Options for Vector Transmission Capacity

Presentation to Transmission Workshop

June 2010

Creative Energy Consulting

Presentation Structure

- Context and Scope of GIC Options Paper
- Commercial Capacity
- Capacity Planning
- Assessment of Current Arrangements
- Options for Change
- Next Steps

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Open Access Transmission

Physical Arrangements

- Design Pressure
- Compressors Capacities
- Supply/Demand Conditions

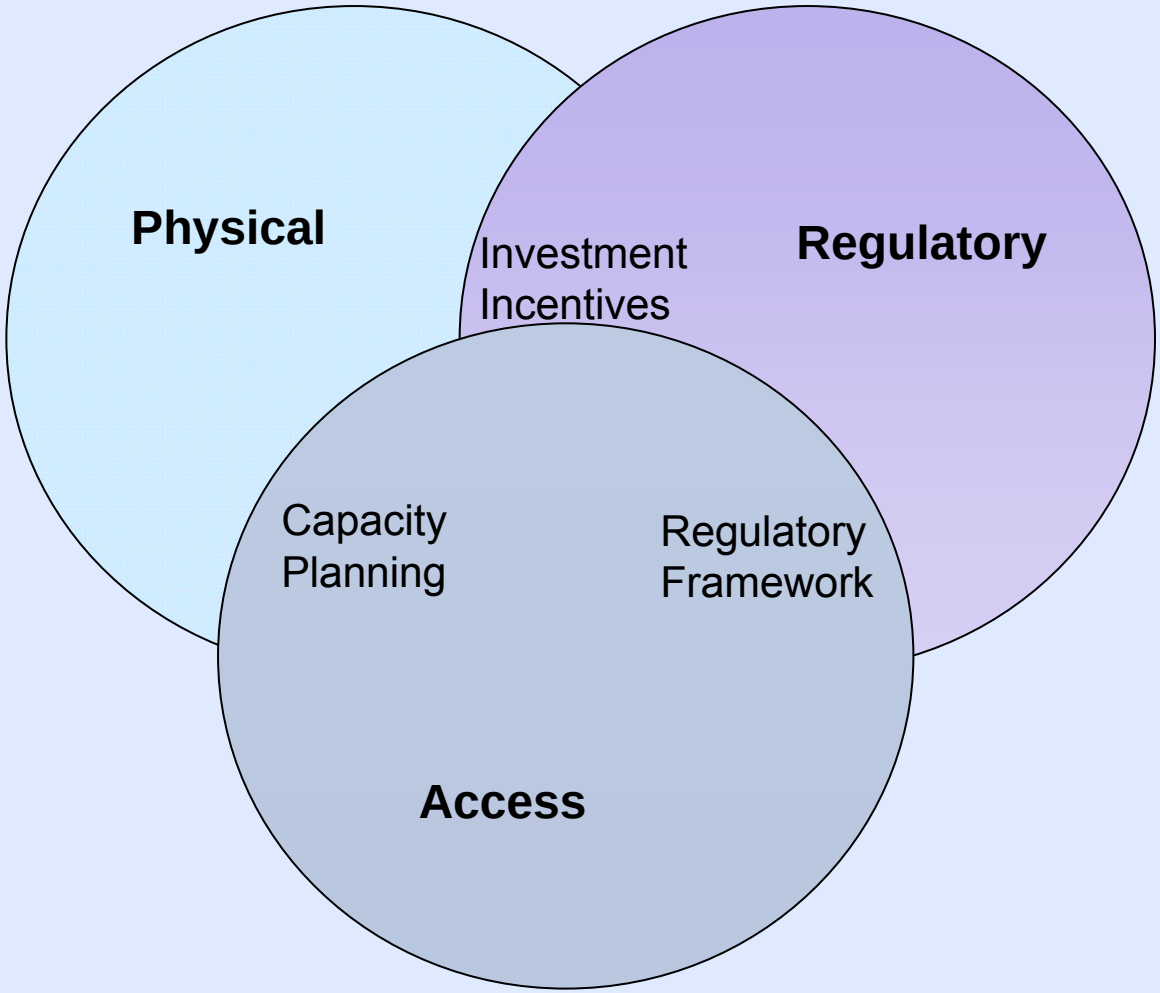
Regulatory Arrangements

- Technical/safety
- Economic

Access Arrangements

- Transport
- Balancing
- Interconnection

Open Access Transmission



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Initiatives and Workstreams

Physical

Supply/Demand Analysis (Vector)

Expansion Options (Vector)

Access

Capacity Workstream (GIC)

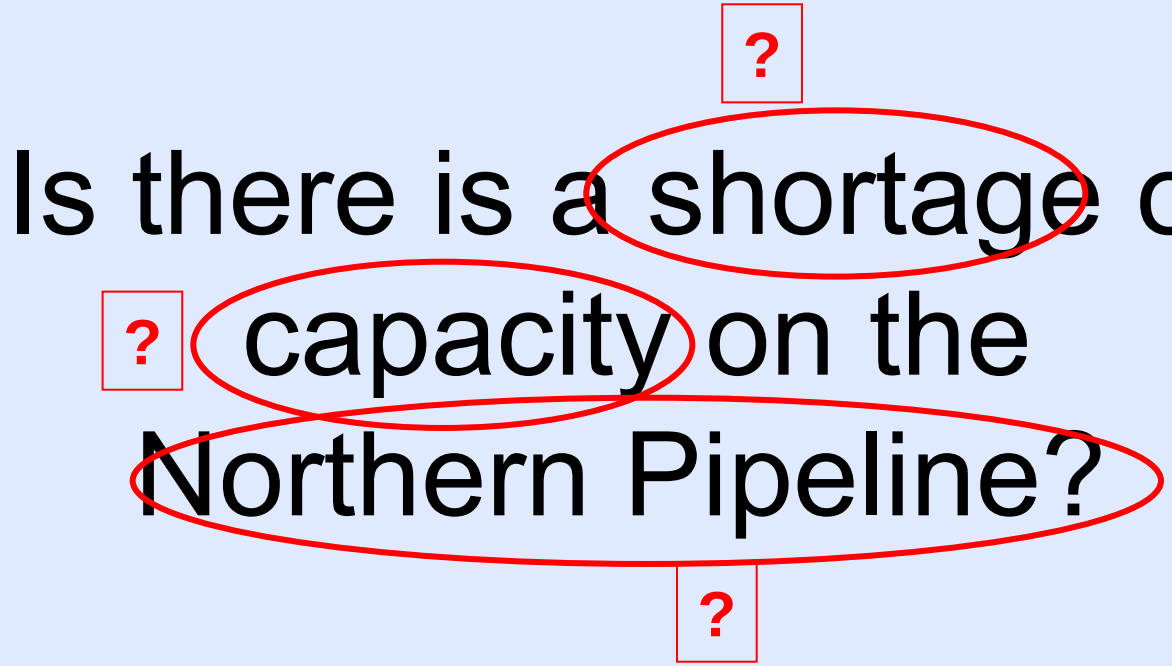
Options Paper (GIC)

ST VTC Options (Vector, Shippers)

Regulation

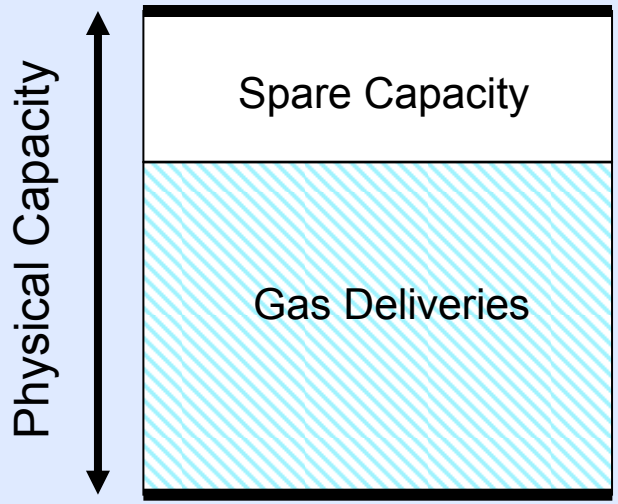
Price-quality Regulation (Commerce Commission)

Northern Pipeline

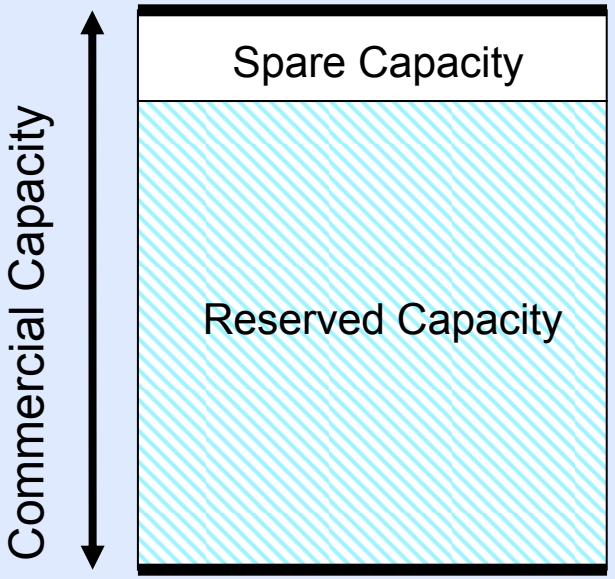


Capacity Types

Physical Domain



Commercial Domain



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Capacity Management

	Physical Capacity	Commercial capacity
Definitions	maximum *gas demand* that can be delivered	maximum *reserved capacity* that can be issued
Limits	operating constraints: eg pressure and survival time	**VTC obligation**: reliably deliver user demand up to reserved MDQ
How Determined	physical modelling or real-time operation	**capacity request process**
Impact of Shortage	congestion: leading to interruption and curtailment	rejected requests: leading to user capacity shortages and retail competition impacts
Current Situation	frequent interruption no curtailment, but close this winter	zero spare capacity on northern pipeline all new requests are being queued

Drivers of Commercial Capacity

- Physical Capacity
- VTC Firmness Obligation
  - Clause 2.2 of VTC
  - VT must deliver each shipper's gas up to its reserved MDQ except under conditions of:
    - Overrun
    - Outage
    - Emergency
- Clause 2.2 will only be breached when:
  - there is curtailment; AND
  - Operating conditions are "normal": no outage or emergency; AND
  - There is no significant overrun

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Measuring Commercial Capacity

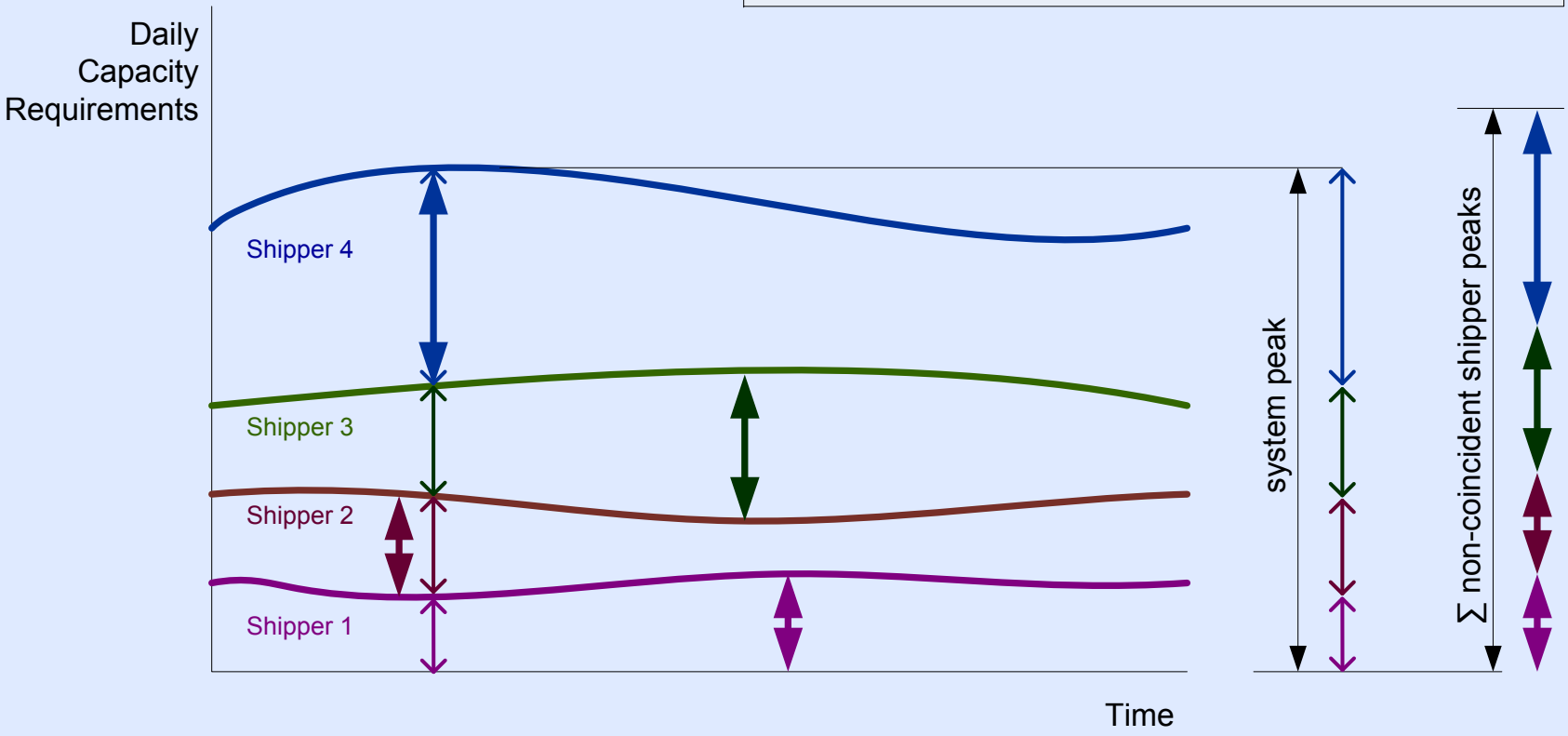
- Capacity Request Process
  - Users submit capacity requests: annual or mid-year
  - Vector considers whether existing + requested reserved capacity could lead to breach of firmness obligation
  - If so, must reject or scale back requests
- Measurement of Commercial Capacity
  - Requests approved implies that reserved + requested < capacity (or equivalently that spare capacity > requested capacity)
  - So, Vector must implicitly measure commercial capacity (or refer to a previous measure) every time capacity is requested
  - How does it do this?

Should Commercial Capacity = Physical Capacity?

- This would ensure firmness obligation met:
  - Curtailment only if gas demand > physical capacity
  - Meaning that gas demand > commercial capacity
  - Meaning there must be some overrun – so curtailment is allowed
- But it is a very conservative calculation of commercial capacity because of:
  - User diversity;
  - Users' "capacity coverage factor": reserved capacity divided by peak demand

User Diversity

$$\text{Diversity Factor} = \frac{\text{system peak}}{\sum \text{non-coincident shipper peaks}}$$



- individual shipper non-coincident peak demand

- individual shipper coincident peak demand

User Diversity Example

- Assume:
  - Physical capacity is 100TJ
  - User diversity factor is 80%
  - *User's request capacity to cover their non-coincident peak demand*
- If commercial capacity limited to 100TJ then
  - System peak demand would be 100TJ * 80% = 80TJ
  - So 20TJ of physical capacity is unused
- In fact, commercial capacity equals 125TJ because
  - 125TJ of total non-coincident peak demand implies:
  - 80% * 125TJ = 100TJ of coincident peak
  - So, system demand should still not exceed physical capacity

Capacity Coverage

Will a user request more or less capacity than its peak demand?

Request less Capacity

- Occasional overrun cheaper than reserved capacity
- Able to buy extra capacity when required
- Able to transfer capacity in
- Able to buy secondary capacity

Request more Capacity

- Minimise Overrun risk
- Overrun attracts damages liability due to curtailment
- Strategic holding to cover retailing requirements
- Able to transfer capacity out
- Able to sell secondary capacity
- Grandfathering value

During shortage, capacity tariff unchanged but capacity *value* increases

High Capacity Coverage Example

- Assume:
  - No user diversity: all users peak at the same time (diversity factor = 100%)
  - Physical capacity = 100TJ
  - Capacity coverage factor = 120%
- Then Commercial capacity is now 120TJ because:
  - if users reserve < 120TJ then:
  - User peak demand is less than 100TJ
  - So , no curtailment

Low Capacity Coverage Example

- Assume:
  - No user diversity: all users peak at the same time (diversity factor = 100%)
  - Physical capacity = 100TJ
  - Capacity coverage factor = 80%
- Then Commercial capacity is 100TJ (not 80TJ) because:
  - Commercial capacity cannot be less than physical capacity
  - Curtailment only if Gas demand exceeds 100TJ - must be overrun
- If reserved capacity is 100TJ then:
  - User peak demand = 100TJ / 80% = 125TJ
  - System peak demand = 125TJ * user diversity factor = 125TJ

Combining Coverage and Diversity

- Conceptually, commercial capacity is:
  - **physical capacity**; times
  - **Maximum of 100% and capacity coverage factor**; divided by
  - **User diversity factor**
- In practice:
  - Vector cannot easily estimate user diversity
  - Capacity coverage usually less than 100%, so probably ignored
- When capacity shortage anticipated:
  - Target capacity coverage may increase
  - Conceptually, commercial capacity should increase correspondingly
  - Practically, difficult to do, so capacity shortage will be created: self-fulfilling prophecy?

Grandfathering

- User entitled to reserved capacity equal to amount in previous year
- So, agreeing to a capacity request creates contingent liability in future years
- Specifically, commercial capacity can fall year-on-year due to reduced capacity coverage or diversity
- But grandfathering means that Vector may be unable to recover reserved capacity already issued

Commercial Capacity Conclusions

- Two types of capacity
- Commercial capacity > physical capacity
- Complex to measure commercial capacity, involving judgement and discretion
- Vicious circle created during anticipated shortages
- Grandfathering means Vector may be conservative and keep back some spare commercial capacity

Capacity Planning

What is capacity planning?

- Forecast demand for capacity
- Identify when/where demand exceeds supply
- Identify investment options to expand capacity
- Select preferred option and invest

Which type of capacity to target?

- Physical – “common carriage”
- Commercial – “contract carriage”

Common Carriage

- Reliability standard established
  - Deterministic
  - Probabilistic
  - Economic
- Invest as needed to maintain that standard
- Minimise investment costs
  - Consider demand-side alternatives
- Investment costs rolled into tariff

Contract Carriage

- Rejected capacity requests are queued
- Invest when queue “long enough”
- Excess investment costs (over and above tariff) recovered from incremental users

What is Vector policy?

- Used to be Contract Carriage
- Currently up in the air – depends upon new regulatory framework

Regulatory Framework

- Determines maximum return on investment
- Common Carriage (revenue regulation)
  - "Prudent" investment included in Regulatory Asset Base
  - Regulated return on RAB
  - "prudency" determined by reference to capacity planning policy: eg to maintain reliability standard
- Contract Carriage (tariff regulation)
  - Maximum tariff specified
  - Return on investment = incremental capacity sales * tariff
- CC approach
  - Currently not decided
  - I think it is likely to be Common Carriage

Demand Forecasting

- Either policy relies on demand forecasts from:
  - Advance notice of capacity requirements (contract carriage)
  - Gas demand forecasts for end-users (common carriage)
- Demand is affected by commercial capacity shortage
  - Prospective users cannot obtain capacity
  - Are they in the demand forecast?

Capacity Planning: Conclusions

- Which type of capacity to plan against: commercial or physical?
- If physical, need a reliability standard
- Vector policy on capacity planning is not clear
- Policy must be aligned with regulation

Current Situation – Northern Pipeline

- Shortage of commercial capacity: capacity requests are rejected
- Unclear if shortage of physical capacity:
  - No historical curtailment during normal conditions
  - Vector predicts no near-term future curtailment
  - But is demand being suppressed by shortage of commercial capacity?

Assessment of Current Arrangements

Capacity Objectives

1. Efficient pricing
2. Efficient allocation
3. Efficient investment
4. Facilitate competition
5. Simple & transparent
6. Price stability
7. Service firmness
8. Transition Costs

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Efficient Pricing

Objective	ensure efficient pricing of capacity
Issues	*Long run*: prices should be levied on coincident peak user demand, not non-coincident peak *Short-run*: prices should reflect scarcity: see “allocation”
Rating	Moderate

Efficient Allocation

Objective	ensure efficient allocation of capacity
Issues	*Grandfathering:* might not allocate capacity to highest value *Issuance*: Vector may be conservative in releasing capacity *Trading*: no effective secondary market *Congestion Management*: coarse process
Rating	Poor

Efficient Investment

Objective	promote efficient investment in new capacity
Issues	*Unclear Policy*: Vector capacity planning policy not clear *Regulation*: current uncertainty in Commerce Commission process *Demand Forecasting*: information from shippers may be unreliable
Rating	Moderate

Facilitate Competition

Objective	Facilitate competition in related markets
Issues	*Shortage of Commercial Capacity:* difficult for retailers to match reserved capacity to customer base *Incumbent Advantage*: retailing incumbent favoured through grandfathering
Rating	Poor

Transparency

Objective	favour simple and transparent design and operation
Issues	*Determining Commercial Capacity:* process is complex, discretionary and unclear *Determining Physical Capacity*: lack of transparency, despite "capacity disclosure"
Rating	Poor

Price Stability

Objective	allow price stability
Issues	*Overrun:* may lead to increase in charges during periods of commercial capacity shortage
Rating	Moderate

Firmness

Objective	provide the level of service firmness that users require and are willing to pay for
Issues	*No intermediate firmness:* existing services are either fully firm or fully interruptible, nothing in between
Rating	Moderate

Transition Cost

Objective	minimise costs of transition from current arrangements
Issues	*No transition Costs*
Rating	Good

Current Arrangements: Summary

Areas of Strength

- *Firmness*: obligations being met
- *Price Stability*: fixed tariffs
- *Transition costs*: no change means no transition cost

Areas of Weakness

- *Allocation*: physical (curtailment) and commercial (grandfathering)
- *Investment*: not happening, policy unclear
- *Competition*: capacity shortage hampering retail competition
- *Transparency*: capacity request process unclear

Capacity Arrangements: Options

- Status Quo
- Contract carriage
- Common carriage
- Hybrid
- MDL regime
- Incremental changes

Basic Options

	Contract Carriage	**Common Carriage**
Reserved Capacity Structure	Like current LT contracts, except that trading allowed	None
Pricing of Transmission	Contract Price and overrun charges	tariff on coincident peak gas demand
Level of Commercial Capacity	equal to physical capacity	Not applicable
Capacity Planning Policy	Contract Carriage: manage queues	Common Carriage: manage reliability
Congestion Management	As now: interruption then curtailment	Pay directly for users to interrupt: recover costs in tariff

Contract Carriage Option

Areas of Strength

- *Transparency*: removes existing "capacity request" complexity
- *Price Stability*: fixed contract prices

Areas of Weakness

- *Allocation*: exacerbates existing commercial capacity shortage
- *Investment*: no allowance for diversity, leading to over-investment
- *Competition*: exacerbates existing issues, increases sunk costs for retailers

Common Carriage Option

Areas of Strength

- *Competition*: removes retailing problems caused by reserved capacity
- *Allocation*: sophisticated congestion management
- *Investment*: clear planning policy

Areas of Weakness

- *Transition*: how to accommodate current LT contracts
- *Firmness*: is reliability standard good enough for “firm” users
- *Price Stability*: congestion management costs recovered through tariff

Hybrid Options

	Hybrid Option	**MDL Carriage**
Reserved Capacity Structure	Users can choose between common or contract carriage	Users choose standard or “AQ” service
Pricing of Transmission	As for common or contract carriage	Similar to hybrid option – *not* current MDL structure
Level of Commercial Capacity	Physical capacity left after common demand supplied	Up to 60% of physical capacity
Capacity Planning Policy	Manage reliability of common demand	*Assume* reliability standard maintained
Congestion Management	Curtail common demand first	Curtail AQ users last

Hybrid Option

Areas of Strength

- *General*: users can choose regime which suits them: retailers will prefer common, “firm” users will prefer contract
- *Allocation*: common carriage congestion management
- *Investment*: clear planning policy
- *Competition*: common carriage for retail market
- *Firmness*: contract carriage for firm customers

Areas of Weakness

- *Transition*: two new regimes to introduce
- *Simplicity*: two regimes to manage

MDL Option

Areas of Strength

- *General*: similar benefits to hybrid option
- *General*: compatible with MDL regime

Areas of Weakness

- *Transparency*: need to introduce MDL nominations regime
- *Allocation*: coarse congestion management process

Incremental Change Option

Change from Current	Reason
Make capacity request process transparent	Current lack of transparency creates user uncertainty
Assign capacity to large customers	Ensure that large customers can obtain competitive supply offers
Adopt a common carriage planning policy	Establish basis for deciding on investment need
Restructure Interruptibility payments	Improve sophistication of congestion management and relieve current congestion
Clarify Pipeline Definitions	Ensure definitions reflect likely constrained zones (rather than balancing pipelines)

Incremental Change Option

Areas of Strength

- *Transition costs*: relatively low cost
- *Investment*: provides basis for efficient investment
- *Firmness*: interruptibility payments allow user value of firmness to be revealed

Areas of Weakness

- *Transparency*: although capacity request transparency improved, large customer process creates new complication

Evaluation Summary

	Current	Contract Carriage	Common Carriage	Hybrid	MDL Carriage	Increment Change
Efficient Pricing	✓	✓	✓✓	✓✓	✓	✓
Efficient Allocation	×	××	✓✓	✓✓	✓	✓
Efficient Investment	✓	××	✓✓	✓✓	✓✓	✓✓
Facilitate Competition	×	××	✓✓	✓✓	✓✓	✓
Simple and Transparent	×	✓✓	✓	✓	×	×
Price Stability	✓	✓✓	✓	✓✓	✓✓	✓
Firmness	✓	✓	✓	✓✓	✓	✓✓
Transition costs	✓✓	×	××	✓	✓	✓

✓✓ good **✓moderate** **×poor** **×× very poor**

Options - Conclusions

- Hybrid Option has best evaluation overall
- Reflects hybrid use of Vector pipelines serving:
  - Wholesale customers (power stations and major industrials)
  - Retail customers (commercial and residential)
- Prevents a capacity shortage causing the retail market to seize up
- Provides continuity for LT users

Implementation Issues for Hybrid Option

- If no additional *physical* capacity then:
  - "zero sum game": some users will "get" more capacity, some less
- Common Users
  - All users/customers currently served by annual capacity
  - Existing users will lose grandfathering rights
  - New users/customers can access capacity – at expense of existing
- Contract Users
  - Existing LT users will retain capacity
  - Can agree to provide "interruptibility"
  - No capacity for new/renewed LT users until sufficient physical capacity to supply common users

Next Steps