

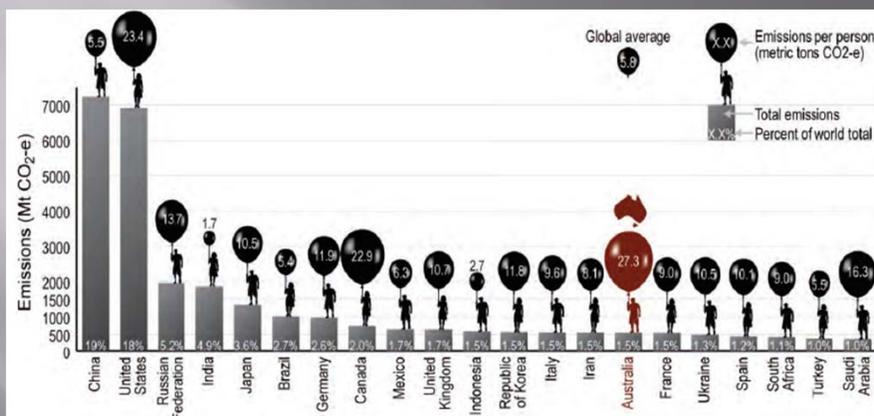
Climate change and Australia

Olivia Coldrey, Australian Solar Institute
Astrid Edwards, Net Balance
Gabrielle Kuiper, ANZ Bank
Tek Maraseni, Australian Centre for Sustainable
Catchments

Overview

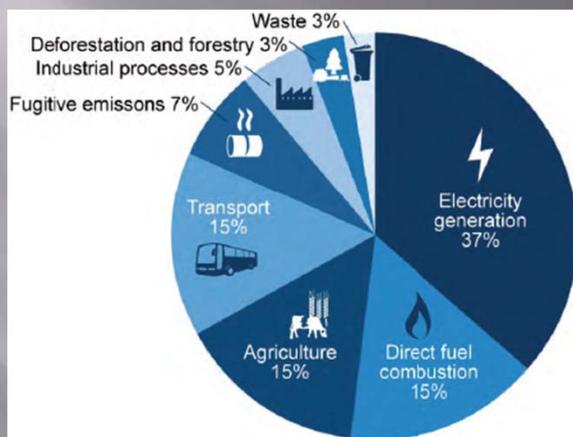
- ▣ Global emissions comparison
- ▣ Australia's emissions profile
- ▣ Physical and geographic challenges
- ▣ Political and regulatory challenges and strengths
- ▣ Business challenges and strengths
- ▣ Technological challenges and strengths
- ▣ Comments and questions

Global emissions comparison



Department of Climate Change and Energy Efficiency, 2011, Securing a Clean Energy Future: The Australia Government's Climate Change Plan, Figure 2.1, p. 12.

Australia's emissions profile



Department of Climate Change and Energy Efficiency, 2011, Securing a Clean Energy Future: The Australia Government's Climate Change Plan, Figure 2.2, p. 13.

Physical and geographic challenges

- ▣ Australia is the driest and most vulnerable inhabited continent in the world – both adaptation and mitigation are essential.
- ▣ Agricultural yields and food security
- ▣ Biodiversity loss
- ▣ Energy security
- ▣ Extreme events (bushfires, cyclones, droughts, floods, infectious diseases)
- ▣ Sea level rise and coastal erosion
- ▣ Water security (Murray Darling Basin)

Political and regulatory challenges

- ▣ The current political environment is highly uncertain, and is hindering investment in infrastructure and new technologies.
- ▣ There is a focus on mitigation, not adaptation.
- ▣ There has been significant under-investment in the energy grid, which has resulted in barriers to adopting new technologies.
- ▣ There is a divide between urban and regional areas, and protectionism in relation to farmers (leading to inefficiencies and a failure to adapt).
- ▣ A brain drain of talent is possible.

Political and regulatory strengths

- Clean Energy Future legislative package introduced into Federal Parliament on 13 September 2011.
 - The aim is to introduce a carbon price by 1 July 2012.
- Carbon Farming Initiative legislative package was passed in August 2011.
 - The legislation will establish a domestic carbon offsets scheme, and is intended to link with the carbon price.

Business challenges

- Federalism
- Vested interests
- Energy intensity of the grid
- Regulatory uncertainty
- Fossil-fuel based transport system
- Distance
- Car-dependent city planning

Business strengths

- NGERs Act and system
- EEO Act
- State government support

Technological challenges

Technology	Current rate	Required annual growth to 2020 *	Current status	Blue Map target 2020
Biofuel	18%	7%	2.54 EJ	5.04 EJ
Biomass power	7%	4%	54 GW	82 GW
Hydropower	5%	2%	980 GW	1219 GW
Solar PV	60%	19%	21 GW	126 GW
Wind power	27%	12%	195 GW	575 GW
Energy intensity of manufacturing	-1.30%	-0.60%	3.73 MJ	3.81 MJ
Geothermal power	4%	7%	11 GW	21 GW
Nuclear power	3%	4%	430 GW	512 GW
CSP	8%	50%	0.6 GW	42 GW
Electricity generation with CCS	Zero projects	3 GW per year	Zero projects	28 GW
Electric vehicles	-	Doubling of sales each year from 10 000 EV/PHEV sales in 2011 to reach Blue Map target	-	7 million sales in 2020

Achieving or exceeding levels, maintain the course
 Progress but more concerted effort needed
 Sizeable gap between deployment and goals

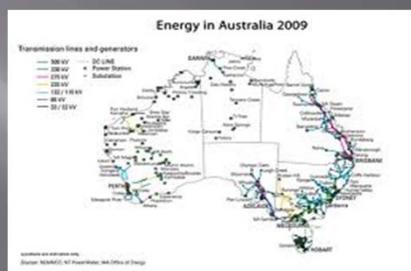
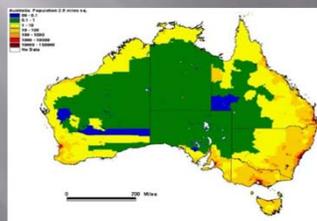
* IEA BLUE Map

Technological challenges

- Lack of finance for technology development....
- Takes time and requires “patient capital”
- Australia has a shallow pool of capital for investment in EARLY-STAGE technologies
- Renewable energy technology development and deployment carries additional risks and complications....
- Lack of sophisticated, reliable resource generation forecasting methodologies
- Lack of long-term market data as basis for risk assessment
- High initial capex + long project development and repayment timeframes
- Secure, long-term, competitively –priced electricity off-take arrangements – the National Electricity Market
- Reduced risk appetite, heightened insolvency risk and increase in the cost of capital due to GFC and ongoing uncertainty in financial markets
- Political risk

Optimal resources not correlated with population and grid access

Some of the best renewable energy – especially solar - resources in Australia are often remote from population centres and the grid. The grid is unique in the world, about 6 000+km long and with low levels of meshing.



This means that grid issues and grid integration are key issues for large scale renewable energy development in Australia.

Presentation by Dr Mike Sargent – Italian PV Summit 2011

Technological strengths

- Outstanding and largely untapped renewable energy resources: wind, hydro, solar, geothermal, biofuels, wave / tidal, nuclear (?)
- World-class research and innovation expertise
- An entrepreneurial culture
- Stable business environment, flexible capital markets and robust legal system should be conducive to commercial funding for technology development – IF we can minimize political and regulatory risk

Comments and questions