

# Learnings from Europe

and its application to Southland

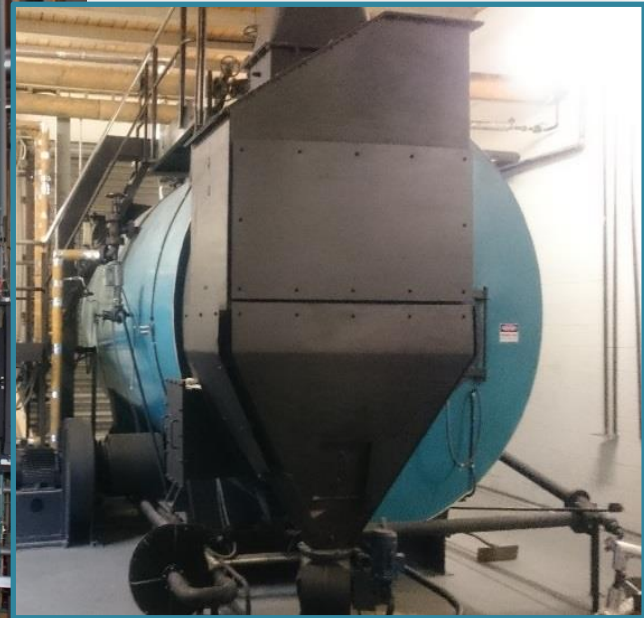




# The energy ages....

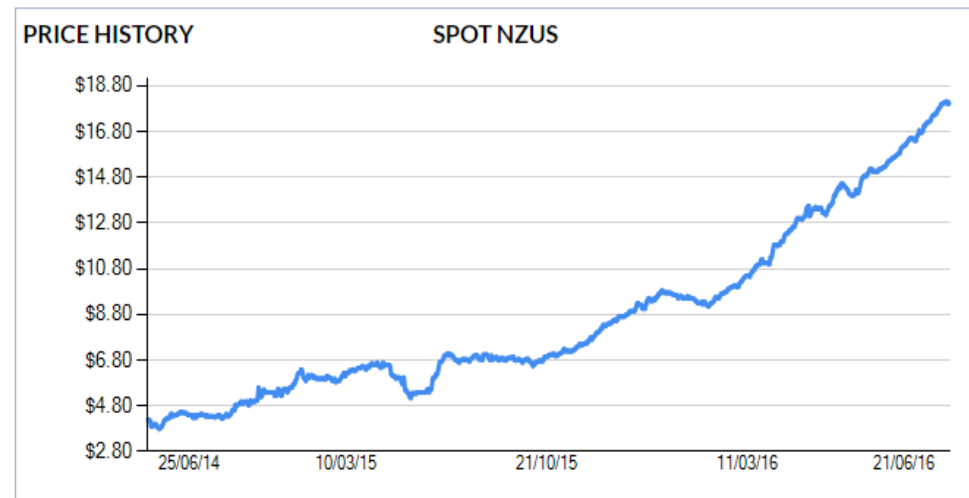
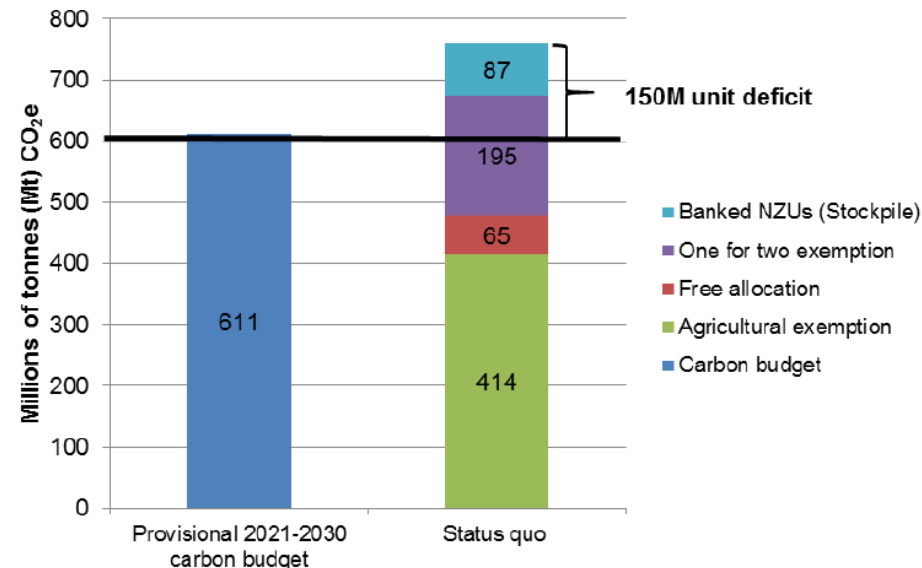


# The energy ages....



# Political environment

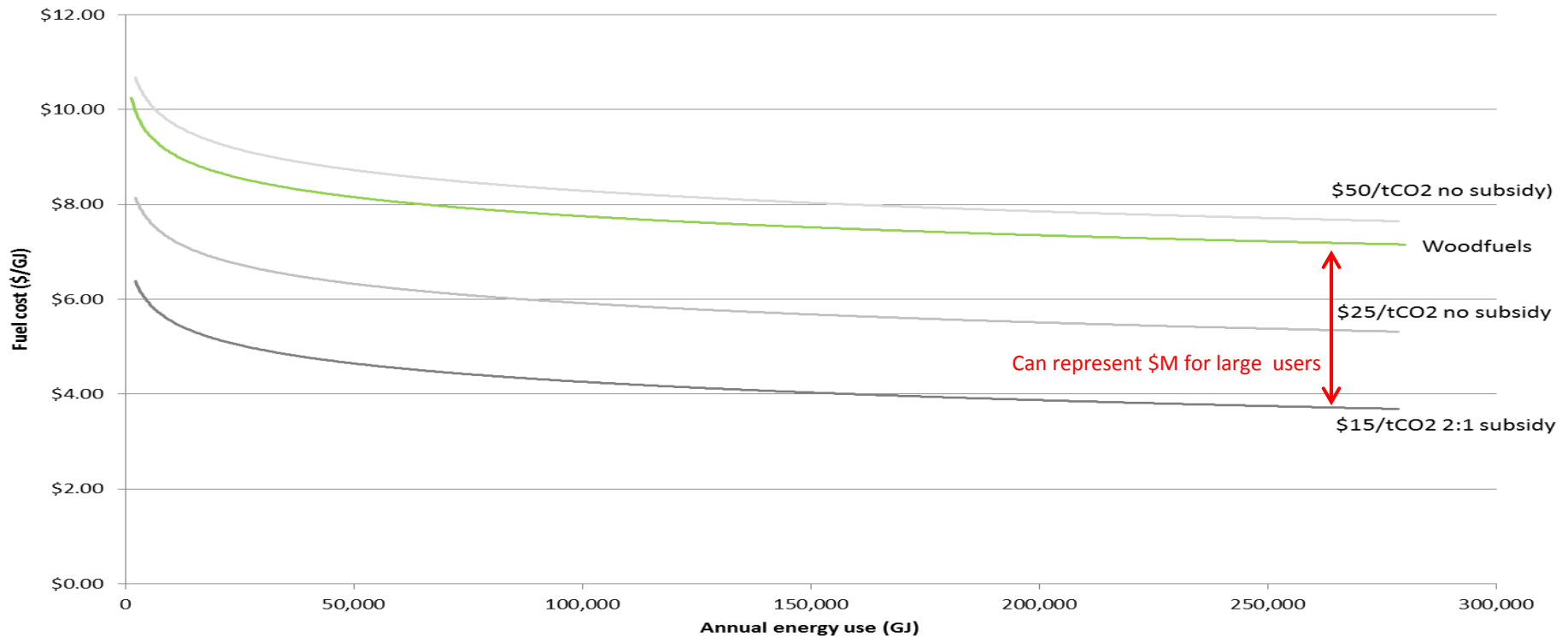
- March 2016- Gov't announces big carbon emitters to lose ETS subsidy
- April 2016- NZ signed the Paris Agreement to reduce GHG emissions by 30% below 2005 levels by 2030. 170 Countries signed
- NZ is looking at a deficit of 150MtCO<sub>2</sub> = \$3.75- \$7.5 billion (Source: MfE)



# Can biomass compete with coal?

- The greatest single barrier to the uptake of wood fuel is the cost of coal
- Carbon tax is capped at \$25 but needs to hit \$50 to make an impact

**Impact of carbon tax on Southland coal prices**





# Fuel price comparison- EU

- Majority of sites €4-5 per GJ
- Coal is €2.50-3/GJ (based on \$US 70/t)















# Fuel price comparison- NZ

- Majority of sites \$7-15 per GJ
- Coal is \$3- 7/GJ
- Residues are sawmill or forest landing residues





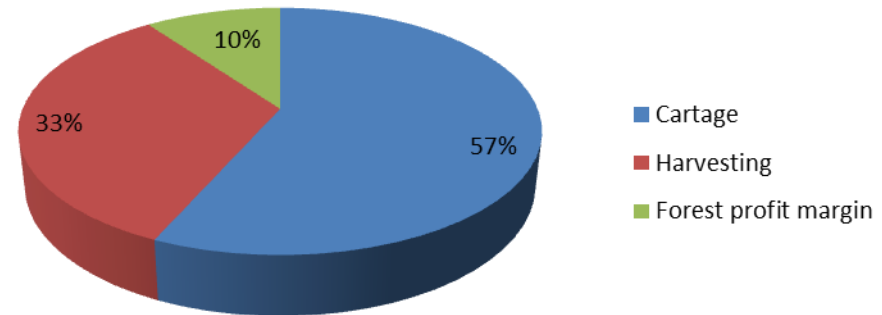


# Fuel price comparison- NZ

- If lower grade fuel is to come from the forest it will be more expensive than billet wood so it needs to come from other easy to gather sites such as landfills or sawmills



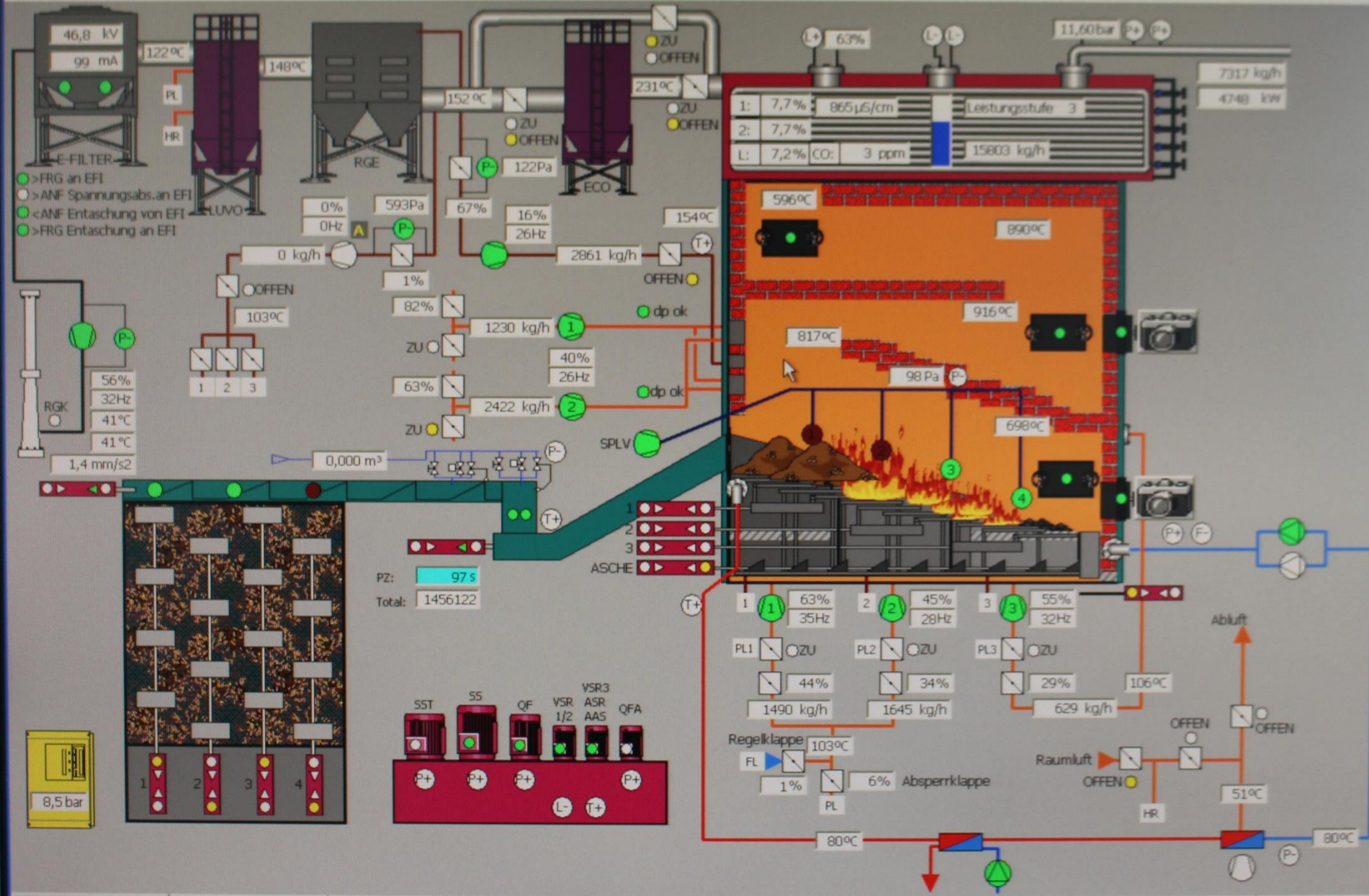
**Billet wood harvesting costs from forest landing**





# Boiler technology- EU

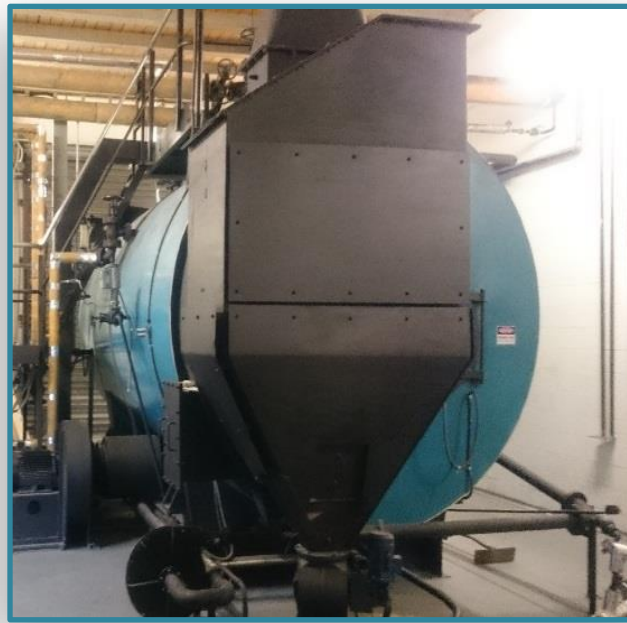
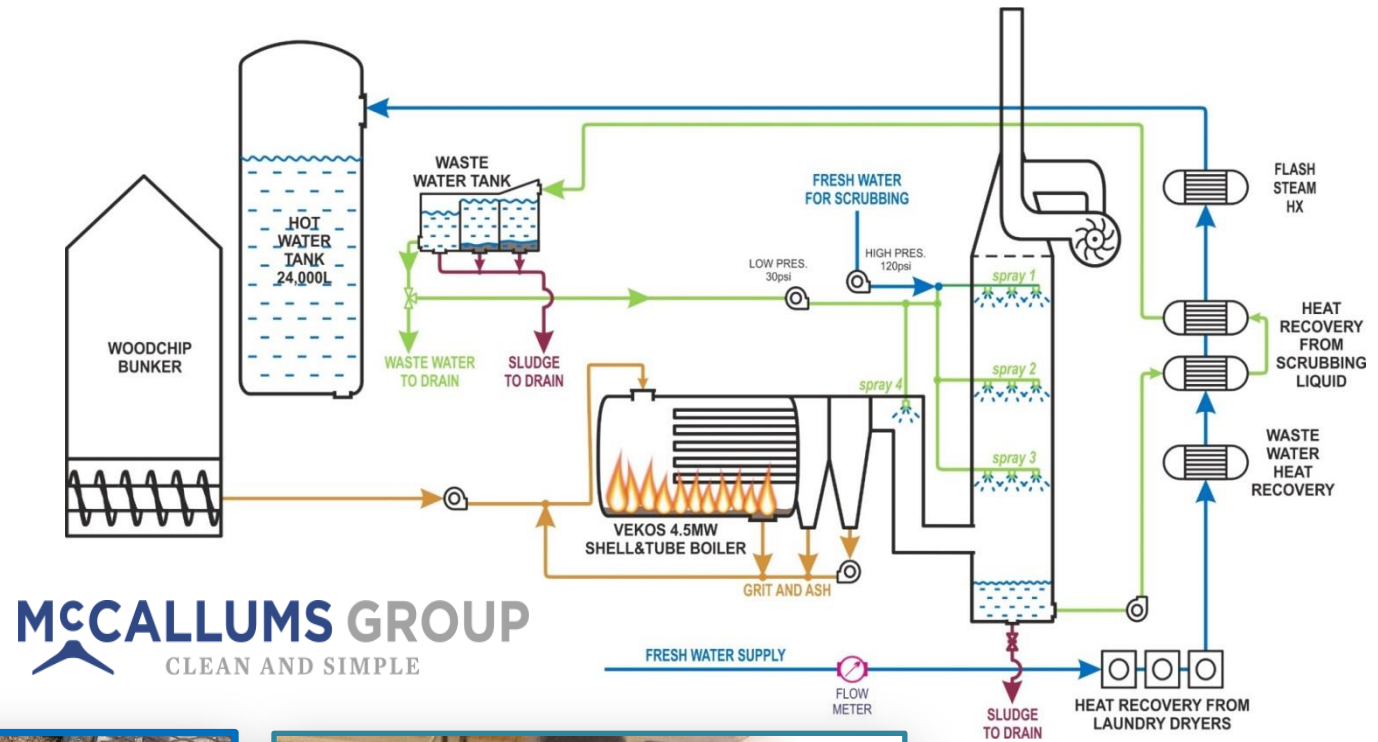
- The quality of the fuel determines the boiler solution and technology required
- All boilers utilised condensing economisers to reclaim energy at several stages
- Other technologies included:
  - Grate heat recovery
  - Flue gas de-pluming





# Boiler technology- NZ

- High grade fuels available in NZ allow the limited use of NZ boilers with biomass (Scott, Anderson, Taymac, Rayners)
- Once over 25-30%mc these boilers struggle and lose a lot of capacity
- For large industrial consumers- wet chip is the only option which eliminates NZ boilers





# Other applications for biomass

## 3.5MW District heating system

Schrems Austria

2MW +1.5MW

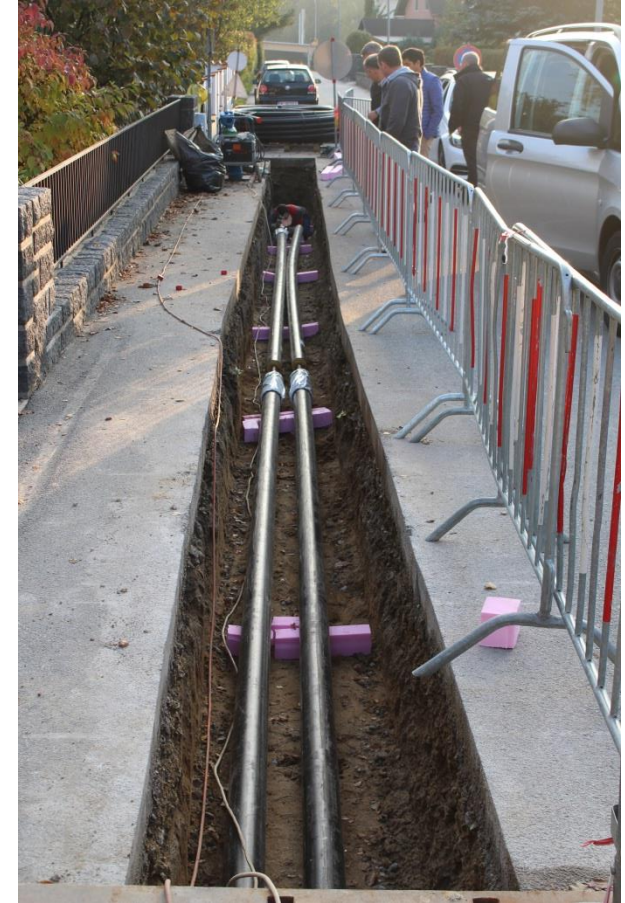
Population- 6,000

Area- 60km<sup>2</sup>

Invercargill (Urban)

Population- 50,000

Area- 115km<sup>2</sup>

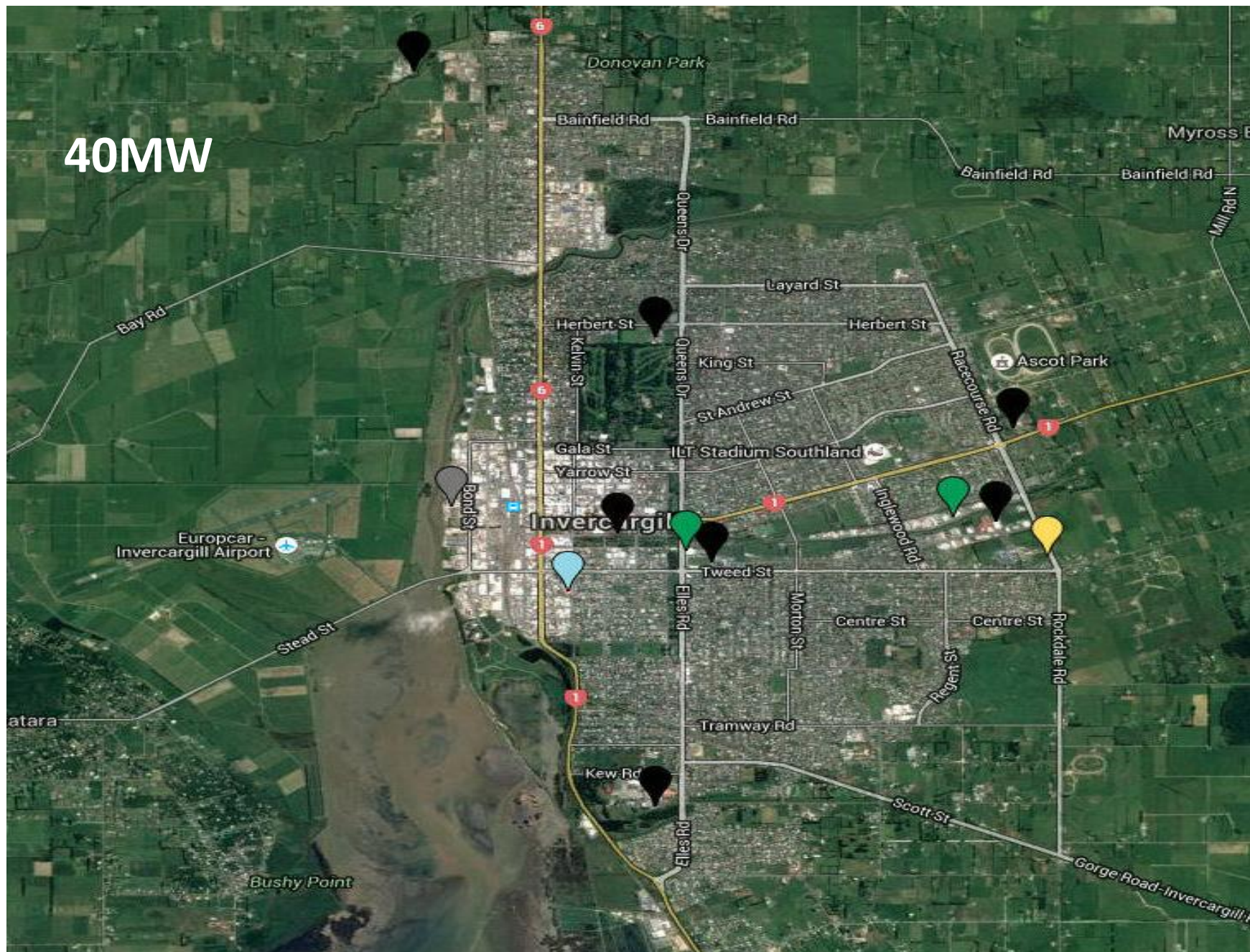






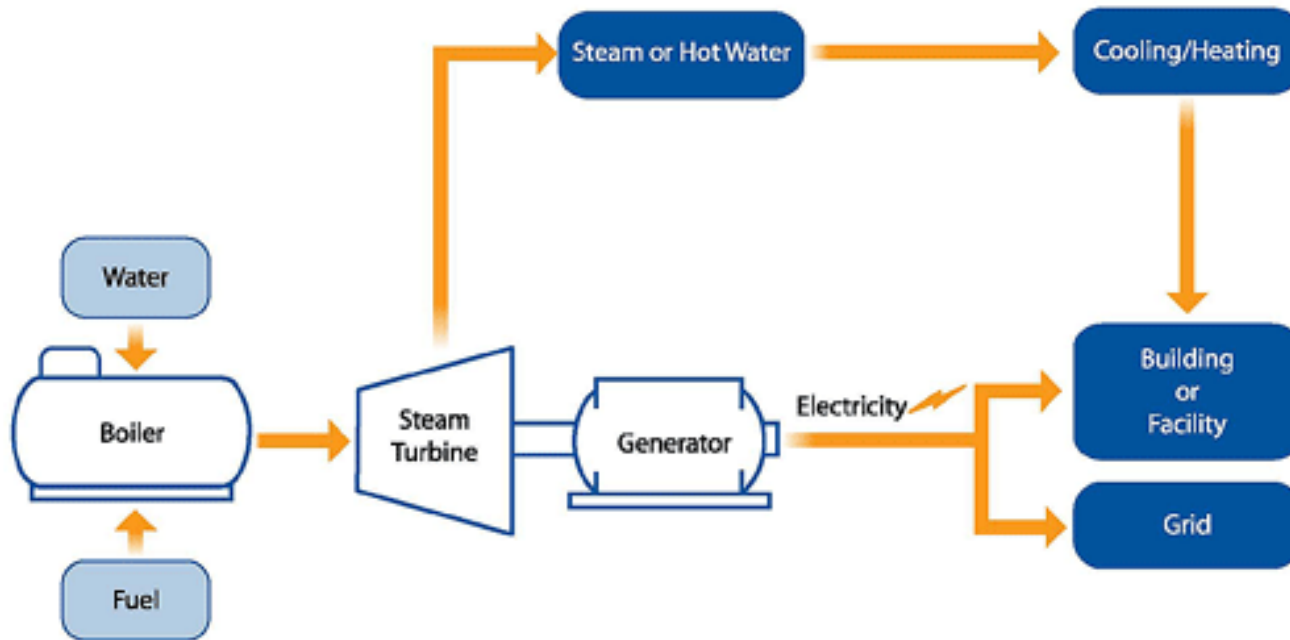


40MW



# Other applications for biomass

## Combined Heat and Power (CHP)





# Other interesting technologies

## Local council control of emissions



# Other interesting technologies

## De-pluming





# Other interesting technologies

## Flue gas heat recovery for pre-drying fuel



# Summary

- The political environment is moving in a direction that will benefit biomass energy
- The cost of low grade coal is the greatest barrier to uptake
- High quality biomass fuel \$7-15/GJ
- \$5-\$6/GJ might be possible from other waste streams of poor quality
- The technology to efficiently and cleanly burn this biomass is expensive
- NZ coal boilers are able to be converted to biomass but only if a high quality fuel is available.