Bioenergy Australia 2016

BIOGAS IN THE CIRCULAR ECONOMY

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IEA Bioenergy Task 37
Access and financial security

Supply interruptions
Weather
Mechanical breakdown
Political instability
Price fluctuations

Impact:
Production, processing and storage facilities, fertiliser costs

Impact:
Budget planning, maintenance of delivery schedules, retention of customer orders
Alternatives to deliver regular supply

A place for Biogas/AD

Total self sufficiency and large surplus for sale

On farm to reduce dependence on national grid
Biogas in policy

- Purposes:
  - Waste management
  - Wastewater treatment
  - Electricity and gas production

*DISPOSAL OF DIGESTATE*

AD undervalued process
The circular process at work
**Milk** from own herds of 1500 cows and 80 milk supply farms in 50 mile radius.

**Feedstock**
75,000Slurry, whey +chopped OSR straw, maize silage, apple pomice & bread to double in 2017

**To open March 2017**
Construction of 2 new digesters to double output. All gas exported to third parties. Potential for milk and biomethane delivery vehicles

**13,000 tonnes cheese**
**Circulated output CHP**
1x 500 kWe /heat to cheese processing plant & 1 x 500 kWe at digester site for process heat & pasteurise digestate; Electric power for on site use and run delivery vans

**Surplus gas** upgraded and fed into national grid

Source: Courtesy of Wyke farms
Gorge Farm- Lake Naivasha Kenya a working model of a circular economy

2000m OD1

Distributed power vital for energy security, reliability and efficiency; guarantee for export targets. Replaced grid electricity for farm & community, diesel for heating glasshouses, fertiliser for community and commercial farms

Horticulture 1bn US$ pa
1986 11,000t – 2015 122,600 t

40% crops misfits for packaging and aesthetics

Source: Courtesy of Clarke Energy
### Financial benefits (Euros)

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<tr>
<th></th>
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<tbody>
<tr>
<td>Avoided expenditure:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electricity</td>
<td>7,000</td>
<td>10,000</td>
<td>13,000</td>
<td>Combined effect of electricity price increase and increase in farm consumption</td>
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<tr>
<td>Heat</td>
<td>15,000-18,000</td>
<td>18,000-20,000</td>
<td>18,000-20,000</td>
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<tr>
<td>Car fuel</td>
<td>2,000</td>
<td>2,000</td>
<td>6,000</td>
<td>Circa 1,000</td>
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<tr>
<td>Tractor fuel</td>
<td>0</td>
<td>0</td>
<td>5,000-6,000</td>
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<tr>
<td>Artificial fertiliser replacement</td>
<td>5,000-6,000</td>
<td>5,000-6,000</td>
<td>5,000-6,000</td>
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<tr>
<td>Reduced expenditure on veterinary bills</td>
<td>Not quantified</td>
<td>Not quantified</td>
<td>Not quantified</td>
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<tr>
<td><strong>Sub-total avoided expenditure (a)</strong></td>
<td>29,000-35,000</td>
<td>35,000-38,000</td>
<td>43,000-46,000</td>
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<td>New income sources:</td>
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<td></td>
<td></td>
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<tr>
<td>Electricity export</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
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<tr>
<td>Heat</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
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<tr>
<td>Biomethane for vehicle fuel</td>
<td>0</td>
<td>12,000</td>
<td>90,000</td>
<td></td>
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<tr>
<td>Extra litres of milk</td>
<td>Not quantifiable</td>
<td>Not quantifiable</td>
<td>Not quantifiable</td>
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<tr>
<td>Gate fees</td>
<td>0</td>
<td>0</td>
<td>5,000</td>
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<tr>
<td><strong>Sub-total new income (b)</strong></td>
<td>0</td>
<td>12,000</td>
<td>95,000</td>
<td></td>
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<tr>
<td><strong>Total financial benefit (a) + (b)</strong></td>
<td>29,000-35,000</td>
<td>47,000-50,000</td>
<td>138,000-141,000</td>
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Biogas & AD - the pivot of the circular economy

- Optimum use of resources – little waste
- Energy – reduced power distribution losses
  - need for road transport of oil, etc
- Fertiliser – demand on primary sources (NPK) & retention and recycling of nutrients, increase in NH₄ N
- Animal & plant health - antibiotics, pest & herbicides
- Human health – flies, odours, bacteria & viral circulations
- On site recirculation of resources-surplus for sale
  - Leads to increased productivity
  - Reduced GHG emissions
  - Cushion against global crises (eg oil)
- Financial stability

THE CASE FOR GLOBAL ADOPTION OF AD

A

HIGHLY FLEXIBLE PROCESS
ACKNOWLEDGEMENTS

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