

Shannon McGuire
Principal Planner
Buckley Vann



Presentation

Renewable Energy - Are we there yet?

Biography

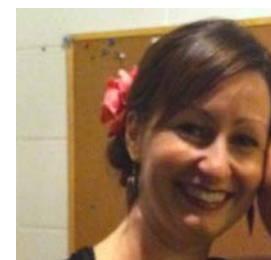
Shannon McGuire is current Planning Institute of Australia Queensland Planner of the Year. She is Principal Planner and the Natural Resource Management Business Leader at Buckley Vann Planning and Development. Over the last 20 years, Shannon has gained practical experience in Local and State Government, as well as private consultancy. Shannon has a background in environmental science and urban and regional planning. Shannon has a passion for NRM and natural hazards and "bridging the gap" between the Science, the community and planning to prepare well-crafted statutory provisions and achieving good planning outcomes and legacies for communities and the environment. Shannon has presented to international audiences on coastal climate change adaptation planning. Climate Change is one of the most challenging and pressing issues facing the global community today and environmental scientists have an important role to play.

Abstract

Climate Change is one of the most challenging and pressing issues facing the global community today and environmental scientists have an important role to play. The recently adopted Paris Agreement sets out a global action plan to reduce the impacts of climate change by limiting global warming to below 2 degrees celsius .

As a result, there has been a call for big investment in renewable energies as a way to reduce global greenhouse gas emissions. So what does the future of renewable energies look like and what can Environmental Scientists do to help communities transition towards a renewable energy future? The presenters will provide an overview of the different forms and "typology" of renewable energy, explain the drivers for investment in renewable energy in Australia and Queensland, identify the emerging planning and environmental issues associated with such infrastructure and development, responses to address these issues and practitioner skill gaps.

Lisa McKinnon
Principal Scientist
BMT WBM



Biography

Lisa McKinnon is Principal Environmental Scientist at BMT WBM, and has almost 20 years' experience in environmental assessment and management for major infrastructure projects and developments both in Australia and the UK. She has significant experience in renewable energy, greenhouse gas, and climate change assessment and strategy development for government, including project for the NSW Government, Qld Government, Sydney Coastal Councils, SEQ Water, City of Gold Coast, Cairns Regional Council and Brisbane City Council. Lisa is currently a member of the advisory committee for the Queensland Government Climate Adaptation Strategy and has also contributed to the EIANZ's recent climate change training program.

Renewable Energy in Queensland

Lisa McKinnon, Principal Scientist, BMT WBM

Shannon McGuire, Principal Planner, Buckley Vann

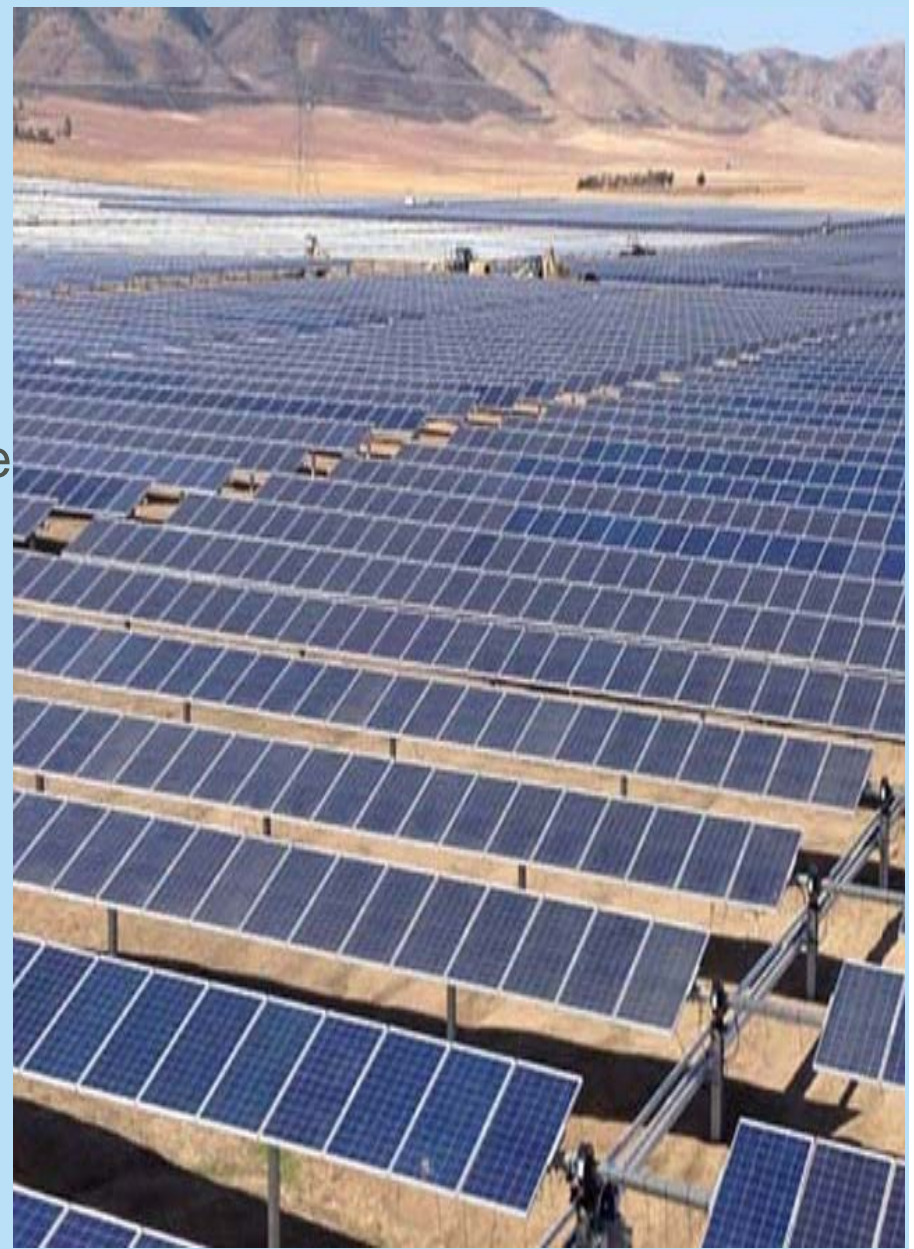
EIANZ Conference | Brisbane | November 2016



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PLANNING + DEVELOPMENT

Outline:

- Snapshot of renewable energy sources
- National context – state of play across Australia
- What forms of renewable energy are feasible in QLD?
- Factors driving renewable energy investment and barriers
- Key success factors and emerging planning and environmental issues
- The role of planning in the future of renewable energy



Malcolm Turnbull has blasted state Labor governments for imposing “ideological” renewable energy targets, describing the South Australian blackout as a “wake-up call” to focus on energy security.

The Prime Minister accepted fierce winds and lightning strikes were the “immediate cause” of the statewide power failure, but there was “no doubt” that the “extremely aggressive” shift to renewables had strained the electricity network.

“I regret to say that a number of the state Labor governments have over the years set priorities and renewable targets that are extremely aggressive, extremely unrealistic, and have paid little or no attention to energy security,”

The Australian 29th September



**Australian Renewable Energy Agency saved but
with reduced funding – experts react**

**Billions axed in clean energy: renewable
target is next**

**Coalition, Labor Agree To Slash \$500m
From ARENA Budget**

ARENA: Doubts in funding leads to clean energy
company suspending projects

**New renewable energy target will mean \$6 billion cut to
investment: analysts**

Snapshot of renewable energy sources

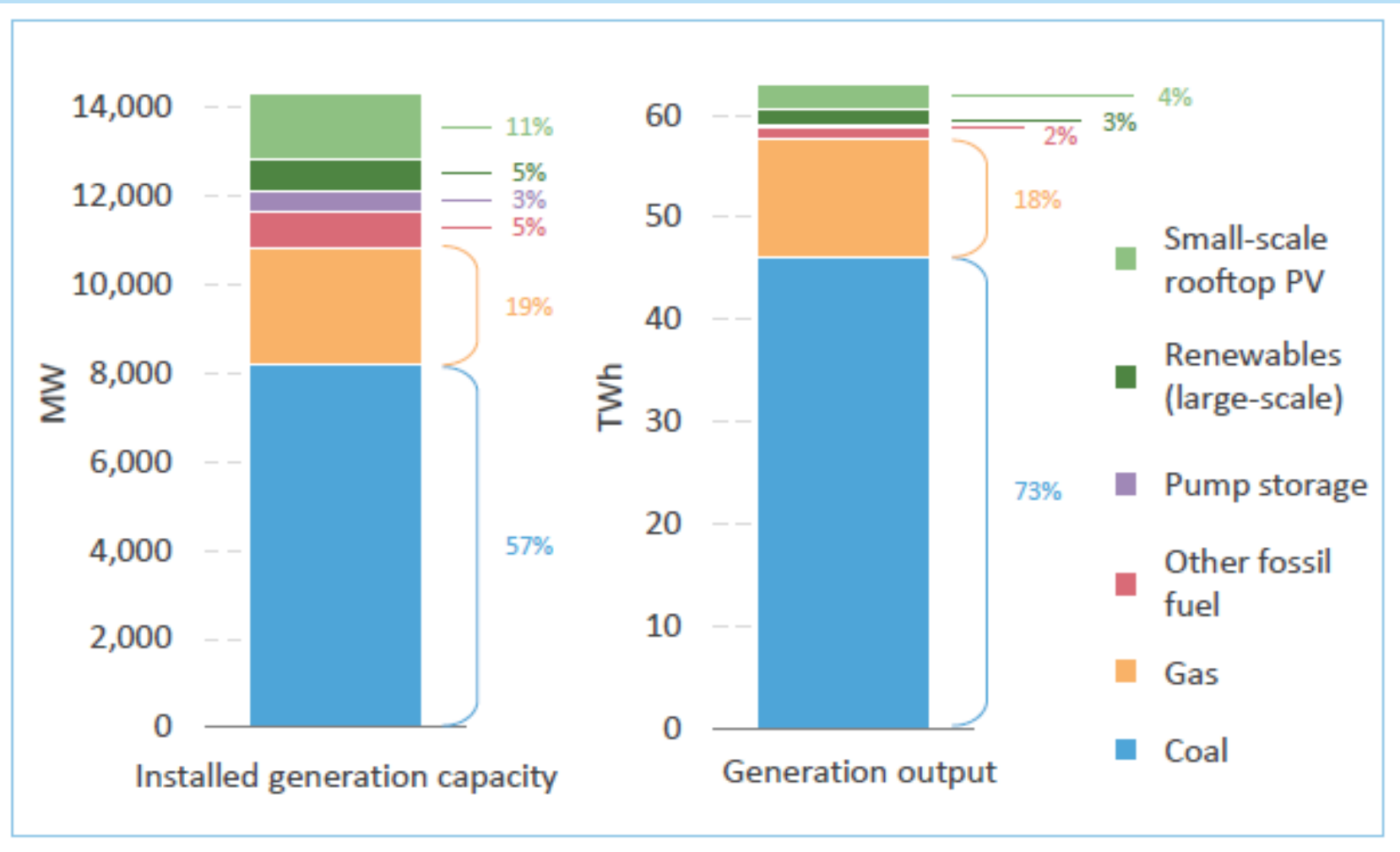
- Types of renewable energy sources and technologies:
 - Wind energy
 - Biomass and bioenergy
 - Solar energy (photovoltaic and solar thermal systems)
 - Geothermal energy (hot aquifers and hot dry rocks)
 - Wave energy
 - Tidal energy
 - Hydro energy



Renewable energy take up across Australia

State	NSW	VIC	WA	QLD	TAS	SA
Overall Score	D	C	C	C	B	A
Renewable Electricity	6%	10%	13%	7%	95%	40%
Large-scale Renewables (excl hydro) Per Capita (kW/cap)	0.14	0.23	0.23	0.24	0.62	0.88
Households with Solar PV	14.1%	14.2%	22.5%	29.6%	12.1%	28.8%
Renewable Electricity Targets	-	At least 20% by 2020	-	50% by 2030	-	50% by 2025

Queensland energy generation



Renewable energy drivers – statutory/policy

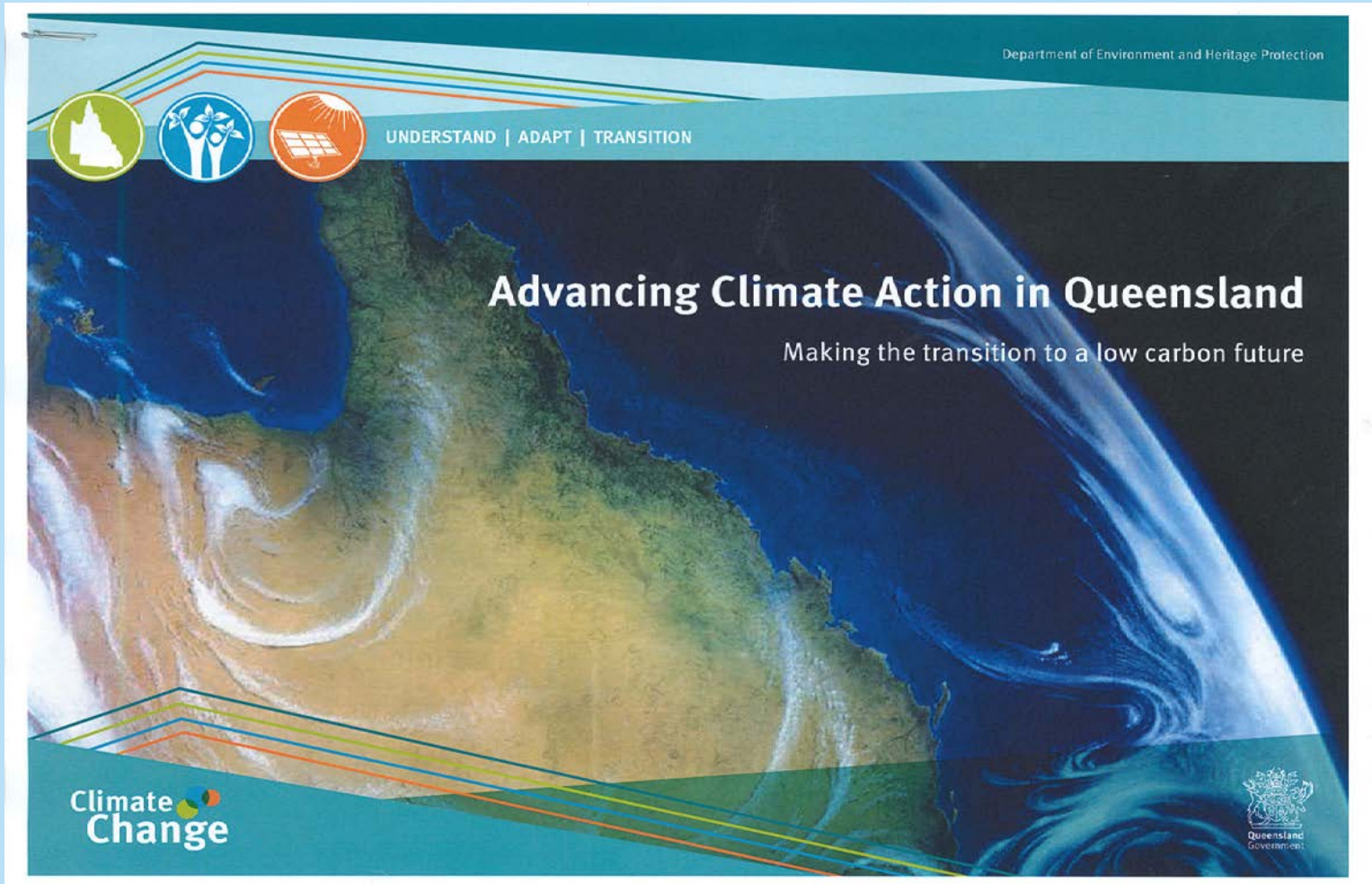
- Paris COP 21 agreement
- Renewable Energy Target (RET) – target of 33,000GwH generated by renewable energy by 2020 (already half way to target)
- Queensland Government commitment to 50% renewable energy

Renewable energy drivers: non-statutory

- Quickly dropping prices – solar likely to reach price parity in the next 5 years
- Community-led interest in ‘off-grid’ projects and sustainability
- Superannuation companies looking for green investment projects
- Communities suffering from the mining downturn looking for alternative revenue schemes and employment opportunities
- ARENA funding

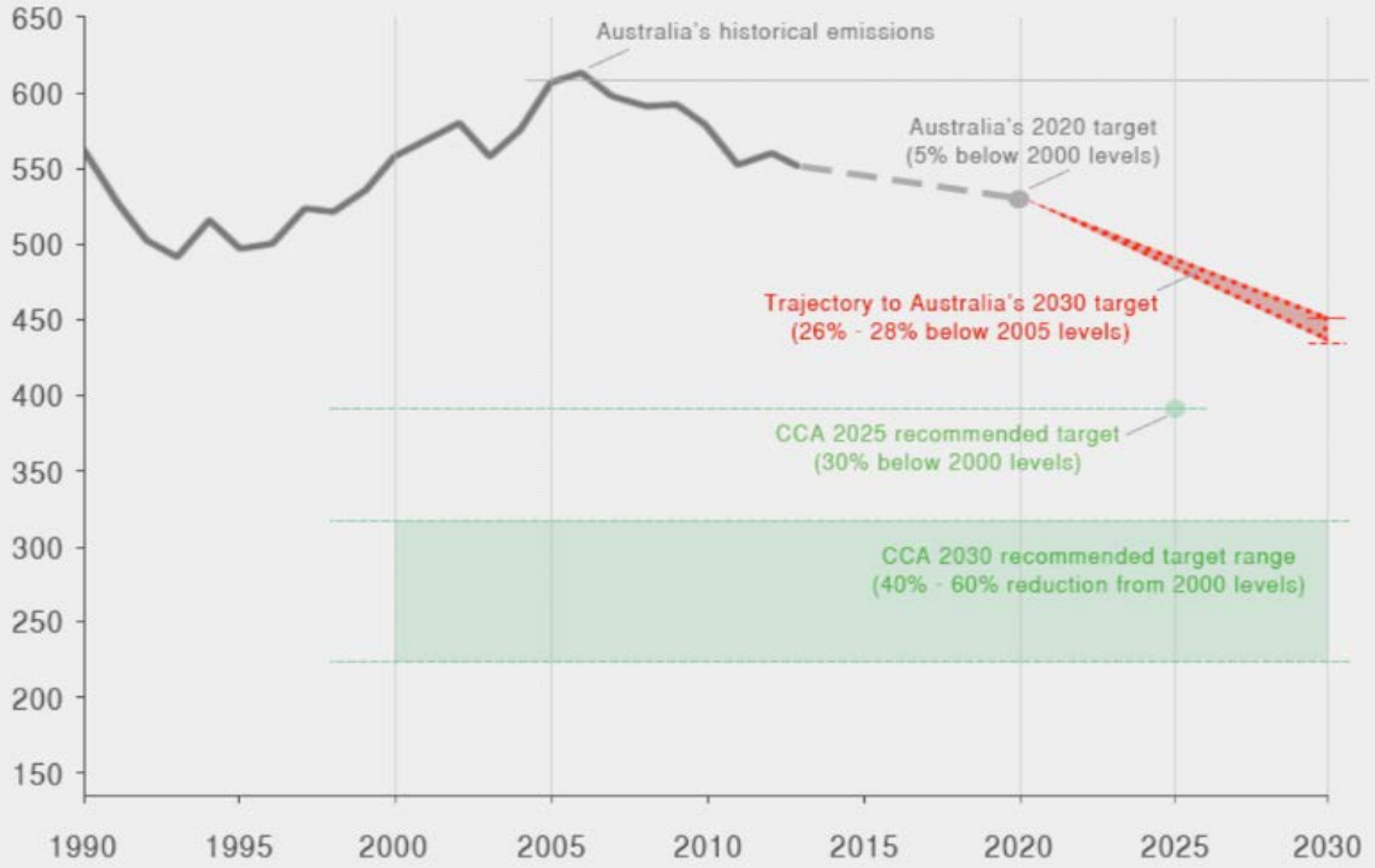


Discussion Paper – Advancing Climate Action in Queensland





Emissions (MtCO₂-e)



Levelised cost of electricity

Technology	Fuel type	Max Capacity factor (%)	2014		2015	
			CO ₂ emissions (kgCO ₂ -e/MWh)	Minimum LCOE (\$/MWh sent out)	CO ₂ emissions (kgCO ₂ -e/MWh)	Minimum LCOE (\$/MWh sent out)
Wind (100 MW)	Wind	43	-	99	-	99
Biomass	Biomass	70	23	100	23	119
Solar PV (FFP)	Solar	21	-	224	-	149
Solar PV (SAT)	Solar	21			-	183
Solar PV (DAT)	Solar	21			-	240
Solar thermal (CR with storage)	Solar	42	-	277	-	218
Solar thermal (CLF)	Solar	23	-	328	-	284
Solar thermal (PT with storage)	Solar	42	-	302	-	294
Wave ¹⁵⁷	Oceanic	60			-	147
Geothermal - HAS	Geothermal	83	-	137		
Geothermal - EGS	Geothermal	83	-	137		

Large – scale Solar ARENA Funding

Applicant	Project name	Size (MW AC)	ARENA funding	Total project cost	Nearest town
Origin Energy	Darling Downs Solar Farm	110.0	\$20 m	\$216.7 m	Dalby, QLD
Edify Energy with Solar Choice	Whitsunday Solar Farm	58.1	\$9.5 m	\$122.4 m	Collinsville, QLD
Neoen Australia	Parkes Solar Farm	50.6	\$7.5 m	\$107.9 m	Parkes, NSW
Genex Power	Kidston Solar Farm	50.0	\$8.9 m	\$126.2 m	Kidston, QLD
Manildra Solar Farm	Manildra Solar Farm	42.5	\$10.9 m	\$109.3 m	Manildra, NSW
RATCH Australia Corporation	Collinsville Solar Power Station	42.0	\$9.5 m	\$95.9 m	Collinsville, QLD
Neoen Australia	Griffith Solar Farm	25.0	\$5.0 m	\$54.6 m	Griffith, NSW
Canadian Solar (Australia)	Oakey Solar Farm	25.0	\$2.2 m	\$47.5 m	Oakey, QLD
Neoen Australia	Dubbo Solar Farm	24.2	\$5.5 m	\$55.6 m	Dubbo, NSW
APT Pipeline (APA Group)	Emu Downs Solar Farm	20.0	\$5.5 m	\$47.2 m	Cervantes, WA
Goldwind Australia	White Rock Solar Farm	20.0	\$6.0 m	\$44.5 m	Glen Innes, NSW
Canadian Solar (Australia)	Longreach Solar Farm	15.0	\$1.3 m	\$28.7 m	Longreach, QLD
TOTAL		482.0	\$91.7 m	\$1,056.4 m	

Small-scale solar

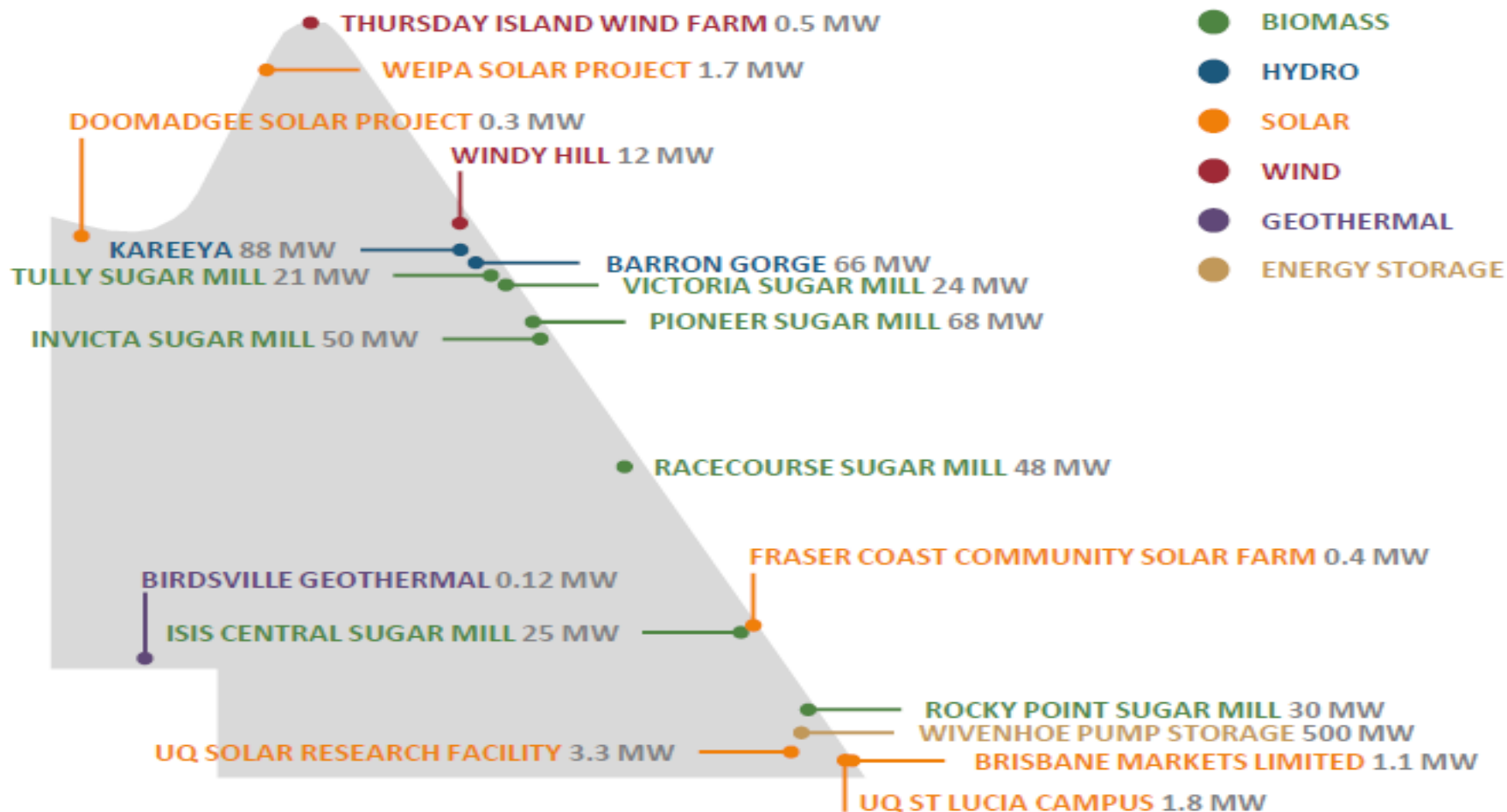
- Australia now has more than 23.2 million solar panels installed, or at least one panel per person in the country
- Community solar schemes are becoming more common (particularly in rural areas), often supported by local governments or community donations/shareholders

Key considerations....

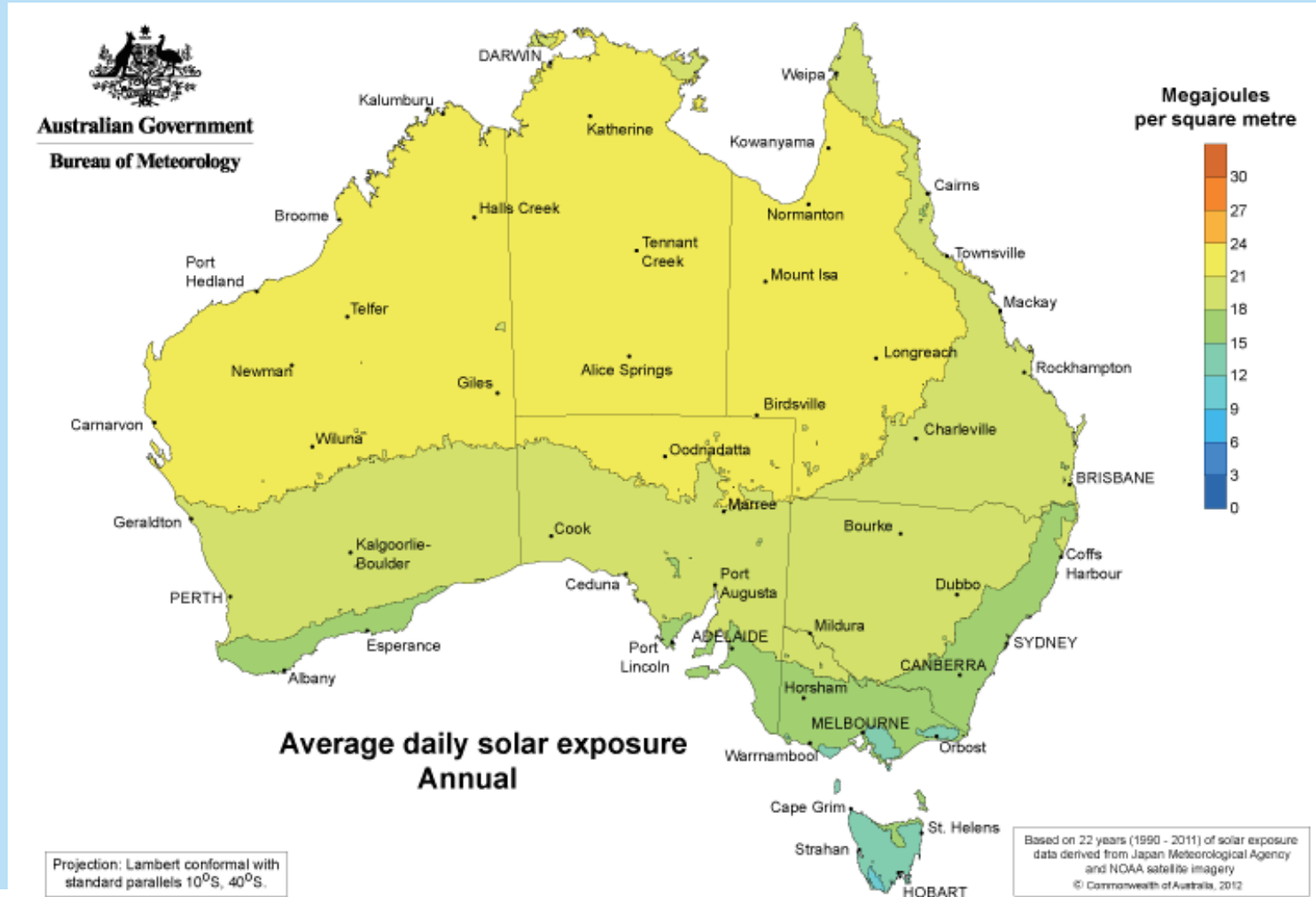
When planning a renewable energy project, the three most important considerations are:

1. The amount of electricity a project can generate.
2. Robust and strategically located infrastructure.
3. How financially viable it will be.

Large scale renewable energy in Queensland

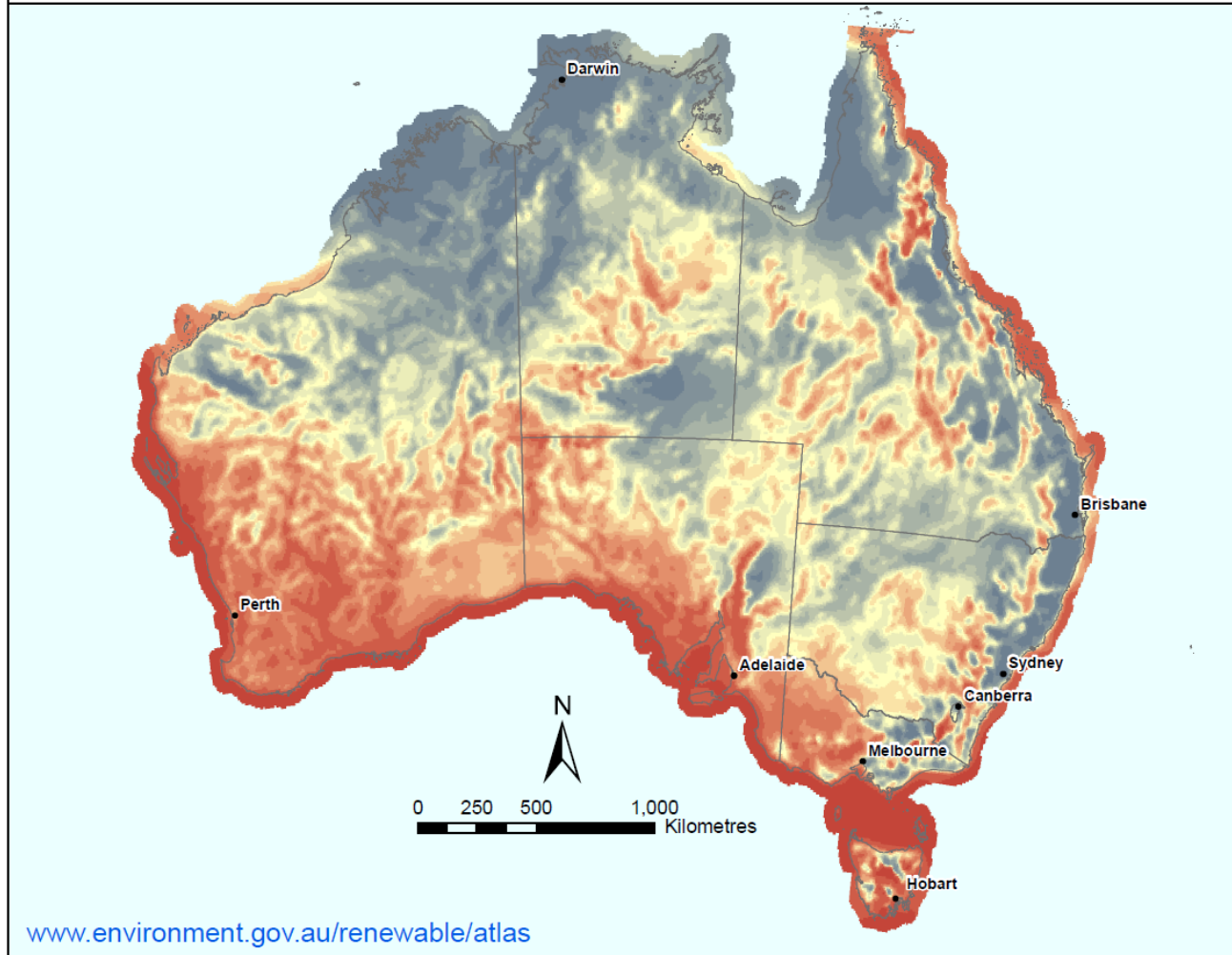


Solar Radiation Index



Wind Speeds

RENEWABLE ENERGY ATLAS OF AUSTRALIA: Mean Wind Speed at 80m above ground level



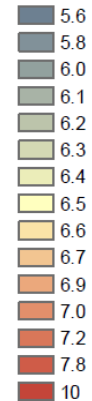
www.environment.gov.au/renewable/atlas



Australian Government

Department of the Environment,
Water, Heritage and the Arts

Metres per Second



Data Sources:

Capital Cities
 © Commonwealth of Australia (Department of the Environment, Water, Heritage and the Arts) 2008
 State Borders
 © Commonwealth of Australia (Geoscience Australia) 2008
 Wind Speed
 © Windlab Systems Pty Ltd 2007

Caveat:

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Map produced by:
 Environmental Resources Information Network (ERIN), Department of the Environment, Water, Heritage and the Arts, October 2008.

Albers Equal-Area Projection (GDA94)

Building renewable energy supply in QLD

- ***“Government policies and actions represent the engine room for renewable energy supply development”***

Martin and Rice 2012

Key policy drivers to building renewable energy supply in QLD

Key government policies and actions which can be barriers and drivers, relate to:

1. Finance
2. Infrastructure
3. Economic
4. Technical
5. Regulation
6. Information and awareness

Barriers to renewable energy growth

1. Finance

- High project capital costs
- Insufficient financial incentives (ARENA funding will help)
- Poor project finance availability
- Power purchase agreements

2. Infrastructure

- Insufficient network capacity
- Remote grid connections and access

3. Economic

- Abundant fossil fuel resource
- Cheap coal fired power

4. Technical

- Lack of a skilled workforce (changing with mining downturn)
- Technology intermittency and storage

5. Regulation

- Complex planning and approvals system
- Time intensive
- Land access and use

Building renewable energy supply in QLD

1. Finance

- Financial incentives
- Project finance support/grants
- Facilitate power purchase agreements

2. Infrastructure

- Network upgrades and enhancements
- Remote grid extensions

3. Regulation

- Streamline planning and approvals

4. Technical

- Technology R&D funding
- Skilled workforce development

5. Economic

- RE investment policy
- Carbon price legislation

Complex regulation

- *Environmental Protection, Biodiversity and Conservation Act (EPBC Act)*
- *Sustainable Planning Act 2009*
- *Environmental Protection Act 1994*
- *Nature Conservation Act 1991*
- *Vegetation Management Act 1999*
- *Electricity Act 1994*
- *Local Government planning scheme*



Role of planning in renewable energy in Queensland



Potential planning and environmental issues and barriers

- **Barriers**
 - Land access
 - Land tenure and native title
 - Environmental values (need large footprints)
 - Visual amenity and glare impacts
 - Planning scheme intent and zoning
 - Transmission and connection to the grid
 - Community objection



Key success factors

Optimal conditions

- ‘Premier’ solar resources – best location in terms of solar radiation index
- Access and connection to the grid
- Proximate to a major town or community
- Best suited to areas where:
 - coal/gas fired generators are coming to end of life; or
 - remote areas where extending electricity network difficult



Key success factors

Optimal conditions *con't*

- Sufficient site area for infrastructure + setbacks + buffers
- Land tenure
- Topography and geotechnical features
- Low environmental significance
- Flood free
- Positioned to avoid unreasonable visual amenity impacts
- Land value 'low' to offset high capital investment in infrastructure
- Land use – opportunity to co-exist with other uses eg: grazing, tourism and restore land to former state if required.



Emerging planning and environment issues

Queensland case studies

- Veldora Solar Farm, Sunshine Coast
- Ross River Solar Farm, Townsville



Valdora Solar Farm, Sunshine Coast Regional Council

- First local government in Australia to build a utility scale solar farm to offset its entire electricity consumption;
- 23Ha of a 49Ha site – 57,000 solar panels generating electricity into the network, 6 inverter stations, control room, access track, road widening, underground lines;
- Will generate 15,000 kilowatts or enough to power 5000 homes.
- Due for completion mid 2017 (30 year life)
- Will be the 5th largest solar farm in Australia



Valdora Solar Farm, Sunshine Coast

Key planning and environmental success factors:

- Site is adjacent to 33kV power line capable of receiving the solar farm's power output
- Site is flat and large enough to develop at a scale sufficient to generate reliable output to match Council's annual power needs
- Site has optimum solar perspective with limited impacts on community.
- The site was zoned appropriately in planning scheme for a renewable energy facility – code assessable.
- Land is owned by Council (former sugar cane farm)





LEGEND

— Subject Site



Source: GHD Town Planning Report, 2014

Ross River Solar Farm, Townsville

- Site area 239 hectares. Disused mango farm
- 30 year lease over 202 hectares
- Townsville's first large utility scale solar farm development
- 450,000 solar panels with a collective capacity of about 135MW.
- Solar panels mounted on trackers to follow sun
- Electricity to be fed into 70 containerized inverter systems that will feed into onsite power reticulation system, before being exported to local grid via Ross River Bulk supply station
- Rural zone and Mixed Farming precinct – subject to impact assessment under planning scheme
- Development approval issued by Council in June 2016
- Construction expected to commence early 2017 and will take 1 year to build.



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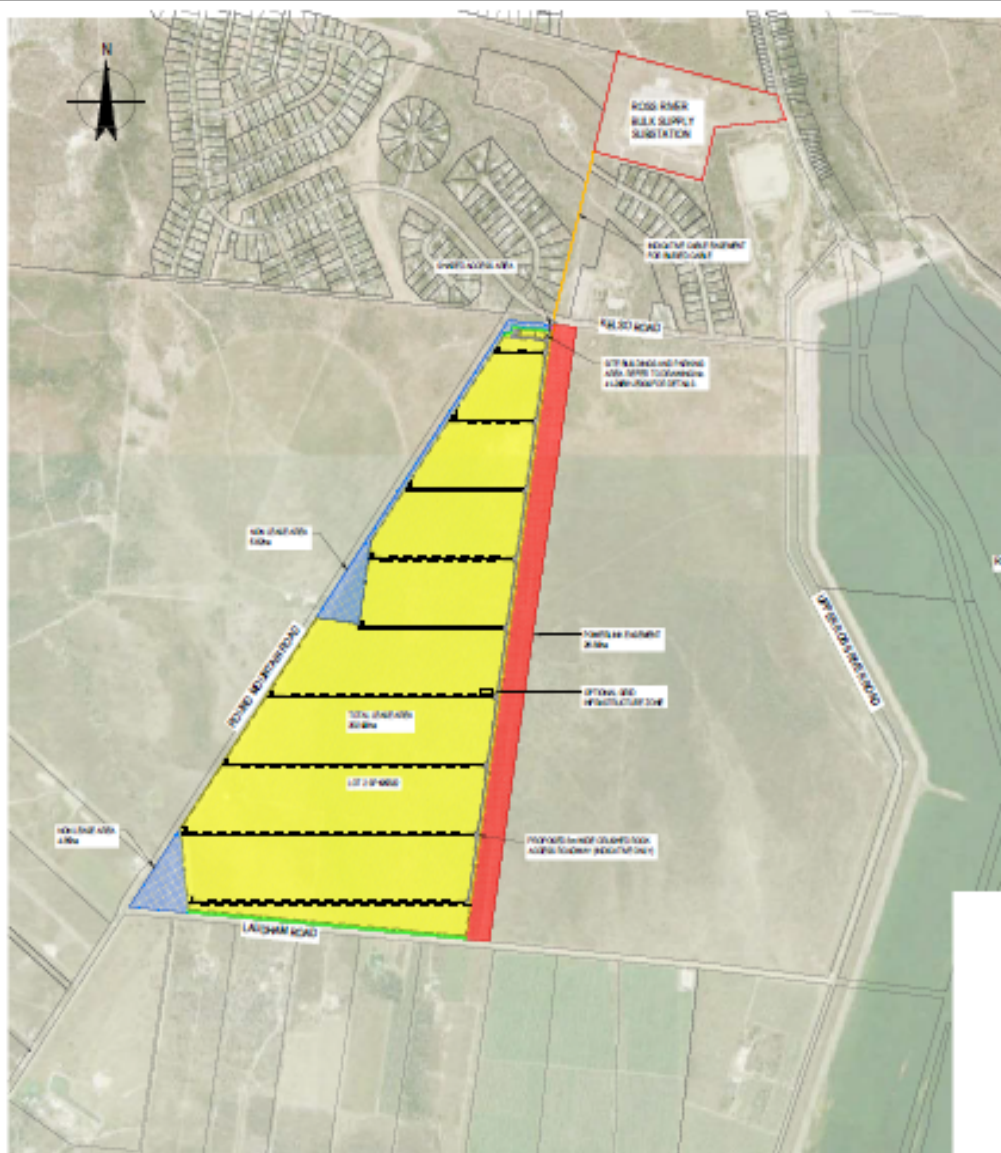
LEGEND
 Highway
 Main Road
 Lot on Plan ZSP195322
 Suburb Boundary

Scale:
 0 1,000 2,000 4,000
 metres
 1:130,000 (when printed at A4)

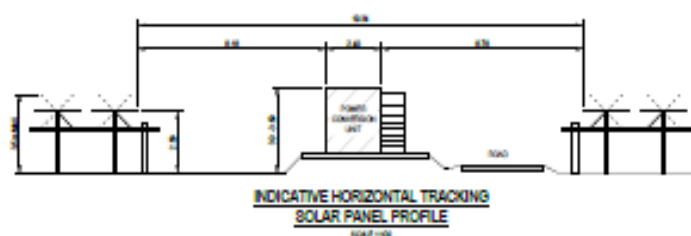
ROSS RIVER SOLAR FARM
Location Map

File created:
 Date: Brisbane - QLD Nov 2015
 Scale: Layer Control, Source: Real, Digitized by:
 Desktop: Particular Description: CHAS/ANON
 DR: UTM, UTM: ABSY, Contouring: Height,
 DR: UTM, elevation, and the 200 Meter
 Contouring.

PROJECT ID	REVISED	Figure 1 A4 size
CRM REF ID	DATE	
LAST APPROVED	BY	
UNDO	1	



INDICATIVE SITE GENERAL ARRANGEMENT
SCALE: 1:500



**INDICATIVE HORIZONTAL TRACKING
SOLAR PANEL PROFILE**
SCALE: 1:500

FINAL

 		  CIID CONSULTANTS 1/40-1/42 Spring Street, Cairns QLD 4878 Australia Ph: 08 4874 7444 / 08 4874 7474 Fax: 08 4874 7444 / 08 4874 7474 www.ciid.com.au or www.ciid.com.au	<p>DO NOT SCALE</p> <p><small>Conditions of use: This document may only be used for the project and any other person who is not a party to the project or the project's design team. It is not to be used for any other purpose, without the prior written consent of the project manager.</small></p>		Drawn: E. BERRY Checked: J. TOWNSEND Approved: J. TOWNSEND (Project Director) Date: 07.05.2016 Scale: AS SHOWN	Designer: S. GILBERT Drawn: A. JOHNSON Date: 07.05.2016	Client: TOWNSVILLE CITY COUNCIL Project: ROSS RIVER SOLAR FARM Title: 135MW HORIZONTAL TRACKING SOLAR FARM	Drawing No: 41-29561-E001	Rev: 0
APPROVED SEAL	R1K: 10/10 A3: 10/10 J3: 10/10 ECOL5: 10/10								

Ross River Solar Farm, Townsville

Key success factors

- Flat topography
- 30 year lease secured
- Limited natural environment values.
- Ross Bulk Supply Station within 1km of site
- Surrounded mostly by broad hectare rural lots, but rural residential located north of site (sensitive receptor)

Ross River Solar Farm, Townsville

Key planning and environmental issues and challenges

- Flood affected
- Significant opposition from residents, concerned with:
 - visual amenity impacts
 - health impacts given proximity to homes.
 - potential future expansion
 - insufficient public consultation with community
- Council approved DA in June 2016 subject to conditions:
 - 10m wide landscape screening buffer
 - Addressed flooding and emergency access

Role of planning in transitioning the community to renewable energy?

- **Planning schemes – big opportunity to facilitate or ‘get in the way’:**
 - Strategic framework
 - Rural zone overall outcomes (only practical zone)
 - Level of assessment

Role of planning in transitioning the community to renewable energy?

- **Planning for rural and non-urban areas and understanding:**
 - Strengths, opportunities and values of rural areas – different shades of brown
 - Rural futures - opportunities to diversify rural areas and economies.
 - Solar farming – part of the ‘mix’ of rural uses and farming activities relying on our natural resources
 - Light touch – doesn’t preclude other uses in the future
 - Emergence of ‘fuel farms’ through solar, wind, ethanol and/or biodiesel farms as potential alternative uses for rural areas.

Role of environmental practitioners in transitioning the community to renewable energy?

- Understanding the nature and volatility of the industry
- Community engagement really important to 'de-risk' projects
- Work with developers to achieve a net environmental gain
- Business as usual.....Smart growth:
 - Standard environmental investigations and best practice
 - Compact urban form, increased density and mixed use;
 - Walkable communities and connectivity;
 - Traditional neighbourhood design etc;
 - Active transport etc.



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PLANNING + DEVELOPMENT

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Thank you

