

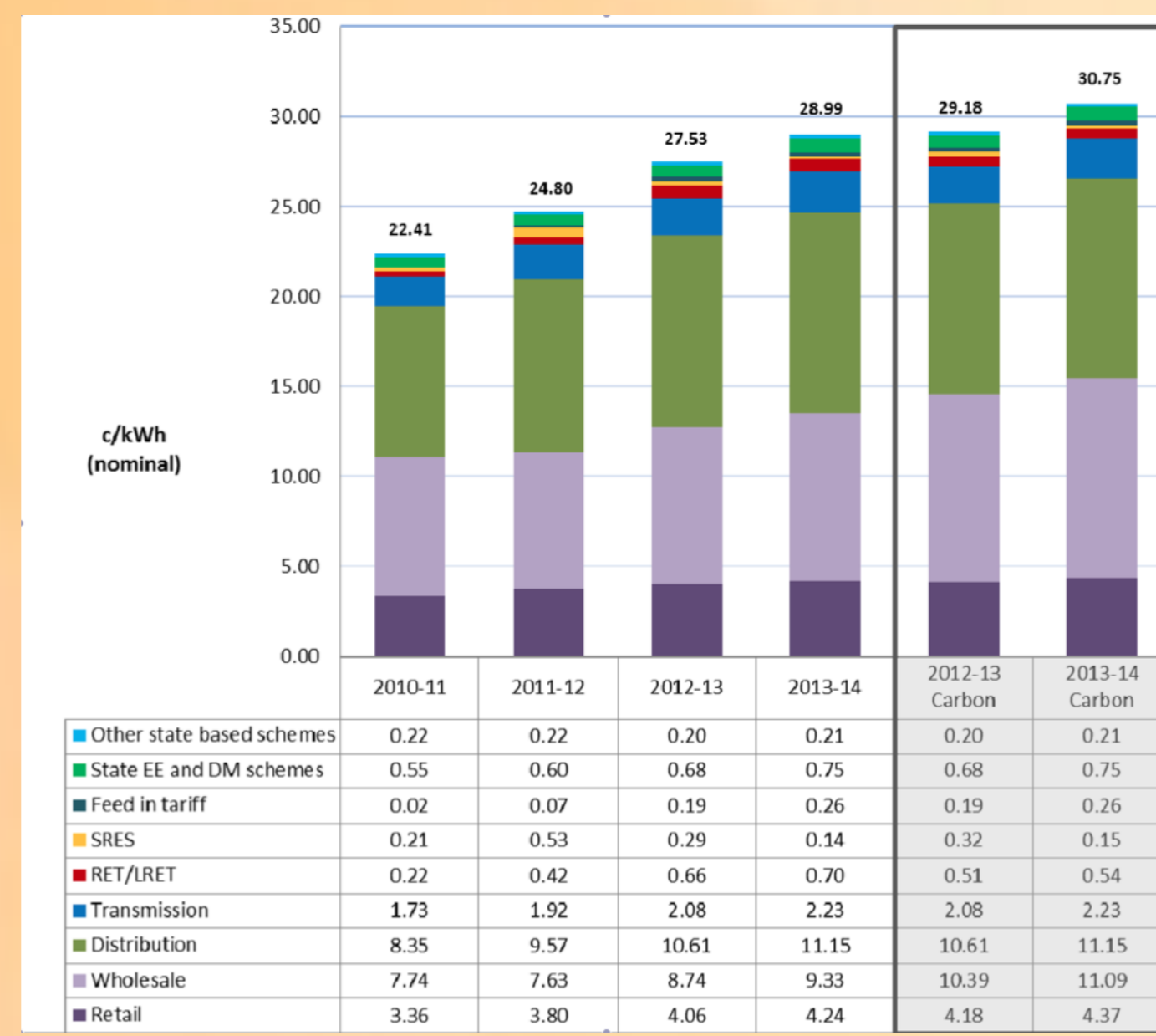
The Need for and Design of a Distributed Energy Market

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Electricity Prices Increasing

- ◆ Electricity prices have increased significantly over the last 5 years, and are expected to continue doing so
- ◆ Network costs are the main driver of price increases
- ◆ Wholesale costs have also increased, and from 2012/13 the carbon price added about 10%



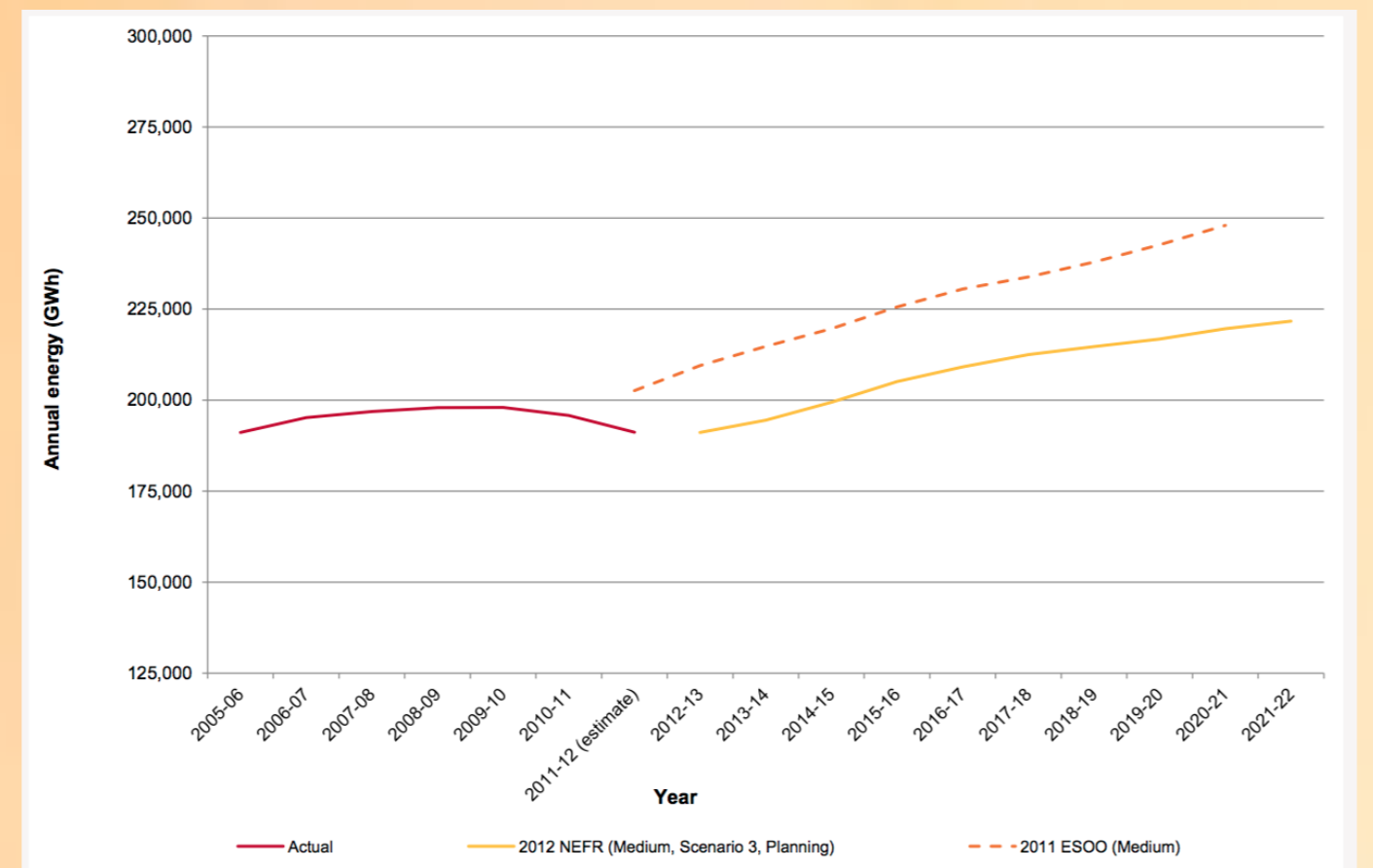
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A Distributed Energy Market

- ◆ Distributed Energy includes Distributed Generation, Energy Efficiency and Demand Side Management
- ◆ A DE Market is an alternative to the current one way generation-distribution-retail business models
- ◆ Opens up the entire National Electricity Market to competition at both the supply and demand sides
- ◆ This can occur at both the planning stage (eg. Integrated Resource Planning) and on an ongoing basis, with consumer choice
- ◆ Will allow incumbent utilities to broaden their income stream from electricity sales and daily access charges to options such as those described below
- ◆ Will help establish a role for third party Energy Service Companies (ESCOs) who go beyond just selling electricity

Demand has Decreased

- ◆ Demand has decreased each year since 2008/09
- ◆ Unexpected: Actual 2011/12 demand 5.7% lower than Australian Energy Market Operator's (AEMO's) August 2011 estimate
- ◆ In part due to higher electricity costs, PV, solar water heaters, other energy efficiency (EE)



Sourced from [2]

Possible Business Models

- ◆ Focus groups and public surveys are being used to see how end users might like to participate in a DE market
- ◆ Possible ESCO business models include
 - ⇒ Energy audits and coordinated purchase of a variety of DE options including PV, PV + battery, SWHs, EE
 - ⇒ Energy audits and leasing some/all these options (with ownership retained by the ESCO)
 - ⇒ Energy audits, DE options owned by ESCO who pays energy bills and is paid a fixed fee by end user in return for energy services. This could include remote control of discretionary energy uses as well as cycling of others, such as AC

Impact on Utilities

- ◆ Decreased revenue for utilities
 - ⇒ Fossil Fuel Generators: reduced sales and wholesale prices—operating costs covered but difficulty paying off capital costs
 - ⇒ Network operators: reduced transmission/distribution earnings—operating costs low but capital costs high and difficulty paying off both replacement and augmentation
 - ⇒ Retailers: can scale down operations but have reduced profit, fixed customer costs are covered by Service Availability Charge
- ◆ Utility responses
 - ⇒ Fossil Fuel Generators: Want reduced support for renewable energy (RE)
 - ⇒ Network operators: Increased usage charges, but these may further reduce usage. Increased daily charges, which makes distributed energy (DE) less attractive
 - ⇒ Retailers: Some oppose support for RE, some also entering DE market by selling PV and providing in-home displays to manage energy use

Government Responses

- ◆ Power of Choice Review^[3]
 - ⇒ Aims to facilitate 'demand side participation'
 - ⇒ Rather than focus on broad EE, emphasis on ensuring price signals reflect network costs, and that end users are exposed to signals and have the capability to respond
 - ⇒ Other government reports such as the Energy White Paper and the Senate Select Committee on Electricity Prices agree with this approach
 - ⇒ Recommendations regarding distributed generation (DG) focus on safeguarding the network operators' revenue
 - ⇒ Some recommendations are good for DE: eg. increased competition in delivering DE services, assistance with short and long-term demand forecasting for AEMO
- ◆ Other Government Responses
 - ⇒ Recent reduction in Solar Credits multiplier to 1
 - ⇒ Climate Change Authority's proposal that the multiplier could go to less than 1 and that the size of systems eligible for deeming be reduced^[4]
 - ⇒ Queensland's Competition Authority's proposal that all DG be forced onto a gross meter and receive only the wholesale price for electricity^[5]

Required Regulatory Arrangements

- ◆ Effective deployment requires more than just cost-effectiveness^[6]

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graph TD
    Technology --- SuccessfulDeployment[Successful Deployment]
    EconomicViability[Economic Viability] --- SuccessfulDeployment
    MarketAccess[Market Access] --- SuccessfulDeployment
    SocialAcceptance[Social Acceptance] --- SuccessfulDeployment
    
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- ◆ Market access includes the business and regulatory environment into which the technologies are deployed
- ◆ Other frameworks that can be applied to 'market uptake' are:
 - ⇒ 'Hardware', 'orgware' and 'software': highlights that technology is more than just hardware. 'Orgware' is the different organisations involved, including the associated economic and legal regulations, while 'software' is the skills and knowledge that are necessary for uptake. 'Orgware' does not automatically emerge in response to market signals, highlighting a role for government, not only through regulations, but in assisting with education and training to help develop 'software'.^[7]
 - ⇒ Innovations systems approaches view industries as networks of actors (businesses and organisations) interacting within an institutional environment. Thus, not only technical innovation but also organisational and institutional innovations determine which technologies become established.^[8]
 - ⇒ Thus, when disruptive technologies such as DG and EE are introduced into a well established industry, their uptake is limited by the existing orgware and hardware and so institutional and organisational changes will be required.
- ◆ To be continued

[1] 'Possible Future Retail Electricity Price Movements: 1 July 2011 to 30 June 2014, Final Report', Australian Energy Market Commission, Nov 2011.
 [2] 'National Electricity Forecasting Report, 2012', Australian Energy Market Operator, 2012.
 [3] 'Draft Report: Power of Choice—giving consumers options in the way they use electricity', Australian Energy Market Commission, Sept 2012.
 [4] 'Renewable Energy Target Review, Discussion Paper', Climate Change Authority, Oct 2012.
 [5] 'Issues Paper: Estimating a Fair and Reasonable Solar Feed-in Tariff for Queensland', Queensland Competition Authority, Aug 2012.
 [6] Derived from Haas, R. 2001, 'Marketing Strategies for PV Systems in the Built Environment', T7 IEA PVPS, with 'Customers' replaced by 'Economic Viability'
 [7] Dobrov, G.M., 1979, 'The Strategy for Organised Technology in the Light of Hard-, Soft-, and Org-ware Interaction, Long Range Planning, 12(4), p79-90.
 [8] Bruce, A., 2007, 'Capability Building for the Manufacture of Photovoltaic System Components in Developing Countries, PhD Thesis, UNSW, Sydney, Australia