

### Consumer information session: The Building Block Model

November 2017

# Outline

- Overview of the AER roles in networks
- The regulatory process we follow
- Building block model
  - Capital base
  - Return on capital
  - Return of capital (depreciation)
  - Capital Expenditure (Capex)
  - Operating and Maintenance Expenditure (Opex)
  - Revenue adjustments and incentive scheme payments
  - Revenue smoothing

## **AER Networks Role**

- AER has two broad energy network regulation roles
  - approving the amount of revenue that transmission and distribution network businesses can recover from customers for using networks. This is done through the regulatory determination process
  - networks pricing and oversight



## **Regulatory process**

- Framework and Approach
  - Classification of services
  - Control mechanism (Revenue caps, Price cap, other)
  - Incentive Schemes
- Regulatory proposal (network service provider)
  - Building block inputs
  - Application of incentive schemes etc.
- AER publishes issues paper and holds public forum



## **Regulatory process**

- AER calls for submissions
- AER draft decision
  - Revised proposal
  - Submissions
- AER final decision
- Appeal
  - Previously subject to Judicial review and Limited merits review
  - Judicial review only from 30 October 2017

## **Regulatory process**

• Post final decision:

- Annual pricing
- Annual reporting
- Cost pass throughs
- Ongoing compliance, e.g. contingent projects



### **Objectives of regulation**

Our regulatory objectives are to promote outcomes in the long term interest of customers.

Revenue should reflect:

- Efficient costs, and
- An appropriate level of service quality
   Various regulatory models could be used to achieve these objectives.



## **Building blocks**

Capital costs

Return on capital

(projected capital base x rate of return)

Regulatory depreciation

Operating expenditure

Incentive mechanism (increment or decrement)

Corporate income tax

Total revenue



### **Building block proportions**

NSW Electricity DNSPs Building Block Revenue (Real 2014-15)

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# **Building block model**

Revenue requirement = opex + depreciation + tax + (WACC × Regulatory Asset Base)

- Requires forecasts for each year of the regulatory control period:
  - Regulatory Asset Base (RAB)
  - Operating expenditure (opex)
  - Capital expenditure (capex)
  - Market conditions (e.g. demand, input costs)
  - Financial conditions (e.g. interest rates, inflation)
  - Other (incentive payments)

### The regulatory asset base (RAB)

- The regulatory asset base (RAB) or capital base is the record of all assets on which service providers require returns
- The National Electricity Rules (NER) prescribe that we update the RAB as follows:

 $RAB_{t} = RAB_{t-1} \times (1 + Inflation_{t-1}) + Capex_{t-1} - Regulatory depreciation_{t-1}$ 



## The regulatory asset base (RAB)

Regulatory Asset Base (RAB)

 $RAB_t = RAB_{t-1} \times (1 + Inflation_{t-1}) + Capex_t - Depreciation_t$ 

Defines how the RAB rolls forward over time

- The size of the RAB affected by the size of capex and the rate of depreciation
- At the same time, the RAB impacts the size of the depreciation allowance and return on capital

## Capex: examples



- Design & negotiations
- Materials purchase and transport
- Erection, testing and connection
- Capital refurbishment
- Replacement (45-75 years later)

## Capex: techniques

- Economic benchmarking
- Trend analysis
- Category analysis
  - Overall cost within each category of capex
  - Unit costs across a range of activities
  - Volumes across a range of activities
  - Asset lives, across a range of asset classes which we use in assessing repex

#### Predictive modelling

- The repex model
- The augex model
- Engineering review

## **Regulatory depreciation**

- Objective of regulatory depreciation sunk cost recovery – SL/DV
- Depreciation interacts with various building blocks – often a 'blunt instrument'
- Period of recovery matters Economic life
- Profile of recovery matters
  - NPV neutrality not efficiency
  - Front or back loading or flat

#### **Regulatory depreciation**

- Regulatory depreciation is based on straight line depreciation, adjusted to offset double counting of inflation that would otherwise arise from multiplying a nominal rate of return by an indexed RAB
- We could alternatively achieve identical outcomes with an indexed RAB and a real WACC.



## Inflation

- We measure inflation using CPI.
- In determinations, we use both forecast inflation for revenue determinations, and actual inflation to update the RAB from the last determination.
- We forecast inflation using an average of the RBA's two years of forward forecasts, and using the midpoint of the target band (2.5 per cent) for the remaining band.

#### Return on capital

 Return on capital = WACC × Regulatory Asset Base



## Rate of Return (WACC)

 The rate of return is the estimated percentage return for an investment of similar risk

- It is a weighted average of:
  - the required return on equity
  - the required return on debt



### Return on equity

- We estimate the return on equity using a 7-step process
- The 'foundation model' is a Sharpe-Lintner CAPM:

Return on equity =  $Rf + \beta x MRP$ 

 We also have regard to other sources of evidence in forming aspects of our estimate (DGMs, market broker estimates/commentary, Black CAPM etc)



### Return on debt

- Estimating the return on debt involves a number of different steps:
  - establishing benchmark characteristics (term, credit rating)
  - establishing the approach to return on debt (on the day vs trailing average, transition)
  - establishing the approach to implement the return on debt (choice of data series, annual testing, extrapolation/interpolation, averaging periods)

### Tax and 'Gamma'

- Service providers are compensated for a benchmark tax allowance
- However, under the imputation tax system, eligible investors receive franking credits to reduce their taxes to reflect prepayment of personal tax at a company tax level
- So, to prevent 'double compensation', we reduce the tax allowance to reflect the value of imputation credits to investors



# **Building Blocks - Opex**



- Inspections
- Testing
- Vegetation clearance
- Preventative maintenance
- Emergency maintenance

## **Opex forecasts**

- Generally opex is largely recurrent, we estimate opex using a 'base-step-trend' approach:
  - Base: First, we determine an efficient base year as a starting point for the opex allowance. Often this is the third or fourth year of the previous period. We then undertake top-down benchmarking and qualitative assessment to determine whether the base year is efficient, and if not, what adjustments are necessary.
  - Step: Step changes account for any material changes in opex compared to the base year. For example, this might reflect new regulatory obligations etc.
  - Trend: The trend aspect impacts how the base year is increased (or decreased) over the regulatory period. It reflects factors such as forecast changes in labour or materials prices, growth in the size of the network etc.



#### Incentive arrangements

EBSS	<ul> <li>Provides for a fair sharing between NSPs and network users of opex efficiency gains and losses made during a regulatory control period</li> </ul>
STPIS	<ul> <li>Provide incentives for NSPs to maintain and improve service performance</li> </ul>
DMIS	<ul> <li>Provide incentives for DNSPs to implement efficient non-network alternatives and manage demand</li> </ul>
CESS	<ul> <li>Allow for the benefits/costs of capex underspends/overspends to be shared between NSPs and their customers</li> </ul>
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## EBSS - opex

 Under the EBSS a service provider retains 30 per cent of the benefit or cost of an underspend or overspend, while consumers retain 70 per cent of the benefit or cost of an underspend or overspend.

• This provides a continuous incentive for a service provider to pursue efficiency improvements in its opex.



## **CESS** - capex

- Under the CESS a service provider retains 30 per cent of the benefit or cost of an underspend or overspend, while consumers retain 70 per cent of the benefit or cost of an underspend or overspend.
- This provides a continuous incentive to defer/avoid capex.
- In the absence of an incentive scheme cost reductions achieved in a single period would lead to level of revealed cost at commencement of next period.
- The incentive to pursue further efficiencies would be reduced or removed. Leading to potential for 'cost padding'.



#### **Demand management incentives**

- Demand management refers to any strategy to address growth in demand and/or peak demand
- We currently allow a relatively small demand management incentive allowance to encourage service providers to implement efficient nonnetwork alternatives or to manage expect demand in some other way.



## Service performance incentives

- Under normal arrangements, service providers can profit by reducing expenditure on network maintenance and replacement, leading to blackouts
- The service target performance incentive scheme (STPIS) addresses this potential problem, by providing incentives linked to reliability and service quality
- Applied during annual pricing process as adjustment to MAR

## **Building block revenue**

• Maximum Allowed Revenue (MAR)

# MAR<sub>t</sub> = RAB<sub>t-1</sub>xWACC + Depreciation<sub>t</sub> + Opex<sub>t</sub> + Revenue adjustment<sub>t</sub>

Defines how the maximum allowed revenue is set, based on the RAB

 The assessment of building block costs may result in a MAR that varies from year to year



## **Revenue Smoothing**

- An assessment of building blocks may result in a revenue stream that is lumpy (unsmoothed)
- Lumpiness or variability in revenues would ultimately translate to price variation
- To avoid significant price variation requires the path of revenue to be smoothed over time relative to the path of expenditure



## Revenue smoothing

- Revenue smoothing applied to unsmoothed revenue to reduce price volatility:
  - Within a regulatory control period
  - Between regulatory control periods



## **Revenue smoothing**

- To smooth revenues within period adjust revenue in each year using CPI minus X formula
- X factor represents the change in real revenue/price from year-to-year
- *X factor* forms an input in the control formula applied to revenues or prices in annual pricing. It is updated annually for change in cost of debt.

## Revenue smoothing example

#### PTRM – X factors worksheet

Year	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	
Revenue Cap Calculation (\$m, Nominal)							
Unsmoothed - Annual Revenue Requirement	164.81	153.48	164.03	161.06	160.65	169.32	NPV \$643.91 (unsmoothed)
		5.59	First year differe	ence (\$m)			Final year - 4.04 difference (\$m) Final year
	3.6% First year difference (%)						
Smoothed - Expected Revenue	164.81	159.07	159.79	160.51	162.88	165.28	\$643.91 NPV (smoothed)
X Factors	_	P_0	X_02	X_03	X_04	X_05	
positive P0, X imply real decrease in price/ revenue constraint		5.83%	2.00%	2.00%	1.00%	1.00%	\$0.00 NPV difference \$0.00 (smoothed vs unsmoothed)



## Revenue smoothing example





## CPI – X

- PTRM determines revenue on a nominal basis
- Nominal values are the prices paid by end users or consumers
- CPI measures change in price level in general economy
- X factor measures *'real'* change in revenue or prices of individual service provider based on assessment of building blocks



## Revenue smoothing example

- X factors are set so that the NPV smoothed revenue is equal to the NPV of unsmoothed revenue
- Revenue are smoothed also to minimise the difference in smoothed an unsmoothed revenue in the final year of the regulatory period
- This constraint helps reduce price variation between periods

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## After the determination process

- Legal appeals
- Annual pricing and service standards compliance
- Pass throughs and contingent projects
- Information gathering and reporting
- Guideline development



## Conclusion

- AER's determination is to set revenues based on the forecast benchmark efficient costs of regulated business
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