28 November 2018

Ms Nicola Falcon
AEMO, Level 22
530 Collins Street
Melbourne Victoria 3000

Lodged via email to energy.forecasting@aemo.com.au

Friday 30/11/18

Dear Ms Falcon,

RE: National Electricity Market Demand Forecasting Methodology

ENGIE appreciates the opportunity to comment on the demand forecasting methodology issues paper.

ENGIE supports the stated objectives of transparency, accountability, but finds the third objective of accuracy inappropriate. This is because without a crystal ball, essentially any point forecast spanning a period of 20 years is going to be precisely wrong. In the current external environment there is a great deal of uncertainty spanning policy, technology, economy, customer preferences. The level of uncertainty is increasing, and it is therefore essential that uncertainty of forecasts is captured effectively.

1. Development and choice of scenarios and internal consistency

The current use of scenarios can be characterised as a “most likely”, “high” and “low” scenario approach. These are quite narrow and fail to capture the range of uncertainty in the energy space. Whilst feedback on the scenario development process is not specifically sought in this consultation, it has a dominant bearing on demand projections.

The scenario development process needs to capture the “driving forces of uncertainty” and to construct scenarios (different futures) that span the range of uncertainty.

For the energy sector the typical driving forces of uncertainty are economy, environment, technology and regulatory (ie regulated vs market-based approaches).

Within each of the scenarios, the choice of variables needs to be internally consistent. To pick a simple example, the number of new connections/housing starts will be different in a high economic activity and a low economic activity.

The range of scenarios need to cover the climate change (CC) policy uncertainty, ranging from strong CC action to no new policies (ie no action beyond what is currently being implemented).

The total number of scenarios needs to be kept manageable and understandable and 4-6 are generally seen as practical and effective. The use of three scenarios is generally discouraged as it tends to drive the most likely, high and low case limited thinking.

The scenario planning process (or scenario learning process) as developed and implemented by Shell is considered as most appropriate for AEMO demand forecasting.

2. Specific considerations

2.1. Aluminium smelter outlook

The aluminium Market is projected to reach USD 221.14 billion by 2023 with annual production growth of 6.48% during the 2017-2023 period (Ref 12/9/18 https://www.marketresearchfuture.com/check-discount/2031) . The key question is what will be Australia’s role in aluminium production? Given the large amount of electricity needed to refine aluminium, electricity prices are highly correlated with aluminium prices.

The competitiveness of Australia’s electricity prices will ultimately determine if there is growth in aluminium smelting in the future or if it spells demise of the industry.

In a future where differential climate change (CC) policies exist between countries, electricity price advantage will drive aluminium smelter loads to countries that don’t have costly CC policies or have a high amount of hydro generation (or large government subsidies). Australia fares poorly in this future as it doesn’t have a competitive price of electricity.

However, in a future with coordinated global climate change action, Australia’s abundance of renewable energy maybe of competitive advantage. In this future, it is expected that there will be growth in

aluminium smelting (with corresponding electricity demand growth) and Australia will be a “solidified electricity” exporter.

It is important for AEMO to factor in these futures when developing scenarios of future demand.

2.2. New connections projections

The current approach of using HIA housing start projections will not work in all scenarios and fails to capture discontinuities due to regulatory and economic changes. According to several property market experts, the housing sector is facing a perfect storm.

- Foreign buyers are being turned away for domestic and international reasons.
- Borrowing restrictions are reducing sales and new starts due to higher equity requirements
- Unsecured loans to part fund purchases (interest of 10-20%pa)
- Some 20% of housing loans are switching from interest only to interest and principal repayments. This is likely to accelerate distress sales.
- The Australian housing market is highly overvalued by global standards
- There is a better than even chance that the current price declines will accelerate

The HIA projections may provide a useful starting point for developing housing projections, but individual housing start forecast must be developed for each of the scenarios to ensure internal consistency.

2.3. Impact of electric vehicles

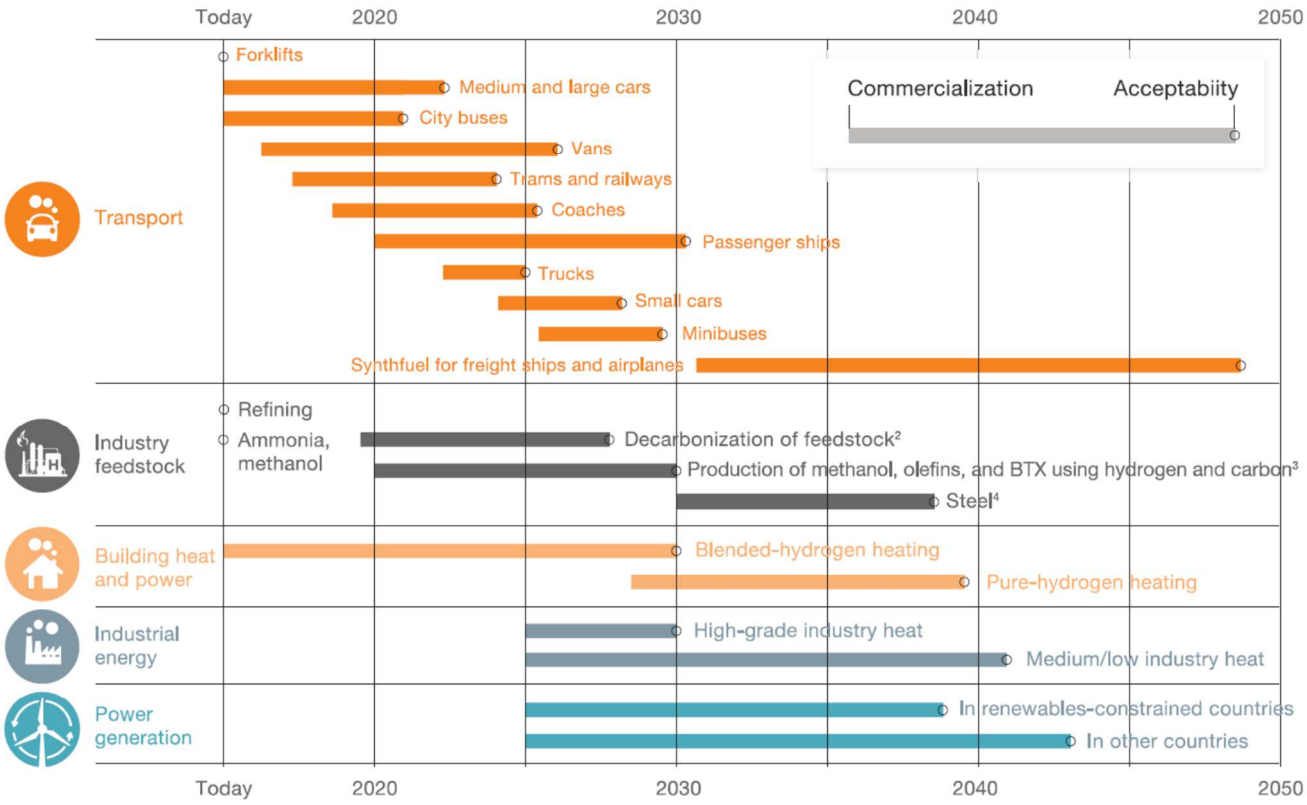
The impact of electric vehicles is far from certain, and multiple EV futures are equally likely. The current assumptions focus on battery storage EVs and the contemplated charging scheme is only one of the possibilities.

Clean transport is likely to include hydrogen either used in advanced internal combustion engines or used in fuel cell powered electric vehicles.

A recent McKinsey article (9/18) provides a good overview of the hydrogen uses as follows.

Hydrogen adoption could start with passenger cars and buses.

Hydrogen use from initial commercialization to mass-market acceptability, years



[1]Defined as sales >1% within segment in priority markets.
[2]Market share refers to the amount of feedstock that is produced from low-carbon sources.
[3]BTX refers to benzene, toluene, and xylene. Market share refers to the amount of production that uses hydrogen and captured carbon to replace feedstock.
[4]Direct-reduced iron with green hydrogen, iron reduction in blast furnaces, and other low-carbon steelmaking processes using hydrogen.

McKinsey&Company | **Source:** Survey and interviews with Hydrogen Council member companies

Reference https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/hydrogen-the-next-wave-for-electric-vehicles

Toyota hydrogen powered vehicle prototype in Australia.

Assumptions regarding transport will impact demand forecasting in the following ways.

- Battery powered vehicles may be used to reduce the evening peak by discharging into the grid.
- The low cost of electricity due to high penetration of PVs will incentivise
    - Battery EV charging during the day
    - Energy storage, including production of hydrogen
- On aggregate, these changes are expected to significantly impact the demand shape and network usage. The net effect is that the demand profile is expected to be quite different from the current status quo.

2.4. Residential pricing

With ever increasing PV penetration at the household level, the existing network pricing structure is unsustainable as it causes additional subsidies to flow from non-PV households to PV households. Non-PV households shoulder a larger portion of the network costs.

The direction set by the AEMC and the AER continues to be towards cost reflective network pricing.

Whilst the precise tariff structure isn't prescribed, efficient tariffs needs to reflect the fixed and variable cost components. Most of the network augmentation cost is driven by demand and this needs to be signalled to customers.

The net impact of network tariff changes will be to increase fixed charges, encourage demand management and to reduce the variable energy charge.

Such a shift in pricing will drive consumer behaviours and must be reflected in the methodology and AEMO scenario modelling. Since there will be a behavioural change, back casting (or projecting past trends) will not be useful in demand forecasting.

2.5. Peak demand projections

An accurate simulation of the peak demand (often referred to as "needle peak" and its shape) is critical to any reliability study quantifying unserved energy. Whilst the methodology description in the document appears sound, it lacks detail.

The generic distribution curves in Figure 10 on p36, need to be replaced with an illustration featuring actual results. References to a goodness of fit need to be illustrated to show the actual demand points on a distribution function, and specifically show how it captures the "needle peak" part of the demand accurately.

2.6. Smart home devices impact demand

There is significant growth in smart home systems and appliances. These range from control hubs to smart field devices, security cameras, alarm sensors and thermometers (Google Home Hub, Nest, TP Link Smart Plug etc). Most of these devices are networked over a Wi-Fi and are typically powered 24/7. The consumption of all these devices, the network infrastructure (switches and routers) and the internet connection can easily consume 2kWh per day (730kWh per annum).

Growth of these devices on aggregate will impact forward demand and need to be factored into the scenarios/projections and will offset some of the energy savings in other areas of demand management.

2.7. Presentational suggestions:

The document should include a list of abbreviations in the methodology document.

The list of references is extensive however it doesn't contain recent local studies and projects, such as the AEMO sponsored university studies/research. These should be included and made available on the AEMO website.

2.8. Detailed documentation

The methodology document covers the principles in preparing demand projections but lacks detail.

It should be possible for participants to follow AEMOs methodology to replicate the results and/or to make changes to some of the assumptions/variables and produce new demand which is consistent with the AEMO demand projection. This is essential for meaningful comparison of results between scenarios/assumptions.

ENGIE recommends that complete and detailed documentation for demand forecasting is made available to participants.

It would be useful to split the current category of "Residential and Business" demand into separate "Residential" and "Business" categories.

ENGIE trusts that the comments provided in this response are of assistance to AEMO in its development of demand forecasting methodology and documentation. Should you wish to discuss any aspects of this submission, please do not hesitate to contact me on, telephone, 0417343537.

Yours sincerely,

David Hoch
Regulatory Strategy and Planning Manager