



New Zealand's EnergyScape

Key Points

16th July 2008



High level

2000

2005

2030

2050

Overall energy system:

- Period of transition
- Access to relatively cheap fuel dwindling
- Likely diverse energy pathways

Drivers for change:

- GHG and air quality emissions, water, food, quality of life, security, ability to adapt, economic development.
- Uncertainty on future weighting
- Awareness influences scope of solutions

Demand

2000 2005 2030 2050

- **Potential for significant change:**
 - Technology
 - Behaviour
 - Sources
 - Pathway efficiency
- **End-use characterisation:**
 - Electricity
 - Heat
 - Transport

Pathways

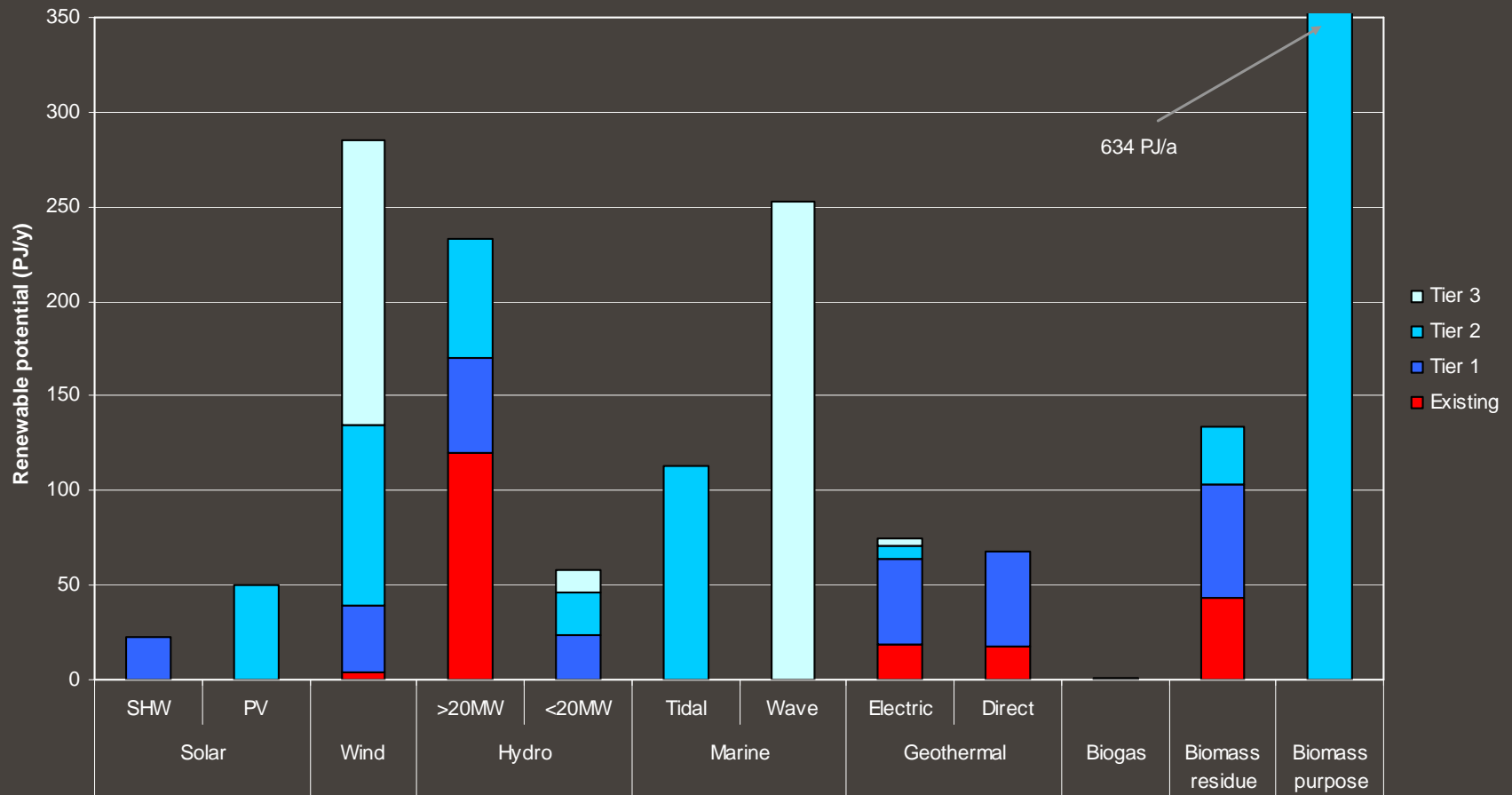
2000 2005 2030 2050

- Reasonably good information on above-ground resources
- Difficult to directly compare different energy pathways
 - Different boundaries, assumptions, costs, scales
- Fossil fuel potential
 - Sufficient low grade coal resources
 - Oil and gas: investment and exploration risks.
 - Both require CCS to meet GHG obligations.

Resources



Potential Realisable Renewable Generation Overview (PJ/y)



Resources

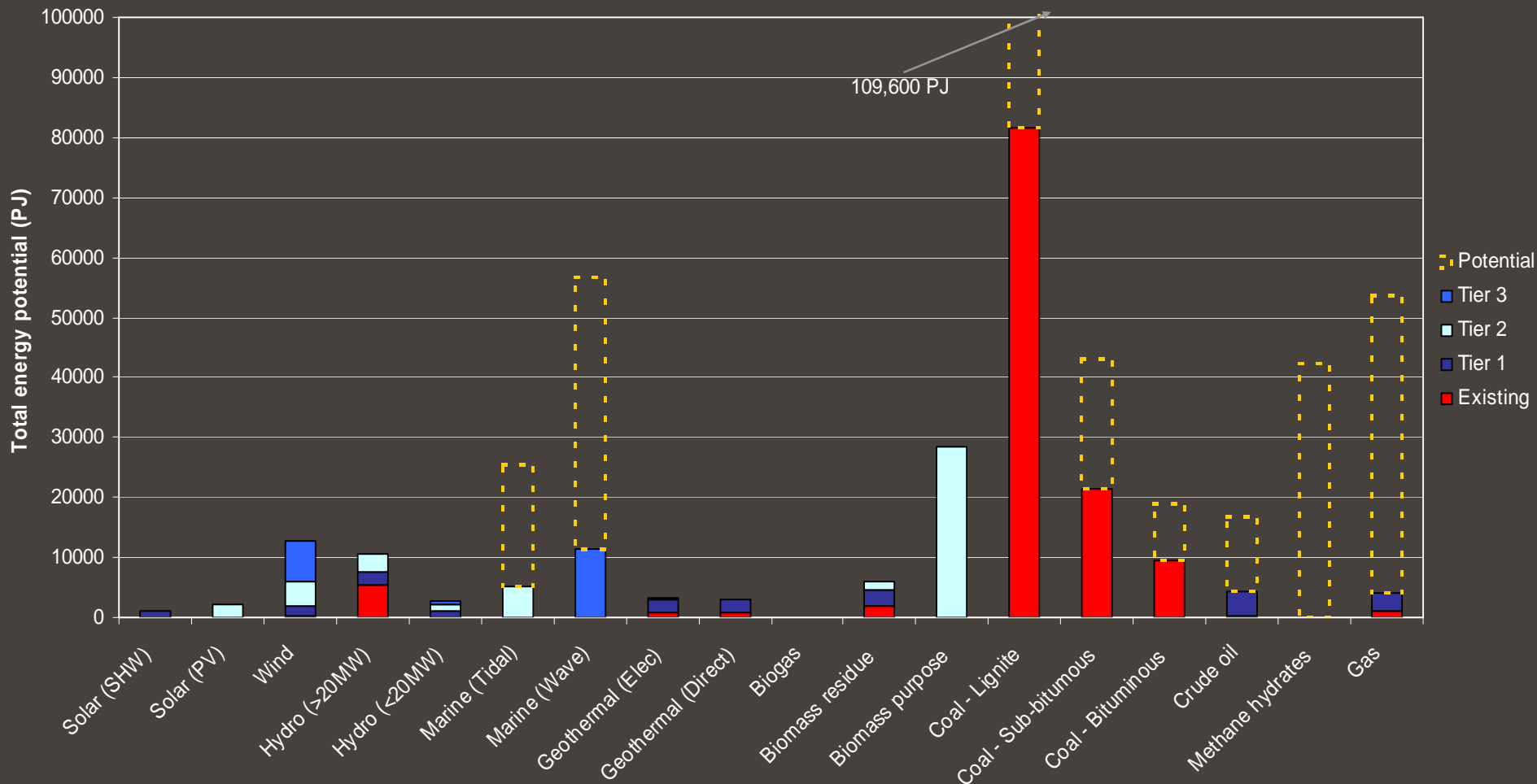
2000

2005

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2050

Indigenous Resources & 45 yrs of Realisable Renewables (PJ)



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Biomass potential

2000 2005 2030 2050

- Residual potential is limited
- Beyond this purpose grown
 - 1 Mha needed for 30% of current fossil imports
- Multiple benefits
- Emerging biomass-to-liquids pathways:
 - Enzymatic conversion
 - Gasification and Fischer-Tropsch
 - Pyrolysis and refining

Key Points – Resources cont.

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Hydrogen:

- Wide range of supply pathways
- Can be a low-carbon option:
 - Biomass
 - Coal with CCS
- Niche stationary applications
- Extension of electric vehicle platform

A Future Transport Scenario – An Option from the Science - 2050

2000

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	PJ/y			PJ/y	%
Total transport	300				
Less Conservation	- 80				
Pathways:			Carriers:		
Residuals and wastes	10	5%	Electricity	65	30%
Oil rapeseed	10	5%	HC Liq/gases	105	48%
Algae	5	2%	Hydrogen	50	23%
EV-from grid/DG etc.	65	30%			
PGF-HC	30	14%	Resources:		
PGF-H	10	5%	Wastes/res	15	7%
Lignite-H	10	5%	PGF/PGB	78	35%
Gas-H	15	7%	Non-PGF grid	52	24%
Bio-H	15	7%	Fossil Indig	10	5%
Gas-HC	5	2%	Imports	45	20%
Fossil and bio imports	45	20%	Total	220	100%
Total	220	100%			

Where to from here?

2000

2005

2030

2050

National dialogue critical

- Transition management

Integrated policy development

- Science contribution to policy making - process
- Develop a plan for energy science R&D

Reporting and information:

- Reports on www.energyscape.co.nz
- LEAP model available to stakeholders

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SCION



NIWA
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