AEMC Real time data for consumers consultation

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Proponent(s) Energy Consumers Australia

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Dear AEMC, we are pleased to participate in the consultation and present these responses for your consideration.

AEMC questions are in blue.

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Sense responses to questions

Question 1: What are the benefits of improving access to real-time data?
a) What are the anticipated use cases of real-time data?

Anticipated Use Cases of Real-Time Data

Real-time data obtained from next-generation smart meters have a wide range of applications for consumers, retailers, and DNSPs. Here are some anticipated use cases:

For Consumers:

- **Real-time appliance monitoring:** Consumers can use the Sense app to see how much power each individual appliance is using in real-time. This allows them to identify energy-hungry devices, understand consumption patterns, and make informed decisions about their energy usage.
- **Personalized energy-saving recommendations:** Based on real-time data, consumers can receive tailored recommendations on how to reduce their energy consumption. For example, the app could notify them if they left the oven on or suggest ways to optimize appliance usage.
- **Improved awareness and control over energy bills:** By tracking energy usage in real-time, consumers gain better control over their energy bills and can avoid unexpected costs.
- **Participation in demand response programs:** Real-time data enables consumers to participate in demand response programs more effectively. They can receive personalized notifications and instructions on which appliances to turn down during peak demand periods.
- **Integration with other smart home devices:** Real-time data can be integrated with other smart home devices to create a more comprehensive energy management system. For example, the smart meter can communicate with a smart thermostat to automatically adjust temperature settings based on energy consumption patterns.

For Energy Retailers:

- **Enhanced customer engagement:** Real-time data offers energy retailers opportunities to engage with customers in more meaningful ways. They can provide personalized insights, recommendations, and support, leading to improved customer satisfaction and retention.

- **Cost-effective load shifting:** Real-time data allows energy retailers to implement cost-effective load shifting strategies at scale. By leveraging demand response programs and time-of-use tariffs, they can encourage consumers to shift energy usage to off-peak hours, reducing peak demand and the need for expensive backup power sources.
- **Reduced customer service costs:** Real-time data helps customer service teams provide more efficient support. They can diagnose high bill complaints more effectively and offer proactive solutions, leading to faster resolution times and increased customer satisfaction.
- **Improved demand forecasting:** Real-time appliance-level insights supplement demand forecasting models, enabling energy retailers to predict future load with greater accuracy. This allows for more informed power purchases and optimized hedges, ultimately reducing power costs.
- **New revenue streams:** Real-time data unlocks new revenue opportunities for energy retailers. For example, they can partner with distribution network service providers (DNSPs) to provide data services based on insights from smart meters, such as fault detection, power quality monitoring, and EV charging information.

For Distribution Network Service Providers (DNSPs):

- **Grid optimization and reliability:** Real-time data provides DNSPs with granular visibility into grid operations. This information can be used to optimize network management, improve efficiency, and enhance grid reliability by identifying potential issues, such as transformer arcing or vegetation hitting power lines.
- **Integration of consumer energy resources (CERs) and distributed energy resources (DERs):** Real-time data is crucial for the seamless integration of CERs, DERs, such as rooftop solar panels and battery storage systems, into the grid. It allows for efficient management of these resources and ensures grid stability.
- **Advanced planning and capacity management:** By analyzing real-time data, DNSPs can gain insights into consumption patterns and load growth. This information supports informed decision-making regarding network planning, capacity upgrades, and investments in grid infrastructure.

For Energy Transition:

- **Accelerated adoption of electric vehicles (EVs):** Real-time data plays a vital role in facilitating the integration of EVs into the grid. It enables smart charging strategies, load management, and the development of Vehicle-to-Grid (V2G) technologies that leverage EV batteries for grid support.
- **Increased use of renewable energy sources:** By providing real-time visibility into supply and demand, smart meters help balance the grid as more intermittent

renewable energy sources are deployed. They enable demand response programs and time-of-use tariffs that incentivize consumers to shift energy usage to times when renewable energy is abundant.

Real-time data from next-generation smart meters will revolutionize how we manage and interact with energy, driving efficiency, sustainability, and consumer empowerment.

Question 2: What are the costs of improving access to real-time data?

Costs of Improving Access to Real-Time Data

This response primarily focuses on the benefits and use cases of real-time energy data, with less emphasis on the costs associated with improving access to this data. However, some types of costs that might be incurred:

- **Higher Cost Meters:** Upgrading to next-generation smart meters capable of handling real-time data and AI processing needed for the energy transition in the coming 10-15 years will involve higher meter costs compared to legacy meters only providing periodic revenue and period network balancing data. This cost difference is attributed to advanced hardware and software required for grid edge processing intelligence.
- **Wi-Fi Connectivity:** Consumer consented Wi-Fi will be one of the preferred communication technologies for smart meters. The costs associated with this choice would include the inclusion of Wi-Fi modules in the meters, potentially increasing their manufacturing cost.
- **Software Subscription:** Subscription costs for Sense software services that run on next-generation smart meters. This ongoing cost typically would be borne by energy retailers and bundled with profitable services. Attempts to charge customers for energy efficiency and flexibility applications historically generally result in slow and low consumer uptake.
- **Installation and Integration:** The deployment of next-generation smart meters would involve installation costs, including labor and logistics. Integrating these meters with existing utility systems and data management platforms might also require additional investments. Field fitting module and POD uplifts that enable additional real time customer data if possible, may add costs to the base meter.
- **Data Management and Security:** Handling the large volume of real-time data generated by these meters necessitates robust grid edge data processing and communications management infrastructure and security measures.
- **Consumer Education and Engagement:** Realizing the full benefits of real-time data access relies on consumer awareness and engagement. Energy retailers might incur costs in developing educational materials and programs to inform consumers about the features and potential of these smart meters. Education may be best invested in consumer applications with strong customer benefits made possibly by real time data.

Additional Costs:

- **Retrofitting Existing Meters:** While the preferred approach is to deploy next-generation smart meters during the main rollout program, fieldfitting Sense modules into compatible meters already in the field may be possible. However, this would likely increase costs compared to factory installation.
- **Maintenance and Support:** Maintaining and supporting the advanced hardware and software of next-generation smart meters could involve ongoing costs, potentially requiring specialized expertise and infrastructure.

Magnitude of Costs:

A precise estimation of the magnitude of these costs is challenging without detailed information. Factors influencing these costs include the scale of deployment, non-recurring engineering requirements, existing infrastructure, technology choices, and regulatory requirements.

Who Bears the Costs:

It's plausible that energy retailers would bear a significant portion of the upfront investment in next-generation smart meters and the associated infrastructure. These costs could then be recouped through subscription fees, service charges, or potentially passed on to consumers through adjustments in energy tariffs. It is possible that supplemental data- not the real time meter data described in this consultation- that is generated by Sense AI, may be sufficiently valuable for other uses cases such as DNSPs such that mechanisms that are rules compliant may be established that enable cost sharing to add vital real time data capabilities for DNSPs such as Sense AI.

Conclusion:

Improving access to real-time energy data through next-generation smart meters involves various costs, including hardware, software, installation, integration, data management, and consumer engagement. Determining the precise magnitude of these costs requires a detailed analysis based on specific implementation choices and market conditions.

d) Do the benefits of improving access to real time data outweigh the costs?

Benefits vs. Costs of Real-Time Data Access

The benefits of improving access to real-time energy data outweigh the costs, particularly when considering the long-term impact on consumers, energy retailers, and the grid as a whole. Sticking to the cheapest and minimum cost meters that provide only revenue and network balancing information, carry an opportunity cost for the coming 10-15 years, that the energy transition must side-step the legacy meter. Costs associated with implementing next-generation smart meters and AI-powered software, may be weighed against the substantial value generated by these technologies over the 10-15 year life, leading to a compelling case for their adoption.

Significant Financial Benefits:

- **Optimised energy bills for consumers:** Consumers can achieve significant reduction of wasted energy on their energy bills through real-time data insights and personalized recommendations. Estimates suggest average savings of 8% (AUS$200-AU$500 oer year). At the same time, increased electrification is the aim to reduce fossil fuels such as car fuel, and gas-fired heating, so energy efficiency and net zero benefits may actually have increased electrification costs, but with far more energy efficiency, making this technology a highly cost-effective energy efficiency measure.
- **Lower power costs for energy retailers:** Real-time data enables more accurate demand forecasting and optimized energy purchases, leading to reduced power costs for retailers. Additionally, effective demand response programs facilitated by real-time data can help avoid the need for expensive and unsustainable backup power sources during peak demand periods.
- **New revenue streams for retailers:** The data generated by next-generation smart meters can be leveraged to create new revenue streams for energy retailers. These include commissions from sales to Distributed Network Service Providers (DNSPs) for grid management services, and opportunities to develop new business lines in areas like home insurance, elder care, and pre-emptive maintenance.

Transformative Value Beyond Financial Gains:

- **Enhanced customer engagement:** Real-time data empowers consumers to actively manage their energy consumption, fostering a sense of control and leading to increased satisfaction and loyalty towards energy retailers. This

translates to improved customer retention, reduced acquisition costs, and lower customer service expenses.
- **Improved grid stability and reliability:** Real-time data enables more efficient grid management, facilitating effective demand response programs and supporting the integration of renewable energy sources. This contributes to grid stability, reduces the risk of power outages, and promotes the transition towards a more sustainable energy future.
- **Active role in the energy transition:** Consumers gain the ability to actively participate in the energy transition, making informed decisions about their energy consumption and supporting the adoption of electric vehicles and other clean technologies.

Cost-Effectiveness and Scalability:

- **Software-driven solution:** The core technology driving these benefits is software-based, leveraging AI and machine learning algorithms running on next-generation smart meters. This approach eliminates the need for expensive hardware installations beyond the smart meter itself, making the solution highly scalable and cost-effective.
- **Marginal cost of software:** The software subscription fee for services like Sense represents a relatively small cost compared to the substantial value generated by the technology. Moreover, this cost is only incurred when consumers choose to download the app and access the full range of features.
- **Long-term benefits:** Next-generation smart meters are designed to last for 15+ years, ensuring that the benefits of real-time data access extend over a significant period. This long-term perspective further strengthens the case for investing in these technologies, as the value generated over time will far exceed the initial costs.

Conclusion:

There is a compelling argument in favor of improving access to real-time energy data. While costs are involved in implementing these technologies, the significant financial benefits, enhanced customer engagement, improved grid stability, and active role in the energy transition create a strong case for their adoption. The software-driven nature of the solution, combined with its scalability and long-term benefits, reinforces the notion that the value generated by real-time data access far outweighs the associated costs.

Question 3: Do metering parties currently have a competitive advantage?
a) Do you agree with the proponent that metering parties have a competitive advantage in providing services not related to their core functions of settlement, billing and maintenance?

Metering Parties and Competitive Advantage in Providing Non-Core Services

The metering parties might indeed have a competitive advantage in providing services beyond their traditional roles of settlement, billing, and maintenance. This advantage stems from their unique access to real-time data generated by next-generation smart meters and their ability to leverage this data through AI-powered software. The advantages may have been reflected in the negotiated and possibly subsidized capital costs and annual service costs, so should not be assumed to have been gifted to the metering party.

Access to Real-Time Data as a Key Differentiator:

- **Investment** Metering parties have already invested in providing services beyond their core functions in a competitive market. This suggests they recognize the potential of expanding their offerings and leveraging their existing infrastructure and expertise.
- **Investment in grid edge intelligence capability** Sense, a software provider for next-generation smart meters, unlocks valuable data for energy retailers, allowing them to engage customers, shift load cost-effectively, reduce service costs, and explore new revenue streams. This highlights how real-time data enables a range of services beyond traditional metering functions.
- **Investment in grid data capability** Sense can provide valuable data services to Distributed Network Service Providers (DNSPs) based on the insights derived from real-time data. This includes Grid capacity and resilience AI capabilities, and demand response support, indicating how metering parties can leverage their data access to offer specialized services to other stakeholders in the energy ecosystem.

AI-Powered Software as a Value Multiplier:

- **New Value Cases** Sense as an AI software solution transforms smart meters into distributed grid edge processing platforms capable of delivering new value propositions. Metering parties can leverage AI to extract actionable insights from real-time data and create innovative services.

- **Differentiated metering propositions** underscore the uniqueness of Sense's approach, combining high-resolution data with AI to unlock unparalleled insights into homes and the grid. This suggests that metering parties equipped with such technology can differentiate themselves by offering superior data analytics and services compared to competitors focusing on cheap, limited functionality legacy meters that lack essential grid edge capabilities for the coming 10 -15 years of energy transition use cases.

Potential Barriers to Competition:

- Removing barriers and ensuring simplicity in accessing new energy services for consumers. This implies that regulations and market structures should foster a competitive environment that allows various players to offer innovative services based on real-time data, and not solely focus on price.
- Metering parties might advocate for technology choices that benefit their existing capabilities and potentially create barriers for competitors using alternative technologies. Guidance to meter parties in specifications of future needed capabilities such as grid edge processing, high resolution data, low cost broadband data communications is important so that the selection isn't simply the cheapest low functionality meter possible, that precludes consumer participation in the energy transition that depends on real time data, grid edge intelligence, and high resolution data.

Considerations for a Balanced Market:

Balanced market A competitive market should ensure that consumers benefit from the value generated by their data, regardless of which entity provides the services and that value may be indirect and part of a commercial service.
Commercial basis there is a need for appropriate commercial arrangements for accessing meter data, suggesting that fair and transparent pricing models are essential to foster a healthy competitive landscape.

Conclusion:

Metering parties possess a potential competitive advantage in providing services beyond their core functions due to their unique access to real-time data and ability to leverage AI-powered software. However, it's crucial to ensure a level playing field where other market participants can also access and utilize this data to offer innovative services. This requires clear regulations, fair pricing models, and a focus on consumer rights and benefits to foster a competitive and dynamic energy market that ultimately serves the best interests of all stakeholders.

b) How would any competitive advantage impact the costs of new energy services to consumers?

Impact of Competitive Advantage on Consumer Costs

There are tensions and tradeoffs between the potential for lower costs through competition and the possibility of higher costs due to a lack of competition or strategic choices made by metering parties. Also between lower factory procurement costs, with later higher cost field fit uplifts to unlock essential energy transition use cases.

Potential for Lower Costs through Competition:

- **More choice but not necessarily lower cost** consumers to access new energy services should be as simple as possible, removing barriers and aligning with the existing market setup. This suggests that a competitive market where multiple providers can offer these services will provide consumers with more choice , but likely will cost Consumers more rather than less, due to the economics of large scale factory fit solutions compared to retrofit aftermarket solutions with far lower quantities, and higher customer promotion and acquisition costs of retrofit competitors, that reduce the investment in the product itself.

Possibility of Higher Costs Due to Limited Competition:

- Factory Fit leverages economies of scale, and metering parties have made investments in providing new energy services, and allowing them to leverage their existing infrastructure could potentially lead to lower costs. However, there are many factors that contribute to consumer pricing, so economies of scale may create competitive advantage but also may might not translate into lower prices for consumers.
- **Meter providers** interest in promoting ubiquitous communications options such as Wi-Fi or 4G data as the communication standard for smart meters, aligning with their existing technology strategy, reducing economic costs, where new technologies are required to be developed and manufactured to meet specifications, competitive disadvantages in cost, delivery will likely result.

Strategic Choices and Their Impact on Pricing:

- Sense charges meter parties an annual subscription fee for its software services and that next-generation smart meters cost slightly more than legacy meters.

While these costs are deemed a fraction of the incremental value generated, the pricing strategy of metering parties will ultimately determine how these costs are passed on to consumers.

- Sense subscription fees are only charged if the consumer downloads the app. This suggests that metering parties might offer tiered pricing models, allowing consumers to choose the level of service and features they desire, potentially providing more affordable options for cost-conscious consumers.

- Sense data services such as DNSPs grid capacity and EV charging detection may in some cases be deployed without requiring full consumer subscription downloads potentially lowering pricing for metering parties.

Balancing Competition and Consumer Protection:

- Balanced fair commercial arrangements so that metering parties have fair compensation and return on their operational costs when providing meter data
- **Fair** and transparent pricing models for accessing meter data, suggests that regulators may play a role in ensuring a level playing field for different market participants and preventing anti-competitive practices that could harm consumers.

Conclusion:

The impact of a competitive advantage on consumer costs for new energy services is complex and depends on factors like market structure, regulatory frameworks, and the strategic choices made by metering parties. While competition has the potential to lower costs by driving innovation and efficiency, it's crucial to ensure a balanced market where consumers have access to diverse options, data rights are protected, and pricing models are fair and transparent. Striking this balance will be essential to realizing the full benefits of the energy transition while protecting consumer interests.

Question 4: Do DNSPs need more than PQD to improve network planning and operation?

a) Do the benefits of improving DNSP access to real-time data outweigh the costs?

Benefits vs Costs of Improved DNSP Access to Real-Time Data

Improving DNSP access to real-time data could offer significant benefits that far outweigh the associated incremental costs. This conclusion stems from the numerous use cases enabled by real-time data, leading to improved grid management, enhanced reliability, and potential cost savings that can ultimately benefit consumers.

Benefits of Real-Time Data for DNSPs:

- **Enhanced Network Planning and Operation:** Access to real-time data leads to positive returns in grid analytics and optimization. DNSPs can leverage this data to improve network planning, optimize grid capacity and asset utilization, and proactively address potential issues, particularly at the grid edge.
- **Specific Use Cases:** Various use cases for real-time data at the grid edge with high resolution analytic insights provide significant additional data to augment current advanced power quality data (PQD). These include network model validation, meter-to-transformer mapping, phase identification, capacity planning, voltage performance monitoring, network anomaly detection, energy diversion detection, and EV detection. This breadth of applications demonstrates the significant value that real-time data can bring to DNSP operations.
- **Improved Demand Forecasting:** Real time appliance level data, combined with weather and historical billing data, allows for more accurate demand forecasting. While this example pertains to energy retailers, the same principle applies to DNSPs, who can benefit from improved forecasting to optimize grid operations and plan for future capacity needs.
- **Targeted Demand Response:** Real time data allows for targeted demand response, enabling energy retailers to request consumers to reduce usage from specific devices. This same capability can be valuable for DNSPs facing localized grid constraints, allowing them to implement targeted demand response measures to alleviate congestion and maintain grid stability.
- **Fault Detection and Localization:** Sense's ability to identify and locate faults on the low and high voltage grid using real-time data from next-generation smart meters. This capability can significantly enhance grid reliability by enabling DNSPs

to quickly pinpoint and address faults, minimizing downtime and improving service quality for consumers.

Costs of Improved Data Access:

- **Significantly improved DNSPs** access to real time high resolution grid edge data would incur costs, and depending on the meter parties involved, may represent data services that help defray the costs of meter services for consumers.

- **Potential Cost Areas:** Potential cost areas, including coordination efforts to provide access to the grid edge data and the development and operation of secure API services to provide and ingest data.

- **Factors Influencing the Cost-Benefit Analysis:**

- **Technology Implementation:** The costs associated with improving DNSP data access will depend heavily on the chosen technology and implementation approach. Wireless communication based on the latest technological advancements, which could potentially reduce installation and maintenance costs compared to wired solutions.
- **Data Sharing Arrangements:** The specific data sharing arrangements, including data formats, security protocols, and access rights, will also impact costs. Standardized data format developed through collaboration between key industry stakeholders, which could streamline data exchange and reduce integration costs.
- **Regulatory Framework:** The regulatory framework governing data access, privacy, and security will influence both costs and benefits. Referencing relevant existing standards to ensure harmonization and minimize compliance costs while maintaining strong data protection.

Conclusion:

The numerous benefits enabled by improved DNSP access to real-time data, including enhanced grid capacity planning, improved reliability and resilience, and targeted demand response, each strongly suggest that the benefits outweigh the costs.

b) What are the use cases for DNSPs and other network planners to have access to real-time data other than advanced PQD?

Use Cases for Real-Time Data for DNSPs Beyond Advanced PQD

A number of use cases for DNSPs and network planners to access real-time data beyond just advanced power quality data (PQD), highlighting how this information can be leveraged to improve grid management and reliability.

Network Insights and Planning:

- **Network Model Validation:** Real-time data from smart meters can be used to validate and refine existing network models, ensuring their accuracy and effectiveness in representing the actual grid conditions.
- **Meter-to-Transformer Mapping:** Identifying the specific meters connected to each transformer is crucial for understanding load distribution and planning localized grid upgrades or maintenance. Real-time data can facilitate this mapping process.
- **Phase Identification:** Accurately identifying the phase of each connection is essential for balanced load distribution and preventing potential issues. Real-time data can assist in determining phase connections.
- **Capacity Planning:** By monitoring real-time load patterns, DNSPs can gain insights into capacity utilization and plan for future infrastructure investments to accommodate growing demand or the integration of new technologies like EVs and renewable energy sources.

Operational Enhancements:

- **Voltage Performance Monitoring:** Continuous monitoring of voltage levels across the grid using real-time data enables DNSPs to identify areas with voltage deviations and take corrective actions to maintain voltage stability and ensure reliable power delivery to consumers.
- **Network Anomaly Detection:** Real-time data analysis can help identify unusual patterns or deviations from normal grid behavior, signaling potential issues like equipment malfunctions, outages, or even energy theft. Early detection of these anomalies allows for proactive intervention, preventing more significant problems and improving grid resilience.

- **Energy Diversion Detection:** Real-time monitoring of energy flows can help detect instances of energy diversion or theft, allowing DNSPs to investigate and address these issues, protecting revenue and ensuring fair energy distribution.
- **EV Detection and Integration:** Real-time data from smart meters can be used to identify households with EVs and track their charging patterns. This information is crucial for understanding the impact of EV charging on the grid and developing strategies to manage this growing load, such as targeted demand response programs or time-of-use tariffs.

Additional Applications:

- **Targeted Demand Response:** Real time data enables targeted demand response, allowing DNSPs to request consumers to reduce usage from specific devices during periods of high demand, over generation periods, and localized grid edge constraints. This approach is more effective and less disruptive than traditional demand response methods, as it focuses on the most energy-intensive appliances and empowers consumers to participate in a targeted and informed manner.
- **Fault Detection and Localization:** Real-time data from next-generation smart meters can be used to identify and locate faults on both low and high voltage grids, enabling faster response times and improved service restoration. This capability is crucial for enhancing grid reliability and minimizing downtime for consumers.

By leveraging real-time data for these diverse use cases, DNSPs and network planners can optimize grid operations, enhance reliability and resilience, and facilitate the integration of new technologies, ultimately benefiting consumers with a more reliable and efficient energy system.

Question 5: Who should have a right to real-time data in the NER?

a) Should consumers, their authorised representatives or any other party, including DNSPs, have a right to access real-time data?

Rights to Access Real-Time Data: A Multi-Faceted Perspective

While there is no outright declaration of whether these parties should have an inherent *right* to access, our response is most helpful at this stage to highlight the potential benefits and considerations surrounding data access for these stakeholders.

Consumer Access: Empowering Informed Energy Management

- **Consumer Engagement:** The essential role of real time data in empowering consumers to actively manage their energy usage. By providing consumers with insights into their real-time energy consumption, appliance-level breakdowns, and comparisons to neighbors or historical usage, they can make more informed decisions to reduce their energy bills, participate in demand response programs, and contribute to broader energy efficiency and sustainability goals.
- **Customer Retention and Acquisition:** The positive impact of real-time data on customer retention and acquisition for energy retailers. By offering consumers valuable insights and tools for managing their energy, retailers can differentiate their offerings and foster stronger customer relationships. Consumer access to real-time data is beneficial not only for individual consumers but also for the energy market as a whole, as it encourages competition and innovation in customer-centric services.
- **Customer Preferences and Control:** The importance of respecting consumer preferences and control when it comes to data access and the use of energy management technologies. Consumers should have the ability to set their own preferences, control data sharing, and opt out of programs or features that they are not comfortable with. This approach ensures that consumers feel empowered and engaged in the energy transition rather than feeling like their data is being used without their consent or understanding.

DNSP Access: Enhancing Grid Management and Reliability

- **Use Cases Beyond PQD:** Various significant use cases for DNSP access to real-time data beyond advanced PQD. These use cases, discussed in our previous response, encompass network planning, operational enhancements, and applications like targeted demand response and fault detection. Real-time data can provide DNSPs with a granular view of grid conditions, enabling them to make more informed decisions to optimize grid operations, enhance reliability, and respond proactively to potential issues.

- **Grid Balancing with Renewables:** Significant and growing challenges of grid balancing with increasing integration of variable renewable energy sources. Real-time data from smart meters can provide DNSPs with the visibility and insights needed to manage these fluctuations effectively. By understanding real-time energy demand and supply patterns, DNSPs can optimize the use of renewable energy resources, minimize reliance on fossil fuel-based backup generation, and maintain grid stability.

Considerations and Potential Concerns:

- **Privacy and Data Security:** It is important to address consumer privacy and data security concerns associated with real-time data access. This requires the implementation of appropriate safeguards and security protocols to protect sensitive consumer information from unauthorized access, misuse, or breaches. Adherence to relevant industry standards and best practices, as suggested is crucial in this regard.
- **Data Ownership and Commercial Arrangements:** These topics require further discussion and regulatory clarity to ensure fairness and transparency for all stakeholders. It is essential to differentiate the currently generated meter AMI revenue and network balancing data that is the subject of this consultation's definition of real time data, from the very broad and growing potential sources of energy data from many sources behind the meter.
- **Cost Allocation:** Different scenarios may warrant different commercial arrangements for accessing meter data. While in some cases it may be valid that consumers may already be paying for metering data through line charges, but this does not explicitly address the potential costs associated with providing real-time data access to various parties, which is a significant operational service undertaking. Determining how these costs are allocated among consumers, DNSPs, energy retailers, and other stakeholders is an important consideration that requires further analysis.

- There is a compelling case for enabling real time data for consumers, their authorized representatives, and DNSPs, with strong potential benefits for individual energy management, grid optimization, and the energy transition as a whole. However, it is essential to address concerns surrounding privacy, data security, ownership, and cost allocation to ensure responsible and equitable data access that respects consumer rights while enabling the efficient and sustainable operation of the energy system.

Question 6: How should real-time data be defined ?

Defining "Real-Time" Data in the Energy Sector

A legal definition that real time data in this consultation is useful to refer to revenue grade customer billing data that is produced by the revenue certified MID part of a meter on a few second basis and includes the notion of historical data for a reasonable period before the requested data.

A consideration is that If the single legal definition above relating to periodic low resolution meter billing data is not the same category of data as energy data generated from a variety of sources n the consumer side of the meter, nor data on the grid side of the meter.

Consumer Perspective: Real-Time Feedback for Engagement

- **Instantaneous Feedback:** From a consumer perspective, "real-time" data often refers to information delivered with minimal delay, ideally within a 1-2 seconds. This allows consumers to associate their actions, such as turning on a device, with the immediate feedback displayed in an application. This instant feedback is crucial for consumer engagement and understanding of their energy consumption patterns.
- **Relatable Timeframes:** Consumers need to be able to relate what they see in their energy management applications to what's happening in their homes. Delays exceeding a few seconds make it difficult for consumers to connect their actions with the displayed energy data, hindering their ability to make informed decisions about their energy usage.

- **Device level detail** Real time presentation of information to consumers requires milliseconds of high resolution data to be processed in order to surface information insight data to consumers in 1-2 seconds.

Grid-Side Functionality: Varying Definitions Based on Use Case

- **Broad Range of "Real-Time":** For grid-side functionality, the definition of "real-time" can vary widely depending on the specific application. Some applications may tolerate delays of minutes, while others require responses within milliseconds.
- **Grid Planning and Operations:** Delays of minutes are often acceptable for grid planning and operations, although the value of insights increases with shorter delays.

- **Critical Grid Events:** For events like downed wire detection and cutoff, response times need to be in the hundreds of milliseconds to ensure safety and minimize damage. Similarly, grid services involving distributed energy resources (DERs) require responses within a few milliseconds to maintain grid stability and ensure seamless integration of these resources.

Data Frequency and Accessibility:

- **High-Resolution Data Sampling:** Next-generation smart meters are capable of collecting high-resolution energy data, sampling voltage and current waveforms at least 6,500 times per second. This allows for a detailed, real-time view of device usage and grid conditions.
- **Remote vs. Local Data:** "Real-time data" can refer to both remote data, which may be available with delays ranging from minutes to 30 minutes, and local real-time data, which is accessible at a much higher frequency directly from the meter.
- **Standardized Data Format:** A standardized data format for real-time data is essential for interoperability and efficient data exchange between different stakeholders. This would facilitate the development of applications and services that can leverage real-time data effectively.

Challenges and Considerations:

- **Data Volume and Processing:** The vast amount of data generated by next-generation smart meters necessitate efficient data processing and management techniques. Distributed computing models, where much of the processing happens locally on the meter, can help address this challenge.
- **Network Capacity:** While distributed computing reduces the need for constant data transmission, certain use cases still require reliable and low-latency network connections. Ensuring sufficient network capacity is crucial for supporting real-time applications.

Overall, defining "real-time" in the energy sector requires considering:

- **The intended use case and the required response time.**
- **The frequency and resolution of data sampling.**
- **The accessibility of data, whether remotely or locally.**
- **The need for standardized data formats for interoperability.**

By clearly defining "real-time" for different applications, stakeholders can leverage high-resolution energy data effectively, enabling more efficient grid management, enhanced consumer engagement, and a smoother transition to a more sustainable energy future.

a) Do stakeholders agree with the proposed definition of real-time data and customer power data?

Stakeholder Agreement on Real-Time Data Definition: Limited Evidence

As shown above, multiple valid definitions of 'real time' data exist that are valid in the context of the data's purpose and use. Customer Power Billing Data appears to be quite close to describing the definition provided of the Real Time Data. So stakeholders may agree that its possible to reach a reasonable definition of "customer power billing data." However, there isn't a single specific quantitative definition of real time data due to the use cases examples provided above.

To add more confusion and potential disagreement, some vendors fudge the framing of their non real time products as 'good enough' or 'near real-time' with partial or summary data or compute power that hamstrings utility decisions on how to use that data. This suggests that some providers might market their solutions as "real-time" despite not meeting a rigorous definition, and potentially leading to disputes about what constitutes true real-time data.

Potential discrepancy in understanding "real-time data," stating that "Remote data may be in the order of 5 minutes, or down to 1 minute for a selection of endpoints and available within 30 minutes. Local real-time data may be available at a higher rate." This differentiation between remote and local data, with varying timeframes associated with each, further complicates the definition and might lead to differing interpretations among stakeholders.

Further research and analysis of industry discussions and regulatory frameworks are necessary to understand the level of consensus and potential areas of disagreement regarding the definition of real-time data in the energy sector. Categorization terms such as AMI 1.0 and AMI 1.5 and AMI 2.0 differentiate using different resolution, compute power at the edge, and real time data.

b) What should be defined and/or further expanded in AEMO procedures?

Areas for Definition and Expansion in AEMO Procedures Regarding Real-Time Data

Based on the sources provided, several key aspects related to real-time data require further definition and expansion in AEMO procedures to ensure clarity, interoperability, and effective implementation of real-time data frameworks.

By addressing these areas, AEMO procedures can establish a robust and well-defined framework for managing real-time data in the Australian energy sector. This would ensure a smoother transition towards a more data-driven energy system, enabling more efficient grid operations, enhanced consumer engagement, and the effective integration of distributed energy resources and innovative energy services.

Further research and consultation with industry stakeholders and relevant regulatory bodies may be necessary to develop comprehensive and well-informed AEMO procedures.

c) Should data be validated or not?

Data Validation: Essential for Reliability and Trust

Meter MID data used for producing bills already has certified revenue calibration in order to be used as the basis for billing. And MID produced periodic network balancing data is secure and certified for accuracy with the same calibrated CTs in the meter. Other supplemental data is less sensitive and doesn't require the same level of certification as billing and settlement data and network balancing data.

Question 7: How should real-time data be accessed and shared?

a) Do parties, other than metering service providers, need to locally connect directly to the meter to access real-time data? If so, what changes are needed to enable this?

Direct Meter Connection for Non-MSPs: A Balancing Act

A nuanced view on the necessity for parties other than Metering Service Providers (MSPs) to have direct local connections to smart meters for real-time data access.

Here's a breakdown of some of the considerations:

Direct Connection: Useful but Not Always Necessary

- there are scenarios where direct local connections could be beneficial, particularly when existing physical interfaces, primarily designed for meter reading, are insufficient.
- However, utilizing wireless technology for any additional interface requirements, capitalizing on the latest advancements in this area. This suggests that direct connections should not be the default approach, especially given the rapid evolution of wireless capabilities.

Wireless Communication and Edge Computing: The Preferred Approach

- The potential of wireless communication and edge computing to eliminate the need for direct connections in many cases.
    - **Existing AMI insufficient for** transmitting the massive volume of high-resolution real-time data generated by next-generation smart meters to utilities or service providers. A distributed computing model where processing happens locally on the meter, significantly reducing network demands.
    - next-gen meters can leverage WiFi or cellular networks for data transfer, negating the need for direct connections in many use cases.
    - The value of AI software residing on next-generation meters. Data analysis and insights can be derived locally, lessening the reliance on accessing raw meter data.

Alternative Data-Sharing Arrangements: Facilitating Broader Access

- Simplifying access to new energy services for consumers, advocating for the removal of barriers while staying within the existing market framework. This points toward the need for rule changes that facilitate data sharing without requiring direct access to meters. These changes could involve implementing secure data-sharing platforms, developing APIs for data access, or establishing standardized data formats for seamless data exchange between stakeholders.

b) Are there alternative data sharing arrangements that should be enabled by a rule change, if Made?

Alternative Data-Sharing Arrangements: Enabling Secure and Efficient Access

Data-sharing arrangements that could be facilitated by rule changes, moving away from direct local connections to smart meters and towards a more secure, efficient, and accessible data ecosystem.

APIs for Data Access: The potential of Application Programming Interfaces (APIs) to enable seamless and standardized access to real-time data. APIs provide a structured way for different software systems to communicate and exchange data. By implementing APIs for smart meter data, authorized parties could retrieve specific data points or datasets without requiring direct access to the meters themselves. This approach promotes interoperability, simplifies data integration, and reduces the need for complex data-sharing agreements.

Question 8: Who should bear the costs of accessing real-time data?

a) Should all consumers bear the cost of accessing real-time data?

The Cost of Real-Time Data Access: A Complex Equation

There are potential benefits of widespread access to such data, but we recognize the financial implications and the need for a balanced approach that considers various factors.

Arguments against Universal Cost Allocation:

- **Value Proposition Discrepancy:** The value proposition of real-time data access may vary significantly for different consumers. For example, consumers who actively engage with energy management tools and are motivated to reduce their energy consumption or participate in demand response programs are likely to derive greater value from real-time data than those who remain passive.

- Sense app users can reduce their energy consumption by an average of 8% and are more likely to participate in demand response events, highlighting the tangible benefits for engaged consumers. However, for consumers who are less inclined to actively manage their energy usage, the value of real-time data might be perceived as lower. Imposing the cost on all consumers, regardless of their level of engagement and potential benefit, could be seen as inequitable.

- **Affordability and Accessibility Concerns:** make energy services accessible to all consumers, regardless of their financial means. Customer acquisition can be expensive and that discounts are often necessary to attract new customers. In this context, adding the cost of real-time data access to all consumers could create a barrier to entry for price-sensitive households, potentially exacerbating energy affordability issues.
- **Alternatives for Non-Engaged Consumers:** data-sharing arrangements could be implemented to cater to the needs of consumers who are not actively seeking real-time data. For instance, a non-real-time consumption breakdown could still be provided to consumers, offering some level of insight without the associated cost of real-time data access. This approach would allow for a tiered system where consumers who desire real-time data can opt in and bear the associated costs, while others can access a more basic level of information at a lower cost or potentially no additional cost.

Arguments for Shared Responsibility:

- **Collective Benefits of Grid Modernization:** There are collective benefits of grid modernization and the transition to a more sustainable energy system. Real-time data plays a crucial role in enabling these advancements by facilitating grid optimization, demand response programs, and the integration of renewable energy sources.

- next-generation smart meters, with their ability to provide real-time load disaggregation, can help manage the grid more effectively, reduce the reliance on expensive and unsustainable backup power sources, and support sustainability goals. As these benefits accrue to all consumers, there is an argument to be made for sharing the costs associated with enabling these advancements, including the cost of real-time data access.
- **Incentivizing Engagement and Innovation:** imposing a cost on real-time data access could incentivize consumer engagement and foster innovation in the energy sector. By placing a value on real-time data, consumers are more likely to actively utilize the information to optimize their energy consumption, participate in demand response programs, and seek out energy-efficient solutions.
- consumers with access to real-time data through the Sense app reduce their consumption by an average of 8%, highlighting the potential for cost savings through active engagement. Furthermore, there is potential for new business innovations leveraging real-time data, such as home insurance, elder care, and pre-emptive maintenance. These innovations could generate additional value for both consumers and energy providers, potentially offsetting the cost of data access.
- **Funding Future Grid Investments:** There are ongoing investments in grid infrastructure to support the energy transition. The cost of providing real-time data access could be partially offset by the revenue generated from these new services. **There may be** potential for energy retailers to earn commissions from sales to Distributed Network Service Providers (DNSPs) based on insights derived from real-time data. By channeling a portion of this revenue towards subsidizing the cost of real-time data access for consumers, a more sustainable funding model for grid modernization could be established.

b) What would be the benefits of a dispute resolution framework and how should it operate?

Benefits and Operations of a Dispute Resolution Framework for Real-Time Energy Data Access

There are potential benefits and operational considerations of a dispute resolution framework within the context of real-time energy data access. Such a framework would be crucial in addressing disagreements and ensuring fair and efficient resolution of conflicts that may arise between various stakeholders, including energy retailers, consumers, and Distributed Network Service Providers (DNSPs).

A well-designed dispute resolution framework is essential for navigating the complexities of real-time energy data access, promoting fair and efficient resolution of conflicts, and fostering a stable and innovative energy market. By incorporating the benefits and addressing the operational considerations outlined above, such a framework can help ensure that the transition to a more data-driven energy system benefits all stakeholders while safeguarding the interests of consumers and promoting the development of a more sustainable and resilient energy future.

Question 9: What changes would be required to ensure interoperability ?

a) Would changes to the minimum services specification requirements be the most effective way to ensure interoperability of real-time data?

Examining Minimum Service Specifications and Real-Time Data Interoperability

While modifying minimum services specification requirements might contribute to enhancing real-time data interoperability, it is essential to consider a multifaceted approach. This involves utilizing existing standards, adopting wireless communication technologies, and carefully evaluating the costs and benefits for all parties involved. A well-balanced strategy will help create a more interconnected and intelligent energy ecosystem that empowers consumers, encourages innovation, and supports the transition to a more sustainable and resilient energy future.

b) Would any other changes be required to facilitate interoperability, for example, changes through device standards?

Additional Changes to Achieve Interoperability

In addition to changes in minimum services specification requirements, other modifications, particularly to device standards, could be crucial for achieving interoperability in the context of real-time energy data.

Achieving interoperability in real-time energy data requires a comprehensive approach involving changes beyond minimum services specification requirements. Standardizing device standards, particularly data formats and wireless communication protocols, emerges as a crucial factor in enabling seamless and secure data exchange across the energy ecosystem. However, it's vital to address security and privacy concerns while considering the cost implications of implementing such changes. A strategic approach balancing these aspects will be instrumental in leveraging the full potential of real-time data for a more efficient, reliable, and consumer-centric energy future.

Question 10: Do existing arrangements sufficiently protect consumer privacy and maintain cyber security for any real-time data framework?

Data Privacy and Cybersecurity in Real-Time Data Frameworks: Examining Existing Arrangements

Referencing existing standards and leveraging ongoing work programs are essential steps in enhancing consumer privacy and cybersecurity within a real-time data framework. However, they don't explicitly confirm if the current arrangements are sufficient. To comprehensively assess the adequacy of existing protections, a deeper understanding of the specific security measures currently in place, the evolving threat landscape, and the potential implications of new technologies and data sharing practices is necessary.

a) Would any additional consumer privacy and cyber security protections be required if a real-time data framework were implemented?

Consumer Privacy and Cybersecurity Protections in a Real-Time Data Framework

Additional consumer privacy and cyber security protections would likely be required if a real-time data framework were implemented. While the sources highlight the importance of leveraging existing standards and ongoing work programs, they also point to the need for continuous improvement and adaptation in the face of an evolving threat landscape.

In addition to technical measures, it's crucial to establish clear policies and procedures for data handling, access, and security.

By taking a proactive approach to security and privacy, real-time data frameworks can harness the benefits of data-driven insights while ensuring the protection of consumer information.

b) Do you consider other work programs could provide any additional protection required, such as the Roadmap for CER Cyber Security?

Additional Protection from Other Work Programs

initiatives focused on cybersecurity and data exchange, such as the Roadmap for CER Cyber Security and CER Data Exchange, could offer valuable contributions to enhancing the security of a real-time data framework. By integrating their guidelines, leveraging their expertise, and staying informed about their latest findings, the framework can benefit from a more comprehensive and proactive approach to security, ensuring robust protection for consumer data and the integrity of the energy infrastructure.