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SUBMISSION TO OPEN ENERGY NETWORKS CONSULTATION PAPER BY WATTWATCHERS DIGITAL ENERGY

Introduction

The Wattwatchers Digital Energy team applauds Energy Networks Australia (ENA), the Australian Energy Market Operator (AEMO) and the Australian Renewable Energy Agency (ARENA) on the Open Energy Networks initiative and consultation process.

Our team welcomes this opportunity to contribute via a written submission as well as through our participation in the workshop series.

This submission focuses primarily on how contemporary digital technologies can augment market architecture to enable the reliable, efficient and cost-effective integration of distributed energy resources (DERs) into electricity grids, with particular attention to:

- Real-time data for visibility and control of rooftop solar generation, on-site storage and strategic behind-the-utility-meter consumption loads.
- Engagement and empowerment of end consumers (who will own much of the DER and also the data that will allow it to be remotely monitored and controlled).
- Orchestration of demand response (DR) in tandem with DER to create 'virtual power and demand plants' that extend to small business and residential sectors with high levels of scalability and interoperability
- Opportunities to harness innovation from Australian and also international technology companies, many of them startups, to help solve the challenges faced by network businesses and grid operators in transitioning to grids with high levels of DER.

We agree, as indicated in the consultation paper, that the ENA, AEMO and ARENA should approach the Open Energy Networks equation from a position of 'technology neutrality' in terms of products and brands.

We further submit, however, that it should be 'technology proactive' in terms of identifying, and ensuring deployment of and access to, the core data/digital grid infrastructure that will be required to enable an orderly transition to a high-DER grid future with strong and informed consumer participation in the marketplace.

About Wattwatchers

Wattwatchers Digital Energy is an Australian-based technology company focused on devices, data, analytics and communications to make behind-the-meter energy management intelligent and connected, easy to install and operate, and cost-effective.

Wattwatchers specialises in cloud-enabled hardware to accurately monitor and control electrical circuits in real-time through the cloud - crossing over for residential, commercial and industrial, and utility use cases that include:

- Enabling distributed energy resources - solar PV, energy storage systems, EVs
- Behind-the-meter services and programs - consumer empowerment, demand response, energy efficiency, sub-metering, microgrids, analytics
- Internet of Things for Energy - integration with technologies from sensors and other hardware devices through to cloud platforms

Submission framing

In framing our submission, we note in particular the ENA's summary (on its website headed 'Solutions through collaboration') of a number of 'key issues' that have been identified by stakeholders during the workshop series. The ENA says:

These include immediate 'no regret' actions such as:

- Visibility of all distributed energy resources connected to the distribution system for both the networks and AEMO;
- Engaging better with the general public, through establishment of good communication and messaging (that is inclusive rather than talking at or down to them);
- Pricing and tariff reform;
- Possible rule changes; and
- Collaboration, innovation and knowledge sharing.

We submit that proactively supporting and accelerating the energy-tech innovation sector in Australia, embracing both homegrown players like Wattwatchers (and numerous others) and also international players, is another 'no regrets' path that can be implemented immediately, and which will help to address the 'key issues' outlined above.

A technology vision for Open Energy Networks

In responding to the above list of potential areas for immediate 'no regrets' actions, Wattwatchers urges ENA, AEMO and ARENA to think outside the square in terms of considering how emerging technologies will replace traditional energy industry models to underpin a digital-and-distributed electricity system (i.e. Grid 2.0).

Enabling technologies - with abundant real-time data and analytics, and intelligent tools - will support the evolution of a cleaner, more intelligent, distributed and electricity-dominated energy system. This is how millions of generation points, millions of storage points and millions of consumption points will be managed simultaneously with great precision at low transactional costs.

Key characteristics of this energy future will include:

- A vibrant community of innovative energy-tech startups and companies
- Informed and proactive consumer participation in the electricity system and marketplace
- New, 'fit for purpose' regulatory systems, market frameworks and energy industry business models; and
- Highly-distributed infrastructure connected to the cloud with over-the-air control capabilities via third-party services and also do-it-yourself consumer apps.

Technology paths for data and the digital grid

Currently we see three main paths for IoT and digitisation of the electricity sector, which are likely to unfold in unison with significant crossovers because none of them - based on today's technologies and regulatory requirements - can provide all of the solutions required on their own:

1. **Smart meters** with mainly software level innovation to make its benefits available to more stakeholders including consumers and operators - benefits from being increasingly ubiquitous and embedded in regulated markets, but is constrained by its inherent limitations to capture data and exert control, and also by industry relationships with consumers.

2. **Smart inverter systems** for solar PV and storage systems - which have the benefit of being integrated into distributed energy resources deployments, but have disadvantages because they are limited to DER, and are tied into manufacturers' 'vertical business models' with very substantial issues in regard to interoperability and sharing of data from what may become 'walled gardens'.

3. **Smart devices** (including Wattwatchers) which can work with many other hardwares (including smart meters and smart inverters) and many softwares - disadvantages include

extra cost on top of the regulated solution e.g. smart meters and embedded smart inverters if they are part of a DER investment, but the benefits include independence from the regulated market and greater flexibility (including control functionality in tandem with monitoring) and the ability to be deployed across many different site scenarios and a natural fit with more open access business models.

The Open Energy Networks initiative, the ENA, and network businesses working in unison can play a key role in creating large-scale and accelerated demonstration and rollout opportunities for finding workable mixes of technologies for a range of grid and site circumstances, including advocating regulatory 'sandboxes' where required.

Global leadership opportunity for Australia

The Open Energy Networks process provides an opportunity to create a world-leading operating environment across Australia for the development and implementation of widely-accessible technologies and intelligent solutions to accelerate the ongoing transition to a cleaner, fairer, more secure and affordable electricity system.

This will support the 'now' needs for affordability, reliability and carbon pollution reduction, and also the 'next' requirements for an intelligent, distributed and digital energy future, and can be achieved via:

- Rapid digitisation of the electricity system (i.e. fast-tracking Grid 2.0)
- A broad-based innovation agenda spanning hardware, software and cloud-based applications & also service and business models
- An open, outcomes-focused approach that is agnostic to brands, products, services and platforms (e.g. communications protocols, operating systems)
- Prioritising end-consumer engagement and involvement
- Overhauling outdated market frameworks, regulations and business models
- Proactively promoting energy-tech startups and supporting them to test, prove and then scale the best solutions.

The benefits of this strategy will include:

- Augmenting the effective integration of distributed energy resources into existing grids and the move to a clean electricity dominated energy future encompassing generation, distribution, storage, consumption and emerging additional major infrastructures (e.g. electric vehicles and their charging networks)
- Highly-granular, real-time visibility, analytics and control capabilities becoming available to key electricity system participants (including market operators and traders, regulators, network and retail businesses, energy services companies)

- Empowerment of energy consumers, enhanced protections and equity measures for vulnerable consumers, and growth of the expanding markets for demand-side and 'behind the meter' solutions and services
- Creation of new skills and jobs, and also investment and export opportunities for Australia.

Prioritise the role of the emerging energy-tech innovation sector

Wattwatchers submits that there are a number of specific policy drivers and responses that should be considered via the 'Open Energy Networks' initiative to create the pre-conditions for an effective digital-and-distributed grid.

What follows below is a summary of current barriers to energy-tech innovation, especially impacting on startups (like Wattwatchers, and also a number of other early and later-stage startups that we have consulted with) and both their product/service solutions, and proposed systemic solutions (i.e. policy responses).

1. **Core data problem** - 'energy data' is typically inadequate to support contemporary IT and IoT solutions for electricity and what data does exist is mainly restricted to regulated markets and proprietary systems and is not widely available on the internet nor readily accessible and controllable by consumers themselves.

   How to respond - proposed policy-based solutions include:
   - Require new-build homes and business sites to include accurate, real-time, cloud-connected monitoring of electricity including mains import/export, on-site generation and major loads (circuit-level). The ability to remotely control loads that are strategic for demand management (e.g. air-conditioning units, hot water systems, pool pumps) should also be considered.
   - Require new, grid-connected rooftop solar PV installations to include accurate, real-time, cloud-connected monitoring and remote export control.
   - Also have data sharing requirements to an appropriate 'open platform' whatever the technologies being used (e.g. smart meters, sub-meters, inverters/inverter-based solutions, IoT devices and sensors etc.)
   - Incentive program for existing rooftop solar PV system owners to retrofit accurate, real-time, cloud-connected monitoring and remote export control (may have a cut-in point such as for system sizes >3kW). An example would be a $250 rebate paid to solar installers offering this service to householders and businesses via a range of technology options (requires participating system owners to agree to data-sharing Terms & Conditions)
   - Similar incentive program for high energy-consuming existing homes and businesses, especially for low-income high-consumption homes

2. **Innovation problem** - the current market frameworks, regulatory systems and prevailing business models are inhibiting energy-tech innovation, including restricting opportunities to propose, test, refine and prove-up, and ultimately go to scale with new and better solutions.

   How to respond - proposed policy-based solutions include:
   - Innovation 'sandboxes' within the existing regulatory environments to allow commercial-scale piloting of solutions with targeted regulatory exemptions
   - Further investment in incubation and acceleration programs, and energy clean-tech startup support and investment (e.g. grants, loans, financing, venture capital). In particular, it would have the potential to 'lift many (if not all) boats' in the energy tech innovation space if ENA could coordinate larger-scale demonstration projects across multiple network businesses (to avoid the 'death by small pilot syndrome' that places excessive strain on poorly-resourced startup businesses).
   - Greater and more-focused use of government procurement to give innovators a head start on gaining market access (e.g. mandate PV with cloud-connected monitoring and control for all government and new buildings with suitable roof spaces)

3. **Consumer engagement problem** - most Australian consumers (5-6 million households) continue to have manual, analog energy meters and receive only quarterly or monthly bills in arrears to show how much energy they are consuming. Over 30% of the time these bills are estimated rather than read. Even consumers with 'smart meters' - including nearly all Victorian energy consumers (approx. 3 million households and businesses) - receive only limited data on their electricity consumption, restricted to their main grid connection, and reliant on utilities. Consumers 'own' their energy data in name only and don't have effective control for their own purposes and benefit.

   How to respond - proposed policy-based solutions include:
   - Deploy new classes of 'network devices' that service both consumer needs for data and control functionality and also network and market needs (e.g. DER and DR aggregation and orchestration)
   - Networks offer local incentives for peer-to-peer trading

4. **Equity problem** - the 'pain points' are rental properties, low-income and socio-economically marginalised households and apartment complexes

   How to respond - proposed policy-based solutions include:
   - ❏ Proliferate and incentivise workable solutions to extend connected solar PV solutions to rental properties addressing both landlords and tenants
   - ❏ Target community housing
   - ❏ Reform embedded networks and enable local microgrids

5. **Skills problem** - 'new energy' technologies offer highly-skilled and regionally-distributed job opportunities, but require new skills and training in inter-related fields e.g. electrical, communications, data processing

   How to respond - proposed policy-based solutions include:
   - ❏ Targeted skills development programs
   - ❏ Keep 'new energy' manufacturing in Australia

In conclusion

In parallel with the Open Energy Networks focus on creating the marketplace pre-conditions for a workable two-way electricity distribution system with high levels of DER infrastructure and orchestration, and also DR, Wattwatchers urges strong consideration of the opportunities to constructively 'orchestrate' energy tech innovation.

'Death by pilot' is a constant challenge for energy tech startups seeking to work with far larger and long-established utilities, both network businesses and retailers. Energy utilities tend to have very long timeframes for investment decision making, especially when hardware is involved, which can be ill-fitting with the typical start-up's need for speed.

ENA, with support from ARENA and AEMO, has clear potential to build on its Electricity System Transformation Roadmap initiative with the CSIRO release in 2017, and also the ARENA A-Lab collaboration work in the same year, by coordinating engagement for innovation. This could include proactively sponsoring regulatory sandbox opportunities for larger-scale technology 'demonstrate and develop' projects, potentially with multiple technology partners; and uniting the nation's network businesses into an Australian version of the Free Electrons global energy accelerator model, providing facilitated, structured and sustained opportunities for accelerating energy tech innovation.

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