Section 11: Local network connections and trading arrangements

This section seeks your views on whether enough is being done to enable connections to, and trading on, the local network. It summarises regulatory arrangements and work underway to address:

- barriers to connecting to the local network
- issues with the arrangements for trading on the local network, and
- issues with pricing and cost allocation for network connections and services.

Barriers relating to consenting distribution lines are discussed in section 7 of this document.

New generation and large potential electricity users (such as process heat sites) can connect to a local distribution network instead of the transmission grid, making use of existing or upgraded capacity. Generation connected to the local network is called distributed generation.

The ICCC and the Electricity Price Review (EPR) both evaluated barriers to connecting new generation or process heat loads to the distribution network. The ICCC noted increased opportunities for investment in new distributed generation, and facilitating greater community involvement. It recommended that any regulatory barriers relating to electrification of process heat, and distributed and off-grid renewable generation are identified and addressed.

Distributed generation can play an important role in maintaining system security and reliability, and potentially provide a lower-cost alternative to investing in transmission or distribution networks directly. As a Distributed Energy Resource (DER), it can also reduce electricity losses, and provide incremental increases in supply that are more aligned to local growth in demand. Other DER includes rooftop solar, battery storage, and demand response. Distributors can enable DER by providing a neutral platform to providers to facilitate two way power flows.

More broadly, the ICCC recognised the role distributors (and retailers) have in providing the right price signals to consumers who want to be more actively engaged in demand response, and the need for pricing reform to enable this. This includes ensuring that consumers have access to data and can offer services to the network, such as battery storage. Consumers and new service providers also need to be able to access and trade on the local network to actively engage in the electricity market.

Related conclusions reached by the EPR are that current distribution pricing does not reflect the cost of distributing electricity and prevents consumers from benefiting fully from emerging technologies, and that powers to regulate access to the network are ambiguous.

The EA has a programme of work underway relating to the development and use of evolving technologies and business models, and recently commenced an Open Networks project to identify and develop ways to provide for the uptake of new technology on distribution networks.[138] The Open Networks project will help to overcome barriers to greater uptake of distributed energy resources at both the consumer and network services level. The EA is also monitoring and supporting distributors' efforts to make network charges more cost-reflective, consistent with distribution pricing principles it released earlier this year.

[138] www.ea.govt.nz/development/work-programme/evolving-tech-business/open-networks/development/

The industry association that represents distributors, the Electricity Network Association (ENA), recently prepared a "Network Transformation Roadmap" (ENA Roadmap) to guide boards and senior management in setting their strategies and planning for the future.[139] The ENA Roadmap focuses on new technologies, rather than traditional aspects of electricity distribution, and emphasises the new activities and functions distributors will need to undertake.

Summary of regulatory arrangements

There are 29 businesses that plan, build and maintain the local networks that distribute electricity. The EA regulates the connection of distributed generation through the Code, including the process for connection and default terms and conditions. It also sets pricing principles for distributors to apply when determining connection charges, and distribution pricing principles to guide how distributors allocate their costs between consumers.

Investments in distribution assets are subject to regulation by the Commerce Commission that is designed to ensure that they have incentives to innovate, invest, and meet customers' quality demands, but are also limited in their ability to earn excessive profits. Seventeen distributors[140] are under price-quality regulation[141], and all 29 are subject to its information disclosure rules.[142]

Information disclosure provides transparency about how distributors are performing, and a check that regulation is working. Relevant disclosures are set out in the text box below. Broadly, they require distributors to plan for a changing environment, including for emerging technologies, and to be transparent about how they price their services.

Relevant disclosures: Commerce Act information disclosure requirements

Asset Management Plans (AMP) – Communicate asset investment and maintenance plans, and provide information on how the distributor intends to manage its assets to meet consumer demands in the future. Plans must include:

- Examples of how asset management strategies respond to a changing environment "….due to a variety of factors including demand growth that needs to be funded in a different way to encourage connection, or a change in customer demand patterns for example, due to the uptake of emerging technology like electric vehicles".
- How the distributor has effectively gathered customer input about network enhancements and developments.

Pricing methodologies – each distributor prepares and uses one to determine the prices it will charge customers connected to its network. A distributor's pricing methodology must set out:

- How it has decided to recover its revenue from different groups of consumers
- Its approach to setting prices in non-standard contracts and for distributed generation
- Its policy or methodology for determining when it will charge a capital contribution towards a new line, and what the charges will be.
- How its pricing methodology is consistent with the EA's pricing principles, including for its capital contributions policy.

These existing requirements provide a platform for better coordination as potential investors (and to a certain extent consumers generally) work with distributors to connect new generation, electrify

[139] http://www.electricity.org.nz/news-and-events/news/transformation-roadmap-to-be-launched-in-april/

[140] The other 12 are consumer-owned and exempt as Parliament has decided that their consumers have enough input into how the business is run.

[141] Price-quality regulation limits the revenue distributors can earn or the maximum average prices they can charge, and requires them to deliver services at a quality that consumers would expect.

[142] https://comcom.govt.nz/__data/assets/pdf_file/0025/78703/Electricity-distribution-information-disclosure-determination-2012-consolidated-3-April-2018.pdf

and/or participate in the electricity market. This includes groups and agencies looking to invest in community energy projects. Distributors may increasingly need to invest in the management of their networks as energy flows become more complex and dynamic (for example. increased network congestion as a result of more distributed generation).

Overview 11.1	The existing regulatory framework provides a platform for better coordination between investors (and to a certain extent consumers generally), distributors and other interested parties to connect new generation, electrify and/or participate in the electricity market. There is a significant amount of activity already underway to improve on the existing arrangements, so no particular option has been identified. Some of the options set out in the transmission section could be extended to include distribution, and these are noted below. This section does not have any specific recommendations on reducing distribution barriers, instead we seek information on your experiences, and on whether there are any gaps not addressed by current and planned future work outlined below in relation to the three areas identified.

Barriers to connecting to the local network

Distributors face the challenge of not over or under investing, and will make investment decisions in the context of their existing asset base, expectations about the future, and the regulatory environment that they face.

Network investment has historically been driven by peak demand and providing resiliency. This is expected to change with more distributed energy resources and digital control, and there are opportunities for better utilisation of the network.

Distributors face challenges to their capacity and capability to evolve networks to cope with the effects of emerging technologies. Technology changes will require distributors to be more proactive, better understand their networks, and to adapt to meet the needs of existing and new customers. Changing technology provides new opportunities but also creates increased risk if the wrong technology investment decisions are made. Sufficient adaptability and flexibility in the regulatory environment is also necessary if networks are to respond to changing technologies and consumer patterns.

Developing networks efficiently that are agile and adaptable to future technological and societal change requires greater adaptability and coordination between the multiple parties involved (large users, providers of DER, distributors, Transpower, and other potential customers). They will need to coordinate, share information and at times adopt a shared planning approach. Achieving these goals may require increased flexibility on behalf of regulators to facilitate and coordinate the most efficient network approach.

Process heat

Part A of this discussion paper explores options to reduce emissions from industrial heat processes, including electrification. Full or partial electrification of process heat may require an upgraded or new distribution connection, rather than a grid connection. However, the capacity needed at a site may change over time as it works through the process of electrification.

This means that investments may be made in the distribution network that then become physically stranded as the needs of the plant change, for example, reaching full electrification that requires a direct connection to the grid. Conversely, an upgrade or new connection may be sized for one customer, which then needs to be upgraded for another (large demand) customer connecting to the same line. This creates risk and costs for the parties involved, and a coordinated approach is needed.

In previous discussions with distributors, it has also been noted that it was important for customers to engage early with them to ensure connections could be planned and delivered in a timely fashion, and that consumers tended to engage relatively late in the process.

Some options for improved coordination of information are outlined in section 10. It may be possible to extend some of those options to cover distribution at a later stage, should those options go ahead.

Distributed generation

Current wind farms are often distributed generation, and in the future more wind can be expected to connect to local networks (rather than the grid). Significant growth in solar PV, both at a household and a commercial level is also expected. This means there tends to be more certainty about the needs of a generator looking to connect to the local network rather than the grid, whether it is a small solar PV installation or a relatively large wind farm (about 45 per cent of New Zealand's current wind capacity is distributed generation).

In some network areas, there may only be a limited amount of capacity available, and if it is allocated on a first-come-first-served basis, this may not lead to the most efficient outcome. Technical standards for connections also vary between local networks, creating uncertainty about requirements.

Current work on these issues

The EA has a work programme underway to shift distributors to an "equal access" model on their network. This means having networks that anyone can connect and use any equipment they want to buy or sell electricity services. "Anyone" can range from a large investor wanting to connect and sell generation, through to a person wanting to trade electricity from their solar PV installation, and anyone in between. This model also promotes the development of new business models and service providers.

In addition, the industry-led ENA Roadmap is based on an "open network" framework concept that supports the equal access model. The associated programme of actions includes items such as enabling third party DER, demand response for network support, and working with regulators on the challenges of multiple users of demand response.

This roadmap also contains a programme to standardise technical arrangements so that there is a consistent method of connection of equipment (distributed energy resources or appliances) within and across local networks, which complies with approved standards. This should provide more certainty to both distributors and connecting parties about the requirements that need to be met, and how to meet them. Lastly, it contains a programme to build and adapt capability within distribution businesses.

Recommendations from the EPR review include that the EA should be given more powers to regulate network access, and that it should continue to prioritise work that supports innovation in the electricity sector, for example, its work on equal access to the network.

The Commerce Commission is also working to foster improvements in distributors' asset management and planning capability, and recently released a decision on price quality paths relevant to greater electrification. More detail on this is set out in the text box below.

Enabling decarbonisation through price-quality regulation
The Commerce Commission's recent default price-quality path decision includes a number of features relevant to encouraging innovation by electricity distributors in a way that contributes to the Government's objective of decarbonisation through greater electrification:

- an allowance for innovative projects
- equalising for operating expenditure and capital expenditure to incentivise no-wire alternatives like demand management where it is more cost effective
- a shift to a revenue cap (from a price cap), allowing more freedom to adjust pricing structures to support demand side management and the adoption of new technologies, such as electric vehicles
- provision to "re-open" a price path to allow for the costs of large distributed generation and large unforeseen industrial connections and, such as due to the electrification of process heat.

Issues with the arrangements for trading on the local network

Enabling businesses, new service providers and consumers to actively engage in the electricity market (if they want to) should promote more demand management and demand response. Both can contribute to reducing peak demand and help manage intermittency.

Current work on this issue

The EA has consulted on introducing a default distributor agreement (DDA)[143] that includes provisions for agreements between distributors and 'traders', who offer products and services such as providing network support through aggregated household batteries. This is in recognition that the electricity industry is rapidly changing in response to innovation and new business models.

A default agreement will make it easier for service providers to contract to use a network and provide services to a distributor. It also helps reduce access barriers, promote the deployment and uptake of new technologies, and enables them to compete in the market for network support services.

It is also important that the regulatory framework supports distributors to innovate, and enables alternatives to poles and wires. Recent decisions following the EPR include that the Commerce Commission's price-quality regulation should be implemented in a way that encourages innovation among distributors.

A related issue is that distributors providing DER could unduly lessen competition in the emerging DER market. Decisions from the EPR include the development of more nimble regulation to enable more DER, while ensuring that consumers can fully benefit from it.

The ENA Roadmap open network framework and "consumer insights" programme are relevant here – the latter is about understanding consumer motivations and behaviours to determine the impact on DER deployment and consumption patterns, and new load requirements on the network. This should promote a move to more active planning and delivery of distribution services.

[143] Primarily for agreements between distributors and retailers for access to the network, and submissions closed on 15 October 2019.

Issues with pricing and cost allocation for network connections and services

How the costs of new network connections are allocated, and the way that distributors price their services, has implications for potential investors in new distributed generation (in terms of both the decision to invest and its ongoing viability). The viability of distributed generation will also be impacted by any payments that a distributor is required to make to its owner (see case study regarding avoided cost of transmission below).

Distribution prices also have implications for consumers investing in technology to generate and store electricity, especially if they are to be rewarded for engaging in the electricity market.

For small distributed generation installations such as household solar PV, the retailer's charges and buy back rates are more relevant. The price a household pays a retailer for the electricity it purchases, and the price the household receives for any electricity it sells back to the grid will include transmission and distribution charges. Retailers decide how to bundle and pass on these charges, which is partly why retailers have a role in providing the right price signals to consumers.[144]

Transpower has noted[145] that 'most end-users today face pricing structures that over-stimulate self-production, under-stimulate efforts to moderate peak usage, and overly deter electrification, so ensuring 'suitably' cost-reflective pricing structures is key given their influence on investment and operational decisions.'

At the same time, it will be important for future investments that distributed generation can receive reward for any benefit it provides to the local network, and that there is certainty about revenue streams.

Case study: Avoided cost of transmission (ACOT) payments

The Code currently requires distributors to make ACOT payments to distributed generators that existed before December 2016, and that cause a reduction in transmission costs. This arrangement is the result of reforms in 2016 and further refinements are expected if changes are made to the TPM guidelines.

It has been argued that the current ACOT arrangements and the potential for further unilateral changes have affected the viability of existing distributed generation, and potential investments. The counter argument is that the previous ACOT arrangements were over-stimulating investment in distributed generation that did not reduce grid costs, but did shift costs onto others, raising electricity prices for consumers in other parts of the country.

Current work on this issue

The EA develops and publishes principles that distributors must apply when pricing their distribution services. Revised principles and a monitoring framework recently published by the EA are encouraging distributors to transition to more efficient distribution pricing. The principles state:

> "*…Reform is needed because the scope for poor outcomes from inefficient price signals is growing. This is a result of technologies, such as electric vehicles, solar panels and battery storage, becoming more available and affordable.*"

[144] The other reason is that retailers need to manage their wholesale price risk, so should have incentives to encourage load shifting and conservation at times when wholesale prices are elevated (i.e. at peak and at times of shortage).
[145] Page 7 of submission to the Productivity Commission's *Low Emissions Economy*.

Without pricing reform, the EA expects poor outcomes resulting from overinvestment by consumers in technologies to avoid network charges, which shifts costs onto other consumers, results in unnecessary network investments, and exposes distributors to commercial risks (for example, stranded assets).

The EA recently released a practice guide to distribution pricing[146] to help distributors interpret and apply the principles, and disclosures against the newly revised principles are due in early 2020. It also asked distributors to publish roadmaps to show how they will move to more efficient pricing.

Distributors are working to different timetables, which creates uncertainty in terms of future distribution pricing. The EA's overview of all the roadmaps notes that "….in general, most distributors[147] intend to complete preparatory work and develop plans (including consultation) over 2017-2019, with the implementation and monitoring of the reform occurring from 2019 onwards."

Distributors themselves face uncertainty until transmission pricing reform is completed, and decisions are made on the EPR recommendation to phase out low fixed charges, both of which are likely to affect distribution pricing. The EA is progressing work to reform transmission and distribution pricing.

Under the current regulated terms, distributors can only charge distributed generation no more than the incremental cost for connection and distribution services. Following consultation in 2016, the EA decided[148] not to proceed with a proposal to remove this 'price ceiling', but may revisit this once decisions are made about the TPM and distributors have made progress with setting cost-reflective charges. The price ceiling protects owners of distributed generation from distributors using their monopoly power to overcharge them. The EA had proposed to remove the price ceiling because in their view it may be providing distributed generators with an artificial competitive advantage over grid-connected generators and also over other technologies, such as solar panels, batteries and other modes of demand response.

The ENA Roadmap is also relevant to this issue, particularly the programme relating to distribution pricing.[149] This recognises that cost reflective pricing is essential as it "…communicates the cost of using the distribution service for energy delivery to and from prosumers[150], and of the need for capacity for network support".

Questions

Q11.1	Have you experienced, or are you aware of, significant barriers to connecting? Are there any that will not be addressed by current work programmes outlined above?

[146] Distribution Pricing: Practice Note, August 2019, available at: www.ea.govt.nz/development/work-programme/pricing-cost-allocation/distribution-pricing-review/development/distribution-pricing-practice-note-and-scorecards/

[147] Six distributors did not provide information on timing, but those that did intend to implement new prices before 2023.

[148] www.ea.govt.nz/development/work-programme/pricing-cost-allocation/review-of-part-6-distributed-generation-pricing-principles/development/authority-decision-on-the-review-of-dgpps-and-acot/

[149] The "Cost Reflective Pricing and Regulation" programme with the objective: "enable the open network framework through ensuring the development of appropriate incentives to coordinate DERs for network and system support, and to avoid congestion".

[150] A person that both consumers and produces a product, in this case, electricity.

Q11.2	Should the section 10 option to produce a users' guide extend to the process for getting an upgraded or new distribution line? Are there other section 10 information options that could be extended to include information about local networks and distributed generation?
Q11.3	Do the work programmes outlined above cover all issues to ensure the settings for connecting to and trading on the local network are fit for purpose into the future? Are there things that should be prioritised, or sped up?
Q11.4	What changes, if any, to the current arrangements would ensure distribution networks are fit for purpose into the future?