

Integrating organics resource recovery and Waste-to-Energy

Bill Grant

Bill.grant@blueenvironment.com.au

0407 882 070



Overview

- Organic waste and energy - the issues
- Managing waste now and in the carbon constrained future/ present
- Integrating source-separated organics with energy recovery

Organic waste and energy - the issues

- By weight, organic wastes (food, garden, paper, timber and other biodegradable materials) make up around 60% of household residual/landfilled waste, over 55 % of commercial and industrial waste, and over 50% of all waste landfilled waste in Victoria.
- In landfill, these materials generate the potent greenhouse gas, methane (with a Global Warming Potential of >25 times greater than CO₂ over 100 years and >65 times over the 30 years to 2050).

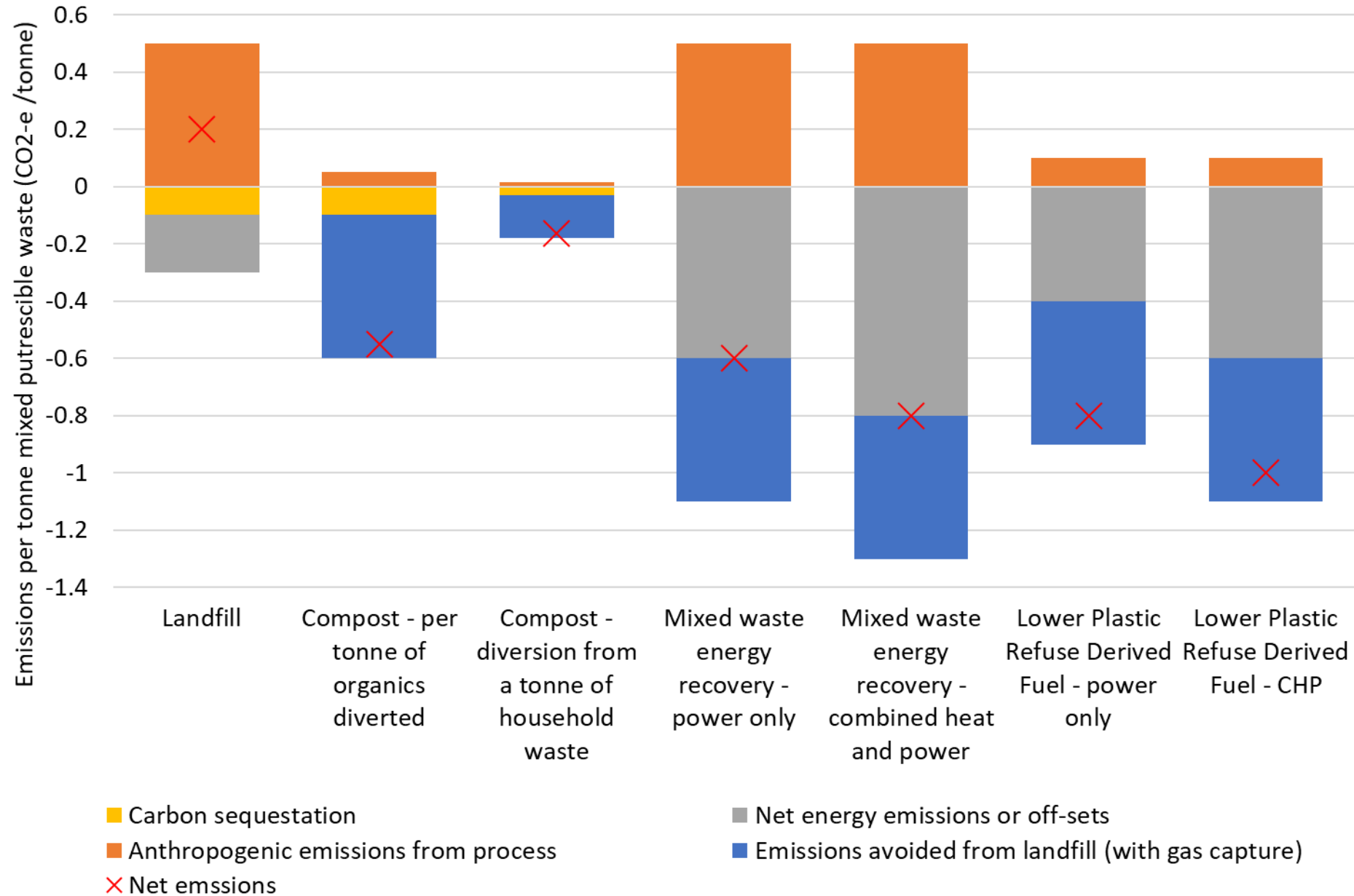
The issues

- Organics in landfill also generate toxic leachate and help to mobilise other toxins in landfill
- Source separation of resources from the waste stream allows higher resource-value recycling, with better net environmental outcomes in most situations
- Food in mixed waste makes it harder to extract recyclables and reduces the calorific value of residuals
- Food adds weight to waste, making it attractive to those charging weight-based gate fees

But.....

- Organics and recycling collection services do not divert/recover all materials from the landfilled garbage stream
- Best practice municipal systems using fortnightly garbage, weekly food and garden organics (FOGO) and fortnightly recycling have achieved >70% organics diversion
- The recycled organics and recycling industries in Victoria struggle with market oversupply, contamination and capacity issues
- **Why don't we just burn it all for energy?**

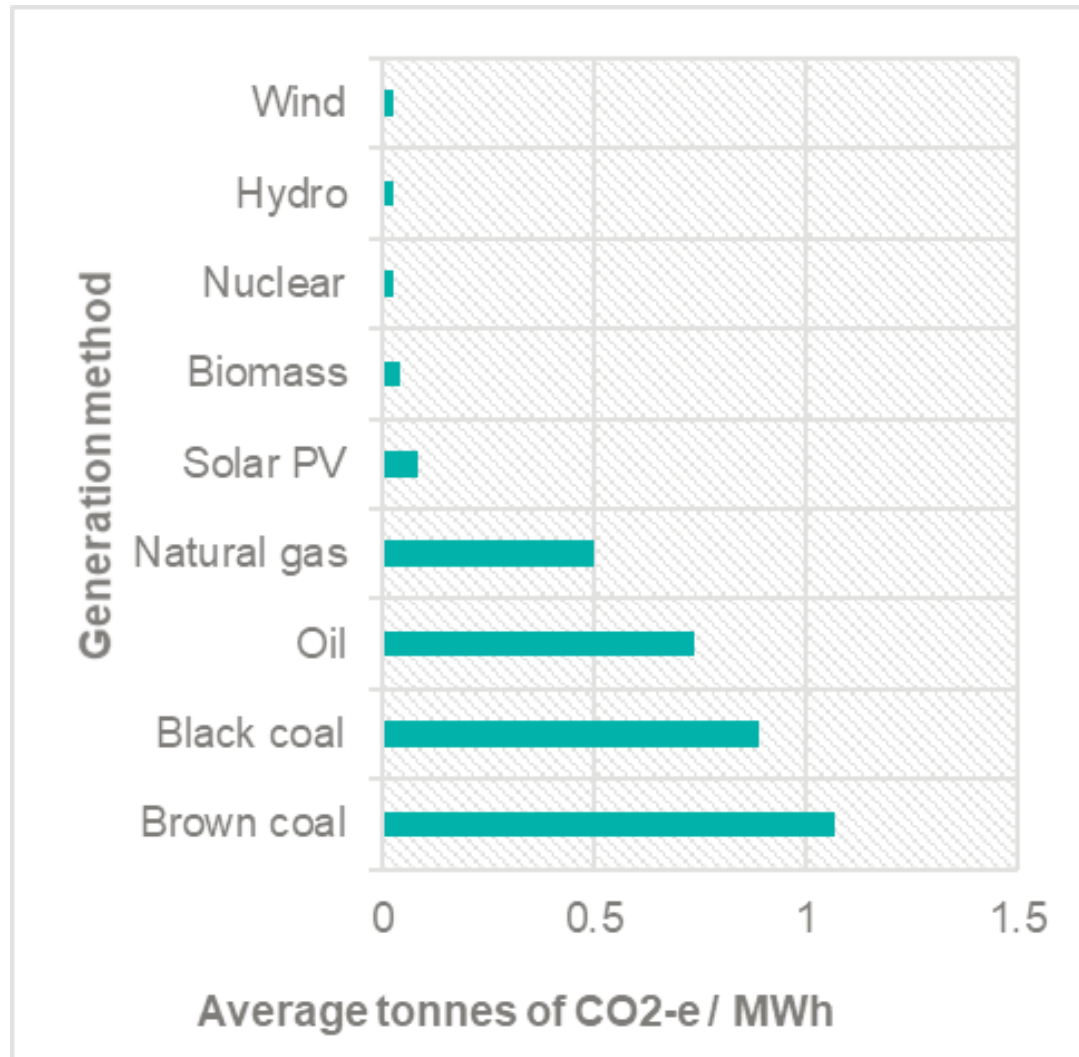
Current net GHG emissions from options



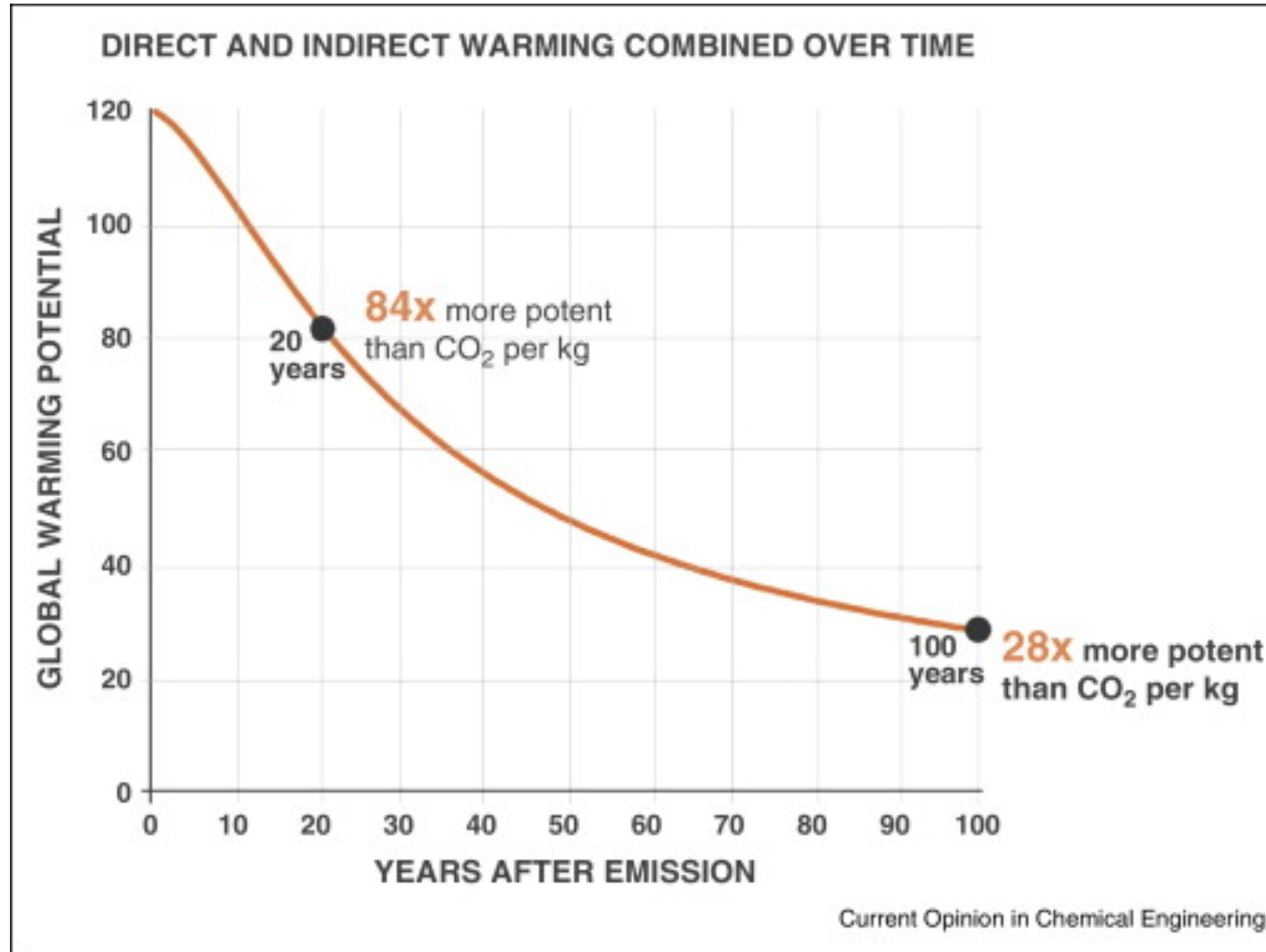
But.....in the future....(2030, 2040,
2050)



Carbon offset from energy will diminish



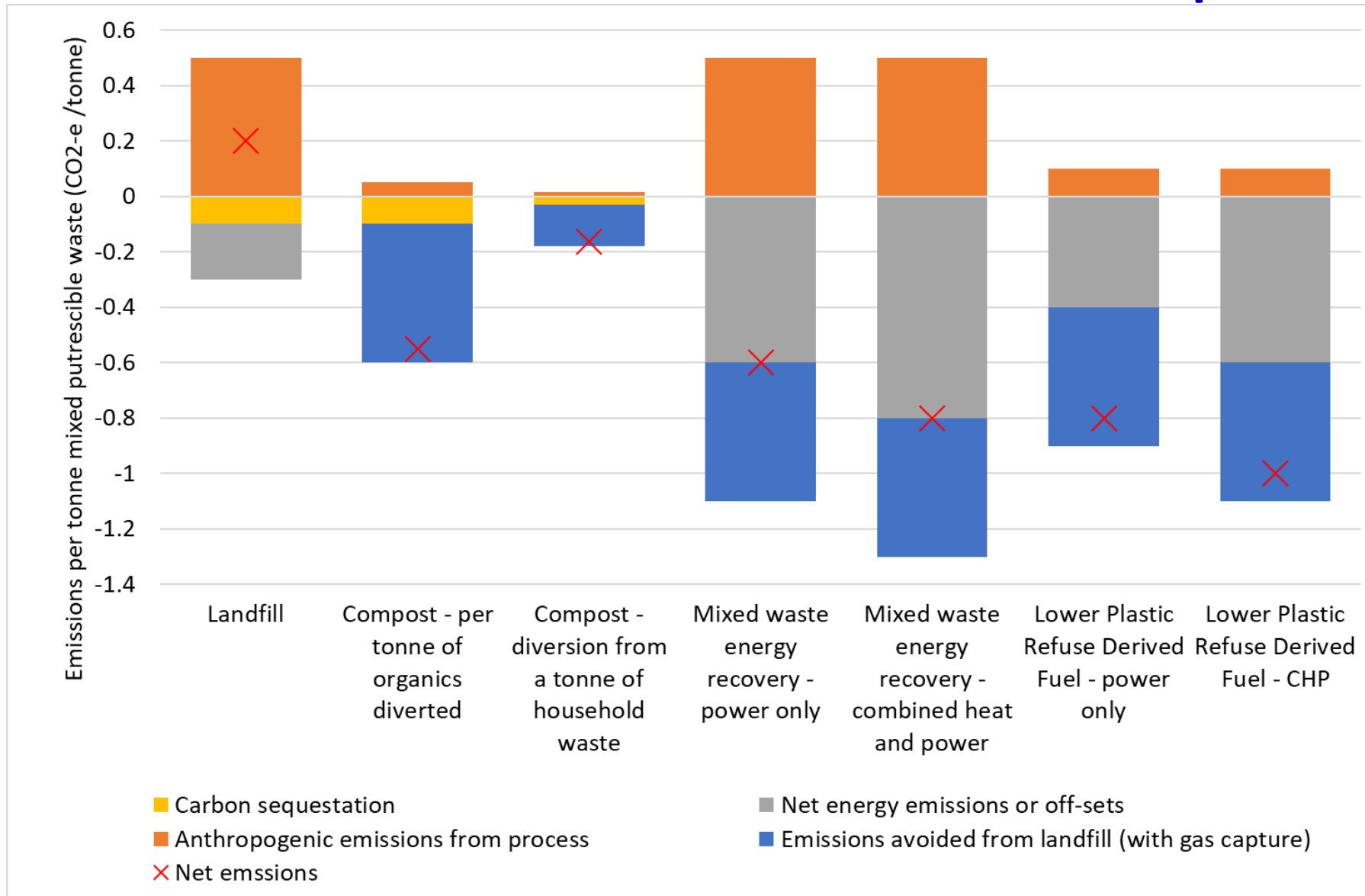
Methane (landfill gas) will become of greater concern – with greater controls/restrictions



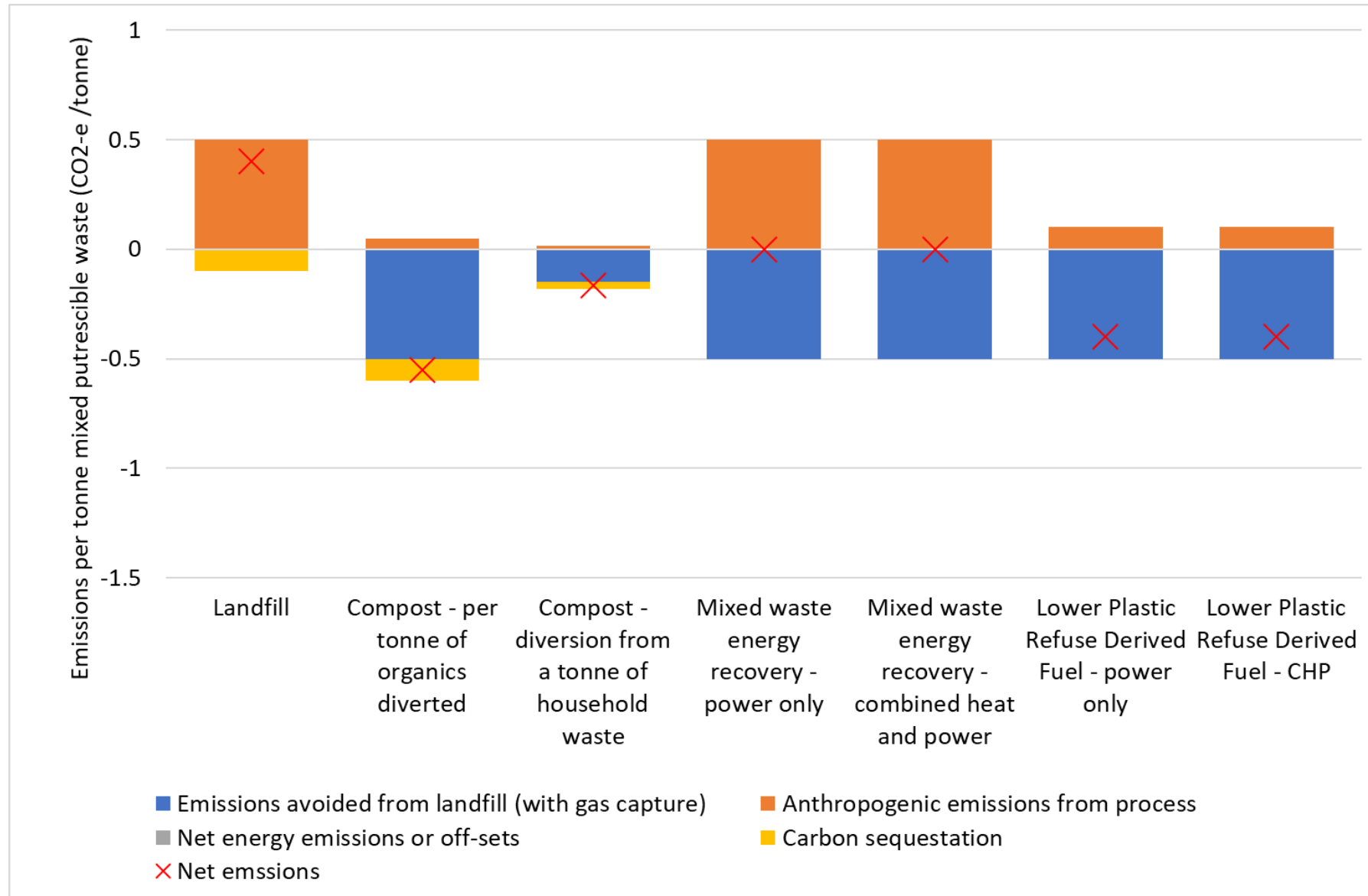
Other factors

- In Victoria, metropolitan and large regional centres' landfill airspace is limited and declining – often faster than scheduled
- By 2025 all packing is to be designed to be recyclable (and recycled) or compostable
- Internationally there is focus on resource/ materials recovery prior to WtE – the hierarchy holds true in a low carbon emissions future
- More plastics/synthetics will need to be made from bio-plastics, including use of pyrolysis syn-gas, and these technologies can convert waste (synthetics and organics/biomass) into syn-gas.

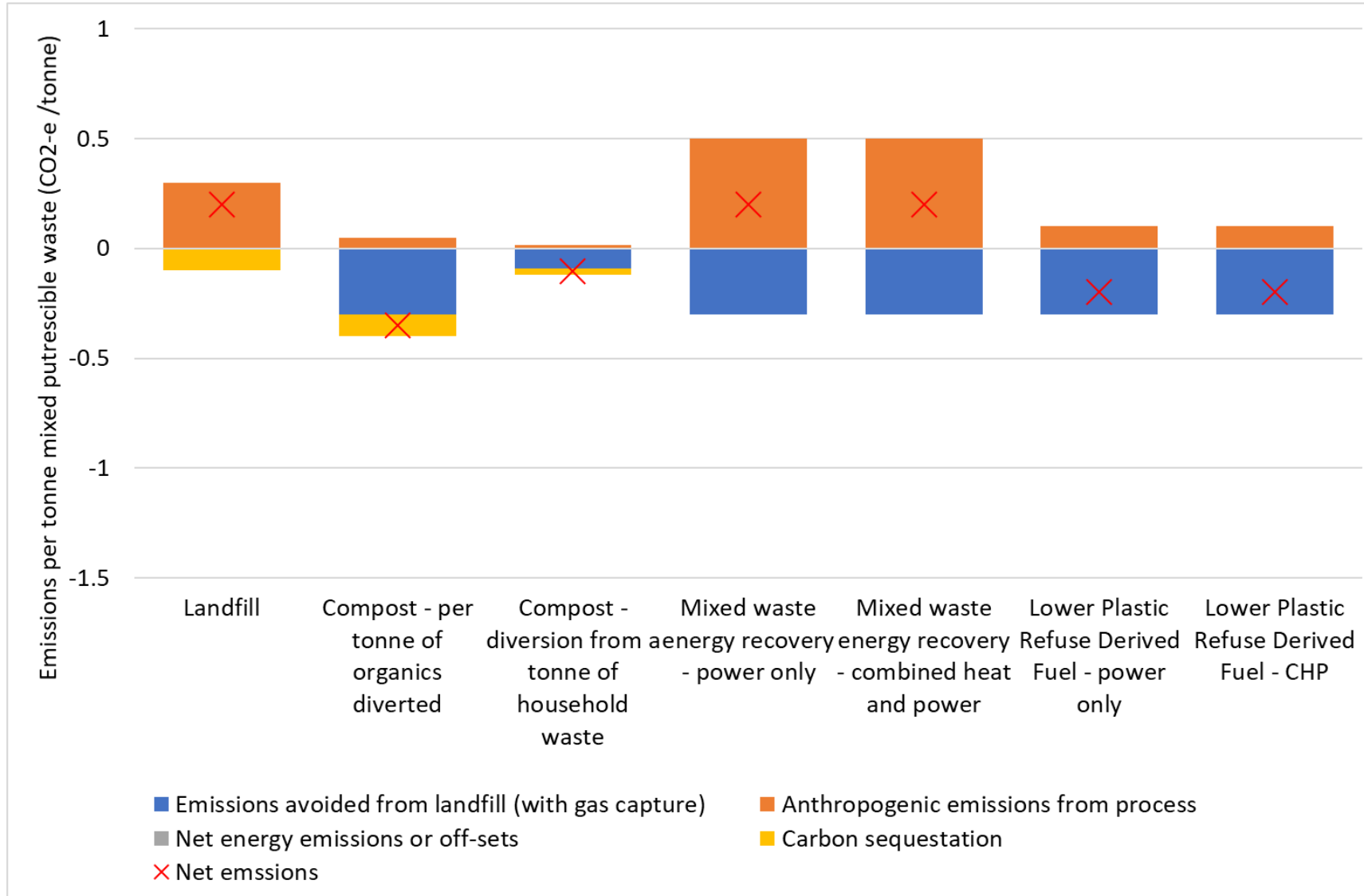
Current net GHG emissions from options



Net GHG emissions in a clean energy future



Net GHG emissions in a clean energy and low landfill emissions future



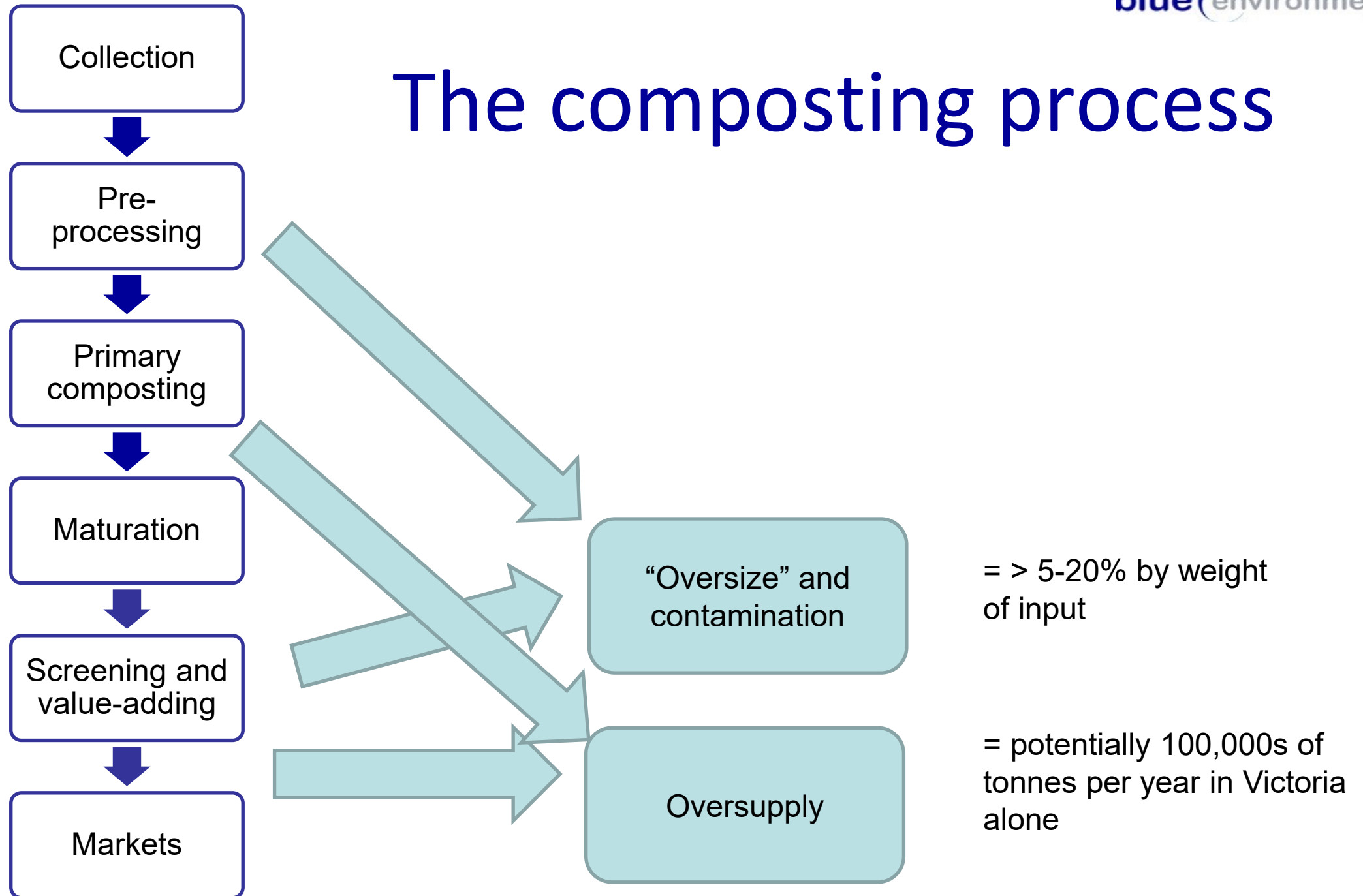
So.....

- Source separation (and reduction) of organics is a key need.
- We need to design Energy Recovery systems that focus on biomass /organics and not plastics
- Mixed waste WtE facilities should be designed/costed with the expectation that more of the fossil-carbon plastics and other synthetics will need to be removed/reduced within the next 20 to 30 years
- Technologies that recover syn-gas from waste and biomass may be a higher resource use option within 30 years

Integration of organics recovery with Energy recovery

- Anaerobic Digestion
 - ‘Wet’ food and garden organics can be collected separately or screened out of food organics and garden organics collections
 - ‘Dry’/solid AD plus aerobic composting technologies are available
- Complementing the composting industry

The composting process



Management of oversize and over supply

- Oversize: In Vic, NSW and SA, there is an estimated >80,000 tonne of bone-dry woody material with plastic, glass, metal and dirt, with individual larger composting sites producing >5,000 – 20,000 tonnes each per year
- Oversupply: many composters are finding low-value takers of immature product but bio-energy markets are unavailable
- In NSW – organic fraction from mixed-waste processing facilities is currently ‘banned’ from reuse
- There is potential to convert these materials to a largely biotic RDF – moderate calorific fuel value similar to pelletised timber

Potential benefits

- Renewable bio-energy
- Avoid recycled organic market gluts
- Improve the quality of compost products on the market
- Allow recycled organics markets to grow...um....organically
- Provide cheaper biomass for biomass EfW facilities
- Provide a revenue stream for composters
- Potentially produce 'biochar' that can add value to compost products
- Integration with biomass EfW projects or some mixed waste WtE

What is needed?

- Bioenergy facilities that can receive RDF
- Standards/specifications for RDF from compost facilities
- Infrastructure /equipment for composters to produce RDF that meets specifications
- Potential integration with other RDF producers and biomass EfW projects
- The composting industry to stop seeing energy recovery as 'The Enemy'/competitors
- Carbon pricing and investment in renewables

Postscript - Interesting (depressing) facts

- In 1989, Liberal party policy was a commitment to reduce national greenhouse gas emissions by 20% between 1990 and 2000
- In 1999, the Howard government developed and almost legislated an emissions trading scheme
- During the 1990s most of Europe restricted the direct landfilling of putrescible waste

Questions/discussion

Thank you

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