

In response to the questions re. the Draft ERP, and specifically the 'Energy' questions 58-69

An Energy Matching Strategy for NZ

How NZ can best use its available biomass resources to alleviate the imminent energy emergency and deliver rapid & cost effective emissions reductions whilst maximising GDP and providing long term markets for under-threat exports

On behalf of the Bioenergy Association's Wood Energy Interest Group

1. The Imminent Energy Emergency

Multiple factors are at play, providing a very dynamic & challenging energy situation :

Increasing Demand for Energy

In-fact record high
on 30 June !

1. Dry years mean reliance on fossil fuels (both coal and gas)
2. Steady increase in demand from domestic heat pumps
3. New electricity demand from high temp heat pumps (up to 80°C)
4. And from electrode boilers (where viable, or encouraged by GIDI)
5. And increasing demand from EV's (if 20,000/yr = c.2.5mill MWH ?)

Decreasing Supply of Energy

Even using diesel
'peaker'....

6. Pressure to phase out coal (which could be replaced with bio-coal)
7. Rapidly declining natural gas resources
8. Offshore exploration ban, so gas supply is only decreasing
9. The Oil Refinery is ceasing production (so is now available for biofuels!)
10. ETS (and customer) pressure to eliminate coal for industrial heat

Our urgent energy challenges

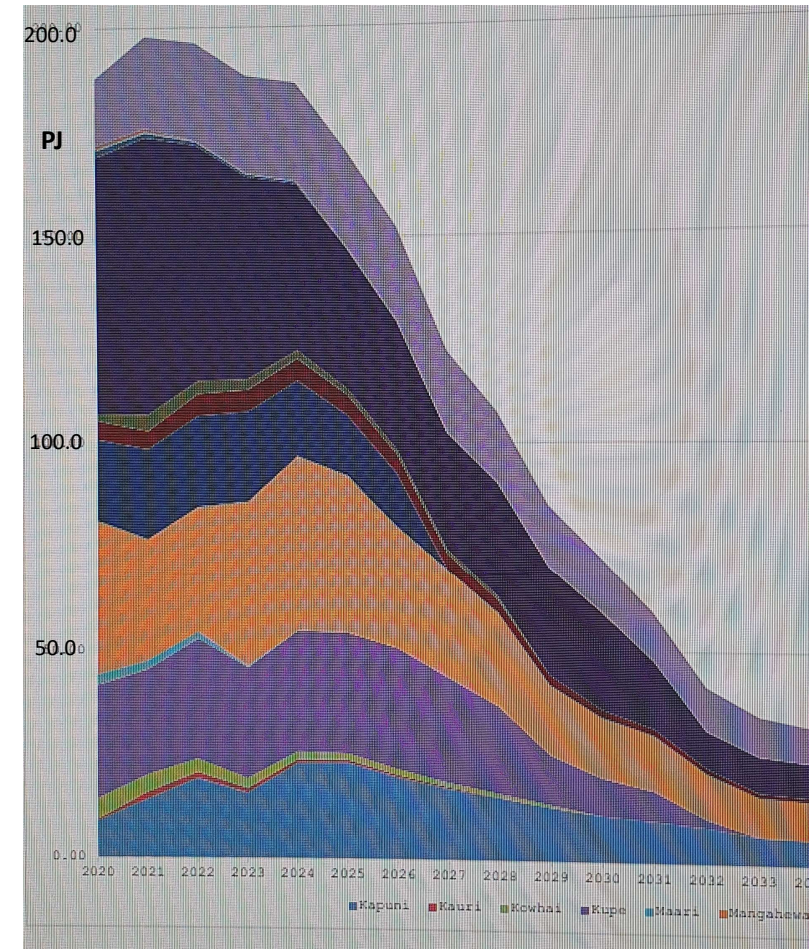
New clean energy sources are needed – and fast

- Strong need for increased electricity supply
- So gas is being diverted from industry (by increasing prices up to 350%)
- High Elec Spot prices forcing factory stoppages

END RESULT :

Industry is struggling to pay for gas and electricity, impacting on GDP and investment decisions.

**Projected Gas Supply
– as at Jan 2020**



Source : MBIE Oil & Gas Report – Jan 2020

Matching energy sources to energy usage

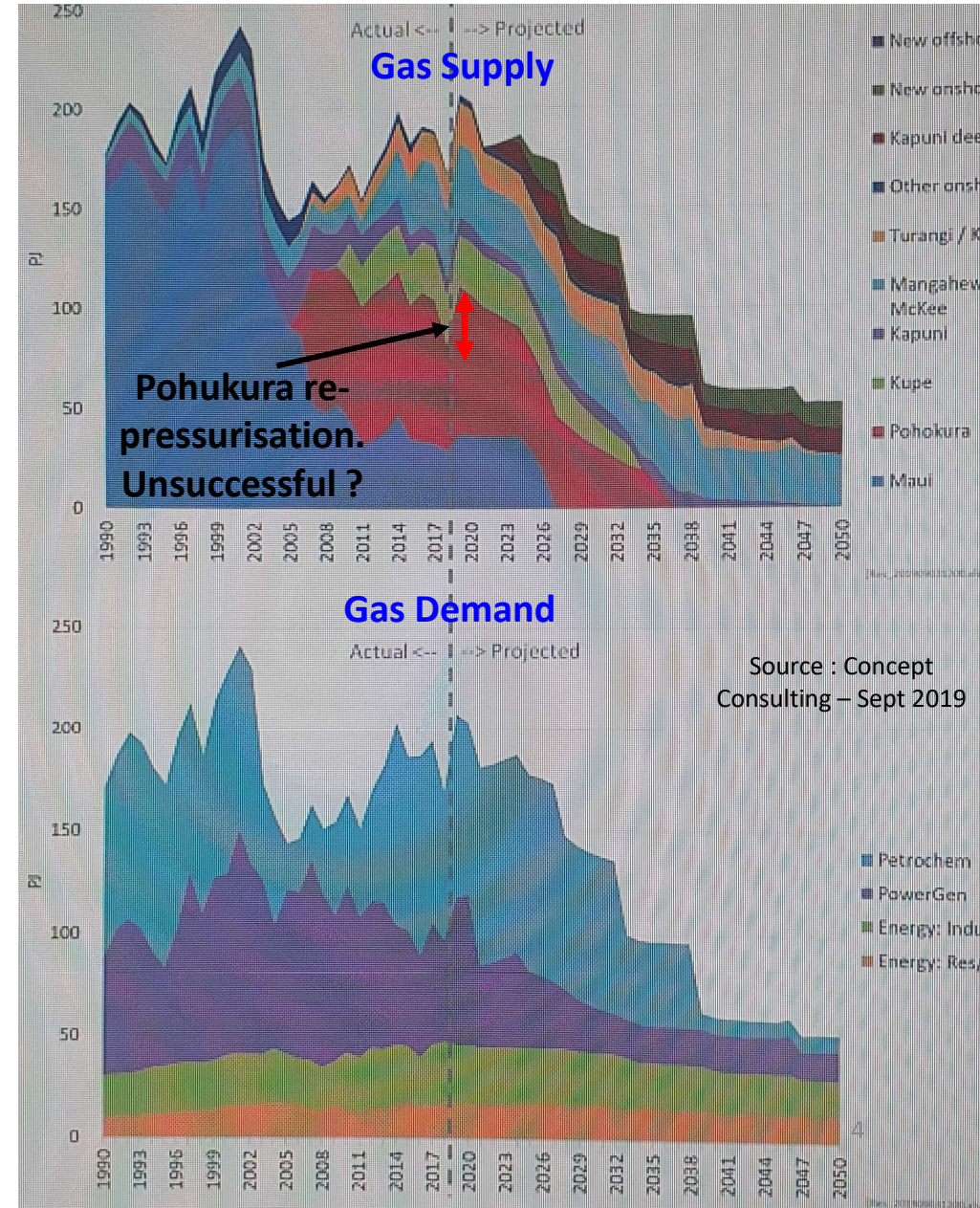
New electricity supply is needed – and fast

- Pohukura is declining rapidly
- Existing gas is needed to fill the electricity shortage
- Ever-increasing risk of Dry Years

With natural gas declining – and existing stock in high demand – what does North Island industry use for process heat ?

Biomass can meet the demand....

...from good old combustion !



Can electricity deliver on NZ's 'Paris curve' ?

- New wind & solar will come, but is needed to meet new demand
- And yes, EV uptake will help a transport transition, but too slowly
- So coal for elec is not easily phased-out (but can be with drop-in bio-coal)
- And remaining gas reserves are needed to keep the lights on
- Agricultural emissions require technology improvements

So delivering on 'the Paris curve' will be challenging, and **electricity is a great energy source that should be used in its high-value uses – not for generating heat, where wood can carry that burden.** *See our answer to Qu 26.*

See our
answer to
Qu. 63

The Paris lag increases the need to take advantage of any quick wins.

So where are quick wins available ?

Biomass can provide the Quick Wins !!

New heat/thermal fuels are needed – and fast. It is do-able :

- NZ exported 21.5mill cubic metres of logs (c.20.5mill tonnes) in 2019
- 80% of this was from the North Island ports
- Each tonne would displace approx 7GJ of natural gas
- South Island industry uses 16PJ of coal – and exports 30PJ of logs
- N.I. Industry uses 25PJ of gas for process heat – and exports 85PJ of logs

See our
answer to
Qu. 58

So demand can be met from the lower-value export logs alone – and with great local expertise, and 20 active boiler suppliers, **industry can convert by 2030.**

That still leaves still 20PJ of lower value logs available for onshore conversion to drop-in biofuels and renewable gas (or 100PJ if we use all logs)

The technology is proven – so what are we waiting for ?

International Log Demand – and the risk to NZ forestry

There's good reason to find alternative markets for our log exports

- 81% of 2019 log exports were shipped to China. This demand is tenuous :
 - In the 1990's China's Central Govn't initiated "China Fast-Growing and High-Yield Plantation Programme"
 - In 1999 there were 46.67 million hectares of plantation forestry
 - The programme aimed to establish a further 13.3m ha by 2015
 - This was projected to supply 150 million cubic metres per year by 2015
 - There is a logging moratorium – currently planned until the 2030's.
 - The Chinese population is set to decline significantly
 - There is significant risk from contagion re. Evergrand & resulting decline in buyer power
- Other countries are planting too, with lower cost bases & distance-to-mkt

Long-term demand for our logs, certainly at current prices, is at risk.

Demand has recently fallen by 35%.

How to deliver on the quick wins ?



Well, luckily....GIDI is already delivering abatement at a cost to Gov't of less than \$8/t of CO₂ (average) – and only \$5/t for biomass

- a. GIDI is now a well-established scheme, so can be easily expanded, adapted and ramped-up
- b. It is technology neutral, supporting abatement via energy efficiency or electricity or biomass
- c. GIDI can now use ring-fenced ETS revenues to subsidise C-neutral boilers, so is effectively another Feebate scheme
- d. Gas users are facing urgent cost and supply issues, so urgently need the GIDI 'Feebate' scheme to be expanded
- e. Coal boilers have an even longer life than cars, so users need the GIDI 'Feebate' scheme
- f. Ramp-up the GIDI scheme to deploy \$250m per year (approx 25% of annual ETS revenues)
- g. Use some of the remaining \$750m/year to help subsidise distributed bio-refineries (see slide 9)
- h. GIDI is delivering abatement at an average cost to government of \$5.44/t for biomass (\$11.44 for electricity)
- i. At even twice current levels, it would still represent the most cost-effective use of ETS funds
- j. There are approx 20 active boiler suppliers, so it represents the best opportunity to get ahead of the Paris curve
- k. To drive more rapid uptake, award a higher percentage of the capital cost (current max is 50%)
- l. Apportioning say 70% of GIDI to North Island heat users (to fund urgent natural gas replacement) would protect GDP

Using ETS \$'s wisely - for rapid Emission reduction

- Passing back ETS Revenues via a Carbon Dividend risks it being spent on consumerism – and represents a missed opportunity
- Instead use it to aggressively drive-down emissions (e.g. wood boilers, biofuels, solar PV)

That will flow through to reduced food and power costs, so protecting the socio-economic sectors most impacted

Use the \$6.4b* & ETS revenues to invest in Bio-refineries at 6 log export ports (see ★right)

The log yards can be used for the biorefineries, and the export workers can be re-deployed to log handling & processing at the bio-refinery. Inject bio-gas into the high pressure network, and use the bio-coal by-product as a drop-in replacement for coal.

See our answers to Qu. 60 and 61



Some mis-perceptions need to be corrected

- Wood fuel can be trucked 300km and the diesel used would only have emitted 375kg of CO₂, **but**
 - The cargo of wood fuel would displace 30,800kg of CO₂ if replacing coal : so Net 98.8% carbon neutral
 - The cargo of wood fuel would displace 18,100kg of CO₂ if replacing gas : so Net 98.0% carbon neutral
 -and biodiesel would further improve this – or electric trucks within 10 years
 - **So every truck arriving on site with boiler fuel is like taking 7 or 12 cars of the road for a year !**
 - (Compare that value-for-money to the cost/tonne of CO₂ abatement delivered by the EV scheme....)
 - Once on the truck, wood can be taken a further 100km for approx \$1/GJ – unlikely to be a deal-breaker
 - **So a long-distance haul to a boiler or bio-refinery is a relatively small additional cost - not a show-stopper at all**
 - MBIE’s “Energy in New Zealand Report 20”, published Aug 2021, comments regarding process heat:
 - a. “However in some regions, such as Canterbury, the supply of woody biomass residues falls short of the energy demand for process heat.” (page 36)
 - b. “Further developments are expected but may be constrained by regional biofuel availability.” (page 36)
- This is wrong : there are plentiful supplies of straw in Canterbury, as well as ‘stranded’ logs, and wilding pines just over the hill, and suppliers are already responding.*
- Short Rotation Crops – can be economic and grown (with rotation benefits) without displacing food
 - Scrap PFSI except in highly erosion-prone areas – they just take land out of productive use. **We need fibre and fuel !**
 - Biomass, through CCS, is the only energy type that can be carbon negative, sucking CO₂ from the atmosphere.

Vision for 2030 : Domestic Bliss – no need for international credits !

1. Forest skids are remediated as all usable fibre is recovered (5PJ if 2% of log volumes on average)
2. Lower-grade export logs are used for energy (if 50% of total export logs, this is 70PJ/year)
 - For N.I. Process Heat - replacing gas (25PJ) and coal (3.3PJ). Same concept in the S.I.
 - For Drop-In Biofuel at 6 regional bio-refineries (replacing diesel) to complement the EV scheme
 - For drop-in Bio-Coal for power generation and industrial heat, with the syngas going to.....
 -Renewable Natural Gas (to replace fossil gas, or for power generation)
3. A value-add strategy converts the higher-grade export logs into lumber, creating 15PJ of wood chip

OUTCOMES by 2030 :

- Our forestry & logging industry has a secure long-term future, with all log demand onshore
- New & expanded sawmills are exporting value-add products, with rural jobs & happy communities
- Industry is near carbon zero using a secure & sustainable source of heat – with burgeoning exports
-and we have 100PJ of Biodiesel and RNG to meet domestic demand – with the rest exported

With some joined-up thinking, these actions become no-brainers ! See our answer to Qu. 23 & 114