IEA Bioenergy

Task 42 Biorefining

# Australia Task 42 Update
# February 2018


Geoff Bell - Microbiogen

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## Govt. and macro conditions improve marginally for biofuels

- No change to the broad regulatory framework for the production of biofuels and biochemicals in Australia
- Queensland still leads the way with expanding biofuel mandates and Bio-futures program
- Queensland Labor Government re-elected and thus continuing support for renewables
- Gradual increase in ethanol blended into fuel supply in Queensland

- NSW enacts fuel labelling laws and anecdotal evidence suggests compliance by retail distributors
- Despite better labelling laws ethanol as a % of the fuel supply continues to decline.
- E10 has fallen from 24.5% in January 2017 to 23.9% in May 2017

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# New projects announced in Australia for new bio-refineries

- Hunter Valley advanced bio-ethanol pilot production facility
- Integrated Bio-process facility for Queensland

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# Hunter Valley advanced bio-ethanol pilot production facility

- To be developed by Ethanol Technologies Limited (Ethtec)
- Total project spend estimated at A$48M (US$37M)
- Supported by ARENA to the tune of A$11.9M
- Primary product is ethanol
- Non-food substrates including crop wastes and forestry materials
- Pilot plant to be built in Muswellbrook, NSW
- 20 research jobs to be generated from the program

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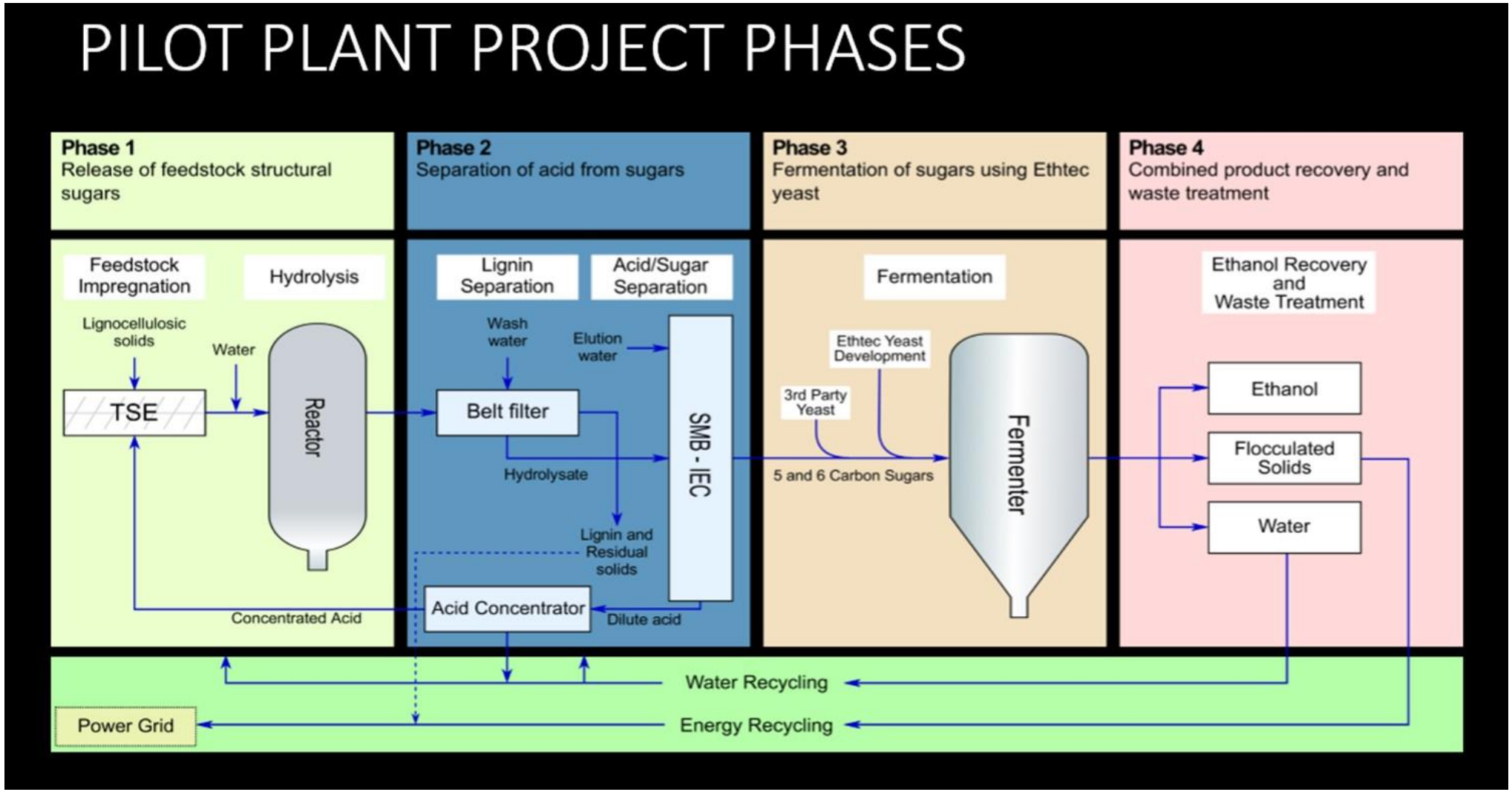
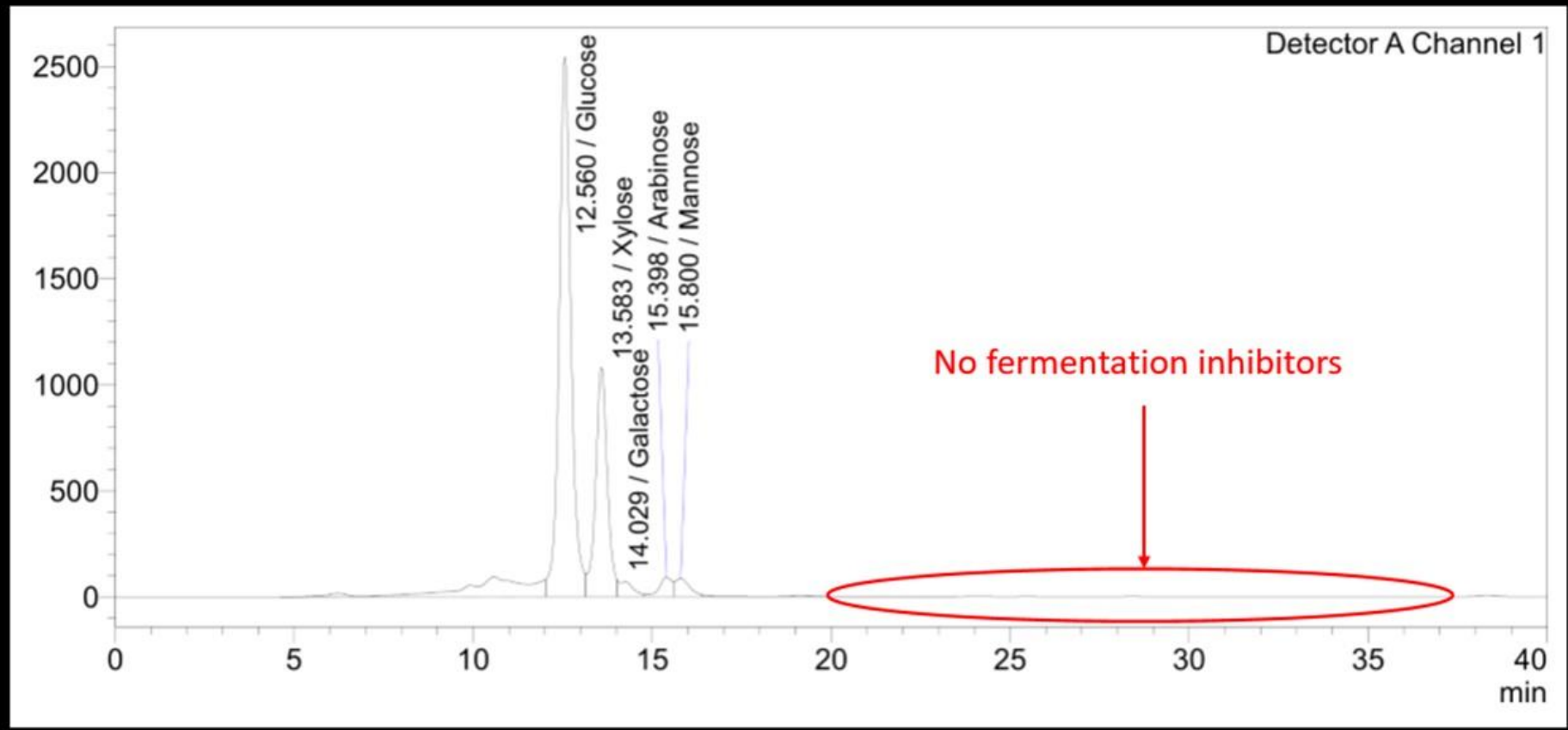
## Hunter Valley advanced bio-ethanol pilot production facility cont…

- Production capacity of the pilot facility is estimated at 270,000l/year
- Primary technology is to convert biomass into sugars
- Once the sugars are released then they can be converted into biofuels or other materials including chemicals, plastic precursors, industrial lubricants or even pharmaceuticals
- Aim is to demonstrate technology over the next 5 years so that enough engineering information is available to build a commercial scale facility
- Potential for commercial scale deployment within a decade
- Industry partner is Jiangsu Jintonggling Fluid Machinery Technology Company Limited
- Other partners include:  Apace Research Ltd, University of Newcastle and Muswellbrook Shire Council


PILOT PLANT PROJECT PHASES
Phase 1
Release of feedstock structural sugars
Phase 2
Separation of acid from sugars
Phase 3
Fermentation of sugars using Ethtec yeast
Phase 4
Combined product recovery and waste treatment
Feedstock Impregnation
Hydrolysis
Lignocellulosic solids
Water
TSE
Reactor
Concentrated Acid
Lignin Separation
Acid/Sugar Separation
Wash water
Elution water
Belt filter
SMB - IEC
Hydrolysate
Lignin and Residual solids
Acid Concentrator
Dilute acid
Fermentation
Ethtec Yeast Development
3rd Party Yeast
5 and 6 Carbon Sugars
Fermenter
Ethanol Recovery and Waste Treatment
Ethanol
Flocculated Solids
Water
Water Recycling
Power Grid
Energy Recycling

# ETHTEC HYDROLYSATES - Sugars Profile



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# Integrated Bio-process facility for Queensland

- A true bio-refinery concept is being planned for Queensland
- Project is still in the planning stages with multiple revenue streams
  - Oilseed process facility – vegetable oil and oilseed meals for animal feed
  - Vegetable oils and tallow to feed a biodiesel plant for biodiesel production
  - Low value glycerol used as substrate to produce Torsel yeast – high value animal nutrition
  - Sugar feedstock to produce high nucleotide yeast for additional revenues
  - All the above are established products with supply and offtake agreements able to be established

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# Value add

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# A step change of Agribusiness

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# Energy Park Synergies

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# Market Led Project

This project is driven by a need to increase non-GMO yeast production to capitalise on expanding domestic and export animal feed markets for:

TorSel® Yeast

- TorSel contains 33% more organic selenium than competitor products
- Sold in levels of 4000ppm (actual level is much higher)
- Proven performer in livestock
- Selenium is added to all feed globally

High nucleotide yeast (HNY)

- Used as a natural flavour and flavour enhancer across the food industry.
- Used in feed as a flavour, source of nucleotides, protein and prebiotic.

Autolysed yeast (AY)

- Used as high protein and palatant – similar to fishmeal

- Process has been patented
- Utilizing proprietary yeast

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# Project Development – Possible Site Layout