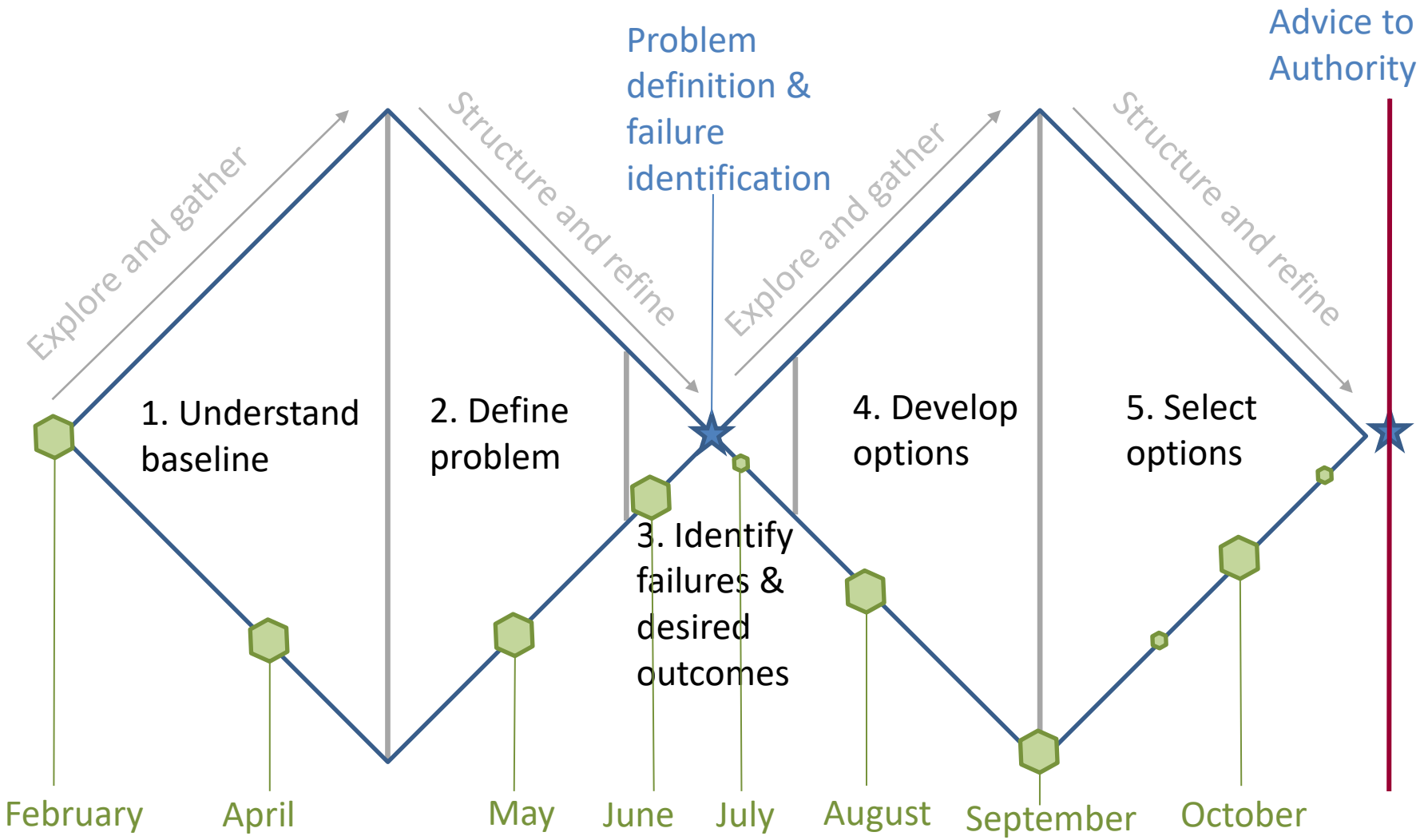
4 December 2019, updated July 2021

Advice on reducing barriers to customer access to multiple electricity services

Innovation and Participation Advisory Group

IPAG secretariat

Project timeline



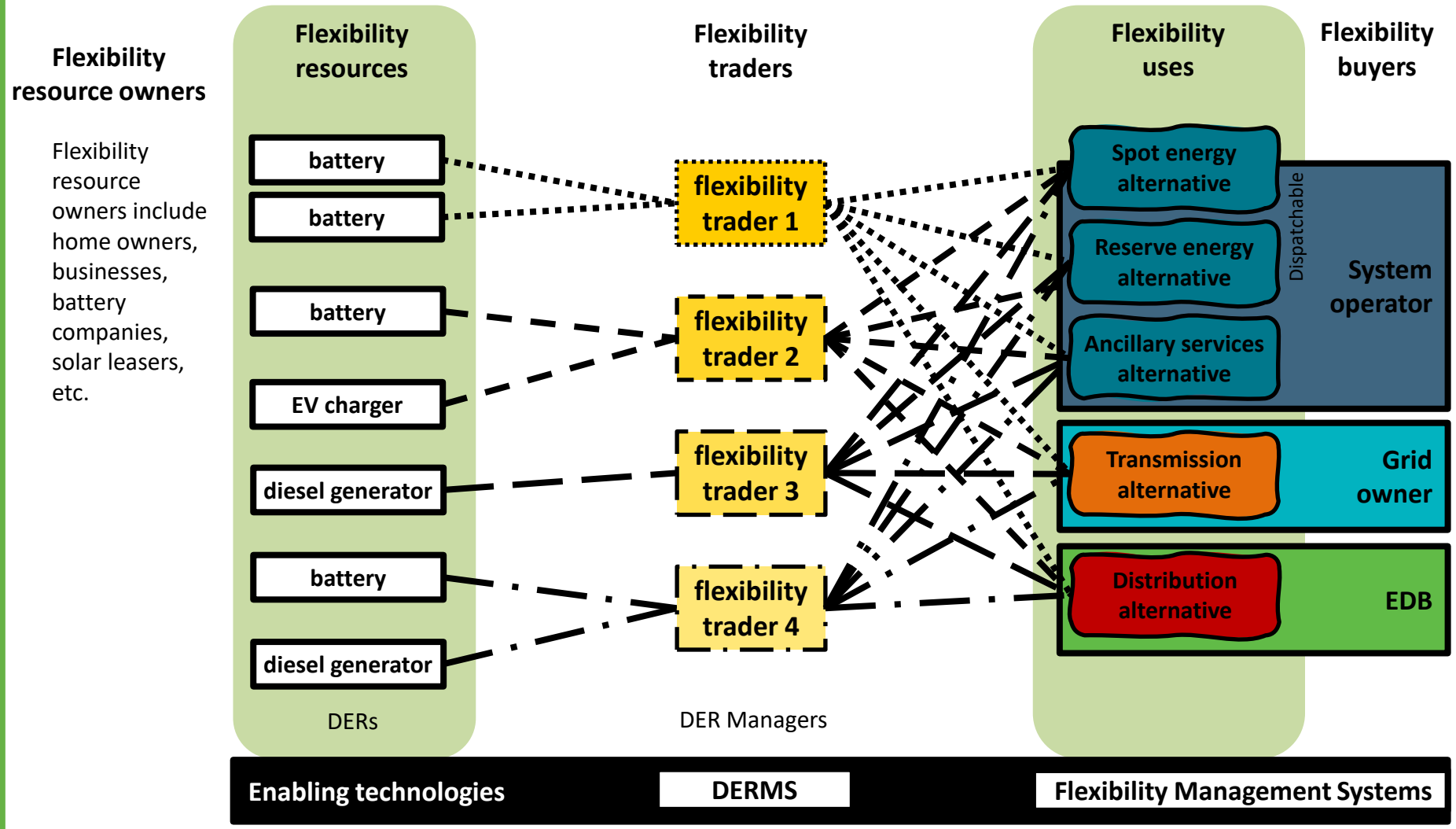
July 2021 update

In light of IPAG's review of Transpower's demand response programme, IPAG has reviewed the input services slides and updated areas where our thinking has evolved.

Changes in red text throughout the slides reflect the changes made during this review. Updates include:

- Terminology: IPAG has refined the key terminology for flexibility markets (see next two slides)
- Pilots: we support pilots to test technical feasibility. However, pilots should not be used as an excuse to not do things at scale. Risks of integrating flexibility should be managed by moving early, not from pilots. Moving early will ensure that flexibility is available when it is needed and help instill confidence in contracting flexibility services.
- Data template: The IPAG notes that a default data template has been introduced to facilitate exchange of consumers' consumption data between distributors and retailers. However, the uses of the data are limited, and distributors have expressed frustration with the current template.

IPAG's review of the Transpower DR programme has clarified terminology and roles in Equal Access



Terminology update

- **Distributed Energy Resources (DERs)** – small-scale, distribution-connected assets that either reduce load or export more power – whether generation (like solar panels), storage (like batteries), or automated load management devices.
- **Controllable DER** – DER whose output or consumption can be turned up or down on demand – for example, diesel generation, batteries, and controllable EV chargers, but not intermittent renewable generation like wind or solar. The impact of controllable DER is flexibility.
- **DER Management (DERM)** – the business process of selling, contracting with, operating and paying for controllable DER portfolios.
- **DERM System (DERMS)** – the software and digital information flows that enable DERM by controlling DER.
- **Flexibility markets** – mechanisms for matching and rewarding traders of controllable supply and/or demand on instruction or in response to prices.
- **Flexibility resources** – Flexibility resources are delivered through DER that is controllable. DER and larger resources like grid-connected generation or batteries that can provide flexibility services. Distributed solar without a battery is not a flexibility resource because it is not controllable.

Terminology update cont'd

- **Flexibility resource owners** – owners of resources that physically provide flexibility services.
- **Flexibility traders** – owners of DER portfolios who manage their DER portfolio to allocate it to its highest value uses. Flexibility traders interact with flexibility buyers (defined below) to provide the flexibility that they require. Importantly, flexibility traders maximise the value of DERs by allocating them to their highest value use ("value stacking") rather than dedicating individual DERs to one use.
- **Flexibility uses** – what flexibility is used for – including energy, ancillary services, transmission investment deferral, distribution investment deferral, outage restoration, and construction risk management.
- **Flexibility buyers** – parties with flexibility needs that contract with flexibility traders to obtain flexibility (eg, System operator, Grid owner, or an electricity distribution business (EDB)) – expressing an explicit need for flexibility and paying for it.
- **Flexibility management** – the business process of identifying need for, procuring, issuing operating instructions, and paying for flexibility services.
- **Flexibility Management Systems (FMS)** – the technology that allows the flexibility manager to forecast and respond to the need for, procure, manage, contract for, issue instructions to, check and reward flexibility providers.

Contents

1. Introduction to multiple electricity services/sub-ICP trading
2. How we have approached the topic
3. What have we found?
4. Overview of issues and recommendations
5. Issues and desired outcomes
6. Solution principles
7. Recommendations (in five stages)
8. Appendices

Note: For brevity, some concepts are not described in detail the first time they appear in the main body of the report. Where relevant, links to later sections, appendices or the glossary are provided.

Introduction

Innovation and Participation Advisory Group

Consumers are changing the way they use electricity, but there are commercial and regulatory gaps

- Customers buy, sell, and trade electricity services.
- Increasing uptake of new technology is changing the nature of these services.
- New kinds of services are available, and customers can have multiple service providers at a single location.
- To provide new electricity services to customers, service providers need access to "input services" including metering & network connection
- There are currently no standards for input services where multiple parties use the same data and distribution network connection.

New technology is enabling customer choice

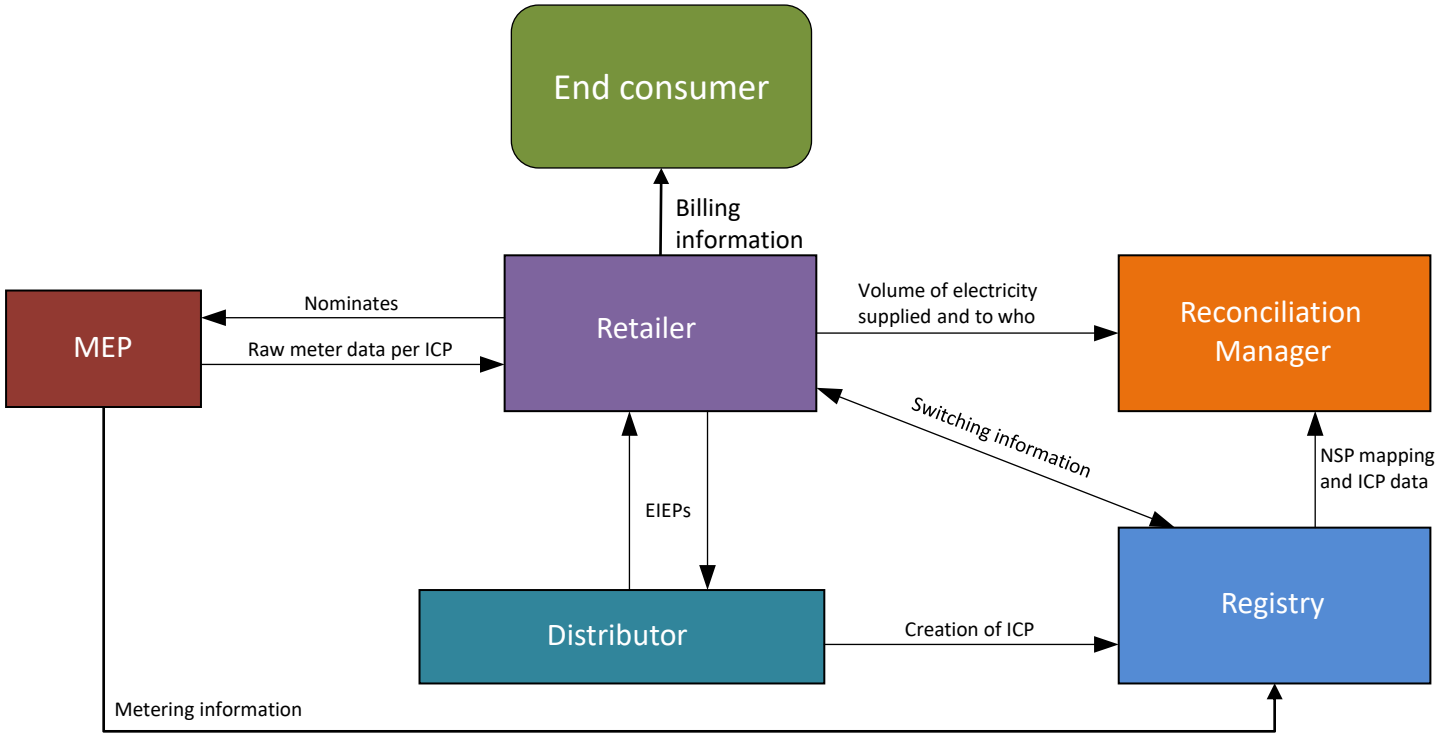
Electricity users (large and small) are deploying new technology including distributed generation, battery storage, electric vehicles and smart energy management devices.

These technologies are facilitating a transition from the traditional centralised electricity system towards a decentralised one incorporating new kinds of electricity services. This includes unlocking the 'flexibility' potential of DER.

The Authority is examining arrangements to enable additional consumer choice of electricity services, to identify and remove barriers to customer choice. This means enabling consumers to choose more than one provider of electricity services at a single ICP – unbundling electricity services to sub-ICP level.

Parties delivering these new sub-ICP services will have to share access to certain inputs. Reducing barriers requires clear access arrangements for these shared input services.

Current retail arrangements assume a single retailer for each customer

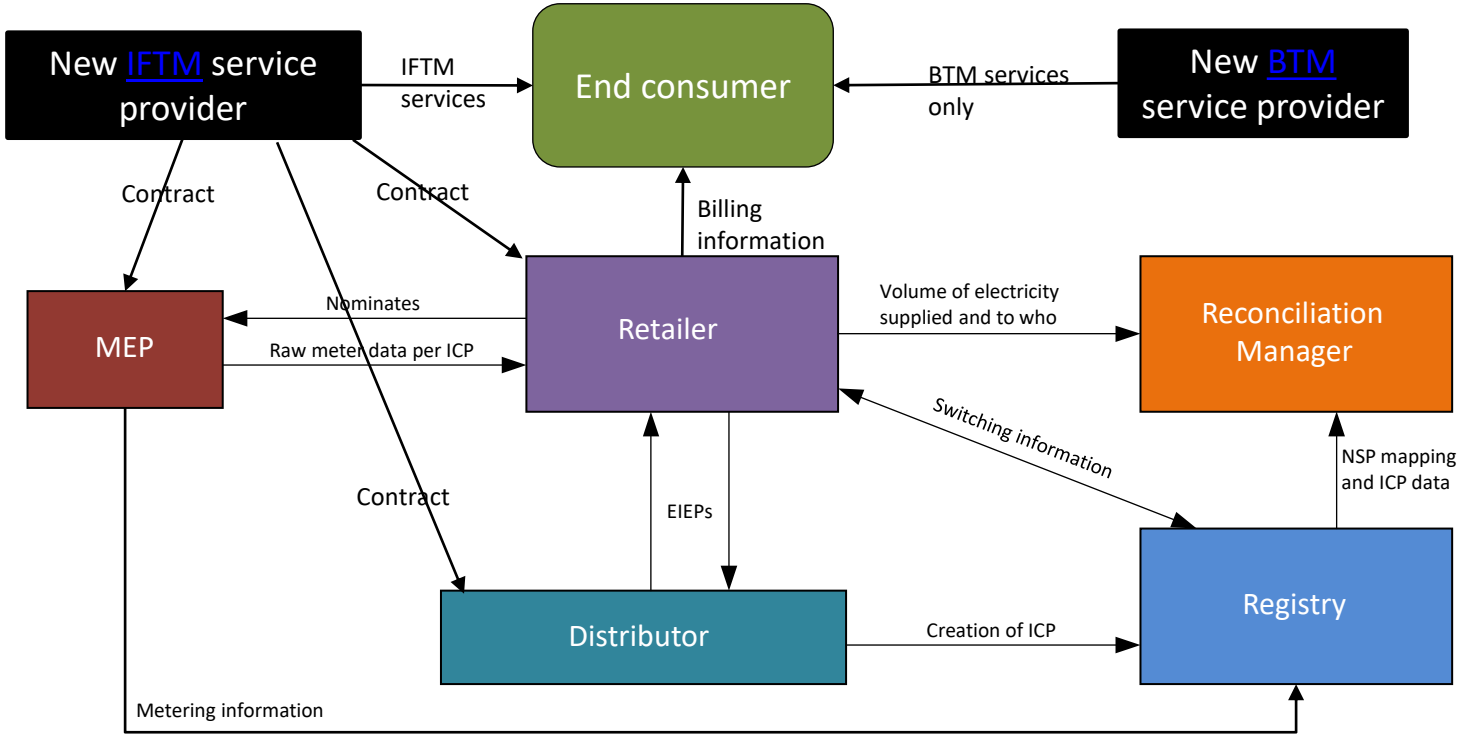


Current retail arrangements are based on the traditional exclusive relationship between a retailer and an end consumer. Every interaction is underpinned by one or more agreements, that deal with:

- Data ownership, access and privacy
- Pricing and payment
- Format and timing for data exchange
- Competition implications (inhibiting competition by making data hard to get, or restricting use for other purposes)

Agreements may include regulated constructs (EIEP or default agreement), be bilaterally negotiated, or have elements of both.

Current arrangements are hard for sub-ICP providers to navigate



- Under current arrangements, new service providers face barriers that make it hard to provide sub-ICP services to the end consumer.
- Companies are already providing services to end consumers using behind-the-meter equipment, but cannot use central market processes. They can only do so by staying completely behind the meter or – if providing services that interact with in-front-of-the meter activities – by negotiating contracts with one or more of the retailer, MEP and distributor.
- Incumbent entities have limited incentives to negotiate and agree these contracts.

How we have approached the topic

Innovation and Participation Advisory Group

The Authority asked IPAG for advice on reducing barriers to customer choice

The Electricity Authority asked IPAG to consider how to reduce barriers to customers' access to multiple electricity services. Specific focus was requested on how to reduce or remove the barriers associated with:

- access to data to supply services to a consumer
- shared use of the distribution service to supply services to a consumer.

The Authority identified a variety of matters for IPAG to consider:

- arrangements for service providers accessing market and non-market data needed to provide their services, focusing on costs and contractual/regulatory arrangements such as:
  - the need to specify a method for determining the price of metering services when shared between multiple suppliers
  - how a change in MEP at an ICP is managed
  - how metering costs are shared between service providers
  - how a party might obtain and pay for additional metering functionality
  - how to reduce transaction costs associated with contracting for metering services
- the arrangements for managing shared use of the distribution network to supply services to a consumer.

Reducing barriers to customer choice is important

Improvements in technology are putting consumers at the centre of the industry in a way that they have not been before.

In future, the proportion of load served by centralised generation will reduce, and the contribution of distributed resources will increase.

Removing or reducing barriers to entry and experimentation will allow new parties to provide new services to consumers in ways that are hard to predict in advance.

This in turn will increase the depth and liquidity of the energy market, reduce costs to consumers, and deliver other factors that consumers value, such as environmental performance, self-sufficiency, and quality of service.

IPAG has considered what other 'input services' may assist electricity services at sub-ICP level

The Authority asked for advice specifically around meter data and the use of the distribution network.

IPAG has considered whether there are other 'input services'[1] that also play a role in customer access to sub-ICP services, using the following definition:

- Input services in scope are those which use *monopoly infrastructure*, and which are *required* to provide electricity services to customers at ICP and *sub-ICP* level.
  - *Monopoly infrastructure* means that the provider possesses (and has the ability to exercise) significant market power, either because there is only one possible provider of the input service, or the cost of engaging an alternative provider exceeds the benefit
  - *Required* means that output services cannot be provided without them
  - *Sub-ICP* means where the service is one of a number supplied to the premise (the customer (as represented by the ICP) receives services from multiple providers)

[1] See appendix A for a definition of 'input services'

IPAG has identified five important input services

Although distribution network- and meter data services are the main input services required, IPAG has identified five input services where changes may reduce barriers to customer choice of sub-ICP electricity services:

1. Electricity network services (connection and use of system)
2. Provision of certified meter data
3. Central reconciliation & settlement
4. Addressing existing meter APIs and relays (including control of customer load)
5. Data communications services (to isolated sites)

Each of these input services relies on monopoly infrastructure and is required for at least one sub-ICP output service. The services are described further in Appendix B.

IPAG has considered the experience of current and future electricity service providers

As well as drawing on our own membership, we sought input from a variety of existing market participants on the barriers they face in relation to current input services arrangements, and the possibilities for improvement:

- Traditional electricity retailers
- New entrant electricity retailers
- Peer-to-peer electricity retailers
- Distributors
- Data analytics companies
- MEPs
- Measurement technology providers

We also identified four new kinds of service provider that are likely to emerge in future:

- Electric vehicle manager
- Peer-to-peer platform (not a complete retailer)
- Smart switcher
- Flexibility trader ~~service provider~~

We used these four cases (described further in Appendix C) to consider whether future service providers will need different inputs and face different problems.

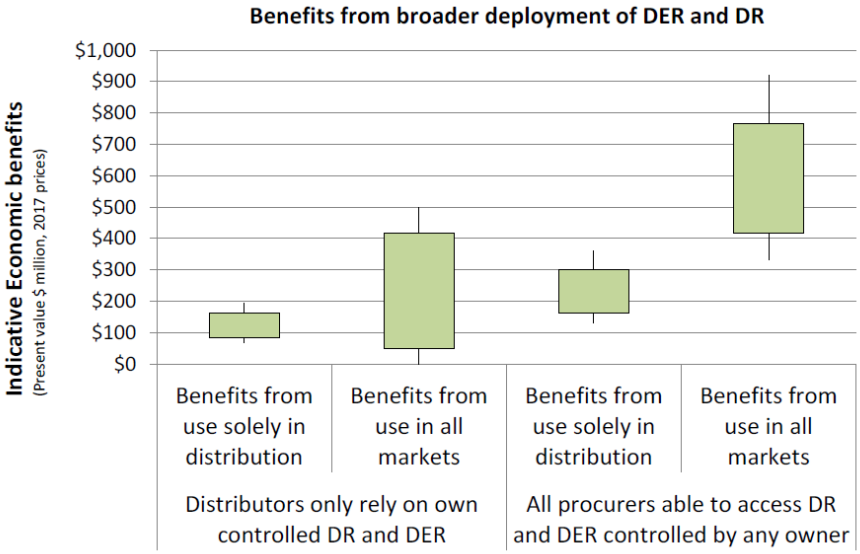
We also identified some issues which are not directly related to input services. They are covered in Appendix D.

What have we found?

Innovation and Participation Advisory Group

Reducing barriers to sub-ICP services would be for the long-term benefit of consumers

In the ACCES Framework project, the Authority estimated quantifiable NPV benefits of between 0.5m and 18.5m solely from the better EV and PV pricing that results from allowing service providers to specialise in a particular sub-ICP service. These figures exclude wealth transfers from retailers to consumers, and are estimated in the absence of significant changes to input services arrangements.



IPAG's Equal Access recommendations noted the significant pool of benefits available from broad deployment of DER and demand response. Without input services/ACCES, Equal Access/Open Networks will still be worthwhile, but will not be able to unlock the full benefits. Ensuring sub-ICP service providers can access the required input services is an important part of unlocking the flexibility of DER.

A more recent piece of analysis by Sapere estimated that if DER were to realise its potential, the net benefits to consumers between 2021 and 2050 would be $7.3 billion in net present value. These benefits are additional to the benefits expected to occur from DER under the current market and regulatory environment.

Increased competition in the metering services market would be for the long-term benefit of consumers

In 2016, the Commerce Commission decided not to conduct a Part 4 inquiry into gas metering, but estimated the benefits of regulation at 15m to 25m over 10 years.

This figure is not directly transferable to the market for electricity metering, but similar dynamics are in play – the market has a high degree of concentration, and MEPs have an effective monopoly position once a meter is installed. In addition, the number of installed electricity meters is an order of magnitude larger than the number of gas meters.

Some of the issues we identified are being addressed by existing activity

Our work on input services is closely related to other initiatives within the Authority and the wider industry. These include links with:

- Previous IPAG advice on Equal Access, and the Authority's resulting Open Networks programme
- The ENA's Network Transformation Roadmap
- The Authority's ACCES Framework and Quick Wins projects

We have focused our recommendations on areas not being addressed in other initiatives.

Improvements to input services arrangements can be made even in the absence of sub-ICP unbundling

A robust Open Networks regime is a necessary pre-condition of unbundling sub-ICP services. Sub-ICP services will be of limited value if there is no route to allow flexibility to be monetised for network support.

While sub-ICP trading is important contributor to unlocking the flexibility of DER, many of the issues we identified are not specific to sub-ICP trading.

Many of our recommended improvements could be made even without the ACCES project, particularly with respect to meter data arrangements.

Changes to input services arrangements would support EPR recommendations

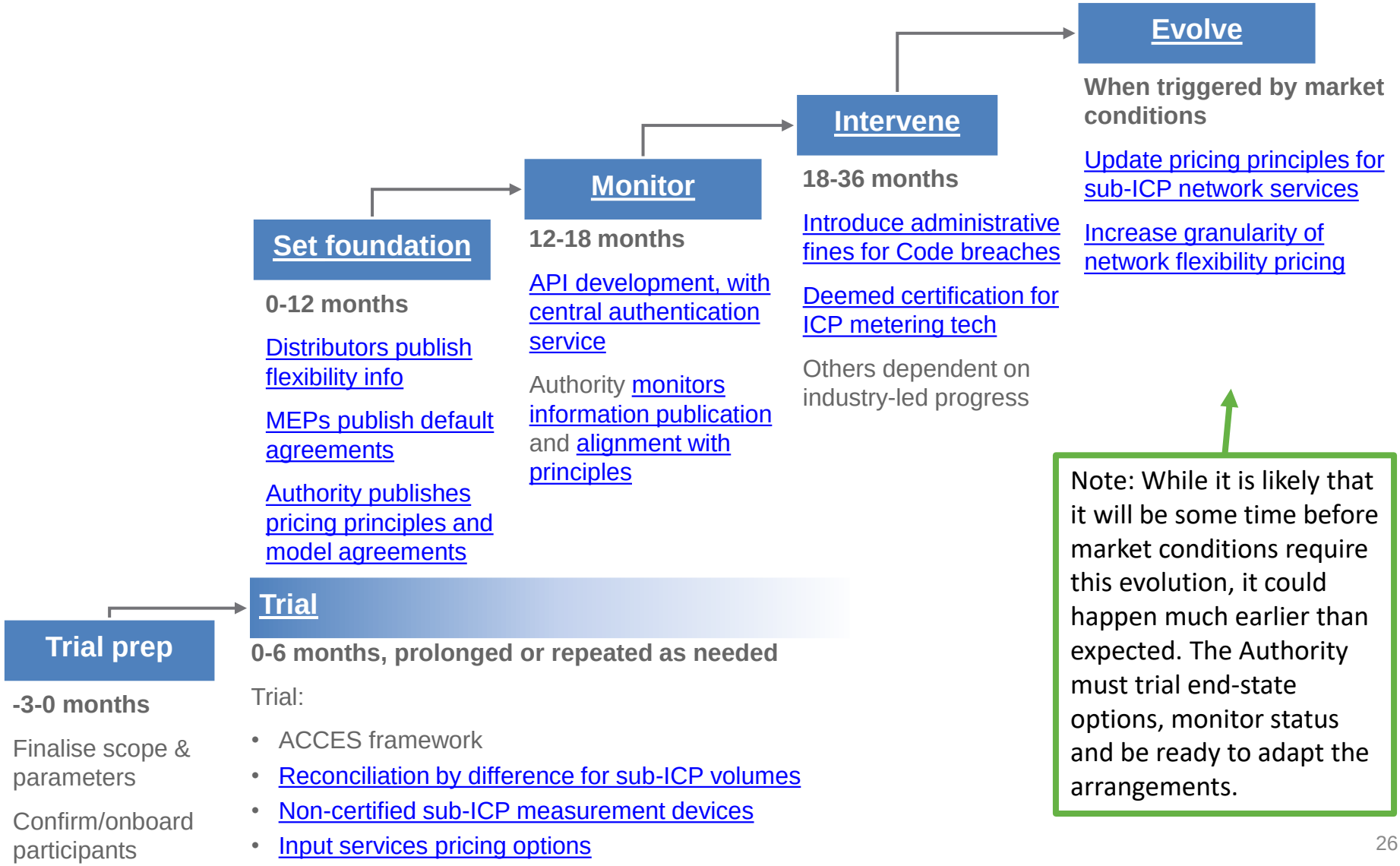
- Our recommendations provide implementation options for some of the recommendations of the Electricity Price Review. In particular, they would address EPR recommendations:
  - C3 - Develop a streamlined way to process customer requests for consumption data (fully)
  - D1 - Improve availability of wholesale electricity and gas market information (partially)
  - E3 - Ensure distributors have access to smart meter data on reasonable terms (partially)
  - G1 - Encourage more energy sector innovation (partially)

- Even though the Authority has completed the majority of its actions from the EPR, changes to input services agreements may provide enhancement options to better meet customer and industry participant needs

The uptake of services is uncertain, so activity should be staged

- Although technology change is happening all around the world, no jurisdictions have yet unbundled sub-ICP services in this way. This means there is no established path to implementation.
- The level and pace of uptake by consumers is uncertain, and future developments may make new and different options available to customers and market participants.
- A direct move to a 'theoretically perfect' final end state would risk a change of direction and arrangements that are not fit for purpose. Nevertheless, lack of action would stymie access to benefits.
- In developing its recommendations, IPAG has taken into account the Regulatory Strategy Principles and Code Amendment Principles published by the Electricity Authority and summarised in Appendix C. Particular focus has been placed on:
  - Ensuring existing regulations can be enforced
  - A preference for market-led solutions
  - Identifying credible regulator-led solutions that can be adopted if market-led solutions do not deliver
  - Staged interventions that reveal more about the true nature of the problem over time
- Regulatory processes can establish a default benchmark that can be built on in commercial negotiation. Given experience in recent years with the length of time industry-led efforts can take, we have recommended timelines for regulatory intervention to avoid the efficiency and welfare losses from delay.

Staging the reduction of barriers



The Authority has a crucial role in guiding the content and execution of trials

Minimally, the Authority's role in enabling trials is to:

- grant Code exemptions for market participants wishing to join and execute a trial
- Reviewing trial outcomes and using them to inform regulatory change

However, to make the most of the opportunity, and allow trials to provide maximum insight into demand for new services and how they can be implemented, a guiding hand is indispensable.

In our view trials will be most successful if the Authority plays a conscious role in:

- Identifying specific design features and process components to include
- Seeking and coordinating interested parties who wish to opt-in
- Convening and facilitating high-level trial planning sessions
- Making sure industry-led trial plans cover regulatory options (e.g. cost recovery mechanisms)
- Convening trial debrief sessions and collating trial outcomes
- Encouraging trials to test technical feasibility and sharing the findings.

Overview of issues and recommendations

Innovation and Participation Advisory Group

Pricing for Sub-ICP arrangements must start simple

Ultimately, sub-ICP trading must have individual traders standing alone from other parties, and exposed to the full costs they impose.

That means electricity network pricing which reflects the individual contribution to network use of each sub-ICP trader, and metering pricing which allows MEPs to recover both fixed and variable costs from all the traders at a single site.

However:

- This will add significant complexity to pricing arrangements, requiring direct relationships between sub-ICP traders and distributors.
- Until a greater number of distributors begin the transition to cost reflective pricing, sub-ICP traders will have limited influence on network charges, so exposing sub-ICP traders to network charges will not improve incentives to use the network effectively.
- The nature of the NZ metering services market means there is significant potential for sub-ICP traders to each end up paying the same or similar charges as they would singly.

Therefore, in the initial stages of sub-ICP trading, simplicity of approach and smoothing the path to implementation will be more important than immediate implementation of the desired end state.

This implies an initial temporary pricing approach based on incremental/marginal costs of service, similar to the existing Distributed Generation pricing principles, with all electricity network costs to be recovered from the main retailer at the site. This will distort incentives for responding to network pricing, because it creates distance between the party causing change and the one paying for it.

~~Trials should cover both simple and complex pricing arrangements to provide information on the level of harm caused by simple-but-distortionary pricing~~. Even if simple arrangements are adopted initially, pricing principles should be amended over time to move closer to the latest distribution pricing principles, with the change well signalled.

We should make use of new measurement technology

The integrity of our global settlement model relies on accurate meter data. However, certification requirements are still based on arrangements originally designed for (now decades old) metering technology.

Consumer electronics devices (including PV inverters, Electric Vehicle Supply Equipment (EVSE) and some home energy monitors) are increasingly capable of accurately measuring usage of a specific device or even a whole site. Over time, the penetration of such devices will increase, as low-cost technology allows smart devices to monitor, log, control, and share their usage.

These measurements provide an alternative source for meter data, and could do so without being individually tested and certified for use, particularly where used for ‘reconciliation-by-difference’ of sub-ICP volumes from a traditional (individually certified) meter at ICP level.

A ‘deemed certification’ approach for such devices would reduce compliance costs of testing, reduce installation effort for measuring volumes (particularly sub-ICP volumes), and provide a vehicle for improved communications of measured quantities.

Use of measurement devices without seals would increase potential for tampering. If such devices were to be used at ICP level (by relaxing certification requirements across the board), they would need to retain sealing requirements. Sub-ICP volumes are less of a concern, as the customer is still responsible for the total volume regardless of the split between sub-ICP service providers.

Better data availability requires more use of half-hour data for reconciliation and settlement

New Zealand's retailer-driven smart meter rollout has been very successful. Around 83% of the nearly 2.2 million ICPs in New Zealand have smart meters certified to provide half hour data, and the proportion of smart residential meters is even higher.

These smart meters measure several types of data, including kWh consumption, voltage, event, and 'last gasp' information. Participants pay to have some of this data collected, stored and transferred to them for use in market processes. However, even where time of use consumption data exists, it is not always used.

For 1.4 million ICPs – 65% of the total - half hour usage data is ignored in central reconciliation and settlement processes. Instead, they are reconciled by applying a fixed profile to monthly totals, just as their accumulation meter predecessors were.

The original rationale for allowing half-hour metered sites to settle on profiles was that, over time, retailers would have incentive to reconcile (cherry-picked) sites on half-hour data, where doing so for that site would result in lower energy costs than using a profile. This would make the profile more extreme and expensive, creating a virtuous cycle in which further sites were moved off profiles and onto half hour reconciliation.

Ten years later, this has still not occurred. Only a third of sites across the country are reconciled using actual half hour data.

The ongoing, widespread use of profiles distorts the efficiency of the wholesale market in several ways:

- It reduces the accuracy of the overall reconciliation process, removing incentives for consumers to adjust their usage to match actual needs
- It calls into question fundamental assumptions about demand response on which several market development proposals are based (open networks, cost reflective network pricing, RTP changes to the wholesale market).
- Data can only be made available to consumers (and their agents) automatically, instantaneously, and at no cost if it is actually collected and stored in the first place.
- Where half hour data is not collected, validated and stored for reconciliation it will not be available at low marginal costs for other uses such as low voltage network analysis and monitoring or distribution asset management

We recommend setting a profiling sunset date at which half hour reconciliation becomes mandatory for all capable sites. This could also be achieved by setting a sinking cap on the percentage of a participant's half hour capable sites reconciled by profile.

Improving data availability and timeliness requires new technology

Users and third parties find it hard to get access to smart meter usage data. Real-time data access is expensive, and not widely available. This is partly due to the processes required to verify, validate, and estimate raw data, but also due to the way data is communicated from meters, to back-office systems, to end users. In our current regime, where obligations to provide energy data (both to reconciliation and to customers) sit with retailers, meeting obligations to provide data requires significant manual effort, processes differ across organisations, and there can be significant delay between requesting historic data and getting access.

While the existing csv-based EIEPs provide standardisation of some data, they don't make available the full scope of data available, nor do they enable instantaneous integration with modern websites, trading systems or other technology. They were not designed to do so.

Enabling better access to data will require implementation of a new approach to data exchange, using a centralised access mechanism which provides access to all data via a single request channel. This would address issues around timeliness, standardisation and process. Having common standards will allow innovators to compete on the substance of their core offerings rather than the format of their data exchange processes.

This repository need not be physically centralised. A physical central meter data store would require duplication of data, communications links, complex implementation, and would not address non-kWh data. A virtual central meter data store could be achieved by retaining the existing distributed data model, but using modern APIs to connect data requestors directly with data holders.

Holding meter data in one place does not address issues around authorisation and access – ensuring data is available to those who have the right to it, and not to those who don't. These issues must be dealt with separately, regardless of whether the central data store is physical or virtual.

Australian work on Consumer Data Rights for energy is taking the distributed approach, and the Authority's ACCES quick wins project is considering a central accreditation system which could potentially form the basis for a NZ equivalent.

The IPAG notes that a default data template has been introduced to facilitate exchange of consumers' consumption data between distributors and retailers. However, the uses of the data are limited, and distributors have expressed frustration with the current template.

We need more transparency of competition for metering services

Certified meters have a 10-15 year life, and it is inefficient to install duplicate measurement equipment or to replace a meter within its lifespan. That means the nature of the metering services market is to have competition *for* the market, but not *in* the market. Once a meter is installed, the MEP has an effective monopoly on providing services at that location, its market power constrained only by the terms of the contract, which are in turn influenced by the degree of competition *for* the market at the time the contract was agreed.

The market for MEP services in New Zealand is highly concentrated. The three largest firms have greater than 90% market share, for an HHI of greater than 4000.

Larger market participants have sufficient scale to provide negotiating power, but smaller participants and new entrants have very little leverage to negotiate commercial terms. This is likely to be frustrating competition in both the metering services market and increase the difficulty of entry for new participants, who must have arrangements in place with the MEP for an ICP before they can start providing services.

Nevertheless, there is some degree of competition between metering services providers, and a price-quality regulatory framework under Part 4 of the Commerce Act would be overkill in the first instance. Market dynamics would be improved by the increased transparency of:

- MEPs publish standard 'pay-as-you go' terms open to all parties (including 'rack rates' for standard meter services)
- Authority development of model metering services agreements (with a similar approach to the Authority's work on Default Distribution Agreements) including specific terms to level the playing field for small participants and new entrants

We do not propose that changes be made to existing contracts. Transparency will support competition at the margin by providing backstop terms for:

- new entrants signing their first contract; and
- existing participants renegotiating when existing contracts expire.

The success of sub-ICP trading is dependent on open networks

In the medium term, sub-ICP trading will only flourish if there are routes for sub-ICP traders to monetise the flexibility they are unlocking.

As a result, some of the recommendations for input services are similar to, or build on our Equal Access recommendations, including:

- Standardising DER connection arrangements
- Using the registry to capture load control capability
- Requiring distributors to publish prices and volumes for flexibility in different parts of their networks.

Issues and desired outcomes

Innovation and Participation Advisory Group

Issues – non-metering

All input services

1. There are no mechanisms to require and enforce access to input services for multiple parties at a single ICP
2. There are no mechanisms to ensure efficient charging for input services for multiple parties at a single ICP

Electricity network services

3. Distribution networks have different rules for connection and operation of DER
4. Current peer-to-peer trading does not account for network charges because there is no mechanism for accurate charging for sub-ICP volumes across neighbouring ICPs.

Reconciliation and settlement

5. Parties offering sub-ICP supply and load control services have to assume responsibility for all load at a single site in order to offer services.
6. Service providers and central market processes do not know what sub-ICP supply and load control services are being provided at each location
7. The Code does not always facilitate the use of the best available data in reconciliation

Addressing existing meter APIs and relays

8. There are multiple uncoordinated mechanisms to signal need for flexibility and they do not address all potential customers

Issues - metering

Meter technology

9. Measurement data from consumer electronics is increasingly accurate but cannot efficiently be used in market reconciliation and settlement
10. Meter data availability is limited by communications technology in the meter itself

Meter data

11. Users and third parties find it hard to get access to kWh usage data
12. Non-kWh data is measured, but unavailable due to technical limitations
13. Most data is historic only. Real-time data is available in some cases, but access is relatively expensive
14. Historic data is not available instantaneously, and only limited data is available without incurring cost
15. Parties use different formats for the same data
16. Some data is incomplete or incorrect

Metering services

17. The MEP services market has significant monopoly elements which cannot be overcome by commercial pressures alone
18. Some existing MEP service contracts inhibit the operation of competition
19. Current regulation and commercial arrangements do not drive compliance with quality standards

Desired outcomes

- For each issue, we have identified one or more desired outcomes.
- Not all outcomes are immediately achievable or desirable in the short-term. Our resulting recommendations reflect a staged approach to achieving the desired outcomes

Desired outcomes – general and non-metering

General

1. Prospective sub-ICP providers face clear and transparent regime for input service charges. Over the long term, charges are consistent with the outcomes of a workably competitive market.

Electricity network services

2. Sub-ICP service providers have clear rights to access distribution network services in a reasonable timeframe
3. All distributors offer publicly available terms for supply and demand at sub-ICP level.
4. DER connection policies are standard across the whole country, unless there is a material benefit of deviating from the national standard.

Reconciliation and settlement

5. Parties offering sub-ICP services can provide services while taking responsibility for only those services at an ICP level.
6. There is a central record of which sub-ICP supply and load control services are provided by whom.
7. Sub-ICP supply and load control services can be switched just as ICP level ones currently are.
8. The Code provides for the most accurate (most recent and most granular time resolution) data to be used at all times.

Addressing existing meter APIs and relays

9. All parties valuing load control:
    a. have a mechanism to signal their need and the value they place on it.
    b. can access the full flexibility that exists
    c. offer dynamic terms as well as terms that require firm and exclusive access to flexibility at a particular location.
10. Anyone offering a flexibility service is able to allocate it to the highest value use.

Desired outcomes – metering

Meter technology

11. All measured data is accessible remotely, or can be accessed by installing technology to supplement the capabilities of existing infrastructure without reference to the MEP, as long as it does not compromise integrity of market data and other services.
12. Data from consumer electronics devices can be used in reconciliation, while retaining accuracy of overall reconciliation process.

Meter data

13. There is a fast, transparent mechanism for service providers to access usage and technical data from certified meters at both ICP and sub-ICP level.
14. Consumers can access all data from their smart meter without human intervention.
15. Third parties can access smart meter data automatically with electronic consumer permission.
16. Businesses (including EDBs and market participants) have the right to access data that contributes to improved safety of persons and property.
17. Third parties are able to access (with appropriate authorisation) any data required to be stored by the MEP.
18. Real-time data from certified meters is available at reasonable cost
19. Consumers and other users can request historic data electronically, and have it returned in near real time
20. All parties use standard formats for data exchange
21. Registry metadata is accurate and up to date
22. Parties are incentivised to provide data at the level of accuracy desired by those using it

Meter services

23. The performance of the MEP services market is consistent with that of a workably competitive market:
    a. Customers have options for metering services
    b. There is appropriate competitive pressure on services (at initial contract signing and throughout time)
    c. Customers can change what metering services they use as their needs change
    d. Monopoly asset owners can recover (but not over-recover) the costs of their assets where they are capable of delivering required services at reasonable cost and in a reasonable time frame.
    e. Meter displacement costs faced by meter data consumers reflect true marginal costs of displacement
24. Parties have incentives to deliver the service quality that customers demand (are prepared to pay for) and that regulation requires.

Recommendations

Innovation and Participation Advisory Group

Our recommendations

- We have grouped our recommendations by:
  - the five suggested stages of implementation
  - whether they relate to the implementation of sub-ICP trading
  - Whether they relate to electricity network or metering activities
- We have not made any recommendations specifically relating to input service 5 (data communications to isolated sites).
- Appendix F links each recommendation to the issue and desired outcome it is seeking to achieve.

Steps 0 and 1: Trial

Given the world-leading nature of this work, and the uncertainty about uptake and implementation mechanisms, the first step is to trial some of the proposed solutions to learn more about the problem. The trial preparation should take no more than three months, initial trial results should be available within 6 months of trial start, and may extend or be repeated out to around 12-18 months.

Sub-ICP trading related

R11. Authority to lead the proposed trial of the ACCES framework changes, with voluntary participation by retailers and other service providers. This will provide a route for sub-ICP providers to participate in central reconciliation and settlement process. The trial should also include input services aspects. In particular, the trial should include testing of sub-ICP business processes as follows:

- The incumbent retailer holds the ICP-level responsibilities, including:
  - Medically dependent and vulnerable customers
  - Settlement of ICP metered volume less the sub-ICP volumes
- Consumer has direct relationships with service providers (not via the connection agent or the incumbent retailer)
- Sub-ICP traders are responsible for sourcing (and, if required, paying for measurement of) sub-ICP volumes, and notifying them to the Connection Agent, who does sub-ICP reconciliation
- Sub-ICP volumes used in reconciliation need not come from the existing certified meter: measurements from sub-ICP level measurement devices can be used even where not individually certified.
- Sub-ICP volumes are reconciled by difference from the certified meter
- Load control capability provided by sub-ICP service providers participating in central reconciliation and settlement is captured in the registry (or the shadow registry used for the trial)
- At least two pricing approaches for network charges:
  - A simplified model where all distribution charges are recovered from the retailer responsible at ICP-level
  - The end-state model where distribution charges are assessed separately for each sub-ICP service provider
- The Authority should explicitly assess the presence or absence of distortions arising from the simplified pricing and cost recovery mechanisms, and the nature of any harm caused.

R19. Authority to report on “open networks” progress of distribution networks.

Step 2: Set foundation (1)

This step is about building on trial results for sub-ICP trading, putting in place new transparency and information publication requirements, and setting parameters for industry-led activity. This work should be carried out within 12 months

Not dependent on sub-ICP trading

Electricity network services

- R9. Distributors to standardise network connection arrangements for DER, with goal to maximise connection of DER within constraints of safety, reliability and supply quality
- R15. Require distributors to publish data on usage of ripple control, including estimated quantity of load curtailed in each time period
- R16. Require distributors to publish (and regularly review, e.g. in the annual planning process) prices and volumes they are prepared to pay for flexibility/demand response in at least two parts of their network (at the granularity at which ripple control can be triggered), with prices based on the same pricing principles as cost-reflective network tariffs, i.e. based on forward requirement for investment (avoided cost of network investment).

Step 2: Set foundation (2)

Not dependent on sub-ICP trading

Meter data

- Authority to consider Code amendments to:
  - R13. Schedule 11.3 to extend the time window in which HHR AMI data is to be used in preference to NHH data or estimates for switch reads (we suggest 10 days).
  - R13. Schedule 10.6 to reduce the time window for MEPs to provide raw meter data to be less than that in schedule 11.3 (we suggest 5 days)
  - R13. 10.48 to require MEPs (as well as reconciliation participants) to amend their records of meter data to reflect the correction
  - R13. Part 10 to reflect timeframes for fixing non-communicating AMI meters as per memo issued on 26 July 2017
  - R26. Allow that where a participant (not a third party) provides an undertaking that access to kWh and non-kWh data from a certified or deemed certified measurement device would contribute to improved safety of persons and property, the participant has a prima facie right to access to the data, without permission from the retailer or end-consumer (with pricing to be negotiated with the data provider).
  - R26. Mandate use of EIEP14 for retail tariff data.
- R22. Authority to mandate use of HHR data for reconciliation from all communicating AMI meters. This could be achieved by setting a sinking cap for the proportion of HHR-capable ICPs reconciled as NHH.
- R31. Require MEPs to publish default 'pay as you go' service arrangements that can be accessed by any party, including:
  - service schedules
  - terms and conditions
  - pricing that allows costs for any given ICP to be determined
- R32. Authority to develop model metering services agreements, including:
  - Service and pricing schedules with:
    - Options for stricter SLAs for HHR data
    - Options for access to data other than kWh consumption data
  - terms and conditions with provisions that allow counterparties to:
    - terminate arrangements for an individual site:
      - where data consumer requires additional services and the incumbent cannot provide them at reasonable cost in a reasonable timeframe **or**
      - with no displacement cost where the meter is over a certain age
    - terminate contract for non-performance where a specified level of performance against SLAs is not met
    - withhold payment where services don't meet contract terms

Step 2: Set foundation (3)

Sub-ICP trading related

General

- Depending on results of trial:
  - R1. Authority to amend Code to explicitly recognise sub-ICP service providers as a sub-class of 'trader' with standing under Code to access electricity network services from distributors and metering services from MEPs
  - R2. Include terms for sub-ICP supply and demand in Default Distributor Agreements
  - R14. Include load control capability data in the registry for sub-ICP service providers participating in central reconciliation and settlement.
- R3. Authority to develop and publish guidance on pricing principles for charging of multiple parties trading at a single ICP for metering and electricity network services.

Electricity network services

- R4. Pricing principles for electricity network services should be aligned to the Authority's distribution pricing principles, but with some simplifications of cost recovery in these early stages of sub-ICP trading:
  - all network charges recovered from the main (incumbent) retailer at the ICP. This would be revisited in Step 5 (Evolve) once sub-ICP trading becomes prevalent, or when the simple approach is seen to distort market activity.
  - any variable charges should align with the level of cost-reflective pricing in the general distribution tariff, and should be based on the incremental/marginal cost of providing service to 2nd and subsequent sub-ICP traders at the ICP.

Meter data

- R5. Pricing principles for metering services to be aligned to existing Distributed Generation pricing principles as follows:
  - goal is to encourage efficient use of the already-existing resource
  - no change expected to charges to incumbent retailer for energy data for use in reconciliation
  - charges to second and subsequent sub-ICP traders may differ depending on services provided, and should reflect incremental/marginal cost of providing service to that party
- R8. Authority to include sub-ICP services in model meter services agreements:
  - Service schedule to include data provision at sub-ICP level (where equipment supports)
  - Pricing schedule to include explicit pricing for multiple sub-ICP service providers at a single premise

Step 3: Monitor

In this step, the Authority would monitor information publication and alignment to published pricing and meter service agreement guidelines, and develop new API-based data exchange methods

This work should span 6 months following the Set Foundation stage

Not dependent on sub-ICP trading

Electricity network services

- R10. If industry does not settle on standard DER network connection arrangements by 12 months, Authority to prescribe default DER connection arrangements (e.g. in default UoS agreements).
- R18. Authority to monitor Distributor pricing for flexibility services, and publish results of monitoring

Meter data

- R23. Authority to drive definition of modern data APIs to supplement mandatory csv-based EIEPs. This should be approached as a clean-sheet IT-driven definition rather than in the Standing Data Formats Working Group.
- R24. Require data providers (including those holding deemed certified sub-ICP meter data) to make any data they hold available by real-time API:
  - Traders: consumption data used in central reconciliation (may be subcontracted to MEPs)
  - MEPs: Non-consumption data
- R25. Authority to manage or oversee MOSP management of central authentication and authorisation service for API access (potentially similar to proposed Australian CDR model)
- R30. Authority to develop and publish participant accuracy reports
- R33. Authority to monitor application of pricing principles and model terms in meter service contracts, and publish results of monitoring in a similar way to distribution pricing.

Step 4: Intervene

In this step, the Authority would step in where market-led activities are not showing progress, as well as implementing some of the longer lead time items. This work should be complete within 3 years.

Not dependent on sub-ICP trading

General

- R29. Authority to introduce a schedule of administrative fines for Code breaches (including where identified in participant audits) in order to provide an effective mechanism to sanction poor performance

Meter data

- R14. Capture load control capability data in the registry for all ICPs, regardless of presence of sub-ICP service providers.
- R20. Authority to implement 'deemed certification' procedures to apply to consumer electronics devices (including EVSE) used for sub-ICP measurement through:
  - relaxed certification requirements for kWh measurements from consumer electronics devices, based on:
    - an up-front accuracy test of an example of the measurement device
    - removal of requirement to certify every individual device
    - spot-checking of deployed devices to review accuracy in the field
  - publishing a list of deemed certified devices (referenced to relevant portions of international measurement standards in Schedule 10.1 e.g. IEC 61557)
  - allowing kWh measurements from deemed certified devices (without a seal) to be used for reconciliation-by-difference of sub-ICP volumes
- R26. If by 24 months, work on a virtual centralised meter data store via APIs is not progressing near instantaneous data access, Authority to progress physical centralised meter data store.
- R34. If by 24 months, default metering services agreements are not aligning with model agreement, Authority to convert model metering services agreement into default metering services agreement (applicable to new contracts only)

Step 5: Evolve

This step is largely about activities that become relevant only when competition in sub-ICP services and cost-reflective electricity network pricing are prevalent, and there is evidence that initial simple approaches are distorting market outcomes.

- R21. Consider revising entire certification process to reflect the 'deemed certification' approach, so that kWh measurements from deemed certified devices (with a seal) can be used for whole-of-ICP measurement
- R6. Adjust pricing principles to split fixed charge components among service providers at an ICP, or allow service-based pricing. This desired end-state must be well-signalled to avoid the issues seen with resistance to changes to DG pricing principles.
- R7. Introduce sub-ICP trader interaction with Distributors, and implement sub-ICP pricing principles in UoS agreements, to expose the causing party to the cost signal
- R17. Increase number of locations and granularity at which distributors must publish demand response pricing – this may be met by a move to locational marginal pricing in the distribution network.
- R12. Further investigate whether a 'mobile ICP' model (where a (sealed) sub-ICP measurement device can be reconciled behind any ICP) could provide value.

Appendix A – what is an ‘input service’?

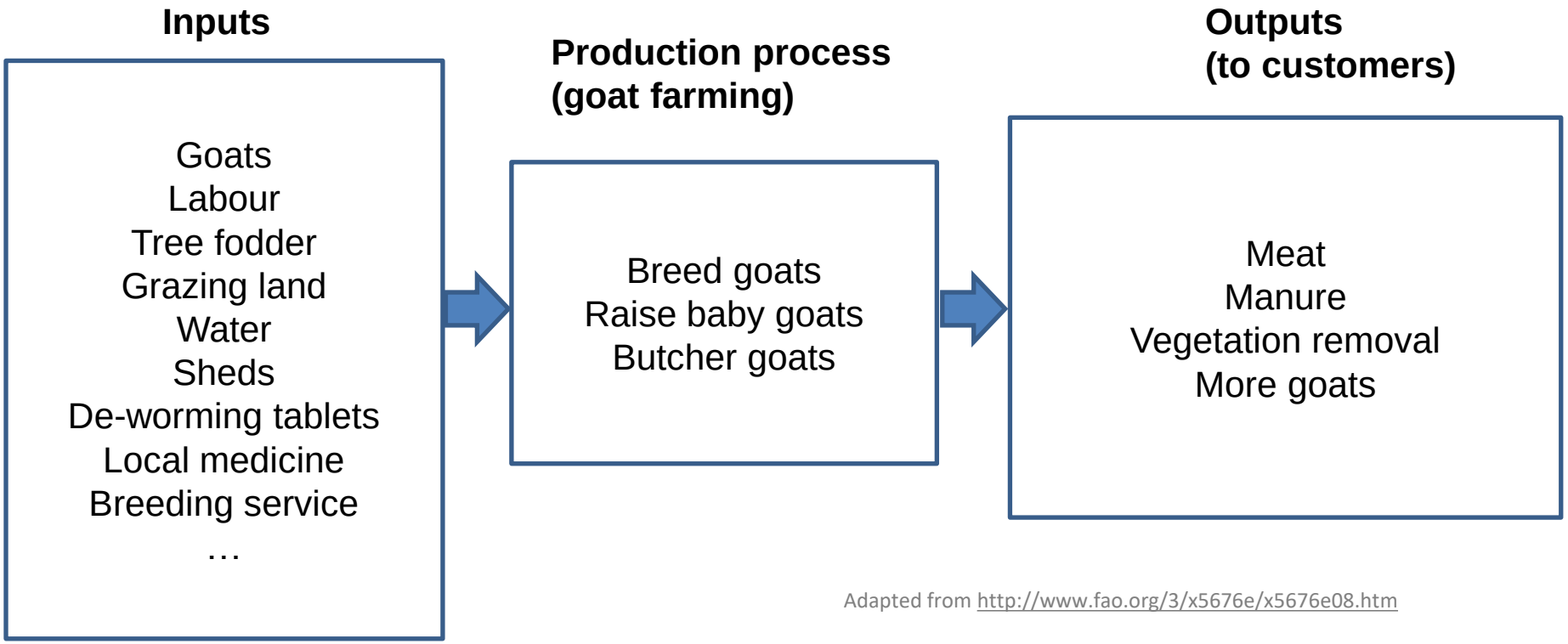
Innovation and Participation Advisory Group

What is an ‘input service’

- ‘Factors of production’, ‘resources’, or ‘**inputs**’ are the things used to bring about the production of a good or service.
- Examples of ‘inputs’ are raw materials, employees, information, money, and other resources
- **Output** refers to the actual finished product or service that is produced.

Example: Goat farming

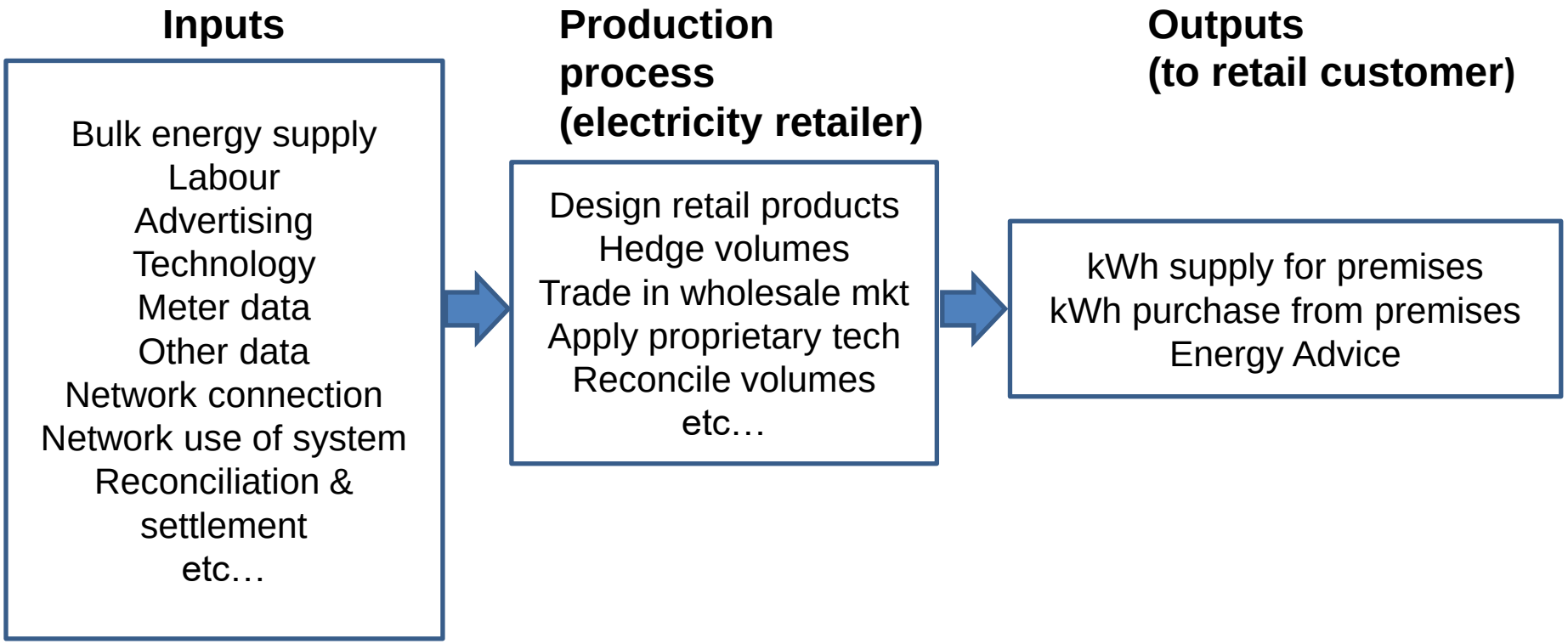
Example: the process of goat farming takes the *inputs* of fodder, water, labour, medicine etc and uses them to create the *outputs* of meat, manure etc.



Adapted from http://www.fao.org/3/x5676e/x5676e08.htm

Example: electricity retailer

An electricity retailer takes a variety of specialised inputs and uses them to create a variety of services



Electricity output services

The same inputs could be used to provide other kinds of electricity services to a variety of end consumers.

For example:

- kWh supply (for an individual appliance)
- kWh purchase (from an individual appliance)
- Battery charge management (for a premise)
- Vehicle charge management (for a premise)
- Aggregated data provision (for a distribution company)
- Load control services (for a distribution company)
- Grid ancillary services (for the system operator)

Some of these services may not be possible under current market arrangements.

Electricity input services for this project

- Not all inputs are in scope for this project. This project is about reducing and removing barriers relating to access to data and shared use of the distribution service.
- Input services in scope are those which use *monopoly infrastructure*, and which are *required* to provide electricity services to customers at ICP and *sub-ICP* level.
  - *Monopoly infrastructure* means that the provider possesses (and has the ability to exercise) significant market power, either because there is only one possible provider of the input service, or the cost of engaging an alternative provider exceeds the benefit
  - *Required* means that output services cannot be provided without them
  - *Sub-ICP* means where the service is one of a number supplied to the premise (the customer (as represented by the ICP) receives services from multiple providers)

Appendix B: In-scope input services

Innovation and Participation Advisory Group

Input service 1: Electricity network services

- Electricity service providers use the transmission and distribution networks to move energy to and from their customers
- Access to provide services via the network connection is currently only available by a commercial agreement with the retailer responsible for the ICP or by installing a new connection
- It is usually inefficient to install multiple parallel physical network connections

Input service 2: Provision of certified meter data

- Data used in central reconciliation and settlement must come from certified meters, which are individually tested and certified for accuracy and precision. Service providers can use data from non-certified devices for other purposes, including customer billing.
- Electricity service providers use consumption and generation data at ICP/sub-ICP level to measure, reconcile and bill their services.
- Each ICP's total energy usage, distribution system usage, and contribution to the costs of central market functions (including UFE) is based on usage data from certified revenue meters.
- Data from certified meters has a variety of non-billing uses (consumption, voltage and 'last-gasp' data from meters also has value to distribution networks)
- The meter certification process incurs significant overhead in pursuit of accuracy and precision, which are important for efficient settlement of the gross pool electricity market.
- Certified meters have a 10-15 year life, and it is inefficient to install duplicate measurement equipment to provide the same data or to replace a meter within its lifespan.

Input service 3: Central reconciliation and settlement

- The electricity market uses centralised systems and processes to reconcile volumes and settle payment amounts
- It is not possible to provide in-front-of-the-meter services to end customers without access to central processes and systems
- Access to central processes and systems is only available to reconciliation participants who, under current rules, must be responsible for all services at an ICP.

Input service 4: Addressing existing meter APIs and relays

- Most ICPs have the capability to shed load in response to a ripple control signal
- Some ICPs have meters with addressable relays which can trigger other actions, including load response other than by ripple control.
- It would be inefficient to install new devices to duplicate this function. Even so, it does happen at commercial/industrial sites where the benefit of flexibility outweighs the cost of duplication.
- Access to trigger load control by this mechanism is currently only available to the local distributor. Customers are recompensed for load control services through a lower distribution tariff
- Access to meter APIs and addressable relays is only available to MEPs.

Input service 5: Data communications to isolated sites

- Most ICPs have smart meters with associated communications links.
- For some of these ICPs, this link represents the only remote communications method for the site.
- While current communications mechanisms are relatively inflexible (2G modem with one dial-in every 24 hours), MEPs and others are working on a new generation of communications technology which may allow much more flexible connection.
- It would be inefficient to duplicate this communications infrastructure.
- Under current arrangements, third party access to this communications network will only be available by agreeing suitable commercial terms with the owner.
- This input service does not directly relate to provision of sub-ICP services.

Appendix C – Future sub-ICP service providers

Innovation and Participation Advisory Group

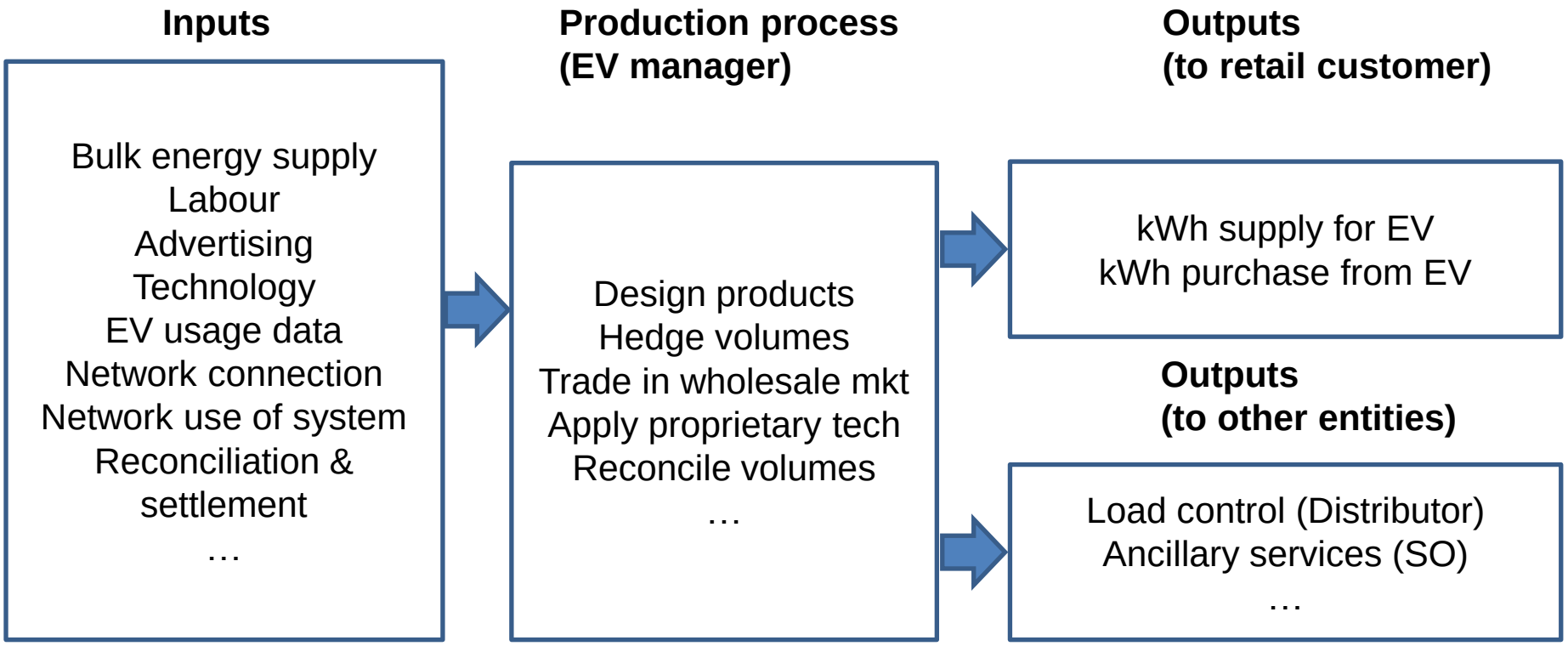
Use case 1a: EV manager (location specific)

- A service provider contracts with an electric vehicle owner to:
  - Procure kWh energy to charge the vehicle
    - May charge the customer for kWh
    - May charge a flat rate
    - May provide for free (e.g. as part of vehicle purchase)
  - Control vehicle charging time and rate
  - Control vehicle to grid discharge
- Services are provided in relation to a location, not a vehicle. The service provider will manage a vehicle only while it is plugged in at the location.
- This is analogous to a fixed line telephone service.

Use case 1b: EV manager (vehicle specific)

- A service provider contracts with an electric vehicle owner to:
  - Procure kWh energy to charge the vehicle
    - May charge the customer for kWh
    - May charge a flat rate
    - May provide for free (e.g. as part of vehicle purchase)
  - Control vehicle charging time and rate
  - Control vehicle to grid discharge
- Services are provided in relation to the vehicle, not the location. The service provider will manage the vehicle at whatever location it is plugged in.
- This is analogous to a mobile telephone service.

Use case 1: EV manager



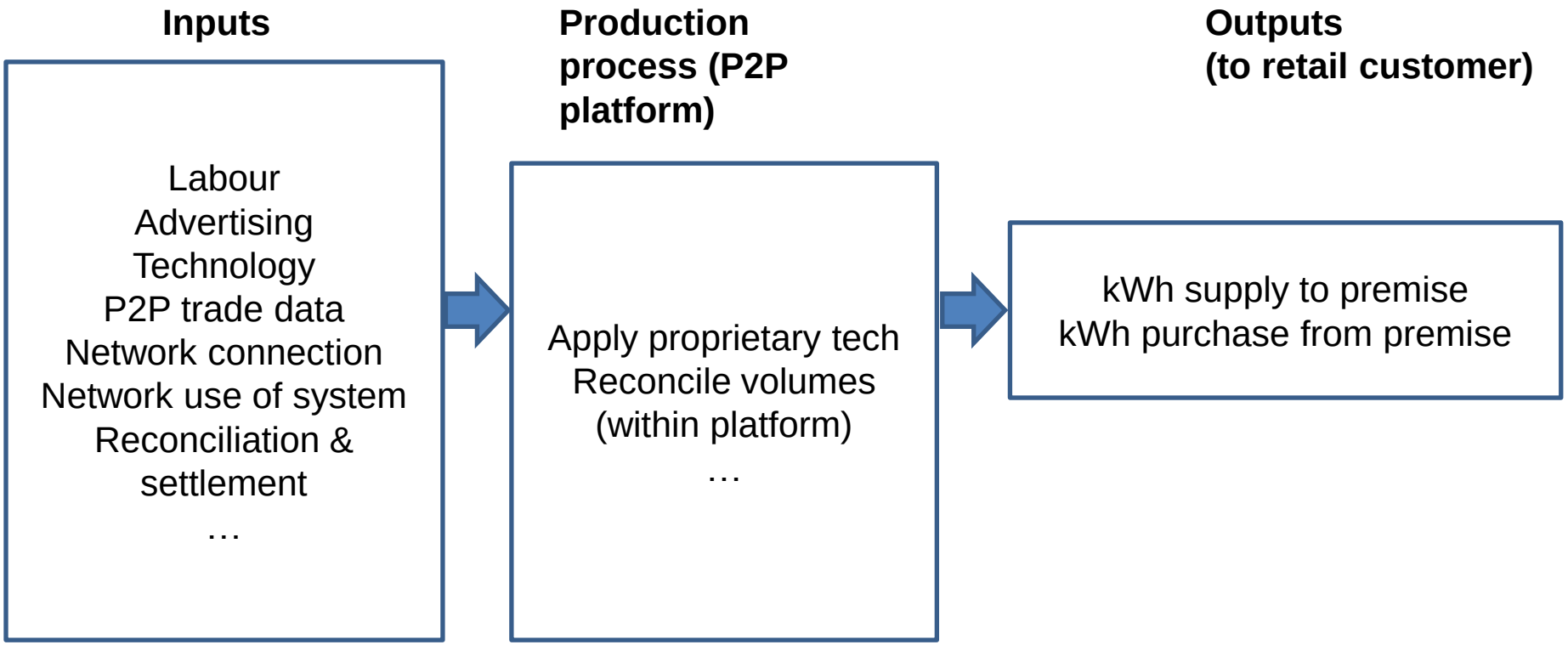
Changes required/problems with current arrangements:

- No mechanism for ensuring fair allocation of contribution to network & metering charges
- No mechanism to reconcile sub-ICP volumes
- No way to net volumes from multiple locations, using consumer electronics meter

Use case 2: Peer-to-peer trading platform

- Neighbours buy, sell and gift energy between themselves
- Transactions are not restricted to export volumes
- Transactions are matched, managed and recorded on a peer-to-peer platform
- Trade data from the peer-to-peer platform may be incorporated into central reconciliation or accounted for in billing only, through agreements between retailers

Use case 2: P2P platform

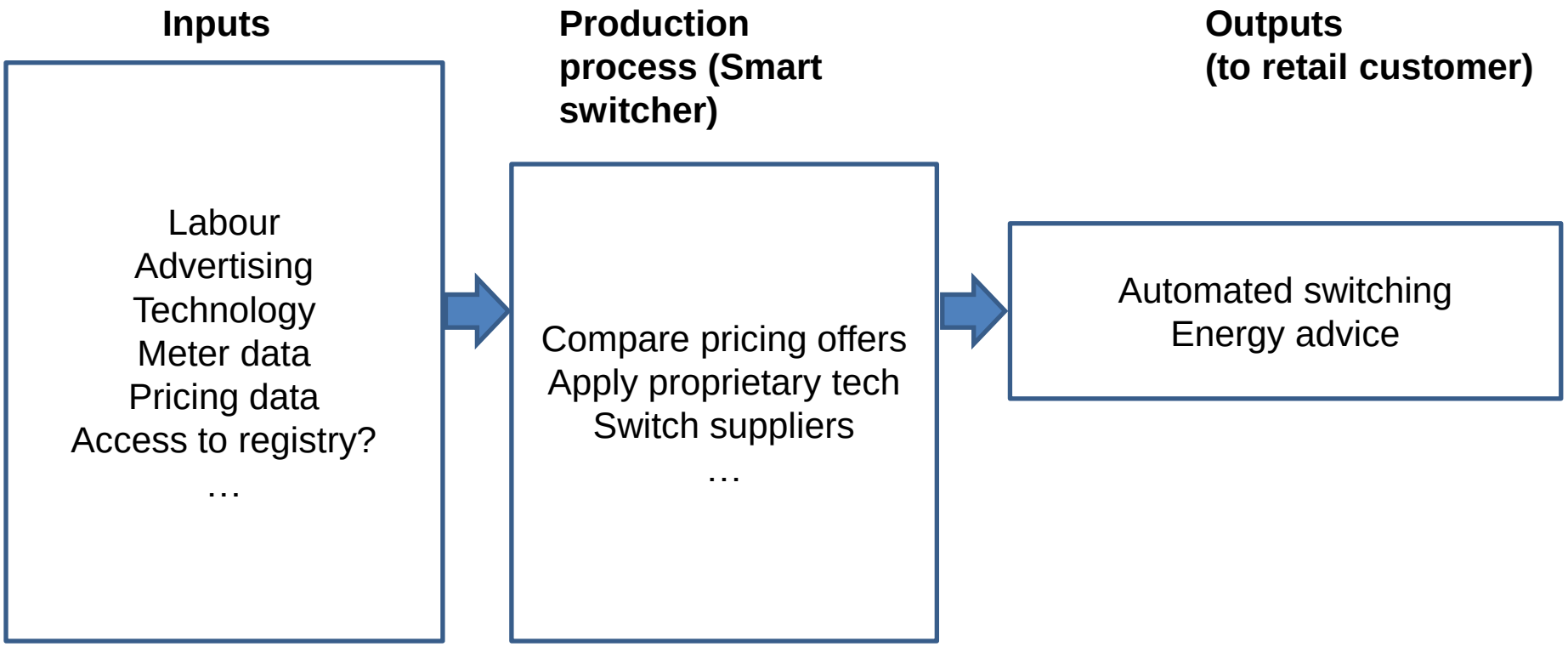


P2P trades do not require access to certified meter data.
Changes required/problems with current arrangements:
- No mechanism to allocate contribution to network charges
- No mechanism to reconcile sub-ICP volumes in central market processes
- No way to net p2p volumes across retailers

Use case 3: Smart switcher

- A comparison service:
  - Uses ICP usage data and pricing/tariff data from multiple service suppliers
  - Identifies the best combination of suppliers for retail customers (industrial, commercial or household)
  - Automatically switches services to new suppliers on a regular basis

Use case 3: Smart switcher

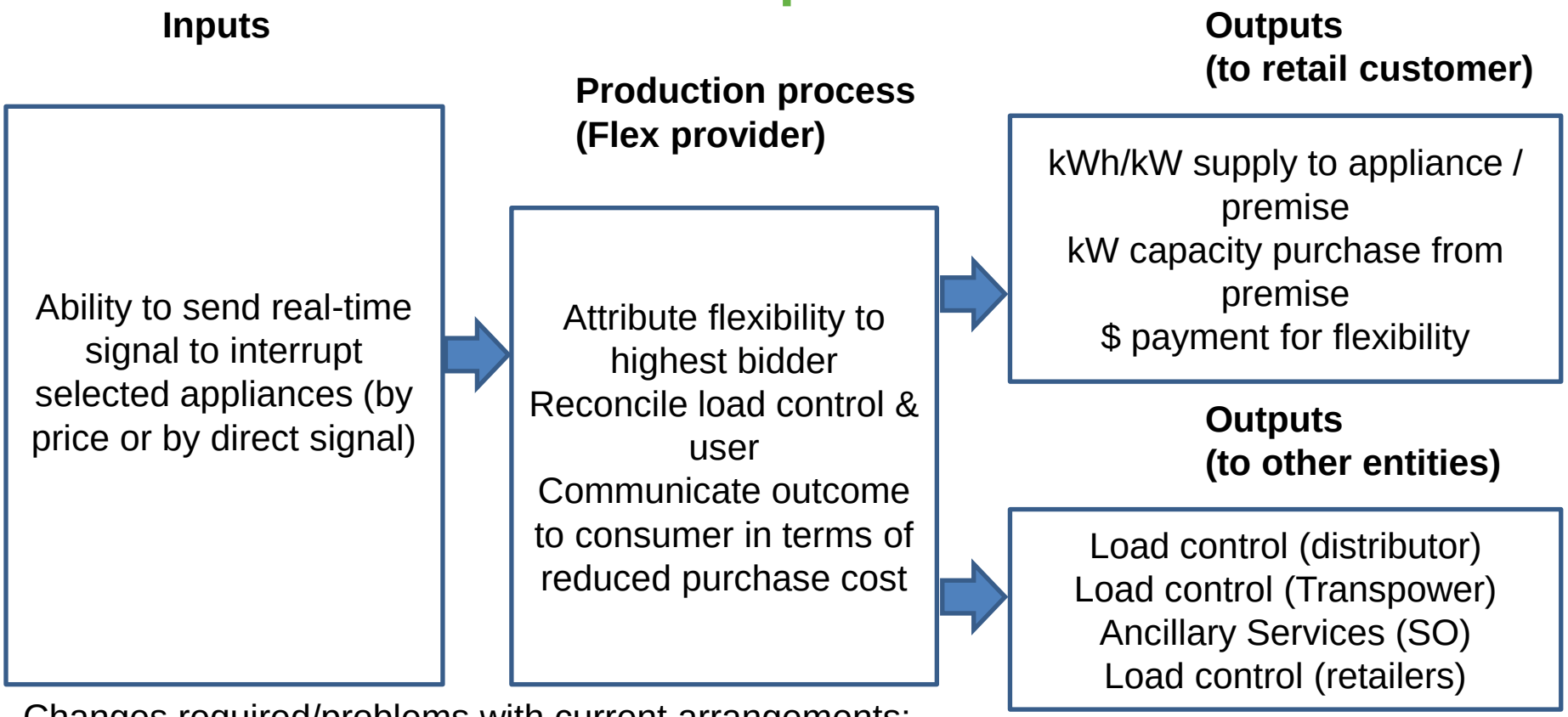


Changes required/problems with current arrangements:
- No current mechanism to access retail pricing data (held by retailers)
- No central mechanism to switch sub-ICP services

Use case 4: Flexibility trader ~~service provider~~

- The consumer accepts lower supply reliability to selected appliances for a lower cost versus higher reliability to others.
- On-site equipment controls those appliances rather than the distributor controlling them.
- Service level preferences of consumers may vary over time. The customer makes trade-offs between cost of supply and reliability to certain appliances / applications, with automated control to achieve this and override supply.
- Appliance could be anything, including pool heater, pump, EV, heat-pump, hot-water cylinder, or storage battery

Use case 4: Flexibility trader ~~service provider~~



Changes required/problems with current arrangements:

- No mechanism to coordinate demand for load control
- No way to signal need for load control (e.g. to opted-in consumers)
- No mechanism to respond and control within ICP nor guarantee minimum service level (e.g. vehicle has sufficient range or HWS has sufficient hot water and avoids legionella)
- No mechanism to *collectively* (amongst all entities) compensate the consumer

Example: How future services could appear in everyday life

Jan runs a small transportation business. She has a single depot in the Hutt Valley.

- The depot has a 10kW rooftop PV system and a 40kWh battery system
- She has a fleet of 10 electric vans with v2g capability. Most (but not all) are at the depot overnight.

Jan uses a variety of electricity service providers:

- An EV Manager who manages fleet charging wherever they are plugged in (including at the depot)
- A Flexibility Trader ~~Service Provider~~, who pays her for the right to charge or discharge her battery system a certain number of times per year
- A Retailer, who supplies all the other load at the depot
- A Smart Switcher, who automatically switches depot supply to the cheapest retailer at any given time
- She donates any solar export from the depot to the local school, through a peer-to-peer platform.

Appendix D – Issues and recommendations for non-input services issues

Innovation and Participation Advisory Group

We identified some issues not relating to input services

1. Tariff data availability

- Issue: Publicly available retail tariff data reflects "rack rates" only, not actual prices available to customers.
- Desired outcomes
  - Any data which the Code requires to be held or published is available in a standardised electronic form.
  - 'Generally available tariff data' is available to anyone without authorisation.
- Possible solutions:
  - Authority to clarify what is a ‘generally available tariff’
  - Make EIEP14 (retail tariff data) mandatory

2. Electricity network information

- Issue: Distributors don't have enough network information to effectively coordinate ~~DER~~ flexibility services with the distribution network service
- Desired outcome: Distributors do have enough network information to effectively coordinate ~~DER~~ flexibility services with the distribution network service
- Possible solution: Authority to amend code to require DER information is captured in the registry

3. Additional data collection

- Issue: Some data that would be useful is not collected (e.g. location of EV charger installations, distributed PV, distributed storage).
- Desired outcomes:
  - Distributors have access to data on location of DER equipment.
  - DER owners provide information to Distributors on locations and DER capabilities.
  - DER data held by Distributors is available to other parties.
- Possible solutions:
  - Authority to amend code to require DER information is captured in the registry
  - Industry to explore capture and dissemination of new types of data

Appendix E – Electricity Authority principles

Innovation and Participation Advisory Group

Regulatory strategy principles

In assessing options, the IPAG has considered the Authority's regulatory strategy principles:

- As far as possible, adopt regulatory arrangements that move the problem over time to a situation where the first-best solution can be adopted.
- Where possible, avoid 'one size fits all' approaches to regulation when regulating parties that may exit the regulated activity.
- Adopt regulatory approaches that, over time, reveal more about the true nature of the problem and the true constraints on regulatory intervention so that more effective regulation can be designed as the regulatory problem and regulatory constraints are better understood over time. The aim is to address the cause, not the symptom.
- As much as possible, avoid the slippery slope of ever more intrusive interventions arising from poorly designed regulatory interventions.
- Avoid regulatory interventions that are not likely to be credible when adverse events occur.
- Strive to achieve regulatory predictability because this is particularly important when regulating high capital investment industries such as electricity.

These regulatory strategy principles are designed to complement the Authority's overall approach to its role, which places an emphasis on a coherent holistic market design and competition and consumer choice to deliver efficient outcomes, supplemented by effective monitoring of market outcomes and wide dissemination of information

Electricity Authority, Strategic directions for market development – decisions and reasons paper, August 2013.

Code amendment principles

The Authority and its advisory groups will have regard to the following Code amendment principles:

- Lawfulness
- Clearly Identified Efficiency Gain or Market or Regulatory Failure
- Quantitative Assessment
- Preference for Small-Scale ‘Trial and Error’ Options
- Preference for Greater Competition
- Preference for Market Solutions
- Preference for flexibility to allow innovation
- Preference for non-prescriptive options
- Risk Reporting

Electricity Authority, *Consultation Charter,* 20 December 2010

Appendix F – issues, outcomes and recommendations

Innovation and Participation Advisory Group

Issue 1 – Service access for multiple parties

Issue – Service access for multiple parties
There are no mechanisms to require and enforce multiple party access to meter data, electricity network services, or data communications links at a single ICP. As a result, sub-ICP services can only be provided outside existing market structures, and new entrants must negotiate commercial contracts with incumbents who may not have incentive to enter into reasonable agreements.
Desired outcomes (efficiency and competition)
There is a fast, transparent mechanism for service providers to access usage and technical data from certified meters at both ICP and sub-ICP level Sub-ICP service providers have clear rights to access distribution network services Service providers can access services on reasonable terms in a reasonable timeframe
Recommendations
R1. Authority to amend Code to explicitly recognise sub-ICP service providers as a sub-class of 'trader' with standing under Code to access electricity network services from distributors and metering services from MEPs R2. Authority to include terms for sub-ICP supply and demand in Default Distributor Agreements

Issue 2 – Service pricing for multiple parties

Issue – Service pricing for multiple parties
There are no mechanisms to ensure reasonable charging of contribution to monopoly network, communications & metering charges for sub-ICP services. New entrants negotiate from a position of weakness, and incumbent parties will have incentive and ability to price up to replacement cost. Unreasonable pricing prevents innovation.
Desired outcomes (efficiency and competition)
Prospective sub-ICP providers face clear and transparent regime for input service charges. Charges are consistent with the outcomes of a workably competitive market.
Recommendations (continues over page)
R3. Authority to develop and publish guidance on pricing principles for charging of multiple parties trading at a single ICP for metering and electricity network services. The pragmatic pricing approach is dependent on state of cost reflective network charging, and level of penetration of sub-ICP trading. Simple principles are likely to be suitable for initial implementation, but not for the long term. The goal is to encourage efficient use of existing assets. R4. Pricing principles for electricity network services should be aligned to the Authority's distribution pricing principles, but with some simplifications of cost recovery in the early stages of sub-ICP trading, along the lines of the current distributed generation pricing principles: - All electricity network charges recovered from the main (incumbent) retailer at the ICP. - any variable charges should align with the level of cost-reflective pricing in the distribution tariff, and should be based on the incremental/marginal cost of providing service to 2nd and subsequent sub-ICP traders at the ICP.

Issue 2 – Service pricing for multiple parties (2)

Recommendations (continued)

R5. Pricing principles for metering services should be aligned to existing Distributed Generation pricing principles as follows:

- no change expected to charges to incumbent retailer
- charges to second and subsequent sub-ICP traders may differ depending on services provided, and should reflect incremental/marginal cost of providing service to that party

R6. When sub-ICP trading and cost-reflective distribution network pricing are prevalent (so sub-ICP traders can be causers of change in network charges) adjust pricing principles to split fixed charge components among service providers at an ICP or allow service-based pricing. This desired end-state must be well-signalled to avoid the issues seen with resistance to changes to DG pricing principles.

R7. When cost-reflective distribution network pricing is prevalent, introduce sub-ICP trader interaction with Distributors, and implement sub-ICP pricing principles in UoS agreements, to expose the causing party to the cost signal.

R8. Authority to develop and publish model meter services agreements for sub-ICP services:

- Service schedule to include data provision at sub-ICP level (where equipment supports)
- Pricing schedule to include explicit pricing for multiple sub-ICP service providers at a single ICP

Issue 3 – Electricity network charges for peer-to-peer trading

Issue – Electricity network charges for peer-to-peer trading
Current peer to peer trading does not account for electricity network charges, which are absorbed by the retailer, because there is no mechanism for accurate charging across neighbouring ICPs. This precludes true peer-to-peer trading.
Desired outcomes (efficiency and competition)
All distributors offer publicly available terms for supply and demand at sub-ICP level.
Recommendations
Addressed by R1, R2, R5, & R6.

Issue 4 – DER standards

Issue – DER standards
Distribution networks have different rules for connection and operation of DER. We noted this in our Equal Access recommendations, and it is present on the ENA roadmap. It is relevant for input services as connecting parties who deal with multiple distributors would benefit from standardisation.
Desired outcomes (efficiency and competition)
DER connection policies are standard across the whole country, unless there is a material benefit of deviating from the national standard.
Recommendations
R9. Distributors to standardise network connection arrangements for DER, with goal to maximise connection of DER within constraints of safety, reliability and supply quality. R10. If industry-led approach does not settle on standard DER network connection arrangements within 12 months, Authority to prescribe default DER connection arrangements (eg in Default Distribution Agreements) This is a more specific version of our Equal Access recommendation #11.

Issue 5 – Inability to offer sub-ICP services

Issue – Inability to offer sub-ICP services

Parties wanting to offer sub-ICP supply and load control services have to assume responsibility for total load at a single site in order to access central reconciliation and settlement services.

Desired outcomes (efficiency and competition)

Parties offering sub-ICP services can provide services while taking responsibility for only those services at an ICP level.

Recommendations

This issue will be largely addressed by the Authority's ACCES Framework project.

R11. The trial proposed for the ACCES Framework should also include input services aspects. In particular, the trial should include testing of sub-ICP business processes as follows:

- The incumbent retailer holds the ICP-level responsibilities, including:
  - Medically dependent and vulnerable customers
  - Settlement of ICP metered volume less the sub-ICP volumes
- Consumer has direct relationships with service providers (not via the connection agent or the incumbent retailer)
- Sub-ICP traders are responsible for notifying sub-ICP volumes to Connection Agent, who does sub-ICP reconciliation
- Sub-ICP volumes used in reconciliation need not come from the existing certified meter: measurements from sub-ICP level measurement devices can be used even where not individually certified. (per R19)
- Sub-ICP volumes are reconciled by difference from the certified meter (per R19)
- Load control capability provided by sub-ICP service providers participating in central reconciliation and settlement is captured in the registry (or the shadow registry used for the trial) (per R14)
- At least two pricing approaches for network charges:
  - A simplified model where all distribution charges are recovered from the retailer responsible at ICP-level
  - The end-state model where distribution charges are assessed separately for each sub-ICP service provider
- The Authority should explicitly assess the presence or absence of distortions arising from the simplified pricing and cost recovery mechanisms, and the nature of any harm caused.

R12. Authority to investigate 'mobile ICP' model (where a (sealed) sub-ICP measurement device can be reconciled behind any ICP) once sub-ICP trading is embedded

Issue 6 – Record of sub-ICP services

Issue – Record of Sub-ICP services
Service providers and central market processes do not know what sub-ICP supply and load control services are being provided at each location, inhibiting information flow for central pool purposes, and coordination of load control services to avoid double-counting. There is no central mechanism to switch sub-ICP supply and load control services
Desired outcomes (efficiency and competition)
There is a central record of which sub-ICP supply and load control services are provided by whom. Sub-ICP supply and load control services can be switched just as ICP level ones currently are.
Recommendations
Addressed by Authority's ACCES Framework project

Issue 7 – Code inconsistencies

Issue – Code inconsistencies
The Code does not always facilitate the use of the best available data in reconciliation. In some situations, NHH data is used in preference to HHR data, some data has weak obligations for correction, and data updates are not always with the right party.
Desired outcomes (efficiency)
The Code provides for the most accurate (most recent and most granular time resolution) data to be used at all times.
Recommendations
R13. Authority to consider Code amendments to: • Schedule 11.3 to extend the time window in which HHR AMI data is to be used in preference to NHH data or estimates for switch reads (we suggest 10 days). • Schedule 10.6 to reduce the time window for MEPs to provide raw meter data to be less than that in schedule 11.3 (we suggest 5 days) • 10.48 to require MEPs (as well as reconciliation participants) to amend their records of meter data to reflect the correction • Part 10 to reflect timeframes for fixing non-communicating AMI meters as per memo issued on 26 July 2017 (https://ea.govt.nz/dmsdocument/22379-memo-ami-flag-and-investigation-of-non-communicating-meters)

Issue 8 – Coordinating demand for load control (1)

Issue – Coordinating demand for load control
There are multiple uncoordinated mechanisms to signal need for flexibility (supply and demand eg load control operation), and they do not address all potential customers. There is no mechanism to coordinate demand for load control, and to compensate consumers accordingly. A large portion of benefits of Sub-ICP trading are dependent on having ways to monetise flexibility.
Desired outcomes (efficiency, reliability)
All parties valuing load control have a mechanism to signal their need and the value they place on it. All parties valuing load control can access the full flexibility that exists Anyone who is offering a flexibility service is able to allocate it to the highest value use. Parties valuing load control offer dynamic terms as well as terms that require firm and exclusive access to flexibility at a particular location.

Issue 8 – Coordinating demand for load control (2)

Recommendations

Our Equal Access advice laid out a staged approach to maximising use of demand response, and the ENA Roadmap includes activities to develop a demand response framework. We make the following input-service related recommendations for inclusion in those processes, providing more specific advice.

R14. Amend registry to capture load control capability:
- initially where provided by sub-ICP service providers participating in central reconciliation and settlement
- Later for all ICPs (even where there are no sub-ICP providers)

This is a more specific version of our Equal Access recommendation #9

R15. Require distributors to publish data on usage of ripple control, including estimated quantity of load curtailed in each time period.

R16. Require distributors to publish (and regularly review, e.g. in the annual planning process) prices and volumes they are prepared to pay for flexibility/demand response in at least two parts of their network (at the granularity at which ripple control can be triggered), with prices based on the same pricing principles as cost-reflective network tariffs, ie based on forward requirement for investment (avoided cost of network investment). This is a more specific version of our Equal Access recommendation #8.

R17. Over time, increase number of locations and granularity at which distributors publish demand response pricing – this may be met by a move to locational marginal pricing in the distribution network.

R18. Authority to monitor Distributor pricing for flexibility services, and publish results of monitoring

R19. Authority to report on "open networks" progress of distribution networks

We note again the importance of enforcement, as captured in Action 8.10 of our Equal Access advice: *Authority and Commission to develop standards of conduct for ~~DER participant~~s flexibility resource owners, flexibility traders and flexibility buyers with equal access principles with accountability and consequences for non-compliance, for example mandatory minimum fines.*

Issues 9 & 10 – Meter technology

Issue – New measurement and communications technology

9. New measurement technology
Consumer electronics devices can measure sub-ICP volumes accurately at low cost, and is currently used for billing in some cases. There is no way to leverage this data for central reconciliation or allocation of sub-ICP volumes between parties.

10. Meter communications
Meter data availability is limited by the communications technology installed under the meter cover. Connection of additional communications devices is restricted by regulation, contracts and technical capabilities.

Desired outcomes (efficiency, competition)

Data from consumer electronics devices can be used in reconciliation, while retaining accuracy of overall reconciliation process.
Consumers can access all data from their smart meter without human intervention.
Third parties can access smart meter data automatically with electronic consumer permission.

Recommendations

These outcomes can be addressed by reducing barriers to use of alternate measurement technologies.
R20. Authority to trial and, if successful, implement 'deemed certification' procedures to apply to consumer electronics devices (including EVSE) used for sub-ICP measurement through:

- relaxed certification requirements for kWh measurements from consumer electronics devices, based on:
  - an up-front test of an example of the measurement device
  - removal of requirement to certify every individual device
  - spot-checking of deployed devices to review accuracy in the field
- publishing a list of deemed certified devices (referenced to relevant portions of international measurement standards in Schedule 10.1 e.g. IEC 61557)
- allowing kWh measurements from deemed certified devices (without a seal) to be used for reconciliation-by-difference of sub-ICP volumes

R21. Consider revising entire certification process to reflect the 'deemed certification' approach, so that kWh measurements from deemed certified devices (with a seal) can be used for whole-of-ICP measurement.

Issues 11 - 15 – meter data availability, timeliness & format (2)

Issue – meter data availability and timeliness
11. kWh data availability Users and third parties find it hard to get access to smart meter usage data. In some cases this is because it is not collected from the meter, and in others it is due to resistance from those holding the data. **12. Non kWh data availability** Non-kWh data is recorded by the meter, but may be unavailable due to technical limitations (e.g. it may not be collected and stored at MEP head end) **13. Access to real-time data** Most data is historic only. Real-time data is available in some cases, but access is relatively expensive. **14. Instantaneous access to historic data** In most cases there is a delay between requesting historic data and getting access – it is not available instantaneously. Consumers only have rights to data 4 times per year – more frequent access often comes at a cost. As a result, it is not possible for third parties to build customer-friendly automated tools. **15. Data formats** The same data is provided in different formats by different parties. For example, retail tariff data.
Desired outcomes (competition, reliability, efficiency)
Consumers can access all data from their smart meter without human intervention. Third parties can access smart meter data automatically with electronic consumer permission. Parties are able to access (with appropriate authorisation) any data required to be stored by the MEP. Real-time data from certified meters is available at reasonable cost Consumers and other users can request historic data electronically, and have it returned near instantaneously Businesses (including EDBs and market participants) have the right to access data that contributes to improved safety of persons and property. All parties use standard formats for data exchange

Issues 11 - 15 – meter data availability, timeliness & format (2)

Recommendations

Issues around authorisation and electronic permission will be partially dealt with through the Authority's ACCES Quick Wins project. Availability will be enhanced by the 'deemed certification' approach – new consumer devices can provide more timely data, and provide a point of competition for legacy MEPs.

R22. Authority to mandate use of HHR data for reconciliation from all communicating AMI meters. This could be achieved by setting a sinking cap for the proportion of HHR-capable ICPs reconciled as NHH.
R23. Authority to drive definition of modern data APIs to supplement mandatory csv-based EIEPs. This should be approached as a clean-sheet IT-driven definition rather than in the Standing Data Formats Working Group.
R24. Require data providers (including those holding deemed certified sub-ICP meter data) to make any data they hold available by real-time API:

- Traders: consumption data used in central reconciliation (may be subcontracted to MEPs)
- MEPs: Non-consumption data

R25. Authority to manage or oversee MOSP management of central authentication and authorisation service for API access (potentially similar to proposed Australian CDR model)
R26. If by 24 months, work on a virtual centralised meter data store via APIs is not progressing near instantaneous data access, Authority to progress physical centralised meter data store.
R27. Allow that where a participant (not a third party) provides an undertaking that access to kWh and non-kWh data from a certified or deemed certified measurement device would contribute to improved safety of persons and property, the participant has a prima facie right to access to the data, without permission from the retailer or end-consumer (with pricing to be negotiated with the data provider).
R28. Authority to make use of EIEP14 mandatory for exchange of retail tariff data

Issue 16 & 17 – enforcing existing standards

Issue – enforcing existing standards
16. Incomplete and incorrect data The data that exists is often incomplete (e.g. missing values in kWh data) or incorrect (e.g. registry AMI flag). This is the case even though commercial agreements include terms for data availability, and the Code places obligations on all parties to maintain accuracy. **17. Code enforcement** Current regulation does not drive compliance with existing service standards. Enforcement options available to the Authority are limited to audit frequency (minor and blunt), formal breach investigation (costly and extended), or denial of registration (extreme). The Code prescribes accuracy standards for data provision (as distinct from measurement accuracy), but it appears that participants do not have enough incentive to meet them. This imposes costs on others, and raises barriers to more sophisticated business models (including HHR reconciliation).
Desired outcomes (efficiency)
Registry metadata is accurate and up to date Parties are incentivised to provide meter data at the level of accuracy required by the code, and desired by those using it
Recommendations
R29. Authority to develop and publish participant accuracy reports R30. Authority to introduce a schedule of administrative fines for Code breaches (including where identified in participant audits) in order to provide an effective mechanism to sanction poor performance.

Issues 18 and 19 – metering services arrangements (1)

Issue – metering services arrangements

18. Competition for MEP services
The MEP services market has significant monopoly elements which cannot be overcome by commercial pressures alone. The Code requires retailers to have an arrangement in place with the MEP at an ICP before the ICP can be switched, so retailers have no choice of the provider of services at the ICP. New entrants have limited leverage to negotiate contract terms with incumbent MEPs, and in some cases, termination or displacement fees may be greater than required to recover the cost of the metering asset, raising a barrier to efficient competition for metering equipment and services.

19. Metering contracts
Some existing contracts may inhibit the operation of competition by restricting access to services (e.g. IP arrangements in some contracts appear to disallow parties from providing data to anyone other than the counterparty). Some current contracts are such that it is not commercially viable to displace an end-of-life meter for which the cost has been fully recovered.

Desired outcomes (competition, efficiency)

The performance of the MEP services market is consistent with that of a workably competitive market. Commercial arrangements are agreed on a truly competitive basis, MEPs have incentives to:

- innovate and invest,
- improve efficiency and provide services at a quality that reflects customer demands,
- share with customers the benefits of efficiency gains (including through lower prices), and
- are limited in their ability to extract excessive profits.

Service providers have options for metering services
There is appropriate competitive pressure on services (at initial contract signing and throughout time)
Service providers can change the metering services they use as their needs change
Asset owners can recover (but not over-recover) the costs of their assets, provided they are capable of delivering required services at reasonable cost and in a reasonable time frame.
Meter displacement costs faced by meter data consumers reflect true marginal costs of displacement

Issues 18 and 19 – metering services arrangements (2)

Recommendations

One option would be to regulate electricity metering under part 4 of the Commerce Act, but lighter handed actions should be used to increase competitive pressures in the first instance. Increasing transparency of metering arrangements and moving towards model services agreements will, over time result in a more level playing field for new entrants (and existing players when contracts are renegotiated). Increased competition is also supported by the 'deemed certification' approach in R19, which would allow the use of alternative certified consumer devices to provide reconciliation data.

R31. Require MEPs to publicly publish default 'pay as you go' service arrangements that can be accessed by any party, including:

- service schedules
- terms and conditions
- Pricing that allows costs for any given ICP to be determined

R32. Authority to develop model metering services agreements, including:

- Service and pricing schedules with:
  - Options for stricter SLAs for HHR data
  - Options for access to data other than kWh consumption data
- terms and conditions with provisions that allow counterparties to:
  - terminate arrangements for an individual site:
    - where data consumer requires additional services and the incumbent cannot provide them at reasonable cost in a reasonable timeframe
    - with no displacement cost where the meter is over a certain age
  - terminate contract for non-performance where a specified level of performance against SLAs is not met
  - withhold payment where services don't meet contract terms

R33. Authority to monitor application of pricing principles and model terms in meter service contracts, and publish results of monitoring in a similar way to distribution pricing.

R34. If default metering services agreements are not aligning with model agreement by 24 months, Authority to convert model metering services agreement into default metering services agreement (applicable to new contracts only).

Appendix G – glossary

Innovation and Participation Advisory Group

Glossary

Term	Meaning
BTM	Behind the meter
DER	Distributed Energy Resources
EIEP	Electricity Information Exchange Protocols
EVSE	Electric Vehicle Supply Equipment. A device used to charge (or discharge) an electric vehicle. It may be a fixed installation or integrated into a charging cable that plugs into a standard socket.
Flexibility	Modifying generation and/or consumption patterns in reaction to an external signal (such as a change in price) to provide a service within the energy system.
HHI	Herfindahl–Hirschman Index, a measure of market concentration. An HHI above 2,500 indicates a highly concentrated market.
ICP	Installation Control Point – a unique identifier for each supply point on the electricity network.
IFTM	In front of the meter
MOSP	Market Operation Service Provider
V2G	Vehicle to Grid.