Electricity Authority update on projects underway

Allen Davison & Sheila Matthews

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ELECTRICITY AUTHORITY
TE MANA HIKO

SHORT-TERM DISTRIBUTION WORK

The Authority's statutory objective

To promote competition in, reliable supply by, and the efficient operation of, the electricity industry for the long-term benefit of consumers

Section 15 of the Act also sets out an additional objective for us to protect the interests of domestic consumers and small business consumers in relation to the supply of electricity to those consumers.

DER can reduce the cost of the electricity transition

- The transition to a renewable electricity future will be costly
  - for distribution alone, tens of billions of dollars to 2050*
- DER can reduce the cost of the transition
  - estimated $6.9b benefit to 2050**
- There are challenges to realising DER potential
  - eg, uncertainties, poor information, incentives, capability & capacity, technical/standards)

* Boston Consulting Group (2022) *The Future is Electric: A Decarbonisation Roadmap for New Zealand's Electricity Sector* (https://web-assets.bcg.com/b3/79/19665b7f40c8ba52d5b372cf7e6c/the-future-is-electric-full-report-october-2022.pdf)
** Sapere (2021) *Cost-benefit analysis of distributed energy resources in New Zealand: A report for the Electricity Authority* (https://www.ea.govt.nz/documents/1742/Sapere_CBA.pdf)

How we will respond to DER challenges in the short term (2023-25)

Data	
1	Amend the Code so distributors and flexibility providers can contract directly with MEPs
2	Amend the Code so MEPs have to publish standard 'pay-as-you-go' terms for data, to be open to all parties
3	Capture more detailed DER information in the registry and/or in a new separate DER register
Market Settings	
4	Produce guidelines on the conditional Code exemption process to support regulatory 'sandboxes' and trials
5	Consult on bringing flexibility providers into the Code to improve visibility and coordination of non-network solutions (NNS)
6	Produce guidance on the threshold that when crossed will lead the Authority to extend the current arm's-length rules
7	Update the distribution vision/outcomes framework and monitor progress on investment in network capacity, DER, use of DER and NNS
DER Standards	
8	Address the non-price barriers to the efficient connection of large capacity load
9	Address the non-price barriers to the efficient prioritisation of large-scale DG applications

https://www.ea.govt.nz/documents/3929/Work_programme_Oct_231406907.13.pdf

Address the non-price barriers to the efficient connection of large capacity load (Project 8)

Large industrials and public electric vehicle charging providers say they face:

(a) a lack of visibility on where their application sits in the process, and of the application process as a whole.

(b) a wide variation in distributor processes to connect.

(c) a lack of engagement and inflexibility on the part of some distributors.

(d) slow application approval times, and long waits for electricity infrastructure to be installed.

We recognise distributors face significant challenges

A 'mirror' Part 6 might be a solution for large capacity load connections

A 'mirror' Part 6 could provide, for example:

- standardised application processes and approval times
- standardised and transparent application fees
- minimum levels of information to be provided
- default regulated terms
- disputes resolution process.

- We are keen to work with the sector:
  - on solutions (such as the proposed 'mirror' Part 6)
  - to ensure the Code complements non-regulatory solutions (eg, EEA work).

Address the non-price barriers to the efficient prioritisation of large-scale DG applications (Project 9)

Currently, Part 6 requires EDBs to prioritise DG applications on a first come first served basis

The Authority wants to:

- ensure firm DG applications are not unduly delayed by more speculative and/or undeveloped proposals
- provide greater transparency of the application process, and where applications sit in the process
- provide greater visibility of the pipeline of projects.

We will consider:

- Transpower + international approaches
- changes to Part 6 application processes, if required
- applying the changes to large load, if appropriate
- how we can complement non-regulatory initiatives (eg, EEA work).

SUMMARY

Our short-term work programme focuses on 3 main areas:

1) Improving the visibility, accessibility, cost and use of network data (eg, consumption, power quality, DER location)
2) Ensuring market settings are appropriate, so consumers get the greatest uptake and value from DER
3) Improving application processes so connections are easier, cheaper and faster

- You are the experts. We need your help to ensure we deliver the right changes.
- Look out for the Authority's next steps.

My contact details

Allen Davison

Principal Analyst

Retail & Network Policy

allen.davison@ea.govt.nz

DDI: 04 471 8625

FUTURE SECURITY AND RESILIENCE

Future Security and Resilience (FSR) - work programme*

- The FSR programme forms part of the Authority's response to the Government's Electricity Price Review – in particular recommendation *G2: Examine the security and resilience of the electricity supply*, which was for the Authority to consider what changes were required to promote future security and resilience of electricity supply, given technology and other changes to the power system as New Zealand transitions to a low-emissions economy.
- The objective of the FSR programme is to ensure New Zealand's power system remains stable, secure and resilient as it evolves in the coming decades.

*You can read more about the FSR projects here: Future security and resilience | Our projects | Electricity Authority (ea.govt.nz)

Future Security and Resilience (FSR) – opportunities and challenges

Theme		Opportunities & Challenges	Activity
The opportunity and challenges related to the changing generation portfolio	1	**Accommodating future changes within technical requirements**	Review and update Part 8 of the Code Review and update Parts Parts 6, 7, 13, 14 of the Code to ensure they align to Part 8 Identify standard to support technical requirements in the Code Update the Policy Statement to manage emerging risks Update the System Operator's policies, procedures, guidelines and tools
	2	**Operating with low system strength**	Investigate system strength challenges and opportunities Amend the Code to support performance criteria Develop suitable market products and tools
	3	**Balancing variable and intermittent generation**	Improve market system and generation/demand forecast Consider new or revised ancillary services to maintain balancing
	4	**Managing reducing system inertia**	Create a frequency reserve strategy to manage low inertia Ensure that the Code and market system can accommodate new reserve types Incorporate new reserve types into the Procurement Plan & testing methodology Update operational procedures and tools
The opportunity and challenges related to the rise of DER and inverter-based resources (IBR)	5	**Coordination of increased connections**	Update Grid Owner and System Operator commissioning processes and benchmark agreement Review the approach to planning connection studies Review operational study tools
	6	**Enabling DER services for efficient power system operations**	Enhance the Code and market system dispatch capability to accommodate DER offers Improve real-time security modelling within operaitonal tools Investigate new DER services to support efficient operation of the power system
	7	**Visibility and observability of DER**	Establish the impact of DER Determine the credible event risk of DER Update the Code to clarify DER obligations and operational requirements Update procedures and tools to include DER asset information
Foundational opportunities and challenges	8	**Leveraging new technology to enhance ancillary services**	Investigate changes to ancillary services Ensure tools monitor the performance of the power system Update the Code, market system and Procurement Plan to enable new technology to provide ancillary services
	9	**Maintaining cyber security**	Continually review and update cyber security measures
	10	**Growing skills and capabilities of the workforce**	Encourage and train the workforce's next generation

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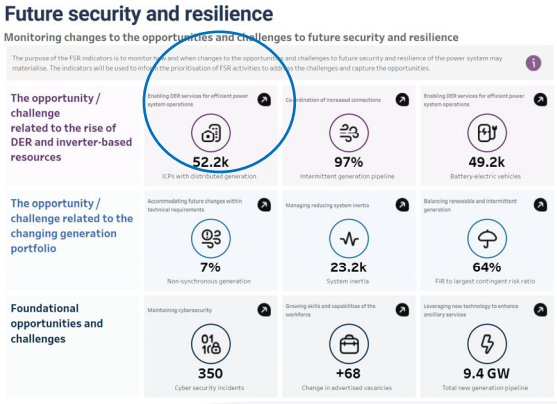
Future Security and Resilience (FSR) - work streams

Dashboard of indicators*

The purpose of the FSR indicators is to monitor the risks and opportunities affecting security and resilience of the power system, and to ensure correct prioritisation of activities in the road map.

***Status**: Published in May 2023.*

***Next steps:** The indicators will be reviewed and updated every six months.*



*You can view the FSR indicators at Future security and resilience indicators | Tableau Public

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Future Security and Resilience (FSR) - work streams

Review of common quality obligations in Part 8 of the Code

The purpose of this work stream is to ensure it accommodates and facilitates changes due to increase of renewables and new technologies.

An issues paper discussing the common quality issues was published for consultation and feedback in April 2023.

Issues identified:

1. FREQUENCY: Inverter-based variable and intermittent resources cause more frequency fluctuations, which are likely to be exacerbated over time by decreasing system inertia.

2. **VOLTAGE:** Inverter-based variable and intermittent resources cause greater voltage deviations, which are exacerbated by changing patterns of reactive power flows.

3. **SYSTEM STABILITY:** Inverter-based variable and intermittent resources can increase the likelihood of network performance issues due to inverter-based resources disconnecting from the power system.

4. **FAULT RIDE THROUGH (FRT):** Over time, far less generation capacity is expected to be subject to FRT obligations in the Code, as more generating stations export less than 30 MW to a network.

Future Security and Resilience (FSR) - work streams

Review of common quality obligations in Part 8 of the Code

5. **HARMONICS:** There is some ambiguity around the applicability of harmonics standards.

6. **DER VISIBILITY:** Network operators have insufficient information on (ie. visibility of) assets wanting to connect, or which are connected, to the power system to provide for the planning and operation of the power system in a safe, reliable, and economically efficient manner.

7. **CODE:** The Code is missing some terms that would accommodate and enable new technologies and contains some terms that will not enable new technologies.

Status: *Issues paper published April 2023 and consultation closed 30 May 2023. Submissions have been published.*

Next steps: *Options paper to be published in 2024.*

Future Security and Resilience (FSR) - work streams

Review of common quality obligations in Part 8 of the Code

Common Quality Technical Group (CQTG):

- The Authority has set up a *technical* group, the Common Quality Technical Group (CQTG) to provide expert technical advise on the Part 8 common quality obligations Code review project.
- As the requirements (common quality obligations) of Part 8 span the entire industry, we wanted to ensure there was representation from across the industry.
- This is not a formal *advisory* group and does not have the ability to set its own work programme or commit resources. It is an ad hoc group established solely to provide the Authority with technical advice during this review.
- There are 11 members in this technical group from across generation, transmission, distribution, suppliers and consultancies.
- Documentation and meeting minutes will be published on the Common Quality Technical Group section of our website.

Future Security and Resilience (FSR) - work streams

Review of common quality obligations in Part 8 of the Code

Common Quality Technical Group (CQTG) members:

- Barbara Elliston *(Elliston Power Consultants)*
- Brad Henderson *(Electronet Consultants)*
- Chris Conway *(Aurora)*
- Graeme Ancell *(WEL)*
- Matt Copland *(Transpower - system operator)*
- Mike Moeahu *(Manawa Energy)*
- Stuart Johnston *(EEA)*
- Stuart MacDonald *(Transpower - grid owner)*
- Rob Orange *(Niko Consultants)*
- Jon Spiller *(Meridian Energy)*
- Gareth Williams *(solarZero)*

Future Security and Resilience (FSR) - work streams

Review of common quality obligations in Part 8 of the Code

Submissions for consultation paper on issues:

- Total submissions: *23*
- Common quality *issues* raised: *37*
- *Options* to address the issues: *75*

Assessment of options to address the 7 issues:

- Initial list drafted by the Authority, including options from submitters: *33*
- Final list after evaluating the options against a set evaluation criteria: *21*
- CQTG sessions:
  - New options added from CQTG sessions: *10*
  - Medium list: *21*
  - **Short list: *12***

Future Security and Resilience (FSR) - work streams

Review of common quality obligations in Part 8 of the Code

Short list of options

Option	Option description	Action
	Issue 1: FREQUENCY **•An increasing amount of variable and intermittent resources, primarily in the form of wind and solar PV generation, is likely to cause more frequency fluctuations, which are likely to be exacerbated over time by decreasing system inertia**	
1	Lower the 30 MW threshold for generating stations to be excluded by default from complying with the frequency-related asset owner performance obligations (AOPOs) referred to in clause 8.21 of the Code	System studies underway
2	Set a permitted dead band beyond which a generation station must contribute to frequency keeping and instantaneous reserve	System studies underway
3	Procure more frequency keeping to manage frequency within the normal band (49.8–50.2 Hz), and procure more instantaneous reserve to keep frequency above 48 Hz for contingent events and above 47 Hz (in the North Island) and 45 Hz (in the South Island) for extended contingent events	System studies underway
	Issues 2, 3, 4: VOLTAGE **•An increasing amount of variable and intermittent resources, primarily in the form of wind and solar PV generation, is likely to cause greater voltage deviations, which are exacerbated by changing patterns of reactive power flows** **•Increasing amounts of inverter-based variable and intermittent resources will reduce the transmission network's system strength thereby increasing the likelihood of network performance issues due to inverter-based resources disconnecting from the power system** **•Over time increasingly less generation capacity is expected to be subject to fault ride through obligations in the Code, as more generating stations export less than 30 MW to a network**	
4	Assign voltage support obligations to distributed energy resources (eg, by revising the 'point of connection' definition)	System studies underway
5	Manage the import and export of reactive power at a GXP (eg, by revising the GXP power factors distributors must maintain, as specified in the Connection Code)	System studies underway
6	Lower the 30MW threshold for generating stations to be excluded by default from complying with the fault ride through obligations referred to in clause 8.21 of the Code	System studies underway

Future Security and Resilience (FSR) - work streams

Review of common quality obligations in Part 8 of the Code

Short list of options

Option	Option description	Action
	Issue 5: HARMONICS **•There is some ambiguity around the applicability of harmonics standards and who manages harmonics (including the allocation of harmonics)**	
7	Locate up-to-date standard(s) for harmonics in one piece of legislation / regulation (eg, the Electricity Industry (Safety) Regulations 2010 or the Code)	Authority to analyse this option
8	Remove the first-mover advantage associated with total harmonic distortion (THD) by requiring the first mover to give up some of their share of THD	Authority to analyse this option
	Issue 6: DER VISIBILITY **•Network operators have insufficient information on assets wanting to connect, or which are connected, to the power system to provide for the planning and operation of the power system in a safe, reliable, and economically efficient manner**	
9	Lower the deminimis for generating stations to provide real time operational SCADA data to the system operator and to distribution network operators	Authority to analyse this option
10	Require wind generation to undertake periodic testing and provide results to system operator and distribution network operators so they can keep their models up to date	Authority to analyse this option
11	Require asset owners (grid-connected parties, grid owners, and embedded generators) to provide asset capability information that network operators and network owners require to meet their regulatory obligations. This includes asset owners providing network operators with sufficiently detailed information so that there is no "black box" when the network operator comes to use the information for equipment performance assessment and checking compliance with technical requirements on the asset owner set out in the Code (eg, the system operator checking compliance with technical requirements in Part 8 of the Code)	Authority to analyse this option
	Issue 7: CODE **•The Code is missing some terms that would help enable technologies, and contains some terms that appear to not be fit for the purpose of appropriately enabling technologies**	
12	New / amended / obsolete definitions are identified and addressed as part of the work on the common quality issues	Authority to analyse this option

Future Security and Resilience (FSR) - work streams

Future system operation

The purpose of this work stream is to ensure New Zealand's power system operation model best promotes the long-term benefit of consumers, by providing a stable, secure, and resilient power system.

With the transition to renewables and increase in distributed energy resources (DER), changes on the power system could, for example:

• affect how the system operator meets its obligations under the Code, and

• create opportunities for new operating arrangements at the distribution network level.

This work stream will cover the operation of the entire power system, including transmission and distribution system operation and is envisaged to be a multi-year work programme given the complexity and importance of system operations.

Status: *Consultation paper in progress.*

Next steps: *Publish discussion paper for consultation in the latter half of 2023/early 2024.*

Future Security and Resilience (FSR) - work streams

Ensuring an orderly thermal transition

The Authority has identified some risks that could prevent an orderly thermal transition:

- The commitment risk that slow-start, combined-cycle thermal generators might not be offered when their capacity is needed, because they cannot be started in time, and their start-up costs are not recovered if they are not dispatched.
- The investment risk that existing thermal units are retired prematurely when they are still required by the market.
- The investment risk that if new open-cycle thermal generators are required during the transition, there are insufficient incentives to invest in them.

While this work stream focuses on the investment risks, the commitment risk has been considered as part of the Authority's Winter 2023 work.

Status: *Consultation paper published June 2023 and consultation closed 28 July 2023.*

Next steps: *Summary of submissions, Monitoring the risk profile.*

The consultation paper is available here Ensuring an orderly thermal transition | Open consultations | Our projects | Electricity Authority (ea.govt.nz)

For any queries on the FSR programme, please email the FSR team at fsr@ea.govt.nz

NETWORK PRICING

Network pricing

The Network Pricing Team is responsible for pricing reform in the electricity distribution segments of the electricity sector.

Aligned with our statutory objectives of promoting efficiency.

More efficient price signals will assist a "lower" cost transition to a low-emissions economy, for the long-term benefit of consumers:

- It can help drive the efficient use of electricity infrastructure, better network investments and technology – lowering overall costs and providing benefits to consumers.
- The amount of forecast investment required is material. The Boston Consulting Group recently estimated $22 billion is required in distribution sector investment in the 2020s to scale up networks, accommodate distributed generation, and invest in smart systems to run the networks.

Reform program

We have released an Issues Paper on targeted distribution pricing reform on 5 July for consultation.

We identified these five areas through engagement with the industry and our scorecards.

The Issues Paper has five areas of potential reform:

- Peak price signals
- Off-peak price signals
- Connection pricing
- Revenue allocation of common costs amongst customer groups
- Electricity retailer's response to distribution pricing

Future options

We are considering three options for supporting targeted reform of distribution pricing - which can be adopted independently or together:

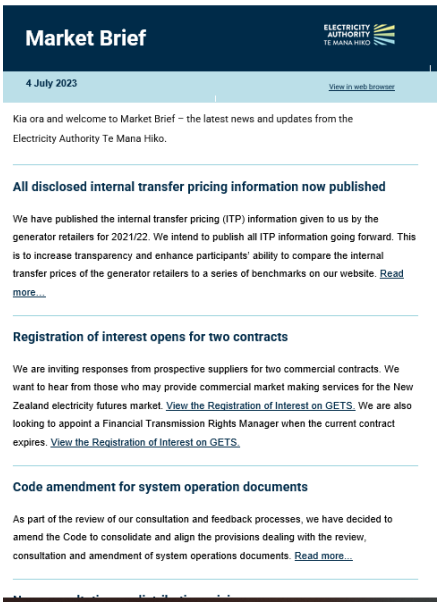
- Continuation - expand our practice note and our pricing scorecards and rely on information and reputational incentives.
- Control - mandate or prohibit pricing approaches. Amend the Code to mandate or prohibit certain pricing approaches.
- Call-in - provide a targeted call-in and approval option. Amend the Code to provide for calling-in pricing methodologies (in full or in part) for review by the Authority against requirements included in the Code.

Market brief

The Authority publishes a weekly newsletter, which contains a round up of our news items throughout the week.

This includes updates on projects the Authority is working on, open consultations, information on recent Code changes, people news etc.

There is no cost, and anyone can sign up to receive the newsletter directly to your inbox **here.**



Market Brief

ELECTRICITY AUTHORITY TE MANA HIKO

4 July 2023

View in web browser

Kia ora and welcome to Market Brief – the latest news and updates from the Electricity Authority Te Mana Hiko.

All disclosed internal transfer pricing information now published

We have published the internal transfer pricing (ITP) information given to us by the generator retailers for 2021/22. We intend to publish all ITP information going forward. This is to increase transparency and enhance participants' ability to compare the internal transfer prices of the generator retailers to a series of benchmarks on our website. Read more...

Registration of interest opens for two contracts

We are inviting responses from prospective suppliers for two commercial contracts. We want to hear from those who may provide commercial market making services for the New Zealand electricity futures market. View the Registration of Interest on GETS. We are also looking to appoint a Financial Transmission Rights Manager when the current contract expires. View the Registration of Interest on GETS.

Code amendment for system operation documents

As part of the review of our consultation and feedback processes, we have decided to amend the Code to consolidate and align the provisions dealing with the review, consultation and amendment of system operations documents. Read more...

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