Support for the submission process

We welcome your feedback on developing a bioenergy sector in Tasmania. We have included some questions that may assist in preparing your submission.

Questions to consider

1. What changes, if any, would you suggest to the draft Bioenergy Vision?

   As outlined in the Bioenergy Vision (draft Dec 2021) there are numerous resource opportunities to convert surplus biomass into directly useable energy products within the state of Tasmania. Although biomass will be the key resource for future generation of bioenergy, the vision does not include current waste streams such as municipal and industrial waste, including low grade and contaminated plastics and tyres unsuitable for recycling. These are key resources for generating renewable energy, particularly for transportation fuel as we slowly transition to higher degree in vehicle electrification.

   Biofuels such as biodiesel and bioethanol have limited useability as they are not chemically identical with fossil fuels and therefor can only be utilised at blend ratios of around 10% without requiring engine modifications or voiding engine manufacturer's warranty. Biofuels generated by other means of converting biomass to liquid fuel (i.e. by catalytic pyrolysis) to directly replace existing fossil fuels are still in early stages of development and are unlikely to be commercially viable due to the complexity of de-oxygenation and molecular re-arrangements required to generate fuels with identical chemical and physical properties to current liquid fuels.

   Synthetic renewable fuels derived from plastics and tyres are chemically identical to modern fossil fuel products and can be readily used to replace imported diesel and petrol. I have spent the last 6 years testing and optimising the required refinery techniques to achieve a complete conversion. Pyrolysis is used to generate the required liquid crude oil, followed by distillation and catalytic hydro-refining (hydro-treatment) to remove impurities and generate a fuel with the required combustion and storage properties. The technology is mature and readily deployable at a reasonable cost, particularly in combination with a growing hydrogen industry, a key component in upgrading fuels.

   The draft vision statement also neglects to mention biomass utilised for high value product generation, where bioenergy is generated as a by-product. One of these examples is the generation of biochar, a high value agriculture resource to improve nutrient uptake and carbon sequestration. When biochar is generated in a closed loop system (i.e. pyrolysis) the surplus heat from charring the wood waste to generate biochar and volatile emissions generated in the process are a valuable by-product for further use.

   The aforementioned examples may not perfectly fit into the linear transition of biomass to bioenergy, however if excluded from the final vision statement then we're neglecting tailored technologies which are likely to gain future traction due to their versatility and higher value-chain outcomes.

2. What are the key roles for the Tasmanian government to support bioenergy?

   The Tasmanian government can support bioenergy production through financial incentives and incorporating true costs of landfilling operations and long-term reliance on (non-electrical) energy imports. Options include levies on imported, high energy goods and replacement fuels.

The generated revenue can then be reallocated to assist businesses with technology uptakes for bioenergy utilisation.

3. What are the key roles for households, industry, and other levels of government to support bioenergy?

   Households can assist through continuation of improved domestic waste separation to assist sorting facilities at local waste processing plants. Councils have already shown great progress in diverting waste from landfills which can be incentivised financially by state governments to utilise surplus resources for bioenergy.

   Industry is often not aware of what tools or technologies are available, particularly in the agricultural and construction sector where waste generation is still high and high consumer demands for fast and affordable turnarounds can inhibit investment in alternative solutions and utilisation of bioenergy (with some exceptions as listed in the ReCFIT draft appendix).

4. What do you think could be done to appropriately accelerate the uptake of bioenergy in Tasmania?

   The most direct way of distributing bioenergy throughout Tasmania is via electricity generation (i.e. incineration of biomass to generate steam and electricity) and supplementing heat requirements as listed in the examples list of the draft vision (wood fired kilns and biogas).

   Generating liquid fuels to replace and substitute existing petrol and diesel consumption is more difficult and best done by utilising tyres and plastic waste due to the chemical similarity of the resource and final product. This uptake can be incentivised through product stewardship schemes and subsidising renewable fuel or mandating businesses to consume a certain portion of energy from renewable sources.

5. What are the key opportunities for bioenergy in Tasmania? What can be done to realise these opportunities?

   By utilising bioenergy from local waste streams, Tasmania can be resource efficient, leading in sustainable and renewable energy that is not limited to electricity production and reduce its reliance on liquid fuel imports. Sequestering carbon through biochar generation is a key factor in reducing carbon footprints and improving soil and nutrient contents at the same time, which benefits agricultural producers and Tasmanian consumers.

6. What are the key challenges for bioenergy in Tasmania? What solutions do you see for these challenges?

   Liquid fuel generation from waste streams requires significant investment to be commercially viable. Without further financial incentives or consumer schemes to encourage synthetic renewable fuel production the uptake of such technologies is unlikely in the near future. Countries that lead in the space (i.e. Germany) have strong incentives and government legislation that imposes requirements on industry and consumer alike to utilise alternative fuels.

   Biochar production is relatively straightforward and already happens at a smaller scale (see Frank's char by Frank Strie, based in northern Tasmania). Such operations are suited for small operations and fail to capture the gases and heat generated in the process to be utilised further. Technology already exists overseas to operate biochar production on a large scale and utilise the gases for heat generation. Here in Tasmania, Fox Design, in partnership with Dovetail Timbers, has constructed a continuous biochar kiln for demonstration purposes, that operates solely on

wood waste, utilising the off-gas in the process. Further modifications would allow for surplus heat to be utilised in the kiln drying operation of the sawmill.

Other examples of direct incineration of biomass over the last few years include:
https://www.theadvocate.com.au/story/5504576/mccain-commits-to-carbon-reduction/
https://www.beefcentral.com/processing/greenham-closes-the-loop-on-energy-production/
https://www.mla.com.au/contentassets/6033621c2d824173abdb2fc720f88a9e/a.env.0106_paunch_waste_final_report.pdf