Clean Energy Council

bioenergy bulletin

Using pellets for bioenergy

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This is the second in a series of bioenergy bulletins produced by the Clean Energy Council to help you understand the key benefits of bioenergy. As we move towards a clean energy future, bioenergy has huge potential in helping Australia achieve its targets for renewable energy and the reduction of carbon emissions. These bulletins will help you understand this potential.

What are pellets?

Pellets are a compacted type of bioenergy. They are typically made of timber waste, sawdust and agricultural waste that is dried and processed into a densely compressed cylindrical pellet measuring about 1cm long, resembling rabbit and chicken food. Because they have a low moisture and ash content pellets burn very efficiently to produce heat and electricity. As a result, pellets are generally used in direct burning devices such as domestic wood heaters and commercial furnaces and boilers.

Pellets in Australia

The pellet market in Australia is still new but has been taken up by many consumers. Pellets are mainly used for residential heating, although there are an increasing number of commercial scale users - such as hospitals, swimming pools, retirement homes etc - using pellets to generate electricity. Pellets are also increasingly being used in large-scale coal power plants to help produce electricity in a more environmentally-friendly manner. Globally, the US, Canada and Europe are currently the biggest suppliers and consumers of pellets but significant demand is also anticipated from Japan and Korea.

The potential for heat and power from pellets in Australia is huge but is yet to be fully realised due to a lack of incentives and long-term policy certainty.

Benefits of pellets

Pellets offer many unique benefits, such as:

- Pellets can provide an economic and social boost for rural and regional communities by using local content, creating local employment and encouraging new and innovative farming techniques.
- Pellets can provide a use for wood by-products - such as sawdust - that would otherwise have no market value. As Australia is one of the top 20 producers of sawdust excess from forestry in the world, this presents opportunities for Australia to use sawdust for domestic renewable energy generation or for export. (A large global export market exists for wood pellets, with some 9 million tonnes of wood pellets traded annually.)
- Because pellets have consistent quality and size they are easy to transport, store and handle. This allows cost-efficient transportation and automatic operation for heat and power, for residential homes and large-scale power plants.
- Existing coal power plants can be modified to produce a percentage (typically 3 and 15%) of its electricity from pellets rather than coal (this is known as 'co-firing'). Co-firing is a cost-effective way to reduce carbon emissions because it utilises existing infrastructure, such as power plants, ports and storage facilities. As a result, minimal capital expenditure is required. Co-firing using wood pellets is widely adopted globally and has been successfully piloted in Australia. Recent studies suggest that if Queensland were to substitute just 3% of coal used

in its coal power stations with pellets, it would achieve carbon emission reductions in the order of 1.4 million tonnes per year.

Does pellet production cause deforestation?

Provided that wood pellets are supplied from forest resources that are managed and harvested in a sustainable manner – such as from the use of wood by-products from plantation timber – wood pellets offer a low-carbon, renewable energy source. It is estimated there is enough wood by-product from forest industry activities in Australia to supply 3000 gigawatt-hours of renewable energy per year without harvesting a single extra tree. Additionally, pellets from wood by-products are recognised as being carbon neutral under the Kyoto Protocol. This is because if wood by-products were left to decompose, they will return carbon to the atmosphere. When wood pellets are burned to produce heat or power, the same amount of carbon returns to the atmosphere. However, unlike an electric or oil heating system, no fossil fuels are used.

Does burning wood pellets create smog and air pollution?

It is commonly thought that burning wood is bad for the environment. However, Australia has stringent controls on emissions from wood combustion. Furthermore, pellets are a highly refined heating fuel, which are dried to a uniform 4-6% moisture content. They are burned in well-controlled systems that run extremely hot and with sufficient airflow to ensure complete combustion. This is in contrast to normal wood which has a 20-40% moisture content that can prevent complete burning, resulting in smoke and emissions from wood particles that have failed to completely combust. As an example, about 2 million tonnes of pellets are burned annually in the US. However, particle emissions from wood pellets amount to less than 1% of the particle emissions caused by forest fires and less than 2% of the emissions from less well-controlled wood combustion, such as open fireplaces and wood stoves.

Conclusion

The technology to make pellets is ready today and the existing know-how for pellet production already exists across a number of supply chain sources, including within forestry, agriculture, transport, and energy providers. Unlike emerging renewable energy technologies yet to be commercially proven, pellets have a proven track record of delivering reliable heat and power to industry and households all over the world. With the right policy support in place, pellets can be used today to play a key role in achieving Australia's carbon abatement and renewables targets.

Read more about the CEC's work on bioenergy here.

For more information or if you know of anyone who would like to subscribe please contact Ange Nichols at ange@cleanenergycouncil.org.au.