flextalk

Scan of Flexibility Projects across New Zealand and Internationally

MARCH 2025

Electricity Engineers' Association

TE TARI TIAKI PŪNGAO
ENERGY EFFICIENCY & CONSERVATION AUTHORITY

technology

Purpose & Audience

EEA in partnership with EECA tasked EA Technology to conduct a literature review of the flexibility projects undertaken in NZ and internationally.

WHY IT MATTERS?

- Identifying key flexibility initiatives, highlighting successes, challenges, and lessons learned.
- Guiding scalable, cost-effective solutions to maximise consumer and grid benefits while avoiding duplication.
- Informing policy and market design by addressing regulatory gaps, standardisation needs, market barriers, and emerging trends.

WHO SHOULD USE THE FINDINGS?

- Researchers and regulators.
- EDBs, policymakers, and market participants.
- Focuses on projects related to regulatory, policy, market and customer engagement – aimed at enabling flexibility and customer choice, control and autonomy.

EEA aims to create an interactive map (digital) of the flexibility initiatives for ready reference, as a guide for the electricity sector as it transitions to clean energy.

flextalk

Methodology

EA TECHNOLOGY IDENTIFIED AROUND 50 FLEXIBILITY PROJECTS

Presented in a workshop by EEA (10th September 2024)

Gathered comments and input from EDBs and industry partners

Workshop attendees were given a 'data collection form' to add more projects

Approximately 50 additional projects were identified by the workshop attendees

Project information was searched (mainly online)

Several EDBs requested to provide more information (via email)

EA Technology further identified a few more projects (particularly in Europe)

flextalk

Scoring – Pg 1/2

All projects were scored against four focus areas (total score 10 for each project), and this information has been plotted using RADAR charts for insights. The following four focus areas were used to score every project (each bullet point represents the types of topic included, but not limited to, under the focus area):

TECHNOLOGY DEVELOPMENT/ INTEGRATION

This includes:

- V2G, standards
- Cyber security
- Inter-operability
- Hardware/software development
- Algorithms
- Compliance

NETWORK MANAGEMENT

This includes:

- Mitigating negative impacts and avoiding inefficient augmentation-hosting capacity
- DOE
- LV visibility
- Data & insights
- Network planning & forecasting

CUSTOMER ENGAGMENT

This includes:

- Communication
- Incentives
- Behaviour/preferences
- Data rights
- Privacy
- Equity
- Government policies
- Tariffs

MARKET DESIGN/ DEVELOPMENT

This includes:

- Roles
- DSO functions
- Coordination
- Dispatch optimisation (decision making) & protocols
- Digital infrastructure architecture
- Flexibility service providers
- Market design and architecture

Scoring – Pg 2/2

Radar charts were prepared using the focus area score for analysis.

Each project has total score of 10 which is divided amongst four focus areas. These four score points are plotted for each and every project. Numbers on the periphery indicate the project number used in the database.

Radar chart has the following legend:

- Technology Development/Integration
- Network Management
- Customer Engagment
- Market Design/Development

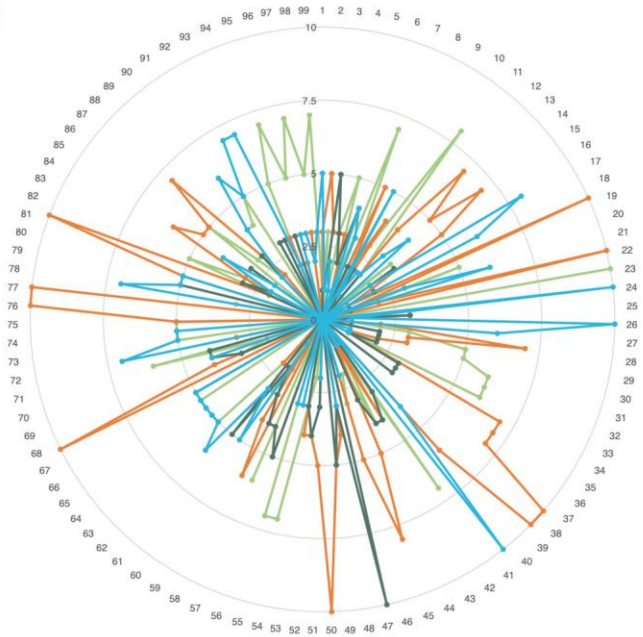
Proportion of the NZ and international projects is 50:50.

Colour spikes towards the periphery indicate how high (dominating) the focus for a project is.

Repetition of colours indicate the number of projects that have this focus area.

flextalk

RADAR Results



OVERALL – NEW ZEALAND AND INTERNATIONAL

Technology Development/Integration

Network Management

Customer Engagment

Market Design/Development

flextalk

Key Findings & Insights

1

All projects addressed multiple focus areas, though most had one primary area of emphasis.

2

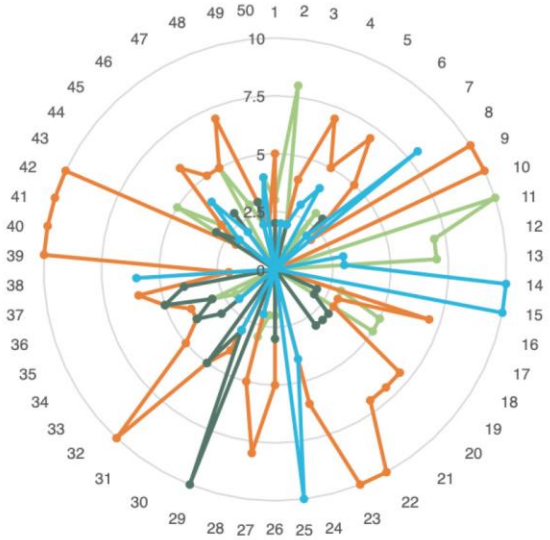
The projects assessed predominantly focus on Network Management and Market Design & Development.

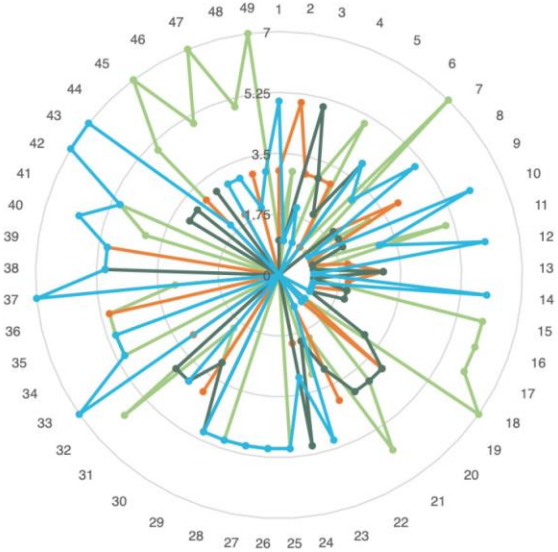
3

The projects in New Zealand to date have primarily focused on Network Management.

flextalk

Key Findings & Insights





NEW ZEALAND

INTERNATIONAL

Technology Development/Integration

Network Management

Customer Engagment

Market Design/Development

flextalk

Key Findings & Insights – Pg 1/2

NEW ZEALAND

- **Network Management** and **Market Design & Development** have been the primary focus areas of flexibility projects in New Zealand to date.
- In New Zealand, **Network Management** is the most prominent focus for projects compared to international trends.

INTERNATIONAL

- The two predominant focus areas overall are **Technology Development/ Integration** and **Market Design & Development**.
- **Technology Development/Integration** covers hardware and software development, grid architecture, and algorithms essential for an efficient flexibility market.

flextalk

Key Findings & Insights – Pg 2/2

NEW ZEALAND

Customer Engagement is underrepresented

Only one NZ project (Community Energy Activator – Orion) scored highly in this area.

Recommendation: Increase focus on customer-driven flexibility, engagement and incentives.

Strong focus on Network Management

17 NZ projects scored highly, including:

» LV Feeder Monitoring (Network Waitaki)

» Hosting Capacity Maps (Powerco)

» Dynamic Voltage Management (WEL Networks)

Implication: Industry prioritises network visibility, resilience, and optimisation.

Gap in Technology Development & Integration

Only two NZ projects scored above 7:

» Residential Space & Hot Water Heating (EECA)

» EV Charging Hub at Tauranga Crossing (ChargeNet)

Key Question: Should NZ focus more on V2G, cyber-security, and smart grid integration?

INTERNATIONAL

More mature market designs overseas

Market-based flexibility services such as Sthlmflex (Sweden), Piclo Flex (UK), and DA/RE (Germany).

New Zealand has only four projects in market design, highlighting an opportunity to explore commercial flexibility models.

Stronger customer participation internationally

» Many projects actively involve end-users, including:

» AGL Dynamic Pricing Load Flex Trial (Australia)

» Future Role for Electric Vehicles (UK)

» COLLECTiEF (EU-wide)

Lesson: NZ should assess demand-side participation in the evolving flexibility market.

V2G (Vehicle-to-Grid) is a bigger focus abroad

Several overseas projects (e.g., REVS Pilot in Australia, Octopus Energy's UK trial) test V2G capabilities.

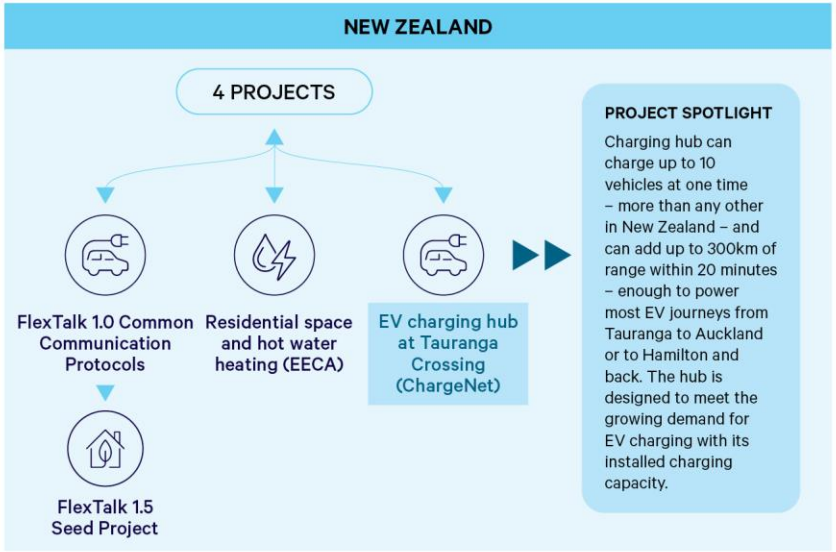
In New Zealand, V2G is not a dominant focus despite rising EV adoption.

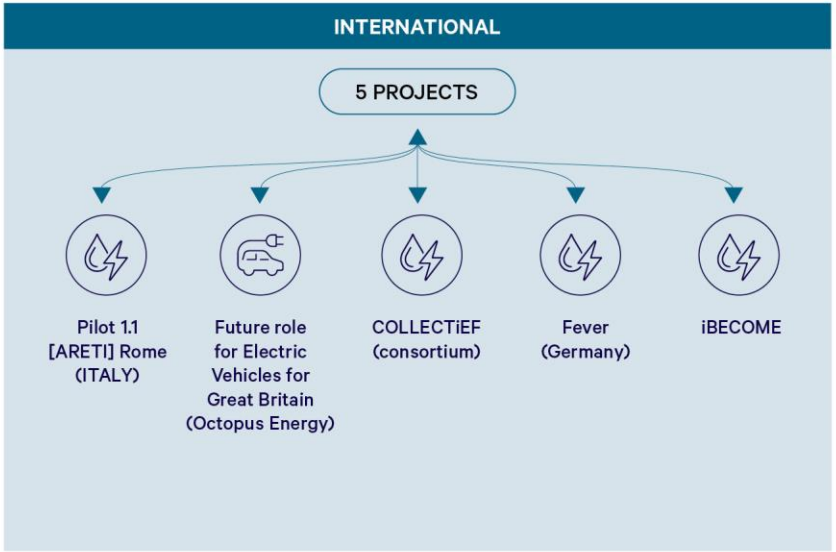
flextalk

Key Projects – Pg 1/4

Focus Area: Technology Development/Integration

Projects scored >7 (out of 10) for this focus area are:





flextalk

Key Projects – Pg 2/4

Focus Area: Network Management

Projects scored >7 (out of 10) for this focus area are:

NEW ZEALAND

17 PROJECTS

1. EA Networks Transport Electrification Project (EA Networks)
2. Methodology to assess the impact of increasing EV charging in LV networks (EECA)
3. LV Feeder Monitoring (Network Waitaki)
4. Hosting capacity maps (11kV and 33kV) (Network Waitaki)
5. High voltage demand capacity map (Powerco)
6. LV Data Reports (Smartco)
7. LV Data Capture and Visibility project (Top Energy)
8. Non-transmission solutions (Transpower)
9. Low Voltage (LV) Network Visibility (Unison)
10. Visibility and System Insights for the Orion Network (ViSION) – Orion
11. Smart Meter Data Analysis (Counties Energy)
12. Second – life Berm batteries and EV charger buffer (Counties Energy)
13. Optimise and manage fleet EV charger power distribution (Evisi)
14. Demand Response - New Zealand Aluminium Smelters Limited (NZAS) – Meridian Energy
15. Supporting the decarbonisation of Open Country Dairy (Meridian Energy)
16. Ruakākā Energy Park (Meridian Energy)
17. Dynamic voltage management (WEL Networks)

PROJECT SPOTLIGHT

Smart meters, now cover over 95% of Counties Energy network, have played an active role in our transformation into a smart network. The smart grid produces a large volume of data that can be analysed for the benefit of customers and the network such as:

1. Data-driven decision-making;
2. Real Time Data for DSO transition; and
3. Estimate current loads and demand forecasting

This visibility across high and low voltage networks enables Counties Energy to prioritise, plan, and communicate restoration and maintenance activities efficiently.

INTERNATIONAL

NONE

flextalk

Key Projects – Pg 3/4

Focus Area: Customer Engagement

Projects scored >7 (out of 10) for this focus area are:

NEW ZEALAND

1 PROJECT

Community Energy Activator (Orion)

PROJECT SPOTLIGHT

A pilot program promoting sustainable, community led energy solutions in urban and rural areas. Made up of nine community groups explore projects with social, economic, and environmental benefits on the Orion network. The energy activator boosts grid resilience, supports community energy growth, and aids Orion's net-zero goal while working with communities to identify local energy needs and investment opportunities.

INTERNATIONAL

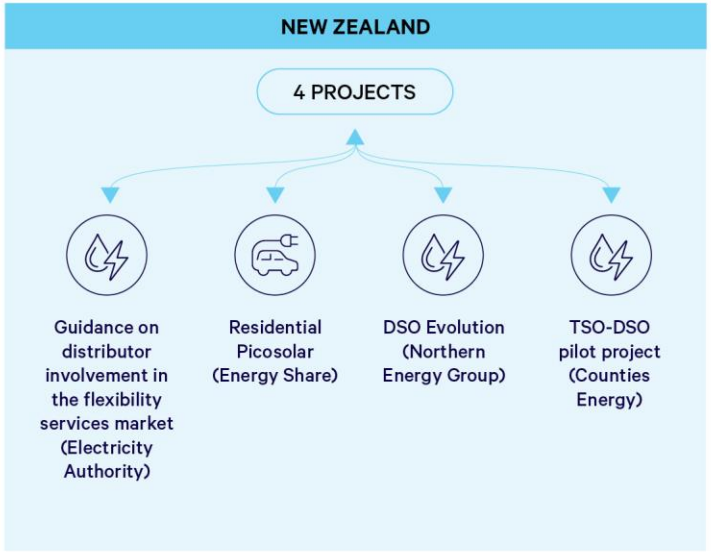
NONE

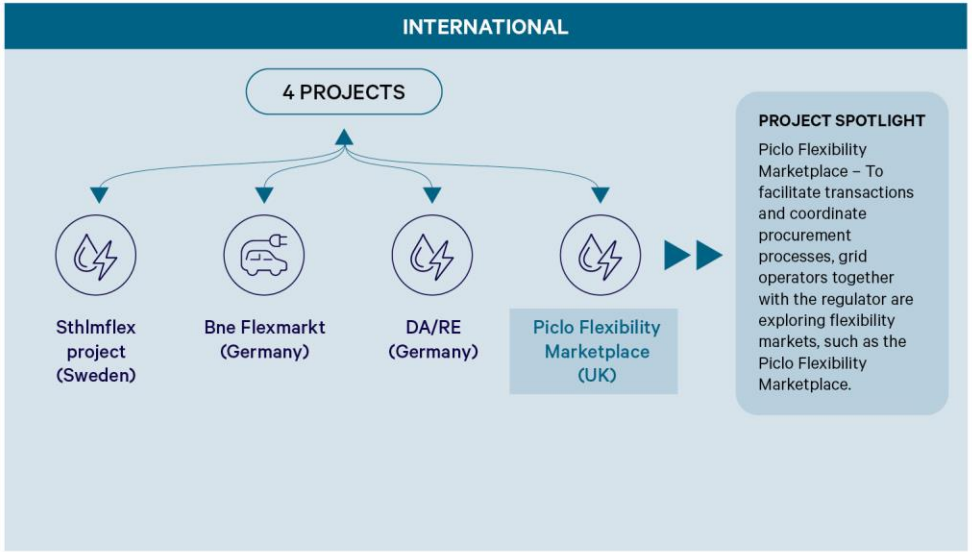
flextalk

Key Projects – Pg 4/4

Focus Area: Market Design and Development

Projects scored >7 (out of 10) for this focus area are:





flextalk

Standardisation Maturity – Pg 1/5

Various standards & protocols support demand-side management, energy trading, energy dispatch, data exchange, and grid integration. These standards enable interoperability across different markets and regulate/support flexibility markets.

STANDARD	KEY FEATURES	USE CASES
COMMUNICATION		
OpenADR3.0 (IEC 62746-10-1)	Automating Demand Response » Price based demand flexibility » Interoperability	Used by utilities (USA, EU, Japan, China) to signal price-based demand response and emergency load reduction. California utilities are already using this to communicate dynamic prices to customers.
IEEE 2030.5-2018 Smart Energy Profile 2.0	Global standard for smart energy communication (for distributed energy resources (DERs) and demand response). Internet-based communication for DERs and demand-side management.	California Rule 21 mandates it for DER integration with grid operators. Common Smart Inverter Profile (CSIP-Aus) based DERMS. International utilities, including those in USA, Australia, Canada, and other countries are aligning with IEEE 2030.5 for DER management, Vehicle-to-Grid (V2G), Load Control and Pricing.

flextalk

Standardisation Maturity – Pg 2/5

STANDARD	KEY FEATURES	USE CASES
MODBUS TCP, MQTT v3.1.1 / v5	Industrial communication protocols for energy devices.	Used in building energy management systems (BEMS) and smart appliances.
AS/NZS 4777.1:2024 & AS/NZS 4777.2:2020	Inverter energy system (IES) connections.	Technical Requirements for 200 kW to 5 MW DER connections (AEMO).
OCPP 2.0.1	Efficient and standardized EV charging experience.	EV charging communications.
OPC UA (Open Platform Communications Unified Architecture)- OPC UA 1.05	Secure, scalable, and platform-independent industrial automation.	Used in virtual power plants (VPPs) and energy aggregators.
EUniversalFlexibility Protocol (EUFP)	To standardise communication between flexibility providers and system operators.	European initiative-one application is its role in enabling real-time demand response and flexibility aggregation in smart grids.
IEC 61850-7-420	Standard for communication networks and systems for power utility automation. Enables communication between distributed energy resources (DERs) and the grid.	Used in smart grids for integrating flexibility from solar, batteries, and electric vehicles.

Standardisation Maturity – Pg 3/5

STANDARD	KEY FEATURES	USE CASES
MARKET & REGULATORY		
CER Technical Standard: NEW ENERGY TECH CONSUMER CODE (NETCC), Australia	The NETCC sets a minimum standard of service for customers looking to purchase new energy tech products, systems and services.	New energy tech providers who have been approved by the 'Code Administrator' (the CEC). Non-exhaustive examples of New Energy Tech include CER devices that are connected to the network such as solar PV, wind, hydro and bio energy generators.
ENTSO-E Market Codes (Europe)	Integrating flexibility into electricity markets.	Guidelines set by the European Network of Transmission System Operators for Electricity (ENTSO-E) .
GB Grid Code (UK)	Defines how flexibility providers interact with the grid.	GB Grid Code is crucial for integrating renewable energy sources into the national grid while ensuring stability, reliability, and security.
Nordic Balancing Model (NBM)	Standardized approach to market-based balancing.	The Nordic Balancing Model is a critical tool in the Nordic region, ensuring that the electricity grid remains balanced and stable despite the challenges posed by renewable energy variability.
E-Flex (USA & Global)	A framework for digital flexibility trading and demand-side management.	Its use in Virtual Power Plants exemplifies how distributed energy resources can be coordinated to create a more resilient, efficient, and sustainable grid—benefiting utilities, consumers, and the environment both in the USA and globally.

Standardisation Maturity – Pg 4/5

STANDARD	KEY FEATURES	USE CASES
MEASUREMENT, VERIFICATION, AND SETTLEMENT		
ENTSO-E Demand Response Baseline Methodologies	Defines methods for measuring flexibility services in electricity markets.	Used in capacity mechanisms and balancing services. Also used CASIO 10 in 10.
North American Energy Standards Board (NAESB) Demand Response Standards	Provides a framework for demand-side resource participation in electricity markets.	Used in PJM, ISO-NE, and ERCOT markets.
International Performance Measurement and Verification Protocol (IPMVP)	Standardises demand-side flexibility measurement.	Used in energy efficiency and demand response programs worldwide.
European Energy Efficiency Directive (EED)	Sets energy performance measurement standards.	The renovation of public and commercial buildings under the EED is a prime example of its practical application.

Standardisation Maturity – Pg 5/5

STANDARD	KEY FEATURES	USE CASES
CYBERSECURITY & DATA PRIVACY		
NIST Cybersecurity Framework (CSF)	Cybersecurity guidelines for critical infrastructure, including energy flexibility systems.	USA
IEC 62351 (Security for Energy Systems)	Protects smart grid communication and demand flexibility transactions.	IEC 62351 is integral to securing the digital backbone of modern energy systems by enforcing strong authentication, encryption, and integrity measures across smart grid communications.
GDPR & DataHub Standards (Europe)	Defines consumer data privacy and security standards for demand response and flexibility markets.	Used in smart meter rollouts and energy aggregation platforms.

Takeaways for Decision-Makers

The report highlights clear messages for EDBs, policymakers, and industry leaders:

1 

New Zealand has strengths in **network management** but lags in customer engagement and technology innovation.

2 

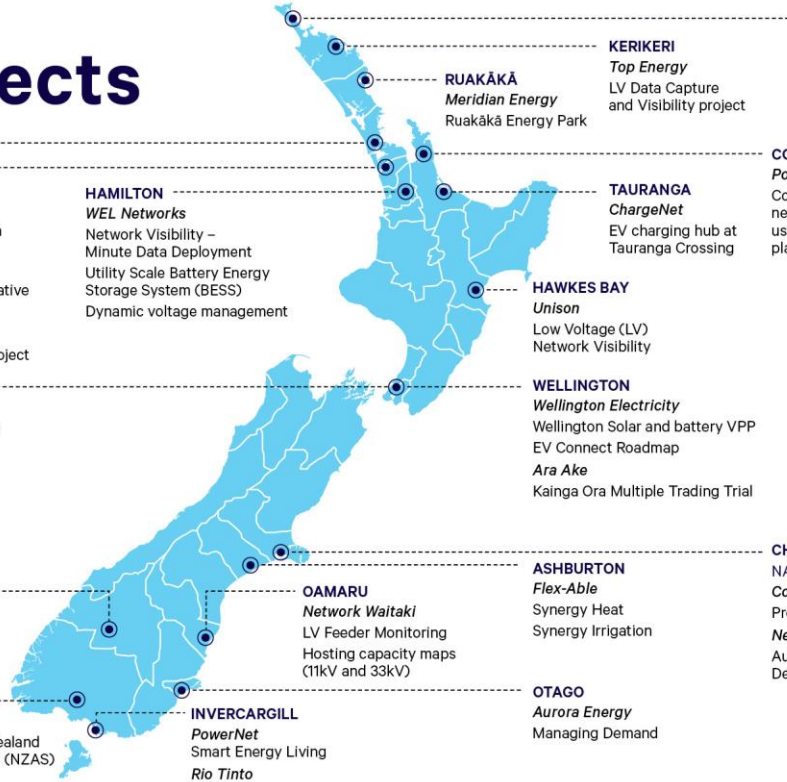
International projects show a stronger push toward **market based flexibility models**.

3 

More focus is needed on V2G, EV integration, and **demand-side flexibility programs**.

flextalk

Flexibility Projects



AUCKLAND
Energy Share
Residential Picosolar
EVisi
Optimise and manage fleet EV charger power distribution
Vector Limited
EV Smart Charging Trial in Auckland
Vector Auckland Transport Flexible Connection
Smart DER management settings

AUCKLAND (SOUTH)
Counties Energy
Smart Meter Data Analysis
Active energy orchestration
Second-life Berm batteries and EV charger buffer
Hot water demand flex initiative
TSO-DSO pilot project
EA Networks
Transport Electrification Project

HAMILTON
WEL Networks
Network Visibility – Minute Data Deployment
Utility Scale Battery Energy Storage System (BESS)
Dynamic voltage management

RUAKĀKĀ
Meridian Energy
Ruakākā Energy Park

KERIKERI
Top Energy
LV Data Capture and Visibility project

COROMANDEL
Powerco
Coromandel network support using virtual power plant technology

TAURANGA
ChargeNet
EV charging hub at Tauranga Crossing

HAWKES BAY
Unison
Low Voltage (LV) Network Visibility

WELLINGTON NATIONWIDE
EECA
Methodology to assess the impact of increasing EV charging in LV networks
Residential space and hot water heating
Electricity Authority
Guidance on distributor involvement in the flexibility services market
FlexTalk EEA/EECA
1.0 Common Communications Protocols
1.5 Seed Project (Device Integration)
2.0 Seed Extension (Household optimisation and integration)
Simply Energy
Open Country utilise its electric and coal boilers in the most carbon-efficient way using Simply Flex
Transpower
Non-transmission solutions

WELLINGTON
Wellington Electricity
Wellington Solar and battery VPP
EV Connect Roadmap
Ara Ake
Kainga Ora Multiple Trading Trial

LAKES DISTRICT
Ara Ake
Queenstown Flex Challenge

OAMARU
Network Waitaki
LV Feeder Monitoring
Hosting capacity maps (11kV and 33kV)

ASHBURTON
Flex-Able
Synergy Heat
Synergy Irrigation

CHRISTCHURCH NATIONWIDE
Cortexo
Project Flexviz
Nexbe Limited
Automated Demand Response

SOUTHLAND
Meridian Energy
Demand Response – New Zealand Aluminium Smelters Limited (NZAS)

INVERCARGILL
PowerNet
Smart Energy Living

OTAGO
Aurora Energy
Managing Demand

Rio Tinto
20-year demand response agreements with Meridian Energy, Contact Energy and NZAS

NORTH ISLAND
Northern Energy Group
DSO Evolution
Powerco
Smart EV charging project
High voltage demand capacity map
Residential hot water control trial
Ultra-fast electric vehicle (EV) chargers

NATIONWIDE
Meridian Energy
Supporting the decarbonisation of Open Country Dairy
Ara Ake
Rewiring Aotearoa Machine Count
Community Energy How-to-guide
Multiple Trading Relationships
Winter Peak Innovation Pilot
Stationary Battery Energy Storage Systems Analysis Report

CHRISTCHURCH
Orion
Lincoln Flexibility
Visibility and System Insights for the Orion Network (ViSION)
Hot Water Flexibility Trials
Community Energy Activator
Resi-flex (Phase 3 – Co-design and Trials)
Smartco
LV Data Reports

NEW ZEALAND

flextalk

Flexibility Projects

1 UNITED STATE OF AMERICA
The Mobility House
Replicable V2X Deployment For Schools (RVXDS)

2 PORTUGAL
Euniversal

3 UNITED KINGDOM
Octopus Energy
Future role for Electric Vehicles for Great Britain

4 SPAIN
EDE
Pilot 3.3 [i-DE] Iberdrola Pilot Bilbao
i-DE
Pilot 3.1 [i-DE] Iberdrola Pilot in Madrid (SPAIN)
Pilot 3.2 [i-DE] Iberdrola Pilot Benidorm (SPAIN)

5 FRANCE
SAP
BeFlexible Pilot 3.5 & 3.6 Pilot

6 NETHERLANDS
TenneT
GOPACS

7 NORWAY
Agder Energi
NorFlex
FLEXGRID

8 SWEDEN
E.ON
E.ON pilot
EONEIS
Pilot 2.2 EONEIS pilot
Svenksa kraftnat
Sthlmflex project

9 GERMANY
SINTEG
Altdorfer Flexmarkt
ReFLEX Dillenburg
Comax
ENKO
Flexibilitatsplattform
TenneT
enera Flexmarkt
Bne Flexmarkt
DA/RE
Grid Integration
FEVER

10 ITALY
Areti
Pilot 1.1 [ARETI] Rome (ITALY)
EDI
Pilot 1.2 [EDI, ENEL] South Italy and Pilot 1.3 North of Italy

11 FRANCE
IRELAND
ITALY
UNITED KINGDOM
iBECOME

12 CYPRUS
FRANCE
HUNGARY
ITALY
NORWAY
SWEDEN
COLLECTiEF consortium
COLLECTiEF

13 AUSTRALIA
AGL
PLUS ES – South Australia Demand Flexibility Trial
AGL Dynamic Pricing Load Flex Trial
AGL EV Orchestration Trial
Realising Electric Vehicle-to-grid Services (REVS) trial
AEMO
Project EDGE
Ausgrid
Project EDITH
Enel X
Enel X Commercial Refrigeration Flexible Demand Project
Intellihub
Intellihub Demand Flexibility Platform Project
Origin
Origin EV Smart Charging Trial
RACE 2030
Business Power Flex
SAPN
Energy Masters' project
Western Power
Project Symphony

INTERNATIONAL

flextalk

Next Steps

Given the rapidly evolving landscape of DER/CER technology, consumer adoption, network management, and electricity market design, it is recommended that this project database be updated annually to maintain its relevance and accuracy.

Report compiled by EA Technology in partnership with FlexTalk (EEA and EECA).

CONTACT US AT:

Yogendra Vashishtha
Head of Future Networks

Email: Yogendra.Vashishtha@eatechnology.com
Phone: 0439 692 010

EA Technology Pty Ltd
381 MacArthur Avenue, Hamilton
QLD 4007 Australia

Dr Stuart Johnston
Lead Advisor, Engineering & Technical

Email: stuart@eea.co.nz
Phone: 021 198 6535

Electricity Engineers Association
Level 5, 40 Mercer Street
PO Box 5324, Wellington, New Zealand

We acknowledge the support of EECA (Energy Efficiency & Conservation Authority) for funding of this scan of flexibility projects across New Zealand and Internationally. Their contribution has been instrumental in advancing our understanding of demand flexibility and its role in enabling a smarter, more resilient energy system for New Zealand.

flextalk