Australian
Energy Market
Commission

New Energy Services and Multiple Trading Relationships

July 2015

www.kpmg.com.au

Contents

Disclaimer

This report has been prepared as outlined in the Our Approach Section. The services provided in connection with this engagement comprise an advisory engagement, which is not subject to assurance or other standards issued by the Australian Auditing and Assurance Standards Board and, consequently no opinions or conclusions intended to convey assurance have been expressed.

Any reference to 'audit' and 'review', throughout this report, is not intended to convey that the Services have been conducted in accordance with any auditing, review or assurance standards. Further, as our scope of work does not constitute an audit or review in accordance with any auditing, review or assurance standards, our work will not necessarily disclose all matters that may be of interest to the Australian Energy Market Commission (AEMC) or reveal errors and irregularities, if any, in the underlying information.

In preparing this report, we have had access to publicly available information. We have relied upon the truth, accuracy and completeness of any information provided or made available to us in connection with the Services. We have not sought to independently verify those sources unless otherwise noted within the report.

Any findings or recommendations contained within this report are based upon our reasonable professional judgement based on the information that is available from the sources indicated. Should the project elements, external factors and assumptions change then the findings and recommendations contained in this report may no longer be appropriate. Accordingly, we do not confirm, underwrite or guarantee that the outcomes referred to in this report will be achieved. KPMG is under no obligation in any circumstance to update this report, in either oral or written form, for events occurring after the report has been issued in final form.

We do not make any statement as to whether any forecasts or projections will be achieved, or whether the assumptions and data underlying any such prospective financial information are accurate, complete or reasonable. We will not warrant or guarantee the achievement of any such forecasts or projections. There will usually be differences between forecast or projected and actual results, because events and circumstances frequently do not occur as expected or predicted, and those differences may be material. KPMG has indicated within this report the sources of the information provided.

The findings in this report have been formed on the above basis.

Third Party Reliance

This report may be made available on AEMC's website. Third parties who access this report are not a party to KPMG's contract with AEMC and accordingly, may not place reliance on this report. If you are a party other than the AEMC, KPMG:

- owes you no duty (whether in contract or in tort or under statute or otherwise) with respect to or in connection with the attached report or any part thereof; and
- will have no liability to you for any loss or damage suffered or costs incurred by you or any other person arising out of or in connection with the provision to you of the attached report or any part thereof, however the loss or damage is caused, including, but not limited to, as a result of negligence.

If you are a party other than the Australian Energy Market Commission and you choose to rely upon the attached report or any part thereof, you do so entirely at your own risk.

New Energy Services and Multiple Trading Relationships

Advances in technology, including information technology, are giving customers greater control and more choices in how they consume and pay for their electricity. It is expected that such advancements will drive substantial transformation in the services available to electricity customers.

The Australian Energy Market Commission is currently considering a rule change to enable Multiple Trading Relationships (MTR) at a single customer site. This would allow customers to engage with multiple retailers or service providers at its premises or residence.

Implementing such an arrangement would enable the customer to split its electricity consumption across multiple retailers and/or disaggregate its embedded generation capability from its electricity supply contract. For example, engaging with one retailer for the main household load but with another retailer for a specific load, such as an electric vehicle or hot water system.

The key difference of MTR is not the customer separating its consumption across multiple metered loads, as this is possible under existing arrangements through a single retailer, but rather the ability for the customer to have multiple "retailers" at its premises.

In doing so, MTR provides more control to the customer to choose a different selection of tariffs or technologies rather than have to deal with what bundles are offered in the market. However, this depends on whether the customer has the ability or desire to deal with multiple contracts. The downside of MTR is the additional complexity in the metering, settlements and billing arrangements required.

To assist in assessing the rule change, the AEMC has asked KPMG to provide advice on the type of services, which could be enabled, or better facilitated, through MTR and also how such services would deliver value to customers and promote efficiency in investment, operation and use of electricity services.

Summary of findings

The Australian Energy Market Commission (AEMC) is currently considering a rule change to introduce Multiple Trading Relationship (MTR) arrangements into the electricity retail markets. Such an arrangement would allow customers to engage with multiple retailers or service providers at the customers' premises or residence.

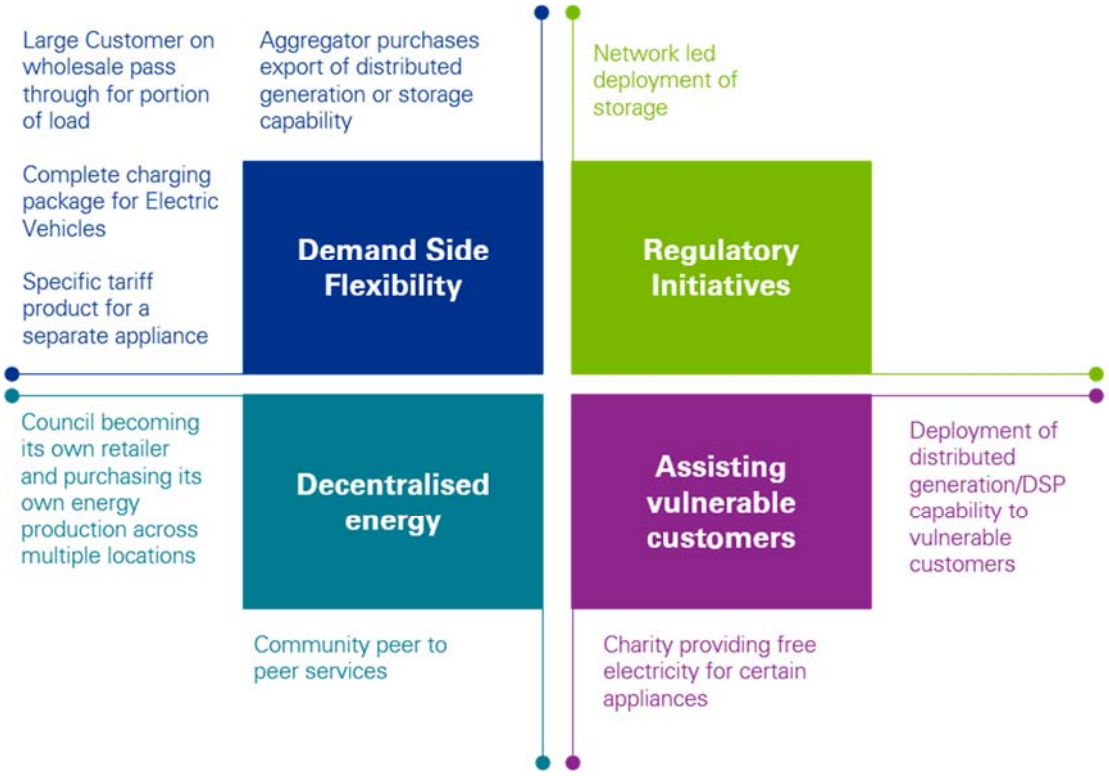
This report seeks to inform on the potential role that this reform could play in the transformation of the electricity market through considering what new services could be facilitated by the arrangements and how those services could deliver additional value to customers and promote efficiency in the National Electricity Market (NEM). The report does not assess the costs or benefits of introducing a MTR arrangement into the NEM.

There are four different categories where new electricity services are expected to emerge in the future:

- Demand side flexibility
- Regulatory Initiatives
- Decentralised Energy (e.g., community based energy projects)
- Assisting vulnerable customers

Across those four categories, this report has identified nine potential services which could be enabled, or better facilitated, if the MTR arrangement was introduced. Diagram 1 shows those services and a more detailed description of each service is provided in section 1.

Diagram 1: Potential Services related to Multiple Trading Relationships



This list is not meant to be exhaustive and represents consideration of potential services dependent upon MTR based upon our understanding of commercial drivers, developments in international markets and the design of the NEM. It would be expected that different services would emerge as the market transforms and new opportunities are created.

For a new service to emerge there needs to be a viable business model and customer demand. The model of each service will depend upon its value proposition and motivation for providing that service.

A value proposition outlines how the service will meet its customer's needs. There are two aspects in considering value proposition:

- How does that service create new value in serving the customer, which existing services do not provide?
- Can that value generate sufficient customer demand for that service?

While the motivation for most services is likely to be commercially driven (e.g. profit, brand loyalty), there is an emerging trend for social and community based energy projects. For these projects, the motivation is more diverse and could include environmental and affordability drivers.

For the first category of services – demand side flexibility – the revenue comes from two potential sources:

- a premium for providing the new value for the customer
- the service provider supplementing that premium through capturing the value of the demand side action to the supply chain (i.e. peak shifting).

For the second category – regulatory initiatives – commercial viability is not an issue as the service is funded through a regulated allowance. The objective of that allowance is to fund a service that delivers extra efficiencies to the electricity market. This review has identified the widespread deployment of grid connected storage capability by a network business as a potential regulatory initiative. Such services would only emerge if it is considered that commercial service providers cannot create products which deliver similar levels of efficiency to the market.

For the third and fourth categories – decentralised energy and assisting vulnerable customers – the motivation for the service is quite different. The motivation is not purely commercial but instead is driven by more social, community objectives. How these services are organised will be very different, and delivering efficiencies across the electricity supply chain may not be a primary focus of the service provider. Rising energy costs in recent years has resulted in a greater focus on affordability and the need to support vulnerable consumers.

We found that for two of the nine services identified, MTR could be essential for that service to emerge. These are:

- Complete charging package for electric vehicles, where the supply contract follows the vehicle rather than being located at a single customer premises
- Aggregator purchasing a customer's distribution generation or storage capability where the aggregator is able to offer more value to the customer for its demand side response compared to standard retailers

For the following two services in the decentralised energy category, MTR would only be a prerequisite in limited circumstances, depending on the nature of the peer to peer or council transaction. The adaption of these services related to the MTR rule change which we have considered for this report include:

- Community peer to peer services, whether the customer is buying or selling electricity directly to other customers but has continued having a contract with a standard retailer available to provide backup supply when required

- Council purchasing its own energy production across multiple locations, where the Council becomes its own retailer buying its own generation thereby bypassing standard retailers but has continued engaging with a standard retailer at consumption premises to provide backup supply when required

Therefore the MTR arrangement is not a prerequisite for council led energy initiatives or peer to peer electricity services to emerge generally, and is only essential in the particular adaption of those services described in this report. Also regarding these two services, other reforms, such as virtual net metering or changes to the arrangements for embedded networks, could enable the same service to emerge and decrease the dependency of these services on the MTR arrangement.[1]

For the remaining five services, we consider that customers could access similar value propositions under existing arrangements. For example, customers can already access a specific network tariff for load controlled devices.[2] It is also possible for a customer to have multiple tariffs for different appliances under the same retailer (i.e. with a dual element meter).

Instead for these services, we consider that MTR could better enable the customer to capture that value proposition.

For demand side flexibility services, the advantage of MTR is that it enables the customer to unbundle its demand response capability from its normal consumption. This could expand the range of providers offering services to the customer and therefore improve choice and possibly help them to negotiate a better price for its demand response compared to the current arrangements where the customer will be negotiating with its existing retailer.

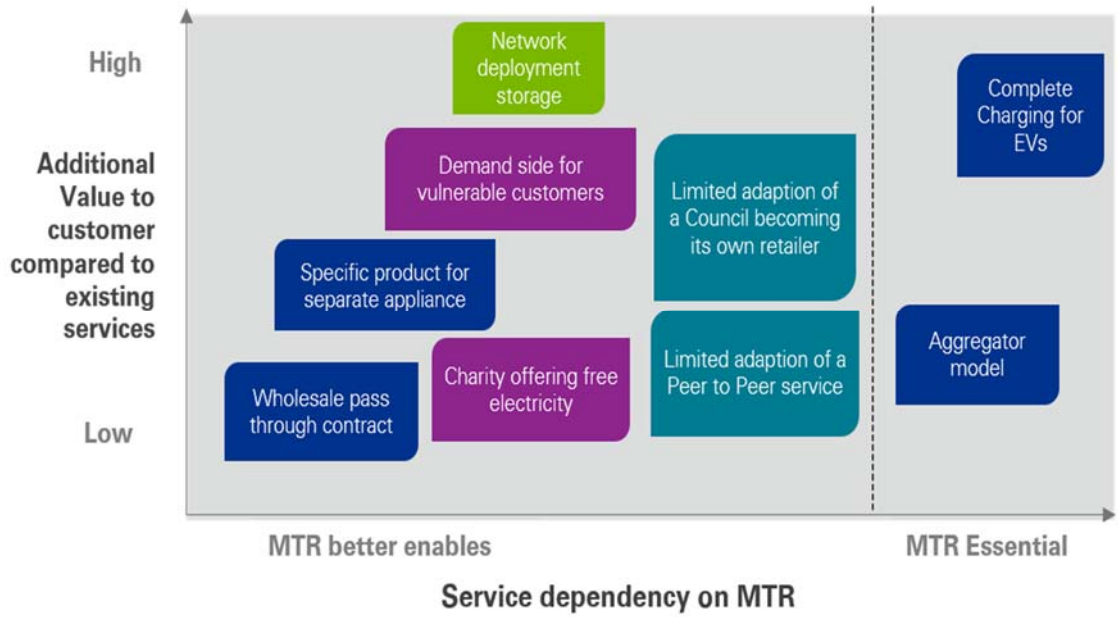
For the vulnerable customer services, the advantage of MTR is that it avoids the need for the government or charity to enter into contracts with multiple retailers in order to deliver the service to vulnerable customers. Under the MTR arrangement, the government or charity could negotiate directly with one supplier for that particular service while the remainder of the premises consumption is supplied through standard retailers. This could ease implementation costs also and avoids issues arising when the customer switches retailers as the vulnerable customer service has been de-coupled from the premises consumption.

Figure 1 maps all nine services by comparing two aspects of the services:

- Whether MTR is essential for that service or only better enables that service to be offered to the customer
- The extent to which the service delivers additional value which is not recognised in existing services

[1] Virtual net metering would enable a customer to offset consumption and generation across multiple meters at different locations. It is commonly used in the United States to allow a group of customers (i.e., tenants of the same apartment) to share the credits of a shared distributed generation project.
[2] For example, in Energex's area, the average pool pump accounts for more than 20 per cent of a household's electricity use, costing more than $640 each year to run. Customers can save $250 a year from the specific load control tariff for pool pumps - Tariff 33 plus $250 signing on bonus (Source: Energex website).

Figure 1: Dependency of the service on MTR compared to the additional value for customers



The position of the services is a matter of opinion and we recognise that the specific circumstances of service providers could result in different value propositions. .

The development of these MTR related services in the market could be limited for a number reasons. Hence even if the AEMC made a rule to introduce MTR, other factors could prevent the emergence of such services. For example:

- **Financial Support**: In the absence of a government subsidy or a regulatory payment, such services may struggle to emerge due to uncertain or insufficient revenue potential at the start. This is because of the lack of scale in the uptake of the service. Developments in international markets demonstrate the importance of financial support for a service to initially emerge (i.e. electric vehicles in California).
- **Regulatory Arrangements**: The appetite for service providers to offer these services is very dependent on other regulatory arrangements which have yet to be addressed. This means that there are "missing pieces to the jigsaw" which would create barriers to entry if left unaddressed. This includes for example, regulation of third party service providers, customer protection arrangements, regulatory incentives, appropriate metering and settlement arrangements, the treatment of storage, and the role of networks in such services.
- **Ease of access for customer:** It is important that the customer is able to understand, engage and utilise the service offered. This means that there is a simple interface between customer and service provider and that the customer fully understands all its commercial obligations and rights. While advances in information technology will improve such access, these services may initially be dependent upon "active customers" who are the early Adopters and are comfortable with managing the additional complexity and information.
- **Commercial, Metering and Billing**: A critical issue will be the ability of each retailer on a single customer site to have a contract and to meter and bill for demand/generation. This will need technology and communication systems, probably owned by one party who undertakes the settlements role. Contracts will need to be interactive which will likely add complexity and cost. Dispute resolution is likely to be more challenging under such arrangements.

We acknowledge that the AEMC is progressing work that may address these regulatory issues, and that MTR is part of a wider package of reforms. For example, the AEMC competition in metering rule change is considering network ring-fencing arrangements, with the draft determination proposed requiring the AER to develop ring-fencing guidelines by July 2016. In addition, the AEMC is currently progressing a rule change on the demand management incentive scheme which seeks to better enable network demand side initiatives to capture all the value across the supply chain.

While some of the services can be delivered today, the majority of the services are dependent upon advancements and uptake of new technologies, such as storage, smart meters, smart appliances and electric vehicles. We note that the potential roll out of smart meters could provide both the opportunity for providers to get consumer interest in different services as well as to save on installation costs.

The addition of storage capability to the service is likely to improve the profitability through enabling the service provider to export stored electricity at times of high wholesale prices. Therefore, the commercial viability of these services, especially the demand side flexibility services, could be dependent upon the viability of storage technology and regulatory treatment of storage (see Box 1).

From our research of emerging services in international countries, there is only one other example of a MTR-type arrangement being developed, which is in California. There the California Public Utilities Commission has introduced a subtractive billing arrangement for electric vehicles (see Case Study 1).

Our analysis has focused on identifying services which could emerge and offer more choice for consumers. We note that additional choice should be welcomed as long as it does not come at the expense of higher costs or regulatory complexity in the market.

Box 1 – Developments in storage technology

Interest in electricity storage is driven by a range of potential applications that include avoiding power outages for customers, reinforcing the grid, reducing other transmission and distribution costs, shifting power consumption away from costly peak-load periods, balancing intermittent renewable energy resources, and providing ancillary services and emergency response services in the wholesale power markets.

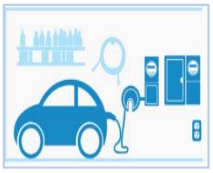
While the potential value of these and other storage applications have long been recognised, electricity storage costs have not been competitive with alternative technologies and resources that can provide comparable services. Due to recent development, electricity storage appears to be on the verge of becoming quite economically attractive. The combination of low-cost lithium-ion batteries derived from the electronic vehicle industry and smart inverter technologies is creating new opportunities for storage and solar PV to solve many grid related issues.

Case Study 1

Californian Electric Vehicle Submetering Pilot Program

Since 1990, the California Public Utilities Commission (CPUC) has introduced a number of measures that have assisted the promotion of plug-in hybrid and electric vehicles (collectively PEV). This included encouraging the three major investor owned utilities (IOUs) – which provide both network and retail services - to develop time-of-use tariffs that enable customer savings and encourage charging at off-peak times. This has resulted in EV customers having the option of either:

"Whole house" Time of Use (ToU) rate - applies to all electricity usage on a single meter, including PEV charging. This encourages consumption shifting so PEV charging (and other appliance usage) can occur during the lower priced, off-peak period, which is typically from 10pm to 8am and during the summer season.



PEV submeter ToU rate – lower rate for electricity used solely for PEV charging and requires installation of a submeter and typically a new electrical panel. The balance of electricity usage is at pre-existing rates. This option involves upfront costs for the new meter, installation and one-off connection charges (circa US$100), rates.

A recent survey[3] showed that, while the majority of drivers (65-80%) knew about these tariff options, only 62% used them, with the rest remaining on the default retail rate. Of that 62%, over 90% of them chose the whole house ToU tariff rate. The take up of special PEV sub-meter rates has been low due to the cost of the sub-meter and the limited savings under this rate.[4]

In 2011, the CPUC released a decision that directed the IOUs to develop a protocol to support their use of customer-owned submeters with subtractive billing arrangements to measure and bill the electricity consumption of PEVs served on separate IOU PEV rates. Retail competition is suspended in California following the 2001 energy crisis so the focus of these reforms is on enabling a customer to access a separate tariff offered by the same retailer and not to access different tariffs for specific appliances from different retailers.

The Commission's expectation was that the use of customer-owned submeters would support the policy goals of customer choice and cost minimisation, among others. Subsequent work with IOUs highlighted various technical and regulatory problems with such subtractive metering, including:

- a lack of national industry standards and technologies;
- third party submeters did not meet standards;
- low take-up of PEV submeter-based tariffs (Southern California Edison data showed only 4-8% of its PEV customers are on this tariff[5]);
- high IOU cost of automated subtractive billing functionality to support PEV submeters;

[3] http://www.cpuc.ca.gov/PUC/energy/altvehicles/Plug-In+Electric+Vehicle+Submetering.htm

[4] The choice in California is also subject to whether the PEV customer decides if Level 1 charging (i.e. using standard 120V and wall outlets) is sufficient for their particular vehicle and charging time needs or whether a more expensive, 240V Level 2 charging station is required. The latter requires a dedicated circuit and potentially an electrical panel upgrade. This decision will affect the optimal tariff for their requirements.

[5] http://www3.sce.com/sscc/law/dis/dbattach4e.nsf/0/8825760E007789EA882579AC0004DA02/$FILE/R.09-08-009_AFV+OIR-SCE+Response+To+ALJ+Ruling.pdf

- the impact of other smart grid mandates on PEV back office functions; and
- issues with privacy/security where there are separate customers at one premises.

Pilot program

The IOUs and CPUC now recognise the need for a submetering protocol, including new tariff rules and technical standards, to cover issues such as testing, safety, data transfer, billing and payment. To assist addressing these issues, the CPUC introduced the Electric Vehicle Submetering Pilot Program (EVSPP) across the 3 IOUs in 2014. The EVSPP is designed to improve residential and commercial customer choice and value by using submeters specifically for PEV charging to help drivers save on fuel costs and avoid upgrading their electrical infrastructure.

The pilot is limited to 500 customers per utility on a first-come, first-served basis and pilot customers will have their PEV electricity usage billed at lower tariff rates for a 12 month period. Pilot customers will use submeters from third-party providers (known as Submeter Meter Data Management Agents) to measure their electricity use for billing purposes.

Our approach

The sole purpose of this report is to assist the AEMC to understand the Multiple Trading Arrangements Rule change request through providing a high level, qualitative analysis of the range of new energy services that might be reasonably expected to develop in the presence of MTR and explaining how such services could add value to customers.

KPMG has identified nine potential services which the MTR arrangement would enable, or better facilitate, in the emergence of the National Electricity Market (NEM).

In Appendix 1, we provide the following detail on those nine services:

- Description of the service;
- Value proposition for both consumer and service provider; and
- Dependency on the MTR arrangement.

This list represents a view of potential new services based upon our understanding of commercial drivers, development in international markets and the NEM.

This list is not meant to be exhaustive and in all likelihood will prove to be incomplete. In a changing market, innovative businesses will see new opportunities and will develop products.

In developing this list, KPMG reviewed commercial services which are emerging in the United States and Europe and assessed their relevance to the MTR arrangement. This report contains a number of case studies of overseas developments to help identify potential trends which could be relevant to MTR.

We have investigated only those services which involved either buying or selling of electricity and therefore require participation in the wholesale electricity market by a financially responsible market participant (the person liable for the settlement of the loads at that premises). We have not looked at emerging services which relate to giving consumers greater information or control over their electricity purchasing as such services are not relevant to the MTR (such as energy service companies providing advice).

There is a regulatory question as to whether the export of electricity from a storage battery or charging of electric vehicles constitutes buying and selling of electricity as defined under the National Electricity Law (NEL) and therefore whether the service provider needs a retailer licence or exemption. For the purpose of this report, we have assumed that for the services incorporating these activities, the service provider would be classified as a financially responsible market participant under the NER.

KPMG was not asked to forecast the uptake of the services identified. However in our report, we note some of the other factors and developments that would influence the commercial success of these services.

The emergence of these new services will not be linear and systematic across all jurisdictions in the NEM. Service providers will follow different paths of adoption based on the needs and issues specific to the jurisdictions they serve. Customer needs in Melbourne differ from those in Townsville, and the supply chain values for reliability, network deferral and resiliency will inevitably be different across the NEM. As such, it is important to understand the various ways this market will evolve, as this will have inherent implications in terms of how and when new commercial providers are likely to bring new value propositions to customers.

Section 1: What new services could emerge?

The nine services set out in Appendix 1 cover a diverse range of products for customers.

For a service to emerge, there must a credible value proposition on both sides of the transaction – the customer and the service provider.

From the customer perspective, the value proposition of these services arises from lower energy bills, environmental considerations and/or a more convenient, better quality service (e.g. complete charging for electric vehicles).

From the service provider's perspective, the motivation for offering the service will depend on various factors including:

- Being able to charge a premium for additional value provided to the customer
- Their ability to capture the value of a customer's demand side response along the supply chain (for example, selling storage at peak times) and sharing those savings with customers
- Social or environmental considerations (e.g. assisting vulnerable customers[6])

Being able to capture all the value of a customer demand side across the various components to the electricity supply chain will obviously improve the commercial viability of a service. However, this can be very difficult to do due to market design, co-ordination and contractual issues. This is discussed further in the next section.

Commercial service providers would make the investment in a new service only they consider the service is likely to be profitable. The costs of service will therefore be a key consideration and we note that this could depend upon the metering configuration. Scale (likely uptake of the service) will be another key consideration for the service provider. Uncertainty about scale creates considerable risks and financial issues if there are a lot of up-front costs.

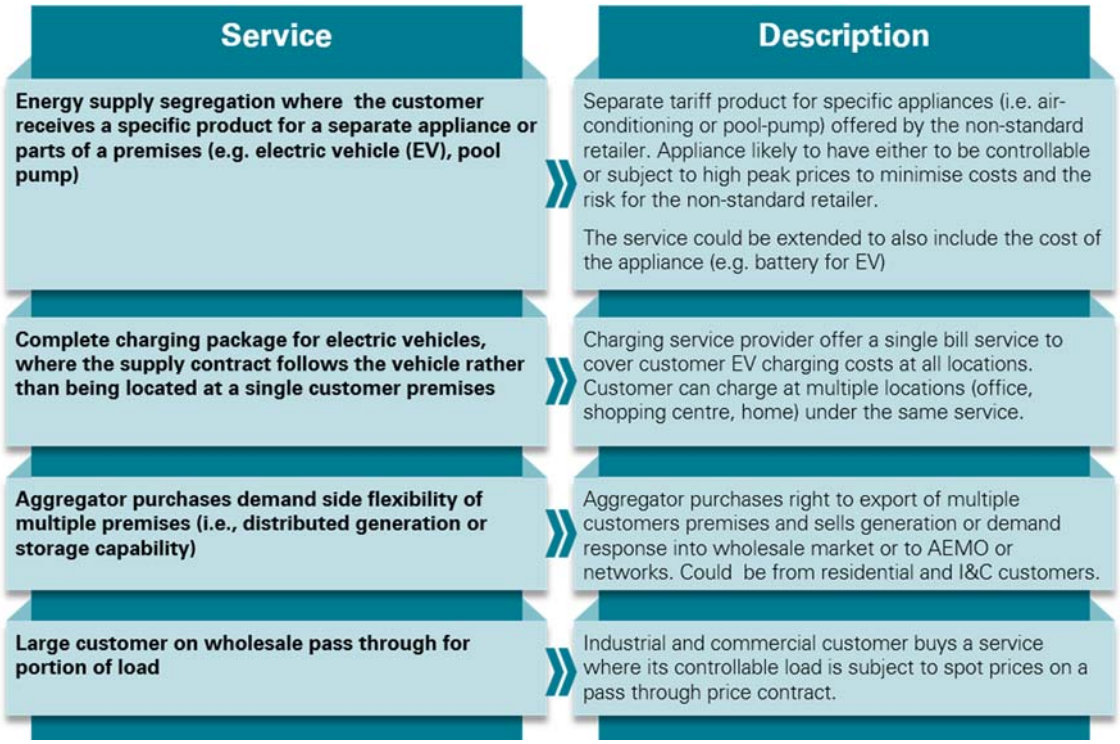
In addition, the service provider would need to invest (or outsource) in back office functions and develop the capability to maximise the value of customer decisions (i.e. trading on the wholesale spot market). The service provider would have to comply with any applicable financial prudential obligations. These issues are not trivial.

Category 1 - Demand-side flexibility

Service providers, for example aggregators and storage operators, provide energy system flexibility services such as demand-side response, energy storage and demand reduction. New actors are also seeking to enter the market with different propositions, for example using smart meter data to optimise energy consumption and offer system flexibility services.

The MTR arrangement could foster a number of new services in this area and this report identifies the following four potential services.

[6] Vulnerable customers are those customers who may have difficulty in paying their electricity bills. In the NEM, such customers could qualify for financial assistance under state government schemes.



Energy supply segregation service (specific product for separate appliance or load)

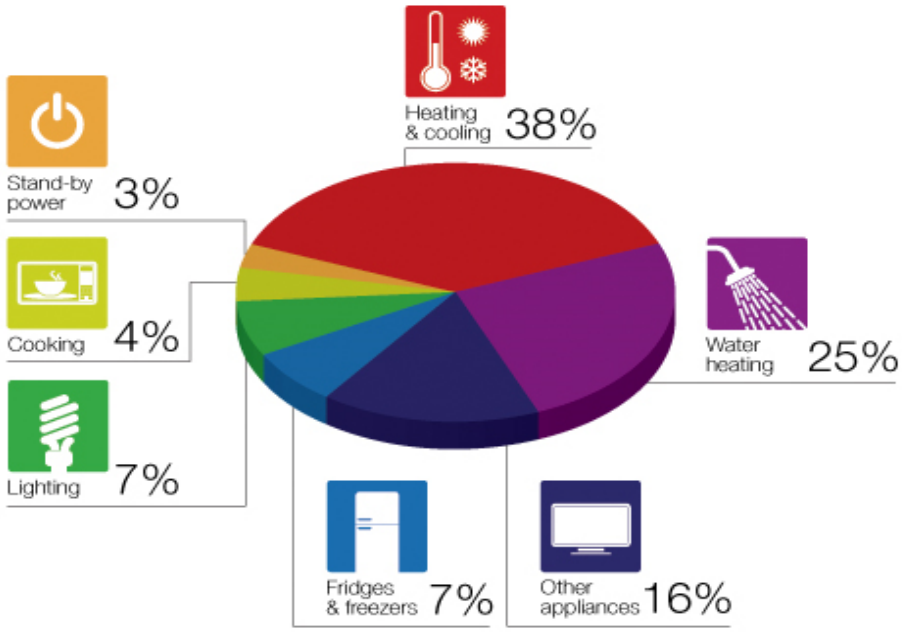
For energy supply segregation services where the customer receives a specific tariff for a separate appliance (or parts of a premises), the value to the customer is greater diversity in tariff choices. The customer could access a ToU tariff for a portion of its load, thereby avoiding the need to put all its consumption onto a ToU tariff structure.

In California, the California Public Utilities Commission (CPUC) requires utilities to support use of customer owned submeters and subtractive billing to have separate billing for Electric Vehicle (EV) load. The CPUC's expectation was that the use of customer-owned submeters would support the policy goals of customer choice, off peak charging of EV and cost minimisation.

However to date, most EV users in California have opted for the whole house ToU rate and not the specific EV rate. As discussed in Case Study 1, data from Southern California Edison showed only 4-8% of its PEV customers are on the specific tariff choice. The cost of the submeter is seen as a key barrier to greater uptake of the specific tariff plus the lack of retail competition in the market. The CPUC is currently conducting a pilot to improve the submeter/subtractive billing option for customers.

The attractiveness of such a service will depend upon the potential savings to customers compared to the cost of segregation. This will depend upon the proportion of the load and the suitability of that proportion to be subject to a ToU tariff or controlled load product. Figure 2 shows the breakdown of consumption by appliance for the typical Australian household. This highlights that such services are most likely apply to heating/cooling appliances, water heating, and other appliances (e.g., pool pumps, electric vehicles).

Figure 2: Average Australian home consumption by appliance.[7]



We do not consider that MTR would be a pre-requisite for the customer to capture the value proposition of such services. A single retailer could offer the same service as long as the appliance is separately metered or able to be controlled. Network businesses already offer specific tariffs for load control devices (i.e. hot water boilers or pool pumps).[8]

We also note that an electric vehicle service provider could prefer to partner up with a standard retailer to offer it services and discounts. For example if Tesla wanted to offer cheap electricity to charge its electric cars, it could do this through certain retailers who would then take care of the metering, billing and regulatory requirements. Tesla would still be available to offer additional value to the customer but avoids the costs and issues associated with becoming a licenced retailer.

Instead, the benefit from MTR is that it could increase choice for the customer and put the customer in a better position to negotiate reward for its demand side flexibility. As explained above, MTR could enable the customer to unbundle its demand response capability from its normal consumption which could in turn expand the range of providers offering services to the customer. In addition, the prospect of losing a proportion of the customer load through MTR could drive a competitive response from existing retailers.

A possible variation of demand side flexibility services is where the customer engages with retailers for provision of energy for different time periods (e.g. seasonal or intra-day supply). The MTR arrangement would only be needed to facilitate such a service if the customer has multiple contracts with retailers at the same time.

Again, we do not see MTR as essential for the customer to capture the value proposition of such a service. The primary driver for this service would be to access cheaper supply of electricity. Therefore, it would be possible for a single retailer to structure a single tariff product

[7] SA Government website: http://www.sa.gov.au/topics/water-energy-and-environment/energy/saving-energy-at-home/check-and-reduce-your-energy-use/energy-use-at-home

[8] For example, in the Energex area, the average pool pump accounts for more than 20 per cent of a household's electricity use, costing more than $640 each year to run. Customers can save $250 a year from choosing the controllable load Tariff 33 plus receive a $250 signing on bonus (Source: Energex website).

which provides the same value to the customer. For that reason, we have not explicitly identified such a service for this report.

Pass-through contract for controllable load

Similar to energy supply segregation services, we consider that MTR is not a pre-requisite for the service where a large customer is on a wholesale price pass-through contract for its controllable load. This is because the existing retailer could offer some specialised service or reward for the controllable load as long as the controllable load is separately metered.

Under the existing arrangements, it should be possible for the existing retailer to offer a segregated pass through contract for part of the customer's load. Competition in the retail market should incentivise the retailer to offer this if a large customer requests the service.

Aggregator services

Under a demand side aggregator model, the service provider would contract with multiple customers for their demand side flexibility. The aggregator would combined all the demand response or generation from its portfolio and sell the value of this product into the wholesale market at high spot prices, or either directly to network businesses, or as an ancillary service to AEMO.

The aggregator model can take many versions depending on:

a) whether the product is distributed generation or changes in consumption patterns; and

b) how the aggregator intends to capture the supply chain value.

It is most likely that the MTR arrangement will be a pre-requisite for the aggregator model as the aggregator needs to be a financially responsible market participant at the customer's premises under the existing market arrangements.[9]

Regarding the aggregation of micro DG from small customers the development of such a services will be subject to:

- whether the aggregator is able to offer a better price for the customer's exported generation than the existing retailer's feed in tariff scheme;
- whether the customer is comfortable with having multiple service providers at its premises; and
- the licencing and regulatory requirements on the aggregator.

A key factor in the emergence of the aggregator services is whether the aggregator is able to offer a better rate for export of generation than the retailer's solar feed-in-tariff (FiT) rate. This would depend upon whether the customer is receiving a premium rate or the voluntary, (unsubsidised) rate offered by retailers.[10]

Residential customers were previously offered generous FiT rates under jurisdictional incentive schemes. These rates are subsidised through distribution network charges. While these premium FiT schemes are now closed for new entrants, existing customers have been grandfathered and will continue to receive the premium rate. An aggregator would only be able to capture such customers if the aggregator is able to access the funding for the premium rate. However it is not clear if this allowed under the existing arrangements.

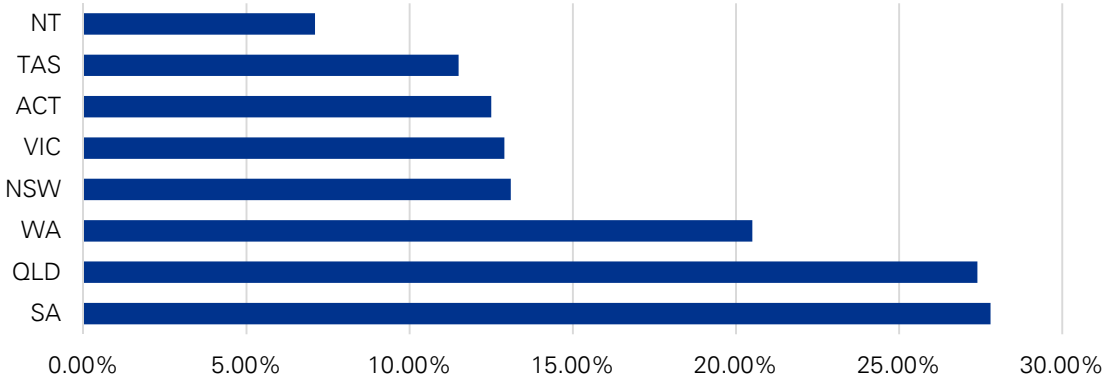
[9] The possible exemption to this, is large customers DG. For larger customers with larger DG installation (say a 1MW gas backup generator), the scale of the generation typically warrants installation of a separate meter/connection point, so MTR may not be required.

[10] FiT schemes generally fall into two categories: premium schemes, which provide a tariff payment that is significantly greater than the wholesale cost of electricity, and non-premium schemes, which generally provide a tariff payment that is equivalent to the avoided cost of supply due to the operation of a rooftop solar generator.

New customers will be offered the retailer's own FiT rate (which is not subsidised), which tends to be set to cover avoided wholesale costs. We understand that these rates have fallen slightly in recent years as the NEM spot prices have decreased. IPART considers that the benchmark range for unsubsidised solar FiT is in the range of 4.9 to 9.3 c/Kwh. [11]

The potential scale of the micro distributed generation market will be a key driver between the dependent of this model. Figure 3 details the current percentage of dwellings with a PV system across Australia and demonstrates the potential size of the market for households yet to install a PV system.

Figure 3: Percentage of dwellings with a PV system by State/Territory



Source: Australian PV Institute (APVI) Solar Map, funded by the Australian Renewable Energy Agency, accessed from pv-map.apvi.org.au on 8 July 2015

If the aggregator were to also sell its product to networks or AEMO as network support or ancillary services, then this could increase its ability to offer a better rate. In addition, the aggregator could also offer a different type of FiT rate (e.g. time of use FiT rates) in order to offer additional value to the customer.

The addition of storage could change the economics of aggregator models as it enables the aggregator to export at peak times thereby maximising the value. However, this will also depend upon the regulatory arrangements for storage. For example, in Queensland, if the customer installs storage as well as a solar PV, then the customer would no longer qualify for the Solar Bonus Scheme rate.

Other aggregator models which focus instead on a demand side response could emerge under the introduction of the Demand Response Mechanism. This mechanism would create a new class of market participant, a demand response aggregator, who will facilitate large energy users to act as though they were non-scheduled generators in the wholesale market, and receive reimbursement for reducing energy demand in response to high price events. The AEMC is currently considering a rule change request on this mechanism. [12]

Complete charging service for electric vehicles

The fourth potential service under the demand side flexibility category is an all in one service for EV charging. The service provider would issue a single bill for all the customer charging of its EV, irrespective of location (i.e. shopping centre, car-park, office or home). Effectively, the supply contract would follow the vehicle instead of being fixed at one premise. MTR would be essential for this service to emerge, as the service providers need to be the financially responsible market participant at the customer's premises for the separated EV load.

[11] IPART, Solar Feed-in-tariff – The subsidy free vale of electricity from small scale solar PV units from 1 July 2014, Final Report- June 2014.
[12] http://www.aemc.gov.au/Rule-Changes/Demand-Response-Mechanism

The emergence of such a service is dependent upon the EV charging solutions which will emerge in the market (e.g. whether there will be an open-access platform across all charging stations).

We note that to date the growth in EVs internationally has been driven by individual purchases and have not been corporate fleet purchases. One of the benefits of this service is that it will facilitate corporate/businesses providing EV to staff as it removes administrative complexity of processing multiple bills. We have not been able to confirm whether such a service has emerged in international countries.

Category two – Regulatory Initiative through network led deployment of storage

There is an emerging trend in the US for some network utilities to lead the deployment of storage facilities across their grids, as discussed in Case Study 2 (page 17).

Given that deploying storage on specific locations on the distribution system is important for capturing the full value that storage can provide, the deployment strategy will be most effective if it is integrated with:

- the planning of transmission and distribution system investments; and
- efforts to use electricity storage backup to reduce customers' power outages.

Therefore, it might be easier for a network business to capture all the value along the supply chain than a commercial service provider focusing solely on wholesale spot arbitrage (see Box 2).

A similar conclusion was reached in a recent assessment of large scale storage deployment in the Texas market (as discussed in Case Study 2). Research conducted for a network utility found that storage investments could not be undertaken at an efficient scale solely by merchant developers in the Texas restructured electricity market. It was considered that the value a merchant storage developer can capture and monetize through transacting in the wholesale power market alone would be too low compared to costs. [13]

[13] The Brattle Group: The Value of Distributed Electricity Storage in Texas – Proposed Policy for Enabling Grid-Integrated Storage Investment – Report to ONCOR, November 2014.

Box 2: Using storage for wholesale spot arbitrage

Energy arbitrage is the trading of wholesale electricity to benefit from the spreads between prices at different times. This typically involves buying power cheaply overnight and selling it at peak when prices are higher. As the volume of intermittent generation increases in future, the volatility in prices is likely to increase and timing of highest and lowest prices may be more variable.

Energy arbitrage requires the spread in prices to be great enough to offset the cost of lost power due to the efficiency of the cycle (charging and discharging the asset). Another consideration is that multiple charging cycles have an impact on the lifetime of the battery, which should be accounted for in the dispatch decision.

In theory, a network deployed storage unit could discharge over the peak period and still provide security, but this would require careful control to ensure that the remaining energy in the storage is sufficient to cover expected and unforeseen changes in demand over the peak period.

We note that the NEM market design is very different to that in Texas (for example, the NEM market price cap is substantially higher at $13,800/MWh than in Texas where the offer cap is US $3000/MWh) and therefore this assessment may not apply to the NEM.

The MTR arrangement is not essential for this service as networks could instead either

a) enter into commercial arrangements with existing retailers regarding the use of the storage deployed; or

b) could install storage in front of the meter and not behind the customer's meter.

Instead the MTR arrangement could better enable such a service to emerge through providing more flexibility and control for the network business. This would be in regarding the operation of the storage unit, when to utilise the stored electricity and also how to capture the supply chain value of the investment. It also avoids the network business having to enter into commercial arrangements with multiple retailers. However, there needs to be both regulatory approval and motivation on the networks behalf for such a service to emerge.[14]

Regarding the motivation, the key questions facing a network business considering such a deployment of storage are:

- Who should take the risk on construction and operation of large scale storage?
- Who should take the benefit and manage the risk associated with capturing the value of storage?
- Which services and markets could the storage operator participate in and how do they complement each other and the network services?
- What are the regulatory consequences?

[14] We note that networks businesses such as Ausnet services and ElectraNet, are conducting trials into battery storage capability and integration into the market. See: http://www.aemc.gov.au/Major-Pages/Integration-of-storage/Documents/Storage-forum-presentations.aspx

Case Study 2

Network led roll-out of storage in the USA

A number of transmission and distribution utilities in the United States are considering deploying large scale storage across their networks. Southern California Edison (SCE) recently announced plans to install up to 250 MW of grid connected energy storage. This includes installation of 50 MW of battery storage at commercial and industrial buildings in Los Angeles to provide large-scale grid support to the utility. The SCE initiative is in response to the California Public Utilities Commission decision in 2013 to require the state's big three investor-owned utilities to add 1.3 gigawatts of energy storage to their grids by 2020.

The utilities in California are bundled network and retailer providers which therefore could help better capture value across the entire supply chain and remove some of the complexity regarding metering.

In Texas, the arrangements are similar to Australia where the network business is unbundled from the retailer. Oncor Electric Delivery Company, a Transmission and Distribution Service Provider (TDSP) in Texas, recently explored the economics of grid–integrated storage deployment in Texas. Oncor is a regulated electric transmission and distribution service provider that serves 10 million customers across Texas.

Oncor is considering a large scale deployment of 5000 MW of grid connected battery storage which would have a combined energy storage capacity of 15,000 MWh. Oncor considers values ranging from ancillary services such as frequency response to deferral of expensive transmission and distribution investments as reasons that Oncor should invest in energy storage, particularly the benefits of increased system reliability and reduced outages, all while lowering consumers' electric bills.

There are two findings from the Oncor proposals that could have relevance to Australia:

- Research conducted for Oncor found that storage investments could not be undertaken at an efficient scale solely by merchant developers in the Texas restructured electricity market because the value that a merchant storage developer can capture and monetize through transacting in the wholesale power market alone is too low compared to costs.
- Because Oncor is a wires company regulated by the state, it cannot directly participate in the wholesale electricity generation market by law. With its proposed business model, Oncor hopes to capture the T&D benefits of adding energy storage and then auction additional energy storage capacity not in use to independent power producers (who can legally offer storage to the wholesale electricity market). Oncor considers that such a regulatory framework would facilitate an economically-efficient level of storage investments in Texas, and reduce investment barriers by allowing the storage technology to be deployed when the combined benefits from the wholesale market, transmission, and distribution systems exceed the expected costs by a sufficient margin.

Both the SCE and Oncor proposals are subject to regulatory approval.

Category 3 – Decentralised energy and the emergence of community services

An emerging trend in electricity markets is the rise of community based projects where supply is decentralised allowing generation to be built closer to where it is used with less dependence on the regulated network. These projects seek to offer something different from traditional business models and enable customers to engage in the electricity market in different ways.

We have identified two potential community based services which could be related to the MTR arrangement

Service	Description
Community peer-to-peer services	Community energy project (peer to peer) through a group of premises which buy and sell electricity from each other. Each customer may need a traditional standard retailer at its premises to provide electricity when there are constraints (i.e. back up security of supply) but becomes its own retailer to manage peer-to-peer transactions and capture benefits from bypassing retailers
Council purchasing its own energy production	Councils owns distribution generation and utilise generation for consumption at local public buildings. Becomes retailer at DG site and other connection points but needs a standard retailer to supply any shortage from DG. Council needs to become its own retailer if flows are conducted on main distribution network and not on an embedded network

There are different models for community energy initiatives which differ in terms of the extent of community involvement and ownership. The underlying principle is that a collective of individuals and businesses buy and sell energy between each other using generation which is owned by individuals in the group or collectively by the group. These initiatives share an emphasis on community ownership, leadership or control where the community benefits.

Community Energy could be a key growth area in the future supporting the move to decentralised electricity supply and micro-girds. Such initiatives create an instant market for the excess energy from customers who have invested in their own micro generation or energy storage technologies.

In the UK, the government have specific community energy strategies offering financial support. In addition, OFGEM has sought to introduce arrangements to better facilitate community based energy (see Case Study 3). This report identifies two possible specific adaptions of community based services which could be dependent upon the MTR arrangement:

- Council purchasing its own energy production across multiple locations; and
- Community peer to peer services.

Council purchasing its own energy production across multiple locations

One of the potential services related to MTR identified is where a council owns a distributed generation (DG) site and wants to utilise that generation for supply to local public buildings at other locations (e.g. public library).

The MTR arrangement would only be essential to this particular form of a council led initiative, where the following circumstances apply:

- The council does not want to partner with a standard retailer.

- The council continues to want to maintain a standard retailer at its local buildings to provide back-up supply because of risks or capability of its local generation.
- The council is using the shared distribution network to transport energy.

Other reforms, such as virtual net metering, could enable the council to source its own generation for consumption at different sites. These alternative reforms provide the ability to capture the same value and therefore decrease the dependency of this type of service on the MTR arrangement.

The value of a council doing this will depend upon the market design and settlement arrangements. Under existing market arrangements, if the generator is classified as a non-market generator (or subject to a registration exemption) then it must sell its entire output to the local retailer or consumer at the same connection point. The price will be a matter for negotiation between the relevant parties. Therefore for any council becoming its own retailer, this would enable it to bypass standard retailers and supply itself directly.

The Council led community energy initiatives in the UK have so far been different to the particular form identified above. They are mainly based on the council entering into a partnership with a retailer to develop community-specific tariff that uses some or all of the energy generated in the local community. This is referred to as white labelling as explained in Case Study 3. Some councils are currently pursuing their own retailer licence with the objective to replicate the standard retailer functions and become a retailer to their local residents.

One disadvantage for the council from disaggregating part of its consumption is that it could negatively affect its price negotiation with its retailer. This is because they would lose some of the benefits of scale. However, councils may not be exploring such services from a purely commercial viewpoint and could instead be doing so for environmental and affordability reasons.

Peer to Peer services

The growth of peer-to-peer services is having a transformative effect in other sectors, such as hospitality, transport and lending.

Some service providers could seek to enter the market and provide a peer-to-peer service to connect generators (e.g. a specific wind farm) directly with customers (domestic, industrial and commercial). This model is already emerging in the UK and the Netherlands, as discussed in Case Study 4.

The current models in Europe are based upon a single generator site selling it generation capacity to a consumer who is buying all its consumption through the peer to peer service. We understand the initial focus is primarily at commercial customers given the metering requirements.

One of the objectives of peer to peer transactions is to avoid retailer supply costs by dealing directly with generators. However under existing arrangements a licenced retailer is required for settlement and billing purposes and therefore one of the key questions to how to address these regulatory requirements in a manner different to the standard retailer model. The emergence of peer to peer transactions could drive changes to these arrangements

Case Study 3

Council led energy services

In the UK, initiatives to try to create community energy services have been under development for a number of years. Ofgem and the UK Government have been keen to enhance competition and service by attracting new types of participants into the retail energy market, bringing technological and business innovation to benefit consumers.

The key challenge has been one to enable new entrants to operate in a complex energy market designed largely for national, vertically integrated (supply and generation) companies operating at scale and enjoying economies of scale and scope. Ofgem initiated a project in 2009 to try to develop a 'Licence Lite' for Community Energy. The aim, supported strongly by Government, was to create a licence that was simpler and more suited to community energy providers - rather than having to deal with all the industry rules and codes themselves, they would have a licenced energy supplier ensuring compliance on their behalf. Progress, however, has been very slow and licences still remain very complex.

The Greater London Authority (GLA) is the most advanced in obtaining such a licence, which would be the first.

An alternative approach, which has made some progress, is the use of 'white labelling' where traditional energy supply companies can target particular market segments and capitalise on the brand of a local authority as an energy retailer. A white label provider is an organisation that does not hold a retailer licence but instead works in partnership with a licensed retailer to offer gas and electricity using its own brand. Therefore effectively a white label service would enable a Council to position itself as a retailer while employing a licenced retailer to manage all the regulatory requirements and settlement requirements. [15] An example of this would be Cheshire, Southend and Peterborough Councils, where OVO Energy (one of the smaller suppliers) has developed a 'Communities' business model in co-operation which the local Council. [16]

Also, two metropolitan authorities are actively progressing supply market entry – Nottingham and Bristol are both seeking direct retailer licences. While there are innovative aspects to their business models, especially the desire to procure regional low carbon generation, they are proposing a traditional energy retailer solution, albeit targeted at local residents. The rationale for these councils to become a retailer are to either get a better deal for their electricity or to promote their environmental credentials.

Challenges remain to the exploitation of community energy projects. Firstly, the market rules assume that suppliers are national, centralised entities operating at scale within a complex set of rules. Secondly, the energy metering and settlements system does not currently allow half hourly settlements at the household or local level. Without local metering and settlement, it is difficult to match local consumer demand to local generation. The planned roll-out of smart meters in the UK could overcome this barrier.

[15] Ofgem is currently considering the appropriate regulatory treatment of white label providers in the domestic retail markets. See https://www.ofgem.gov.uk/publications-and-updates/treatment-white-label-providers-domestic-retail-market

[16] https://www.ovoenergy.com/energy-plans/communities/

Case Study 4

Peer-to-peer energy services in Europe

There are currently two peer-to-peer models being developed in Europe. At this stage, both seek to sell offers from premises which are generation only sites and therefore may not be related to MTR.

Netherlands

Vandebron (translates as 'from the source'), a Netherlands start-up company, seeks to connect consumers directly to an independent renewable energy producer.[17] The business model provides a subscription based service (similar to Spotify) and charges €10/month for linking up households with individual renewable energy producers, each of which has an online profile. Vandebron does not charge trading margins and seeks to offer lower cost, renewable energy by bypassing energy supply companies.

Vandebron has received start-up funding from Tridos Bank and the Dutch Greentech fund.

United Kingdom

Open Utility, a UK start-up energy technology company, has developed 'Piclo', the UK's first online peer-to-peer trading service for renewable electricity. The aim for Piclo is to provide an 'eBay for energy' where renewable generators will be able to sell their electricity directly to their neighbours, local businesses or schools for the best price. The scheme aims to give energy consumers more transparency and control over renewable energy purchases than in the past.

The project will undergo a six-month operational trial in starting in August 2015. It is backed by the UK Government's Department for Energy and Climate Change (DECC) through its Energy Entrepreneurs Fund scheme alongside digital social enterprise funding.

Under this service, the customer will use a web interface to pick a merit order of generators and prices to buy electricity from (so this may be local generators or a certain technology). The Piclo software matches every half hour of demand with the requested generation merit order. Therefore a pre-condition for participation is that the customer has half-hourly billing.

One of the objectives of peer to peer transactions is to avoid retailer supply costs by dealing directly with generators. However a licenced retailer is required for settlement and billing purposes. Open Utility has partnered up with a renewable electricity supplier, Good Energy, to ensure that Piclo meets all regulatory requirements and to help facilitate billing. Good Energy will send the bill according to the generation price merit order and customer's consumption set out in the supply contract. If customer generation or demand response is included in the contract then this can be part of the commercial arrangement with Open Utility and the Good Energy.

The generator will also have a Power Purchase Agreement with Good Energy (managed by Open Utility). It is expected that generators will seek to sell its own brand and offer discounts for particular customers.

It is expected that the UK pilot will identify changes to the regulatory arrangements, including the metering and settlement arrangements, required to better facilitate peer-to-peer services.

[17] Vandebron is an online marketplace for sustainable energy based in the Netherlands https://vandebron.nl/

In the UK model, the pilot service is based upon having both generators and consumers sign up with a single "enabler" retailer – appointed following an auction process – who is responsible for all settlement and billing transactions in return for a small fee. Therefore even if the customer buys electricity off multiple generators, all the supply is deemed effectively to go through this single retailer.

The MTR arrangement would only become relevant to a peer to peer service if the following circumstances apply:

- it the consumer does not buy all its consumption through the peer to peer service and seeks to maintain a standard retailer contract at its premises to provide backup supply; and
- the peer to peer transactions occur on the main distribution grid and not within an embedded network.

In the circumstances where the customers wants to both buy electricity and sell its distributed generation through the peer to peer platform, we do not consider that the MTR arrangement would be essential for this. While ultimately this will depend upon the settlement and billing arrangements for the service, we would envisage that both transactions could be facilitate through the single enabler retailer, which is the feature in the UK model.

One of the objectives of peer to peer is to avoid retailer supply costs by dealing directly with generators. So having multiple retailers and the costs associated with MTR could actually impede not facilitate peer to peer services. Therefore we consider that the introduction of MTR arrangements in the NEM would unlikely foster peer to peer services.

A peer-to-peer service will raise considerable new challenges for regulators and policy makers. Also, we note that such a service may not be suitable for electricity given the nature of electricity flows and the inability to identify which generator is supplying which customer. A key question relates to validation of the electricity transaction. This is simple to do on other peer-to-peer platforms such as Ebay, AirBnB and Uber due to nature of those transactions. However electricity transactions raises complexity issues given the inability to identify the source of electricity.

Category 4 - Services addressing vulnerable customers

Some service providers may not be motivated by pure commercial opportunities but instead by community, environmental and social factors. For example, an increased focus on vulnerable customers could drive different services and increase government subsidies.

We have included two such services models which could be relevant to the MTR arrangement.

Service	Description
Free electricity for vulnerable customers	Charity offers free electricity supply for certain appliances to assist vulnerable customers (i.e. free heating/cooling at stress times of the year)
Deployment of distributed generation to vulnerable customers	Government provides financial grant to a service provider to deploy distribution generation, storage and/or smart meters to public housing to help vulnerable customers. Service provider becomes financial responsible market participant for the demand side capability associated with those technologies

Both of these services would be operated through a single service provider which would become the financially responsible market participant for the electricity transactions related to each service. Those transactions would be separated from the main household load and the role of the service provider is to act as the enabler for the charity or government.

There are potential benefits for both the service provider and the government/charity under such a model. The service provider receives a guarantee source of funding and potential immediate access to a large pool of customers. For the government/charity, this model enables them to provide a more direct means to addresses fuel poverty.

MTR is not essential for the government/charity to offer this services to vulnerable customers. Similar models could be delivered under existing arrangements through retailers. Instead MTR has the advantage of unbundling the service away from existing retailers. This could make it easier to market and administer the services. It would help alleviate potential contractual issues for the government/charity (as it would have to deal with a single service provider) in addition to avoiding issues relating to the impact of the service when the customer switches retailer.

Problems with these services which could limit their emergence, for example, tenants' opposition, damage to equipment, difficult to interface with the customer. Some of the issues are currently being experienced in a UK pilot scheme that is looking at improving vulnerable customers' participation in energy efficiency and demand side response (see Case Study 5).

Impact of metering configuration

The Rule Change proposal identifies three possible metering configurations to implement the MTR arrangement:

- Parallel metering
- Subtractive metering
- Net metering[18]

These configurations differ by the location of the second meter and the required interactions with the primary meter and therefore between the multiple retailers at the premises. The AEMC also asked whether any of the services identified are particularly dependent on the existence of a specific form of metering configuration.

The metering configuration will influence the development of the service through impacting upon the costs and also the complexity of the contractual arrangements between the retailers at the same premises. For example, subtractive metering is likely to require more significant changes to retailers' billing and data systems.

In terms of whether the design of the service is particularly dependent on a specific configuration, we do not consider this to be the case for the services identified. The exception to this, is that the net metering arrangement is only suitable for services which includes distributed generation or storage exporting back into the grid.

The two main services which are most dependent upon MTR (complete charging package for electric vehicles, and aggregator purchasing a customer's distribution generation or storage capability) can be facilitated under either the parallel or subtractive metering arrangement.

[18] A detailed description of these different metering configurations can be found in the rule change request: http://www.aemc.gov.au/Rule-Changes/Multiple-Trading-Relationships

Case Study 5

UK Power Networks Vulnerable Customers and Energy Efficiency Project

UK Power Networks received $6m of funding from OFGEM under its Low Carbon Network incentive scheme to conduct a trial into enhancing insights into the needs of fuel poor customers, and to explore the means to engage with them to facilitate increased participation in energy efficiency and demand side participation.

The project demonstrates the extent to which this residential customer group are able and willing to engage in such activities, the benefits that they can realised from their participation and consequently how reductions in demand and changes in their demand away from network peak demand periods can benefit the network by deferring or avoiding network reinforcement.

The project is scheduled to run from January 2014 to December 2017 and is based in London, but the implementation of the scheme has been delayed for the following reasons: [19]

- **Identifying suitable channels to engage vulnerable customers**: UK Power Networks and the project partners are working with a local community charity as the front-line contact to customers. The charity's Customer Field Officers are therefore involved in almost all of the partner's activities with the customers and are responsible for collecting key data. The charity's financial strength is clearly limited and their ability to provide indemnities and accept liabilities may be less than other partners are commercially able to accept, should any know-how be misused.
- **Risk of damage to equipment:** Works involved in installing smart meters and monitoring equipment in the home and communal areas of apartment blocks have a small but finite risk of causing damage. UK Power Networks have not yet reached agreement with the public housing association nor the smart meter provider about which party is exposed to this risk.

UK Power Networks has also decided that labelling the scheme as Vulnerable Customers and Energy Efficiency (VCEE) would not be appropriate when communicating with residential customers. The project will now be known externally and when engaging with customers as 'energywise' alongside the slogan 'be energywise'.

[19] UK Power Networks report to OFGEM: Vulnerable Customers and Energy Efficiency Low Carbon Networks Fund Project Progress Report – July to December 2014.

Section 2: How would those services promote efficiency in the NEM?

The services identified could create and capture value along the electricity supply chain through:

- Reducing high wholesale prices through reducing consumption or exporting storage at peak times
- Avoiding network outages and deferring the need for transmission or distribution network investment
- Providing network support or ancillary services (reliability, NCAS, FCAS)

Being able to capture all the supply chain benefits will improve the profitability of the service.

In Table 1, for each of the nine services identified we list how such services could deliver efficiencies to the NEM. What is important for the commercial viability of these services is whether under the current market arrangements, the service provider is able to capture the value of that efficiency and reflect it in the price of the service. The table also covers that perspective.

The commercial model for the services in categories of demand side flexibility and regulatory initiatives are based upon capturing market efficiencies. The services regarding decentralised energy or vulnerable customers, the motivation behind the model might be different with less focus on market efficiencies.

Table 1: Electricity Supply Chain Value

Service	Network	Wholesale	Ancillary
Specific product for a separate appliance	Could encourage a greater proportion of consumption being subject to either dynamic pricing or controllable load. Depending upon location, this could deliver operation and reliability benefits to networks in addition to deferring the need for network augmentation. The customer would capture the value of this efficiency through the design of the network tariff structure. In addition, the network business could offer incentives/rewards for participating in this service (i.e. Energex pool pump scheme).	Should promote peak shifting thereby helping to alleviate wholesale price peaks. The customer is rewarded through lower electricity supply prices in their tariff. The market efficiencies from lower wholesale prices are shared across the market under the current arrangements. The implementation of a Demand Response Mechanism would enable some of that efficiency to be shared with the customer.	It is unlikely that providing ancillary services will be a feature of this service.
Complete charging package for Electric Vehicles	No NEM efficiency gain. Commercial model is based upon simplicity for consumer		
Aggregator purchases export of distributed generation or storage capability	Possible, subject to location, nature and scale of the DG/storage capability available to the aggregator. Customer will get value only if aggregator can sell service to the local network.	Efficiency to market could be achieved through a) aggregator uses storage to sell at peak times or b) aggregation improves supply reliability and avoids the need for new (more expensive) generation investment.	Possible, subject to location, nature and scale of the DG/storage capability available to the aggregator. Any payment for ancillary services is likely to be shared with customers through the price of the service.
Large customer on wholesale pass through for portion of load	Yes, through decreasing peak consumption. The customer would capture the value of this efficiency through the design of the network tariff structure	Yes, through promoting peak shifting thereby helping to alleviate wholesale price peaks. The customer is rewarded through lower electricity supply prices in their tariff.	It is unlikely that providing ancillary services will be a feature of this service.
Network led deployment of storage	Yes – improved network reliability and deferral of investment will be primary drivers behind the regulatory approval of this service.	Yes, if network is permitted to use storage for wholesale spot arbitrage (or to sell the right to do so).	Possible

Service	Network	Wholesale	Ancillary
Community peer-to-peer services	Unlikely to create network efficiencies Potential minor benefit of reducing flows on transmission network. Hard of the value of this benefit to be captured and reward to the customers unless it quantifies for avoided transmission use of system (TUOS) payment or receives a network support payment from the transmission network	Yes, if it results in more economic DG on the grid.	Not a factor in this service
Council purchasing its own energy production across multiple locations	Unlikely to create network efficiencies unless it encourages more deployment of economic DG	Yes, if it results in more economic DG on the grid.	Not a factor in this service
Free electricity for vulnerable customers	No network efficiency	No	Not a factor in this service
Deployment of distributed generation/storage to vulnerable customers	Yes – subject to tariff structure	Yes, efficiency to market could be achieved through a) service provider uses storage to sell at peak times or b) the demand side capability improves supply reliability and avoids the need for new (more expensive) generation investment.	Possible, subject to location, nature and scale of the DG/storage capability available.

As discussed in Table 1, the design of the network tariff structure is important for the customer to capture the value of its demand side flexibility.

Being able to capture all the supply chain benefits will improve the profitability of the service. However, this is often impossible due to mis-alignment in the value to different components to the supply chain. This mis-alignment could either be time or location:

- Location is important for capturing both network and ancillary services – but not necessarily would this value be in the same area.
- Networks needing to deal with peak demand at feeder and transformer level while retailers focus on aggregated off-peak, peak and shoulder pricing frameworks set by periods in the day. Consequently, the incentives for both to pursue DSP do not always align due to differences in the timing of peaks and variation in pricing signals.

Capturing the supply chain value can also be difficult to do due to co-ordination, contractual and split incentives problems. Some of the services identified could possibly overcome these issues by introducing a third party.

In considering whether MTR would lead to services which improve the efficiency of the market, the following questions are relevant:

- Would giving customers the ability to segregate its load result in a greater proportion of consumption subject to controllable or time-of-use pricing?
- Would MTR lead to a greater deployment of efficient storage on the grid which could be used to help to alleviate network and wholesale peaks?
- Would MTR lead to the emergence of services which capture all the benefit along the supply chain (e.g. wholesale, network, ancillary)?

Out of the services identified, the aggregator model and the network led deployment of storage are the only possible services that could, in theory, capture all the value along the supply chain.

Section 3: Missing pieces to the jigsaw – factors which will influence new services

The AEMC also asked for advice on other issues which could be relevant to the development of these services.

We consider that the potential emergence of these services will depend upon a wide range of different commercial, regulatory and market related factors and not solely under the introduction of a MTR arrangement. Due to these "missing pieces", it is important to recognise that the MTR arrangement, by itself, will not guarantee increased choice and value for customers at this stage.

Such factors are summarised below.

Regulatory developments

There are a lot of different regulatory reforms which could influence the emergence of MTR related services. This section briefly summarises the key developments, recognising that there are on-going processes looking at addressing these issues.

There is some uncertainty regarding the regulatory treatment of third party service providers and what requirements need to be imposed on different service providers. The COAG Energy Council is progressing its review into this matter.[20]

One important consideration is the extent of consumer protection regulations imposed on the providers of such services. For the demand side flexibility services, the consumer is actively identifying and disaggregating that portion of its load which is viewed to be discretionary, and hence not essential. Thus, the question of whether such discretionary services require the same level of consumer protections as the customer's main electricity services needs to be addressed.

There are a number of questions to be addressed regarding the treatment of storage, such as whether export from storage is subject to retail regulation, and the treatment of network charges. The AEMC is considering these issues through its energy storage project.[21]

Clarification on the ring-fencing arrangements for network businesses would be needed before a network led deployment of storage service which is based on MTR. The AEMC competition in metering rule change is considering network ring-fencing arrangements, with the draft determination proposed requiring the AER to develop ring-fencing guidelines by July 2016.

There are potential amendments to the regulatory arrangements which could better facilitate the ability of the service provider to capture the supply chain value:

- Reform of Demand Management Incentive Scheme
- Demand Response Mechanism

The AEMC is currently considering rule changes requests on both of these reforms.

While further reform is needed, the pace of regulatory change can create instability, and the layers and complexity of both the regulatory framework and the market make it a challenging place for new entrants to navigate.

[20] In December 2014, the Energy Market Reform Working Group (EMRWG) released for public comment a consultation paper examining the regulatory implications of new products and services in the electricity market.

[21] For further information see: http://www.aemc.gov.au/Major-Pages/Integration-of-storage

Government subsidies

- The commercial viability of the services would be greater improved if either:
- the service provider receives some type of subsidies, or
- the technology is subsidised.

Initial financial support could help develop the product and remove some of the risks. Countries where there is a high penetration of electric vehicles are those countries which offer substantial financial incentives.[22]

Early Adopters

Some services may also be dependent upon "active customers" who are the early Adopters and are comfortable with managing the additional complexity and information.

Understanding the performance of behind-the-meter investments is key to customers recouping their costs and capturing the value. Software and analytics platforms make it easier for customers to understand these benefits and data from smart meters could open up new opportunities for customer-facing value-add products and services.

The question is whether there is likely to be sufficient volume of early Adopters to provide the scale necessary to make such a service profitable.

Customer engagement

It is important that the consumer is able to understand, engage and utilise the service offered. This means that there is a simple interface between customer and service provider and that the customer fully understands all its commercial obligations and rights. Advances in information technology can support customer engagement and could make demand side activities automatic. However, a level of understanding and willingness on the customer's behalf will still be required.

The electricity market can suffer from a lack of consumer engagement and trust with existing established retailers. This could have both positive and negative impacts for the emergence of new services.

The lack of trust could drive new entrants who would distinguish themselves from the existing retailers. However, some companies may be wary of getting involved in the energy sector for fear of tarnishing their core brand by association with a sector that has low levels of consumer trust and confidence.

Proactive utilities

Existing retailers and network businesses have more capability, established brand and financial resources to invest in developing new services. If traditional players take the lead on defining new services and products, the probability of success could increase.

In addition, network businesses could seek to take the lead on defining the demand side participation within the service territory. While regulatory incentives are important, ultimately the commercial and risk attitudes of network businesses will drive their involvement in these types of services.

---

[22] In Norway, there are 35,524 electric vehicles and electric vehicles PEVs representing 14.38% of new car sales; the vast majority of those vehicles were Battery EVs. Norway provides generous consumer purchase and in-use incentives for Battery EVs including: tax incentives, free electricity, free public charging, reduced company car tax, road toll exemptions, and use of bus lanes for BEVs. See ITS UC Davis, Institute of Transportation Studies Research Report – Plug-In Electric Vehicles: A Case Study of Seven Markets – October 2014.

Appendix 1: Potential new energy services

Service	Description	Value proposition	Dependency on MTR
Specific product for a separate appliance or parts of a premises (e.g. electric vehicle (EV), pool pump)	Separate tariff product for specific appliances (i.e. air-conditioning or pool-pump) offered by the non-traditional retailer. Appliance likely to have either to be controllable or subject to high peak prices to minimise costs for service providers. The service could be extended to also include the cost of the appliance (e.g. battery for EV) 23	Facilitates consumption of appliances at off-peak times thereby preventing contribution to peak consumption. Customers access a wider range of tariffs and capture a reward for elements of their consumption which are suitable for controlled load or shifting consumption to off-peak times. Consumers can access value without subjecting all household consumption to dynamic pricing. Service provider could increase profit opportunity if service includes battery storage capacity through exporting surplus to wholesale market plus any ancillary services.	Not essential but MTR could expand the range of services available to customers. Existing retailer and networks could offer specific appliance service as long as load is separately metered/controlled. Networks already offer specific tariffs for controlled load (hot water, pool pumps) and could do the same for EVs.
Complete charging package for EVs	Charging service provider offer a single bill service to cover customer EV charging costs at all locations. Customer can charge at multiple locations (office, shopping centre, home) under the same service.	Customer benefits from convenience and simplicity for which it pays a premium to service provider. EV charging provider provides more complete service and captures larger volumes.	Essential. MTR is required to separate EV load from residential consumption and allocate to a different retailer. To date, uptake of EV internationally has been driven more by individuals than by corporate purchases. This service would better facilitate corporates providing EVs to staff as it removes administrative complexity of multiple bills.
Aggregator purchases export of distributed generation or storage capability	Aggregator purchases right to export of multiple DG sites and sells generation into export market. Could be offered for both residential and I&C customers.	Aggregator acts like a peaking generator and sells export into spot market at peak times. Value is arbitrage between the price paid to customer and the payment from the spot market plus any ancillary services. Storage capability would enable the aggregator to maximise value at peak times. Residential customers would have to receive higher payment than existing retailer feed in tariff payments.	Essential as aggregator would be an additional service provider to the existing retailer. Question whether gross (parallel) or net metering (substrative) would change the commercial value of the services.

[23] We note that this model of battery plus electricity was the original model advocated by BetterPlace. We understand that this model is not pursued anywhere in the world.

Service	Description	Value proposition	Dependency on MTR
Large customer on wholesale pass through for portion of load	Industrial and commercial customer buys a service where its controllable load is on a pass through price contract.	Customer receives lower energy costs. IT technology makes this service seamless and simple for the customer. DRM could provide similar rewards to the customer without being exposed to spot price volatility.	Not essential as existing retailer could offer some specialised service for the controllable load. Value of MTR depends on expanding the range of services and improving the customer's ability to negotiate a better price.
Network led deployment of storage	Network business gains regulatory approval for large scale deployment of storage across grid. Customer signs up to allow network to install storage at customer site. Network either becomes financially responsible market participant for importing and exporting electricity from storage settlement point or sub-contracts this role to a third party. Deployment could be at either residential or Industrial and commercial customers. Initially more likely at larger customers due to size and contractual costs.	Customer receives a fee and potentially access to storage depending upon contract with network. For networks, storage acts as alternative to capital investment and improves security of supply and reliability performance. Raises regulatory questions regarding network ability to use storage for spot price arbitrage profit and ancillary services. Could auction off right to third party.	Not essential but better facilitates service. Networks could enter into commercial arrangements with existing retailers. However, such arrangements are likely to be very complicated (what happens when customer switches retailer?). In addition, networks could install storage in front of the meter and not behind the meter.
Community peer-to-peer services	Community energy project (peer to peer) through a group of premises which buy and sell electricity from each other. Each customer may need a traditional retailer at its premises to provide electricity when there are constraints (i.e. back up security of supply) but becomes its own retailer to manage peer-to-peer benefits.	Bypasses traditional retailers and could lower energy costs.	Essential only if peer-to-peer transactions utilise regulated network and are subject to NEM requirements. Peer-to-peer more likely to occur on micro grids/embedded networks. However, could still be required at the entry point to the micro gird/embedded network. Virtual net metering could provide similar value proposition.
Council purchasing its own energy production	Councils owns distribution generation and utilise generation for consumption at local public buildings. Become retailer at DG site and other connection points but needs a	Enables councils to sell its own DG to itself thereby bypassing traditional retailers.	Dependency on MTR only if council wants to maintain standard retailer as back up at consumption sites. May not be essential as virtual net metering could provide similar value proposition.

Service	Description	Value proposition	Dependency on MTR
	standard retailer to supply any gap from DG. Council needs to become its own retailer if flows are conducted on main distribution network and not an embedded network.		Needs a separate retailer at the export and import sites in different locations.
Free electricity for vulnerable customers	Charity offers free electricity supply for certain appliances to assist vulnerable customers (i.e. free heating/cooling at stress times of the year).	Charity has guarantee that their funds are being used to offset energy bills compared to a cash payment. However, there are significant costs of becoming a retailer and buying electricity.	Not essential but better facilitates service as it avoids having to enter into multiple contracts with existing retailers and agreement upon estimated consumption if appliance is not metered.
Deployment of distributed generation to vulnerable customers	Government provides financial grant to a service provider to deploy distribution generation, storage and/or smart meters to public housing to help vulnerable customers. Service provider becomes financial responsible market participant for the demand side capability associated with those technologies.	Local governments/tenants get lower electricity bills and lowers fuel poverty by making energy more affordable for local or vulnerable consumers. Service provider benefits from a) any government subsidy and b) ability to sell surplus to the wholesale market. Again, like other service models, value to service provider could increase if storage is also installed.	Not essential as government could do this via existing retailers. The benefit of MTR is that contractual agreements become simpler (as there is only one service provider) and avoids questions regarding what happens when the customer switches retailers. Single service provider can take all operational and investment risk.

Contact us

Eamonn Corrigan
Infrastructure Projects Group
T 0428 231 220
E ecorrigan1@kpmg.com.au

www.kpmg.com.au