

Bioenergy

A renewable energy alternative generated from organic waste.



Bioenergy is a renewable energy alternative to fossil fuels produced from organic matter known as 'biomass'. It is considered a vital component of Australia's clean energy future.

Biomass is produced from forestry and agriculture activities, and waste and residue sources. It is processed to generate electricity, heat and transport fuels. As a growing Australian market, Tasmanian landholders have the opportunity to sell biomass to generate additional income while reducing farm waste.

How is bioenergy made?

Biomass can be converted to bioenergy through a range of technologies. Primary methods are:

- Direct combustion – the most common method of conversion, where biomass is burned to provide heating or to generate electricity in steam turbines
- Anaerobic digestion – a well-used method of conversion, where biomass is decomposed by bacteria to produce biogas, which can then be used to generate heat and electricity

- Gasification and pyrolysis – an innovative technology, where biomass is exposed to temperatures with little to no oxygen and converted to synthesis gas (syngas) and bio-oil.

Examples of biomass

Biomass comes from a range of sources that can be categorised into forestry, agriculture, and other organic wastes and residues.

Category	Forestry	Agriculture	Other organic wastes + residues
Biomass source	<p>Natural forests and plantations</p> <p>Forestry residues (e.g., small trees, branches, tops and un-sellable wood)</p> <p>Wood processing residues (e.g., wood waste and black liquor)</p>	<p>Food crops including sugar, starch and oil crops</p> <p>Non-food crops including microalgae and lignocellulosic plants (e.g. eucalyptus)</p> <p>Crop harvesting residues (e.g., straw)</p> <p>Livestock residues and manure</p> <p>Agro-food processing residues (e.g., fruit and nut waste)</p>	<p>Municipal wastes (solids and liquids)</p> <p>Construction and demolition waste (e.g., timber and vegetation)</p>

Sources of biomass across sectors.

Biomass and the environment

Bioenergy is a renewable source of energy that can replace fossil fuels in almost every market.

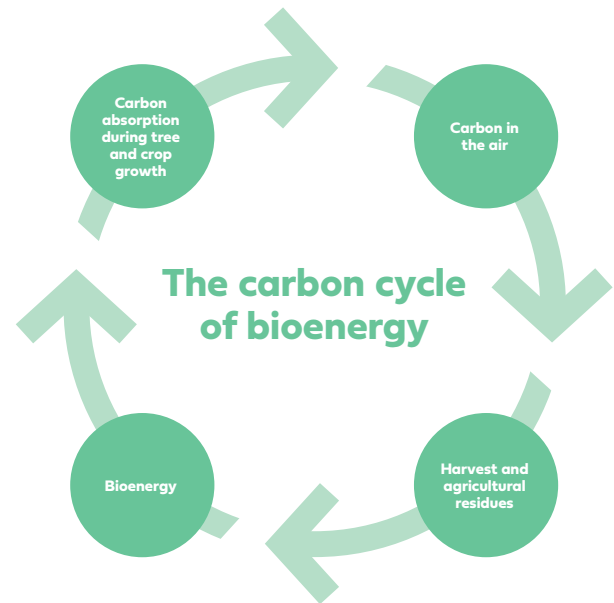
When used for electricity, heat and transport fuels, the carbon released from bioenergy is reabsorbed into biomass as it grows, creating a circular flow of emissions. When bioenergy is used to displace fossil fuels, greenhouse gas emissions are further reduced supporting climate change mitigation.

Bioenergy is also effective as a waste management and resource recovery tool. By turning forestry and agricultural waste into valuable energy sources, biomass reduces waste to landfill and maximises the use of materials at every stage of the life cycle.

Market opportunities

Bioenergy is the largest form of renewable energy in Australia. National and state governments are implementing strategies to increase the use of biomass as a replacement for fossil fuels, to reach environmental targets and activate the bioenergy market.

Bioenergy is an emerging market in Tasmania. In 2023, the Tasmanian Government launched its Bioenergy Vision for Tasmania:



'To embed bioenergy as a valued renewable resource for the Tasmanian economy, community, and environment as an aid to energy production, waste management and resource recovery and reduction of greenhouse gas emissions.'

In 2021, the Australian Government also launched its Australia's Bioenergy Roadmap, which aims to enable and expand the bioenergy market – including investing in infrastructure and facilities.

As this emerging market continues to grow, new opportunities may arise for Tasmanian farmers to increase their income while reducing farm waste.



Tasmania has a goal to be 200% self-sufficient in renewable energy by 2040 – bioenergy represents a significant contribution to this target.

References

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