

**ASSESSMENT OF ECONOMIC EFFECTS OF THE PROPOSED  
WAITAHA RIVER HYDRO SCHEME**

**Brown, Copeland & Co Ltd**

**31 March 2014**

## 1. INTRODUCTION

### Outline of Proposal

- 1.1 Westpower Limited (**Westpower**) is investigating the construction of a run-of-river hydro scheme on a section of the Waitaha River in South Westland. The proposed Waitaha River hydro scheme (the **Scheme**) would have a capacity of 16-20 MW and generate between 110 and 120 GWh of electricity per annum.
- 1.2 The additional energy from the Scheme will provide renewable electricity for the benefit of consumers, while potentially reducing New Zealand's climate change liability. The Scheme will connect directly to Westpower's distribution network and make West Coast consumers less reliant on electricity imported via Transpower's transmission system. Westpower's distribution area current (2013) peak demand is around 50 MW, of which about 50% (25 MW) must be imported via the national grid. The Scheme could potentially reduce the reliance on the national grid by up to between 10 to 18% (5 to 9 MW) of peak demand depending on river flows at the time of system peaks. This will reduce transmission losses and improve security of supply for local residents and businesses.

### Scope of Report

- 1.3 This report identifies and evaluates the economic effects of the Scheme.
- 1.4 Following a summary of its contents, the report's Section 3 discusses the relevance of economic matters to statutory frameworks such as under the Resource Management Act 1991 (**RMA**). This is followed in Section 4 by an overview of the Westland District and West Coast regional economies. Section 5 provides a brief description of key elements of the New Zealand Energy Strategy and Emissions Trading Scheme and how the Scheme is consistent with Government policies

affecting the electricity sector. Section 6 of the report briefly describes New Zealand's electricity market and projections for national electricity demand and supply. West Coast electricity supply and demand characteristics are covered in Section 7. The economic benefits of the proposed Scheme are identified in Section 8, whilst Section 9 discusses potential economic costs. Section 10 contains the report's conclusions.

## 2. REPORT SUMMARY

2.1 The proposed Scheme will improve the economic wellbeing of the Westland District and West Coast region by:

- a. increasing employment, incomes and expenditure in the Westland District and West Coast economies during the Scheme's construction and, to a lesser extent, during the Scheme's operation;
- b. making wholesale prices more competitive for electricity supplied to the Westpower supply area and the Upper South Island<sup>1</sup>;
- c. reducing transmission losses and improving security of supply for local residents and businesses and therefore increasing economic efficiency; and
- d. providing increased confidence for business investment in Westland and on the West Coast through a more reliable and cost effective electricity supply.

2.2 At the national level the Scheme will improve resource use efficiency by:

- a. lowering the costs of generating additional quantities of electricity;
- b. reducing transmission line losses;
- c. increasing the geographic diversity of supply of electricity from hydro generating stations; and

---

<sup>1</sup> Defined to include Christchurch, north of Christchurch and the West Coast of the South Island.

d. potentially reducing New Zealand's climate change liabilities.

2.3 Although the Waitaha River catchment area has significant recreational values, the Scheme will have a negligible effect on the West Coast tourism industry, for the reasons set out in section 9 of this report.

### 3. ECONOMICS AND THE RMA

#### Community Economic Wellbeing

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, section 5(2) refers to enabling "*people and communities to provide for their ... economic ... well being*" as part of the meaning of "*sustainable management*", the promotion of which is the purpose of the RMA.

3.2 As well as indicating the relevance of economic effects in considerations under the RMA, section 5 also refers to "*people and communities*", which highlights that in assessing the effects of a proposal it is the effects on the community and not just on the applicant or particular individuals or organisations, that must be taken into account. This is underpinned by the definition of "*environment*" which also extends to include people and communities.

#### Economic Efficiency

3.3 Section 7(b) of the RMA requires 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 include the economic concept of efficiency<sup>2</sup>. Economic efficiency can be defined as:

---

<sup>2</sup> See, for example, in *Marlborough Ridge Ltd v Marlborough District Council* [1998] NZRMA 73, the Environment Court noted that all aspects of efficiency are "*economic*" by definition because economics is about the use of resources generally.

The effectiveness of resource allocation in the economy as a whole such that outputs of goods and services fully reflect consumer preferences for these goods and services as well as individual goods and services being produced at minimum cost through appropriate mixes of factor inputs.<sup>3</sup>

3.4 More generally economic efficiency can be considered in terms of:

- a. Maximising the value of outputs divided by the cost of inputs;
- b. Maximising the value of outputs for a given cost of inputs;
- c. Minimising the cost of inputs for a given value of outputs;
- d. Improving the utilisation of existing assets; and
- e. Minimising waste.

### **Viewpoint**

3.5 An essential first step in carrying out an evaluation of the positive and negative economic effects of a development project is to define the appropriate viewpoint that is to be adopted. This helps to define which economic effects are relevant to the analysis. Typically a district or wider regional viewpoint is adopted and sometimes even a nationwide viewpoint might be considered appropriate<sup>4</sup>. For the Scheme it is appropriate to consider the Westland District, West Coast regional and national economic effects given:

- a. The Scheme's electricity supply effects for residents and businesses of the Westpower supply area (comprising the Westland District, the Grey District and the southern part of the Buller District);
- b. The Scheme's expenditure and employment effects for the residents and businesses of the Westland District and West Coast region; and

---

<sup>3</sup> Pass, Christopher and Lowes, Bryan, 1993, *Collins Dictionary of Economics* (2<sup>nd</sup> edition), Harper Collins, page 148.

<sup>4</sup> For example the New Zealand Environmental Protection Authority administers applications under the RMA for major infrastructure projects of national significance.

- c. The Scheme's wider national economic effects of electricity generation and transmission efficiency and use of renewable resources.

### **Externalities**

- 3.6 There are private or financial costs and benefits associated with the Scheme. If concessions and consents are granted, and Westpower gives effect to them, then it can be assumed that these private or financial costs and benefits have been responsibly and properly analysed and that from the viewpoint of those with money at risk, the expected financial benefits exceed the expected costs. Accountability for accuracy of this commercial analysis clearly rests with Westpower.
- 3.7 However, not covered in any private sector cost benefit analysis are the so-called externalities – i.e. those side effects of the production process, which affect third parties, other than the buyer and seller. A range of economic externalities (both positive and negative) arising from the proposed Scheme are discussed later in this report.
- 3.8 Because Westpower is 100% community owned, any profits generated by the Scheme will be passed through to the community by way of rebates to local electricity consumers served by the Westpower network. Therefore as compared to other electricity generation projects, where the shareholders are central government or private sector interests the issue of whether generation and other cost savings are passed on to consumers, is less problematic and the Scheme will provide a significant long term asset to be owned by West Coast residents and businesses.

#### 4. THE WESTLAND DISTRICT AND WEST COAST REGIONAL ECONOMIES

- 4.1 Statistics New Zealand data<sup>5</sup> indicate that the resident population in Westland District declined from 8,450 in 1996 to 7,990 in 2001; increased to 8,620 in 2006 and is estimated to have grown to 8,950 (i.e. an additional 330, or 3.8%) in 2013. Statistics New Zealand's medium projection is for population to gradually increase over the remainder of its forecast period out to 2031 at an average rate of 0.2% per annum.
- 4.2 For the West Coast region as a whole population fell from 33,200 in 1996 to 31,100 in 2001. Since then the population has increased to 32,100 in 2006 and to an estimated 32,700 in 2013. Statistics New Zealand's medium projection is for population to grow over the remainder of its projection period out to 2031 at an average rate of -0.01% per annum. This compares with a medium projection average growth rate for New Zealand's total population of +0.8% per annum.
- 4.3 Employment in the Westland District has increased from 3,010 persons employed in 2000 to 3,670 persons<sup>6</sup> employed in 2013 (i.e. an average growth rate over the period of 1.5% per annum). For the West Coast region, employment has grown from 11,800 persons employed in 2000 to 15,320 persons employed in 2013 (i.e. an average growth rate over the period of 2.0% per annum). During this same period employment in New Zealand has grown at an average rate of 1.5% per annum.<sup>7</sup>
- 4.4 The mainstays and major growth sectors for the West Coast regional economy are mining, agriculture<sup>8</sup> and tourism. However, according to Statistics New Zealand, mining is not a significant component of the

<sup>5</sup> Statistics New Zealand website, Sub-national population estimates, last modified 18 December, 2013.

<sup>6</sup> This is a headcount figure. A report by Berl Economics (*Potential Contribution of Mining to the West Coast Region*; report prepared for the Development West Coast; November 2010) gives a 2009 fulltime equivalent figure of 4,327.

<sup>7</sup> Source: Statistics New Zealand [www.stats.govt.nz](http://www.stats.govt.nz); NZ.Stat; Detailed industry by region – (ANZSIC 06) 2000 – 2013; 23 December 2013.

<sup>8</sup> Including milk products manufacture for the West Coast regional economy, and which is undertaken at Westland Milk Product's plant at Hokitika.

Westland District economy with only 60 persons (1.6%) employed in 2013. Mining activity on the West Coast is concentrated in the Grey and Buller Districts. For the West Coast there were 1,320 mining jobs in 2013 or 8.6% of all jobs.<sup>9</sup>

- 4.5 Employment in tourism<sup>10</sup> grew rapidly in the Westland District and on the West Coast between 2000 and 2006, but has since declined. In Westland in 2000 there were 610 jobs in accommodation and food services and this had grown to 990 by 2006. However by 2013 there were only 750 jobs (20.4% of total employment) in this sector – i.e. a decline of 24.2%. For the West Coast in 2000 there were 1,440 jobs in accommodation and food services and this had grown to 2,070 by 2006. By 2013 the number had reduced to 1,830 (12.0% of total employment), a decline of 11.6% since 2006.
- 4.6 Similar trends (i.e. strong initial growth at the start of the century, but then a decline, or levelling off in tourism activity) are shown from an analysis of guest nights in commercial premises in Westland and on the West Coast. For Westland there were 516,795 guest nights recorded for the year ending June 2002. This had risen to 692,933 guest nights for the year ending June 2006 (i.e. a rise of 34.1%). For the year ending June 2010 guest nights had risen to 702,883 (i.e. a rise of 1.4%). For the year ended June 2012, guest nights had fallen to 635,246 (i.e. a fall of 9.6%). For the year ending June 2013 had risen slightly to 648,823 (i.e. a rise of 2.1%), but for the year to October 2013 have fallen back to 639,571 (i.e. a fall of 1.4%). For the West Coast, guest nights for the year ended June 2002 were 968,135 and had risen to 1,205,997 for the year ended June 2006 (i.e. a rise of 24.6%). For the year ended June 2010 they had risen to 1,223,217

---

<sup>9</sup> Statistics New Zealand employment data for mining exclude on-site employees engaged in mineral processing, construction and site preparation activities. Therefore they understate the importance of the mining industry to the West Coast economy. A 2010 Berl report (*Potential Contribution of Mining to the West Coast Region*; report prepared for Development West Coast; November 2010) estimates the extent of this understatement is around 50% - i.e. the mining industry accounts for around 17% of all jobs on the West Coast in 2012.

<sup>10</sup> As represented by the Accommodation and Food Services group. This is only a proxy for tourism since accommodation and food services will also be used by non-tourists. Also tourism related activities will be covered by other industry groups – e.g. retail trade, arts and recreation services and other services.



(i.e. a rise of 1.4%) and for the year ending June 2012 they had fallen to 1,094,868 (a fall of 10.5%) and for the year ending June 2013 they had fallen further to 1,081,586 (i.e. a further fall of 1.2%) and for the year to October 2013 had fallen further to 1,066,953 (i.e. a further fall of 1.4%).<sup>11</sup>

- 4.7 Agricultural employment in Westland and on the West Coast also grew rapidly between 2000 and 2006. Since 2006 there has been continued but less spectacular growth.<sup>12</sup> For Westland in 2000 there were 200 agricultural jobs, growing to 280 jobs in 2006, an increase of 40.0%. By 2013 the number of agricultural jobs in Westland had grown to 3300, an increase of 17.9%. For the West Coast region agricultural jobs in 2000 were 540, growing to 930 in 2006, an increase of 72.2%. By 2013 they had increased to 1,020, an increase of 10.0%.
- 4.8 Westland Milk Products dairy factory in Hokitika is also a significant employer providing around 290 jobs in 2013, up from 150 jobs in 2000.
- 4.9 In summary, for the West Coast region employment growth since 2000 has resulted from increased activity in the agricultural<sup>13</sup>, mining and tourism sectors. Between 2000 and 2006 the agricultural and tourism sectors were the dominant growth sectors, but more recently (i.e. between 2006 and 2013) increased mining activity has been the main source of economic growth. For the Westland District agriculture<sup>14</sup> and tourism have been the dominant growth sectors.
- 4.10 Future economic growth for the Westland District is likely to again depend upon the agriculture and tourism sectors, whilst for the West

---

<sup>11</sup> Source: Commercial Accommodation Monitor Pivot Tables; Ministry of Business, Innovation and Employment ([www.tourismresearch.govt.nz](http://www.tourismresearch.govt.nz)); 23 December, 2013.

<sup>12</sup> The Berl Economics report suggests a flattening out of growth in the agricultural sector on the West Coast.

<sup>13</sup> Including milk processing, and for the West Coast this is all done at Westland Milk Products dairy factory at Hokitika in the Westland District.

<sup>14</sup> Including the Westland Milk Products dairy factory at Hokitika.

Coast region these two sectors, together with mining, will underpin future economic growth. The 2010 Berl Economics report states:

*“Our assessment of the West Coast economy is that the Buller District will rise and fall with the mining sector. Westland District will rise and fall with tourism and dairy. As the main service centre for the West Coast region, Greymouth District’s growth is better spread across industries (with a bias toward mining) but is heavily dependent upon the fortunes of Buller and Westland.*

*Growth in dairy appears to have eased off, and additional gains are likely to be from productivity or product improvements rather than volume increases. Tourism is a growth industry, although growth will be incremental and there are issues around infrastructure, sustainability and environmental impacts. Mining appears to provide the greatest step change potential for the Region with the opportunity to positively affect growth in the regional economy.”*

- 4.11 However, since the Berl report was prepared the Pike River and Spring Creek mines in the Grey District have closed, the new Escarpment Mine in Buller proposed by Buller Coal Limited (a subsidiary of Bathurst Resources) although having been granted consents is on hold and the outlook for significant expansion of the mining industry on the West Coast is less certain.
- 4.12 Improvements in electricity supply self-sufficiency and reliability will help sustain employment in the key growth sectors for the Westland District and West Coast regional economies by providing increased confidence for business investment in Westland and on the West Coast through a more reliable and cost effective electricity supply. In the short to medium term the Project’s construction will also provide additional jobs in the district and region.

## 5. ALIGNMENT WITH GOVERNMENT ENERGY POLICY

- 5.1 The New Zealand Emissions Trading Scheme (**ETS**) has been progressively introduced since 2009<sup>15</sup> with the stationary energy sector (that applying to coal, gas and geothermal electricity generation) being brought into the ETS in 2010. The ETS was designed to reduce New Zealand's net emissions below a 'business as usual' level and to comply with New Zealand's international obligations, including the Kyoto Protocol obligations.
- 5.2 The basic concept behind the ETS is a requirement for generators of emissions to hold emission units (**NZUs**)<sup>16</sup> to match the emission levels for which they are responsible. The Government initially gifted NZUs to particular industry participants based upon the extent to which it was perceived that a sector was disadvantaged as compared to those able to pass any cost on to customers. Other than gifted units, participants are required to purchase NZUs either in New Zealand or overseas via auctions and normal trading of emission units.
- 5.3 In the case of the stationary energy sector, no NZUs have been gifted and the consequence is to raise the cost of thermal generation (i.e. coal, gas and to a lesser extent geothermal fired generation) relative to that utilising renewables such as hydro and wind generation, which are outside the ETS. This occurs as a consequence of the stationary energy sector being required to hold NZUs corresponding to emission levels of their respective fuels.
- 5.4 The macroeconomic impact of the ETS, as originally proposed, was estimated in the short term to reduce growth in gross domestic product (**GDP**) by around 0.1% per annum, versus expected average annual growth of around 2% per annum. In the longer term the macroeconomic impact of the ETS will depend on the stringency of

---

<sup>15</sup> The forestry sector became a participant in the ETS in 2009 but the agricultural sector's entry to the ETS will not be until 2015.

<sup>16</sup> Or corresponding overseas emission units.

international agreements. However from a national economic perspective the fewer emission units which need to be purchased, the more competitive the New Zealand economy will be and the lower will be the economic impact of meeting New Zealand's greenhouse gas emission obligations. Thus the Scheme, to the extent that it displaces alternative thermal generation, is likely to have a positive effect on the New Zealand economy under the ETS.

- 5.5 The Government has adopted an economy-wide target for a 50% reduction in New Zealand's carbon-equivalent net emissions compared to 1990 levels, by 2050. Emissions from electricity generation<sup>17</sup> accounted for 19.6% of New Zealand's total energy sector emissions in 2012.<sup>18</sup> The Government also has a target that 90% of electricity generation be from renewable sources by 2025 (in an average hydrological year) providing this does not affect security of supply.<sup>19</sup> This is against a backdrop of renewable electricity sources accounting for 81% of total generation in 1990, falling to 65% in 2008<sup>20</sup>, in the face of new electricity demand being largely met by new thermal generation over the period 1990 to 2008. In 2012 renewable electricity sources accounted for 73% of total generation.
- 5.6 Increased development of hydro power, such as the Scheme, is clearly consistent with the Government's energy policy.

---

<sup>17</sup> Includes use of coal, gas and geothermal energy.

<sup>18</sup> Source: Ministry of Business, Innovation & Employment website, Energy Greenhouse Gas Emissions; 2012 Calendar Year Edition; 2013.

<sup>19</sup> *New Zealand Energy Strategy 2011-2021, Developing our Energy Potential and The New Zealand Energy Efficiency and Conservation Strategy 2011-2016*; Ministry of Economic Development; August 2011.

<sup>20</sup> Of which hydro accounted for around 73%. Source: *The New Zealand Energy Data File 2013*; Section G Electricity; Ministry of Business, Innovation & Employment website, 17 March, 2013.

## 6. NEW ZEALAND'S ELECTRICITY MARKET

### Overview of the Market<sup>21</sup>

- 6.1 There are five main generating companies in New Zealand which accounted for 91% of generation in calendar year 2011 – Meridian Energy (28%), Contact Energy (23%), Genesis Power (18%), Mighty River Power (17%) and TrustPower (6%). The remaining 9% of generation is from on-site cogeneration and other independent generators, such as Westpower.
- 6.2 Electricity generation by fuel type in calendar year 2012 was hydro 52.9% (22,667 GWh), gas<sup>22</sup> 19.4% (8,325 GWh), geothermal 13.6% (5,843 GWh), coal<sup>23</sup> 7.8% (3,320 GWh), wind 4.8% (2,053 GWh) and others<sup>24</sup> 1.5% (637 GWh). However hydro's contribution in percentage terms has fallen sharply over the last 27 years – i.e. since 1980, when hydro generation contributed 84.5% of total generation, due to the rapid exploitation of the Maui gas field resulting from the economic pressure applied by the 'take or pay' gas contracts which dominated this period.
- 6.3 In the calendar year 2012, some 64% of hydro generation (i.e. around 35% of total generation) was from South Island generation schemes, principally located in South Canterbury and Otago.
- 6.4 In terms of installed generating capacity, in 2012 hydro made up 54.8% (5,262 MW), gas 15.7% (1,503 MW), coal 7.8% (750 MW), geothermal 7.5% (723 MW), wind 6.4% (614 MW), and others 7.8% (751 MW). Much of the thermal generating capacity is nearing the end of its life and will need to be replaced over the coming decade.

---

<sup>21</sup> Data in this section from *Energy in New Zealand, 2013*; Section G Electricity; Ministry of Business, Innovation & Employment website, 17 March, 2014.

<sup>22</sup> Includes co-generation from gas.

<sup>23</sup> Includes co-generation from coal.

<sup>24</sup> Includes generation from biogas, wood, oil and waste heat.

- 6.5 Transpower owns and operates the national transmission network which enables electricity to be transported from regions having electricity surpluses to those with electricity deficits. Areas of deficit and surplus change by time of day and time of year according to supply characteristics (in the case of wind and hydro supply) and demand characteristics. For example the underwater cable joining points of supply and demand in the North and South Islands is generally for carriage of electricity northwards. However at certain times of the year, it is also used to carry electricity from north to south. The transmission network (sometimes referred to as the national grid) connects to electricity lines companies or distribution network companies, such as Westpower. In turn the electricity lines companies distribute power to individual residential and commercial customers within their region. Transpower also transports electricity directly to customers, but only to major customers such as New Zealand Aluminium Smelters at Bluff.
- 6.6 Most electricity prices for consumers in New Zealand are set in the first instance via the wholesale market. Generators bid in supply quantities over half hour periods for supply at grid exit points and the wholesale price is set by the clearing price – i.e. the highest priced quantity of supply which makes aggregate supply equal to aggregate demand. Because there are several competing retailers, certain cost savings will be passed on over time to retail customers. Consequently areas with generation assets on average experience lower prices than those regions which do not have generation.
- 6.7 New Zealand has, amongst other developed nations, enjoyed comparatively low electricity prices, although prices have risen for residential consumers in recent years.<sup>25</sup> Comparatively low electricity prices have been an important contributor to New Zealanders' standard of living and economic wellbeing – both directly, in terms of

---

<sup>25</sup> A recent Electricity Authority report (*Analysis of Electricity Industry Historic Costs*; 21 January 2014) states that current electricity prices on average are not higher in real terms than in the 1980s but that residential consumer prices have risen in real terms and commercial consumers have experienced significant reductions in charges. This reflects the removal of previous cross-subsidisation of residential consumers by commercial consumers.

lower household electricity costs and lower priced goods and services reliant on an electricity input; and indirectly by contributing to New Zealand industry's ability to maintain its comparative advantage and compete in domestic and overseas markets. A proposal which increases the supply of electricity, such as the proposed Scheme, plays a part in helping to keep electricity prices low and economic wellbeing high.

### **Growth in Electricity Demand<sup>26</sup>**

- 6.8 Historically, demand for electricity has been closely linked to economic growth. Over the period 1990 to 2004, New Zealand's electricity consumption grew at an average annual rate of over 2% per annum as a consequence of strong growth in the economy and population. Since 2004, electricity consumption growth has slowed to an average annual rate of 0.5% per annum as a consequence of weak global growth and the Christchurch earthquakes.
- 6.9 On the basis of moderate future growth in the economy and population, the Ministry of Business, Innovation & Employment is forecasting future growth in demand averaging between 0.9% and 1.3% per annum over the period 2012 to 2040. The Ministry's assumed average growth in gross domestic product over the 28 year period is less than the 2.2% averaged over the period 1990 to 2004. Also much of the growth to occur is assumed to take place in the less energy intensive service sector of the economy, whilst energy efficiency improvements are assumed to continue. These factors explain the expected slower growth in electricity demand in the future.
- 6.10 There is uncertainty surrounding the future plans of the Tiwai Aluminium Smelter (which consumed 13% of New Zealand's total electricity demand in 2012). Also the demand for new electricity generation capacity may be restricted by restructuring of the

---

<sup>26</sup> Data in this section from *New Zealand Energy Outlook; Electricity Insight; Explaining the Uncertainty in Future Electricity Demand and Supply*; Ministry of Business, Innovation & Employment; Ministry of Business, Innovation and Employment website, 30 August, 2013.

wholesale electricity market by a future government. Notwithstanding these future uncertainties, there will be a role for new renewable energy sources like the Scheme in meeting electricity demand, even if demand growth is slow. New renewable sources of supply will be required to replace retired thermal capacity. Also the Scheme will enable an increase in West Coast electricity supply self-sufficiency.

## 7. **WESTPOWER DISTRIBUTION AREA ELECTRICITY DEMAND AND SUPPLY<sup>27</sup>**

- 7.1 The Westpower distribution area covers Westland and Grey District's and the southern part of the Buller District below Westport but including Reefton. Westpower's distribution area has limited own generation capacity totalling 25 MW generating approximately 145 GWhs per annum. This compares with peak demand of 50 MW and annual electricity consumption of around 300 GWhs and means that the region imports electricity all of the time. Around 50% of peak demand and 52% of electricity consumption must be met with electricity generated outside the region.
- 7.2 Peak demand for electricity in the Westpower distribution area is forecast to grow from 50 MW in 2012 to 70 - 80 MW by 2030,<sup>28</sup> whilst electricity consumption is forecast to grow from 300 GWhs to 400 GWhs per annum by 2030. These growth rate forecasts incorporate possible new mining developments and ongoing growth in dairy farming and milk processing. This will increase the reliance on imported electricity via the national grid in the absence of new generating capacity.
- 7.3 Westpower has recently constructed a run of the river scheme on the Amethyst River east of Harihari and this was commissioned in June 2013. This has lifted Westpower distribution area own supply capacity to 25 MW and own supply generation to 145 GWhs. Other proposed

---

<sup>27</sup> Data in this section provided by Westpower unless otherwise stated.

<sup>28</sup> Over the period 2003 to 2011 peak demand has grown at an average rate of 4.32% per annum. This growth would have been higher still but for the closure of the Pike River Mine in 2010.



new power generation schemes on the West Coast<sup>29</sup> (i.e. in the Westpower distribution area and the neighbouring Buller Electricity distribution area) are less certain. If all these schemes operate, at times surpluses would occur and these would be exported to help meet net demand in the rest of the “Top of the South” region, defined to cover the northern part of the South Island, including Christchurch and areas north of Christchurch plus the whole of the West Coast region. However by reducing the reliance of the West Coast on electricity imported to the region via Transpower’s national grid at times when local demand exceeds supply, electricity prices for local businesses and residents will be lower than would otherwise be the case.<sup>30</sup>

- 7.4 The Scheme by adding between 16 to 20 MW to local supply could potentially decrease the current reliance on national grid supply from around 25 MW (i.e. about 50% of peak demand) to between 5 to 9 MW (i.e. about 10 to 18 % of peak demand), depending on river flows at the time of system peaks.
- 7.5 The demand forecast for 2021, when the Scheme becomes operational, is 60MW with expected peak local generation capacity of 41 to 45 MW. Self sufficiency will be approximately 70 to 75% in peak demand terms, again depending on river flows at the time of system peaks.

---

<sup>29</sup> Including Arnold River (TrustPower), Mokihinui River (Meridian) and Stockton/Ngakawau River (Hydro Developments Limited) or Stockton/Ngakawau River (Solid Energy). These new generation proposals either hold unimplemented resource consents or are in the resource consent process.

<sup>30</sup> Electricity prices throughout New Zealand are expected to increase in future as new electricity generating capacity becomes progressively more expensive. Therefore it is more correct to say that the Scheme will keep electricity prices lower than they would otherwise be, rather than to imply that the Scheme will reduce electricity prices from their current levels.

## 8. ECONOMIC BENEFITS OF WAITAHA RIVER HYDRO SCHEME<sup>31</sup>

### Increased Economic Activity from Scheme Construction and Operation

8.1 The construction and operation of the Scheme will increase economic activity for the local Westland District and West Coast regional economies.

### Effects during Construction Period

8.2 Construction of the Scheme will use, where practicable, local products and services over its expected three to four year construction period. Goods and services that could be provided locally include concrete, tunnelling, civil construction and labour. The total construction cost is estimated at between \$80-100 million<sup>32</sup>, of which about 70% or \$56-70 million (\$19-23 million per annum assuming a three year construction period) could be spent in Westland and 80% or \$64-80 million (\$21-27 million per annum assuming a three year construction period) could be spent on the West Coast. Employment directly created by this local expenditure is estimated to average 20 full time equivalent jobs over a three year construction period with wages and salaries paid estimated at \$1.8 million per annum.<sup>33</sup>

8.3 In addition to the direct economic effects, there are indirect effects arising from:

- a. The effects on suppliers of goods and services to the firms directly contracted by the Scheme from within the district and region (i.e. the “forward and backward linkage” effects); and
- b. The supply of goods and services to the employees of firms directly contracted by the Scheme (i.e. the “induced” effects). For example, there will be additional jobs and incomes for

<sup>31</sup> Data in this section provided by Westpower.

<sup>32</sup> All monetary amounts in this and the next section of this report are in 2011 price terms.

<sup>33</sup> Based on annual salaries averaging \$90,000 including overtime.

employees of supermarkets, restaurants and bars as a consequence of the additional expenditure by employees directly involved in construction at the site.

8.4 District and regional multipliers can be estimated to gauge the size of these indirect effects. The size of the multipliers is a function of the extent to which a regional economy is self-sufficient in the provision of a full range of goods and services and the region's proximity to alternative sources of supply. Using multipliers<sup>34</sup> derived by G V Butcher Partners Ltd in relation to the proposed Mokihinui Hydro scheme implies total effects (i.e. direct plus indirect effects) for the Westland District, during the three year construction period of:

- a. \$25-30 million per annum in additional expenditure;
- b. 30 additional jobs; and
- c. \$2.6 million per annum in additional wages and salaries.

If the construction period stretches to four years the annual effects will be smaller but will stretch over a longer period.

8.5 For the West Coast region, the total (direct plus indirect) effects during the three year construction period are estimated to be:

- a. \$29-38 million per annum in additional expenditure;
- b. 33 additional jobs; and
- c. \$3.0 million per annum in additional wages and salaries.

Again, if the construction period stretches to four years the annual effects will be smaller but will stretch over a longer period.

---

<sup>34</sup> These multipliers were derived using data on hydro scheme construction costs, Statistics New Zealand data and G V Butcher Partners Ltd models of the Buller District and West Coast regional economies. They are considered to be reasonable estimates to use to calculate the indirect expenditure, employment and income effects for the Westland District and West Coast region from the construction of the proposed Scheme.

## Operational Effects

- 8.6 Once the Scheme is operational there will be an additional fulltime equivalent staff member required to undertake regular operations and maintenance duties. There will also be additional expenditure within the Westland District and West Coast regional economies on other goods and services purchased locally.
- 8.7 Again, there will be both direct and indirect economic effects associated with this additional employment, income and expenditure.

## Contribution to Economic Wellbeing

- 8.8 As indicators of levels of economic activity, economic effects (in terms of expenditure, income and employment) are not in themselves measures of improvements in economic welfare or economic wellbeing. However, there are economic welfare enhancing benefits associated with increased levels of economic activity. These relate to one or more of:
- a. Increased economies of scale: Businesses and public sector agencies are able to provide increased amounts of outputs with lower unit costs, hence increasing profitability or lowering prices;
  - b. Increased competition: Increases in the demand for goods and services allows a greater number of providers of goods and services to enter markets and there are efficiency benefits from increased levels of competition;
  - c. Reduced unemployment and underemployment<sup>35</sup> of resources: To the extent resources (including labour) would be otherwise unemployed or underemployed, increases in economic activity can bring efficiency benefits when there is a reduction in unemployment and underemployment. The

---

<sup>35</sup> Underemployment differs from unemployment in that resources are employed but not at their maximum worth; e.g. in the case of labour, it can be employed at a higher skill and/or productivity level, reflected in higher wage rates.

extent of such gains is of course a function of the extent of underutilized resources within the local economy at the time and the match of resource requirements of a project and those resources unemployed or underemployed within the local economy; and

- d. Increased quality of central government provided services: Sometimes the quality of services provided by central government such as education and health care are a function of population levels and the quality of such services in a community can be increased if increased economic activity maintains or enhances population levels.

- 8.9 It is reasonable to assume that the anticipated increases in economic activity (i.e. expenditure, income and employment) as a consequence of the Scheme construction and operation will give rise to one or more of these four welfare enhancing economic benefits at the local district and regional level.

### **Lower Cost Electricity Generation and Supply**

- 8.10 There will be cost savings to the extent that the costs of generation from the Scheme are less than the generation and transmission costs of alternative new generation capacity elsewhere in New Zealand, which is displaced or delayed. These cost savings reflect:
  - a. Lower or at least comparable average generation costs per kWh compared to alternative new generation options to meet predicted growth in electricity demand in New Zealand (see previous section of this report). Alternatively, if new capacity does not keep pace with growth in demand, there will be increased costs for electricity consumers and for the economy generally;

- b. A reduction in the transmission line losses incurred in supplying local consumers with electricity via Transpower's national grid;<sup>36</sup>
  - c. A reduction in the transmission charges for Westpower and its consumers. Transpower charges Westpower (and other lines companies) on the basis of Westpower's average load at the time of the Upper South Island's 12 highest loads over half-hour periods throughout the year. So long as the Scheme is able to provide capacity at all or many of these 12 periods, Westpower will face lower transmission charges.
- 8.11 These various cost savings (or at least reductions in future cost increases, which would otherwise occur) will in the first instance accrue to Westpower as a generator<sup>37</sup> and as the local lines company. Westpower is a community owned company, and lower costs will be passed through to local business and residential consumers either via lower retail electricity prices and/or via larger annual rebates to consumers.

### **Increased Security of Supply**

- 8.12 Although the Scheme, being run-of-river, will have no water storage capability, increasing the amount of generating capacity on the West Coast improves security of supply for local business and residential consumers by reducing reliance on supply via the national grid network. The Scheme will provide some protection against situations when no or restricted external transmission capacity into the region is available. For residential consumers, outages as a result of transmission failures are likely to be sufficiently brief to cause only minor inconvenience. However for business customers with high electricity reliance or consumption the costs can be more significant – either in terms of lost production or the requirement to invest in expensive back-up sources of electricity supply.

---

<sup>36</sup> The closer the electricity plant is to the point of demand, the less the transmission losses.

<sup>37</sup> Westpower will either "wholesale" the electricity to an electricity retail company or retail the electricity itself. However any retailing by Westpower will be to larger customers.

- 8.13 For example, for the approximate 2 month period between 18 March and 23 May 2006 there were 5 outages to transmission supply to Westpower's customers, each of up to 90 minutes duration. A survey by Westpower established that these 5 outages led to estimated losses totalling \$352,000 for 32 out of 34 businesses surveyed. Survey respondents had spent an additional \$736,000 on back-up equipment to protect against losses from future outages.<sup>38</sup>
- 8.14 Also in relation to security of supply, the Scheme will provide geographic diversity of supply of electricity from hydro generating stations, which in the South Island are heavily dependent upon water catchments and climatic conditions in South Canterbury and Otago.

### **Environmental Benefits**

- 8.15 If the Scheme results in the avoidance of an equivalent level of generation from gas thermal plants there will be an estimated reduction of 51,120 tonnes<sup>39</sup> of carbon dioxide equivalent greenhouse gases (CO<sub>2</sub>-e) and applying a carbon price of \$25 per tonne<sup>40</sup> this implies an annual saving of \$1.3 million in terms of reduced emission units which would need to be purchased offshore by the New Zealand electricity generation sector. The equivalent annual saving if coal thermal generation is displaced is estimated at \$1.9 million.

---

<sup>38</sup> Dollar amounts in 2006 price terms. Source: Report on Survey Results into Economic Effect of Westpower Customer Power Outages between 18 March and 23 May 2006; Westpower Limited; July/August 2006.

<sup>39</sup> Based on data from *The New Zealand Energy Data File 2011*; Ministry of Economic Development; and *New Zealand Energy Greenhouse Gas Emissions 2011*; Ministry of Economic Development; 2011.

<sup>40</sup> The figure used by the MED in the Reference scenario contained in its New Zealand Energy Outlook 2011 document.

## 9. ECONOMIC COSTS OF THE WAITAHA RIVER HYDRO SCHEME

### Tourism Expenditure<sup>41</sup>

- 9.1 The Waitaha River Catchment area is used for kayaking, angling, hunting, tramping and mountaineering. Whilst the area has been assessed as having significant recreational values, the economic effects of the Scheme, in terms of reduced expenditure for the local tourism industry, will be negligible because:
- a. There is a low level of recreational use on or near the Waitaha River and this is likely to continue in the future with or without the Scheme;
  - b. There are a range of alternative locations on the West Coast for all recreational activities affected;
  - c. All land based recreational activities in the Waitaha River catchment will be able to continue after the Scheme is built with only visual effects;
  - d. Because of the high level of skill required to paddle the Waitaha River, the number of kayakers able to paddle it are small – only around 50 persons per year kayak the Waitaha Gorge section of the river and most (80%) portage the Morgan Gorge section. In any one year, fewer than 10 individuals might kayak the upper Waitaha Gorge (above Moonbeam Hut) and/or Morgan Gorge. Also these sections of the river might not be run at all for long periods and for these sections there is a very small pool of suitably skilled kayakers.

---

<sup>41</sup> This section is based on the findings of *Westpower Waitaha Hydro Investigations Recreation and Tourism Assessment of Effects*; Prepared for Westpower Ltd by Rob Greenaway and Associates; February, 2014.



### **Utility Costs**

- 9.2 Externality costs from a project such as the Scheme arise when public sector agencies (local, regional or central government) must provide and fund new infrastructure that is required, without appropriately set levies or charges for such costs to be recovered from the development. However no such externalities will arise in the case of the Scheme because it will not require any new infrastructure from public sector agencies.

### **Road Congestion Costs**

- 9.3 The Scheme's construction will lead to additional volumes of traffic on the local road network. However the local road network has sufficient capacity to handle the additional construction traffic. It is not anticipated that the additional traffic will result in significant congestion effects.<sup>42</sup>

### **Loss of Biodiversity, Landscape and Recreational Values**

- 9.4 In economics, 'intangible' costs and benefits are defined as those which cannot be quantified in monetary terms. For any project such effects may include amenity effects, landscape effects, ecological effects, Māori cultural and relationship effects and recreational effects. Such effects may be positive or negative – i.e. a benefit or a cost for a particular community of interest.
- 9.5 A number of non-market valuation techniques (e.g. willingness to pay surveys or inferring values on the basis of differences in property values) for assessing “intangible” effects have evolved over time. However, these techniques are frequently subject to uncertainty and criticism. As a consequence, it is generally better to not attempt to estimate monetary values for these effects but leave them to be part of the overall judgement under s 5 of the RMA. This also avoids the danger of “double-counting” – i.e. including them within the measure

---

<sup>42</sup> See the Application and Assessment of Environmental Effects, Description of Construction.

of efficiency and treating them as a separate consideration in the overall judgement under s 5.

- 9.6 The biodiversity, landscape and recreational effects of the Scheme are assessed in other technical reports appended to the Assessment of Environmental Effects.

10. **CONCLUSION**

- 10.1 The Scheme will help to enable the people and community of the Westland District and West Coast region to provide for their economic well being, by making West Coast consumers significantly less reliant on electricity imported via Transpower's transmission system. It will also be consistent with the efficient use and development of natural and physical resources.