



ASX Announcement
17th June 2011

Encouraging Biomass (Agricultural Residue) Collection, Storage and Transportation Farm Trial Results

Highlights:

- **Excess residual straw collection, storage and transportation systems were trialled on farms in South Australia as part of harvest 2010/2011**
- **Fully integrated costings and other data on multiple systems were collected and analysed**
- **Farmers were surveyed regarding potential supply**
- **Climate change scenarios have been modelled to ensure long term sustainability of supply while maintaining 'critical cover'**
- **Results show that quantities of excess residual straw are available at costs of collection, storage and transportation that potentially support commercial power plant or energy pellet plant developments in the Yorke Peninsula and Mid North High Rainfall areas of South Australia**
- **Potentially significant bulk collection system cost reductions (equipment improvements) have been identified**
- **Results are transferrable to other locations**

Introduction

The Board of Directors of Syngas Limited (ASX: SYS) is pleased to announce a number of encouraging preliminary findings from the Syngas and the Yorke Peninsula Alkaline Soils farmers Group (YPASG) joint Logistics Management Field Trial project, which is nearing completion.

The Australian and local knowledge base in agricultural residue collection through to commercial use is expected to be significantly contributed to through the trial findings.

The field trial work took place during, and post, the Cereal Crop Harvest of 2010/2011 (between December 2010 and February 2011) at locations on the Yorke Peninsula and in the Mid North High Rainfall area, as well as other locations across South Australia. Best practice baling and various bulk handing equipment was accessed and used and the trials were supported by farmers, contractors and farming equipment suppliers.

The field work has been supported by RenewablesSA, through a \$300,000 grant which has progressively provided funds across all aspects of the project.

The Directors of Syngas sincerely thank everyone who has been involved in the field work.

Syngas and YPASG are now completing the field trial report, which will set out details of field trial findings and the specific commercial opportunities that have been identified, as well as recommendations on further work.

More information will be made publicly available on finalisation of the report.

Several preliminary findings are provided below.

Preliminary Findings

The field trial data that has been generated, analysed and compared with field trial work completed by others, outside of Australia, indicates:

1. That sufficient quantities of excess residual straw could potentially be cost effectively collected, stored and transported, on a sustained basis (i.e. under future climate change scenarios, sustaining 'critical cover' and backed by farmer willingness to supply), providing input into commercial return downstream Bio-energy developments in the Yorke Peninsula, and/or in the Mid North High Rainfall areas.
2. Commercial developments of a power generation plant and/or a straw pellet production plant in these areas are now being focussed on. Although sufficient quantities of feedstock are available for a Biomass to Liquid plant, the preliminary commercial assessment of this option is not encouraging.
3. Agricultural residue and energy crop collection field trial results from work conducted in Canada, the USA, and Germany over the past 8 years, has been compiled and compared where appropriate with the results achieved from these field trials^{1,2,3,4}. Baling costs, as calculated by Syngas, and bale densities for the high density bales produced in the Yorke Peninsula as part of the trials, were broadly consistent with past trial results achieved in Canada⁴, in real terms, with the differences potentially resulting from the type of material baled and improvements in technology. These results are shown in Table 1 below.

Costs [A\$/t in 2011 dollars]	Large (4x4x8) ft High Density Bale Density [kg/m³]	Trial Location	Material
(20 to 22)	+ 176	Syngas/YPASG Field Trials	Wheat Straw
27	173	BIOCAP ⁴	Switch grass

4. Although the bulk collection systems trialled delivered sub-optimal results when compared with results that have been achieved overseas in the past, a number of encouraging improvement opportunities have been identified. Subsequent discussions have been held with machinery manufacturers on the latest technology developments and with engineering design companies on improvements to current equipment for potential trialling.
5. Information on Biomass to Power plants currently operating around the world, as well as Energy Pellet plants, has been reviewed and compiled as input to the commercial analysis completed.

¹ The US Department of Energy, Uniform Format Bioenergy Feedstock Supply System Design Report Series, Volume A: "Uniform-Format" Vision and Conventional Bale Supply System, 2009

² REAP, Optimization of Switchgrass Management for Commercial Fuel Pellet Production, March 2008

³ Neue Landwirtschaft, "Forage Harvester or Self-Loading Wagon?" article, 2003

⁴ BIOCAP Research Integration Program, cost benefit of biomass supply and pre-processing, March 2006

6. Completion of the field trial report is expected to lead to further work on the specific opportunities which have been identified, further to Syngas Board approval.

Background

Syngas' wholly owned Bio-energy Company, BioSyngas, is continuing to assess the viability at various locations in Australia of:-

1. A Biomass to Liquid (BTL) fuel production project, leveraging off the Company's BTL technology/engineering relationship with Rentech Inc (NYSE AMEX: RTK), announced to the ASX in January 2010, which was renewed and again announced in December 2010.
2. Biomass to Power developments, in addition to, and leveraging off development of the Bomen 3 MW Power Project, located at Wagga Wagga, New South Wales. This project is currently undergoing a Bankable Feasibility Study.
3. Biomass to Energy pellet projects.

A critical element in the commercial viability assessments of these downstream 'value adding' processes is establishing that cost effective, sustainable and timely **collection, storage and transportation** of the quantities of suitable biomass required to feed each process is achievable. Establishing feed supply sustainability is necessary for further investment decisions by Syngas and others to take place.

In May 2009, Syngas entered into a Memorandum of Understanding (MoU) with the YPASG, a cereal cropping farmers group, headquartered in Minlaton, to assess residual straw (biomass) opportunities as part of Syngas' carbon management strategy.

In early 2010 Syngas and YPASG jointly applied for a grant from RenewablesSA.

In August 2010 a \$300,000 grant was approved by RenewablesSA to support the field trial work.

Syngas and YPASG have also contributed funds/resources to the progression of the field trial program of work, on a matching basis.

Field trial data has now been collated and analysed and is in the final stages of report preparation for presentation to RenewablesSA and Farmers, as well as the Syngas Board in terms of further investment decision making.

Field Trial Activities Completed

During harvest 2010/2011, the post harvester or windrower performance of high density baling equipment, currently widely used to bale/collect excess residual straw from cereal crop paddocks, was compared (in cost and efficiency terms) with bulk collection equipment arrangements/systems. These systems comprised of a combination of:

1. Forage harvester
2. Stack handler (loafer)
3. Compression trailer
4. Rubbish/refuse transportation trailer

In addition, bulk residual straw storage trials took place and on-road transportation costs for different materials were collected and collated.

Data collected during the trials has been compared, as appropriate, with trials completed outside of Australia over the past 8 years and has provided input into commercial

downstream 'value adding' project (i.e. Power, Pellets, BTL) financial modelling and project viability analysis.

As part of the trials, farmers' views have been collected through a farmer survey. This survey asked for information on farmers' expectations on payments for straw supply, as well as their views on a range of other aspects of potential straw supply.

Growing trials, investigating the biomass yields of different crops used in the area by farmers in rotation with cereal crops, and different wheat varieties, were also conducted in the Mid North area as part of the trials.

The field trial work involved the commissioning of a highly focussed module of spatial modelling work across the Yorke Peninsula and Mid North which has been undertaken by the CSIRO, in conjunction with Rural Solutions (PIRSA). This work leverages off the larger state wide agriculture residue spatial modelling project which is underway and due for completion in 2012.

This spatial modelling work has allowed long term, sustainable quantities of post harvest excess residual straw to be modelled around potential plant locations. Based on soil types, 109 years of rainfall and temperature history and other land management assumptions, three climate change scenarios have been modelled in terms of their potential impacts on supply. This work was necessary to ensure quantities can sustainably be supplied whilst 'critical cover' is maintained over the areas.

Summary

In 2009, Australia was amongst the top 10 Wheat Straw Residue producers globally⁵. South Australia was estimated as the third largest Wheat Straw Residue producing state in Australia annually⁶ at that time.

Large farm sizes and high levels of mechanisation in farming practices favour Australia establishing large scale, cost effective and efficient collection systems for residual straw for input into commercial projects.

BioSyngas' focus is on identifying and developing commercial Bio-energy projects in Australia, applying proven technologies, already successfully commercially used outside of Australia, to generate returns for shareholders.

The Yorke Peninsula and Mid North areas are relatively high yield/production level cereal crop areas in South Australia, and as such, relatively high levels of associated wheat (and barley) straw residue production areas⁷.

Over the past 24 months BioSyngas has developed a working relationship in the Yorke Peninsula with crop farmers, and more recently, in the Mid North High Rainfall area, with a view to identifying and developing mutually beneficial, long term excess residual straw based projects.

This field trial work has significantly advanced local knowledge. It has provided encouraging results which indicate that both from a quantity and cost perspective Power and Energy pellet projects could potentially be commercially developed in conjunction with farmers, in the Yorke Peninsula and Mid North areas. The trials have provided a basis for further work to be progressed.

Ends

⁵ Maintains, G (1999), Worldwide availability of Agriwaste and International Wheat Production Statistics, Wikipedia

⁶ ABARE

⁷ ABS and Crop and Pasture Report PIRSA (2010)

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