Transgrid

A Transmission Network for the Future: Enabling Energy Transition Through Resilience and Coordination

Robbie Aherne
General Manager – System Resilience

People. Power. Possibilities.

Acknowledgement of Country

In the spirit of reconciliation, the Transgrid acknowledges the Traditional Custodians of the lands where we work, the lands we travel through and the places in which we live.

We pay respect to the people and Elders past and present and celebrate the diversity of Aboriginal and Torres Strait Islander peoples and their ongoing connections to the lands and waters of NSW and the ACT.

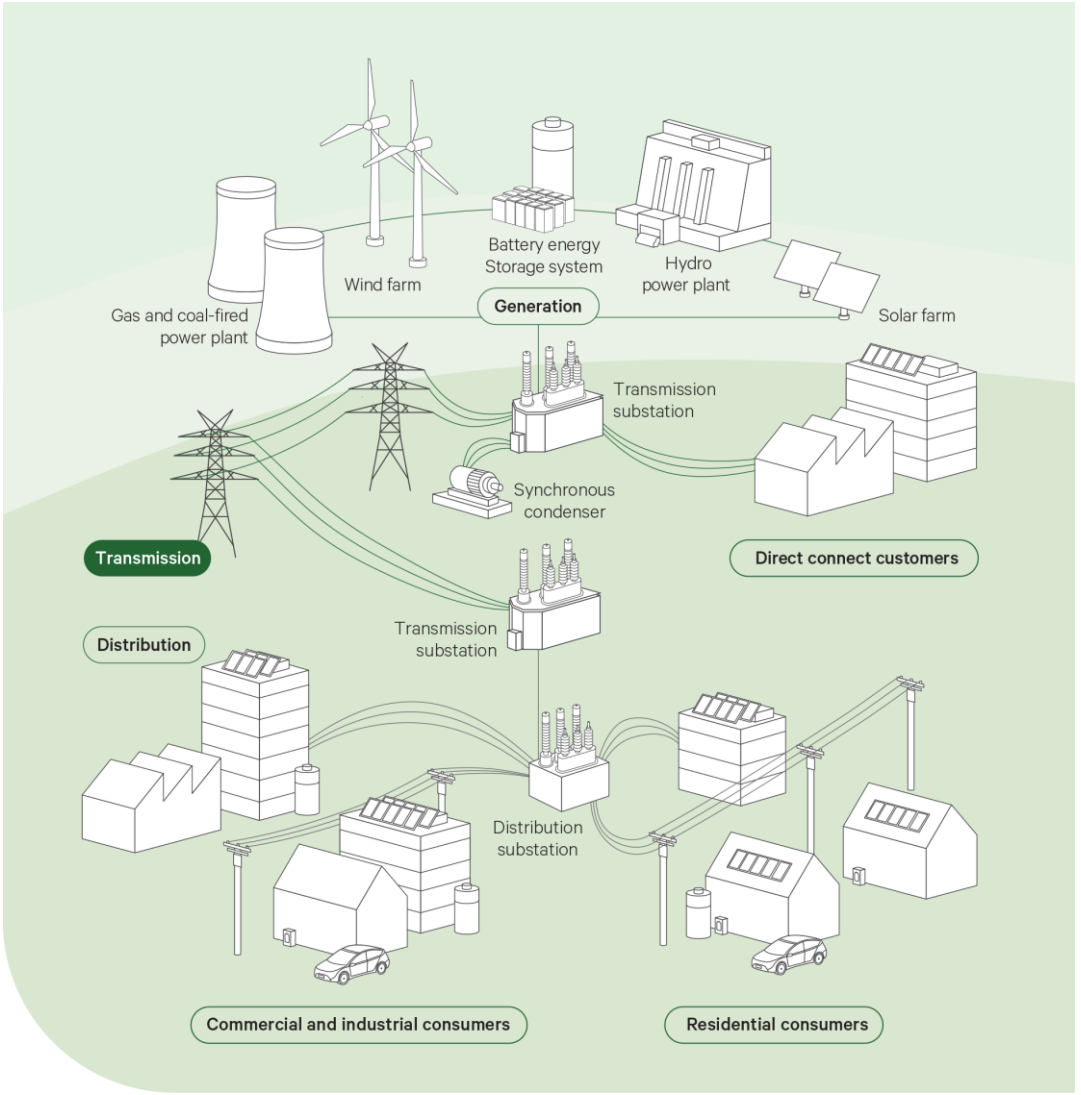
Transgrid within the electricity supply chain

131 substations

13,461 km of HV transmission lines

109 km of underground

Six interconnectors

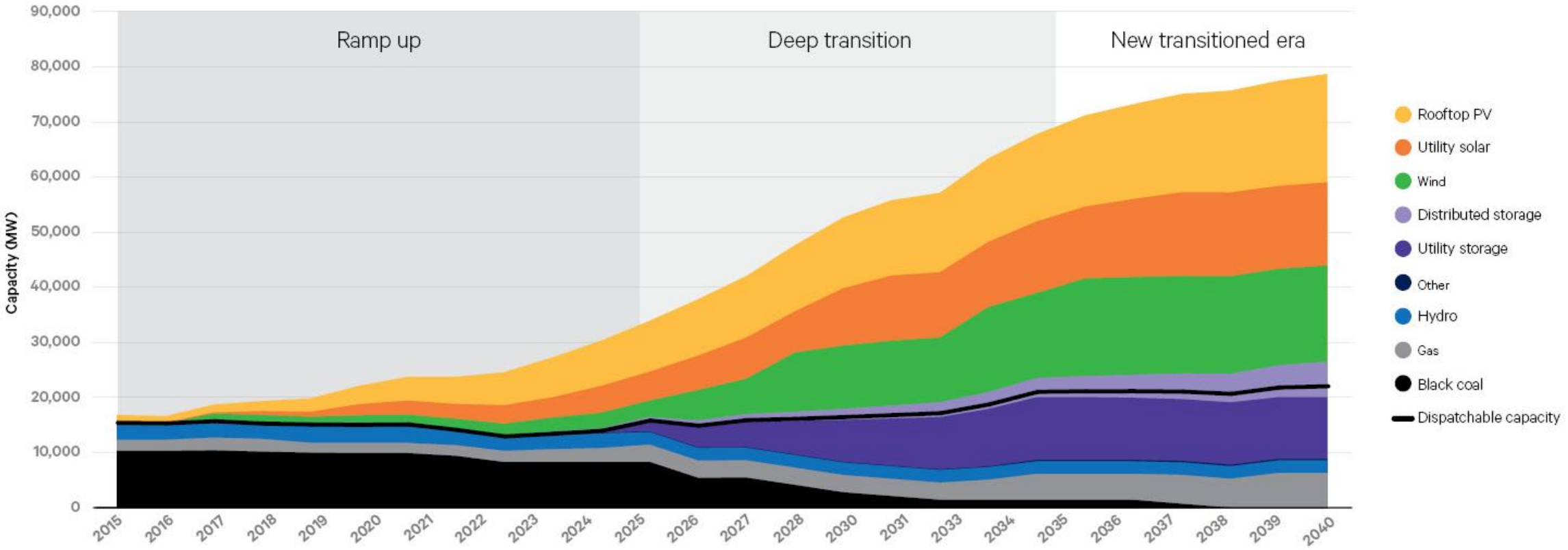


Transgrid

The new phase of transition

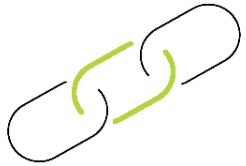
The energy transition in NSW is entering a new phase

Installed generation capacity in NSW – historical and forecast



AEMO 2024 ISP, AEMO Draft 2025 Inputs, Assumptions and Scenarios Report, Jacobs 2025, Rooftop solar and Battery Forecasting for NSW (prepared for Transgrid), AER State of the Electricity Market (various historical), AEMO Generaiton Information, Transgrid analysis

Our three-fold plan over the next decade



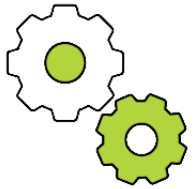
Energy Reliability

Deliver thousands of kms of transmission lines and supporting infrastructure to:

- Enable the connection of GWs of new large-scale renewable and storage capacity
- Integrate Renewable Energy Zones into the transmission backbone
- Expand transmission interconnection between regions and states

System Security

- Facilitate a mix of network and non-network system strength solutions to meet growing needs
- Co-optimise supply of other system security services including inertia and voltage support
- Trial and prove the suitability of new technologies to support system security
- Establish secure operating envelopes



Operability

- Deploy Operational Technology tools to increase network visibility, forecasting, situational awareness and decision support to enhance real-time operations, planning and asset management
- Increase operations, planning and asset management headcount and training

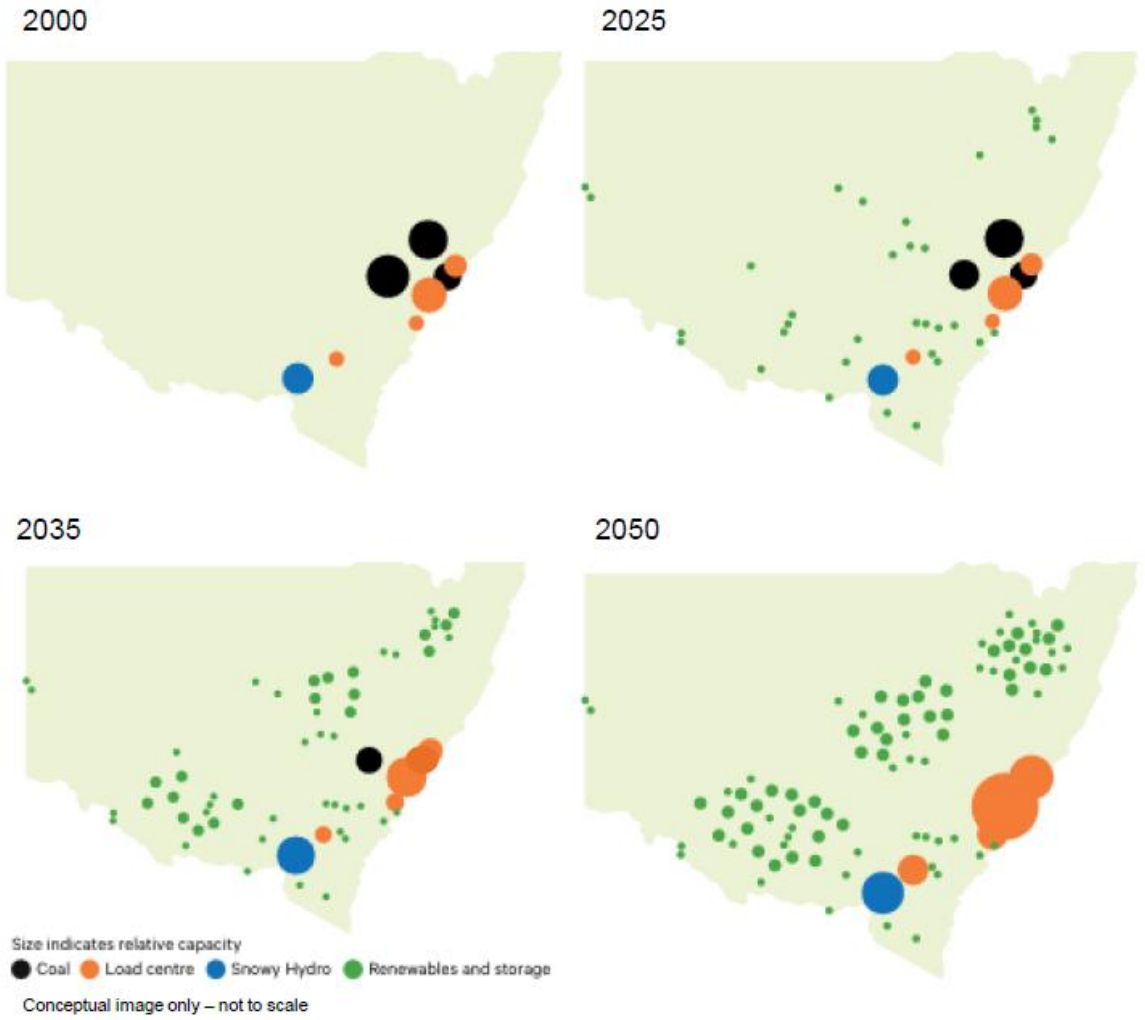
Transgrid

The grid's new reality

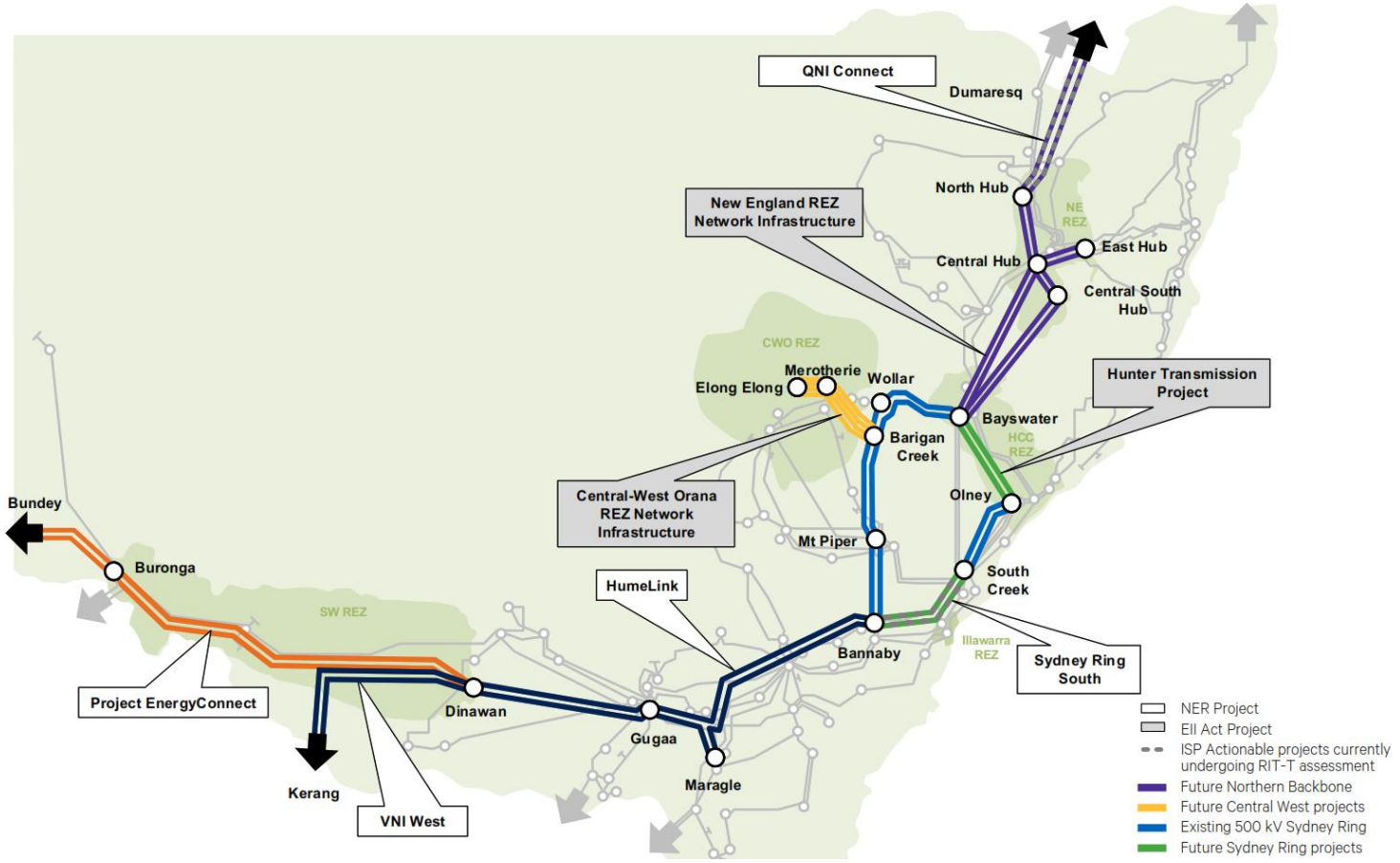
Population growth for NSW and ACT

2025 – 8.5 million

2035 –10 million



Major Projects enhancing our transmission network



Transgrid

Emerging technologies, innovative solutions

EnergyConnect	Phase-shifting transformers	Synchronous condensers
Waratah Super Battery	System Integrity Protection Scheme (SIPS)	700 MW from BESS
Snowy 2.0	Dispatchable hydro energy	2,000 MW capacity
Data centres	Potential significant growth in demand to 2035	Applications up 5x over past 6 months

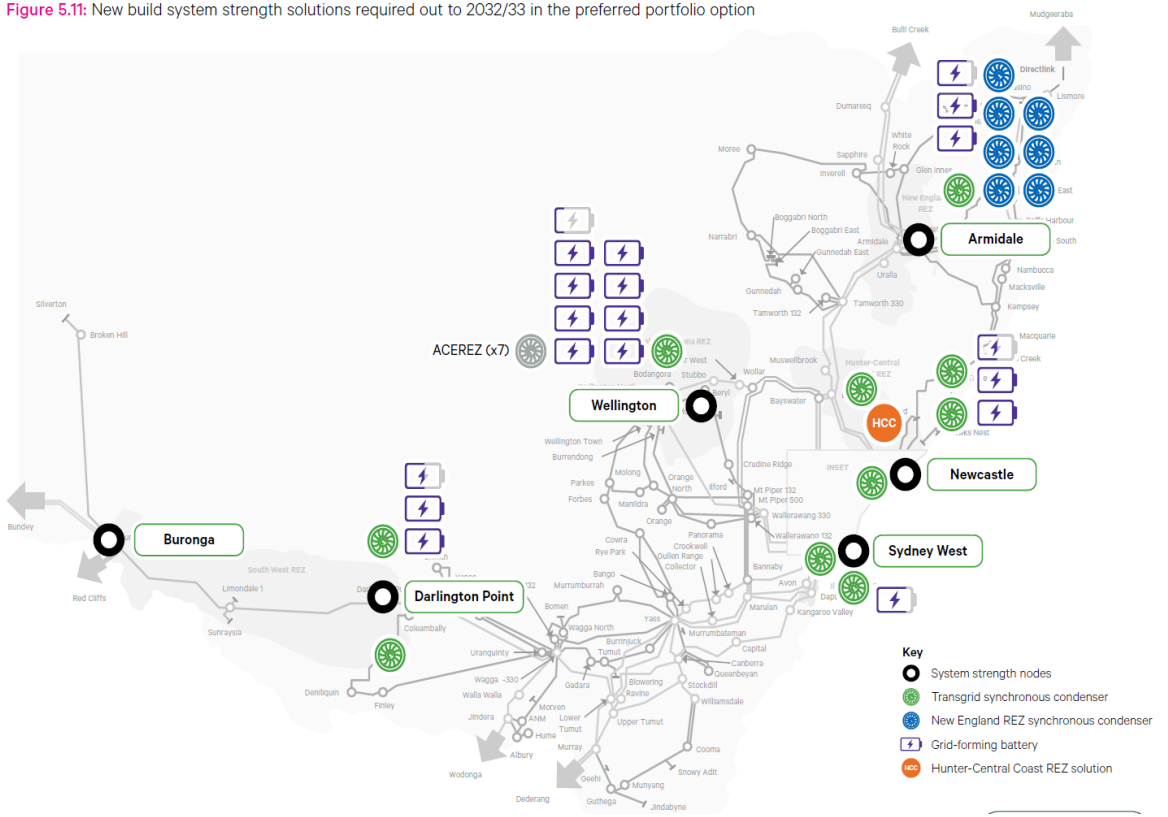
Transgrid Group

Security and operability as a foundation

System Strength – A Portfolio of Solutions

- New renewable energy generation, storage and the decline in coal generation is reshaping the power system – resulting in a growing and changing system strength need.
- System strength is integral to the secure operation of the power system – from a system stability, safety and controllability perspective.
- A power system with inadequate system strength raises the risk of system instability and supply interruptions to energy consumers.

Figure 5.11: New build system strength solutions required out to 2032/33 in the preferred portfolio option



Operational complexity is growing fast

Between **2015 & 2025**

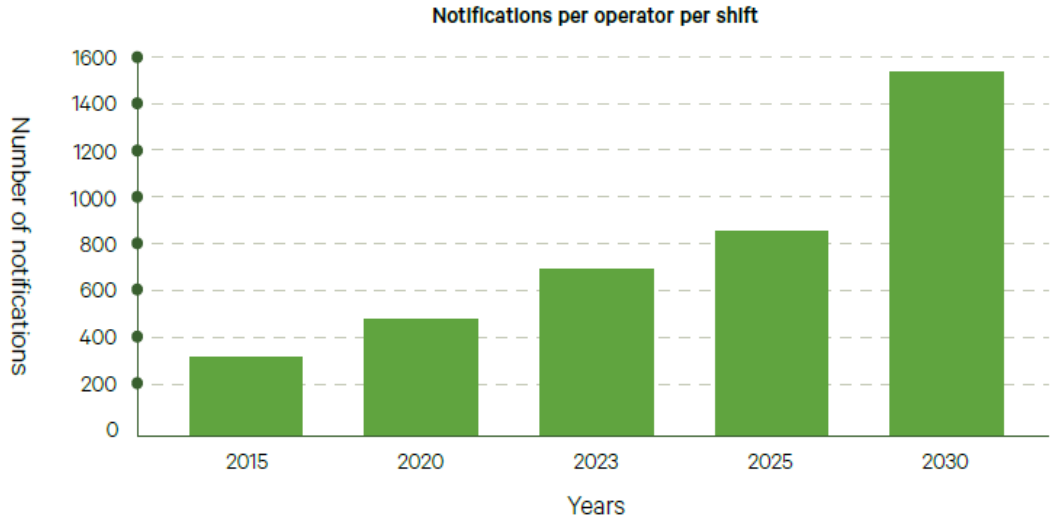
18,000 to 65,000

Increase in **Alarm Monitoring Points**

9 to 47

Increase in **Generator Operators** interfacing with our control room

Each control-room operator manages about 800 alarms per shift. This will nearly double over the next five years, leading to **operator overload**, reduced situational awareness and greater potential for delayed response to critical events.



Planning and operating a complex power system

People

- headcount
- training

Tools

- real-time decisions
- forecast analysis

Transformation

- data-driven control
- integrated systems

Operability

Build capabilities and capacity to plan, manage and operate a complex power system capable of 100% instantaneous renewable generation

Transgrid

Transgrid Group

Stronger collaboration

Transgrid Group

Thank you