The Need

What is the National Grid?

The National Grid is the network of high-voltage transmission assets (lines, towers, poles and substations). These assets transport electricity from power stations to local lines companies and major industrial users.

Why is the National Grid so important?

Over half New Zealand's electricity is generated from renewable energy sources such as hydro, geothermal and, increasingly, wind. These energy sources exist in remote areas, a long way from where most people live. As these resources can not be transported to areas of demand, a National Grid is needed to transport the power generated.

A strong National Grid supports competition in the market and helps generation to be developed and electricity transported to where it is used.

Why is Transpower upgrading the National Grid?

The current 'backbone' of the National Grid was built largely in the 1950s and '60s, and is now nearing capacity in places. Transpower is planning a major investment programme to address:

- Strong growth in electricity demand in recent years and projected growth looking out over the next 40 years.
- The need to connect a diverse range of new sources of generation.
- The ageing of the national grid.

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The National Grid is essentially a transport system and, like the roading network, it needs to be maintained and upgraded to meet the needs of a growing economy. Also, like the roading network, there comes a time when demand exceeds available capacity and a new route is necessary.

Which regions are affected?

Transpower has embarked on an investment programme to upgrade electricity supply to many parts of New Zealand. This programme is expected to cost around $4 billion over the next ten years. A key initiative is securing future supply for the upper North Island. Transpower has two major projects underway at present to address that need:

- The North Island Grid Upgrade Project (to provide more capacity into the upper North Island)
- The North Auckland and Northland Grid Upgrade Project (to provide more capacity across Auckland and into North Auckland and Northland)

How fast is the upper North Island's electricity demand growing?

For the four years between 2007 and 2011, peak demand in the upper North Island (Auckland and Northland) is forecast to grow by 16% or about 354 MW. This is based on a forecast that on average will be exceeded only once every ten years.

How fast is New Zealand's overall electricity demand growing?

While New Zealand's average peak electricity demand growth is about 2% per year over a long period, it can vary greatly from year to year. The National Grid is planned to ensure that even if electricity growth is higher than an average forecast, the transmission capacity remains adequate. This is achieved through using a forecast that only has a 10% probability of being exceeded.

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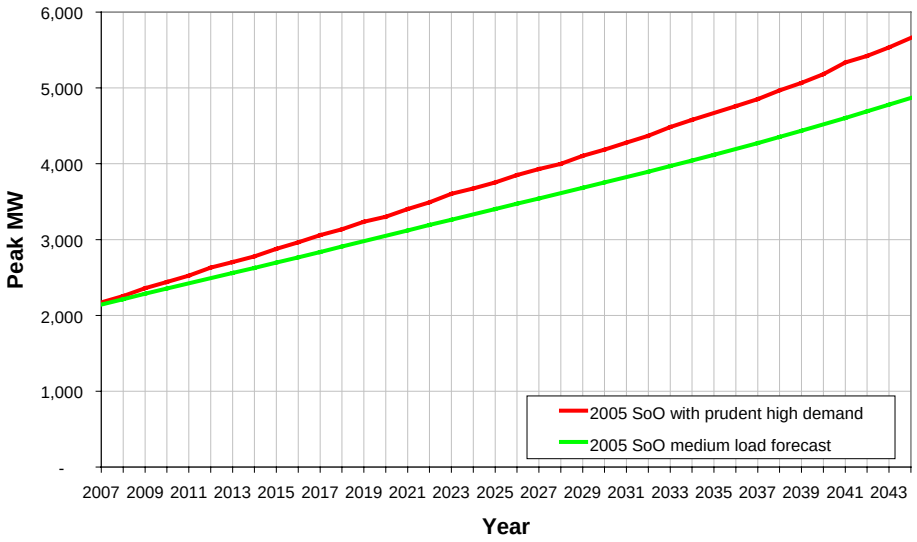

How is electricity demand growth forecast?

A number of factors are brought together when forecasting the likely future electricity demand. These include key indicators like population growth, housing growth and economic growth. For planning purposes, Transpower begins with the demand forecasts published by the Electricity Commission as part of its Statement of Opportunities (SoO). For the North Island Grid Upgrade Project, Transpower has used a prudent high demand forecast provided by the Commission. This has a probability of exceedence of 10% - meaning that it may be exceeded on average, once every ten years.

Do your forecasts take into account new generation projects?

Yes. We have considered a number of generation growth scenarios that reflect the possible installation of new generation. These scenarios are based on how certain electricity resources (like water, gas, coal and wind) may be used in the future, and are included in Transpower's forecasting.

What about the increasing use of solar power and other generating initiatives by business and households?

The forecasts also take account of the likely growth that could occur in all forms of generation. This includes generators run by large businesses connected to local distribution networks, and the smaller generation technologies now available to some householders (eg, solar and small wind or hydro projects). However the uptake of these technologies has been very low to date.

Why can't we just use power more efficiently?

New Zealanders do need to be more responsible with their electricity use. Transpower encourages sustainable environmental practices within our own industry and with our customers.

A June 2005 study undertaken by consultants SKM for the Electricity Commission on possible initiatives to dampen electricity demand in the upper North Island region noted that such demand-side initiatives are:

> "…unlikely to take the place of transmission upgrade or the addition of appropriate generation, but will simply serve to defer these supply options."

New Transpower projects will now take into account the need to provide diversity particulary to serve major load centres.

In any event, electricity usage continues to grow as our population and economic activity grows. For example, on average, Auckland's population grows by between about 50 and 100 people a day. Each new person relies on electricity — for cooking, heating, lighting and working. While we can be more efficient with our usage, our overall demand will continue to grow as our country grows.

Requirement for Diversity

Recent events have demonstrated that some parts of the National Grid may be particularly affected by natural hazards and/or human error, as there are not enough alternative connections to cover faults or failures in one part of the system. Part of Transpower's forward planning, strongly encouraged by the Government, now emphasises diversity. In this way the effects of unavoidable and/or unforeseen risks can be minimised. New Transpower projects will now take into account the need to provide diversity particularly to serve major load centres.