Advanced metering infrastructure state of play: Nomination of MEP and access to data

Discussion paper for AMI Forum, 30 November 2011

Prepared by the Electricity Authority

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Executive summary

1. This paper seeks to progress work on nomination of the metering equipment provider (MEP) and advanced metering infrastructure (AMI) data access by identifying the state of play for AMI in order develop options to enable the Electricity Authority (Authority) Board to make an informed decision on the way forward.

2. This paper provides background and a basis for discussion at the AMI Forum to be held on 30 November 2011 at the Abel Tasman Hotel, Wellington. The intention is to give stakeholders the opportunity to confirm, clarify and critique the Authority's understanding of the state of play.

3. AMI comprises advanced meters, a two way communications network and back office systems (i.e. the information technology).

4. The objective in relation to access to AMI data is to "ensure that access to AMI data is provided in a manner that promotes competition in, reliable supply by, and the efficient operation of, the electricity industry for the long-term benefit of consumers." This objective is based on the Authority's statutory objective.

5. The Electricity Industry Participation Code 2010 (Code) as currently written, and the proposed revision to the Code that was recently consulted on as part of the September 2011 consultation,[1] are silent on which party appoints the MEP and on access to AMI data, other than for reconciliation purposes.

6. The May 2011 consultation paper[2] defined the problem as follows:

    (a) AMI is an infrastructure asset with natural monopoly characteristics; and

    (b) this means parties who own or control an MEP have incentives to charge prices for AMI data that would likely stymie the dynamic efficiency benefits from value-added AMI services.

7. Most non-consumer submitters did not agree with this problem definition.

8. Major retailers, owners of major MEPs and one major distributor considered the AMI market is workably competitive and not a natural monopoly, and that barriers to entry to the AMI market are low. They considered this was supported by potential entry into the market by Smartco, previous findings by the High Court, Commerce Commission and Electricity Commission, the fact that obtaining AMI data was not a problem in practice, and availability of other options for distributors seeking AMI data, including duplication of infrastructure and alternative technology.

9. Distributors seeking functionality from AMI to enable them to implement "smart grids" and/or intending to enter the AMI market considered the problem related to impediments to co-ordinating between MEPs, retailers and distributors to obtain the functionality, inter-operability, and communications infrastructure sought by these

[1] Electricity Authority, *Consultation paper: Part 10 review – Proposed amendments to the Code,* September 2011.

[2] Electricity Authority, *Consultation paper: Nomination of the MEP and access to data,* 17 May 2011.

different parties. They considered having multiple AMI providers on a distribution network would prevent distributors obtaining the data or functionality that they required.

10. Most consumer submitters broadly agreed with the problem definition but most had concerns with the solution proposed in the May 2011 consultation paper of giving consumers the role of appointing the MEP.

11. Based on information received in submissions and subsequent discussions with industry participants, the Authority is wanting to test the proposition that the AMI market may be workably competitive, taking into account:

    - the first limb of the Authority's statutory objective is "to promote competition for the long-term benefit of consumers", which the Authority has interpreted as meaning *workable* or *effective competition*;
    - the entry and potential entry into the metering and AMI market by a range of providers, which suggests there are no apparent or unreasonable barriers to entry;
    - entrants appear to have developed business cases to support duplication of AMI rather than negotiating third party access to existing AMI;
    - the range of AMI solutions and offers; and
    - the degree of innovation and investment in what appears to be a dynamic AMI market.

12. The Authority is also testing the extent that issues around ensuring that AMI delivers the functionality that meets the requirements of some distributors and the longer-term requirements of consumers. This is to confirm whether reliance on commercial negotiations and competition is sufficient to ensure the Authority's objectives are achieved in relation to access to AMI data, or whether it is appropriate to give any one party "rights" over nomination of the MEP.

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2. Introduction and purpose of this paper

2.1 Introduction

2.1.1 Part 10 of the Electricity Industry Participation Code 2010 (Code) establishes the regulatory framework for metering in the New Zealand electricity industry.

2.1.2 Starting in August 2008, the Electricity Commission and now the Authority has undertaken extensive consultation with participants and consumers on Part 10 (formerly Part D), to develop a new set of metering arrangements that will be fit for purpose and future proof, including enabling the adoption of new metering technology, such as smart meters (the Part 10 Review).

2.1.3 One aspect of the Part 10 Review is the consideration of arrangements for nomination of the MEP and access to data available from AMI. This area has proved contentious, with diverse opinions regarding the appropriate way to provide for these matters efficiently. The Authority consulted on these matters in May 2011. Following consideration of submissions the Authority decided in July 2011 to "carve" these matters out from the rest of the Part 10 review, and proceed with consideration of these matters separately.

2.2 Purpose

2.2.1 The purpose of this paper is to progress the nomination of MEP and AMI data access workstream. The Authority's approach is to identify the state of play for AMI in order to develop options to enable the Authority Board to make an informed decision on the way forward.

2.2.2 This paper is intended as background and a basis for discussion at a forum to be conducted by the Authority on 30 November 2011[3]. The intention is to give stakeholders the opportunity to confirm, clarify and critique the Authority's understanding of the state of play. In this context, the paper:

(a) outlines regulatory objectives for AMI and any risks to achieving these objectives, which may provide the basis for any regulatory intervention;

(b) provides an overview of submissions to the May 2011 consultation paper; and

(c) sets out the Authority's understanding of the state of play in relation to AMI.

[3] Advanced Metering Infrastructure Forum, 9.00am to 12.30pm, Wednesday 30 November 2011, Abel Tasman Hotel, 169 Willis Street, Wellington.

3. AMI and the AMI market

3.1 Description of AMI

3.1.1 AMI comprises:

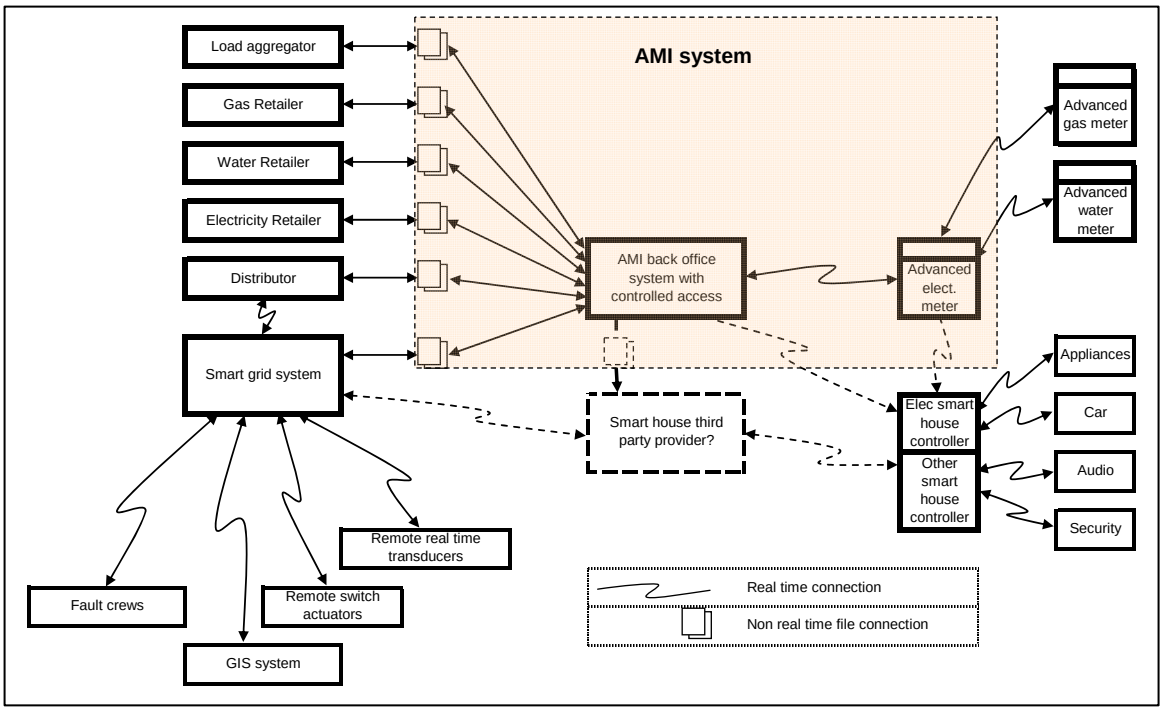
(a) advanced meters, which are electronic electricity meters that measure and record electricity consumption within programmable time periods, eg electricity consumption per half hour, and transmit this information back to the MEP and/or retailer. Advanced meters are also capable of receiving information, upgrades and instructions sent remotely by the MEP;

(b) a two way communications network; and

(c) back office systems (the central computer server).

3.1.2 This is illustrated in Figure 1.

Figure 1: Overview of AMI system



Source: Electricity Authority

3.1.3 AMI is the name given to a system comprising both advanced meters and the back office software that operates, interrogates, controls, and maintains the meters. AMI is also the platform that enables a number of other services to be offered to industries or consumers where there is value associated with the data that the AMI system collects or conveys or the functionality that the AMI system can deliver. The above diagram schematically represents data connections that may be possible to other systems that may exist outside of the AMI system.

3.1.4 AMI is not an end in itself; world wide the view is that AMI systems are an important enabler and catalyst to the development of electricity markets and the eventual implementation of smart grid technology has the potential to facilitate the deferment of capital expenditure and maintenance of power quality.

3.1.5 There are two important and independent attributes to an AMI system and these are

(a) data collection – AMI systems when installed can become a data hub within a premise that allows data to be easily communicated to a back office system for low incremental cost; and

(b) functionality – AMI systems can have functionality that is remotely reprogrammable allowing metering installations to be easily reconfigured not just for electricity measurement, but also the provision of other services such as power quality monitoring, load control etc.

3.1.6 On its own, the data collected by an AMI system in addition to electricity usage (which is required for billing of customers) may have limited value. However, the information that the data enables may be of high value and can include:

(a) collection of information from non-electricity meters such as water or gas;

(b) enablement of initiatives such as load management and cost reflective pricing;

(c) opportunities to develop offers to consumers or the industry to process and present information;

(d) potential to sell information to consumers that may enable consumers to carry out cost conservation or energy conservation;

(e) potential for traders to differentiate their offers from those of other traders; and

(f) potential for deferment of capital expenditure for network companies and generators.

3.1.7 The functionality of AMI systems in addition to measuring electricity usage presents opportunities and value through:

(a) remote connection and disconnection of consumers;

(b) vacant premise occupancy alerts;

(c) credit control by limiting load capacity, or remotely reconfiguring the meter as a prepayment system;

(d) potential to convey cost information to consumers;

(e) additional load control possibilities by incorporating heat pumps or other appliances into load control and the ability to measure the response;

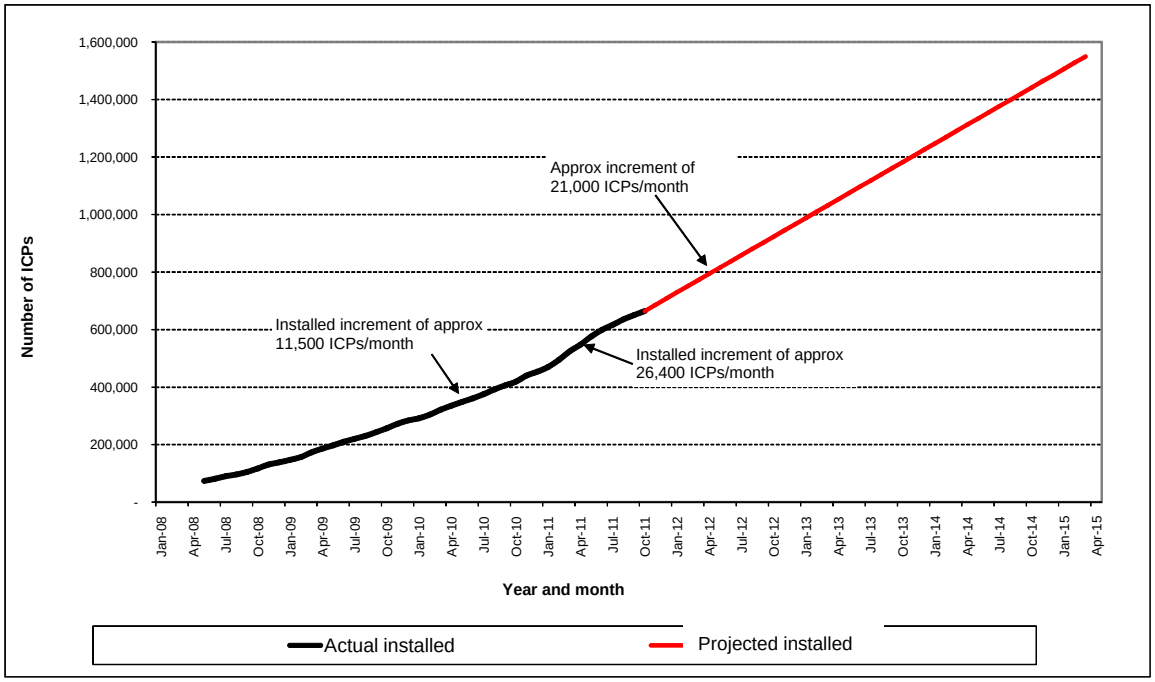
(f) ability to connect to other devices such as networks SCADA systems to convey SCADA information; and

(g) management of power quality where distributed generation is prevalent.

3.2 Usage of AMI

3.2.1 Figure 2 provides an estimate of the number of AMI meter installations as at October 2011 and a projection for AMI meter installations to March 2015. A steady increase in the number of AMI meter installations is expected to continue into the future.

Figure 2 Estimate of actual and projected AMI meter installations



Source: Electricity Authority

3.2.2 To provide further context of the landscape in relation to AMI, the following is an outline of some of the key recent developments the Authority understands that have occurred in relation to investment in AMI:

- Genesis Energy has indicated that they have contracted with Advanced Metering Services (AMS) to install around 500,000 advanced meters at their customers' premises over a five year period. As at June 2011, AMS had rolled out over 170,000 AMI meters to Genesis Energy's customers and were installing an additional 10,000 meters every month;[4]

[4] Genesis Energy, *Submission on Advanced Metering Infrastrucutre: Nomination of the MEP and access to data*, 21 June 2011.

- Contact Energy has indicated that they have contracted with AMS to install around 150,000 advanced meters at their customers' premises over a five year period;[5]
- Smartco, a company comprised of 14 electricity distribution companies serving a total of about 500,000 customers, has indicated that they have selected preferred vendors for AMI rollout after an RFP process, and is presently engaged in detailed discussions with retailers on their preferred AMI rollout. The Authority understands that at least one Smartco member company has developed a business case for deployment of AMI on part of its network;
- Mighty River Power has indicated that as of June 2011 they have invested "upwards of $100 million over the last five years to develop … AMI to support the provision of smart meter services";[6]
- Arc Innovations has "rolled out more than 130,000 smart meters around the country";[7]
- Unison has indicated that it is progressively investing in a smart grid on its network. Its plans involve a requirement for real-time, or near real-time information on network demand and an ability to communicate with consumers' premises and it therefore considers that AMI is an integral part of its requirements for this.[8]

3.2.3 This is not an exhaustive list but is intended to provide an indication of recent or current activity in the AMI market.

[5] "Contact selects AMS to roll out 150,000 smart meters", *Energy News,* 5 October 2011.

[6] Mighty River Power, Submission on *Advanced metering infrastructure: Nomination of the MEP and access to data*, 21 June 2011, paragraph 12, page 3.

[7] "Arc Innovations valued at $40 million; new CEO appointed", *Energy News,* 4 October 2011.

[8] Unison, Submission on *Advanced metering infrastructure: Nomination of the MEP and access to data*, 23 June 2011.

4. Analysis

4.1 Objectives

4.1.1 The objective of the Part 10 Review in relation to access to AMI data is to "ensure that access to AMI data is provided in a manner that promotes competition in, reliable supply by, and the efficient operation of, the electricity industry for the long-term benefit of consumers." This objective is based on the Authority's statutory objective.

4.1.2 The three limbs of the Authority's statutory objective have implications for consideration of the issue of access to AMI data.

4.1.3 In regard to the first limb (promotion of competition), access to AMI data by different parties provides the potential for participants to use the data to provide competing services. This includes not just electricity retailing but other services that rely on utilisation of the data, such as energy management. In addition, there is also the issue of competition in the provision of metering equipment itself.

4.1.4 Access to AMI data also has implications in relation to the second limb of the statutory objective (reliable supply). Specifically, access to AMI data provides the potential for parties supplying electricity to consumers to obtain data and use it to improve the reliability of electricity supply.

4.1.5 In regard to the third limb (efficient operation), efficiency considerations in relation to access to AMI data have several dimensions:

(a) productive efficiency: Ensuring that AMI data is utilised so that the cost of operation of the electricity for a given unit of output is minimised;

(b) allocative efficiency: Ensuing that there are no impediments to the party (parties) that have the highest value use of AMI data being able to obtain it; and

(c) dynamic efficiency: Providing incentives for efficient innovation and investment in AMI over time.

4.2 Issues under discussion

4.2.1 The May 2011 consultation paper discussed two key issues:

(a) which party is able to nominate the MEP; and

(b) the ability of parties other than the party nominating the MEP to obtain access to AMI data and the terms of access.

4.2.2 The party that nominates the MEP has the ability to determine the functionality provided by the metering installation and controls the access to data produced by the installation. This means the party that nominates the MEP has the ability to

determine whether a third party is able to obtain access to the data and on what terms.

4.2.3 The current Part 10 and the proposed Part 10 (that was consulted on as part of the September 2011 consultation) are silent on which party appoints the primary metering contact and, in the case of the proposed Part 10, who nominates the MEP, and on access to data, except for provision of data for reconciliation purposes.

4.2.4 However, both the current Part 10 and the proposed Part 10 place the responsibility with the trader for an ICP to ensure that;

(a) there is a metering installation in place; and

(b) the party responsible for the metering installation is recorded in the registry.

4.2.5 The current Part 10 of the Code assumes that, for a trader to meet their obligations, they must contract with a metering provider to meet their obligations to provide metering information into the reconciliation process. However, the proposed Part 10 explicitly states that a trader must contract with an MEP prior to commencing the switch of an ICP for which an MEP is recorded in the registry as providing a metering installation.

4.2.6 The proposed Part 10 of the Code is, however, silent on whether the trader actually appoints the MEP. Instead, it requires the trader to advise the registry of the MEP that it has contracted with to meet its obligations to provide Code compliant submission information to the reconciliation manager. It should also be noted that an MEP can only update information for an ICP's records on the registry when they have advised the registry that they are the MEP at an ICP.

4.2.7 As noted in the September 2011 consultation paper, the implications of this are:

- the trader at the ICP would retain the responsibility for quantification of electricity conveyed as is the case in the existing Part 10;
- appointment of an MEP is to be a matter for commercial negotiation, and an MEP does not have obligations for an ICP unless they accept the advice from the registry;
- a trader would still be responsible for notifying the registry of the identity of the MEP at an ICP where it is trading or intends to trade; and
- a trader must not request energisation of an ICP where there is no metering installation or MEP.

4.2.8 The proposed Part 10 does not require an MEP to provide data to a trader at an ICP unless they have an agreement to do so. However, if a trader switches an ICP without an agreement with an MEP they are in breach of the Code.

4.2.9 The key issue is whether reliance on commercial negotiations to govern the appointment of the MEP and the terms and conditions of access to data and

functionality will be sufficient to ensure access to AMI data is made available in a manner consistent with the Authority's objective.

4.3 Problem definition in May 2011 consultation paper

4.3.1 The May 2011 consultation paper defined the problem as follows:

(a) AMI is an infrastructure asset with natural monopoly characteristics because it is cost efficient to only have one meter per ICP – that is, AMI costs are sub-additive;

(b) parties who own or control an MEP have incentives to charge prices for AMI data that represent their opportunity cost for use of the data. Providing another party with access to the data would mean giving up a profit-making opportunity, implying a price significantly in excess of marginal cost. This would likely mean the dynamic efficiency benefits that would come from value-added AMI services would be stymied;

(c) the threat of retaliation means that parties that own or control an MEP have an incentive to charge each other a price that reflects the competitive price when they acquire each others' customers, but no such incentive exists if the other party does not control or own an MEP. This means a price equal to the full opportunity cost will be charged in the latter case.

4.3.2 Most non-consumer submitters did not agree with this problem definition. Submitters were in two main groups:

(a) *Major retailers, owners of major metering providers, one major distributor that was not a meter owner nor intending to be one: These parties*:

- considered the AMI market is workably competitive and not a natural monopoly, and that barriers to entry to the AMI market are low. They considered that this was supported by:
  - entry of Smartco into the AMI market;
  - decisions by the Commerce Commission and High Court that found, respectively, that the market for metering was workably competitive and barriers to entry low, and that meters did not meet the economic test of an "essential facility" that would justify regulated access terms;
  - the fact that obtaining access to meters and data owned or controlled by competing retailers was not a problem in practice and that there was no impediment to distributors obtaining access on similar terms. This was because AMI data is non-rival, meaning that utilisation of the data by one party does not diminish or prevent utilisation of the data by another party. In addition, it was in an MEP's interests to sell the data to other users as that increased the revenue from the data. Parties that owned or controlled access to AMI data also noted that they had sought to engage with distributors seeking AMI data. These

parties considered there should be no impediment to distributors obtaining access to data from retailer-controlled MEPs as retailers were not in competition with distributors (and vice versa); and

– noted that the functionality sought by some distributors could be obtained via other existing technologies.

(b) *distributors that sought functionality from AMI to enable them to implement "smart grids" and/or were intending to enter the AMI market:* These parties considered that:

- the problem related to impediments to establishing coordination between MEPs, retailers and distributors to obtain the functionality, inter-operability, and communications infrastructure sought be these different parties;
- retailers and retailer-owned or affiliated MEP's did not have the incentives to provide the information distributors sought for managing their networks; and
- having multiple MEP providers would prevent distributors obtaining the data or functionality that they required and would increase transactions costs and prevent them from obtaining economies of scale.

4.3.3 Most consumer submitters broadly agreed with the problem definition but most had concerns with the proposed solution of giving consumers the role of appointing the MEP. This was because of concerns about lack of familiarity with the technology and that many consumers would be unwilling to engage with an additional provider.

4.4 Problem definition reconsidered

Is the AMI market workably competitive?

4.4.1 The first limb of the Authority's statutory objective is "to promote competition for the long-term benefit of consumers". The Authority has interpreted competition to mean *workable* or *effective competition.*

4.4.2 Under workable or effective competition, the actions of competitors and potential entrants ensure that a market participant acts efficiently, with no single participant able to *sustainably* charge prices in excess of long run marginal cost or restrict supply. Under workable competition, however, there may be periods when a firm is able to temporarily set prices in excess of cost because of superior performance or innovation. Over time, though, the ability to do this will be competed away, and the benefits in terms of both price and service quality will be shared with consumers.

4.4.3 The Authority notes that AMI data may exhibit the characteristics of a club good. Club goods are goods (or services) that are non rival (meaning consumption by one party does not diminish the ability of other parties to consume the good) but excludable (meaning it is possible to prevent other parties from consuming the

good). The theory of competitive provision of club good differs from standard goods, as the competitive outcome often involves two-part pricing: a membership fee and a user fee. In this situation, AMI providers in a competitive market could require access seekers to pay a share of the fixed costs of AMI and pay a variable fee equal to the short run marginal cost (SRMC) of providing data. Alternatively, they might charge a margin over SRMC to obtain a contribution to fixed costs of AMI. Both charging regimes would achieve efficient outcomes provided costs to the access seeker were lower than their standalone costs.

4.4.4 Based on information received in submissions and subsequent discussions with industry participants, the Authority considers that the AMI market may be workably competitive.

4.4.5 The potential entry of Smartco and other distributor-based MEPs, and the entry by MEPs affiliated with smaller retailers indicates that there may be no barriers to entry.

4.4.6 Duplication of metering infrastructure by some distributor-based MEPs may also be an indication of workable competition. The May consultation paper suggested that such duplication may be inefficient. However, several submissions proposed any such duplication may just be a byproduct of competition and, while “untidy”, such competition will ultimately promote efficiency that will work to the long-term benefit of consumers. The Authority notes such duplication may indeed be an example of competition, in particular competition between providers of a club good or service. The potential for duplication should provide added impetus to commercial negotiation, which may assist distributors and competitors to a party controlling access to AMI data being able to obtain the data that best meets their needs.

4.4.7 The rollout of AMI by different parties is occurring at different rates, is utilising different technologies and is offering differing levels of functionality. Some MEPs have not offered AMI at all, while for others a significant portion of their offer is AMI. The differing perspectives on the technological solution, the level of functionality required and even the terms of access are what is to be expected in a relatively new, dynamic market, where participants are competing for a commercial advantage. Further, the development path of the market is not yet clear so different commercial solutions are to be expected.

4.4.8 Entry by new providers, the potential for duplication by parties that consider access terms are unreasonable, the range of AMI solutions and offers, and the degree of innovation and investment all indicate that the AMI market may be workably competitive. This will be a key topic for discussion at the AMI Forum.

Access to AMI data for smart grid operation

4.4.9 To the extent there is an access issue, the submissions indicate it mainly relates to concerns of some distributors about their ability to obtain data in the form they require to operate their networks in the manner they would prefer. The May 2011 consultation paper appears to have provided added impetus to discussions

between these parties and parties controlling access to AMI data. As some submissions suggest, since the data requirements of distributors to operate their networks should be complementary with the data requirements of retailers to conduct their activities, there should not be an impediment to distributors obtaining data they require on a commercial basis.

4.4.10 To the extent that distributors are not able to access data on the terms that they consider acceptable, submissions indicate that there may be other options available to address their needs, including alternative technological solutions or, if necessary, duplication of infrastructure.

4.4.11 Another possible issue articulated by some distributors and some other parties is, under current arrangements, implementation of AMI will occur in a manner that focuses only on the needs of retailers, and not all parties. These parties are concerned this will impede the successful implementation of "smart" grids. They would prefer that distributors are allocated the role of appointment of the MEP on the basis that "ubiquity" of AMI infrastructure on a distribution network will ensure that the benefits of smart grids are fully realized. They suggest that, if the status quo is allowed to continue, the rollout of AMI will occur in a disparate fashion across distribution networks, and not all features that distributors are seeking from AMI will be implemented, and those distributors intending to implement AMI will not achieve economies of scale.

4.4.12 However, not all distributors share this view. Although some are MEP owners, they do not appear concerned about competition or implementation of alternative AMI by other MEPs on their network.

4.4.13 These different views among distributors may be because of different intentions around the implementation of smart networks and other potential features of AMI. Implementation of AMI by multiple parties across a distribution network may result in higher transaction costs in ensuring that a distributor's requirements are met than implementation by a single party. This is the case, however, whenever multiple parties use a single piece of infrastructure, such as a distribution network. Distributors already manage specification of their requirements across multiple parties through their use of system agreements. It could be relatively straightforward to incorporate AMI requirements through use of system negotiations.

Ensuring AMI meets consumers' needs

4.4.14 A further related potential issue is whether rollout of AMI will occur in a manner that ensures desirable features of AMI from a consumer perspective are implemented, rather than implemented only sporadically, or can only occur at a later date. This was a key motivation for the proposal for consumer appointment of the MEP. The Authority wishes to ensure no barriers are introduced through implementation of AMI in the short term that prevent potential longer term benefits to consumers from being realised.

4.5 Questions for consideration

4.5.1 In summary, following submissions, the Authority is now considering the following questions:

(a) Is the AMI market workably competitive?

(b) If the AMI market is workably competitive then:

(i) is there any role for the regulator to ensure AMI is implemented in a manner that meets the requirements of some distributors and the longer-term requirements of consumers, and

(ii) is there any reason why the Code needs to specify which party nominates the MEP?

(c) If the AMI market is not sufficiently workably competitive, then what can the Authority do to enhance competition in this area, and what interim initiatives are required in the meantime in regard to a possible role for the Authority, including establishing whether there is a need for amendment of the Code?