

Keeping the energy flowing

- dismantling the existing 110 kV Arapuni to Pakuranga transmission line
- obtaining designations, easements, resource consents and property purchases necessary for all of the above work
- planning the works, including the acquisition of designations, consents and easements to allow for an eventual upgrade to 400 kV operation.



#### When will the line be changed from 220 kV to 400 kV?

There is no set date for when this change will occur as it will depend on how quickly demand increases. However, our forecasts show that it will be needed around 2030.

#### When will the project be commissioned?

The expected commissioning date for the project is Autumn 2012.

#### How many properties are directly affected by the project?

344 properties are directly-affected by the project.

#### How is Transpower working with landowners and communities affected by the project?

We are working hard to establish effective partnerships with communities and respectful and fair relationships with directly affected landowners throughout the project. Where possible, we will help to provide solutions to their concerns.

Affected communities also have the opportunity to apply to our CommunityCare Fund – a fund established to assist those communities affected by our assets and projects by investing in community-based projects that add real value and benefit to the community as a whole.

#### Does Transpower compensate landowners directly affected by the project?

We pay full and fair compensation to landowners who are directly affected by new lines and upgrade works. The estimated quantum of land compensation for this project is about \$125 million.

Compensation is in the form of a lump sum payment for procuring an easement over the line corridor, and compensation for any direct impact (such as disturbance) of the construction works and other landowner expenses, such as legal advice. The objective is to ensure that landowners are not disadvantaged by our works or assets.

Compensation for the easement takes into account the value of the land before and after the line is built – therefore it takes into account any impact our assets have on the

future use of the land in the same way that the market price for buying and selling land takes into account future use.

#### Who are Transpower's contractors for the construction of the project?

For the overhead transmission component of the project, we have signed an alliance contract agreement with Balfour Beatty United Group.

For the underground cable component, Taihan NZ Ltd – on behalf of a consortium of Taihan Electric Wire Co Korea and LS Cable Korea, the two largest Korean cable manufacturers – has been appointed. Transfield Services NZ Ltd will be the principal subcontractor for the installation of the cables.

For the substation component, tendering for the Pakuranga substation earthworks and construction has started. Tenders for Brownhill substation are expected to be requested in 2010.

In addition, a number of subcontractors and suppliers will be appointed to undertake some works, and the majority of these contractors will be local.

Keeping the energy flowing

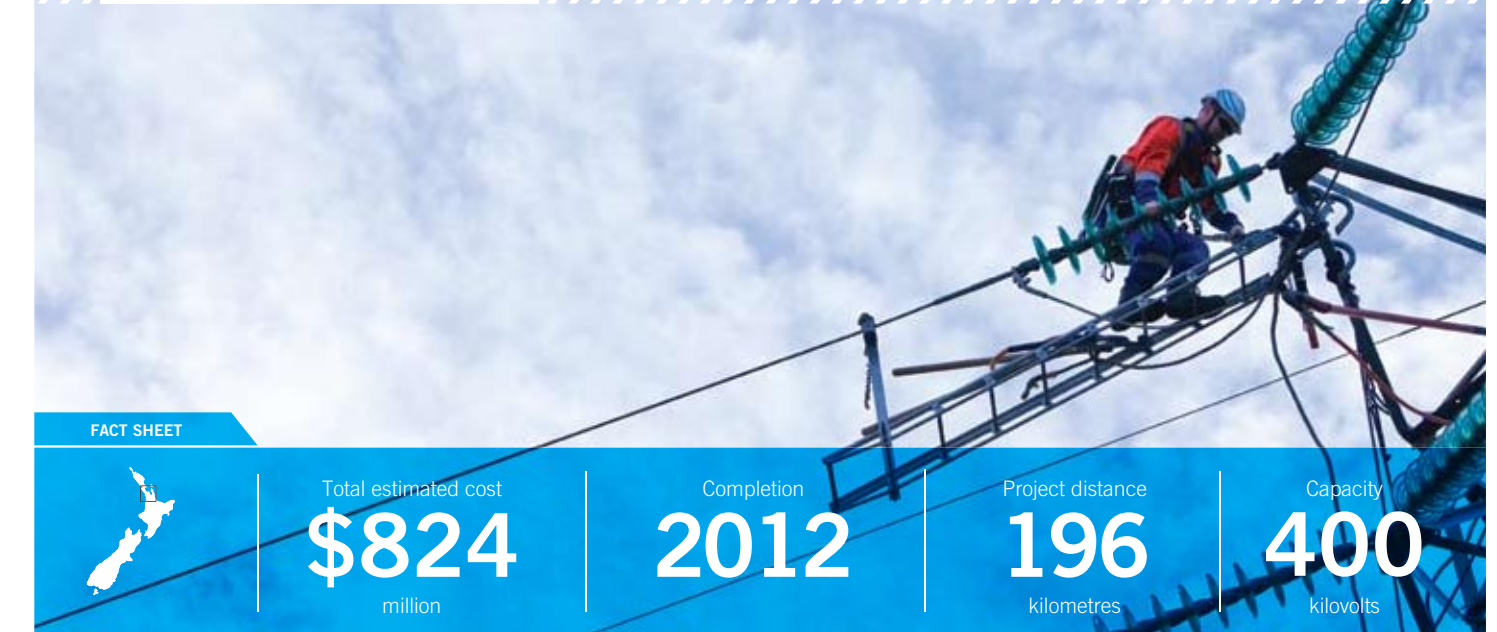
TRANSPower



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## NORTH ISLAND GRID UPGRADE PROJECT FACT SHEET



The North Island Grid Upgrade Project is one of the largest electricity transmission projects to be undertaken in New Zealand since 1960. The project is separated into three components: the overhead transmission line, substations and underground cables. The 186 km, 400 kV capable overhead transmission line runs from a new substation at Whakamaru (north of Taupo) to a new switching station in South Auckland. Four underground cable circuits will run from this substation – two circuits to a new substation at the existing Pakuranga site and, at a later date, two circuits to Otahuhu Substation.

#### Why is this project important?

The \$824 million project is vitally important to meeting the growing demand for electricity in the upper North Island. There are currently six transmission lines that run north into Auckland. The last of these were built in the 1960s. In the intervening 40 years, the population of the upper North Island has more than doubled and electricity use has more than trebled.

The upgrade is the best long-term solution to meet growing demand and provide a secure supply of electricity into Auckland and Northland well into the future.

### What benefits does it provide?

There are a number of significant benefits that this project provides including:

- Greater transmission capacity**  
 Building a transmission line that is 400 kV capable (although it will initially only be operated at 220 kV) provides greater transmission capacity to meet increases in demand going into the future, while only requiring one new line to be built rather than two. This is more economic as well as being less disruptive to those communities affected by our works.

### WHO IS TRANSPOWER?

Transpower is the owner and operator of the National Grid – the high voltage transmission network made up of lines and substations connecting areas of generation with towns and cities across New Zealand.



- Supports and facilitates the development of renewable energy**  
 The project supports the development of renewable energy sources and will make the grid more robust and able to withstand the stresses placed on the system by intermittent generation such as wind power.
- Facilitates investment in new generation projects**  
 The project provides both capacity and long-term confidence to generation investors.
- Diversity of electricity supply**  
 The project reinforces supply to Auckland and Northland by connecting to Pakuranga substation reducing reliance on Otahuhu substation.
- Economic benefits**  
 The project will create employment, local trade and social benefits.
- Alignment with Government policy**  
 The proposal meets many of the stated objectives of the revised Government Policy Statement on Electricity, including:
  - resilience against low probability but high impact events
  - diversity of electricity supply
  - avoiding multiple low-capacity lines
  - facilitating renewables (90% target).

### What will the project involve?

The North Island Grid Upgrade Project has three major components:

- Overhead transmission line**  
 A new double circuit, steel lattice tower, overhead transmission line of

186 km from a new substation near the existing Whakamaru substation to a new substation at Brownhill Road (near the South Auckland urban boundary), which is capable of initial operation at 220 kV and future 400 kV operation of around 2700 MVA per circuit.

- Underground cables**  
 Four underground circuits from the new substation at Brownhill Road (South Auckland). The first two cable circuits will connect to Pakuranga substation. The second two cable circuits will connect to Otahuhu substation at a later date (around 2020 or later) as demand increases. This will provide greater diversity of supply. The cables are capable of 220 kV operation and have a continuous rating of around 660 MVA per set of cables.
- Substations**  
 The necessary substation facilities include:
  - a new substation near the existing Whakamaru substation (Air Insulated Switchgear – outdoor)
  - a substation located at Brownhill Road in South Auckland (becoming a Gas Insulated Substation – indoor around 2020 or later)
  - upgrade of the existing Pakuranga substation from 110 kV to 220 kV.

The project also includes:

- carrying out the works necessary to convert the existing 110 kV Otahuhu-Pakuranga line to 220 kV operation – already designed and consented

## PROJECT KEY FACTS

### NEW OVERHEAD TRANSMISSION LINE:

Length of overhead route  
**186**  
kilometres

Number of properties affected by the new line  
**318**

Number of structures required  
**426**

Design capacity of new line  
**2700**  
MVA per circuit

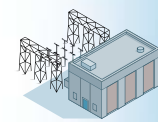
Average tower height  
**60\***  
metres

Average span length (between each tower)  
**437**  
metres

**Maximum** tower height **70** metres

**Minimum** tower height:  
 Double circuit towers **46.3** metres\*  
 Single circuit tower **25** metres\*

\* Subject to minor change



### SUBSTATIONS

**BROWNHILL**  
 Design  
**Indoor** (Gas insulated)  
 Voltage  
**220 kV (400 kV capable)**

**WHAKAMARU**  
 Design  
**Outdoor** (Air insulated)  
 Voltage  
**220 kV (400 kV capable)**

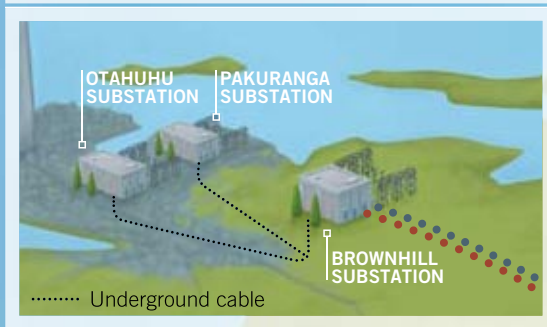
Number of properties affected  
**6**



### UNDERGROUND CABLE:

OTAHUHU	PAKURANGA
Length of underground cable <b>10.5</b> kilometres	Length of underground cable <b>11.5</b> kilometres
Number of properties affected <b>8</b>	Number of properties affected <b>12</b>

### UNDERGROUND FROM BROWNHILL



### ARAPUNI - PAKURANGA 110 kV LINE:

Age of line  
**1940**

Length of line to be removed  
**147**  
kilometres

Number of towers to be removed  
**460**

Average height of towers  
**25**  
metres

Capacity of line  
**114**  
MVA

ILLUSTRATIONS NOT TO SCALE