Biomass to heat



The models we can learn from

30% or more of our energy is as heat and cooling

Heat energy is the lowest cost renewable

Fuels for heat: straw, wood or wastes

Heat can be from combined heat and power (CHP) plants





Biomass to energy



Heat, electricity and fuels from unutilised forestry and agricultural biomass and municipal wastes

Vic. towns and cities were largely selfsufficient for energy up till 1930s



Now they import almost all energy- LPG, natural gas, electricity and transport fuels



some renewable energy options are being explored, but it's a minute share



We can be producing up to 50% of our energy locally again. The benefits?

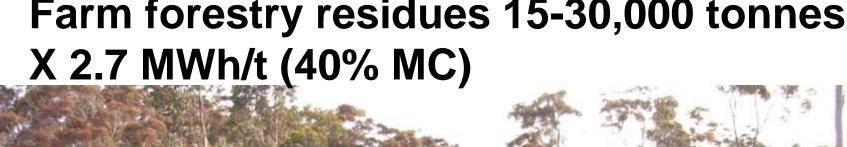
- Use wasted biomass, slash GHG emissions
- Create permanent energy jobs
- Keep money in the local economy
- Saleable RECs
- Increased Carbon sequestration
- Attract new 'green' businesses
- New income stream to farmers
- New enterprises in value-adding
- Slash landfill costs, boost recycling



We have extensive available residues



Farm forestry residues 15-30,000 tonnes







Industrial plantation residues up to 100,000 tonnes X 2.7 MWh/ green tonne (40% MC)



Short rotation coppice for energy wood-2.7 MWh/tonne x ??ha/yr





Straw and wood chip-fired CHP plant

Danish plant built 1996

Input: 45,000 t big straw bales & 5,000 t woodchip

Output: 9 MW-e, 30 MW-th

Enough for town of 30-40,000 people (30-40% of Ballarat)



Wet waste to biogas

Swedish municipal plant - 60,000 m3 to 6 million Nm3 gas

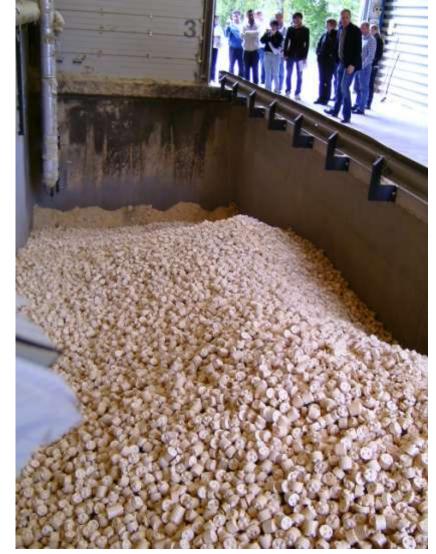


Biomethane as LPG substitute



wood waste to heat (and cooling?)





Timber processing waste and urban waste wood Up to 40,000 tonnes @3 -3.5 MWh/t (20% MC)

Methane, biodiesel and ethanol fuels



And gasification for fuelling engines

