



Energy Efficiency and
Conservation Authority
Te Tari Tiaki Pūngao

Current and projected renewable energy in New Zealand



EGNRET 43

New Zealand's energy strategy

Develop renewable energy resources

Develop petroleum and mineral fuel resources

Embrace new energy technologies

Diverse resource development

Best practice in environmental management for energy projects

Reduce energy-related greenhouse gas emissions

Environmental responsibility

Warm, dry, energy efficient homes

An energy efficient transport system

Enhance business competitiveness through energy efficiency

Better consumer information to inform energy choices

Efficient use of energy

Competitive energy markets

Reliable electricity supply

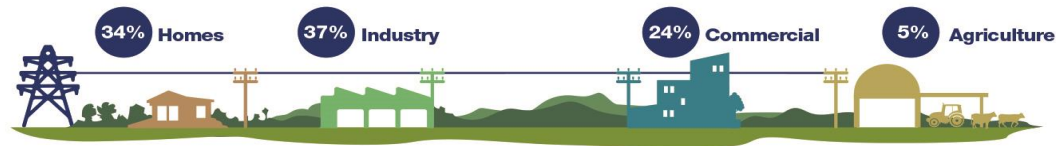
Oil security and transport

Secure and affordable energy

**Make the
most of our
energy potential**

Current energy use by sector

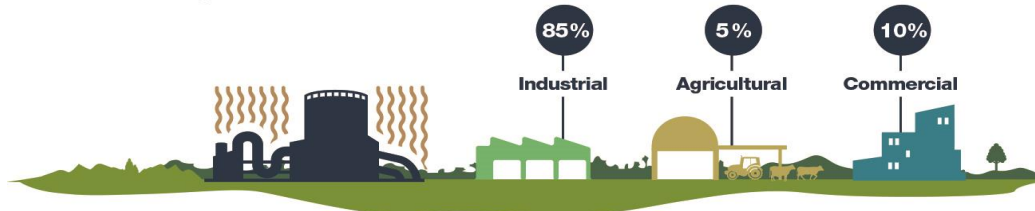
26% Electricity



38% Transport Fuels



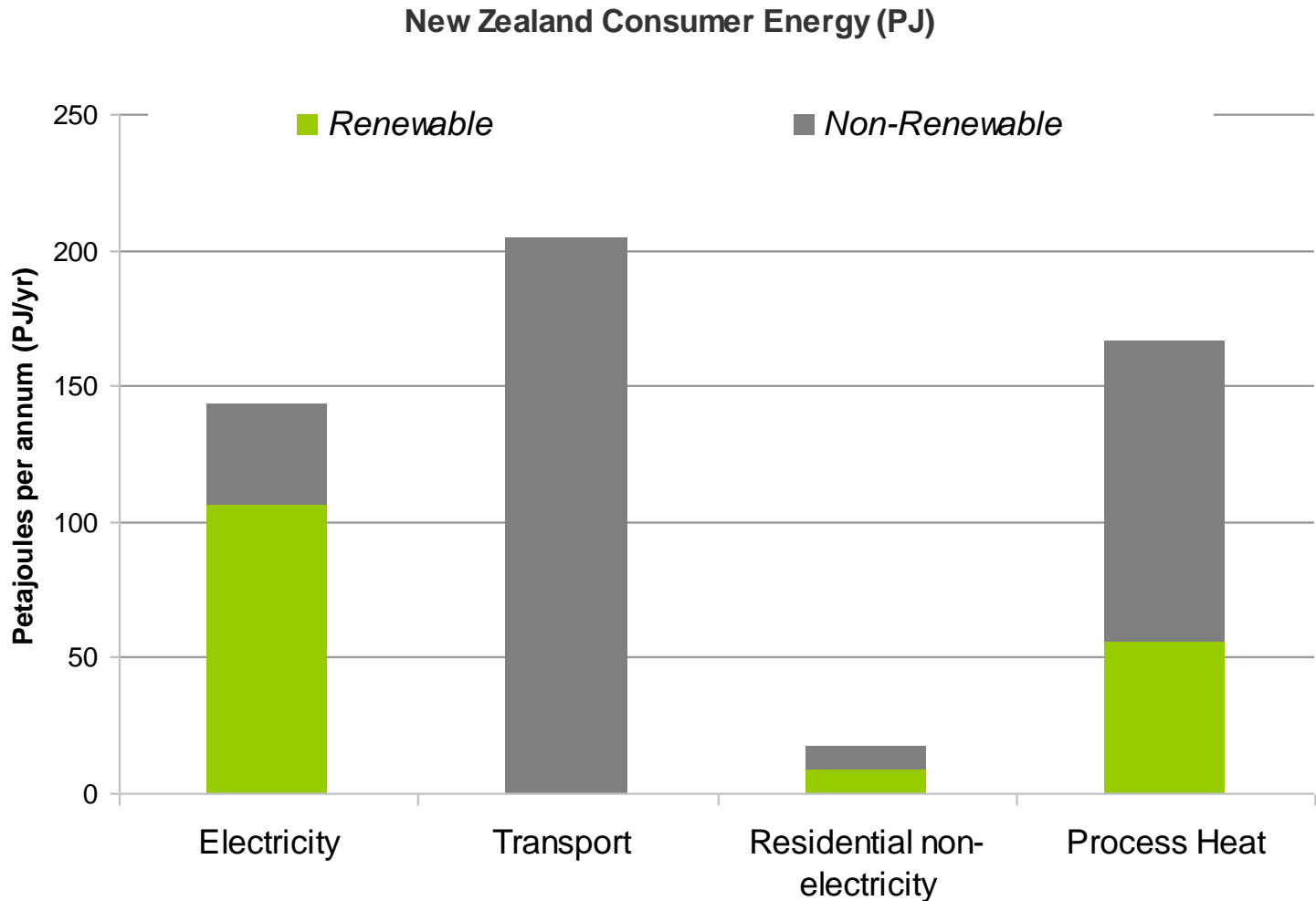
28% Process Heat



8% Other

Includes some business transport and non-electric residential.

Current renewable energy by sector



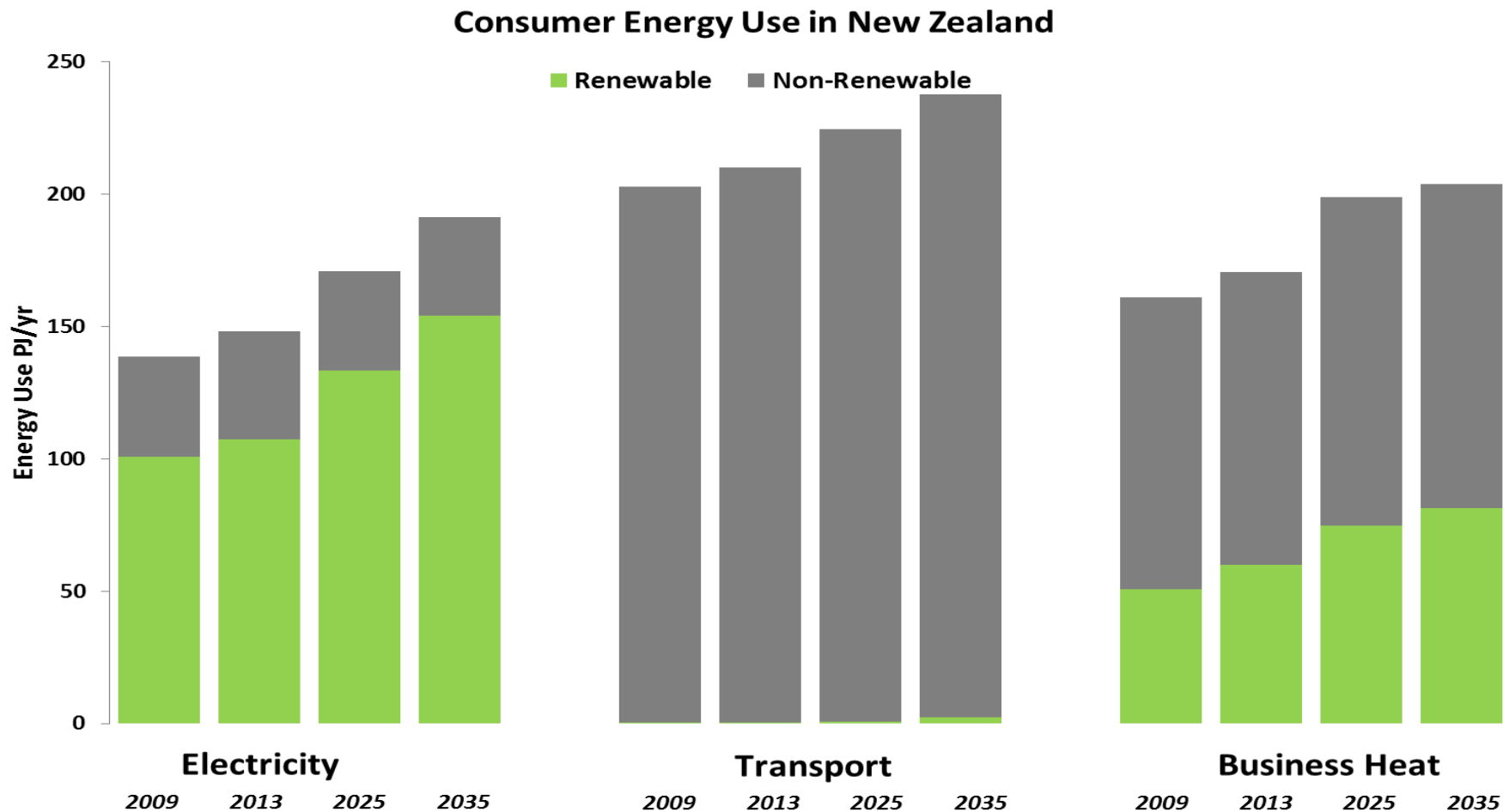
Current renewable generation and 12 month changes

	June 13 Quarter	Sep 13 Quarter	Dec 13 Quarter	Mar 14 Quarter	Jun 14 Quarter	Change Jun 13-14
Total generation (GWh)	10,529	11,074	10,266	9,942	10,459	-0.7%
% renewable	68.1%	75.6%	84.5%	79.4%	78.5%	+14.5%
Hydro	5,085	6,056	6,418	5,649	5,830	+17.9%
Geothermal	1,468	1,451	1,580	1,584	1,594	+17.9%
Wind	457	587	520	502	487	+6.7%
Wood and biogas	145	148	150	149	143	-1.5%
Gas	2,414	2,176	1,376	1,690	1,718	-28.8%
Coal	937	518	210	348	524	-44.1%
Oil and waste heat	9	9	9	9	9	+0.4%
Greenhouse gas emissions (kt CO ₂ -e)	2,010	1,511	933	1,187	1,356	-32.5%

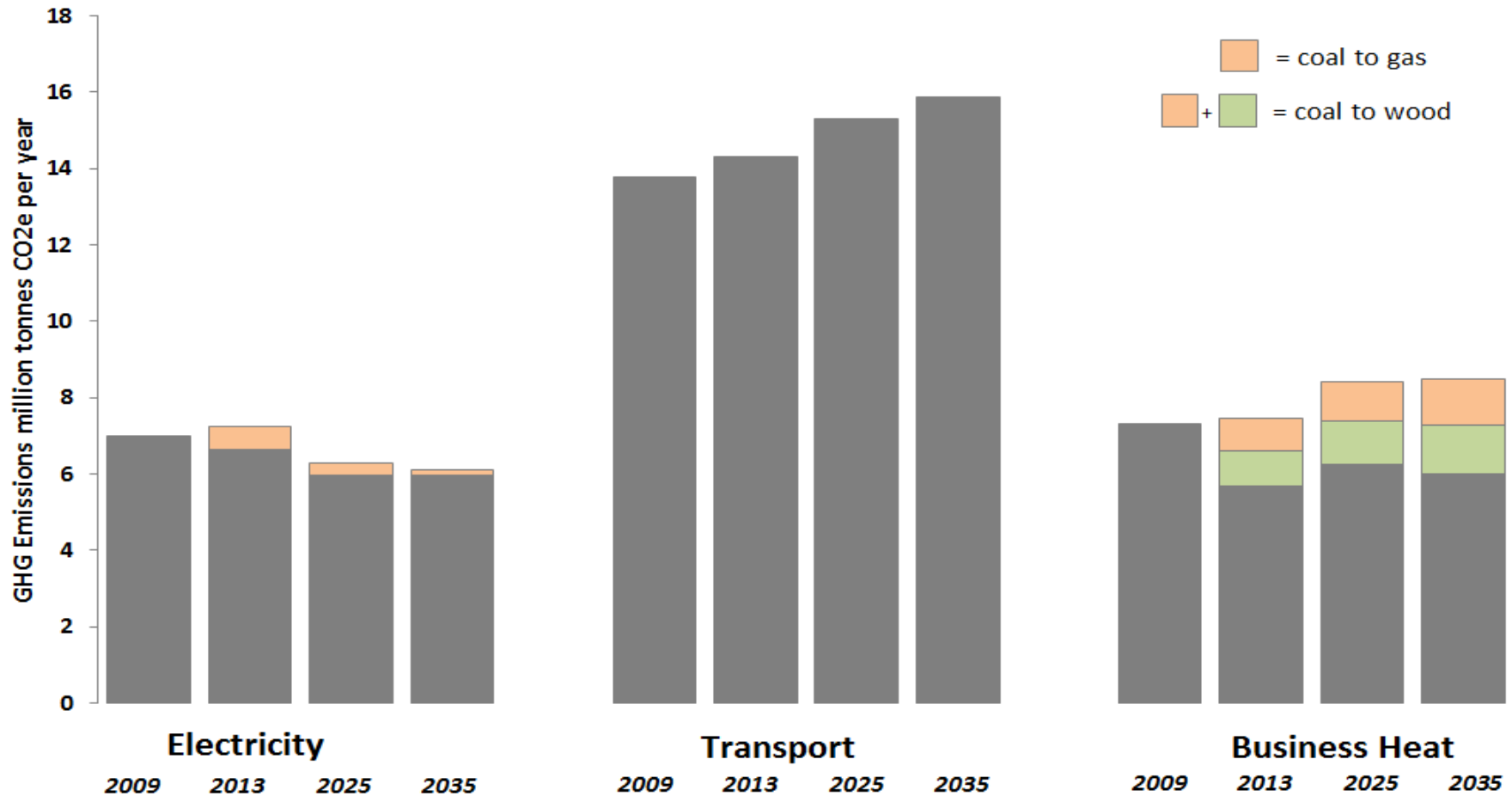
Renewable generation - progress

- Renewable electricity generation in the June 2014 quarter was 78.5% up from 68.1% in June 2013, largely due to a new geothermal plant operating at full capacity
- Thermal generation was down 33% and greenhouse gas emissions from electricity generation are down 32% over the same time
- Total electricity demand is currently falling, and this is the main limitation to building additional new renewable generation at the moment
- There are sufficient consented renewable generation projects to meet all demand growth to 2035
- Renewable electricity generation is not subsidised in New Zealand but fossil generation is subject to the Emissions Trading Scheme (a price on carbon)
- Geothermal energy currently appears to be the cheapest new baseload generation technology in New Zealand, at around 9 c/kWh, followed by wind and then natural gas (MBIE 2013)
- There is a target for 90% renewable electricity generation by 2025 (New Zealand Energy Strategy)

2011 “reference” renewable projections



Technical potential for substituting all current coal use

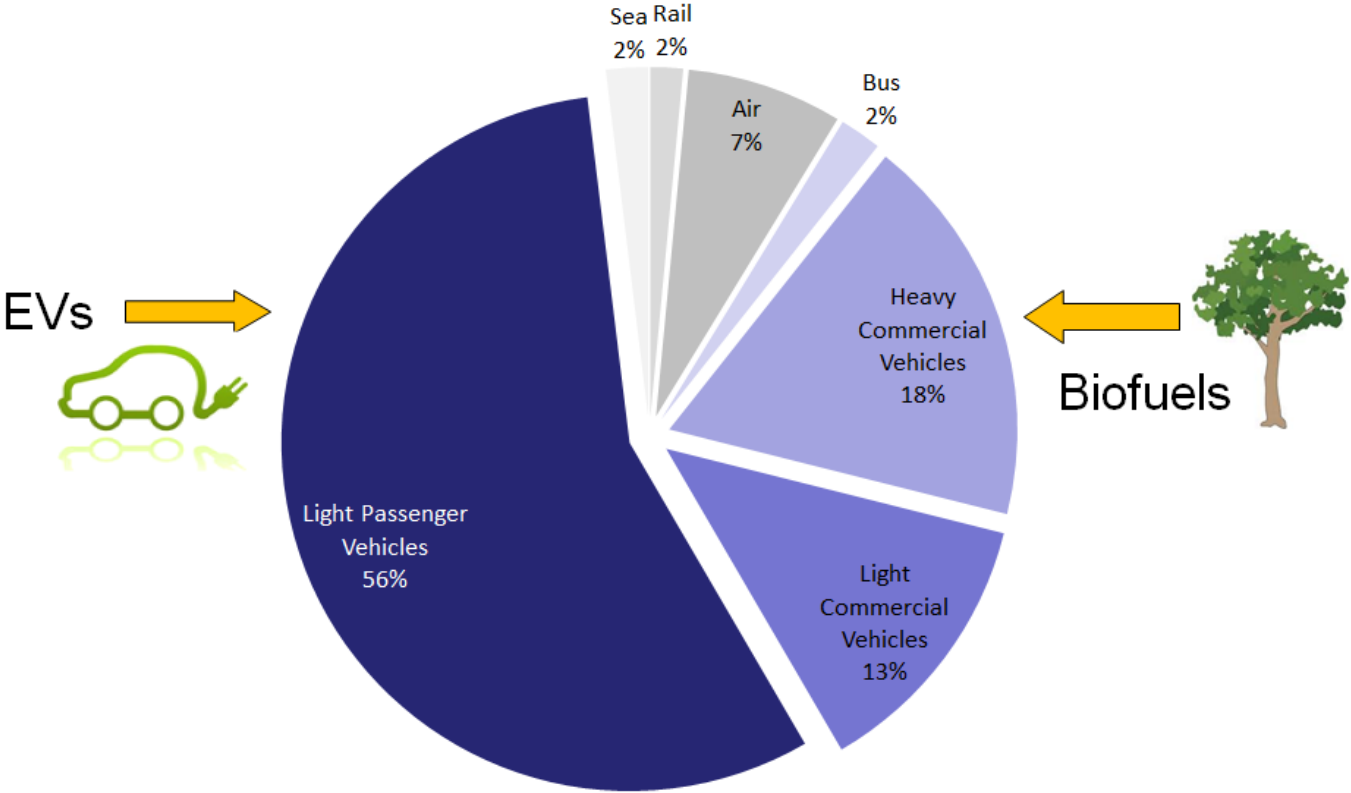


Use of wood as process heat

- Business currently uses a significant amount of wood residue as process heat in New Zealand, mainly in the pulp and paper industry
- Wood energy can be a cost-effective alternative to coal in New Zealand
- For example the government recently announced the Wood Energy South project - a joint initiative between EECA and Venture Southland that will partner with local businesses, schools and healthcare facilities to help them convert to cleaner, renewable wood burning technology
- The project will establish a sustainable supply chain utilising some of the 300,000 tonnes of wood waste generated in Southland each year
- The Government is investing \$1.5 million into the project over the next three years, with private investment expected to better this funding
- The project Wood Energy South is expected to save 8,000 tonnes of CO₂ per year, which is equivalent to taking 2,500 cars off the road

Renewable transport fuels

- Transport is biggest area of potential increase in renewables for New Zealand



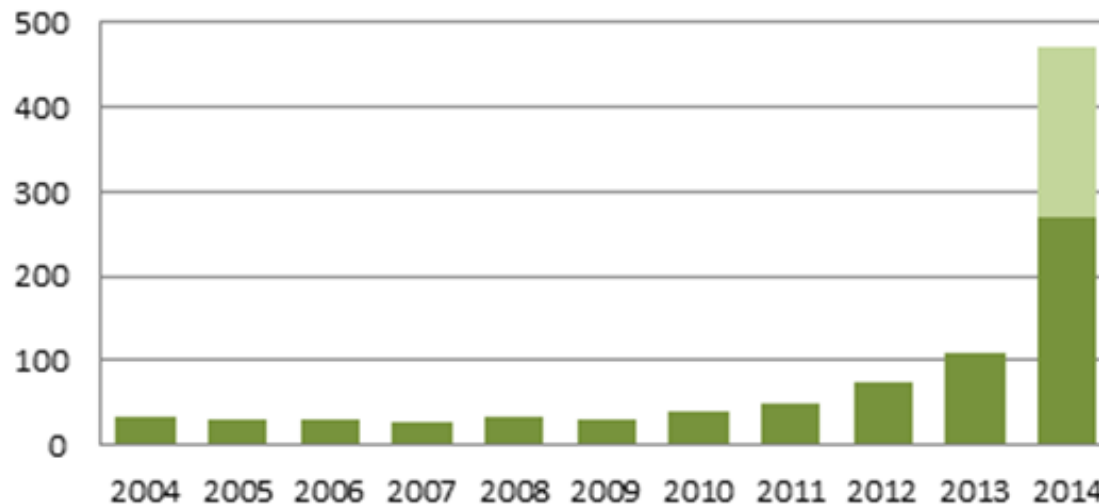
Renewable transport fuels progress - EVs

Electric vehicles are an excellent fit with New Zealand due to:

- High proportion of renewable electricity offering 85% reduction in CO₂
- High proportion of homes with off-street parking - 2nd highest in world
- Multiple car ownership by households - 2nd highest in world
- Low average commute distance – 28 km/day
- 230 Volts – easy overnight charging

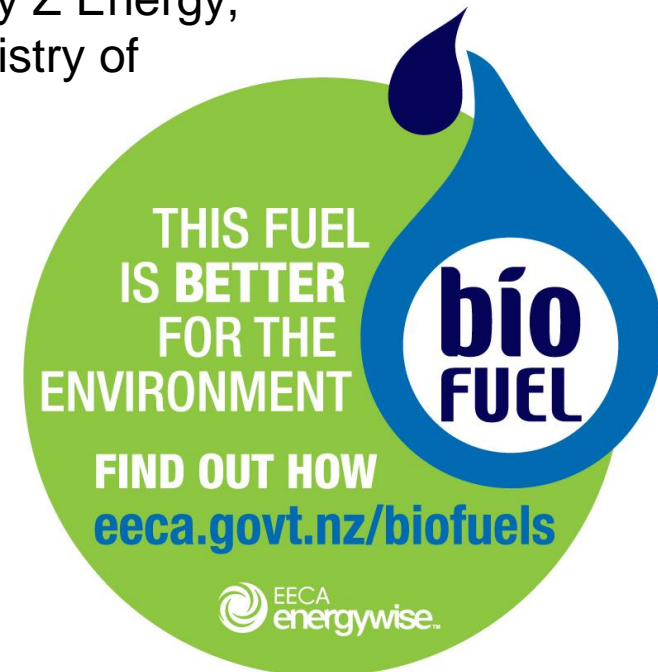
Government has exempted EVs from road user charges until 2020.

EVs in the New Zealand fleet

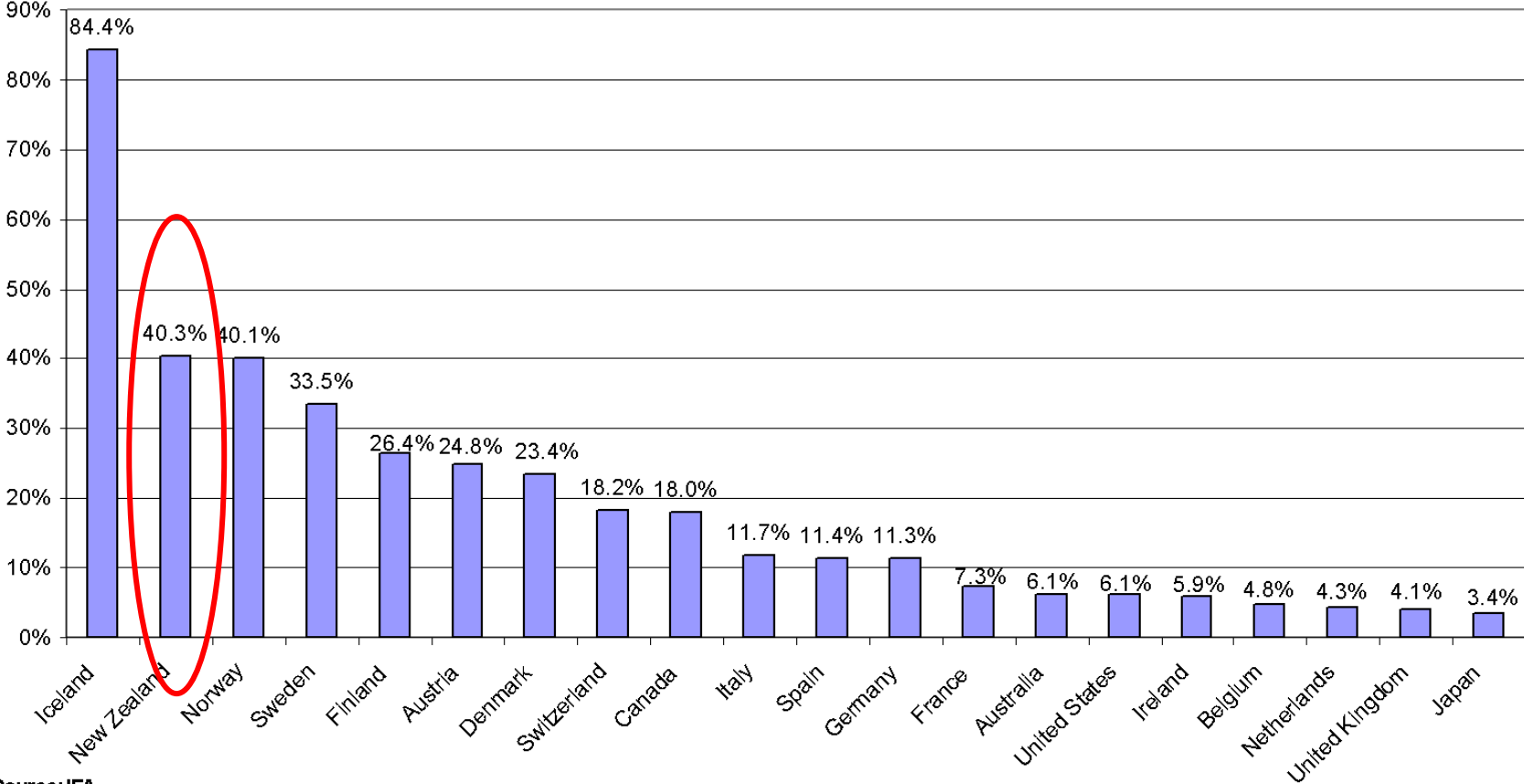


Renewable transport fuels progress - biofuels

- 5% biodiesel and 10% bioethanol blends currently retailed in NZ although availability is limited
- Increasing biofuel blends sales is the quickest way to substantially reduce CO₂ emissions (changing vehicle fleet make-up with EVs is relatively slow)
- Z Energy, one of the largest petroleum product retailers in NZ, is constructing of a tallow biodiesel plant and plans to start retailing in 2015
- The “Stump to Pump” feasibility study, co-funded by Z Energy, pulp and paper company Norske Skog and the Ministry of Primary Industries, has just been released.
- The report says it is technically feasible path for New Zealand to convert forestry residues to liquid fuels and that there are sufficient forestry residues available for this
- Achieving commercial viability and ensuring the fuel can meet standards will take time
- Industry will fund the next stage of the project



New Zealand's energy is 40% renewable now



Source: IEA



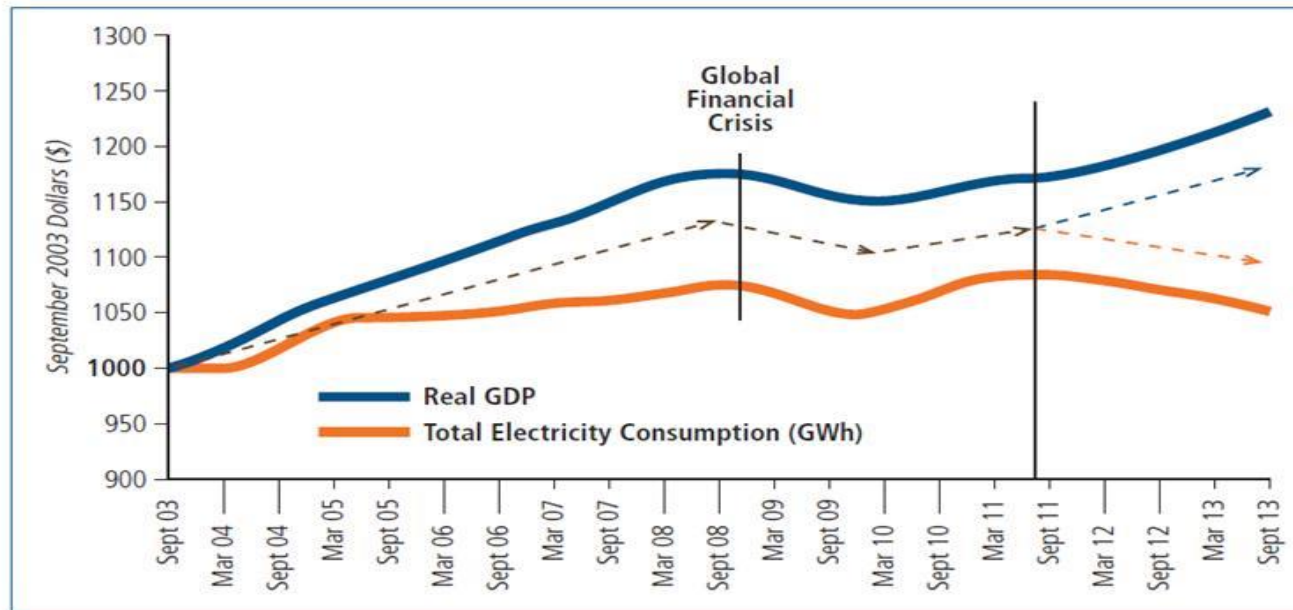
APEC renewable energy goal

- APEC Ministers aspire to the goal of “doubling the share of renewables in the APEC energy mix, including in power generation, from 2010 levels by 2030.”
- New Zealand is already at 40% renewable energy. While there is potential to increase this particularly in transport, for New Zealand would not be able to double renewable energy to 80% by 2030 itself. However the proportion of renewable energy is increasing and will contribute to this APEC wide goal.
- New Zealand’s achievements in renewable electricity generation can hopefully be an inspiration for other APEC economies.

APEC energy intensity goal

- The decoupling of GDP and electricity consumption showing a reduction in energy intensity, is in line with the APEC goal of reducing energy intensity by 45% by 2035

Growth in electricity consumption and real GDP (2003 – 2013)



Source: EA, NZIER, ENA Analysis, PwC Analysis

Note: Real GDP and electricity consumption are 12 month rolling averages

Summary

- The proportion of electricity generation in New Zealand net by renewables is increasing and is now close to 80% but falling electricity demand may limit further construction of additional renewable generation
- Wood can be a cost effective substitute for coal and gas for business process heat in New Zealand
- Transport biofuels are technically viable in New Zealand are the greatest area of potential renewable energy uptake and greenhouse gas emissions reduction from energy. New Zealand has sufficient forestry residues available as feedstock for advanced biofuel plants when these become commercially viable
- Electric vehicles are a particularly good fit for New Zealand and have the potential to help reduce emissions, increase the use of renewable energy and improve transport fuel efficiency over the long term