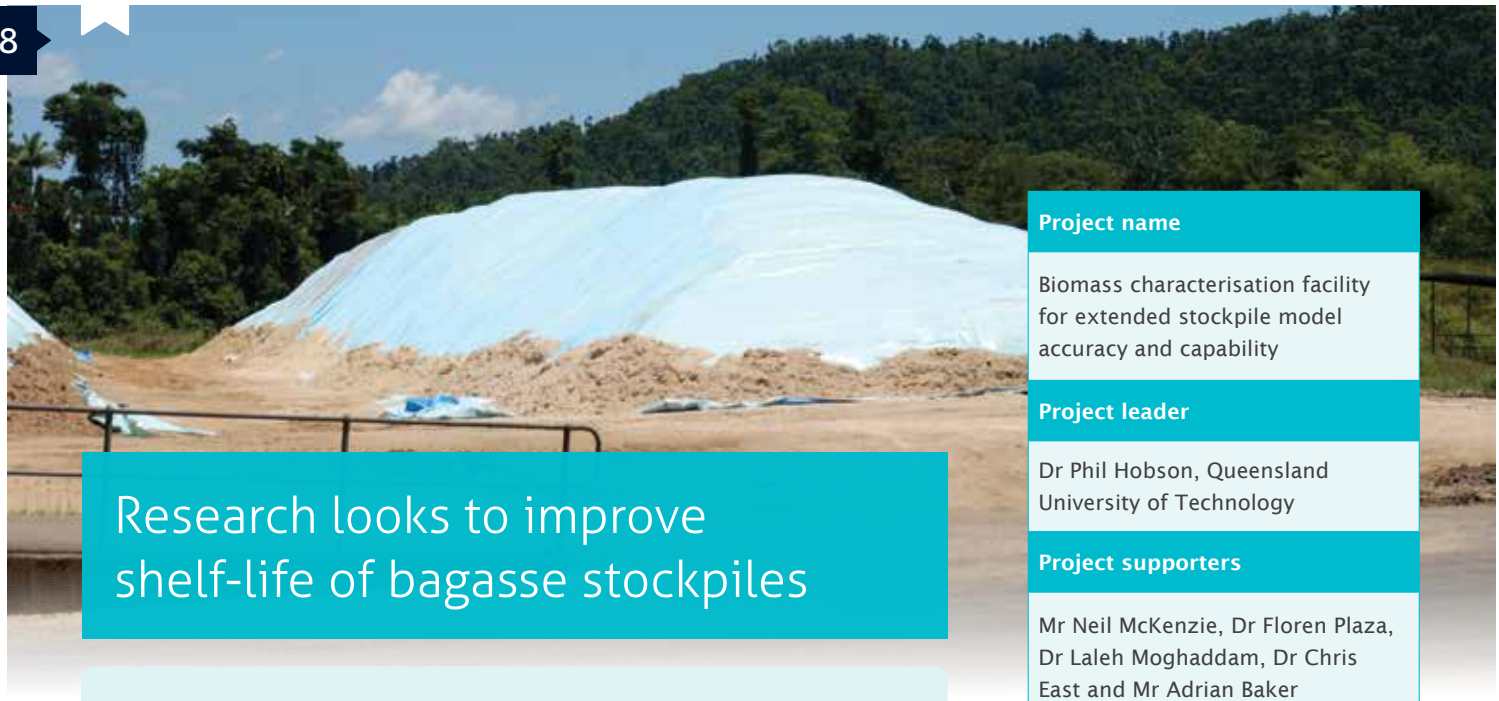

Research looks to improve shelf-life of bagasse stockpiles

A recently completed project has looked closely at what is happening inside bagasse stockpiles in order to provide information that would allow millers to more efficiently and sustainably store this important resource.

Project name

Biomass characterisation facility for extended stockpile model accuracy and capability

Project leader

Dr Phil Hobson, Queensland University of Technology

Project supporters

Mr Neil McKenzie, Dr Floren Plaza, Dr Laleh Moghaddam, Dr Chris East and Mr Adrian Baker

Research provider

Queensland University of Technology

The approach in this study was to further develop QUT's existing stockpile model and to build equipment that would enable key characteristics of bagasse (or any other biomass) to be measured and used to increase the accuracy of the model predictions.

The project made a number of important findings in relation to factors that influence the temperature of a bagasse stockpile, which in turn is a factor that influences its degradation. Researchers from QUT working on the project also gathered important information on managing spontaneous combustion.

The project was led by QUT researcher Dr Phil Hobson, with support from other researchers at QUT. Some of their results were presented at recent milling research workshops held by QUT and Sugar Research Australia across the Australian sugar industry.

At these workshops, Dr Geoff Kent with QUT told the audience that the research found that the maximum temperature inside a bagasse stockpile occurred not far below the surface, which meant that increasing the stockpile higher elevated that maximum temperature point higher in the stockpile.

"All of the degradation is predicted to happen near the surface," he said. "As the stockpile gets bigger, the proportion of degraded material gets lower."

He said temperature was largely related to the amount of oxygen that could enter the stockpile and the moisture content of the stockpile.

Tarping is sometimes used over stockpiles. Dr Kent said that the effect of tarping was not pinned down mathematically, but preliminary modelling of covered stockpiles indicated that tarping could reduce the maximum temperature by a notable amount.

Increasing density of the stockpile reduces the rate at which oxygen is able to enter and travel through the stockpile, which can also result in lower temperatures.

The project also revealed findings around moisture content that require further investigation. Common assumption would be that increased moisture content risks higher temperatures, as is the case for most stockpiles of other organic matter. However, there were some findings that might suggest that high levels of moisture in bagasse inhibit the rate of transport of oxygen through the stockpile, which could mean a lower temperature.

Above: Tarping was found to be the single most effective means of controlling stockpile heating.

Top: Research at QUT has studied degradation in bagasse stockpiles.

A number of factors can be considered to help reduce degradation in a bagasse stockpile.

In summary, the project's four main recommendations were to:

1. ***Increase bagasse bulk density***

   The adoption or increased use of bagasse moving equipment during construction of the stockpile could typically increase bulk density, resulting in a reduction in maximum untarped stockpile temperature.

2. ***Increase stockpile height***

   The depth of bagasse below the stockpile surface affected by degradation is independent of the stockpile height. Increased stockpile height will therefore result in a reduced mean loss of dry matter. The greatest gains are for small untarped stockpiles. Increasing stockpile height has no impact on maximum stockpile temperature.

3. ***Tarp open stockpiles and improve sealing of tarped stockpiles***

   Tarping was found to be the single most effective means of controlling stockpile heating. A stockpile fitted with a reasonably well sealed tarp has predicted maximum temperatures which are below those in the equivalent untarped stockpile.

4. ***Stockpiling bagasse at elevated moisture contents reduces the risk of spontaneous combustion and dry matter loss***

   Further experimental proof of this effect is required before this recommendation can be adopted with any confidence.

Biofuels mandate powers sustainable future

The Queensland Parliament has passed legislation requiring fuel sellers to meet targets for the sale of ethanol-blended petrol and bio-based diesel.

The mandate has been established under the *Liquid Fuel Supply (Ethanol and Other Biofuels Mandate) Amendment Act 2015* and is hoped to grow the biofuels and bio-manufacturing sectors.

The Bill includes an initial three per cent ethanol mandate for petrol and a half a per cent bio-based diesel mandate with both due to start on 1 January 2017.

In practical terms, the mandate will require E10 to make up 30 per cent of regular petrol sales in Queensland in 2017.

A joint Deloitte Access Economics/QUT study predicts bio-refining in all its forms could contribute more than $1.8 billion in gross state product to Queensland and create up to 6640 jobs over the next 20 years.

"New types of bio-based fuels that may be developed in the future will also count toward the mandate, further helping to stimulate investment and innovations in Queensland's biotechnology sector," the State Government said.

Further information about the biofuels mandate is available on the Department of Energy and Water Supply website: www.dews.qld.gov.au.