ARENA

Australian Government

Australian Renewable Energy Agency

Australian PV Association

DE Markets – Introduction

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IT Power (Australia) & SPREE, UNSW

Distributed Energy Markets - Stakeholder Workshop

Canberra, 19th July 2013

Program

Australian PV Association

- 10.30am **Welcome, Introduction to the APVA and to this research project** - Muriel Watt, Chair APVA
- 11:45am **DE market policy trends and customer attitudes to PV: USA and Mexico** – Ardeth Barnhart and Viviana Barquero, University of Arizona (via video-link)
- 12:30pm **Lunch**
- 1:30pm **Focus Group and Customer Survey responses** - Peta Ashworth, CSIRO
- 2:15pm **Consequences for utilities of increased PV and energy efficiency, utility and government responses, and proposed alternative approaches** – Rob Passey, UNSW / IT Power Australia
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The APVA – who we are

Australian PV Association

- An Association of businesses & researchers with an interest in PV:
  - research, technology, manufacturing, systems, policies, programs and projects.
- Our work is independent, apolitical and widely used – by ASC, government agencies, business
- Our objective is:
  - ***To support the increased development and use of PV via research, analysis and information.***
- Soon to transform to Australian PV Institute

What we do

Australian PV Association

- Education & Information
  - Reports and analyses
  - Events and networking
- Research
  - IEA PVPS & SHC
  - Distributed Energy Markets
  - High PV Penetration – technical issues
  - PV Module Performance & Standards
  - PV Map of Australia
  - Solar Access and other Legal & Planning issues
  - PV prices and grid parity modelling
  - PV and storage
  - Australian PV Industry Innovation Precinct

Global PV Markets

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Michelin Factory, Germany

Market Development

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- 8 GW installed in 2009
- 18 GW in 2010
- 26 GW in 2011
- 29 GW 2012
- 38 GW projected for 2013
- Production capacity ~41GW
- Installed capacity now > 100 GW
- >230 GW expected to be installed 2013-2017
- C-Si module production costs ~US$0.50/Wp

Past and projected Annual PV Installations

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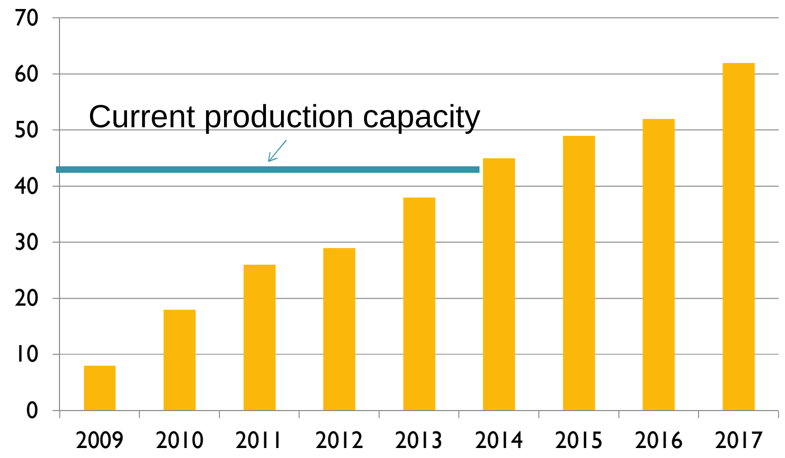

PV penetration levels

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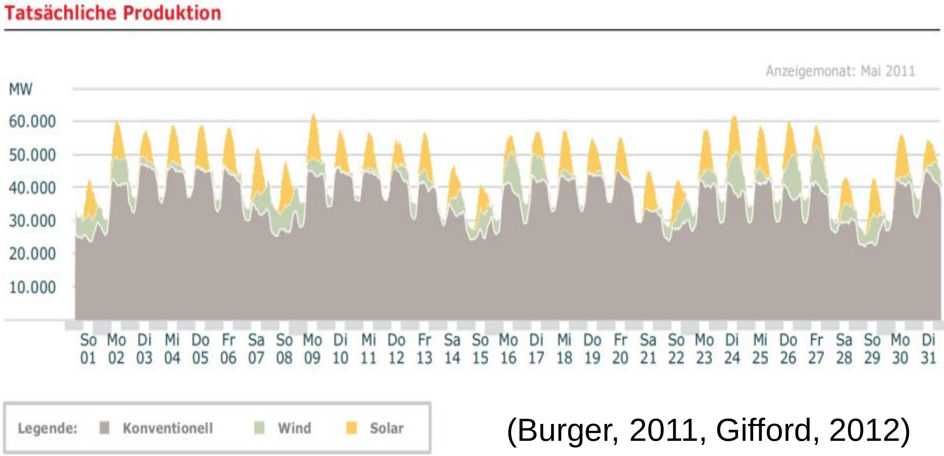
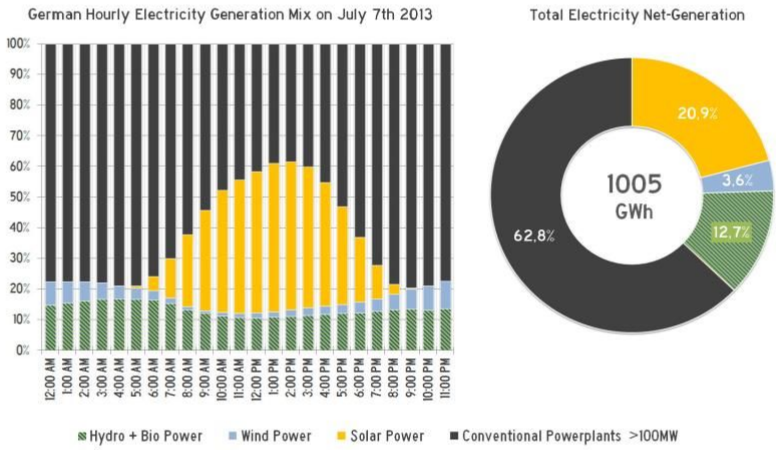
- > 40% of demand on summer weekends in Germany - 2011



(Burger, 2011, Gifford, 2012)

2013 - 45% peak penetration, 20% daily electricity (Reneweconomy / Cleantechnica, 2013)



THE AUSTRALIAN PV MARKET

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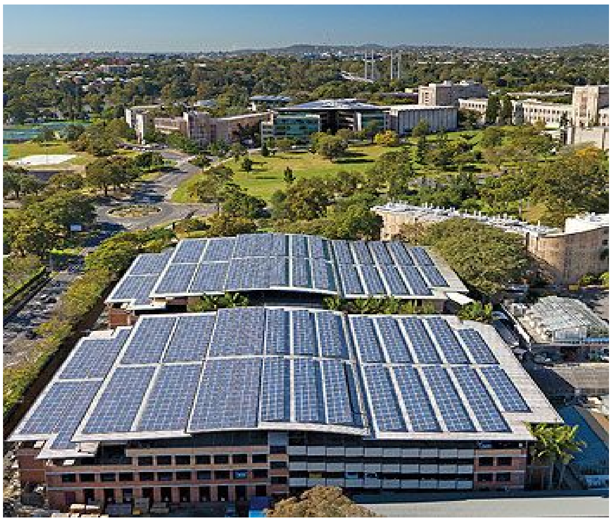

1.22 MWp PV system, Queensland University

Early Off-grid PV market development (APVA 1995-2004)

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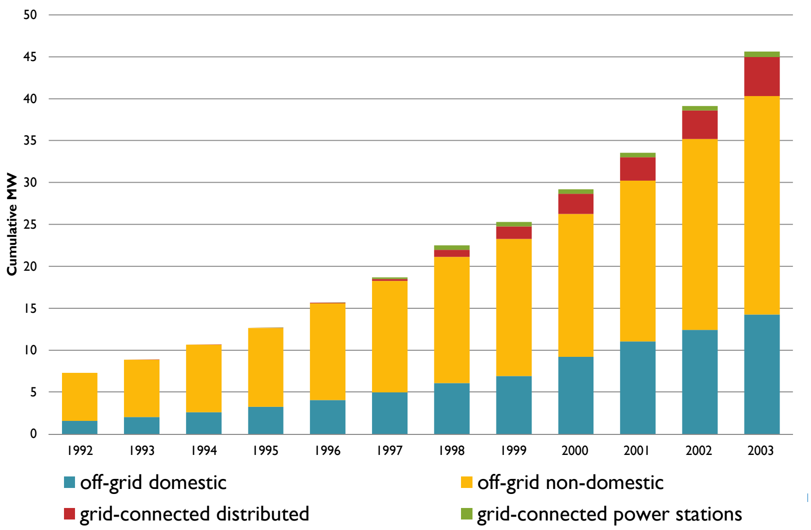

Grid-connected PV Uptake

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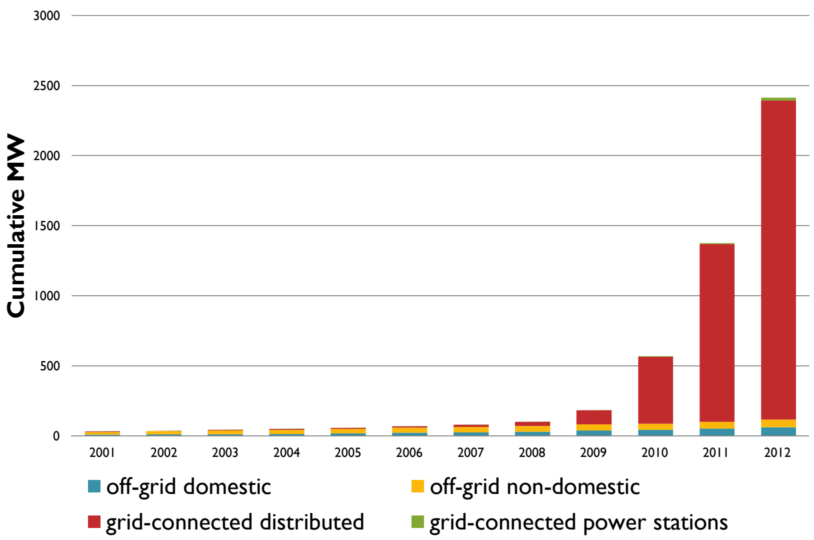
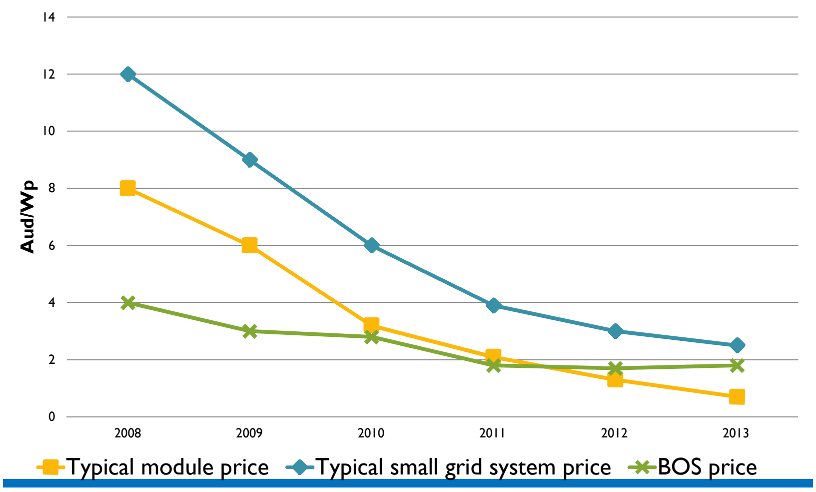


Australian system price trends

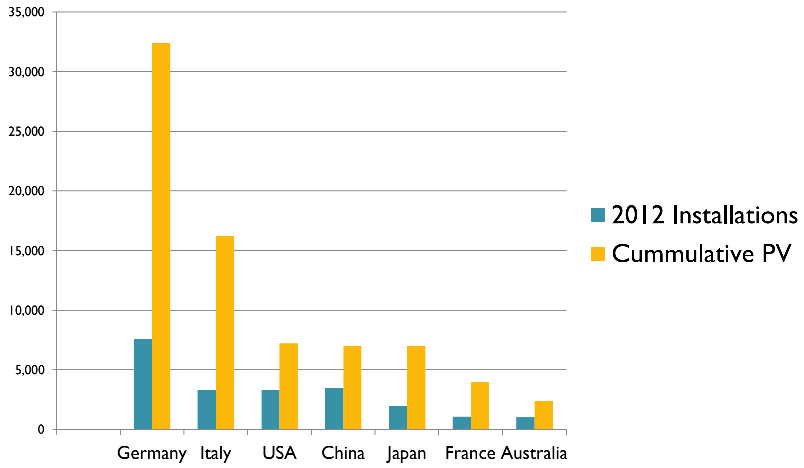


2012 Australian PV Installations

Sub-market/ application	off-grid domestic	off-grid non-domestic	grid-connected distributed	grid-connected centralized	Total
PV power installed in 2012 (MW)	10	6	1008	14	1038

- 4.5% of Australian generation capacity
- 70% of new capacity added in 2012
- 1.3% of electricity used

Comparisons with international installations (MW) (IEA PVPS 2013)



International %PV electricity (IEA PVPS 2013)

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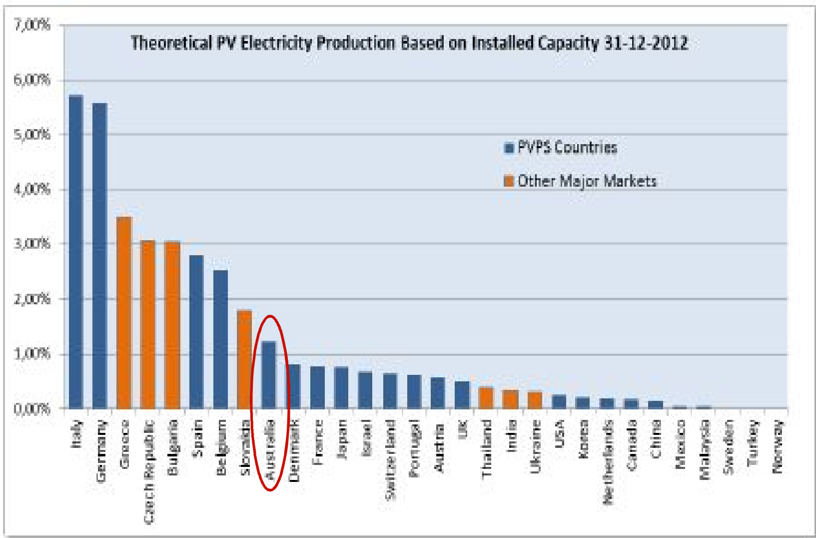

Possible annual installations

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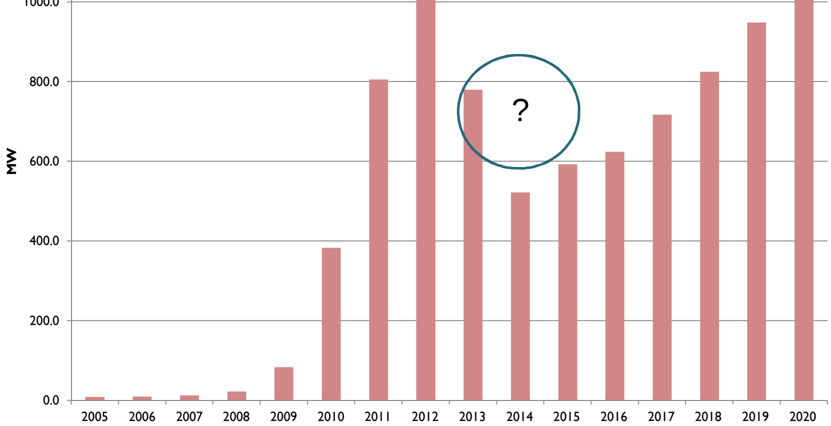
- 15% growth in off-grid and distributed markets post 2014
- Flagship + 3 X 50 MW systems by 2020
- No or low C price post 2013 / reduced RET target?



Possible cumulative installations of ~8GW by 2020

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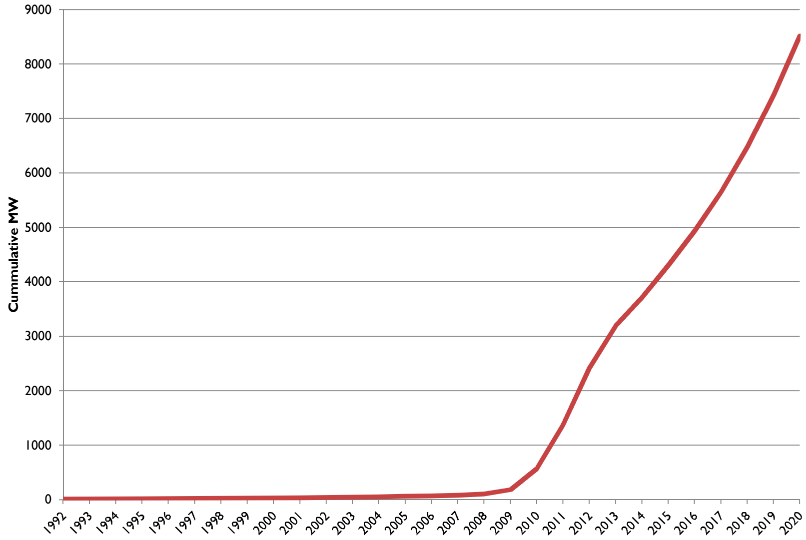
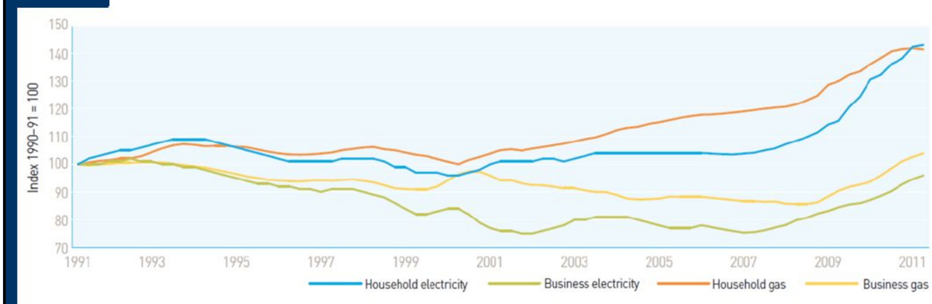


ELECTRICITY MARKET IMPLICATIONS

Australian electricity prices

- Increased 40% between 2008/09 and 2011/12
- Main driver - networks – half capital replacement, half augmentation to meet increasing peak
- 2009 – 2011 - EU-27 residential (12.2%), US (2.7%)



Source: DRET, 2012

Projections (AEMC, 2013)

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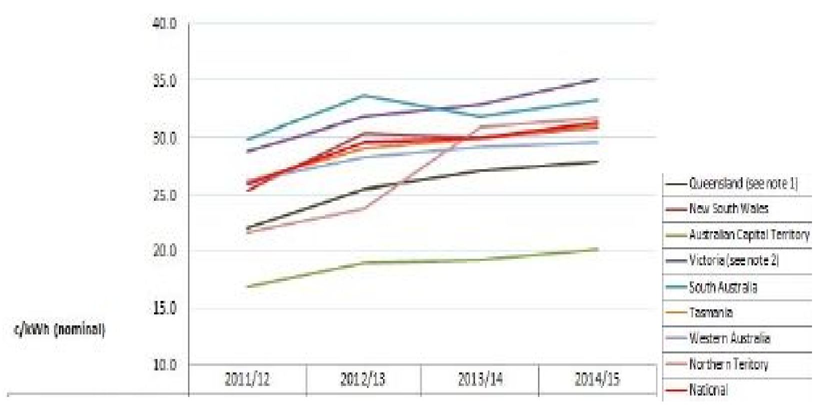
Figure 2 Residential electricity price movements - 2011/12 to 2014/15



Electricity price components

(CPD, 2013)

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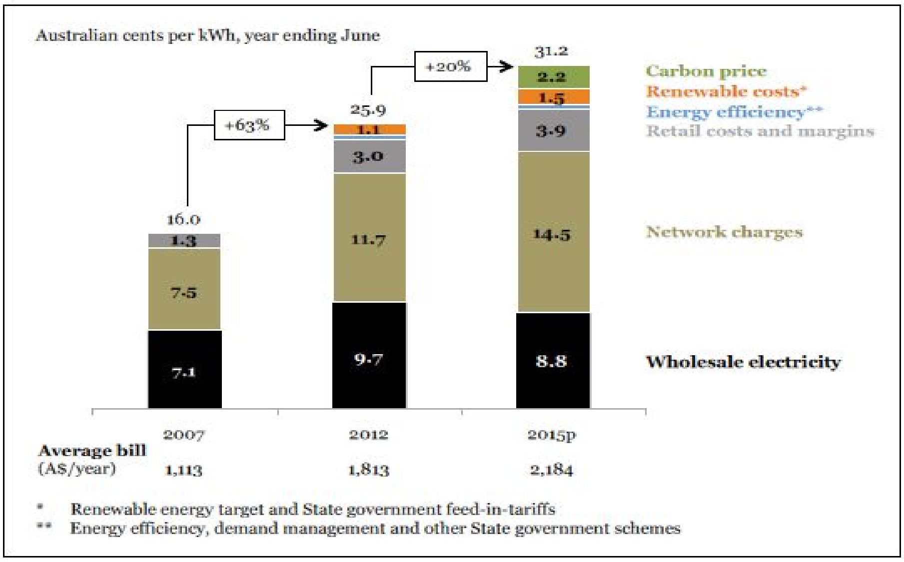
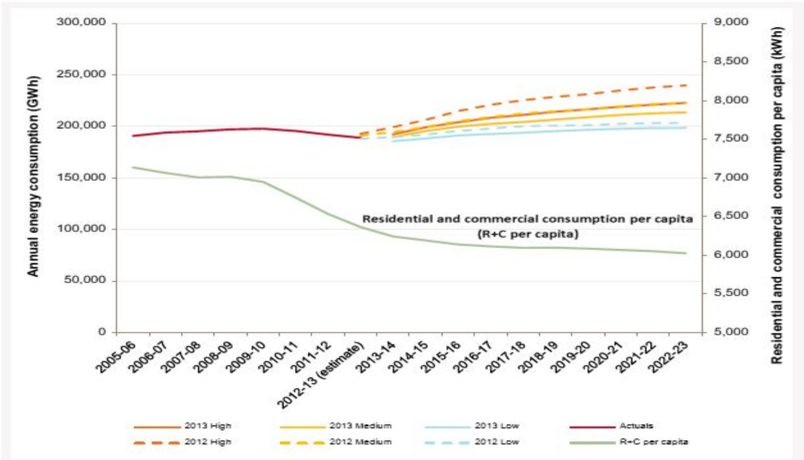


Australian electricity use
(AEMO, 2013)

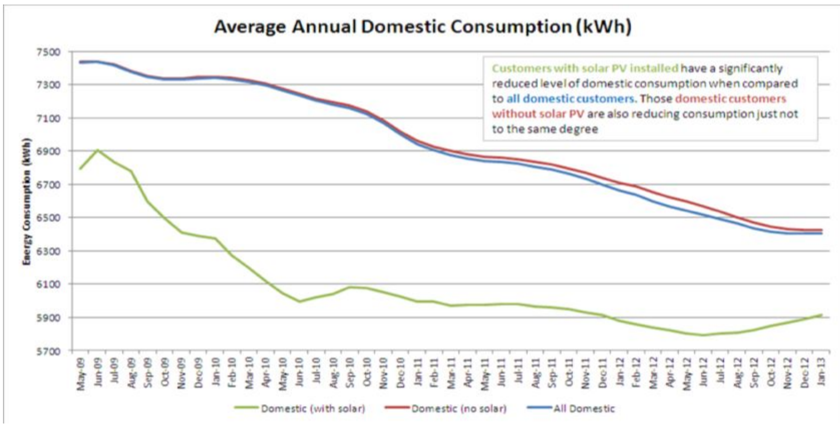
- Decreased on average 1.1% per year every year since 2008/09
- Forecasts adjusted each year

Figure 1 — NEM total annual energy (GWh)



Residential decline & PV Impact (Reneweconomy, 2013b)

- Energex, SE Qld urban
- Mostly PV but also general EE



Source:

Reasons for decline (IES, 2103)

- Range of factors, some ongoing, some not
- If more EE and DG, then will likely decline further

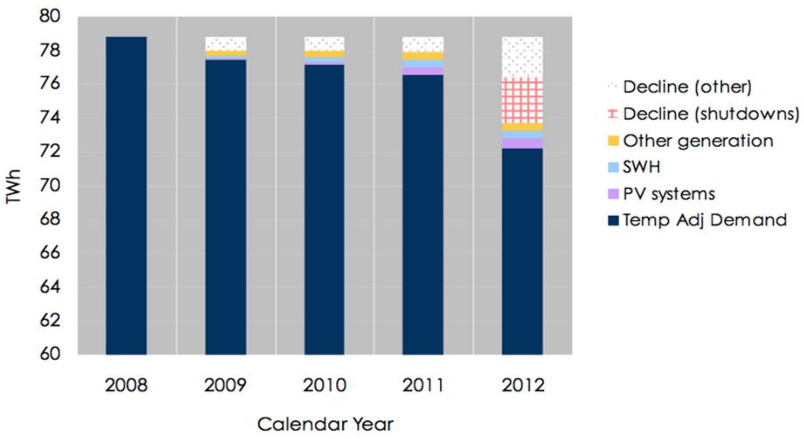
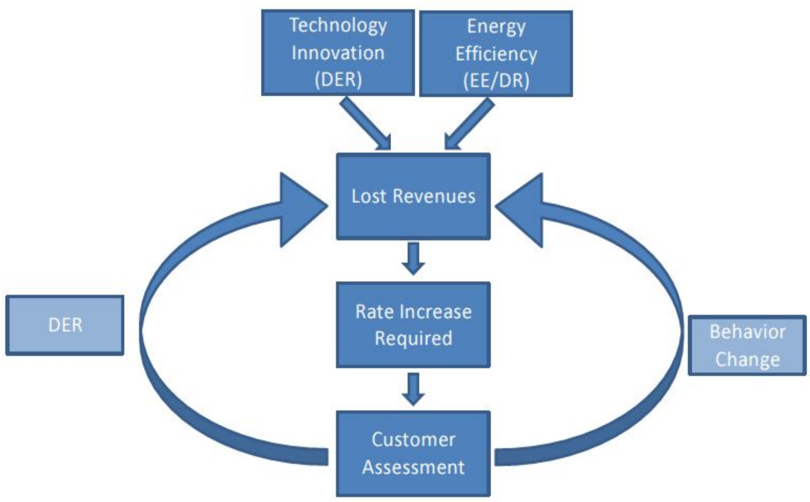


Exhibit 3
Vicious Cycle from Disruptive Forces

(Kind, 2013)



SOLUTIONS TO THE "DEATH SPIRAL"

New Market Solutions

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- Develop new regulatory frameworks which ensure that distributed energy can compete fairly in generation, distribution and retail sectors of the energy market
- Move to integrated resource planning models for network regulation
  - Transparency
  - 3rd party access and competition
  - Distributed resources considered on equal footing
- Allow DNSPs to provide DE options
  - Ring fencing to overcome market power issues

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Australian PV Association

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