Bioenergy and Australian Agriculture
translating lessons from overseas to Australia

Information Presentation

September 2018

Bioenergy international investigation – Nuffield

Nuffield Topic: **Renewable energy technologies in the Australian chicken meat industry**

Relevance

1. ~ 60-70% of poultry farm costs are in labour, electricity, gas
2. Electricity and gas prices continue to increase
3. Large renewable technologies investment
4. Poultry farms produce significant quantities of waste

Nuffield international travel

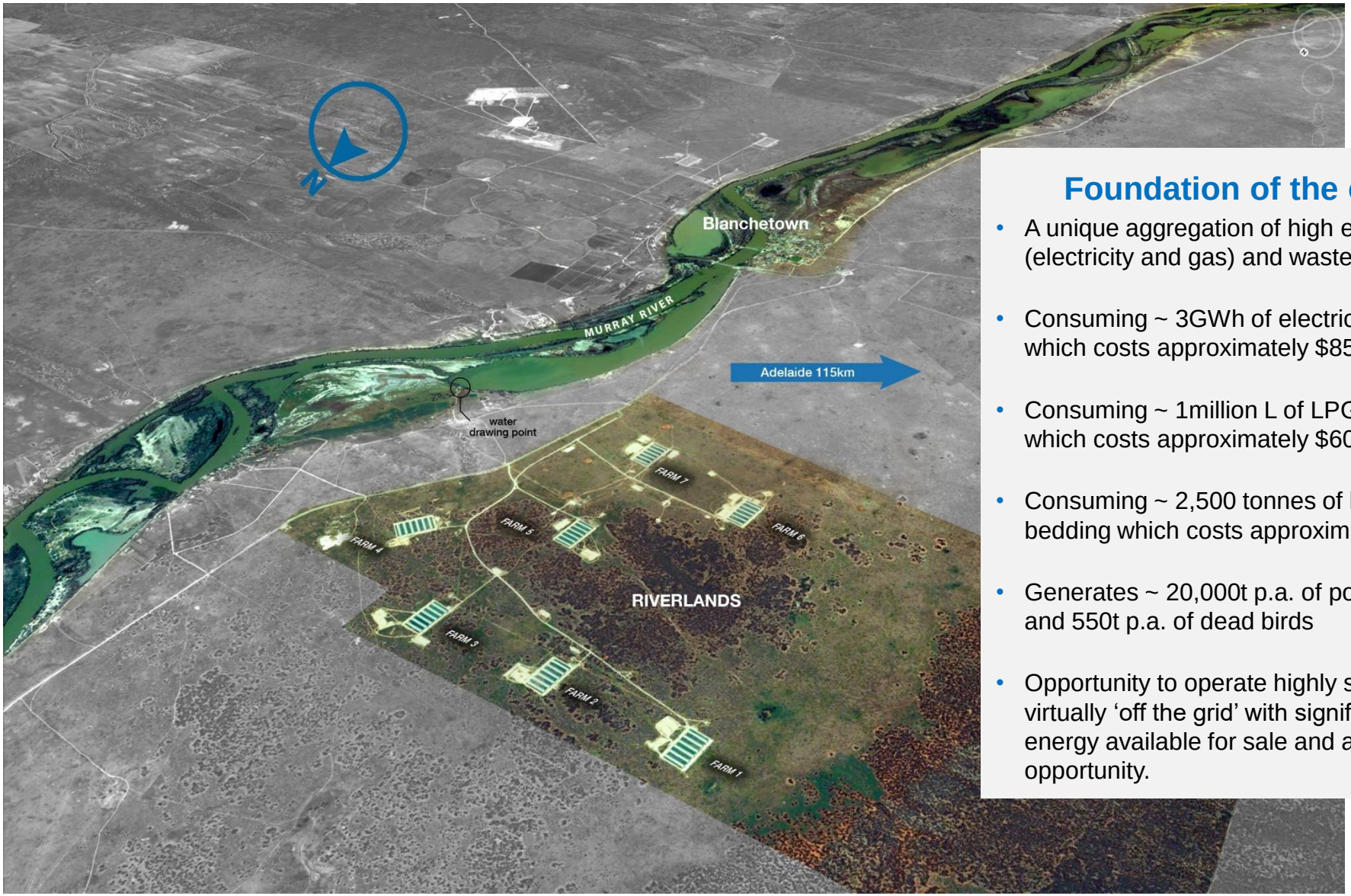
10 countries….

- UK, Northern Ireland, Singapore, India, Qatar, Turkey, France, USA, Denmark, China

AgriFutures Australia

NUFFIELD AUSTRALIA FARMING SCHOLARS

Anaerobic Digestion – the Australian opportunity



Foundation of the opportunity

- A unique aggregation of high energy consuming (electricity and gas) and waste producing assets
- Consuming ~ 3GWh of electricity per annum, which costs approximately $850,000 p.a.
- Consuming ~ 1million L of LPG used for heating, which costs approximately $600,000 p.a.
- Consuming ~ 2,500 tonnes of hay used for bedding which costs approximately $300,000 p.a.
- Generates ~ 20,000t p.a. of poultry litter, bedding and 550t p.a. of dead birds
- Opportunity to operate highly sustainable and virtually ‘off the grid’ with significant surplus energy available for sale and a sustainable reuse opportunity.

Anaerobic Digestion & SCPF

Significant Project Benefits

- 100% sustainable and energy self-sufficient intensive agricultural operation, generating more base load power than the site requires (eliminating the requirement for 1mL of LPG and 3GWh of power from the network)
- Putting in to practice the circular economy
  - *Using local straw for poultry bedding → By-product (straw and manure) used in a renewable energy plant → digestate (high nutrient organic fertiliser) used in surrounding agriculture → grows crops → crop residue (straw) used for poultry bedding*
- Can be used as a template / pilot site on how cost effect poultry production can be
- Opportunity to change the international competitiveness of the whole poultry industry (and intensive agriculture)

Waste to energy → who we are talking to….

COLBY industries

Project advisory

xergi	DVO renewables at work	biogass Energy from Waste	BEKON
• Based in Denmark with 30 years' experience in Biogas • 60 biogas plant • Currently building a high quantity feedstock chicken manure AD plant in Northern Ireland • **BYOSIS Group – Netherlands** , nitrogen extraction and removal	• America's largest digester company • 120 installations worldwide • Processes waste and generates 78MWh of electricity • Patented two-stage plug flow digester • Operating a 100% poultry manure AD plant in the United States	• Successfully commissioned a 35,000-50,000 tonne per annum food waste capable of 2.4MW (e)	• 50 plants in operation, 3 additional plants under construction, 7 new plants planned • Currently undertakes dry AD • In collaborate discussions with UK. Professor William Clarke from UQ, professor for solids waste bioprocessing

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Technology Options: Dry v wet AD

Dry / batch

Wet / continuous

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Application and business case

20,500 tonne of waste

Chicken manure / waste

20,000t chicken manure & 500t of dead birds

AD process

Anaerobic Digestion

5million m3 of biogas, being 2.8million m3 of methane

Revenue

Fees for accepting waste

+

11GWh electricity via 1.5MW CHP

+

7GWh for heating

or

Equivalent to Diesel

+

15,000t compost

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Renewables SCPF

1. **Stage 1** – 100kW per farm, 700kW Solar PV in total (completed)
2. **Stage 2** – 100kW per farm, 700kW Solar PV totalling 1.4MW solar PV system, plus looking at further solar and battery / storage installations

Compost SCPF

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We have started to compost the poultry manure already building this market which will align with the AD business case (which generate digestate)

Anaerobic Digestion & SCPF

Project challenges and work to be undertaken

- Obtaining a feasible network connection from SAPN
- Obtaining engineering certainty for use of high quantities of poultry manure
- Obtain offtake agreement for surplus electricity sales (PPA)
- Land use (development approval) and State Government approval requirements and timings
- Cost associated with detailed feasibility work with challenging counter parties
- Alignment of industry – common goals

QUESTIONS????.....

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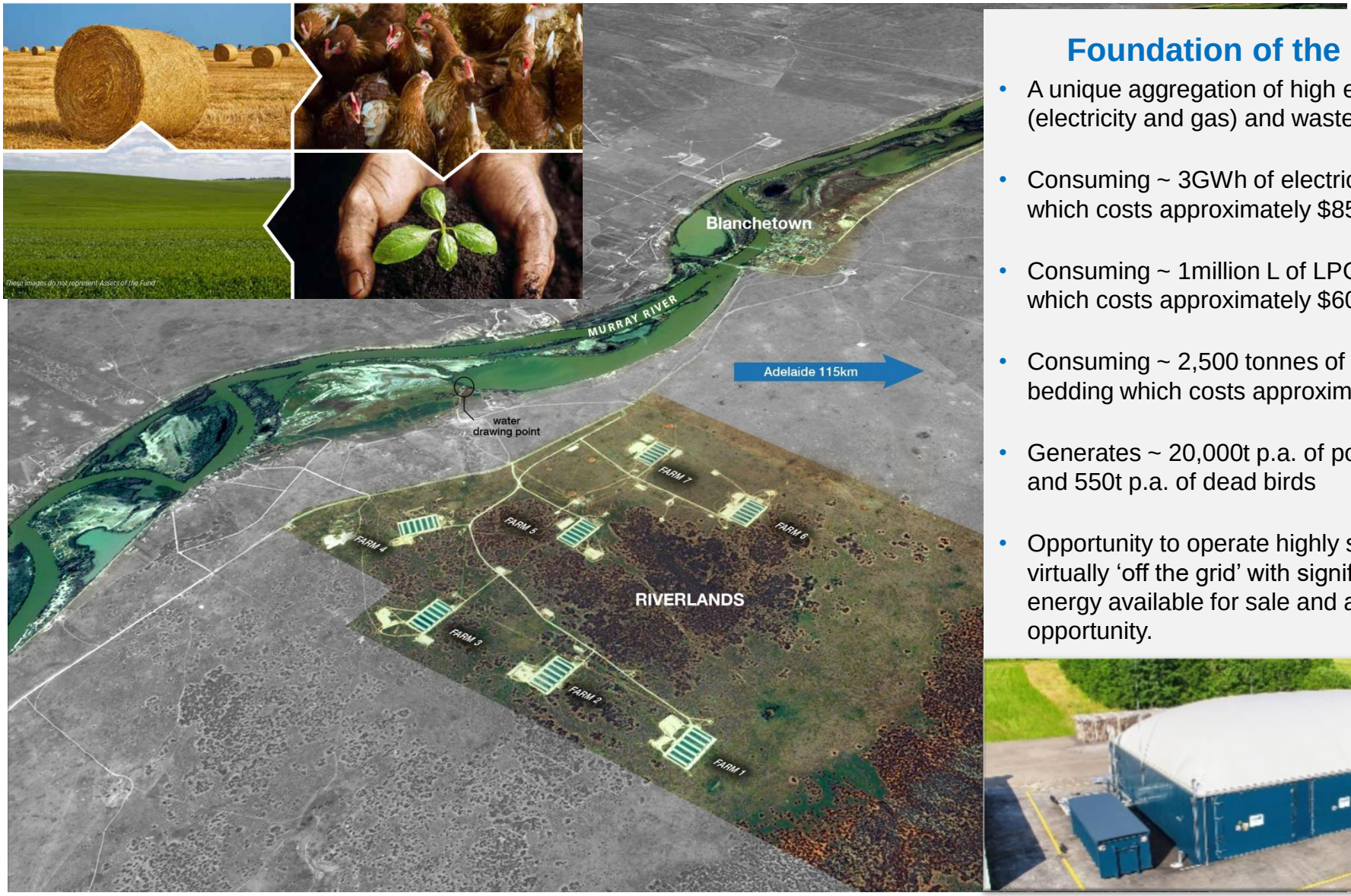

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