GREENBOX
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Australian Energy Market Review
PO Box A2449
SYDNEY SOUTH NSW 1235

By email: aemc@aemc.gov.au

11 October 2012

Dear Commissioners,

Power of choice – giving consumers options in the way they use electricity

GreenBox Group Limited (GreenBox) welcomes the opportunity to make a submission in response to the Australian Energy Market Commission's (the Commission) Power of Choice Draft Recommendations Report (the Draft Report).

GreenBox is an Australian-based Energy Monitoring and Management technology provider. We have undertaken significant research into the field of DSP and its monetisation on spot markets like the NEM, as well as developed control technologies that enable cost effective implementation of demand management for mass market and C&I customers.

We are the author of an International Patent Application that describes a system for real-time forecasting and control of resources like electricity in order to create energy efficiency and reduce peak demand. Accordingly, we are well placed to comment on the development of demand side opportunities in the Australian energy market.

GreenBox is supportive of initiatives that provide consumers with greater choice over the source of energy, the timing of its consumption and afford to opportunity to create value through the resulting arbitrage opportunity.

They key themes of our response are:

- That an efficient market for DSP would benefit from the creation of new market participant - we believe that the differing business models and priorities of Retailers, Networks and ESCOs will provide consumers will the widest choice of parties to sell their loads to and maximise value for all.

- In considering the definition of DSP, there is a clear distinction between energy services that monetise energy efficiency in the wholesale market or through load control in a Network, and energy monitoring services/customer portals.

- Furthermore, we believe that it is important to encourage new entrants into the DSP market by lowering barriers to entry whilst maintaining a reasonable balance in protecting the integrity of the NEM and managing counter-party risk.

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- To this end we consider that DSP does not need over-regulation. We contend that “true” energy services should be regulated under existing market rules and as distinct from energy monitoring/customer portals that should be governed by existing aspects of the ACL and NECF Marketing Code;

- We believe that the adoption of real-time energy monitoring and control technologies should be encouraged by: ensuring consumers and their agents have free access to meter data; that the deployment of smart meters is accelerated; and that energy efficiency and DSP initiatives should be harmonised.

- Whilst we encourage the deployment of smart meters and time-based pricing structures, we caution that smart meter specifications are already technologically obsolete.

- We also consider that Retailers should be provided with scope to develop innovative offers, for example the offering of flat-rates to consumers whilst managing wholesale risk using control technologies.

In the attached document we outline these points in more detail and provide answers to the specific questions raised in the Draft Report where we consider our responses appropriate.

Should you have any questions or comments in relation to this submission, please contact me, Simon Barnes, Director Strategy & Business Development at simon.barnes@greenbox-group.com or on (03) 8825 3200.

Yours sincerely,

Simon Barnes
Director Strategy & Business Development, GreenBox

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1. Introduction and summary of our response

GreenBox welcomes the opportunity to respond to the Australian Energy Market Commission's Draft Report. GreenBox fundamentally supports demand side participation (DSP) and as a leading innovator in the field of Real-time Energy Monitoring and Control we are well placed to provide support and suggestions for this review and are pleased to do so.

We are well known in the Australian Energy Market with Retailers, Networks and AEMO through our work in understanding the business model and technological barriers to the adoption of DSP and energy efficiency.

Our implementation of the GreenBox Energy Management Platform includes technologies that are able to forecast and price load curves in near real-time to enable consumers to value a demand resource in order to collaborate with their Retailer, Network or ESCO to monetise this load.

We believe there is a very real opportunity for incumbent players and new entrants to leverage technology in order to collaborate with their customers through innovative energy services that educate, assist and enable consumers to better manage their electricity usage and understand the benefits of participating in energy efficiency or peak-load curtailment.

New Entrants and Emerging Technologies

GreenBox considers that an efficient market for DSP would benefit from the creation of new market participant. We believe that the differing business models and priorities of Retailers, Networks and energy services players will provide consumers will the widest choice of parties to sell their loads to and maximise value for all.

We are confident that technologies like ours will emerge to dramatically reduce the transaction cost for consumers and market participants in undertaking the sale of demand resources. We therefore consider that the proposed new role would and should enable smaller consumers to participate in this new market opportunity through aggregation.

Defining Energy Services

We note that it is a consumer's right to become energy efficient or to shift load in order to reduce energy bills, and that these activities have occurred, behind the meter, since the birth of the industry.

Whilst new energy services and technologies are emerging to assist consumers in managing the volume or timing of their energy consumption, it is our view that Australian Consumer Law should be the principal mechanism for protecting consumers in this regard.

In our response we draw a distinction between DSP energy services that monetise energy efficiency in the wholesale market or through load control in a Network, and energy monitoring services and consumer-led load control that may be governed by existing aspects of the ACL and NECF Marketing Code.

We consider that the recommendation of creating a sub-category of generator that is able to monetise demand resources in the wholesale market adequately defines a DSP Energy Services Provider (although we highlight the need for limited tightening of the NECF Marketing Code in order to minimise consumer confusion from the increasing range of energy monitoring products and services).

Consumer Access to Meter Data

GreenBox is supportive of clarifying the NER to ensure that electricity consumers are able to access their electricity meter data. We view this as an essential first step in order to raise awareness of energy consumption behaviours and in particular, to unlock the benefits of smart metering.

Given that Retailers already store meter data in order to bill their customers, and that significant investments in Network infrastructure, including new meters, are the principal driver of increases in electricity bills, we do not consider it appropriate for consumers to be charged for accessing their raw meter data.

Furthermore, we consider that with limited technology investment, access to existing meter data could be readily extended to consumers in a computer readable format, on demand, from a secure and private website rather than via a telephone call to a call centre.

Modern software development uses APIs (Application Programming Interfaces) to cost effectively integrate disparate systems and applications. We would encourage the adoption of industry standard APIs to enable all participants and third-parties to integrate their systems, particularly with respect to the sharing of meter data, in a consistent manner. This would reduce technology costs and avoid situations like today where, for example, Retailers must support a multitude of integration interfaces to Network businesses, instead of a single interface.

We recognise that some Retailers may seek to minimise access to meter data by consumers and their third party agents but we highlight that advancements are already being made in the NEM the form of free consumer portals, and we consider that due to their direct relationships with consumers Retailers are well placed to drive innovation in customer service on this back of this new level of transparency.

We also direct the Commissions' attention to the success of the US Green Button initiative that enables electricity customers to securely download their own detailed household or building energy usage information from their utility website. This initiative has encouraged a wave of third-party agents (technology providers) and utilities to develop novel, innovative and often no-cost approaches to educating consumers on their energy consumption habits.

Meters as an enabler for DSP

In addition to supporting direct access to meter data via APIs, GreenBox views the acceleration of smart meter deployments as a positive enabler for consumer education and DSP. By moving from a batch world (where meters are read monthly or quarterly) into the provision of near-real-time information, and with authorised access to consumption data by third-party agents, we anticipate that consumers will benefit from a range of value-add energy monitoring services and on a more timely basis in order to participate in DSP.

When we consider the emerging world of circuit level metering, multiple intelligent devices and real-time control, GreenBox concludes that by defining the SMI Minimum Functionality Specification to include energy management and smart grid functions, that the SCER has gold plated metering standards with technologies that are in danger of being quickly obsolete and has defined an architecture that is fundamentally flawed.

In the near future, GreenBox considers that there will be a multitude of intelligent devices (in the home and business) that will deliver consumption information in five, one minute and eventually second intervals. More importantly, these devices will undertake complex control processing, requiring robust software systems in order to deliver grid management or wholesale market transactions. This future is illustrated Figure **1**:

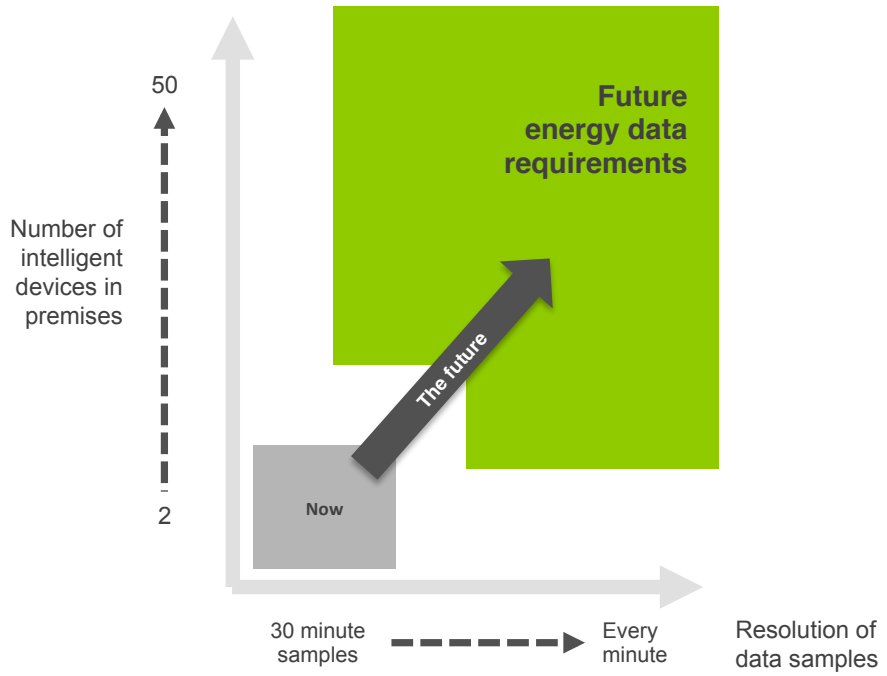

Figure 1. The direction of energy data requirements

Embedded real-time energy monitoring and management requires considerable local data storage, significant processing power and significant memory, for example, a single device monitoring a single measurement such as kWh in minutes would require over 525,000 data points in a year. It is GreenBox's opinion that the SMI Minimum Functionality Specification includes a proprietary operating system, insufficient data storage, insufficient processing power and a software stack that is unable to support the range of applications and transactions demanded by energy management/DSP services.

In contemplating the minimum specifications for smart meters, the Commissioners should recognise that the energy metering and monitoring space is also moving towards low-cost, miniaturised, wirelessly read sensors, managed by an increasingly powerful combined smartbox/gateway. In this context the smart meter will just be another device in a site that interacts with an embedded management system that is also responsible for gas, water and other services.

From the perspective of technology obsolescence, and particularly when considering a contestable smart meter market, we conclude that smart meters should be limited to the ability of the meter to record interval consumption, be remotely read and enable and provide a common method for direct binding to the meter by an in-home display or energy management system.

Innovative tariff structures

Smart meters are clearly an important enable for innovative tariffs. GreenBox considers the introduction of time varying pricing to be beneficial both to the efficient operation of the market and to assist consumers in implementing bill reduction strategies. Furthermore, we believe that Retailers should be free to innovate in the development of attractive tariffs.

We note that with available real-time energy monitoring and control technologies, Retailers can adequately manage the wholesale risk of delivering "flat pricing" (analgous to mobile phone capped plans) to small and medium customers – a segment of the market that is likely to embrace such offers.

Accordingly we consider that the proposed approach to phase-in cost reflective pricing is valid and that the flexibility of a segmented approach provides Retailers with the opportunity to innovate in the area of pricing *so long as the option to benefit from time varied pricing remains*.

Furthermore, we consider that settlement of consumption according to interval data (where a meter has interval read capability) combined with the *option* of a time varied retail tariff will drive competition and innovation in the market.

Convergence of energy efficiency and DSP

Finally, we agree with the Commissions' findings that existing energy efficiency (EE) schemes do not consider the full range of DSP options and that better coordination of EE and DSP policy and measures is required to drive new and competitive electricity services and take up of DSP.

We would highlight the need for the adoption of technologies like real-time energy monitoring and control to take a more central role in energy efficiency schemes. In doing so, DSP providers would be encouraged to deploy technologies that provide a dual service to the customer in generating energy efficiency and demand resources, as would energy efficiency players.

In the following sections we outline our responses to the specific questions raised by the Draft Report.

2. Facilitating consumer access to electricity consumption information

2.3.1. Timely and accessible energy and metering data to consumers

1. What should be the minimum standard form and structure of energy and metering data supplied to consumers (or their agents)? Should these arrangements differentiate between consumer sectors (ie industrial/ commercial and residential)

GreenBox supports the Commission's view that consumers should be given access to electricity consumption information and that NECF should be clarified to facilitate this.

We note that regardless of DSP, the first step in improving consumer education about electricity consumption is to ensure that they are informed about how they are consuming power, in real-time, with current pricing information, as well as other units used for billing such as power-factor (for capacity charges) and kWh.

Currently householders cannot get access to their electricity meter data in a cost effective, readily useable and timely manner in order for them to take action to reduce their bills. Typically, if pressed, a Retailer will be able to provide a PDF copy of a consumers' meter data, once a year. In our experience, tenacious consumers have been successful in securing this data in spreadsheet format from their local Network provider.

This means that a consumer:

- Cannot check that their bills are accurate
- Does not have visibility of how they are trending in terms of cost
- Are impeded in shopping for a better deal
- Cannot compare their usage with others
- Cannot identify simple changes in behaviour to reduce bills

GreenBox considers that the NER should be clarified to ensure that every electricity consumer is able to access their electricity meter data in a computer readable format, on demand, from a website rather than via a call centre.

We consider that the consumer must be given access to this data either as a data file or as a web service. We note that modern software development uses APIs (Application Programming Interfaces) to cost effectively

integrate disparate systems and applications. We would encourage the adoption of industry standard APIs to enable all participants and third-parties to integrate their systems, particularly with respect to the sharing of meter data, in a consistent manner.

The definition of standard APIs would reduce technology costs and enable the development of innovative web applications that would automatically extract and display the data – these applications already exist and are low-cost to develop.

The format of the data provided should be:

- At the granularity that the Retailer calculates a bill (NEM12 and aseXML standards)
- And, that this data should be provided to consumers in the same timeframe that Retailers receive the information from their Meter Data Providers in order to ensure that consumers can make timely decisions about how to consume electricity.

We consider that the first main purpose of providing this information is to enable consumers to form an independent view of the accuracy of their bills. Further more, we note that whilst advancements have occurred in retail billing systems, there are regular occurrences of incorrect billing in the market and that accordingly some Retailers may not be supportive of this level of transparency.

For this very reason we consider that the NER should be amended to ensure that the consumer must receive raw data that has not been manipulated in order to validate the accuracy of their bills.

We direct the Commissions' attention to the success of the US Green Button initiative that seeks to enable electricity customers to securely download their own detailed household or building energy usage information from their utility website.

Since Meter Data Providers deliver this information to Retailers for billing purposes, there should be minimal technical issues in supplying it to a consumer of any size therefore we do not see a need to differentiate between consumer segments. Furthermore, given the Retailers' relationship with the consumer we consider them well placed to authenticate the consumer's identity in order to protect the privacy and security of their data.

2. When do you think it is appropriate for a retailer (or responsible party) to charge a fee for supplying energy and metering data to consumers or their agents?

It is our view that the electricity sector lags other industries in customer service levels and that the NER should positively encourage the adoption of online customer service portals to improve billing transparency and consumer education as a precursor to DSP.

We do not consider it appropriate for consumers to be charged for accessing their raw meter data in order to check the accuracy of their bills for the following reasons:

- Retailers already store meter data in order to bill their customers and with limited technology investment could readily extend access to this information to their customers.
- Whether explicitly broken out or not, electricity bills already include a charge for metering services that is made by the Meter Data Provider and passed onto consumers by their Retailer.
- Given that investments in Network infrastructure, including new meters, are the principal driver of increases in electricity bills and customer angst, we anticipate that double charging would be dimly viewed by consumers.
- Other industries routinely provide their customers with online access to account information as a method for improving customer service and reducing their cost-to-serve.

Furthermore, we consider that as stated above, a cost-effective technical solution to the dissemination of raw meter data would be via a web portal.

We consider it advantageous that NECF ensures that consumers can authorise a third-party agent, at no additional cost, to access their meter data directly via a webservice (APIs) – this approach will not only encourage innovative technology solutions but minimise Retailer costs in the provision of this information.

2.3.2 Transfer of energy and metering data to authorised consumer agents

DRAFT RECOMMENDATIONS
- We propose that changes are made to Chapter 7.7 (a) of the NER to enable agents, acting on behalf of consumers, to access consumers' energy and metering data directly from a retailer. This would include requirements on a retailer to provide consumers' energy and metering data to an authorised consumer's agent (third party), following explicit informed consent.

To maintain the NEM's reputation as a thriving competitive market we consider it imperative that consumers are able to delegate access to third-parties in order to facilitate transparent, independent assessments of energy consumption and tariffs, identify energy efficiency opportunities and provide demand response services.

We recognise that some market participants may seek to minimise access to meter data by consumers and their third party agents but we highlight that advancements are already being made in the form of free consumer portals, and we consider that due to their direct relationships with consumers via retail tariffs, Retailers are well placed to drive innovation in customer service but that they should be challenged to do so by the enablement of third-party value-add services.

2.3.3 Market information to develop DSP products and services

3. Do you agree that general market information should be published on consumer segment load profiles to inform the development of DSP products and services to consumers?
4. Is AEMO the appropriate body to publish such information, or should each DNSP be required to provide such information particularly where data will be at the feeder level where accumulation meters are installed?

GreenBox agrees that general market information on consumer segment load profiles will facilitate the development of DSP services, particularly by new entrant energy services providers and tier-two retailers that may lack penetration in the market.

We consider that a DSP would require wholesale prices as well as the load profile of the immediate network delivering the energy.

We consider AEMO an appropriate body to publish this information, and would expect that at a minimum this information should be at the feeder level in order to develop DSP products and services that are of use to DNSPs who make seek to utilise them.

3. Engaging with consumers to provide DSP products and services

3.3.1. Energy services to residential and small business consumers

5. What specific criteria could be used to determine whether elements of the NECF (ie marketing code) apply to third parties providing DSP energy services to consumers? That is, beyond Australian Consumer Law?

In considering the definition of "DSP energy services" GreenBox would first note that to create an efficient market for DSP, it is desirable that NECF should not overly regulate this area.

We draw attention to note 83 of the Draft Report that paraphrases the responses of five incumbent energy retailers, the ERRA and the ENA, and states:

"[Retail Energy Services] may potentially create consumer confusion, given that these parties potentially have different business models and arrangements for communicating with consumers than electricity retailers".

We note that there is a clear incentive for Retailers and Networks with business models are driven by volume sales of electricity to create barriers to entry for new players that seek to de-couple energy consumption from sales in order to create new value for themselves and consumers.

Furthermore, we note that it is a consumer's right to become energy efficient or to shift load in order to reduce energy bills and that these activities have occurred, behind the meter, since the birth of the industry.

Whilst new energy services and technologies are emerging to assist consumers in managing the volume or timing of their energy consumption, it is our view that ACL protects consumers in this regard.

To expand on the Draft Reports' example of air conditioning with direct load control, we submit that NECF should only consider this a "DSP energy service" in the scenario where a consumer is paid to reduce their consumption or shift load by a DNSP for the purposes of managing the grid or by a market participant for the purpose of selling load onto the spot market.

In this regard, we draw a distinction between true services that monetise energy efficiency or load control in a Network, and energy monitoring services and consumer-led load control that may be governed by existing aspects of the ACL and NECF Marketing Code but are not DSP energy services (see Table **1**).

Table 1. Example of energy services and non-energy services

Service	Description/example	Regulatory framework	DSP Energy Service?
Electricity comparison website	Uses consumer input consumption estimate and example tariffs to estimate electricity bill with other Retailers.	ACL and Marketing Code apply in relation to accuracy of tariff information and impartiality of provider.	No
In-home Display	Wirelessly reads smart plugs or adaptor behind the meter to estimate spend – may not include retailer tariffs if provided by a non-Retailer.	ACL manages marketing issues in relation to the ability of a device to *estimate* spend	No
Electricity portal (using meter data)	Meter data provided to a consumer via a web portal – may not include retailer tariffs if provided by a non-Retailer.	ACL and Marketing Code apply in relation to the ability of a device to accurately calculate spend using tariffs. NECF would need to provide for consumer access to data, its accuracy and the accuracy of tariffs.	No
Real-time electricity monitoring service (no smart meter binding)	Uses wireless monitors and a web portal to estimate spend – may not include retailer tariffs if provided by a non-Retailer.	ACL and Marketing Code apply in relation to the ability of a device to *estimate* spend.	No
Real-time electricity monitoring service (with smart meter binding)	Wirelessly binds to a smart meter to estimate spend before a bill - may not include retailer tariffs if provided by a non-Retailer.	ACL and Marketing Code apply in relation to the ability of a service to accurately calculate spend using tariffs. Meter Provider manages access and authorisation to bind to meter – NECF may need to provide for binding.	No
User-defined electricity control	Thermostat used for setting air conditioning or a web accessible thermostat for remote control - may not include retailer tariffs if provided by a non-Retailer.	ACL applies in relation to consumer marketing issues in relation to expectations of customer savings as a result of service.	No
Third-party outsourced electricity control (not grid or sport market	Consumer outsources building management, including air conditioning to a third party under a	ACL applies in relation to consumer marketing issues in relation to expectations of customer savings as a	

aligned)	performance-based contract	result of service.	
Third-party outsourced direct electricity control for demand-side management in a Network or to monetise load on sport market	Consumer outsources control of an electrical appliance or device and is paid by a Network, Retailer or Third-Party to allow them to control this load which is monetised through avoidance of capital expenditure in the grid or on the sport market.	A new category of participant in the energy market with implications for the consumer's quality of service, the stability of the grid and counter-party risk in the wholesale market.	Yes

6. What requirements should be in place for these third parties? For example, what should be the form of authorisations/accreditations?

Security and Privacy Considerations

In considering regulatory enhancements to NECF to support the adoption of energy monitoring services, GreenBox considers that consumer data privacy and security is of paramount interest.

In this regards we direct the Commissioners to an illuminating article by Mark Gregory, Senior Lecturer in Electrical and Computer Engineering at RMIT University, entitled, *"Is Origin Smart sleepwalking into a shocking personal data breach?"*[1]. Published soon after the launch of Origin Energy's "Origin Smart" portal, Mr Gregory points out that the portal:

- Places valuable electrical consumption data on the internet in the absence of industry standard security protocols
- Requires consent by the consumer to share this data with, "*relevant contractors which may include installers, mail houses, data processing analysts, IT service providers and smart energy technology providers, debt collection agencies and credit reporting agencies, relevant Government authorities …*"
- States in its terms and conditions that data will be sent to a "*third-party smart energy technology provider*" that happens to be located in Colorado, USA and that, "*The USA does not have laws that provide the same level of protection for an individual's personal information as in Australia, however, the Third Party Provider is required to comply with any applicable privacy legislation"*.

GreenBox considers it in the vital that NECF protects the interests of consumers by:

- Ensuring that appropriate security protocols are mandated to guard against cyber-crime
- Limiting the ability of Retailers, Networks and third-party service providers to share increasingly detailed electricity consumption data with external marketing agents
- Ensuring that electronically stored data remains under the governance of Australian Laws and NECF (ie. is not sent offshore)
- Likewise, with respect to the binding of third-party (non-Meter Data Provider) technologies to smart meters, appropriate security and privacy protocols should be in place.

Furthermore, GreenBox considers that the NECF Marketing Code should be cognisant that any technology or service that does not utilise NEM accredited data *and* the correct retail tariffs is only an estimate of a consumer's spend and should be clearly stated as such.

Authorisations & Accreditations

The Commissioners state in the Draft Report:

> *"NECF's primary objective relates to the sale and supply of electricity and gas. In regards to electricity, we do not consider that the test under the NERL for retail licensing or authorisations should be amended to include the "sale of energy services"*

[1] "Is Origin Smart sleepwalking into a shocking personal data breach?" by Mark Gregory - Senior Lecturer in Electrical and Computer Engineering at RMIT University, 3 September 2012
http://theconversation.edu.au/is-origin-smart-sleepwalking-into-a-shocking-personal-data-breach-9236

Whilst we agree with this statement, we consider that NECF should handle and make a clear distinction between:

- A party providing an estimate of a consumers spend
- A party binding to a meter
- A party collecting consumption data
- A party providing load-control services that are monetised in the grid or sport market

We propose that where necessary the NECF Marketing Code is enhanced to ensure consumers are made aware of the limitations of any energy monitoring service they purchase, and that two new categories of participant are created in the market:

- An accredited energy monitoring service provider to manage data security, privacy and integration concerns
- A DSP Energy Services provider as contemplated in Section 5. “Demand side participation in wholesale electricity and ancillary services markets” of the Draft Report

We outline the distinctions with examples in Table **2**.

Table 2. Examples energy monitoring and energy services participants

Service	Accreditation required?	Nature of accreditation	Marketing Code Governance
Electricity comparison website	No		NECF Marketing Code requires clear description of the limitations of the service
In-home Display (not linked to smart meter)	No		NECF Marketing Code requires clear description of the limitations of a service
Electricity portal (using meter data)	Yes	Service provider requires accreditation in relation to security standards, data privacy standards, adherence to Australian Law and use of accurate tariffs	
Real-time electricity monitoring service (no smart meter binding)	No		NECF Marketing Code requires clear description of the limitations of the service in relation to use of tariffs and accuracy of readings
Real-time electricity monitoring service (with smart meter binding)	Yes	Service provider requires accreditation in relation to security standards, data privacy standards, adherence to Australian Law, use of accurate tariffs and adherence to technical integration standards	
User-defined electricity control	No		NECF Marketing Code requires clear description of the limitations of the service in relation to use of tariffs
Third-party outsourced electricity control (not grid or sport market aligned)	No		n/a
Third-party outsourced direct electricity control for demand-side management in a Network or to monetise load on sport market	Yes	Service provider must be a registered market participant (Network, Retailer or proposed new Energy Services Provider)	

3.3.2. Role of retailers and distribution network businesses - engaging with consumers

7. Do you agree that existing rules and guidelines should be amended to clearly outline the circumstances when distribution businesses are able to directly contract with residential and small consumers to deliver DSP network management services/programs?

On the basis of our suggestions for the creation of accredited energy monitoring services as well as DSP energy service providers, GreenBox considers that an efficient market for DSP would encourage the participation of Retailers, Networks and Third-party ESCOs (representing consumers).

We believe that differing business models and priorities consumers will promote consumer choice and maximise value. Furthermore, we see a role, and our own technology enables, the three parties to collaborate in Smart Energy as shown in Figure **2**.

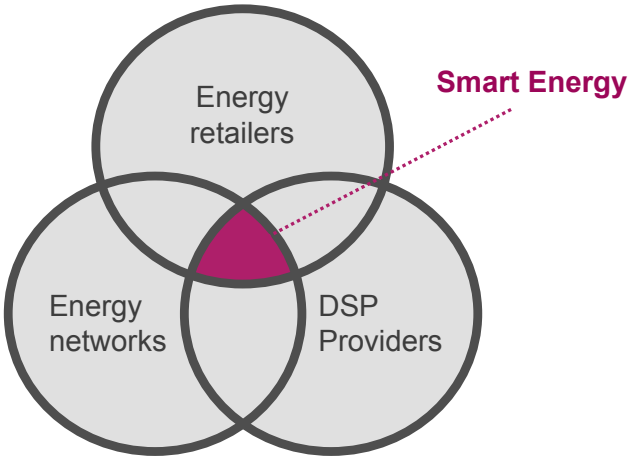

Figure 2. Collaboration between market participants

To this end, GreenBox is supportive of DNSPs engaging directly with consumers. Whilst we recognise that their desire may be to directly control loads under a more traditional regime than other providers, we believe that where there is a market for controllable load, consumers should be free to determine whether DNSPs are successful in their business models and incentives.

GreenBox therefore encourages the Commissioners to ensure that there is a level playing field for DSP and that DNSPs are not provided with a form of monopoly rights to controllable loads.

Furthermore, we believe that Retailers, Networks and Third-Party ESCOs should be treated equally if they provide accredited energy monitoring services or DSP services as described previously. For example, a Network providing consumption data via a portal would still need to declare its limitations with respect to the accuracy of tariffs and estimated bills.

Finally, we are less concerned about DNSPs subsidising energy services activities with regulated revenue, than we are that DNSPs may have privileged information on sweet spots within their networks on which to target offerings.

For this reason, we would suggest that DNSPs energy services businesses would need to be ring-fenced away from their traditional regulated business. This would not preclude the offering of price-based DSP by the network via tariffs as opposed to contracted DSP that we would consider to be a true energy service.

4. Enabling technologies for DSP

4.3.1. Functional Specification of meters in the NER

7.	Should the minimum functionality specification for meters be limited to only those functions required to record interval consumption and have remote communication? Alternatively, should the minimum functionality include some, or all, of the additional functions specified in the SMI Minimum Functionality Specification?

GreenBox is supportive of the deployment of real-time metering technology. We consider this to be an important enabler for energy monitoring services and the education of consumers.

As an expert in the field of real-time energy monitoring and control, GreenBox considers that mandated metering standards should be limited to the ability of the meter to provide:

- Record interval consumption (at least down to 30 minute intervals)
- Remote reads
- The ability for remote updates of firmware and tariffs
- A common standard (and accredited process) for the direct binding to the meter by an in-home display or local energy management system

By defining the SMI Minimum Functionality Specification to include an Energy Management System and Smart Grid business functions, GreenBox considers that *the SCER has gold plated metering standards with technologies that are in danger of being obsolete* and has defined an architecture that is fundamentally flawed.

Architectural Flaws in the SMI Minimum Functionality Specification.

To avoid mandating metering technology that is gold-plated and obsolete, we consider that in the future, a home or business will have at least three meters (electricity, gas and water) even before the addition of an energy management system, more granular sensors and smart devices.

The implication here is that the control functionality embedded in the SMI Minimum Functionality Specification could be duplicated at great expense to the consumer who indirectly pays for the meters. Table **1** overleaf, illustrates the potential duplication of metering technologies at a consumer's site.

Table 3. Duplication of metering and related technologies at a consumer's site

Sub-optimal approach to metering with duplicated computing components					
Metering technology at a site	Smart Electricity Meter	Smart Gas Meter	Smart Water Meter	Smart LPG Meter	Combined Smartbox/ Gateway
Major Bill of Materials (modules)					
Metering component	Yes	Yes	Yes	Yes	No
On-board processor (CPU)	Yes	Yes	Yes	Yes	No
Data storage	Yes	Yes	Yes	Yes	No
Outward Communications Module (WAN)	Yes	Yes	Yes	Yes	No
Inward Communication Module (LAN/HAN)	Yes	Yes	Yes	Yes	No

Optimal approach to metering utilising common processing and data storage					
Metering technology at a site	Smart Electricity Meter	Smart Gas Meter	Smart Water Meter	Smart LPG Meter	Combined Smartbox/ Gateway
Major Bill of Materials (modules)					
Metering Technology	Yes	Yes	Yes	Yes	No
Miniature Computer (CPU)	No	No	No	No	Yes
Data Storage	No	No	No	No	Yes
Outward Communications Module (WAN)	No	No	No	No	Yes
Inward Communication Module (LAN/HAN)	Yes	Yes	Yes	Yes	Yes

Table **3** shows that significant productivity can be obtained by rationalising computing power (processing, data storage and communications modules) into a combined smartbox/gateway for managing all smart meters at a site. We anticipate that DSP would seek to become the owner of this smartbox/gateway in order to derive economies of scope at a site.

Furthermore, the SMI Minimum Functionality Specification assumes that control applications and consumption data are stored in a cloud (server) off-site. From a data management perspective this assumption is sound when the meter is only collecting one data point every 30 minutes however in the future a site might be monitoring 10 or 20 devices or circuits a at 5 minute resolutions in order to support trading of DSP in the spot market (see Figure **3**).

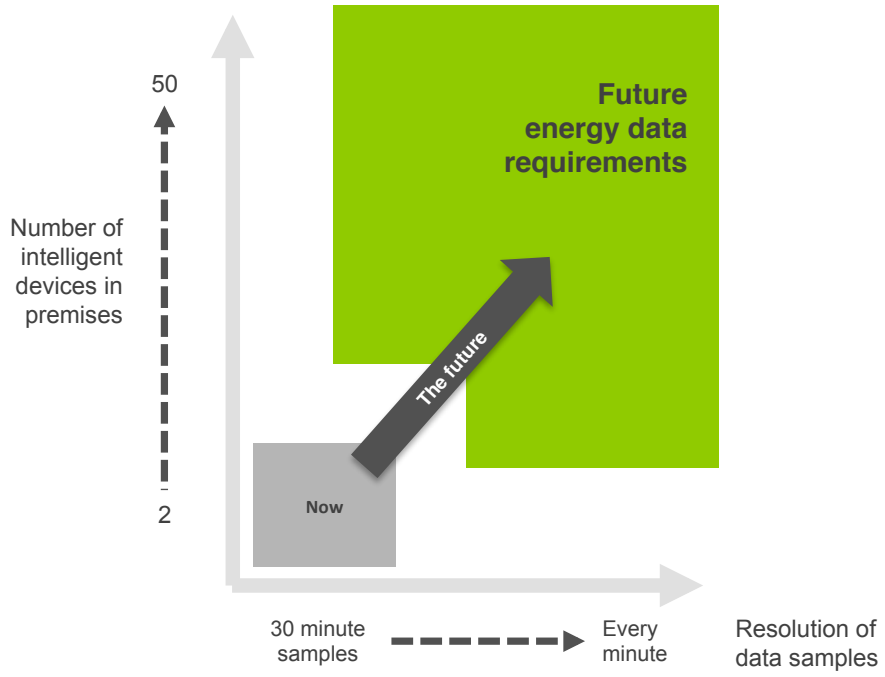

Figure 3. Direction of energy data requirements

Where there are many intelligent devices and the resolutions of data samples moves below 30 minutes granularity, cloud-meter architecture will quickly fail – they are susceptible to:

- Massive data bottlenecks
- Scaling issues
- Data management cost issues
- Latency and performance issues
- Resilience issues related to communications availability
- Security flaws in relation to the control of devices and appliances

Furthermore, the technology specified in the meter will quickly become redundant as more agile, innovative and scalable technologies become available. It is worth noting that according to Moores Law, which has held true for 45 years, processing power doubles roughly every 18 months it would be unwise to embed into smart meters communication and computing modules and not to expect them to be obsolete in 2 years.

In summary, when considering the future direction of metering, the SMI Minimum Functionality Specification assumes:

- A proprietary operating system
- Insufficient data storage
- Insufficient processing power
- A software stack that is unable to support the range of applications and transactions demanded by energy management/DSP services

GreenBox contends that smart meters (as currently detailed in the SMI Minimum Functionality Specification) should not be viewed as the "brains" in a site. Rather they should be considered to be an important source of real-time, audited metrology data for the preparation of bills.

We believe that data storage and control capabilities should remain separate to smart meters in order to provide consumers with scalable, lowest cost, powerful energy management capabilities and to avoid the deployment of redundant technology.

4.3.2. When should metering infrastructure be installed

DRAFT RECOMMENDATION
We recommend that:
- the installation of meters consistent with the proposed minimum functionality specification to be required in certain situations (eg refurbishment, new connections, replacements).
- Such metering must also be installed on an accelerated basis for large residential and small business consumers whose annual consumption a defined threshold.

GreenBox considers these recommendations to be advantageous in the education of consumers. We note that the ability to directly bind to a meter or at a minimum receive regular interval data, is an important first step in educating consumers about their consumption and will likely prove a catalyst for a DSP market.

Furthermore, it is well understood that larger consumers in the mass market are subsidised by the majority under the net system load profile method of settling consumption. We consider that settlement of consumption according to interval data combined with the option of a time varied retail tariff will drive competition and innovation in the market. To this end we believe that accelerating the deployment of remote read, interval capabilities will be beneficial to the mass market.

4.3.3 Arrangements to support commercial investment in metering technology

7. Does the separation of the provision of metering services from retail energy contracts remove the need for meter churn when a consumer changes retailer? Does this cause any unforeseen difficulties or create any material risk? Are there any alternative approaches to reducing the need for meter churn?
8. Are there sufficient potential metering services providers to facilitate a contestable roll out of AMI? Does the proposed model mitigate all the material risks of a contestable roll out? If not, should a monopoly roll out be adopted?
9. What should the exit fee when a consumer upgrades it meter from one provided by the local distribution business? Is the proposed fixed 30% of the cost of a replaced meter appropriate?
10. Does the option of a government mandating an AMI roll out within its jurisdiction act as a strong disincentive to a commercial roll out? Should the ability for these governments to mandate an AMI roll out removed from the NEL?

No comments.

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5. Demand side participation in wholesale electricity and ancillary services markets

5.3 Demand response mechanism

12. Participation in the wholesale market:
a) Do stakeholders agree that the proposed demand response mechanism is likely to result in efficient consumption decisions by end-users? If not, are there any changes you recommend to the mechanism to facilitate this?
b) On balance, is a new sub-category of market generator required for consumers providing a demand that enables aggregation? What types of issues should be considered when developing the registration process?

GreenBox considers that there has been little innovation in the utilisation of DSP despite its potential to drive efficiencies in the grid through management of peak demand as well as in the wholesale market.

We believe that the introduction of new mechanisms that that enable the monetisation of demand resources in the wholesale market will encourage the entry of new players with innovative DSP business models that are decoupled from the traditional volume based models of the incumbent players.

GreenBox is therefore supportive of the creation of a mechanism that allows consumers to participate in the wholesale market via the sale of demand resources through a new form of participant.

Removing barriers to entry

GreenBox believes that it is important to encourage new entrants into the DSP market by lowering barriers to entry whilst maintaining a reasonable balance in protecting the integrity of the NEM and managing counter-party risk.

DSP by its very nature should remain a low-cost approach to managing peak demand and ancillary services (as well as driving energy efficiency and driving carbon abatement) – registration and participation costs should therefore also remain low-cost.

We imagine that requirements similar to those placed on existing Retailer and Generator roles will be placed on participants ie. that prudential guarantees will be required in order to manage counterparty risk.

In considering the regulatory requirements required of a DSP provider, GreenBox would encourage the Commissioners to expand the existing prudential mechanisms for managing counter-party risk to include alternatives that address the current market power and re-allocation cost issues that affect smaller Retailers.

We anticipate that any party trading demand resources will develop contractual agreements with its end-customers and hedge contracts in order to secure firm commitments to demand and manage counterparty risk. We consider that at a minimum, workable Futures Offset Arrangements (FOA) be implemented for DSP traded onto the wholesale market.

We also consider that where a DSP Energy Services provider has made investments in securing technological control over electricity consumption *and* can demonstrate firm commitments to demand resources, that this capability should be considered in setting (reducing) any prudential requirements placed on them.

In our International Patent Application “Resource Supply Management System & Method” (application number 2009900529) we describe a system that enables the forecasting (relative to a baseline) and real-time control of resources like electricity, and a method of monetisation of these resources on spot market like the NEM.

Our implementation of the GreenBox Energy Management Platform includes technologies that are able to forecast and price load curves in near real-time to enable consumers to value a demand resource in order to collaborate with their Retailer (or in this case a new sub-class of market generator) by providing firm commitments (scheduled and non-scheduled) to demand resources.

Technologies like GreenBox will contribute to the democratisation of the DSP market, dramatically reducing the transaction cost for consumers and market participants in undertaking the sale of demand resources. We consider that the proposed new role would and should enable smaller consumers to participate in this new market opportunity through aggregation and that DSP Energy Services providers' investments in technologies that enable the accurate trading of demand resources are recognised in setting any prudential requirements.

Finally, we consider that these real-time monitoring and control technologies could be utilised by AEMO to monitor the portfolio of a DSP Energy Services provider in real-time to enable the tracking of a participants market exposure.

13. Consumer baseline consumption:
a) What factors should be taken into consideration when developing a baseline consumption method?
b) Have we identified the correct three key principles for developing a baseline consumption method (data refresh, accuracy, metering)?
c) Are there any substantial changes to metering and settlement arrangements required for this mechanism to be implemented? Can these issues be resolved through AEMO's consultation process and procedures or are broader amendments to the rules required?

We consider that the baseline consumption method is appropriate and that the correct principals have been identified.

We would note that it is technologically feasible for telemetry and communication standards to enable response to be dispatch instructions in five-minute intervals. GreenBox would consider that it would be beneficial for AEMO to have this level of granularity of data.

14. Incorporating demand response into central dispatch:
a) Do you agree that similar arrangements for generation should apply to demand resources in terms of thresholds for registering as scheduled or non-scheduled basis?
b) What are the ways in which the regulatory arrangements can be adapted to facilitate the participation of scheduled and non-scheduled load in AEMO's central dispatch process? Are there any specific changes to reporting, telemetry and communication requirements?
c) Should both market and non-market loads above a certain size be required to provide information to AEMO regarding their controllable (and therefore interruptible) load blocks?
d) Should there be a trigger in the monitoring and reporting framework that requires consumers to provide greater detail regarding their demand resource to AEMO or affected DNSPs?

See our comments above in relation to real-time tracking of DSP providers' portfolios using real-time monitoring technology.

6.6.1 Demand forecasting

15. How should AEMO's powers be expanded to improve demand forecasting? Should retailers and other market participants be obliged to provide information regarding DSP capabilities? Will non-obligatory requirements achieve the desired accuracy in reporting requirements?
16. In what ways can AEMO improve its survey questions regarding DSP capabilities? How often should AEMO be required to update its expectations on DSP capabilities in the NEM?
17. Would a pre-dispatch that includes active and price-responsive DSP improve decision making processes for C&I users and aggregators? If not, do you have any other suggestions for improving the ability for AEMO to accurately forecast demand?

GreenBox has no comment on the scope of expansion required to AEMO's role.

We consider that in order for a demand resource to be traded on the spot market that a registered participant will undertake this trade. We therefore consider it a necessary requirement of registration that the party be obliged to forecast its DSP capabilities at a suitable time interval as required by AEMO.

Furthermore, we view DSP as analogous to generation and should therefore be subject to the same forecasting obligations. With prior contractual commitments by end-consumers to demand resources and suitable forecasting technology we do not see a reason why this would be unachievable by market participants.

We consider that DSP should be either implemented using control technology (in the case of relatively small loads that are being aggregated) or (through the more traditional) contractually binding, firm commitments to load shedding by larger C&I customer who may curtail their demand on request. We anticipate that in both cases a market participant would require a pre-dispatch that enables made up of active and price-responsive DSP would better enable the forecasting of potential value and therefore increase participation.

5.7.1 Creating new category of market participant

18. Do you agree that a new category of market participant should be established for the provision of non-energy services?
19. What types of issues should be considered when developing the registration process, such as eligibility, obligations and liabilities?
20. What metering arrangements need to change to implement this mechanism?

GreenBox considers that an efficient market for DSP would benefit from the creation of new market participant. We believe that the differing business models and priorities of Retailers, Networks and energy services players will provide consumers will the widest choice of parties to sell their loads to and maximise value for all parties.

We draw the Commissioners' attention to our responses to question 5 where we draw a distinction between true DSP services that monetise energy efficiency on the wholesale market or load control in a Network, and energy monitoring services and consumer-led load control that may be governed by existing aspects of the ACL and NECF Marketing Code but are not DSP energy services.

In responding to questions 18 and we reiterate our view that this new market participant should be defined by its participation in the trading of demand resources onto the spot market. We further reiterate that we consider this to be analogous to a generator, with similar counterparty risks and therefore eligibility requirements.

We would note that it is technologically feasible for telemetry and communication standards to enable response to be dispatch instructions in five-minute intervals. GreenBox would consider that it would be beneficial for AEMO to have this level of granularity. We therefore consider that for a market participant to trade demand resources we expect that they would have the ability to provide AEMO with a sufficiently accurate forecast – this implies that metering and telemetry arrangements on end-customer sites would need to support this.

6. Efficient and flexible pricing options

18. Do stakeholders agree with our approach for phasing in cost-reflective pricing? If not, how can the policy be improved to transition to cost-reflective pricing?
19. Have we identified the main issues with transitioning to cost reflective pricing? If not, what other issues need to be considered?
20. How should consumption thresholds be determined?

GreenBox considers the introduction of time varying pricing to be beneficial both to the efficient operation of the market and to assist consumers in implementing bill reduction strategies. Furthermore, we believe that Retailers should be free to innovate in the development of attractive tariffs.

We note that with available real-time energy monitoring and control technologies, we believe that Retailers could adequately manage the wholesale risk of deliver "flat pricing" (analogous to mobile phone capped plans) to small medium customers – a segment of the market that is likely to embrace such offers.

Accordingly we consider that the proposed approach to phase-in cost reflective pricing is valid and that the flexibility of a segmented approach provides Retailers with the opportunity to innovate in the area of pricing *so long as the option to benefit from time varied pricing remains optional*.

Furthermore, at this relevant juncture, we note the Draft Report's recommendations in relation to the settling of consumer consumption using interval data:

> *"We recommend that once a residential and small business consumer has a meter with interval read capability, that consumer's consumption should be settled in the wholesale market using the interval data and not the net system load profile. This will be the case irrespective of whether the consumer has reverted to a flat retail tariff"*

It is well understood that larger consumers in the mass market are subsidised by the majority under the net system load profile method of settling consumption.

We consider that settlement of consumption according to interval data (where a meter has interval read capability) combined with the *option* of a time varied retail tariff will drive competition and innovation in the market.

6.3.6 Strengthening arrangements for network tariffs

21. We seek stakeholder comments on appropriate pricing principles for distribution businesses and the appropriate time period for stakeholder consultation on distribution network pricing proposals.

It is our understanding that many distribution businesses have provided attractive time varying tariff structures but that Retailers may be reluctant to market these offerings.

We therefore consider that formalising the consultation process between the AER, Networks and Retailers *may* improve the structuring of these tariffs. An annual review would be sufficient although we would hope that this does not preclude the introduction of new network tariff structures in small time periods.

7 Distribution networks and distributed generation

7.3.1 Potential return for network businesses implementing DSP projects

22. Would it be beneficial to include reference to the suggested mechanisms and provide more guidance and an overall objective in the Rules governing the demand management incentive scheme?

No comment.

23. Should separate provisions for an innovation allowance be included into the rules? Given that the costs of the allowance would be borne by electricity consumers, is it more appropriate for such innovation to be funded through government programs?
24. Should the provisions for a demand management incentive scheme be included in the regulatory framework for transmission businesses?

We consider that an efficient market is customer driven and that innovation allowances have the potential to distort the value of a particular technology or approach.

Furthermore, we consider that the most successful and viable renewable energy and demand side management programmes in the NEM have been undertaken on a commercial basis.

Given the current isolation of the Networks and Transmission Networks from end-consumers we consider it inappropriate for the regulations to be amended to allow them to undertake subsidised trials of DSP with the remaining costs loaded up into retail tariffs.

Rather, we consider that Networks, in particular, should be able to establish DSP Energy Services Businesses and Distributed Generation operations on a commercial, competitive basis in the market. In this context we believe that Networks, like any other operator, will develop commercially viable business cases for DSP projects.

7.3.2 Network tariff structure influencing incentive to do DSP

25. What amendments are required to the current distribution pricing principles as set out in clause 6.18.4 of the national electricity rules?

No comment.

7.4 Distributed Generation

DRAFT RECOMMENDATIONS
b) Ability of DNSPs to own and operate DG
- We recommend that the AER should give consideration to the benefits of allowing distribution network businesses to own and operate DG assets when developing the national consistent ring fencing guidelines for these businesses

c) Feed in tariffs and value of export from DG units
- We consider that SCER should, in developing a national approach to feed in tariffs, take into account the value of time varying feed in tariffs to encourage owners of DG to maximise the export of their energy during peak demand periods

DNSP Ownership of DG

In relation to the draft recommendation that DNSPs should be allowed to own and operate DG assets, we refer to our answers to question 7: GreenBox considers that an efficient market would encourage the participation of Retailers, Networks and Third-Party ESCOs (representing consumers). We believe that differing business models and priorities consumers will promote consumer choice and maximise value.

To this end, GreenBox is supportive of DNSPs engaging directly with consumers in the provision of DG. Furthermore, we believe that Retailers, Networks and Third-Party ESCOs should be treated equally if they provide DG services. For this reason, we agree that DG services provided by DNSPs would need to be ring-fenced away from their traditional regulated business.

DG Feed-in-tariffs

GreenBox is supportive of feed-in-tariffs that enable owners of distributed generation assets to receive the value attributable to the energy produced by their system.

We suggest that any scheme should be nationally consistent to move away from the complexities faced by service providers when operating across states and to minimise sovereign risk currently experienced by asset providers in the renewables space.

We believe that the value of the energy should be based upon the time-based wholesale value of the energy generation – this would encourage market participants to consider the arbitrage opportunities available between the wholesale market, DSP and DG/energy storage.

Furthermore, we believe that the barriers to entry for smaller distributed generation participants should be minimised as much as possible. In particular, we would encourage transparency in registration fees and network connection charges, and consistency in right of access to networks for all players.

8 Supply chain interactions

DRAFT RECOMMENDATION
- The recommendations are a package of integrated reforms for the market. If implemented, the market should have time to adjust and transition to the new environment. There should be ongoing monitoring and evaluation of the market for the desired outcomes to be achieved. We therefore do not consider that additional regulatory mechanisms beyond those recommended in this report are needed for the market at this time.

It is GreenBox's view that between Retailers, Networks and ESCOs, consumers will gain access to a variety of products and offerings with differing transaction costs and benefits that will enable the monetisation of demand.

Furthermore, we are of the opinion that market participants, aided by real-time energy monitoring and control technology, will develop technical and contractual mechanisms that will transform 'non-firm' (ie price responsive) components into firm commitments for the purposes of monetisation in the wholesale market.

For these reasons, GreenBox agrees with the Commissioners findings as outlined Section 8 (Supply Chain Interactions) of the Draft Report that no further regulatory mechanism are required. More specifically, we agree that is not necessary to mandate a single mechanism for implementing multilateral frameworks to support the negotiation and trading of DSP.

9 Energy Efficiency measures and policies

GreenBox considers it important that the AEMC and authorised market participants take a more active role in the coordination of energy efficiency schemes with DSP in order to avoid the 'gravy train' of recent energy efficiency programmes, and more importantly, to drive the adoption of technologies that support both outcomes.

It is our opinion that a national energy efficiency scheme would enable economies of scale for participants delivering energy efficiency offerings.

We also consider that this scheme should utilise a baseline/savings methodology consistent with that proposed for DSP.

Finally, we would encourage the adoption of technologies like real-time energy monitoring and control, as accredited under the proposed changes to NECF by this Draft Report, to take a more central role in energy efficiency schemes. In doing so, DSP providers would be encouraged to deploy technologies that provide a dual service to the customer (in generating energy efficiency and demand resources).