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The Regulatory Arrangements Required for a Distributed Energy Market

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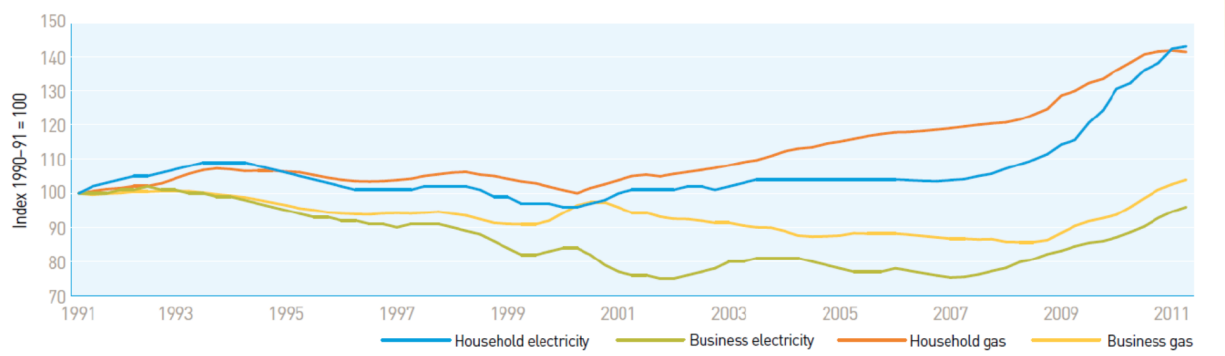
Presentation outline

1. Australian electricity prices (up) and use (down)
2. Consequences for utilities
3. Responses by utilities
    1. Concerned about use
4. Responses by government
    1. Concerned about prices, but also use
    – some help for EE, DSM, DG
5. If want significant DE, need more fundamental change
6. What is a Distributed Energy Market?
7. Conclusions

Australian electricity prices

- Increased by 40% between 2008/09 and 2011/12
- Expected to average €0.26c/kWh (2012/13), €27.5c/kWh (2013/14), and €28.5c/kWh (2014/15) – about 7% per year
- Main driver of increases are networks – half capital replacement, half augmentation to meet increasing peak demand
- Over 2009 – 2011 - EU-27 residential (12.2%), US (2.7%)



Source: 'Fact Sheet: Electricity Prices', Department of Resources, Energy and Tourism, Australian Government, 2012

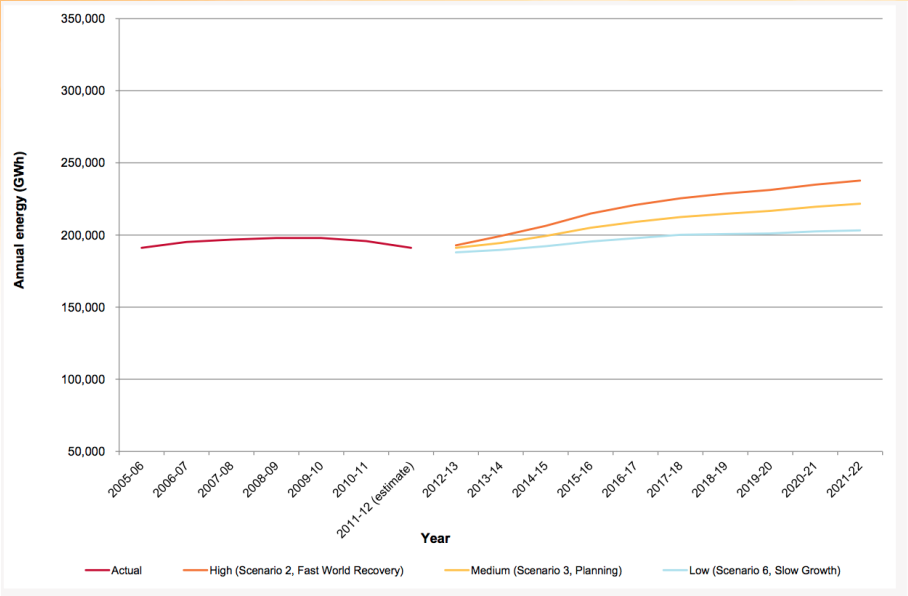
Australian electricity use - 1

- Decreased every year since 2008/09, 3.4% lower by 2011/12
- Regulators 'catching up' with change

Source: 'National Electricity Forecasting Report: For the National Electricity Market (NEM)', by the Australian Energy Market Operator

Australian electricity use - 2

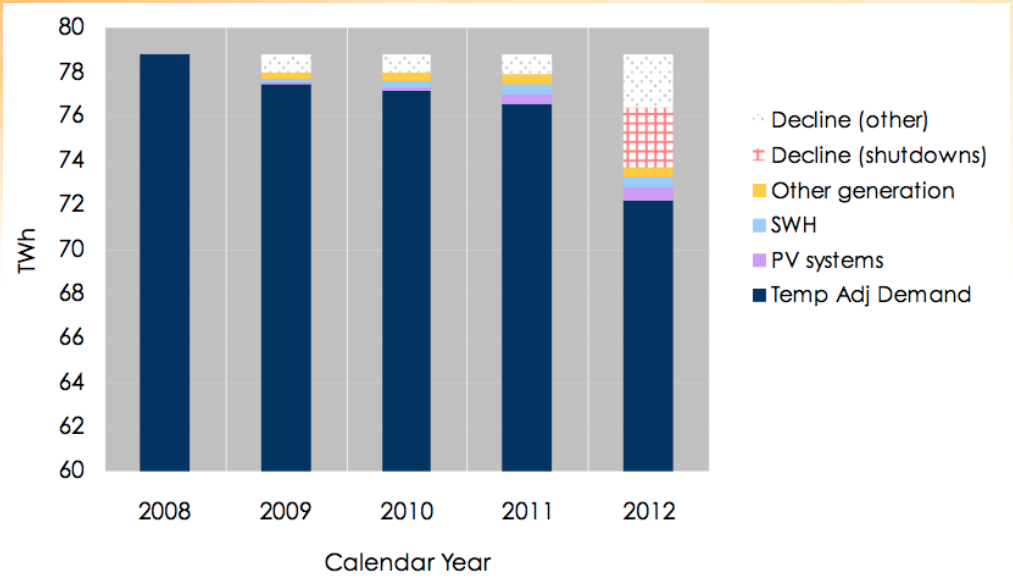
- More recent projections are more realistic ?



Source: 'National Electricity Forecasting Report: For the National Electricity Market (NEM)', by the Australian Energy Market Operator

Reasons for decline

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



Source: 'Update: What is driving the decline in electricity demand?', Intelligent Energy Systems, Insider Issue 14, April, 2013

Consequences for utilities

- Generators: reduced wholesale prices and reduced sales
- Network operators: reduced revenue
- Retailers (Suppliers): reduced sales

- Edison Electric Institute

"…falling costs of distributed generation ……increasing customer, regulatory, and political interest in demand-side management ……..government programs to incentivize selected technologies …… and rising electricity prices in certain areas of the country …… are potential "game changers" to the U.S. electric utility industry, and are likely to dramatically impact customers, employees, investors, and the availability of capital to fund future investment ….

….The financial risks created by disruptive challenges include declining utility revenues, increasing costs, and lower profitability potential, particularly over the long -term….

…. Left unaddressed, these financial pressures could have a major impact on realized equity returns, required investor returns, and credit quality…."

Source: Kind, P., 2013, 'Disruptive Challenges: Financial Implications and Strategic Responses to a Changing Retail Electric Business', prepared by Energy Infrastructure Associates for the Edison Electric Institute, Jan 2013

Responses by utilities

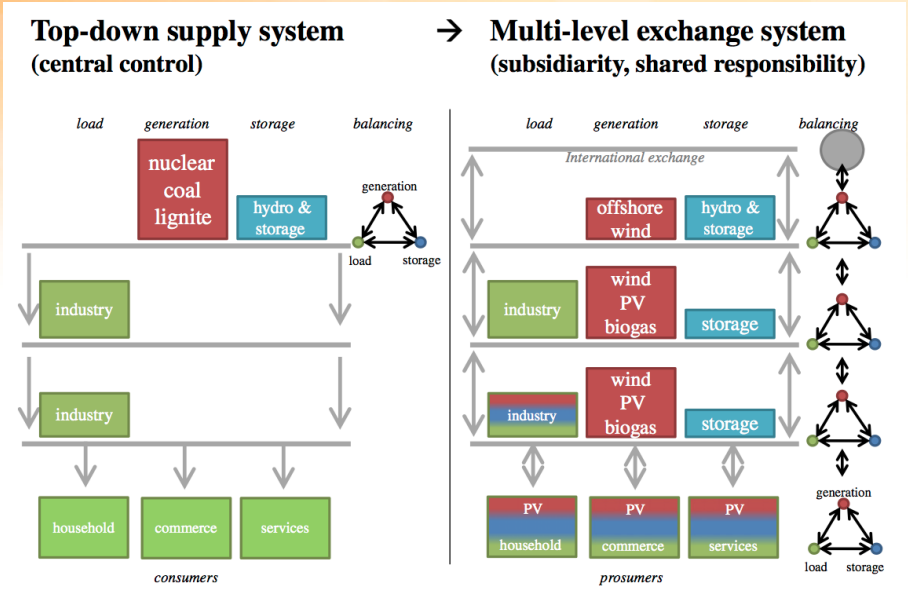
- TOU tariffs
  - Helps to reduce generation/network costs, and increase revenue…, not good for PV but good for EE, DSM, storage
- Higher demand charges
  - Helps to reduce generation/network costs, and increase revenue…, possibly good for PV and good for EE, DSM, storage
- Higher fixed daily charges
  - Just maintains utility revenue, suggestion that PV owners should have higher fixed charges … no mention of AC systems …..
- Low payments for exported electricity
  - At the lower end of, or below, range recommended by governments
- Imposition of network limits on DG
  - Because of technical impacts, some justified, some not. Most likely the easiest option to deal with 'disruptive' technology
- Some retailers promote PV, DSM and EE
  - PV sales offset lower elec sales? Marketing? Reducing wholesale purchase costs?
- => Aim to maintain current business models

Responses by governments

- High electricity prices are a strong focus of governments (Federal and State)
- Also State focus on maintaining revenue for electricity networks that are seen as an 'essential service'
- => how to reduce electricity costs while maintaining payments for networks?
  - Have come up with some reasonable proposals
- However
  - Are ad hoc and piecemeal
  - EE, DSM, DG just 'add-ons' to market, which remains unchanged
  - EE: Focus on reducing demand peaks rather than overall demand
  - DG: Divergent views on whether it should be supported, much outright opposition (eg. low payment for export, higher fixed charges)
- Need
  - Fundamental changes to operation of electricity market

The Need for More Fundamental Change

- EE, DSM, DG are 'disruptive' (eg. Edison quote)
- Don't simply integrate, but exert change eg. telecommunications



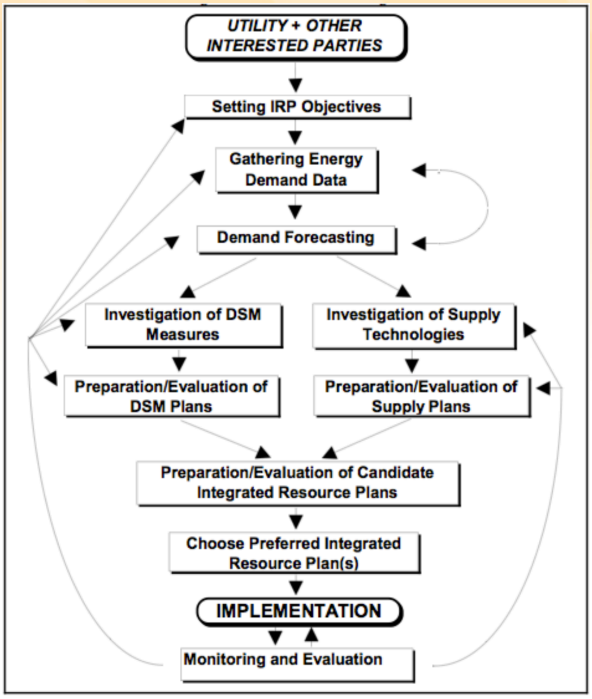
Source: Schleicher-Tappeser, R., 2013, 'How renewables will change electricity markets in the next five years', *Energy Policy*, 48, p64-75

What is a Distributed Energy Market?

- Competition at all levels:
  - Generation, Networks, Retail
  - Supply vs Demand
- Networks – a special case
  - High sunk capital costs, regulated monopoly
  - Seen as an 'essential service' and so regulation aims to ensure their income
  - => Competition also needs to occur during the planning stages (when networks are being built)
  - => Integrated Resource Planning
- Also full competition on a day-to-day basis

Networks - Integrated Resource Planning

1. Considers a full range of feasible supply-side and demand-side options and assesses them against a common set of planning objectives and criteria;
2. Is transparent and participatory throughout, meaning that parties other than the network operator can propose both supply-side and demand-side options;
3. Is subject to oversight by an independent body (normally government); and
4. Is subject to regular review

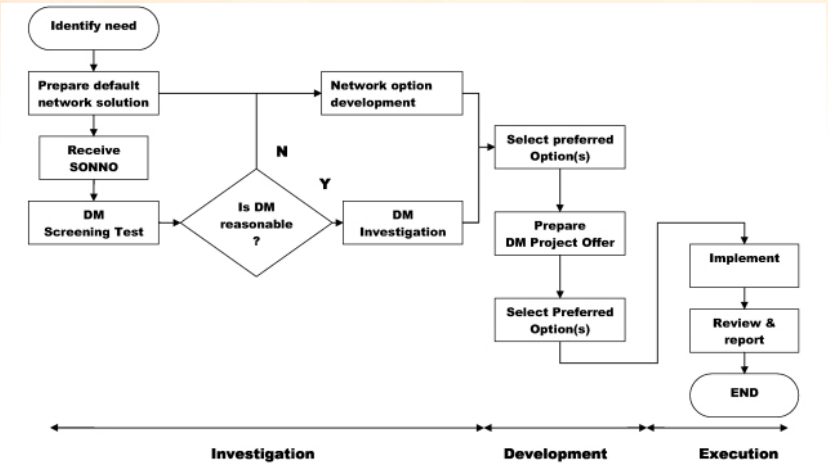


Source: Tellus, 2000, 'Best Practices Guide: Integrated Resource Planning For Electricity', by the Tellus Institute for the Energy and Environment Training Progra, of the Office of Energy, Environment and Technology, Global Bureau, Centre for the Environment, United States Agency for International Development, 2000

Current Determination Process

1. A certain level of demand is assumed
2. Alternatives to network augmentation are internally assessed
3. Networks then designed to meet that demand
4. Is reviewed by external party, but serious information asymmetry

Senate Select Committee on Electricity Prices
- The main reason for high electricity prices is inefficient over-investment in electricity networks driven by perverse incentives inherent in the regulatory environment



Source: Ausgrid, 2012, Demand Management Process, accessed 17 Dec 2012, http://www.ausgrid.com.au/Common/Our-network/Demand-management-and-energy-efficiency/Demand-Management-at-Ausgrid/Demand-Management-process.aspx#.ULV7TphhniQ

Full day-to-day competition

Relevant market arrangements can be divided into those that:

1. Relate to operation of incumbents
2. Relate to the design of the DE market itself
3. Stimulate the broader DE market

….. Some examples

1. Operation of incumbents

1. Decrease their opposition to DE
   1. Need to decouple network revenue from sales
   2. Most Australian distribution networks under a WAPC - their volume-weighted prices are capped, so reduced sales means less income
   3. Most proposals are for specific DM programs, not suitable for general EE etc
   4. Under a revenue cap, if sales decrease, prices can be increased next year to compensate
   5. Used in most US states, Denmark, Germany, the UK, Spain …. now in some Aust states …
   6. Note: only decouples until the next regulatory period ….
2. Enable their participation in DE
   1. Easy enough for retailers (suppliers) eg. White Certificates
   2. Allowing network operators to engage in DE???
   3. Potential anti-competitive behaviour if regulated income used to subsidise DSM & DG – unfair to 3rd party providers of EE, DSM & DG
   4. Could have 'one-way' ring fencing, where $ can only flow from DE arm back to network operator – but under a revenue cap there would be no incentive, so possibly keep % of revenue???

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2. Design of the DE Market

Establishes an environment where different participants can fairly compete …. for example:

1. That consumers be able to source their electricity from, and sell their PV generation/DSM etc to, entities other than their retailer (portability)
2. That third parties (ESCOs) be able to provide energy services
3. Formalisation of solar access rights (PV, SWHs, lighting and heating passive solar buildings)

3. Stimulation of the broader DE Market

1. Support mechanisms
    1. Forecasting of short and long-term demand
    2. Maps of network constraints
    3. Capacity building of groups wanting to participate in IRP
2. Command and control mechanisms
    1. Minimum Energy Performance Standards
    2. Building Standards
3. Price mechanisms
    1. White certificate schemes
    2. Pricing GHG emissions

Conclusions

If want significantly increased uptake of EE and DG then need:

1. Fundamental changes that creates a full DE market that allows:
    1. incumbents to develop new business models, and
    2. new entrants to fully participate
2. Networks: special case and competition needs to be at planning stage
3. Ongoing supply/demand competition at generation, network, retail:
    1. Operation of incumbents (eg. revenue cap)
    2. Design of the broader DE market (both incumbents and new entrants)
    3. Stimulate the broader DE market
4. Measures that focus only on 3.3 will be insufficient

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Thank you… and *questions*

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