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Submission by TWS Energy Controls on Initiatives 2B and 2C

Introduction

TWS Energy Controls Ltd (TWS) appreciates the opportunity to comment on the Energy Competition Task Force's proposed Initiatives 2B and 2C. We are New Zealand's leading manufacturer of instrument transformers for the electricity industry, with over 40 years of experience supplying revenue-metering equipment. We support the Task Force's proposals to promote more cost-reflective, time-varying pricing for electricity.

In particular, we welcome the focus on requiring retailers to identify and recognise the full costs of customers' contributions to peak demand, as outlined in the consultation. To ensure these reforms achieve their intended benefits, our submission emphasizes the critical importance of accurate metering data. We believe that improving metering accuracy – especially at low load levels – is essential to fairly allocate costs and send correct price signals under the new pricing regimes.

Importance of Accurate Metering Data for Cost Reflectivity

The consultation paper underscores that when electricity prices reflect underlying costs, consumers can make decisions that reduce overall system costs.

A core objective of Initiatives 2B/2C is therefore to sharpen price signals so that peak demand costs are properly attributed and passed through. However, we note the consultation's finding that current industry practices dilute cost reflectivity due to data limitations. In some cases, retailers are not exposing the true peak costs to consumers because of how metering data is handled. For example, a recent Electricity Authority survey found 34% of consumption data was provided to distributors only as a monthly aggregate instead of granular half-hour values. This practice prevents retailers from identifying which customers drive peaks, as the peak contribution gets distributed across the aggregate total. The result is that retailers cannot identify or recognise the accurate costs of individual customers' peak demand.

TWS agrees with the Task Force that resolving such data accuracy issues is crucial. We emphasize that even with fully granular data, the usefulness of price signals depends on the underlying measurement accuracy. Inaccurate metering will undermine cost-reflective pricing by misstating when and how much electricity is used, especially during critical peak periods. Conversely, high-fidelity metering data will enhance retailers' ability to pass through correct price signals for peak usage, reinforcing the desired behavioural response (shifting consumption off-peak, etc.). Thus, metering accuracy is a foundational enabler for the success of Initiatives 2B and 2C.

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Metering Accuracy in the NZ Residential Sector

Ensuring accurate metering is particularly important given the profile of New Zealand electricity consumers. There are approximately 2.21 million ICP (installation control point) connections on the national electricity network, and the vast majority (around *85%*) of these are residential installations.

Most residential and small business (mass-market) consumers are metered with devices in "Category 5" installations, using Class 2 accuracy meters. *Class 2* metering accuracy is defined as a ±2% margin of error at full rated load (unity power factor). In practice this is an accepted accuracy band for basic mass-market metering. However, it is important to note that the allowed error of Class 2 meters worsens at lower loads.

Standard IEC meter and instrument transformer classes only guarantee their accuracy down to a certain percentage of rated load (often 5% or 10% of maximum current) – below that, the error is not tightly controlled and can increase substantially. For instance, an accuracy class 2.0 device that is ±2% at 100% load might have error on the order of ~±6% (or more) at 5% of load. This means that during periods of very low current (such as overnight off-peak times for a household), a typical mass-market meter/CT could significantly mismeasure the actual consumption.

Nearly all (≈85%) of NZ consumers are using meters/CTs with this level of accuracy, so this is a widespread issue. Under flat tariff regimes, a few percentage points of measurement error have little visible impact on billing fairness. But under time-of-use or peak-demand-based pricing, even small measurement biases at the wrong time can distort charges – either overcharging a customer who actually reduced load at peak or undercharging one who contributed to a peak without it being accurately recorded.

In short, our current metering accuracy standards (Class 2 for most residential ICPs) may be insufficient to meet the enhanced accuracy expectations inherent in the Task Force's pricing reforms.

To illustrate the issue: the Task Force proposes that each retailer's costs should fully reflect their customers' contributions to peak demand. If a household reduces demand during the system peak, the meter should reliably capture that drop so the retailer (and network) recognize it. But if the meter's error at that low load level is, say, ±5%, the true reduction might be masked. Likewise, if a household is using only a small amount of power during peak, a ±5% error could proportionally misallocate network peak charges – defeating the purpose of finely signalling cost differences.

Therefore, we caution that the move toward more granular, peak-sensitive pricing must be accompanied by improved metering precision. Relying on legacy accuracy classes (with ±2% tolerance at best, and potentially much larger error at partial loads) could create fairness issues and undermine confidence in the new pricing signals.

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Extended-Range Accuracy Instrument Transformers (Class M vs M(S))

TWS Energy Controls wishes to highlight that technology solutions exist to dramatically improve metering accuracy at low currents. In the domain of current transformers (CTs) used for revenue metering, there are established extended-accuracy classes often denoted with an “S”. For example, IEC standards define classes 0.5 and 0.2 for CTs (guaranteed accuracy to 5% of rated current), and the enhanced classes 0.5S and 0.2S, which maintain their accuracy down to 1% of rated current. In New Zealand metering terminology, these might be referred to as *Class M (standard metering)* versus *Class M(S) (special accuracy metering)* current transformers.

An M(S) class CT is essentially a high-accuracy, extended-range device. It can accurately measure from 1% load through to well over 100% (rating factor) with minimal error. By contrast, a normal Class M CT might only be calibrated from 5% or 10% through 100% and becomes unreliable below that range.

Despite their technical advantages, market uptake of extended-range (M(S) class) CTs in New Zealand has been limited to date. Our company’s sales data indicate that the bulk of LV metering CTs installed for mass-market applications are still standard Class 1 or Class 0.5 devices (meeting the minimum accuracy required by code). Utilities and meter installers have rarely specified the high-accuracy 0.2S/0.5S class units for residential or small commercial metering, likely due to added cost and lack of regulatory drivers.

The situation to date has been understandable – under older flat tariff structures, the incremental benefit of an extended-range CT was small. However, as the industry shifts to time-varying pricing and expects granular accuracy, it is an appropriate time to revisit metering equipment specifications.

We note that international best practice is moving in this direction: for example, many North American utilities now use “revenue grade” 0.15S class CTs for their advanced metering installations, given the push for improved loss reduction and accurate distributed energy resource (DER) measurements. New Zealand should not fall behind in metering accuracy when our retail pricing is evolving to demand more from the data.

From a technical perspective, upgrading to extended-range metering CTs (and meters) will ensure that even very low demand levels are captured accurately. This supports fairness: a household that consistently draws only a small amount during peak (e.g. by load shifting or using home generation/storage) will *truly* see a lower peak charge, not one obscured by measurement error. Equally, a customer who contributes disproportionately to peaks cannot “fly under the radar” of measurement uncertainty.

In summary, Class M(S) instrument transformers align metering capabilities with the cost-reflective pricing goals, whereas continuing with standard Class M could leave a gap between the prices signalled and the reality of consumption.

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Recommendations for Metering Accuracy Improvements

To fully realize the benefits of Initiatives 2B and 2C, TWS Energy Controls recommends that the Task Force incorporate provisions to raise metering accuracy standards, particularly for the mass-market segment. Specifically, we propose the following measures:

- **Mandate Low-Load Calibration:** Update the metering certification requirements so that meters (or meter/CT systems) must be tested and certified at a low current point, approximately 1% of rated load. This would ensure compliance with the accuracy expectations at very low demand levels. For instance, a meter/CT combo might be required to demonstrate accuracy within a tight tolerance (e.g. ≤2% error) at 1% of its maximum current. Mandating a certified calibration point at 1% would effectively compel the use of higher-accuracy devices. This change directly supports the proposals' intent by guaranteeing that the data used for peak charge allocation is accurate even at minimal loads.

- **Adopt Extended Accuracy Classes for New Meters/CTs:** We recommend phasing in a requirement that revenue metering CTs for new or replacement installations be of an extended accuracy class (M(S)). Practically, this could mean specifying IEC 0.5S (or 0.2S for higher-end applications) as the minimum standard for CTs in Category 5 installations from a certain date forward. Likewise, modern electronic smart meters typically have class 1.0 or better accuracy; regulators could incentivize or require that any new smart meters installed for time-of-use tariffs be class 1.0 or 0.5 (instead of class 2.0), to narrow the error margins. Many of the ~2 million smart meters already deployed in NZ are capable of high accuracy, but ensuring the supporting CTs (for CT-linked meters) are also high precision is key. Adopting "accuracy class upgrade" as a policy will send a strong signal to metering equipment providers and installers to stock and use the improved devices.

- **Strengthen Code and Monitoring:** Incorporate these accuracy requirements into the Electricity Industry Participation Code (EIPC) or relevant Registry/Distributor standards. The Code should reflect that accurate data is a regulatory expectation in support of cost-reflective pricing. We also suggest that the Authority monitor metering accuracy performance as part of the rollout of time-varying pricing. For example, perform audits or require reports on the total metering error observed in sample sites (perhaps via test houses or calibration checks) to verify that the population of meters is performing within the desired accuracy bands (including at low loads). This oversight will ensure continuous improvement and compliance with the new standards.

TWS Energy Controls acknowledges that requiring higher accuracy instrumentation may involve some incremental cost. Extended-range CTs and higher-class meters are slightly more expensive than standard ones. However, we submit that the cost impact

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is marginal when spread over the life of the metering asset and is far outweighed by the benefits of improved data integrity.

According to the consultation paper, even now some retailers fail to assign time-of-use network tariffs or provide detailed data because of convenience or system limitations. If we are to overcome such practices and implement reforms that rely on granular, trustworthy data, a modest investment in metering accuracy is both prudent and necessary. The overall accuracy of the electricity market's measurements underpins confidence in billing and pricing. In the context of an essential service, accuracy is not a luxury – it is fundamental for fairness.

Conclusion

In conclusion, TWS Energy Controls reiterates its support for Initiatives 2B and 2C aimed at improving pricing plan options and enhancing cost reflectivity in the electricity retail market. We are encouraged by the Task Force's recognition of data accuracy issues in current billing processes and its efforts to address them. Our submission has highlighted that metering technology and standards should advance in tandem with pricing innovation.

By tightening accuracy requirements (especially at low load conditions that matter for peak pricing) and encouraging the adoption of extended-range metering transformers, New Zealand can ensure that the implementation of time-varying pricing is based on a solid foundation of precise data. This will help achieve the policy goals of equity and efficiency – consumers will pay their fair share of peak costs and be rewarded for peak reductions, and investments in the network can be more efficiently targeted based on reliable usage information.

TWS Energy Controls thanks the Task Force for considering our input. We remain available to assist with any technical details regarding instrument transformer accuracy and to support the industry's transition to more accurate and transparent metering.

We believe that by working together on these metering improvements, regulators, retailers, and equipment providers can deliver a better outcome for consumers and the power system as a whole.

References:

- *Electricity Authority, Improving Pricing Plan Options for Consumers: Time-varying retail pricing for electricity consumption and supply, 2024 – sections on cost reflectivity and data accuracy https://www.ea.govt.nz/documents/6483/2BandC_-_Consultation_paper_web_version.pdf*

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- *MBIE. Electricity Statistics https://www.mbie.govt.nz/building-and-energy/energy-and-natural-resources/energy-statistics-and-modelling/energy-statistics/electricity-statistics*