

Starting the

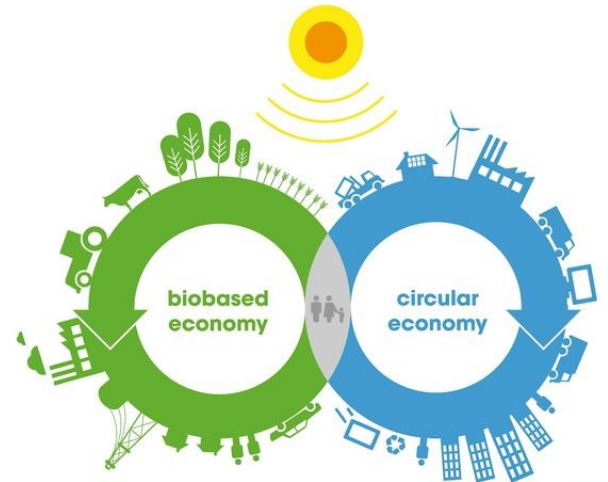
Bioenergy

Journey

Dr Chris Colby

Managing Director – Colby Industries Pty Ltd

BIO  economy



What have we learned?

The
technology
exists

It's already
part of the mix

It will be part
of our future

Is it part of my future?

- *Can it save (or make) money?*
- *How much does it cost (& how do I pay for it)?*
- *Is it just about the money?*



Financial feasibility?

$$\text{Simple Payback (years)} = \frac{\text{CAPEX (\$)}}{\text{Revenue/Savings} \left(\frac{\$}{\text{yr}}\right) - \text{OPEX} \left(\frac{\$}{\text{yr}}\right)}$$

Simple Payback (CAPEX/Nett Income)	Nett Income (% of CAPEX)	Relative Profitability (IRR _{10years})
3 years	33% of CAPEX	31%/year
5 years	20% of CAPEX	15%/year
7 years	14% of CAPEX	7%/year



Revenue/Savings

Bioenergy

- Electricity – On-site, Micro-Grid, Export
- Process heat → Refrigeration
- Renewable Energy Certificates (Electricity)

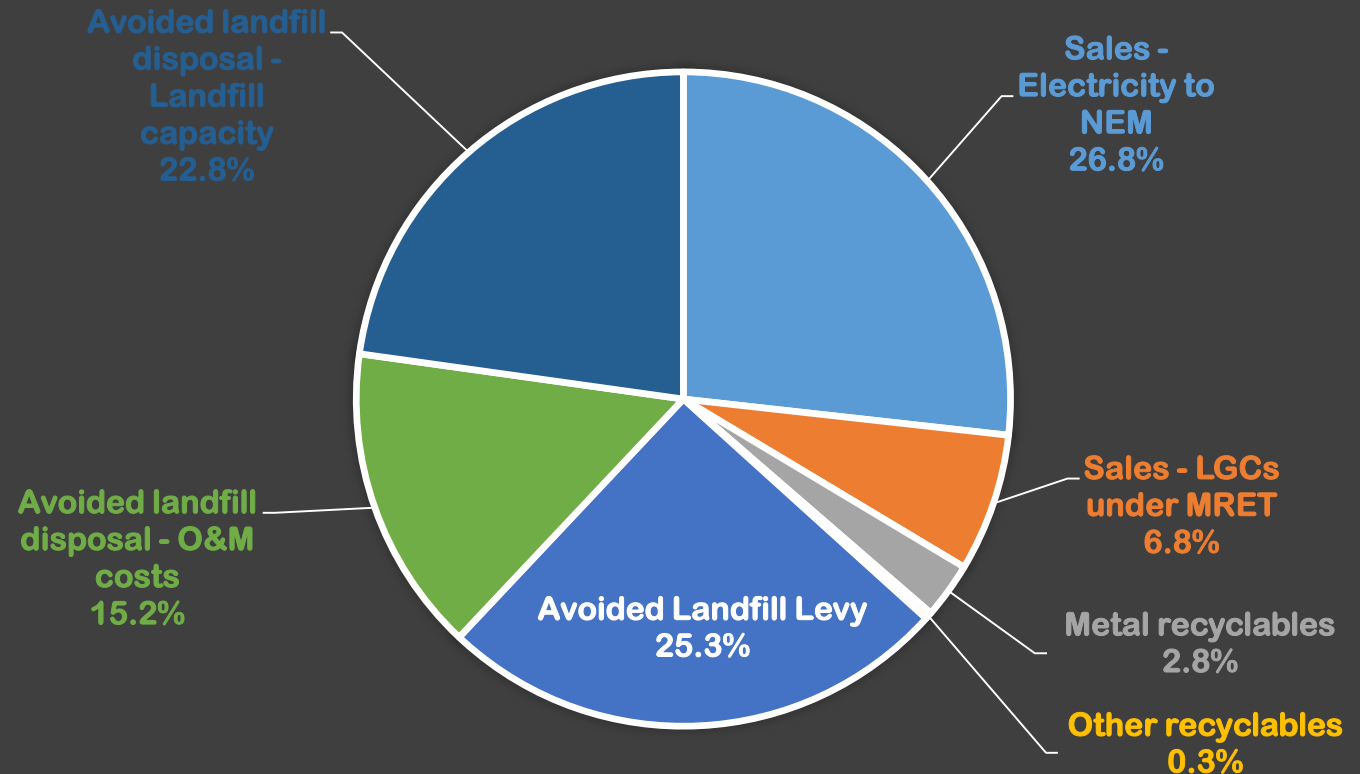
Biofuels &/or Bio-products

- Biodiesel
- Ethanol
- Wood/biomass pellets/briquettes
- Bio-oil
- Biogas or Biomethane
- Biochar – Thermal or Agricultural
- Syngas – Energy or feedstock
- Digestate/nutrient rich extracts

Avoided costs/Other revenue

- Avoided waste disposal costs
- Carbon Credits
- Business/product value

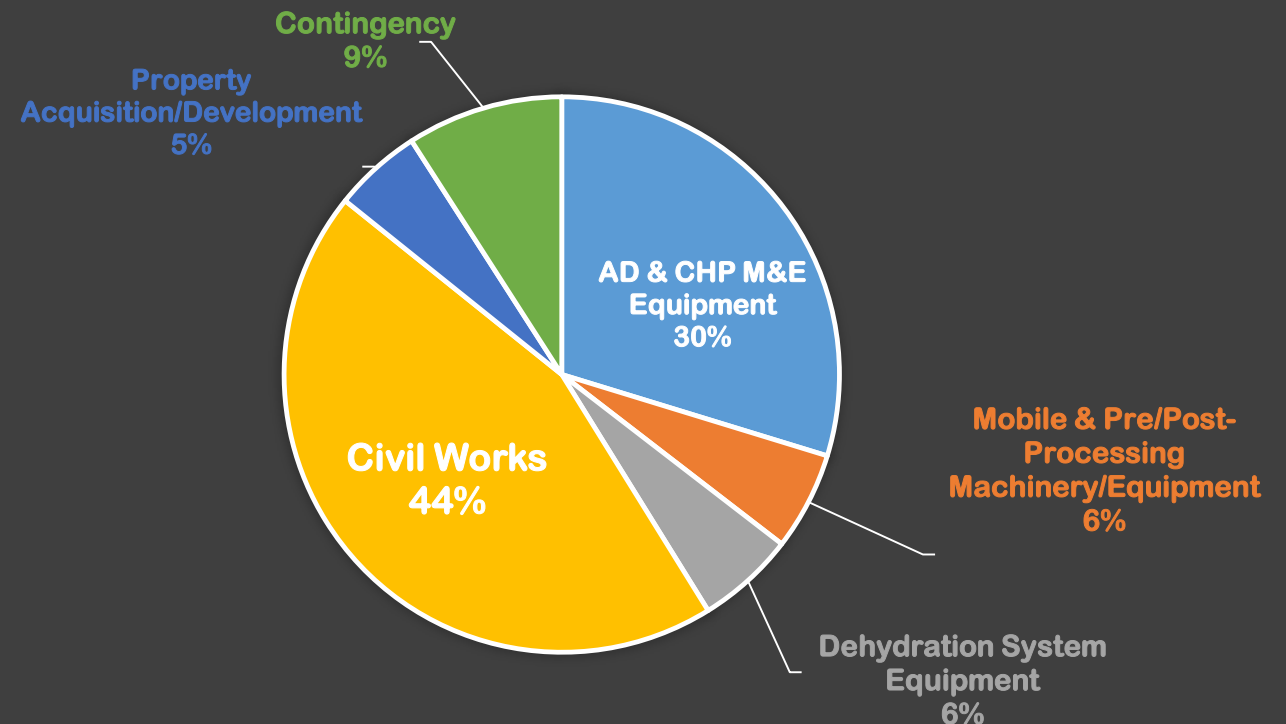
EXAMPLE: WASTE INCINERATION REVENUE BREAK-UP



CAPEX

- Bioenergy Technology/Plant is only one part of the CAPEX, e.g. 25-50%
- Other CAPEX can include:
 - Land
 - Buildings & civil works
 - Mechanical & electrical
 - Feedstock & Bioproduct storage
 - Residual/bioproduct processing
 - Mobile plant & equipment
 - Electricity &/or gas connection(s)
 - Water supply & wastewater management
 - **Contingency**

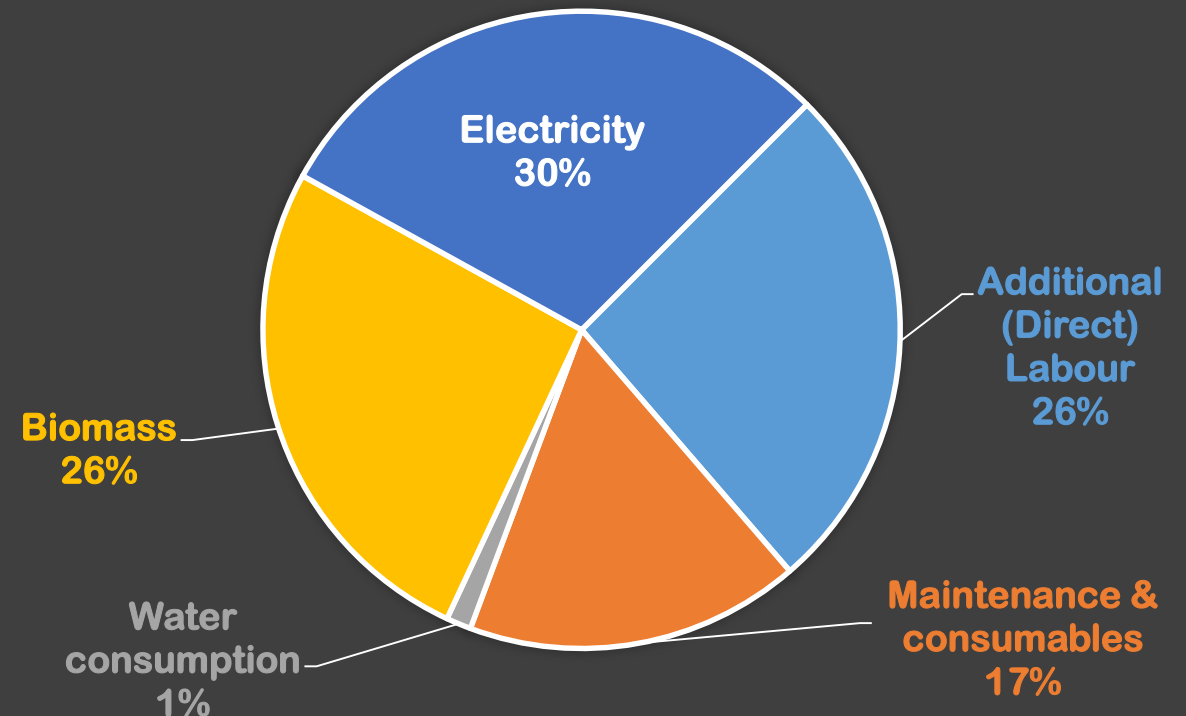
EXAMPLE: DRY AD CAPEX BREAK-UP



OPEX

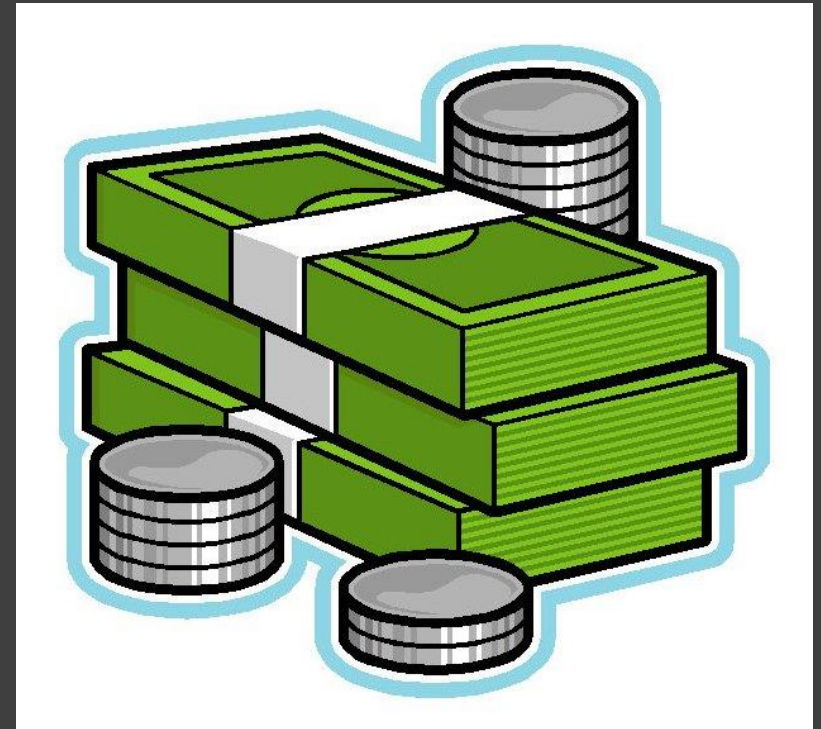
- ❑ Feedstock
- ❑ Labour
- ❑ Fuel
- ❑ Electricity/energy (parasitic/other)
- ❑ Water supply
- ❑ Wastewater treatment
- ❑ Chemicals
- ❑ Maintenance
- ❑ Finance costs (interest)
- ❑ Administration costs & overheads
- ❑ Transport costs
- ❑ Licensing fees (technology, statutory)

EXAMPLE: WHEAT INCINERATED HEATED ABSORPTION REFRIGERATION PLANT

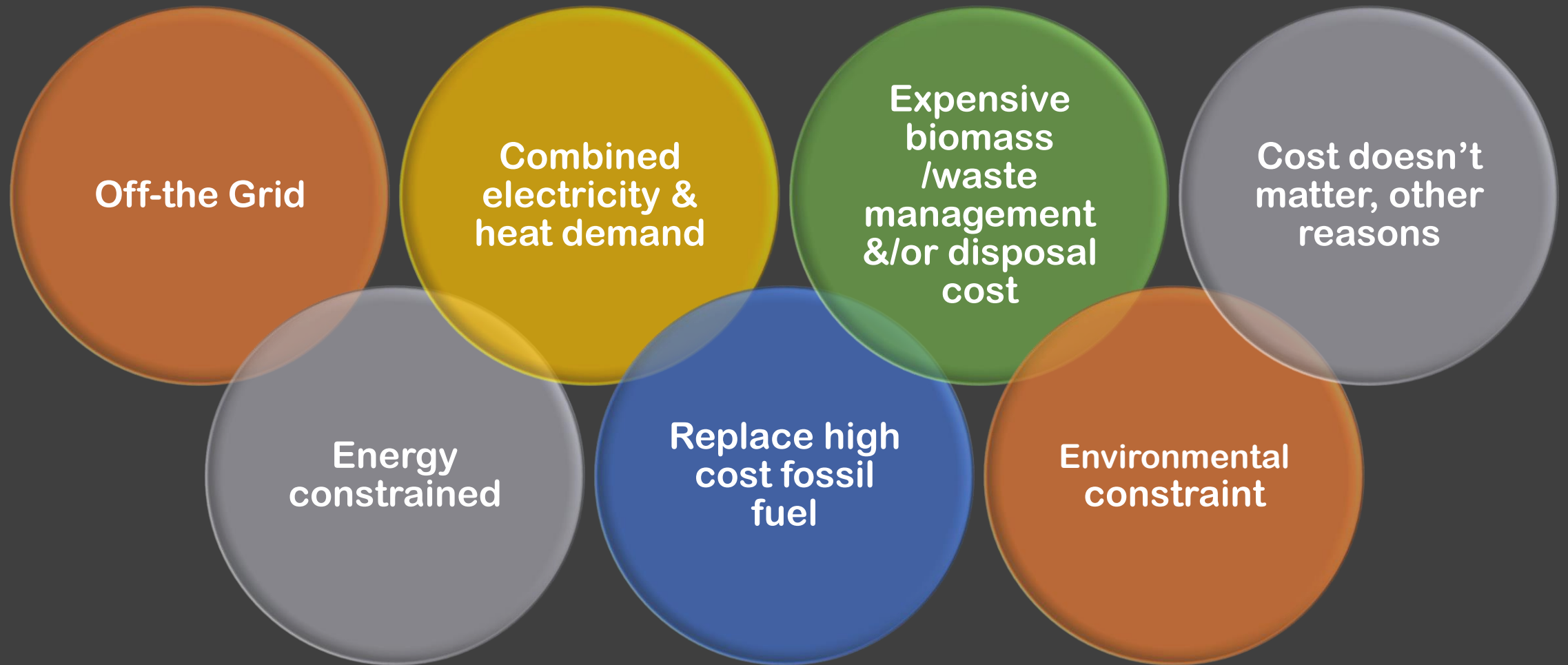


Funding

- Cash
- Equity
- Finance
 - Conventional lenders
 - Clean Energy Finance Corporation (CEFC)
 - Australian Renewable Energy Agency (ARENA)
 - Other government schemes
- Grants
 - ARENA
 - Other government programs



Where is bioenergy most likely feasible?



Taking the bioenergy journey

Step 1 – Define objective

- Money
- Environment
- Sustainability

Step 2 – Learn from & work with others

- Public information
- Peers
- Government
- Industry bodies

Step 3 – Gather information (data)

- Current energy sources, use(s) & costs
- Future energy needs & costs
- Potential biomass sources & residue fates & their costs
 - Australian Renewable Energy Mapping Infrastructure (AREMI)

Step 4 – Preliminary assessment

- Technology options
- Up-front (CAPEX) & on-going (OPEX) costs
- Cost savings &/or revenue
- Payback / investment return
- Paying for the investment
- Benchmarking against other solutions

Step 5 – Detailed assessment

- Design
- Detailed costings
- Financial assessments
- Development approvals &/or environmental licenses
- Securing feedstock &/or customers
- Securing finance

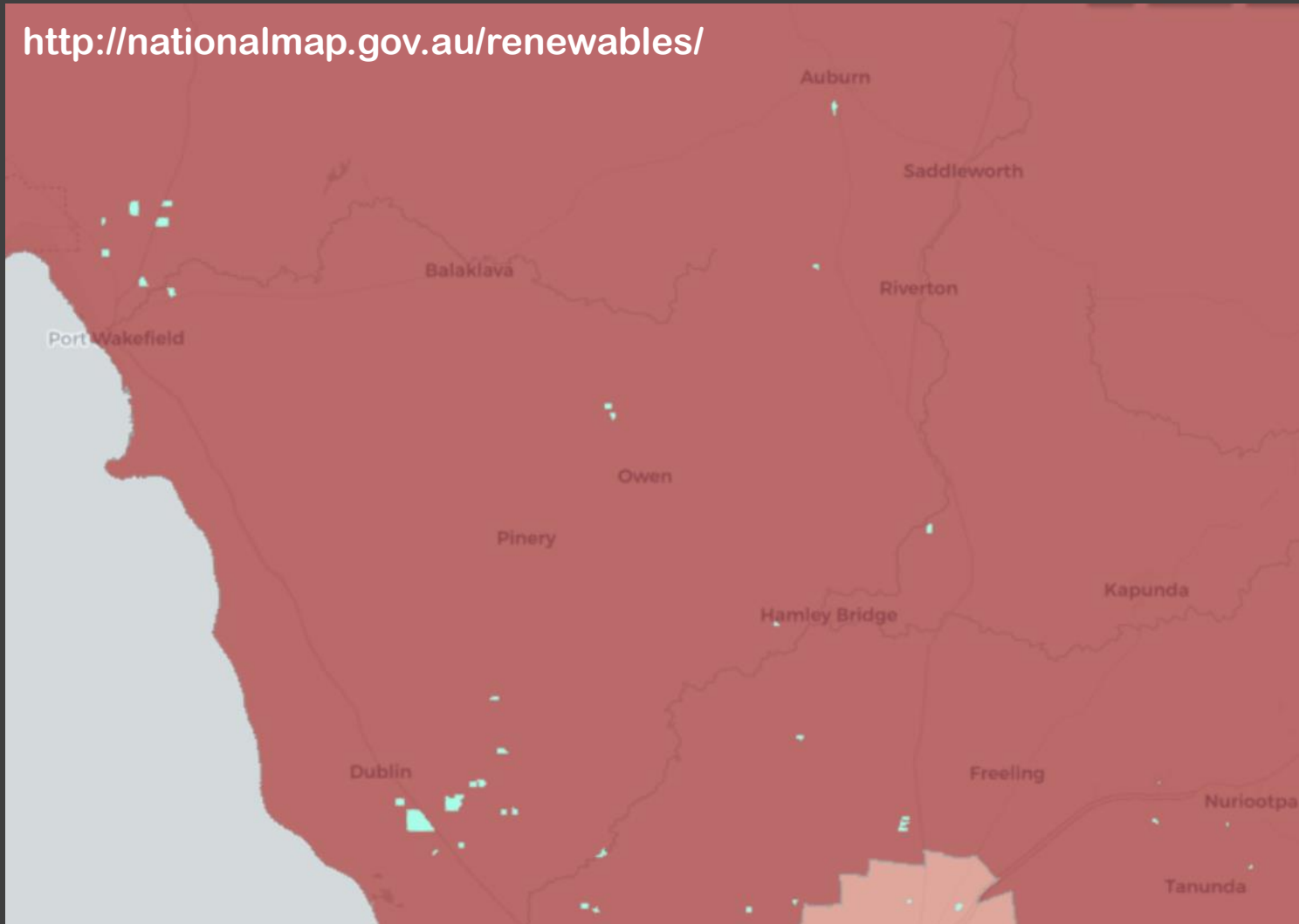
Step 6 – Project implementation (DCC&O)



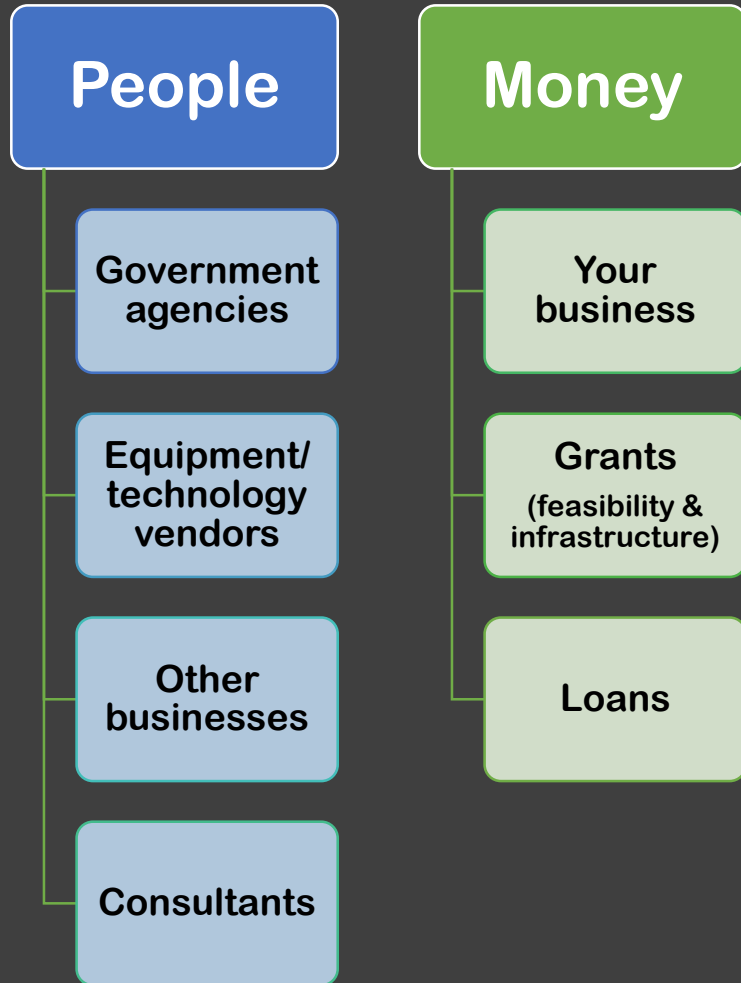
Primary Industries and Regions SA



AREMI Example: Poultry Land Uses



Who can help



Mary Lewitzka
Low Carbon
Economy Unit



Dylan Strong
RDA CEO



Andrew Hutcheons
Green Industries SA



Lyn Wallace
RDA EDO



Simon Millcock
Legatus



Bonnie Maynard
PISA

GRANTassist



Thank you & questions

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