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9 June 2021

Re: Energy Efficiency Council response to Post 2025 Market Design Options Consultation Papers A and B

Dear Dr Schott and Mr Swift

The Energy Efficiency Council (EEC) thanks you for the opportunity to comment on the Energy Security Board's (ESB) *Post 2025 Market Design Options Consultation Papers A and B*

Our attached submission responds to some of the questions set out in the ESB's two Consultation Papers. However, the Consultation Papers canvas too many issues to develop detailed industry-wide consensus on in the consultation timeframe. Therefore, we would urge that some important matters examined in this report, such as 'scheduling light', be further consulted on in the coming year.

At a high level, the EEC:

- Welcomes the ESB considering demand response alongside generation and storage for a range of market services, including capacity and frequency control. However, there are still some sections of the Consultation Papers where there is a bias towards supply-side solutions, and in general the Consultation Papers ignore the critical role of energy efficiency and load shaping to reduce demand outside periods of peak solar PV production;
- Supports the development of markets for system services (e.g. frequency control, inertia and reliability) that are:
    - Technology neutral and support the deployment of the most cost-effective solutions; and
    - Tradable so that aggregators and retailers can compete fairly with networks and vertically integrated providers, and parties with obligations (e.g. generators) can pay other parties to discharge those obligations.
- Strongly urges the development of open markets for network services; and
- Supports the broad intent of both the 'maturity plan' and 'scheduling light', while reserving the EEC's position on the details of both proposals.

However, the Consultation Papers do not address two critical issues that we urge you and other senior members of the ESB to consider:

- Diurnal vs non-diurnal variability; and
- The principle of 'Energy Use First'.

Diurnal vs non-diurnal variability

The shift to renewable generation is creating two quite separate categories of supply variability – diurnal and non-diurnal. For example, the majority of solar PV output is highly predictable over a 24-hour period (diurnal), but a fraction of PV output varies on a non-diurnal basis, changing with cloud cover and season. While wind generation is reasonably predictable, it is largely variable on a non-diurnal basis.

The Consultation Papers often conflates these two categories of variability, but there are resources that can address diurnal variability that cannot address non-diurnal variability. For example, improving residential heating and cooling efficiency will reduce demand between 5pm and 9pm, helping to address diurnal supply variation. However, addressing non-diurnal supply-variability will require a combination of resources that include demand response, batteries and dispatchable generation.

In numerous places the Consultation Paper tacitly conflates diurnal and non-diurnal variability, with the result that it proposes mechanisms that will effectively only incentivise demand response, batteries and dispatchable generation. As a result, the overall Post-2025 framework will fail to drive diurnal load-shaping activities that can significantly reduce the volume of non-diurnal activities that are required.

The assumption that consumer electricity tariffs alone will be sufficient to drive optimal load-shaping is demonstrably incorrect. We encourage the ESB to consider reforms that will encourage parties such as networks, retailers, aggregators and other parties to drive coordinated load-shaping activities.

Properly considering and addressing cost-effective diurnal load shaping will significantly reduce the volume of more expensive capacity required to address non-diurnal supply variability.

Energy Use First

The EEC uses the term 'energy management' to refer to a broad suite of measures including energy efficiency, demand response and load shaping. Managing how much energy we use, and when we use it, is essential to ensure that electricity remains reliable and affordable. Energy management already delivers significant benefits to consumers and the National Electricity Market (NEM), but it possible to deliver far greater benefits by increasing the volume of energy management and better aligning it with the needs of the NEM.

1. Energy management can provide large volumes of reliable capacity

Energy management delivers low-cost, reliable and zero-emissions capacity. The International Energy Agency (IEA) has concluded that improvements in energy efficiency over the last forty years have delivered more capacity than any form of generation. As a result, the IEA now calls energy efficiency the 'First Fuel'.

There has been growing recognition in Australia that demand response can provide capacity, with industrial sites able to conservatively deliver at least 3.8 Gigawatts of demand response.[1] However, there is far less awareness about the importance of energy efficiency as a form of capacity, which is potentially many times larger.

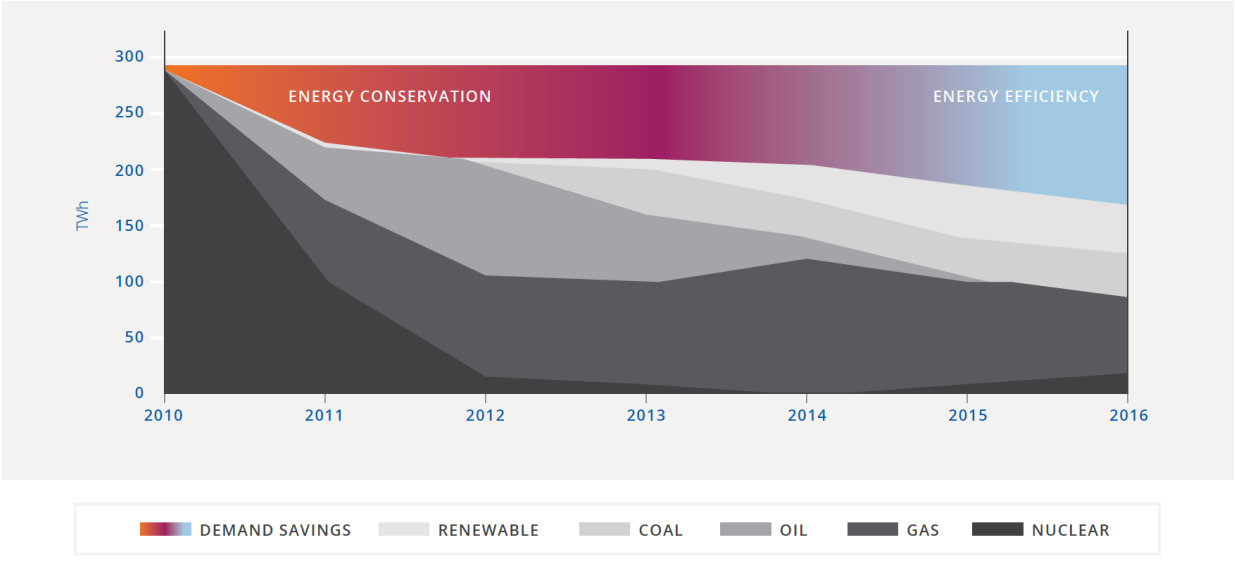
[1] ClimateWorks Australia 2014, *Industrial demand side response potential*, Climate Works Australia, Melbourne.

First, the amount of renewable generation that a system requires is based on the demand for energy. The fact that renewable generation needs to be overbuilt to provide reliable capacity only increases the importance of energy management, as the level of overbuild is determined by peak demand.

Second, certain types of energy management will deliver particularly valuable forms of capacity. For example, improvements in the energy efficiency of residential building fabric (e.g. insulation) and air conditioning systems will significantly reduce demand between 5pm and 9pm, when supply from solar PV is significantly reduced. This will significantly reduce the need for expenditure on both networks and forms of dispatchable capacity like storage.

In the context of the closure of Australia's thermal generators, it is worth looking at the example of Japan, which effectively closed its entire fleet of nuclear generators in 2010-11, removing about 30 per cent of its electricity generation capacity in a little over a year. While Japan invested in a range of generation technologies to make up this shortfall, by far the largest form of capacity that it added to the market was energy management, with Japan creating about 100 TWh of additional annual energy savings in just six years.

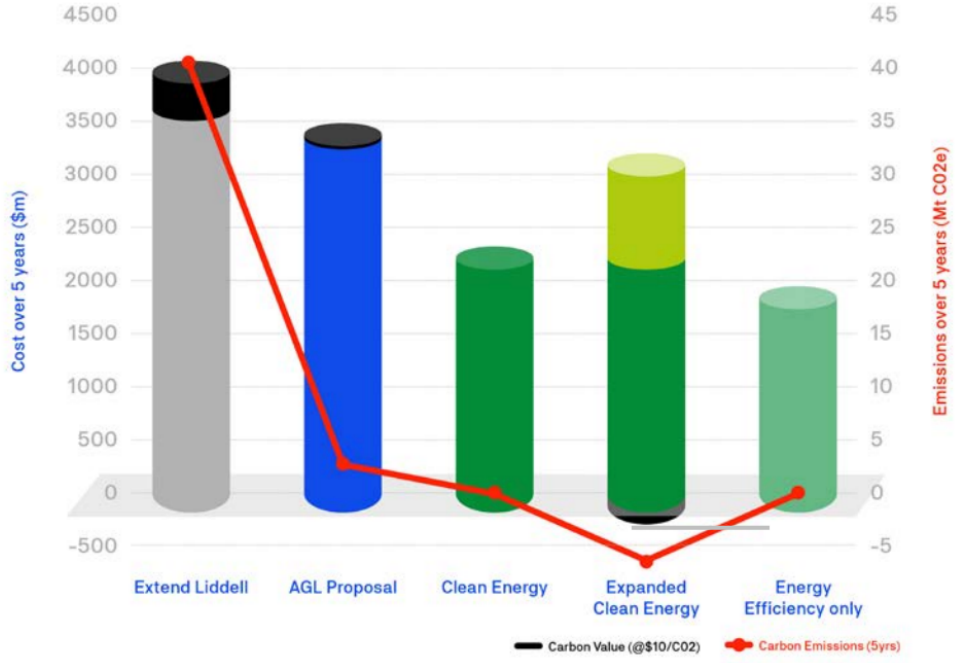
Figure 1. Replacement of nuclear electricity generation in Japan



Source: International Energy Agency 2017, *Energy Efficiency 2017*, IEA, Paris.

In Australia, the Institute of Sustainable Futures conducted modelling in 2017 that found that the cheapest way to provide sufficient capacity to meet the loss of Liddell's capacity was energy efficiency.

Figure 2. Cost and emission comparisons of options to replace Liddell



Source: Institute of Sustainable Futures 2017 Beyond Coal: Alternatives to Extending the Life of Liddell Power Station, Institute of Sustainable Futures, Sydney.

2. Energy management improves system security

In addition to providing low-cost capacity, energy management can boost system security. Demand response can provide both support services like Frequency Control Ancillary Services (FCAS) and emergency capacity.

3. Energy management supports the transition to clean generation

In addition to providing dispatchable capacity, flexible energy use can help the NEM incorporate higher levels of wind and solar generation. For example, moving water heating to the middle of the day can both absorb the excess output of solar PV systems and reduce the size of the evening peak. Accordingly, Germany has adopted the principle *'Energy Efficiency First'* (discussed later in this submission) as a central plank of the *Energiewende.*

4. Ensure that energy bills remain affordable

Energy management is well understood to lower consumers' bills by reducing the amount of energy that they consume – energy efficiency improvements in Germany between 2000 and 2017 saved the average German household $790 off their energy bills in 2017.[2] However, energy management can also lower the cost per unit of energy by providing low-cost capacity and system services. For example, after demand response and energy storage were allowed to provide FCAS, the total cost of FCAS in the NEM dropped substantially.

The principle of energy use first

Some of the barriers to better energy management lie outside the NEM rules and processes, such as poor compliance systems associated with the quality of new

[2] IEA 2017, *Energy Efficiency Market Report 2017*, IEA, PARIS

homes in Australia. However, there are a variety of barriers to energy management in the NEM, which have been identified in numerous reports including the *Parer Review* in 2002 and the *Finkel Review* in 2017. The *Parer Review* states:

> *"The Panel found that there is a relatively low demand side involvement in the NEM because:*
>
> - *The NEM systems are supply side focused;*
> - *The demand side cannot gain the full value of what it brings to the market; and*
> - *Residential consumers do not face price signals."* [3]

The fundamental reason for the reason that the NEM has favoured supply-side capacity over demand-side capacity was highlighted in a 2019 report by the Australian Energy Market Commission (AEMC) - Australia's energy markets have been designed around mobilising supply-side resources to meet demand, with much less effort on demand-side investment.[4] In other words, we have designed our markets based on supply-side assumptions, and so they are biased towards supply.

Accordingly, the EEC reiterates its recommendation that the that the ESB recommend that governments, market bodies and other parties adopt the European Union's principle *'Energy Efficiency First',* although we think that this is probably better termed *'Energy Use First'*.

It's important to clarify that *'Energy Use First'* does not mean that energy management should be given precedence over energy supply. Instead, based on the recognition that energy systems tend to be designed with a supply-side bias, the principle requires decision-makers consider both supply-side and demand-side issues *first*, before they finalise policy design or infrastructure investments. In other words, *'first'* refers to *sequencing,* rather than *priority.*

Implementing 'Energy Use First' will involve a number of principles, including:

- **Technology neutrality:** The principle of technology neutrality has often been poorly implemented in Australia, by designing markets around the features of specific supply-side technologies (e.g. coal-fired generators) and expecting other technologies with different features to compete in these markets. True 'technology neutrality' must involve considering: the market's needs; the features of various technologies; and what systems would dispatch an optimal mix of these resources to meet the market's needs.
- **Incentives:** All energy users should be able to seamlessly face incentives to manage demand, regardless of their current retail arrangements. This is the key to the Wholesale Demand Response Mechanism (WDRM) - it offers energy users a very low barrier to entry if they want to *try* demand response. Currently, energy users need to become spot exposed or have a major

[3] Parer, W. 2002 *COAG Energy Market Review – Towards a Truly National and Efficient Energy Market*, Commonwealth of Australia, Canberra, p 174

[4] AEMC 2019 *Wholesale demand response mechanism, Draft rule determination*, AEMC, Sydney. p 35-42.

change to their retail plan to even *try* demand response. In other words, we need to consider both accuracy and practicality in incentives;

- **Value stacking:** energy users need to be able to combine multiple value streams, including wholesale, network and system services;
- **Access to experts and data:** allowing energy users to seamlessly be serviced by multiple parties to help them manage their energy use. This covers issues such as access to data and allowing multiple Financially Responsible Market Participants (FRMPs) to service a single connection;
- **Competition:** ensuring that there is competition in energy market services, especially in relation to network services and non-wires alternatives; and
- **Governance:** the key to implementing the principle of *'Energy Use First'* will be both considering it in the Post 2025 market design process, but also embedding it in governance systems so that energy policy and markets deliver the lowest cost mixture of supply-side and demand-side investments.

The EEC will continue to engage in the detailed issues that the ESB's has examined to date as part of the Post 2025 framework, but we urge the ESB to step back and consider the importance of adopting the principle of 'Energy Use First'.

The EEC commends that the ESB's leadership in looking to the future of the electricity sector and looks forward to continuing to work with the ESB. For further information please contact me on rob.murray-leach@eec.org.au or 0414 065 556.

Yours sincerely

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energy efficiency
COUNCIL

Submission to the Energy Security Board Post 2025 Market Design Options Consultation Papers A & B

9 June 2021

Table of Contents

Consultation Paper A

Section 2. Resource Adequacy and Aging Thermal Generator Retirement

Enhancements to information provision on resources to be underwritten

Question 1. What types of information provision regarding jurisdictional investment schemes would benefit participants the most?

The EEC supports the provision of higher quality information on the development and dispatch of new generation in the energy market. However, far more pressing is the provision of higher quality information on future trends in energy demand.

The Australian Energy Market Operator (AEMO) does provide some information on future demand trends through the Integrated System Plan (ISP), including the impact of energy efficiency policies. However, the demand side of AEMO's projections is underfunded, and it does not provide information on demand at the level of resolution that is needed to support investment decisions. For example, projections of annual energy consumption and peak demand will be far less valuable than load shapes for different periods of the year.

2. Which financial principles are most important in establishing means to integrate jurisdictional investment schemes with market arrangements as smoothly as possible?

See response to question 3.

3. Are there financial principles missing, or that have been included but shouldn't be?

It is critical that jurisdictional investment schemes do not collectively distort against investment in energy management by over-subsidising energy supply.

Enhanced exit mechanisms

The EEC has no comments on questions 4 to 12

Modifying the Retailer Reliability Obligation

The EEC does not have a position on the Retailer Reliability Obligation (RRO) at this time. However, if the RRO is expansded then it is critical that it is designed to:

- Incentivise both demand-side and supply-side options, including not only demand response but also load shifting and energy efficiency in the periods between 5pm and 9pm; and
- Not artificially disadvantage aggregators and pure-play retailers at the expense of networks and vertically integrated organisations.

The EEC has no other comments on questions 13 to 23.

Section 3. Essential System Services, Scheduling and Ahead Mechanisms

System Strength and Scheduling mechanisms

A functioning electricity system requires a range of services that are not valued by the wholesale electricity market, including inertia, frequency response and adequate capacity for contingencies. The EEC supports the ESB's position that many of these services are not properly incentivised in the NEM, and this will become a serious issue as the mix of generation technologies in the NEM changes.

The EEC generally favours incentivising services by developing markets that are as open as possible, as this supports diversity and competition. This includes the development of markets for:

- Fast Frequency Response (FFR);
- Primary Frequency Response (PFR). The EEC notes that the potentially rapid retirement of thermal generation means that it's not tenable to design a system into the future where generators would be mandated in some way to provide PFR. Instead PFR will need to be provided by a competitive market; and
- Inertia.

Energy management can deliver capacity at a variety of timeframes, with automated demand response able to dispatch under 3 seconds, some forms of manual demand response requiring an hour to prepare and some resources only able to dispatch with significant notice (e.g. factories scheduling their maintenance to occur during periods of peak demand).

The EEC notes that scheduling mechanisms can help the development and dispatch of demand-side capacity that takes longer to prepare, as energy users require both advanced notice and confidence that their demand response will be valued if dispatched. Accordingly, some of the international electricity markets with large volumes of demand response participation include ahead mechanisms.

However, the EEC and its members are still considering whether ahead mechanisms would, on balance, be of benefit in the current context of the NEM.

The EEC does not have any further comments on questions 24-25

Ramping / operating reserve

Question 26. How do stakeholders view a ramping or operating reserve as fitting within the overall framework for essential system services?

The EEC notes that it is critical that any operating reserve mechanism consider the potential for demand response and other demand-side measures to provide capacity.

Section 4. Integration of DER and Demand Side Participation

Roles and responsibilities

27. What are stakeholder views on the issues raised on supporting market participation for active DER? Are there other paths that could also be considered for different types of consumers?

No comment

28. Is the unbundling of services delivered by active DER resources (e.g., solar PV, batteries or smart hot water appliances) from energy supplied by DER viewed as important to allow innovation and new business models? What might be the pros and cons of this approach?

The EEC supports the development of new models for service provider in the energy market that moves away from the traditional model of 'generator, network, retailer, customer'. The EEC highlights that this should not only look at generation and storage services, but also energy use and energy management services.

29. What might be implications of a growing fleet of active batteries or electric vehicles? Are other pathways that need to be considered to reflect these needs?

No comment

Customer choice and protection in the energy transformation

Question 30. Are there constraints on switching providers with DERs today? Are constraints on switching likely to occur through standards being introduced now or expected, such as IEEE 2030.5?

There are a number of constraints that impede customers from engaging with DER providers, including:

- The lack of rapid and consensual access to energy user data; and
- The inability to have multiple responsible parties operating from a single NMI is a barrier to the uptake of energy management services.

Question 31. What are stakeholder views on approaches outlined? What might be the advantages and disadvantages associated with each?

No comment

Balancing at the system limits

The EEC has no comments on questions 33 to 35.

Tariff and regulatory changes

Both energy flexibility and reductions in energy demand can reduce the need for network investment. Currently, there is no system for energy users and aggregators to ensure that they are fairly remunerated for reducing the need for network investments. Ultimately, a range of measures will be required to unlock these opportunities, including both time-of-use tariffs to energy users and procurement of aggregated demand reductions from retailers, aggregators and other energy service providers.

The EEC has no other comments on questions 36-41

Section 5. Transmission and Access -

The EEC has no comment on questions 42 to 48.

Consultation Paper B

Section 2. Essential System Services, Structured procurement and Ahead Mechanisms

Structured procurement and scheduling mechanisms

Questions 1-13

The language in this section is extremely unclear, but it appears that most of the discussion is relation to inertia. If the discussion around structured procurement, a System Security Mechanism (SSM) and a Unit Commitment for Security (UCS) relate to inertia, the EEC does not have extensive commentary.

However, the EEC does note that the potentially rapid retirement of thermal generation means that any market for inertia will need to support the development and dispatch of all appropriate forms of inertia and other system security services. Designing markets for system security services based on around the features of thermal generation would lead to a range of major problems.

Ramping / Operating Reserve

The EEC notes that there are two broad forms of generation variability:

- Variability that is largely follows a diurnal cycle (e.g. solar PV output); and
- Variability that is less predictable or has longer cycles (e.g. wind output).

Different resources can help address these different forms of variability. For example:

- Load shaping (e.g. residential energy efficiency that reduces demand between 5pm and 9pm) will significantly assist with diurnal variation;
- Demand response and high-expense peaking generators can address less predictable variability; and
- Batteries and shoulder generation can address both forms of variability.

As usual, it is critical that whatever is designed to address variability looks at both supply-side and demand side solutions. However, it is equally critical that the development of a system for ramping and operating reservices considers both forms of variation and does not ignore the importance of load shaping.

Therefore, we strongly urge the ESB to think beyond generation and demand-response, to also consider the role of load shaping.

Question 14 How do generators and demand response providers position themselves under current frameworks ahead of periods of high ramping or periods of uncertainty?

Demand response providers position themselves with portfolios of capacity that they can deploy at best price. For further details, individual demand response providers will need to provide their own, likely confidential submission.

As noted above, we urge ESB to think beyond generation and demand response to the role of load shaping to reduce the need for operating reserves.

Question 15. What challenges are envisaged in a future with higher variability and uncertainty in net demand?

The EEC does not have a response to this question at this time.

Question 16. How would a reserve service influence commitment and other operational decisions made by generators and demand response providers?

More clarity is required around what a reserve service influence commitment would actually entail in order to respond to this question.

Question 17. Who should pay for reserves and why?

Generally, energy users pay for energy security and reliability, unless there are parties within the energy market whose actions create security and reliability issues.

Question 18 Would the fleet described inthe case study have provided more ramping reserves under current frameworks if there was higher net demand uncertainty?

No comment at this time.

Question 19. In what circumstances would a reserve service be beneficial for consumers?

No comment at this time.

Section 3. Integration of Distributed Energy Resources and Demand Side Participation

Maturity Plan Framework

Question 20. What are stakeholder views on the proposed maturity plan approach and priorities identified for the first release?

The EEC broadly supports the intent of the 'maturity plan'. Agreeing to a pipeline of issues that will be considered over time appears to be a very sensible approach to manage the necessary consultation on a broad range of issues, as capacity constraints on companies and peak bodies limit our ability to properly consider a large number of energy market reforms simultaneously.

While the EEC believes that the issues identified as priorities for the maturity plan are important issues, there is a strong focus on technical issues and we recommend that other issues are given priority that have major impacts on the future operation of the grid. In particular, the EEC recommends that the maturity plan consider:

- '**Energy Use First'**: The AEMC, AEMO, AER and other energy market bodies need to formally adopt the principle that energy market governance, rules and investments should properly consider the roles of both energy supply and energy use management in meeting system needs (a principle that is termed 'energy efficiency first' in Europe). Unfortunately, the energy market's governance and structures still have a supply-side focus, as identified by the Parer Review in 2002.
- **Load shaping and time-specific energy efficiency:** The role of load shaping to support the transition to renewable-rich energy systems. In particular, energy efficiency in the period 5pm to 9pm (e.g. thermal efficiency improvements in homes) would help to better align energy generation and use, reducing the need for overbuilding generation, storage and networks to maintain a reliable grid.

Flexible Trading Arrangements

Question 21. Do stakeholders have any feedback on the approach for developing the trader-services model pathway?

No comments at this time.

Question 26. Are there other options the ESB could consider on the path to support more flexible trading for end-users?

The EEC strongly recommends that the ESB review the Multiple Trading Relationship (MTR) model and does not understand why consideration has been limited to either:

- **Second connection point.** This model entails significant extra costs and does not deliver the kind of energy use flexibility that is possible with an MTR model. This model is generally only useful for demand-side generation and has much more limited application to demand-side load management; or
- **Sub-meter connection point.** While the 'sub-meter connection point' model has lower costs than a 'second connection point' model, it still suffers from a lack of flexibility for demand-side load management.

While the ‘sub-meter connection point’ approach is slightly preferred to the ‘second connection point’, both of these models are generally highly unsuitable for load management. While adding a meter is relatively straightforward for generation or storage equipment, load management normally takes place across a broad range of equipment on a site, and separate metering is neither desirable nor practical. Therefore, the EEC strongly recommends that the ESB consider a non-metered MTR model.

Questions 22-25

No comment at this time.

Scheduled Lite

The EEC broadly supported the development of a ‘scheduled lite’ approach but does not have detailed positions on all of the consultation questions.

Question 27. Are the stated objectives appropriate? Should additional objectives be considered in the design of a ‘scheduled lite’ arrangement?

These objectives appear appropriate.

Question 28. Are there any additional or alternate principles that should be considered?

The EEC recommends that the ESB add a principle for scheduling lite that, where appropriate, scheduling requirements or offers be made available at the aggregator level, as this will deliver significant cost reductions while delivering the same if not greater benefits.

Questions 29 -43

The EEC has no comments on these questions at this time.