LRMC Methodology Enhancement Options

Gas TCMF - Gas Transmission Charging Methodologies Forum

23rd February 2006

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Introduction

- ◆ This presentation covers

  - ◆ Summary of the prevailing LRMC Methodology

  - ◆ Options for potential enhancements to the LRMC Methodology

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LRMC Methodology Enhancement Options

Prevailing Capacity Price Methodology

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Prevailing Capacity Price Methodology Recap

- ◆ **Similar capacity pricing methodologies are in place for**
  - ◆ Exit (LRMC)
    - ◆ Defined within the Transmission Transportation Charging Methodology Statement
      - ◆ http://www.nationalgrid.com/NR/rdonlyres/36D16671-5658-43B2-B933-8246418D577C/4170/StatementoftheTransmissionTransportationChargingMe.pdf
  - ◆ Entry (LRIC) – Incremental prices
    - ◆ Defined within Incremental Entry Capacity Release Methodology Statement
      - ◆ http://www.nationalgrid.com/NR/rdonlyres/2161F25D-73D6-4451-8706-A9136EB7E890/4158/IECRv52FinalProposals5Oct05.pdf
  - ◆ Entry UCAs – Used to set reserve prices
    - ◆ National Grid NTS analysis feeds into Ofgem process
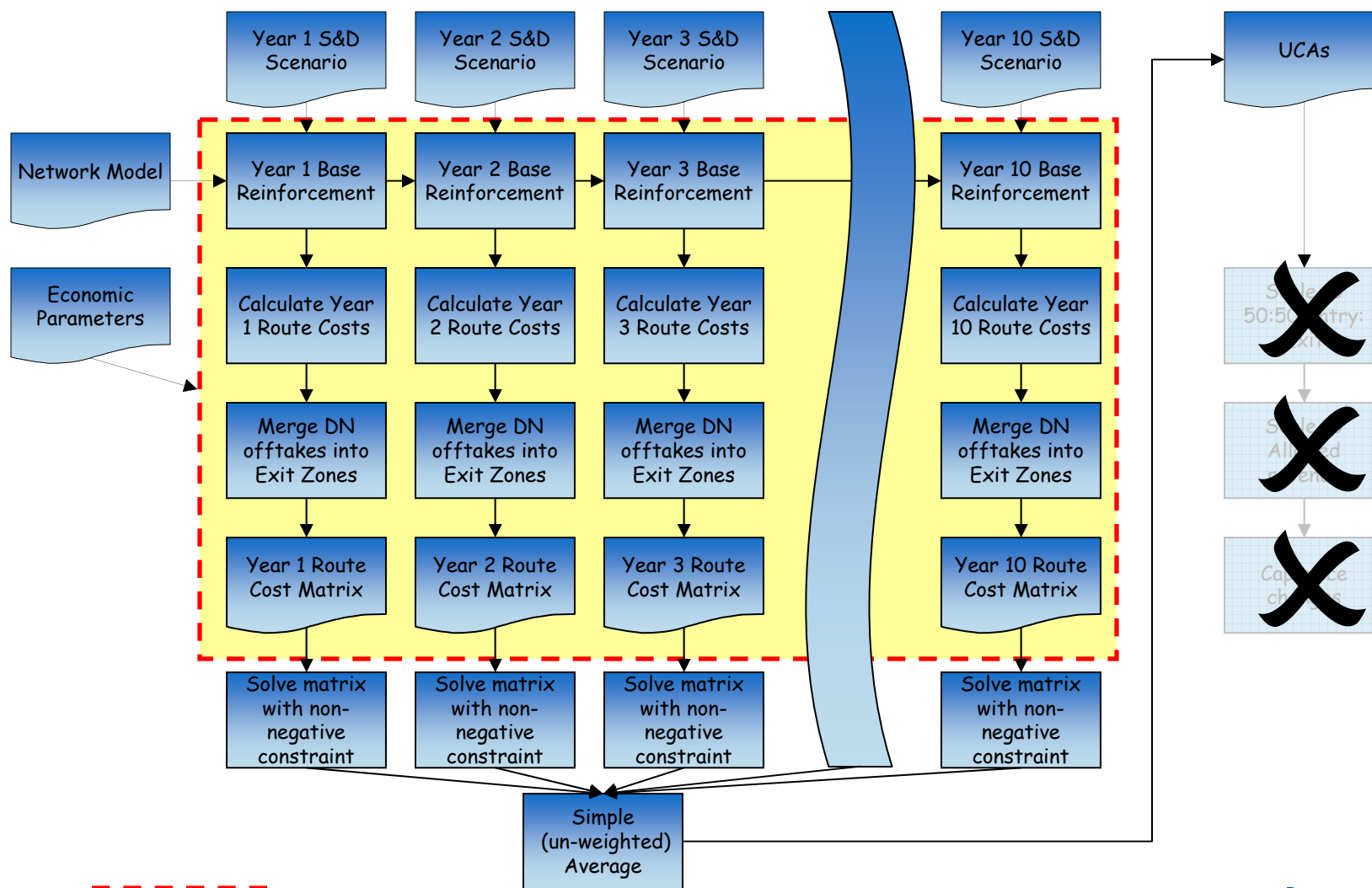
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Prevailing Exit LRMC Methodology
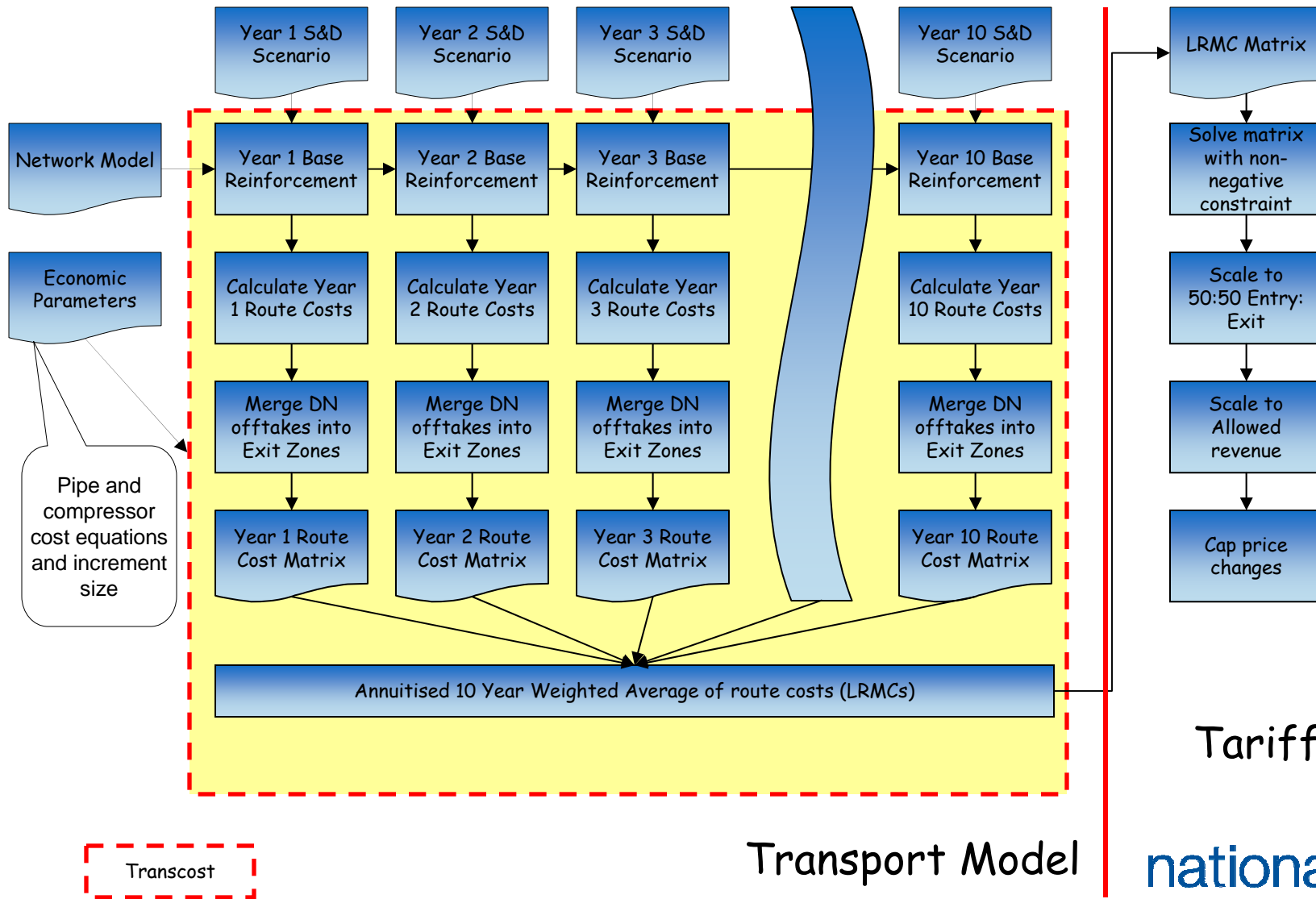
Prevailing Entry LRIC Methodology
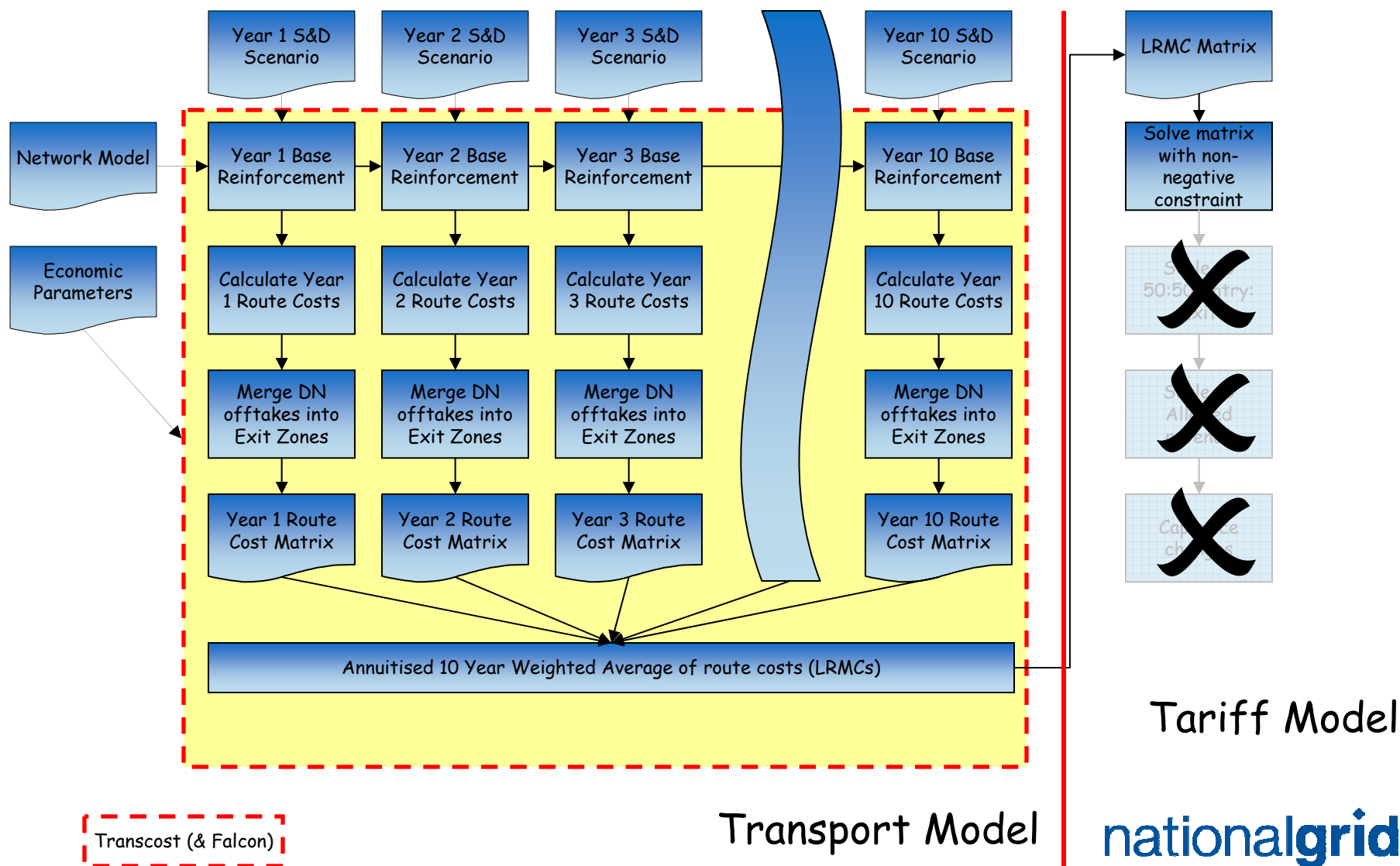
2002 Entry UCA Data Methodology

Potential Enhancements

- **Transport Model**
  - Investigating potential enhancements to "Transcost" and alternative "simpler" models
  - If Transcost is to be retained, considering ways in which model could be made easier to use by industry

- **Tariff Model (post processing)**
  - Assessing whether there are any better alternatives to the way in which the outputs from the Transport Model are used to derive tariffs

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Key Questions for the Review

1. **S&D Scenarios: 1 Year or multiple Year?**
2. **How should incremental costs be modelled?**
3. **How should spare network capacity be treated?**
4. **Should decrement (back flow) costs be considered?**
5. **How should entry and exit costs be disaggregated?**
6. **How should negative costs be treated?**
7. **Should capacity charges be adjusted to 50:50 entry:exit and if so how?**
8. **Are zones required?**
9. **Should capacity charges be adjusted to recover allowed revenue and if so how?**
10. **Should year on year price changes be capped?**

Transport Model | Tariff Model

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Key Questions for the Review

1. **S&D Scenarios: 1 Year or multiple Year?**
2. How should incremental costs be modelled?
3. How shou...
4. Should de...
5. How shou...
6. How shou...
7. Should ca...
   entry:exit...
8. Are zones...
9. Should ca...
   allowed re...
10. Should ye...

- *a) How should S&D scenarios be generated?*
- *b) If multiple years,*
  - *i) The number of years might depend on the duration of capacity on offer*
  - *Ii) When in the sequence should costs be combined?*
  - *iii) Should yearly costs be combined by a weighted or a simple average?*

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Key Questions for the Review

1. S&D Scenarios: 1 Year or multiple Year?
2. **How should incremental costs be modelled?**

   ◆ *Three Transport Model Options…..*

3. How should capacity be modelled?
4. Should decrement (back flow) costs be considered?
5. How should entry and exit costs be disaggregated?
6. How should negative costs be treated?
7. Should capacity charges be adjusted to 50:50 entry:exit and if so how?
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Transport Model 1: Transcost

- Under this option, Transcost would be retained.
  - Incremental flows based on physical flow model
  - Incremental costs based on minimum cost of pipe and/or compression required to maintain pressures
    - Additional compressor units added at existing sites
    - Additional pipe added in parallel to existing pipes
   - NB there is no requirement to fully duplicate a route so the minimum pipe is identified

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Transport Model 2:
Transcost + Expansion Factor

- Under this option, a Transcost type model would be used to simulate incremental injections and offtakes to calculate incremental flows.

- The output used from Transcost would be:
  - the incremental (or decremental) flows on each line segment for a given incremental injection / offtake pair; and
  - the length and diameter of each line segment.

- Separately, an estimate would be made of the cost of accommodating an incremental MWkm of flow over different diameter pipelines (termed the "expansion constant" in the electricity regime).

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Transport Model 2 Process: Transcost + Expansion Factor
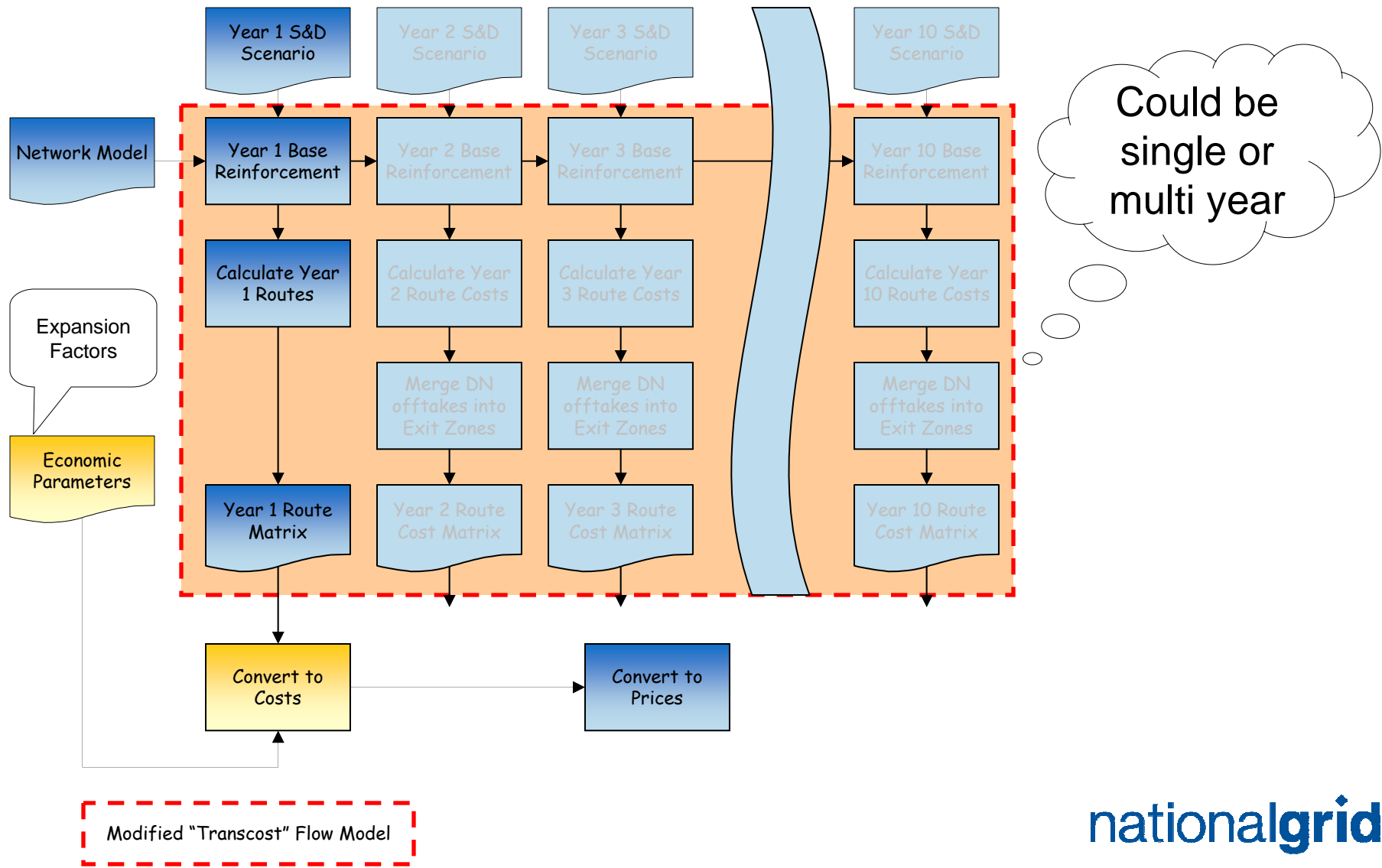
Transport Model 3:
Transportation model + Expansion Factor

- Under this option, the Transcost model is not used.

- The estimation of incremental flows is simply derived from a Transportation model

    - The Transportation Model retains the underlying network model characteristics but does not model flows based on physical flow equations (pan-handle).

    - As in Model 2, an estimated cost to accommodate incremental MWkm on pipes of different diameters is used.

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Transport Model 3 Process:
Transportation model + Expansion Factor
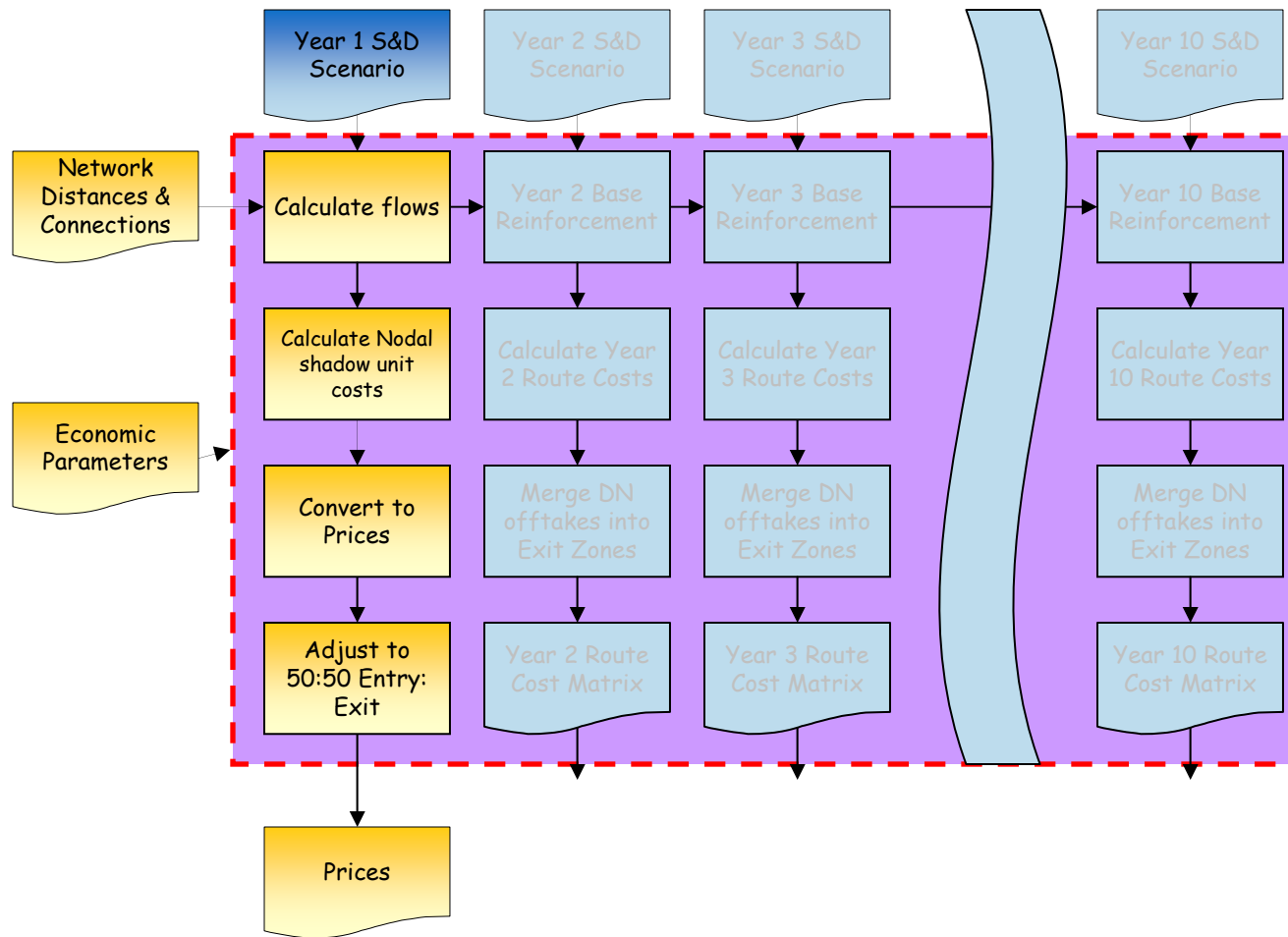
Key Questions for the Review

1. S&D Scenarios: 1 Year or multiple Year?
2. How should incremental costs be modelled?
3. **How should spare network capacity be treated?**

   - *A) Included in the model*
   - *B) Removed by*
     - *Scaling flows*
     - *Removing assets*
     - *Capping pressures*

4. Should ~~be considered?~~
5. How sh~~isaggregated?~~
6. How sh~~l?~~
7. Should ~~to 50:50 entry:e~~
8. Are zon
9. Should ~~capacity charges be adjusted to recover allowed revenue and if so how?~~
10. Should year on year price changes be capped?

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"Spare Capacity"
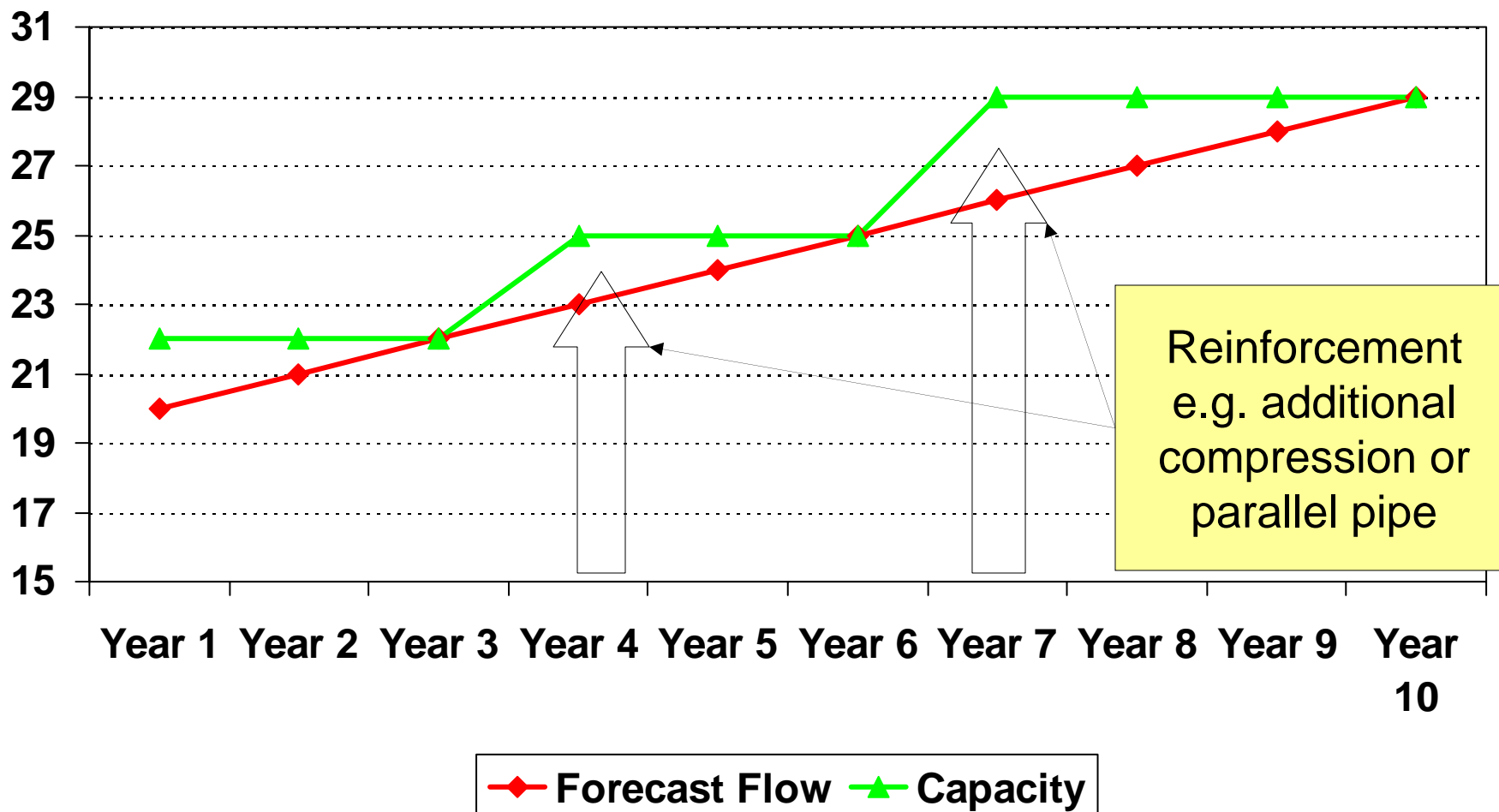
Key Questions for the Review

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2. How should incremental costs be modelled?
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5. How should network costs be disaggregated?
6. How should ?
7. Should capacity charges be adjusted to 50:50 entry:exit and if so how?
8. Are zones required?
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◆ *What costs could be associated with backflow?*

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Decremental Costs

- Decremental flow:
  - An incremental flow in the opposite direction to the prevailing flow
  - If there is an extra unit of Entry at B and an extra unit of Exit at X then the flow in pipe A to Y will <u>decrease</u> by 1 unit
- Costing Options
  - Ignore as flow may be required if no entry flow at B
  - Avoid reinforcing in future = negative of A to Y incremental cost
  - Cost of reducing capacity in pipe A to B
    - Smaller diameter?

Entry A: 10 units

Exit X: 1 units

+1

+1

Entry B: 1 units

Exit Y: 10 units
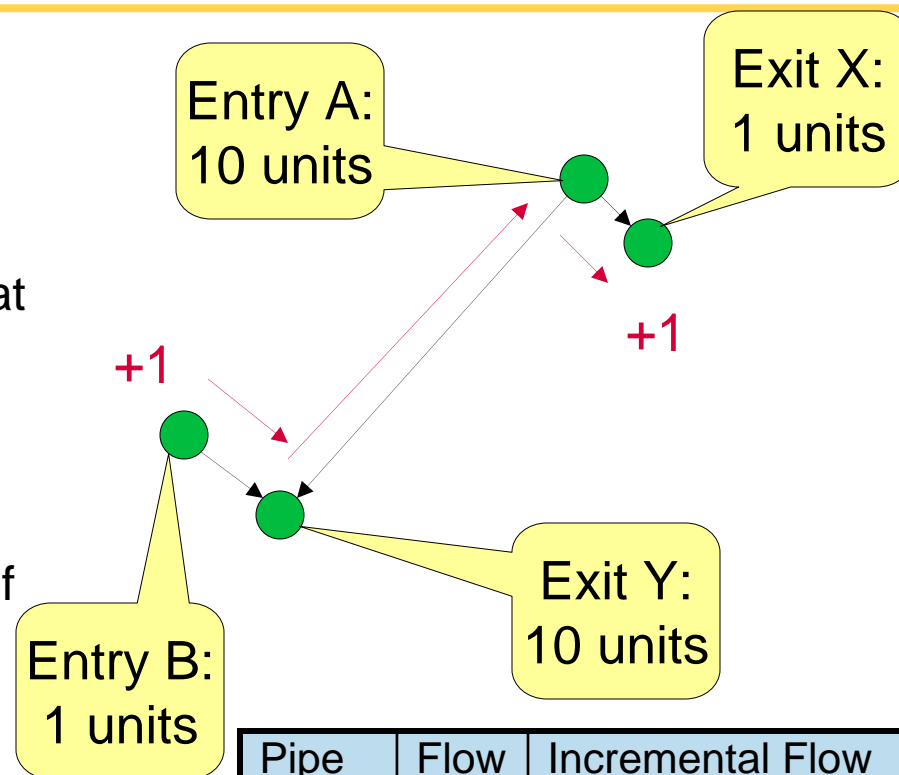
Pipe	Flow	Incremental Flow
A to X	1	2 (+1)
A to Y	9	8 (-1)
B to Y	1	2 (+1)

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Alternate Transport Models Summary

Scenario	Prevailing Exit (Transcost)	Model 1 (Transcost)	Model 2 (Transcost + Expansion Factor)	Model 3 (Transportation model + Expansion Factor)
1. S&D Scenarios: 1 Year or multiple Year?	10 Years	1 to 10 years	1 to n years	1 to n years
2. How should incremental costs be modelled?	Physical Flow Model	Physical Flow Model	Physical Flow Model	Transportation Model
	Physical Flow equation	Physical Flow equation	Physical Flow equation**	Shortest path
	Additional asset costs	Additional asset costs	Expansion constant	Expansion constant
3. How would spare capacity be treated?	Retained	Could be removed*	Would not be modelled	Would not be modelled
4. How would decrement (back flow) costs be treated?	Zero	Could be calculated	Negative expansion constant	Negative expansion constant

method to be defined

***Incremental method to be defined**

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Key Questions for the Review

1. S&D Scenarios: 1 Year or multiple Year?
2. How should incremental costs be modelled?
3. How should spare network capacity be treated?
4. Should decrement (back flow) costs be considered?
5. **How should entry and exit costs be disaggregated?**

   - *A) Reference node?*
   - *B) Solver with*
     - *Non-negative constraint?*
     - *50:50 constraint?*
     - *Other constraint?*
   - *C) Other?*

6. How sh...
7. Should ... 50:50 entry:e...
8. Are zon...
9. Should ... to recover allowed...
10. Should ... capped?

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Key Questions for the Review

1. S&D Scenarios: 1 Year or multiple Year?
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6. **How should negative costs be treated?**
7. Should ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~0:50 entry:e~~~~
8. Are zo~~~
9. Should~~~~~~~~~~~~~~~~~~~ecover allowe~~~
10. Should~~~~~~~~~~~~~~~~~~ped?

♦ *A) Removed …*

   ♦ *by solver?*

   ♦ *as last step in Methodology?*

♦ *B) Retained;*

   ♦ *With obligation to flow?*

   ♦ *Commoditised?*

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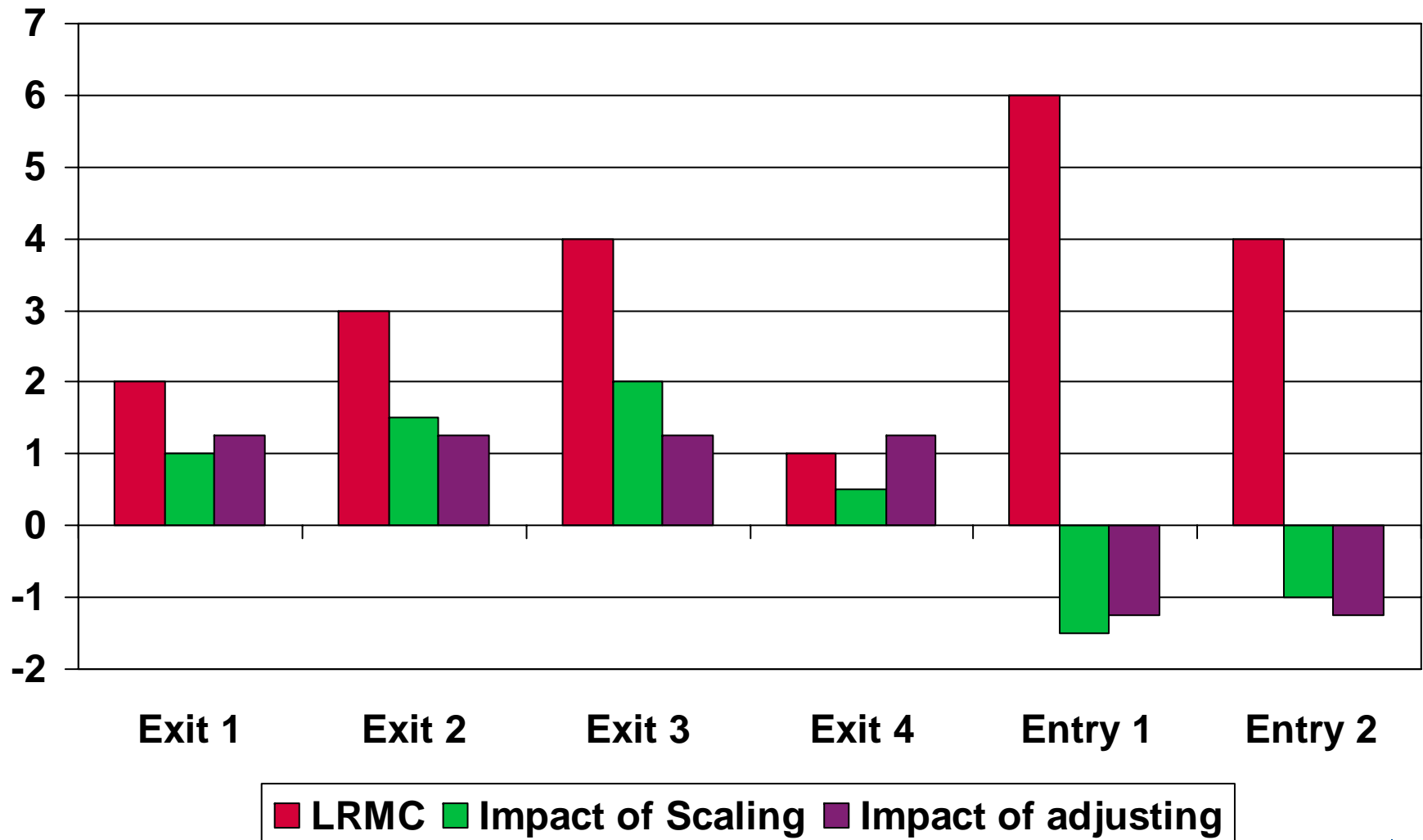7. **Should capacity charges be adjusted to 50:50 entry:exi...**
8. Are zone...
9. Should c... over allowed ...
10. Should y... ...ed?

- *A) 50:50*
  - *Scaling (multiplicative)?*
  - *Adjustment (additive)?*
  - *by solver?*

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Examples of Adjusting LRMCs to 50:50 Entry Exit

Legend: ■ LRMC ■ Impact of Scaling ■ Impact of adjusting

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Adjustment impact compared with scaling

- If Entry Costs increase while Exit Costs decrease
  - Entry points with lower than average costs "lose"
  - Entry points with higher than average costs "win"
  - Exit points with lower than average costs "win"
  - Exit points with higher than average costs "lose"

- If Entry Costs decrease while Exit Costs increase
  - Entry points with lower than average costs "win"
  - Entry points with higher than average costs "lose"
  - Exit points with lower than average costs "lose"
  - Exit points with higher than average costs "win"

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Key Questions for the Review

1. S&D Scenarios: 1 Year or multiple Year?
2. How should incremental costs be modelled?
3. How should spare network capacity be treated?
4. Should decrement (back flow) costs be considered?
5. How s~~hould~~ ~~aggregated?~~
6. How s~~hould~~

    - *A) For DN purposes?*

    - *B) To mirror exit regime?*

    - *C) To enhance stability?*

7. Should~~0:50 entry:~~
8. **Are zones required?**
9. Should capacity charges be adjusted to recover allowed revenue and if so how?
10. Should year on year price changes be capped?

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5. How shoul~~~~~~~~~~~~~~~~~~~~~~~~~~ated?
6. How shoul
7. Should cap
   entry:exit a
8. Are zones

- ◆ *A) No, recover via commodity*
- ◆ *B) Yes*
  - ◆ *i) Scaling (multiplicative)?*
  - ◆ *Ii) Adjustment (additive)?*

9. **Should capacity charges be adjusted to recover allowed revenue and if so how?**
10. Should year on year price changes be capped?

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8. Are zone
9. Should c
   allowed

   ◆ A) To reflect uncertainty (forecast change)?

   ◆ B) To enhance stability?

10. **Should year on year price changes be capped?**

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Alternate Tariff Model Summary

	Issue	Prevailing Exit	Options
5	**How should entry and exit costs be disaggregated?**	Solver with non-negative constraint	Unconstrained Solver or Reference Node
6	**How should negative costs treated?**	Removed via solver	Retained or removed as final step
7	**Should capacity charges be adjusted to 50:50 entry:exit and if so how?**	Scaled	Constant adjustment factor or solver constraint
8	**Are zones required?**	Yes	By price comparison if required
9	**Are capacity charges adjusted to recover allowed revenue and if so how?**	Yes	No - cost recovery via commodity charges
10	**Should year on year price changes be capped?**	Yes (+/- 30%)	No capping or capping based on forecast or average costs

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