

IN THE MATTER

of the Resource Management Act 1991

AND

IN THE MATTER

an application by **MAJAC TRUST** to vary parts of
the Buller River Water Conservation Order
relating to the Gowan River.

EVIDENCE OF MICHAEL CAMPBELL COPELAND

1. QUALIFICATIONS AND EXPERIENCE

- 1.1 My name is Michael Campbell Copeland and I am a consulting economist of Wellington. Currently I am joint managing director of Brown, Copeland and Company Limited, a firm of consulting economists which has undertaken a wide range of studies for public and private sector clients in New Zealand and overseas. During the period July 1990 to July 1994, I was also a member of the Commerce Commission and currently I am a lay member of the High Court under the Commerce Act. Prior to establishing Brown, Copeland and Company Limited in 1982, I spent six years at the New Zealand Institute of Economic Research and three years at the Confederation of British Industry.
- 1.2 I acknowledge that I have read the code of conduct for expert witnesses contained in the Environment Court Practice Note at [2005] NZRMA 193 and I have complied with it when preparing my written statement of evidence and I agree to comply with it when I give this oral evidence before the Environment Court.
- 1.3 The evidence that I give is within my area of expertise unless I state that I am relying on the evidence of another person.
- 1.4 I have not omitted to consider material facts known to me that might alter or detract from the opinion I express.
- 1.5 I hold a Bachelor of Science degree in mathematics and a Master of Commerce degree in economics. A summary of my curriculum vitae is attached as **Appendix 1**.
- 1.6 With respect to the Resource Management Act 1991 (**RMA**), I have prepared evidence for clients covering a number of development projects and policies. A selection of these is listed in Appendix 1.

2. SCOPE OF MY EVIDENCE

- 2.1 My evidence addresses the following issues:
- The relevance of economics to matters under the RMA and in particular Water Conservation Order variations;

- The economic benefits to the Nelson region during the construction phase of the proposed Gowan River scheme (“the scheme”);
- The economic benefits of the scheme in terms of reduced electricity generation and transmission costs;
- The economic benefits of enhanced electricity security of supply for businesses and households in the Nelson region; and
- The potential economic costs for the Nelson region of any displaced rafting as a consequence of the scheme.

3. ECONOMICS AND THE RMA

- 3.1 Economic considerations are intertwined with the concept of the sustainable management of natural and physical resources, which is embodied in the RMA. In particular, Part II section 5(2) refers to enabling “people and communities to provide for their ... *economic* ... well being” as part of the meaning of “sustainable management” and therefore part of the purpose of the Act.
- 3.2 Part II section 7(b) notes that in achieving the purpose of the Act, all persons “shall have particular regard to ... the efficient use and development of natural and physical resources”, which refers to the economic concept of efficiency.
- 3.3 Part I section 207 of the RMA in relation to the matters a special tribunal shall have regard to in considering an application for a water conservation order includes at sub clause 207(b) “The needs of primary and secondary industry, and of the community”. Given section 216(4) consideration of these needs is also required with respect to any variation of a water conservation order.
- 3.4 Primary industry covers those sectors of the economy, which involve the extraction of raw materials (often referred to as primary products) for later processing and include farming, horticulture, fishing, forestry and mining. Secondary industry is the second stage in the production chain and involves taking primary products and processing them into goods. This processing, which may involve a number of separate steps, is also called manufacturing. Examples include the manufacture of meat, dairy, fish and other food products, the manufacture of timber products, aluminium production and the

manufacture of metal products. Primary and secondary industry excludes businesses in the tertiary (services) sector of the economy. I interpret the “needs of primary and secondary industry” to be principally economic in nature and to include the reliable supply of goods and services (including electricity) to businesses in these sectors at prices which are sufficiently low to enable them to compete in domestic and overseas markets.

3.5 The term “community” covers the general population in their various functions as consumers, employees, owners of businesses and members of organisations. I interpret the “needs of the community” to encompass both economic and non-economic aspects, and to include opportunities for employment and the reliable supply of basic goods and services (including electricity) at affordable prices.

3.6 From the foregoing I believe that from an economic perspective¹ an application for a variation to the water conservation order over the Gowan River would be considered favourably, in terms of Part II section 5(2), Part II section 7(b) and Part I section 207 of the RMA, where: (i) the variation enables a project to be developed bringing additional employment opportunities and incomes to the local region; (ii) the variation leads to more efficient generation and transmission of electricity and the delivered cost of electricity for local business and residential consumers is lowered or at least future price increases are constrained; (iii) the variation enables improvements to be made to the reliability and security of electricity supply to local business and residential consumers; and (iv) the variation does not result in reductions in economic benefits to the region from any displacement of alternative uses of the affected water resource. I address each of these in the remainder of my evidence.

4. CONSTRUCTION PHASE ECONOMIC BENEFITS

4.1 I have been informed by the Majac Trust, that the project is likely to take three years to construct, creating an additional 30 construction jobs in the Nelson

¹ I understand that other witnesses for the applicant will address non-economic factors.

region during this period and additional wage and salary payments estimated to be \$1.5 million per annum.²

- 4.2 In addition to these increases in “direct” employment and incomes as a consequence of the project’s construction, there are also the “indirect” or “multiplier” effects to consider. Indirect or multiplier effects arise because of
- The effects on suppliers of goods and services to firms engaged in constructing the project from within the region (called the “forward and backward linkage” effects); and
 - The supply of goods and services to employees at the site and to those engaged in supplying goods and services to the site (called the “induced” effects).
- 4.3 Typically regional employment and income multipliers range between 1.5 and 2.0. Taking the mid-point of this range (1.75) would indicate that for every direct job created by the project there are an additional 0.75 jobs created elsewhere in the regional economy; and for every \$100 in direct wages and salaries paid by the project there are an additional \$75 dollars in wages and salaries paid elsewhere.
- 4.4 Using an assumed multiplier of 1.75 implies total (i.e. direct plus indirect) additional regional employment of 52 jobs and additional regional incomes of \$2.6 million for each year of the three-year construction phase of the project – a total of \$7.8 million.
- 4.5 In my opinion, these employment and income effects during the construction phase, while only temporary, would be significant and contribute to the “economic well being” and needs of the community generally in the local Nelson region. In addition the project’s construction would contribute to the “needs of ... secondary industry” in the region by generating additional demand for goods and services from local firms.
- 4.6 During the operational phase of the project there will be positive employment and income effects for the region and additional demand for goods and

² I.e. an average annual wage payment of \$50,000 per job.

services from the local economy. However these impacts will be relatively minor compared to the construction period effects.

5. MORE EFFICIENT ELECTRICITY GENERATION AND TRANSMISSION

5.1 Electricity forecasts³ suggest that 150 MW of new base load electricity generation will be required in New Zealand each year, assuming long run average demand growth of 2 per cent per annum. New small-scale hydro generation plants such as the proposed Gowan River scheme are attractive options in helping to meet this requirement in that:

- They will be the most timely and cost effective sources of new power supply;
- They may be easier to finance as they spread risk over a number of smaller new stations rather than just a single large station;
- They can provide transmission benefits including reduced line losses if they are able to be located closer to centres of demand than alternative large stations in remote locations;
- They may reduce constraints on transmission lines at, or near, capacity, deferring the need for new investment in constrained parts of the transmission network;
- They may enhance security of the electricity supply system through diversification of sources of supply and reduced reliance on the national transmission grid; and
- They provide an avenue for increasing renewable energy supply and contribute to reducing greenhouse gas emissions.⁴

5.2 The applicant's engineer Mr Peter Swan indicates that a cost estimate for electricity generated by the proposed scheme is approximately 5 cents per kWh. This is low compared to the estimated costs for new generation from

³ See Facilitating Distributed Generation; a Ministry of Economic Development Discussion Paper; September, 2003.

⁴ These advantages are taken from Facilitating Distributed Generation; a Ministry of Economic Development Discussion Paper; September 2003. Although the Gowan River Scheme will connect to the transmission grid and is therefore not strictly speaking "distributed generation" (since it does not directly connect to the lower voltage local distribution network), it shares many of the same benefits as distributed generation through its small scale and strategic location.

other sources. The table below summarises data taken from “Energy Outlook to 2005,” published by the Ministry of Economic Development in October, 2003:

Generation Type	Total Cost (c/kWh)
Gas Combined Cycle	
• 2005 – 2025	5.7 to 7.7
• 2008 – 2025 (incl. carbon charge)	6.5 to 8.5
Wind	
• 2006 – 2010	6.2
• 2011 – 2020	6.2
• 2021 – 2025	6.5
• 2006 – 2025	8.5
Geothermal	
• 2006 – 2010	4.0
• 2011 – 2020	6.2
• 2021 – 2025	6.2
• 2006 – 2025	8.5
Project Aqua	4.5
Other Hydro	
• Medium Cost	7.0
• High Cost	8.5
Coal	
• South Island	
- 2005 – 2025	6.1 to 7.1
- 2008 – 2025 (incl. carbon charge)	7.6 to 8.6
• North Island	
- 2005 – 2025	8.3 to 9.4
- 2008 – 2025 (incl. carbon charge)	9.8 to 10.9
Cogeneration	4.6
Liquefied Natural Gas (LNG)	
• 2005 – 2025	8.5 to 10.6
• 2008 – 2025 (incl. carbon charge)	9.3 to 11.6
Fuel Oil	
	11.3

• 2005 – 2025	12.0
• 2008 – 2025 (incl. carbon charge)	
Distillate	
• 2005 – 2025	16.0
• 2008 – 2025 (incl. carbon charge)	17.0

5.3 These costs estimates are based on various assumptions, (such as exchange rates, international fuel prices and the likely timing and size of carbon taxes being introduced in New Zealand) and are two years old. Project Aqua has now been removed from contention and in any case may have cost more than 4.5 cents per kWh had it gone ahead. There is only a limited amount of new North Island geothermal production (25 megawatts), which was estimated to cost less than the electricity to be generated by the Gowan River scheme. Cogeneration (estimated to generate electricity at a cost of 4.6 cents per kWh) requires electricity generation to be developed in conjunction with a significant processing plant with a large requirement for heat energy. There are no known plans for cogeneration developments in the Nelson region. At 5 cents per kWh, the Gowan River scheme's generation costs compare very favourably with the estimated costs from alternative generation sources.

5.4 Mr Swan indicates that among the reasons for the relatively low generation costs for the proposed Gowan River scheme are:

- The land is owned by the applicant and has been purchased on the basis that it is economic as a farming/forestry operation. The land required for the scheme is part of natural river terraces and is not part of the farming/forestry operation. Therefore the land acquisition cost in terms of its economic opportunity cost⁵ is minimal;
- Lake Rotoroa provides a significant catchment area and buffer effect, smoothing out the peaks and troughs of water flows and providing a much more uniform water flow than most catchments;
- Relatively high year round rainfall in this area contributes to a high load factor for the scheme;

⁵ I.e. its alternative use value.

- The steep gradient of the river enables 55 metres of head to be achieved with a 4.0 kilometre long canal, which is high compared to most natural river gradients;
- The design of the side wall entry intake is very economical compared to typical hydro intake structures, including dams; and
- The cost of the canal construction is relatively low due to the Gowan Valley geomorphology, which allows the canal to follow natural river terraces.

5.5 In addition the proposed scheme's location benefits from its close proximity to Transpower's existing national transmission grid. Two existing 110kV HT transmission lines cross the property and the output from the scheme can be supplied via these lines with minimal additional transmission costs.

5.6 Therefore the location and other specific features of this scheme provide comparative advantages with respect to both generation and transmission costs as compared to alternative new sources of electricity supply. A variation to the water conservation order enabling the Gowan River scheme to proceed would consequently be consistent with "the efficient use and development of natural and physical resources".

5.7 These efficiency benefits will be passed on to residential and business consumers since:

- The Gowan River scheme is essentially a "run of the river" scheme and therefore electricity from it will be bid into the national wholesale market at zero cost to ensure it is dispatched, earning the scheme's owners the market clearing price. This means some electricity in the "bid stack" priced at more than the market clearing price will be displaced, and therefore the Gowan River scheme has a downward (albeit very small) influence on wholesale electricity prices; and
- Additional generation in the upper South Island will reduce the load and therefore the level of losses on the transmission system serving not only Nelson but also the West Coast, Canterbury and Marlborough regions. Via competition between retailers this saving will be passed on to consumers in these areas.

5.8 Therefore in addition to being consistent with the efficient use of resources, a variation to the water conservation order enabling the Gowan River scheme to proceed is consistent with enabling “people and their communities to provide for their ... economic ... well being” and meeting “the needs of primary and secondary industry, and of the community”.

6 IMPROVED SECURITY OF SUPPLY

6.1 The expected annual output from the Gowan River Scheme is 59 GWhs per annum sufficient to supply 7564 households⁶. In May 2004 prominence in the news media was given to the lack of security of supply for electricity consumers in the Upper South Island for the winter months of 2004 and in years to come as a consequence of pressure being placed on the national grid’s transmission system, especially in supplying electricity to the Nelson region. The transmission system is the network of high voltage lines that carry electricity from power stations into the regions where power is used.

6.2 There are four main transmission lines feeding into Canterbury, Nelson/Marlborough and the West Coast regions in the Upper South Island. Because the Upper South Island does not have a lot of its own generation it receives most (88 percent)⁷ of its electricity via the Transpower grid. Growth in electricity demand in this region and a lack of new investment in the transmission system has led to a situation, where it is feared a significant spike in demand, most likely triggered by an extreme weather event, would require shedding of load – i.e. power outages for some customers. Because these power outages would be as a consequence of unpredictable weather events and consumers’ responses to them, this load shedding may involve little, if any notice, for consumers to make alternative arrangements.

6.3 It is emphasised that any such power outages are not because of a shortage of generating capacity, but because of the limitations of the transmission system. Transpower is giving urgent consideration to upgrading the

⁶ Based on an average household consumption of 7,800 kWhs per annum (ESANZ/AD Jenkins Ltd; Guide to Energy Units and Conversions; 1997).

⁷ Source; Transpower New Zealand Ltd

transmission network in the Upper South Island but such upgrades will take time⁸ and will be at considerable cost.

6.4 Increasing own generation capacity within the Upper South Island region, via schemes such as that proposed for the Gowan River, is therefore of considerable economic benefit in that it will reduce capacity requirements for the transmission system, and reduce the prospect of power outages for consumers. In the longer term it will reduce the extent and cost of transmission system upgrades.

6.5 In February, 2004 Transpower wrote to Majac Trust's electrical engineer, Mr Peter Swan, concerning the connection of the Gowan River scheme to the 110 kV Inanagahua – Kikiwa transmission lines which traverse the property owned by the Majac Trust, stating that "Generation in this area has the following positive benefits:

- Generation onto the 110 kV system will reduce the load on the interconnecting transformers at Kikiwa (by 8 MW) and Stoke (by 4 MW). These transformers are reaching maximum load.
- Any generation in this region reduces the power transfer into the region from Islington (on the outskirts of Christchurch) and into Islington from the Waitaki Valley. Although 13 MW is a small amount it represents 2 years of regional load growth.
- New generation increases the diversity of supply in the region.
- Additional dynamic reactive support in this region allows more power to flow into the region and will improve stability."

6.6 The evidence of Mr Swan, Mr Barrow and Mr Leyland discuss these improved security of supply benefits in greater detail. However in this evidence on economic matters I note that these benefits are important in terms of:

- Economic wellbeing – for business as well as household consumers. Whilst consumers may save expenditure on electricity at times of outages or shortage induced voluntary savings initiatives, it must be assumed that at the prevailing prices consumers would prefer to

⁸ Transpower is proposing a programme of work to increase grid capacity into the Upper South Island each year for the next six years.

consume the saved electricity. In other words the benefits they perceive from the electricity consumption exceeds the cost; In the case of business consumers the costs to them may involve loss of product as well as goodwill with customers whose orders cannot be met or are delayed;

- Efficiency – for business and household consumers. It is quite inefficient to have capital, labour and land assets lying idle or only partially utilised because one factor input (electricity) is unavailable or temporarily in short supply such that prices rise dramatically. Also where special “back-up” facilities have to be put in place to cover the possibility of electricity outages this implies increased cost and therefore less efficient use of resources;
- The needs of primary and secondary industry and of the community - in the twenty-first century of a first world country such as New Zealand, a reliable, secure and reasonably priced electricity supply is regarded as a necessity for all types of businesses and for household consumers across the whole socio-economic spectrum.

7. DISPLACED ECONOMIC ACTIVITY

7.1 Other witnesses on behalf of the Applicant have addressed the impacts of the proposed scheme on rafting on the Gowan River.

7.2 I understand the applicants case is that the proposed scheme will have limited if any real effect on rafting activity on the river given the availability of a telemetry system to enable restoration of full natural flow and the very limited use of the river for rafting because of the danger from willows.

7.3 However, for completeness I note that **even if** there were negative impacts from the scheme in terms of rafting, the economic⁹ consequences of such impacts would be likely to be negligible.

7.4 Firstly, taking a regional or community wide viewpoint, I believe it is unlikely there would be any reduction in economic activity within the Nelson region as

⁹ I am not qualified to comment on non-economic consequences.

a consequence of a reduced number of visitors rafting on the Gowan River. Much more likely would be the diversion of any rafting activity which is displaced to other localities within the region resulting in no economic loss for the region as a whole. In other words the number of, and expenditure by, visitors to the Nelson region would be unchanged.

- 7.5 Secondly, **even if** some reduction in visitor numbers and expenditure by visitors to the region as a whole occurred as a consequence of reduced rafting on the Gowan River, the net economic cost (i.e. the economic efficiency loss) would only be a fraction of any measured reduction in expenditure by visitors to the region. Typically profit margins for tourism related businesses are likely to be only 5 to 10 per cent of gross turnover and it is lost profits and not gross turnover, which measures the net economic cost to the community.

8. CONCLUSION

- 8.1 A variation to the water conservation order enabling the Gowan River scheme to proceed is consistent with enabling people and communities to provide for their economic wellbeing; the efficient use of natural and physical resources; and meeting the needs of primary and secondary industry and the community.

**APPENDIX 1
CURRICULUM VITAE**

MICHAEL CAMPBELL COPELAND

DATE OF BIRTH	3 October 1950
NATIONALITY	New Zealand
EDUCATIONAL	Bachelor of Science (Mathematics) 1971
QUALIFICATIONS	Master of Commerce (Economics) 1972
PRESENT POSITION	Economic Consultant and Joint Managing Director,
(Since 1982)	Brown, Copeland & Co Ltd
(Since 2001)	Lay Member of the High Court under the Commerce Act
(Since 2001)	West Coast Regional Council Trustee, West Coast Development Trust
(Since 2003)	Director, Wellington Rugby Board
PREVIOUS EXPERIENCE:	
(1) <u>1978-82</u>	NZ Institute of Economic Research Contracts Manager/Senior Economist
(2) <u>1975-78</u>	Confederation of British Industry Industrial Economist
(3) <u>1972-75</u>	NZ Institute of Economic Research Research Economist
(4) <u>1990-94</u>	Member, Commerce Commission

- Port storage facilities at Westport;
- The proposed Clifford Bay ferry terminal;
- The proposed pipeline and related facilities to utilise water from the Waikato River for metropolitan Auckland;
- A container terminal expansion by the Ports of Auckland;
- The designation of the Transmission Gully motorway route;
- The proposed Variation No. 8 to the Wellington City District Plan covering height and other controls on development of the airspace above the Wellington railway yards;
- A proposed Town Centre Zone within the Kapiti Coast District;
- Wellington City Council's heritage preservation policy;
- Solid Energy's proposed West Coast Coal Terminal at Granity;
- The proposed Waimakariri Employment Park;
- The designation of land for a proposed motorway extension in the Hawkes Bay;
- The Hastings District Council's Ocean Outfall;
- A proposed new shopping and entertainment centre in Upper Hutt;
- New regional correctional facilities in Northland, South Auckland, Waikato and Otago;
- Proposed controls on wake generation by vessels travelling within the waterways of the Marlborough Sounds;
- Southern Capital's proposed new township at Pegasus Bay, north of Christchurch;
- Renewal of water resource consents for the Tongariro Power Development Scheme;

- The imposition of land use restrictions within noise contours surrounding Christchurch International Airport; and
- The expansion of the Whangaripo Quarry in Rodney District.
- The construction of a new hydro electric power scheme on the Arnold River near Greymouth.