

Pipes & Wires

Thought leadership of critical energy & infrastructure matters

Issue 240 – October 2026

From the editor's desk...

Welcome to Pipes & Wires #240 this issue starts with a look at quantum batteries, and then examines some revenue resets in Australia and Ireland. We then examine the renewal of some electricity distribution concessions in Brazil, followed by a look at Britain's planned nuclear stations and NZ's security of supply assessment. This issue concludes with a cost of capital decision in NZ.

So ... until next time, happy reading...

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Significant client projects

Recent client projects include...

Transaction advisory (\$12b and counting)

- Forecasting AugEx, RepEx and OpEx, advising on likely revenue cap implications.
- Identifying strategic, commercial and regulatory red-flags.
- Translating demand forecasts into AugEx.
- Reviewing procurement models and processes.

Climate governance and resilience

- Identifying the governance, strategy and risk programs required to align with TCFD.
- Compiling a client resilience framework for an electric distribution company.

Asset strategy and asset management practices

- Assessing the strength of an EDB's organizational culture, work process and asset management practices.
- Compiling a road map to guide an EDB on its asset management improvement journey.
- Identifying a range of structural and service delivery models for an electric company.
- Identifying best customer engagement practices on

Decarbonisation and energy transition

- Estimating the costs of DERMS (distributed energy resource management system) penetration for distribution feeders for a large US electric company.
- Identifying leading practices in behind-the-meter activities (eg. batteries, solar, smart data, VPP's etc) for a large US electric company.
- Identifying best Australian practices in EV charging for a large US electric company.
- Identifying key features of demand management in the Australian NEM for a large US electric company.
- Identifying best practices in grid-scale and community-scale batteries for an Australian distributor.
- Identifying best practices in EV charging on behalf of an Australian distributor.

Global trend and pattern analysis

- Identifying the global and regional trends facing transmission grid operators for a US client.

Regulatory analysis

- Reviewing the AER's recent treatment of network

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behalf of an Australian distributor.

- Providing an independent assessment of network condition and spend adequacy.
- Providing an independent review of asset condition and spend forecasts for a distribution company investor.
- Advising on the regulatory implications of an aging timber transmission pole fleet.
- Identifying the learnings from the RIIO – ED1 reset on behalf of an Australian distributor.

transformation expenditure.

Cool multimedia stuff

This [short video clip](#) examines the history of hydro-electric power in Scotland, backed with some enchanting music.

Engineering & technology

Global – quantum batteries emerge

Introduction

News recently emerged of a proof-of-concept quantum battery in Australia. This article examines the physics of quantum batteries, how they compare with existing batteries and what the implications might be for transmission and distribution networks.

What is a quantum battery ?

Simply put, a quantum battery uses the principles of quantum mechanics to store electric charge, rather than a (typically wet) chemical reaction. Those principles of quantum mechanics include...

- Entanglement, in which two or more sub-atomic particles become so deeply entangled that they share a single, unified quantum state.
- Superpositioning, in which a particle such as an electron can exist in all possible states at once (the [probability cloud model](#)).
- Interaction between light and electrons.

The proof-of-concept quantum battery consists of a multi-layered organic micro-cavity, which includes organic molecules sandwiched between mirrors that trap light (hence the wireless laser charging). This is quite different to conventional chemical batteries.

How do quantum batteries compare to existing battery chemistries ?

A couple of characteristics of quantum batteries (in comparison to existing battery chemistries include)...

- They can be charged by lasers (using quantum superpositioning in which particles absorb energy collectively rather than individually).
- Evidence to date is that larger quantum batteries seem to charge faster.
- Energy density could be 4x that of existing battery chemistries.
- Possible reduction of the safety risks around chemicals such as Lithium and molten Sodium.

Implications for key uses

Implications for key use include...

- Vehicles – faster charging, and longer ranges. But if they can be charged by lasers, maybe range will be less of an issue ?
- Stationery – again, faster charging. And possibly no dangerous chemicals.
- Aviation – depending on weight and charge density, this could be promising ?

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- Charging – faster charging could require higher capacity chargers. But then we need to understand more about whether quantum battery charging is even equivalent to wired battery charging as we know it ... it looks increasingly like it may not be, so the implications for grids and networks may not be significant ?

Pipes & Wires will follow further quantum battery developments as they emerge.

Network regulatory decisions

Aus – the AusNet transmission revenue determination

Introduction

The Australian Energy Regulator is currently resetting [AusNet Services](#) electricity transmission revenue for the 5 year control period commencing on 1st April 2027. This article examines AusNet's [Proposal](#), the AER's [Draft Decision](#), and AusNet's [Revised Proposal](#).

A bit about AusNet's electricity transmission business

AusNet Services owns and operates the 500kV and 220kV transmission networks in the Australian state of Victoria, with an annual revenue of about \$575m (which is the subject of this article). In addition, AusNet also owns and operates an electricity distribution network supplying 802,000 customers in eastern Victoria and a gas distribution network supplying 790,000 customers in central and western Victoria.

AusNet has multiple owners including Brookfield (45.4%), the Australian Retirement Trust (15%) and several Canadian pension and investment funds (39.6%).

Regulatory framework

The basis of the regulatory framework is [Chapter 6a of the National Electricity Rules](#), which is made pursuant to the [National Electricity Law](#).

Key features of the process to date

Key features of the AusNet electricity transmission process to date include...

Parameter	Proposal	Draft Decision	Revised Proposal	Final Decision
CapEx	\$2,437m	\$1,710.9m	\$2,425m	
OpEx	\$2,169m	\$2,149.2m	\$2,133m	
Opening RAB	\$4,716m	\$4,769.5m	\$4,790m	
Nominal vanilla WACC	6.04% to 6.45%	6.34%	6.19% to 6.74%	
Regulatory depreciation	\$711m	\$741.8m	\$809.3m	
Smoothed revenue	\$4,696m	\$4,754.4m	\$4,888m	

Pipes & Wires will comment further when the AER releases its Final Decision.

Aus – the Melbourne Water revenue reset Final Decision

Introduction

It's been a while since Pipes & Wires examined the Victorian water sector, so the recent release of the Essential Services Commission (ESC) [Final Decision](#) for Melbourne Water for the 5 year period starting on 1st July 2026 prompted me to examine the Decisions in a similar format to the Australian electricity businesses (noting that a very similar building block methodology is used).

A bit about Melbourne Water

Melbourne Water is a statutory body responsible for managing the Melbourne region's drinking water supply, sewage treatment, regional drainage, flood protection and waterway health. This includes catchment (primarily in the Yarra Ranges), operation of 50 reservoirs and bulk supply of 1,250,000,000 liters of water each day to the three retail water businesses (Greater Western Water, South East Water and Yarra Valley Water).

Regulatory framework

The regulatory framework for the revenue reset includes the following...

- The Water Act 1989, which established Melbourne Water as a statutory authority and sets its legal mandates.

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- The Water Industry Act 1994, which set the powers of the ESC to regulate the Victorian water sector.
- The Essential Services Commission Act 2001, which empowers the ESC to hold public reviews, demand submissions and enforce compliance.
- The Water Industry Regulatory Order 2014, which sets the principles that water businesses must follow in preparing their regulatory proposals (rate cases).

Key features of the process to date

Key features of the process to date include...

Parameter	Initial Proposal	Draft Decision	Final Decision
OpEx	\$5,512m	\$5,411m	\$5,532m
CapEx	\$7,856m	\$7,300m	\$7,308m
Opening RAB	\$15,733m	\$15,733m	\$15,621m
Return on equity	4.1%	4.1%	4.1%
Regulatory depreciation	\$1,827m	\$1,828m	\$1,772m
Revenue	10,132m	9,992m	\$10,010m

This concludes Pipes & Wires examination of Melbourne Water's revenue reset.

Ireland – setting the gas transmission revenue

Introduction

The Commission for Regulation of Utilities (CRU) recently released its [Final Decision](#) for [Gas Networks Ireland's](#) allowable transmission revenue for the Gas Year (GY) starting 1st October 2026. This article examines GNI, the prevailing regulatory framework, and the key features of the Final Decision.

A bit about GNI

GNI is a state-owned company (formerly known as [Bord Gáis Networks](#)) which supplies gas pipeline services to 720,000 end-use customers across both Eire and Northern Ireland through 14,700km of transmission and distribution pipelines. Allowable annual transmission revenue is €290m, along with an allowable annual distribution revenue of €250m.

The regulatory framework

The regulatory framework includes...

- Electricity Regulation Act 1999 (which has been variously amended by additional Irish legislation and by EU directives).
- Gas (Interim)(Regulation) Act 2002, which extended the Commission for Electricity Regulation's mandate to include gas as well as electricity.
- Commission Regulation (EU) 2017/460, which mandates an EU-wide methodology for setting transmission tariffs.

Structure of the revenue control

The structure of GNI's revenue control is slightly different from the NZ and Australian approaches (which set all 5 years revenue at the time of the Final Decision) in that...

- The CRU sets an Initial Base Year for each of the 5 years of the control period (in this case PC5, which runs from 1st October 2022 to 30th September 2027) using the forecasting methodologies that we are all familiar with.
- Each year GNI submits updated forecasts along with actual costs and previous years' revenues, which are then used to update the base revenue for each year.

Key features of the GY27 Final Decision

Key features of the GY27 Final Decision of €307.91m include...

Parameter	Value
GY27 base revenue (set in December 2023)	€239.75m

Inflation adjustment	€60.27m
Updated forecast of pass-through items	-€5.84m
K-factor adjustments	€13.67m
PC5 incentive rewards / penalties	€0.06m
Allowable GY27 revenue	€307.91m

Industry reshuffling & capital allocation

Brazil – renewing the distribution concessions

Introduction

Pipes & Wires has recently examined the possible revoking of Enel SP's distribution concession in Brazil. On a happier note, this article examines the renewal of 4 of Energisa's distribution concessions and their associated network investment commitments.

A bit about Energisa

The [Energisa Group](#) is a vertically integrated electric company with 13 high voltage transmission concessions and 9 distribution concessions supplying about 8,800,000 customers. The focus of this article is on the following 4 distribution concessions that received 30 year renewals...

- Energisa Mato Grosso – supplies 1,700,000 customers through the state of [Mato Grosso](#).
- Energisa Mato Grosso do Sul – supplies 1,150,000 customers through the state of [Mato Grosso do Sul](#).
- Energisa Sergipe – supplies 900,000 customers through the state of [Sergipe](#).
- Energisa Paraíba – supplies 2,000,000 customers through the state of [Paraíba](#).

These 4 distribution concessions represent about 50% of Energisa's EBITDA.

Energisa's investment plans

Energisa has announced that it will invest \$US3.5b in these 4 renewed concessions over the next 5 years across the following common themes...

- Renewal of aging assets.
- Storm hardening.
- Extending supply to new customers.
- Improving reliability

This planned spend is about double the previous 5 years spend (again, a common theme), and represents about 50% of Energisa's total planned distribution investment.

Energy mix and grid security

Britain – further nuclear stations

Introduction

Pipes & Wires has been regularly following the planning and construction progress of Britain's new nuclear power station fleet (for about 20 years). This article quickly recaps the two that are under construction and the one that is being planned, and then examines some of the options for future stations.

A quick recap of the new nuclear fleet

A quick recap of the new nuclear stations includes...

- Hinkley Point C – adjacent to the decommissioned A and B stations on the south side of the Bristol Channel, the C station is well under construction.

- Sizewell C – under construction adjacent to the now decommissioned A station and the operative B station on the Suffolk coast.
- Wylfa – site-enabling contracts have been let, along with a two-stage contract with Rolls-Royce for small modular reactors (SMR's) adjacent to the decommissioned Wylfa station on the north Wales coast.

Further nuclear stations

Further sites being explored for new nuclear stations include...

- Oldbury – ground testing and preparatory works are in progress adjacent to the original Oldbury station which is being decommissioned and demolished. This site is also a leading candidate for further SMR roll-out, with Rolls-Royce being selected as the preferred designer.
- Hartlepool – this site near Middlesbrough has been selected as the first site for a fleet of 12 advanced modular reactors (AMR's). Specific technologies such as innovative coolants allow AMR's to produce industrial heat and green hydrogen as well as electricity.
- Cottam – this now closed coal-fired station in Yorkshire is being re-developed into a nuclear-powered data center campus using SMR's.

Pipes & Wires will comment further as progress emerges.

Further reading

Readers may be interested in the following further reading...

- [Pipes & Wires #238](#) – reshuffling the nuclear portfolio.
- [Pipes & Wires #237](#) – progress on Sizewell C.
- [Pipes & Wires #233](#) – approving Sizewell C.
- [Pipes & Wires #231](#) – progress on Hinkley Point C.
- [Pipes & Wires #228](#) – planning the third nuclear station.

NZ – the Final Security of Supply Assessment

Introduction

Over the last few years Pipes & Wires has regularly examined the Australian [Integrated System Plan](#), which has included security of supply forecasts. On a similar theme, this article examines Transpower's recently published [Final Security Of Supply Assessment 2026](#) (SOSA).

Transpower's role as the system operator

Transpower's role as the System Operator includes *inter alia* a requirement to provide short-to-medium term security of supply forecasts, which requires the publication of the Security Of Supply Assessment for the following decade. This is similar to the [AEMO's](#) role as System Operator for the Australian [National Electricity Market](#) (NEM).

The SOSA considers demand forecasts, planned generation and planned storage to forecast the following 3 parameters...

- Energy margins to ensure there is enough energy nationally to get through dry winters (NZ-WEM).
- Energy margins to ensure the South Island can meet its dry winter energy consumption, including for both generation and HVDC transfer limits (SI-WEM).
- Capacity margins to ensure there is enough North Island generation and South Island HVDC transfer to meet North Island winter demand including reserves (NI-WCM).

These margins are compared to the security standards specified by the Electricity Authority in the [Security Standards Assumptions Document](#). The security standards reflect an efficient balance where shortage costs equal the cost of new generation. Dropping below the standard signals an economic justification for new generation, not an immediate supply shortage, especially for minor breaches, while higher margins reflect a lower risk of shortages.

Key findings of the Final SOSA

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The key findings of the Final SOSA 2026 are as follows...

Parameter	2026 - 2028	2029 - 2031	2032 - 2035
NZ-WEM	<ul style="list-style-type: none"> Expected to drop below the lower standard if gas supply decline is greater than forecast, even if all committed projects delivered on time. Sensitive to new generation delays, reduced dry-period support from Huntly, high demand growth, low gas supply or weaker than forecast solar and wind. 	<ul style="list-style-type: none"> Expected to remain above the upper security standard if additional gas is provided by imported LNG. Otherwise, falls below the lower security standard by 2031 even with planned projects. This falling below the lower security standard could occur earlier if new generation is delayed, thermal generation availability declines, demand growth is higher than forecast, gas supply is low, or wind and solar generation is less than forecast. 	<ul style="list-style-type: none"> Expected to remain above the upper security standard subject to the granting of consents for new generation. Higher-than-expected demand growth coinciding with reduced Huntly availability, low gas supply, or lower-than-expected wind and solar generation could result in the NZ-WEM falling below the lower standard earlier.
SI-WEM	<ul style="list-style-type: none"> Security margin is above upper security standard, signaling that resources are sufficient to meet a dry SI winter. Sensitive to new generation delays, reduced dry-period thermal support, high demand growth, or very low gas supply. 	<ul style="list-style-type: none"> Security margin is above upper security standard if committed projects proceed, signaling that committed resources are sufficient to meet a dry SI winter. Sensitive to higher-than-forecast demand, low gas supply, low thermal generation availability, or lower than expected wind and solar generation. 	<ul style="list-style-type: none"> Security margin is above the upper security standard subject to the granting of consents for new generation, signaling that upcoming resources are sufficient for SI winter needs. Higher-than-expected demand growth coinciding with reduced thermal generation availability, low gas supply, or lower-than-expected wind and solar generation could result in the NZ-WEM falling below the lower standard earlier.
NI-WCM	<ul style="list-style-type: none"> Security margin is above the upper security standard, signaling sufficient committed generation to meet forecast winter peak demand. Capacity risks could still occur due to low wind generation, delays in new generation, and reduced Huntly availability during high demand periods. 	<ul style="list-style-type: none"> Security margin drops below the upper security standard but stays above the lower security standard if committed new generation proceeds, signaling sufficient generation to meet forecast winter peak demand. Reduced gas supply could drive the security margin below the lower standard. Risks could still occur if higher-than-forecast demand growth coincides with delays in new generation or low thermal generation availability. 	<ul style="list-style-type: none"> Security margin is above the upper security standard subject to the granting of consents for new generation, signaling sufficient upcoming generation to meet NI winter demand. Downside risks include higher peak demand growth, very low gas supply, and real-time supply coordination to meet demand. Margins are expected to be maintained in the long-term if the forecast pipeline of new generation is delivered on target. Subdued demand growth or higher gas supply would hold all 3 margins above the upper standards until beyond the 10 year SOSA planning horizon.

Interested parties should read the full SOSA as the above analysis is necessarily abbreviated.

Regulatory setting and policies

NZ – cost of capital decisions

Introduction

The Commerce Commission recently released the [cost of capital determinations](#) that will apply to the following regulated infrastructure for their respective regulatory years ending on 30th June 2027...

- [Transpower](#).
- [GasNet](#).
- [Vector's gas distribution business](#).
- [Auckland](#) and [Christchurch Airports](#).

This article examines the key features of those decisions.

Regulatory frameworks

The regulatory frameworks are set out in...

- Clauses 3.5.1 to 3.5.8 of the [Transpower Input Methodologies Determination](#) (consolidated to 1st April 2025).
- Clauses 4.4.1 to 4.4.9 of the [Gas Distribution Services Input Methodologies Amendment Determination](#) (No. 1) 2026.
- Clauses 5.1 to 5.7 of the [Commerce Act \(Specified Airport Services Input Methodologies\) Determination 2010](#) (noting that this version of the Determination does exclude some matters).

Key features of the WACC's

Key features of the Transpower WACC's include...

Parameter	25 th percentile	Mid-point	65 th percentile	75 th percentile
Vanilla WACC	5.80%	6.53%	6.95%	7.26%

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Post-tax WACC	5.17%	5.90%	6.32%	6.63%
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Key features of the GasNet and the Vector gas distribution WACC's include...

Parameter	25 th percentile	Mid-point	75 th percentile
Vanilla WACC	5.96%	6.72%	7.47%
Post-tax WACC	5.35%	6.11%	6.86%

Key features of the Auckland and Christchurch Airport WACC's include...

Parameter	Mid-point
Vanilla WACC	8.20%
Post-tax WACC	7.86%

As always, effected or interested parties should examine the full Decision documents.

General stuff

Guide to NZ electricity laws

I've compiled a "wall chart" setting out the relationship between various past and present electricity Acts, Regulations, Codes etc in sort of a chronological progression. To request your free copy, pick [here](#). It looks really cool printed in color as an A2 or A1 size.

A bit of light-hearted humor

What if price control had been around in the 1920's and 1930's ? A collection of classic historical photo's with humorous captions looks at some of the salient features of price control. Pick [here](#) to download.

Extending the above, a second collection of classic historical photo's with humorous captions looks at some topical issues of regulating emerging technologies. Pick [here](#) to download.

A potted history of electricity transmission

I've recently compiled a potted history of electricity transmission. Pick [here](#) to download.

Wanted – old electricity history books

Now that I seem to have scrounged pretty much every book on the history of electricity in New Zealand, I'm keen to obtain historical book, journals and pamphlets from other countries. So if anyone has any unwanted documents, please [email me](#).

House-keeping stuff

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