

Electricity Authority

Clearing Manager

Functional Specification

Version 30.0

April 2023

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Revision History

Version	Release Date	Description
1.0	September 2006	Final Version released
2.0	May 2007	Change to the format of the buyer seller files received from the reconciliation manager. Removal of information specific to the tender process.
	June 2007	Corrections and clarification.
3.0	February 2012	Updated with Code references. Addition of IN-065. Modification to PB-020 to show that constrained on amounts are for generation and reserves and constrained off amounts are for generation only.
4.0	November 2012	FTR edits
5.0	March 2013	Updates from FTR implementation
6.0	May 2013	Updates from FTR audit process
7.0	May 2013	Additional Updates
8.0	June 2013	RF-020 Update
9.0	June 2013	FT-020 Update
10.0	June 2013	Additional Updates
11.0	August 2013	Prudential security assessment update
12.0	November 2013	Updates as a result of the documentation review. Includes details from other documents that describe: <ul style="list-style-type: none"> • all inputs from other service providers and participants, • the calculation of ancillary service invoice amounts and interfaces, • the calculation of constrained on and off, • the calculation of block settlement differences, and • the calculation of prudential exposure • the calculation of payments to payees in the event of payer defaults.
13.0	April 2014	Updates for Dispatchable Demand
14.0	May 2014	Updates for Dispatchable Demand Audit
15.0	July 2014	FTR enhancement updates
16.0	August 2014	SPS changes for the October 2014 release
17.0	February 2015	SPS part 1 changes for March 2015 release
18.1	March 2015	SPS part 2 changes for March 2015 release
19.0	June 2015	Cogeneration dispatch arrangement changes
19.1	August 2015	Constrained on/off data for the Authority
20.0	April 2016	Super statements, late DD bids constrained on/off and variable value guarantee changes
20.1	May 2016	Removal of inband frequency keeping constrained payments
20.2	June 2016	Prudential CSV file added (AS-030)
20.3	September 2016	FTR DSP extended file added (DF-040) and UOG file upload by generators (RV-020)
20.4	October 2016	Publication of invoice and statements by SFTP (DI-060)
20.5	November 2016	Notification of acceptance of has by the clearing manager (CH-020)

Version	Release Date	Description
20.6	January 2017	Changes to the DSP calculation methodology (MF-010)
20.7	February 2017	Implementation of FTR Initial Margins automation (CF-040) Changes to support participants with multiple participant identifiers
20.8	April 2017	Automated prudential security requests (AS-040) Automated delivery of payment confirmations (PP-010, PP-040)
20.9	May 2017	Prudential Summary Report (AS-030) Additional Constrained Amounts information (DI-030)
20.9.1	June 2017	Automation of FTR periods, products and auctions (MR-020)
20.10.1	August 2017	Additional feature to store security documents (MR-050, AS-005, AS-010, MR-010)
20.10.2	September 2017	Scarcity Pricing procedures (CC-035)
20.11.3	April 2018	Additional report: Daily EA FTR Holdings (DF-050) Additional files for settlement information (PB-010, PB-020, PB-060) Calculation of FTR location factors (CF-050)
20.11.4.	July 2018	Manage Defaults (HD-040) Minor wording changes in (HD-020) and (MR-070)
20.11.5	August 2018	Manage bank accounts (MR-040) Receive payments from participants (PP-010)
20.11.6	January 2019	Prudential Adjustment improvements (PE-010)
20.11.7	June 2019	Adjust constrained-on amounts due to scarcity pricing (CC-080) Notify the Authority of scarcity pricing adjustments (PB-070)
21.0	August 2019	Changes related to intermittent generation (PE-040) and (RV-070)
22.0	January 2020	FTR Settlement Prices (DF-060)
23.1	March 2020	Calculate dispatched quantities (CC-020) Receive and validate data from system operator (RV-040)
24.0	May 2020	Deliver detailed invoice related data to the Authority (PB-080)
25.0	Oct 2020	CM-CR73 Dealing with Test Dispatch Instructions
26.0	May 2021	Changes to prudential reports (AS-030) to include daily FTR breakdown report. (CM-CR77)
27.0	July 2021	Changes to process of Calculate constrained amounts (sub process CC-070)
28.0	April 2022	Removed publication to WITS from Section 6.16, CC-070 and where relevant. Enabling energy storage systems to offer instantaneous reserves (RV-070, CA-040, CC-070)
29.0	August 2022	Changes under Real Time Pricing Project
30.0	April 2023	Real Time Pricing Project Phase Four Changes <ul style="list-style-type: none"> • New formula for DD constrained on/off calculation • New dispatch notification generators/purchasers

Clearing and settlement system

Functional specification

1 Introduction

The responsibilities of the clearing manager role are defined in the Electricity Industry Participation Code 2010 (Code). They are carried out by a service provider on behalf of the Electricity Authority. The terms and conditions under which service providers are appointed and must act are set out in the Electricity Industry (Enforcement) Regulations 2010 (Regulations).

2 Code references

This document describes the responsibilities and functions of the clearing manager role as described, mainly, in parts 14, 14A, 13 and 8 of the Code. Parts 14 and 14A give details of the clearing manager's responsibilities, including in relation to financial transmission rights; part 8 subpart 3 specifies the calculations required for ancillary services; and part 13 specifies the calculations for constrained on and constrained off amounts and the clearing manager responsibilities regarding the must-run dispatch auction. However, there are a number of clauses in other parts of the Code that make reference to the clearing manager:

Clause 11.25	Defines the responsibility of the Registry to provide the clearing manager with active NSP information (currently not utilised).
Clauses 15.3, 15.14, 15.21-15.26	Define the responsibilities of the reconciliation manager to provide information to the clearing manager regarding any changes to the grid and reconciliation information pertaining to each reconciliation participant.
Clauses 15.27-15.28	Defines the revision/wash-up process.
Clauses 2 and 28, schedule 15.4 Clause 15.29	Define the timing of delivery of reconciliation information. Defines the volume dispute process.

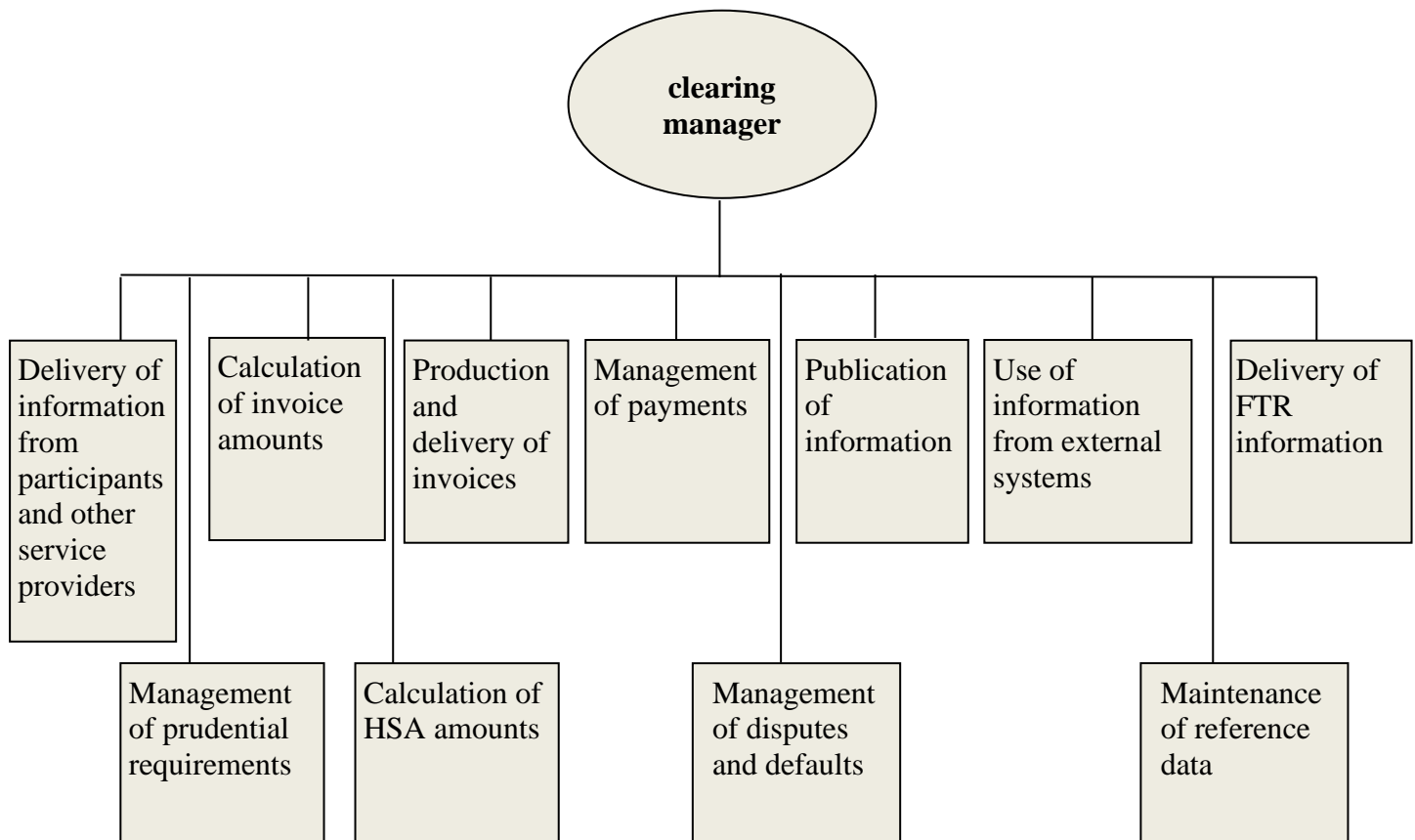
If there appears to be any conflict between this document and the Code then the Code takes precedence.

3 Overview

The primary obligation of the clearing manager is to settle the purchases and sales of electricity in New Zealand. As part of this obligation, the clearing manager has a number of responsibilities defined in the Code, including the following business functions:

1. The validation of the interim prices, the publication of the interim and final prices;
2. The production of invoices that include costs and charges for:
 - the purchase and sale of electricity,
 - ancillary services,
 - must-run dispatch auction rights,
 - hedge contracts,
 - financial transmission rights (FTRs),
 - constrained on and constrained off compensation,
 - Dispatchable demand constrained on and constrained off compensation
 - loss and constraint excesses,
 - fees and taxes, and
 - washups.
3. The management of prudential security to ensure that participants can meet their financial obligations;
4. The management of payments from purchasers and to sellers;
5. The management of invoicing disputes and payment defaults;
6. The determination and publication of FTR daily settlement prices and initial margin rates; and
7. The publication of reports and information to participants and the Authority.

Many of the business functions performed by the clearing manager require the delivery of information to and from other service providers and participants (see next section).



Delivery of information from participants and other service providers

The clearing manager receives and validates information from participants and other service providers in order to produce invoices for the various electricity products and to manage the participants prudential requirements (see section 5 Information Flows).

Information is received from;

- WITS – PRS prices, Dispatch prices and interim prices for the interim price validation. final bids and offers to enable the calculation of energy purchases and sales, constrained on and off for generation, dispatchable load purchasers and generation reserves, final hedge settlements and FTR settlement amounts to determine the minimum level of prudential security.
- Reconciliation manager – reconciliation information, loss adjusted dispatchable load information and related information to enable the calculation of energy purchases and sales, constrained on and off for generation, dispatchable load purchasers and generation reserves, and to determine the minimum level of prudential security.

- FTR manager – auction awards, reconfigurations, FTR assignments, FTR rental amounts and the prudential limits for participants used in auctions.
- Registry – information on which NSPs are active (currently not utilised).
- Generators – must run dispatch auction offers, unoffered and embedded generation information used to estimate prudential requirements.
- System operator – ancillary service costs and charges and related information, and dispatch instructions for the calculation of constrained on and off.
- Grid owner – historical load information that is used to estimate must-run dispatch auction rights.
- Participants – unoffered generation information required to determine the minimum level of prudential security.

Management of pricing error claim

The clearing manager manages the pricing error claims (PECs),

- Receives pricing error claim from the market participant or the clearing manager can also raise a pricing error claim.
- Sends out the market notification on the details of the PEC, notifies the Authority and System Operator.
- Re-calculates the interim prices if PEC is confirmed and accepted by the Authority.
- Publish the final prices after PEC is rejected or resolved.

Management of prudential requirements

The clearing manager manages the prudential requirements of each participant to ensure they have sufficient security to meet their financial obligations in the event of a default.

It is the clearing manager's responsibility to determine the methodology used in the assessment of participants' prudential requirements and which can change over time. The methodology the clearing manager uses to assess the prudential requirements for FTRs is documented in the *clearing manager Financial Transmission Rights Prudential Security Assessment Methodology* document, which is published on the clearing manager's website.

The main elements of the prudential methodology covering all energy products are:

- The clearing manager calculates daily the current and projected exposure of each participant taking into account purchases and sales of electricity, expected ancillary service amounts, expected hedge amounts and expected FTR settlement amounts. As a result, the clearing manager needs to record all hedge details and FTR holdings. FTR holdings are the net result of auction awards of FTRs and any assignments and reconfigurations.

- The clearing manager records the security details for each participant and participant group. Security details may require to be changed as prudential exposure levels increase or decrease. New, replacement and releases of security require assessment and approval by the clearing manager. The clearing system holds digital copies of these documents.
- Every day, the trading limit (excess security) of every FTR participant is notified to the FTR manager and reserved for the time the auction bidding window is open.
- Once the FTR auction bidding window has closed any unused trading limit is notified to the clearing manager in order for this amount to be released.
- To assist the FTR manager, the clearing manager also advises the FTR manager every day of the estimated value of each FTR product period (i.e. the FTR daily settlement price). The clearing manager uses a predictive model and ASX prices, as well as auction prices when available for this purpose. The clearing manager can use a number of valuation methods which may require data from external sources.

Calculation of invoice amounts

The clearing manager calculates the amounts payable and receivable for the previous invoice period, and for each wash-up, for the following products.

- Energy – purchases and sales using reconciliation information and final prices.
- Constrained on and off:

Generators (other than dispatch notification generator) – constrained on payments are made to generators that were required by the system operator, via dispatch instructions, to generate electricity when their offer was for a higher price than the resultant final price. The difference between the final price and their offer price is paid to generators for energy and ancillary service agents for reserves. Constrained off is calculated and reported but not invoiced.

Purchasers – constrained on and off payments are made to dispatchable load purchasers (other than dispatch notification purchasers) that were required by the system operator, via dispatch instructions, to consume electricity when their bid differed from the resultant final price. The difference between the final price and their bid price is paid to dispatchable load purchasers.

Purchasers pay for constrained on and off payments in proportion to their energy purchases.

- Hedges – the difference between the hedge price and the final price is calculated and invoiced.
- Must run dispatch auction payments – the auction price paid by generators.

- FTR settlement amounts – the difference between the acquisition cost (value at the auction price) and the value at the final price(s) is calculated and invoiced. Assignment difference payments and reconfiguration amounts for FTR assignments and FTR reconfigurations respectively are also invoiced.
- Ancillary services – information on both costs and charges for various types of ancillary service are provided by the system operator which the clearing manager processes to calculate the amounts to be invoiced. Note, ancillary service costs includes instantaneous reserve constrained on compensation.
- Loss and constraint excess – is calculated by the clearing manager and included in the invoice to each grid owner. A portion of the loss and constraint excess is used to fund the FTR settlement amounts. The portion is calculated by the FTR manager (as the initial FTR rental amount) and notified to the clearing manager who sets this amount aside from the (initial) loss and constraint excess into a separate account. The (initial) loss and constraint excess is reduced by the initial FTR rental amount.
- Fees – additional fees can be included in invoices.
- GST – is calculated and included in invoices.

Production and delivery of invoices

The clearing manager produces and delivers invoices (pro-forma, tax and buyer created) and supporting documentation for the previous invoice period and for each wash-up for each participant or participant identifier. A statement is produced that shows the netted amounts owing from the invoices and provides the amounts payable.

Participants are required to confirm receipt of their invoices and statements.

Management of payments

The clearing manager is required to:

- Ensure payments are first received from participant with amounts payable by the participant before the clearing manager pays participants. If a default occurs, payments to participants are reduced to match the total amounts received from participants.
- Modify any FTR settlement amount payments if there are insufficient funds in the FTR manager's account.

Management of disputes and defaults

The clearing manager has powers to exercise a number of remedies in the event of a default, including the reassignment of FTRs and taking of prudential security.

Publication of information

The clearing manager is required to publish:

- Interim prices on WITS. WITS is publishing the interim prices on behalf of the clearing manager. The clearing manager validates the interim prices calculated by WITS.
- Final prices for energy and reserve on WITS.
- Constrained on and constrained off amounts for generation, dispatchable load purchasers and generation reserves.
- Settlement differences. These are calculated and published by the clearing manager.
- Monthly reports to the market administrator.
- Base and adder prices used for prudential exit period prices.
- Price index to WITS. Price index is a seven-day rolling trading period average regional energy price.

Use of information from external systems

There are a number of external systems, external to the main CHASM software, used by the clearing manager to calculate data used in the FTR suite of programs. The calculations are for the following:

1. **Reference prices and ratios.** These are used in the calculation of the FTR daily settlement price (DSP) using a number of external data feeds and a predictive model as described in the Prudential Security Assessment Methodology document published by the clearing manager.
2. **Daily Settlement Price.** The clearing manager determines a daily settlement price DSP (\$/MWh) for each FTR product on the FTR Registry in accordance with the published FTRs Prudential Security Assessment Methodology document.

Delivery of FTR information

The clearing manager delivers the following FTR information to the FTR manager:

- The prudential status of FTR participants, their registration details and breach status, if applicable,
- Daily settlement price per FTR product period,
- Initial margins (liabilities) for the FTR products to be auctioned,
- Settlement and revenue details resulting from each month's invoices.

The clearing manager also publishes FTR information on their public website.

Maintenance of reference data

The clearing manager maintains reference information such as:

- Valid participant identifiers and their contact details
- Related party groups for SRA, prudential, defaults and statements
- Valid grid points

- Groupings of generating plants into blocks and station dispatch groups
- Valid grid points where a participant is approved to trade
- Approved users
- Auction details
- FTR product information
- Dispatch capable load stations
- Approved dispatch notification generators
- Approved dispatch notification purchasers.

4 This document

This document should be read in conjunction with the following associated documents:

1. clearing manager operational requirements.
2. Integration requirements FTR manager and clearing manager published by Energy Market Services (version 2.7).
3. FTRs Prudential Security Assessment Methodology published by the clearing manager and approved by the Authority.
4. FTR allocation plan published by the FTR manager and approved by the Authority.
5. Parts 14 and 14A of the Electricity Industry Participation Code 2010.

The clearing and settlement system is required to keep up to date with technological advances to ensure it delivers its functions efficiently and securely to participants. Therefore, this document assumes the service provider uses one or more computer systems to perform most of the business functions required by the clearing manager role.

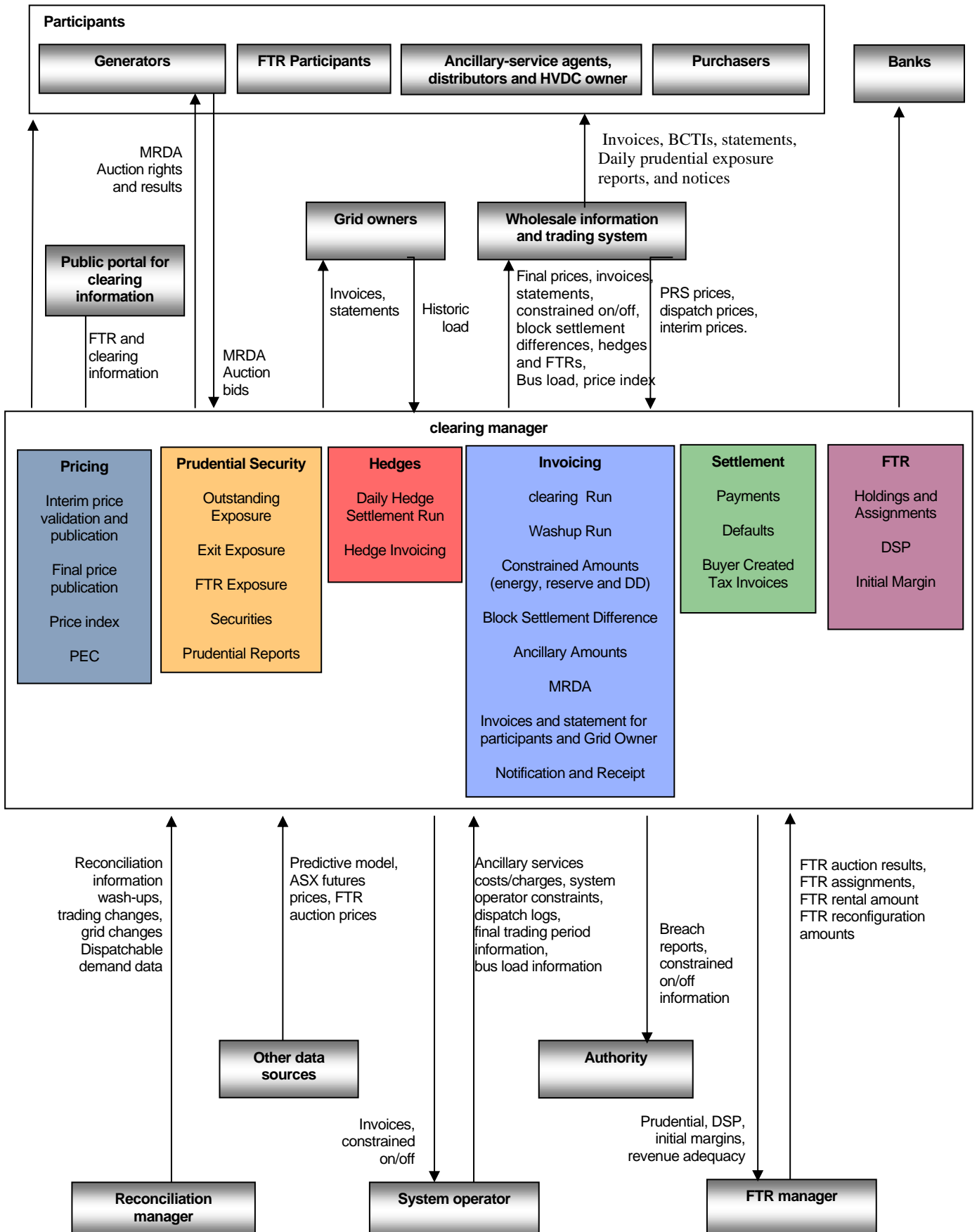
Some of the process descriptions in this document include data descriptions. These show information content only, not the actual file formats. The clearing manager service provider is expected to agree formats, schedules and transfer mechanisms with each service provider and participant.

The Code makes reference to an 'information system' for the publication or transfer of information to participants. The Authority publishes an Information System Definition, setting out the various systems that constitute the 'information system' that are operated by a number of market operations service providers and range from bespoke systems to internet websites to standard email. Other than email and voice, the current systems used are:

Code role (party responsible)	Code part	IS system
Authority	8, 10, 11, 12, 13	Electricity Authority website Wholesale Information and Trading System
System operator	8 13	Own website Wholesale Information and Trading System SQL*Net over TCP/IP
Registry	11 13	Reconciliation manager's website Registry web application
Generator	13	Own website, Wholesale Information and Trading System FTP
Purchaser	13	Own website, Wholesale Information and Trading System
Grid owner	13	Own website, SQL*Net over TCP/IP Wholesale Information and Trading System
Ancillary service agents	13	Wholesale Information and Trading System
Embedded generator	13	Wholesale Information and Trading System, FTP
WITS manager	13	Wholesale Information and Trading System
Reconciliation manager	15	reconciliation manager System
clearing manager	13,14, 14A	Wholesale Information and Trading System, clearing manager clearing website, FTP, ESB
FTR manager	13	FTR manager's FTR Information System (FIS)

The above list is provided for information only and is intended to be consistent with the Authority's **Information System Definition**, published on the Authority's website.

• **Information flows to and from the clearing manager**



Definitions

Billing period/consumption period

In parts of the Code, specifically in part 15, the term 'consumption period' is used but in part 14 the term 'billing period' is used instead. They are equivalent and both mean a period of one calendar month. Because the focus of this document is on clearing and settlement, the term 'billing period' is used throughout.

Buyer created tax invoices (BCTI)

Buyer created tax invoices are issued by the clearing manager to participants with amounts owing by the clearing manager following settlement. Invoices will be for the exact amount paid out by the clearing manager, taking into account any scaling required should there be a default.

Dispatch Capable Load Station (DCLS)

A Dispatch Capable Load Station (DCLS) is an electricity consuming device or group of devices. DCLS must be approved by the system operator.

Dispatchable load purchaser

A dispatchable load purchaser is a purchaser that purchases electricity for an approved DCLS. A dispatchable load purchaser is able to bid into the market for a DCLS and be dispatched by the system operator, giving them better price certainty and the ability to participate in setting prices. As part of the regime, dispatchable load purchasers may be compensated with a constrained on or constrained off payment in certain scenarios where they were dispatched at a level and the price they were prepared to pay at that level differed from the final price.

Dispatch notification purchaser/generator

A dispatchable load purchaser may apply to operate the DCLS as a dispatch notification purchaser by applying to the system operator for approval under schedule 13.8. A dispatch notification purchaser is not qualified for any constrained on or off payment.

A generator may apply to become a dispatch notification generator by applying to the system operator for approval. A dispatch notification generator is not qualified for any constrained on or off payment.

Estimated FTR hedge value

An estimation of the final value of an FTR (its FTR hedge value) based on the daily settlement price and the holding volume. The estimated FTR hedge value is used to assess the FTR component of a participant's prudential exposure.

Grid points

Reconciliation information is provided at the grid network supply point (NSP) level. This grid NSP is a two-part field consisting of the grid point (injection or

exit)—the connection point on the network at which electricity was injected or extracted)—and the network participant identifier. The network participant identifier indicates the owner of the network that conveyed electricity from the consumer or generator to the grid point. The network code does not have any relevance in any calculations required to be performed by the clearing manager. Final prices are provided at the grid point level, not at the NSP level.

Financial transmission rights (FTRs)

A financial transmission right (FTR) is essentially a hedge contract, which allows parties to cover their price risk between two nodes on the national grid. Effectively, they are a type of insurance that protects wholesale market participants from half-hourly variations in spot market prices in one location versus another.

The FTR rules adopted by the Authority allow a wide range of FTRs to develop, both inter and intra-island in nature. The FTR Allocation Plan allows for point-to-point products using North Island (Otahuhu, Haywards) and South Island (Benmore, Islington and Invercargill). In total, there are 40 available products per month. Inter- Island FTRs are available to retailers and generators, large consumers buying their electricity directly from the spot market, and other institutions such as banks, in monthly auctions up to two years in advance of the FTR period.

If a participant purchases an FTR from Benmore to Otahuhu for a given month they will receive the difference in price between Otahuhu and Benmore, assuming the price at Otahuhu is higher than at Benmore. For example, if the price on the wholesale market for electricity is \$10 per megawatt hour (MWh) at Benmore and \$100 per MWh at Otahuhu, a retailer who needs to buy electricity to supply their customers near Otahuhu has to pay \$100 per MWh on the wholesale market. However, if they hold a Benmore to Otahuhu FTR, they receive back \$90 per MWh (i.e. the FTR hedge value – the price difference between Benmore and Otahuhu), less the value of the FTR based on the price they paid for the FTR (i.e. FTR acquisition cost).

By bidding successfully for an FTR, the holder reduces their price risk between the North and South Islands, vice versa or within island. The FTR holder knows that if the volatility in the market causes prices in one island to suddenly surge upwards then they should be covered for the amount of FTRs they hold, and will receive a payout from the FTR.

FTR acquisition cost

The initial FTR acquisition cost (\$/MWh) is set at the time of awarding an FTR in an auction. That FTR acquisition cost remains constant through to FTR settlement unless it has been adjusted due to one or more FTR assignments.

The FTR acquisition cost is paid at the time of FTR settlement.

FTR allocation plan

FTR allocation plan, is issued by the FTR manager under clause 13.238 of the Code, and approved by the Electricity Authority (the Authority) under clause 13.240 of the Code.

The FTR allocation plan sets out how the FTR manager will operate the FTR market, and sets out the terms of FTR products and the auction rules.

FTR assignment

An assignment, in relation to FTRs, is the transfer of an FTR product from one FTR participant to another, made during the period up to and including the FTR period in which it relates. An FTR participant may choose to assign part or all of an FTR to another FTR participant. These assignments are recorded in the FTR register and form part of the prudential security calculation and are settled by the clearing manager at the end of the FTR period.

FTR assignment difference payment

An assignment difference payment is a payment between the clearing manager and assignor in respect to an FTR assignment. Where the assignment price is disclosed, it is the difference between the assignor's FTR acquisition value and the assignee's FTR acquisition value (based on each party's FTR acquisition cost and MW holding). There is no assignment difference payment when the assignment price is not disclosed.

Assignment difference payments from the clearing manager to the assignor are invoiced at the time the FTR is settled. Assignment difference payments from the assignor to the clearing manager are invoiced the month after the assignment (i.e. in the invoice for the billing period in which the assignment took place).

FTR daily settlement price (DSP)

The daily settlement price (DSP) is the clearing manager's best estimate of the settlement price (\$/MWh) of an FTR, calculated daily during the FTR horizon, based on predictive modelling and reference price methodologies. The DSP is used to calculate the estimated FTR hedge value (\$) of each FTR participant's holdings which is used to calculate their prudential exposure. The DSP is published on the clearing manager's public website.

FTR hedge value

The FTR hedge value (\$) of an obligation FTR is the sum of the price differences for the FTR period between the relevant nodes multiplied by the volume of the FTR.

The FTR hedge value (\$) of an option FTR is the sum of positive price differences for the FTR period between the relevant nodes multiplied by the volume of the FTR.

FTR duration and FTR periods

Currently, each FTR has an FTR duration of one calendar month, from the first trading period in that month to the last.

The calendar month that applies to an FTR for settlement purposes is known as the FTR period.

FTR hedge available funds

The proceeds of an FTR auction that are available to pay FTR holders for the settlement of FTRs for an FTR period.

This amount comprises the FTR rental amount plus the value of FTR acquisition costs payable to the clearing manager plus the value of assignor to clearing manager assignment difference payments minus the value of FTR acquisition costs payable by the clearing manager minus the value of clearing manager to assignor assignment difference payments.

FTR hubs

Currently, there are five FTR hubs: Benmore (BEN), Otahuhu (OTA), Haywards (HAY2201), Islington (ISL2201) and Invercargill (INV2201). All FTRs are point-to-point between each of these five hubs, with one hub as the source, and another hub as the sink.

FTR horizon

The range of dates between a specified date (e.g. now) up to (and excluding) the start of the FTR period.

FTR Initial margin rates

The clearing manager calculates and publishes a set of initial margin rates (\$/MWh) for each FTR product to be auctioned. The initial margin rate is used to calculate the maximum initial margin (\$) amount which is the collateral amount (\$) required by the clearing manager to ensure participant's exposure is covered for the worst probable one-day loss that might occur based on a set of 'what-if' scenarios.

Initial margin rates are calculated on the following basis:

1. > 5 months before FTR period
2. ≤ 5 months before FTR Period – FTR period in Summer month
3. ≤ 5 months before FTR Period – FTR period in Winter month
4. After the end of the FTR Period (and before market settlement)

Summer months mean between the months of October-March inclusive. Winter months mean between the months of April-September inclusive.

For products falling into 4) above, the initial margin will equal zero.

In the case of option products, the maximum possible loss to a participant is capped at acquisition cost, reflective of the maximum possible loss. As such, Initial Margin is capped at the Daily Settlement Price (specifically min (DSP, published IM rate). The difference between acquisition costs and DSP is captured within the daily mark-to-market calculation.

FTR payment scaling factor

The degree to which FTR hedge values need to be scaled-down in cases of revenue inadequacy. The FTR payment scaling factor is the minimum of 1.0 or the ratio of the hedge available funds over the net FTR hedge value payable by the clearing manager.

FTR products – option and obligation

There are forty products available to participants to trade on the FTR market. Each product has a “24 hour” profile. It follows that with 5 nodes, there are ten point-to point combinations as follows:

ID	HUB_A	HUB_B
1	OTA	BEN
2	OTA	HAY
3	OTA	ISL
4	OTA	INV
5	BEN	HAY
6	BEN	ISL
7	BEN	INV
8	HAY	ISL
9	HAY	INV
10	ISL	INV
etc

Each nodal combination has option and obligation products in each direction. As an example, for combination 1 above (OTA, BEN), there are the following products:

- Option FTR with source hub Benmore and sink hub Otahuhu
- Option FTR with source hub Otahuhu and sink hub Benmore
- Obligation FTR with source hub Benmore and sink hub Otahuhu
- Obligation FTR with source hub Otahuhu and sink hub Benmore.

FTR profile

The FTR profile is an attribute of an FTR product. It determines what date and time periods the FTR is applicable to. Initially the only profile in use is “24 hour” (i.e. FTR product is applicable 24 hours, 7 days a week).

FTR prudential security

FTR prudential security requirements are calculated independently of the requirements for the balance of the wholesale electricity market; however prudential security requirements for spot electricity, ancillary services, lodged hedges, and FTRs are aggregated to determine a participant’s total exposure.

FTR reconfiguration amount

An amount equalling the difference between the sale volume’s purchase value at the original acquisition cost and its sale value at the auction clearing price of the sale. Both in-the-money and out-of-the-money amounts are invoiced at the time the FTR is settled.

FTR reference price ratios

The reference price ratios are the outputs obtained from the clearing manager’s predictive model, ASX futures prices and other data sources according to the clearing manager’s published methodology for prudential security in relation to FTRs.

They are used in the calculation of FTR daily settlement prices (DSP).

FTR rental amount

After each FTR period, the FTR manager determines the FTR portion of the loss and constraint excess (FTR rental amount) according to Schedule 14.6 of the Code (which is based in part on inputs from the system operator and informs the clearing manager by 1600 hours on the 7th Business Day after that FTR period.

If the FTR rental amount advised by the FTR manager exceeds the amount of the loss and constraint excess for the FTR period, the clearing manager reduces the FTR rental amount to the loss and constraint excess amount.

FTR settlement price

The FTR settlement price (\$/MWh) of an obligation FTR is the trading period average of the sum of the final price differences between the relevant nodes, for the FTR period.

The FTR settlement price (\$/MWh) of an option FTR is the trading period average of the sum of the positive final price differences between the relevant nodes, for the FTR period.

FTR trading limit

The excess of a participant's security less their total exposure. The trading limit is used by the FTR manager to determine the maximum total auction bid value at auction or the maximum value of a potential FTR assignment per participant.

FTR volume

Every FTR award, assignment and reconfiguration is for a defined FTR volume, in multiples of 0.1MW, with a minimum value of 0.1MW. The defined FTR volume applies to both the source and sink hubs and to all trading periods in the FTR period.

Hedge Settlement Agreement (HSA)

A contract in the one of the forms specified in Schedule 14.4. An HSA is settled by the clearing manager and is considered in the clearing manager's estimate of prudential exposure.

An HSA can be in the form of a Contract for Difference (CfD), Cap/Floor option or Cap/Floor average option.

Must run dispatch auction (MRDA)

The clearing manager runs the must run dispatch auction every day for the following trading day. Generators bid into the auction for the right to offer a quantity of generation at a zero price for the next trading day.

Prudential security

This is the amount of collateral required for a market participant to participate in the wholesale electricity market in New Zealand. Prudential security is required to cover participants' exposure to wholesale market conditions and to ensure, in case of default, that the generators receive payment for their generation.

The required prudential security level is calculated by the clearing manager on a daily basis. The calculation includes estimated participants' purchases, generation, ancillary service costs/payments and hedges including FTRs. The purpose of the calculation is to determine whether or not a participant has sufficient cover for all of their purchases in the wholesale market. The clearing manager estimates the amount for that day and each of the next three business days. On each day the participant must hold the minimum of the estimates made for that day.

Prudential security can be provided to the clearing manager in the form of a cash deposit, a letter of credit(s) or sufficient credit rating, as described in Part 14A of the Code.

Reconciliation period

At present, the term 'reconciliation period' means the current month. Invoices are produced in the current month for the previous billing period and for any earlier billing periods for which revised reconciliation information has been received (see wash-ups below).

Reconfiguration

This is a successful sale of all or part of an FTR holding in an FTR auction. The sale is as a result of a participant submitting a sell bid (offers) for a volume of a FTR that they hold for a specific FTR Period. A sell bid may be for the full volume of an FTR holding, or for a part. Successful sales are sold at the auction clearing price. Reconfiguration is another term for a sale transaction.

Residual loss and constraint excess

The surplus FTR amount that was not required for the settlement of FTRs for the FTR period (i.e. hedge available funds minus payments to FTR holders). This amount is allocated back to the grid owner(s).

Under Frequency Event

When the system operator determines the causer of an Under Frequency Event the clearing manager invoices the charges to the causer and allocates the payment to other parties on behalf of the system operator.

Wash-ups

‘Wash-up’ is the term used by the industry to describe prior billing periods for which revised reconciliation information has been provided to the clearing manager. These are described in Part 1 of the Code, as well as in subpart 6 of Part 14.

In the current reconciliation period, reconciliation information is provided for the previous billing period and revised reconciliation information may be provided for these specific previous billing periods: three months prior, seven months prior and 14 months prior. However, it is possible for revised reconciliation information to be provided 18 months prior and 24 months prior, if the Authority requires it.

Data may be required for up to 38 months prior (if a 14 months prior wash-up amount is disputed after the allowed 2 years from invoice date).

Other revised information can be received for ancillary services. These can be for any prior billing periods of up to 24 months.

Changes for the 2013 Part 14 Code amendments

Base price

The base price is used for the prudential exit period margin for the following quarter. The base price is provided as a table of prices based on an average of NZ electricity futures prices from the ASX. The table provides a single price per node, per trading period per day type (business or non-business day) per month for a quarter.

Adder price

This is a single \$/MWh amount for the following year that is added to the base price to determine the price per MWh to be used for prudential calculations.

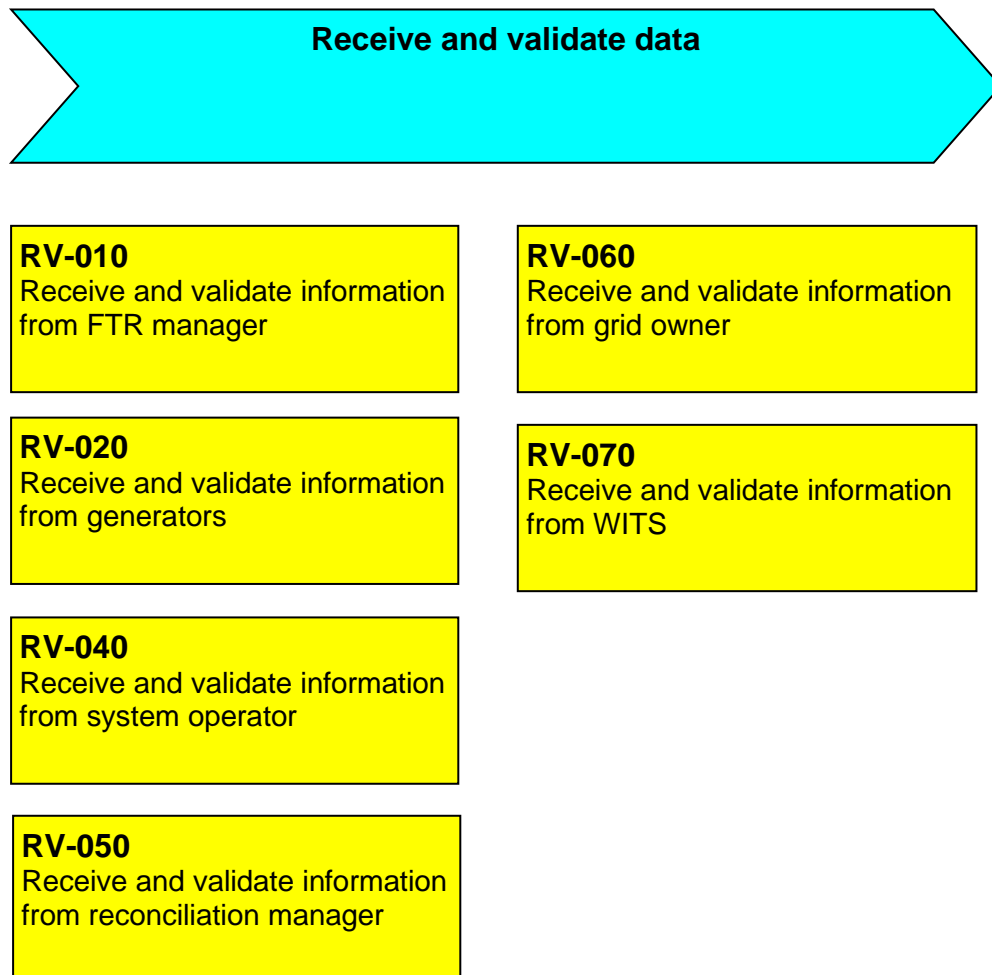
Changes made to support the 2013 Settlement and Prudential Security Amendments

Changes have been made to the areas of Prudential, HSAs, Settlement, Invoices, and various other parts to support the major changes to clearing, settlement and prudential security.

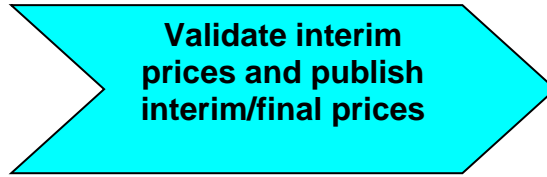
5 Process maps

N.B. Sub-processes shown in orange are currently manual and detailed in Section 8.

Process map – Receive and validate data

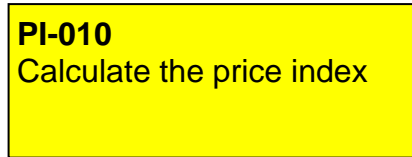
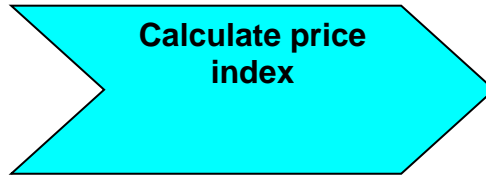


Process map – Validate interim prices and publish final prices

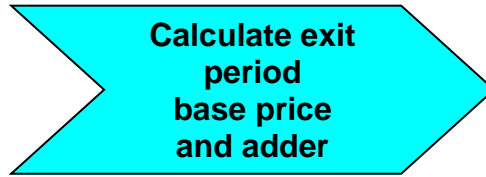


VP - 010
Validate interim prices and publish interim/final prices

Process map – Calculate price index



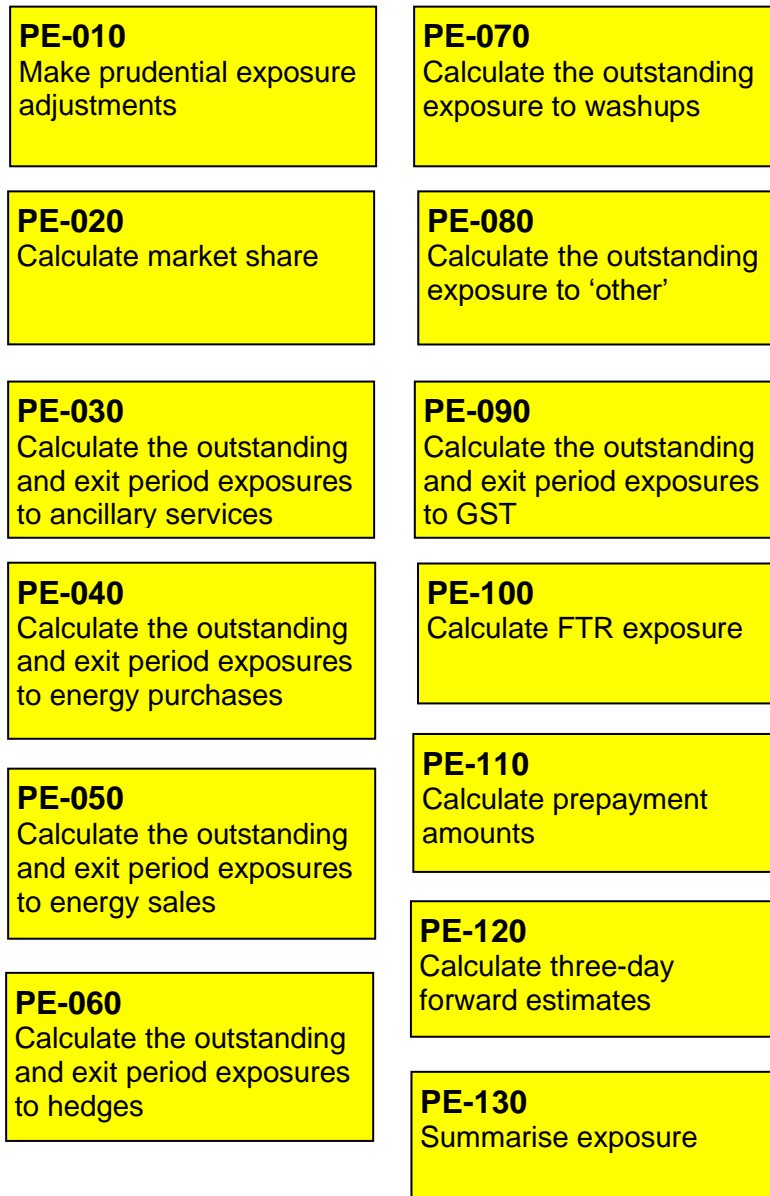
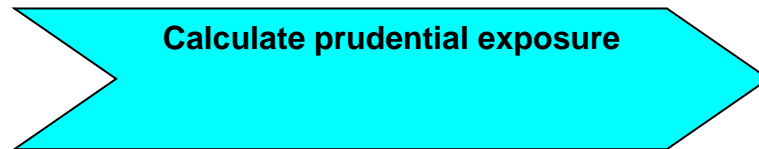
Process map – Calculate exit period base price and adder



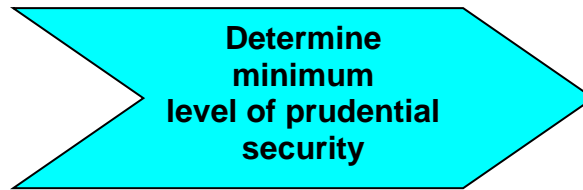
BA-010
Calculate the exit period
base price and factors

BA-020
Calculate the adder

Process map – Calculate prudential exposure



Process map – Determine minimum level of prudential security



AS-005
Record prudential security
details

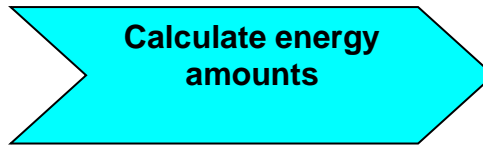
AS-010
Maintain security details and
determine if sufficient

AS-020
Calculate FTR trading limit

AS-030
Provide prudential reports
FTR holdings to EA

AS-040
Notify participants when
additional security is required

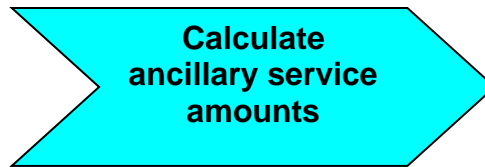
Process map – Calculate energy amounts



CE-010
Calculate electricity purchase amounts

CE-020
Calculate electricity sale amounts

Process map – Calculate ancillary service amounts



CA-010
Calculate black start costs and charges

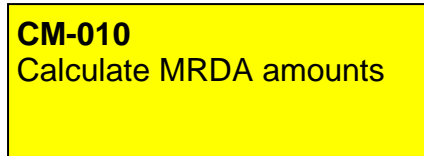
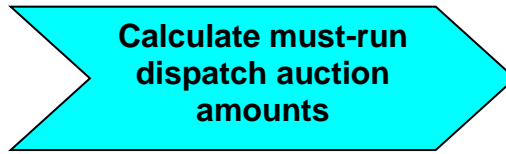
CA-020
Calculate over-frequency costs and charges

CA-030
Calculate frequency keeping costs and charges

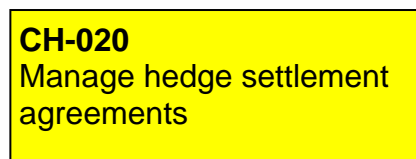
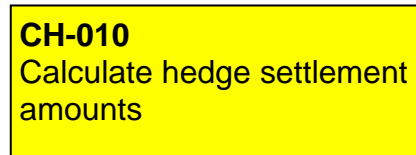
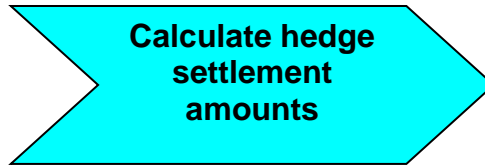
CA-040
Calculate instantaneous reserve costs and charges

CA-050
Calculate voltage support costs and charges

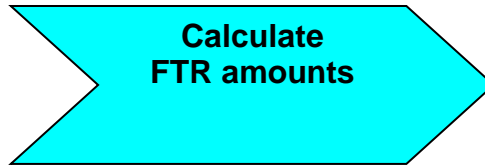
Process map – Calculate must-run dispatch auction amounts



Process map – Calculate hedge settlement amounts



Process map – Calculate FTR amounts



CF-010
Calculate initial FTR
hedge value & FTR
provisional payments

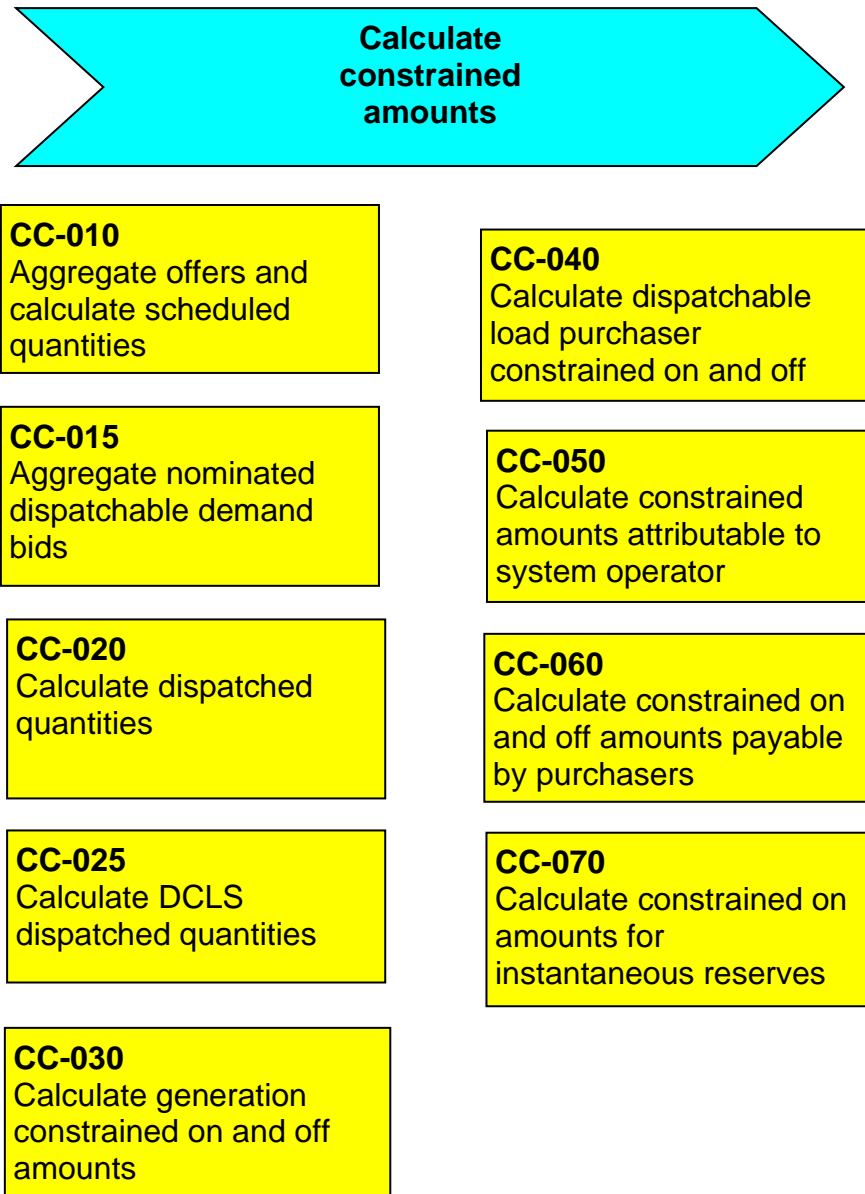
CF-020
Calculate FTR
assignment difference
payments

CF-030
Calculate FTR
reconfiguration payment
amounts

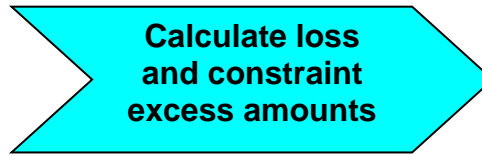
CF-040
Calculate initial margin
rates

CF-050
Calculate FTR location
factors

Process map – Calculate constrained amounts



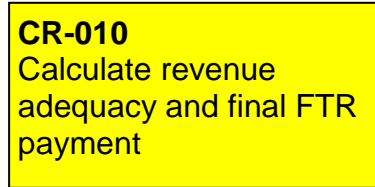
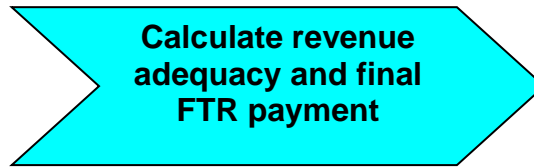
Process map – Calculate loss and constraint excess amounts



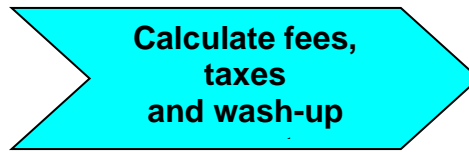
CL-010
Calculate loss and
constraint excess

CL-020
Calculate grid owners
payments

Process map – Calculate revenue adequacy and final FTR payment



Process map – Calculate fees, taxes and wash-up amounts

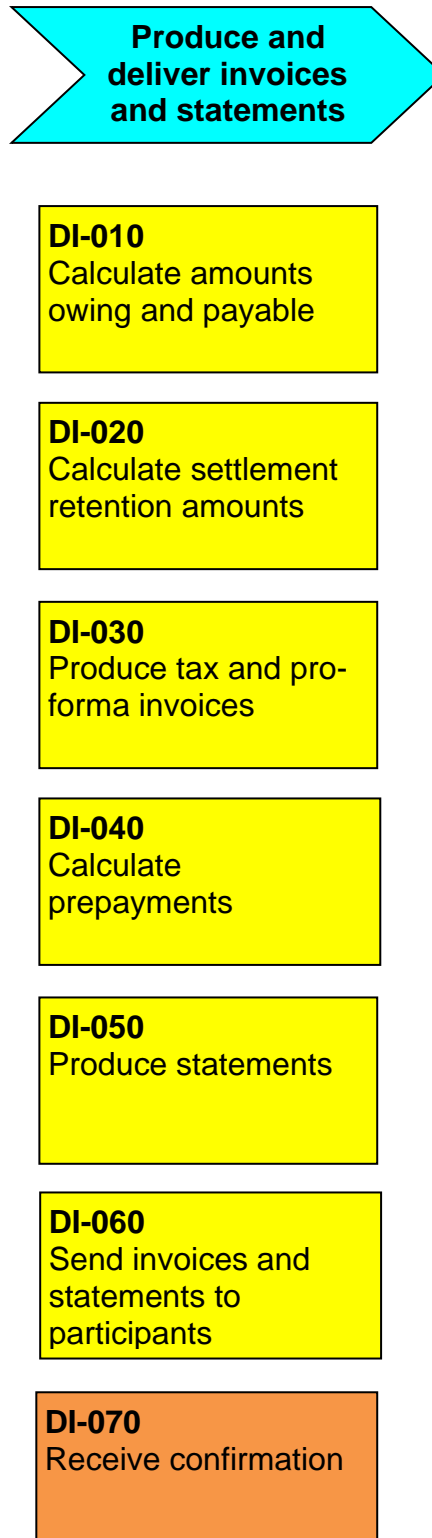


CW-010
Calculate sundry fees
and taxes

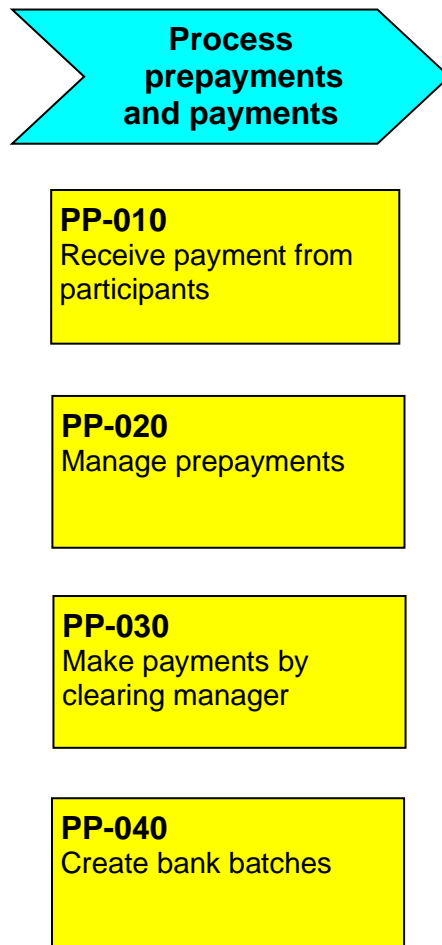
CW-020
Calculate GST

CW-030
Calculate wash-up
amounts

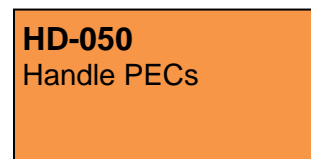
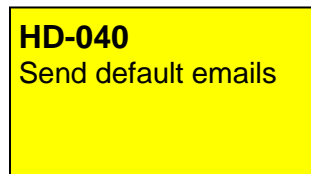
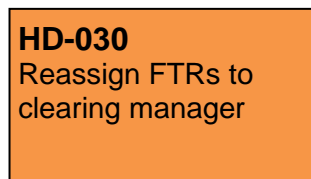
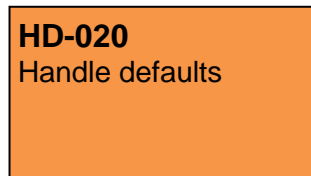
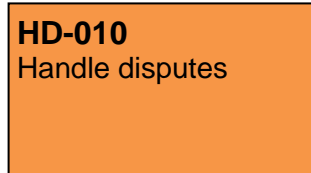
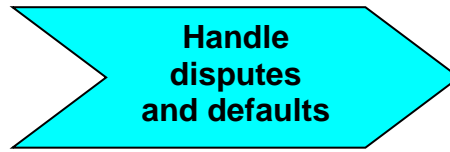
Process map – Produce and deliver invoices and statements



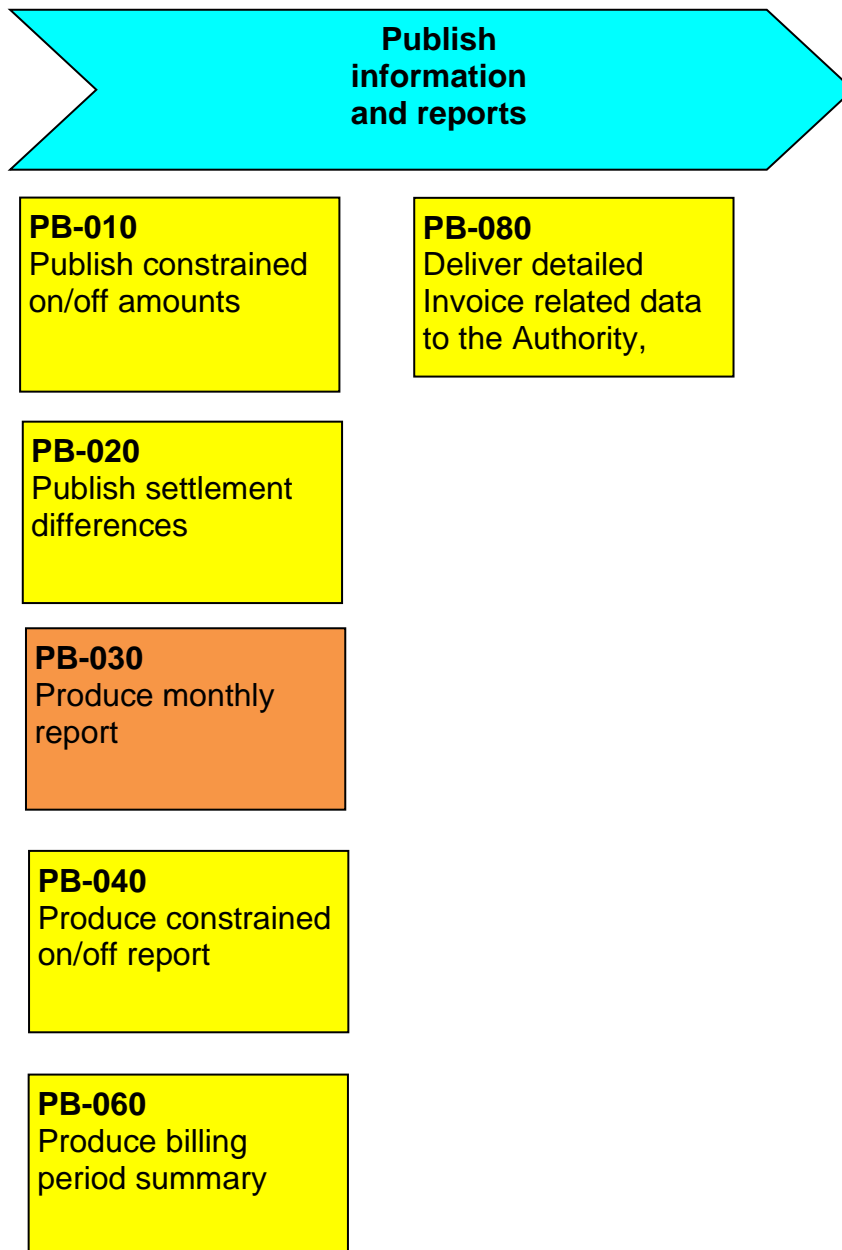
Process map – Process prepayments and payments



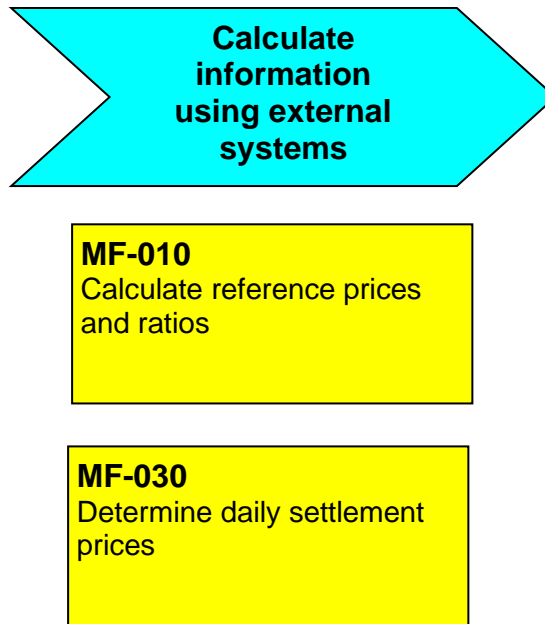
Process map – Handle disputes and defaults



Process map – Publish information and reports



Process map – Calculate information using external systems



Process map – Deliver FTR information



DF-010
Deliver participants prudential status to FTR manager

DF-020
Deliver DSP and initial margin data to FTR manager

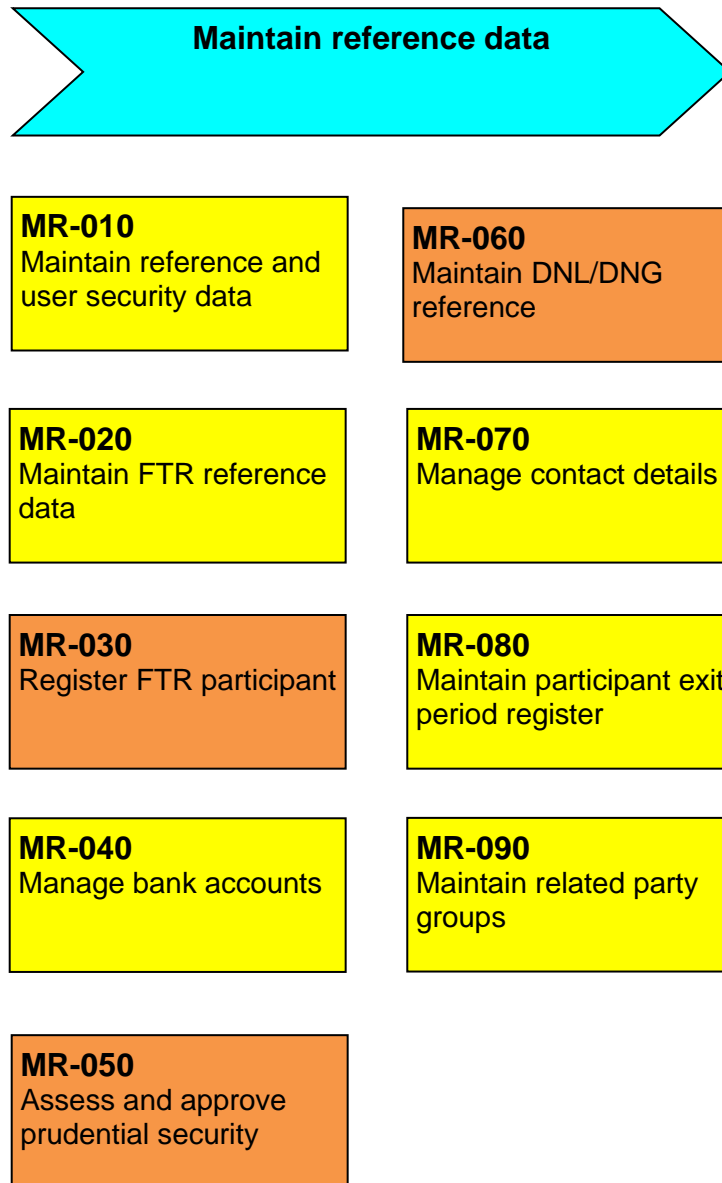
DF-030
Deliver FTR results and revenue adequacy to FTR manager

DF-040
Publish FTR information to public website

DF-050
Publish FTR holdings information to Authority

DF-060
Calculate and publish FTR settlement prices to public website.

Process map – Maintain reference data



6 AUTOMATED SYSTEM

The sub-processes described in this section are those which implemented as part of the CHASM software and are all subject to software audit requirements.

6.1 Receive and validate data

Sub-process:	RV-010 Receive and validate data from FTR manager
Process:	Receive and validate data
Code references:	13.249(2), 13.250(2), 13.252, Schedule 13.6, 14.16(2)
Dependencies:	MR-020, AS-020, CF-040
Module Name	RV-510, RV-520, RV-540

Description:
<p>The clearing manager receives information from the FTR manager comprising:</p> <ol style="list-style-type: none"> 1. details of interim prudential allocations in FTR auctions after the auction bid window is closed but before FTRs are awarded, or after an assignment but before inclusion in the assignments data, 2. details of auction awards and changes to FTR holdings. The information includes the quantity of each holding and the auction clearing price or disclosed assignment price (trade price) that was applicable. 3. notifications of FTR rental amounts (including a breakdown of different components of this rental amount) for a particular FTR period and grid by 1600 hours on the 7th business day of the month following the FTR period from the FTR manager.

Business requirements:
<ol style="list-style-type: none"> 1. The clearing manager must receive and validate interim prudential data from the FTR manager after an auction bid window is closed but before FTRs are awarded. 2. The clearing manager must mark the auction as allocated when the information has been successfully processed. 3. The clearing manager must receive individual assignments, awards and reconfigurations of FTR holdings from the FTR manager and add them to the full history maintained by the clearing manager. 4. Where an existing holding is partially assigned or reconfigured (sold), the clearing manager must create a new holding belonging to the assignor/seller for the remaining MW quantity. 5. The clearing manager must maintain, and is able to view, the full history of FTR holdings including the original awarding and any assignments or reconfigurations (including splitting), together with the associated acquisition amounts, any applicable initial margin amounts, assignment difference payment amounts (if applicable) and reconfiguration payment amounts (if applicable).

6. The clearing manager must mark the auction as closed (completed) when the information has been successfully processed.
7. The clearing manager must receive the initial FTR rental amount and store it as the FTR rental amount for the FTR period and grid.

Data inputs:			
1. Initial margin rates per FTR product and FTR period (CF-040)			
2. Daily settlement prices per FTR product and FTR period (MF-030)			
• Interim prudential allocation			
Field	Format	Mandatory /optional	Description
FTR Participant Code	Char(4)	M	Participant industry code - uniquely identifies an FTR participant.
Allocated Auction Name	Varchar(50)	M	Uniquely identifies the FTR Auction where the prudential trading limit was allocated. This will be blank for assignments.
Allocated Prudential Amount	Number(10,2)	M	Identifies the amount of the prudential trading limit allocated to the auction or assignment.
As At Datetime	YYYY-MM-DDThh:mm:ss	M	Identifies the date the data in the file applies at
• FTR holding change information – auction award, reconfiguration and FTR assignment details:			
Field	Format	Mandatory /optional	Description
FTR Holding Code	Number(10,0)	O	Unique identifier of the FTR holding. Mandatory for occurrences when Type (as below) is “BUY” or for assignments. Null in the case of a “SELL” type.
Previous FTR Holding Code	Number(10,0)	O	Unique identifier of the previous FTR holding of this FTR product. Mandatory for assignments and reconfigurations. Null for awards.
FTR Profile	Varchar(40)	M	The profile of the FTR product.
Source Hub	Char(3)	M	Station code for source hub
Sink Hub	Char(3)	M	Station code for sink hub
Hedge Type	Varchar(3)	M	OBL=obligation, OPT=option
Type	Varchar(4)	O	Will contain either BUY(buy bids), SELL (Sell bids) or NULL (assignments)

FTR Period	Char(6)	M	FTR period to which the assumed liability applies
FTR Volume	Number(10.1)	M	Volume in MW of the award, reconfiguration or assignment.
Current FTR Holder Code	Char(4)	M	FTR Participant identifier for participant who is the existing owner/holder (via Award or Assignment) or the seller of a SELL.
Previous FTR Holder Code	Char(4)	O	FTR participant Code for the participant who was the most recent previous holder (if applicable).
First FTR Holder Code	Char(4)	M	FTR Participant identifier for the participant who was/is the original holder of a holding. In the case of an assignment or reconfiguration, this will be the same as the Current FTR Holder Code.
FTR Auction clearing Price	Number(10.2)	O	Auction clearing price (\$/MWh) for awards and reconfigurations. This is the sale price of reconfigurations. It will be NULL for assignments.
FTR Assignment Price	Number(10.2)	O	Assignment price (\$/MWh) if disclosed, otherwise NULL.
Allocated Auction Name	Varchar (50)	M	Uniquely identifies the FTR Auction for this FTR Product Period (if awarded <u>or sold</u> via auction)
Date Acquired	DateTime	M	Award, reconfiguration or assignment transaction date and time
FTR Allocation Plan	Varchar(40)	M	Unique identifier for the FTR Allocation Plan for this FTR auction, reconfiguration or assignment
Status	Char(1)	M	A = Auctioned, M = Assigned
As At Datetime	(YYYY-MM-DDThh:mm:ss.s)+	M	Identifies the date the data in the file applies at.
• FTR rental amount notifications			
Field	Format	Mandatory/optional	Description
ID	Number(10,0)	M	Identifier for FTR Rentals Output
As At Datetime	YYYY-MM-DDThh:mm:ss.s	M	Timestamp when the FTR Rentals are calculated and added
FTR Period	Char(6)	M	The Name of the FTR Period in which the FTR Rentals Amounts are calculated

AC Branch Constraint Rental	Float with 2 decimal places	M	The Rentals amount calculated for AC Branch Constraint
Branch Group Constraint Rental	Float with 2 decimal places	M	The Rentals amount calculated for Branch Group Constraint
Loss Constraint Rental	Float with 2 decimal places	M	The Rentals amount calculated for Loss Constraint
HVDC Rental	Float with 2 decimal places	M	The Rentals amount calculated for HDVC
FTR Rental Amount	Float with 2 decimal places	M	Total Rental Value, the sum of the individual Rentals components, FTR Rentals in \$

Processing:

The system:

1. Validates and, if successfully validated, saves the details of interim prudential allocations in an FTR auction to the database. The validation rules are:
 - a. The participant identifier provided must be a valid FTR participant code who is not in breach.
 - b. The auction ID, if provided, must refer to a valid auction recorded by the clearing manager otherwise the prudential allocation will relate to an assignment.
 - c. The allocated amount must be less than or equal to the FTR participant's trading limit as at the date of the file.
2. Returns either an acknowledgement or an error message to the FTR manager.
3. Validates and, if successfully validated, saves the details of assignments, reconfigurations and awarded FTR holdings to the database. The validation rules are:
 - a. Each record must be for a valid FTR product and the FTR period must exist.
 - b. The current, previous, and first FTR holders must each be valid FTR participants.
 - c. For auction awards and assignments, the FTR holding code must not already exist.
 - d. For assignments and reconfigurations, the previous FTR holding code must be the holding code of an existing FTR holding record.
 - e. If an allocated auction name is provided then
 - it must map to an existing auction record;
 - the auction clearing price must be provided;
 - a disclosed assignment price must be null; and
 - the date acquired should be on or after the auction date.
 - f. If a disclosed assignment price is provided then
 - the allocated auction name should be null;
 - the auction clearing price should be null; and
 - the date acquired must be on or after the acquisition date of the previous FTR holding.

- g. Reconfiguration details and the holding record indicated by the previous FTR holding code are compared as follows:
 - the reconfiguration date acquired must be on or after the previous FTR holding's date acquired; and
 - their allocated auction names must differ.
- h. The FTR allocation plan provided must match an existing allocation plan.
4. Prior to storing the validated information, calculates and stores the following additional attributes with each FTR award, reconfiguration and assignment:
 - a. The FTR acquisition cost (\$/MWh) for the award, reconfiguration or assignment:
 - for awards, the FTR acquisition cost (\$/MWh) = auction clearing price (\$/MWh);
 - for assignments where the price is disclosed, the FTR acquisition cost (\$/MWh) = FTR assignment price (\$/MWh);
 - for assignments where the price is not disclosed, the FTR acquisition cost (\$/MWh) = FTR acquisition cost (\$/MWh) of the original holding or assignment as indicated by the previous FTR holding code;;
 - for reconfigurations, the FTR acquisition cost (\$/MWh) = FTR acquisition cost (\$/MWh) of the original holding or assignment as indicated by the previous FTR holding code;
 - b. For awards and assignments, the value of the initial margin (\$) amount posted by the holder as collateral = initial margin rate (\$/MWh) x FTR volume (MW) x number of hours in the FTR period (h)/2, In the case of Option hedge types, the initial margin rate is capped at the daily settlement price (DSP) or the acquisition cost if the DSP is unavailable.
 - c. For awards, reconfigurations and assignments, calculates the acquisition amount = FTR acquisition cost (\$/MWh) x FTR volume (MW) x number of hours in the FTR period (h)/2.
5. For assignments and reconfigurations, reduces the FTR holding volume of the previous FTR holding code, creates a new holding record for the reduced FTR holding and recalculates using the reduced volume:
 - The initial margin amount as described above but using the latest published initial margin rate (CF-040); and
 - The acquisition amount as described above but using the holding's original FTR acquisition cost (\$/MWh).

N.B. The reduced FTR holding can be from an award or an assignment.
6. Receives an FTR rental amount for each grid and FTR period to be settled and pays the amount into the FTR manager's account. If the FTR rental amount stipulated is greater than the loss and constraint excess (LCE), the amount transferred will be the LCE amount. Any surplus FTR rental funds, after settlement will be transferred to the grid owner as residual LCE.

Data outputs:

- Allocated FTR trading limit per auction and FTR participant.

- FTR holdings (awards) as a result of an auction together with their acquisition costs, acquisition amounts, initial margin rates and initial margin amounts.
- FTR assignment details together with their acquisition costs, acquisition amounts, initial margin rates and initial margin amounts.
- FTR reconfiguration details together with their acquisition costs and acquisition amounts.
- Updated FTR holdings (as a result of part assignments and/or part reconfigurations) together with their recalculated acquisition costs, acquisition amounts, initial margin rates and initial margin amounts.
- FTR rental amount recorded for FTR period and grid.
- Acknowledgement or error message to the FTR manager.

Exceptions:

Sub-process:	RV-020 Receive and validate UOG information from generators
Process:	Receive and validate data
Code references:	Schedule 14A.1 clause 13
Dependencies:	
Module Name	RV-010

Description:
The clearing manager receives unoffered generation information directly from generators. Unoffered generation is generation with a capacity less than 10 MW that is not offered into the market. This data is used to estimate spot market sales quantities for prudential security assessment purposes (see PE-050).

Business requirements:
<ol style="list-style-type: none"> 1. Authorised users must be able to upload their participant organisation's unoffered generation information. 2. The clearing manager must be able to upload a participant's unoffered generation information on their behalf. 3. The clearing manager must be able to view the status of all uploaded files. 4. Authorised users must be able to view the status of the uploaded files for their organisation. 5. The clearing manager must validate unoffered generation information and store it if all the information is valid. 6. The clearing manager must be able to view the reasons why any unoffered generation information is rejected as invalid. 7. The clearing manager must be able to select which unoffered generation information should be extracted for use as prudential manual adjustments.

Data inputs:			
<ul style="list-style-type: none"> • Checked UOG information – Participant Code, POC, Trading Date range. • Unoffered generation: 			
Field	Format	Mandatory/optional	Description
Participant Code	Char(4)	M	
POC	Varchar (8)	M	Applicable GXP or GIP
Station	Char(3)	O	
Unit	Number(2)	O	
Trading Date	DD/MM/YYYY	M	Applicable trading date
Trading Period	Number (2)	M	Trading periods from 1 to 50
Power	Number (7,3)	M	In MW.

Processing:
<p>The system:</p> <ol style="list-style-type: none"> 1. Checks that the submitter is authorised to submit UOG information then validates the data for format and completeness and, if successfully validated, saves the details to the database together with the audit details. 2. Stores and displays the processing status – uploaded, validated, errored – against each file uploaded together with their audit information. 3. Extracts the unoffered generation information selected and reformats it for use as prudential manual adjustments.

Data outputs:			
<ul style="list-style-type: none"> Validated unoffered generation information – same format as input with the addition of audit information. Audit trail of all files uploaded by participants including their processing status. Prudential manual adjustments of unoffered generation information: 			
Field	Format	Mandatory/ optional	Description
Party	Char(4)	M	Participant Code from input file.
Trading Date	DD/MM/YYYY	M	Trading Date from input file.
Trading Period	Number(2)	M	Trading Period from input file.
Node	Varchar(8)	M	POC from input file.
Adjustment Category	Char(2)	M	“CB” - Change of Business.
Exposure Type	Char(1)	M	“O” – Outstanding.
Adjustment Type	Char(2)	M	“UG” - Unoffered Generation.
Action Type	Char(1)	M	“A” – add.
Adjustment Volume	Number(10,3)	M/O	Power from input file.
Adjustment Amount	Number(8,2)	M/O	Null.
Reason	Varchar(4000)	M	“ex UOG File”

Exceptions:

Sub-process:	RV-040 Receive and validate data from system operator
Process:	Receive and validate data
Code references:	8.55 to 8.69, 13.6, 13.7AC, 13.60, 13.64, 13.78
Dependencies:	
Module Name	RV-010

Description:
The clearing manager receives information from the system operator for the calculation of ancillary service invoice amounts and constrained amounts.

Business requirements:
<ol style="list-style-type: none"> 1. Dispatch instructions, information relating to ancillary service costs and charges and details of constrained on situations attributable to the system operator must be delivered to the clearing manager by 1600 hours on the 7th business day of each billing period. 2. The system operator, generators must notify the clearing manager within five business days of the effective date, if offers are changed in terms of being offered by block, station dispatch group or by individual stations. 3. Purchasers must notify the clearing manager within five business days before submitting a bid for the first time. This information will be coming from WITS. (RV-070) 4. The clearing manager must receive and validate information required from the system operator to enable the calculation of invoice amounts.

Data inputs:			
• Dispatch instructions			
Field	Format	Mandatory /optional	Description
Action Type	Char (1)	M	'I'
Action Date-Time	Date:Time	M	e.g. 1/04/2010 8:30:35
Din ID	Number (24)	M	e.g.20167792726
Market Node	Char (13)	M	e.g. CYD2201 CYD0
Block ID	Char (3)	O	N/A
Party	Char (4)	M	Participant identifier, e.g. CTCT
Effective Date	Date:Time	M	e.g. 1/04/2010 12:15:00
Effective DSI	Char (1)	M	Daylight saving indicator
Instruction Type	Char (1)	M	A/R/I/D/G/E
Reserve Class	Char (1)	M	F/S
Power	Number (10,3)	M	Quantity dispatched. Target power.

			Invalid if null.
Voltage	Number (6,1)	O	
Arm or Disarm Indicator	Char (1)	O	
Comments	Varchar (250)	O	
GCMP Bonafide	Char (1)	O	
Req By GOSP	Char (1)	O	
Discretion Reason	Char (1)	O	
Status	Char (1)	O	
Comm Status	Char (1)	O	
Ramp Up Rate	Number (15,3)	O	MW/hr. Zero or a positive value. Derived by system operator.
Ramp Down Rate	Number (15,3)	O	MW/hr. Zero or a positive value. A positive value indicates that the system operator has deemed this instruction to have been "ramp constrained".
Dispatchable Code	Number (1)	O	This is applicable for dispatchable demand (DD) and dispatchable notification (DNG or DNP/DNL) only. 1 --DNG, DNP/DNL or DD instruction sent to a pricing node location in a dispatchable state. 0 --DNG, DNP/DNL or DD instruction sent to a pricing node location to indicate it is operating as non-dispatchable.

N.B. The duration of the dispatch instruction (in minutes) is the time between the Effective Dates on this instruction and the next instruction for the same Market Node, Party, Instruction Type and Reserve Class.

• **Constrained on attributable to the system operator**

Field	Format	Mandatory /optional	Description
Trading Date	DD/MM/YYYY	M	
Trading Period	Number (2)	M	Trading periods from 1 to 50
Unit	Number (2)	M	
Station	Char (3)	M	
Block ID	Char (5)	M	
Constrained ON or OFF	Char (2)	M	"ON" or "OF"

system operator Voltage Quantity	Number (22,2)	O	
system operator Non-Security Quantity	Number (22,3)	O	
Frequency Control Quantity	Number (22,2)	O	Bandwidth (+/-)
system operator Voltage Support Indicator	Char (1)	O	Y/N
system operator Other Reason Indicator	Char (1)	O	Y/N. Relates to over-frequency reserves and/or instantaneous reserves.

• **Allocable costs**

Costs allocable due to provision of ancillary services. Each item is included as a separate line item. Costs include procurement costs, administration costs, dispensation costs and identifiable costs.

In addition to the market component of the procurement costs the following is included as separate line items:

1. event fee and event fee charge for black start and over frequency,
2. constrained on and constrained off quantities for frequency keeping.

There are separate files for each billing month and wash-up month.

Field	Format	Mandatory /optional	Description
Party Code	Char (4)	M	Participant identifier, e.g. CTCT
Party Role	Char (4)	M	e.g. ASAG
Invoice Month	Date	M	MMM-YY
SO Product Code	Varchar (6)	M	e.g. 501001
Product Description	Varchar (100)	M	
Net Amount	Number (10,2)	M	Cost or charge excl. GST

• **Availability costs**

The availability cost associated with providing instantaneous reserve. Availability cost is allocable by HVDC or generating unit for NI and SI by trading period.

There are separate files for each billing month and wash-up month.

Field	Format	Mandatory /optional	Description
Island Code	Char (2)	M	e.g. NI
Trading Date	DD/MM/YYYY	M	
Amount (TP1)	Number (10,2)	M	
...
Amount (TP50)	Number (10,2)	M	Unless daylight saving end date, trading periods 49, 50 = 0 If daylight saving start date, trading periods 47, 48 = 0

• Injected electricity by generation unit			
Injected electricity by generating unit and trading period (NI & SI). There are separate files for each billing month and wash-up month.			
Field	Format	Mandatory /optional	Description
POC	Varchar (8)	M	e.g. CYD2201
Generating Unit	Char (4)	M	e.g. G1
Party Code	Char (4)	M	Participant identifier, e.g. CTCT
Unit of Measure	Char (3)	M	e.g. kWh
Injection/Offtake	Char (1)	M	must be 'I'
Interim/Final	Char (1)	M	must be 'I' or 'F'
Trading Date	DD/MM/YYYY	M	
Injection (TP1)	Number (7)	M	
...
Injection (TPn)	Number (7)	M	n = 46 (if daylight saving start date), or 50 (if daylight saving end date), or 48
Checksum	Number (12)	M	
• Distributor metering information			
Metering Information for distributors for all GXP's for invoice period.			
Field	Format	Mandatory /optional	Description
POC	Varchar (8)	M	e.g. GOR0331
Asset Owner	Char (4)	M	Connection asset owner participant identifier, e.g. TPCO
Connection Type	Char (2)	M	e.g. GN
Party Code	Char (4)	M	Participant identifier, e.g. TPNZ
Unit of Measure	Char (3)	M	e.g. kWh
Injection/Offtake	Char (1)	M	must be 'X'
Interim/Final	Char (1)	M	must be 'I' or 'F'
Trading Date	DD/MM/YYYY	M	
Amount (Tp1)	Number (7)	M	
...
Amount (Tpn)	Number (7)	M	n = 46 (if daylight saving start date), or 50 (if daylight saving end date), or 48
Checksum	Number (12)	M	
• Nominated peak kVAr			

Annual nominated kVAr peak demand by distributor (network), by distributor kVAr reference node. N.B. Distributors may have more than one distributor kVAr reference node.			
Field	Format	Mandatory /optional	Description
Zone	Char (1)	M	Valid zones are 1, 2, 3, 4
Network Participant Identifier	Char (4)	M	e.g. VECT
Distributor kVAr Reference Node Code	Char (7)	M	e.g. VECT001
Grid POC	Char (8)	M	e.g. PEN1101
Nominated Peak	Number (12)	M	kVAr
• Alternative purchaser frequency keeping kWh			
Quantity (kWh) of frequency keeping provided pursuant to alternative arrangement, at a point of connection by trading period. N.B. Data available at grid point level only, i.e. not available by purchaser. There are separate files for each billing month and wash-up month where arrangement(s) exist.			
Field	Format	Mandatory /optional	Description
POC	Varchar (8)	M	e.g. GOR0331
Network Participant Identifier	Char (4)	M	e.g. TPCO
Connection Type	Char (2)	M	e.g. GN
Party Code	Char (4)	M	Participant identifier, e.g. TPNZ
Unit Of Measure	Char (3)	M	e.g. kWh
Alternative Flag	Char (1)	M	must be 'A'
Interim/Final	Char (1)	M	must be 'F'
Trading Date	DD/MM/YYYY	M	
Amount (TP1)	Number (7)	M	
...
Amount (TP50)	Number (7)	M	Unless daylight saving end date, trading periods 49, 50 = 0 If daylight saving start date, trading periods 47, 48 = 0
• Alternative instantaneous reserve values for generating units			
Instantaneous reserve provided for Generating Units pursuant to alternative arrangement, by party, GIP, trading date, trading period. There are separate files for each billing month and wash-up month where arrangement(s) exist.			
Field	Format	Mandatory /optional	Description
POC	Varchar (8)	M	e.g. GOR0331

Generating Unit	Char (4)	M	e.g. G1
Party Code	Char (4)	M	Participant identifier, e.g. CTCT
Unit Of Measure	Char (3)	M	e.g. kWh
Alternative Flag	Char (1)	M	must be 'A'
Interim/Final	Char (1)	M	must be 'F'
Trading Date	DD/MM/YYYY	M	
Amount (TP1)	Number (7)	M	
...
Amount (TP50)	Number (7)	M	Unless daylight saving end date, trading periods 49, 50 = 0 If daylight saving start date, trading periods 47, 48 = 0

• **At-risk HVDC transfer quantities**

Quantity of At-Risk HVDC transfer into the North Island or South Island by trading period
There are separate files for each billing month and wash-up month where arrangement(s) exist.

Field	Format	Mandatory /optional	Description
HVDC Receiver	Varchar (8)	M	HAYSN or BHVNS
Flow Identifier	Varchar (4)	M	NS (north-south) or SN (south-north)
Party Code	Char (4)	M	Grid owner code e.g. TPNZ
Unit of Measure	Char (3)	M	e.g. kWh
Injection Flag	Char (1)	M	must be 'I'
Interim/Final	Char (1)	M	must be 'F'
Flow Direction	Char (1)	M	N (into NI) or S (into SI)
Trading Date	DD/MM/YYYY	M	
Amount (TP1)	Number (7)	M	
...
Amount (TP50)	Number (7)	M	Unless daylight saving end date, trading periods 49, 50 = 0 If daylight saving start date, trading periods 47, 48 = 0

• **Alternative instantaneous reserve values for at-risk HVDC**

Instantaneous reserve provided for At-Risk HVDC pursuant to alternative arrangement, by GIP, trading date, trading period.

There are separate files for each billing month and wash-up month where arrangement(s) exist.

Field	Format	Mandatory /optional	Description
HVDC Receiver	Varchar (8)	M	HAYSN or BHVNS
Flow Identifier	Varchar (4)	M	NS (north-south) or SN (south-north)

Party Code	Char (4)	M	Participant identifier, e.g. TPNZ
Unit Of Measure	Char (3)	M	e.g. kWh
Alternative Flag	Char (1)	M	must be 'A'
Interim/Final	Char (1)	M	must be 'F'
Flow Direction	Char (1)	M	N (into NI) or S (into SI)
Trading Date	DD/MM/YYYY	M	
Amount (TP1)	Number (7)	M	
...
Amount (TP50)	Number (7)	M	Unless daylight saving end date, trading periods 49, 50 = 0 If daylight saving start date, trading periods 47, 48 = 0

• **Instantaneous reserve forecasts**

System operator's bona-fide estimates of:

- availability cost
- electricity losses due to under frequency events
- number of under frequency events for 12-month period

Provided a month in advance of billing.

Field	Format	Mandatory /optional	Description
Start Date	DD/MM/YYYY	M	Date from which data is valid
End Date	DD/MM/YYYY	M	Date to which data is valid
Type	Char (3)	M	IR – Availability Cost estimate INT – Electricity Loss estimate EV – Event occurrences estimate
Unit	Char (3)	M	'DOL' (IR) or 'MW' (INT) or NULL (EV)
Quantity	Number (12)	M	

• **Event losses**

Quantity of electricity lost due to under-frequency event, by event, by point of connection or HVDC Injection Point

Field	Format	Mandatory /optional	Description
Event id	Number (6)	M	Transpower event identifier unique to event (i.e. all records associated with event to have same event_id)
Causing Party	Char (4)	M	Industry code for organisation that is causer of event. Special notes: 'UTBD' where causer unknown

			if causer is TPNZ, Role = HVDC if causer is not TPNZ, Role = GENR If causer is TPNZ and role is not HVDC, then SO will notify CM
Unit of Measure	Char (3)	M	e.g. kWh
Event Date	DD/MM/YYYY	M	
Event Time	HH:MI:SS	M	
Quantity	Number (12)	M	Total of electricity lost during trading period
• Forecast voltage support fixed rates			
Fixed peak rate & penalty rate in \$/kVAr set annually in advance, by zone.			
Field	Format	Mandatory /optional	Description
Start Date	DD/MM/YYYY	M	
End Date	DD/MM/YYYY	M	
Zone	Char (1)	M	Valid zones are 1, 2, 3, 4
Rate Type	Char (4)	M	Must be PEAK – Peak rate or PEN – Penalty rate
Quantity	Number (24,8)	M	kVAr – set annually for 12-month period
• kVAr non-compliance			
Quantity difference in kVAr between actual and required capability for dispensed generator			
Field	Format	Mandatory /optional	Description
Party	Char (4)	M	TOPE
Party Role	Char (6)	M	e.g. GENR
Zone	Char (1)	M	Valid zones are 1, 2, 3, 4
Trading Month	MM/YYYY	M	
Unit	Char (4)	M	e.g. kVAr
kVAr Dispensation Quantity	Number (7)	M	
• kVAr quantities			
Actual measured kVAr quantities, by distributor, point of connection, trading period. There are separate files for each billing month and wash-up month.			
Field	Format	Mandatory /optional	Description
POC	Varchar (8)	M	e.g. BOB1101
Distributor	Char (4)	M	Asset owner participant identifier, e.g. COUP

Zone	Char (8)	M	Valid zones are ZONE0001 to ZONE0004
Network participant identifier	Char (4)	M	e.g. TPNZ
Unit	Char (4)	M	e.g. kVAr
kVAr Quantity (TP1)	Number (9,1)	M	
...
kVAr Quantity (TPn)	Number (9,1)	M	n = 46 (if daylight saving start date), or 50 (if daylight saving end date), or 48
Checksum	Number (13,1)	M	

Processing:

The system:

1. Validates the formats and completeness of the data and, if successfully validated, saves the details to the database.
2. With respect to the constrained on attributable to the system operator notifications, where the information is provided at unit level (i.e. unit field contains a number), the system must aggregate the information by station, delete the unit records, and then create a new record for the aggregated station but as a block. All the quantity values are added together. For yes/no fields, if there is at least one Y then Y else N.

e.g. records at unit level for station HLY

Date	Period	Block	Station	Unit	Frequency Quantity	GO Voltage
1/1/01	1		HLY	1	10	N
1/1/01	1		HLY	2	20	N
1/1/01	1		HLY	3	30	N

are aggregated to Station level for Block HLY

Date	Period	Block	Station	Unit	Frequency Quantity	GO Voltage
1/1/01	1	HLY			60	N

3. With respect to dispatch instructions with an instruction type of A and a null power value, they are flagged and their details emailed to the clearing manager to review with the system operator. The system permits the clearing manager to update these null dispatch instructions with a positive decimal power value or to delete (soft) them. Only if the null power value is updated will the system store the instruction as valid otherwise null dispatch instructions are treated as invalid.

The system creates an audit trail for all updated or all deleted dispatch instructions.			
Data outputs:			
<ul style="list-style-type: none"> Validated data inputs, stored in the same format input. Email notifications to the clearing manager when dispatch instructions with an instruction type of A and a null power value are detected. Audit trail of updated or deleted dispatch instructions that include the original information appended with: 			
Action Code	Varchar (1)	N	Clearing Manager Action Code Acceptable Values: D – Delete U – Update
Notes	Varchar (250)	Y	Clearing Manager Notes
Created Date	Date	N	Date instruction validated and stored in system
Created By	Varchar (30)	N	User ID of process that validated and stored the instruction
Modified Date	Date	Y	Date instruction modified
Modified By	Varchar(30)	Y	User ID of modifier
Exceptions:			

Sub-process:	RV-050 Receive and validate data from reconciliation manager
Process:	Receive and validate data
Code references:	Schedule 15.4
Dependencies:	
Module Name	RV-010

Description:
<p>The clearing manager receives information from the reconciliation manager including reconciliation information, loss adjusted dispatchable load information and related information to enable the calculation of energy purchases and sales, constrained on and constrained off for generation, dispatchable load purchasers and generation reserves, and for the estimation of prudential requirements.</p> <p>The reconciliation manager provides an embedded generation report to the clearing manager twice per month. Embedded generation refers to generation connected to a distribution network.</p>

Business requirements:
<ol style="list-style-type: none"> 1. The reconciliation manager must provide reconciliation information to the clearing manager by 1600 hours of the 7th business day of each month for the previous billing period and by 1200 hours on the last business day of each month for wash-ups. 2. The clearing manager must receive and validate information required from the reconciliation manager to enable the calculation of invoice amounts and prudential requirements.

Data inputs:			
• Reconciled generation and consumption			
Field	Format	Mandatory /optional	Description
POC	Varchar (8)	M	e.g. BOB1101
Network ID	Char (4)	M	Asset owner participant identifier, e.g. COUP
Buyer	Char (4)	M	Participant identifier, e.g. CTCT
Seller	Char (4)	M	Participant identifier, e.g. TPNZ
Contract Number	Char (5)	M	
Trading Date	DD/MM/YYYY	M	
Half-Hour Reconciliation Quantity (1...46/48/50) In kW.	Number (8)
Checksum	Number (10)	M	n = if daylight saving start date then 46else if daylight

			saving end date then 50 else 48
• Loss adjusted dispatchable load information			
Field	Format	Mandatory /optional	Description
POC	Varchar (8)	M	e.g. BOB0331
Network ID	Char (4)	M	Asset owner participant identifier, e.g. COUP
Dispatch capable load station identifier	Char (5)	M	From the dispatchable demand information
Buyer	Char (4)	M	The clearing manager participant identifier, e.g. ECHL
Seller	Char (4)	M	The participant identifier for the purchaser, e.g. CTCT
Unit	Char 3	M	"kW"
Status	Char 1	M	"F"
Trading Date	DD/MM/YYYY	M	
Half-Hour Reconciliation Quantity (1...46/48/50) in kW.	Number (8)
Checksum	Number (10)	M	n = if daylight saving start date then 46 else if daylight saving end date then 50 else 48
• Aggregated Embedded Generation			
Embedded generation information is only provided for the initial and first revision.			
Field	Format	Mandatory /optional	Description
Consumption period	Char (6)	M	YYYYMM
POC	Varchar 8	M	e.g. BOB1101
Quantity	Number (12,2)	M	l flow from NHH and HHR submission data.

Processing:
The system: <ul style="list-style-type: none"> Validates the formats and completeness of the data and, if successfully validated, saves the details to the database.

Data outputs:
<ul style="list-style-type: none"> Validated data inputs in a same format.

Exceptions:

Sub-process:	RV-060 Receive and validate data from grid owners
Process:	Receive and validate data
Code references:	13.145
Dependencies:	
Module Name	RV-010

Description:
The clearing manager receives daily demand half hour metering (bus load) information from grid owner(s) that is used to estimate prudential requirements and used in must-run dispatch auctions.

Business requirements:
<ol style="list-style-type: none"> 1. By 1200 hours each business day, grid owner must advise the clearing manager the adjusted load data (daily demand half hour metering information) for the previous trading day. 2. The clearing manager must receive and validate information required from the grid owner to enable the calculation of prudential amounts.

Data inputs:			
<ul style="list-style-type: none"> • Demand half hour metering (bus load) information (from grid owner) 			
Field	Format	Mandatory/optional	Description
GXP/GIP	Varchar (8)	M	Applicable GXP or GIP
Trading date	DD/MM/YYYY	M	Applicable trading date
Market time	HH:SI	M	Equivalent (start) time for the trading period in HH24:MI format. May have a '*' appended to the time to indicate daylight saving change. E.g. 02:00*, 02:30*.
Run time	DD/MM/YYYY HH:SI	M	
Load	Number (9,4)	M	The demand quantity in MW

Processing:
<p>The system:</p> <ul style="list-style-type: none"> • Validates the formats and completeness of the data. • Creates trading period value based on the market time. • Saves the details to the database. • Sends the file to WITS.

Data outputs:			
Demand half hour metering (bus load) information (from grid owner)			
Field	Format	Mandatory/ optional	Description
GXP/GIP	Varchar (8)	M	Applicable GXP or GIP
Trading date	DD/MM/YYYY	M	Applicable trading date
Trading period	Number (2)	M	Trading periods from 1 to 50
Market time	HH:MI	M	The start time of the trading period e.g., market time for trading period 1 = 00:00
Load	Number (9,4)	M	The demand quantity in MW
Run time	DD/MM/YYYY HH:MI	M	Run time by the grid owner

Exceptions:

Sub-process:	RV-070 Receive and validate data from WITS
Process:	Receive and validate data
Code references:	13.63, 13.67
Dependencies:	
Module Name	RV-010

Description:
<p>The clearing manager receives information from Wholesale Information and Trading System (WITS) including dispatch prices, interim prices for energy and reserves; final bids and offers to enable:</p> <ul style="list-style-type: none"> • Interim prices validation • the calculation of energy purchases and sales, • the calculation of constrained on and constrained off for generation, dispatchable load purchasers and generation reserves, • the must-run dispatch auction, and • the estimation of prudential security, • final hedge settlements and FTR settlement amounts.

Business requirements:
<ol style="list-style-type: none"> 1. The clearing manager must receive and validate information required from WITS to enable interim prices validation, the calculation of invoice amounts, must-run dispatch auction results and the estimation of prudential security.

Data inputs:			
• Company Location information (from WITS)			
Field	Format	Mandatory/optional	Description
Company Code	Char (4)		
POC	Char (8)		
Station	Char (3)		
Unit	Number (2)		
Suspended_YN	Char (1)	O	Y/N (defaults to N)
Start Date	DD/MM/YYYY	M	Date the DCLS becomes effective
End Date	DD/MM/YYYY	O	Date the DCLS ceases to be effective
Order Code	Char (20)	O	DCLSBID – Dispatch capable load stations
• Offers			
Field	Format	Mandatory/optional	Description

Order ID	Num (10)	M	
Company Code	Char (4)	M	
GIP/GXP	Char (8)	M	
Station	Char (3)	O	
Unit	Number (2)	O	
Trading Date	DD/MM/YYYY	M	
Trading Period	Char (2)	M	Trading periods from 1 to 50
Maximum Output	Number (4)	O	
Maximum Ramp Up rate	Number (4)	O	
Maximum Ramp Down rate	Number (4)	O	
Band 1 Power	Number (10, 3)	O	
Band 1 Price	Number (8, 2)	O	
Band 2 Power	Number (10, 3)	O	
Band 2 Price	Number (8, 2)	O	
Band 3 Power	Number (10, 3)	O	
Band 3 Price	Number (8, 2)	O	
Band 4 Power	Number (10, 3)	O	
Band 4 Price	Number (8, 2)	O	
Band 5 Power	Number (10, 3)	O	
Band 5 Price	Number (8, 2)	O	
Trader Code	Char (4)	O	
User ID	Number (4)	O	
Created Date	DD/MM/YYYY	O	
Last Amended Date	DD/MM/YYYY	O	
User reference	Char (16)	O	
Status	Char (1)	O	
Error Message	Char (100)	O	
Origin	Number (1)	O	
Forecast of generation potential	Number (10,3)	O	This field is populated only where the offer relates to intermittent generation.
• Nominated dispatch bids			
Field	Format	Mandatory/optional	Description
Order ID	Num (10)	M	
Company Code	Char (4)	M	
POC	Char (8)	M	DCLS grid point
Station	Char (5)	O	DCLS code
Dispatchable_yn	Char (1)	O	

Trading Date	DD/MM/YYYY	M	
Trading Period	Char (2)	M	Trading periods from 1 to 50
Band 1 Power	Number (10, 3)	O	
Band 1 Price	Number (8, 2)	O	
Band 2 Power	Number (10, 3)	O	
Band 2 Price	Number (8, 2)	O	
Band 3 Power	Number (10, 3)	O	
Band 3 Price	Number (8, 2)	O	
Band 4 Power	Number (10, 3)	O	
Band 4 Price	Number (8, 2)	O	
Band 5 Power	Number (10, 3)	O	
Band 5 Price	Number (8, 2)	O	
Band 6 Power	Number (10, 3)	O	
Band 6 Price	Number (8, 2)	O	
Band 7 Power	Number (10, 3)	O	
Band 7 Price	Number (8, 2)	O	
Band 8 Power	Number (10, 3)	O	
Band 8 Price	Number (8, 2)	O	
Band 9 Power	Number (10, 3)	O	
Band 9 Price	Number (8, 2)	O	
Band 10 Power	Number (10, 3)	O	
Band 10 Price	Number (8, 2)	O	
Trader Code	Char (4)	O	
User ID	Number (4)	O	
Created Date	DD/MM/YYYY	O	
Last Amended Date	DD/MM/YYYY	O	
User Reference	Char (16)	O	
Status	Char (1)	O	
Error Message	Char (100)	O	
Origin	Number (1)	O	
• Generator reserve offers			
Information Input	Format	Mandatory/optional	Comments
Participant code of generator	Char (4)	M	Code allocated by reconciliation manager to participant.
POC	Varchar (8)	M	
Station	Char (3)	M/O	Mandatory if no unit.
Unit	Number (2)	M/O	Mandatory if no station.
Trading date	DD/MM/YYYY	M	Trading date to which the offer applies.

			Trading period to which the offer applies 1 to 48 for standard day 1 to 50 for daylight saving end 1 to 46 for daylight saving start.
Trading period	Number (2)	M	
PLSR band 1 percentage – fast response	Number (5,1)	O	
PLSR band 1 maximum quantity – fast response	Number (10,3)	O	MW.
PLSR band 1 price – fast response	Number (8,2)	O	
PLSR band 1 percentage – sustained response	Number (5,1)	O	
PLSR band 1 maximum quantity – sustained response	Number (10,3)	O	MW.
PLSR band 1 price – sustained response	Number (8,2)	O	
PLSR band 2 percentage – fast response	Number (5,1)	O	
PLSR band 2 maximum quantity – fast response	Number (10,3)	O	MW.
PLSR band 2 price – fast response	Number (8,2)	O	
PLSR band 2 percentage – sustained response	Number (5,1)	O	
PLSR band 2 maximum quantity – sustained response	Number (10,3)	O	MW.
PLSR band 2 price – sustained response	Number (8,2)	O	
PLSR band 3 percentage – fast response	Number (5,1)	O	
PLSR band 3 maximum quantity – fast response	Number (10,3)	O	MW.
PLSR band 3 price – fast response	Number (8,2)	O	
PLSR band 3 percentage – sustained response	Number (5,1)	O	

PLSR band 3 maximum quantity – sustained response	Number (10,3)	O	MW.
PLSR band 3 price – sustained response	Number (8,2)	O	
NSGR band 1 maximum quantity – fast response	Number (10,3)	O	MW.
NSGR Band 1 Price – Fast Response	Number (8,2)	O	
NSGR Band 1 Maximum Quantity – Sustained Response	Number (10,3)	O	MW.
NSGR Band 1 Price – Sustained Response	Number (8,2)	O	
NSGR Band 2 Maximum Quantity – Fast Response	Number (10,3)	O	MW.
NSGR Band 2 Price – Fast Response	Number (8,2)	O	
NSGR Band 2 Maximum Quantity – Sustained Response	Number (10,3)	O	MW.
NSGR Band 2 Price – Sustained Response	Number (8,2)	O	
NSGR Band 3 Maximum Quantity – Fast Response	Number (10,3)	O	MW.
NSGR Band 3 Price – Fast Response	Number (8,2)	O	
NSGR Band 3 Maximum Quantity – Sustained Response	Number (10,3)	O	MW.
NSGR Band 3 Price – Sustained Response	Number (8,2)	O	
• Retailer reserve offers (interruptible load)			
Field	Format	Mandatory/optional	Comments
Participant code	Char (4)	M	Code allocated by reconciliation manager to participant.
POC	Varchar (8)	M	GXP or interruptible load group GXP
Station	Char (3)	O	
Unit	Number (2)	O	

Trading date	DD/MM/YYYY	M	Trading date to which the offer applies. (DD/MM/YYYY)
Trading period	Number (2)	M	Trading period to which the offer applies 1 to 48 for standard day 1 to 50 for daylight saving end 1 to 46 for daylight saving start.
Band 1 Maximum Quantity – Fast Response	Number (10,3)	O	MW.
Band 1 Price – Fast Response	Number (8,2)	O	
Band 1 Maximum Quantity – Sustained Response	Number (10,3)	O	MW.
Band 1 Price – Sustained Response	Number (8,2)	O	
Band 2 Maximum Quantity – Fast Response	Number (10,3)	O	MW.
Band 2 Price – Fast Response	Number (8,2)	O	
Band 2 Maximum Quantity – Sustained Response	Number (10,3)	O	MW.
Band 2 Price – Sustained Response	Number (8,2)	O	
Band 3 Maximum Quantity – Fast Response	Number (10,3)	O	MW.
Band 3 Price – Fast Response	Number (8,2)	O	
Band 3 Maximum Quantity – Sustained Response	Number (10,3)	O	MW.
Band 3 Price – Sustained Response	Number (8,2)	O	
<ul style="list-style-type: none"> NRSS, NRSL, PRSS, PRSL, WDS and Dispatch schedules (includes cleared offers) 			
Field	Format	Mandatory/ optional	Description

OrderID	Number (10)	M	An ID given to the order by WITS. Will be null if power type is L or R.
POC	Varchar (8)	M	Applicable grid point
Station	Char (3)	M	A three letter code for the station
Unit	Number (2)	M	A two number code for the unit
Username	Char (20)	M	The WITS username for the trader who entered the order
Power Type	Char (1)	M	'G' - generation 'L' - total cleared load 'R' - forecast load at conforming nodes 'N' - cleared load, non-conforming GXP 'D' - cleared load, conforming GXP 'T' - NSGR, including TWDR and injectable reserve from an energy storage system 'P' - PLSR 'I' - interruptible load reserve 'B' - cleared dispatchable bids
Response Time	Char (2)	M	6 seconds or 60 seconds or 0
Trading Date	D/MM/YYYY	M	Applicable trading date
Trading Period	Number (2)	M	Trading Periods from 1 to 50
Power	Number (10,3)	M	MW of power scheduled
Company Code	Char (4)	M	A four-letter code identifying the company. Will be 'LOAD' for power type 'L' and 'R'.
Block ID	Varchar (5)	O	The identifier for a block dispatch group - this field will be blank/empty where not applicable
Schedulers Constraint	Char (1)	M	'Y' or 'N' - notifies if a constraint has been taken into account in preparing this schedule
MW Armed	Number (4)	M	
Max Power	Number (4)	O	Optional – for use when there is a constraint applied to a station or unit within a block dispatch group
Min Power	Number (4)	O	Optional – for use when there is a constraint applied to a station or unit within a block dispatch group
Run Time	DD/MM/YYYY HH:MI:SS	M	Solution run time

Free Text	Varchar (100)	O	This allows the scheduler to send a text message to a participant
User Text	Varchar (16)	O	Text entered by the user at time of input of the order
• Must-run dispatch auction bids (from generators)			
Field	Format	Mandatory/optional	Description
Participant Code of Generator	Char (4)	M	Code allocated by reconciliation manager to participant.
Auction Date	DD/MM/YYYY	M	Date of auction.
Time Block	Char (1)	M	Time block to which bids apply, day or night ('D' or 'N').
Valid Until Cancelled	Char (1)	O	'Y' or 'N' (defaults to 'N')
Bid 1 Price	Number (8,2)	M	Price (all prices must be positive)
Bid 1 Quantity	Number (10,3)	M	MW (all quantities must be positive)
Bid 2 Price	Number (8,2)	O	Price
Bid 2 Quantity	Number (10,3)	O	MW
Bid 3 Price	Number (8,2)	O	Price
Bid 3 Quantity	Number (10,3)	O	MW
Bid 4 Price	Number (8,2)	O	Price
Bid 4 Quantity	Number (10,3)	O	MW
Bid 5 Price	Number (8,2)	O	Price
Bid 5 Quantity	Number (10,3)	O	MW
• Historic load information (from grid owner(s))			
Field	Format	Mandatory/optional	Description
Historical Date	DD/MM/YYYY	M	Preceding year day for the day following the auction
Trading Date	DD/MM/YYYY	M	Trading date to which the load data is to be applied
Trading Period	Number (2)	M	Trading period on the trading date to which the load data is to be applied 1 to 48 for standard day 1 to 50 for daylight saving end 1 to 46 for daylight saving start.
MW Demand	Number (10,3)	M	MW (must be positive)
• Energy prices (from WITS manager)			
Field	Format	Mandatory/optional	Description
GIP/GXP	Varchar (7)	M	Applicable GXP or GIP

Trading Date	DD/MM/YYYY	M	Applicable trading date
Trading Period	Number (2)	M	Trading periods from 1 to 50
Market Time	Varchar (5)	M	Market Time Format: HH:MI
Price	Number (8, 2)	M	
Run Time	DD/MM/YYYY HH:MI:SS	M	Solution run time
Run Type	Varchar (1)	M	A – PRS short G – PRS long D – Dispatch T -- Interim
Time Zone	Varchar (4)	M	NZDT NZST
Publish Time	DD/MM/YYYY HH:MI:SS	M	Publish time
• Reserve prices (from WITS manager)			
Field	Format	Mandatory/ optional	Description
GIP/GXP	Varchar (7)	M	Applicable GXP or GIP
Trading Date	DD/MM/YYYY	M	Applicable trading date
Trading Period	Number (2)	M	Trading periods from 1 to 50
Price 6S	Number (8, 2)	M	Fast Instantaneous Reserve Price
Price 60S	Number (8, 2)	M	Sustained Instantaneous Reserve Price
Run Time	DD/MM/YYYY HH:MI:SS	M	Solution run time
Run Type	Varchar (1)	M	A – PRS short G – PRS long D – Dispatch T -- Interim
Time Zone	Varchar (2)	M	NZDT NZST
Publish Time	DD/MM/YYYY HH:MI:SS	M	Publish time
• Dispatch Capable Load Station information (from system operator)			
Field	Format	Mandatory/ optional	Description
POC	Char (8)	M	Applicable GXP or GIP
DCLS_code	Char (5)	M	Code allocated by SO
Suspended_YN	Char (1)	O	'Y' or 'N' (defaults to 'N')

Start Date	DD/MM/YYYY	M	Date the DCLS becomes effective
End Date	DD/MM/YYYY	O	Date the DCLS ceases to be effective

Processing:

The system:

- Validates the formats and completeness of the data and, if successfully validated, saves the details to the database.

Data outputs:

1. Validated data inputs.
2. Same format as input.

Exceptions:

6.2 Validate interim prices and publish interim/final prices

Sub-process:	VP-010 Validate interim prices and publish final prices
Process:	validate interim prices and publish final prices
Code references:	13.131, 13.134A, 13.167, 13.182A, 13.183, 13.184
Dependencies:	RV-070, HD-050
Module Name	

Description:
<p>The clearing manager is responsible for the calculation of interim and final prices. For efficiency, WITS performs the functions of calculating and publishing the interim price, on behalf of the clearing manager, to make the interim prices available to participants as soon as possible after each trading period. The clearing manager validates every interim price the next trading day and then confirms, to WITS, which interim price can be published as final and which is to remain as interim due to a pricing error claim. Pricing confirmations are sent to WITS by 1300 hours the next business day following the trading day.</p> <p>NB: All prices are referring to both energy and reserve prices under this process.</p>

Business requirements:
<ol style="list-style-type: none"> 1. The clearing manager must validate the interim prices received from WITS using the methodology set out under the Code clause 13.134A. 2. The clearing manager must make the interim prices final for all the trading periods with no pricing error claim at 1400 hours the next business day. 3. The clearing manager must publish the final prices on WITS.

Data inputs:
<p>Interim, Dispatch, PRS prices received from WITS (RV-070) Pricing error claims (HD-050)</p>

Processing:
<p>The system:</p> <ol style="list-style-type: none"> 1. Verifies interim prices for the previous trading date at 4am for each GIP/GXP, and trading period for energy and reserves using a time weighted average calculation of the dispatch prices and PRS prices and compares it with the interim prices: <p>For each dispatch price published in a trading period, the duration (weight) for each dispatch price is calculated, in seconds, from the publish time of the dispatch price to the publish time of the next dispatch price (for the same GIP/GXP, and trading period) or to the end time of that trading period, whichever is the earliest. (NB: This is because dispatch schedules do not continue/apply into the next trading period. The start time of the trading period of the first dispatch is used as a starting point for the calculation.)</p>

If there is no dispatch price with a publish time before or equal to the start time of that trading period, then the latest PRS price (of the same GIP/GXP, trading date and trading period) applies for the duration from the start of the trading period up to the publish time of the next dispatch price or end time of that trading period, whichever is the earliest.

If there is any price difference exists, the system will send an email to the Clearing Manager to investigate.

If there is no pricing error claim (PEC) by 12pm, all interim prices will be finalised and published at 2pm by the Clearing Manager (manual process).

If there is a PEC, all interim prices other than the interim prices in the PEC trading periods will be finalised and published by 2pm.

3. By 1300 hours each business day, creates a file of final price confirmations containing details of every GIP/GXP and trading period published as interim the previous trading day and identifies if there was a PEC raised. The final price confirmation details are then sent to WITS.
4. Creates and stores final prices for energy and reserves for every interim price confirmed as finalised.

Data outputs:

Final prices confirmation file to WITS

Field Name	Format	Description
Trading date	Date	Applicable trading date
Trading period	Number (2)	
Status	Char (4)	F: Finalised PEC: Pricing error claim PECU: Pricing error claim upheld
Publish time	DD/MM/YYYY HH24:MI:SS TZD	Publish date/time and zone

Interim, final energy prices

Field	Format	Mandatory/optional	Description
GIP/GXP	Varchar (7)	M	Applicable GXP or GIP
Trading date	DD/MM/YYYY	M	Trading date
Trading period	Number (2)	M	Trading periods from 1 to 50
Price type	Char (1)	M	F: Final T: Interim

Price	Number (8, 2)	M	Format: 9999999990.00
Publish time	DD/MM/YYYY HH:MI:SS	M	Publish time
Interim, final reserve prices			
Field	Format	Mandatory/ optional	Description
Island	Char (2)	M	NI – North Island SI – South Island
GIP/GXP	Varchar (7)	M	Applicable GXP or GIP
Trading date	DD/MM/YYYY	M	Trading date
Trading period	Number (2)	M	Trading periods from 1 to 50
Price type	Char (1)	M	F: Final T: Interim
Price 6S	Number (8, 2)	M	Fast instantaneous reserve price
Price 60S	Number (8, 2)	M	Sustained instantaneous reserve price
Publish time	DD/MM/YYYY HH:MI:SS	M	Publish time

Exceptions:

6.3 Calculate price index

Sub-process:	PI-010 Calculate the price index
Process:	Calculate price index
Code references:	NA
Dependencies:	VP-010
Module Name	

Description:
<p>The price index is a seven-day rolling trading period average regional electricity price. It is weighted by load (demand) for each of four regions (Upper North Island, Lower North Island, South Island and New Zealand).</p> <p>For each region, the index is formed by multiplying the price by the load and dividing the total load of the region. The load (demand) used to weight prices is the metered load.</p>

Business requirements:
<ol style="list-style-type: none"> 1. The clearing manager must calculate price index information daily. 2. The information calculated each day must cover the previous 7 trading days. 3. The clearing manager must publish the price index information on WITS.

Data inputs:
<ul style="list-style-type: none"> • Published interim or final prices for energy for the last 7 days from VP-010. • GXP bus load data for the last 7 days from RV-060. • GXP regions from reference data.

Processing:
<p>The system:</p> <ol style="list-style-type: none"> 1. Calculates the rolling 7-day price index for each region (Upper North Island, Lower North Island, South Island and New Zealand) per day i.e.: <ol style="list-style-type: none"> a. Extracts the published final prices or interim prices when final prices are not available, of the last 7 trading days for the GXPs that are required to be included in each region, as indicated in the GXP Regions data. Data with a load of zero is excluded. b. Calculates the load weighted average as the sum of the prices multiplied by the load for each GXP, trading date and trading period in the region divided by the sum of load in the region. c. Sums the results of b for each region and divides by 10 to obtain a price in cents per kWh. 2. Recalculates the regional price index for all the affected days when the clearing manager has republished the interim prices or changed the prices from interim to final for any of the previous six days. The price index for the

day that has changed, and each of the following days, is recalculated and republished.
3. Formats the information appropriately and sends it to WITS for publication.

Data outputs:

Price index

Field	Format	Mandatory/optional	Description
Region	Char (2)	M	LNI – Lower North Island UNI – Upper North Island SI – South Island NZ – New Zealand
Trading date	DD/MM/YYYY	M	Trading date
Price	Number (8, 4)		

Exceptions:

6.4 Calculate exit period base price and adder

Sub-process:	BA-010 Calculate the exit period base price and factors
Process:	Calculate exit period base price and adder
Code references:	14A.5, Schedule 14A.1.10(2)(c)(i), Schedule 14A.1.10(3), Schedule 14A.1.10(4)
Dependencies:	VP-010
Module Name	

Description:
<p>The clearing manager determines and publishes the exit period base prices, and the elements used in their calculation. The monthly base prices are published quarterly, 2 months in advance of the next quarter.</p> <p>The elements that are used to calculate the base price are:</p> <ul style="list-style-type: none"> • Average ASX quarterly futures prices (ASXQFP). • Monthly profile factors (MPF). • Quarterly and day type profile factors (QDTPF). • Quarterly trading period and day type profile factors (QTPDTPF). • Yearly nodal profile factors (YNPF). <p>The Average ASX quarterly futures prices are not published.</p>

Business requirements:
<ol style="list-style-type: none"> 1. The clearing manager must calculate the exit period base prices using the methodology set out in the document <i>Settlement and Prudential Securities Methodologies</i>. 2. The clearing manager must calculate and publish the exit period base prices for each month, node, day type and trading period in the next quarter by 2 months prior to the start of the quarter. 3. The clearing manager must calculate the average ASX quarterly futures prices for each reference node (island) for the next quarter by 2 months prior to the start of the quarter. 4. The clearing manager must calculate and publish the monthly profile factors annually, for each reference node and month in the next calendar year by 31st October of the previous year. 5. The clearing manager must calculate and publish the quarterly and day type profile factors annually for each reference node, quarter and day type (business or non-business day) for the next calendar year by 31st October of the previous year. 6. The clearing manager must calculate and publish the quarterly trading period and day type profile factors annually for each reference node, quarter, trading period and day type (business or non-business day) for the next calendar year by 31st October of the previous year. 7. The clearing manager must calculate and publish the yearly nodal profile factors annually for each node for the next calendar year by 31st October of the previous year.

8. The clearing manager must not use any historical final or interim prices for trading dates prior to 01/10/2010 and must be able to exclude the prices of specific quarters. At least 3 years of historical prices must be used to a maximum of 10 years.

Data inputs:

- All open ASX Quarterly daily closing prices per reference node (Otauhu representing the North Island and Benmore representing the South Island) from the previous calendar month. N.B. ASX prices are only available on business days.
- Quarters exclusion list. Details the list of quarters to exclude when selecting historical final prices.
- Historical prices – final prices, or interim prices where final prices are unavailable, per node, trading date and trading period. All prices are extracted from 01/10/2010 up to the last day of the previous month but excluding the months indicated in the quarters exclusion list.
- Configuration parameters/run variables:
 - a. Exit period – initially set at 19 days.
 - b. ASX days – initially set at 20 days.**

Processing:

The system:

- Calculates the *average ASX quarterly futures prices (ASXQFP)* per quarter per island by averaging the ASX quarterly daily closing prices for the last *ASX days* of the previous month. The resultant 2 quarterly averages apply across all nodes that reside within the respective island and for all trading periods and day types in the following quarter. If any of the day's closing prices are missing then the reduced number of prices are averaged.
- Calculates the *monthly profile factors (MPF)* per island per month for every month in the following year. The factor is the ratio of the average historical price of a specific month (e.g., January), aggregated by month and island, against the average historical price of the quarter in which the month occurs (e.g., Quarter1), aggregated by quarter and island. The resultant 2 island prices of each month apply across all nodes that reside within the respective island and for all trading periods and day types in that month of the following year.
- Calculates the *quarterly and day type profile factors (QDTPF)* per day type per quarter per island for the following year. The factor is the ratio of the average historical price of a specific quarter (e.g., Quarter1), aggregated by quarter, day type and island, against the corresponding quarter's average historical price, aggregated by quarter and island (not by day type). The resultant quarterly day type island average applies to the same quarter and day type in the following year and for all trading periods and all nodes that reside in the respective island.
- Calculates the *quarterly trading period and day type profile factors (QTPDTPF)* per trading period per day type per quarter per island for the following year. The factor is the ratio of the average historical price of a specific quarter, aggregated by quarter, trading period, day type and island, against the corresponding quarter's average

historical price aggregated by quarter, day type and island (not by trading date). The resultant quarterly trading date day type island average applies to the same quarter, trading date and day type in the following year and to all nodes that reside in the respective island.

- Calculates the *yearly nodal profile factors* (YNPF). The factor is the ratio of the average historical price of a specific node against the average historical price of the reference node of the corresponding island. The resultant yearly nodal average applies to all day types and trading periods of the specific node in the following year.
- Calculates the exit period base price for each month by node, trading period and day type as follows:

$$\text{Exit Period Base Price} = \text{ASXQFP} \times \text{MPF} \times \text{QDTPF} \times \text{QTPDTPF} \times \text{YNPF}$$

- Outputs and publishes the exit period base prices, ASXQFP, MPF, QDTPF, QTPDTPF and YNPF together with the quarters exclusion list.

Data outputs:

- The average ASX quarterly futures prices (ASXQFP) per island per quarter including the actual number of days used to calculate the average ASX values.
- The monthly profile factors (MPF) per island per month per year.
- The quarterly and day type profile factors (QDTPF) per day type per quarter per island per year.
- The quarterly trading period and day type profile factors (QTPDTPF) per trading period per day type per quarter per island per year.
- The yearly nodal profile factors (YNPF) per node per year.
- The quarters exclusion list.
- The exit period base prices per year, quarter, month, day type, node and trading period.

Exceptions:

When calculating prices and factors for 2011, 2012 and 2013, fewer than 3 years of historical prices can be used.

Sub-process:	BA-020 Calculate the adder
Process:	Calculate exit period base price and adder
Code references:	14A.5, Schedule 14A.1.10(2)(c)(ii), Schedule 14A.1.10(5), Schedule 14A.1.10(6)
Dependencies:	RV-060, PR-010, VP-010
Module Name	

Description:
<p>The clearing manager determines and publishes an adder price annually on or before October 31st in any year for the following calendar year. This is a single price that applies to all nodes and trading periods in that year. The adder is a historical margin of the difference between the actual exit period exposure and the profiled (forecast) exit period exposure.</p> <p>The system is able to calculate the adder quarterly, if required.</p>

Business requirements:
<ol style="list-style-type: none"> 1. The clearing manager must calculate the adder prices using the methodology set out in the document <i>Settlement and Prudential Securities Methodologies</i>. 2. The clearing manager must calculate and publish the adder price(s) annually by 31st October for the following year. Either a single annual price or 4 quarterly prices must be calculated and published. Initially only an annual price must be calculated and published. 3. The clearing manager must not use any historical data for trading dates prior to 1 October 2010 in the calculation of the annual adder. At least 3 years of historical information must be used to a maximum of 10 years. 4. The adder must be expressed in \$/MWh and must not be negative.

Data inputs:
<ul style="list-style-type: none"> • Quarters exclusion list. Details the list of quarters to exclude when calculating exposure differences. • Historical prices – final prices or interim prices where final prices are unavailable, per node, trading date and trading period. All final prices are extracted from 01/10/2010 up to the last day of the previous month. • Half hour demand (bus load) information (RV-060) adjusted for embedded generation, intermittent generation and dispatchable demand (i.e., adjusted bus load) per node, trading date and trading period. • Exit period base prices for each quarter by node, trading period and day type (PR-010). • Configuration parameters/run variables:

- c. Exit period – initially set at 19 days.
- d. Constant proportion – initially set at 5%.
- e. Rolling days – initially set at 21 days.
- f. Adder frequency – quarterly or annual. Initially set to annual.

Processing:

The system:

- Calculates the *profiled exit period quantities* for every node, trading date, trading period and day type by:
 - Calculating the rolling day type averages of the hypothetical load where hypothetical load = the *constant proportion* of each node's positive adjusted bus load. There will therefore be 2 values per trading period i.e. a rolling average for each day type; and
 - Multiplying each of the rolling day type averages by the corresponding number of business days or non-business days (day type) in the exit period (including the trading date being processed).
- Calculates the *profiled exit period exposure* by summing the exit period base prices of the following *exit period* (including the current day) for day type = business days for the same node and trading period and also summing the base prices of the following *exit period* (including the current day) for day type = non-business days for the same node and trading period. These 2 figures are then multiplied by the corresponding *profiled exit period quantity* (for this trading date) and then summed.
- Calculates the *actual exit period quantities* for each node, trading date and trading period by adding the hypothetical load values of the following *exit period* (including the current day), for the same node and trading period.
- Calculates the *actual exposure* by multiplying the hypothetical load for each node, trading date and trading period by the corresponding trading period's historical price.
- Calculates the *actual exit period exposure* for each node, trading date and trading period by summing the *actual exposures* for the following *exit period* (including the current day), for the same node and trading period.
- Calculates the *Adder Shortfall* per trading date
 - = Sum *actual exit period exposure* across all nodes and trading periods of the trading date –
 - Sum *profiled exit period exposure* across all nodes and trading periods of the trading date
- Calculates the *Initial Adder* per trading date
 - = *Adder Shortfall* / Sum *actual exit period quantities* across all nodes and trading periods
 - If the result is negative then the Initial Adder is zero.
- Derives the *Adder* for the next year by:

1. Excluding the Initial Adders for the trading dates in the quarters indicated in the quarters exclusion list.
 2. Assigning each remaining Initial Adder to the appropriate grouping - year or quarter in the following year (as indicated by the Adder frequency),
 3. Ranking the Initial Adders, within each group, in descending value sequence.
 4. Identifying the lowest Initial Adder value of the top 25% percentile of each group.
- Outputs and publishes the Adder(s).

Data outputs:

- The adder \$/MWh price(s) for the year or quarters.
- The quarters exclusion list.

Exceptions:

When calculating the adder for 2011, 2012 and 2013, fewer than 3 years of historical information can be used.

6.5 Calculate prudential exposure

Sub-process:	PE-010 Make prudential exposure adjustments
Process:	Calculate prudential exposure
Code references:	14A.17 (3) (a)
Dependencies:	
Module Name	

Description:
<p>The clearing manager may add or subtract adjustment amounts to a participant's energy quantities and for ancillary service costs to increase or decrease a participant's prudential exposure for the associated prudential categories – energy purchases, energy sales and ancillary services. The adjustments are to account for information received from a new participant, significant changes to a participant's business, for an under-frequency event or for unoffered generation (UOG).</p> <p>This process is for the clearing manager to input adjustment records. Their usage is described in PE-030, PE-040 and PE-050.</p>

Business requirements:
<ol style="list-style-type: none"> 1. The clearing manager must be able to add, subtract or replace exposure amounts to be applied on a particular run date to the calculation of overall prudential exposure for a participant. 2. Adjustments must be categorised as applying to the outstanding period or to the exit period, and must be specified by trading date, trading period and GIP/GXP. The adjustments can be in volumes bought or sold or in dollar amounts. Dollar amounts will be treated as ancillary services amounts but can be for any purpose. 3. There must be an audit trail of all adjustments made by the clearing manager with an explanation for the adjustment. 4. Adjustments must be able to be maintained online or via an upload facility.

Data Inputs:			
1. Pre manual adjustments			
2. Manual adjustments:			
Field	Format	Mandatory/ optional	Description
Run date	Date	M	
Party	Char(4)	M	Participant identifier
Trading Date	DD-Mon-YY	M	
Trading Period	Number(2)	M	1 to 50.
Node	Varchar(8)	M	Applicable GXP or GIP

Adjustment Category	Char(2)	M	CB - Change of Business, NE - New Entrant
Exposure Type	Char(1)	M	O – Outstanding, X - Exit Period
Adjustment Type	Char(2)	M	QP - Purchase Quantities, QS - Sale quantities, UG - Unoffered Generation, AS - Ancillary Services
Action Type	Char(1)	M	A – add, R – replace. Ancillary Services must have an action type a (add)
Adjustment Volume	Number(10,3)	M/O	MWh. May be negative. If adjustment type = AS must be null otherwise must be provided
Adjustment Amount	Number(8,2)	M/O	\$. May be negative. If adjustment type = AS must be provided otherwise must be null
Reason	Varchar(4000)	M	Free text

Processing:

The system:

1. Validates prudential exposure adjustment information input or uploaded by the clearing manager.
2. Generates audit trail information and stores the validated exposure adjustment information as manual adjustments.

Data outputs:

- Manual adjustments – same as input but with the addition of audit trail information.

Exceptions:

Sub-process:	PE-020 Calculate market share
Process:	Calculate prudential exposure
Code references:	
Dependencies:	RV-050 MR-090
Module Name	

Description:
The market share at each node for each participant identifier is calculated based on the reconciliation data.

Business requirements:
1. The clearing manager must calculate market share according to the clearing manager methodology, which requires the clearing manager to calculate market share based on reconciled (consumption) data for a prior complete consumption period.

Data inputs:
<ul style="list-style-type: none"> • Run date • Reconciliation information (RV-050)

Processing:
<p>The system:</p> <ol style="list-style-type: none"> 1. Checks to see if there is new reconciliation information, and calculates new market share ratios if it there is new data. 2. Calculates the market share ratio by summarising the reconciled quantities (consumption and generation) from the most recent consumption period for which data is available by: <ol style="list-style-type: none"> a) participant identifier, b) power type (load), c) POC, d) day type (weekday/weekend), e) 3 hourly block, where each trading block covers 3 hours of a normal 48 period trading day: <ol style="list-style-type: none"> 1. 00:00 to 03:00 (3 hours normally, 2 hours on daylight saving end date, 4 hours on daylight saving start date) 2. 03:00 to 06:00 3. 06:00 to 09:00 4. 09:00 to 12:00 5. 12:00 to 15:00 6. 15:00 to 18:00

7. 18:00 to 21:00
 8. 21:00 to 00:00
- Divides each summed quantity above by the sum of all the participant identifiers' reconciled quantities according to:
 - power type (load),
 - POC,
 - day type (weekday/weekend),
 - 3 hourly block.

Data outputs:

- Market Share information for each participant identifier at each node per power type, day type and 3 hourly block for each run date.

Exceptions:

Sub-process:	PE-030 Calculate the outstanding and exit period exposures to ancillary services
Process:	Calculate prudential exposure
Code references:	Schedule 14A.1 Part 2
Dependencies:	PE-010 DI-010 MR-080 MR-090
Module Name	

Description:

The outstanding and exit period exposures to ancillary services are calculated every business day per participant identifier or participant group.
Ancillary service exposure amounts are estimated from the latest settled amounts, modified by any applicable manual adjustments that have been loaded.

Business requirements:

1. The clearing manager must calculate the exposure amounts of each participant identifier's ancillary services for the outstanding period and the exit period.

Data inputs:

- Run dates – today's date.
- Settled ancillary service amounts
- Invoiced but not settled ancillary service amounts (DI-010) excluding GST.
- Manual adjustments (PE-010).
- Participant exit period register (MR-080)

Processing:

The system

- Calculates the ancillary services (AS) daily estimate for each participant identifier by taking the sum of their ancillary services amounts from the last settled billing month and dividing by the number of days in that month.
- Calculates each participant identifier's AS outstanding amount as at the run date as follows:
 - outstanding period = number of days commencing on the start date of the last billing period and ending on the day before the run date (trading dates that have been settled are excluded);
 - AS outstanding amount = sum of the invoiced but not settled amounts for ancillary services + AS manual adjustments + (outstanding period * ancillary services daily estimate);
 - AS manual adjustments = aggregate of the manual adjustments that have an adjustment type of AS, an exposure type = O and trading dates and trading periods within the outstanding period.

- Calculates each participant identifier's AS exit period amount as at the run date as follows:
- exit period = participant's applicable exit period from the participant exit period register;
- AS exit period amount = (exit period * ancillary services daily estimate) + AS manual adjustments;
- AS manual adjustments = aggregate of the manual adjustments that have an adjustment type of AS, an exposure type = X and trading dates and trading periods within the outstanding period.

Data outputs:

- AS outstanding amount and AS exit period amount per participant identifier and run date.

Exceptions:

Sub-process:	PE-040 Calculate the outstanding and exit period exposures to energy purchases
Process:	Calculate prudential exposure
Code references:	
Dependencies:	BA010, BA-020, PE-010, MR-080, RV-050, RV-060, RV-070, DI-010, MR-090, MR-010
Module Name	

Description:

The outstanding and exit period exposures to energy purchases are calculated every business day per participant identifier and participant group.

Exposure to energy purchase uses energy purchase amounts from the latest published but unsettled invoice and reconciliation information or bus load data (historic load) apportioned by the participant identifier's market share and manual adjustments. Prices used are: final prices or, where these are unavailable, interim prices or, where these are unavailable, exit base prices plus adder.

Business requirements:

1. The clearing manager must calculate the exposure amounts to energy purchases of each participant identifier and participant group (where relevant) for the outstanding period and exit period. The exposure amounts must exclude GST.
2. The clearing manager must be able to adjust estimated purchase quantities using volume adjustments to account for information received from a new participant, significant changes to a participant's business. Adjustments must not be applied to trading dates and trading periods that have reconciled quantities. Adjustments can be for additional volumes (these can be negative) or for the replacement of the estimated quantities. If the result is a negative quantity, zero must be used. Where there are multiple adjustments for the same trading date and trading period, the maximum must be used.

Data inputs:

- Run date
- Manual adjustments (PE-010).
- Participant identifier's market share information (PE-020)
- Grid point information (MR-010)
- Daylight savings information (MR-010)
- Participant exit period register (MR-080)
- Reconciliation information (RV-050)
- Aggregated embedded generation (RV-050)
- Exit period base prices and adder (BA-010 and BA-020)
- Historic load information (RV-060)
- Cleared nominated dispatch bids (RV-070)
- Cleared offers from PRSS and NRSS schedules (RV-070)

- Invoiced but not settled energy purchase volumes (DI-010) excluding GST.

Processing:

The system:

1. Calculates each participant's energy purchases outstanding exposure for each participant node, trading date and trading period in the outstanding period as at the run date as follows:

outstanding purchases exposure = unsettled invoiced purchase amount +
(quantity purchased * exposure price)

Where:

unsettled invoiced purchase amount = any published invoiced amount for spot purchases that remains unsettled (this figure excludes GST)

and

quantity purchased = reconciled volumes, if available, otherwise estimated purchase volumes

and

exposure price = final price, if available, otherwise interim price, if available, otherwise exit period price + adder price

and

estimate purchase volumes are calculated as:

- i. [bus load at the node (for the trading period) + cleared type B co-generation offers + the maximum of (average embedded generation volume - average cleared offers volume, 0)] x market share + cleared nominated dispatch bid volumes,
(For TWI2201, for participant identifiers NZAB and NZAP, historical load is not assigned by market share. Instead, after market share is allocated to all other participants, the remainder is split as follows: the first Y MW is allocated to NZAB and any load over Y MW allocated to NZAP. Y is a parameter defined by the clearing manager); or
 - ii. for nodes with grid connected type B co-generation, the average consumption recorded per trading period in the most recent month of reconciliation information; or
 - iii. if there is no bus load information available for a trading period then the estimated quantity is calculated in the same way as for the exit period quantity calculation;
- plus**
- iv. any additional volume from manual adjustments table or if the adjustment is a replacement, then the estimate calculated above is replaced by the adjustment volume. The manual adjustment must have an adjustment type of QP, an exposure type = O and trading dates and trading periods within the outstanding period. If the resultant volume is negative, zero is used. If there are multiple adjustments for a trading period, the maximum is used.

Where

average embedded generation volume = latest available consumption period's aggregate embedded generation/number of trading periods in the consumption period.

and

average cleared offers volume = aggregate cleared offers for the corresponding month for which embedded generation is available /number of trading periods in the consumption period.

and

outstanding period = commencing on the start date of the last billing period and ending on the day before the run date (trading periods that have been settled are excluded).

2. Calculates each participant's energy exit period purchases exposure for each participant node, trading date and trading period in the exit period as at the run date as follows:

exit period purchases exposure = quantities_{n,TP,daytype,month} X
(exit price_{n,TP,daytype,month} + adder)

where:

quantities_{n,TP,daytype,month} is calculated as:

- i. the 21 day rolling average of the net recalculated outstanding quantity purchased for each participant, for each trading period at each node for business and non-business days;
plus
- ii. any additional volume from manual adjustments table or if the adjustment is a replacement, then the estimate calculated above is replaced by the adjustment volume. The manual adjustment must have an adjustment type of QP, an exposure type = X and trading dates and trading periods within the exit period. If the resultant volume is negative, zero is used. If there are multiple adjustments for a trading period, the maximum is used.

and

exit period = commences from run date up to run date + the participant's applicable exit period from the participant exit period register.

3. Aggregates the outstanding and exit period energy purchases exposures (separately) for the participant at the run date and if applicable, for the participant group. No GST is calculated on these exposure amounts.

Data outputs:

- Energy purchases outstanding exposure per run date, participant, POC, trading date and trading period.
- Energy purchases exit period exposure per run date, participant, POC, trading date and trading period.
- Aggregated energy purchases outstanding exposure per run date and participant.
- Aggregated energy purchases exit period exposure per run date and participant.

- Aggregated energy purchases outstanding exposure per run date and participant group.
- Aggregated energy purchases exit period exposure per run date and participant group.

Exceptions:

Sub-process:	PE-050 Calculate the outstanding and exit period exposures to energy sales
Process:	Calculate prudential exposure
Code references:	Schedule 14A.1 Part 2
Dependencies:	BA010, BA-020, PE-010, MR-080, RV-050, RV-060, RV-070 MR-090
Module Name	

Description:

The outstanding and exit period exposures to energy sales are calculated every business day per participant identifier and participant group.
Exposure to energy sales uses energy sale/generation amounts from the latest published but unsettled invoice, reconciliation information and manual adjustments. Prices used are final prices or, where these are unavailable, interim prices or, where these are unavailable, exit base prices plus adder.

Business requirements:

1. The clearing manager must calculate the exposure amounts to energy sales of each participant identifier and participant group (where applicable) for the outstanding period and exit period. The exposure amounts must exclude GST.

Data inputs:

- Run date
- Manual adjustments (PE-010).
- Participant exit period register (MR-080)
- Reconciliation information (RV-050)
- Exit period base prices and adder (BA-010 and BA-020)
- Invoiced but not settled energy sale volumes (DI-010) excluding GST
- Cleared offers from PRSS and NRSS schedules – whichever is the latest (RV-070)
- Unoffered generation (RV-040)

Processing:

The system:

1. Calculates each participant identifier's energy sales outstanding (period) exposure for each participant node, trading date and trading period in the outstanding period as at the run date as follows:

$$\text{outstanding sales exposure} = \text{unsettled invoiced sale amount} + (\text{quantity sold} * \text{exposure price})$$

where:

unsettled invoiced sale amount = any published invoiced amount for spot sales that remains unsettled.

and

quantity sold = reconciled volumes, if available, otherwise estimated sale volumes.

and

exposure price = final price, if available, otherwise interim price, if available, otherwise exit period price + adder price.

and

estimated sale volumes are calculated as:

- i. cleared offers.

plus

- ii. any additional volume from the manual adjustments table or if the adjustment is a replacement, then the estimate calculated above is replaced by the adjustment volume. The manual adjustment must have an adjustment type of QS or UG, an exposure type = O and trading dates and trading periods within the outstanding period. If the resultant volume is negative, zero is used. If there are multiple adjustments of the same adjustment type for a trading period, the maximum is used. Adjustment quantities of Adjustment Types of UG are in addition to any QS adjustments.

and

outstanding period = commencing on the start date of the last billing period and ending on the day before the run date (trading periods that have been settled are omitted).

2. Calculates each participant identifier's energy exit period sales exposure for each participant identifier,node, trading date and trading period in the exit period as at the run date as follows:

exit period sales exposure = quantities_{n,TP,daytype,month} X
(exit price_{n,TP,daytype,month} + adder)

where:

quantities_{n,TP,daytype,month} is calculated as:

- i. the 21 day rolling average of the net recalculated outstanding quantity sold for each participant identifier, for each trading period at each node for business and non-business days,

plus

- ii. any additional volumes from the manual adjustments table or if the adjustment is for replacement, then the estimate calculated above is replaced by the adjustment volume. The manual adjustment must have an adjustment type of QS or UG, an exposure type = X and trading dates and trading periods within the exit period. If the resultant volume is negative, zero is used. If there are multiple adjustments of the same adjustment type for a trading period, the maximum is used. Adjustment quantities of Adjustment Types of UG are in addition to any QS adjustments;

and

exit period = commences from run date up to run date + the participant's applicable exit period from the participant exit period register.

3. Aggregates the outstanding and exit period energy sales exposures (separately) for the participant identifier at the run date and if applicable, for the participant group. No GST is calculated on these exposure amounts.

Data outputs:

- Energy sales outstanding exposure per run date, participant identifier, POC, trading date and trading period.
- Energy sales exit period exposure per run date, participant identifier, POC, trading date and trading period.
- Aggregated energy sales outstanding exposure per run date and participant identifier.
- Aggregated energy sales exit period exposure per run date and participant identifier.
- Aggregated energy sales outstanding exposure per run date and participant identifier or participant group.
- Aggregated energy sales exit period exposure per run date and participant identifier or participant group.

Exceptions:

Sub-process:	PE-060 Calculate the outstanding and exit period exposures to hedges
Process:	Calculate prudential exposure
Code references:	Schedule 14A.1 Part 2
Dependencies:	BA-010, BA-020, PE-010, CH-020, DI-010, MR-080, MR-090 PR-010
Module Name	

Description:

The outstanding and exit period exposures to hedges are calculated every business day per participant and participant group.

The calculation of exposure to hedges uses the daily hedge settlement amounts calculated when new final prices are available, hedge amounts from the latest published but unsettled invoices and the contract notional amounts. Prices used are contract fixed prices and final prices or, where these are unavailable, interim prices or, where these are unavailable, exit base prices plus adder.

Business requirements:

1. The clearing manager must calculate the exposure amounts to hedges of each participant and participant group for the outstanding period and exit period. Hedges do not attract GST.

Data inputs:

- Run date
- Participant exit period register (MR-080)
- Exit period base prices and adder (BA-010, BA-020)
- HSA details (CH-020)
- Hedge settlement amounts (DI-010)

Processing:

The system:

1. Calculates hedges outstanding exposure for each hedge payer, hedge contract, node, trading date and trading period in the outstanding period as at the run date as follows:

hedges outstanding exposure = unsettled invoiced hedge amount + settlement amount + cash settlement amount + premium amount

Where

outstanding period = commencing on the start date of the last billing period and ending on the day before the run date (trading periods that have been settled are omitted).

and

unsettled invoiced hedge amount = published invoiced amount for hedges that remains unsettled

and

settlement amount is derived from active fixed price hedges

and

cash settlement amount and premium is derived from active cap/floor hedges and cap/floor average hedges.

For fixed price hedges:

for floating price payers:

settlement amount = notional quantity * (floating price - fixed price)

and for fixed price payers:

settlement amount = the negative of the settlement amount of the floating price payer

where

notional quantity = hedge contract notional quantity,

and

fixed price = hedge contract fixed price,

and

floating price = final price, if available, otherwise interim price, if available, otherwise exit period price + adder price.

For cap/floor hedges:

for the option buyer:

option premium = contract calculation period premium; and

cash settlement amount = the negative of the notional quantity multiplied by the strike price differential

and for the option seller:

option premium = the negative of the option buyer's option premium, and

cash settlement amount = the negative of the option buyer's cash settlement amount

where

strike price differential is:

- i. for a put option: the greater of the strike price minus the floating price, and zero;
- ii. for a call option: the greater of the floating price and the strike price, and zero.

and

floating price = final price, if available, otherwise interim price, if available, otherwise exit period price + adder price.

and

strike price = contract strike price.

For cap/floor average hedges:

for the option buyer:

option premium = contract calculation period premium; and
cash settlement amount = the negative of the notional quantity multiplied by the strike price differential

and for the option seller:

option premium = the negative of the option buyer's option premium

and

cash settlement amount = the negative of the option buyer's cash settlement amount

where

strike price differential is:

- i. for a put option: the greater of the strike price minus the average floating price, and zero;
- ii. for a call option: the greater of the average floating price minus the strike price, and zero.

and

average floating price is the option period floating price amount divided by the option period notional quantity, where:

- i. the option period floating price amount is the aggregate of the calculation period floating amounts for each calculation period in that option period;
- ii. the calculation period floating amount is the product of the notional quantity multiplied by the floating price;
- iii. the option period notional quantity is the aggregate of the notional quantities for each calculation period in the option period.

and

floating price = final price, if available, otherwise interim price, if available, otherwise exit period price + adder price.

and

strike price = contract strike price.

2. Calculates each payer's exit period hedge exposure for each hedge contract, node, trading date and trading period in the exit period as at the run date in the same manner as for the outstanding period hedges exposure above except that:

floating price = exit period price + adder price

and

exit period = commences from run date up to run date + the participant's applicable exit period from the participant exit period register.

3. Aggregates the outstanding and exit period hedge exposures (separately) for the participant at the run date and if applicable, for the participant group (no GST is calculated on these exposure amounts).

Data outputs:

- Hedges outstanding exposure per run date, hedge contract, participant, node, trading date and trading period.
- Hedges exit period exposure per run date, hedge contract, participant, node, trading date and trading period.
- Aggregated hedges outstanding exposure per run date and participant.
- Aggregated hedges exit period exposure per run date and participant.
- Aggregated hedges outstanding exposure per run date and participant group.
- Aggregated hedges exit period exposure per run date and participant group.

Exceptions:

Sub-process:	PE-070 Calculate the outstanding exposure to washups
Process:	Calculate prudential exposure
Code references:	Schedule 14A.1 Part 2
Dependencies:	DI-010
Module Name	

Description:

The outstanding exposures to wash-ups, for wash-up amounts published on the prior invoice but still unsettled, are included in the calculation of the prudential exposure per participant and participant group.

Business requirements:

1. The clearing manager must include unsettled wash-up amounts in the assessment of a participant and participant group's prudential exposure for the outstanding period.
2. GST on wash-ups is itemized separately in the prudential reports; however, wash-up interest does not attract GST so must be excluded from the calculation of GST. Wash-up exposure is exclusive of GST.

Data inputs:

- Run date
- Wash-up settlement amounts (DI-010)

Processing:

The system:

1. Calculates the wash-up exposure for each participant for the outstanding period as at the run date as follows:
 - wash-up outstanding exposure = sum of the unsettled wash-up amounts,
 - wash-up outstanding exposure that attracts GST = sum of the unsettled wash-up amounts minus any unsettled wash-up interest.
2. Aggregates the wash-up outstanding exposure and wash-up outstanding exposure that attracts GST for the participant group at the run date, if applicable.

Data outputs:

- Wash-up outstanding exposure per run date and participant.
- Wash-up outstanding exposure that attracts GST per run date and participant.
- Aggregated wash-up outstanding exposure per run date and participant group.
- Aggregated outstanding exposure that attracts GST per run date and participant.

Exceptions:

Sub-process:	PE-080 Calculate the outstanding exposure to 'other'
Process:	Calculate prudential exposure
Code references:	
Dependencies:	
Module Name	

Description:

The category of 'other' is used to include all the products listed in billed but unsettled invoices that are not already included in the other product lines detailed under exposure in the prudential reports. At present these may include amounts for constrained on and constrained off energy, dispatchable demand and instantaneous reserves, must-run dispatch auction, and loss and constraint excess.

Business requirements:

1. The clearing manager must be able to include payments from prior billed but unsettled invoices as additional exposure amounts, classified as "Other" in the prudential reports, not included under the categories of energy sales, energy purchases, ancillary services, FTRs, hedges, wash-ups as part of the assessment of a participant and/or participant group's prudential exposure for the outstanding period only.
2. GST must be calculated separately for those payment types that attract GST and included in the GST exposure category in the prudential report.

Data inputs:

- Run date
- Billed but unsettled invoice payment amounts per participant and participant group.

Processing:

The system:

1. Extracts the payments from prior billed but unsettled invoices that are not included in the prudential categories of energy sales, energy purchase, ancillary services, FTRs, hedges and wash-ups, and aggregates three amounts:
 - Other payments that attract GST; and
 - Other payments that do not attract GST; and
 - Total other payments (the above 2 added together).
2. Stores the aggregated information for the run date.

Data outputs:

- Other outstanding exposure that attracts GST per run date and participant or participant group.
- Total other outstanding exposure per run date and participant or participant group.

Exceptions:

Sub-process:	PE-090 Calculate the outstanding and exit period exposures to GST
Process:	Calculate prudential exposure
Code references:	Schedule 14A.1 Part 2
Dependencies:	PE-020, PE-030, PE-040, PE-050, PE-070, PE-080, MR-010, MR-090
Module Name	

Description:

The outstanding and exit period exposures to GST are included in the assessment of prudential exposure. GST is calculated on the prudential security exposure amounts for energy (purchases and sales), 'other' exposure, wash-ups that attract GST and ancillary services (AS). They are calculated every business day per participant and participant group.

Business requirements:

1. The clearing manager must include GST amounts in the assessment of a participant and participant group's prudential exposure for the outstanding and exit periods.

Data inputs:

- Run date
- GST rate (MR-010)
- Aggregated energy purchases outstanding exposure per run date and participant.
- Aggregated energy purchases exit period exposure per run date and participant.
- Aggregated energy purchases outstanding exposure per run date and participant group.
- Aggregated energy purchases exit period exposure per run date and participant group.
- Aggregated energy sales outstanding exposure per run date and participant.
- Aggregated energy sales exit period exposure per run date and participant.
- Aggregated energy sales outstanding exposure per run date and participant group.
- Aggregated energy sales exit period exposure per run date and participant group.
- Aggregated AS outstanding exposure per run date and participant.
- Aggregated AS exit period exposure per run date and participant.
- Aggregated AS outstanding exposure per run date and participant group.
- Aggregated AS exit period exposure per run date and participant group.
- Wash-up outstanding exposure that attracts GST per run date and participant.
- Aggregated wash-up outstanding exposure that attracts GST per run date and participant group.
- Other outstanding exposure that attracts GST per run date and participant or participant group.

Processing:

The system:

1. Calculates the GST exposure for each participant or participant group (if applicable) for the outstanding period and exit period as at the run date by multiplying the exposures for purchases, sales, ancillary services, washups and 'other' (if applicable) by the applicable GST rate.
2. Aggregates the outstanding and exit period exposures to GST separately for the participant or the participant group, if applicable, at the run date.

Data outputs:

- Aggregated GST outstanding exposure per run date and participant.
- Aggregated GST exit period exposure per run date and participant.
- Aggregated GST outstanding exposure per run date and participant group.
- Aggregated GST exit period exposure per run date and participant group.

Exceptions:

Sub-process:	PE-100 Calculate FTR exposure
Process:	Calculate prudential exposure
Code references:	Schedule 14A.1 Part 2
Dependencies:	RV-010, MF-030, MR-020
Module Name	PR-012, PR-016, PR-017

Description:

The clearing manager calculates the net exposure amount for each FTR participant by calculating the estimated FTR hedge value (\$) of each of their FTR holdings, deducting their respective acquisition cost, offsetting the result by the initial margin (\$) amount already lodged then summarising these values.

Where an FTR participant organisation has one or more subsidiary organisations that are also FTR participants, then the clearing manager allows the FTR exposure of the FTR participant group to be combined together.

N.B. FTR exposure is reported as outstanding exposure.

Business requirements:

1. The clearing manager must calculate the (market) value of each FTR participant's FTR holding(s) (i.e. estimated FTR hedge value) and deduct the acquisition cost and add any initial margin (\$) amount already lodged.
2. The clearing manager must calculate the exposure of FTR participants due to FTR assignment difference payments.
3. The clearing manager must calculate the exposure of FTR participants due to FTR reconfiguration amount payments.
4. The clearing manager must determine a total net FTR exposure amount for the FTR participant by summarising all the values.
5. The clearing manager must allow FTR participants with subsidiary FTR participants (an FTR participant group) to have their FTR exposure grouped together as the group parent participant's FTR exposure.

Data Inputs:

- Run date
- Assignor's acquisition cost (\$/MWh) (RV-010)
- Daily settlement price (\$/MWh) (MF-030)
- Disclosed assignment price (if disclosed) (\$/MWh) (RV-010)
- FTR holdings (RV-010)
- Initial margin amount posted by holder (RV-010)
- FTR acquisition cost (RV-010)
- FTR Reconfiguration sell price
- Member FTR participants for each FTR participant group (MR-020)

Processing:

The system:

1. Calculates the exposure for each current holding of every FTR participant using the estimated FTR hedge value (\$) as at the run date as follows:
exposure for each FTR holding (\$) = estimated FTR hedge value (\$) less the FTR acquisition value (\$) plus initial margin (\$) amount already posted as collateral (\$)
where:
estimated FTR hedge value (\$) = predicted daily settlement price (\$/MWh) of the FTR product multiplied by the volume of the FTR holding (MW) multiplied by the number of hours in the FTR period
and
the FTR acquisition value (\$) = acquisition cost (\$/MWh) of each FTR holding multiplied by the volume of the FTR holding (MW)
and
the initial margin (\$) amount = initial margin rate stored with the FTR holding information multiplied by the volume of the FTR holding (MW).
2. Calculates the exposure of FTR assignments that have not been settled as follows:
 - a) if there is no disclosed assignment price or disclosed assignment price = assignor acquisition cost, then the assignee must post prudential security based on the same acquisition cost as the original assignor:
 - assignee exposure (\$) = assignor's acquisition cost (\$/MWh) * assignment quantity (MW) * number of hours in the FTR period (h).
 - assignor exposure is reduced to zero and collateral may be returned.
 - b) if the disclosed assignment price > assignor acquisition cost then
 - assignee exposure (\$) = (disclosed assignment price – daily settlement price) * assignment quantity (MW) * number of hours in FTR period (h)
 - assignors have a prudential credit which is set at (disclosed assignment price – assignor acquisition cost) * assignment quantity * number of hours in FTR period (h). This applies until the FTR holding settles.
 - c) if the disclosed assignment price < assignor acquisition cost then
 - assignors have a prudential debit which is set at (acquisition cost - disclosed assignment price) * assignment quantity * number of hours in FTR period (h). (This applies until the next settlement date at which time the amount is paid to the CM by the assignor).
 - assignee exposure (\$) = zero (because the assignor is covering the clearing manager's whole exposure)
3. Calculate the exposure of any FTR reconfiguration amounts that have not yet been settled:
 - a. if the reconfiguration sell price > sellers original acquisition price then
the seller receives a credit reconfiguration amount = (reconfiguration sell price – acquisition price) * sell quantity (MW) * number of hours in FTR period (h) until the FTR settles
 - b. if the reconfiguration sell price < sellers original acquisition price then

the seller receives a debit reconfiguration amount = (reconfiguration sell price – acquisition price) * sell quantity (MW) * number of hours in FTR period (h) until the FTR settles.

4. Outputs the exposure and volumes (MW) for each FTR Holding, FTR assignment and FTR reconfiguration for each participant, assignor, assignee, and reconfiguration seller.
5. For each FTR participant, aggregates the net exposure over all their FTR holdings, reconfiguration amounts and FTR assignments as at the run date.
6. Additionally, aggregates the exposure of each FTR participant member of the FTR participant group to a total exposure amount for the whole FTR participant group.

Data outputs:

Per run date:

- FTR exposure and volume per assignee and assignor of each assignment
- FTR reconfiguration exposure and volume per seller of each reconfiguration
- FTR exposure and volume of each participant's FTR holding
- Aggregated net FTR exposure per FTR participant
- Aggregated exposure amount for the parent FTR participant of the FTR participant group (used for PE-130).

Exceptions:

Sub-process:	PE-110 Calculate prepayment amounts
Process:	Calculate prudential exposure
Code references:	14.30 (2) (b)
Dependencies:	PE-120, PE-130, DI-010, MR-020, PE-010
Module Name	

Description:
<p>A prepayment is an amount of money received as a deposit for the payment of consumption not yet incurred.</p> <p>A prepayment is assigned to an invoice period and may only be used for that invoice period. With the prepayment the participant provides instructions on what to do with any surplus – applied to the next invoice period or returned.</p> <p>Where a prepayment is deposited after the start of the assigned invoice period it may only be used for that portion of the month that is after the date it was received</p> <p>Prepayment amounts are calculated for the current date and the next 3 business days. For the next 3 business days, the prepayments are covered in the calculation of forward estimates (PE-120).</p> <p>Prepayments are only applied to amounts owed by the participants.</p> <p>Then for each month, how much of the quantity of each prepayment deposited can be used to cover the exposure in that month is determined on a pro rata basis. For instance if there are 11 days in the month after the prepayment was received then the prepayment can only apply to monthly amount owing * 11/number of days in the month. Any excess is either used in the next month's assessment, if the participant indicated it could.</p>

Business requirements:
<ol style="list-style-type: none"> 1. The clearing manager must calculate the amounts of prepayments that can be applied to prudential estimates for amounts owed by the participant or participant group for the outstanding and exit periods for the next 3 business days. 2. Prepayments must be strictly applied to the billing periods that they are specified to be for, and not for any exposure that was incurred before the clearing manager received the prepayment amounts. 3. Prepayments are to be deducted from amounts owing in prudential calculations.

Data inputs:
<ul style="list-style-type: none"> • Run date • Outstanding exposures for energy purchases, ancillary services, hedges, FTRs (PE-030 to PE-100), wash-ups and other per participant and participant group (if applicable). (PE-130) • Exit period exposure for energy purchases and ancillary services per participant and participant group (if applicable).(PE-130) • Adjustment amounts for ancillary services (PE-010). • Forward estimates for the current day and each of the next 3 business days per participant and participant group for the run date. (PE-120)

- Prepayments applicable to the exposure period for the current day and each of the next 3 business days per participant and participant group for the run date.
- Billed but unsettled invoice amounts with the settlement date (DI-010)
- Prudential group information (MR-020).

Processing:

The system:

1. Estimates the amount of prepayment that will be available for the exposure period (outstanding period + exit period) for the current day and the next three business days as follows:

- For each day (current and next 3 business days) calculate the Daily Average Exposure over the exposure period i.e.

Daily Average Exposure = exposure period total exposure/exposure period

where

exposure period total exposure is the sum of the amounts owed (for the run date) or the day's forward estimate. If the resultant value is negative then zero is assigned.

Amounts owed =

Outstanding (and adjusted) energy purchase amounts excluding billed but unsettled amounts; plus

Outstanding ancillary service adjustment amounts if > 0; plus

Outstanding ancillary service amounts if > 0 (excluding billed but unsettled amounts); plus

Outstanding hedge settlement amounts where each contract's settlement amount for a trading date and trading period > 0 (excluding billed but unsettled amounts); plus

FTR exposure where amount > 0; plus

Billed but unsettled amounts for outstanding energy purchases, washups, outstanding ancillary services, outstanding hedges, FTRs and Other if > 0; plus

GST calculated on the qualifying outstanding (and adjusted) energy purchase amounts, outstanding ancillary service adjustments, ancillary service amounts, wash-ups and Other; plus

Exit period (and adjusted) energy purchases; plus

Exit period ancillary service amounts if > 0; plus

Exit period ancillary service adjustment amounts > 0; plus

Exit Period hedge settlement amounts where each contract's settlement amount for a trading date and trading period > 0; plus

GST calculated on the qualifying exit period (and adjusted) energy purchase amounts, outstanding ancillary service adjustments and ancillary service amounts.

- Then for each prepayment (using the earliest received first) calculate the monthly prepayment amount that can be applied to each month in that day's exposure period, starting with the earliest month i.e.

monthly prepayment amount = MIN(daily average exposure * number of days in the month for which the prepayment can be used, prepayment amount)

For the next month's calculation the prepayment amount is reduced by the previous month's monthly prepayment amount

Note that

- the prepayment amount cannot be used for days on or prior to their date of receipt or for days prior to the commencement month.
 - if a prepayment amount was received in a prior month and there is a remainder available for the next month (as instructed by the participant) then that remainder is used in the above calculation.
2. Summarises the monthly prepayment amounts for each day (current and next 3 business days) per participant and participant group.

Data outputs:

1. Prepayment amounts for the current day and each of the next three business days per participant and participant group as at the run date.
2. Billed but unsettled invoice amounts due to be received for the current day and each of the next three business days per participant and participant group as at the run date.

Exceptions:

Sub-process:	PE-120 Calculate three-day forward estimates
Process:	Calculate prudential exposure
Code references:	
Dependencies:	PE-030, to PE-110, MR-010
Module Name	

Description:

Each business day the clearing manager estimates the exposure of each participant or participant group, for the next three business days.

The business and non- business day increment is calculated from the last seven days and these increments are used to estimate forward three business days. Three business days could include a number of non-business days.

Business requirements:

1. The clearing manager must calculate, each business day, the net exposure of each participant and participant group as at the run date, and the forward estimate for the next three business days.
2. The estimate must include the expected settlement payments, and prepayments that have been received.

Data Inputs:

- Run date
 - Aggregated energy purchases outstanding exposure for the last 7 run dates for the participant and participant group.
 - Aggregated energy sales outstanding exposure for the last 7 run dates for the participant and participant group.
 - Aggregated AS outstanding exposure for the last 7 run dates for the participant and participant group.
 - Aggregated GST outstanding exposure for the last 7 run dates for the participant and participant group.
 - Aggregated hedges outstanding exposure for the last 7 run dates for the participant and participant group.
 - Aggregated washup outstanding exposure for the last 7 run dates for the participant and participant group.
 - Net FTR exposure for the last 7 run dates for the FTR participant and FTR participant group
 - Other outstanding exposure for the last 7 run dates for the participant and participant group.
 - Amounts Payable due in the next three business days.
 - Amounts prepaid for the billing period(s) included in the next three business days.
- N.B. Last 7 run dates includes the current date.

Processing:

The system:

1. For each participant and per participant group, if applicable, for the run date and for each of the previous 7 days calculates:
total exposure =
 - energy purchases outstanding exposure
 - energy sales outstanding exposure
 - + ancillary services outstanding exposure
 - + hedges outstanding exposure
 - + GST outstanding exposure
 - + wash-up outstanding exposure
 - + other outstanding exposure
 - + FTR exposure

2. Calculates the average daily change in total exposure for business days and non-business days over the last seven days:
 - a) negative increments are treated as zero,
 - b) negative outstandings are treated as zero,
 - c) negative or zero outstandings will set increments to zero,
 - d) averages will not include any zero increments.

3. Calculates the number of business and non-business days between the run date and each of the next one, two and three business days.
Example: if run day is Thursday, next business day is Friday so there is 1 business day between; also, Monday is the next business day after and there are 2 business days and 2 non-business days between.

4. Calculates the forward estimate for each of the next one, two and three business days (after run date) as follows:
forward estimate = current day's total exposure
 - + (number of non-business days between * non-business day average daily change)
 - + (number of business days between * business day average daily change)

Data outputs:

- Forward estimate for the current day and each of the next 3 business days per participant and participant group for the run date, including any amounts that are due to be paid or prepayments for the billing periods included in the next three business days.

Exceptions:

Sub-process:	PE-130 Summarise exposure
Process:	Calculate prudential exposure
Code references:	Schedule 14A.1 Part 2
Dependencies:	PE-030 to PE-120, MR-010, MR-090
Module Name	

Description:

Each business day the clearing manager estimates the current day's net exposure of each participant, split into outstanding exposure and exit period exposure, for energy purchases on the spot market, energy sales on the spot market, ancillary services, hedge contracts, FTRs, wash-ups and for additional exposure amounts (classified as 'other') . GST is also itemised for the calculation of net exposure but is not calculated on FTR and hedge exposures.

Net exposure is summarised per participant and participant group defined Related Parties Group MR-090 (if applicable).

Also, the last 3 forward estimates previously calculated for the current day are also detailed, together with their associated pre-payments, in order to calculate the minimum security required, being the lowest of the 3 forward estimates minus the prepayments and any settlement payments expected to be received for a prior billed but unsettled invoice amounts.

In addition, the forward estimates for the next 3 business days are detailed together with their associated prepayment and settlement payment amounts.

Business requirements:

1. The clearing manager must calculate, each business day, the net exposure of each participant as at the run date for the time periods covered by the current exposure period and projected exposure period, including GST.
2. The clearing manager must not calculate GST on either hedges or FTRs.
3. The clearing manager must calculate 3 forward estimates for the next 3 business days.

Data Inputs:

- Run date
- Aggregated energy purchases outstanding exposure for the run date per participant and participant group.
- Aggregated energy purchases exit period exposure for the run date per participant and participant group.
- Aggregated energy sales outstanding exposure for the run date per participant and participant group.
- Aggregated energy sales exit period exposure for the run date per participant and participant group.
- Aggregated AS outstanding exposure for the run date per participant and participant group.

- Aggregated AS exit period exposure for the run date per participant and participant group.
- Aggregated GST outstanding exposure for the run date per participant and participant group.
- Aggregated GST exit period exposure for the run date per participant and participant group.
- Aggregated hedges outstanding exposure for the run date per participant and participant group.
- Aggregated hedges exit period exposure for the run date per participant and participant group.
- Aggregated washup outstanding exposure for the run date per participant and participant group.
- Aggregated washup exit exposure for the run date per participant and participant group.
- Net FTR exposure per FTR participant and parent FTR participant of the FTR participant group for the run date
- Total other outstanding exposure for the run date and participant and participant group.
- Forward estimates for each of the next 3 business days per participant and participant group calculated on the run date (PE-120).
- Historical forward estimates applicable to the current day, per participant and participant group, calculated on the run date and on each of the 3 previous business days (PE-120).
- Prepayments for each of the next 3 business days per participant and participant group calculated on the run date (PE-110).
- Historical prepayment amounts applicable to the current day, per participant and participant group, calculated on the run date and on each of the 3 previous business days (PE-110).
- Billed but unsettled invoice amounts for each of the next 3 business days per participant and participant group calculated on the run date (PE-110).
- Historical billed but unsettled invoice amounts applicable to the current day, per participant and participant group, calculated on the run date and calculated each of the 3 previous business days (PE-110).
- Prudential group information (MR-020).

Processing:

For each participant and per participant group, if applicable, and as at the run date, the system:

1. Calculates:

$$\begin{aligned} \text{outstanding exposure} = & \text{energy purchases outstanding exposure} \\ & - \text{energy sales outstanding exposure} \\ & + \text{ancillary services outstanding exposure} \\ & + \text{hedges outstanding exposure} \\ & + \text{GST outstanding exposure} \end{aligned}$$

	<ul style="list-style-type: none"> + washup outstanding exposure + other outstanding exposure + FTR exposure.
exit period exposure =	<ul style="list-style-type: none"> energy purchases exit period exposure - energy sales exit period exposure + ancillary services exit period exposure + hedges outstanding exposure + GST exit period exposure + other exit period exposure.
total exposure and total security required =	<ul style="list-style-type: none"> outstanding exposure + exit period exposure - prepayment amount applicable to the current day and calculated on run date.
2.	<p>Calculates the minimum-security requirements from previously calculated forward estimates for the current day:</p> <ul style="list-style-type: none"> minimum security required = MIN(previous 3 forward estimates for the current day) total payments = prepayments + settlement payment (relating to the minimum forward estimate) net security required = minimum security required - total payments.
3.	<p>Displays the forward exposures for the next 3 business days including their applicable prepayment and settlement payment amounts and the net exposure = forward estimate – (prepayments + settlement payment).</p>

Data outputs:	
	<ul style="list-style-type: none"> • Aggregated outstanding exposures for energy purchases, energy sales, ancillary services, wash-ups, hedges, FTR amounts, other amounts per participant and participant group (if applicable). • Aggregated exit period exposures for energy purchases, energy sales, ancillary services, wash-ups, hedges, FTR amounts, other amounts per participant and participant group (if applicable). • Outstanding exposure per participant and participant group (if applicable). • Exit period exposure per participant and participant group (if applicable). • Total exposure per participant and participant group (if applicable). • Forward estimates for the current day and each of the next 3 business days per participant and participant group calculated on the run date. • Prepayments + settlement payments for the current day and each of the next 3 business days per participant and participant group calculated on the run date. • Minimum security required per participant and participant group (if applicable). • Historical forward estimates applicable to the current day, per participant and participant group, calculated on the 3 prior business days.

- Prepayments + settlement payments applicable to the current day, per participant and participant group, calculated on the 3 prior business days.
- Net security required per participant and participant group (if applicable).

Exceptions:

6.6 Determine the minimum level of prudential security

Sub-process:	AS-005 Record prudential security details
Process:	Manage prudential security
Code references:	14A.1 to 14A.10, Schedule 14A.1
Dependencies:	PE-130, RV-010, MR-050, MR-090
Module Name	

Description:
<p>After approving changes to security levels or releases (as per MR-050), the clearing manager records the security details provided by participants (including credit ratings as applicable).</p> <p>The clearing manager also calculates the value of variable price guarantees as per Schedule 14A.2 (a) where a formula is used to calculate the value of the guarantee, based on a fixed amount at the final price (or best available price) for each trading period at a GXP/GIP/reference point.</p> <p>The clearing manager allows a group of related participants to have their prudential security calculated and recorded at an aggregated level (a “prudential related party group”).</p>

Business requirements:
<p>The clearing manager must:</p> <ul style="list-style-type: none"> • Keep a record of all forms of security provided by participants and store a scanned copy of any related document so that is readily accessible. • Calculate the total value of any variable price guarantee on a daily basis. • Store the current value of the value of the security. • Store the audit trail of all additions, changes and reductions of security amounts.

Data inputs:
<ul style="list-style-type: none"> • Run date • Security details that includes the value of the security and the date of approval (MR-050). • Security release/withdrawal/additions approval and value (MR-050). • Scanned copies of security documents, including digital documents.

Prudential Security Guarantors			
Field	Format	Mandatory/optional	Description
Guarantor Code	Varchar(6)	M	
Name	Varchar(50)	M	
Address	Varchar(100)	O	
Address 2	Varchar(100)	O	
Address 3	Varchar(100)	O	

Town City	Varchar(50)	O	
Postcode	Varchar(4)	O	
Created By	Varchar(30)	M	
Created Date	DD/MM/YYYY HH:MM	M	
Modified By	Varchar(30)	O	
Modified Date	DD/MM/YYYY HH:MM	O	
• (Second) Secured Parties			
Field	Format	Mandatory/ optional	Description
Secured Party Code	Varchar(6)	M	
Name	Varchar(50)	M	
Address	Varchar(100)	O	
Address 2	Varchar(100)	O	
Address 3	Varchar(100)	O	
Town City	Varchar(50)	O	
Postcode	Varchar(4)	O	
Created By	Varchar(30)	M	
Created Date	DD/MM/YYYY HH:MM	M	
Modified By	Varchar(30)	O	
Modified Date	DD/MM/YYYY HH:MM	O	
• Participant Acceptable Credit Rating			
Field	Format	Mandatory/ optional	Description
Organisation	Varchar(4)	M	Valid organisation code
ACRR Id	Numeric(10)	M	Code of the agency and rating
Comments	Varchar(250)	O	
Start Date	DD/MM/YYYY	M	There can only be one credit rating for an organisation per date range. Date ranges (Start Date, End Date) cannot overlap. Cannot be before the commencement date of the organisation.
End Date	DD/MM/YYYY	O	Must be greater than or equal to the Start Date, if not null. Must be greater than or equal to today's date, if not null
Created By	Varchar(30)	M	
Created Date	DD/MM/YYYY HH:MM	M	
Modified By	Varchar(30)	O	
Modified Date	DD/MM/YYYY HH:MM	O	
• Surety Bond			
Field	Format	Mandatory/ optional	Description
Organisation	Varchar(4)	M	Valid organisation code

Amount	Numeric(12,2)	M	
Bond Number	Varchar(50)	M	
Guarantor Code	Varchar(6)	M	Valid guarantor
Comments	Varchar(250)	O	
Security Status Code	Varchar(1)	M	Valid security status
Accepted Date	DD/MM/YYYY	O	
Start Date	DD/MM/YYYY	M	Cannot be before the commencement date of the organisation.
End Date	DD/MM/YYYY	O	Must be greater than or equal to the Start Date, if not null. Must be greater than or equal to today's date, if not null
Created By	Varchar(30)	M	
Created Date	DD/MM/YYYY HH:MM	M	
Modified By	Varchar(30)	O	
Modified Date	DD/MM/YYYY HH:MM	O	
• Participant Bank Guarantee			
Field	Format	Mandatory/ optional	Description
Organisation	Varchar(4)	M	Valid organisation code
Bank Guarantee Number	Varchar(50)	O	
Amount	Numeric(12,2)	M	
Bank Code	Varchar(8)	M	Valid bank
Comments	Varchar(250)	O	
Security Status Code	Varchar(1)	M	Valid security status
Accepted Date	DD/MM/YYYY	O	
Start Date	DD/MM/YYYY	M	Cannot be before the commencement date of the organisation.
End Date	DD/MM/YYYY	O	Must be greater than or equal to the Start Date, if not null. Must be greater than or equal to today's date, if not null
Created By	Varchar(30)	M	
Created Date	DD/MM/YYYY HH:MM	M	
Modified By	Varchar(30)	O	
Modified Date	DD/MM/YYYY HH:MM	O	
• Deed of Guarantee and Indemnity			
Field	Format	Mandatory/ optional	Description
Organisation	Varchar(4)	M	Valid organisation code
Guarantor Code	Varchar(6)	M	Valid guarantor

Comments	Varchar(250)	O	
Security Status Code	Varchar(1)	M	Valid security status
Accepted Date	DD/MM/YYYY	O	
Start Date	DD/MM/YYYY	M	Cannot be before the commencement date of the organisation.
End Date	DD/MM/YYYY	O	Must be greater than or equal to the Start Date, if not null. Must be greater than or equal to today's date, if not null
Interest Rate	Numeric(5,2)	O	
Settlement Bid Rate	Numeric(5,2)	O	
Costs	Numeric(12,2)	O	
Expenses	Numeric(12,2)	O	
Created By	Varchar(30)	M	
Created Date	DD/MM/YYYY HH:MM	M	
Modified By	Varchar(30)	O	
Modified Date	DD/MM/YYYY HH:MM	O	
• Participant variable load guarantees			
Field	Format	Mandatory/optional	Description
Organisation	Varchar(4)	M	Valid organisation code
GIP/GXP	Varchar(8)	M	
Volume (MWh)	Numeric(12,2)	M	
Bank Code	Varchar(8)	M	Valid bank
Notice Period Days	Number(5)	M	
Maximum Security Amount	Numeric(12,2)	O	
Comments	Varchar(250)	O	
Security Status Code	Varchar(1)	M	Valid security status
Start Date	DD/MM/YYYY	M	Cannot be before the commencement date of the organisation.
End Date	DD/MM/YYYY	O	Must be greater than or equal to the Start Date, if not null. Must be greater than or equal to today's date + notice period days, if not null
• Specific Security Deed			
Field	Format	Mandatory/optional	Description
Organisation	Varchar(4)	M	Valid organisation code
Start Date	DD/MM/YYYY	M	Cannot be before the commencement date of the organisation.

End Date	DD/MM/YYYY	O	Must be greater than or equal to the Start Date, if not null. Must be greater than or equal to today's date, if not null.
Financing Statement Number	Varchar(50)	M	
Verification Date	DD/MM/YYYY	M	
Debtor PIN	Numeric(10)	M	
Financing Statement PIN	Numeric(10)	M	
Collateral Wording	Varchar(500)	M	
Deed Of Priority Required Y/N	Varchar(1)	M	
Comments	Varchar(250)	O	
Legal Signed Date	DD/MM/YYYY	O	Cannot be after today's date
Email Sent Date	DD/MM/YYYY	O	Cannot be after today's date
Created by	Varchar(30)	M	
Created Date	DD/MM/YYYY HH:MM	M	
Modified By	Varchar(30)	O	
Modified Date	DD/MM/YYYY HH:MM	O	

• **Participant deed of priority**

Field	Format	Mandatory/optional	Description
Specific Security Deed ID	Numeric(10)	M	Must be the ID of an existing Specific Security Deed
Amount	Numeric(12,2)	M	
Secured Party Code	Varchar(6)	M	Must be the code of an existing Secured Party
Comments	Varchar(250)	O	
Legal Signed Date	DD/MM/YYYY	O	
Start Date	DD/MM/YYYY	M	Cannot be before the related specific security deed.
End Date	DD/MM/YYYY	O	Must be greater than or equal to the Start Date, if not null. Must be greater than or equal to today's date, if not null.
Created By	Varchar(30)	M	
Created Date	DD/MM/YYYY HH:MM	M	
Modified By	Varchar(30)	O	
Modified Date	DD/MM/YYYY HH:MM	O	

• **Letter of credit (LOC) details**

Field	Format	Mandatory/optional	Description
Organisation	Varchar(4)	M	Valid organisation code

Bank Code	Varchar(6)	M	Valid bank
LOC Number	Varchar(50)	M	Letter of credit number
Amount	Numeric(12,2)	M	
LOC Type	Varchar(1)	M	Valid letter of credit type
Comments	Varchar(500)	O	
Security Status Code	Varchar(1)	M	Valid security status
Accepted Date	DD/MM/YYYY	O	
Start Date	DD/MM/YYYY	M	Cannot be before the commencement date of the organisation.
End Date	DD/MM/YYYY	O	Must be greater than or equal to the Start Date, if not null. Must be greater than or equal to today's date, if not null.
Created By	Varchar(30)	M	
Modified Date	DD/MM/YYYY HH:MM	M	
Modified By	Varchar(30)	O	
Modified Date	DD/MM/YYYY HH:MM	O	
• Participant letter of credit amendment details			
Field	Format	Mandatory/optional	Description
Letter of credit ID	Numeric(10)	M	Identifies the letter of credit this amendment applies.
LOC Amendment Number	Varchar(50)	M	
Amount	Numeric(12,2)	M	
Comments	Varchar(250)	O	
Security Status Code	Varchar(1)	M	Valid security status
Accepted Date	DD/MM/YYYY	O	
Start Date	DD/MM/YYYY	M	Cannot be before the start date of the associated letter of credit. Cannot be after the end date of the associated letter of credit. For a specific letter of credit there can be multiple amendments but their date ranges (Start Date, End Date) cannot overlap.
End Dare	DD/MM/YYYY	O	Must be greater than or equal to the Start Date, if not null. Cannot be after the end date of the associated letter of credit.
Created By	Varchar(30)	M	
Created Date	DD/MM/YYYY HH:MM	M	
Modified By	Varchar(30)	O	
Modified Date	DD/MM/YYYY HH:MM	O	

• Electricity Authority Industry Participant Code Schedule			
Field	Format	Mandatory/optional	Description
Primary Organisation	Varchar(4)	M	Valid organisation code
Child Organisation Code	Varchar(4)	M	Valid organisation code that is different to the primary organisation
Comments	Varchar(250)	O	
Start Date	DD/MM/YYYY	M	Cannot be before the latest commencement date of the primary or child organisation.
End Date	DD/MM/YYYY	O	
Created By	Varchar(30)	M	
Created Date	DD/MM/YYYY HH:MM	M	
Modified By	Varchar(30)	O	
Modified Date	DD/MM/YYYY HH:MM	O	
• Participant non-cash prudential security files			
Field	Format	Mandatory/optional	Description
Security Type	Varchar(4)	M	
Security Id	Numeric(10)	M	
File Name	Varchar(100)	M	
Blob Content	Blob	M	
MIME Type	Varchar(100)	M	
File Sequence Number	Numeric(3)	O	
Created By	Varchar(30)	M	
Created Date	DD/MM/YYYY HH:MM	M	
Modified By	Varchar(30)	O	
Modified Date	DD/MM/YYYY HH:MM	O	
• Participant prudential amounts			
Field	Format	Mandatory/optional	Description
Primary Organisation	Varchar(4)	M	Valid organisation code
Security Type Code	Varchar(4)	M	Valid type of security (Includes cash)
As At Date	Date	M	Date the value was set
Details	Varchar2(50)	O	Comment field
Amount	Number(15,2)	M	Value of security
Banking Institution	Varchar2(30)	O	Name of bank
Expiry Date	Date	O	
Bank Comment	Varchar2(30)	O	Comment field
Non-Cash Security ID	Number(10)	O	Non-cash security index

Processing:

The system:

1. Permits the clearing manager to make, store and view a scanned copy of any documented security.
2. Permits the clearing manager to maintain – add, change, delete – security lodgement and credit rating records. A credit rating accepted and recorded by the clearing manager implies unlimited security has been provided.
3. For cash security, checks that the participant is able to provide security in cash i.e. has a current specific security deed and the amount does not exceed their deed of priority limit.
4. Calculates the total value of any variable price guarantee daily as follows:

The GIP/GXP amount(\$) must be calculated for each specified GXP/GIP using the following formula:

sum of (the best available trading period price * fixed quantity (volume))
across all the trading periods covered by the outstanding period and the
notice period .

Where:

outstanding period = the number of days commencing on the start date of the latest billing period or the commencement date of the guarantee, if later, and ending on the day before the run date (trading dates that have been settled are excluded); and

notice period = the number of business days commencing on today's date and ending on the last day of the notice period after today's date as defined in the guarantee, or the exit period end date, or the guarantee expiry date, whichever is earlier; and

best available trading period price means either the trading period's final price, interim price or exit period price + adder price (in order of availability) at the GIP/GXP.

If the GIP/GXP amount (\$) is limited by a maximum amount at a GIP/GXP, the maximum amount is used if this is lower than the calculated GIP/GXP amount. The total value of any variable price guarantee is the aggregate of its GIP/GXP amounts.

5. Calculates the total value of security lodged per participant and/or a participant group.

Data outputs:

- Scanned copies of security documents, including digital documents.
- Approved security lodgement details including a reference to the scanned copy.
- Contact details of guarantors and secured parties.
- The current value of each security, the participant and/or participant group.
- Audit trail of changes to security details and approvals.
- Aggregate total of security lodged per participant and/or a participant group.

Exceptions:

Sub-process:	AS-010 Maintain security details and determine if sufficient
Process:	Determine the minimum level of prudential security
Code references:	14A.1 to 14A.10, Schedule 14A.1
Dependencies:	AS-005, PE-130, RV-010, MR-050, MR-090
Module Name	

Description:

Participants provide the clearing manager with the means (security or credit rating) to be able to meet their financial obligations under the Code in the event that they default on their invoice payment on settlement day; and the clearing manager regularly monitors their estimated current and projected exposure levels in order to ensure their continued ability to meet those obligations.

The clearing manager allows a group of related participants to have their prudential exposure and security calculated and recorded at an aggregated level (a “prudential related party group”).

Business requirements:

The clearing manager must:

1. Ensure that all participants satisfy the prudential requirements at all times, both on an individual or if applicable, on a group basis.
2. Determine the prudential security levels of each participant or participant group, if applicable and compare these against their prudential exposure to determine the security excess or deficiency amount.

Data inputs:

- Run date
- Aggregate total of security lodged per participant and/or a participant group (from AS-005).
- Minimum security required of participants and their prudential group, if applicable (from PE-130).
- Amount of an FTR participant’s trading limit already allocated to an FTR auction (RV-010).
- Final interim exit period and adder prices
- Prudential group information (MR-090).

Processing:

The system:

1. Each run date, assesses the prudential position of participants or where applicable, their prudential group, by:
 - comparing this total security value against the participant’s or participant group’s minimum-security requirement.

2. Where the prudential position indicates the participant or a prudential group has insufficient security to cover their minimum-security requirement, notifies the clearing manager that there is a deficit and the amount of the deficit.
3. Where the prudential position indicates the participant or a participant group has sufficient security to cover their minimum-security requirement, notifies the clearing manager that there is an excess, the amount of the excess and that this excess can be used in the calculation of the FTR trading limit used in the FTR market, if that participant or participant group is an FTR participant.

Data outputs:

- Excess quantity of security per participant and/or a participant group. (If negative indicates a deficit of security.)

Exceptions:

Sub-process:	AS-020 Calculate FTR trading limits
Process:	Determine the minimum level of prudential security
Code references:	14A.1 to 14A.10, Schedule 14A.1
Dependencies:	RV-010, AS-010, MR-090, MR-020, PE-130
Module Name	

Description:

The clearing manager allows a group of related FTR participants to have their FTR trading limits calculated as a configurable proportion of the nominated participant's positive excess security (an "FTR participant group" with the nominated participant being the group owner) and recalculates an FTR participant's trading limit (or the trading limits of members of an FTR participant group) whenever their prudential security excess changes due to an increase or decrease in exposure or level of security held.

Business requirements:

The clearing manager must:

1. Recalculate an FTR participant's trading limit whenever their prudential security excess changes due to an increase or decrease in exposure or security level changes – including when:
 - the credit rating or security provided has changed, or
 - the participant's exposure has been recalculated, or
 - a proportion of the participant's trading limit has been allocated at FTR auction (after the bid window has closed but before auction results are finalised).
2. If an FTR participant is a member of an FTR participant group (including the group owner), calculate the trading limit for the FTR participant group as a whole and also allocate a proportion (according to the specified proportions and cap if applicable) to each member of the FTR participant group (including the group owner). The trading limit information for each FTR participant will be available to send to the FTR manager when requested (and will determine how much the FTR participant can bid in an FTR auction or the value of FTRs that can be assigned). The trading limit of the FTR participant group should be sufficient to cover the potential exposure of each of its member FTR participants.

Data inputs:

- Run date
- Amount of an FTR participant's trading limit already allocated (interim) to an FTR auction (from RV-010).
- Excess quantity of security per participant and/or a participant group (AS-010).
- Prudential group information (MR-020).
- FTR participant group information that includes the specified proportion and cap (from MR-020) to be allocated to each member of the group.
- Total exposure per participant and participant group (if applicable). (PE-130).

Processing:

The system:

1. Calculates the group FTR trading limit of each FTR participant group as:
excess quantity of security of the FTR participant group
minus
FTR auction allocation(s) of group members, but only minus if the total exposure of the participant group is positive
minus
total exposure of the participant group, but only minus if the total exposure of the participant group is negative.
2. Calculates the FTR total capacity of each member of an FTR participant group as:
if the group FTR trading limit is positive:
MIN(group FTR trading limit * member's specified proportion of the Group's trading limit, member's cap),
otherwise excess quantity of security of the FTR participant group.
3. Calculates the FTR total capacity of each FTR participant who is NOT a member of an FTR participant group as:
excess quantity of security of the FTR participant
minus
FTR auction allocation(s) of the FTR participant, but only minus if the total exposure of the FTR participant is positive
minus
total exposure of the FTR participant, but only minus if the total exposure of the FTR participant is negative.
4. Calculates the FTR trading limit (available capacity) of each member of an FTR participant group as:
if the group FTR Trading limit is positive:
FTR total capacity of the member – FTR auction allocation(s) of the member,
otherwise zero.
5. Calculates the FTR trading limit (available capacity) of each FTR participant who is NOT a member of an FTR participant group as:
if the excess quantity of security per participant is positive:
FTR total capacity of the participant – FTR auction allocation(s),
otherwise zero.

Data outputs:

- Group FTR trading limits.
- FTR total capacity of each member of each FTR group.
- FTR total capacity of each participant not on a group.
- FTR trading limit (available capacity) of each member of each FTR group.
- FTR trading limit (available capacity) of each participant not on a group.

Exceptions:

Sub-process:	AS-030 Provide prudential reports
Process:	Determine the minimum level of prudential security
Code references:	14A.20, 14A.21
Dependencies:	RV-010, PE-130, AS-010, AS-020, MR-090
Module Name	PR-030

Description:

The clearing manager produces a set of prudential reports for participants. The clearing manager will normally produce a set of prudential reports each business day (or at least weekly as required by the Code).

Business requirements:

1. The clearing manager must provide the full set of prudential reports at least weekly, as at a given run date, for participants to manage their prudential exposure.
2. The clearing manager must provide a CSV file containing prudential information for download or delivery to a participant by SFTP.
3. The clearing manager must provide the Authority with a prudential report showing the prudential data and situation of all participants who deal with the clearing manager.

Data inputs:

- Run date
- Aggregated outstanding exposures for energy purchases, energy sales, ancillary services, wash-ups, hedges, FTR amounts, other amounts per participant and participant group (if applicable). (PE-130)
- Aggregated exit period exposures for energy purchases, energy sales, ancillary services, wash-ups, hedges, FTR amounts per participant and participant group (if applicable). (PE-130)
- Outstanding exposure per participant and participant group (if applicable). (PE-130)
- Exit period exposure per participant and participant group (if applicable). (PE-130)
- Total exposure per participant and participant group (if applicable). (PE-130)
- Forward estimate for the current day and each of the next 3 business days per participant and participant group for the run date. (PE-130)
- Prepayments for the current day and each of the next 3 business days per participant and participant group calculated on the run date. (PE-130)
- Minimum security required per participant and participant group (if applicable). (PE-130)
- Historical forward estimates (last 3) applicable to the current day per participant and participant group. (PE-130)
- Net security required per participant and participant group (if applicable). (PE-130)
- Security lodgement details per participant and/or prudential group (AS-010).
- Aggregate total of security lodged per participant and/or a prudential group (AS-010).

- Deficit or excess quantity of security per participant and/or a prudential group (AS-010).
- Amount of an FTR participant's trading limit already allocated (interim) to an FTR auction (from RV-010).
- Group FTR trading limits.
- FTR total capacity of each member of each FTR group.
- FTR trading limit (available capacity) of each FTR participant not in a group.

Processing:

The system:

1. Generates an individual report for each participant or prudential group, if applicable, detailing their:
 - position summary including the total security lodged, the minimum security required, and the total FTR allocated amount. *An amount available for reduction* is calculated as total security lodged - minimum security required - total FTR allocated amount. If the result is negative the value is described as *Amount due by 1600 hours*;
 - security lodgements with an overall total;
 - FTR trading limits, either for each group member or for the individual participant and which includes:
 - FTR total capacity,
 - FTR allocated amounts (interim),
 - FTR trading limits (available capacity),with totals for all the above.
In addition the following is included:
unallocated capacity = amount available for reduction + ABS (net exposure total (if negative)) - total FTR trading limits (available capacity).
 - outstanding and exit period exposure of spot purchases, spot sales, hedges, ancillary services, FTRs, wash-ups, other (billed items), GST and prepayments, with sub-totals and an overall net exposure total;
 - previous prudential exposure history applicable to the current day and the 3 previous business days together with the assessment of the current security required being the minimum exposure of the latest 4 exposure calculations (that includes the run date) less any prepayments and settlement payment amounts;
 - forward estimates of exposure for the next 3 business days that includes prepayment and settlement payment amounts;
 - forward estimates of exposure for the next 2 business days that were calculated on the 2 business days prior to this run date.
2. Generates a CSV file containing prudential information for download and for delivery to each participant's or participant group's SFTP folder.
3. Generates a summary of the position of all participants, without identifying any individual participant.
4. Generates a CSV file containing all participant's prudential information for delivery to the Authority's SFTP folder.

Data outputs:		
<ul style="list-style-type: none"> • Summary reports for all participants for the clearing manager. • Combined report in CSV format (as shown below) of all participants and participants groups for the Authority. • Individual reports in PDF format for each participant group or individual participant. • Individual reports in CSV format (as shown below) for each participant group or individual participant: 		
Field Column Name	Format	Description
Trading Date	DD/MM/YYYY	Date calculated for (run date)
Organisation Code	Char (4)	Participant identifier
Primary Organisation Code	Char (4)	Participant identifier of the participant group or the Organisation Code if the Organisation Code is not in a group.
Security Lodged*	Number (10,2)	Value of security lodged with the clearing manager
Minimum Security Required*	Number (10,2)	Minimum amount of security required
FTR Allocated Amount Total*	Number (10,2)	Amount of security allocated to FTR bids
Amount Available For Reduction*	Number (10,2)	Amount available to be withdrawn
Amount Due By 1600 Hours*	Number (10,2)	Amount due on trading date to meet requirements
FTR Total Capacity	Number (10,2)	Amount of security available to prudential FTRs
FTR Allocated Amount	Number (10,2)	Amount allocated to FTR bids
FTR Available Capacity	Number (10,2)	Amount available for FTR exposure
Current Period Start Date	DD/MM/YYYY	First day of the current calculation period
Current Period End Date	DD/MM/YYYY	Last day of the current calculation period
Current Spot Purchases	Number (10,2)	Spot energy purchases amount (Current)
Current Spot Sales	Number (10,2)	Spot energy sales amount (Current)
Current Ancillary Amount	Number (10,2)	Ancillary services amount (Current)
Washup Amounts	Number (10,2)	Washups amount (Current)
Current Hedge	Number (10,2)	Hedge settlement amount (Current)
Current FTR	Number (10,2)	FTR amount (Current)

Current Other Amounts	Number (10,2)	Other amount invoiced (Current)
Current GST	Number (10,2)	GST on current amounts
Current Total	Number (10,2)	Total of current amounts
Exit Period Start	DD/MM/YYYY	First day of exit period
Exit Period End Date	DD/MM/YYYY	Last day of exit period
Exit Spot Purchases	Number (10,2)	Spot energy purchases amount (Exit)
Exit Spot Sales	Number (10,2)	Spot energy sales amount (Exit)
Exit Ancillary Amount	Number (10,2)	Ancillary services amount (Exit)
Exit Hedge	Number (10,2)	Hedge settlement amount (Exit)
Exit GST	Number (10,2)	GST on exit amounts
Exit Total	Number (10,2)	Total of exit amounts
Prudential Start Date	DD/MM/YYYY	First day of prudential period
Prudential End Date	DD/MM/YYYY	Last day of prudential period
Total Spot Purchases	Number (10,2)	Spot energy purchase amount (Total)
Total Spot Sales	Number (10,2)	Spot energy sale amount (Total)
Total Ancillary Amount	Number (10,2)	Ancillary services amount (Total)
Total Washup Amounts	Number (10,2)	Washup amount (Total)
Total Hedge	Number (10,2)	Hedge settlement amount (Total)
Total FTR	Number (10,2)	FTR amount (Total)
Total Other Amounts	Number (10,2)	Other amount (Total)
Total GST	Number (10,2)	GST (Total)
Prepayment	Number (10,2)	Total of the prepayment amounts allowed in the prudential period
Total Exposure Net	Number (10,2)	Net exposure for the trading date. This is the net value of all the totals.
Previous Exposure 3 Date*	DD/MM/YYYY	Date of 3 business days before the trading date
Previous Exposure 3 Net*	Number (10,2)	Net exposure calculated for the 3 rd business day before the trading date
Previous Exposure 2 Date*	DD/MM/YYYY	Date of 2 business days before the trading date
Previous Exposure 2 Net*	Number (10,2)	Net exposure calculated for the 2 nd business day before the trading date

Previous Exposure 1 Date*	DD/MM/YYYY	Date of 1 business day before the trading date
Previous Exposure 1 Net*	Number (10,2)	Net exposure calculated for the previous business day before the trading date
Forward Exposure 1 Date*	DD/MM/YYYY	Date of the next business day after the trading date
Forward Exposure 1 Net*	Number (10,2)	Forward estimate for the next business day after the trading date
Minimum Forward Exposure 1 Net*	Number (10,2)	Minimum of the forward estimates for the next business day, calculated on the current and previous 2 business days.
Forward Exposure 2 Date*	DD/MM/YYYY	Date of 2 nd business day after the trading date
Forward Exposure 2 Net*	Number (10,2)	Forward estimate for the 2 nd business day after the trading date
Minimum Forward Exposure 2 Net*	Number (10,2)	Minimum of the forward estimates for the 2 nd business day after the trading day, calculated on the current and previous business day.
Forward Exposure 3 Date*	DD/MM/YYYY	Date of 3 rd business day after the trading date
Forward Exposure 3 Net*	Number (10,2)	Forward estimate for the 3 rd business day after the trading date
* Value appears only when Organisation Code = Primary Organisation Code.		
Authority and Individual reports		
Field Column Name	Format	Description
Primary Organisation Code	Char (4)	Participant identifier of the participant group or the participant if not in a group.
Trading Date	DD/MM/YYYY	Date calculated for (run date)
Minimum Security Required	Number (10,2)	Minimum amount of security required on trading date
Security Lodged	Number (10,2)	Value of security lodged with the clearing manager
Security Types	Varchar(2000)	Description of the types of security, each separated by a '/'. Otherwise: Security Lodged – Minimum Security Required
Excess	Number (10,2)	If one of organisation's security types is "acceptable credit rating", then excess is 0. Otherwise: Security Lodged – Minimum Security Required
Daily FTR Breakdown report		
Field Column Name	Format	Description
Organisation code	Char (4)	Participant identifier of the participant group or the participant if not in a group.

FTR period	YYYYMM	FTR period
FTR profile	Char (4)	24HR or 12HR
FTR type	Char (3)	OPT- Option OBL - Obligation
Source hub	Char (3)	Station code for source hub
Sink hub	Char (3)	Station code for sink hub
Holding quantity in MW	Number (11,1)	
Holding exposure (\$)	Number (10,2)	
Assignment quantity in MW	Number (11,1)	
Assignor exposure (\$)	Number (10,2)	
Reconfiguration sale quantity in MW	Number (11,1)	
Reconfiguration sale exposure (\$)	Number (10,2)	

Exceptions:

Sub-process:	AS-040 Notify participants when additional security is required
Process:	Determine the minimum level of prudential security
Code references:	14A.1 to 14A.10, Schedule 14A.1
Dependencies:	RV-010, MR-070, MR-090, AS-010, AS-030
Module Name	

Description:
<p>The clearing manager regularly monitors participant's current and projected exposure levels in order to ensure participants' ability to meet their obligations and sends an email when there is insufficient security lodged.</p> <p>Once the daily prudential reports have been published, the clearing manager checks the total security lodged by each participant or participant group against their minimum-security requirement for the current date and against each of the minimum forward estimates of exposure for the next 2 business days and against the forward exposure of the 3rd business day. Where the current day's minimum-security requirement or any of the forward exposures exceed the total amount of security lodged, the clearing manager sends an email to the participant using the appropriate contact.</p>

Business requirements:
<p>The clearing manager must:</p> <ol style="list-style-type: none"> 1. Ensure that all participants satisfy the prudential requirements at all times, both on an individual or on a group basis, if applicable. 2. Notify participants, via email using the contact details held as reference data, if the current day's minimum security requirement or any of the minimum forward estimates of exposure for the next 2 business days or the forward exposure of the 3rd business day exceeds the total amount of security held for the participant or participant group, if applicable.

Data inputs:
<ul style="list-style-type: none"> • Run date • Minimum security required of participants and their prudential group, if applicable (from AS-030). • Minimum forward exposure for each of the next 2 business days (AS-030). • Forward exposure for the 3rd business day per participant and participant group for the run date. (AS-030). • Aggregate total of security lodged per participant and/or a prudential group (AS-030). • Prudential group information (MR-090). • Participant contact details for the process area (MR-070)

Processing:
The system:

1. Calculates for each date, current and the next 3 business days, the security excess or deficit amount of a participant or their prudential group, where applicable, by subtracting the total security lodged value from each of the values: minimum security required, the minimum forward exposure for the next day, the minimum forward exposure for the next day + 1 and the forward exposure for the next day + 2.
2. Generates an email using an appropriate template for the earliest date (current or forward) where the amount calculated is negative. The email address used is the one stored against the participant or participant group, if applicable, for this function.
3. Stores information about the prudential security assessments made for each participant or participant group, if applicable, each business day. The information includes the datetime stamp the email was sent.

Data outputs:

- Email using the appropriate template and contact.
- Prudential security deficit assessment with email details per participant or participant group and run date.

Exceptions:

6.7 Calculate energy amounts

Sub-process:	CE-010 Calculate electricity purchase amounts
Process:	Calculate energy amounts
Code references:	14.22, 14.23, 13.132, clauses 2 and 28(c) schedule 15.4
Dependencies:	RV-050, VP-010
Module Name	IN-010

Description:

For each purchaser of electricity, the clearing manager calculates the amount due for each trading period and grid exit at which the participant extracted electricity.

Business requirements:

1. Where final prices are not present for a trading period, the clearing manager must exclude that trading period from the calculation.
2. The clearing manager must advise participants of the amounts owing and owed for electricity in accordance with clause 14.18.

Data inputs:

- Final prices per MWh from VP-010.
- Reconciliation information from the reconciliation manager (buyer file) (RV-050).

Processing:

The system:

- Validates the reconciliation information and final prices:
 - grid exit points must be valid, i.e. there must be associated reference data; and
 - buyers must be known to the system, i.e. there must be associated reference data.

Data outputs:

Purchase amounts for energy record details

- If the reconciliation quantity is zero, no output is produced.

Field	Format	Description
POC	Varchar (8)	Valid grid exit point.
Buyer	Char (4)	Participant identifier
Trading Date	DD/MM/YYYY	
Trading Period	Char (2)	Normally 48 values but 46 or 50 at daylight saving.

Settlement Quantity	Number (8)	In MWh.
Final Price	Number (8,2)	In NZ\$.
Purchase Amount	Number (10,2)	Calculated.

Exceptions:

Sub-process:	CE-020 Calculate electricity sale amounts
Process:	Calculate energy amounts
Code references:	14.22, 14.23, 13.132, clauses 2 and 28(c) schedule 15.4
Dependencies:	RV-050, VP-010
Module Name	IN-020

Description:

The clearing manager calculates for each generator of electricity the amount due excluding GST for each trading period and grid injection point at which they injected electricity.

Business requirements:

1. Where final prices are not present for a trading period, the clearing manager must exclude that trading period from the calculation.
2. The clearing manager must advise participants of the amounts owing and owed for electricity in accordance with clause 14.18.

Data inputs:

- Final prices in MWh from VP-010.
- Reconciliation information from the reconciliation manager, i.e. the seller file (RV-050).

Processing:

The system:

- Validates the reconciliation information and final prices:
 - grid injection points must be valid, i.e. there must be associated reference data; and
 - sellers must be known to the system as generators, i.e. there must be associated reference data.

Data outputs:

- Sale amounts for energy record details

If the reconciliation quantity is zero, no output record is produced.

Field	Format	Description
POC	Varchar (8)	Valid grid exit point.
Seller	Char (4)	Participant identifier
Trading Date	DD/MM/YYYY	

Trading Period	Char (2)	Normally 48 values but 46 or 50 at daylight saving.
Settlement Quantity	Number (8)	In MWh.
Final Price	Number (8,2)	In NZ\$.
Sale Amount	Number (10,2)	Calculated.

Exceptions:

6.8 Calculate ancillary service amounts

Sub-process:	CA-010 Calculate black start costs and charges
Process:	Calculate ancillary service amounts
Code references:	14.19(2)(f), 8.6, 8.31(1)(a), 8.55 to 8.70
Dependencies:	RV-040, MR-010
Module Name	IN-030

Description:

Black start capability is the ability to fully restore the grid from a complete shutdown. As many generating stations need an electricity supply to restart generation, generating stations with a black start capability must generate initially to provide this supply.

The system operator procures this black start capability in case of complete grid failure.

The clearing manager receives allocable costs for black start from the system operator. The types of allocable cost are associated with black start are:

- procurement;
- administrative;
- contribution from dispensation;
- identifiable; and
- event fee.

The Code requires the total costs to be calculated as follows:

procurement + administrative – contribution from dispensation – identifiable – event fee

However, each allocable cost provided by the system operator includes the appropriate sign +/- relating to whether the participant of the cost is to have an amount owing by the participant (-) or an amount owing by the clearing manager (+). Each cost is itemised by type of allocable cost for every affected participant.

The clearing manager sums these costs and recovers the total from the grid owner. The event fee is itemised separately i.e. there are 2 line items for grid owner(s).

Business requirements:

1. The clearing manager must charge all black start costs in full to the grid owner.
2. If there is ever more than one grid owner, the clearing manager must apportion the amount according to their ODV valuations as per clause 8.56.
3. The clearing manager must be able to process any revisions of black start costs (wash-ups) and include them in the next invoice run.

Data inputs:

From Allocable Costs (RV-040):

- Procurement costs for black start from ancillary service agents.
- Administrative costs incurred for black start by the system operator.

- Contribution from dispensation costs for black start
- Identifiable costs for black start
- Event fees and charges for black start.

Processing:

The system:

1. Determines which allocable costs relate to black start using the ancillary services - product code reference table (see MR-010). For each, a row is output in the ancillary amounts table.
2. Summarises the black start allocable costs, keeping the event fee as a separate total, for recovering the costs from the grid owner. The sign is negated.
3. Converts the SO product code to the CM product code using the ancillary services – product code reference table (see MR-010).

Data outputs:

Black start amounts payable and receivable by participants and grid owner(s).

• **Ancillary Amounts**

Field	Format	Description
Participant Code	Char (4)	e.g. CTCT
Party Role	Char (4)	See MR-010 for valid values
Month Date	DD/MM/YYYY	First day of invoice period
CM Product Code	Char (6)	800001 BS procurement costs 800002 BS admin costs 800003 BS contribution from dispensation 800004 BS identifiable costs 800005 BS event fee 800006 BS charges 800007 BS event fee charge
Product Description	Varchar (255)	From the ancillary amounts - product codes table (MR-010) applicable to the CM product code.
Net Amount	Number (10,2)	+ or -
GST Amount	Number (10,2)	
FileBatchId	Number (10)	Assigned by system

Exceptions:

Sub-process:	CA-020 Calculate over-frequency costs and charges
Process:	Calculate ancillary service amounts
Code references:	14.19(2)(f), 8.6, 8.31(1)(a), 8.55 to 8.70
Dependencies:	RV-040, MR-010
Module Name	IN-030

Description:

Over-frequency reserves complement instantaneous reserves in that they similarly cover contingent events that cause sudden frequency rise. The main cause would be if the HVDC link tripped causing frequency in the South Island to rise very quickly. To prevent this the system operator contracts generators to trip automatically before excessive system frequencies are reached, ensuring supply and demand balance.

Over-frequency reserves are provided under contract to the system operator.

The clearing manager receives allocable costs from the system operator. Five types of allocable cost are associated with over-frequency events:

- procurement;
- administrative;
- contribution from dispensation;
- identifiable; and
- event fee.

The Code requires the total costs to be calculated as follows:

procurement + administrative – contribution from dispensation – identifiable – event fee

However, each allocable cost provided by the system operator includes the appropriate sign +/- relating to whether the participant of the cost is an amount owing by the participant (-) or amount owing by the clearing manager (+). Each cost is itemised by type of allocable cost for every affected participant.

The clearing manager sums these costs and recovers the total from the HVDC owner.

Business requirements:

1. The clearing manager must charge all over-frequency costs in full to the HVDC owner.
2. The clearing manager must be able to process any revisions of over-frequency costs (wash-ups) and include them in the next invoice run.

Data inputs:

From Allocable Costs (RV-040):

- Procurement costs for over-frequency events from ancillary service agents.
- Administrative costs incurred for over-frequency events by the system operator.

- Contributions from dispensation costs for over-frequency events from asset owners.
- Identifiable costs for over-frequency events from participants.
- Event fees.

Processing:

The system:

1. Determines which allocable costs relate to over-frequency using the ancillary services – product code reference table (see MR-010). For each, a row is output in the ancillary amounts table.
2. Summarises the over-frequency allocable costs recovering the costs from the to the HDVC owner. The sign is negated.
3. Converts the SO product code to the CM product code using the ancillary services – product code reference table (see MR-010).

Data outputs:

Over-frequency amounts payable and receivable by participants and the HVDC owner.

• **Ancillary amounts**

Field	Format	Description
Participant Code	Char (4)	e.g. CTCT
Party Role	Char (4)	See MR-010 for valid values
Month Date	DD/MM/YYYY	First day of invoice period
CM Product Code	Char (6)	810001 OFR procurement costs 810002 OFR admin costs 810003 OFR contribution from dispensation 810004 OFR identifiable costs 810005 OFR event fee 810006 OFR charges 810007 OFR event fee charge
Product Description	Varchar (255)	From the ancillary amounts - product codes table (MR-010) applicable to the CM product code.
Net Amount	Number (10,2)	+ or -
GST Amount	Number (10,2)	
FileBatchId	Number (10)	Assigned by system

Exceptions:

Sub-process:	CA-030 Calculate frequency keeping costs and charges
Process:	Calculate ancillary service amounts
Code references:	14.19(2)(f), 8.6, 8.31(1)(a), 8.55 to 8.70
Dependencies:	RV-040, RV-050
Module Name	IN-030

Description:

When supply onto the system exceeds demand off the system (or vice-versa) the frequency moves away from the (desired) 50Hz. To manage small fluctuations in frequency a station takes on the duty of *frequency keeping*. A frequency keeping station automatically (in real time) increases or decreases generation in order to keep the system in balance, and thus the frequency at 50 Hz. Typically, a frequency keeping station operates in a plus or minus 50 MW band.

Frequency keeping is provided under contract to system operator.

The clearing manager receives allocable costs from the system operator. Six types of allocable cost are associated with frequency keeping events:

- procurement;
- constrained on (a type of procurement cost);
- constrained off (a type of procurement cost);
- administrative;
- contribution from dispensation; and
- identifiable.

The Code requires the total costs to be calculated as follows:

procurement + constrained on + constrained off + administrative – contribution from dispensation – identifiable

However, each allocable cost provided by the system operator includes the appropriate sign +/- relating to whether the participant of the cost is an amount owing by the participant (-) or an amount owing by the clearing manager (+). Each cost is itemised by type of allocable cost for every affected participant.

Each cost identifies the affected participant. The clearing manager sums these costs and recovers the total from the purchasers in proportion to each purchaser's off-take, less any frequency keeping provided, as per clause 8.58.

Business requirements:

1. The clearing manager must charge all frequency keeping costs to participants in proportion to each purchaser's off-take, less any frequency keeping provided.
2. The clearing manager must be able to process any revisions of frequency keeping costs (wash-ups) and include them in the next invoice run.

Data inputs:

From Allocable Costs RV-040:

- Procurement costs for frequency keeping from ancillary service agents.
- Frequency keeping constrained on costs from generators.
- Frequency keeping constrained off costs from generators.
- Administrative costs incurred for frequency keeping by the system operator.
- Contributions from dispensation costs for frequency keeping from asset owners.
- Identifiable costs for frequency keeping from participants.
- Alternative purchaser frequency keeping kWh

From RV-050:

- Reconciled quantities – for off-take quantities

Processing:

The system:

1. Determines which allocable costs relate to frequency keeping using the Ancillary Services – Product Code reference table (see MR-010). For each, a row is output in the Ancillary Amounts table.
2. Summarises the total allocable frequency keeping costs to recover from purchasers (Fc).
3. For each purchaser, date and trading period calculates:

$$\text{purchaser offtake} = \text{sum}(\text{reconciled quantities}) \text{ across all that purchaser's GXP}$$
4. For each purchaser, date and trading period calculates the alternative FK kWh:
 - Identifies purchaser GXP at which an arrangement is in place (GXPx).
 - For each arrangement GXP (GXPx):
 - Returns total arrangement amount at GXP (KWHarr).
 - Identifies number of purchasers at GXP (Ptot).
 - Calculates purchaser amount ($\text{KWHpx} = \text{KWHarr} / \text{Ptot}$).
 - Calculates total purchaser alternative FK kWh amount = $\text{Sum}(\text{KWHpx} \text{ across all arrangement GXP})$.
5. For each purchaser, date and trading period calculates:

$$\text{total} = \text{purchaser offtake} - \text{alternative FK kWh amount.}$$
6. Sums the total over all trading periods and dates to give a total for the purchaser:

$$\text{purchaser total} = \text{Max}(0, \text{Sum}(\text{total})).$$
7. Create a total for all purchasers for the invoice period:

$$\text{grand total} = \text{sum}(\text{purchaser totals}).$$
8. For each purchaser, calculates the share of allocable cost in relation to frequency keeping:

$$\text{purchaser ratio} = \text{purchaser total} / \text{grand total},$$

$$\text{share} = \text{Fc} * \text{purchaser ratio}.$$
9. For each purchaser, allocates their share as a cost to that purchaser.

Data outputs:		
Frequency-keeping amounts payable and receivable by participants.		
<ul style="list-style-type: none"> Ancillary amounts 		
Field	Format	Description
Participant Code	Char (4)	e.g. CTCT
Party Role	Char (4)	See MR-010 for valid values
Month Date	DD/MM/YYYY	First day of invoice period
CM Product Code	Char (6)	820001 FK procurement costs 820002 FK constrained on 820003 FK constrained off 820004 FK admin costs 820005 FK contribution from dispensation 820006 FK identifiable costs 820007 FK charges
Product Description	Varchar (255)	From the Ancillary Amounts - Product Codes table (MR-010) applicable to the CM Product Code.
Net Amount	Number (10,2)	+ or -
GST Amount	Number (10,2)	
FileBatchId	Number (10)	Assigned by system
Exceptions:		

Sub-process:	CA-040 Calculate instantaneous reserve costs and charges
Process:	Calculate ancillary service amounts
Code references:	14.19(2)(f), 8.6, 8.31(1)(a), 8.55 to 8.70
Dependencies:	RV-040, MR-010
Module Name	IN-030

Description:
<p>Instantaneous reserves (“reserves”) are generation capability (supply side) or interruptible load (demand side) that is held on standby. They respond to system failure within a short timeframe (6 or 60 seconds) in order to arrest a major frequency drop. The system operator has the job of procuring sufficient reserves to cover failed generation (or to reduce demand) and ensure supply and demand balance.</p> <p>Instantaneous reserves are supplied by Market Participants offering in to the 6 (fast instantaneous reserve (FIR)) and 60 (sustained instantaneous reserve (SIR)) second reserve markets.</p> <p>The system operator determines the quantity of reserves required and the price is determined at the intersection of supply and demand. Suppliers are paid this price for being on standby, plus the energy price for any quantity it is called upon to produce. Interruptible loads are paid only the cleared price, but save the energy price if required to trip off.</p> <p>Types of instantaneous reserve are:</p> <ol style="list-style-type: none"> 1. Interruptible load which describes all forms of offtake reserve. It is demand side reserve where load can be quickly removed from the system. 2. Generation Reserve, which describes all forms of injectable reserve including: <ol style="list-style-type: none"> a. Partly loaded spinning reserve (PLSR), offered by generators not running at capacity. The term ‘spinning reserve’ is used because the generator is already ‘spinning’ and ready to increase production quickly if needed. b. Non-Specific Generation Reserve (NSGR) <ol style="list-style-type: none"> i. Tail water depressed reserve (TWDR) is a form of reserve provided by hydro stations. Generating units are kept spinning but with no water going through them, and can therefore ramp up instantaneously. ii. Injectable reserve from an energy storage system. <p>Invoicing for IR involves four types of costs:</p> <ol style="list-style-type: none"> 1. Allocable costs. 2. Availability Costs per island are apportioned to generators (by generating unit) and the HVDC according to the formula in the Code clause 8.59. N.B. Availability costs are a different breakdown of the Allocable Costs (by Island and trading period). The total summed value of the Allocable Costs (not including Dispensation) = total summed value of the Availability Costs. 3. Event charges are calculated and apportioned to the causer of an under frequency event according to the formula in the Code clause 8.64.

4. Event charges that have been paid are rebated to availability cost participants (and causers holding a dispensation) according to the formula in the Code clause 8.65

Business requirements:

1. The clearing manager must invoice participants for allocable costs, availability costs, event charges for under frequency events and event rebates relating to the provision of instantaneous reserves.
2. The clearing manager must be able to process any revisions of IR costs (wash-ups) and include them in the next invoice run.

Data inputs:

From RV-040 and for the billing period:

- Allocable costs
- Availability costs
- Electricity injection quantities by generating unit
- Instantaneous reserve quantities per generating unit and trading period.
- At-risk HVDC transfer quantities.
- Alternative Instantaneous reserve values for at-risk HVDC transfer.
- Event losses - electricity loss quantity and causer (participant) per event, event time and grid or HVDC injection point.
- Participant availability costs paid per participant and billing period for the two preceding billing periods).
- Instantaneous reserve forecasts – providing bona fide annual estimates of availability costs, losses for under-frequency events and number of under frequency events.

From MR-010:

- Grid point reference data detailing the grid point, whether exit or injection, island and zone.

Processing:

The system:

For Allocable Costs:

1. Determines which allocable costs relate to instantaneous reserve using the Ancillary Services – Product Code reference table (see MR-010). For each, a row is output in the Ancillary Amounts table.

For Availability Costs:

2. Calculates the share of each participant and the HVDC owner of the Availability cost.

For each trading period and island, the system:

- Identifies the availability cost by trading period and island
- Calculates and saves the HVDC injection component:

$$m_{ht} = \text{MAX}((\text{at-risk HVDC transfer into island}_{(1)})/1000 - (\text{alternative IR for at-risk HVDC})/1000 - 30), 0)$$

- For each Generating Unit calculates and saves the injection component:

$$m_{xt} = \text{MAX}((\text{electricity injected into island}_{(3)})/1000 - (\text{alternative IR for generating unit})/1000 - 30), 0)$$

- Sums and saves the generating unit injection components to party level:

$$m_{pt} = \text{SUM}(m_{xt})$$

- Calculates the total injection:

$$M_t = \text{SUM}(m_{pt}) + m_{ht}$$

- Calculates and saves the HVDC share of the availability costs:

$$\text{Share}_{t \text{ island HVDC}} = A_{ct} * m_{ht} / M_t$$

- For each generator, calculates and saves the party share of the availability costs:

$$\text{Share}_{t \text{ island Party}} = A_{ct} * m_{pt} / M_t$$

3. Calculates the invoice amounts for each generator and HVDC owner for the availability cost by outputting a record in the ancillary amounts table for:

- the HVDC share of the availability costs across all trading periods and both islands (combined):

$$\text{Share}_{\text{HVDC}} = \text{SUM}(\text{Share}_{t \text{ island HVDC}})$$

- each party, the share of the availability costs across all trading periods and both islands (combined):

$$\text{Share}_{\text{Party}} = \text{SUM}(\text{Share}_{t \text{ island Party}})$$

For the under-frequency event charge:

4. Calculates under-frequency event charge (EC) for each causer (participant) of an under-frequency event:

$$EC = ECR * (INT - 60)$$

where

ECR = Either a fixed \$ amount or, if null, calculated as follows:

$$IR/2 * (INT - (60 * EV))$$

Where

IR is the system operator's bona fide annual estimate of the availability cost for all trading periods in the relevant 12 month period;

INT is the system operator's bona fide annual estimate of electricity which will be lost by virtue of under-frequency events in the relevant 12 month period (expressed in MW);

EV is the system operator's bona fide annual estimate of the number of under-frequency events which will occur in the year.

INT = Sum(Event Losses for a specific event).

5. For each participant calculates the event charge for the invoice period and outputs a row in the ancillary amounts table:

$$EC(p) = \text{SUM}(EC \text{ of participant } p)$$

For the under-frequency event charge rebate:

6. Calculates the event rebate due to each participant with an amount payable by the participant for each under-frequency event:

$$ER = EC * (Zx / Zt)$$

where

EC = see EC in point 4 above.

Zx = SUM(availability costs paid over the current and the previous 2 billing periods by each participant with an amount owing by the participant)

Zt = SUM(Zx)

7. For each participant calculates the rebate totals for the invoice period and outputs a row in the ancillary amounts table.

$$ER(p) = \text{SUM}(ER \text{ of participant } p).$$

Data outputs:

IR amounts payable and receivable by participants.

1. Ancillary amounts

Field	Format	Description
Participant Code	Char (4)	e.g. CTCT
Party Role	Char (4)	See MR-010 for valid values
Month Date	DD/MM/YYYY	First day of invoice period
CM Product Code	Char (6)	830001 IR spinning reserve 830002 IR interruptible load 830003 IR dispensation 830004 IR other costs 830005 IR availability costs – GENR 830006 IR availability costs – HVDC 830007 IR event charge – GENR 830008 IR event charge – HVDC 830009 IR event rebate – GENR 830010 IR event rebate – HVDC
Product Description	Varchar (255)	From the ancillary amounts - product codes table (MR-010) applicable to the CM product code.
Net Amount	Number (10,2)	+ or -

GST Amount	Number (10,2)	
FileBatchId	Number (10)	Assigned by system

Exceptions:

Sub-process:	CA-050 Calculate voltage support costs and charges
Process:	Calculate ancillary service amounts
Code references:	14.19(2)(f), 8.6, 8.31(1)(a), 8.55 to 8.70
Dependencies:	RV-040
Module Name	IN-030

Description:

Voltage support is required to preserve voltage quality on the grid. Unlike frequency quality, which affects the whole AC grid, this is generally a more regional issue. Generators are required under their connection contracts to provide some voltage support, with additional requirement procured by the system operator.

The cost is split into three parts:

- a. nominated peak charge is paid by distributors and generators holding a dispensation;
- b. monthly peak-penalty charge is paid by distributors; and
- c. residual charge is paid by distributors and generators holding a dispensation.

The total allocable costs calculated, above, are used only in the final part (clause 8.67(5)) after the calculation of the nominated peak kVAr charge and the monthly peak penalty charge. The basis for all the calculations are described in clause 8.67.

Business requirements:

1. The clearing manager must invoice participants for nominated peak charges, monthly peak penalty charges and residual charges for voltage support.
2. The clearing manager must be able to process any revisions of voltage support costs (wash-ups) and include them in the next invoice run.

Data inputs:

From RV-040 for the billing period:

- Nominated peak kVAr is the annual nominated kVAr peak demand (also called 'nominated kVAr' in clause 8.67(3) and (4));
- kVAr non-compliance – contains the dispensation quantity per zone, generator, generating station and billing period;
- Forecast voltage support fixed rates – includes the fixed peak and penalty rates (\$) per kVAr;
- kVAr quantities - demand per zone, distributor, distributor kVAr reference node and trading period (used in clause 8.67(3) and (4) as 'kVAr above'); and
- Distributor metering information–offtake per zone, distributor, distributor kVAr reference node and trading period.

Processing:

The system calculates for each zone:

Nominated Peak kVAr charges per distributor:

- a. For each zone and distributor, the system:
 - Obtains the peak rate nominated for this zone for this period (PkRate) from Forecast voltage support fixed rates.
 - For each distributor:
- a. Sums the nominated peak kVAr values for this invoice period by distributor kVAr reference node code from the nominated peak kVAr file:
$$Qxz = \text{SUM}(\text{Nominated Peak kVAr})$$
- b. Calculates and saves the nominated peak kVAr charge:
$$\text{NomCharge} = \text{PkRate} * Qxz$$
 - Sums the nominated peak kVAr charges for each distributor and outputs a row in the ancillary amounts table.

Nominated Peak kVAr charges per generator with a dispensation:

- b. For each zone and generator, the system:
 - a. Obtains the peak rate nominated for this zone for this period (PkRate) from Forecast voltage support fixed rates.
 - b. For each generator with a dispensation:
 - c. Sums the kVAr difference values (Kvar Dispensation Quantity) for this invoice period from kVAr non-compliance.
$$Qxz = \text{SUM}(\text{kVAr differences}).$$
 - d. Calculates and saves the Nominated Peak kVAr charge:
$$\text{NomCharge} = \text{PkRate} * Qxz$$
 - c. Sums the nominated peak kVAr charges for each generator and outputs a row in the ancillary amounts table.

Nominated Peak penalty charges per distributor:

- c. For each zone and distributor:
 1. Obtains the penalty rate nominated for this zone (PenRate) from forecast voltage support fixed rates.
 2. For each distributor reference node in each zone:
 - e. Obtains the nominated peak kVAr for this reference node (NomPeak) from nominated peak kVAr.
 - f. For each business day in invoice period:
 - i. Calculates kVAr peaks by
 - a. summing kVAr quantities for all GXPs in the reference node for each trading period between 15 and 42.
 - b. selects 2 highest calculated kVAr peaks for ref node (Peakx1, Peakx2).
 - c. adds Peakx1 and Peakx2 to list of ref node peaks, sorted by highest in descending order.
 - ii. Averages and saves the 6 highest peaks for the reference node; and
 - iii. Calculates and saves the penalty quantity:

$$\text{GxpPenQty} = \text{AVERAGE}(\text{Peak1} \dots \text{Peak6}) - \text{NomPeak}$$

g. Calculates and saves the peak penalty charges for the invoice period:

$$\text{PkPenCharge} = \text{PkRate} * \text{SUM}(\text{GxpPenQty})$$

3. Sums the peak penalty charges for each distributor and zone and outputs a row in the ancillary amounts table:

$$\text{Peak Penalty Charge} = \text{SUM}(\text{PkPenCharge})$$

Residual charges or payments per distributor:

For each zone and distributor, the system:

1. Calculates total allocable costs:

$$\text{Vcostz} = \text{procurement} + \text{admin} + \text{dispensation} + \text{identifiable.}$$

2. Sums and saves all the Nominated Peak kVAr charges calculated above:

$$\text{NCall} = \text{SUM}(\text{NomCharge})$$

3. Sums and saves all the Nominated Peak penalty charges calculated above:

$$\text{PPCall} = \text{SUM}(\text{Peak Penalty Charges})$$

4. Calculates the residual charge total:

$$\text{RSDall} = \text{Vcostz} - \text{NCall} - \text{PPCall}$$

5. Calculates and saves each distributors portion of the total residual charge:

$$\text{RSDline} = \text{RSDall} * (\text{SUM}(\text{Peak Demand}) / \text{SUM}(\text{Peak Demand} + \text{kVAr Differences}))$$

(This can also be described as:

$$\text{RSDline} = \text{RSDall} * (\text{SUM}(\text{Qdist}) / \text{SUM}(\text{Qall}))$$

Where

peak demand is the nominated peak kVAr; and

kVAr differences is the kVAr dispensation quantity from kVAr non-compliance.

6. Calculates and saves generators (with dispensation) portion of total residual charge:

$$\text{RSDgen} = \text{RSDall} * (\text{SUM}(\text{kVAr Differences}) / \text{SUM}(\text{Peak Demand} + \text{kVAr Differences}))$$

(This can also be described as:

$$\text{RSDgen} = \text{RSDall} * (\text{SUM}(\text{Qgen}) / \text{SUM}(\text{Qall}))$$

7. Calculates and saves total billing period offtake by distributors in the zone:

$$\text{BPOall} = \text{SUM}(\text{offtake from kVAr Ref Nodes in Zone})$$

8. For each Distributor calculate Residual Charge totals for zone:

Sums billing period offtake for each distributor:

$$\text{BPOdist} = \text{SUM}(\text{offtake from Distributor kVAr Ref Nodes in Zone})$$

Calculates and saves residual charge for distributor:

$$\text{RSDdist} = \text{RSDline} * (\text{BPOdist} / \text{BPOall})$$

9. For each generator with dispensation (DIGE) calculate residual charge totals for zone:

Sums kVAr Differences over all GXPs for DIGE:

$\text{NonCompgen} = \text{SUM}(\text{Qgen})$

Calculates and saves residual charge for distributor:
 $\text{RSDgen} = \text{RSDgen} * (\text{Qgen} / \text{Qall})$

Sum the residual charges by party and zone and output a row for each in the ancillary amounts table.

Also output a row for each allocable cost for voltage support in the ancillary amounts table.

Data outputs:		
<ul style="list-style-type: none"> • 6 highest peaks per distributor, zone and reference node • Ancillary Amounts 		
Field	Format	Description
Participant Code	Char (4)	e.g. CTCT
Party Role	Char (4)	See MR-010 for valid values
Month Date	DD/MM/YYYY	First day of invoice period
CM Product Code	Char (6)	840001 VS procurement costs 840002 VS admin costs 840003 VS contribution from dispensation 840004 VS identifiable costs 840005 VS nominated peak charges - DIGE 840006 VS nominated peak charges - DIST 840007 VS monthly peak charges 840008 VS residual charges - DIST 840009 VS residual charges - DIGE
Product Description	Varchar (255)	From the ancillary amounts - product codes table (MR-010) applicable to the CM product code.
Net Amount	Number (10,2)	+ or -
GST Amount	Number (10,2)	
FileBatchId	Number (10)	Assigned by system
Exceptions:		

6.9 Calculate must-run dispatch auction amounts

Sub-process:	CM-010 Calculate MRDA amounts
Process:	Calculate must-run dispatch auction amounts
Code references:	Schedule 13.3 and 14.20(2)(e)
Dependencies:	RV-050, RV-070
Module Name	IN-040

Description:

Every day, the clearing manager holds an auction for the right by generators to offer electricity at zero price for specific time blocks. The reason being that some generation plants cannot be easily switched off and are required to be dispatched even at zero price.

The clearing manager calculates the quantity of auction rights available in each time block at each auction. Generators submit up to five bids for each time block. The bids are then ranked and matched against the rights available. Bids succeed if they are matched in whole or part and are paid for by the successful generators. The revenue received from the auction is paid to purchasers according to the proportion of electricity purchased by them during each trading period.

Business requirements:

1. The clearing manager must conduct a must-run dispatch auction every day.
2. The clearing manager must specify the format that bids should be offered and must reject any bid not in the format. Generators submit bids to the clearing manager via a WITS interface.
3. The clearing manager must advise generators, by 1100 hours every day, of the quantity of auction rights that will be available in the auction due to be held on the following day and invite bids for those rights.
4. The clearing manager must only accept positive bids.
5. The clearing manager must allow generators to change or cancel their bids up to 0900 hours on the day of the auction.
6. The clearing manager must accept bids that are just for one auction and also bids that are valid till cancelled.
7. By 1100 hours on the day of an auction, the clearing manager must inform all bidders of the quantity and price of all successful bids made at the auction.
8. The clearing manager must issue authorisations to all successful generators setting out the auction rights won and the price to be paid for them.
9. All information exchanged during the auction must be passed through the Wholesale Information and Trading System (WITS) and the clearing manager must agree the mechanism with the WITS service provider.
10. In the event that WITS is unavailable, the clearing manager must use the alternative arrangements previously agreed by itself, the Board and generators.

11. The clearing manager must keep complete records of each auction for three years including all bids received, all rights offered and all prices achieved by time block, and be able to provide generators on demand with the details of their bids and the outcome of any auction within that period.

Data inputs:

- Bids from generators via WITS (RV-070).
- Historical load data from grid owners via WITS (RV-070). This is used as the measure of demand.
- Reconciliation information from the reconciliation manager (RV-050).

Processing:

The system:

1. Calculates the quantity of auction rights available for auction for each time block by:
 - determining the lowest demand in the trading periods of the corresponding time block of the day after the auction day in the preceding year and multiplying it by a fixed factor (see formula in clause 13.120). Auction rights are calculated in two tiers; night demand [80% of minimum demand from 00:00 till 07:59:59] and day demand [80% of minimum demand from 08:00 till 23:59:59].
 - matching the bids for each time block against the available rights by ranking the bids in descending order by price per MWh then allocating the auction rights accordingly until there are none left (see clauses 13.124, 13.125 and 13.126).
2. Calculates the amounts payable to each purchaser for each trading period of each time block by apportioning the total auction revenue for the time block equally to each trading period in the block then allocating that revenue to the purchaser according to their percentage of the total electricity purchased during the trading period (see formula in clause 13.112(1)).
3. Calculates the amounts receivable from each generator for each time block from the price and quantity of auction rights acquired by the generator for the block.
4. Includes amounts receivable and payable on the relevant party's invoice in the next invoice run.

Data outputs:

- Amounts receivable from generators.
- Amounts payable to purchasers.
- Authorisations to successful bidders specifying what quantities they may offer, during what trading periods and the amount they owe the clearing manager.
- The outcome of the auction to all bidders.
- The price and quantity of all successful bids to all generators and purchasers.

Exceptions:

The auction cannot proceed if the historical load information is not provided.

6.10 Calculate hedge settlement amounts

Sub-process:	CH-010 Calculate hedge settlement amounts
Process:	Calculate hedge settlement amounts
Code references:	14.8, 14.9, Schedule 14.4
Dependencies:	CH-020, VP-010
Module Name	

Description:
<p>Purchasers and generators may arrange a hedge settlement agreement (HSA) for the purchase and sale of a quantity of electricity at a fixed price.</p> <p>The settlement of the amounts and management of the contract is conducted by the clearing manager.</p> <p>There are three types of HSA:</p> <ol style="list-style-type: none"> 1. In a fixed price HSA, the difference between the fixed and floating price is paid by one party to the other. 2. In a cap/floor HSA, the fixed price is replaced by a strike price, and the HSA has value only when the final price is above the strike price (for a call) or below that price (for a put). 3. In a cap/floor average HSA, the price is averaged over the option period and then compared to the strike price to calculate the value. <p>Types 2 and 3 have a premium payable by the option buyer which is an amount per calculation period during the HSA active period.</p> <p>In Schedule 14.4 of the Code, Form 1 is used to specify fixed price HSAs, Form 2 cap/floor HSAs and Form 3 cap/floor average HSAs.</p> <p>The HSAs stipulate the parties involved, fixed price and quantity in MW for specific trading periods at specific grid points, and for types 2 and 3: the option type (put or call), the premium, and for type 3, the option period.</p> <p>HSAs are signed by the clearing manager. Before they are signed they are validated as described in CH-020.</p> <p>HSA settlement amounts (cash settlement and any premium settlement amounts) are included in prudential security calculations (described in PE-060). The settlement amounts of both parties of a HSA is calculated daily for this purpose.</p> <p>HSA settlement amounts are settled monthly. The clearing manager advises the parties to the HSA of their settlement amounts applicable to the previous month's HSAs.</p>

Business requirements:
<ol style="list-style-type: none"> 1. HSA settlement amounts must only be calculated when the HSA is in the "active" state. 2. The clearing manager must calculate the amounts owing for the previous month in each billing period and notify both parties by the 5th business day of the relevant billing period. 3. The clearing manager must include the amounts payable on the tax and pro-forma invoices of the appropriate party.

4. Where final prices or interim prices are not present for a trading period, that trading day must not be considered for invoicing for that billing period.

Data inputs:

- Final and interim prices. (VP-010).
- HSA details including the HSA status (CH-020).

Processing:

The system:

For each fixed price HSA, calculates the hedge settlement amounts as follows (n.b. calculation periods are those trading periods detailed in the HSA contract that relate to the billing period):

1. For each calculation period, the floating amount is the product of the calculation period notional quantity and the final price per MWh for the related trading period and hedge grid point. If the final price is unavailable, the interim price is used.
2. For each calculation period, the fixed amount is the product of the calculation period notional quantity and the fixed price per MWh.
3. The aggregate floating amount is the sum of all the calculation period floating amounts.
4. The aggregate fixed amount is the sum of all the calculation period fixed amounts.
5. The settlement amount of each HSA is the absolute value of the difference between the aggregate floating amount and the aggregate fixed amount.
6. Payments made are:
 - if the aggregate floating amount exceeds the aggregate fixed amount:
 - a. the floating price payer pays the clearing manager the settlement amount;
 - b. the clearing manager pays the fixed price payer the settlement amount;
 - if the aggregate fixed amount exceeds the aggregate floating amount:
 - c. the fixed price payer pays the clearing manager the settlement amount;
 - d. the clearing manager pays the floating price payer the settlement amount.

For each cap/floor HSA, calculates the hedge settlement amounts as follows (n.b. calculation periods are those trading periods detailed in the HSA contract that relate to the billing period):

1. The option premium is the sum of the specified calculation period premiums.
2. The cash settlement amount is the sum of the specified calculation period settlement amounts, which are calculated as the notional quantity multiplied by the strike price differential of each calculation period.
3. The strike price differential is:
 - a. for a put option: the greater of the strike price minus the floating price, and zero;
 - b. for a call option: the greater of the floating price minus the strike price, and zero.
4. The floating price is the final price per MWh for the related trading period and hedge grid point. If the final price is unavailable, the interim price is used.
5. Payments made are:
 - a. the option seller pays the clearing manager the cash settlement amount;

- b. the clearing manager pays the option buyer the cash settlement amount;
- c. the option buyer pays the clearing manager the option premium;
- d. the clearing manager pays the option seller the option premium.

For each cap/floor average HSA, calculates the hedge settlement amounts as follows (n.b. a calculation period is a trading period specified in the HSA contract that relates to the billing period; and an option period is a set of calculation periods specified in the HSA over which the average floating price is calculated and there may more than one option period spanning the term of the HSA.):

For each option period:

1. The option premium is the sum of the calculation period premiums.
2. The cash settlement amount is the sum of the calculation period settlement amounts, which are calculated as the calculation period notional quantity multiplied by the calculation period strike price differential.
3. The calculation period strike price differential is:
 - a. for a put option: the greater of the calculation period strike price minus the average floating price, and zero;
 - b. for a call option: the greater of the average floating price minus the calculation period strike price, and zero.
4. The average floating price is the option period floating amount divided by the option period notional quantity, where:
 - a. the option period floating amount is the sum of the calculation period floating amounts;
 - b. the calculation period floating amount is the product of the calculation period notional quantity and the calculation period floating price;
 - c. the calculation period floating price is the final price per MWh for the related trading period and hedge grid point - if the final price is unavailable, the interim price is used;
 - d. the option period notional quantity is the sum of the calculation period notional quantities
5. Payments made are:
 - a. the option seller pays the clearing manager the cash settlement amount;
 - b. the clearing manager pays the option buyer the cash settlement amount;
 - c. the option buyer pays the clearing manager the option premium;
 - d. the clearing manager pays the option seller the option premium.

Data outputs:

- Hedge Settlement Details for each buyer and seller per trading date and trading period of each HSA contract:

Field	Format	Mandatory /optional	Description
Contract ID	Number(10)	M	Unique identifier of a HSA contract assigned by the system.
Details ID	Number(10)	M	
Trading Date	Date	M	
Trading Period	Number (2)	M	

Field	Format	Mandatory /optional	Description
Holder	Varchar (4)	M	Eg CTCT, (Floating price payer or option seller.)
Party	Varchar(4)	M	Eg CTCT (Fixed price payer or option buyer.)
GIP/GXP	Varchar(8)	M	Valid grid point
Floating Price	Number (8,2)	M	
Floating Price Type	Char(1)	M	F – final, I - Interim
Premium	Number (8,2)	O	
Hedge Price	Number (8,2)	M	
Quantity	Number (9,3)	M	MWh
Strike Price Difference	Number (8,2)	O	
Settlement Amount	Float	M	

Exceptions:

Sub-process:	CH-020 Manage hedge settlement agreements
Process:	Calculate hedge settlement amounts
Code references:	14.8, 14.9
Dependencies:	CH-010, RV-050
Module Name	

Description:

A new Hedge Settlement Agreement (HSA) is supplied to the clearing manager on one of the three forms specified in Schedule 14.4 of the Code. The clearing manager loads the contract details into the system.

The HSA is valid when at least one participant to the HSA has a physical position as described in clause 14.8(3) of the Code.

Once the HSA has been validated by the system, the clearing manager can countersign the HSA and upload a scanned copy.

Once the copy is uploaded and there are email addresses for both participants, the HSA can become active.

Once active, a copy of the HSA is emailed by the system to the participants. Only activate HSAs are calculated, reported on and settled.

An HSA can be cancelled in the event of a default or as described in clause 14.9 of the Code.

Business requirements:

- The system must be able to record the details of the three forms of HSAs specified in Schedule 14.4 of the Code.
- A new HSA must only become valid if it meets the physical position test set out in clause 14.8 of the Code by which at least one party must meet the 33% threshold in any month calculated as follows:
 - a participant's physical position, being the greater of the average reconciled quantities sold or purchased over the last 12 months, or the average reconciled quantities sold or purchased over the last one month, is at least 33% or more of the sum of the average MW for each of its HSAs for any month to which the HSA applies.
- A scanned copy of the corresponding physical HSA form must be stored in the system and must be viewable.
- A valid HSA must only become active when the system holds a scanned copy of the contract and email addresses for each participant.
- A new and active HSA must be able to be cancelled, an active HSA must be able to revert to being valid and a valid HSA must be able to revert to being new.
- When a valid HSA becomes active, a notification must be emailed to both participants containing the countersigned HSA and the fact that it has now been accepted.

Data inputs:

<p>1. Reconciled Quantities (RV-050).</p> <p>2. Copy of the physical countersigned HSA contract.</p> <p>3. Email addresses of participants.</p> <p>4. HSA Contract details: Each HSA must have a header row containing summary information about the HSA contract and one or more detail rows.</p>			
HSA Contract Summary Details (Header)			
Field	Format	Mandatory /optional	Description
Contract ID	Number(10)	M	Unique identifier of a HSA contract assigned by the system.
Name	Varchar(50)	O	Free format description.
Contract Date	Date	M	Date contract signed from the HSA contract.
Holder	Varchar (4)	M	Floating price payer or option seller. Must be a valid participant ID.
Party	Varchar(4)	M	Fixed price payer or option buyer. Must be a valid participant ID.
Activated Date	Date	O	Contract's actual activation date.
Cancelled Date	Date	O	Required for cancelled contracts.
Hedge Type	Varchar (4)	M	STDR – Standard, CFPP – Cap/floor period price, or CFAP – Cap/floor average price.
Status	Char(1)	M	N – new, I – invalid, A – active, V – valid, or C - cancelled
Last Valid Date	Date	M	Last date the contract was successfully validated.
<p>One or more detail rows are completed for each contract header. Each row describes a time slice to which the contract details apply. The time slice is defined by a Start Date, End Date, From Trading Period, To Trading Period and Days Type. The details relate to each trading period within the trading period range (From Period to Period) and to each trading date of the type indicated in Days Type (all, weekends or weekdays only) within the date range (Start Date to End Date). Settlement amounts are calculated only for the trading periods within this time slice.</p> <p>There are 2 formats : Standard and Cap&Floor which is indicated by the Hedge Type in the Header.</p>			
Standard contract details:			
Field	Format	Mandatory /optional	Description

Details ID	Number(10)	M	Unique identifier assigned by the system.
Contract ID	Number(10)	M	Unique identifier of the HSA contract that this detail relates to.
Start Date	Date	M	Commencement date of the time slice to which these details relate.
End Date	Date	M	Last date of the time slice to which these details relate.
From Period	Number (2)	M	Commencement trading period of the time slice to which these details relate.
To Period	Number (2)	M	Last trading period of the time slice to which these details relate.
Quantity	Number (9,3)	M	MWh
Price	Number (8,2)	M	
GIP/GXP	Varchar(8)	M	Valid grid point
Days Type	Varchar (2)	M	AD – all days WD – weekdays only WE – weekends only
Formula	Varchar(10)	M	STRDSA - Standard Settlement Amount
Cap&Floor contract details:			
Field	Format	Mandatory /optional	Description
Details ID	Number(10)	M	Unique identifier assigned by the system.
Contract ID	Number(10)	M	Unique identifier of the HSA contract that this detail relates to.
Option Type	Char(1)	M	P – Put option C – Call option
Start Date	Date	M	Commencement date of the time slice to which these details relate.
End Date	Date	M	Last date of the time slice to which these details relate.
From Period	Number (2)	M	Commencement trading period of the time slice to which these details relate.
To Period	Number (2)	M	Last trading period of the time slice to which these details relate.
Quantity	Number (9,3)	M	MWh
Price	Number (8,2)	M	
Premium	Number (8,2)	M	
GIP/GXP	Varchar(8)	M	Valid grid point
Days Type	Varchar (2)	M	AD – all days WD – weekdays only WE – weekends only

Formula	Varchar(10)	M	CFPPPSA - Cap/Floor Period Price (Put) Settlement Amount CFPPCSA - Cap/Floor Period Price (Call) Settlement Amount CFAPPSPD - Cap/Floor Average Price Strike Price Differential (Put) CFAPCSPD - Cap/Floor Average Price Strike Price Differential (Call)
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Processing:
<p>The system:</p> <ol style="list-style-type: none"> a. Allows the user to input, validate and store information for new HSAs using the data from the appropriate form and the copy of the contract. b. Creates new HSAs with the status “new”. c. When the user elects to cancel the HSA, changes the status to “cancelled”. d. When the user elects to validate the HSA, the system performs the physical position check as follows: <ul style="list-style-type: none"> • Calculates and sums the average MW, for each month that the HSA will be operating, for all HSAs that participant has with an “active” status (including the HSA being validated), for both participants. • Calculates the average for the last 12 months of purchases, and for sales, for each participant. • Calculates the average for the last month’s purchases, and for sales, for each participant. • Determines the greater of the averages calculated in (b) and (c) above. • For each participant compares the values from (a) above for each month with the greatest average from (d) above,. <ul style="list-style-type: none"> • At least one participant must have a physical position calculated in (d) above that is at least 33% of its average HSA position calculated in (a) above, for every month of the HSA being validated. e. If the physical position check is successful, changes the HSA status to “valid” and records the date, otherwise changes it to “invalid”. f. Allows the user to change the status of an HSA from “valid” to “new” again. g. Allows the user to validate an “invalid” HSA again. h. If the system holds a copy of the HSA countersigned by the clearing manager and an appropriate email address for each participant, allows the user to change the status of a valid HSA to “active”. i. When the status is changed from “valid” to “active”, sends each participant a notification by email with an attached copy of the countersigned HSA. j. Allows the user to scan and retain a copy of the HSA. This scanned stored copy is kept with the stored contract details.

- k. Allows the user to view all contract details and any associated scanned copies of the contract.

Data outputs:

- HSA contract details - header and multiple detail rows.
- HSA scanned contract copy.
- HSA validation values 4(a) through 4(f) above for each party, for each month the HSA will operate.
- Email to participants with a copy of the countersigned HSA contract attached.

Exceptions:

6.11 Calculate FTR amounts

Sub-process:	CF-010 Calculate initial FTR hedge value and FTR provisional payments
Process:	Calculate FTR amounts
Code references:	13.250(3), 14.17
Dependencies:	RV-010, VP-010
Module Name	IN-055

Description:

The clearing manager calculates the provisional FTR payment amount for each FTR being settled by subtracting the acquisition value of the FTR from the calculated initial FTR hedge value.

The clearing manager will pay the FTR holder if an FTR holding's value at settlement is more than the value it was acquired for. The FTR holder will pay the clearing manager if the value of the FTR holding is less.

Business requirements:

The clearing manager must calculate the provisional FTR payment amounts payable or receivable by each party. This is the difference between the value of the FTR holding at settlement and the value of the FTR holding when it was acquired.

Where final prices are not present for a trading period, that trading period will not be considered by the calculation.

Data inputs:

- Final prices (\$/MWh) (VP-010)
- FTR holdings (with non-zero MW quantity, \$/MWh acquisition cost) (RV-010)

Processing:

1. Calculate the Initial FTR hedge value (\$) for each FTR holding to be settled =
FTR volume (MW) * 0.5 * (sink price – source price) (i.e. nodal price difference, but floored at zero for option FTRs) for each trading period in the FTR period
2. Calculate the acquisition value (\$) of each FTR holding to be settled =
FTR volume (MW) * 0.5 * FTR acquisition cost (\$/MWh) * number of half-hours in the FTR period
(where the FTR acquisition cost is initially the price at auction, subsequently updated by any assignments where the assignment price was disclosed)
3. Calculate the provisional FTR payment (\$) for each FTR holding being settled =
Initial FTR hedge value (\$) – acquisition value (\$)

Data outputs:

- Provisional FTR payment amounts (for each FTR being settled)
- FTR acquisition values
- Initial FTR hedge values

Exceptions:

Sub-process:	CF-020 Calculate FTR assignment difference payments
Process:	Calculate FTR amounts
Code references:	13.249 (4), 13.249 (7), 14.17
Dependencies:	RV-010
Module Name	IN-056

Description:

The clearing manager calculates any assignment difference payments applicable to an assignment for inclusion on the applicable invoice.

Business requirements:

The clearing manager must:

1. Determine the assignment difference payment amounts payable and include on the appropriate invoice:
 - If the assignment difference payment is payable **to** the clearing manager (an assignor to clearing manager assignment difference payment) then it will be included on a participant tax invoice addressed to the assignor for the billing period in which the assignment took place.
 - If the assignment difference payment is payable **by** the clearing manager (a clearing manager to assignor assignment difference payment) then it will be included on a pro-forma invoice (or participant credit note) when the FTR is settled.
 - If the assignment price is not disclosed there is no assignment difference payment.

N.B. Assignment difference payments are not scaled.

Data inputs:

- Assignments occurring during the billing period being settled (RV-010).

Processing:

The system:

1. Calculates any assignment difference payment that is applicable to the assignment:

assignment difference payment (\$) = (assignor's acquisition cost (\$/MWh) – disclosed assignment price (\$/MWh)) * assignment quantity (MW) * number of hours in the FTR period (h).

Or (the equivalent calculation based on half hours)

assignment difference payment (\$) = (assignor's acquisition cost (\$/MWh) – disclosed assignment price (\$/MWh)) * assignment quantity (MW)/2 * number of half hours in the FTR period (hh).
2. Determines the participant with an amount owing b the participant:

- a. If the assignment difference payment is positive (i.e. disclosed assignment price < assignor's acquisition cost) then it is an *assignor to clearing manager* assignment difference payment (and will be invoiced the following month).
- b. If assignment difference payment is negative (i.e. disclosed assignment price > assignor's acquisition cost) then it is a *clearing manager to assignor* assignment difference payment (and will be invoiced when the FTR is settled).
- c. There is no assignment difference payment if the disclosed assignment price = assignor's acquisition cost.

Data outputs:

- Assignment difference payment amounts (per assignment).

Exceptions:

Sub-process:	CF-030 Calculate FTR reconfiguration payment amounts
Process:	Calculate FTR amounts
Code references:	13.242A, 13.247
Dependencies:	RV-010
Module Name	IN-056
Description:	
The clearing manager calculates the reconfiguration payment amounts applicable for inclusion on the appropriate invoice.	

Business requirements:
The clearing manager must: <ol style="list-style-type: none"> Determine the reconfiguration amounts payable and receivable and include them in the appropriate invoice.

Data inputs:
<ul style="list-style-type: none"> Reconfigurations for the FTR period being settled (RV-010).

Processing:
<p>The system:</p> <ol style="list-style-type: none"> Calculates the reconfiguration payment amounts as follows: <p>Reconfiguration payment amount (\$) = (original holding or assignment acquisition cost (\$/MWh) – reconfiguration (sale) price (\$/MWh)) * reconfigured (sale) volume (MW) * number of hours in the FTR period (h).</p> <p>Or (the equivalent formula in half hours)</p> <p>Reconfiguration amount (\$) = (original holding or assignment acquisition cost (\$/MWh) – reconfiguration (sale) price (\$/MWh)) * reconfigured (sale) volume (MW)/2 * number of half hours in the FTR period (hh).</p> Determines the participant with an amount owing by the participant: <ol style="list-style-type: none"> If the reconfiguration payment amount is positive (i.e. reconfiguration sale price < original acquisition cost) then it is a reconfiguration payment amount due from the selling participant to the clearing manager when the FTR period is settled. If the reconfiguration payment amount is negative (i.e. reconfiguration sale price > original acquisition cost) then it is a reconfiguration payment amount due from the clearing manager to the seller when the FTR period is settled. The reconfiguration payment amount is zero if reconfiguration sale price = original acquisition cost.

Data outputs:
<ul style="list-style-type: none"> Reconfiguration payment amounts (per reconfiguration).

Exceptions:

Sub-process:	CF-040 Calculate initial margins
Process:	Calculate FTR amounts
Code references:	
Dependencies:	MR-020
Module Name	RV-530, FT-010

Description:

The clearing manager calculates initial margin rates for each to-be-auctioned FTR product following the methodology. This initial margin data is used to determine the initial collateral required by auction participants and is provided to the FTR manager and published.

Business requirements:

1. The clearing manager must calculate, validate, confirm and publish initial margin rates for FTR products to be auctioned for an FTR period. Initial margin rates are stipulated on a per product basis on a >5 month, =<5 month Summer, <= 5 month Winter and post FTR period basis. For those products in the post FTR period duration, the initial margin will equal \$0.

Data inputs:

- FTR product(s) and FTR period(s) to be auctioned.
- Daily Settlement Prices (DSPs) for FTR products for the last two years.
- Current published initial margins.
- Monthly ASX price differences and monthly average PPM price differences per FTR product and FTR period (MF-010).
- Effective date.

Processing:

The system:

- Calculates the initial margins for each product (FTR profile, source hub to sink hub, for each of option and obligation type products) for each of three cases - the *far term* (where the FTR period is greater than 5 months in the future) and the *near term* (where the FTR period is less than or equal to 5 months in the future) with the near term further broken down into two seasons (winter and summer).
For each product and case, the IM value is calculated as follows:
 - For each business day for the previous 2 years, the DSP difference is calculated by taking the difference between the DSP of that day and the day 2 weeks before.
 - For each FTR period of a product, a list is created that includes all the business days calculated in a), the associated DSP difference calculated in a) and the case, where the case is a combination of

<ul style="list-style-type: none"> a. <i>the time remaining</i> – either <i>near term</i> (<= 5months) or <i>far term</i> (> 5months) depending on the length of time from the business day and the commencement of the FTR period, and b. <i>the season</i> – from the FTR period, either <i>summer</i> (the months October to March inclusive) or <i>winter</i> (the months April to September inclusive). <ul style="list-style-type: none"> ○ The lists of all the FTR periods of a product are merged into one list and sorted first by <i>case</i> (<i>time remaining</i> and <i>season</i>) then by DSP difference (ascending). ○ For options, for each <i>case</i>, the 15th percentile of the DSP differences is found. If this value is negative, the absolute value is used as the initial margin. Positive values are excluded. ○ For obligations, for each <i>case</i>, the absolute values of the 15th and the 85th percentiles are compared and the greatest value is used for the initial margin. ○ For products where there are fewer than 60 DSP values available, two years of monthly average PPM price differences and Monthly ASX price differences are used instead of the DSP. For option products only the PPM is used. For obligation products, the weighted average of the PPM and ASX values are used with a weight of 0.5 for each. <ul style="list-style-type: none"> ● Displays the results (initial margins) permitting values to be edited, if required. ● Stores the initial margins, in the ‘proposed’ state, until confirmed. ● On confirmation, validates the effective date required to be assigned. It must be after the run date and within one month from it. ● Publishes the confirmed initial margins. ● Prevents published initial margins from being changed. <p>N.B. The calculation of the initial margin is as per the methodology described in the FTR Prudential Security Assessment Methodology. Refer to the clearing manager’s ‘Prudential Security Assessment Methodology’ document for details.</p>
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Data outputs:		
The initial margin summary file is posted to the clearing manager’s website and used from the effective date.		
• Initial Margin Summary Report		
Field	Format	Description
FTR Profile	VarChar(4)	Time period of FTR i.e. 24Hr
FTR Type	Char(3)	Type, (OPT for Option or OBL for Obligation)
Source Hub	Char(3)	Source hub for the FTR product
Sink Hub	Char(3)	Sink hub for the FTR product

Time Remaining Before FTR Period	VarChar(12)	Number of months until the product period. (“> 5 months”, “<= 5 months”)
Product Season	VarChar(12)	Season. (If Time Remaining is less than or equal to 5 months then “Summer” or “Winter” else “”).
IM Confirmed Date/Time	DD/MM/YYYY HH24:MI:SS	Date/Time confirmed and published
IM Per MWH	Number(10,2)	Value of IM in \$/MWh
Effective Date	DD/MM/YYYY	Date the IM is applicable
Previous IM Per MWH	Number(10,2)	Previous IM for same product, time remaining and season
Previous Effective Date	DD/MM/YYYY	Date of previous published IM

Exceptions:

Sub-process:	CF-050 Calculate FTR location factors
Process:	Calculate FTR amounts
Code references:	
Dependencies:	MR-020, VP-010
Module Name	

Description:

The clearing manager calculates quarterly FTR location factors for all FTR hubs provided there are final prices for every trading period in the quarter. FTR location factors are used in the calculation of the daily settlement price for option products when no price setting trade is available as defined in the FTR Prudential Security Assessment Methodology published by the clearing manager.

Business requirements:

1. The clearing manager must calculate and store FTR location factors for all FTR hubs each quarter.

Data inputs:

- Final prices. (VP-010)
- FTR hubs. (MR-020)
- Reference hubs. (MR-020)
- Annual quarter.

Processing:

The system:

1. For each FTR hub calculates the FTR location factor:
$$\text{location_factor}(q,h) = \frac{\text{Average}(\text{final_prices}(q,h))}{\text{Average}(\text{final_prices}(q, r_h))}$$

where:

 - q is annual quarter,
 - h is FTR hub, and
 - r_n is reference hub for FTR hub h.
2. Stores the location factors per FTR hub and annual quarter.
3. Reports the success or failure of the calculations.

Data outputs:

- Location factor per FTR hub and annual quarter.

Exceptions:

If there are any missing final prices in the annual quarter then the calculation is aborted.

6.12 Calculate constrained amounts

Sub-process:	CC-010 Aggregate offers and calculate scheduled quantity
Process:	Calculate constrained amounts
Code references:	13.192,13.194, 13.202, 13.203
Dependencies:	RV-070, MR-010, VP-010
Module Name	IN-060

Description:

The clearing manager aggregates cleared offers (other than the offers from the dispatch notification generators) in order to calculate their scheduled quantity i.e. the quantity of electricity that is scheduled to be generated at a particular grid injection point for a trading date and trading period based on the (cleared) generator offers and the final prices.

Business requirements:

1. The clearing manager must aggregate cleared offers and calculate a scheduled quantity for each offer.
2. The clearing manager must exclude offers from dispatch notification generators.

Data inputs:

- Cleared offers/final offers (RV-070)
- Final prices (VP-010)
- GIP groupings – whether part of a block, station dispatch group or is treated as a single generating station.
- Dispatch notification generation grid points, stations and units (MR-010)

Processing:

The system :

1. Calculates an aggregated offer stack by:
 - obtaining final cleared offers for every grid injection point and trading period within the billing period excluding those from dispatch notification generators;
 - obtaining the final prices for every grid point and trading period within the billing period;
 - combining offers by block or station dispatch group (rather than by individual generating station), where the system operator dispatches by block or station dispatch group. To determine whether aggregation is required by block or station dispatch group, the system looks up the GIP in the grouping reference data;
 - ranking of (aggregated or non-aggregated) offers. Ranking is the process by which offers are separated into individual 'offer bands' and then sorted

- in ascending (offer price – final price) sequence to form an aggregated offer stack;
- calculating the aggregated quantity of each ranked offer band. This is a cumulative total of the offer quantities in the lower ranked offers.
2. Identifies the scheduled quantity of each aggregated offer stack. This is the highest aggregated quantity where the (offer price - final price) is less than or equal to zero.
 3. Derives the ramp up and ramp down rates for each aggregated offer by assigning the highest absolute ramp up and ramp down rates of the cleared offers involved in the aggregation.

- Data outputs:**
- Aggregated Offer Stack with ramp up and ramp down rates.
 - Scheduled Quantity for each offer or aggregated offer (for blocks and station dispatch groups).

• **Aggregated Offer Stack**

Field	Format	Description
Party Code	Char (4)	Participant identifier, e.g. CTCT
Supply Point	Varchar (8)	Block ID, Station Dispatch Group ID or individual station POC
Trading Date	DD/MM/YYYY	
Trading Period	Number (2)	
Offer Band Quantity	Char (1)	
Previous Offer Band Aggregated Quantity	Number (10,3)	
Offer Band Aggregated Quantity	Number (10,3)	
Offer Band Price	Number (8,2)	
POC	Varchar (8)	
Ramp Up Rate	Number (4)	
Ramp Down Rate	Number (4)	
Station Code	Char (3)	
Network Code	Char (4)	Grid owner participant identifier

• **Scheduled Quantities**

One row output for each aggregated offer. By block, station dispatch group or individual station per trading date and period. (May be derived from Aggregated Offer Stack.)

Field	Format	Description
Party Code	Char (4)	Participant identifier, e.g. CTCT
Supply Point	Varchar (8)	Block ID, Station Dispatch Group ID or individual station POC
Trading Date	DD/MM/YYYY	
Trading Period	Number (2)	

Scheduled Quantity	Number (10,3)	Maximum Offer Band Aggregated Quantity where Offer Band Price \leq Final Price
--------------------	---------------	--

Exceptions:

Sub-process:	CC-015 Aggregate nominated dispatchable demand (DD) bids
Process:	Calculate constrained amounts
Code references:	13.192,13.194, 13.202, 13.203
Dependencies:	RV-070, MR-010, VP-010
Module Name	IN-060

Description:

The clearing manager aggregates nominated dispatch bids (other than the bids from the dispatch notification purchasers) in order to calculate the scheduled quantity i.e. the quantity of demand that is scheduled to be dispatched at a particular market node (grid point, DCL station and unit) for a trading date and trading period based on the nominated dispatchable bids and the final prices.

Business requirements:

1. The clearing manager must aggregate nominated dispatchable demand bids for each dispatchable demand market node for each trading date and trading period.
2. The clearing manager must not aggregate any nominated non-dispatchable demand bids.

Data inputs:

- Nominated DD bids (RV-070)
- Final prices (VP-010)
- Dispatch notification purchaser grid points, stations and units (MR-010)

Processing:

The system :

1. Calculates an aggregated nominated DD dispatchable bid by:
 - obtaining nominated DD dispatchable bids for every DCLS market node and trading period within the billing period;
 - obtaining the final prices for every grid point and trading period within the billing period;
 - ranking of bids i.e., the process by which bids are separated into individual 'bid bands' and then sorted in descending (bid price – final price) sequence to form an aggregated bid stack;
 - calculating the aggregated quantity of each ranked bid band. This is a cumulative total of the bid quantities in the higher ranked bids.

Data outputs:

- Aggregated quantity for each bid band – sorted in descending (bid price – final price) sequence

Aggregated dispatchable demand (DD) bids		
Field	Format	Description
Party Code	Char (4)	Participant identifier, e.g. CTCT
Supply Point	Varchar (8)	Grid exit point
DCLS Code	Varchar (5)	Dispatch capable load station code and unit
Trading Date	DD/MM/YYYY	
Trading Period	Number (2)	
Bid Price	Number (8,2)	
Bid Quantity	Number (10,3)	
Aggregated Low Quantity	Number (10,3)	
Aggregated Quantity	Number (10,3)	

Exceptions:

Sub-process:	CC-020 Calculate dispatched quantities
Process:	Calculate constrained amounts
Code references:	13.193 13.202, 13.203, 13.212B
Dependencies:	RV-040, CC-010
Module Name	IN-060

Description:

The clearing manager calculates the average trading period dispatched quantity i.e. the calculated quantity of electricity a generator (other than the dispatch notification generator) was instructed to dispatch at a particular grid injection point, station dispatch group or block for a trading date and trading period, as derived from the dispatch instructions.

To facilitate the calculation of block settlement differences (PB-020) this process also calculates the dispatched quantities of the individual stations that make up a block, in the same way. However these are not used in the constrained on and off calculations and are only calculated and output in this process.

Where the system operator has indicated that a “ramp constrained” situation existed in a dispatch instruction, for the duration of any ramp-down period, the calculation of the average trading period dispatch quantity ignores any generation quantities greater than the scheduled quantity (as required by clause 13.212B of the Code). This adjustment does not apply to block settlement differences.

Business requirements:

1. The clearing manager must calculate the dispatched quantity for each trading date and trading period covered by a dispatch instruction (other than dispatch notification generators).

Data inputs:

- Aggregated offer stack (CC-010)
- Scheduled Quantities (CC-010)
- Dispatch instructions (RV-040)

Processing:

The system:

1. Calculates the dispatched quantity per trading period for each offer or aggregated offer by:
 - Obtaining the relevant dispatch instructions. Only instructions with:
 - instruction type = 'A', and
 - action type = 'I' (insertion) or 'D' (deletion)

Generally all instructions should be 'I' (insertions) but if Transpower were to correct an incorrect dispatch then it is possible

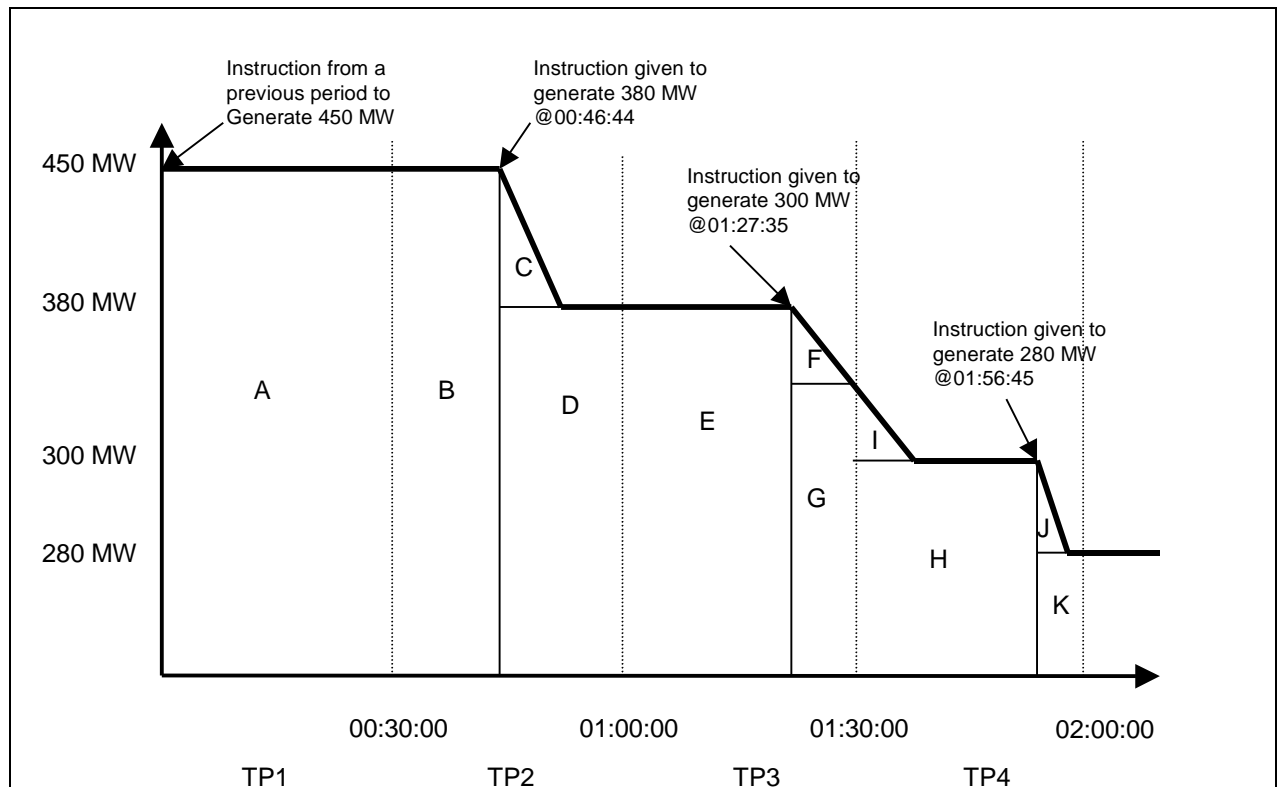
that they would delete instructions so that their post processing would be correct. In this case we would get a 'D' flag and should ignore the original dispatch instruction. In this case it gets soft deleted.

- Selecting the instructions issued to whole blocks ,station dispatch groups and individual stations including the individual stations that are part of a block.
- Deriving additional information for each dispatch instruction to assist in the calculation of the dispatched quantity and storing these as processed dispatch instructions. The additional information includes:
 - The Din ID of the next dispatch instruction. This enables the system to calculate the duration of the dispatch instruction and hence the effective trading periods it covers (taking into account daylight saving). These can extend over multiple billing periods.
 - Initial Power. The important thing in the processing is identifying the initial and final energy quantities for each trading period. This allows for the determination of the dispatched quantity for the trading period by calculating the area under the graph.
 - Ramp Rate: The ramp-up and max ramp-down rates from the related aggregated offer stack are required to work out the weighted average quantity generated during the ramping up and down periods . For a block containing stations that have differing offered ramp rates, the ramp rate is taken as the highest of the offered ramp rates.

Ramp Constrained situation:- When a dispatch instruction contains a positive ramp-down rate, this indicates that a “ramp constrained” situation existed. In this case, during any ramp-down period, any quantities of power above the scheduled quantity are not to be included in the calculation of the dispatched quantity.

Calculation of the dispatched quantity per trading period:

The actual dispatched quantity is the weighted average of the power levels expected to be generated when complying with dispatch instructions, received from the system operator, for each grid injection point, SDG or block for each trading period of every trading day. Graphically (see fig.) the dispatch quantity can be calculated as the area under the graph (i.e. a sum of rectangular and triangular area calculations).



dispatched quantity per trading period (mw) = sum of the weighted average power (mw) of every dispatch area within a trading period.

where:

dispatch area = a time period within a trading period when the power is either constant or changing at a constant rate i.e. the applicable (up or down) ramp rate

The start time of each dispatch area will be one of:

1. the start time of the trading period, or
2. the time of a new dispatch instruction, or
3. the time when the target power is reached.

The end time of each dispatch area will be the earliest of the following after the dispatch area's start time:

1. a new dispatch instruction (time of the next instruction), or
2. the time when the target power is reached, or
3. when the trading period ends or
4. the time when, during a "ramp constrained" situation where the initial power level is greater than the scheduled quantity, the ramp-down quantity reaches the scheduled quantity

N.B. End time cannot be the same as the start time.

For each dispatch area:

weighted average power (MW) =

If the instruction involves ramping down then

$$\text{ABS}(\text{power level at the dispatch area start} - \text{power level at the dispatch area end in seconds})^2 * (1 / \text{Ramp Rate in MW per second} / 1800) / 2 + \text{MIN}(\text{power level at the dispatch area start}, \text{power level at the dispatch area end}) * (\text{duration between the dispatch area start and the dispatch area end in seconds}) / 1800$$

Otherwise

$$\text{MAX}(\text{power level at the dispatch area start}, \text{power level at the dispatch area end}) * (\text{duration between the dispatch area start and the dispatch area end in seconds}) / 1800 - \text{ABS}(\text{power level at the dispatch area start} - \text{power level at the dispatch area end in seconds})^2 * (1 / \text{Ramp Rate in MW per second} / 1800)$$

For a dispatch instruction that indicates a “ramp constrained” situation occurred, any dispatch area being ramped down from a power level greater than the scheduled quantity, must have all power levels reduced to equal the scheduled quantity until the ramp-down power level reaches the scheduled quantity.

N.B. The ABS part of the equation deals with any triangular area and the MIN/MAX part is for the constant underlying power over the same duration.

Data outputs:		
<ul style="list-style-type: none"> Dispatched Quantity 		
One row output for each trading date and trading period covered by a dispatch instruction issued to a block, station dispatch group or individual station.		
Field	Format	Description
Dispatch Type	Char (4)	“BDST” for block settlement differences otherwise “NORM”
Party Code	Char (4)	Participant identifier, e.g. CTCT
Supply Point	Varchar (8)	Block ID, Station Dispatch Group ID or individual station POC
POC	Varchar (8)	
Station Code	Char (3)	“BDG” if a block, “SDG” for station dispatch groups otherwise the individual Station Code.
Trading Date	DD/MM/YYYY	
Trading Period	Number (2)	
Dispatched Quantity	Number (10,3)	
<ul style="list-style-type: none"> Processed Dispatch Instructions 		
Field	Format	Description
Din ID	Number (24)	Dispatch instruction ID provided by the system operator e.g.20167792726

Din ID Suffix	Number (3)	For internal processing
Status	Char(1)	For internal processing
Effective Date	Date:Time	Of the dispatch instruction e.g. 1/04/2010 12:15:00.
Effective Trading Period	Number (2)	Conversion of the effective datetime to a trading period
Effective DSI	Char (1)	Daylight saving indicator
Duration	Number (9,12)	Time in hours between the effective datetimes of the dispatch instruction and the next dispatch instruction
Next Din ID	Number (24)	Din ID of the next instruction
Next Din ID Suffix	Number (3)	For internal processing
Reprocess Indicator	Number (2)	Y/N. Internal processing indicator. Defaults to N.
Party	Char (4)	Participant identifier, e.g. CTCT
Station	Char (3)	e.g. CYD
Supply Point	Char (8)	e.g. Grid Point or Block or Station Dispatch Group code
Block ID	Number	For internal processing of BDSG
Initial Power	Number (10,3)	Power at the effective datetime of the dispatch instruction
Ramp Rate	Number (15,3)	Current maximum offered ramp rate for the generating station
Power	Number (10,3)	Target power
Deleted Indicator	Char (1)	Y/N. Internal processing indicator. Defaults to N.
Comments	Varchar (250)	
Ramp Up Rate	Number (15,3)	MW/hr. Zero or a positive value.
Ramp Down Rate	Number (15,3)	MW/hr. Zero or a positive value. A positive value indicates that the system operator has deemed this instruction to have been "ramp constrained".

Exceptions:		
<ol style="list-style-type: none"> 1. If no dispatch instruction exists then a dispatched quantity of 0 should be assumed. Any dispatched quantity of 0 should be flagged. 2. When a block or station dispatch group ends (changes grouping), the final dispatch instruction must be manually ended as the dispatcher issues no 'closing' dispatch instruction. 		

Sub-process:	CC-025 Calculate DCLS dispatched quantities
Process:	Calculate constrained amounts
Code references:	13.194, 13.195
Dependencies:	RV-040
Module Name	IN-060

Description:

The clearing manager calculates the trading period dispatched quantity for a dispatch capable load station (other than a dispatch notification purchaser) was instructed to dispatch at a particular grid point, DCL station and unit for a trading date and trading period, as derived from the dispatch instructions.

Business requirements:

1. The clearing manager must calculate the DCLS dispatched quantity for each trading date and trading period covered by a dispatch instruction.
2. DCLS dispatch quantities for a trading period is calculated using time weighted average of dispatched power.

Data inputs:

- Dispatch instructions (RV-040)
- Dispatch notification purchaser grid points, stations and units (MR-010).

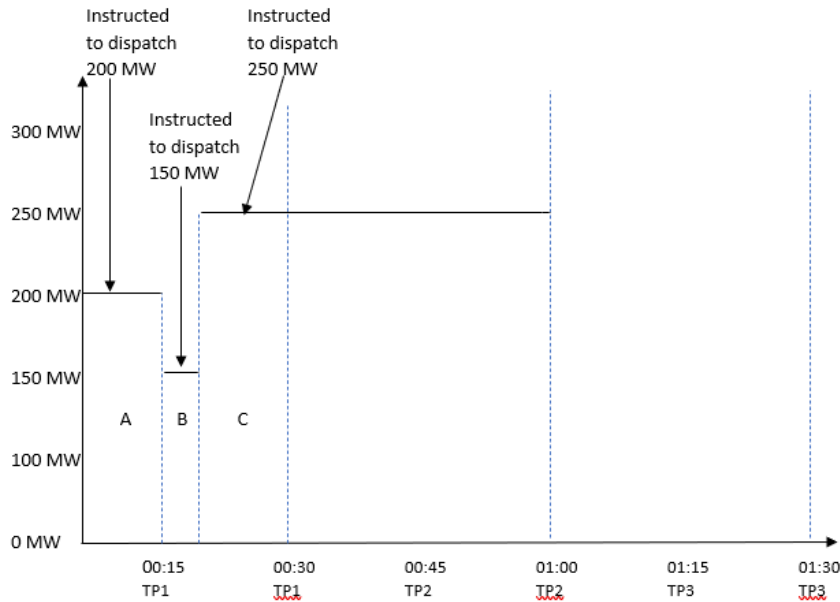
Processing:

The system:

1. Calculates the dispatched quantity per trading period excluding dispatch notification purchasers for each bid, by:
 - Obtaining the relevant dispatch instructions. Only instructions with:
 - instruction type = 'D', and
 - action type = 'I' (insertion) or 'D' (deletion)

Generally all instructions should be 'I' (insertions) but if Transpower were to correct an incorrect dispatch then it is possible that they would delete instructions so that their post processing would be correct. In this case we would get a 'D' flag and should ignore the original dispatch instruction. In this case it gets soft deleted.
 - Deriving additional information for each dispatch instruction to assist in the calculation of the dispatched quantity and storing these as processed dispatch instructions where dispatchable equals to yes. The additional information includes:

- The Din ID of the next dispatch instruction. This enables the system to calculate the duration of the dispatch instruction and hence the effective trading periods it covers (taking into account daylight saving). These can extend over multiple billing periods.



Calculation of the dispatched quantity per trading period:

The actual dispatched quantity is the weighted average of the power levels expected to be dispatched when complying with dispatch instructions, received from the system operator, for each grid point, DCL station and unit for each trading period of every trading day. When the dispatchable code equals to no, then the power is zero.

dispatched quantity per trading period (mw) = sum of the weighted average power (mw) of every *dispatch area* within a trading period.

where:

dispatch area = a time period within a trading period

The start time of each dispatch area will be one of:

- the start time of the trading period, or
- the time of a new dispatch instruction

The end time of each dispatch area will be the earliest of the following after the dispatch area's start time:

- a new dispatch instruction (time of the next instruction), or
- when the trading period ends

N.B. End time cannot be the same as the start time.

Examples of the dispatched quantity calculation for TP 1 and TP2 showed in graph above:

For trading period TP1:

weighted average power (MW) = sum of the power of all dispatch areas (A + B +C) sum (power level at the dispatch area A * duration between the dispatch area start and the dispatch area end in seconds + power level at the dispatch area B * duration between the start and end in seconds + power level at the dispatch area C * duration between the start and end in seconds)/1800

$$(200 \text{ MW} * 600 + 150 \text{ MW} * 300 + 250 \text{ MW} * 900)/1800 = 216.67 \text{ MW}$$

For trading period TP2:

$$(250 \text{ MW} * 1800)/1800 = 250 \text{ MW}$$

Data outputs:		
Processed Dispatch Instructions		
Field	Format	Description
Din ID	Number (24)	Dispatch instruction ID provided by the system operator e.g.20167792726
Party Code	Varchar2 (4)	Participant identifier
GXP/GIP	Varchar2 (8)	Grid point
DCLS Code	Varchar2 (5)	Dispatch capable load station code
Effective Date	Date	
Effective TP	Number (2)	Effective trading period
Power	Number (10,3)	In MW
Deleted Y/N	Varchar2 (1)	
Comments	Varchar2 (255)	
Created Date	Date	Default: system date
Created By	Varchar2 (30)	Default: user
Modified Date	Date	
Modified By	Varchar2 (30)	
Status Code	Varchar2 (1)	T: Transferred P: Processed C: Calculated (dispatch quantity)
DSI Y/N	Varchar2 (1)	Day light savings indicator (yes/no)
Duration	Number	
Next Din ID	Varchar2 (24)	
Dispatchable Code	Varchar2 (1)	0: non-dispatchable 1: dispatchable

• Dispatched Quantity Header		
Field	Format	Description
ID	Number (10)	Dispatch quantity header ID
Party Code	Varchar2 (4)	Participant identifier
GXP/GIP	Varchar2 (8)	Grid point
DCLS Code	Varchar2 (5)	Dispatch capable load station code
Trading Date	Date	Trading date
Deleted Y/N	Varchar2 (1)	Yes or no
Created Date	Date	Default: system date
Created By	Varchar2 (30)	Default: User
Modified Date	Date	
Modified By	Varchar2 (30)	
• Dispatched Quantity		
One row output for each trading date and trading period covered by a dispatch instruction issued to a block, station dispatch group or individual station.		
Field	Format	Description
ID	Number (10)	Dispatch quantity ID
DDHH ID	Number (10)	Dispatch quantity header ID
Trading Period	Number (2)	Trading period
Quantity	Number (10,3)	Dispatched quantity
Exceptions:		

Sub-process:	CC-030 Calculate generator constrained on and off amounts
Process:	Calculate constrained amounts
Code references:	13.194 to 13.204, 13.206
Dependencies:	RV-040, RV-050, CC-010, CC-020, MR-010
Module Name	IN-060, PB-010

Description:

The clearing manager calculates the constrained on payable to generators (other than dispatch notification generators) and constrained off amounts. Constrained off amounts are not included in invoices but are reported for information purposes.

A generator constrained on situation occurs in a trading period when the generator is given a dispatch instruction to generate a quantity of electricity that was offered at a price higher than the final price published for the grid injection point.

A generator constrained off situation occurs in a trading period when the generator was not given a dispatch instruction to generate all the quantity of electricity that was offered at a price below the final price published for the grid injection point.

Business requirements:

1. The clearing manager must calculate the compensation for the generator (other than a dispatch notification generator) constrained on quantity within each offer band at a price that is the difference between the final price and the offer price of the band.
2. By 1600 hours of the 8th business day of each billing period the clearing manager must calculate constrained on amounts for the previous billing period.

Data inputs:

- Aggregated offer stack (CC-010)
- Scheduled quantity (CC-010).
- Final prices per MW for energy provided per trading day, trading period and POC (VP-010).
- Reconciliation information containing reconciled quantities (RV-050).
- Dispatched quantity (CC-020).
- Reference information on the organisation of blocks and station dispatch groups, and reference information on DNG grid points (MR-010).

Processing:

The system:

1. Determines if a generator (other than a dispatch notification generator) constrained on or a constrained off situation occurred in each aggregated offer by comparing its scheduled quantity (SQ), the dispatched quantity (DQ) and the reconciled quantity

(RQ) where they are related on party code/supply point/trading date/trading period, as follows:

- A generator constrained on situation has occurred when the scheduled quantity is less than both the dispatched quantity and the reconciled quantity.
- A generator constrained off situation has occurred when the scheduled quantity is greater than both the dispatched quantity and the reconciled quantity.
- Where neither of the above two conditions are true then there is no generator constrained on or constrained off situation

Properties	Constrained Situation
$SQ = DQ$	None
$SQ = RQ$	None
$DQ < SQ < RQ$	None
$RQ < SQ < DQ$	None
$SQ < \text{MIN}(DQ, RQ)$	ON
$SQ > \text{MAX}(DQ, RQ)$	OFF

2. Determines the generator constrained on amount by :

a) calculating the generator constrained on quantity by finding the minimum of the (absolute) difference between

- the scheduled quantity and the dispatched quantity, or
- the scheduled quantity and the reconciled quantity, or
- the scheduled quantity and the maximum quantity offered.

b) determining the price bands this generator constrained on quantity was offered in, from the aggregated offer stack i.e. in the next offer bands in the stack where the offer price \geq final price starting from the band after the scheduled quantity and working upwards in the stack.

c) multiplying the resultant quantity by the difference between the price offered for that quantity in the aggregate offer stack and the final price.

$$\text{i.e. } Q_{\text{con}} = \text{MIN}(Q_{\text{con}}, Q_{\text{cap}}) * (P_{\text{offer}} - P_{\text{final}})$$

where:

Q_{con} means the calculated constrained on quantity.

Q_{cap} means a cap amount put on the constrained on quantity (equal to the difference between the aggregated offer amount and the maximum aggregated offer amount).

P_{offer} means the price offered for that price band by the generator for the quantity of electricity that was constrained on.

P_{final} means the final price for that trading period at the grid injection point.

3. Determines the generator constrained off amount by :
 - a) calculating the generator constrained off quantity by finding the minimum of the absolute (positive) differences between
 - the scheduled quantity and the dispatched quantity.
 - the scheduled quantity and the reconciled quantity.
 - b) determining the price bands this generator constrained off quantity was offered in, from the aggregated offer stack i.e. the offer bands where the offer price < final price starting from the highest offer price and working backwards down the stack.
 - c) multiplying the resultant quantity by the difference between the price offered for that quantity in the aggregate offer stack and the final price.

$$\text{i.e. } Q_{cof} = ABS(Q_{cof} * (P_{offer} - P_{final}))$$

where:

Q_{cof} means the calculated generator constrained off quantity.

P_{offer} means the price offered for that price band by the generator for the quantity of electricity that was constrained on.

P_{final} means the final price for that trading period at the grid injection point.

Data outputs:

- Generator constrained amounts and related information applicable to generators for every aggregated offer which was constrained on or off.

• Generator Constrained Amounts Information		
Internally stored information.		
Field	Format	Description
Invoice Period	Number (6)	
Trading Date	Date	
Trading Period	Number (2)	Trading periods from 1 to 50
Generator Code	Varchar(4)	
Network Participant Identifier	Varchar(10)	Required by current processing for block identification
Supply Point	Varchar(8)	POC, Block ID or Station Dispatch Group
Station	Char (3)	

Unit	Number (2)	
Block ID	DD/MM/YYYY	
Dispatched Quantity	Number (22,4)	
Reconciled Quantity	Number (22,4)	
Scheduled Quantity	Number (22,4)	
Constrained Quantity	Number (22,4)	
Constrained Situation Type	Char(2)	ON/ OF
Constrained Amount	Number(24,4)	
system operator Proportion Of Constrained Amount	Number(24,4)	Initially missing until populated by CC-050
Maximum Constrained Quantity	Number (22,4)	Maximum aggregated offer quantity

Exceptions:

If dispatch instructions or reconciliation information are missing, generator constrained amounts information cannot be produced.

Sub-process:	CC-040 Calculate dispatchable load purchaser constrained on and off amounts
Process:	Calculate constrained amounts
Code references:	13.192, 13.194, 13.202, 13.204, 13.206
Dependencies:	RV-040, RV-050, RV070, VP-010, MR-010
Module Name	IN-060, PB-010

Description:
<p>The clearing manager calculates the constrained on and constrained off amounts for dispatchable load purchasers (other than dispatchable notification purchasers) in relation to a DCLS.</p> <p>A constrained on situation in relation to a dispatch load station occurs in a trading period when the dispatchable load purchaser is given a dispatch instruction to consume a quantity of electricity that was more than the scheduled quantity, provided there is a corresponding nominated dispatch bid and a reconciled quantity. A constrained off situation in relation to a dispatch load station occurs in a trading period when the dispatchable load purchaser is given a dispatch instruction to consume a quantity of electricity that was less than the scheduled quantity, provided there is a corresponding nominated dispatch bid and a reconciled quantity.</p>

Business requirements:
<ol style="list-style-type: none"> 1. The clearing manager must calculate the compensation for the constrained on and off quantity within each affected bid band at a price that is the positive difference between the final price and the bid price of the affected band. 2. By 1600 hours of the 8th business day of each billing period the clearing manager must calculate constrained on and off amounts for the previous billing period.

Data inputs:
<ul style="list-style-type: none"> • Final prices per MW for energy provided per trading day, trading period and POC (VP-010). • Loss adjusted dispatchable load information (reconciled quantity) (RV-050). • Aggregate nominated dispatchable DD bids (CC-015). • DCLS dispatched quantity (CC-025). • Reference information for the dispatch notification purchasers and grid points (MR-010).

Processing:
<p>The system:</p> <ol style="list-style-type: none"> 1. Identifies the scheduled quantity (Qsch) of each aggregated bid stack. This is the highest aggregated quantity where the (bid price – final price) is greater than or equal to zero. 2. Determines if a dispatchable load purchaser constrained on or a constrained off situation occurred in each trading period by comparing the scheduled quantity (Qsch), the dispatched quantity (Qdisp) and the reconciled quantity (Qrec), for

each dispatch load purchaser (other than a dispatch notification purchaser), POC, dispatch load station, trading date and trading period, as follows:

- A constrained on situation has occurred when the scheduled quantity is less than both the dispatched quantity and the reconciled quantity.
- A constrained off situation has occurred when the scheduled quantity is greater than both the dispatched quantity and the reconciled quantity.
- Where neither of the above two conditions are true then there is no constrained on or constrained off situation.

Properties	Constrained Situation
$Q_{sch} = Q_{disp}$	None
$Q_{sch} = Q_{rec}$	None
$Q_{disp} < Q_{sch} < Q_{rec}$	None
$Q_{rec} < Q_{sch} < Q_{disp}$	None
$Q_{sch} < \text{MIN}(Q_{disp}, Q_{rec})$	ON
$Q_{sch} > \text{MAX}(Q_{disp}, Q_{rec})$	OFF

However:

- where there is a dispatch quantity (Q_{disp}) > 0 or null but the scheduled quantity (Q_{sch}) is missing, the dispatched quantity is deleted;
 - where the dispatch quantity (Q_{disp}) or reconciled quantity (Q_{rec}) is missing, no constrained on or off amounts are calculated.
3. Calculates dispatchable load purchaser constrained quantity for each dispatch load purchaser, POC, dispatch load station, trading date and trading period using the following formulas:

- Constrained On Quantity

It is the amount expressed in MW by which the lowest of Q_{disp} and Q_{rec} exceeds Q_{sch}

$$\text{ConOnQ} = \min(Q_{disp}, Q_{rec}) - Q_{sch}$$

- Constrained Off Quantity

It is the amount expressed in MW by which Q_{sch} exceeds the highest of Q_{disp} and Q_{rec}

$$\text{ConOffQ} = Q_{sch} - \max(Q_{disp}, Q_{rec})$$

4. Calculates the dispatchable load purchaser constrained amounts for the dispatch load station for each affected nominated dispatch bid price band as follows:

- Constrained on is calculated using the following formula:

$$\text{ConOnAmtdisp} = \text{ConOnQ} * (\text{Pf}-\text{Pb})$$

Where more than one nominated dispatch bid price band is constrained on, the constrained on quantity is allocated to the highest priced band that is less than the final price first, followed by next highest and so on, in descending order.

The quantity allocated per price band is the minimum of either the constrained on quantity (remainder unallocated) or the band quantity. Each band allocation reduces the constrained on quantity until the total allocation equals the constrained on quantity or when there are no more bands. For any remaining unallocated constrained on quantity, no compensation is calculated.

- Constrained off is calculated using the following formula:

$$\text{ConOffAmtdisp} = \text{ConOffQ} * (\text{Pb}-\text{Pf})$$

Where more than one nominated dispatch bid price band is constrained off, the constrained off quantity is allocated to the lowest priced band that is greater than the final price first, followed by next lowest and so on, in ascending order.

The quantity allocated per price band is the minimum of either the constrained off quantity (remainder unallocated) or the band quantity. Each band allocation reduces the constrained off quantity until the total allocation equals the constrained off quantity or when there are no more bands. For any remaining unallocated constrained off quantity, no compensation is calculated.

Pb is the price bid for each affected nominated dispatch bid price band for the dispatch load station that was constrained on or off.

Pf is the final price for the trading period at the grid exit point.

5. Aggregates the constrained on or off amounts of each band to the POC, dispatch load station, trading date, trading period level.

Constrained On Example:

Dispatched Quantity (Qdisp) = 70MW

Reconciled Quantity (Qrec) = 60MW

Final Price (Pf) = \$1,200

Nominated Dispatch Bid:

Band 1: 10MW@\$1,250/MWh

Band 2: 10MW@\$1,200/MWh
 Band 3: 10MW@\$1,100/MWh
 Band 4: 10MW@\$1,000/MWh
 Band 5: 10MW@\$800/MWh
 Band 6: 10MW@\$600/MWh
 Band 7: 10MW@\$400/MWh
 Band 8: 10MW@\$200/MWh
 Band 9: 10MW@\$50/MWh
 Band 10: 10MW@\$5/MWh

Scheduled quantity (Qsch) = 10 + 10 = 20MW (band 1 and band 2)

Constrained On Quantity = Min (70,60)-20 = 40

Constrained On Amount = $10*(1200-1100)/2 + 10*(1200-1000)/2 + 10*(1200-800)/2 + 10*(1200-600)/2$ (N.B. From Bands 3 to 7)
 = \$6,000

Constrained Off Example:

Dispatched Quantity (Qdisp) = 8MW

Reconciled Quantity (Qrec) = 9MW

Final Price (Pf) = \$5

Nominated Dispatch Bid:

Band 1: 10MW@\$1,250/MWh
 Band 2: 10MW@\$1,200/MWh
 Band 3: 10MW@\$1,100/MWh
 Band 4: 10MW@\$1,000/MWh
 Band 5: 10MW@\$800/MWh
 Band 6: 10MW@\$600/MWh
 Band 7: 10MW@\$400/MWh
 Band 8: 10MW@\$200/MWh
 Band 9: 10MW@\$50/MWh
 Band 10: 10MW@\$5/MWh

Scheduled quantity (Qsch) = 100MW (band 1 to 10)

Constrained Off Quantity = 100 – Max (8,9) = 91

Constrained Off Amount = $10*(5-5)/2 + 10*(50-5)/2 + 10*(200-5)/2 + 10*(400-5)/2 + 10*(600-5)/2 + 10*(800-5)/2 + 10*(1000-5)/2 + 10*(1100-5)/2 + 10*(1200-5)/2 + 1*(1250-5)/2$ (N.B. From Bands 1 to 10)
 = \$27.172.50

Data outputs:

Constrained amounts and related information applicable to dispatchable load purchasers for every trading period that was constrained on or off.

• Dispatchable Load Purchaser Constrained Amounts Information

Internally stored information.

Field	Format	Description
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Invoice Period	Number (6)	
Trading Date	Date	
Trading Period	Number (2)	Trading periods from 1 to 50
Dispatchable load purchaser code	Varchar (4)	
Supply Point	Varchar (8)	POC, Block ID or Station Dispatch Group
DCLS code	Char (5)	
Dispatched Quantity	Number (22,4)	
Reconciled Quantity	Number (22,4)	
Scheduled Quantity	Number (22,4)	
Constrained Quantity	Number (22,4)	
Constrained Situation Type	Char (2)	ON/ OF
Constrained Amount	Number (24,4)	
Final Price	Number (8,2)	
Bid Price	Number (8,2)	Bid price of the lowest or highest affected bid band (depending on whether ON or OFF)

Exceptions:

Sub-process:	CC-050 Calculate generator constrained amounts attributable to system operator
Process:	Calculate constrained amounts
Code references:	13.196 13.205
Dependencies:	CC-030, RV-040
Module Name	IN-060

Description:
The clearing manager determines the generator constrained on amounts attributable to the system operator using the notifications provided by the system operator.

Business requirements:
<ul style="list-style-type: none"> - By 1600 hours of the 8th business day of each billing period the clearing manager must calculate and send to the system operator details of the generator constrained on amounts attributable to them.

Data inputs:
<ul style="list-style-type: none"> • Generator constrained amounts (CC-030) • Constrained on attributable to the system operator (RV-040)

Processing:
<p>The system:</p> <ul style="list-style-type: none"> • Determines the quantity of the generator constrained on or off amount attributable to the system operator by assigning the whole of the generator constrained amount to the system operator for those trading periods in which the reason is <i>voltage support</i> and when the reason is <i>'Other'</i>, but assigns only a proportion of the generator constrained amount up to the maximum quantity for which the system operator was responsible for (i.e. up to the quantity contained in the notification), during those trading periods in which <i>non-security</i> and <i>frequency keeping</i> occurred i.e. : $\text{SO Generator Constrained Proportion} = (\text{SO Generator Constrained Quantity} / \text{Total Generator constrained Quantity}) * \text{Generator Constrained Amount}$ <p><u>Example 1– reason of non-security</u></p> <p>Generator was scheduled at 90 MW, dispatched at 150 MW, metered at 145 MW and the clearing manager received an “on” non-security record notification from the system operator for a quantity of 50MW.</p> $\begin{aligned} \text{Total Constrained Quantity} &= \text{MIN}(\text{ABS}((150-90), 145-90))) \\ &= 55\text{MW} \\ \text{SO Constrained Quantity} &= 50\text{MW} \end{aligned}$

$$\begin{aligned} \text{SO Constrained Proportion} &= 50/55 \text{ MW} * \text{Constrained Amount} \\ \text{Purchasers' Proportion} &= 5/55 \text{ MW} * \text{Constrained Amount} \end{aligned}$$

Example 2 – generator constrained on for reason of frequency keeping

Generator scheduled at 500MW, dispatched at 570MW, metered at 560MW and the clearing manager received a frequency control advice from the Grid Operator of 50MW.

$$\begin{aligned} \text{Total Constrained Quantity} &= \text{MIN}(\text{ABS}((570-500),(560-500))) \\ &= 60\text{MW} \\ \text{SO Constrained Quantity} &= 50\text{MW} \\ \text{SO Constrained Proportion} &= 50/60 \text{ MW} * \text{Constrained On Amount} \\ \text{Purchasers' Proportion} &= 10/60 \text{ MW} * \text{Constrained On Amount} \end{aligned}$$

N.B. Where the quantity constrained on is less than frequency control advice quantity then the Grid Operator pays for the full quantity constrained on amount.

Example3 – generator constrained off for reason of frequency keeping

Generator scheduled at 1000MW, dispatched at 800MW, metered at 850MW and the clearing manager received a frequency control advice from the system operator of 50MW.

$$\text{SO Constrained Quantity} = \text{ABS}(\text{MIN}((800-1000),(850-1000))).$$

$$\begin{aligned} \text{Total Constrained Quantity} &= \text{MIN}(\text{ABS}((800-1000),(850-1000))) \\ &= 150\text{MW} \\ \text{SO Constrained Quantity} &= 50\text{MW} \\ \text{SO Constrained Proportion} &= 50/150 \text{ MW} * \text{Constrained Amount} \\ \text{Purchasers' Proportion} &= 0 \text{ (not paid as constrained off)} \end{aligned}$$

- Updates the generator constrained amounts information to include the generator constrained amounts attributable to the system operator (i.e. the SO Generator Constrained Proportion).
- Delivers details of the generator constrained amounts attributable to the system operator to the system operator.
- Calculates the Purchaser's proportion per trading period and updates the purchaser country value in the constrained on summary information.

Data outputs:

- Updated Generator Constrained Amounts Information that includes the Generator Constrained Amounts attributable to the system operator (see CC-030 for format).
- **Constrained amounts attributable to the system operator**

Field	Format	Comments
Invoice Period	Number (6)	
Power Type	Char (1)	'F' – frequency keeping 'V' – voltage support 'O' – other 'N' – non-security
Constrained Situation Type	Char(2)	ON/ OF
Participant Code	Char (4)	Of generator
POC	Varchar (8)	GIP
Station	Char (3)	
Unit	Number (2)	
Block ID	DD/MM/YYYY	
Trading Date	DD/MM/YYYY	
Trading Period	Number (2)	Trading period to which the offer applies 1 to 48 for standard day. 1 to 50 for daylight saving end. 1 to 46 for daylight saving start.
SO Constrained Quantity	Number (10)	Quantity attributable to system operator
Final Price	Number (8,2)	
SO Constrained Amount Payable	Number (24)	SO constrained proportion.
<ul style="list-style-type: none"> • Constrained on summary information 		
Internally stored information.		
Field	Format	Description
Invoice Period	Number (6)	
Trading Date	Date	
Trading Period	Number (2)	Trading periods from 1 to 50
Total Purchasers	Number	Total number of purchasers
Total Generators	Number	Total number of generators
Purchaser North Value	Number (22,4)	Total North Island Purchaser's Proportion of Constrained amounts
Purchaser South Value	Number (22,4)	Total South Island Purchaser's Proportion of Constrained amounts
Purchaser Country Value	Number (22,4)	Total NZ Purchaser's Proportion of Constrained amounts

Exceptions:

Sub-process:	CC-060 Calculate constrained on and off amounts payable by purchasers
Process:	Calculate constrained amounts
Code references:	13.195 13.212, 13.202(2)
Dependencies:	RV-050, CC-010, CC-020, CC-030, CC-040
Module Name	IN-060

Description:

The clearing manager allocates generator constrained on compensation which is not attributable to the system operator, and dispatchable load purchaser constrained on and constrained off compensation, for payment by all purchasers in proportion to each participant with an amount owing by the participant's market share.

Business requirements:

1. By 1600 hours of the 8th business day of each billing period the clearing manager must calculate all generator and dispatchable load purchaser constrained on and constrained off amounts for the previous billing period.
2. Two business days after receiving reconciliation information for the prior billing period, the clearing manager must issue an invoice to each participant with an amount owing by the participant and a pro-forma invoice to each participant with an amount owing by the clearing manager detailing any generator and/or dispatchable load purchaser constrained on and constrained off amounts due.

Data inputs:

- Updated generator and dispatchable load purchaser constrained amounts that include the constrained amounts attributable to the system operator (see CC-030 and CC-040 respectively).
- Reconciliation information containing reconciled quantities (RV-050).

Processing:

The system:

1. Extracts the off-take (purchase quantities) from the reconciliation information and calculates island (both) and overall country ratios for each purchaser for every trading date and trading period of their market share.
2. Reduces the generator constrained on amount by the constrained amount applicable to the system operator.
3. Allocates the reduced generator constrained amount and the dispatchable load purchaser constrained on and constrained off amounts to each purchaser in proportion to their overall country market share ratio.
4. Creates an invoice amount detail record for every allocation.
5. Outputs the purchaser ratios.

Data outputs:

- Invoice amount detail records per purchaser containing their proportion of generator and dispatchable load purchaser constrained on and constrained off amounts.

Purchaser ratios

Field	Format	Description
Purchaser	Varchar(4)	
Trading Date	Date	
Trading Period	Number (2)	
Purchaser Ratio South	Number (14,10)	South Island market share
Purchaser Ratio North	Number (14,10)	North Island market share
Purchaser Ratio Country	Number (14,10)	Total NZ market share

Exceptions:

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Sub Process:	CC-070 Calculate constrained on amounts for instantaneous reserves
Process:	Calculate constrained amounts
Code References:	13.212(6), 13.212(7), 13.202(1)(c), 13.204(1)(c)
Dependencies :	RV-040, RV-070, MF-010, VP-010
Module Name	IN-065

Description:
<p>The clearing manager determines whether an instantaneous reserve (IR) constrained on situation has occurred in any trading period and the quantity that was constrained on.</p> <p>An IR constrained on situation occurs in a trading period when an ancillary service agent is given a dispatch instruction to generate a quantity of instantaneous reserve where part or all of that quantity was offered at a price higher than the final island reserve price published for the point of connection for the reserve class for that trading period.</p>

Business Requirements:
<ol style="list-style-type: none"> 1. The service provider must make arrangements with the system operator and WITS manager and agree the format, schedule and transfer mechanism for the delivery of all necessary information required by the clearing manager to calculate constrained on amounts for instantaneous reserves. 2. By 1600 hours of the 8th business day of each billing period the clearing manager must calculate constrained on amounts for instantaneous reserves (\$) for the previous billing period and send them to the system operator. 3. Dispatch instructions must to be delivered to the clearing manager by 1600 hours on the 7th business day of each billing period by the system operator. 4. The system operator must provide trading period information to the clearing manager, including final bids and offers, daily by 0730 hours. 5. The clearing manager must calculate the amounts (\$) constrained on for instantaneous reserves for each ancillary service agent for all trading periods of the billing period. 6. The clearing manager must calculate the IR constrained on amount (\$) for the constrained on quantity within each reserve offer band, at a price that is the difference between the final island reserve price and the reserve offer price of the band and aggregate these quantities for each ancillary service agent per point of connection per trading period per instruction type (R and I) and reserve class (fast and sustained).

Data Inputs:
<ul style="list-style-type: none"> • Final reserve offers for PLSR, NSGR and interruptible load (see below) that have been confirmed by the system operator (RV-070).

- Final reserve prices for fast and sustained reserves per MW per trading day, trading period and two points of connection (i.e. by island) HAY2201 and BEN2201.(VP-010)
- Dispatch instructions/log providing the time and dispatch quantity of reserves requested per point of connection (not blocks or station dispatch groups). For PLSR and NSGR the instruction type is 'R', i.e. the log does not distinguish, and for interruptible load it is 'I'. For energy the instruction type is 'A'. (RV-040)
- GIPs and their island (MF-010).

N.B. Unlike offers for active power, offers for reserves cannot be submitted for blocks or station dispatch groups. They can only be offered at a single point of connection () or at a point of connection, station and unit (PLSR). In this specification the term 'point of connection' is used to describe both instances.

Processing:

The system:

1. Changes participant identifiers in the files received from the system operator (RV-040) for consistency against participant identifiers in the reconciliation system using the mapping of participants' codes which is stored on the customer invoice access table.
2. Determines if an IR constrained on situation occurred for a trading period in the invoicing period for an ancillary service agent at a point of connection and calculates the constrained on amounts for instantaneous reserves as defined in paragraphs 3 to 13.

Splits reserve dispatch instructions into trading periods

3. From each reserve dispatch instruction (RDI), creates trading period reserve dispatch instructions (TP_RDI) per instruction type (R and I), reserve class (6s and 60s), point of connection, ancillary service agent and trading period.

The trading period is derived by slicing the time duration between the Effective Time of the original RDI and the Effective Time of the next RDI, into the relevant trading periods. Each TP_RDI contains the same attributes as the original RDI except for the Effective Time. Only the Effective Time for the first TP_RDI will have the same Effective Time as the original RDI; the rest (if they exist) will have the start times of the relevant trading period.

For example:

if the reserve dispatch instruction x was logged at 06:15 and the next reserve dispatch instruction y was logged at 07:10, 3 TP_RDI's are created: one for trading period 13 with an Effective Time of 06:15, the second for trading period 14 with an Effective Time of 06:30 and the third for trading period 15 with an Effective Time of 07:00.

N.B. It is assumed that the requested reserve Power quantity is available immediately. However, if the instruction is logged within 1 minute of the end of a trading period, the power is assumed to be available at the start of the next trading

period.

4. For each TP_RDI, calculates the duration (D) of the instruction within the trading period i.e. from the Effective Time of the TP_RDI to the end of the trading period or to the Effective Time of the next reserve dispatch instruction, whichever is the earliest. For the example above the 3 durations would be 15 minutes, 30 minutes and 10 minutes respectively.

Obtains the dispatched quantity of energy (DQE)

5. For each TP_RDI:
 - uses the Power quantity as the *reserves dispatched quantity* (RDQ); and
 - only where the instruction type of the TP_RDI is 'R', obtains the Power quantity from the dispatch instruction of instruction type 'A' that is applicable at the Effective Time of the TP_RDI, at the same point of connection and ancillary service agent; and
 - uses this as the *dispatched quantity of energy* (DQE).

DQE is required to calculate the quantity of reserves in each reserve offer band when an offer band specifies a percentage quantity (see below). This does not apply to instruction types of 'I'.

Obtains the associated reserve offers and calculates their reserve offer quantities per band for instruction type of 'R'

6. For each TP_RDI with instruction type of 'R', obtains the associated reserve offer(s) i.e. for the same reserve class, point of connection, ancillary service agent and trading period. The system then merges the bands of the reserve offers of type PLSR and NSGR.

For each reserve offer of type PLSR and reserve offer band:

- calculates the reserve offer quantity of each offer band (ROBQ) using the appropriate reserve class percentage and maximum quantity in each offer band as follows:

$\text{reserve offer band quantity (ROBQ)} = \text{MIN}(\text{percentage} * \text{dispatched quantity of energy (DQE)}, \text{maximum quantity})$

where

dispatched quantity of energy (DQE) was obtained in (5.) above.

For each reserve offer of type NSGR and reserve offer band:

reserve offer band quantity (ROBQ) = band maximum quantity.

Ranks the reserved offers and aggregates the band quantities

7. For each TP_RDI, ranks the reserve offer bands i.e. sorts the bands by ascending reserve offer band prices. Then for each ranked reserve offer band (in increasing price sequence) aggregates the reserve offer band quantities i.e. band 2 aggregate quantity = band 1 aggregate quantity + band 2 reserve offer band quantity etc.

N.B. The reserve offer band quantity (ROBQ) for IL reserves is the band maximum quantity.

Determines if the TP_RDI was constrained on

8. For each TP_RDI and each related ranked offer, in ascending band sequence,

locates the last row in the ranked offer bands where the reserve offer band price \leq island reserve final price. If the aggregate quantity of this band (AQ) is less than the dispatched quantity of reserves and there are more reserve offer bands with higher prices, then an IR constrained-on situation has occurred in the TP_RDI. A constrained-on quantity and amount is then calculated for each of the bands with a higher price than the island reserve final price.

Determines the constrained on quantity (IRCO)

9. For each TP_RDI and ranked reserve offer band where a constrained on situation has occurred, calculates the IR constrained on quantity (IRCO) as follows:

Reduce RDQ by AQ then for the band calculate

$$\text{IRCO} = \text{MIN}(\text{RDQ}, \text{ROBQ})$$

Reduce RDQ by IRCO and if > 0 repeat IRCO calculation for next reserve offer band(s) until $\text{IRCO} \leq 0$.

Determines the IR constrained on amount

10. For each TP_RDI and ranked reserve offer band where a constrained on situation has occurred, calculates the IR constrained on amount as follows:

$$\text{(time weighted) IRCO_Amount (\$/hr)} = \text{IRCO} * (\text{applicable ranked reserve offer price (\$/MWh)} - \text{island reserve final price (\$/MWh)}) * \text{duration (min)} * / 60 \text{ (min)}.$$

11. For each TP_RDI, sums all the applicable (time weighted) constrained-on amounts calculated in (10.) and also sums the IR constrained on quantities (IRCO) calculated in (9.).
12. Delivers all the details of the IR constrained on amounts attributable to the system operator to the system operator in the agreed format and manner.

Additional Notes

The constrained on amounts for IR (\$) are sent to the system operator for invoicing via the ancillary services costs and charges process detailed in sub-process IN-030.

Payments to ancillary service agents are provided to the clearing manager by the system operator via the allocable costs file. Additional product codes have been allocated so that these types of charges can be separately identified in the invoices.

The constrained on amounts for IR (\$) are allocated to generators and the HVDC owner from the availability costs and event charges provided by the system operator for this purpose, and allocated in accordance with Part C Section IV rule 11.5. This allocation process is described in sub-process IN-030 for instantaneous reserves.

Data Outputs:

• **Grid IR constrained on amounts**

Grid IR Constrained Amounts is the IR constrained on amounts attributable to the system operator (all). Thus, it has the same data as the calculated IR constrained on amounts. This will be referenced when publishing constrained amounts to the system operator.

Field	Format	Mandatory /optional	Comments
Invoice Period	Number(6)	M	

Power Type	Char (1)	M	R/I
Reserve Class	Char (1)	M	F/S
Organisation Code	Char (4)	M	
POC	Varchar (8)	M	GIP
Station	Char (3)	M/O	Mandatory if power type is 'R'
Unit	Number (2)	M/O	Mandatory if power type is 'R'
Block ID	DD/MM/YYYY	O	N/A
Trading Date	DD/MM/YYYY	M	Trading date to which the offer applies.
Trading Period	Number (2)	M	Trading period to which the offer applies 1 to 48 for standard day 1 to 50 for daylight saving end 1 to 46 for daylight saving start.
Res Con Quantity	Number (10)	M	Quantities that were constrained on
Res Con Amount	Number (24)	M	IR constrained on amount (\$)
Res Grid Amount	Number (24)	O	Grid IR constrained amounts (\$) i.e. same value as the IR constrained on amount (\$).

• **Summary Grid IR constrained amounts**

Total constrained on amounts (\$) per ancillary service agent, point of connection, trading period, reserve type and reserve class.

Field	Format	Mandatory /optional	Comments
Run Type	Char (1)	M	F – Final
Power Type	Char (1)	M	R/I
Reserve Class	Char (1)	M	F/S
Organisation Code	Char (4)	M	
Market Node ID	Varchar (12)	M	E.g. CYD2201 CYD0
Trading Date	DD/MM/YYYY	M	Trading date to which the offer applies.
Trading Period	Number (2)	M	Trading period to which the offer applies 1 to 48 for standard day 1 to 50 for daylight saving end 1 to 46 for daylight saving start.
Amount	Number (24)	M	Grid IR constrained amounts (\$) i.e., same value as the IR constrained on amount (\$).

Exceptions:

N.B. It is assumed that the system operator has performed all the validation checks against reserve offers maximums etc. prior to the dispatch instruction being logged. Therefore there should be no exceptions; however, any exceptions found will indicate operational errors such as files not being loaded or available prior to commencement.

1. If any final prices, dispatch instructions for reserves, and reserve offers are missing, then those errors should be reported and the process stopped.
2. If there are insufficient reserve offer bands to cover all the reserve dispatch quantity then the dispatch quantity should be limited to the maximum reserve offer.
3. If there is no dispatch instructions for energy found that is prior to the reserve dispatch instructions 'R', a warning message should be produced and the actual PLSR offer quantity should then be the maximum offer in each offer band.

6.13 Calculate loss and constraint excess amounts

Sub-process:	CL-010 Calculate loss and constraint excess
Process:	Calculate loss and constraint excess amounts
Code references:	14.16(1)
Dependencies:	CE-010, CE-020
Module Name	IN-090

Description:

The clearing manager calculates the initial loss and constraint excess for each billing period for each grid owner.

Business requirements:

The clearing manager must:

1. Calculate the difference between the total invoiced amounts of electricity purchases and sales for each grid and billing period, including wash-up billing periods.

Data inputs:

- Amounts owing for the purchase and sale of electricity (CE-010, CE-020).

Processing:

Calculate the initial loss and constraint excess as the difference between the total invoiced amount of electricity purchases and total invoiced amount of electricity sales (excluding any GST) on each grid for each billing period, including wash-up billing periods.

Data outputs:

- Initial loss and constraint excess (\$) for each grid and billing period.

NB: Currently there is only one grid owner.

Exceptions:

Sub-process:	CL-020 Calculate grid owners payments
Process:	Calculate loss and constraint excess amounts
Code references:	14.16(6, 7), 14.56
Dependencies:	CR-010
Module Name	IN-097

Description:

The clearing manager pays each grid owner the final loss and constraint excess and any residual loss and constraint excess, for each billing period, subject to prioritisation of funds in clause 14.56 and in accordance with any proportions notified by the Authority (14.16(6)).

Business requirements:

The clearing manager must:

- Pay each grid owner both the final loss and constraint excess amount and the applicable residual loss and constraint excess amount, subject to clause 14.56, and in accordance with the proportion notified by the Authority (14.16(6)).
- If no notification is provided, the clearing manager must pay the full loss and constraint excess amount (less the final FTR rental amount) plus any residual loss and constraint excess to the grid owner (14.16(7)).

Data inputs:

- Final loss and constraint excess (from CR-010).
- Residual loss and constraint excess (from CR-010).

Processing:

Obtain the final loss and constraint excess and residual loss and constraint excess amounts for each grid owner and include those amounts on each grid owner's pro-forma invoice for the current billing period and any wash-up billing periods.

Data outputs:

- Pro-forma invoice for each grid owner, containing:
 - Invoice transaction (of type "PGRD") for final loss and constraint excess
 - Invoice transaction (of type "RLCE") for residual loss and constraint excess.

NB: Currently there is only one grid owner: Transpower.

Exceptions:

6.14 Calculate revenue adequacy and final FTR payment amounts

Sub-process:	CR-010 Calculate revenue adequacy and final FTR payment
Process:	Calculate revenue adequacy and final FTR payment
Code references:	13.252 (1a, iii), 13.249(7), 14.16(4, 5), 14.17
Dependencies:	CL-010, CF-010, CF-020, CF-030, RV-010
Module Name	IN-095

Description:
<p>The clearing manager calculates the final FTR payment amounts for each FTR and as part of this must determine the revenue adequacy for the FTR period and whether the initial FTR hedge values need to be scaled.</p> <p>The clearing manager pays a portion of the loss and constraints excess (i.e. the final FTR rental amount), as provisionally determined by the FTR manager then adjusted for any revenue adequacy, into the operating account.</p>

Business requirements:
<p>The clearing manager must:</p> <ol style="list-style-type: none"> 1. Determine the final FTR rental amount available for each grid for settlement of the FTR period. If the initial loss and constraint excess is less than the initial FTR rental amount provided by the FTR manager then the final FTR rental amount will be the loss and constraint excess amount. Otherwise, the initial FTR rental amount provided by the FTR manager will be the final FTR rental amount. 2. Calculate the final FTR payment transactions for each FTR being settled, including the FTR payment scaling factor applicable to the FTR period according to the formulae specified in the Code (14.17).

Data inputs:
<ul style="list-style-type: none"> • Provisional FTR Payment amounts (CF-010, CF-020, CF-030) • Acquisition value of each FTR holding based on FTR acquisition cost (from CF-010) • Initial loss and constraint excess amount (from CL-010) • Initial FTR rental amount (from FTR manager, RV-010) • Assignment difference payment amounts (CF-020) • Reconfiguration Amounts (CF-020)

Processing:
<ul style="list-style-type: none"> • Determine the final FTR rental amount – i.e. the proportion of the initial loss and constraint excess that is to be paid into the operating account = the minimum of the initial FTR rental amount or the initial loss and constraint excess amount. • Determine the final loss and constraint excess amount = initial loss and constraint excess – final FTR rental amount. • Determine the revenue adequacy amount for the FTR period (as per 14.17(5)) = (sum of provisional FTR payments payable to clearing manager (14.17(2))) + sum

of reconfiguration amounts payable to clearing manager (14.17(2)) + sum of assignor to clearing manager assignment difference payments (13.249(6)) + final FTR rental amount) – (sum of provisional FTR payments payable by the clearing manager (14.17(3)) + sum of reconfiguration amounts payable by clearing manager (14.17(3)) + sum of clearing manager to assignor assignment difference payments (14.20(2))). “Revenue adequate” if > 0.

- Calculate the FTR payment scaling factor as 1.0 if “revenue adequate”, otherwise:
 - Calculate hedge available funds (C) (\$) (schedule 14.1(2))
(Final FTR rental amount (LCE_{FTR}) + sum of any FTR acquisition and reconfiguration values payable to clearing manager (AC_P) + sum of any assignor to clearing manager assignment difference payments (AP)) – sum of any FTR acquisition and reconfiguration values payable by the clearing manager (i.e. due to negative acquisition costs) (AC_{CM}) – sum of any clearing manager to assignor assignment difference payments for FTRs being settled (AC_M). Hedge available funds (HV) is floored at zero.
 - Calculate the net FTR hedge value (D) (\$) payable by the clearing manager (Schedule 14.1(3))
Sum of FTR hedge values payable by the clearing manager (HV_{CM}) – sum of FTR hedge values payable to the clearing manager (HV_P)
 - Calculate the FTR payment scaling factor = (hedge available funds amount (C) / net FTR hedge value payable by the clearing manager (D)). If net FTR hedge value is zero then the scaling factor will be 1.0.
- Calculate the scaled final FTR hedge value (HV_{scaled}) (\$) for each FTR to be settled (Schedule 14.1(1))
Original FTR hedge value amount (HV) x FTR payment scaling factor.
- Calculate the final FTR payment (\$) for each FTR holding =
Final FTR hedge value (\$) – acquisition value (\$)
- Determine the residual loss and constraint excess to be allocated back to each grid owner. This is zero if not “revenue adequate” otherwise = hedge available funds amount (C) – net FTR hedge value payable by clearing manager (D).

Data outputs:

1. Final FTR rental amount
2. Scaled FTR hedge value amounts
3. Final FTR payment amounts (for DI-010 and DI-030)
4. FTR payment scaling factor
5. Final loss and constraint excess amount (for CL-020)
6. Residual loss and constraint excess amount (for CL-020)

Exceptions:

6.15 Calculate tax and wash-up amounts

Sub-process:	CW-020 Calculate GST
Process:	Calculate tax and wash-up amounts
Code references:	14.19(2)(j), 14.20(2)(j), 14.38, 14.56,
Dependencies:	CE-010, CE-020, CM-010, CC-030, CC-050, CC-060, CC-070, CW-030, MR-010
Module Name	IN-100

Description:
<p>The clearing manager calculates the goods and services tax (GST) payable on those invoiced amounts that attract it, on tax invoices, pro-forma invoices and wash-up notifications.</p> <p>None of the following types of transaction currently attract GST:</p> <ul style="list-style-type: none"> • Hedge settlement amounts • Obligation or option FTRs • Interest payments • Loss and constraint excess amounts (from May 2013)

Business requirements:
<ul style="list-style-type: none"> • Invoices must show GST for those amounts on which it is payable and receivable.

Data inputs:
<ul style="list-style-type: none"> • Invoice amounts. • Invoice amount categories that attract GST (CE-010, CE-020, CM-010, CC-030, CC050, CC-060, CC-070). • GST rate applicable to billing/consumption month (MR-010). • GST rate specific to particular categories e.g. fees and taxes.

Processing:
Calculate GST on all invoice amounts that attract GST at the appropriate GST rate.

Data outputs:
<ul style="list-style-type: none"> • GST amounts for each applicable invoice amount.

Exceptions:

Sub-process:	CW-030 Calculate wash-up amounts
Process:	Calculate tax and wash-up amounts
Code references:	14.19(2)(d) 14.20(2)(d), 14.23, 14.36 to 14.40, clause 2 schedule 15.4, 8.69
Dependencies:	DI-030, CC-030, CC-050, CC-060, CC-070, RV-050
Module Name	IN-070

Description:

The clearing manager recalculates for each purchaser and generator the invoice amounts for a previous billing period or periods. The differences between the original invoiced amounts and the new invoiced amounts are included in the next invoice run as either a credit or debit with interest applied.

Revised reconciliation information impacts the invoice amount, calculations of electricity purchases, electricity sales, constrained on and off compensation, must-run dispatch auction and ancillary services.

A recalculation is also required if revised information is provided by the system operator for ancillary services.

Business requirements:

1. A wash-up run must be done whenever the reconciliation manager provides revised reconciliation information or the system operator provides revised ancillary services information.
2. Invoices (tax and pro-forma) issued to participants must include any wash-up amounts (differences only) together with the associated interest amounts.
3. Information must be provided to participants, which includes the original invoiced amounts, the revised invoice amounts and the net wash-up amounts payable together with the supporting details of the revised amounts (see DI-030 for formats).
4. Interest must be calculated on wash-up amounts.
5. Interest must be accrued from the payment due date of the original invoice until the issue date of the next invoice in which the wash-up amounts are included. The issue date is the 9th business day of the billing period.
6. Interest must be calculated daily at the bank bill bid rate, less any deductions for resident withholding tax, compounded at the end of each calendar month.

Data inputs:

- Revised reconciliation information from the reconciliation manager.(RV-050)
- Revised ancillary services information from the system operator.
- Corrected information arising as the result of a dispute resolution.
- Daily bank bill bid rates.
- Invoice amounts of previous invoice run. (DI-030)

Processing:

The system:

1. Re-runs the invoicing process for the relevant billing period for which revised information has been received.
2. Obtains the invoicing amount information from the previous invoicing run for the relevant billing period.
3. Calculates the differences between the previous invoice run and the revised invoice run. These are the wash-up invoice amounts.
4. Publishes the wash-up amounts (previous and revised) to participants.
5. Includes the wash-up amount differences in the next invoice and include details of the associated billing period.
6. Calculates any wash-up interest using the daily bank bill bid rate, compounding at month end.
7. Includes the wash-up interest amounts in the next invoice.

Data outputs:

- Original invoiced amounts.
- Revised invoice amounts.
- Wash-up amounts, payable and receivable.
- Wash-up interest amounts, payable or receivable.
- Supporting details relating to the revised invoice amounts.
- Supporting details relating to the wash-up interest amounts.

Exceptions:

The calculation of wash-up interest cannot be completed if a bank bill bid rate is not present for each business day.

6.16 Produce and deliver invoices and statements

Sub-process:	DI-010 Calculate amounts owing
Process:	Produce and deliver invoices and statements
Code references:	14.17, 14.18, 14.19, 14.20
Dependencies:	CR-010, CE-010, CE-020, CA-010, CA-020, CA-030, CA-040, CA-050, CM-010, CH-010, CC-030, CC-050, CC-060, CC-070, CF-010, CF-020, CF-030, CL-020, DI-020, DI-040, MR-090
Module Name	

Description:
<p>The clearing manager calculates for each purchaser and generator the amounts owing by the participant and by the clearing manager, for a previous billing period or periods.</p> <p>Amounts owing by each participant for each role (purchaser or generator) to the clearing manager (14.19) and detailed in tax invoices (for each role) are for:</p> <ul style="list-style-type: none"> • electricity purchases of the participant (spot market) • constrained off compensation for dispatchable load payable by the participant • constrained on compensation for energy and instantaneous reserves payable by the participant • wash-up amounts payable by the participant • wash-up interest payable by the participant • MRDA amounts payable • ancillary services amounts payable • hedge settlement agreements where the participant is the payer • FTR holding settlements where the net amount is payable by the participant • FTR assignment settlements where the settlement amount is payable by the participant • GST applicable an all the amounts above. <p>Amounts owing by the clearing manager to each participant (14.20), for each role (purchaser or generator) and detailed in pro-forma invoices (for each role) are for:</p> <ul style="list-style-type: none"> • electricity sales by the participant (spot market) • constrained off compensation for dispatchable load receivable by the participant • constrained on compensation for energy and instantaneous reserves receivable by the participant • wash-up amounts receivable by the participant • wash-up interest receivable by the participant • MRDA amounts receivable by the participant

- ancillary services amounts receivable by the participant
- hedge settlement agreements where the participant is the payee
- FTR holding settlements where the net amount is receivable by the participant
- FTR assignment settlements where the settlement amount is receivable by the participant
- GST applicable on all the amounts above
- loss and constraint excess (but only to the Grid Owner); and
- residual loss and constraint excess (but only to the Grid Owner).

Business requirements:

The clearing manager must determine amounts owing and publish them in accordance with clauses 14.18 to 14.23. However:

1) *If the clearing manager cannot determine the amounts owing by participants no later than the 9th business day of the month following the billing period as the clearing manager has not received the information, or considers that it is unlikely to receive the information, to determine the amount owing, the clearing manager should not produce or deliver invoices. In this instance, if the clearing manager*

(i) receives the information to produce invoices 2 business days or more before the 20th calendar day of the month, the clearing manager must produce invoices; or

(ii) does not receive, or considers that it is not likely to receive, the information to meet the requirements of (i) the clearing manager must refer the matter to the Authority, follow the Authority's direction, and advise participants of the Authority's direction.

2) *If the clearing manager receives revised information that changes amounts owing for the current billing period, such as the resolution of a dispute, or revised reconciliation information from the reconciliation manager, then if the clearing manager*

(i) receives the revised information 2 business days or more before the 20th calendar day of the month, the clearing manager must cancel previous invoices and produce replacement invoices; or

(ii) does not receive, or considers that it is not likely to receive, the information to meet the requirements of (i) the clearing manager must refer the matter to the Authority, follow the Authority's direction, and advise participants of the Authority's direction.

3) *If the Authority directs that published amounts are to be revised and republished, the published documents need to be replaced and kept for reference.*

Data inputs:

Applicable to the billing period and participant:

- Purchase and sale amounts for energy. (CE-010, CE-020)
- Ancillary amounts – black start, over-frequency, frequency keeping, instantaneous reserve and voltage support. (CA-010 to CA-050)
- Must run dispatch settlement amounts for generators and purchasers. (CM-010)
- Hedge settlement amounts.(CH-010)
- Generator constrained on amounts for generation, and reserves (CC-030, CC-070).
- Dispatchable load purchaser constrained on and constrained off amounts (CC-060)

- Purchaser ratios and amounts payable by purchasers for generator constrained on and dispatchable load purchaser constrained on and constrained off amounts (CC-060).
- Final FTR payment amounts (CR-010)
- FTR settlement amounts (CF-010).
- FTR assignment difference payment amounts (CF-020).
- FTR Reconfiguration amounts (CF-030).
- Final loss and constraint excess amounts. (CL-020)
- Residual loss and constraint excess amounts. (CL-020)
- GST amounts. (CW-020)
- Related parties for invoicing. (MR-090)
- Wash-up amounts.(CW-030)
- Wash-up interest amounts.(CW-030)

Processing:

The system:

1. Summarises the following amounts for the current billing period:
 - amounts owing (including GST) to the clearing manager for each product by each participant and role
 - amounts owing (including GST) for each product by the clearing manager to each participant and role
 - total amount owing (including GST) by each participant and role to the clearing manager (AOp)
 - total amounts owing (including GST) by the clearing manager to each participant and role (AOcm)
2. Saves the calculated amounts for subsequent processes.

Data outputs:

- total amount owing by each participant and role to the clearing manager (AOp)
 - total amount owing by the clearing manager to each participant and role (AOcm)
 - amounts owing to the clearing manager for each product by each participant and role (AOpElectricity, AOpEnergy, AOpFTR, AOpAncillaryServices, AOpMRDP, AOpHedges, AOpConON, AOpResCons, AOpDDCons, AOpDCof, AOpWash, AOpWint)
 - amounts owing for each product by the clearing manager to each participant and role (AOcmElectricity, AOcmEnergy, AOcmGeneral, AOcmFTR, AOcmAncillaryServices, AOcmMRDP, AOcmHedges, AOcmConON, AOcmResCons, AOcmDDCons, AOcmDCof, AOcmWash, AOcmWint, AOcmLCE, AOcmRLCE)
- N.B. Electricity = Spot market, Energy = all products excluding FTRs, General = all products excluding FTRs and Ancillary Services.

Exceptions:

Sub-process:	DI-020 Calculate settlement retention amounts
Process:	Produce and deliver invoices and statements
Code references:	14.21
Dependencies:	DI-010, DI-040, MR-090
Module Name	

Description:

The clearing manager calculates the value of the SRA ratio for the general and FTR markets, and the SRA amounts for the general and FTR markets for each participant and SRA related participant group (SRA group).

Business requirements:

1. The clearing manager must calculate the SRA ratio for the general and FTR markets in the manner described in the methodology as prescribed in clause 14.21 of the Code and use these ratios to calculate the SRA amounts for each participant.
2. The clearing manager must determine which participants belong to related participant groups as defined by the methodology.

Data inputs:

For each participant in the billing period:

- SRA and default related party groups (SRA groups and DEF groups)
- total amount owing by each participant and role to the clearing manager (AOp)
- total amount owing by the clearing manager to each participant and role (AOcm)
- amounts owing to the clearing manager for each product by each participant and role (AOpElectricity, AOpEnergy, AOpFTR, AOpAncillaryServices, AOpMRDP, AOpHedges, AOpConON, AOpResCons, AOpDDCons, AOpDCof, AOpWash, AOpWint)
- amounts owing for each product by the clearing manager to each participant and role (AOcmElectricity, AOcmEnergy, AOcmGeneral, AOcmFTR, AOcmAncillaryServices, AOcmMRDP, AOcmHedges, AOcmConON, AOcmResCons, AOcmDDCons, AOcmDCof, AOcmWash, AOcmWint, AOcmLCE, AOcmRLCE)
- total amount of prepayments to be used for settlement (SP) (from DI-040);

Processing:

The system:

- Calculates, for each participant and for each SRA group the ratio that the amounts owing would be reduced by, if that participant or SRA group were not to pay their amount payable.
- Calculates separately for each of the general and FTR market pools for each participant and SRA group as follows:
(N.B. all amounts are for the participant or the sum of the amounts for the related participant group, if applicable, except where there is a 'SUM()' when all

participants' figures are aggregated (but not SRA groups). Also, by definition, AOp and AOcm includes GST).

1. general SRA ratio = $\text{MAX}(0, \text{residual general}/\text{required general})$

where

residual general = retained GST + (AO_p – AO_{cm} – SP – FTR shortfall)

required general = SUM(AO_{cmGeneral}) + amounts owing by clearing manager to the Grid Owner for wash-ups including GST + amounts owing by clearing manager to the Grid Owner for wash-up interest – AO_{cmGeneral}

and

FTR shortfall = (see below)

retained GST = GST calculated on (AO_{pEnergy} - AO_{cmEnergy}) and on amounts retained for non-payment by the participant or all the participants in the SRA group, as applicable

2. FTR SRA Ratio =

IF current FTR shortfall >

residual loss and constraint excess amount of the Grid Owner,

THEN residual FTR/required FTR

ELSE 0;

where

residual FTR = FTR current - residual loss and constraint excess amount of the Grid Owner

required FTR = SUM(shortfall FTR current) - shortfall FTR current

and

FTR current = AO_{pFTR} but only for amounts settling in the billing period

shortfall FTR current = FTR shortfall – shortfall FTR future

and

shortfall FTR future = FTR shortfall * amount owing by each participant for FTRs for assignments that relate to future billing periods / AO_{pFTR}

and

FTR shortfall = shortfall * AO_{pFTR}/AO_p

and

shortfall = $\text{MAX}(0, \text{AO}_p - \text{SP} - \text{AO}_{cm})$

- Selects the highest ratio across all participants and SRA groups as the SRA ratio for each market. However, where a participant is included in a DEF group, that participant's ratios are excluded from the selection of both market pools.
- Calculates the General SRA Amount per participant and SRA group as :
the highest General SRA ratio * AO_{cmGeneral}
- Calculates the FTR SRA amount per participant and SRA group as :
the highest FTR SRA ratio * AO_{cmFTR}.

- Calculates the SRA payment amount per participant and SRA group as:
General SRA amount + the FTR SRA amount.

Data outputs:

For each billing period:

- SRA FTR ratio
- General FTR ratio
- General SRA amount for each participant and SRA group
- FTR SRA amount for each participant and SRA group
- SRA payment amount per participant and SRA group

Exceptions:

Sub-process:	DI-030 Produce tax and pro-forma invoices
Process:	Produce and deliver invoices and statements
Code references:	14.19, 14.20
Dependencies:	CE-010, CE-020, CA-010, CA-020, CA-030, CA-040, CA-050, CM-010, CH-010, CL-020, CC-030, CC-050, CC-060, CC-070, CF-010, CF-020, CF-030, CW-020, CW-030, CR-010, DI-010, MR-090, RV-040
Module Name	PR-110

Description:
<p>The clearing manager issues tax invoices for amounts owing by participants to the clearing manager and pro-forma invoices for amounts owing by the clearing manager to each participant.</p> <p>Amounts related to generation and amounts relating to retail or consumption are treated as separate entities with their own invoices and pro-forma invoices.</p> <p>Wash-ups are single total amounts for each month washed up. (The items within the wash-up are not shown, only the total of the differences including the wash-up interest.)</p> <p>Refer to DI-010 for details on what amounts are included in the definition of amounts owing by participants to the clearing manager and amounts owing by the clearing manager to each participant.</p>

Business requirements:
<ul style="list-style-type: none"> • Two business days after receiving reconciliation information and dispatchable load information for the prior billing period (or as described in clause 14.19), the clearing manager must advise of amounts owing by the clearing manager to each participant and amounts owing by each participant to the clearing manager. • Invoices must contain summary information, be printable and conform to the standards and requirements of the Inland Revenue Department of New Zealand. • Invoices must include GST. • Supporting information must be provided in a file format for all invoice amounts.

Data inputs:
<p>Applicable to the billing period and participant:</p> <ul style="list-style-type: none"> • Purchase and sale amounts for energy (spot market). (CE-010 and CE-020) • Ancillary amounts – black start, over-frequency, frequency keeping, instantaneous reserve and voltage support. (CA-010 to CA-050) • Alternative instantaneous reserve values for generating units (RV-040) • Must run dispatch settlement amounts for generators and purchasers.(CM-010) • Hedge settlement amounts. (CH-010) • Generator constrained on amounts for generation, and reserves (CC-030, CC-070).

- Dispatchable load purchaser constrained on and constrained off amounts (CC-050)
- Purchaser ratios and amounts payable by purchasers for generator constrained on and dispatchable load purchaser constrained on and constrained off amounts (CC-060).
- Final FTR payment amounts (CR-010)
- FTR payment scaling factor (CR-010)
- Scaled FTR hedge value amounts (CR-010)
- FTR settlement amounts (CF-010)
- FTR assignment difference payment amounts (CF-020)
- FTR Reconfiguration amounts (CF-030)
- Final loss and constraint excess amounts. (CL-020)
- Residual loss and constraint excess amounts. (CL-020)
- GST amounts. (CW-020)
- Related parties for invoicing.(MR-090)
- Washup amounts.(CW-030)
- Washup interest amounts.(CW-030)

Processing:

The system:

1. Calculates the participants' amounts owing for each of their roles and their amounts payable as per DI-010.
2. Creates a printable version of the tax invoices and pro-forma's.
3. Generates the supporting details for each invoice amount in files, in a format that is acceptable to the participant (currently in CSV format).

Transaction types:

- ACS – ancillary service amounts
- ASIR – AS instantaneous reserve
- ASIR_SUM – AS instantaneous reserve summary
- ASVP – AS voltage peaks
- CONS – purchaser/generator constrained amounts
- DDCONS – dispatchable demand constrained on amounts
- DCOF – dispatchable demand constrained off amounts
- DFTR – FTR assignment difference payments
- HEDG – hedge settlement amounts
- MRDG – must-run auction amounts for generators
- MRDP– must-run auction amounts for purchasers
- RESCONS – Reserves constrained amounts
- RFTR – Reconfiguration amounts for FTRs.
- RTIO – purchaser ratios
- SFTR – settlement of FTRs

- SPOT – electricity spot amounts (on Transpower grid)
- SSUM – spot summary
- WASH – Spot wash-up amounts
- WINT – wash-up interest
- WSUM – SPOT wash-up summary

Treatment of settled FTR holdings and assignment difference payments:

1. Final hedge values payable to the clearing manager, as well as any assignor to clearing manager assignment difference payments, will be included on tax invoices.
2. Final hedge values payable to the FTR holder, as well as any clearing manager to assignor assignment difference payments, will be included on pro-forma invoices.

Data outputs:

Tax invoices and pro-forma invoices containing aggregated invoice amounts for the different energy products together with supporting details for each invoice amount.
Supporting details (i.e. CSV files) for each invoice amount:

• **Transaction file (TRAN)**

This file contains an aggregated total for each combination of billing period and type of transaction appearing on a participant's invoice.

Field	Format	Description
Invoice ID	Number (10)	Invoice number
Transaction Type	Varchar (4)	ACS=ancillary services CONS=constrained DCON=DD constrained on DCOF=DD constrained off HEDG=hedge amounts MRDP=must-run auction SPOT=spot electricity WINT=wash-up interest SFTR=settlement of FTR DFTR=FTR assignment difference payment etc. (see above)
Transaction Date	DD/MM/YYYY	Last date of a billing period – except for ancillary services (“ACS”) which are the first date of the billing period
Amount Excl. GST	Number (22,2)	
GST Amount	Number (22,2)	
Trade Reference	Varchar (22)	Legacy column. Not currently used.
Transaction Identifier	Varchar (10)	Only currently used for ancillary services (“ACS” transaction type) to contain Transpower product code.
Participant Type	Char (1)	P=purchaser, G=generator, M=grid owner

Participant Code	Char (4)	e.g. MERI
<p>• Ancillary service instantaneous reserve file (ASIR)</p> <p>This file contains an instantaneous reserve quantity for each half-hour at each location where a participant trades.</p>		
Field	Format	Description
Trading Date	DD-MMM-YY	
POC	Varchar (8)	e.g. BEN0161
Period 1	Number (13,2)	Instantaneous reserve (IR) quantity for trading period 1 (00:00 to 00:30)
...
Period 50	Number (13,2)	Unless daylight saving end date, periods 49, 50 = 0. If daylight saving start date, periods 47, 48 = 0.
Total	Number (13,2)	Sum of periods 1 to 50
<p>• Ancillary services instantaneous reserve summary (ASIR_SUM)</p> <p>Ancillary Service Instantaneous Reserve summed for each participant</p>		
Field	Format	Description
Trading Date	DD-MMM-YY	
Participant Code	Char (4)	e.g. MERI
Period 1	Number (13,2)	Total Instantaneous reserve quantity (all grid points) for participant for trading period 1 (00:00 to 00:30)
...
Period 50	Number (13,2)	Unless daylight saving end date, periods 49, 50 = 0. If daylight saving start date, periods 47, 48 = 0.
Total	Number (13,2)	Sum of periods 1 to 50
<p>• Ancillary service voltage peaks file (ASVP)</p> <p>This file contains a summary of the participant's six highest kVAr peaks at each location in each ancillary services zone for the consumption period.</p>		
Field	Format	Description
Billing Period	MMM-YYYY	Consumption month
Participant Name	Varchar (50)	Organization name
Participant Code	Char (4)	Industry code
POC	Varchar (8)	e.g. GLN0331
Ancillary Services Zone	Number (2)	Valid values 1, 2, 3, 4
Party Role	Char (4)	Ancillary services role e.g. DIST
Peak 1 Date	DD-MM-YYYY	Date of highest kVAr peak

Peak 1 Period	Number (2)	Trading period of highest kVAr peak (1 <= period <= 50)
Peak 1 kVAr	Number (8,1)	Highest kVAr peak demand
Peak 2 Date	DD-MM-YYYY	Date of 2nd highest kVAr peak
Peak 2 Period	Number (2)	Trading period of 2nd highest kVAr peak
Peak 2 kVAr	Number (8,1)	2nd highest kVAr peak demand
Peak 3 Date	DD-MM-YYYY	Date of 3rd highest kVAr peak
Peak 3 Period	Number (2)	Trading period of 3rd highest kVAr peak
Peak 3 kVAr	Number (8,1)	3rd highest kVAr peak demand
Peak 4 Date	DD-MM-YYYY	Date of 4th highest kVAr peak
Peak 4 Period	Number (2)	Trading period of 4th highest kVAr peak
Peak 4 kVAr	Number (8,1)	4th highest kVAr peak demand
Peak 5 Date	DD-MM-YYYY	Date of 5th highest kVAr peak
Peak 5 Period	Number (2)	Trading period of 5th highest kVAr peak
Peak 5 kVAr	Number (8,1)	5th highest kVAr peak demand
Peak 6 Date	DD-MM-YYYY	Date of 6th highest kVAr peak
Peak 6 Period	Number (2)	Trading period of 6th highest kVAr peak
Peak 6 kVAr	Number (8,1)	6th highest kVAr peak demand
Peak Average	Number (8,1)	Average of the six peaks

• **Constrained amounts file (CONS)**

This file contains a row for each constrained on or constrained off amount applicable to a generator for each billing period being invoiced or washed-up.

Field	Format	Description
Invoice ID	Number (10)	Invoice ID as per TRAN file
Constrained On/Off Indicator	Varchar (3)	Must be ON or OFF
Supply Point	Varchar (8)	Will either be a market node, block dispatch group or station dispatch group.
Trading Date	DD/MM/YYYY	
Trading Period	Number (2)	1 <= period <= 50
Metered Quantity	Number (10,3)	MW
Final Offered Quantity	Number (10,4)	MW
Total Settlement Amount Excl. GST	Number (20,4)	\$
Total Grid Constrained Amount Excl. GST	Number (20,4)	\$
Total Amount Excl. GST	Number (20,4)	\$
Participant Code	Char (4)	e.g. MERI

• **DD Constrained amounts file (DDCONS)**

This file contains a row for each constrained on or constrained off amount applicable to a dispatchable load purchaser for each billing period being invoiced or washed-up.

Field	Format	Description
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Invoice ID	Number (10)	Invoice ID as per TRAN file
Constrained On/Off Indicator	Varchar (3)	Must be ON of OFF
Supply Point	Varchar (8)	Will either be a market node, block dispatch group or station dispatch group.
DCLS Code	Varchar(5)	
Trading Date	DD/MM/YYYY	
Trading Period	Number (2)	1 <= period <= 50
Constrained Amount	Number(24,4)	
Constrained Quantity	Number(10,3)	MW
Scheduled Quantity	Number (10,3)	MW
Reconciled Quantity	Number (10,4)	MW
Dispatch Quantity	Number (10,4)	MW
Final Price	Number(8,2)	
Bid Price	Number(8,2)	
Participant Code	Char (4)	e.g. MERI
<p>• Additional constrained amounts file (CONS2)</p> <p>This file contains a row for each constrained on or constrained off amount applicable to a generator for each billing period being invoiced or washed-up. This is additional data that was used to calculate the constrained amounts.</p>		
Field	Format	Description
Invoice ID	Number (10)	Invoice ID as per TRAN file
Organisation Code	Char (4)	Participant identifier
Trading Date	DD/MM/YYYY	
Trading Period	Number (2)	1 <= period <= 50
Supply Point	Varchar (8)	Will either be a market node, block dispatch group or station dispatch group.
Metered Quantity	Number (10,3)	MW
Dispatch Quantity	Number (10,4)	MW
Scheduled Quantity	Number (10,3)	MW
Maximum Offered Quantity	Number (10,4)	MW
Constrained Indicator	ON/OFF	Values: ON, OFF
Constrained Quantity	Number (10,4)	MW Absolute Value
Constrained Amount Excl. GST	Number(24,4)	\$
Grid Constrained Amount Excl. GST	Number(24,4)	\$
Net Constrained Amount Excl. GST	Number(24,4)	\$
<p>• FTR Assignment Difference Payments (DFTR)</p>		

This file contains one record for each assignment difference payment that is being invoiced.

Assignor to clearing manager assignment difference payments will be included on a tax invoice addressed to the assignor for the billing period in which the assignment took place (i.e. the month after the assignment, not when the FTR itself is settled). Clearing manager to assignor assignment difference payments are invoiced when the FTR is settled. Assignments where there is no assignment difference payment will also be included in the file when the FTR is settled. Assignment difference payments will always appear as positive or negative amounts on a tax invoice ("TRAN" file 'Participant Type' = "P").

The sum of the Assignment Difference Payment Amounts will be the 'Amount excl. GST' of the "DFTR" transaction in the TRAN file for that Invoice ID and (potentially in-the-future) FTR period (consumption/billing period).

Field	Format	Description
Invoice ID	Number (10)	Invoice ID as per TRAN file
Assignment Difference Payment Participant	Char (4)	Participant identifier e.g. MERI
Assignment Difference Payment Participant	Char (4)	Participant identifier e.g. NZCM
Product Profile	Varchar (40)	Currently the only product profile is "24HR"
Hedge Type	Char (3)	Must be OPT(ion) or OBL(igation)
Source Hub	Char (3)	e.g. BEN
Sink Hub	Char (3)	e.g. OTA
FTR Period	YYYYMM	
Holding Code	Number (10)	This is the FTR ID from the FTR Register
Assigned Quantity	Number (10,1)	MW
Assignment Date	DD/MM/YYYY	
Assignor Acquisition Cost	Number (10,2)	\$/MWh
Disclosed Assignment Price	Number (10,2)	\$/MWh
Assignment Difference Payment Amount	Number (10,2)	

• **Must-run dispatch auction generator file (MRDG)**

This file contains a record for each half-hour in the month for each generator, describing their must-run auction revenue.

Field	Format	Description
Invoice ID	Number (10)	Invoice ID as per TRAN file
Participant Code	Char (4)	e.g. MERI
Trading Date	DD/MM/YYYY	
Trading Period	Number (2)	1 <= period <= 50
Auction Revenue	Number (14,10)	\$

• **Must-run dispatch auction purchaser file (MRDP)**

This file contains a record for each half-hour in the month for each purchaser, describing the amount payable to cover their market share of the must-run auction revenue paid-out to generators during that half hour.

Field	Format	Description
Invoice ID	Number (10)	Invoice ID as per TRAN file
Participant Code	Char (4)	e.g. TRUS
Trading Date	DD/MM/YYYY	
Trading Period	Number (2)	1 <= period <= 50
Purchaser Ratio	Number (14,4)	Market share for the trading period
Purchaser Revenue	Number (14,4)	Negative \$ means the amount is payable by the purchaser
Auction Revenue	Number (8,4)	The total amount paid to must-run auction winners for the trading period

• **Reserve constrained amounts file (RESCONS)**

This file contains a record for every half-hour during the month where the participant had an IR constrained amount calculated.

Field	Format	Description
Invoice ID	Number (10)	Invoice ID as per TRAN file
Market Node	Varchar (12)	e.g. CYD2201 CYD
Trading Date	DD/MM/YYYY	
Trading Period	Number (2)	1 <= period <= 50
Quantity	Number (7,3)	MW
Total Settlement Amount	Number (20,4)	
Grid Settlement Amount	Number (20,4)	
Net Amount	Number (20,4)	
Participant Code	Char (4)	e.g. CTCT

• **FTR Reconfiguration Amount payments (RFTR)**

This file contains one record for each reconfiguration amount that is being invoiced. Reconfiguration amounts (being the recorded loss or gain to a participant as a result of a reconfiguration auction) will be included on a tax invoice addressed to the participant with an amount owing by the participant for the billing period in which the FTR is settled. Reconfiguration Amounts where there was no difference between original acquisition costs and reconfiguration price will also be included in the file with zero value when the FTR is settled.

The sum of the Reconfiguration Amounts will be the 'Amount excl. GST' of the "RFTR" transaction in the TRAN file for that Invoice ID and FTR period (consumption/billing period).

Filename format: [filename prefix]_RFTR_[Invoice ID].csv.

Field	Format	Description
Invoice ID	Number (10)	Invoice ID as per the TRAN file
Reconfiguration amount participant	Char (4)	

Reconfiguration amount participant	Char (4)	E.g. assignor to clearing manager Assignment Difference Payment (because disclosed assignment price < assignor acquisition cost)
Product profile	Varchar (40)	Currently the only product profile is "24HR"
Hedge type	Varchar (3)	
Source hub	Char (3)	
Sink hub	Char (3)	
FTR period	Char (6)	yyyymm
Holding code	Number (10)	This is the FTR ID from the FTR Register
Reconfigured quantity	Number(10.1)	MW
Reconfiguration date	Date	dd/mm/yyyy
Original acquisition cost	Number (10.2)	\$/MWh
Reconfiguration price	Number (10.2)	\$/MWh
Reconfiguration amount	Number (10.2)	\$ (e.g. (14.02 – 13.55) \$/MWh * 25.4 MW * 720 h)
<p>• Purchase ratio file (RTIO)</p> <p>This file contains a record for each half-hour in the consumption period for each purchaser, describing their total market share and market share for each island.</p>		
Field	Format	Description
Invoice ID	Number (10)	Invoice ID as per TRAN file
Participant Code	Char (4)	e.g. TRUS
Trading Period	Number (2)	1 <= period <= 50
Trading Date	DD/MM/YYYY	
Purchaser Ratio South	Number (14,10)	South Island market share
Purchaser Ratio North	Number (14,10)	North Island market share
Purchaser Ratio Country	Number (14,10)	Total NZ market share
<p>• Settlement of FTRs file (SFTR)</p> <p>This file contains one record per half-hour for each holding of an FTR product for the FTR period being settled, held by the FTR participant.</p>		
Field	Format	Description
Invoice ID	Number (10)	Invoice ID as per TRAN file
FTR Participant Code	Char 4	e.g. MERI
Product Profile	Varchar (40)	Currently the only product profile is "24HR"
Hedge Type	Char (3)	Must be OPT(ion) or OBL(igation)
Source Hub	Char (3)	e.g. BEN
Sink Hub	Char (3)	e.g. OTA
FTR Period	YYYYMM	
Holding Code	Number (10)	This is the FTR ID from the FTR Register
Quantity	Number (10,1)	MW
Acquisition Cost	Number (10,2)	\$/MWh

Acquisition Value	Number (10,2)	\$
Trading Date	DD/MM/YYYY	
Trading Period	Number (2)	1 <= period <= 50
Price Difference	Number (10,2)	Sink price – source price
Initial FTR Hedge Value	Number (10,2)	
Payment Scaling Factor	Number (7,6)	Will be 1.0 if FTR period is revenue adequate or less than 1.0 if not revenue adequate.
Final FTR Payment	Number (10,2)	Final (scaled) FTR hedge value (\$) – acquisition value (\$)
<p>• Electricity spot amounts file (SPOT)</p> <p>This file contains a record for every half-hour where at each location traded at by the participant during a billing period (consumption period). It only reports half-hours where there are final prices at the location. Wash-ups are reported via the WASH file type.</p>		
Field	Format	Description
Invoice ID	Number (10)	Invoice ID as per TRAN file
POC	Varchar (8)	e.g. CPK0331
Trading Date	DD/MM/YYYY	
Trading Period	Number (2)	1 <= period <= 50
Quantity	Number (10,3)	MW
Price	Number (6,2)	Final price (\$/MWh)
Settlement Amount	Number (20,4)	\$
Participant Type	Varchar (10)	Must be “G”, “GENERATOR”, “P” or “PURCHASER”
<p>• Electricity spot summary file (SSUM)</p> <p>This file contains a summary at each location traded at by the participant during a billing period (consumption period). It only considers half-hours where there are “F”inal prices at the location. Wash-ups are reported via the WSUM file type.</p>		
Field	Format	Description
Invoice ID	Number (10)	Invoice ID as per TRAN file
POC	Varchar (8)	e.g. CPK0331
Month Start Date	DD/MM/YYYY	The 1 st of the consumption period
Total Quantity	Number (10,3)	Sum of quantity (MW) over all half-hours in the consumption period
Average Price	Number (10,2)	Simple average of all final prices during the consumption period (\$/MWh)
Total Settlement Amount	Number (10,2)	Sum of price * quantity over all half-hours in the consumption period
Participant Type	Varchar (10)	Valid values are “G”, “GENERATOR”, “P” or “PURCHASER”
<p>• Electricity spot wash-up amounts file (WASH)</p>		

This file contains a record for every half-hour at each location traded at by the participant during a billing period (consumption period) that is being washed-up. It only reports half-hours where there are "F"inal prices at the location.

Field	Format	Description
Invoice ID	Number (10)	Invoice ID as per TRAN file
POC	Varchar (8)	e.g. CPK0331
Trading Date	DD/MM/YYYY	
Trading Period	Number (2)	1 <= period <= 50
Quantity	Number (10,3)	MW
Price	Number (6,2)	Final price (\$/MWh)
Settlement Amount	Number (20,4)	\$
Participant Type	Varchar (10)	Must be "G", "GENERATOR", "P" or "PURCHASER"

• **Electricity spot wash-up summary file (WSUM)**

This file contains a summary at each location traded at by the participant during a billing period (consumption period) that is being washed-up. It only considers half-hours where there are "F"inal prices at the location.

Field	Format	Description
Invoice ID	Number (10)	Invoice ID as per TRAN file
POC	Varchar (8)	e.g. CPK0331
Month Start Date	DD/MM/YYYY	The 1 st of the consumption period
Total Quantity	Number (10,3)	Sum of quantity (MW) over all half-hours in the consumption period
Average Price	Number (10,2)	Simple average of all final prices during the consumption period (\$/MWh)
Total Settlement Amount	Number (10,2)	Sum of price * quantity over all half-hours in the consumption period (\$)
Participant Type	Varchar (10)	Must be "G", "GENERATOR", "P" or "PURCHASER"

Exceptions:

Note: Parties who have ceased to be a participant are still invoiced for any amounts owing and payable calculated as a result of wash-ups for billing periods when they were still participants.

Sub-process:	DI-040 Calculate prepayment amounts
Process:	Produce and deliver invoices and statements
Code references:	
Dependencies:	CE-010, CE-020, CA-010, CA-020, CA-030, CA-040, CA-050, CM-010, CH-010, CF-010, CF-020, CC-030, CC-040, CC-060, CC-070, CF-010, CF-020, CF-030, CW-010, CW-020, CW-030, CL-010, CR-010
Module Name	

Description:
<p>The clearing manager calculates the value of all prepayments that can be used against amounts owing by the participant for the billing period. Any unused prepayment amount may be kept for use in subsequent billing periods or returned to the participant, as instructed by the participant.</p> <p>Prepayments cannot be used to pay for amounts owing that were consumed before the prepayment was received by the clearing manager.</p> <p>In general, outstanding prepayment amounts are pro-rated i.e. are applied to amounts owed in the latest billing period in proportion to the number of prepayment applicable days. The number of prepayment applicable days is calculated either from the first day of the month if the prepayment was received in a previous month or from the day of receipt of the prepayment up to and including the last day of the month.</p> <p>Some amounts owed are not pro-rated as they are calculated daily so only the amounts for the same dates as covered by the prepayment applicable days can be selected. FTRs are neither pro-rated nor selected by day.</p> <p>Amounts owed are:</p> <ul style="list-style-type: none"> • energy purchase amounts that are for the same trading days as the prepayment applicable days, including GST; plus • pro-rated ancillary service adjustment amounts including GST, if > 0; plus • pro-rated ancillary service amounts including GST, if > 0; plus • hedge settlement amounts where each contract's settlement amount for a trading date > 0 and that are for the same trading days as the prepayment applicable days; plus • FTR payment amounts where amount > 0; plus • wash-up amounts including GST and wash-up interest amounts where the amounts are > 0; plus • pro-rated Other amounts such as MRDA, constrained on and constrained off, loss and constraint excess, including GST if applicable, where amounts are > 0. <p>If there are multiple prepayments that can be applied to the month, they are processed by received date in ascending order, then by amount in descending order.</p> <p>Only the parent participant of a statement group can have prepayments.</p>

Business requirements:

1. The clearing manager must calculate the amount of each prepayment to be used against amounts owing in each billing period.
2. If there are any unused prepayments amounts, the clearing manager must follow the participant's instructions and either return them as part of the settlement payment or allocate them to the next billing period.
3. Prepayments must not be used to pay for amounts that were consumed before the prepayment was received by the clearing manager.

Data inputs:

Applicable to the billing period and participant:

- Outstanding prepayments
- Final FTR payment amounts for each holding (CR-010)
- Purchase and sale amounts for energy.
- Ancillary amounts – black start, over-frequency, frequency keeping, instantaneous reserve and voltage support.
- Ancillary service instantaneous reserve summed for each participant.
- Ancillary service voltage peaks.
- Must run dispatch settlement amounts for generators and purchasers.
- Hedge settlement amounts
- Generator constrained on amounts for generation, and reserves (CC-030, CC-070).
- Dispatchable load purchaser constrained on and constrained off amounts (CC-040)
- Purchaser ratios and amounts payable by purchasers for generator constrained on and dispatchable load purchaser constrained on and constrained off amounts (CC-060).
- Final FTR payment amounts for each holding (CR-010).
- FTR assignment difference payment amounts (CF-010).
- FTR Reconfiguration amounts (CF-020).
- Final loss and constraint excess amounts (CF-030).
- Residual loss and constraint excess amounts.
- GST amounts.
- Wash-up amounts (CW-030)
- Wash-up interest amounts (CW-030).

Processing:

The system:

1. Calculates the amount of each prepayment that is applicable against the current billing period's amount owing as follows:
MIN(prepayment amount available in current billing period, total amount owing where
Total amount owing =
 - a. energy purchase amounts that are for the same trading days as the prepayment applicable days, including GST; plus

- b. pro-rated ancillary service adjustment amounts including GST, if > 0; plus
 - c. pro-rated ancillary service amounts including GST, if > 0; plus
 - d. hedge settlement amounts where each contract's settlement amount for a trading date > 0 and that are for the same trading days as the prepayment applicable days; plus
 - e. FTR payment amounts where amount > 0; plus
 - f. wash-up amounts including GST and wash-up interest amounts where the amounts are > 0; plus
 - g. pro-rated Other amounts such as MRDA, constrained on and off, loss and constraint excess, including GST if applicable, where amounts are > 0.
2. Calculates and stores against the prepayment:
 - the amount used in this billing period
 - the remaining prepayment amount available for return or for the next billing period.
 3. Calculates a new total amount owing after the application of the prepayment.
 4. Repeats the process for any additional applicable prepayments or until there are no more applicable prepayments.
 5. Where there are multiple applicable prepayments for the month, they are processed in earliest received date sequence, then by largest amount.

Data outputs:

For each participant and billing period:

- total amount of prepayments to be used for settlement;
- total amount of prepayments to be returned to the participant;
- total amount of prepayments to be carried over to the next billing period.

Exceptions:

Sub-process:	DI-050 Produce statements
Process:	Produce and deliver invoices and statements
Code references:	14.19
Dependencies:	DI-010, DI-020, DI-030, DI-040
Module Name	

Description:

Statements are created by combining tax and pro-forma invoices for a single *statement participant*.

For participants in a statement group (STM group), the *statement participant* is the participant identifier indicated as being the parent of the group. This group statement amalgamates the invoice amounts of all the related participant identifiers of the group, as indicated in the related party group table.

For participants not in a statement group, the *statement participant* is the participant's identifier. This statement will contain only the invoice amounts pertaining to the single participant identifier.

A statement includes any prepayments that are to be used, retained or returned, the SRA ratio for the general and FTR pools, and the SRA amounts for the general and FTR pools. The net amounts payable are calculated and displayed on the statement.

Business requirements:

1. Two business days after receiving reconciliation information and dispatchable load information for the prior billing period, the clearing manager must advise of amounts owing and amounts payable by participants and of amounts owing by the clearing manager, the settlement retention amounts payable by participants and the amount payable by the clearing manager.
2. The clearing manager must provide the SRA ratios, the SRA amounts and the amounts payable on a statement per *statement participant*.
3. The statement must contain the amounts of prepayment to be considered and returned on settlement.

Data inputs:

Applicable to the billing period:

1. Invoice amounts owing by each participant to the clearing manager (tax invoices) (AO_p and AO_pFTR) (DI-010)
2. Invoice amounts owing by the clearing manager to each participant (pro-forma invoices) (AO_{cm} and AO_{cm}FTR) (DI-010)
3. Related party groups (MR-090)
4. General SRA ratio (DI-020)
5. FTR SRA Ratio (DI-020)
6. SRA payment amounts per participant and SRA group (General SRA amount, FTR SRA amount and total SRA payment amount) (DI-020)

7. Total amount of prepayments to be used for settlement per participant (DI-040).
8. Total amount of prepayments to be returned to the participant per participant (DI-040).
9. Total amount of prepayments to be carried over to the next billing period per participant (DI-040).

Processing:

The system:

- Summarizes the amounts owing by each *statement participant* and the clearing manager, the prepayments to be used or returned and the SRA amounts.
- Calculates:
 - The amount payable by each *statement participant* to the clearing manager (AP_p) as:

$$\text{MAX}(0, \text{sum of the amounts owing by the } \textit{statement participant} \text{ to the clearing manager} - \text{total amount of prepayments to be used for settlement by the } \textit{statement participant} \text{ in the billing period} - \text{sum of the amounts owing by the clearing manager to the } \textit{statement participant} + \text{SRA of the } \textit{statement participant});$$
 and

The amount payable by the clearing manager to each *statement participant* (AP_{cm}) as:

$$\text{sum of the amounts owing by the clearing manager to the } \textit{statement participant} - \text{sum of the amounts owing by the } \textit{statement participant} \text{ to the clearing manager} + \text{total amount of prepayments to be used for settlement in the billing period by the } \textit{statement participant} + \text{amount payable by the } \textit{statement participant} \text{ to the clearing manager } (AP_p).$$
- Creates a printable version of the statement showing the following amounts:
 - Total amount owing by the *statement participant* (AO_p)
 - Prepayment amounts to be applied
 - SRA ratios
 - SRA amounts
 - Total amount owing by the clearing manager (AO_{cm})
 - The sub-total: $AO_p - AO_{cm}$
 - Amount payable by the *statement participant* (AP_p)
 - Amount payable by the clearing manager (AP_{cm})
 - Amount to be returned from prepayments (PP_{return})
 - Total amount of prepayments to be carried over to the next billing period (PP_{kept})
 - Net amount payable by the clearing manager ($AP_{cm} + PP_{return}$)
- Creates the associated statement files.

Data outputs:

Per statement participant and billing period:

<ul style="list-style-type: none"> • Statement (pdf). • • Statement csv file. • Statement 2 CSV file. • Invoice details CSV file. <p>SRA details CSV file.</p>		
<p>• Statement file</p>		
<p>This file contains a record for each invoice (tax and pro-forma) issued to a statement participant in respect of a billing period and the net amounts payable by and/or to the statement participant.</p> <p>Rows with an invoice ID show the invoice amounts (AOp or AOcm) and the total statement AOp or AOcm as well as the SRA, APp, APcm, prepayment amounts used, kept and returned and other amounts.</p> <p>Rows without an invoice ID show the total of the invoices AOp or AOcm on that statement. Values for fields from “Spot market SRA ratio” onwards are the same for all rows. The printed statement contains a summary of the information.</p>		
Field	Format	Description
Statement number	Number(10)	Invoice ID as per the TRAN file
Billing period ID	Number(10)	Unique number assigned to each billing period
Participant ID	Char(4)	
Statement date	Date	
Invoice type	Char(3)	GEN=Generator PUR=Purchaser
Amounts owing by	Char(50)	Either amounts owing by the participant or amounts owing by the clearing manager
Invoice ID	Number(10)	Invoice ID as per the TRAN file
Net amount	Number(22,2)	Amount excl. GST
GST amount	Number(22,2)	If applicable
Total amount	Number(22,2)	Net amount + GST
Spot market SRA ratio	Number(14,10)	Settlement retention ratio in the spot market (General SRA ratio)
FTR market ratio	Number(14,10)	Settlement retention ratio in the FTR market (FTR SRA ratio)
Spot market SRA amount	Number(20,2)	Spot market (general) settlement retention amount
FTR market SRA amount	Number(20,2)	FTR market settlement retention amount
Total SRA amount	Number(20,2)	Total settlement retention amount
Prepayments used	Number(20,2)	Prepayments that have been provided and used
Prepayments kept by CM	Number(20,2)	Excess prepayments to be applied in a future period

Prepayments returned to participant	Number(20,2)	Excess prepayments to be returned to the participant
Amount payable by participant	Number(20,2)	Amount participant must pay the clearing manager
Amount payable by CM	Number(20,2)	Amount the clearing manager must pay the participant
Net amount payable by CM	Number(20,2)	Amount payable by the clearing manager + prepayments returned
• Statement 2 file		
This file contains a record for each invoice for each participant identifier in a statement group, or participant that is not in a statement group, and the subtotals for amounts owing by the participant group or participant, and the clearing manager, plus a record containing the statement amounts.		
Field	Format	Description
Statement number	Number(10)	
Invoice month	MMM YYYY	
Organisation code	Char(4)	Participant identifier for invoice. If blank then the information is a sub-total or total and applies to the statement participant.
Primary organisation code	Char(4)	Participant identifier for the statement.
Statement date	DD/MM/YYYY HH:MM	
Invoice type	Char(3)	Invoice type is "GEN" for AP _{cm} , "PUR" for AP _p amounts. Blank for the statement grand total and subtotals.
Description of the aggregated data	Char(100)	For the statement grand total "Statement Payable Amount Details", otherwise If the invoice type is "GEN" then "Amounts Owing by the clearing manager (AO _{cm})" else If the invoice type is "PUR" then "Amounts Owing by the Participant (AO _p)" otherwise "Subtotal (AO _p - AO _{cm})".
Invoice number	Number(10)	Blank for the statement grand total.
Net amount	Number(20,2)	Blank for the statement grand total.
GST amount	Number(20,2)	Blank for the statement grand total.
Total amount	Number(20,2)	Blank for the statement grand total.
General SRA ratio	Number(20,2)	Applies only to the statement grand total.
FTR SRA ratio	Number(20,2)	Applies only to the statement grand total.
General SRA amount	Number(20,2)	Applies only to the statement grand total.
FTR SRA amount	Number(20,2)	Applies only to the statement grand total.
Total SRA amount	Number(20,2)	Applies only to the statement grand total.
Prepayment amount used	Number(20,2)	Applies only to the statement grand total.

Prepayment amount kept	Number(20,2)	Applies only to the statement grand total.
Prepayment returned	Number(20,2)	Applies only to the statement grand total.
Amount payable by participant	Number(20,2)	Applies only to the statement grand total.
Amount payable by clearing manager	Number(20,2)	Applies only to the statement grand total.
Net amount payable by clearing manager	Number(20,2)	Applies only to the statement grand total.
• Invoice details file		
This file contains the records from similar to FR CLR report but excludes the IRD amounts. The file has one record per customer ID for all the <i>statement participant's</i> participant IDs.		
Field	Format	Description
Invoice period	Number(10)	Unique number assigned to each billing period
Org code	Char(4)	Participant Identifier
CSI ID	Number(10)	Customer ID
CSI type	Char(1)	P=purchaser G=provider
Invoice type	Char(3)	GEN=Generator PUR=Purchaser
Invoice ID	Number(10)	Invoice ID as per the TRAN file
Cons Amount	Number(20,2)	Constrained on amounts
Dcon Amount	Number(20,2)	DD constrained on amounts
DCOF Amount	Number(20,2)	DD constrained off amounts
ACS Amount	Number(20,2)	Ancillary services amounts
MRDS Amount	Number(20,2)	Must Run Dispatch Auction amounts
Spot Amount	Number(20,2)	Spot market energy amounts
SFTR Amount	Number(20,2)	FTR settlement amounts
DFTR Amount	Number(20,2)	FTR assignment amounts
RFTR Amount	Number(20,2)	FTR reconfiguration amounts
Hedge Amount	Number(20,2)	HAS settlement amounts
Grid Amount	Number(20,2)	Amount paid to Grid owner
RLCE Amount	Number(20,2)	FTR Residual LCE amounts
Total Amount Excl GST	Number(20,2)	Total amount excl. GST
GST Amount	Number(20,2)	GST amount
Total Amount Incl GST	Number(20,2)	Total amount incl. GST
Washup Cons Amount	Number(20,2)	Washup Constrained on amounts
Washup Dcons Amount	Number(20,2)	Washup DD constrained on amounts
Washup DCOF Amount	Number(20,2)	Washup DD constrained on amounts

Washup ACS Amount	Number(20,2)	Washup ancillary services amounts
Washup MRDA Amount	Number(20,2)	Washup MRDA amounts
Washup SPOT Amount	Number(20,2)	Washup spot market amounts
Washup SFTR Amount	Number(20,2)	Washup FTR settlement amounts
Washup DFTR Amount	Number(20,2)	Washup FTR assignment amounts
Washup RFTR Amount	Number(20,2)	Washup FTR reconfiguration amounts
Washup Hedge Amount	Number(20,2)	Washup HSA settlement amounts
Washup Interest Amount	Number(20,2)	Washup interest amounts
Washup Grid Amount	Number(20,2)	Washup grid owner amounts
Washup RLCE Amount	Number(20,2)	Washup FTR Residual LCE amounts
Washup Total Amount Excl GST	Number(20,2)	Washup total amount excl. GST
Washup GST Amount	Number(20,2)	Washup GST amounts
Washup Total Amount Incl GST	Number(20,2)	Washup total amount incl. GST
Invoice Total Amount Excl GST	Number(20,2)	Invoice total amount excl. GST
Invoice GST Amount	Number(20,2)	Invoice GST amount
Invoice Total Amount Incl GST	Number(20,2)	Invoice total amount incl. GST
<p>• SRA details file</p> <p>This file contains SRA information for a participant. All participants in a related party group are included in the parent's SRA details file.</p>		
Field	Format	Description
Statement number	Number(10)	Statement ID
Billing period ID	Number(10)	Unique number assigned to each billing period
Organisation code	Char(4)	Participant identifier
Primary organisation code	Char(4)	Parent participant identifier
Statement date	DD/MM/YYYY HH:MM	
General SRA amount	Number(20,2)	Amount of SRA for the General market
FTR SRA amount	Number(20,2)	Amount of SRA for the FTR market

Sub-process:	DI-060 Send invoices and statements to participants
Process:	Produce and deliver invoices and statements
Code references:	14.23, 14.29
Dependencies:	DI-030, DI-050, MR-070
Module Name	IN-120

Description:

The clearing manager delivers invoices (tax and pro-forma), statements and supporting information to participants on the 9th business day of each month.

Business requirements:

1. The clearing manager must issue invoices and statements to participants two business days after receiving reconciliation information and other data from the reconciliation manager, or as described in clause 14.19
2. If the invoices are issued late, then the clearing manager must notify parties of the new payment date.
3. The clearing manager must deliver the invoices, statements and supporting information electronically and by post if requested by the participant).
4. Supporting information must be provided in a file.
5. The clearing manager must ensure that invoices, statements and supporting information are only delivered to the participant to whom the information relates.
6. Delivery must be via a secure electronic delivery mechanism.
7. The clearing manager must email the participant when the statements are published.
8. The clearing manager must telephone the participant if the statements have not been viewed by noon the following business day.

Data inputs:

- Tax invoices and pro-forma invoices (DI-030).
- Statements (DI-050).
- Supporting details for each invoice amount (DI-030).
- Contact details for organisations (MR-070).

Processing:

The system:

- Delivers the statements, invoices and the supporting information to the relevant participant using the secure electronic delivery mechanism.
- Informs the participants by email when the statements are published.
- Indicates to the clearing manager that the documents have been viewed by the participant.

Data outputs:

- Tax invoices, pro-forma invoices and statements.
- Supporting details for each invoice amount.
- Updated viewed information.

Exceptions:

Sub-process:	DI-070 Receive confirmation
Process:	Produce and deliver invoices and statements
Code references:	14.23, 14.24
Dependencies:	DI-060
Module Name	IN-130

Description:

Each participant is required to confirm the receipt of their statement and its supporting details to the clearing manager. The clearing manager checks a confirmation has been received from every participant with an amount payable by the participant by 1200 hours of the next business day after the invoices were sent.

Business requirements:

1. The clearing manager must check whether a confirmation has been received.
2. The clearing manager must be able to re-send invoices and supporting information when necessary.

Data inputs:

- Confirmations – date and time invoices either downloaded from the Clearing Portal or confirmation email received or phone confirmation obtained.
- Tax invoices, pro-forma invoices and statements
- Supporting details for each invoice amount.

Processing:

1. Check confirmations.
2. Re-send invoices and supporting information to the appropriate party.

Data outputs:

- Tax invoices, pro-forma invoices and statements
- Supporting details for each invoice amount.

Exceptions:

6.17 Process prepayments and payments

Sub-process:	PP-010 Receive payments from participants
Process:	Process prepayments and payments
Code references:	14.31
Dependencies:	MR-040, DI-060, MR-070
Module Name	

Description:

Each participant is required to pay their amount payable in cleared funds into the clearing manager's operating account by 1300 hours on the 20th calendar day (or the next business day if this is not a business day), or as directed in clause 14.31.

All operating account transactions are stored and classified by intended purpose – settlement, prepayment etc. – against the participant identifier of the payer.

A participant may instruct the clearing manager to pay all or part of an amount payable by the participant:

1. using an amount paid by the participant into the clearing manager's operating account identified as a cash settlement amount; and
2. under clause 14.31, from their prudential cash deposit held by the clearing manager; and
3. from the prudential security lodged for use as payment against the amount payable.

Once payment is received in full, the clearing manager sends an email to the statement participant confirming this. Once all possible payments have been received (or have been taken) by 1500 hours on settlement day, the settlement run is initiated. Payments received after the settlement process has commenced are classed as late payments. A separate type of email is sent for late payments that result in full payment being received.

Business requirements:

- The clearing manager must monitor the operating account regularly for all cash receipts and store them together with the participant identifier of the payer and the intended use of the payment e.g. settlement, prepayment, interest etc.
- The clearing manager must check their operating account for an acknowledgement that payment has been received, and/or have received an instruction from the statement participant to use all or a specified amount from their prudential cash deposit. The clearing manager may also take an amount from the prudential security lodged for use as payment against the amount payable.
- The clearing manager must keep a tally of the payments received against a statement. When payment is received in full, the clearing manager must confirm this by sending an email, using an appropriate template, to the stored contact assigned to each *statement participant* for this purpose. If payment is

received in full but late, a different type of email template is to be used and sent.

Data inputs:

- Operating bank account transactions.
- clearing manager bank account details and bank account details of each participant from organisation management (MR-040)
- Bank transaction file conversion information and bank transaction codes (MR-040)
- Payment instructions from the statement participant.
- Amount payable by the statement participant (APp), amount payable by the clearing manager (APcm) from statements (DI-060)
- Email contact details for payment notifications for the statement participant (MR-070)

Processing:

The system:

1. Extracts and stores all the new transactions that appear in the clearing manager's operating account
2. Permits the clearing manager to identify the settlement transactions, and add an optional comment. Non settlement transactions are identified to be ignored..
3. Calculates total amounts received into the operating account for settlement and separately those marked to be ignored over a period and the opening and closing balances of the account.
4. For each statement amount payable, allows the clearing manager to record the type of payment and the total amount paid, against the associated statement. The types of payments are:
 - cash amount used for settlement purposes from the operating account; or
 - cash amount paid from prudentials; or
 - amount taken from prudentials (recorded after 1300 hours and prior to the settlement run commences); or
 - late receipt amount (recorded after the settlement run has completed)
5. Stores the audit details of each operating transaction stored/updated as well as all payment details input.
6. Prior to the settlement run, calculates the total amount of payments from 2 payment types – settlement cash amounts and amounts paid from prudentials - and compares the total against the total amount payable (APp) from the applicable statement, then:
 - a. If payment is in full, generates an email, using the appropriate email template, to the contact stored against the statement participant for this purpose ,
 - b. Otherwise, calculates and stores any shortfall that includes an offsetting amount of APcm.
7. On input of a late payment, calculates the total of all payments types recorded plus APcm and compares it to the total amount payable (APp) then:
 - a. If payment is in full, generates an email, using the appropriate email template (late payment), to the contact stored against the statement participant for this purpose,

- b. Otherwise, calculates and stores any shortfall that includes an offsetting amount of APcm.
- 8. For each email sent, stores the date and time stamp of when the email was sent, and that payment has been made in full.
- 9. Prevents further emails from being sent i.e. only one can be sent.

Data outputs:
<p>Per statement:</p> <ul style="list-style-type: none">• Details of every payment• Summary of payments including whether full payment has been received, whether an email has been sent, the shortfall amount and set-off amount• Emails sent to statement participants• Audit details of any email sent. <p>Per account (between start and end dates selected):</p> <ul style="list-style-type: none">• Transaction details• Participant identifier• Payment purpose.• Summary totals for settlement and non-settlement purpose• Opening and closing balances• Comment

Exceptions:

Sub-process:	PP-020 Manage prepayments
Process:	Process prepayments and payments
Code references:	
Dependencies:	DI-040
Module Name	

Description:

The clearing manager records and keeps a balance of prepayment amounts deposited by participants for use against statements.

Information about the deposit is provided to the clearing manager including information such as: the first billing period to which it will be applied, and, whether any remainder is to be returned or to be used in subsequent billing periods.

The balance of any prepayment amounts are applied against amounts owing in statements and included in the overall assessment of a participant's prudential requirements.

The system keeps a balance of prepayment amounts deducting amounts applied to statements and withdrawals.

When the clearing manager enters prepayment deposits and withdrawals, the system generates banking transactions between the participant's prepayment account and the participant's nominated bank account.

When a prepayment amount is to be used for settlement, the system creates a banking transaction to transfer the calculated prepayment amount from the prepayment account of the participant to the participant's settlement bank account.

Only the parent participant of a STM group can have prepayments.

Business requirements:

1. The clearing manager must record:
 - each prepayment deposit,
 - each prepayment amount used against a billing period's amounts owed, and
 - all withdrawals of unused prepayment amounts.
2. The clearing manager must affect the updates to the participant's bank accounts and clearing manager's operating accounts with respect to repayment deposits, usage against statements and withdrawals.

Data inputs:

- Details of the participant's prepayment accounts, nominated bank accounts and settlement accounts.
- Details of the clearing manager's operating accounts.
- Prepayment amounts used in this billing period (DI-040)
- **Prepayment summary**

Field	Format	Mandatory /optional	Description
Prepayment ID	Number(10)	M	Unique identifier.
Invoice Period	Number(10)	M	First billing period to which the deposit is to be applied.
Organisation	Varchar (4)	M	Valid participant identifier.
Received Date	Date	M	Date deposit received.
Balance Amount	Number(10,2)	M	Prepayment amount.
Instruction	Char(1)	M	N – Next, or R – Return.

• **Transaction History**

Field	Format	Mandatory /optional	Description
Prepayment ID	Number(10)	M	Unique identifier of prepayment summary.
Input Date	Date/Time	M	Date/time input/generated.
Action	Char(1)	M	D - Deposit new, F - deposit carried forward, W - withdrawal, S – used for settlement, X – cancelled, R – remainder for refund, N – remainder for next billing period, C - closure.
Amount	Number(10,2)	M	Positive amount.
Notes	Varchar(4000)	O	Comments.

Processing:

The system:

1. Validates and stores the information of each prepayment deposit as a new prepayment.
2. Reduces the balance of each prepayment with each withdrawal.
3. Reduces the balance of each prepayment with the prepayment amount applied to a statement, on settlement of the invoice.
4. Generates banking transactions to effect the changes to the participant's bank accounts and the clearing manager's operating accounts.

Data outputs:

- Updated prepayment balance
- Updated prepayment transaction history
- Banking transactions

Exceptions:

Sub-process:	PP-030 Make payments by the clearing manager
	Process prepayments and payments
Code references:	14.29 to 14.35, 14.41 to 14.52
Dependencies:	CE-010, CE-020, CA-010, CA-020, CA-030, CA-040, CA-050, CM-010, CH-010, CC-010, CC-020, CC-030, CC-040, CC-050, CW-010, CW-020, CW-030, CL-010, HD-020, MR-010, PP-010, MR-090
Module Name	

Description:
<p>The clearing manager pays the amounts advised as payable by the clearing manager in clause 14.22(2) provided all the amounts advised as payable by the <i>statement participants</i> have been paid (see PP-010). In the event of a payment default, the clearing manager may exercise the remedies described in Clause 14.45 (see HD-020).</p> <p>If there is still a short fall of available funds then the clearing manager must prioritise payments in the order specified in clauses 14.55 to 14.63. These same priorities are applied in the event of further late payments by the defaulting <i>statement participant</i>.</p> <p>If a defaulting <i>statement participant</i> is a member of a default group, every participant in that default group is deemed to be in default.</p> <p>When the amounts to be paid have been determined, the clearing manager must issue Buyer Created Tax Invoices.</p>

Business requirements:
<ol style="list-style-type: none"> 1. The clearing manager must pay the amounts advised as payable by the clearing manager in clause 14.22(2) provided all the amounts advised as payable by <i>statement participants</i> have been paid (i.e. there are no defaults). 2. In the event of a payment default, the clearing manager may exercise the remedies described in Clause 14.45 (see HD-020). <ol style="list-style-type: none"> a. If a shortfall that can be set-off as described in 14.45(a) the clearing manager reduces the payment to be made to that defaulting participant. b. If a shortfall can be covered from the defaulting participant's prudential cash, then the clearing manager proceeds to make the full payment as if no default had occurred 3. Between 1300 hrs and 1500 hrs the clearing manager must attempt to recover more funds from any defaulting participant. At 1500 hrs the clearing manager processes the settlement run. If there is still a shortfall of available funds then: <ol style="list-style-type: none"> a. All payments received by the clearing manager, as well as prudential amounts used (14.32(2)) and taken (14.44(c), 14.45(b)) are considered for payments in the event of a default. b. If the amounts received following the remedies applied under 14.44 are less than the amount payable by the participant, a short fall amount remains. c. The shortfall is allocated to the general pool and the FTR pool in proportion to the amounts owed to the clearing manager by the defaulting participant in each pool.

- d. The shortfall in the FTR pool is further split and allocated to FTRs settling in the current billing period and to assignments settling in future billing periods in proportion to the defaulters current and future FRA settlement amounts. .
- e. For the general pool, the clearing manager applies the funds available in the following priority order:
- i. GST that is payable by the clearing manager;
 - ii. Ancillary service amount payable by the clearing manager;
 - iii. Loss and constraint excess to be applied to the settlement of FTRs;
 - iv. Loss and constraint excess to be paid to the grid owner;
 - v. Other general amounts owing to participants that excludes FTRs.
- f. For the FTR pool, the clearing manager applies the funds available in the following priority order:
- i. first to the FTR amounts owing to participants;
 - ii. second to the amount owing to the grid owner.
- g. Where the full payment cannot be made to participants following the payments of e (i to iv) and f above, the following revised amounts owing to participants are to be calculated as per 14.56(2)(b):
- i. $AO_{CM(\text{general revised})} = AO_{CM(\text{general})} \times (A_{\text{general}}/R_{\text{general}})$
where
 $AO_{CM(\text{general})}$ is the total amount owed to the participant by the clearing Manger for the general pool.
 A_{general} is the total amount available to settle amounts owed by the clearing Manger to participants for the general pool
 R_{general} is the total amounts owed by the clearing Manger to participants for the general pool
 - ii. $AO_{CM(\text{FTRs revised})} = AO_{CM(\text{FTRs})} * (C_{\text{FTR}}/FTR_{\text{required}})$
where
 $AO_{CM(\text{FTRs})}$ is the total amount owed to the participant by the clearing Manger for the FTR pool.
 C_{FTR} is the total amount available to settle amounts owed by the clearing Manger to participants for the FTR pool.
 FTR_{required} is the total amounts owed by the clearing Manger to participants for the FTR pool.
- h. The clearing manager then calculates a scaled amount payable to participants as:
- $AP_{CM(\text{Scaled})} = (AO_{CM(\text{general revised})} + AO_{CM(\text{FTRs revised})}) - AOP + \text{prepayment amount to be used} + P$
- where P is any amount payable by the participant under 14.31 and in the case of a defaulting participant that amount minus any amount set-off under 14.44(1)(c).

4. In the event that the scaled amount payable under h. above is negative for the defaulting participant, the clearing manager must seek to recover the absolute value

- of the amount from that participant. The clearing manager has to 1530 hrs to recover extra funds from the defaulting participant.
5. If the clearing manager cannot recover the absolute value of the negative scaled amounts from the relevant participant, the clearing manager must revise the amounts payable to participants as follows:
 - a. For participants with negative scaled amounts, set the amounts to zero; otherwise
 - b. Adjust the participants positive scaled amounts as follows:

$$AP_{CM}(\text{RevisedScaled}) = \frac{AP_{CM}(\text{scaled}) + \text{SUM}(AP_{CM}(\text{Scaled}) \text{ if } AP_{CM}(\text{Scaled}) < 0)^*}{\text{SUM}(AP_{CM}(\text{Scaled}) \text{ if } AP_{CM}(\text{Scaled}) > 0)}$$

$$\frac{(AO_{CM}(\text{general revised}) + AO_{CM}(\text{FTRs revised}))}{\text{SUM}(AP_{CM}(\text{Scaled}) \text{ if } AP_{CM}(\text{Scaled}) > 0)}$$
 6. When funds are recovered from participants as per above, they must be paid to participants that did not have negative amounts by 1600 hrs on the day they were received. The amount paid to participants must be the difference between the scaled payment amount and the revised payment amount. If not all funds are recovered, the funds must be paid out in proportion to the expected payments.
 7. As further funds are received from the defaulting participants and they are for this billing period, the funds are allocated to either the general pool or the FTR as before, and paid out as if they were received on settlement day, but with the amounts already paid deducted.
 8. The clearing manager must issue buyer created tax invoices detailing the allocations.
 9. The clearing manager must calculate and demand interest from the defaulting participant, and pay that interest to participants that received late payments.

- Data inputs:**
- Operating bank account payment details – amounts received from individual participants in cleared funds and any amounts transferred from participant’s cash deposits lodged as security with the clearing manager.
 - Tax invoice amounts owing by the participant including GST.
 - Pro-forma invoice amounts owing by the clearing manager including GST.
 - Statement details including amounts payable and receivable, prepayments applied.
 - GST Rate (MR-010).
 - Interest rate for late payment.
 - Related party groups (MR-090).

- Processing:**
1. The clearing manager checks the clearing manager’s settlement account (using whatever mechanism is provided by the bank for this purpose) to determine amounts paid by each participant. If a participant’s payment amount does not match the amount payable, the clearing manager will set-off where possible and then transfer cash deposits held as prudential security for the defaulter to make up any shortfall. These amounts taken are added to any amounts of prudential security that the clearing manager was instructed by the participant to use. All data on payments received is entered in the Settlement receipts screen and saved.

2. On payment in full, the clearing manager pays all amounts payable by the clearing manager.
3. In the event of a default and after the shortfall has been allocated to the general and FTR pools according to the priorities:
 - The revised amounts owing to participants are calculated for the general and FTR pools (as per business requirement 3.g.) and then scaled (as per business requirement 3.h.); then
 - If there are no negative scaled amounts payable, the clearing manager pays the scaled amounts payable by the clearing manager, otherwise
 - If there are negative scaled amounts payable, the system calculates the revised scaled amounts payable (as per business requirement 5.) and the clearing manager pays the revised scaled amounts payable.
 - If later funds are received by the clearing manager, the funds are paid as if there were received on time, minus the amounts already paid by the clearing manager.
 - If amounts are received from those participants that had negative scaled amounts payable, these are paid to the participants that did not have negative scaled amounts payable.
4. the buyer created tax invoices (BCTIs) are created for participants stating the AOcm (revised). For participants in statement groups, their BCTIs are aggregated.
5. For late payments, the system calculates daily interest on the defaulted amount using the default interest rate from the payment due date to the date full payment is received. Interest is allocated to participants that had amounts owing by the clearing manager in proportion to the amounts payable by the clearing manager plus any negative scaled amounts demanded. New buyer created tax invoices are issued.

Data outputs:

- Total amounts payable by the clearing manager (PAYM transactions).
- Total of all FTR allocations to participants.
- Buyer created tax invoices (i.e. one BCTI for ancillary services and another BCTI for everything else).
- Daily Interest amounts.
- Payment amounts of each *statement participant*.

Exceptions:

Sub-process:	PP-040 Create bank batches
Process:	Process prepayments and payments
Code references:	14.34, 14.63, 14.64, 14.34, 14.30, 14A.6, 14A.7, 14A.8
Dependencies:	MR-040, PP-010
Module Name	

Description:

The clearing manager makes payments from bank accounts to other bank accounts during the month and on settlement day.

These transactions use amounts and details from settlement, default, prepayment and prudential systems. Bank batches make these details available to the clearing manager to undertake the banking transactions.

Business requirements:

The clearing manager must:

- Deposit prudential cash immediately into accounts at 2 or more banks, in approximately equal amounts.
- Return surplus prudential cash to the participant if directed to within 2 days.
- Credit interest earned on prudential cash and prepayments to the participant or pay to the participant.
- Deposit prepayments and credit the interest to the participant.
- Pay settlement with prepayment amounts as determined by the statement process.
- If a participant directs the clearing manager to pay all or of their amount payable from their prudential cash, do so.
- If a participant directs the clearing manager to pay a settlement amount that the clearing manager is to pay them to their prudential cash accounts, do so.
- Cash deposits to be refunded must be paid into the bank account nominated by the participant for that purpose.
- Pay the prudential interest (less any deduction for taxes or bank fees) within 2 business days of the end of the month to a nominated bank account when requested by a participant.

Data inputs:

1. Bank account details for each participant and type of account from organisation management. (MR-040). The type of accounts are:
 - Holding accounts managed by the clearing manager per participant for
 - a. Prepayments
 - b. Prudential ANZ
 - c. Prudential ASB
 - External accounts (nominated bank accounts) owned by participants which the clearing manager can direct credit for:
 - d. Prepayment Returns

- e. Settlement
- f. Prudential withdrawals
2. Deposit amounts for prepayment and prudential payments.
3. Participant's request to return cash deposit.
4. Cash deposit details from Prudential.
5. clearing manager's bank account details from organisation management. These operating accounts are used for
 - a. Settlement
 - b. Assignment Difference Payments
 - c. Prudential cash
 - d. GST
 - e. Bank fees
6. Amount paid from prudential for settlement
7. Amount taken from prudential for settlement

Processing:

1. Prepayment deposits:
 - when a prepayment is made, the participant direct credits the clearing manager's Settlement Account and notifies the clearing manager of its details and return instructions.
 - the clearing manager enters the amount and details into the prepayment system;
 - the prepayment system creates a bank batch that credits the participant's prepayment holding account and debits the clearing manager's Settlement account.
2. Prepayment returns:
 - when instructed by the participant for a prepayment to be returned, the clearing manager enters the amount and details into the prepayment system;
 - the prepayment system creates a bank batch that debits the participant's prepayment holding account and credits the clearing manager's Settlement account.
 - the prepayment system also creates a bank batch that debits the clearing manager's Settlement account and credits the participant's nominated prepayment account.
3. Prepayment used for settlement:
 - the settlement system creates a bank batch that debits the participant's prepayment holding account and credits the clearing manager's Settlement account.
4. Prudential deposit:
 - when a prudential deposit is made, the participant direct credits the clearing manager's Prudential Cash account and notifies the clearing manager of its details;
 - the clearing manager enters the amount into the prudential system;

- the prudential system creates a bank batch that credits the participant's prudential holding accounts (ANZ and ASB), each with half of the prudential deposit amount, and debits the clearing manager's Prudential Cash account.
5. Prudential withdrawal:
- when instructed by the participant for a prudential withdrawal, the clearing manager enters the amount and details into the prudential system;
 - the prudential system creates a bank batch that debits the participant's prudential holding accounts (ANZ and ASB), each with half of the prudential withdrawal amount, and credits the participant's nominated prudential withdrawals account.
6. Prudential used or taken for settlement:
- when the clearing manager indicates that prudential amounts are to be used for settlement, the clearing manager enters the amount and details CHASM on the settlement receipts screen;
 - CHASM creates a bank batch that debits the participant's prudential holding accounts (ANZ and ASB), each with half of the amount to be used for settlement, and credits the clearing manager's Settlement account.
7. Payment of GST:
- As part of the clearing run, the system creates a bank batch that credits the clearing managers GST Account and debits the clearing manager's Settlement account.
8. Payment of future Assignment Difference Payment (ADP):
- when an amount is paid to the clearing manager which is for a future period ADP payment, the settlement system creates a bank batch that credits the clearing manager's ADP account and debits the clearing manager's Settlement account.
9. Use of past ADP amount in settlement:
- when settlement includes the use of ADP amounts that were paid to the clearing manager in the past for settlement in the current billing period, the settlement system creates a bank batch that debits the clearing manager's ADP account and credits the clearing manager's Settlement account.
10. Settlement payments:
- When the clearing manager is required to pay the participant the amount payable by the clearing manager for settlement, the settlement system creates a bank batch that credits the participant's nominated settlement account and debits the clearing manager's Settlement account for that amount.

Data outputs:

- System messages indicating the type, amount, source and destination of all bank transactions.
- A text file in the format required by each bank of transactions will be downloaded by the user.

Exceptions:

- The system does not allow for settlement amounts to be a future prepayment. This will be handled manually.

- The system does not allow for settlement amounts to be deposited as prudential. This will be handled manually.
- The system does not allow for settlement amounts of GST to be paid to the IRD. This will be handled manually.

6.18 Publish information and reports

Sub-process:	PB-010 Publish constrained on and constrained off amounts
Process:	Publish information and reports
Code references:	13.199, 13.208, 13.210, 13.211
Dependencies:	CC-030, CC-040, CC-070
Module Name	PB-010

Description:
The clearing manager publishes constrained on and constrained off amounts for generation, dispatchable load purchasers and generation reserves via the Clearing Portal.

Business requirements:
<ol style="list-style-type: none"> 1. The clearing manager must publish the constrained on and constrained off amounts (for generation, dispatchable load purchaser and generation reserves) by 1600 hours on the 8th business day of each billing period. 2. The information must be both viewable online and able to be downloaded.

Data inputs:			
<ul style="list-style-type: none"> • Constrained on amounts for generation (CC-030) 			
Field	Format	Mandatory /optional	Comments
Invoice Period	Number (3)	M	
Organisation Code	Char (4)	M	
POC or Block ID	Varchar (8)	M	GIP, GXP or Block
Trading Date	DD/MM/YYYY	M	Trading date to which the offer applies.
Trading Period	Number (2)	M	Trading period to which the offer applies 1 to 48 for standard day 1 to 50 for daylight saving end 1 to 46 for daylight saving start.
Type	Char (2)	M	ON/OF
Constrained Amount	Number (9,4)	M	Quantities that were constrained on
Grid Amount	Number (9,4)	M	IR constrained on amount (\$)
<ul style="list-style-type: none"> • Constrained on amounts for dispatchable load purchasers (CC-040) 			
Field	Format	Mandatory /optional	Comments
Invoice Period	Number (3)	M	

Organisation Code	Char (4)	M	
POC	Varchar (8)	M	GXP
Trading Date	DD/MM/YYYY	M	
Trading Period	Number (2)	M	Trading period: 1 to 48 for standard day 1 to 50 for daylight saving end 1 to 46 for daylight saving start.
Type	Char (2)	M	ON/OFF
Constrained Amount	Number (9,4)	M	Quantities that were constrained on or off

• **IR constrained on amounts (CC-070)**

Field	Format	Mandatory /optional	Comments
Invoice Period	Number (3)	M	
Organisation Code	Char (4)	M	
POC	Varchar (8)	M	GIP
Station	Char (3)	M/O	Station code
Unit	Number (2)	M/O	Unit
Power Type	Char (1)	M	R/I
Reserve Class	Char (1)	M	F/S
Trading Date	DD/MM/YYYY	M	Trading date to which the offer applies.
Trading Period	Number (2)	M	Trading period to which the offer applies 1 to 48 for standard day 1 to 50 for daylight saving end 1 to 46 for daylight saving start.
Reserves Constrained On Amount	Number (9,4)	M	Quantities that were constrained on
Reserves Grid Amount	Number (9,4)	M	IR constrained on amount (\$)

Processing:

The system:

1. Publishes the information to Clearing Portal..

Data outputs:

The Constrained Amounts, Reserve Constrained Amounts and DD Constrained Amounts are available for display and as CSV files available in the SFTP folder. The files have the layout described and the file names are of the form:
 <inv pd>_<run date(yyyymmdd)>_PR_CON_AMTS.csv for Constrained Amounts
 <inv pd>_<run date(yyyymmdd)>_PR_RES_AMTS.csv for Reserved Constrained Amounts
 <inv pd>_<run date(yyyymmdd)>_PR_DD_CON_AMTS.csv for DD Constrained Amounts
 Where *inv pd* is the Invoice Period Identifier, the *run_date* is the date the file was created.

• Constrained Amounts

Field	Format	Mandatory /optional	Comments
Invoice Period ID	Number(3)	M	Invoice Period identifier
Organisation	Char(4)	M	Participant identifier
Grid Point/Block	Char(7)	M	Block/POC
Trading Date	DD/MM/YYYY	M	Date of constrained event
Trading Period	Number(2)	M	Trading period of constrained event
Constrained On/Off	Char(3)	M	Constrained ON or Constrained OFF
Total Constrained AMT	Number(11,2)	M	Total Constrained amount (\$)
Grid Constrained AMT	Number(11,2)	M	Constrained amount attributed to the Grid owner (\$)

• Reserves Constrained Amounts

Field	Format	Mandatory /optional	Comments
Invoice Period ID	Number(3)	M	Invoice Period identifier
Organisation	Char(4)	M	Participant identifier
Grid Point	Char(7)	M	POC
Station	Char(3)	M	Station Code
Unit	Char(1)	M	Unit Identifier
Power Type	Char(1)	M	Power Type (I,R)
Reserve Class	Char(1)	M	Reserve Class (F,S)
Trading Date	DD/MM/YYYY	M	Date of constrained event
Trading Period	Number(2)	M	Trading period of reserve constrained event
Total Res Constrained ON AMT	Number(11,2)	M	Total reserve constrained on amount (\$)
Grid Res Constrained ON AMT	Number(11,2)	M	Constrained on amount attributed to the Grid owner (\$)

• DD Constrained Amounts

Field	Format	Mandatory /optional	Comments
Invoice Period ID	Number(3)	M	Invoice Period identifier
Organisation	Char(4)	M	Participant identifier
Grid Point	Char(7)	M	POC

Trading Date	DD/MM/YYYY	M	Date of constrained event
Trading Period	Number(2)	M	Trading period of constrained event
Constrained On/Off	Char(3)	M	Constrained ON or Constrained OFF
Total Constrained AMT	Number(11,2)	M	Total Constrained amount (\$)

Exceptions:

Sub-process:	PB-020 Publish settlement differences
Process:	Publish information and reports
Code references:	14.71 to 14.74
Dependencies:	VP-010, RV-050, CC-020, MR-010
Module Name	PB-020

Description:

The clearing manager is required to calculate and publish block settlement differences. These are the differences between the amounts settled when generating plants/units are treated as a block as against the amounts that would have been settled if they had been dispatched individually.

The basis of the calculation is the dispatch instructions log. As well as providing details of the dispatch instructions given for each block, the log also lists, per individual generating plant/unit, the instructions that would have been given if they were dispatched individually. The instructions are used to calculate the generation quantity per trading period for each generating plant/unit within a block as well as for the block itself.

The dispatch instructions only record the time an instruction was given to the generator and the quantity of electricity required to be generated. The calculation of the generation quantity therefore involves conversion of the time to the relevant trading period (including the correct conversion for daylight saving) and the application of the ramp-up and ramp-down rates to obtain a time-weighted average quantity for the trading period.

Business requirements:

1. The clearing manager must publish for each billing period the block settlement differences by 0900 hours on the 2nd business day after the pro-forma invoices have been delivered.
2. The system operator must deliver dispatch instructions to the clearing manager by 1600 hours on the 7th business day of each billing period.
3. The reconciliation manager must provide reconciliation information to the clearing manager by 1600 hours on the 7th business day of each month for the previous billing period and by 1200 hours on the last business day of each month for wash-ups.
4. The system operator must provide trading period information to the clearing manager, which includes final bids and offers, daily by 0730 hours.
5. The system operator and generators must notify the clearing manager within 5 business days of the effective date, if offers are changed in terms of being offered by block, station dispatch group or by individual stations.
6. Information must be both viewable online and able to be downloaded.
7. Settlement differences must not to be calculated for wash-ups.

Data inputs:

- Dispatched quantities for blocks (CC-020).

- Dispatched quantities for the individual stations that are members of a block (CC-020).
- Final prices (VP-010).
- Reconciliation information (RV-050).
- Reference data detailing the generating plants/units within each block.

Processing:

The system:

1. For each block and trading period in the billing period, obtains the dispatched quantities for the block and for each individual station within the block already calculated in CC-020. These are the 'generation quantities' defined in the Code.
2. For each block and trading period in the billing period, calculates the settlement difference for each individual station within a block and trading period as follows:

$$\text{Settlement Difference} = \text{final price at the POC of the individual station}^* (\text{reconciled quantity of the individual station} - (\text{dispatched quantity of the individual station}^* (\text{sum of the reconciled quantities of the individual stations that make up the group}) / (\text{sum of the dispatched quantities of the individual stations that make up the group}))) / 2$$
3. Summarises the settlement differences of the individual stations by block and trading period (BSQ).
4. Finds the max settlement difference of each block by finding the maximum of the settlement differences (BSQ) calculated for that block across all the trading periods in the billing period.
5. Calculates the sum of the settlement differences of each block by aggregating all the settlement differences (BSQ) of each block across all the trading periods in the billing period.
6. Publishes only two figures per block for the whole billing period: the maximum settlement difference and the total settlement difference.
7. Transfers information to SFTP folder and to the Clearing Portal for publication,

Data outputs:

The Block Settlement Difference are available for display and as a CSV file available in the SFTP folder.

The file has the layout described and the file name is of the form:

`<inv pd>_<run date(yyyymmdd)>_PR_BLK_SET_DIFS.csv.`

Where *inv pd* is the Invoice Period Identifier, the *run_date* is the date the file was created.

• Block Settlement Differences

Field	Format	Mandatory/optional	Comments
Invoice ID	Number(3)	M	Invoice Period Identifier
Organisation Code	Char(4)	M	Participant identifier
Block	Char(3)	M	Block
Maximum Difference	Number(11,2)	M	Maximum settlement difference
Total Difference	Number(11,2)	M	Total settlement difference

Exceptions:

Sub-process:	PB-040 Produce constrained on/off report
Process:	Publish information and reports
Code references:	
Dependencies:	PB-010, CC-030 to CC-070, CA-010 to CA-050, DI-010
Module Name	PB-040

Description:

The clearing manager delivers constrained on and constrained off information to the Authority.

Total constrained on and off volumes and amounts (\$) are extracted for frequency keeping, energy, reserves and dispatchable demand, per trader, trading period, grid point/block.

Monthly aggregate constrained amounts, allocated to traders, are extracted for frequency keeping, energy and instantaneous reserve. All amounts are GST exclusive.

Business requirements:

- The clearing manager must provide the information to the Authority each month for the previous clearing month and for all the normal wash-up periods generated that clearing month.
- The information must be provided via SFTP in CSV formatted files.

Data inputs:

- Constrained amounts attributable to the system operator (CC-050).
- Generator constrained amounts (CC-030 and updated in CC-050 with the amounts attributed to the system operator).
- Ancillary amounts (CA-010 to CA-050).
- Dispatchable load purchaser constrained amounts information (CC-040)
- IR constrained amounts (CC-070)
- Invoiced amounts (DI-010)

Processing:

The system:

- A. Selects the data from the appropriate data inputs for the previous clearing month and wash-up months and creates the extracts as follows:
 - a) For the frequency keeping constrained on/off volume and revenue extract, the information is sourced from *constrained amounts attributable to the system operator* but only for power type = 'F'.
 - b) For the energy constrained on/off volume and revenue extract, the information is sourced from *generator constrained amounts*.
 - c) For the reserve constrained on volume and revenue extract, the information is sourced from *IR constrained amounts*.

- d) For the dispatchable demand constrained on/off volume and revenue extract, the information is sourced from *dispatchable load purchaser constrained amounts information*.
- e) For the frequency keeping constrained on/off cost allocated to traders extract, the information is sourced from *ancillary amounts* but only for frequency keeping constrained on/off (CM product codes 820002 and 820003).
- f) For the constrained on/off cost allocated to traders extract, the information is sourced from *invoice amounts* but only for constrained on amounts for energy and constrained on and constrained off amounts for dispatchable demand.
- g) For the Instantaneous reserve cost allocated to traders extract, the information is sourced from *ancillary amounts* but only for CM product codes relating to instantaneous reserves and excluding spinning reserve, interruptible load and constrained on.

B. Creates a CSV formatted file for each extract type by month and wash-up month.

Data outputs:			
DATAEA report group contains the following reports. The file names are prefixed with the common header: <YYYYMM>_<YYYYMMDDHH24MISS> and a file type reflecting the format. The first part of the prefix relates to clearing or wash-up invoice period. The second part relates to the time the report was created.			
Report ID	Name	Format	File name
400	Frequency keeping constrained on/off volume and revenue	CSV	_EA_FK_CONS
401	Energy constrained on/off volume and revenue	CSV	_EA_ECONS
402	Reserve constrained on volume and revenue	CSV	_EA_RES_CONS
403	Dispatchable demand constrained on/off volume and revenue	CSV	_EA_DD_CONS
404	Frequency keeping constrained on/off cost allocated to traders	CSV	_EA_FKCONS_COST
405	Constrained on/off cost allocated to traders	CSV	_EA_CONS_COST
406	Instantaneous reserve cost allocated to traders	CSV	_EA_RES_COST

• Frequency Keeping Constrained On/Off Volume and Revenue		
Field	Format	Comments
Trading Date	DD/MM/YYYY	Trading date (dd/mm/yyyy)
Trading Period	Number(2)	Trading period: 1 to 48 (46 for DLSS and 50 for DLSE)
Org Code	Varchar(4)	Organization code
GIP/GXP Full	Varchar(8)	Grid point
Block Id	Varchar(5)	Block dispatch group
Con Id	Varchar(2)	Frequency keeping constrained indicator (On/Off)

Quantity	Number(10,3)	Frequency keeping constrained quantity
Amount	Number(24,2)	Frequency keeping constrained amount
• Energy Constrained On/Off Volume and Revenue		
Field	Format	Comments
Trading Date	DD/MM/YYYY	Trading date (dd/mm/yyyy)
Trading Period	Number(2)	Trading period
Org Code	Varchar(4)	Organisation code
GIP/GXP Full	Varchar(8)	Grid point
Con Id	Varchar(2)	Energy constrained indicator (On/Off)
Quantity	Number(10,3)	Energy constrained quantity
Amount	Number(24,4)	Energy constrained amount
• Reserve Constrained On Volume and Revenue		
Field	Format	Comments
Trading Date	DD/MM/YYYY	Trading date (dd/mm/yyyy)
Trading Period	Number(2)	Trading period: 1 to 48 (46 for DLSS and 50 for DLSE)
Org Code	Varchar(4)	Organisation code
GIP/GXP Full	Varchar(8)	Grid point
Station	Varchar(3)	Grid point station
Unit	Number(2)	Grid point station unit
Power Type	Varchar(1)	Power type
Reserve Class	Varchar(1)	Reserve class
Quantity	Number(10,3)	Reserve constrained on quantity
Amount	Number(24,4)	Reserve constrained on amount
• Dispatchable Demand Constrained On/Off Volume and Revenue		
Field	Format	Comments
Trading Date	DD/MM/YYYY	Trading date (dd/mm/yyyy)
Trading Period	Number(2)	Trading period: 1 to 48 (46 for DLSS and 50 for DLSE)
Org Code	Varchar(4)	Organisation code
GIP/GXP Full	Varchar(8)	Grid point
Con Id	Varchar(2)	Dispatchable demand constrained indicator (on/off)
Quantity	Number(10,3)	Dispatchable demand constrained quantity
Amount	Number(24,4)	Dispatchable demand constrained amount
• Frequency Keeping Constrained On/Off Cost Allocated to Traders		
Field	Format	Comments
Org Code	Varchar(4)	Organisation code
Month Date	DD/MM/YYYY	Month start date (dd/mm/yyyy)

Net Amount	Number(15,2)	Frequency keeping constrained on/off cost allocated to traders (excluding GST)
• Constrained On/Off Cost Allocated to Traders		
Field	Format	Comments
Org Code	Varchar(4)	Organisation code
Month Date	DD/MM/YYYY	Month last date (dd/mm/yyyy)
Net Amount	Number(15,2)	Energy constrained on/off cost allocated to traders (excluding GST)
• Reserve Cost Allocated to Traders		
Field	Format	Comments
Org Code	Varchar(4)	Organisation code
Month Date	DD/MM/YYYY	Month start date (dd/mm/yyyy)
Net Amount	Number(15,2)	Reserve cost allocated to traders (excluding GST)

Exceptions:

Sub-process:	PB-060 Calculate and publish Billing Period Summary
Process:	Publish information and reports
Code references:	
Dependencies:	DI-020, DI-030, DI-040, CE-010, CE-020, CF-010, CF-020, CF-030, RV-040, RV-050, CA-010 to CA-050, CM-010, CH-010, CC-030, CC-050, CC-060, CC-070, CR-010, CL-010, CL-020, CW-020, CW-030, MR-020, MR-090
Module Name	PB-060

Description:
The clearing manager publishes the summary of invoiced amounts for the billing period.

Business requirements:
<ol style="list-style-type: none"> 1. Each month when amounts owing are published, the clearing manager must calculate and publish information relating to the entire billing period across all participants. 2. This information must be both viewable online. The billing period details must be available to download.

Data inputs:
<ul style="list-style-type: none"> • General and FTR SRA Ratios (DI-020) • General and FTR SRA amounts (DI-020) • Reconciled volumes from the reconciliation manager (RV-050) • GST amounts (DI-030) • Purchase and sale amounts for energy (spot market). (CE-010 and CE-020) • Ancillary amounts – black start, over-frequency, frequency keeping, instantaneous reserve and voltage support. (CA-010 to CA-050) • Alternative instantaneous reserve values for generating units (RV-040) • Must run dispatch settlement amounts for generators and purchasers.(CM-010) • Hedge settlement amounts. (CH-010) • Generator constrained on amounts for generation, and reserves (CC-030, CC-070). • Dispatchable load purchaser constrained on and constrained off amounts (CC-050) • Purchaser ratios and amounts payable by purchasers for generator constrained on and dispatchable load purchaser constrained on and constrained off amounts (CC-060). • Final FTR payment amounts (CR-010) • Final FTR rental amounts (CR-010) • FTR Hedge Available Funds (CR-010) • FTR payment scaling factor (CR-010)

- Scaled FTR hedge value amounts (CR-010)
- FTR settlement amounts (CF-010).
- FTR assignment difference payment amounts (CF-020).
- FTR Reconfiguration amounts (CF-030).
- Initial loss and constraint excess amounts. (CL-010)
- Final loss and constraint excess amounts. (CL-020)
- Residual loss and constraint excess amounts. (CL-020)
- Final loss and constraint excess amounts. (CL-020)
- GST amounts. (CW-020)
- FTR Periods – initial rental (MR-020)
- Related parties for invoicing.(MR-090)
- Washup amounts.(CW-030)
- Washup interest amounts.(CW-030)

Processing:

The system:

1. Aggregates amounts across all participants per invoice period and publishes the information.
2. Formats the Billing Period Details for download and delivery to all participants.

Data outputs:

The Billing Period Summary Details are available for display and as a CSV file available in the clearing manager's SFTP folder.

The file has the layout described and the file name is of the form:

<inv pd>_<run date(yyyymmdd)>_PR_PR_PD_DETS.csv.

Where inv pd is the Invoice Period Identifier, the run date is the date the file was created.

• **Summary List of all billing periods**

Field	Format	Mandatory /optional	Comments
Invoice ID	Char(3)	M	Invoice period identifier
SRA General (%)	Number (3)	M	SRA percentage of the general pool
SRA FTR (%)	Number (3)	M	SRA percentage of the FTR pool
Purchaser (\$)	Number(13,2)	M	Total amount paid by purchasers
Providers (\$)	Number(13,2)	M	Total amount paid to providers
L&C Excess (\$)	Number(13,2)	M	Total amount of LCE
IRD (\$)	Number(13,2)	M	Amount owed to IRD as GST on LCE

Balance (\$)	Number(13,2)	M	Amount surplus
Generation (MW)		M	Total generation paid for by clearing manager
Offtake (MW)	Number(10,2)	M	Total energy sold by clearing manager
Losses (MW)	Number(10,2)	M	Amount of energy lost (MW)
Losses (%)	Number (3)	M	Amount of energy lost (%)
• Statement Summary of a billing period			
Field	Format	Mandatory /optional	Comments
Providers(\$)	Number(13,2)	M	Total amount paid by providers
Purchasers (\$)	Number(13,2)	M	Total amount paid to purchases
L&C Excess	Number(13,2)	M	Total amount of LCE
IRD (\$)	Number(13,2)	M	Amount owed to IRD as GST on LCE
Balance (\$)	Number(13,2)	M	Amount surplus
• FTR Summary of a billing period			
Field	Format	Mandatory /optional	Comments
Revenue Adequacy (\$)	Number(13,2)	M	Total amount of Revenue Adequacy
Initial Loss and Constraint Excess (\$)	Number(13,2)	M	Total amount of the initial L&CE
Initial Rentals (\$)	Number(13,2)	M	Total amount of the initial rental
Final Loss and Constraint Excess (\$)	Number(13,2)	M	Total amount of the final L&CE
Final Rental (\$)	Number(13,2)	M	Total amount of the final rental
ADP Received(\$)	Number(13,2)	M	Total amount of Assignment Difference Payments received
Hedge Available Funds (\$)	Number(13,2)	M	Total amount of the FTR hedge available funds
Net Hedge Value Payable (\$)	Number(13,2)	M	Total value of hedges (FTRs) payable
Residual L&C Excess (\$)	Number(13,2)	M	Total amount of Residual LCE
Scaling Factor	Number(5,2)	M	Scaling factor
• Volume Summary of a billing period			
Field	Format	Mandatory /optional	Comments

Generation (MW)		M	Total generation paid for by clearing manager
Offtake (MW)	Number(10,2)	M	Total energy sold by clearing manager
Losses (MW)	Number(10,2)	M	Amount of energy lost (MW)
Losses (%)	Number (3)	M	Amount of energy lost (%)
• SRA Ratios of a billing period			
Field	Format	Mandatory /optional	Comments
SRA General (%)	Number (3)	M	SRA percentage of the general pool
SRA FTR (%)	Number (3)	M	SRA percentage of the FTR pool
• Ancillary Service Details of a billing period per provider or purchaser			
Field	Format	Mandatory /optional	Comments
Provider/Purchaser	Char(12)	M	“Purchaser” or “Provider”
Ancillary Service Type	Char(253)	M	Description of the type of ancillary service e.g. Black start procurement costs
Amount(\$)	Number(13,2)	M	Cost or charge amount including GST
• Billing Period Details of a billing period per product File			
Field	Format	Mandatory /optional	Comments
Invoice ID	Number (3)	M	Invoice Period Identifier
Total Indicator	Number(1)	M	Indicates if the row is a total of other rows (1), or not (0)
TransactionProduct Type	Char(253)	M	Description of a billing product e.g. Constrained On Compensation
Providers(\$)	Number(13,2)	M	Amount attributed to Providers of the product
Purchasers(\$)	Number(13,2)	M	Amount attributed to Purchasers the product
LCE Amount (\$)	Number(13,2)	M	Amount attributed to LCE
IRD Amounts (\$)	Number(13,2)	M	Amount attributed to IRD
Balance(\$)	Number(13,2)	M	Balance across previous four amounts

Exceptions:

Sub-process:	PB-080 Generate and deliver invoice related reports to the Authority
Process:	Publish information and reports
Code references:	
Dependencies:	CC-030, CC-040, CC-050, CC-060, CC-070, CW-020, CW-030, CA-010, CA-020, CA-030, CA-040, CA-050, CM-010, CE-010, CE-020, CF-010, CF-020, CF-030, CR-010, , CH-010, CL-010, CL-020, DI-020, DI-040
Module Name	

Description:
The clearing manager generates and delivers detailed invoice data to the Authority.

Business requirements:
1. Each month on the 25 th business day, invoicing related reports must be generated for the previous settlement month and published to the Authority.

Data inputs:
<ul style="list-style-type: none"> • Constrained on and off amounts (CC-030) • Dispatchable load purchaser constrained on and off amounts (CC-040) • Constrained amounts attributable to system operator (CC-050) • Constrained on and off amounts payable by purchasers (CC-060) • Constrained on amounts on instantaneous reserves (CC-070) • Calculated GST (CW-020) • Wash-up amounts (CW-030) • Black start costs and charges (CA-010) • Over-frequency costs and charges (CA-020) • Frequency keeping costs and charges (CA-030) • Instantaneous reserve costs and charges (CA-040) • Voltage support costs and charges (CA-050) • MRDA amounts (CM-010)

- Electricity purchase amounts (CE-010)
- Electricity sale amounts (CE-020)
- Initial FTR hedge value and FTR provisional payments (CF-010)
- FTR assignment difference payments (CF-020)
- FTR reconfiguration payment amounts (CF-030)
- Revenue adequacy and final FTR payment (CR-010)
- Hedge settlement amounts (CH-010)
- Loss and constraint excess (CL-010)
- Grid owners payments (CL-020)
- Settlement retention amounts (DI-020)
- Prepayment amounts (DI-040)

Processing:

The system:

1. Summarises invoicing data
2. Generates the relevant reports for the Authority in a number of csv files and saves the files to the database.
3. Transfers the csv files to the Authority.

Data outputs:

The reports are available as csv files and provided to the Authority.

Last Clearing Month in Invoice Details

Field	Format	Comments
Clearing Month	YYYYMM	
Statement ID	Number(10)	
Parent Organisation Code	Char(4)	
Organisation Cod	Char(4)	
Participant Type	Char(10)	Generator / Retailer / Grid
Invoice ID	Number(10)	
Invoice Type	Char(11)	Pro-Forma / Tax Invoice
Constrained On Compensation Amount	Number(22,2)	
Constrained On Compensation GST Amount	Number(22,2)	
Dispatchable Demand Constrained On Compensation Amount	Number(22,2)	
Dispatchable Demand Constrained On Compensation GST Amount	Number(22,2)	

Dispatchable Demand Constrained Off Compensation Amount	Number(22,2)	
Dispatchable Demand Constrained Off Compensation GST Amount	Number(22,2)	
Ancillary Services Amount	Number(22,2)	
Ancillary Services GST Amount	Number(22,2)	
Must Run Dispatch Auction Amount	Number(22,2)	
Must Run Dispatch Auction GST Amount	Number(22,2)	
Settlement of Electricity Amount	Number(22,2)	
Settlement of Electricity GST Amount	Number(22,2)	
Settlement of FTRs Amount	Number(22,2)	
FTR Assignment Difference Payments Amount	Number(22,2)	
FTR Reconfiguration Amount	Number(22,2)	
Hedge Settlement Amount	Number(22,2)	
Final Loss and Constraint Excess Amount	Number(22,2)	
Residual Loss an Constraint Excess Amount	Number(22,2)	
Loss and Constraint Excess GST Amount	Number(22,2)	
Aggregated Wash-up Constrained On Compensation Amount	Number(22,2)	
Aggregated Wash-up Constrained On Compensation GST Amount	Number(22,2)	
Aggregated Wash-up Dispatchable Demand Constrained On Compensation Amount	Number(22,2)	

Aggregated Wash-up Dispatchable Demand Constrained On Compensation GST Amount	Number(22,2)	
Aggregated Wash-up Dispatchable Demand Constrained Off Compensation Amount	Number(22,2)	
Aggregated Wash-up Dispatchable Demand Constrained Off Compensation GST Amount	Number(22,2)	
Aggregated Wash-up Ancillary Services Amount	Number(22,2)	
Aggregated Wash-up Ancillary Services GST Amount	Number(22,2)	
Aggregated Wash-up Must Run Dispatch Auction Amount	Number(22,2)	
Aggregated Wash-up Must Run Dispatch Auction GST Amount	Number(22,2)	
Aggregated Wash-up Settlement of Electricity Amount	Number(22,2)	
Aggregated Wash-up Settlement of Electricity GST Amount	Number(22,2)	
Aggregated Wash-up Settlement of FTRs Amount	Number(22,2)	
Aggregated Wash-up FTR Assignment Difference Payments Amount	Number(22,2)	
Aggregated Wash-up FTR Reconfiguration Amount	Number(22,2)	
Aggregated Wash-up Hedge Settlement Amount	Number(22,2)	
Aggregated Wash-up Final Loss and Constraint Excess Amount	Number(22,2)	

Aggregated Wash-up Residual Loss an Constraint Excess Amount	Number(22,2)	
Aggregated Wash-up Loss and Constraint Excess GST Amount	Number(22,2)	
Aggregated Wash-up Interest Amount	Number(22,2)	
Aggregated Wash-up Loss and Constraint Excess GST Interest Amount	Number(22,2)	
Wash Up details		
Field	Format	Comments
Clearing Month	YYYYMM	
Wash-up Month	YYYYMM	
Statement ID	Number(10)	
Parent Organisation Code	Char(4)	
Organisation Code	Char(4)	
Participant Type	Char(10)	Generator / Retailer / Grid Owner
Invoice ID	Number(10)	
Invoice Type	Char(11)	Pro-Forma / Tax Invoice
Wash-up Invoice ID	Number(10)	
Wash-up Constrained On Compensation Amount	Number(22,2)	
Wash-up Constrained On Compensation GST Amount	Number(22,2)	
Wash-up Dispatchable Demand Constrained On Compensation Amount	Number(22,2)	
Wash-up Dispatchable Demand Constrained On Compensation GST Amount	Number(22,2)	
Wash-up Dispatchable Demand Constrained Off Compensation Amount	Number(22,2)	
Wash-up Dispatchable Demand Constrained Off Compensation GST Amount	Number(22,2)	
Wash-up Ancillary Services Amount	Number(22,2)	
Wash-up Ancillary Services GST Amount	Number(22,2)	

Wash-up Must Run Dispatch Auction Amount	Number(22,2)	
Wash-up Must Run Dispatch Auction GST Amount	Number(22,2)	
Wash-up Settlement of Electricity Amount	Number(22,2)	
Wash-up Settlement of Electricity GST Amount	Number(22,2)	
Wash-up Settlement of FTRs Amount	Number(22,2)	
Wash-up FTR Assignment Difference Payments Amount	Number(22,2)	
Wash-up FTR Reconfiguration Payments Amount	Number(22,2)	
Wash-up Hedge Settlement Amount	Number(22,2)	
Wash-up Final Loss and Constraint Excess Amount	Number(22,2)	
Wash-up Residual Loss and Constraint Excess Amount	Number(22,2)	
Wash-up Loss and Constraint Excess GST Amount	Number(22,2)	
Wash-up Interest Amount	Number(22,2)	
Wash-up Loss and Constraint Excess GST Interest Amount	Number(22,2)	
Clearing Month Invoice Ancillary Service Details		
Field	Format	Comments
Clearing Month	YYYYMM	
Statement ID	Number(10)	
Parent Organisation Code	Char(4)	
Organisation Code	Char(4)	
Participant Type	Char(10)	Generator / Retailer / Grid Owner
Invoice ID	Number(10)	
Invoice Type	Char(11)	Pro-Forma / Tax Invoice
Ancillary Service ID	Number(10)	
Ancillary Service	Char(70)	
Ancillary Service Amount	Number(22,2)	

Ancillary Service GST Amount	Number(22,2)	
Functional Specification Reference	Char(20)	
Wash-up Ancillary Service details attached to the Clearing Month Invoices.		
Field	Format	Comments
Clearing Month	YYYYMM	
Wash-up Month	YYYYMM	
Statement ID	Number(10)	
Parent Organisation Code	Char(4)	
Organisation Code	Char(4)	
Participant Type	Char(10)	Generator / Retailer / Grid Owner
Invoice ID	Number(10)	
Invoice Type	Char(11)	Pro-Forma / Tax Invoice
Wash-up Invoice ID	Number(10)	
Ancillary Service ID	Number(10)	
Ancillary Service	Char(70)	
Wash-up Ancillary Service Amount	Number(22,2)	
Wash-up Ancillary Service GST Amount	Number(22,2)	
Functional Specification Reference	Char(20)	
Clearing Month Invoice Hedge Details		
Field	Format	Comments
Clearing Month	YYYYMM	
Statement ID	Number(10)	
Parent Organisation Code	Char(4)	
Organisation Code	Char(4)	
Participant Type	Char(10)	Generator / Retailer / Grid Owner
Invoice ID	Number(10)	
Invoice Type	Char(11)	Pro-Forma / Tax Invoice
Hedge Contract ID	Number(10)	
Hedge Contract Name	Char(50)	
Hedge Contract Party A	Char(4)	Floating Price Payer
Hedge Contract Party B	Char(4)	Fixed Price Payer
Hedge Settlement Amount	Number(22,2)	
Functional Specification Reference	Char(20)	
Wash-up Hedge details attached to the Clearing Month Invoices.		
Field	Format	Comments
Clearing Month	YYYYMM	

Wash-up Month	YYYYMM	
Statement ID	Number(10)	
Parent Organisation Code	Char(4)	
Organisation Code	Char(4)	
Participant Type	Char(10)	Generator / Retailer / Grid Owner
Invoice ID	Number(10)	
Invoice Type	Char(11)	Pro-Forma / Tax Invoice
Wash-up Invoice ID	Number(10)	
Hedge Contract ID	Number(10)	
Hedge Contract Name	Char(50)	
Hedge Contract Party A	Char(4)	Floating Price Payer
Hedge Contract Party B	Char(4)	Fixed Price Payer
Wash-up Hedge Settlement Amount	Number(22,2)	
Functional Specification Reference	Char(20)	
Clearing Month Invoice FTR Details		
Field	Format	Comments
Clearing Month	YYYYMM	
Statement ID	Number(10)	
Parent Organisation Code	Char(4)	
Organisation Code	Char(4)	
Participant Type	Char(10)	Generator / Retailer / Grid Owner
Invoice ID	Number(10)	
Invoice Type	Char(11)	Pro-Forma / Tax Invoice
FTR Product Label	Char(17)	
FTR Period	YYYYMM	
FTR Holding Label	Char(39)	
FTR Acquisition Type	Char(23)	
FTR Transaction Quantity	Number(11,1)	In MW
Invoice Transaction Type	Char(50)	Settlement of FTRs / FTR Assignment Diff Payments / FTR Reconfig Amount Payments
FTR Amount	Number(22,2)	
Functional Specification Reference	Char(20)	
Wash-up FTR details attached to the Clearing Month Invoices.		
Field	Format	Comments
Clearing Month	YYYYMM	
Wash-up Month	YYYYMM	
Statement ID	Number(10)	
Parent Organisation Code	Char(4)	

Organisation Code	Char(4)	
Participant Type	Char(10)	Generator / Retailer / Grid Owner
Invoice ID	Number(10)	
Invoice Type	Char(11)	Pro-Forma / Tax Invoice
Wash-up Invoice ID	Number(10)	
FTR Product Label	Char(17)	
FTR Period	YYYYMM	
FTR Holding Label	Char(39)	
FTR Acquisition Type	Char(23)	
FTR Transaction Quantity	Number(11,1)	In MW
Invoice Transaction Type	Char(50)	Settlement of FTRs / FTR Assignment Diff Payments / FTR Reconfig Amount Payments
Wash-up Amount	Number(22,2)	
Functional Specification Reference	Char(20)	
Statement SRA and Prepayment Details		
Field	Format	Comments
Clearing Month	YYYYMM	
Statement ID	Number(10)	
Parent Organisation Code	Char(4)	
General Settlement Retention Amount	Number(22,2)	
FTR Settlement Retention Amount	Number(22,2)	
Prepayment Amount Used	Number(22,2)	Prepayment Amount (\$) Used during the invoicing
Prepayment Amount Kept	Number(22,2)	Prepayment Amount (\$) kept for the next invoicing
Prepayment Amount Returned	Number(22,2)	Prepayment Amount (\$) returned to the participant on the Settlement day
Functional Specification Reference	Char(20)	

Exceptions:

6.19 Calculate information using external systems

Sub-process:	MF-010 Calculate reference prices and ratios
Process:	Calculate information using external systems
Code references:	
Dependencies:	MR-020, MF-030, VP-010
Module Name	FT-020, RV-550

Description:
The clearing manager uses external data feeds and its predictive model to determine the likely values of FTR products over time and develops and maintains methodologies for calculating reference prices and reference price ratios for FTR products.

Business requirements:
<ul style="list-style-type: none"> The clearing manager must model predictive electricity price outcomes for nodes and periods of interest. The clearing manager must calculate the reference price ratio for combinations for FTR product and FTR period from the input data to be used in the daily settlement calculation for every business day.

Data inputs:
<ul style="list-style-type: none"> Modelled spot prices (from predictive pricing model (PPM)) ASX futures prices (per quarter). Monthly climate node weightings (i.e. wet year/dry year weightings per month in each ASX quarter for each FTR node). Climate settings (i.e. whether a wet or dry year weighting should be used). clearing manager's reference price methodology weightings (e.g. use 50% of ASX price and 50% of PPM price) FTR products. Price setting trades (refer to MF-030 on how price setting trades are derived)

Processing:
<p>The system, for each business:</p> <ol style="list-style-type: none"> Loads and validates quarterly ASX futures prices. Calculates a monthly ASX price (i.e. per FTR period) by applying a node weighting for each month in the quarter to the quarterly price (e.g. April OTA = 0.8 of June OTA ASX price, May = 0.94 of June price, June = 1.03 of June price). A different weighting will apply depending on whether a wet year or dry year methodology is being applied. For a non-ASX node, applies the relevant average quarterly location factor, being the average historic price difference between the non-ASX and the same island ASX node. Historic average to be on a rolling 3 yearly basis.

4. Calculates a *monthly ASX price difference* (i.e. per FTR period) for each FTR product. This is the price difference between the sink and source nodes (and for an option products (if applicable) will be positive or zero).
5. Loads and validates predictive pricing model (PPM) prices for each FTR node. N.B. For a time period covering at least the full duration of open FTR Products (i.e. up to 26 months) year's worth of dates based data back to 1931, 5 model versions, and 8 prices per day for all stipulated FTR nodes, this results in about 2.6M records.
6. Calculates a *monthly average PPM price difference* (i.e. per FTR period) for each FTR product. This is the average of the applicable price differences for each FTR product in the FTR period (i.e. obligations = all differences, options = only the positive differences).
7. Calculates a *reference price ratio* for each FTR product and future FTR period (i.e. *future* FTR periods compared to the run date – because as per PR-015, we don't apply drifting of DSP once inside the FTR period itself) by weighting the ASX and PPM change ratios:

Obligation

ASX change ratio = (today's monthly ASX price difference – previous business day's monthly ASX price difference)

PPM change ratio = (today's *monthly average PPM price difference* – previous business day's *monthly average PPM price difference*)

Reference price ratio(obligation) = (ASX change ratio * methodology weighting for ASX) + (PPM change ratio * methodology weighting for PPM)

Option

Option products only use PPM prices.

PPM change ratio :

There are three cases:

- A. Where the *monthly average PPM price difference* is calculated on the day of the latest auction is less than the price from the price setting trade at that auction, and either the *monthly average PPM price difference* for today or the previous business day is not zero.
- B. Where the *monthly average PPM price difference* is calculated on the day of the latest auction is less than the price from the price setting trade at that auction, and the *monthly average PPM price differences* for both today and the previous day are zero.
- C. When neither A or B applies.

The PPM change ratio in case A is

today's *monthly average PPM price difference* – previous business day's *monthly average PPM price difference*

The PPM change ratio in case B is the latest non-zero result of :

a business day's *monthly average PPM price difference* – the previous business day's *monthly average PPM price difference*

i.e start with today as the business day and if the result is zero decrement business day by 1 and repeat until a result is found not equal to 0.

The PPM change ratio in case C is

$\text{today's monthly average PPM price difference} / (\text{previous business day's monthly average PPM price difference, if } > 0)$.

Where the denominator is 0 the PPM change ratio is set to 1.

PST weighting (option)

For cases A and B,

PST weighting = *monthly average PPM price difference* on day of the last auction divided by the price of the price setting trade on that auction day.

Reference price ratio (option)

For cases A and B, the *reference price ratio* = PPM change ratio * PST weighting.

For case C, the *reference price ratio* = PPM change ratio.

Example. Obligation:

ASX change ratio = $(-\$3.39 - -\$3.53) = 0.14$

PPM change ratio = $(-\$5.58 - -\$5.58) = 0.0$

Reference price ratio (obligation) = $(0.14 * 0.5) + (0.0 * 0.5) = 0.07$

(i.e. in MF-030, the previous day's DSP will get adjusted ("drifted") by this value)

Example Option Case A:

PPM change ratio = $\$3.50 - \$3.00 = 0.5$

PST Ratio = $4/5 = 0.8$

Reference price ratio = $(0.5 * 0.8) = 0.4$

Example Option Case C:

PPM change ratio = $\$3.50/\$3.00 = 1.1666$

Reference price ratio = 1.1666

8. Calculate an **ASX** and **PPM reference price** for each applicable FTR hub and FTR period:

ASX reference price = Latest monthly ASX price

PPM reference price = Average of all calculated predictive model (PPM) prices from the latest PPM file.

Data outputs:

For each business day:

- Monthly ASX prices.
- For each applicable FTR product and FTR period:
 - monthly ASX price difference,

- monthly average PPM price difference,
 - monthly average PPM price difference on day of the last auction(P_{nA})
 - last non-zero daily change of monthly average PPM price differences prior to today(ΔP_n)
 - ASX change ratio,
 - PPM change ratio,
 - reference price ratio (for MF-30).
- For each FTR hub and FTR period:
 - ASX reference price,
 - PPM reference price.

Exceptions:

Sub-process:	MF-030 Determine daily settlement prices
Process:	Calculate information using external systems
Code references:	Schedule 14A.1 clause 12
Dependencies:	VP-010, MF-010
Module Name	PR-015

Description:

The clearing manager determines a daily settlement price DSP (\$/MWh) for each FTR product on the FTR Registry in accordance with the published FTRs Prudential Security Assessment Methodology document.

The methodology describes a priority list of calculations for the DSP. If the highest priority calculation cannot be calculated due to insufficient information, the next highest priority calculation is attempted.

The calculated DSPs are checked and approved by the clearing manager prior to their publication.

Business requirements:

The clearing manager must define and publish a methodology that describes how the daily settlement price (DSP) of each FTR product is to be calculated. Each methodology must:

1. Contain a number of valuation sub-routines – depending on the information available and the proximity to settlement – and may be applied to either options or obligations and a variety of source and sink nodes.
2. Apply different methods of assessment for each of the following time periods:
 - a. The period after the FTR month (FTR period) but ahead of settlement.
 - b. The FTR period.
 - c. The month prior to the FTR period.
 - d. Three other periods extending to 24 months ahead of the FTR period.
 - i. For each of the time periods the clearing manager must use a combination of valuation sub-routines – with the general principle that the best source of information is used unless it is not available, then the next best source shall be used (e.g. use final spot prices during the period after the FTR period but ahead of settlement). These valuation sub-methodologies must include:
 - e. Actual underlying price (spot price).
 - f. Projected underlying price (i.e. forecast price as determined by the clearing manager’s prudential security assessment methodology).
 - g. Market value of the FTR as determined by a relevant price setting trade.
 - h. Market value adjusted (or drifted) by reference price ratios (e.g. last week’s trade price multiplied by today’s reference price divided by last week’s reference price).
 - i. Adjusted (or drifted) daily settlement price.

3. Apply criteria to determine whether market-based prices used to determine FTR value are reflective enough of true market value as follows:
4. Assign price setting trades where they are greater than a threshold capacity (MW) or have trade values at or above a threshold amount (\$).
5. Allow trades between related parties to be omitted.
6. Allow trades to be excluded at the request of the Authority (e.g. market power determinations or where the Authority believes there is manipulation of prudential security levels).
7. The clearing manager must calculate the daily settlement price for each FTR product and FTR period, in accordance with the methodology, every business day. N.B. The clearing manager has implemented the current published methodology which is described below.
8. The clearing manager must be able to approve the calculated daily settlement prices before they can be published.

Data inputs:

- Reference price ratios and monthly average PPM price differences per FTR product and FTR period (from MF-010)
- Price setting trades (from auction or assignments)
- Reconfigurations for the FTR period being settled (RV-010)
- Price setting trade thresholds (from MR-020)
- Final prices (VP-010)
- Forecast prices (using averages of final and interim prices) (VP-010)
- Publication approval

Processing:

The system:

Calculates an estimated settlement price difference (a.k.a. the daily settlement price) (\$/MWh) every business day for each auctioned FTR product for an FTR period, using one of the following methods. The system begins with the first method, if data is not available or criteria cannot be met, it then proceeds to the next method.

Method 1: Where a Price Setting Trade exists.

Obtain the price from the latest price setting trade. The price setting trade is the acquisition cost (\$/MWh) or reconfiguration sell price (\$/MWh) that meets the 'price settling trade thresholds' (from MR-020). The price setting trade thresholds are a set of minimum criteria (i.e. minimum trade quantity, minimum value of trade etc.) for selecting whether an FTR auction award or reconfiguration sell record can be used to set the price.

If a Price Setting Trade is obtained, all products related by both sink-source (A-B) combination and period must be reset using the non-arbitrage relationship of $\text{Price}(\text{Option A to B}) - \text{Price}(\text{Option B to A}) = \text{Price}(\text{Obligation A to B}) = -\text{Price}(\text{Obligation B to A})$. This condition is subject to sufficient price setting trades occurring to derive non-arbitrage prices.

Method 1: Where there is no Price Setting Trade.

Calculate the Drifted Daily Settlement Price as follows:

For obligations:

Previous business day's DSP plus the applicable reference price ratio (from MF-010) calculated for today's date.

For options:

Where the *monthly average PPM price difference* is calculated on the day of the latest auction is less than the price from a price setting trade at that auction then:

Previous business day's DSP plus PPM reference price ratio calculated for today's date

Otherwise:

Previous business day's DSP multiplied by the PPM reference price ratio calculated for today's date. Minimum value equals \$0.01.

Method 2: Forecast prices are used during the month before the start of the FTR period as follows:

$$\text{DSP} = (\text{Forecast Price Weighting} * \text{DSP per weighted average difference of forecast prices}) + ((1 - \text{Forecast Price Weighting}) * \text{Drifted Daily Settlement Price})$$

Where:

- Forecast Price Weighting = $((0.95 / (\text{Days in Month} - 1)) * (\text{Day of Month} - 1)) + 0.05$.
This increments the weighting evenly over the month from 5% on day one to 100% on the last day.
- DSP per weighted average difference of forecast prices = sum of the forecast price differences for the month using week day and weekend prices where appropriate / total number of periods in month.
- The sign on the difference depends on the direction: BEN to OTA or vice versa.
- Drifted DSP for Obligations = The previous business day's unweighted DSP + Reference Price Ratio (obligations) (as per MF-010).
- Drifted DSP for Options = The previous business day's unweighted DSP * Reference Price ratio (Options) (As per MF-010). Min Value (\$0.01).
- There is a "phasing out" through the month as the Forecast Price Weighting goes from 0.05 to 1.

Method 3: Final prices are used from the FTR period until settlement as follows:

DSP = sum of the Price Differences from the start of FTR period until the settlement date / total number days in the period

Where:

- Price Difference is calculated using either final prices if they exist or interim prices if there are no final prices.
- The sign on the difference depends on the direction: BEN to OTA or vice versa.

Once the results have been approved, the system outputs the estimated daily settlement prices as the daily settlement prices.

Data outputs:

Daily settlement price for each FTR product and FTR period per business day.

Price of the latest price setting trade for each FTR product and FTR period per business day.

Exceptions:

6.20 Produce and deliver FTR information

Sub-process:	DF-010 Deliver participants prudential status to FTR manager
Process:	Produce and deliver FTR information
Code references:	13.251(4)-13.251(7)
Dependencies:	AS-020, MR-030
Module Name	PB-110

Description:

The clearing manager produces a report containing FTR participant registration information and their FTR trading limit information (including default status) and sends it to the FTR manager.

Business requirements:

1. On receipt of a request from the FTR manager the system must check the required data is available and if it is, then create a report containing the participant and trading limit information and submit it for delivery to the FTR manager.
2. The status of the report must remain as “published” until the system has received an acknowledgement message from the FTR manager at which time its status will change to “delivered”.
3. If the prudential data changes, the clearing manager must provide the updated information to the FTR manager, if requested to do so (13.251(6)).

Data inputs:

- Request message from the FTR manager.
- Acknowledgement or error message from the FTR manager.
- Registered FTR participants (from MR-030)
- FTR trading limits of each FTR participant (not the group FTR limit) (AS-020)

Processing:

The system:

- Gets all registered FTR participants as at a given trading date and returns their details including default (breach) status and their FTR trading limit as at the trading date.

Data outputs:

- Report containing:
 - FTR participant name
 - FTR participant identifier
 - FTR participant contact person
 - FTR participant contact person’s position

- Email address of FTR participant
- FTR trading limit
- Flag indicating if participant is in breach
- As at date and time (i.e. when the file data is applicable)

The FTR manager will use this information to populate the FTR Registry with a newly approved FTR participant's details. Subsequently, this file will just be used to update their trading limit and breach status.

Exceptions:

Sub-process:	DF-020 Deliver DSP and initial margin data to FTR manager
Process:	Produce and deliver FTR information
Code references:	Schedule 14A.1 clause 12
Dependencies:	CF-040, MF-030
Module Name	PB-120

Description:
The clearing manager produces a report containing daily settlement prices and initial margin rates and provides it to the FTR manager where an FTR participant's auction bid or assignment exposure will be compared against their trading limit.

Business requirements:
<ol style="list-style-type: none"> 1. On receipt of a request from the FTR manager for a DSPIM file the system will provide the latest report containing daily settlement prices and initial margins of FTR product periods and submit it for delivery to the FTR manager. 2. The report must only contain daily settlement prices for auctioned FTR products for an FTR period. Initial margins will be provided for all FTR products for FTR periods that are not yet settled.

Data inputs:
<ul style="list-style-type: none"> • Request message from the FTR manager. • Daily settlement prices (\$/MWh) for auctioned FTR product periods (MF-030). • Initial margin rates (\$/MWh) for FTR product periods (CF-040).

Processing:
<p>The system:</p> <ol style="list-style-type: none"> 1. Gets all FTR product periods already auctioned but not yet settled and all FTR product periods not yet settled and generates a file containing the daily settlement price and/or the (maximum) initial margin rate.

Data outputs:			
<ul style="list-style-type: none"> • Daily Settlement Prices and Initial Margins (DSPIM) 			
Field	Format	Mandatory /optional	Description
FTR Profile	Varchar(40)	M	The profile of the FTR product. Default is '24HR'.
Source Hub	Char(3)	M	Station code for source hub
Sink Hub	Char(3)	M	Station code for sink hub
Hedge Type	Varchar(3)	M	OBL=obligation, OPT=option

FTR Period	Char(6)	M	FTR period to which the assumed liability applies.
Daily Settlement Price	Number(10,2)	M	Calculated daily settlement price (FTR value) for auctioned FTR product periods and trading date.(\$/MWh)
Maximum Initial Margin (Maximum Liability)	Number(10,2)	M	Maximum assumed liability (initial margin) for this FTR product period to be auctioned on the given auction date (\$/MWh).
As At Datetime	(YYYY-MM-DDThh:mm:ss.s	M	Identifies the date the data in the file applies.
• Trading Limit			
Field	Format	Mandatory /optional	Description
FTR Participant Code	Char(4)	M	Participant Industry code - uniquely identifies an FTR participant.
FTR Participant Name	Varchar(50)	M	Participant Industry name.
FTR Participant Contact Person	VarChar(50)	M	
FTR Participant Contact Position	VarChar(50)	M	
FTR Email Address	Varchar(50)	M	
FTR Prudential Limit	Number(10,2)	M	Identifies the Prudential trading limit.
In Breach	Char(1)	M	Will either be Y or N; for Yes or No. Indicating if the FTR participant is in breach.
As At Datetime	(YYYY-MM-DDThh:mm:ss.s	M	Identifies the date the prudential limit in the file is applicable at.

Exceptions:

Sub-process:	DF-030 Deliver FTR results and revenue adequacy to FTR manager
Process:	Produce and deliver FTR information
Code references:	Schedule 14A.1 clause 12
Dependencies:	CR-010
Module Name	PB-140

Description:

The clearing manager will deliver information about settlement results and revenue adequacy for the FTR period and send it to the FTR manager.

Business requirements:

1. The clearing manager must send settlement results and revenue adequacy results for the FTR period to the FTR manager by the end of the 9th business day.

Data inputs:

- FTR settlement results (CR-010)
- Final FTR rental amount (\$) (CR-010)
- FTR payment scaling factor (CR-010)
- Final loss and constraint amount (CR-010)
- Residual loss and constraint amount (CR-010)

Processing:

The system:

- Provides the FTR manager with all settlement transactions and the revenue adequacy (final FTR rental amount) for the FTR period.

Data outputs:

- Information including:
 - FTR payment scaling factor
 - Final FTR rental amount (or shortfall) (\$)

Exceptions:

Sub-process:	DF-040 Publish FTR information to public website
Process:	Produce and deliver FTR information
Code references:	Part 14A
Dependencies:	MF-010, CF-040, MF-030, CR-010
Module Name	PB-150

Description:	Publication of FTR information to a public website.
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Business requirements:	1. The clearing manager must publish general information including daily settlement prices and other relevant information to a public website every business day.
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Data inputs:	<ul style="list-style-type: none"> • Daily settlement prices (including DSP_{d-1})(MF-030) • FTR scaling payment factors (CR-010) • Initial margin rates (CF-040) • ASX and PPM reference prices, monthly average PPM price differences (including P_d, P_{d-1}, ΔP_n and P_{nA}), ASX and PPM change ratios and ASX and PPM reference price ratios (MF-010) • Latest price setting trade (including PST_A)(MF-030)
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Processing:	<p>The system:</p> <ol style="list-style-type: none"> 1. Extracts, formats and publishes information to the public website.
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Data outputs:	<ul style="list-style-type: none"> • FTR scaling payment factors • Initial margin rates • Daily settlement prices in the DSP summary file and DSP extended summary file:
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• DSP summary file		
Field	Format	Description
FTR Profile	Varchar(40)	The profile of the FTR product. Default is '24HR'.
FTR Type	Varchar(3)	OBL=obligation, OPT=option
Source Hub	Varchar(3)	Station code for source hub
Sink Hub	Varchar(3)	Station code for sink hub
FTR Period	YYYYMM	

Latest Run Date Time	DD/MM/YYYY hh:mm	
Latest DSP per MWh	Number(10,2)	
• DSP extended summary file		
Field	Format	Description
FTR Profile	Varchar(40)	The profile of the FTR product. Default is '24HR'.
FTR Type	Varchar(3)	OBL=obligation, OPT=option
Source Hub	Varchar(3)	Station code for source hub
Sink Hub	Varchar(3)	Station code for sink hub
FTR Period	YYYYMM	
Run Date/Time	DD/MM/YYYY hh:mm	A business day.
Latest DSP per MWh	Number(10,2)	DSP _d for the run date.
Previous DSP per MWh	Number(10,2)	For the previous business day. DSP _{d-1} .
Unweighted DSP per MWh	Number(10,2)	Only applies to method 2.
Previous Unweighted DSP per MWh	Number(10,2)	Only applies to method 2.
DSP Method number	Number(1)	1, 2 or 3.
Price Setting Trade	Varchar(1)	(Y/N). Applicable only to method 1. Defaults to N.
Latest ASX Derived Price	Number(10,2)	Monthly average of ASX prices.
Previous ASX Derived Price	Number(10,2)	
ASX Ratio	Number(5,2)	Applicable only to obligations.
ASX Weighting	Number(5,2)	Applicable only to obligations.
Predictive Price Model (PPM) Derived Price	Number(10,2)	Today's monthly average PPM price difference. P _{nd} .
Previous PPM Derived Price	Number(10,2)	Previous business day's monthly average PPM price difference. P _{nd-1} .

Latest PPM Price on PST	Number(10,2)	Monthly average PPM price difference on price setting trade auction date. (P_{nA}).
Latest PST Price	Number(10,2)	Latest price setting trade price. (PST_A).
Latest Non Zero PPM Change	Number(10,2)	Last non-zero daily change of monthly average PPM price differences prior to today. (ΔP_n).
PPM Ratio	Number(5,2)	For the run date.
PPM Weighting	Number(5,2)	Applicable only to obligations.
Reference Price Ratio	Number(5,2)	For the run date.
CMSMPSPPM Price	Number(10,2)	clearing manager's Spot Market Prudential Security Price Projection Methodology (CMSMPSPPM) Price. Applicable only to method 2.
CMSMPSPPM Price Weighting	Number(5,2)	clearing manager's Spot Market Prudential Security Price Projection Methodology (CMSMPSPPM) Price Weighting. Applicable only to method 2.
Final Price Day Count	Number(2)	Number of days where final pricing was used. Applicable only to method 3.

Exceptions:

Sub-process:	DF-050 Deliver FTR holdings information to the Authority
Process:	Produce and deliver FTR information
Code references:	
Dependencies:	CF-010, CF-020, CF-030, PE-100
Module Name	DF-050

Description:
The clearing manager publishes daily summaries of participants FTR holdings for the Authority. This report is sent at the time of publishing prudential and provides information relating to each participant's current FTR holdings

Business requirements:
<ol style="list-style-type: none"> 1. Each business day, prudential amounts and the FTR Daily Settlement Price are calculated and published to participants. At the time of publishing the prudential reports, the Authority FTR Holding report must be created and sent showing the net exposures and volumes (MW) for each participant's net FTR holdings, net assignments and net reconfigurations per FTR Period.

Data inputs:
<ul style="list-style-type: none"> • FTR settlement amounts (CF-010). • FTR assignment difference payment amounts (CF-020). • FTR Reconfiguration amounts (CF-030). • FTR assignment amount and exposure (PE-100) • FTR reconfiguration amount and exposure (PE-100) • FTR hedge value and total MW holdings (PE-100)

Processing:
<p>The system:</p> <ol style="list-style-type: none"> 1. Aggregates the exposure and volumes of FTR holdings, of assignments and of reconfigurations per participant and per FTR period 2. Creates a CSV file which is sent using SFTP to the Authority.

Data outputs:
<p>The FTR Holdings Summary is available as a CSV file and provided to the Authority via SFTP.</p> <p>The file has the layout described and the file name is of the form: <i>FTR_Exposure_Summary_EA_yyyymmdd.csv</i>.</p> <p>Where <i>yyymmdd</i> is the date the file was created.</p>

• FTR Exposure Summary EA report.		
Field	Format	Description
Organisation Code	Char(4)	Participant identifier
FTR Period	Char(6)	FTR period
Holdings MW	Number (11,1)	Total number of MW holdings for that participant in that product period
Holding Net Exposure	Number(10,2)	Total net exposure (\$) of FTR holdings for that participant in that product period
Assignments MW	Number (11,1)	Number of MW of FTR capacity that was gained by assignment for that participant in that product period
Assignment Net Exposure	Number(10,2)	Net exposure (\$) of FTR capacity that was gained by assignment for that participant in that product period
Reconfiguration MW	Number (11,1)	Number of MW of FTR capacity that was gained by reconfiguration for that participant in that product period
Reconfiguration Net Exposure	Number(10,2)	Net exposure (\$) of FTR capacity that was gained by reconfiguration for that participant in that product period

Exceptions:

Sub-process:	DF-060 Calculate and publish FTR settlement prices
Process:	Produce and deliver FTR information
Code references:	13.245, 13.246
Dependencies:	VP-010, RV-010
Module Name	

Description:
The FTR settlement prices are automatically calculated after the final prices for the previous clearing month are available in the clearing manager system and these are then published to the public website (Electricity Clearing Portal) and SFTP server.

Business requirements:
<ol style="list-style-type: none"> 1. Each month, the clearing manager system must run an automated calculation of the FTR settlement prices, for each FTR product. 2. The newly calculated settlement prices must be published via the public website and SFTP. 3. An email must be sent to the clearing manager confirming publication.

Data inputs:
<ul style="list-style-type: none"> • Final prices (\$/MWh) (VP-010) • FTR holdings (RV-010) • Previous Clearing Month and details.

Processing:
<p>The system:</p> <ol style="list-style-type: none"> 1. Calculates the FTR settlement prices, then confirms and saves the newly calculated price into the FTR settlement prices table. 2. Displays the new prices on a detail screen which allows publishing to the public website (electricity clearing portal) and SFTP.

Data outputs:															
<ul style="list-style-type: none"> • FTR Settlement Price (\$/MWh) Report The format of the filename is: FTR_Settlement_Prices_<FTR_Period>.csv. The FTR Period will be in YYYYMM format. 															
<table border="1"> <thead> <tr> <th>Field</th> <th>Format</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>FTR Profile</td> <td>Char(4)</td> <td>24HR or 12HR</td> </tr> <tr> <td>FTR Type</td> <td>Char(3)</td> <td>OBL – Obligation, or OPT – Option</td> </tr> <tr> <td>Source Hub</td> <td>Char(3)</td> <td>Station code for source hub</td> </tr> <tr> <td>Sink Hub</td> <td>Char(3)</td> <td>Station code for sink hub</td> </tr> </tbody> </table>	Field	Format	Description	FTR Profile	Char(4)	24HR or 12HR	FTR Type	Char(3)	OBL – Obligation, or OPT – Option	Source Hub	Char(3)	Station code for source hub	Sink Hub	Char(3)	Station code for sink hub
Field	Format	Description													
FTR Profile	Char(4)	24HR or 12HR													
FTR Type	Char(3)	OBL – Obligation, or OPT – Option													
Source Hub	Char(3)	Station code for source hub													
Sink Hub	Char(3)	Station code for sink hub													

FTR Period	YYYYMM	Clearing period
Confirm Date/Time	DD/MM/YYYY HH24:MI:SS	
FTR Settlement Price	Number(12,5)	\$/MWh Format: 9,999,990.00000

Exceptions:

6.21 Maintain reference information

Sub-process:	MR-010 Maintain reference and user security data
Process:	Maintain reference data
Code references:	13.60, 14.2 to 14.7
Dependencies:	
Module Name	RF-010

Description:
<p>The system maintains reference information about users, participants, grid points and other operational information in order to:</p> <ul style="list-style-type: none"> • validate that any information provided is correct and complete; and • ensure only authorised users have access to the system.

Business requirements:
<ol style="list-style-type: none"> 1. The system must maintain information about: <ul style="list-style-type: none"> • valid grid points, the island in which they are located, the island reference points and zone; • generating plants and whether they are part of a block or station dispatch group and whether they are offered by unit or station; • grid points with grid connected intermittent generation or type B cogeneration; • embedded intermittent generation or type B cogeneration stations; • approved dispatch notification purchasers/generators and associated market nodes, market node is a combination of grid points, station and unit; • trading period start and end times; • daylight saving times; • participants, i.e. their identifiers and roles: generators, ancillary service agent, purchaser, grid owner, system operator, distributor, HVDC Owner or a combination of roles; • participant trading information, i.e. the grid points at which participants purchase and sell electricity; • participant contact details and bank accounts; and • approved users per participant organisation • GST rates and their start and end dates • Invoice periods and their start and end dates, and settlement date • Types of securities that can be used as prudential security • Types of letters of credit • Acceptable Credit Rating Agencies 2. The maintenance of reference information must be a supervisor function, i.e. restricted to a limited number of personnel.

3. There must be a strong audit trail for all maintenance of information.
4. The system must incorporate industry standards for the management of passwords and lock-outs for unsuccessful attempts.

Data inputs:

- New reference and security data values.
- Active NSPs from the Registry.

Ancillary Services - Party Roles

CODE	DESCRIPTION	TYPE
ASAG	ANCILLARY SERVICE AGENT	PAYEE
ADCO	ADMIN COSTS OF SYSTEM OPERATOR	PAYEE
DICO	ASSET OWNERS WITH DISPENSATIONS COSTS	PAYER
IDCO	IDENTIFIABLE COST	PAYER
GRID	GRID OWNER	PAYER
HVDC	HVDC OWNER	PAYER
PURC	PURCHASER	PAYER
GENR	GENERATOR	PAYER
CAUS	EVENT CAUSER	PAYER
DIGE	GENERATOR WITH DISPENSATION	PAYER
DIST	DISTRIBUTOR	PAYER
DICA	CAUSER HOLDING DISPENSATION	PAYEE

Ancillary Services – Product Codes

CM Product Code	SO Product Code	Description	Cost Type
800001	501001	Black Start-Procurement Costs	Allocable Costs
800002	501003	Black Start-Admin Costs	Allocable Costs
800003	409016	Black Start-Contribution From Dispensation	Allocable Costs
800004	409017	Black Start-Identifiable Costs	Allocable Costs
800005	501004	Black Start-Event Fee	Allocable Costs
800006	409002	Black Start-Charges	N/A
800007	409018	Black Start-Event Fee Charge	Allocable Costs
810001	501002	Over Frequency Reserves-Procurement Costs	Allocable Costs
810002	501005	Over Frequency Reserves-Admin Costs	Allocable Costs
810003	409019	Over Frequency Reserves-Contribution From Dispensation	Allocable Costs
810004	409020	Over Frequency Reserves-Identifiable Costs	Allocable Costs
810005	501006	Over Frequency Reserves-Event Fee	Allocable Costs
810006	409004	Over Frequency Reserves-Charges	N/A

810007	409021	Over Frequency Reserves-Event Fee Charge	Allocable Costs
820001	502003	Frequency Keeping-Procurement Costs	Allocable Costs
820002	502002	Frequency Keeping-Constrained On	Allocable Costs
820003	502001	Frequency Keeping-Constrained Off	Allocable Costs
820004	502006	Frequency Keeping-Admin Costs	Allocable Costs
820005	409022	Frequency Keeping-Contribution From Dispensation	Allocable Costs
820006	409023	Frequency Keeping-Identifiable Costs	Allocable Costs
820007	409003	Frequency Keeping-Charges	N/A
830001	503002	Inst. Reserve-Spinning Reserve	Allocable Costs
830002	503007	Inst. Reserve-Interruptible Load	Allocable Costs
830003	408003	Inst. Reserve-Dispensation	Allocable Costs
830004	503008	Inst. Reserve-Other Costs	Allocable Costs
830005	408001	Inst. Reserve-Availability Costs - GENR	N/A
830006	408004	Inst. Reserve-Availability Costs - HVDC	N/A
830007	201025	Inst. Reserve-Event Charge – GENR	N/A
830008	408005	Inst. Reserve-Event Charge - HVDC	N/A
830009	503009	Inst. Reserve-Event Rebate - GENR	N/A
830010	503010	Inst. Reserve-Event Rebate – HVDC	N/A
830011	503011	Inst. Reserve-Constrained On	Allocable Costs
840001	504002	Voltage Support-Procurement Costs	Allocable Costs
840002	504007	Voltage Support-Admin Costs	Allocable Costs
840003	409024	Voltage Support-Contribution From Dispensation	Allocable Costs
840004	409025	Voltage Support-Identifiable Costs	Allocable Costs
840005	409026	Voltage Support-Nominated Peak Charges - DIGE	N/A
840006	409027	Voltage Support-Nominated Peak Charges - DIST	N/A
840007	409028	Voltage Support-Monthly Peak Charges	N/A
840008	409029	Voltage Support-Residual Charges - DIST	N/A
840009	409030	Voltage Support-Residual Charges - DIGE	N/A

Invoice Periods

Field	Format	Description
Start Date	Date (DD/MM/YYYY)	Start date of the invoice period
End Date	Date (DD/MM/YYYY)	End date of the invoice period
Settlement Date	Date (DD/MM/YYYY)	Settlement date of the invoice period

Types of Security

Code	Description
SSD	Specific Security Deed - Sch 14A.1
DOP	Deed of Priority
SCH	Schedule 1.1 or 1.2
LOCA	Letter of Credit Amendments - Sch 14A.4
CASH	Cash - Sch 14A.1

ACR	Acceptable Credit Rating - Clause 14A.3
GI	Guarantee or Deed of Indemnity - Sch 14A.3
LOC	Letter of Credit - Sch 14A.4
BG	Bank Guarantee - Sch 14A.2
SB	Surety Bond - Sch 14A.5
LOAD	Variable Guarantee - Sch 14A.2

Security Status Types

Security Status Code	Varchar(1)	M	Status of this security. A – accepted, D - draft
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Processing:
<p>The system:</p> <ul style="list-style-type: none"> - Allows the operator with supervisor authority to maintain reference and security data. - Calculates and stores the Invoice Periods up to 27 months in advance. - Allows reference data to be uploaded and downloaded.
Data outputs:
<ul style="list-style-type: none"> - Updated reference and security data values.
Exceptions:

Sub-process:	MR-020 Maintain FTR reference data
Process:	Maintain reference data
Code references:	Schedule 13.5
Dependencies:	
Module Name	RF-020

Description:
The clearing manager will receive or calculate, and store reference data relating to FTR products and FTR auctions.

Business requirements:
<p>The clearing manager must:</p> <ol style="list-style-type: none"> 1. Maintain the details of FTR products that are available for clearing and settlement. 2. Store the relevant details of all FTR auctions. 3. Store information about reference price methodologies used by the clearing manager. 4. Record when FTR holdings have received approval from the Authority to use alternative valuations, including commencement and expiry dates. 5. Manage grouping of related FTR participants for prudential purposes. 6. Manage thresholds and parameters used in FTR processing. 7. Have a strong audit trail for all maintenance of information. 8. Incorporate industry standards for the management of passwords and lock-outs for unsuccessful attempts.

Data inputs:
<ul style="list-style-type: none"> • FTR product details, including: <ul style="list-style-type: none"> - FTR profile (e.g. “24HR” = default, but placeholder for other profiles – e.g. strip, peak, etc.) - FTR type (i.e. “OBL”igation or “OPT”ion) - Source hub (e.g. Benmore (BEN)) - Sink hub (e.g. Otahuhu (OTA)) - Other characteristics if applicable • FTR products offered for FTR periods (“Product Periods”) <ul style="list-style-type: none"> - FTR product - FTR period - Status (i.e. setup, pre-auction, auctioned, settled) - Latest DSP (\$/MWh) - Latest IM (\$/MWh)

- FTR auction details, including:
 - Unique auction identifier
 - Auction status (i.e. open, allocated, closed) (updated by RV-510, RV-520)
 - Auction date
 - FTR Allocation Plan
- Reference price methodologies
 - Code
 - Description
 - Start Date
 - End Date
 - ASX Weighting
 - PPM Weighting
- Price setting trade thresholds (for use in daily settlement price calculation) (i.e. minimum trade quantity, minimum value of trade).
 - Assignment MW must be \geq
 - Assignment value must be \geq
 - Auction MW must be \geq
 - Auction Value must be \geq
 - Effective Date
 - Effective Until
- FTR Participant Groups
 - Participant Group Name
 - Member Participant
 - Trading Limit Proportion within the group
 - Capped amount
 - Priority
- FTR Periods
 - ID
 - Start Date
 - End Date
 - Initial Rental
 - Revenue Adequacy
 - Scaling Factor
 - Final Rental
 - Final L&CE
 - Residual L&CE
- Participants
 - Code
 - Name
 - Contact Person
 - Role

- Email
 - In Breach
 - Groups
 - Group Name
 - Owner Participant
 - Members
 - Allocated Limits
 - ID
 - Org Code
 - Auction ID
 - Allocated Amount
 - Allocated At
 - Incoming File
 - Holdings
 - Participant
 - Holding
 - Product Period
 - Acquired At
 - Type
 - MW
 - Cost Per MWh
 - Acquisition Value
 - Estimated Hedge Value
 - Auctioned Product Periods
 - Auction
 - Product Period
 - clearing Price per MWh
 - Results File
 - Created At
- FTR Hubs
- Hub Identifier
 - Reference Hub Identifier

Processing:

The system:

- Allows the operator with supervisor authority to maintain FTR reference data.
- Calculates and stores the FTR Product Periods and their Initial Margins on the 1st day of every quarter for 2 years ahead (i.e. on the 1st day of January, April, July and October).
- Calculates and stores the FTR auction details on the 1st day of every month.

- Allows reference data to be uploaded and downloaded.

Data outputs:

Updated reference data values.

Exceptions:

Sub-process:	MR-040 Manage bank accounts
Process:	Maintain reference data
Code references:	14.23, 14.25 (3), 14A.20
Dependencies:	
Module Name	

Description:
<p>The clearing manager opens and operates various bank accounts according to the requirements of the Code. These accounts are managed in CHASM to:</p> <ul style="list-style-type: none"> • enable the system to identify the payers in bank transaction receipts and record their intended use; • allow the creation of the banking batches.

Business requirements:
<ol style="list-style-type: none"> 1. The clearing manager is required to make payments to participants and keep funds in bank accounts when received from participants. The system must store the data required to perform these actions. 2. The system will allow the clearing manager to have accounts that are owned by the clearing manager and associated with a participant, as well as accounts owned by participants. The clearing manager also has accounts (such as operating, GST, fee and cash accounts) in the name of the clearing manager.

Data inputs:
<ul style="list-style-type: none"> • Participant and clearing manager bank account contact details, including: <ul style="list-style-type: none"> ○ Account Owner identifier ○ Account Party identifier ○ Account shortname ○ Bank address and contact details ○ Bank account type ○ Bank account details such as account number, bank SWIFT code. • Bank transaction file conversion information: <ul style="list-style-type: none"> ○ Bank account description ○ Corporate identifier ○ Account number ○ Start date ○ End date ○ Viewable-in-CHASM indicator ○ Retention months • Bank transactions codes to identify the purpose of bank transactions: <ul style="list-style-type: none"> ○ Transaction code e.g. NEW, CASI for cash payment in etc. ○ Transaction code description

- Transaction code status – S for settlement, I for ignored, U for unassigned
- Transaction code status description

Processing:

The system:

- Permits the information to be maintained – create, update, delete and view.
- Maintains an audit trail of each change.

Data outputs:

- Bank account contact details
- Bank transaction file conversion information
- Bank transactions codes

Exceptions:

Sub-process:	MR-070 Manage contact details
Process:	Maintain reference data
Code references:	14.23, 14.25 (3), 14A.20
Dependencies:	
Module Name	

Description:

The clearing manager is required to notify participants when certain data has been published (invoices, prudential statements, washup notifications, and HSA amounts notified), and to inform participants when situations such as an invoice dispute or default occur. CHASM will initiate the emails to the correct participants at publication time. Other events can use the CHASM reference data to send emails notices for those events.

Business requirements:

The clearing manager must:

- Advise participants of amounts owing and payable.
- If requested, post the information to the participant. This requires the system to send the information.
- Advise participants materially affected by an invoice dispute no later than 1 business day after the dispute is notified.
- Advise participants of Hedge Settlement Agreement amounts once they are available.
- Advise participants that a HSA has been accepted by the clearing manager
- Provide participants that have provided a cash deposit with a statement regarding the balance of the cash deposit.
- Notify the Authority, Market, the defaulter and the defaulter's participant group in the event of a default, late payment, call notice and resolution of default.

Data inputs:

1. Participant contact details, including:

- Participant identifier
- Process area event that this contact is associated with for that organisation.
- Name
- Position
- Phone number
- Email address
- Physical postal address
- Notes

Processing:

The system:

- Stores the contact details to be used for each participant identifier and process area event. There can be multiple contacts per participant identifier and process area event.
- Provides all the relevant participant's contact details when given the participant identifier and processing area event.

Data outputs:

- Participant contact details per participant identifier and processing area event.

Exceptions:

Sub-process:	MR-080 Maintain participant exit period register
Process:	Maintain reference data
Code references:	14A.22
Dependencies:	
Module Name	

Description:

The clearing manager maintains a register of the prudential exit period and the post-default exit period applicable to every participant, unless the participant is only an FTR participant.

Business requirements:

1. The clearing manager must maintain a register of exit periods for each participant unless they are solely FTR participants.
2. The post-default exit period must be assigned as 18 trading days for retailers, 7 trading days for direct purchasers and 7 business days for all other classes of participant, unless directed otherwise by the Authority.
3. The prudential exit period must be assigned as the post-default exit period plus 1 day.
4. The clearing manager must record in the register the commencement date and if applicable, the expiry date of a change to any exit period.

Data inputs:

- The post-default exit period in business days.
- Commencement date and expiry date (if applicable) per participant.

Processing:

The system:

1. Allows the clearing manager to maintain a participant's post-default exit period and applicable commencement and/or expiry dates.
2. Calculates the prudential exit period as the post-default exit period + 1.

Data outputs:

Per participant:

- post-default exit period,
- prudential exit period ,
- commencement date,
- expiry date (if applicable).

Exceptions:

Sub-process:	MR-090 Maintain related party groups
Process:	Maintain reference data
Code references:	14.21
Dependencies:	
Module Name	

Description:

For certain reporting areas, information for two or more participant identifiers is summarised (grouped). The relationship between the individual participant ID's and their grouping is maintained for each processing area – prudentials, FTR, defaults, statements and SRA.

Business requirements:

1. The clearing manager must be able to maintain the relationship between participants identifiers and their reporting group for each processing. The groups can have a parent-child relationship or a simple peer relationship.

Data inputs:

- Group shortname (must not contain special characters)
- Parent indicator – boolean and must be 'No' for process area SRA and DEF.
- Participant ID (must be an existing participant in MR-010)
- Participant full name (MR-010)
- Process area (SRA, PRU, FTR, DEF or STM)
- Start date
- End date (after start date)

Processing:

The system

1. Validates, maintains and stores group relationship information together with audit information.

Data outputs:

Same as input but with audit information for each addition, change and deletion.

Exceptions:

6.22 Handle disputes and defaults

Sub-process:	HD-040 Send settlement default event email
Process:	Handle disputes and defaults
Code references:	14.41 to 14.65, 14A.6, 14A.7 to 14A.10, 14A.13
Dependencies:	PP-010, PP-030, MR-070, MR-090
Module Name	

Description:
<p>In the event of a settlement default, the clearing manager notifies the defaulter, the defaulter's group, the Authority and the market by email at various stages during the default resolution process.</p> <p>The process begins when the clearing manager advises the Authority, prior to the deadline for payments, of an anticipated default by a participant.</p> <p>When the deadline for payment has passed and when one or more participants have not paid the clearing manager the full amount they owe, the clearing manager advises the Authority, the defaulter and the defaulter's group (if applicable) that an actual default event has occurred.</p> <p>If, after applying the appropriate remedies described in clause 14.44, the clearing manager has been able to reduce the shortfall to zero, the usual settlement process is initiated, without scaling, and the event of default is resolved.</p> <p>If, after applying the appropriate remedies described in clause 14.44, the clearing manager is unable to reduce the shortfall to zero, the clearing manager initiates the settlement process which will scale payments. The market is informed of the reduced pool amount that will be available.</p> <p>If SRA payments are insufficient to cover the net shortfall, the clearing manager informs the market that call notices may be due and issues call notices to those participants that are affected.</p> <p>Any full or partial payments made by the defaulter after the initial settlement run are treated as late payments and acknowledged as such. The market is notified of the receipt of each late payment and how that affects the amount available for pay out. Participants who have received call notices are also informed of their revised amounts.</p> <p>The default situation ends when the shortfall is reduced to zero. Until that time emails may be sent repeatedly and a final settlement process is run.</p>

Business requirements:
<p>The clearing manager must:</p> <ol style="list-style-type: none"> 1. Keep a track of the stages of an event of settlement default. 2. Be able to create emails that: <ul style="list-style-type: none"> • Notify the Authority of an anticipated default event by a participant. • Notify the Authority of an actual default event by a participant. • Prior to the settlement process, inform the defaulting participant and the defaulting participant's group when the default amount has been fully remedied by the clearing manager and that the default event has been resolved. • Prior to the settlement process, inform the defaulting participant and the defaulting participant's group when there is a shortfall that will result in a scaled payment to the market.

- After the settlement process has run and there is a shortfall, inform the market of the reduced pool amount that will be paid.
 - Acknowledge receipt of each partial late payment made by the defaulting participant to both the defaulting participant and the defaulting participant's group.
 - Inform the market of the revised reduced pool amount whenever there is a partial late payment made by a defaulting participant.
 - Acknowledge receipt of a full late payment made by the defaulting participant to both the defaulting participant and the defaulting participant's group.
 - Inform the market of the receipt of a full late payment from the defaulting participant and that the default event has been resolved.
 - Notify the market that a call notice payment may be due.
 - Inform a participant of the amount required for a call notice payment.
 - Inform a participant of a revised amount for a call notice payment after receipt of a partial late payment from a defaulter.
 - Acknowledge receipt of a call notice payment from a participant.
 - Notify the Authority when a default situation (anticipated or actual) is resolved.
3. Be able to include additional details to the prepared emails before sending.
 4. Be able to send the correct email to the correct recipient(s) at the correct time.
 5. Where the defaulter is the member of a group, treat all group members as if they are a defaulter and copy all emails sent to the defaulter to the other members of the group.
 6. Create an audit trail of when emails have been sent and to whom.

Data inputs:

- Participants and the related participants in their group (MR-090)
- Participant contact details per process area (MR-070)
- Summary of payments including whether full payment has been received, whether an email has been sent, the shortfall amount and set-off amount (PP-010)
- Payment details (PP-010)
- Buyer created tax invoice amounts including the revised AOcm (PP-030)
- Email template from list described below:

Template	Contact process area	Recipients	Timing
Anticipated Default Notification to the Electricity Authority	OTHDEF	Electricity Authority and clearing manager	Prior to the payment deadline and prior to the initial settlement run
Formal Default Notification to the Electricity Authority	OTHDEF	Electricity Authority and clearing manager	After the payment deadline and prior to the initial settlement run
Formal Notification to Defaulter – Non-Scaling	OWNDEF STLNTF	Defaulting Participant	After the payment deadline and prior to the initial settlement run
Formal Default Notification to Defaulting Group - Non-Scaling	OWNDEF STLNTF	Defaulting Group	After the payment deadline and prior to the initial settlement run

Formal Notification to Defaulter - Scaling)	OWNDEF STLNTF	Defaulting Participant	After the payment deadline and prior to the initial settlement run
Formal Default Notification to Defaulting Group - Scaling	OWNDEF STLNTF	Defaulting Group	After the payment deadline and prior to the initial settlement run
Formal Payment Notification to Market	OTHDEF STLNTF INVOICE	All participants/groups issued with statements in the invoice period other than the defaulting participant/group.	After the initial settlement run
Partial Late Payment Receipt Acknowledgement Email to Defaulter	OWNDEF STLNTF	Defaulting Participant	On input of each partial payment after the initial and subsequent settlement run(s)
Partial Late Payment Receipt Acknowledgement Email to Defaulting Group	OWNDEF STLNTF	Defaulting Group	On input of each partial payment after the initial and subsequent settlement run(s)
Revised Payment Notification to Market after receiving Partial Late Payment	OTHDEF STLNTF INVOICE	All participants/groups issued with statements in the invoice period other than defaulting participant/group.	On input of each partial payment after the initial settlement run
Full Late Payment Receipt Acknowledgement Email to Defaulter	OWNDEF STLNTF	Defaulting Participant	On input of each full payment after the initial and subsequent settlement run(s)
Full Late Payment Receipt Acknowledgment Email to Defaulting Group	OWNDEF STLNTF	Defaulting Group	On input of each full payment after the initial and subsequent settlement run(s)
Remaining Payment Notification to Market after Receiving Full Late Payment	OTHDEF STLNTF INVOICE	All participants/groups issued with statements in the invoice period other than defaulting participant/group.	On input of each full payment after the initial and subsequent settlement run(s)
Call Notice Email to Participant	CALLNTC	Participants with negative scaled amount payable by clearing manager (Scaled APcm) and with no default	After the initial settlement run
Revised Call Notice Email to Participant after receiving Late Payments from Defaulter	CALLNTC	Participants with negative scaled amount payable by clearing manager (Scaled APcm) and with no default	After the subsequent settlement run not the initial

Call Notice Amount Receipt Acknowledgement	CALLNTC	Participants from which the clearing manager has received the call notice amount.	On input of each call notice amount payment after the initial and subsequent settlement run(s)
Call Notice Payment Notification to the Market	CALLNTC	All participants/groups issued with statements in the invoice period other than defaulting participants/group.	On input of each call notice amount payment after the initial and subsequent settlement run(s)

Processing:

The system:

- a) Permits the clearing manager to select a specific type of email to be sent.
- b) Determines the current stage that the default event has reached based on the current time in relation to the payment deadline and whether a settlement run has been completed.
- c) Checks that the current stage matches the timing defined against the email template for the selected email.
- d) Generates an email using:
 - The template for the type of email selected,
 - The email contact addresses for the contact process areas defined against the template,
 - The appropriate values for the variable fields in the template.
- e) Permits the clearing manager to include additional details, such as reasons for the default, to the email before sending.
- f) Stores then sends the completed email.
- g) Maintains an audit trail of when the email was sent and to whom.

Data outputs:

Sent email
Updated summary of payments
Audit trail

Exceptions:

Note: The automation of the above notifications refers only to settlement defaults, all other default notification processes, as required under Part 14.41 of the Code, will continue to be handled manually.

7 MANUAL SYSTEM

The sub-processes described in this section are those which are currently carried out manually and therefore not subject to software audit requirements. They may be automated in the future.

7.1 Calculate tax and wash-up amounts

Sub-process:	CW-010 Charge sundry fees and taxes
Process:	Calculate tax and wash-up amounts
Code references:	14A.15
Dependencies:	
Module Name	IN-080

Description:

The clearing manager may need to charge for fees and extra taxes (in addition to GST). These may include bank fees incurred by the clearing manager in the management of cash deposit accounts held for prudential requirements and any additional taxes imposed by the IRD on those accounts.

These charges are not included in the system-generated invoices but are invoiced separately.

Business requirements:

1. The clearing manager must be able to invoice for additional fees and extra taxes.

Data inputs:

- Fee or tax type, description, amounts owing by the participant or amounts owing by the clearing manager, fee amount, GST amount (if applicable).

Processing:

Data outputs:

- Invoice amounts for fees and/or taxes for the relevant party.
- Applicable tax returns to the IRD.

Exceptions:

7.2 Handle disputes and defaults

Sub-process:	HD-010 Manage disputes
Process:	Handle disputes and defaults
Code references:	14.25
Dependencies:	
Module Name	MD-010

Description:

When participants dispute invoices within 2 years of the date of invoice issue, the clearing manager will investigate and resolve the dispute as described clause 14.25, which describes the disputes procedure, and include the notification of affected parties. The clearing manager may recalculate the invoices for the latest billing period, provided revised information has been received at least 2 business days prior to the payment due date. Disputes relating to prior billing periods are resolved using the wash-up process.

Business requirements:

1. In the event of a dispute the clearing manager must be able to recalculate and reissue invoices for the current billing period, or as described by clauses 14.25 to 14.28.
2. For prior billing periods, provided revised information is provided for those prior billing periods, the clearing manager must be able to conduct the wash-up process. Wash-ups must, however, only be conducted for any of the prior 24 billing periods.
3. The clearing manager must notify affected participants if invoices need recalculating.

Data inputs:

- Revised reconciliation information from the reconciliation manager.
- Revised ancillary services information from the system operator.
- Any other revised information that impacts the invoicing process, e.g. the organisation of block dispatch groups.
- Revised daily bank bill bid rates.

Processing:

1. Rerun the invoice process for the latest billing period.
2. Rerun the wash-up process for any prior billing period.
3. Resend invoices as per process DI-010.
4. Recheck confirmations as per process DI-020.

Data outputs:

1. Revised invoices, as per DI-010.

Exceptions:

Sub-process:	HD-020 Manage defaults
Process:	Handle disputes and defaults
Code references:	14.41 to 14.52, 14.65, 14A.6, 14A.7 to 14A.10, 14A.13
Dependencies:	
Module Name	MD-020

Description:
<p>An event of default occurs if one or more of the following situations arises:</p> <ul style="list-style-type: none"> • a participant fails to pay the full amount payable by payment due date; • a participant fails to maintain their level of security with respect to prudential requirements in accordance with clause 14A.6; • a participant becomes involved in statutory management or investigation as described in clause 14.41(c) to (e); • a participant becomes involved in a scheme of arrangement or composition with creditors as described in clause 14.41(f); • a participant becomes involved in a receivership or liquidation as described in clause 14.41(g). <p>In the event of a default, the clearing manager has the power to exercise a number of remedies as described in clause 14.44 including:</p> <ul style="list-style-type: none"> • Set-off of amount payable by the clearing manager • applying a cash deposit; • enforcing a letter of credit, guarantee or bond or • taking possession of FTR(s) held by the defaulter (see HD-030). <p>These remedies can then be used to adjust the participant's payment amounts in the allocation of payments process in PP-010.</p>

Business requirements:
<p>The clearing manager must:</p> <ol style="list-style-type: none"> 1. Be vigilant for the possibility of default by participants. 2. Notify the participant in default of the fact it is in default. 3. Inform the Authority of defaults. 4. Exercise the remedies available under the Code and the law in order to ensure payment is met (see clause 14.44).

Data inputs:

Processing:
<ul style="list-style-type: none"> • Notify the Authority. • Exercise remedies and transfer additional funds into the clearing manager's operating account.

- Re-run the allocation process PP-030 with the adjusted defaulting participant's payment amount.

Data outputs:

Exceptions:

Sub-process:	HD-030 Reassign FTRs to the clearing manager
Process:	Handle disputes and defaults
Code references:	14.44(1)(d), 14.45(c)(ii), 14.47
Dependencies:	CF-040
Module Name	MD-021

Description:

The clearing manager may assign FTR holdings from a defaulter to itself in accordance with the Code in order to remedy a defaulted FTR amount.

Business requirements:

1. The clearing manager may (in accordance with clauses 14.44, 14.45, and 14.47) request assignment of FTR holdings from the defaulter to the clearing manager.
2. If the amount received by the clearing manager from settlement or sale of an assigned FTR holding exceeds the amount required to remedy the default, then the excess amount must be repaid to the defaulter.
3. If an FTR holding would have been payable by the defaulter but has now been assigned to the clearing manager, then no amount is payable by the clearing manager in respect of that FTR holding.

Data inputs:

- FTRs held by FTR participant
- Default amount

Processing:

1. Identify FTR holding(s) that would remedy the defaulted amount.
2. Apply to the FTR manager to be assigned the requested FTR holding(s).
3. Settle or sell the assigned FTR holding(s).
4. Repay the defaulting participant any surplus funds.

Data outputs:

- Assignment request to FTR manager.
- Funds from settlement/sale of FTR holding(s).

Exceptions:

Sub-process:	HD-050 Manage Pricing Error Claim (PEC)
Process:	Handle PEC
Code references:	13.170, 13.134A
Dependencies:	
Module Name	HD-050

Description:

Pricing errors are strictly defined as the wrong set of dispatch (reserve) prices been used or incorrect calculation of interim prices in accordance with clause 13.134A.

A person may make a pricing error claim to the clearing manager in respect of that price under clause 13.170,

- After interim price published on WITS; and
- No later than 1200 hours on the 1st business day following the trading day; and
- The clearing manager may investigate a potential pricing error in respect of that price under clause 13.170A.

Business requirements:

The clearing manager must:

- Receive the PEC request,
- Validate the PEC request,
- Inform relevant parties regarding the PEC,
- Recalculate the interim prices after PEC is accepted,
- Publish final price as normal after PEC is resolved.

Error claimant must include the following information when raising a PEC,

- That the error claimant has been affected by the claimed pricing error; and
- The basis for the claim that a pricing error has occurred.

Data inputs:

Processing:

In the event of a PEC, the clearing manager:

- Validates PEC request information,
- Confirms to the error claimant that PEC is received with/without required information (request information if the required information is not contained),
- Gives a written notice on WITS and notifies to the Authority, the claimant, and any person that has requested notice about the PEC including the information listed under output no later than 1300 hours on the 1st business day following the trading day.

- Provides a report to the Authority with clearing manager's investigation results no later than 1700 hours on the 2nd business day following the trading day.
- Changes the status of prices from interim to final one hour after the Authority determines no PEC has occurred or rejects a PEC (under clause 13.182B),
- Recalculates and publishes replacement interim prices if a PEC is upheld (under clause 13.177),
- Publishes interim prices to final as normal if a PEC is rejected by the Authority

Data outputs:

Notification to the market including:

- that a pricing error has been claimed, and
- the name of the error claimant; and
- the reasons the error claimant has given for the PEC; and
- the trading periods are affected by the PEC request; and
- that the clearing manager has decided to investigate a potential PEC; and
- the reasons for the investigation; and
- the trading periods that the clearing manager believes may have been affected by the potential pricing error.

Investigation results to the Authority:

- Whether, in the clearing manager's view, a PEC has occurred.
- If the clearing manager's view is that a PEC has occurred, it is a material error.
- The reasons for the clearing manager's view.
- A copy of all of the information that the clearing manager considered in reaching it's view.

Exceptions:

7.3 Publish information and reports

Sub-process:	PB-030 Produce monthly report
Process:	Publish information and reports
Code references:	3.13, 3.14, 14.68, 14.69
Dependencies:	
Module Name	PB-040

Description:

The clearing manager is required to deliver a monthly report detailing

1. any breaches of the Code by participants or itself and
2. a self-assessment against the performance standards as set out in the service provider agreement; and
3. may include other matters for the Authority such as recommendations for changes to the Code.

Business requirements:

1. The clearing manager must deliver the monthly reports to the Authority by 0900 hours on the 10th business day of each calendar month.

Data inputs:

- Instances of breaches and the party involved – as described in clause 14.68.
- Performance standards agreed with the Authority
- Performance measurements for the previous month

Processing:

1. Produce and deliver report.

Data outputs:

1. Breach report comprising:
 - details of Code breaches, including any by the clearing manager,
 - performance measurements against the agreed performance standards,
 - details of any events that the clearing manager believes warrant a change to the Code,
 - any other matters requested by the Authority.

Exceptions:

7.4 Maintain reference information

Sub-process:	MR-030 Validate FTR participant meets registration requirements
Process:	Maintain reference data
Code references:	14A.2 to 14A.4
Dependencies:	DF-010, MR-020
Module Name	PR-005

Description:
<p>The clearing manager receives and maintains FTR participant registration information. The clearing manager checks a participant is not in breach or default and they have met all their prudential security requirements.</p> <p>Note: FTR Participant Groups may be used to manage prudential security of multiple related participants and are dealt with via MR-020.</p>

Business requirements:
<ol style="list-style-type: none"> 1. The clearing manager must have processes in place to validate a participant (or proposed participant) is not in breach or default and they have met all their prudential security requirements.

Data inputs:
<ul style="list-style-type: none"> • FTR participant organisation.

Processing:
<ul style="list-style-type: none"> • Check each participant for default and validate information supplied.

Data outputs:
<ol style="list-style-type: none"> 1. Participant registration details (MR-020) 2. Participant and breach information (used by DF-010).

Exceptions:

Sub-process:	MR-050 Assess and approve prudential security
Process:	Maintain reference data
Code references:	14A.3, 14A.4, 14A.7 to 14A.10
Dependencies:	AS-010, MR-040
Module Name	

Description:

Participant with net amounts owing provide the clearing manager with the means (security or credit rating) to be able to meet their minimum prudential security requirements as required under the Code.

Participant with net amounts owing may meet their prudential security requirements by either maintaining an acceptable credit rating or by providing sufficient security.

The clearing manager assesses and approves all security provided by all participants.

Business requirements:

The clearing manager must:

1. Ensure that credit ratings and securities comply with the requirements of the Code.
2. Store the physical copy of any documents that relate to the security (see AS-005).
3. Ensure that cash deposits are not accepted without applicable security documents being provided.
4. Ensure that cash deposits do not exceed limits provided in the security documents.
5. Deposit cash received in more than one bank.
6. Allow a participant to change the form of security held.
7. Allow a participant to reduce or release their security.
8. Release security in the event that a participant ceases to be a participant.
9. Must reduce or release the security within 1 business day, if a participant becomes entitled to a reduction or release.

Data inputs:

- Evidence of an acceptable credit rating.
- Total exposure per participant and/or prudential group (AS-010).
- Participant request to change, reduce or release security.
- New participant security details.

Processing:

The clearing manager:

1. Where new security is provided, checks that it complies with the Code.

2. Assesses the value of any proposed new/replacement/released security and credit rating.
3. For security reductions or releases and changes to credit ratings, checks that the participant is not in default and would still hold sufficient security to cover their net exposure as calculated in AS-010, if the reduction is approved.
4. Releases security within one business day where the necessary conditions have been met.
5. When cash is deposited, move this to the bank accounts that are determined by MR-040 for that participant for that purpose.
6. When cash is withdrawn, moves the cash from the bank accounts it is held into the participant's account nominated in MR-040.

Data outputs:

- New or replacement security acceptance and approval together with security details that includes the value of the security*.
- Security* release approval and value.
- The bank batch to move the cash in the case of a deposit or withdrawal of prudential cash.

*Security includes cash.

Exceptions:

