Making Network Data Accessible

Case for Making Network Data Accessible by Implementing a Standard Data Interchange Protocol for:

- Network, Asset Management & Operations

- Decarbonisation Opportunities – Generation Data Interchange with Third Parties

Michael Petrove - Asset & Network Performance Analyst
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POWERco

We bring electricity and gas to 1.1 million customers across the North Island

There's a lot that goes into bringing light and heat to your home or business. We're proud to play an important part thanks to the lines, cables and pipes we own.

*based on FY19 figures

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Our part in bringing energy to you

Energy is generated by power stations, then sent along transmission networks operated by Transpower (for electricity) and First Gas (for gas) to distributors like us.
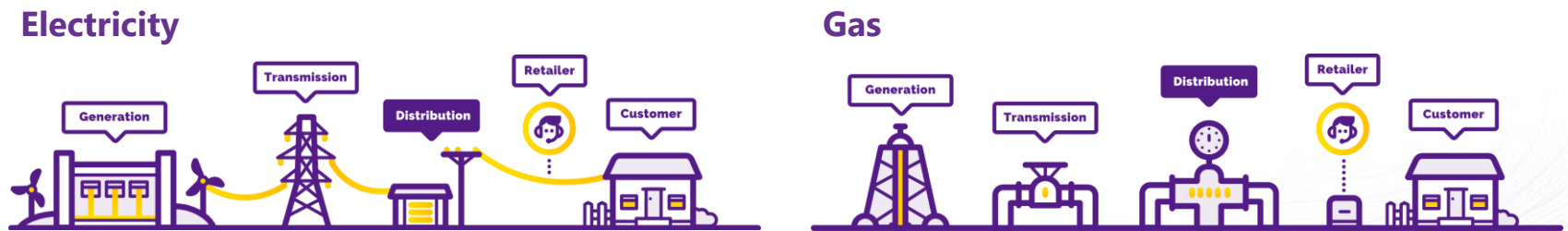
We own and maintain the local lines, cables and pipes that deliver power to the people and businesses who use it. You pay your retailer for the energy you use, and some of what you pay comes to us so we can continue to invest in our network to ensure your power supply is safe and resilient.

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Electricity

Generation · Transmission · Distribution · Retailer · Customer

Gas

Generation · Transmission · Distribution · Retailer · Customer

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Our electricity network

Powerco is New Zealand's largest electricity utility by the area we serve. Our electricity networks are in Western Bay of Plenty, Thames, Coromandel, Eastern and Southern Waikato, Taranaki, Whanganui, Rangitikei, Manawatu and Wairarapa.

28,441

Kilometres of lines and cables covered by our network

344,000

Homes, businesses and industries connected to us

Coromandel to South Waikato

Bay of Plenty:
Tauranga & Mt Maunganui

Taranaki

Whanganui & Rangitīkei

Manawatū

Wairarapa

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Gas network

Powerco is New Zealand's largest gas distribution utility. Our gas pipeline networks are in Taranaki, Hutt Valley, Porirua, Wellington, Horowhenua, Manawatu and Hawke's Bay.

6,100

Kilometres of pipes make up our network

112,000

Homes, businesses and industries connected to us

Taranaki

Hawkes Bay

Manawatū

Porirua & Hutt Valley

Wellington

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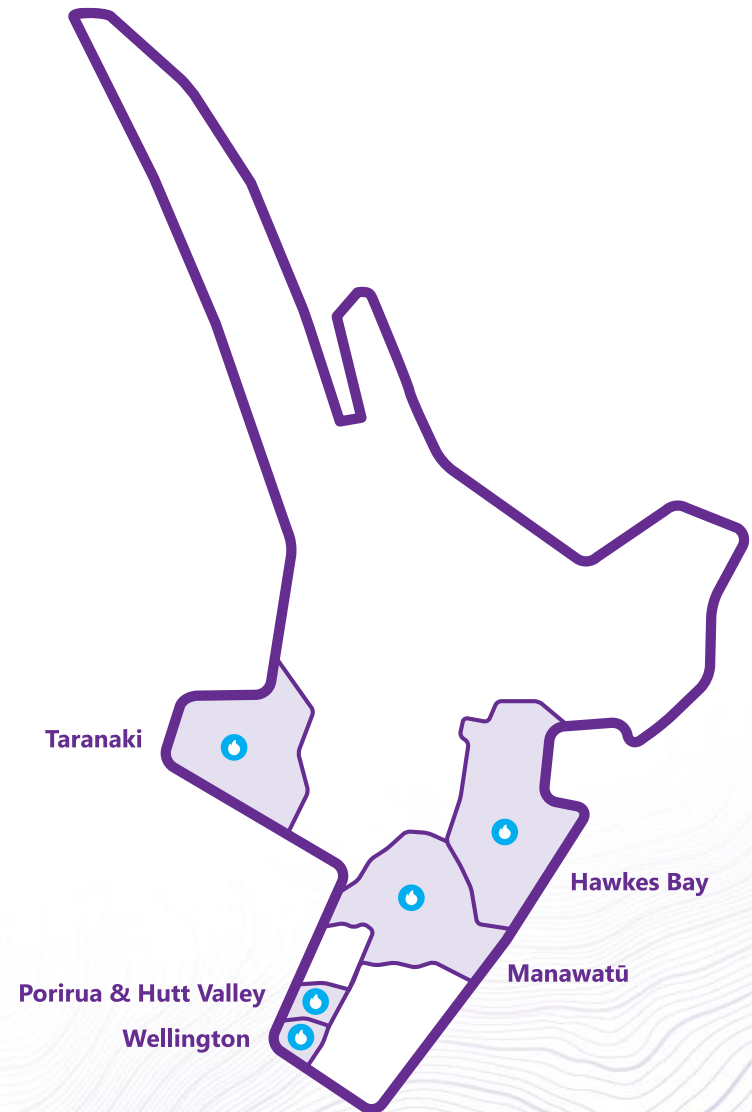
We get the best outcomes for our customers and stakeholders

The way people feel about us ensures we operate effectively and get the best outcomes for our customers and stakeholders. We know we've gained trust when our customers and stakeholders feel:

Confident
Our team and partners have the skills, expertise and knowledge to make the right decisions, providing accurate and timely information and updates We don't leave people wondering. We front up and walk the talk.

Connected
Customers and stakeholders are connected to us literally via our assets and the services we provide, and feel a sense of connection to our business and members of our team. They feel that their voice is heard, they see themselves represented, and know that we share their values.

Cared for
Our customers and stakeholders are considered in every decision we make. We're part of the communities in which we operate. Our team and partners share their backyard in terms of where they live and work and are passionate about meeting their needs.

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Reliable energy for your world

Reliable
Reliability is at the core of our business. It's what our customers and stakeholders want now and in the future.

Energy
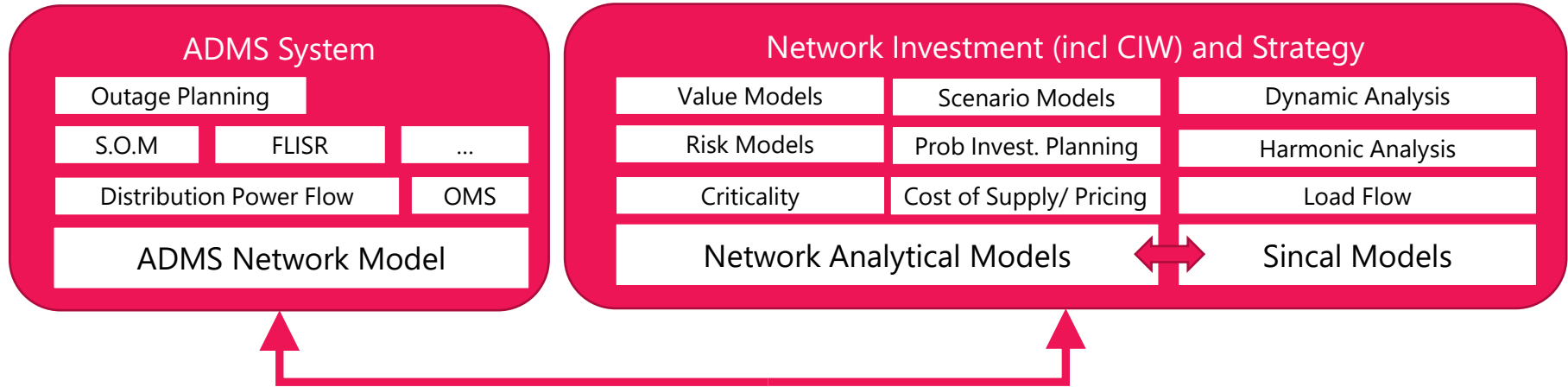Our electricity and gas networks, and other energy sources.

Your
We cater for more than just the needs and preferences of our communities, it's also about individuals.
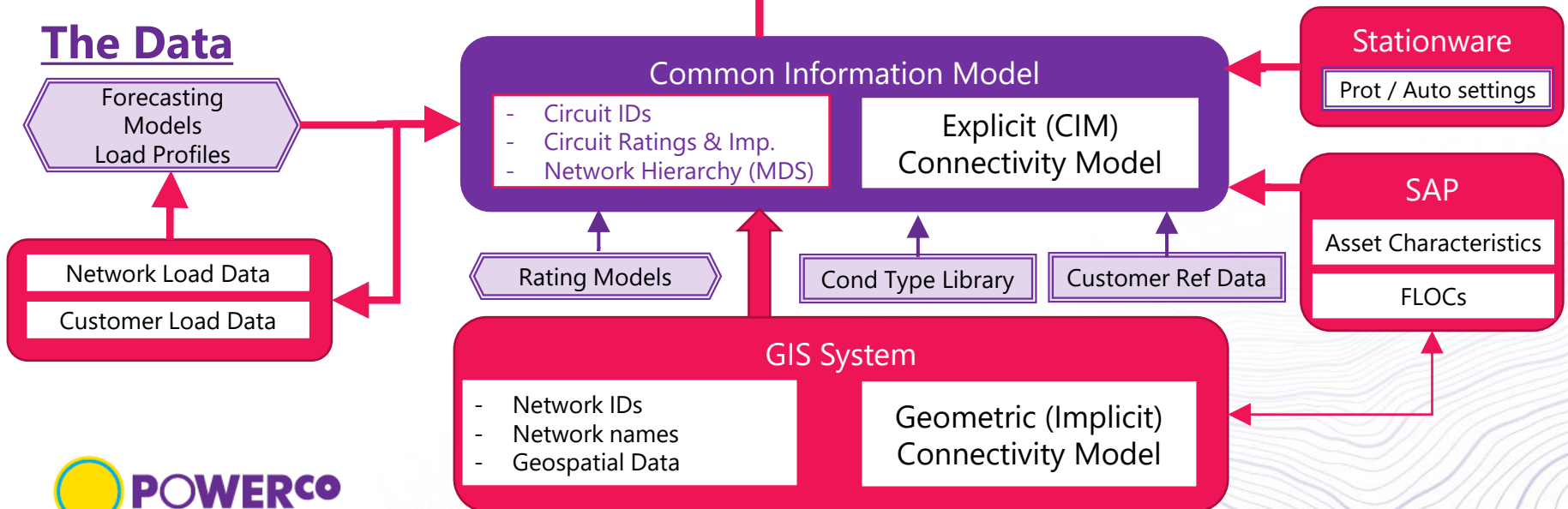
World
People build their own 'world' – communities, families, businesses, industry groups and partners.

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The Concept

Network Analysis Tools

ADMS System

Outage Planning		
S.O.M	FLISR	...
Distribution Power Flow		OMS

ADMS Network Model

Network Investment (incl CIW) and Strategy

Value Models	Scenario Models	Dynamic Analysis
Risk Models	Prob Invest. Planning	Harmonic Analysis
Criticality	Cost of Supply/ Pricing	Load Flow

Network Analytical Models ⟷ **Sincal Models**

The Data

Forecasting Models Load Profiles

Common Information Model

- Circuit IDs
- Circuit Ratings & Imp.
- Network Hierarchy (MDS)

Explicit (CIM) Connectivity Model

Stationware

Prot / Auto settings

Network Load Data
Customer Load Data

Rating Models

Cond Type Library

Customer Ref Data

SAP

Asset Characteristics
FLOCs

GIS System

- Network IDs
- Network names
- Geospatial Data

Geometric (Implicit) Connectivity Model

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Easy access to an up-to-date complete set of network data is necessary to manage and operate our Network effectively

1. Integrated cross functional data making it available across the organisation for operations, design, asset management, network performance, programme management, environmental, strategic options analysis, new generation options, impact of decarbonisation, etc.

2. Role of CIM in decarbonisation of New Zealand for inter-business data interchange involving distributed generation.

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Objective

- Enable off-the-shelf electricity industry software easy access to up-to-date integrated data about the business.

- Data required for: Protection, design, load-flow, project management, dynamic analysis, harmonic analysis, cost of supply, criticality, network optimisation, operations, asset management, performance, programme management, environmental, decarbonisation opportunities, etc.

- Data about our electricity (and gas) network businesses made available in a consistent integrated format for use across the business.

- All items on today's Asset Information Managers' Forum 2022 agenda tend to be difficult, or sometimes impossible, to implement easily without access to a consistent set of up-to-date complete, accurate and integrated data.

- Promote good data architecture by implementing CIM (Common Information Model)

- The related international standards are IEC 61968-11 & IEC 61970-301 (specific to the electricity industry).

- CIM would also be used to help in the decarbonisation of New Zealand for inter-business data interchange as distributed generation becomes main-stream and tighter management of generation dispatch is required.
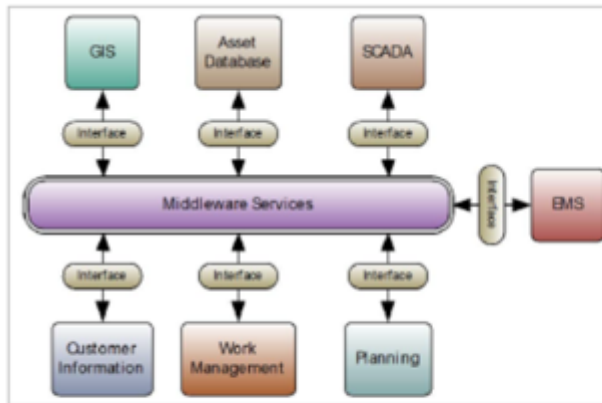
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What is proposed?

EXISTING

(**too** many manual & bespoke linkages to be updated and maintained)

Before implementing universal data interchange protocol

RECOMMENDED

(**one** universal data interchange protocol)

After implementing universal data interchange protocol

Figure 1: Electricity network data combined and exposed in a standard format to all Powerco network planning, analysis, and operational tools

Benefits

The benefits of putting the data representing the complete set of current state information about Powerco's network into one table accessible to everyone in Powerco are:

- Asset Management functions become a lot easier to perform.

- Avoids data being kept separately in many disperse systems that are not aligned, extracted and presented as a full and trusted data set.

- Enables Powerco's asset, operations and strategy teams to easily extract and analyse the data they need to improve network performance and safety, and to develop a network suitable for the future decarbonisation of energy.

  - Data has multi-uses across the business for e.g. for load flow, forecasting, safety, design, future network probabilistic planning, investment, routine maintenance, systemic network performance, protection, strategic options analysis, new generation options, impact of decarbonisation, etc.

- In particular, with decarbonisation Powerco receives a lot more queries about new connections for electric vehicles (EV's) and solar generation where an automated response could be provided in a short space of time if access to the current state of the network was easily available.

- Accurate and complete data about the network should be made easily available to avoid the need for many bespoke (expensive) IT extraction and manual extracts for each activity each taking time to set up and manage.

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Thank you

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Appendix 1 – IEC Standards for CIM

Two internationally recognised IEC Standards embody the electricity industry standard for interchange of network data. These are currently used as the interface for many power systems tools and are the likely data format for Powerco to use as the basis of its data interchange protocol. These are:

[1]   IEC 61970-301:2016   International Standard, Energy Management System Application Program Interface – Part 301: Common information model (CIM) base

[*Describes the components of a power system at an electrical level and the relationships between each component*]

[2]   IEC 61968-11   System Interfaces for Distribution Management – Part 11: Common Information Model (CIM) Extensions for Distribution

[*Software data exchange format between systems*]

Table 1: IEC Standards – Internationally Recognised Format for Data Interchange Protocol

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