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NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

# New Zealand Scholarship

# Geography, 2004

9.30 am Monday 22 November 2004

RESOURCE BOOKLET

Refer to the Resources in this Booklet to help you answer the questions in Question and Answer Booklet 93401Q.

Check that this booklet has pages 2–15 in the correct order and that none of these pages is blank.

**YOU MAY KEEP THIS BOOKLET AT THE END OF THE EXAMINATION.**

# Electric Blue

## Resource A – Global electricity production and consumption

Global electricity usage has spiralled in the last one hundred years. Modern economies and societies rely on electricity as a major energy source. Table A1 gives statistics of global increases in electricity consumption between 1992 and 2001. The figures show significant spatial variation in the rates of increase. Greatest increases are taking place in countries where rapid population and economic growth are happening simultaneously.

New Zealand has experienced increases in the use of electricity, but the way in which electricity is produced in New Zealand is unlike that of most other countries. New Zealand has a very high reliance on hydro-electric power (HEP) and a low reliance on thermal means of generation. Table A2 provides details of global electricity production profiles.

Electricity is produced in a variety of ways from both renewable and non-renewable resources. Resource A3 provides information about electricity production methods. Although electricity is regarded as an essential item, its generation is often contentious. People are showing increased concern about the using up of non-renewable resources, atmospheric pollution, environmental degradation and the social consequences of large electricity-producing schemes. Meeting present and future demand for electricity in a sustainable way is a goal that is not easy to achieve.

### Table A1 : World Electricity Consumption 1992 – 2001 (Billion Kilowatt hours)

**World Total Net Electricity Consumption, 1992-2001**
(Billion Kilowatt hours)

| | 1992 | 1998 | 2001 |
|---|---|---|---|
| **Region/Country** | | | |
| **North America** | | | |
| **Total** | **3 446.2** | **4 066.2** | **4 294.0** |
| Canada | 445.8 | 479.1 | 504.4 |
| United States | 2 885.6 | 3 425.1 | 3 602.1 |
| **Central & South America** | | | |
| **Total** | **498.6** | **673.6** | **719.9** |
| Brazil | 246.3 | 334.3 | 335.9 |
| **Western Europe** | | | |
| **Total** | **2 244.3** | **2 540.9** | **2 726.8** |
| France | 353.3 | 392.2 | 415.3 |
| Germany | 463.4 | 484.7 | 506.8 |
| United Kingdom | 293.3 | 330.0 | 346.1 |
| **Eastern Europe & Former USSR** | | | |
| **Total** | **1 676.4** | **1 389.8** | **1 453.7** |
| Russia | 881.5 | 714.6 | 773.0 |
| **Middle East** | | | |
| **Total** | **237.5** | **367.2** | **430.3** |
| Saudi Arabia | 68.8 | 106.6 | 113.8 |
| **Africa** | | | |
| **Total** | **294.4** | **359.2** | **396.0** |
| Nigeria | 13.1 | 13.5 | 14.6 |
| South Africa | 144.6 | 175.8 | 181.2 |
| **Asia & Oceania** | | | |
| **Total** | **2 431.4** | **3 363.1** | **3 913.2** |
| New Zealand | 29.4 | 35.1 | 34.9 |
| Australia | 140.5 | 172.7 | 184.4 |
| China | 670.6 | 1 019.5 | 1 312.2 |
| India | 295.1 | 439.1 | 497.2 |
| Japan | 797.9 | 926.7 | 964.2 |
| Korea, South | 113.6 | 210.2 | 270.3 |
| **World Total** | **10 828.8** | **12 760.0** | **13 934.1** |

## Table A2 : World Electricity Generation by Type 2000 (Billion Kilowatt hours)

| **World Net Electricity Generation by Type, 2000** (Billion Kilowatt hours) | | | | | |
|---|---|---|---|---|---|
| | **Thermal** | **Hydro** | **Nuclear** | **Geothermal and Other** | **Total** |
| **Region/Country** | | | | | |
| **North America** | | | | | |
| **Total** | **2 997.1** | **657.6** | **830.4** | **99.0** | **4 584.0** |
| Canada | 156.4 | 354.7 | 68.7 | 7.2 | 587.1 |
| United States | 2 692.5 | 270.0 | 753.9 | 85.7 | 3 802.1 |
| **Central & South America** | | | | | |
| **Total** | **204.1** | **545.0** | **10.9** | **17.4** | **777.4** |
| Brazil | 20.8 | 301.7 | 4.9 | 12.0 | 339.5 |
| **Western Europe** | | | | | |
| **Total** | **1 365.4** | **557.5** | **849.4** | **74.8** | **2 847.1** |
| France | 46.8 | 66.2 | 394.4 | 3.7 | 511.1 |
| Germany | 334.9 | 21.5 | 161.2 | 18.6 | 536.2 |
| United Kingdom | 260.1 | 5.1 | 81.7 | 5.0 | 351.9 |
| **Eastern Europe & Former USSR** | | | | | |
| **Total** | **1 043.7** | **253.5** | **265.7** | **3.9** | **1 566.9** |
| Russia | 552.6 | 157.8 | 122.5 | 2.5 | 835.4 |
| **Middle East** | | | | | |
| **Total** | **425.3** | **13.8** | **0.0** | **0.0** | **439.1** |
| Saudi Arabia | 120.7 | 0.0 | 0.0 | 0.0 | 120.7 |
| **Africa** | | | | | |
| **Total** | **333.7** | **69.8** | **13.0** | **0.4** | **416.9** |
| Nigeria | 9.4 | 5.7 | 0.0 | 0.0 | 15.1 |
| South Africa | 181.8 | 1.3 | 13.0 | 0.0 | 196.2 |
| **Asia & Oceania** | | | | | |
| **Total** | **2 949.2** | **528.7** | **464.7** | **43.1** | **3 985.7** |
| New Zealand | 9.5 | 24.4 | 0.0 | 3.9 | 37.8 |
| Australia | 182.0 | 16.6 | 0.0 | 1.7 | 200.3 |
| China | 1 050.0 | 220.2 | 16.0 | 1.6 | 1 287.7 |
| India | 422.6 | 73.7 | 14.1 | 1.6 | 512.0 |
| Japan | 615.9 | 86.4 | 293.8 | 19.0 | 1 015.0 |
| South Korea | 165.7 | 4.0 | 103.5 | 0.5 | 273.6 |
| **World Total** | **9 318.4** | **2 625.8** | **2 434.2** | **238.7** | **14 617.0** |

## Resource A3: Methods of producing electricity: a global view – is any source of energy perfect?

For copyright reasons, this resource cannot be shown here.

## Resource B: Project Aqua (2001 – 2004)

For copyright reasons, this resource cannot be shown here.

## B2: Plug pulled on Aqua

**March 30 2004**

Meridian Energy chief executive Keith Turner announced today the abandoning of Project Aqua. He cited increased costs, uncertainty over water rights, an unworkable process of getting the necessary consents through the Resource Management Act, plus increasing local opposition as reasons for the ditching of Aqua. The decision he said was a commercial one caused not by one factor alone but by a combination of factors.

## B3: Project Aqua, Kurow and the Lower Waitaki Valley

## B4: Kurow and the Waitaki Valley: topographic map (1:50 000) and aerial photo extracts

## B5: How others see Project Aqua

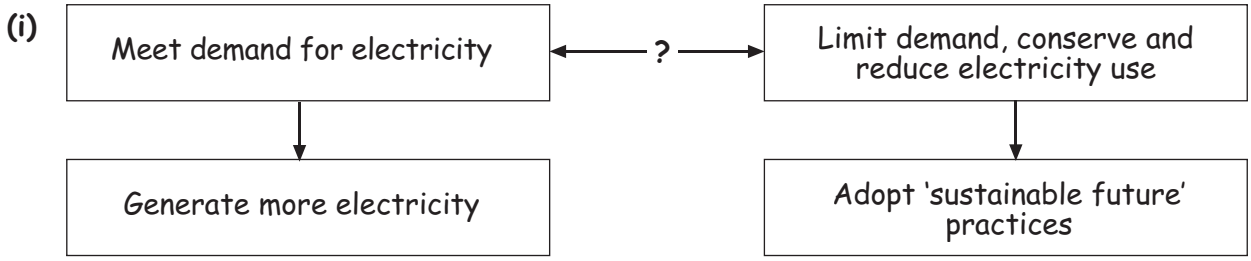
## Resource C: Hydro Electric Power Schemes – a Canadian case study

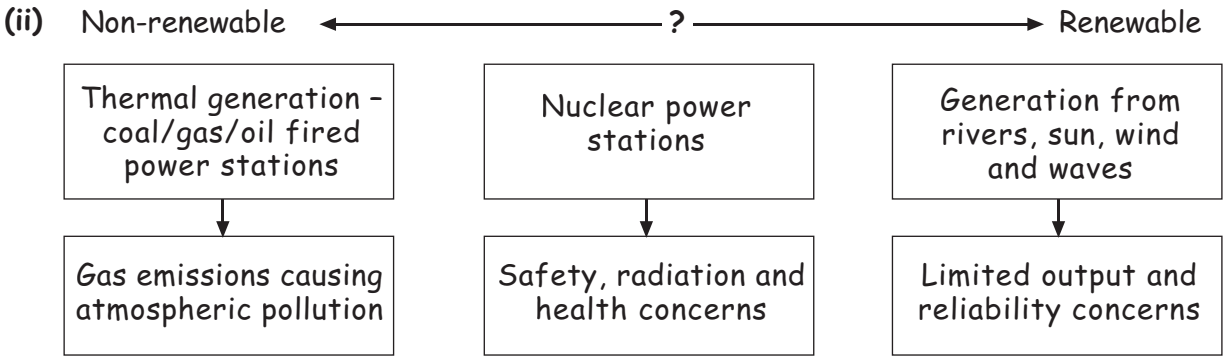
For copyright reasons, this resource cannot be shown here.

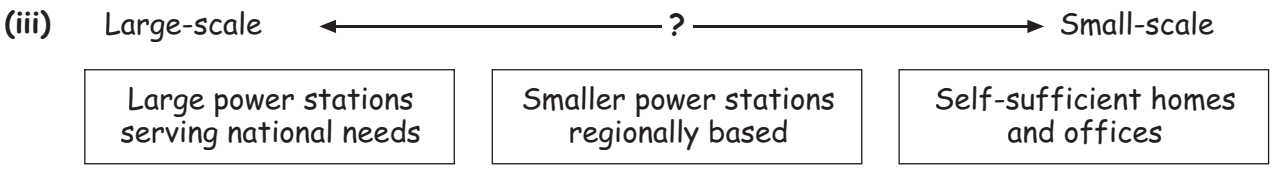
## Resource D: Electricity in New Zealand – where to next?

For copyright reasons, this resource cannot be shown here.

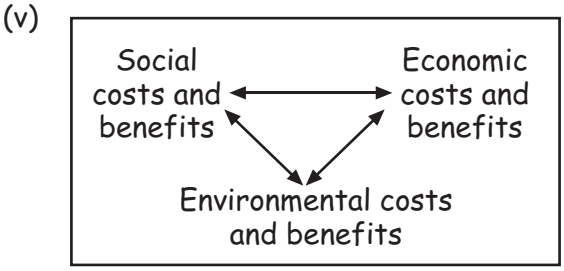
## D2: Options and issues








**(vi) Some views about sustainability:**

- 'the overall goals of environment and development are not in conflict but are indeed the same, namely the improvement of the human quality of life and welfare for present and future generations'
- 'sustainable development involves the management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations'
- 'the best decision that can be reached in resource use for sustainability is one that does not compromise the viability of another element of the environment'
- 'is it correct to judge all human transformations of the natural environment as being a negative outcome for the environment?'
- 'governments are caught between wanting to be competitive in global markets and the desire of their electorate to be clean and green'.

## D3: Different perspectives about environmental management for sustainability

For copyright reasons, this resource cannot be shown here.

## D4: Towards self sufficiency at home – an ecocentric approach

For copyright reasons, this resource cannot be shown here.

## D5: A summing-up – the view of a geographer

## Acknowledgements


Pages 2 & 3 Tables A1 and A2 adapted from www.eia.doe.gov

Pages 4 & 5 Adapted from pp 72–73, *Earthworks*, John Widdowson, John Murray, 2000.

Page 6 Adapted from articles in *Weekend New Zealand Herald*, Dec 20–21, 2003 and *NZ Listener*, Nov 15, 2003.

Page 7 Meridian Energy and *Weekend Herald*, April 3–4, 2004.

Page 8 (top) Aerial photo, 5 February, 2003, GeoSmart.
(centre) Segment of Topomap Kurow 260-I40, Department of Survey and Land Information, Edition 1, 1987.
(bottom) Aerial photo, 5 July, 2000, GeoSmart.

Page 9 www.waitakifirst.co.nz
*NZ Listener*, Nov–Dec 2003 editions.

Pages 10–11 Radio Netherlands: www.rnw.nl/special/en/html/rivers 02085.html

Page 11 www.ottertooth.com

Page 12 *New Zealand Herald*, 31 March, 2004.

Page 14 (top) adapted from *Explorations in Human Geography: Encountering Place*, p 266, edited by Le Heron, Oxford, 1999.
(bottom) *New Zealand Herald*, A9, 12 April, 2004.

Page 15 *New Zealand Herald*, p A9, 12 April, 2004.