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# NZ energy use: challenges and opportunities for the wood industry



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# What is EECA?



*Residential*



*Business*

***Inspiring energy efficiency –  
advancing renewable energy***



*Products*



*Energy supply*



*Government & local  
govt*



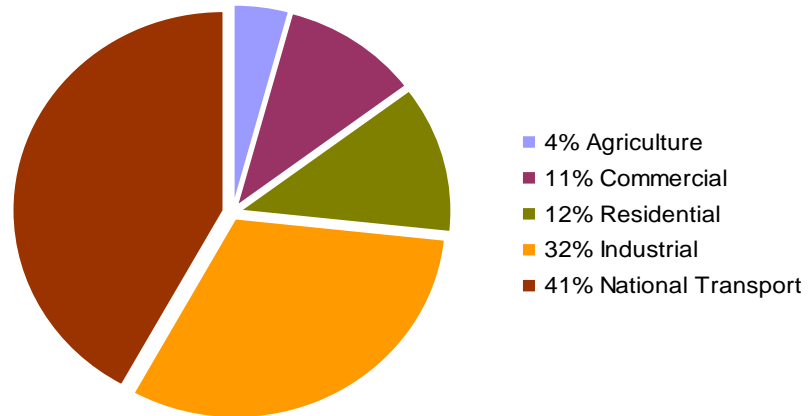
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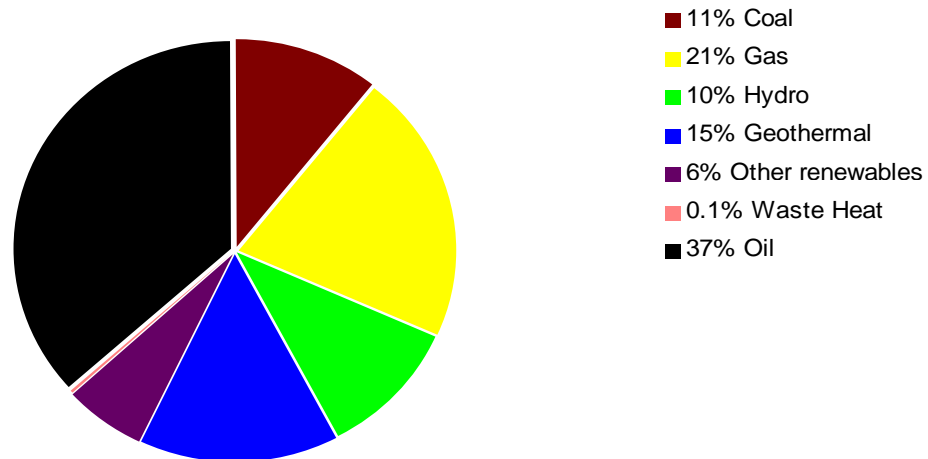
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## TOTAL CONSUMER ENERGY BY SECTOR IN 2008



NZ Energy Data File (MED, 2009)

## TOTAL PRIMARY ENERGY SUPPLY 2008



NZ Energy Data File (MED, 2009)



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## Why energy efficiency and renewable energy?

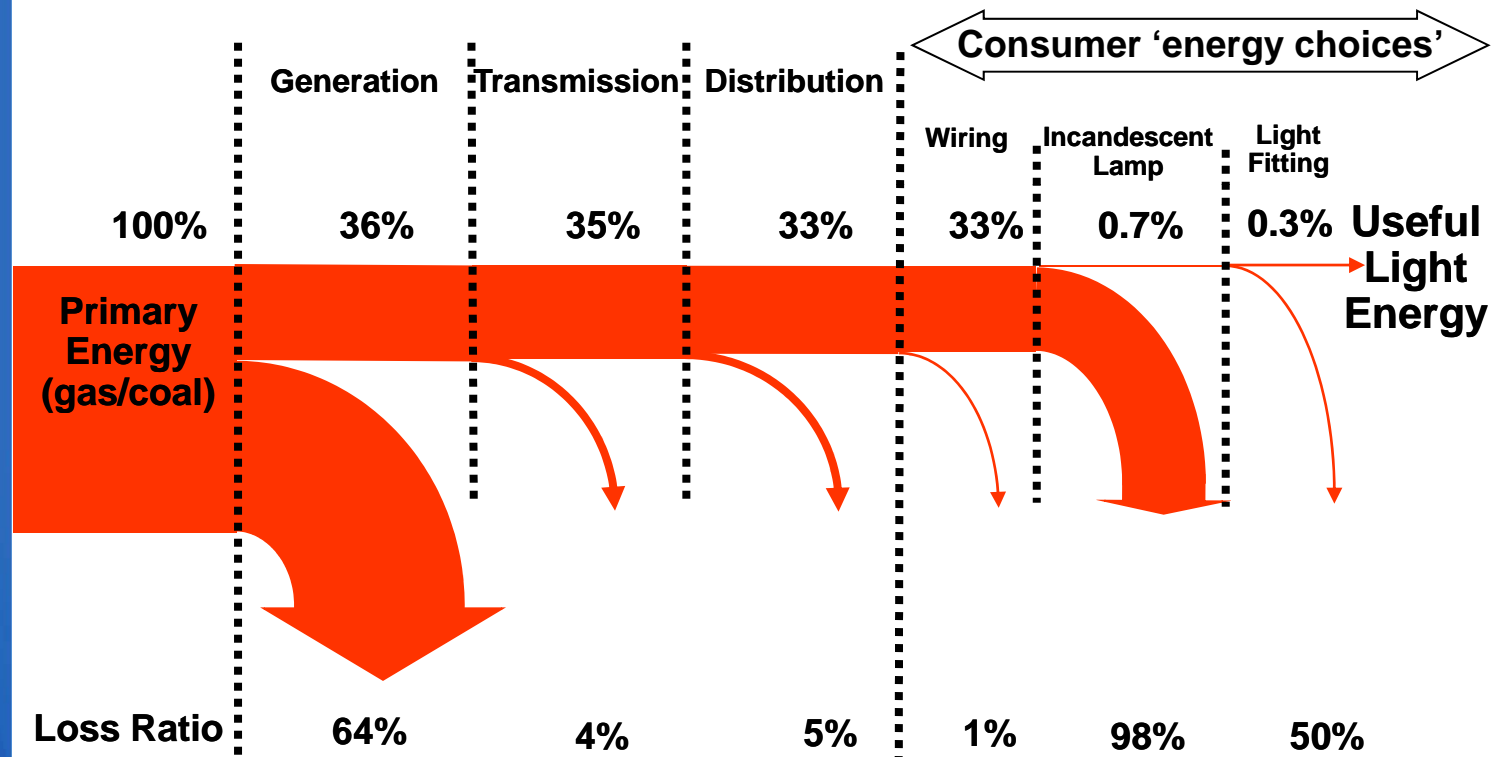
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- Balance supply and demand
- Cost-effective way to get multiple benefits
- Potential to significantly reduce NZ's \$16billion energy bill
- Reduces emissions
- Helps to meet our climate change objectives
- Significant health benefits – warm, dry homes
- Improved local air quality
- Environmental benefits – less infrastructure
- Fewer transmission towers
- Builds on NZ's clean, green image
- Boosts regional economy
- **Stronger businesses – good for the bottom line**



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# Huntly power station to electric light bulb

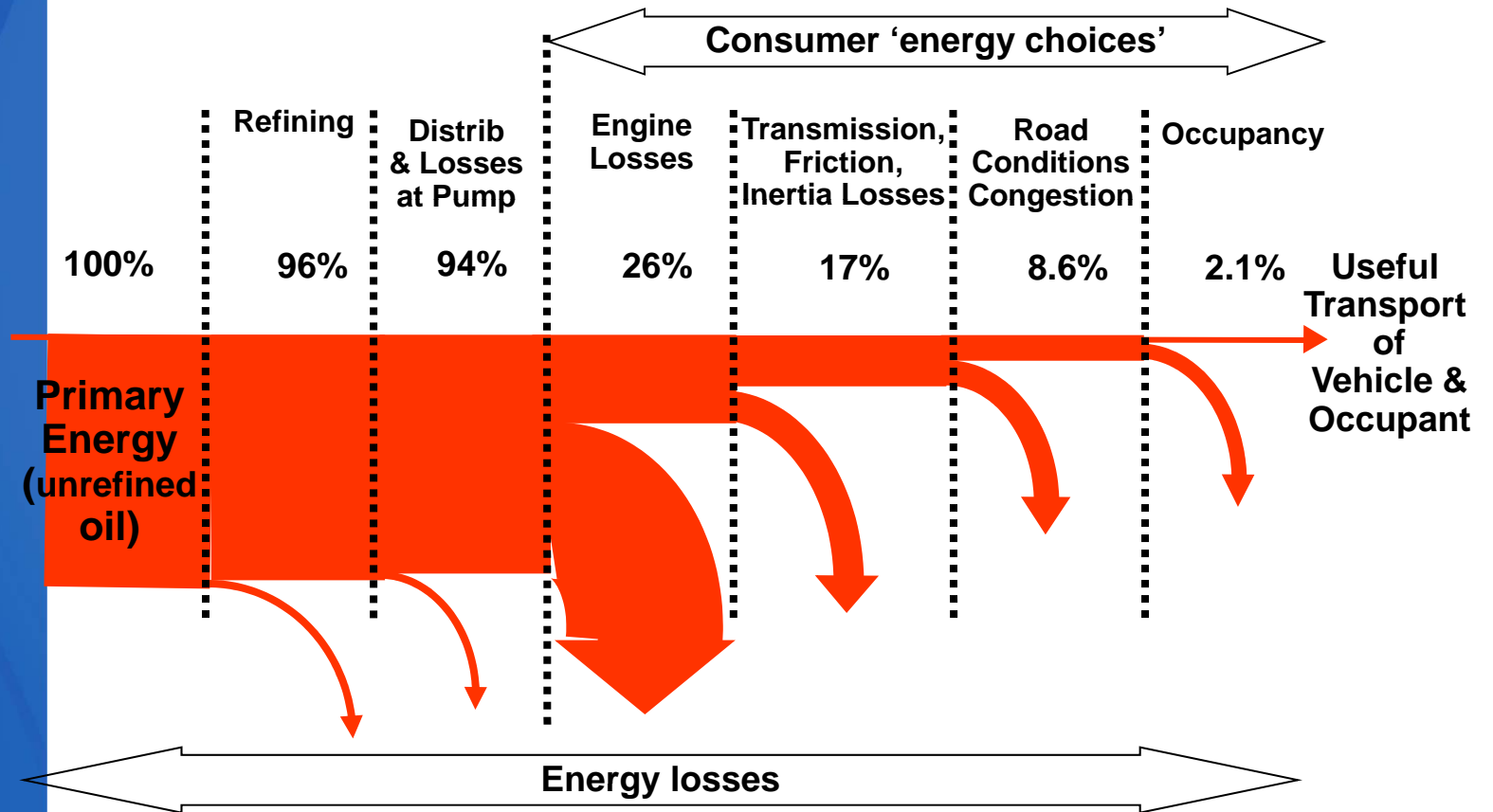


Need to focus on both supply and demand sides



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# Transport energy losses





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## Why energy efficiency and renewable energy?

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# This Government's energy aims

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To support:

- Economic growth
- Energy security
- Affordability
- Environmental responsibility
  - 90% renewable electricity target
  - 13% renewable transport





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## What's so good about wood energy?

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- Renewable – we can keep doing it
- Carbon neutral – forests absorb CO<sub>2</sub> to counteract greenhouse gases released in combustion
- Reduces overall GHG emissions when used to replace fossil fuels
- Lower PM<sub>10</sub> emissions than coal, diesel
- More cost-effective than many other fuels
- Uses, and reduces, waste – less to landfill
- Versatile - electricity generation / heating / biofuel
- Increased value to forest owners
- Employment in the wood fuel supply chain



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## Wood - the international scene

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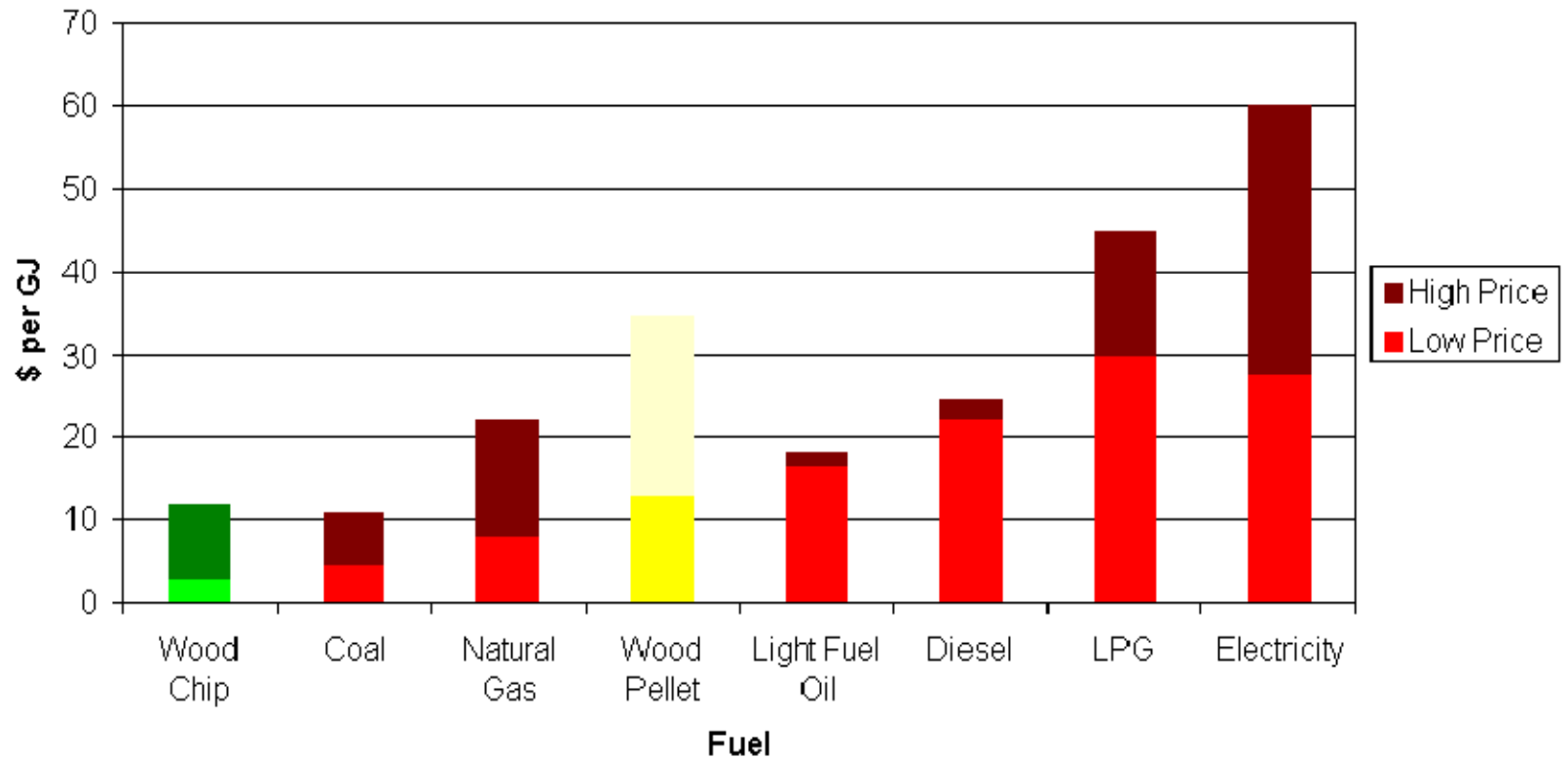
- Demand is strong and growing for wood pellets internationally:
  - demand in Germany and Austria expected to grow 25% during 2009
  - annual growth in Sweden for wood pellets 8% – 10%
- EU renewable energy target of 20% by 2020 - biggest increase in bioenergy – mainly wood
- Over 450 wood pellet plants in Europe currently
- Around 25% of global production is exported
- Real concern about demand outstripping supply



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# The value of wood energy

Fuel Costs





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## The value of wood energy

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- Dried wood has 20.2GJ / tonne of energy
  - Equivalent to **5.3 kWh / kg**
- Comparison with petrol: **13.1 kWh / kg**
  - Recognised as a highly concentrated energy source
- Cost-effective alternative to other fuels – stable supply, less subject to price volatility



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## The value of wood energy

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- Wood energy customers currently pay up to \$12 / GJ for wood chip
- At \$10 / GJ, value per tonne of dry wood fuel is more than \$200
- Value of unprocessed logs less than \$75 / tonne at August 2009
- **So - why is more New Zealand pine processed in China than in New Zealand?**



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## Wood energy potential in NZ

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- NZ total energy use per year: 543 PJ
- Current energy production from biomass (mostly wood) 45PJ per year
- Potential for a further **60PJ** per year
- Could rise to 90PJ per year by 2050 (through increasing volumes of forest harvesting and wood processing)

*(source: Scion - Bioenergy Options for New Zealand)*

- Context: 1PJ is equal to the amount of energy used by 28,000 NZ households in a year – roughly the size of Nelson



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## Wood energy – what EECA is doing

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- In 2009/10 we aim to increase wood energy use by 0.3PJ / year
  - oversubscribed, limited by funding
- Through Forest Industry Development Agenda (FIDA), EECA is supporting development of wood energy market
- Grants for using or selling wood energy
- Information and support
  - Bioenergy Knowledge Centre ([www.bkc.co.nz](http://www.bkc.co.nz))
  - Wood Fuel Trading Platform – online marketplace for buying and selling wood resource
  - Wood Fuel Quality Guidelines





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## New markets: Wood energy for industrial heat

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- Radford Yarn Technologies
  - New Zealand's first wood pellet-fired industrial boiler
  - Benefits
    - Reduced electricity bill by 50,000 kWh / yr
    - Reduced CO2 emissions by 350 tonnes / yr
    - Markets product as environmentally friendly
  - Supreme winner at EECA Awards 2009
- New Zealand Foam Latex
  - Installed a wood chip fired boiler for industrial heat
  - Using demolition wood.



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## New markets: Wood energy for space heating

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- 31 schools in Auckland, Rotorua, Canterbury, Otago have switched to wood energy through our Renewable Heating in Schools Project.
  - Switched to either chips or wood pellets
    - Reduced emissions / maintenance time
    - Environmental leadership within local communities
- Accommodation provider, Titoki Healing Centre, using wood pellet boiler



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# *Energy management opportunities in the wood industry*



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## NZ business – huge energy efficiency opportunities

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- NZ businesses use 367PJ per year - 73% of NZ's total energy use
- Huge potential to improve the overall efficiency of New Zealand businesses
- Smarter energy management could deliver **\$2 billion** in annual savings
  - *That's \$2 billion pa off the bottom line*
- Good for business – good for national supply



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## Energy opportunities for business

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- Drivers for changing the way energy is used
  - New technology
    - New paradigm – LEDs vs incandescent lights
    - Incremental
  - Behaviour change - the way we use energy
    - Motivated by many external factors and beliefs
- Our experience tells us:
  - businesses understand energy supply, purchasing, savings opportunities
  - but they don't set targets and KPIs; lack awareness and training, reporting
  - *leadership and accountability is key*



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## Why invest in energy management?

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- **Positive for the bottom line**
  - Lower operating costs, improved productivity, protects profitability
  - Helps insulate business against recession
  - Savings accumulate over time
- **Reduces environmental impact**
  - Offsetting overseas perceptions of food and passenger miles
  - Meeting ETS requirements
  - Positive branding (60% of NZ GDP exports – branding increasingly important)
- Corporate social responsibility
- Positive for staff morale



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## Energy opportunities in the wood industry

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- Energy audits – across the business sector for every \$1 invested, \$15 of savings are identified
- BUT in wood processing sector: for every \$1 invested in energy audits, **\$20 in savings identified:**
  - \$6 in savings with less than 12 months payback / \$14 in savings with 1 – 5 years payback
  - Most common recommendations from energy audits for sawmills are to:
    - upgrade insulation
    - re-tune boilers
- Consider energy audits, getting staff onboard, monitoring and targeting





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## Energy management: the basics

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- No-cost change in energy use and behaviour
  - simplest and most cost-effective especially in recession - focus moves to short-term survival
  - 10% - 15% savings possible
- Low-cost maintenance-type measures, e.g. tuning, changes to plant policy and procedure
  - further 10% savings possible
- Capital investment – biggest commitment, longer term payback
  - Many technology investments have payback of less than 2 years



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## EECA's industry partnerships

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- We currently work with six industry associations in energy intensive sectors:
  - Plastics NZ
  - Tourism Industry Association
  - NZ Seafood Industry Council
  - Primary sector: NZ Pork, Zespri
  - Aggregate and Quarry Assn
- Deliver targeted energy efficiency and energy management programmes
- How can we best work alongside the wood industry?



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## ***Some success stories from the wood industry...***



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## Winstone Pulp International / Energy for Industry

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- Introduced heat recovery at Karioi pulp mill following an energy audit
- Reduced energy use by over \$2m/yr
- CO2 emissions reduced by 6,000 tonnes per year
- Project cost \$3.6m - payback less than 2 years
- Winner of the Large Business Award at EECA Awards 2009 – judges commended ‘spectacular’ savings





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## Southern Pine Products

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- Installed a briquette press to turn MDF waste into fuel
- Produces more than 400 kg of briquettes per hour
- Briquettes sold on to greenhouse complex as high-energy boiler fuel – created new revenue stream
- Benefits:
  - Estimated payback 1.3 years
  - \$180,000 / year projected saving in disposal costs
  - \$25,000 extra revenue in briquette sales





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## Pacific Wood Products

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- Installed an Ecogate dust extraction system
- Variable speed drive allows the dust fan extractor speed to match demand
- Results
  - 42% energy savings - \$23,000 per year
  - Payback 4 years
  - reduced CO2 emissions by 45 tonnes / year





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## Ernslaw One Bioenergy

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- Purchased a mobile wood chipper based in Otago
  - Produces 13 tonnes of wood chips per hour using 30 litres of diesel
  - Able to turn wood residue into chips for sale (adding value to low grade wood)
- In conjunction with AES, supporting the development of a bio-oil plant in Pukekohe
- Bio-oil plant will enable extraction of energy from remote wood residue sites.





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## To conclude...

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- **Enormous potential for wood energy in NZ – EECA is working to help grow the industry (supply and demand)**
- **Energy management – huge potential for wood processors to reduce costs, improve bottom line and gain significant co-benefits**
- **EECA can work with you as an industry to help achieve this**