eea Electricity Engineers' Association

PROFESSIONAL DEVELOPMENT

Annual Power Engineering Exchange (APEX)

Future Proofing the New Zealand Grid

THROUGH SUSTAINABLE INNOVATIONS

GEORGINA PRICE
POWER SYSTEMS ENGINEER
Beca

DATE: 30 SEPTEMBER 2021

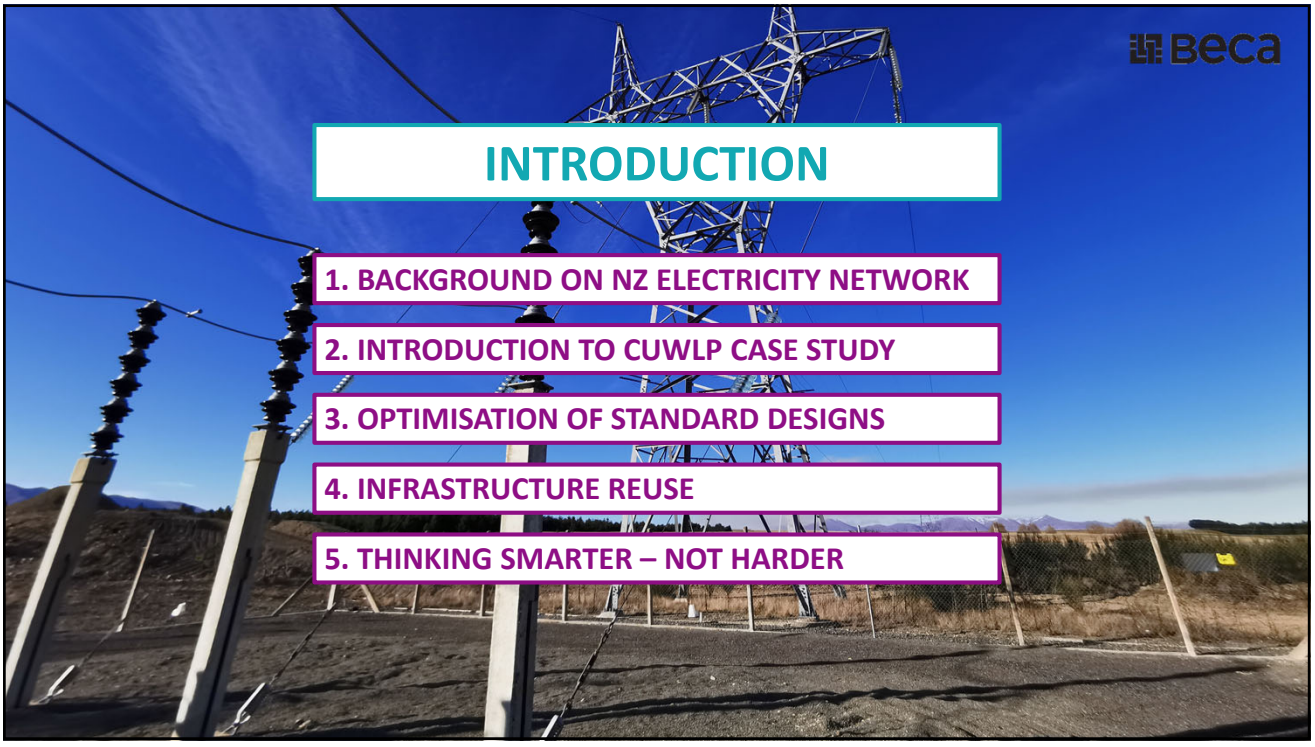
EEA.CO.NZ

cigré

Thank you to our sponsors for their support.

PSC

1



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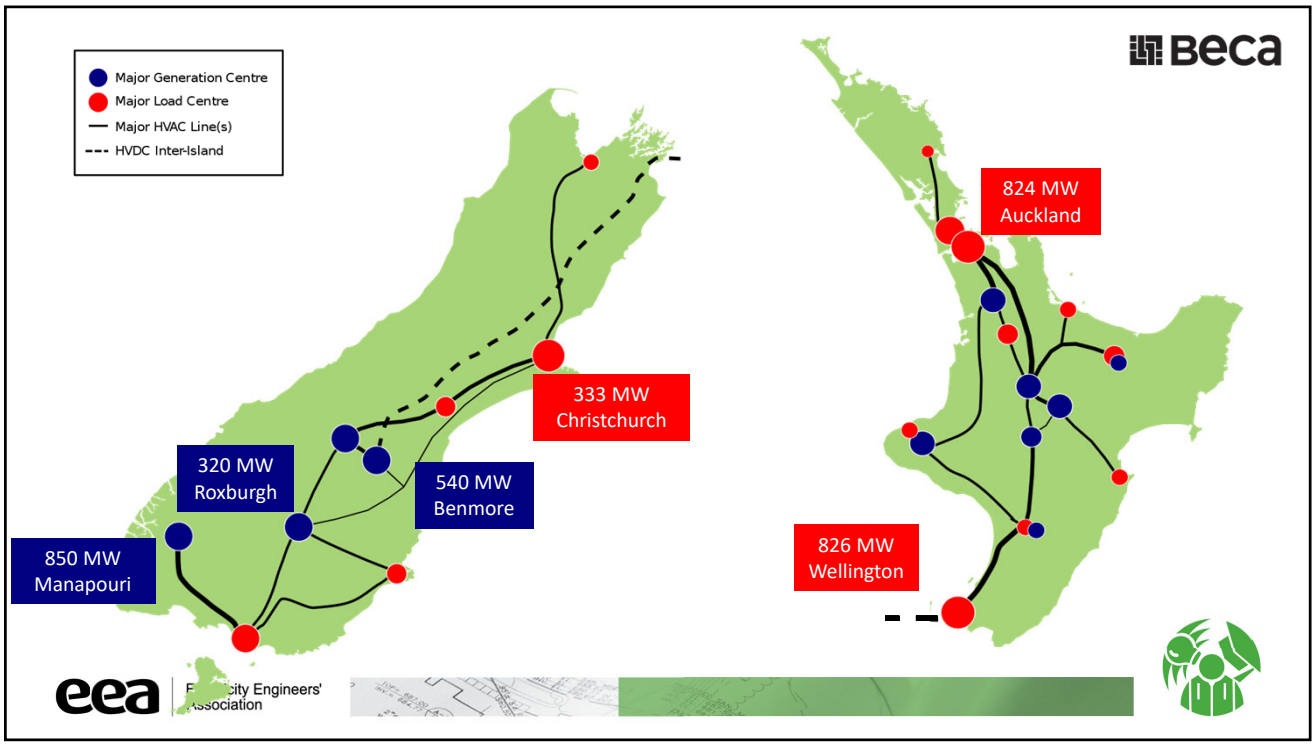
Major Generation Centre
Major Load Centre
Major HVAC Line(s)
HVDC Inter-Island
824 MW
Auckland
333 MW
Christchurch
320 MW
Roxburgh
540 MW
Benmore
850 MW
Manapouri
826 MW
Wellington
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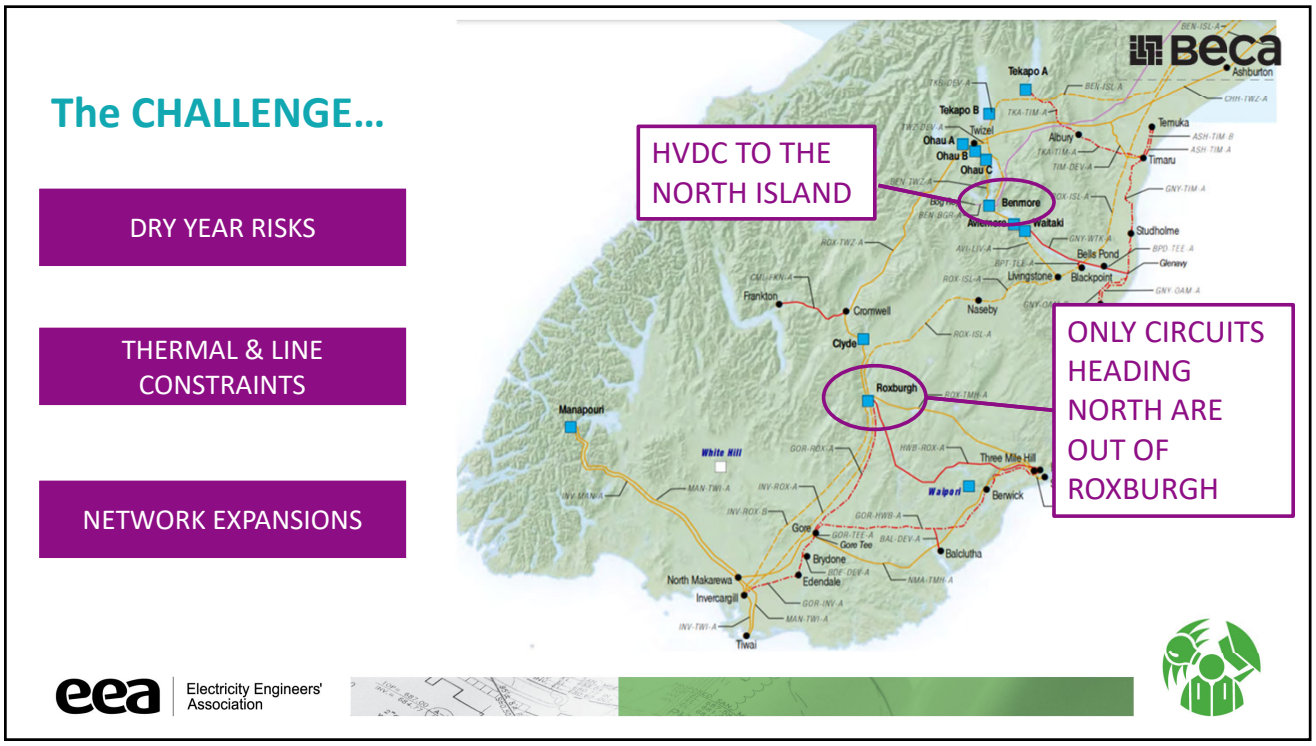
3


The CHALLENGE…
DRY YEAR RISKS
THERMAL & LINE CONSTRAINTS
NETWORK EXPANSIONS
HVDC TO THE NORTH ISLAND
ONLY CIRCUITS HEADING NORTH ARE OUT OF ROXBURGH
Beca
Tekapo A
Tekapo B
Ohau A
Ohau B
Ohau C
Benmore
Waitaki
Roxburgh
Clyde
Cromwell
Frankton
Naseby
Livingstone
Blackpoint
Bells Pond
Studholme
Timaru
Albury
Temuka
Ashburton
Manapouri
White Hill
Three Mile Hill
Waipori
Berwick
Gore
Gore Tee
Brydone
Edendale
North Makarewa
Invercargill
Tiwai
Balclutha
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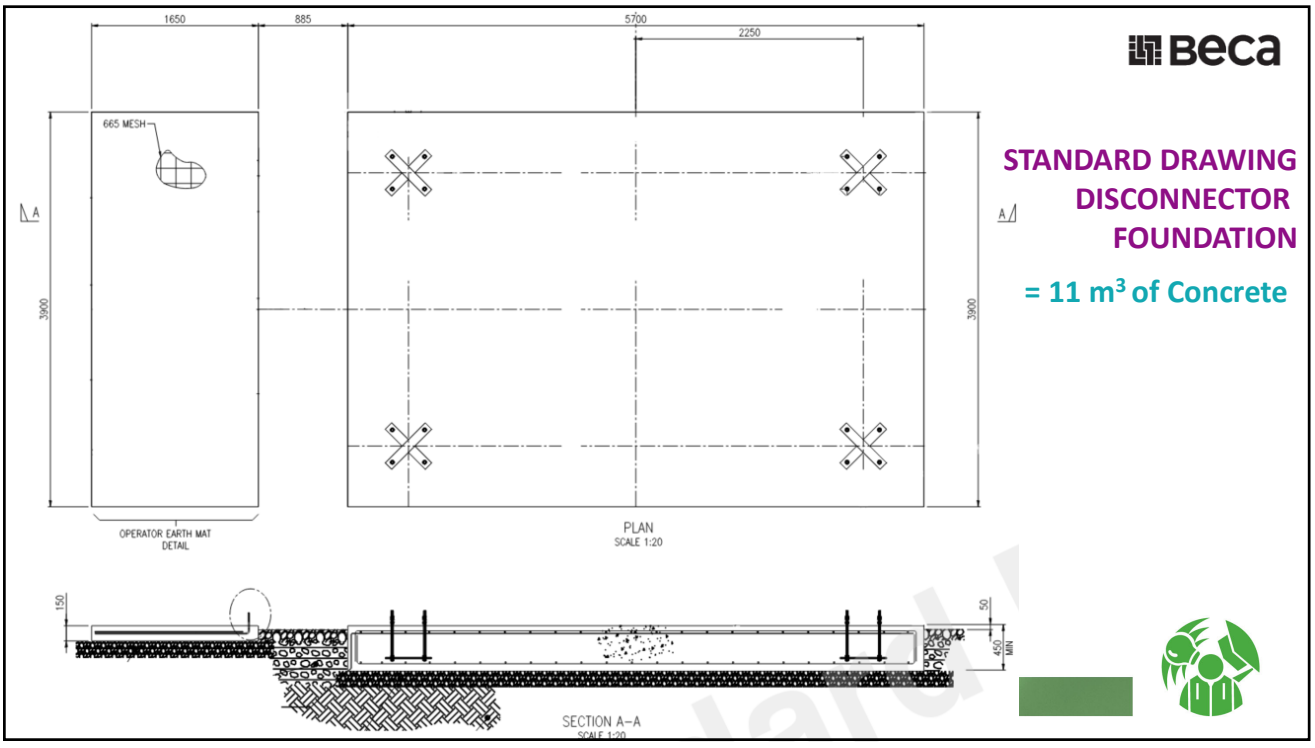
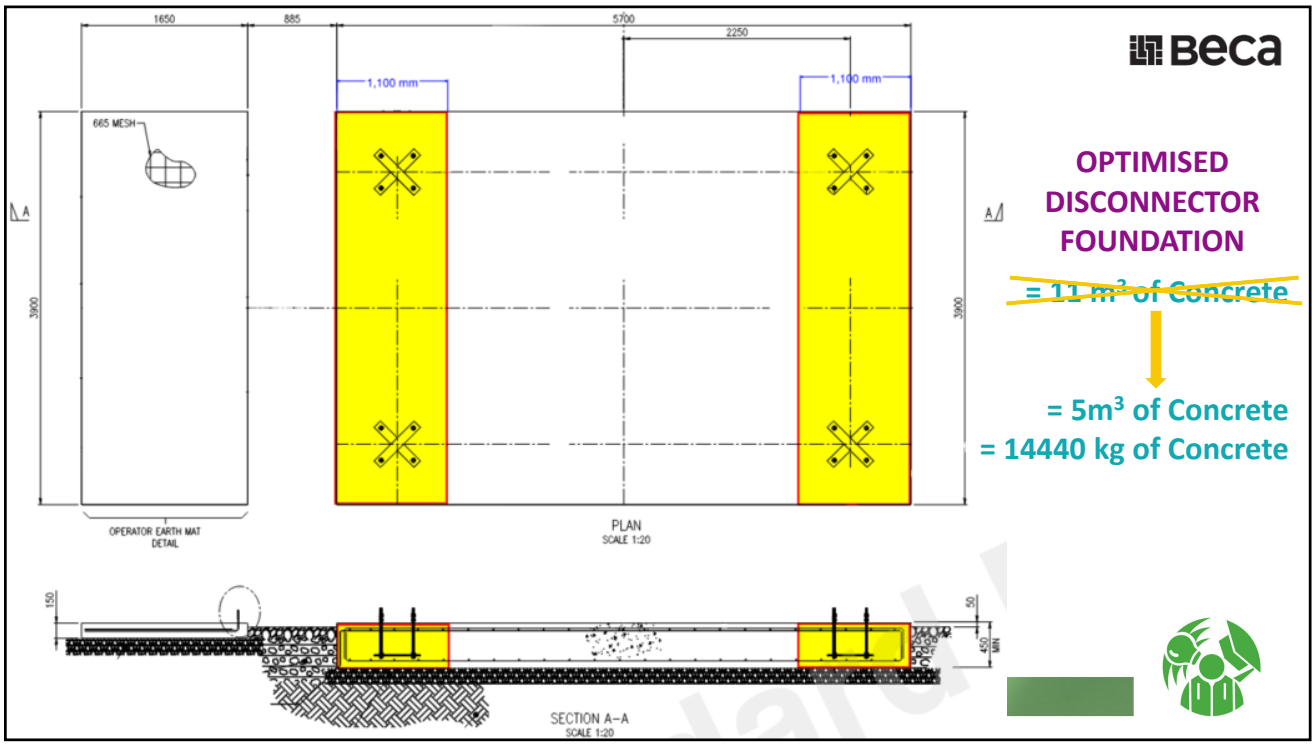
4


Beca
...The SOLUTION
CLUTHA UPPER WAITAKI LINES PROJECT
CUWLP

5


1650
885
5700
2250
665 MESH
3900
OPERATOR EARTH MAT DETAIL
PLAN
SCALE 1:20
150
50
450 MIN
SECTION A–A
SCALE 1:20
Beca
STANDARD DRAWING
DISCONNECTOR FOUNDATION
= 11 m3 of Concrete

6


1650
885
5700
2250
1,100 mm
1,100 mm
665 MESH
3900
3900
OPERATOR EARTH MAT DETAIL
PLAN
SCALE 1:20
150
50
450 MIN
SECTION A–A
SCALE 1:20
beca
OPTIMISED DISCONNECTOR FOUNDATION
= 11 m³ of Concrete
= 5m³ of Concrete
= 14440 kg of Concrete

7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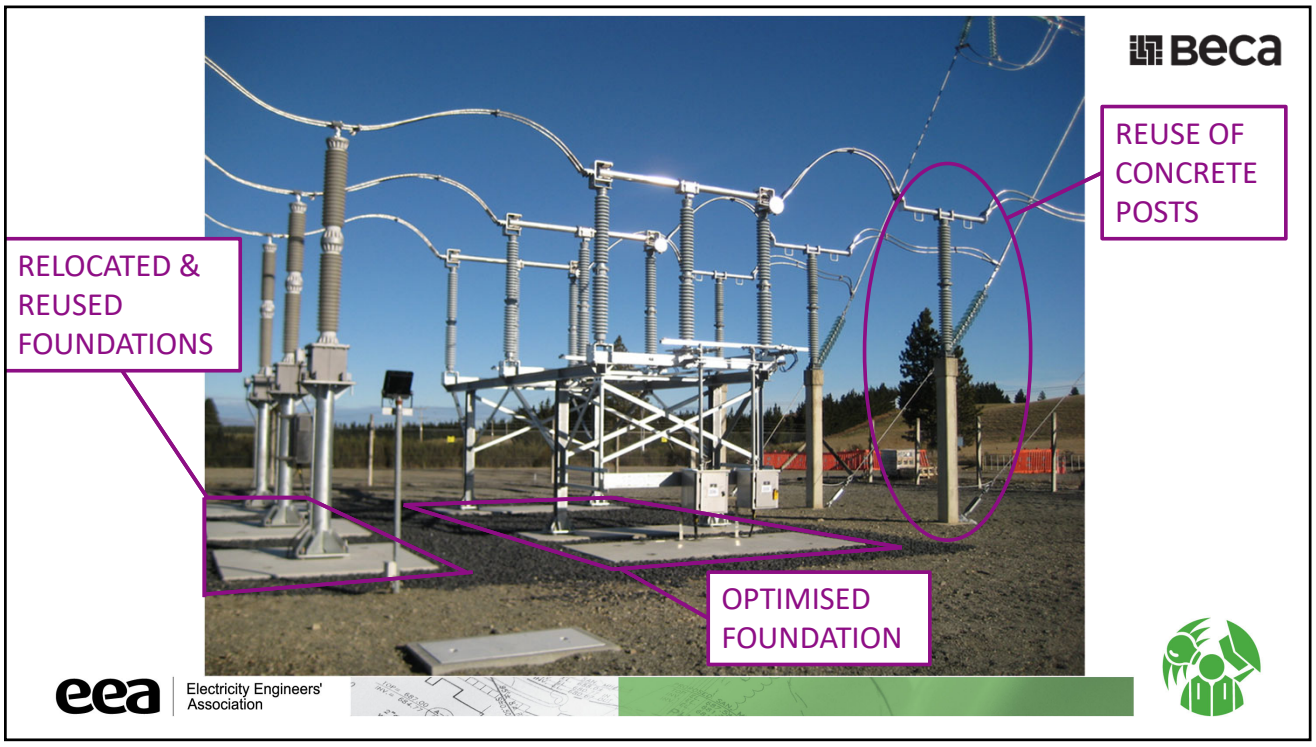
8


Beca
REUSE OF CONCRETE POSTS
RELOCATED & REUSED FOUNDATIONS
OPTIMISED FOUNDATION
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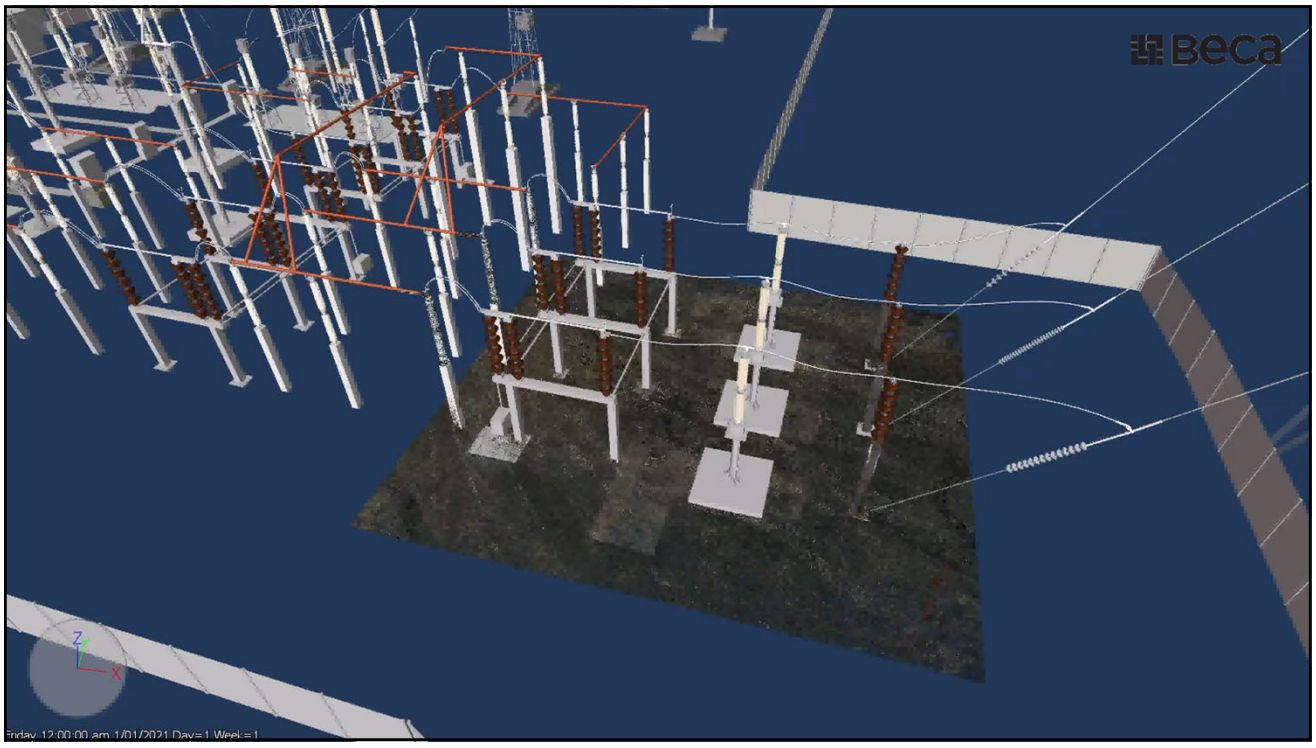
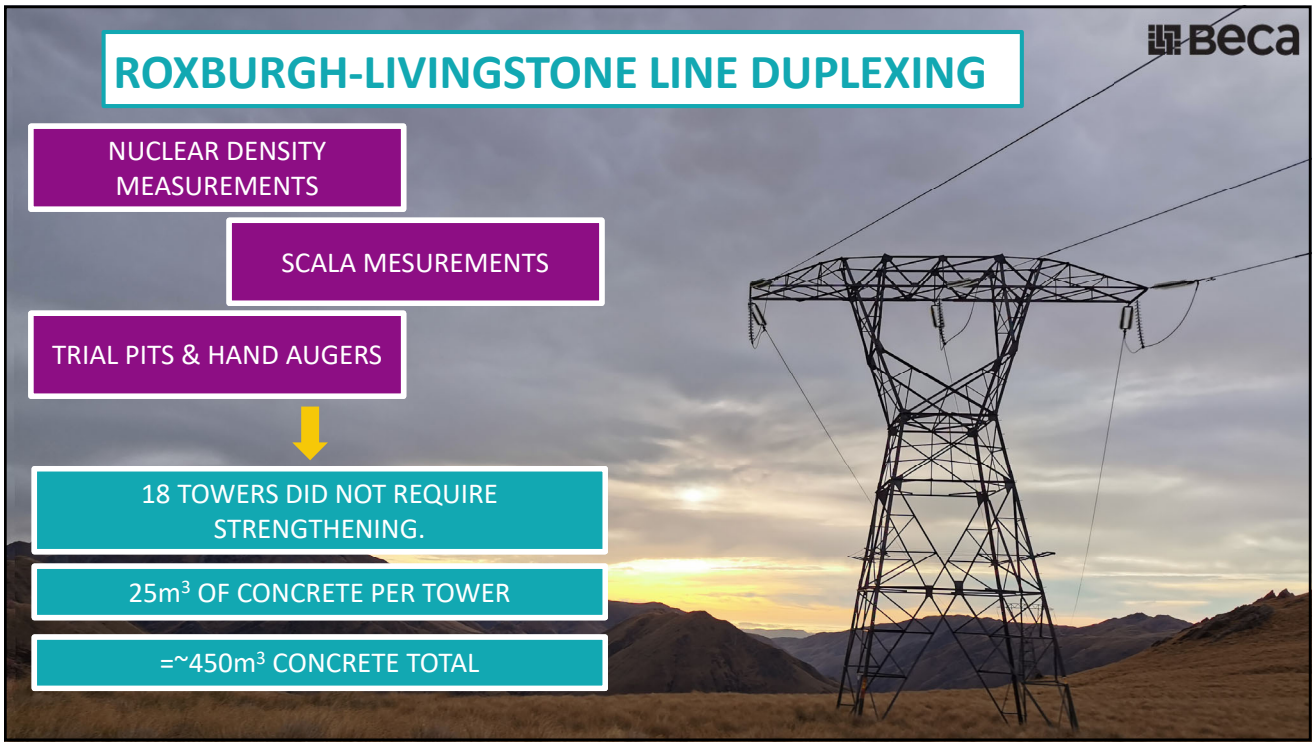
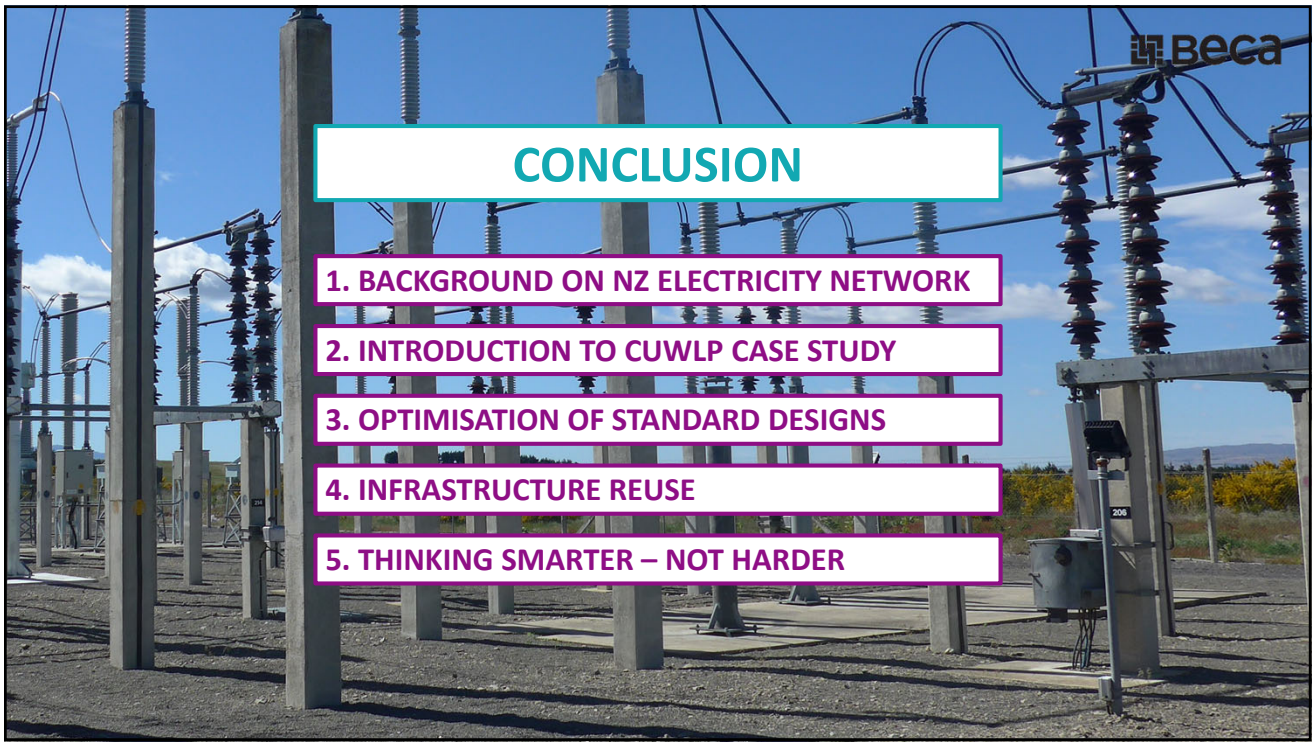
9


Beca

10


ROXBURGH-LIVINGSTONE LINE DUPLEXING
NUCLEAR DENSITY MEASUREMENTS
SCALA MESUREMENTS
TRIAL PITS & HAND AUGERS
18 TOWERS DID NOT REQUIRE STRENGTHENING.
25m3 OF CONCRETE PER TOWER
=~450m3 CONCRETE TOTAL

11


CONCLUSION
1. BACKGROUND ON NZ ELECTRICITY NETWORK
2. INTRODUCTION TO CUWLP CASE STUDY
3. OPTIMISATION OF STANDARD DESIGNS
4. INFRASTRUCTURE REUSE
5. THINKING SMARTER – NOT HARDER

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