



Australian Government
Australian Renewable
Energy Agency

Off Grid Opportunities for Renewable Energy

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General Manager, Strategy



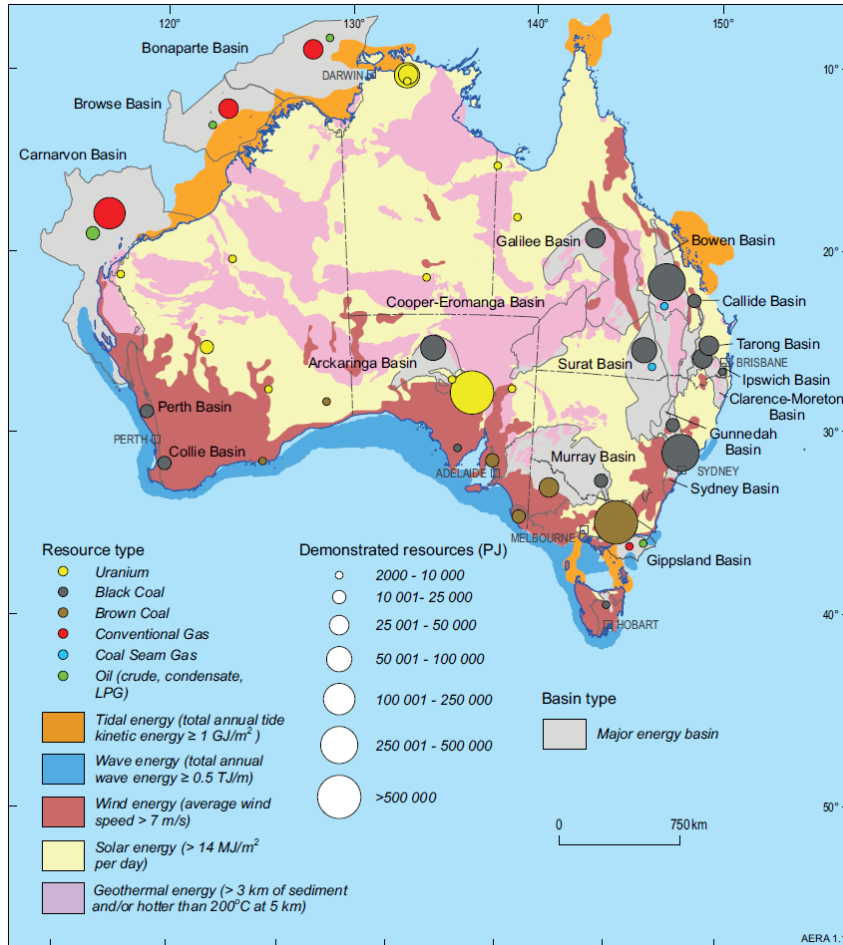
Energy in Australia



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Distribution of Australia's Energy Resources

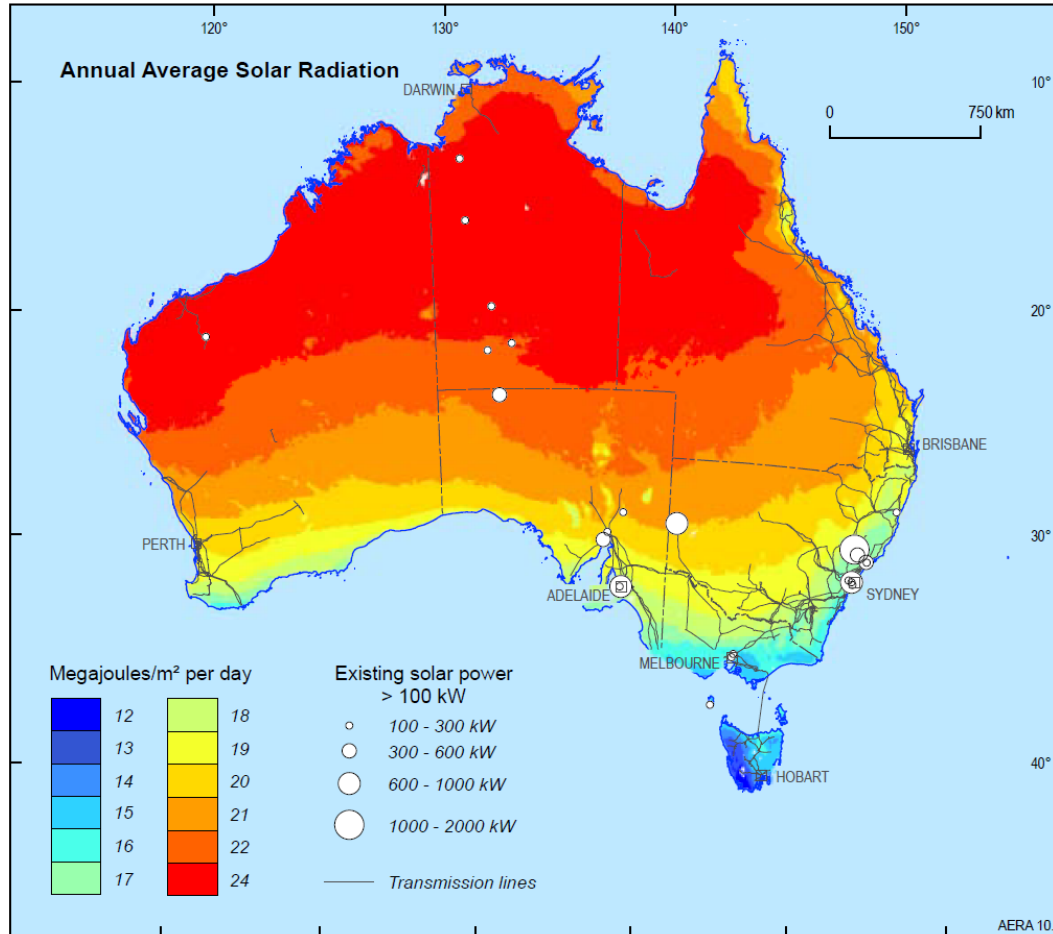


Map of Australia showing the distribution of Australia's Energy Resources including renewable energy resources: Tidal, Wave, Wind, Geothermal and Solar energy. The map also shows the non-renewable and renewable energy plant locations across Australia.

Source: BREE, *Australian Energy projections* (2011)



Distribution of Australia's Energy Resources



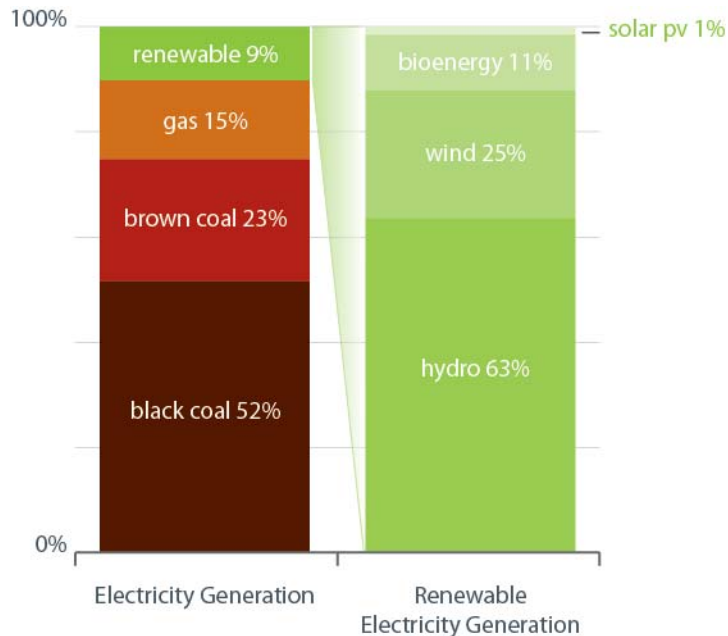
Map of Australia showing the annual average solar radiation and areas of existing solar power greater than 100 kW and less than 2000 Kw.

Source: Geoscience Australia and ABARE, *Australian Energy Resource Assessment (2010)*



Renewables in Australia's Energy Mix

Australian electricity generation 2009-10



Percentage total of of Australian Electricity Generation for 2009-10

Electricity generation from:

Black coal 52%

Brown coal 23%

Gas 15%

Renewable energy 9%

Renewable Electricity Generation

Hydro 63%

Wind 25%

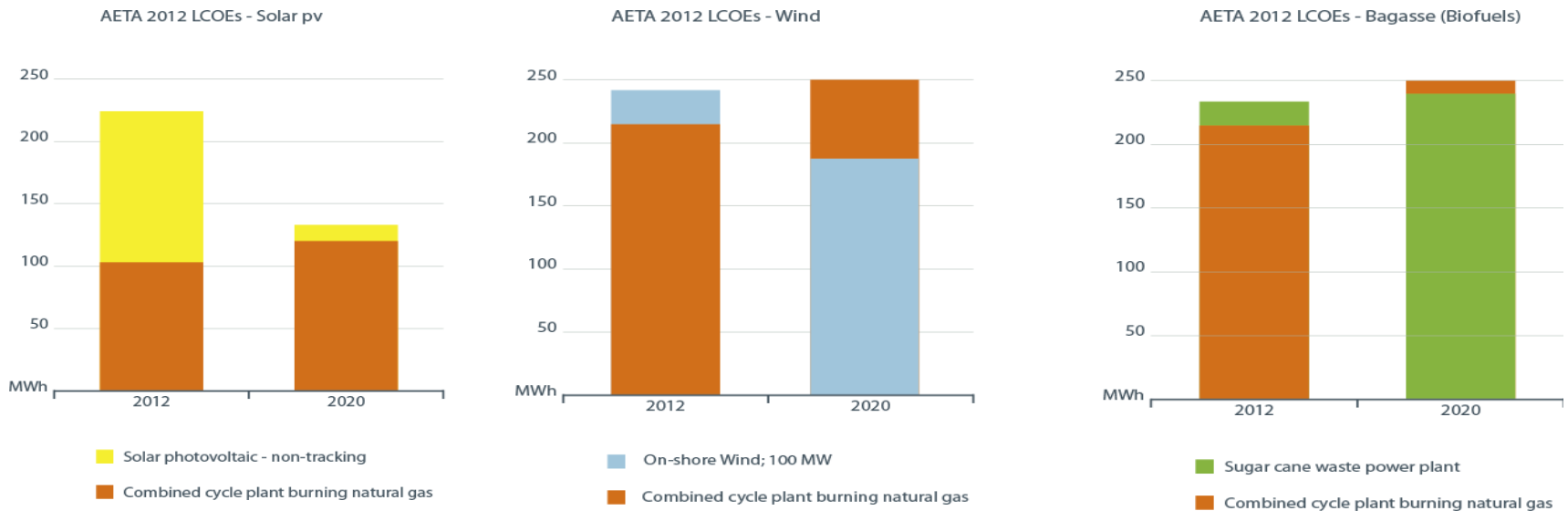
Bioenergy 11%

Solar Photovoltaic 1%

Source: ABARES, *Australian Energy Statistics* (2011)



Australian Energy Technology Assessment's (AETA) Levelised Costs of Energy (LCOE) in 2012 and 2020



These three charts make a comparison of the Levelised Cost of Energy (LCOE) of solar photovoltaic, on-shore wind and bagasse (biofuels) and combined cycle plant burning natural gas in 2012 and 2020.

Source: BREE, *Australian Energy Technology Assessment (2012)*

Australian Renewable Energy Agency (ARENA)

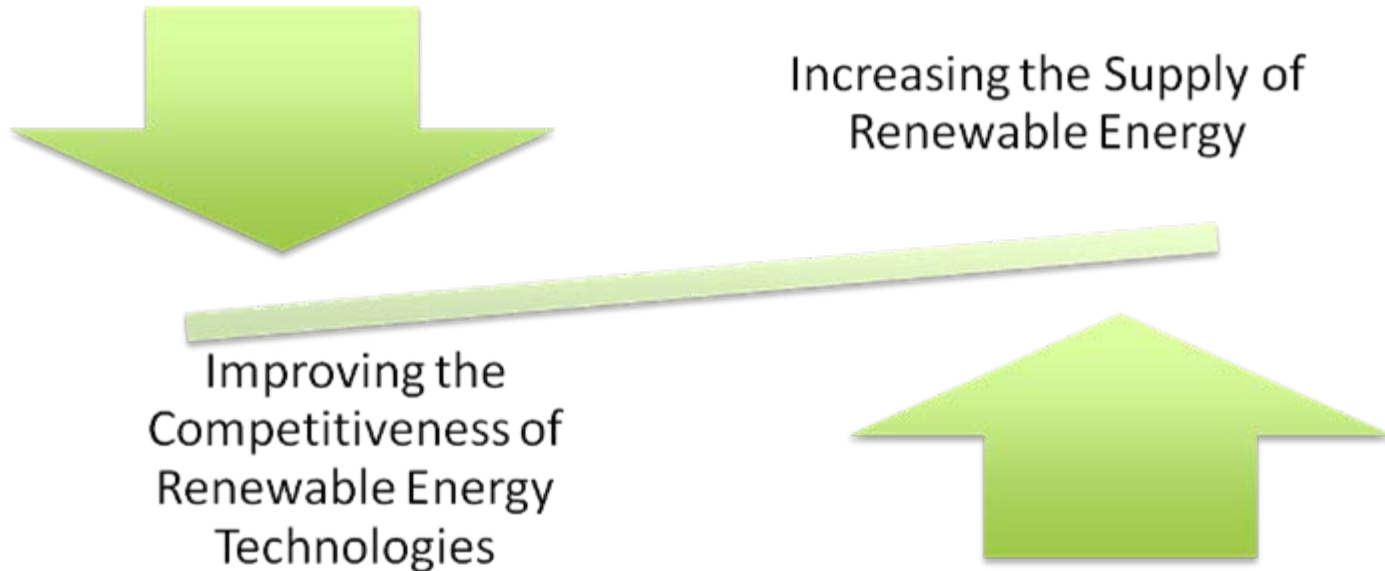


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The Basics

\$3.2 billion in funding



Doing Business

1. Complementarity

Complement existing programs and market pull mechanisms such as the Renewable Energy Target.

2. Technology Neutrality and Recognition

Support a range of prospective renewable energy and related technologies and allow specific assistance where strategically appropriate.

3. Openness and Transparency

Active promotion of knowledge sharing to spur innovation and improve renewable energy uptake.

4. Collaboration

Establish and maintain productive working relationships with domestic and international partners.

5. Value for Money

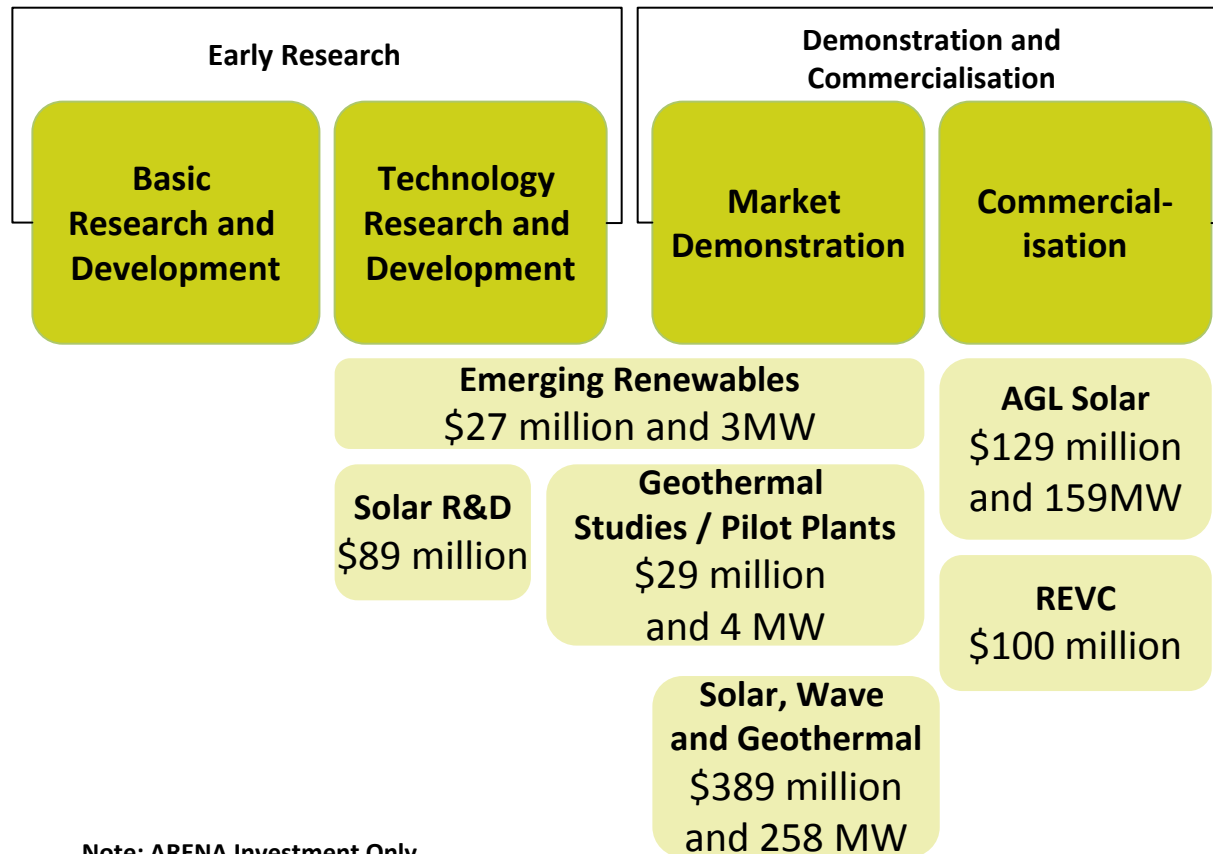
Employ appropriate, effective and efficient decision-making whilst managing risk.

6. National Interest

Where appropriate, contribute to broader national goals.



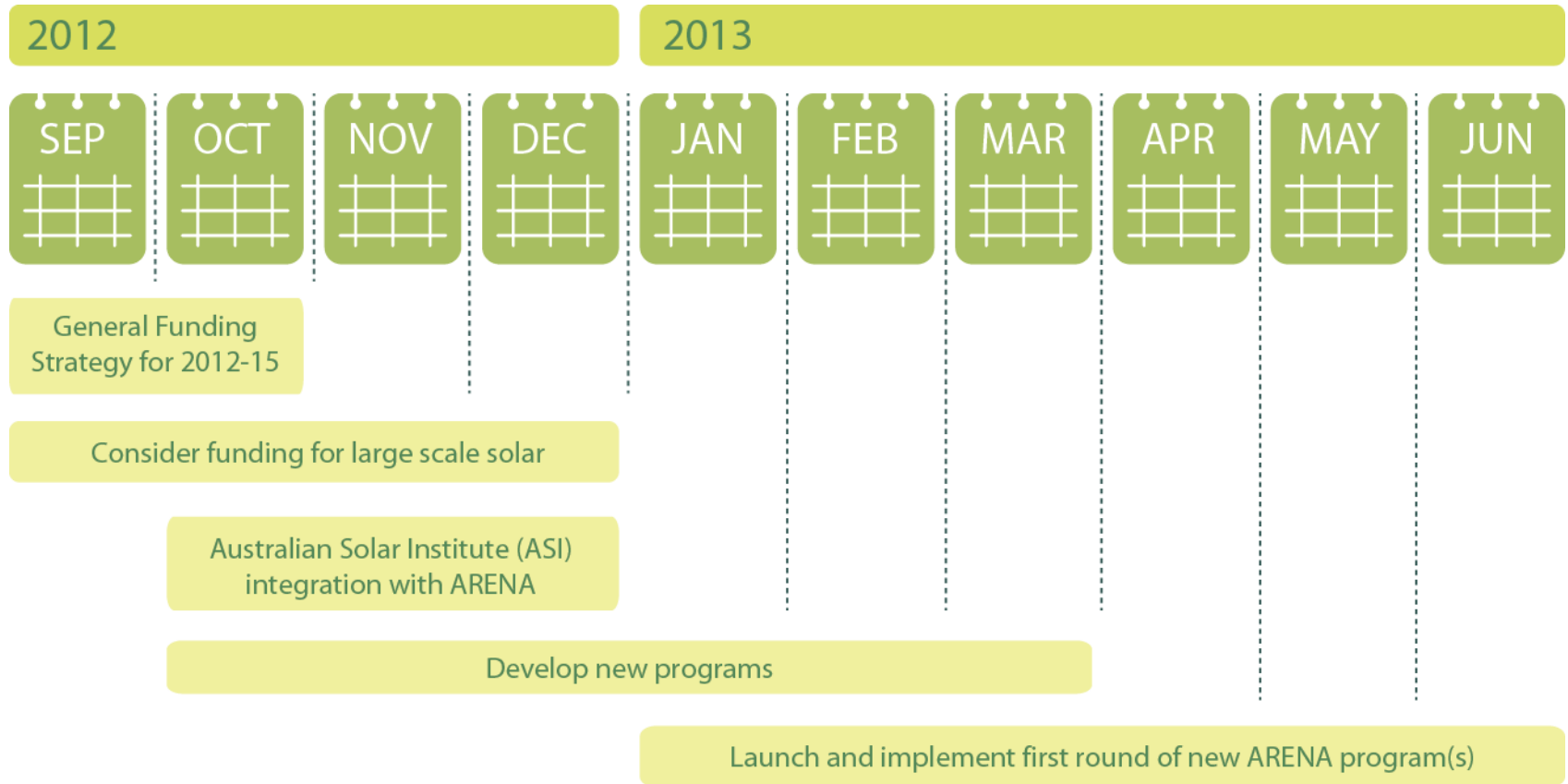
Transferred Projects



Note: ARENA Investment Only



Work Priorities



ARENA's Funding Strategy



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Consultation Process



Consultation Findings

- ◆ Stakeholders looking to ARENA for strategic leadership in addressing matters of policy and coordination across jurisdictions
- ◆ Decisiveness and speed in decision-making
- ◆ A fresh, flexible and innovative approach to the provision of financial assistance (including through reverse auctions, market support and open funding rounds)
- ◆ Genuine partnership
- ◆ Embrace all energy types
- ◆ Importance of dispatchability to improve value for renewable energy
- ◆ Make returns and reinvest in the industry
- ◆ Knowledge sharing and protection of IP
- ◆ A large scale solar hub or research park



Current ARENA Support for Off Grid



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Can Off Grid Projects be Supported by ARENA Now?

Emerging Renewables Program

- ◆ \$126 million flexible and integrated program
- ◆ **ACRE Projects** – to progress renewable energy and enabling technologies as they move through the innovation chain and to lower the cost of renewable energy in Australia
- ◆ **ACRE Measures** – for renewable energy industry capacity building and skills development

Renewable Energy Venture Capital Fund

- ◆ Venture capital and active investment management for Australian Companies commercialising renewable energy technologies
- ◆ \$200 million Southern Cross Renewable Energy Fund established under the program with \$100 million from ARENA and \$100 million from the private sector
- ◆ Independent fund manager Southern Cross Venture Partners makes all investment decisions.

Current ARENA project with Off Grid Potential

King Island Renewable Energy Integration Project (REDP) –

- ◆ Commonwealth \$15.28 million, Tasmania Government \$30 million
- ◆ Will integrate wind energy, solar energy and storage with a biodiesel generator
- ◆ Providing baseload and peak power for King Island's mini-grid system
- ◆ Potential application to isolated grids in remote and regional areas



Off Grid



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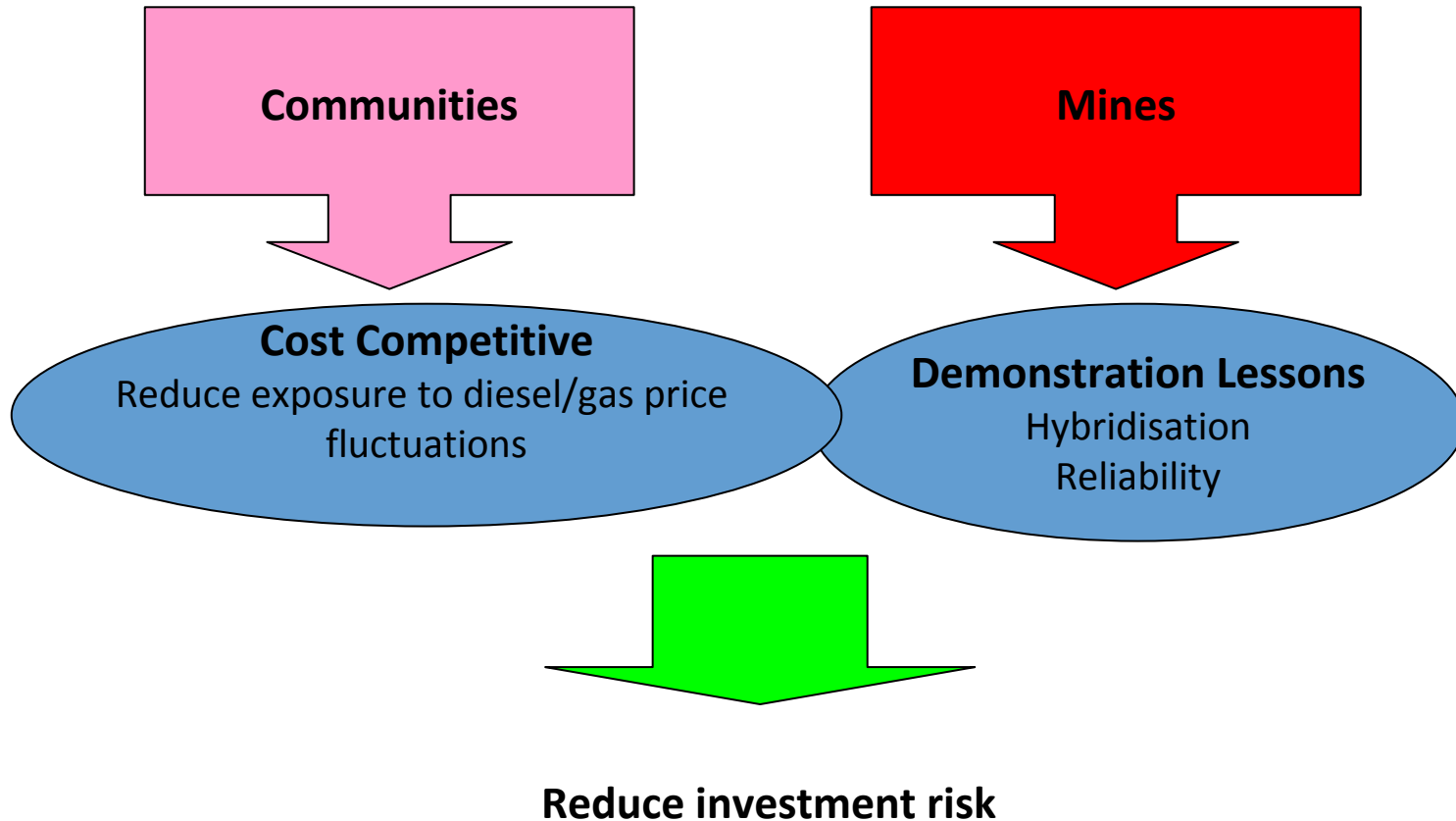
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Off Grid Opportunities

- ◆ 2,600 GWh – 1 per cent of Australia's electricity generation from fuel oil mostly off-grid generation and back-up peak generation
- ◆ Western Australia – 2,000 MW of diesel capacity on either off-grid or isolated grids – 3,000 MW forecast in Pilbara region alone by 2020
- ◆ Northern Territory – 320MW of installed diesel generation in more than 1000 discrete diesel generation sites; Power and Water Corporation uses renewable energy systems at six communities with an installed capacity of almost 800 kW
- ◆ South Australia – 2,600 customers in 13 remote towns are provided with over 15 million kWh of electricity annually (approx 170MW)
- ◆ Queensland – 28 ML of diesel used by 34 isolated power stations (approx 80MW)



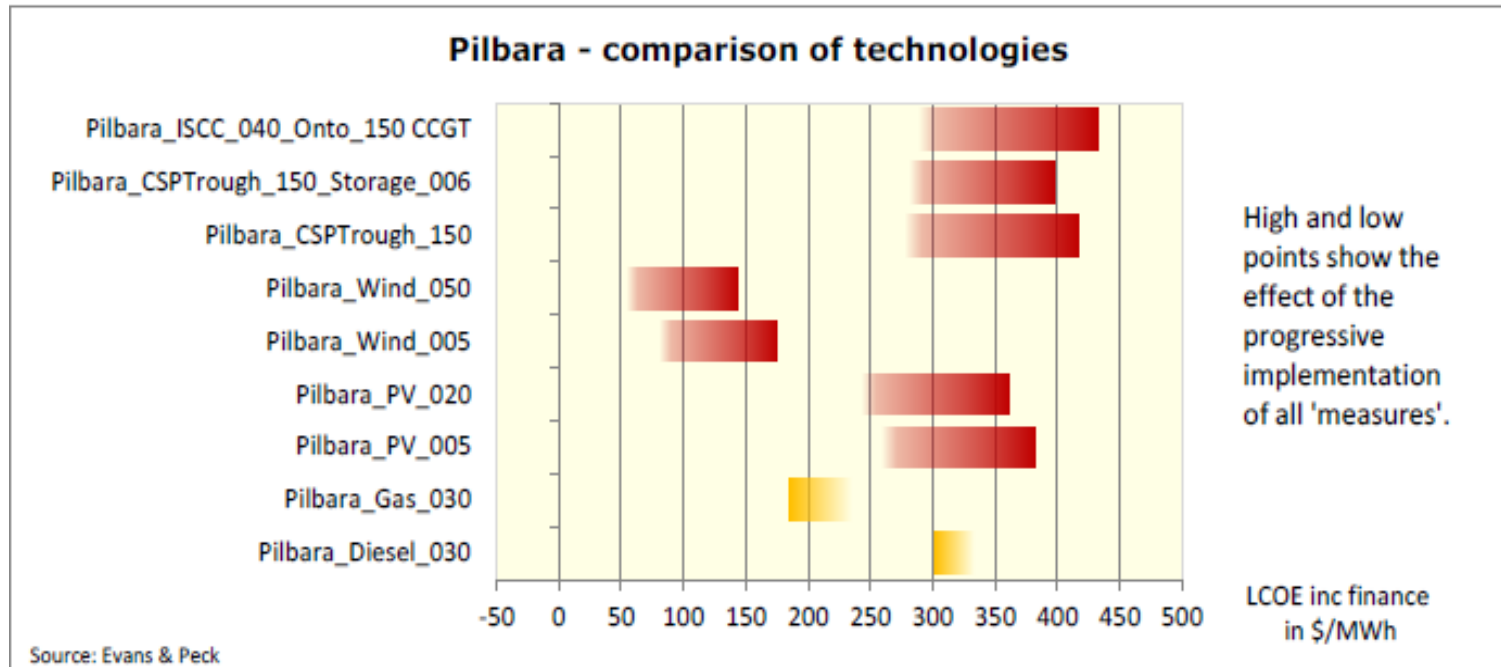
Off Grid Renewable Energy Demonstration



The Economics of Off Grid Renewables and Diesel

Summary of LCOE costs (\$/MWh) for relevant technologies

Figure 127: Summary of LCOE costs (\$/MWh) for relevant technologies



This figure shows the effect of enablers on each of the renewable energy generation types and the change in the levelised cost of energy.

Source: Evans and Peck, *Assessment of the Potential for Renewable Energy Projects and Systems in the Pilbara* (2011)



Challenges to Off Grid Renewable Energy

- ◆ Financial barriers
- ◆ Technology barriers
- ◆ Successful small/large scale demonstrations for various applications
- ◆ Installation may be more complex than diesel systems
- ◆ Availability of skills/maintenance in regions scarce
- ◆ Managing intermittency



Existing Off Grid Projects and Programs

Commonwealth

- ◆ Renewable Remote Power Generation Program
- ◆ Remote Indigenous Energy Program



Existing Off Grid Projects and Programs

- ◆ Western Australia – Test integration projects by Horizon Power in Geraldton
- ◆ South Australia – Remote Areas Energy Supplies (RAES) scheme - Parachilna solar/diesel hybrid power generation produces around 12 per cent of town's energy
- ◆ Northern Territory - The government-owned utility has renewable energy systems in eight remote locations, including 1 MW installed across three locations as a pilot project for the roll-out of 10 MW of solar PV



Contact ARENA to Discuss Off Grid

ARENA has an open approach
and would welcome discussions on off-grid.

Contact is arena@arena.gov.au



Thank you



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