ELECTRICITY NETWORK TRANSFORMATION ROADMAP

2017-27

Demand Management Incentives for the NEM

14th February 2017

Energy Networks Australia

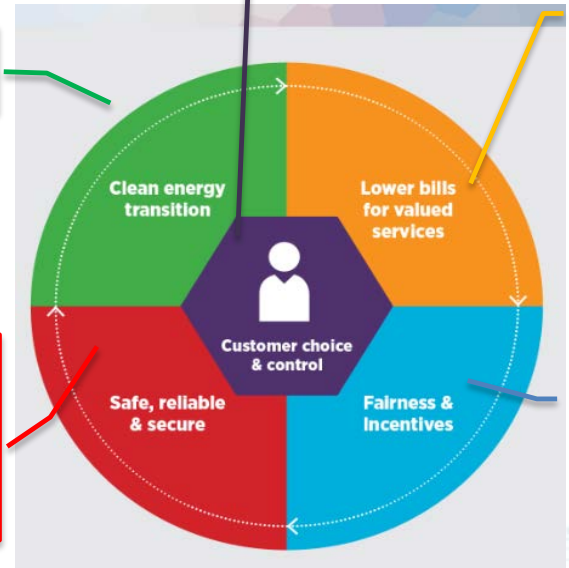
CSIRO

A better future…

- Almost 2/3 of customers have DER
- 1/3 customers on ‘stand alone power system’ tariff
- Customer protection and concession schemes fit for purpose.

- Reduce total system spend by $101 BN by 2050
- Save Households $414 pa
- Network charges 30% lower than 2016

- COP 21 aspiration of Zero Net Emissions by 2050 is met

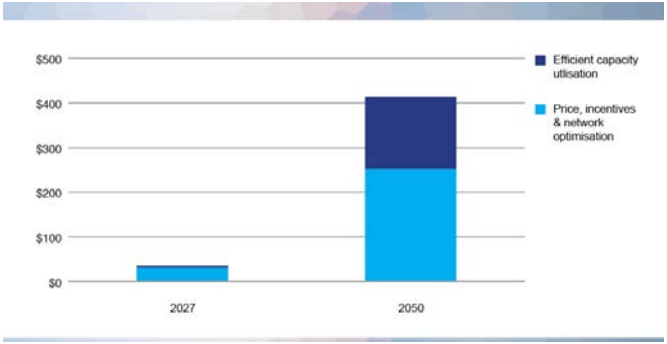


- Efficient solutions for new NEM services avoid security & stability risks.
- Real time balancing, reliability & quality of supply with millions of DER participants

- Avoid over $18 BN in cross subsidies
- Means $600 pa. for mid size family without DER
- Networks pay over $2.5 BN pa for DER services

Comparing the Roadmap Outcomes

Projected savings in average residential bills under the roadmap scenario



Cumulative electricity system total expenditure to 2050 – Roadmap & counterfactual

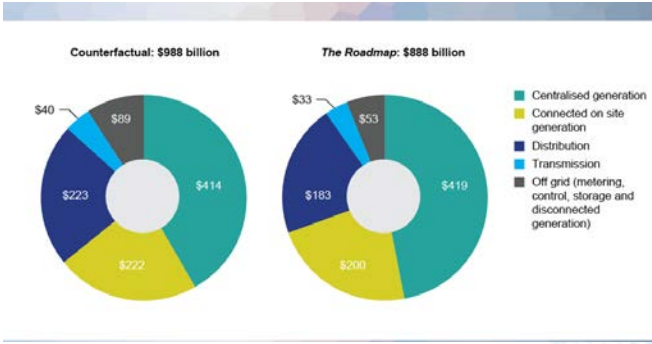
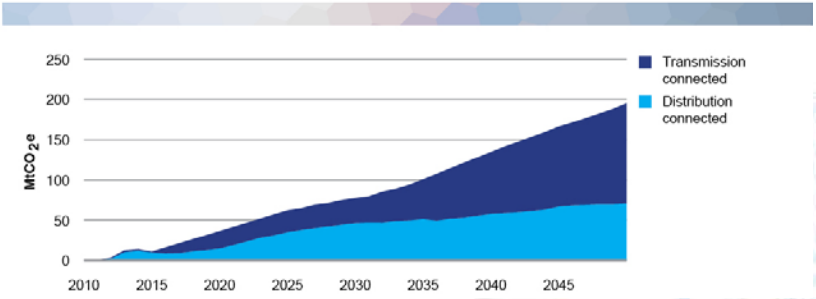
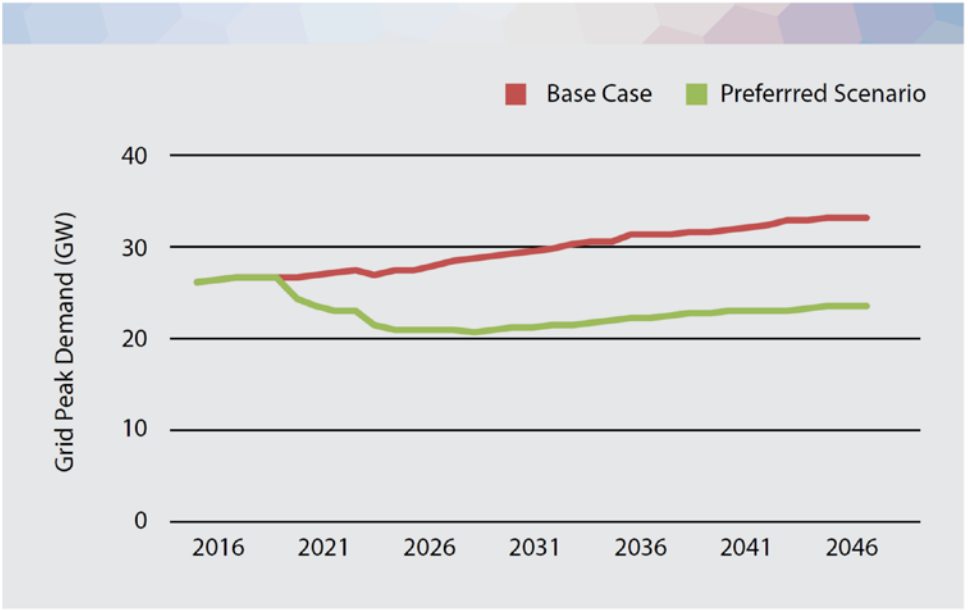


Figure 4: Historical and projected quantity of electricity sector abatement by location on the network (*Roadmap* Scenario)



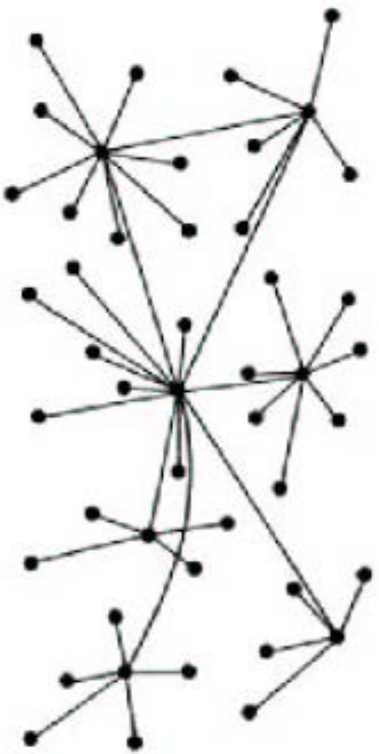
‘Second Wave’ incentives for Network Optimisation

Figure 3: Total Network Non-Coincident Peak Demand (GW)

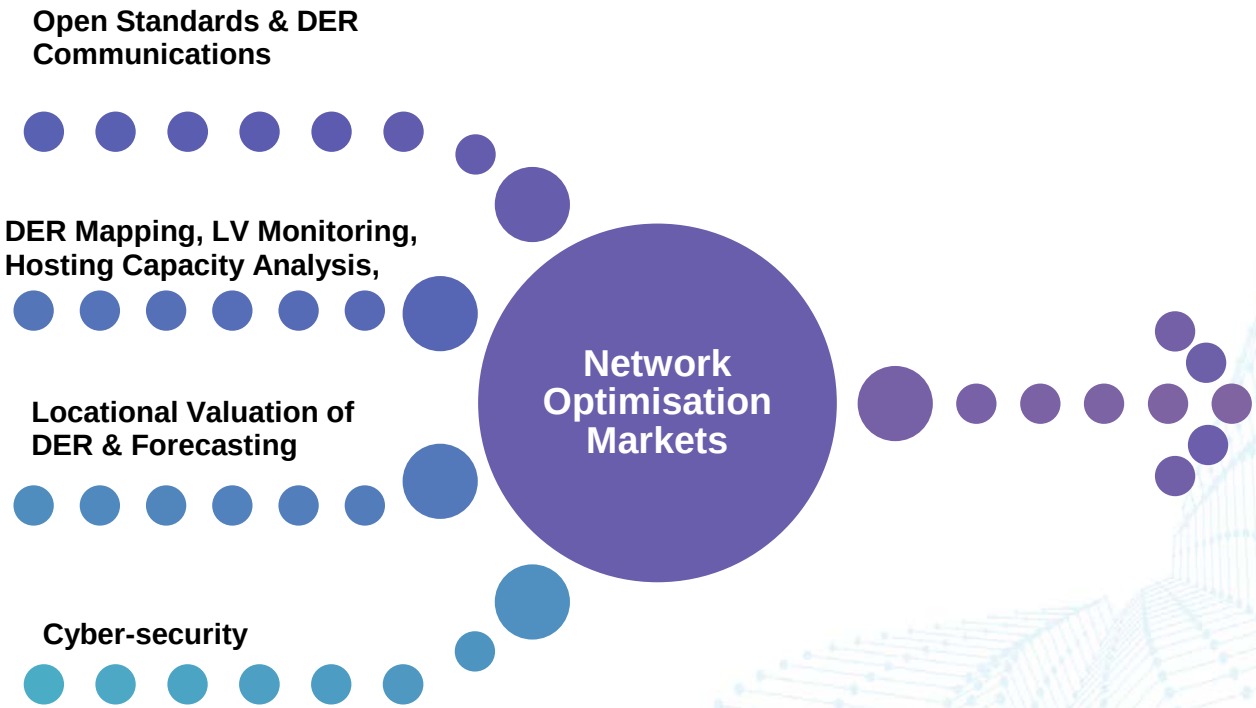


‘Second Wave’ incentives for Network Optimisation

- Customers (or agents) could choose to ‘opt in’ to rewards for support in the *right place* at the *right time*:
  - **Incentive Payments for ‘orchestration’ of DER** (eg. battery discharge; smart inverters; load control; HEMs platforms);
  - **Advanced Network Tariffs for Behavioural Response** *(eg. Critical Peak Price; Peak Time Rebates; Nodal Pricing)*;
  - **Transactive Energy:** (eg. real time pricing in future in distributed markets).

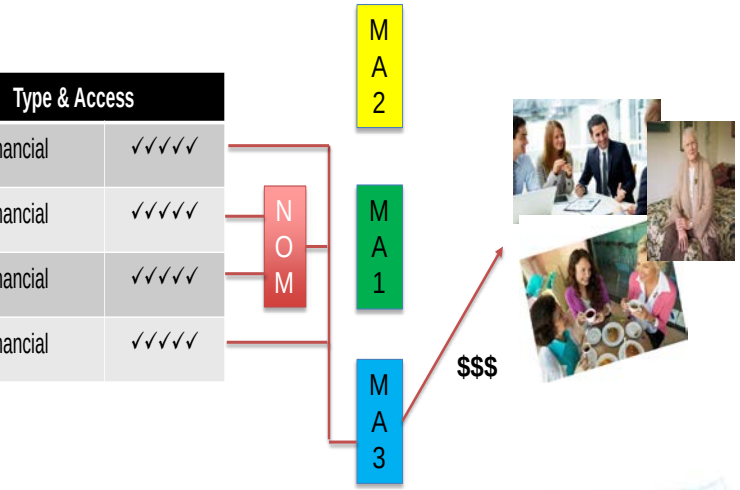


Market transformation (NOM) needs to be supported by advanced network planning and DER valuation capabilities



Unlocking the Value stack to animate DER markets

Source of value	Type & Access	
Wholesale market	Financial	✓✓✓✓✓
Transmission networks	Financial	✓✓✓✓✓
Distribution networks	Financial	✓✓✓✓✓
Customer self-consumption	Financial	✓✓✓✓✓



Current “CPI-X” Incentive Frameworks

Figure 14.1 Revenue cap formulae

1. $TAR_t \geq \sum_{i=1}^{n} \sum_{j=1}^{m} p_t^{ij} q_t^{ij}$ i=1,..,n and j=1,...,m and t=1,...,5

2. $TAR_t = AR_t + I_t + B_t + C_t$ t = 1,2,...,5

3. $AR_t = AR_{t-1}(1+\Delta CPI_t)(1-X_t)(1+S_t)$

where;

TAR_t is the total annual revenue in year t.

p_t^{ij} is the price of component 'j' of tariff 'i' in year t.

q_t^{ij} is the forecast quantity of component 'j' of tariff 'i' in year t.

AR_t is the annual smoothed expected revenue for regulatory year t. For the first year of the 2015–20 regulatory control period, this amount will be equal to the smoothed revenue requirement for 2015–16 set out in the PTRM.

I_t is the final carryover amount from the application of the DMIS from the 2010–15 distribution determination. This amount will be calculated using the method set out in the DMIS and deducted from/added to allowed revenue in the 2016–17 pricing proposal.

B_t is the sum of:

- any under or over recoveries relating to capital contributions and shared assets from 2013–14 and 2014–15
- any under or over recovery of actual revenue collected through DUoS charges in regulatory year t–2 as calculated using the method in appendix A.

C_t is the sum of adjustments related to:

- feed-in tariff pass through amounts relating to the 2013–14 and 2014–15 regulatory years
- any AER approved cost pass through amounts during 2015–20 regulatory control period.

ΔCPI_t is the annual percentage change in the ABS CPI All Groups, Weighted Average of Eight Capital Cities[56] from the December quarter in year t–2 to the December quarter in year t–1, calculated using the following method:

The ABS CPI All Groups, Weighted Average of Eight Capital Cities for the December quarter in regulatory year t–1

divided by

The ABS CPI All Groups, Weighted Average of Eight Capital Cities for the December quarter in regulatory year t–2

minus one.

For example, for the 2015–16 year, t–2 is December quarter 2013 and t–1 is December quarter 2014 and in the 2016–17 year, t–2 is December quarter 2014 and t–1 is December quarter 2015 and so on.

X_t is the X factor for each year of the 2015–20 regulatory control period as determined in the PTRM, and annually revised for the return on debt update in accordance with the formula specified in attachment 3—rate of return—calculated for the relevant year.

S_t is the s-factor determined in accordance with the service target performance incentive scheme (STPIS) for regulatory year t.[57]

Figure 14.2 Side constraints

$$\frac{(\sum_{i=1}^{n} \sum_{j=1}^{m} d_t^{ij} q_t^{ij})}{(\sum_{i=1}^{n} \sum_{j=1}^{m} d_{t-1}^{ij} q_t^{ij})} \leq (1+\Delta CPI_t)\times(1-X_t)\times(1+2\%)\times(1+S_t)+I_t'+B_t'+C_t'$$

where each tariff class has "n" tariffs, with each up to "m" components, and where:

d_t^{ij} is the proposed price for component 'j' of tariff 'i' for year t.

d_{t-1}^{ij} is the price charged for component 'j' of tariff 'i' in year t–1.

q_t^{ij} is the forecast quantity of component 'j' of tariff 'i' in year t.

ΔCPI_t is the annual percentage change in the ABS CPI All Groups, Weighted Average of Eight Capital Cities[58] from the December quarter in year t–2 to the December quarter in year t–1, calculated using the following method:

The ABS CPI All Groups, Weighted Average of Eight Capital Cities for the December quarter in regulatory year t–1

divided by

The ABS CPI All Groups, Weighted Average of Eight Capital Cities for the December quarter in regulatory year t–2

minus one.

For example, for the 2015–16 year, t–2 is December quarter 2013 and t–1 is December quarter 2014 and in the 2016–17 year, t–2 is December quarter 2014 and t–1 is December quarter 2015 and so on.

X_t is the X factor for each year of the 2015–20 regulatory control period as determined in the PTRM, and annually revised for the return on debt update in accordance with the formula specified in attachment 3—rate of return—calculated for the relevant year. If X>0, then X will be set equal to zero for the purposes of the side constraint formula.

S_t is the s-factor determined in accordance with the STPIS for regulatory year t.[59]

I_t' is the annual percentage change from the final carryover amount from the application of the DMIS from the 2010–15 distribution determination. This amount will be deducted from/added to allowed revenue in the 2016–17 pricing proposal.

B_t' is the annual percentage change from the sum of:

- any under or over-recoveries relating to capital contributions and shared assets from 2013–14 and 2014–15
- any under or over recovery of actual revenue collected through DUoS charges in regulatory year t–2 as calculated using the method in appendix A.

C_t' is the annual percentage change from the sum of adjustments related to:

- feed-in tariff pass through amounts relating to 2013-2014 and 2014-2015

2017-27 Pricing & Incentives:
Milestones and Actions

Milestone 1: Early transition to better tariffs. (2021)

Milestone 2: New prices for new and differentiated services or to incentivise customer response so as to lower network costs overall. (2021)

Milestone 3: Micro-grids and standalone power systems are a feasible alternative to traditional grid connection. (2021)

Milestone 4: Networks buying grid services from customer power systems as an alternative to grid investment. (2027)

2017-27 Regulatory Policy & Frameworks:
Milestones and Actions

Milestone 1: By 2018, the **customers' role is central** to regulatory processes covering core regulated services for agreeing **network outputs** and **risk allocation**.

Milestone 2: By 2018, **structured trials** of alternative regulatory approaches is well advanced, including **customer settlement** approaches, as well as **TOTEX** trials. **TOTEX is adopted as default approach by 2027.**

Milestone 3: By 2019, new **regulatory frameworks that are more adaptive to emerging competition** are implemented (i.e. tests for whether regulation is needed, shifting services out of regulation).

For More Information: www.ena.asn.au