Optional Firm Access: Access Pricing

Stakeholder Workshop

13 November 2014 (Sydney) / 14 November 2014 (Melbourne)

AUSTRALIAN ENERGY MARKET COMMISSION

Agenda

- Background to OFA and Objectives of workshop
- Access pricing
- LRIC theory
- Prototype:
  - Purpose
  - Development of model
  - How the model works
  - Results
  - Limitations
- Next steps

Objectives of workshop

- It is often easier to explain our work and receive feedback in a workshop setting
- We'd like to explain our model and results, and answer questions on it
- This will help you with submissions you write, which are due on 11 December
- We'd also like to hear feedback from you on how you have found the pricing model

Background to OFA

Background to OFA

- We've been directed to undertake this project by COAG Energy Council, including:
  - Developing the OFA model further
  - Assessing the costs/benefits if the model were implemented
- We're working towards a draft report and recommendation to COAG Energy Council in February 2015 and a final report mid-2015
- Further work on the pricing model will be included in the draft report
- We have not yet formed a view as to whether we will recommend OFA – it depends on where our assessment work ends up
- What we do after February will depend on the draft recommendation

What OFA is designed to achieve

- A more coordinated approach to generation and transmission investment (including a market-led approach to transmission investment)
- Transfer some risk of transmission investment from consumers to owners of generators
- Contributes to a market better able to adapt to an uncertain future, including changing demand and generation patterns
- Through this should lead to better outcomes for consumers

Access pricing

Background to access pricing

- For right locational signals, access pricing should reflect costs imposed on TNSPs – this tells generates how much cost their decision to locate in a particular spot creates for TNSP
- Best way to determine the price is by a regulated model – avoids generators having to negotiate with TNSPs for shared service
- Creates certainty for generators, the payments are then locked in for the life of the access
- Generators can use pricing model themselves to work out costs in different locations

How much detail should be in the pricing model?

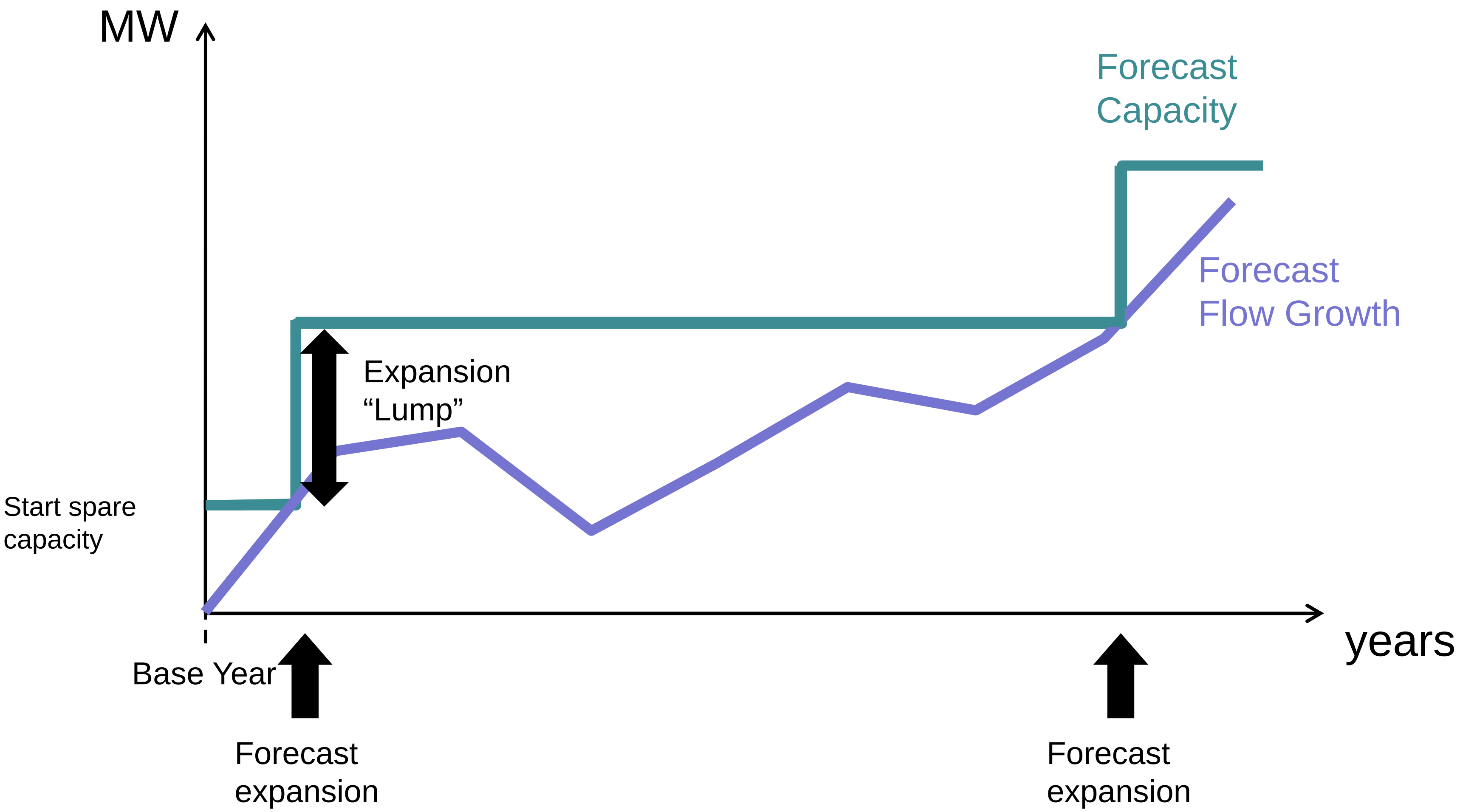
- Our pricing model represents a balance in how much detail it contains:
  - It cannot completely reflect actual TNSP costs – since these are a forecast anyway
  - Assuming away the complexity results in more smooth and stable price outcomes
  - Provided it is not biased high or low it should work out evenly in the long run
  - But, need to have some confidence about how much it reflects TNSP costs, to know:
    - Generators aren’t being charged too much
    - Consumers aren’t having to pay for providing generators with access

Long Run Incremental Cost

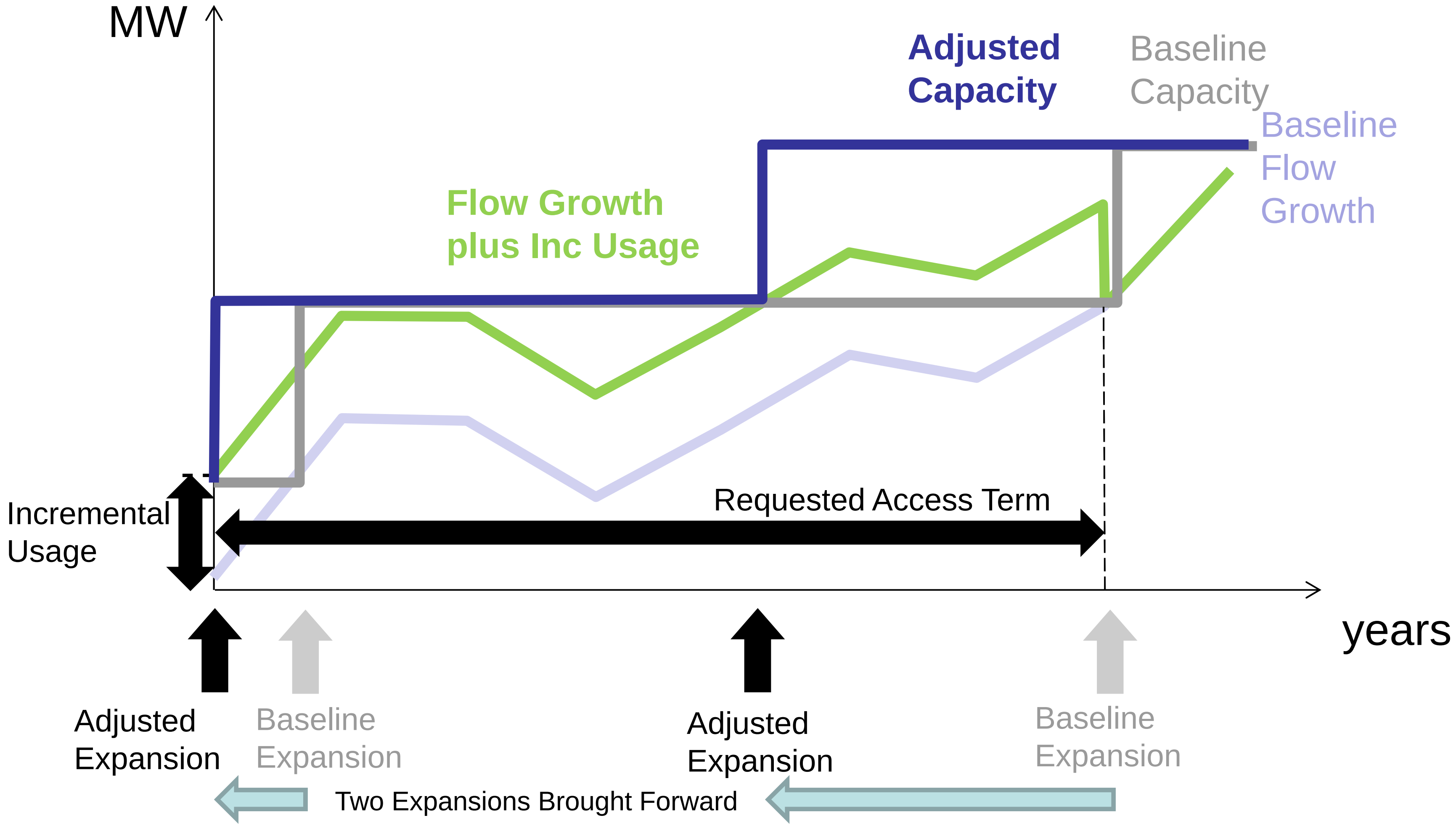
Long run incremental cost

- Under a LRIC method the generator would pay for the immediate and future *incremental* cost (NPV) of providing FAPS-compliant shared network
- LRIC would be estimated by a *stylised* expansion model of the transmission network, considering each network element
- LRIC would also reflect *meshedness* of a network element
  - Reflects spare capacity on remote network elements
  - Discounts spare capacity on core network elements

Baseline network development scenario for a network element



Adjusted network development scenario for a network element



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Prototype Pricing Model

Purpose of pricing prototype model

- We have developed a prototype of the pricing model to help us understand:
  - how the LRIC method could be implemented in practice
  - strengths and weaknesses of using the LRIC method
  - potential access prices, and the extent which these are sensitive to input data and other assumptions
- The prototype will also feed into our assessment of the costs and benefits of implementing optional firm access
- Note: if OFA was to be implemented, a complete, more comprehensive version of the model would be developed

Development of pricing prototype model (1)

- We engaged a software consultant to develop the program for the prototype
- We tested the model with TNSPs and consultants
- The program implements the logic of the LRIC method
- The model comprises 3 elements:
  - A model of the NEM transmission network
  - Other input data
  - The program itself, which calculates LRIC prices
- The model allows the user to select a *location* it wants access from, *a length of time* it wants access for, and *an amount* of access it wants
  - > an LRIC price is produced

Development of pricing prototype model (2)

Input	Source
Existing access	AEMO's transitional access allocation
Forecast access	AEMC assumptions, with generator entry based on 2013 NTNDP
Short-medium term peak local demand	For next 10 years: TNSP APRs
Long-term peak line flow growth	AEMC assumption
Existing transmission network	AEMO
Cost of expansion	Publically available data
WACC	6.4 per cent real pre-tax WACC

How the model works (1)

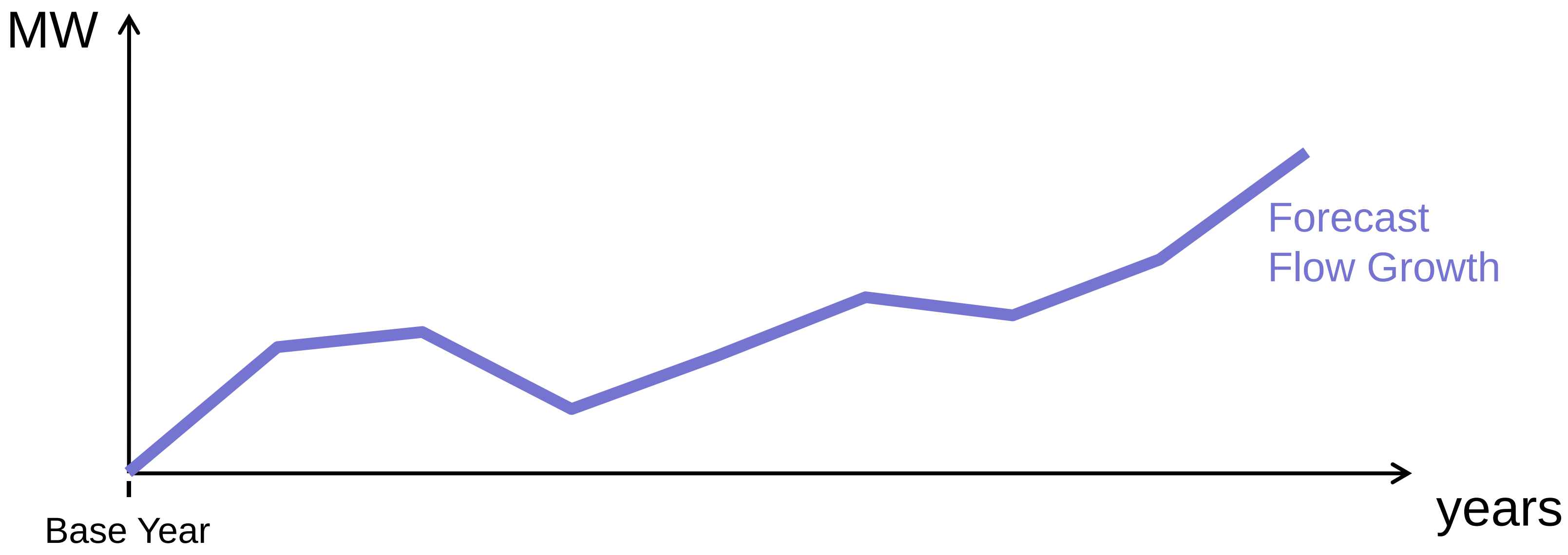
- Prices are based on the difference, in NPV terms, between a baseline modelled network development scenario, and an adjusted modelled network development scenario which accommodates a firm access request.

- Each of the baseline and adjusted network development scenarios are calculated via 6 simplified steps

How the model works (2)

1. Calculation of forecast peak line flow

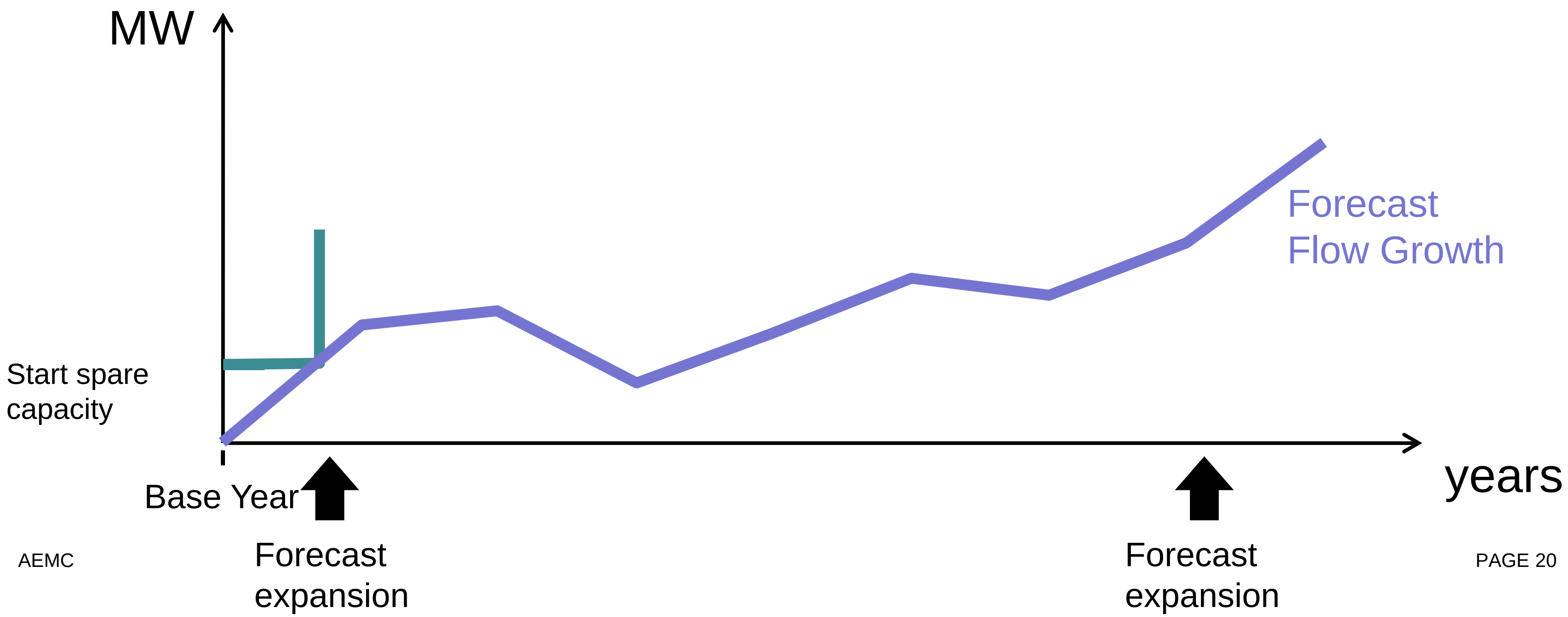
- In the short term, peak line flows are calculated in each year on each line, based on the physical characteristics of each of the lines, the forecast demand at each node, and the forecast firm access at each node
- In the long term, peak flow is assumed to grow by a fixed amount based on final year in which short term method was applied



How the model works (3)

2. Prompting an expansion

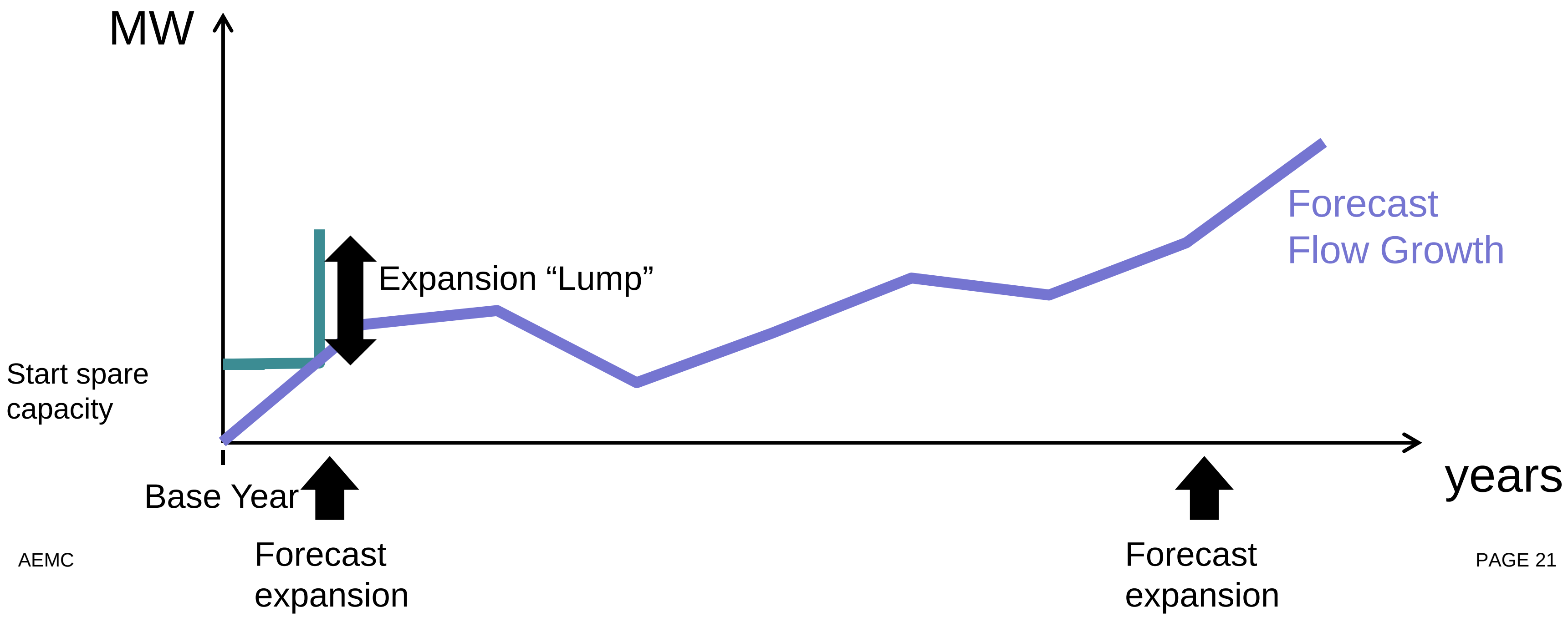
- For each line in each year, forecast peak line flow is compared to the capacity of the line. Where peak line flow exceeds capacity, an expansion is prompted



How the model works (4)

3. The nature and size of the forecast expansion

- Model replicates existing line route
- Size of expansion (MW capacity) based on predefined economic lumpiness of an expansion



How the model works (5)

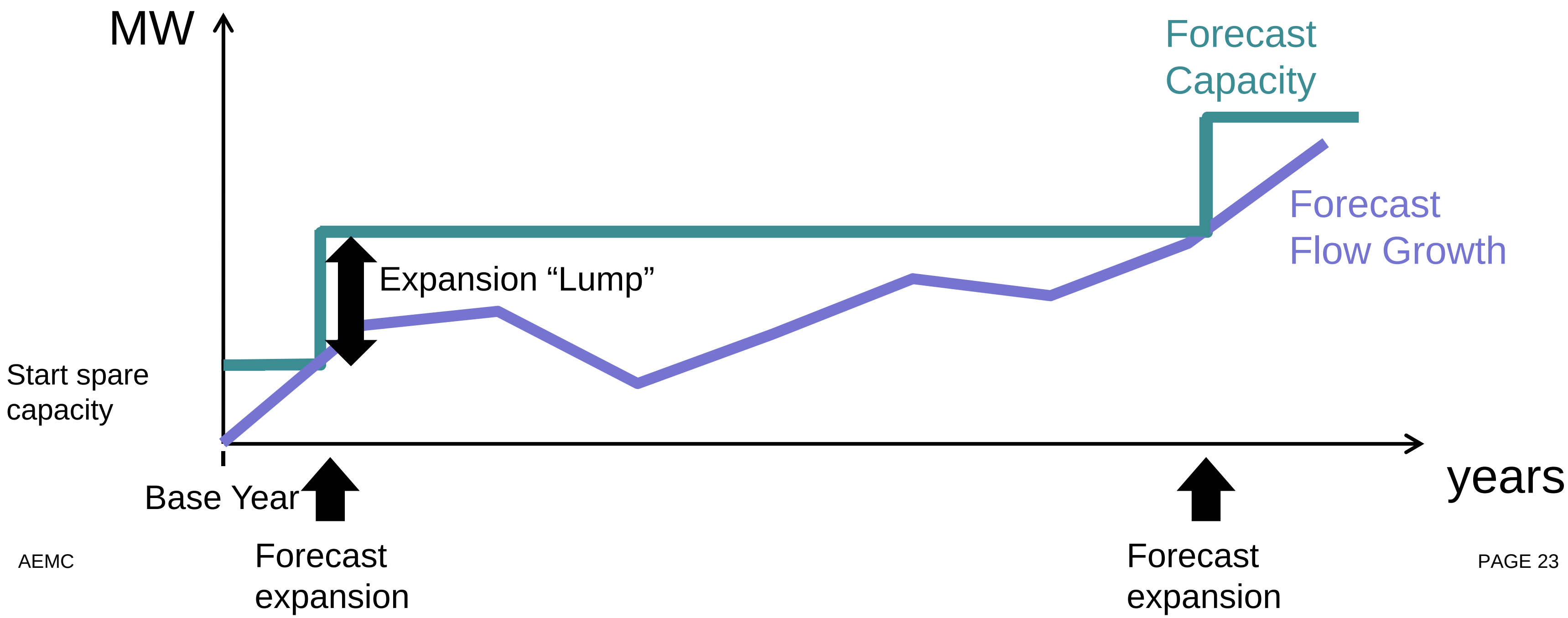
4. Forecast cost of expansion

- For lines: cost per MW (based on lumpiness) per km
- For transformers: cost per MW

How the model works (6)

5. Updating the capacity of the line based on the expansion

- Capacity on the line is increased in years after the forecast expansion, to reflect the expansion
- Further forecast expansions are not required until forecast peak line flow exceeds the new, higher capacity

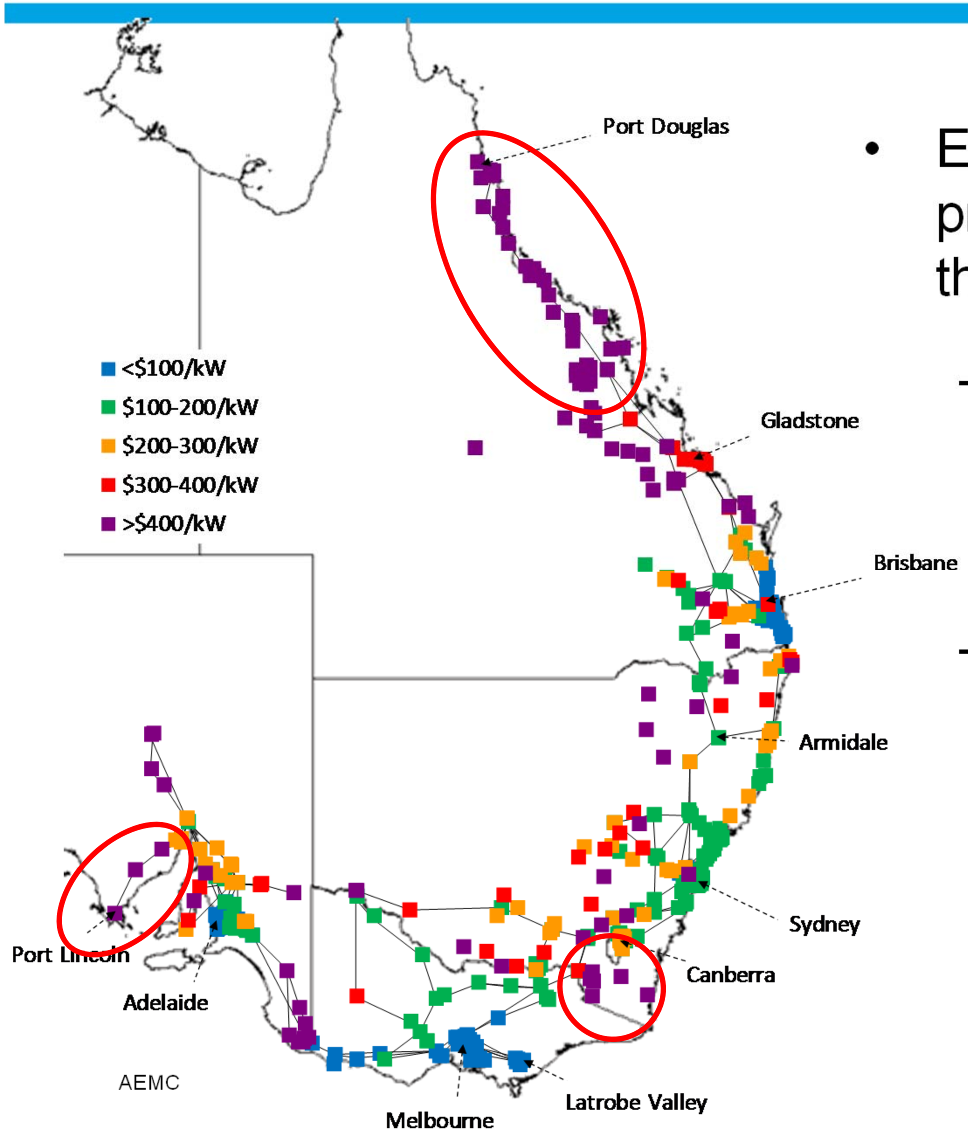


How the model works (7)

6. Calculating the cost of each development scenario

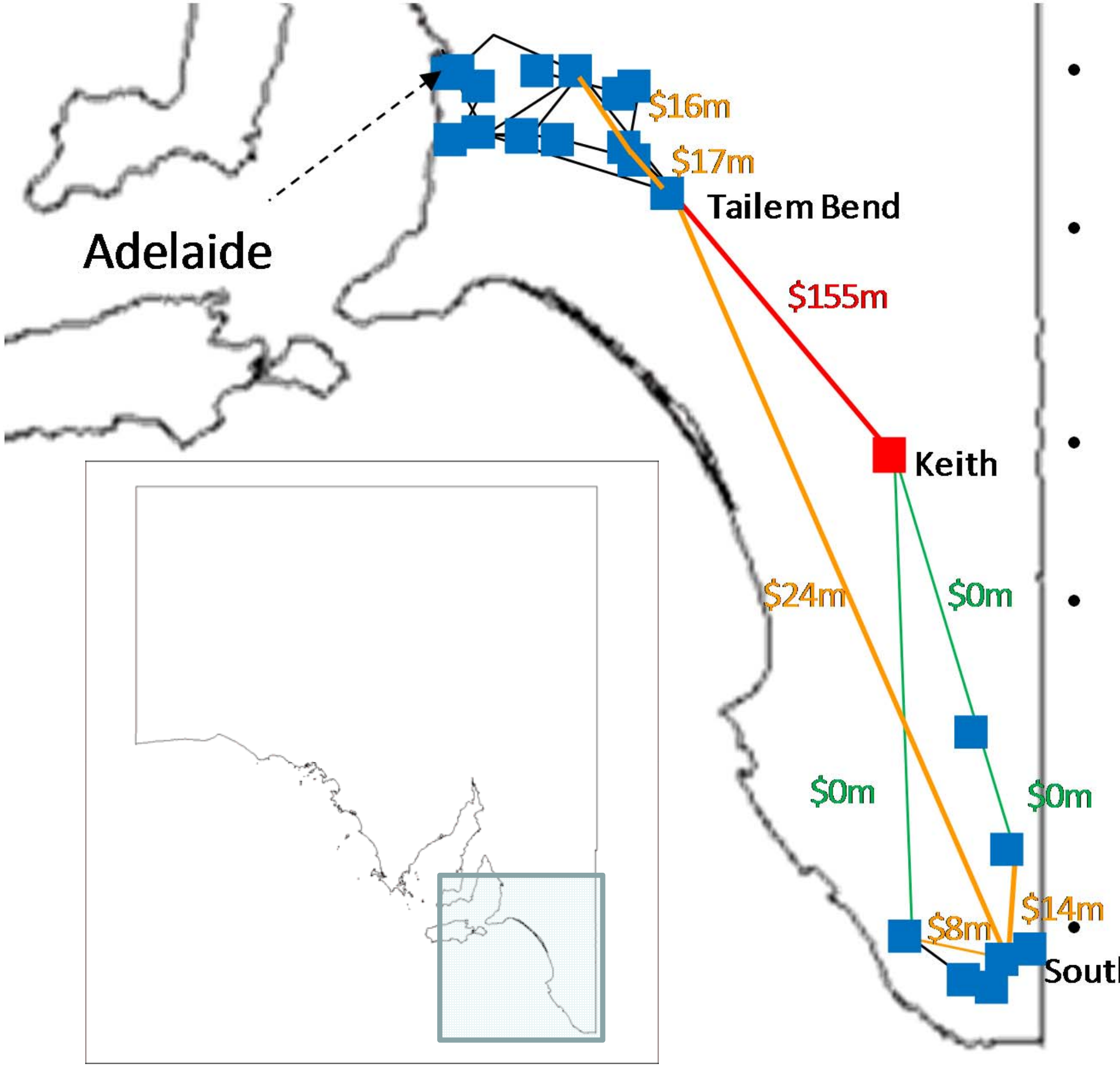
- Sum of the net present cost of all of the expansions on all of the lines which are forecast to be expanded

Results – impact of location on LRIC



- Expected characteristics of LRIC pricing method observed. All other things equal:
  - nodes remote from RRN and other major load centres pay higher price (due to longer transmission lines) and
  - nodes where there is limited spare transmission capacity pay higher price (as expansions are prompted sooner)

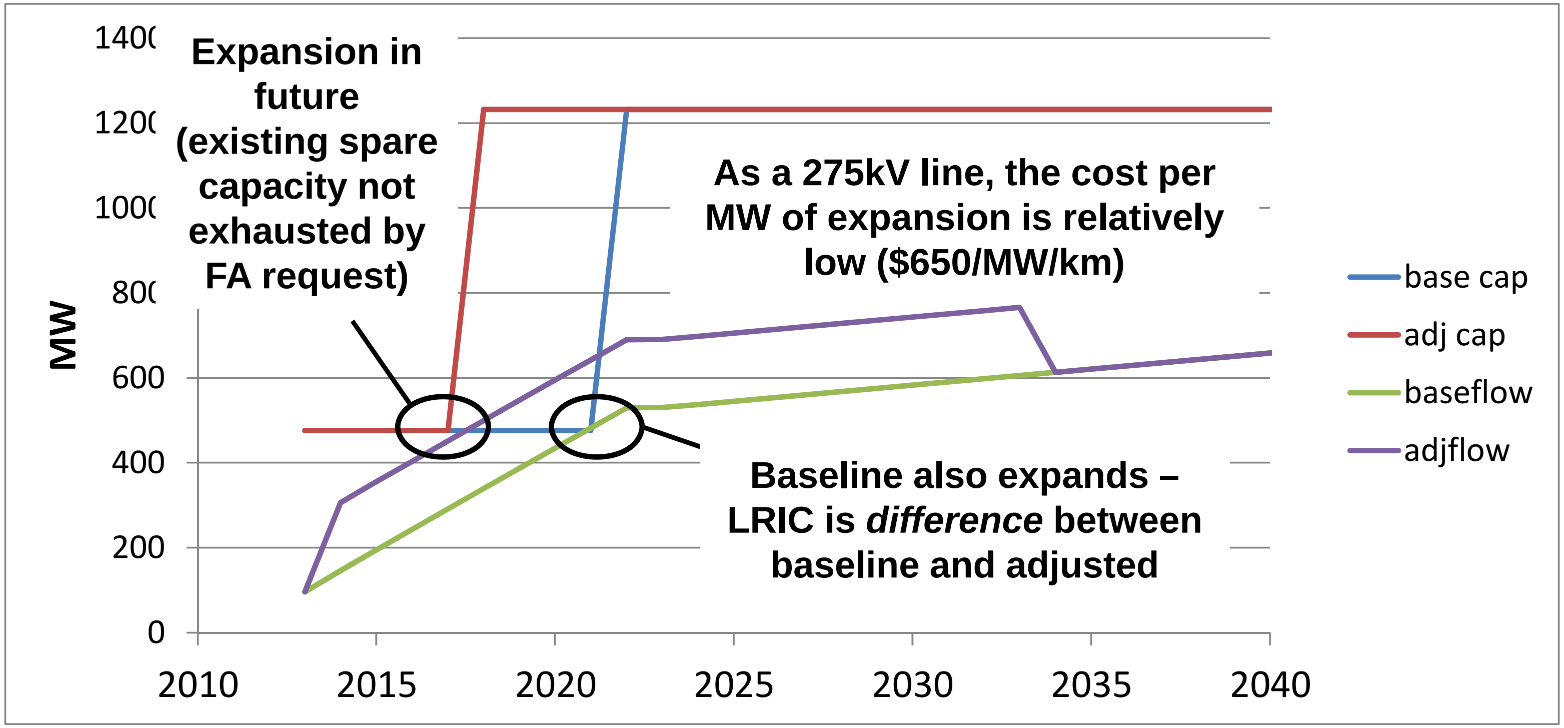
Example node – Keith in SE South Australia



- LRIC = $264m ($661.1/kW) for 400MW for 20 years
- Lines which contribute significantly to the LRIC are marked (90% of LRIC)
- Keith to Tailem Bend is by far the largest contributor to LRIC
- All of the 400MW additional firm access between Keith and the RRN flows through Tailem Bend: 240MW directly, 160MW via South East
- Flow via South East also contributes to LRIC

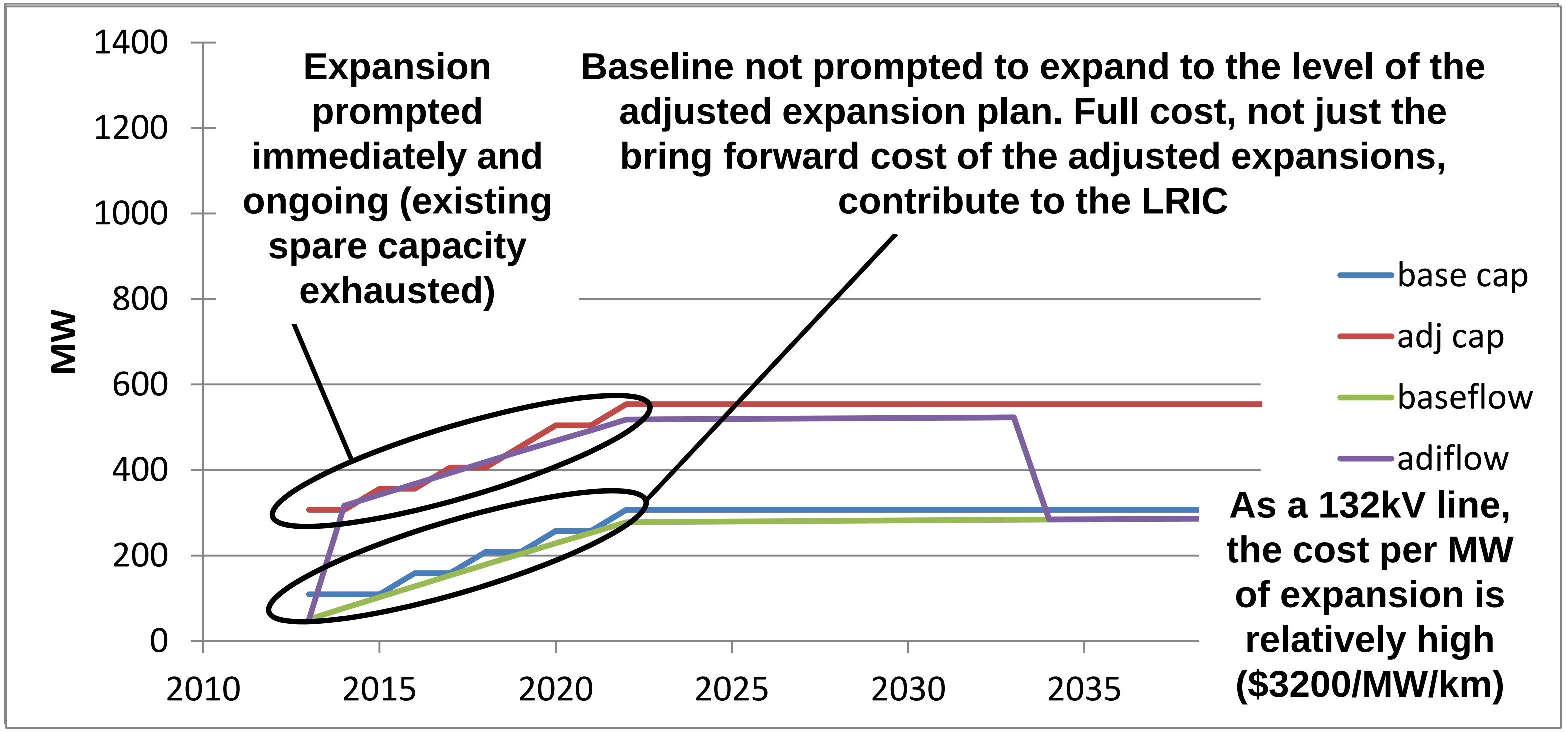
Example node – Keith in SE South Australia

- Focusing on the South East to Tailem Bend 275kV line (LRIC=$24M), we can see how the firm access request prompted an expansion, and hence cost:



Example node – Keith in SE South Australia

- In contrast, examining the Keith to Tailem Bend 132kV line (LRIC=$155M), we can see how the firm access request resulted in higher cost associated with this line:



Limitations to the prototype pricing model

- The prototype model contains a number of known limitations. We consider the most material of these are likely to be that:
  - the model includes augmentation costs but not replacement costs
  - the model does not accommodate non-thermal constraints (such as stability)
  - capacity is always provided by replicating lines along the same route;
  - the quality of the cost input data is limited.
- These and other limitations and methodological assumptions are discussed in more detail in appendix C of the Pricing report
- We are working to overcome as many of these factors as possible

Next steps

Wrap up

- On the whole the pricing model is a work in progress
- It shows a pricing model can work to generate prices for OFA
- The prices produced are showing the right sort of relativities
- We don’t yet have confidence that the *quantum* of prices reflects incremental TNSP costs – prices can’t yet be used as a guide to how much generators would pay if the model was implemented
- We are working to address limitations with the model

Next steps

- We will continue to work through these limitations for the draft report in February 2015
- We will consider submissions we receive plus further work we do
- We look forward to receiving your submissions on pricing by 11 December 2014

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