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Net Zero Grid Pathways Proposed Work Programme

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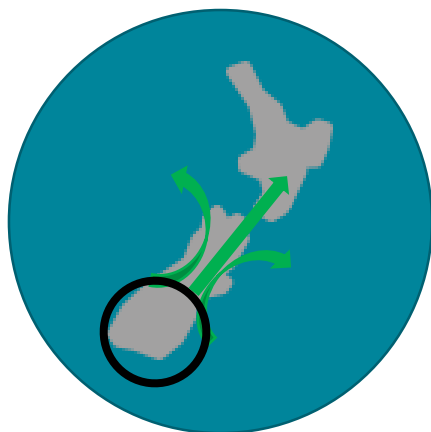
What we will cover today:

- the impact of the Smelter's closure
- Transpower's immediate response: CUWLP
- what's needed in the medium and long term?
- what role can you play?



The Context

- The smelter's closure unlocks low cost, renewable electricity in the Lower South Island
- Our job is to make sure that the rest of New Zealand can access it



Unlocks

13%

of NZ's
electricity

Enough to
power

2.2M

electric vehicles

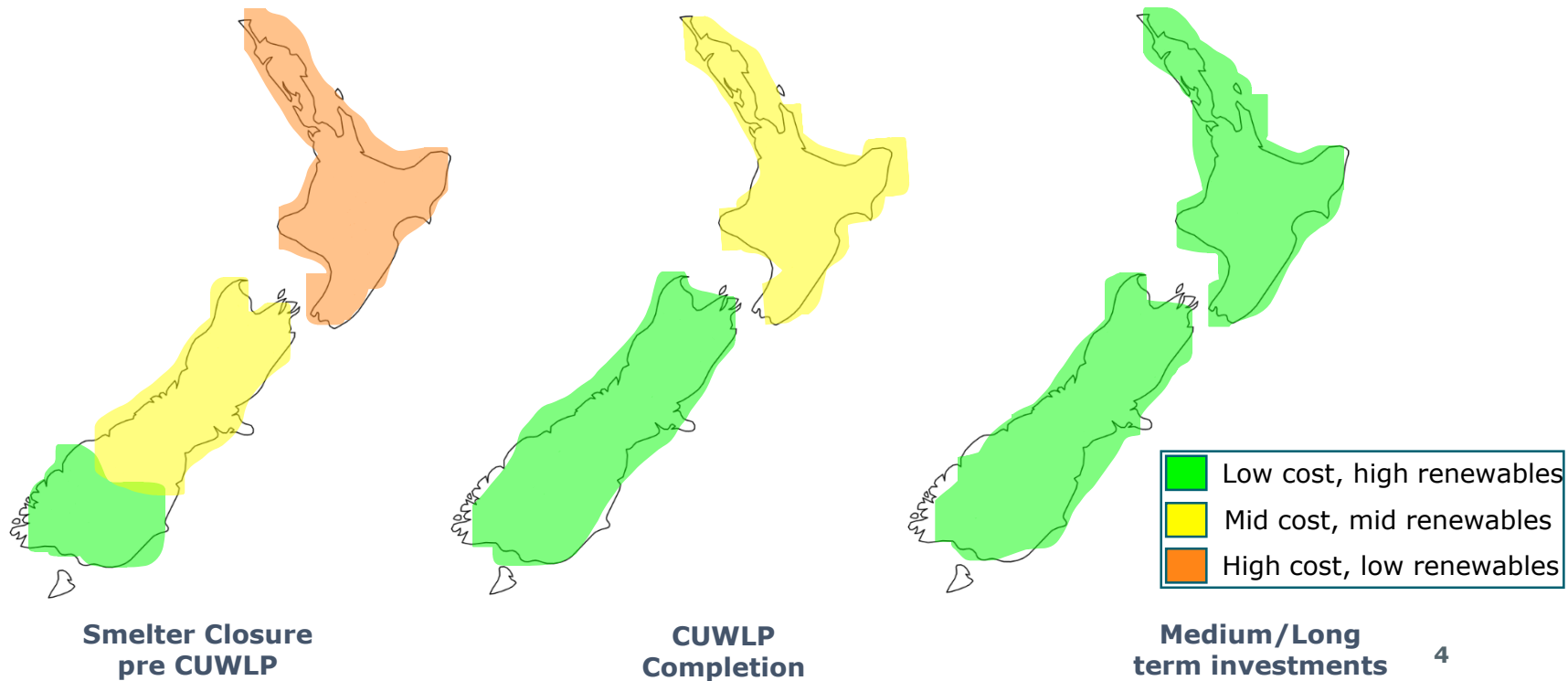
Enabling
approximately

95%

renewable by
2025

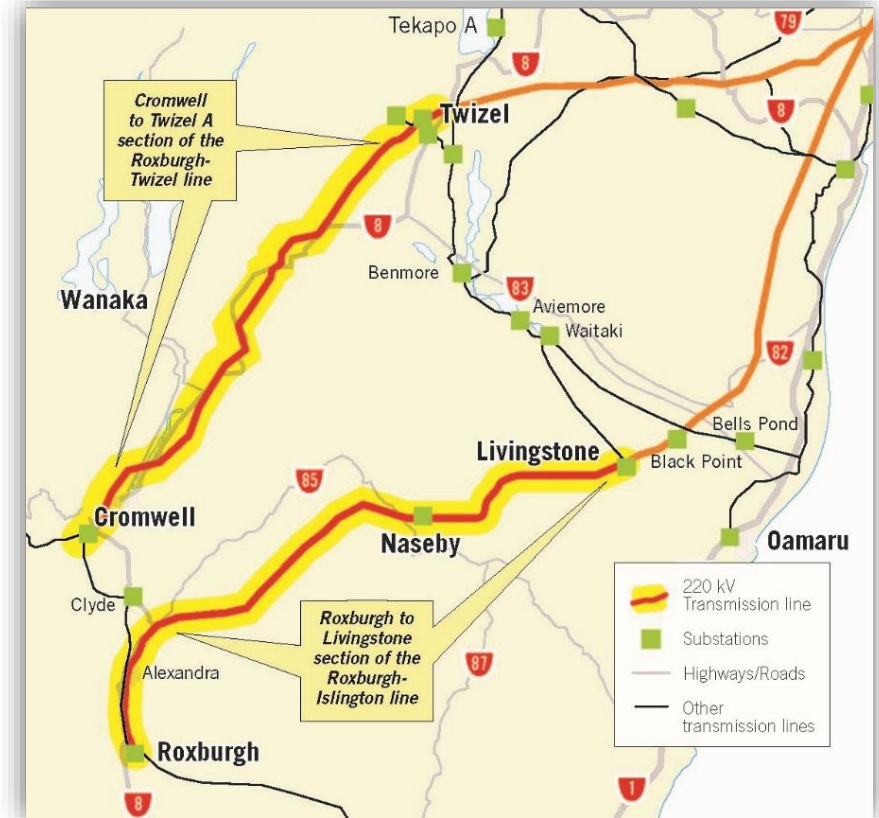
Our Response: Net Zero Grid Pathways

- Release urgent constraints, maintain system security, and gradually spread benefits across New Zealand



Clutha Upper-Waitaki Lines Project (CUWLP)

- Unlocks benefits of \$100m per year for consumers by avoiding spilled energy
- Upgrading two sections of existing lines
 - Cromwell - Twizel
 - Roxburgh - Livingstone
- Change the way the grid works between Aviemore-Benmore to increase capacity



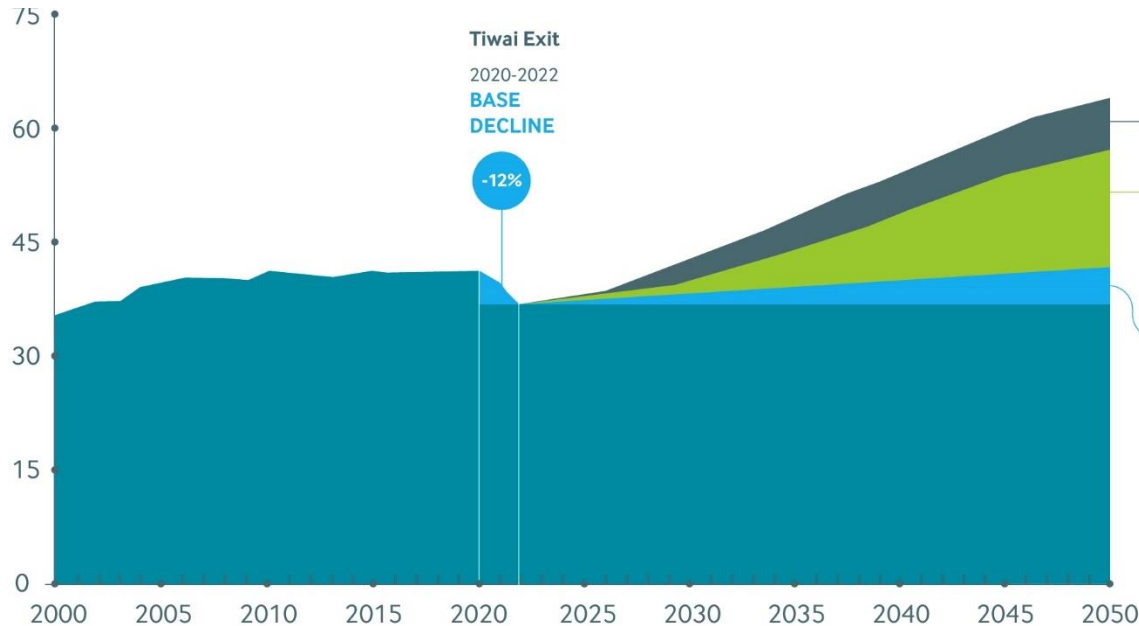
System Operator

- System Security Forecast in December will assess impacts of a smelter close in 2021
- Any changes of generation mix and availability will have implications for dry winters
- Will also consider system stability and AUFLS implications
- CANs will advise of industry teleconferences for updates

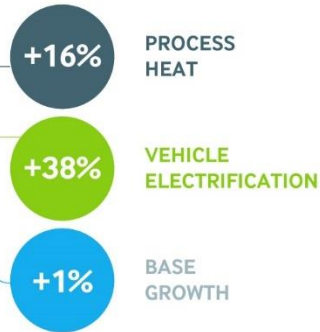


Investments are made in the context of decarbonisation

Electricity demand, TWh

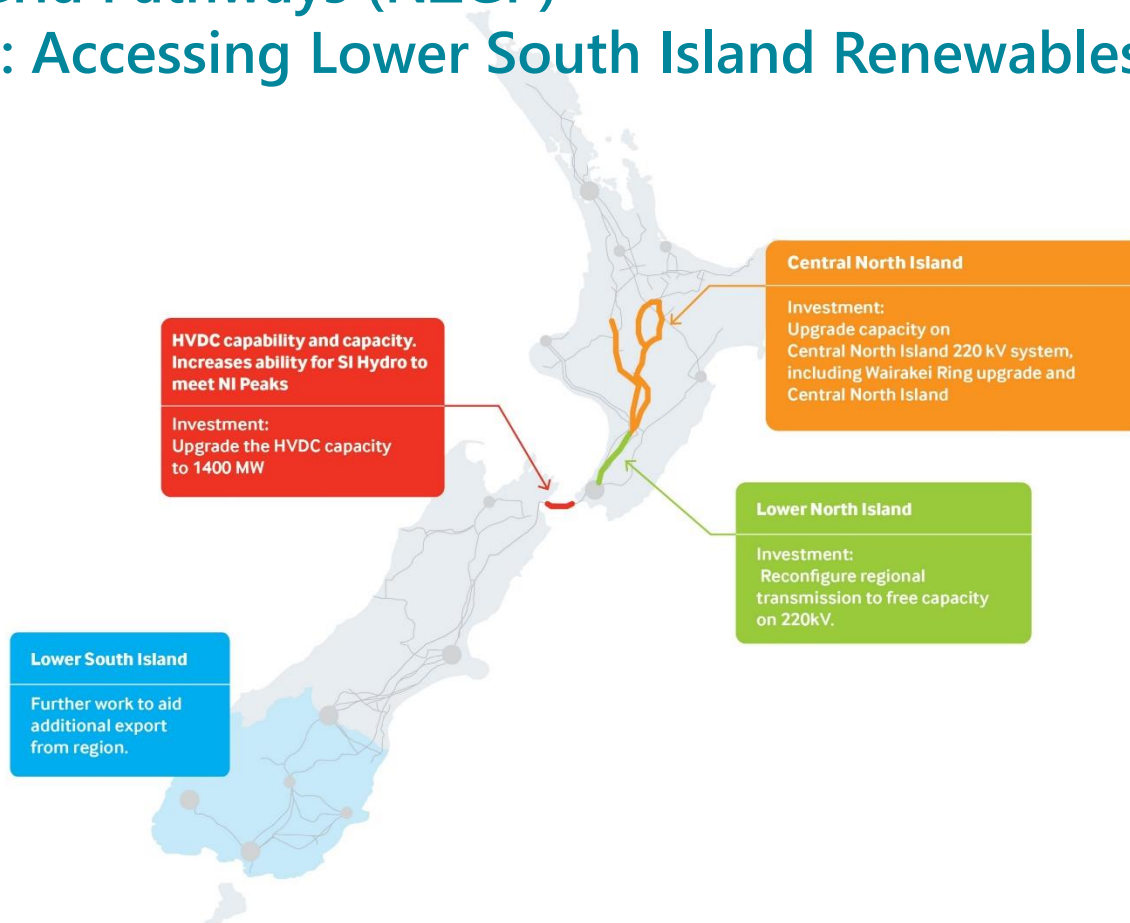


Electricity demand growth contribution 2020-2050



Net Zero Grid Pathways (NZGP)

Phase One: Accessing Lower South Island Renewables



NZGP - Accessing Lower South Island Renewables

HVDC capacity and capability

Investigation to consider

- Fourth undersea cable to increase transfer from 1200 to 1400 MW
- Options to increase capability of Pole 2 to reduce reserves needed
- Possible early replacement of one or more of the existing cables

Fourth Cable

- Timing: Late 2020s
- Cost: \$150-\$200 million



NZGP - Accessing Lower South Island Renewables

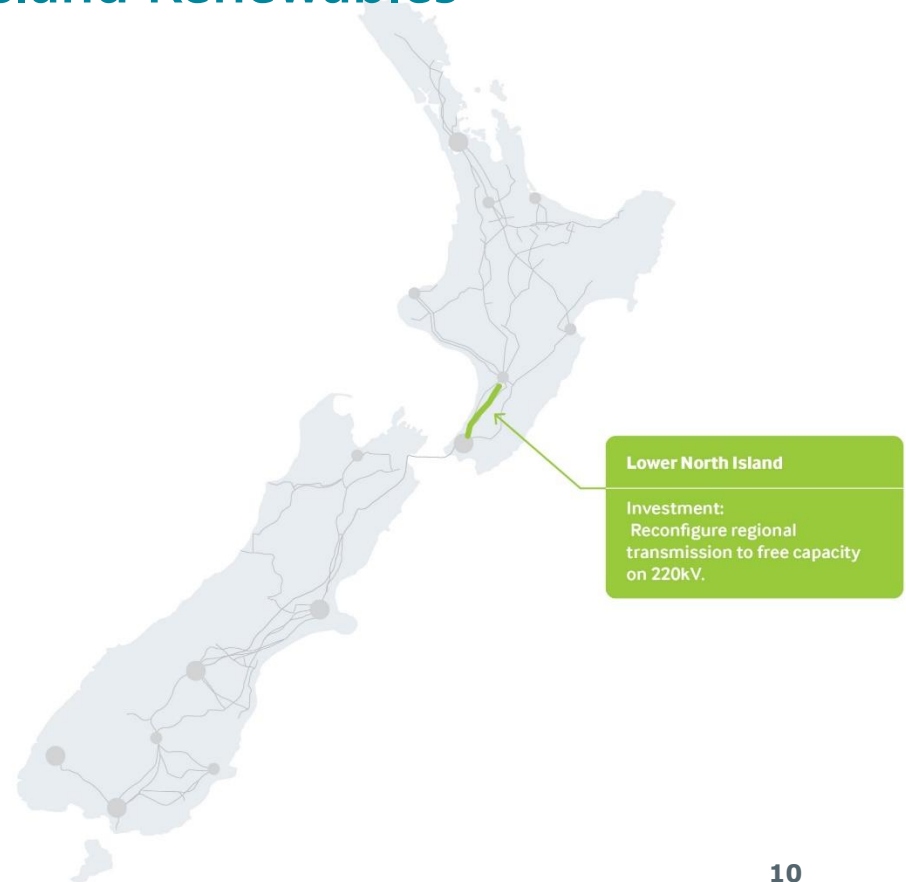
Lower North Island Constraints

Investigation to consider

- Constraints imposed on the backbone 220kV grid due to regional lines
- Possible grid reconfigurations to address

Constraint relief

- Timing by 2025
- Cost: <\$20m



NZGP - Accessing Lower South Island Renewables

Central North Island Capacity and Constraints

Investigation to consider

- Both added capacity on 220kV grid backbone and constraint relief due to regional lines
- Focus upgrades to existing lines as with CUWLP

Cost and timing

- Constraint relief by 2025
- Capacity upgrades if justified, late 2020s.
- Cost: \$300-\$350million



NZGP – Accessing Lower South Island Renewables

Further work in the lower South Island

Investigation to consider

- Further economic investments to aid export from the lower SI

Lead into Net Zero Grid Pathways: Phase Two

- Integrated 'least regrets' view of transmission and power system needs to aid renewables and electrification



Lower South Island

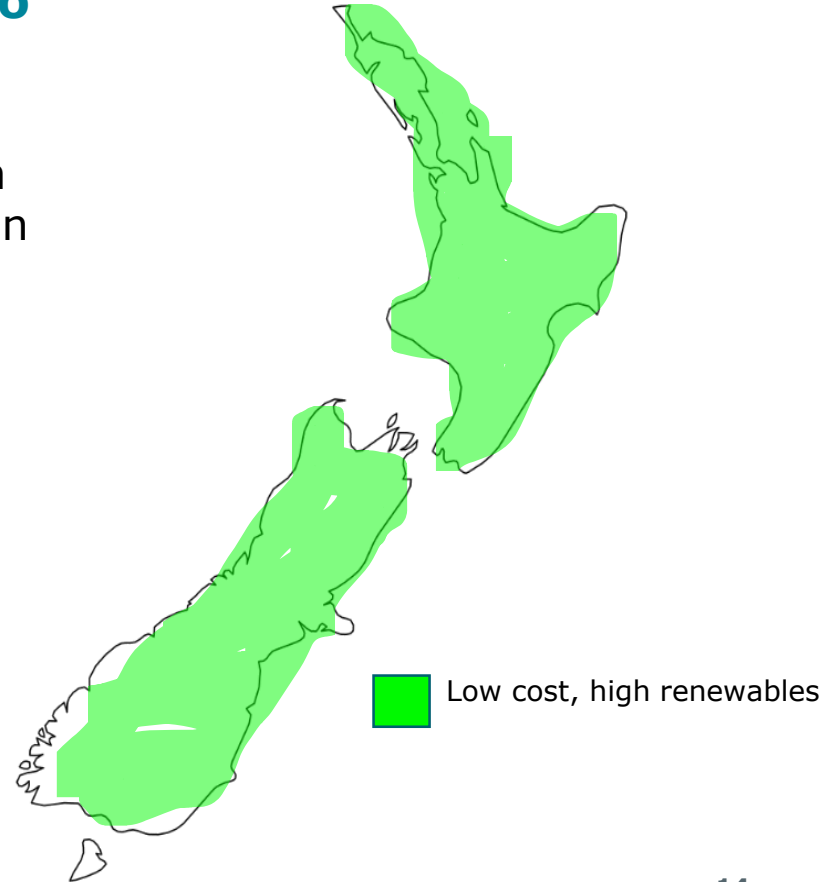
Further work to aid additional export from region.

Net Zero Grid Pathways – Phase 1

Sept-Dec 2020	<ul style="list-style-type: none"> Confirm potential system development needs from updated studies
Oct 2020	<ul style="list-style-type: none"> Industry engagement on possible post smelter demand and generation scenarios
Dec 2020	<ul style="list-style-type: none"> Updated list of areas for investigation for investment Publish System Security Forecast
Early 2021	<ul style="list-style-type: none"> Finalise demand and generation scenarios with industry and MBIE Commence work on individual investment cases for Commerce Commission approval
End 2021 – End 2022	<ul style="list-style-type: none"> Submission of investment cases to Commerce Commission
Early 2022 – Mid 2023	<ul style="list-style-type: none"> Indicative timeline for Commerce Commission Approval of investment cases
2022–2030	<ul style="list-style-type: none"> Delivery of approved investments

Net Zero Grid Pathways Phase Two

- An integrated view of future transmission and power system needs for electrification and renewables
- Key to 'least-cost' transition to a low carbon economy



Waikato Upper North Island Voltage Management

- Investment of \$150m has final approval from Commerce Commission.
- Important to maintain a reliable supply if Huntly generation reduces
- Timing for grid investment still a challenge – uncertainty at Huntly verses investment lead times
- Can non-transmission solutions meet the need and defer or replace investment in grid voltage support assets?
- We are exploring these options with industry





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Questions?