

# Draft decision on Transpower's Auckland 400kV grid investment proposal

Presented by Electricity Commission Chair, Roy Hemmingway  
27 April 2006

# The Electricity Commission

- Established September 2003 after failure of industry self-governance
- Full-time chair and four part-time commissioners
- 40 staff
- Oversees electricity markets, provides dry-year reserve, conducts electricity efficiency programmes, and **regulates transmission investment**

# Commission consideration of GUPs

- Transpower proposes grid upgrade plans (GUPs)
- Commission considers GUP, using Grid Reliability Standards (GRS) and Grid Investment Test (GIT)
- Commission must determine that proposal is superior to alternatives (benefits versus costs)

# Supply into Auckland

- Demand growth forecast at 2.8% per year
- No new generation committed for Auckland or Northland
- Security not at preferred levels now
- Unacceptable security in 2010 if no investment occurs
- Major new line needed **if** no new generation or no reduction in demand growth (question is when?)

**Transpower and Electricity Commission agree on these points**

# Commission process - 400kV proposal

- Began wide consultation on transmission alternatives (May 05)
- Transpower submitted 400kV proposal (Sep 05)
- Community, iwi and industry briefings (ongoing 05/06)
- Analysis of proposal and alternatives (early 06)
- GIT analysis of 4 transmission-based alternatives and 400kV proposal (early 06)
- Commission's work internationally peer-reviewed (ongoing)

# Transmission-based alternatives

2017	New 400kV transmission line
2017	New 220kV transmission line
2017	New HVDC transmission line
2021	New 400kV transmission line

- All provide secure capacity into Auckland and achieve the same reliability as Transpower proposal
- All require intermediate investments to get to 2017
- All require additional investment after 2017 (so does Transpower proposal) to get to 2030

# Investments needed before 2010

- **Already approved by Commission:**
  - thermal upgrade of WKM-OTA 220kV A and B lines
  - new 220kV substation at Huntly East
  - 100MVar static var compensator (SVC) and 100MVar capacitors at Albany
  - 24MVar capacitor at Kaitaia
- **Indicative additional projects:**
  - 30MVar capacitor at Bombay (required by 2008)
  - 100MVar capacitor at Otahuhu (required by 2009)
  - new 220/110kV interconnecting transformer at Bombay (required by 2010)

# Indicative investments before 2017

- **After 2010:**
  - uprate section of the WKM-OTA 220kV C line from 493/404MVA<sub>r</sub> to 670/614MVA<sub>r</sub>
  - 2 x 100MVA<sub>r</sub> capacitors at Huntly
  - Install phase shifting transformers on the Arapuni – Bombay, Arapuni–Pakuranga and Hamilton–Bombay 110kV circuits
- **After 2016:**
  - 300MVA<sub>r</sub> SVC at Otahuhu 220kV

# GIT analysis results

	400kV 2010	400kV 2017	220kV 2017	HVDC 2017	400kV 2021
	<b>2010 dollars (millions)</b>				
Mean capital cost (A)	775	495	400	493	607
Mean O&M costs (B)	15	6	3	10	3
Mean reliability benefit (C)	0	5	15	13	15
Mean relative loss cost (D)	0	76	118	74	109
Mean capacity benefit (E)	5	0	0	0	0
Mean terminal benefit (F)	31	30	6	15	45
<b>Mean NPV cost (A+B-C+D-E-F)</b>	<b>754</b>	<b>541</b>	<b>499</b>	<b>549</b>	<b>658</b>

# Sensitivity analysis results

Sensitivity	400kV 2010	400kV 2017	220kV 2017	HVDC 2017	400kV 2021	Biggest Difference
	<b>2010 dollars (millions)</b>					
Reference Case	0	-213	-254	-205	-96	<b>-254</b>
Capital Cost +10%	0	-241	-293	-233	-113	<b>-293</b>
Capital Cost -10%	0	-185	-216	-177	-79	<b>-216</b>
Hydro or renewable 50%	0	-196	-217	-193	-69	<b>-217</b>
Gas scenario 50%	0	-247	-316	-237	-154	<b>-316</b>
Coal scenario 50%	0	-217	-268	-205	-99	<b>-268</b>
Reduced demand scenario 50%	0	-208	-255	-196	-86	<b>-255</b>

# Sensitivity analysis results (2)

Sensitivity	400kV 2010	400kV 2017	220kV 2017	HVDC 2017	400kV 2021	Biggest Difference
	<b>2010 dollars (millions)</b>					
Fuel Cost + 20%	0	-198	-223	-192	-73	<b>-223</b>
Fuel Cost - 20%	0	-228	-285	-218	-118	<b>-285</b>
No carbon tax - cost of losses 12% less	0	-222	-272	-212	-109	<b>-272</b>
Discount rate 9%	0	-272	-320	-273	-148	<b>-320</b>
Discount rate 5%	0	-142	-166	-119	-31	<b>-166</b>
Alternative project costs +20%	0	-114	-176	-107	-26	<b>-176</b>
Easement costs inflated at 3% per annum	0	-194	-241	-194	-74	<b>-241</b>

# Sensitivity analysis results (3)

Sensitivity	400kV 2010	400kV 2017	220kV 2017	HVDC 2017	400kV 2021	Biggest Difference
	2010 dollars (millions)					
Cost of Unserved Energy \$30,000 per MWh	0	-216	-262	-212	-103	<b>-262</b>
Cost of Unserved Energy \$10,000 per MWh	0	-210	-247	-198	-88	<b>-247</b>
Transpower Capital Costs for Proposal	0	-113	-154	-105	+5	<b>-154</b>
Transpower Capital Costs for Alternative Projects	0	-216	-227	-145	+123	<b>-227</b>
Use LRMC for loss benefits	0	-200	-225	-197	-77	<b>-225</b>

# Commission's draft decision

- On the information available and the analysis undertaken to date, there are alternative projects that minimise the expected net market costs compared with Transpower's proposal

**Therefore, Transpower's proposal does not meet the Grid Investment Test and cannot be approved**

# A transmission corridor?

- New lines must now have exclusive corridors with easements
- Land near Auckland rapidly urbanising
- If a corridor is possible, may provide certainty to landowners and security to Transpower
- Ideally new corridor should allow 220kV, HVDC or 400kV options
- May not be within Commission's powers

**Would acquisition of corridor be desirable and practicable? The Commission will consult on this question**

# Next steps in process to final decision

- Written submissions on draft decision by 9 June
- Public hearings
  - Manukau 1 June 2006
  - Hamilton 2 June 2006
- Public conference (if requested)
  - Wellington 6 and 7 July 2006
- Final Commission decision late July 2006

## If final decision is 'No'

- Build investments needed before 2010 and 2017
- Transpower may come back to Commission with revised proposal
- Revised proposal need not be one of the alternatives considered:
  - Commission did not seek to develop least-cost alternative
  - Transpower is grid planner
- Revised proposal would require Commission analysis, decision, and consultation

# If final decision is 'Yes'

- Transpower seeks designation under Resource Management Act
- Ministerial approval may be needed to invoke Public Works Act for land acquisition
- Transpower must come back to Commission if proposal or costs materially change
- Transpower seeks approval for investments needed before 2010

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