

Victorian DWGM Review

Working Group Meeting 1



Agenda

Welcome, introduction and background

Rationale for change

Overview of the proposed model

- Continuous commodity trading in the Southern Hub
- Balancing mechanism
- Capacity allocation

Examples of how proposed model addresses issues into the DWGM

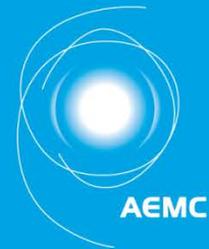
Subsequent working group meeting on 13 July and 10 August will discuss the balancing mechanism, commodity trading, capacity allocation and transitional issues in detail

Victorian DWGM review – context, recap and next steps

- The Final Report for the East Coast review was sent to COAG Energy Council last month.
 - Expected publication 13 July
 - Contains high level recommendations in relation to Southern Hub development
- Energy Ministers to consider recommendations and implementation approach.
- Victorian Government extended DWGM review to allow for further consultation and detailed analysis of issues.
 - Draft Final recommendations to be made in October 2016
 - DWGM recommendations would be implemented in conjunction with broader East Coast Review recommendations.
- This working group created to:
 - Provide stakeholders with further opportunity to understand objectives of proposed reforms
 - Progress solutions to outstanding issues
 - Gather feedback, which we can follow up on individually if required

Workstreams and objectives by October

- In order to address the Victorian Minister's letter and to satisfy ourselves (with regard to the National Gas Objective) and stakeholders that reform to the DWGM is beneficial, the AEMC has identified 5 workstreams to progress by October:
 1. Commodity trading (prior to the gas day)
 2. Balancing (on the gas day)
 3. Capacity allocation (how existing capacity is allocated and traded)
 4. Capacity expansion (how new capacity is created)
 5. Transitional issues relating to liquidity at market start
- In addition to this working group, we intend to work bilaterally with stakeholders:
 - Market participants
 - Consumer groups and large consumers
 - APA
 - AEMO and AER
- Intention by October is not to have fully developed every detail of the market design. Instead, we aim to address high level issues, and be satisfied that detailed issues are resolvable.
- A further work program, involving close collaboration with stakeholders, will be required to finalise and implement the detailed arrangements.



Rationale for change

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AEMC has identified two key drivers for change

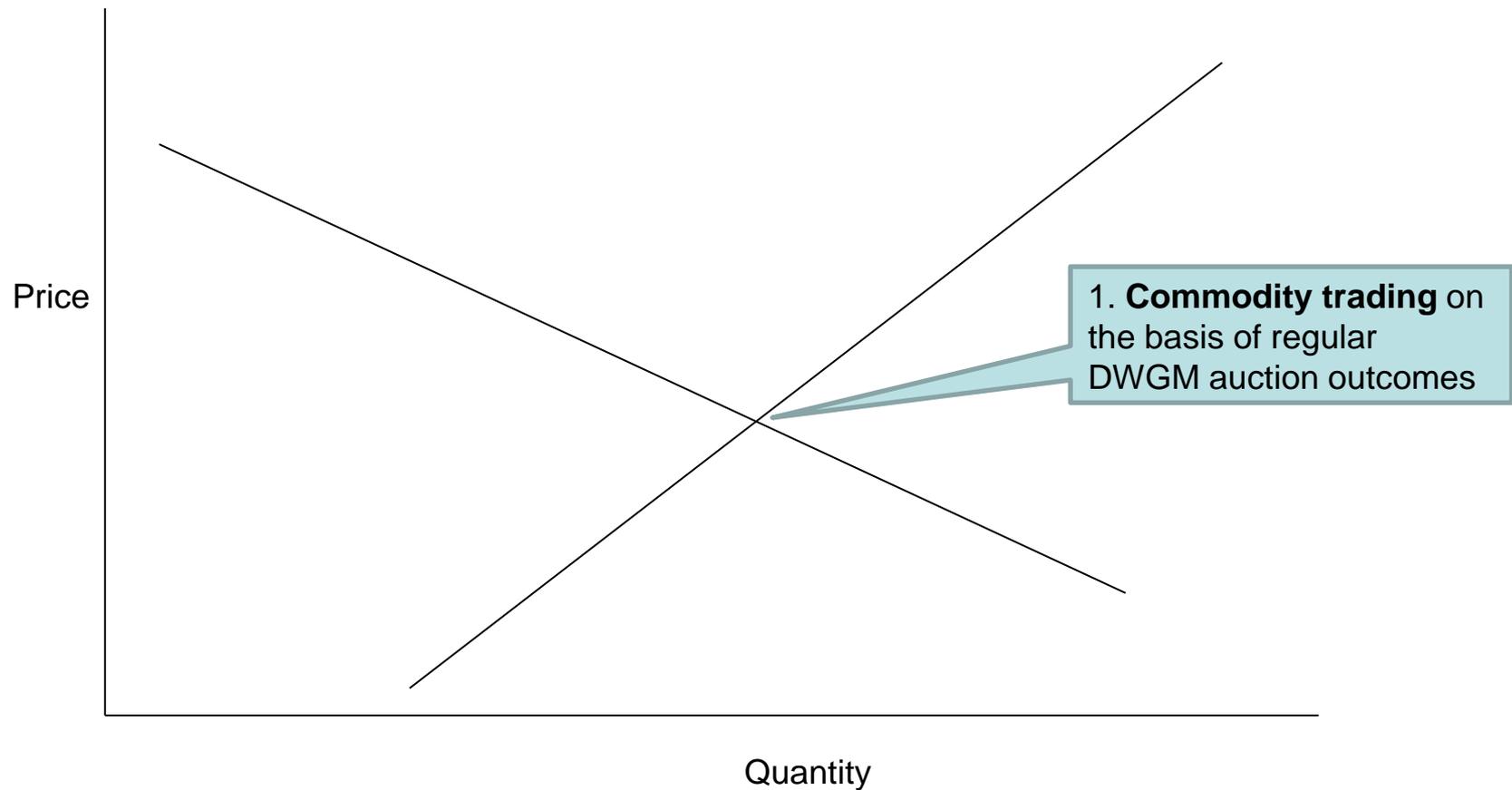
Effective risk management

- MPs only able to hedge short term price risk by taking a physical position through a GSA.
 - About 80% of gas traded bilaterally outside of the market.
- GSAs have become more expensive and less flexible, and look set to remain so in light of a changed supply/demand balance on the east coast market.
- As an alternative to physical hedges through GSAs, trading through facilitated markets must enable price risk to be hedged. However, the DWGM:
 - Does not support forward trading because gas can only be bought on the day; and
 - Unlike the NEM, has not seen the development of an effective futures market to manage the risk of trading on the day, due to intra-day prices, deviation payments/charges and uplift
- As the east coast market becomes more dynamic, the development of liquid physical trading and financial risk management products becomes even more important.

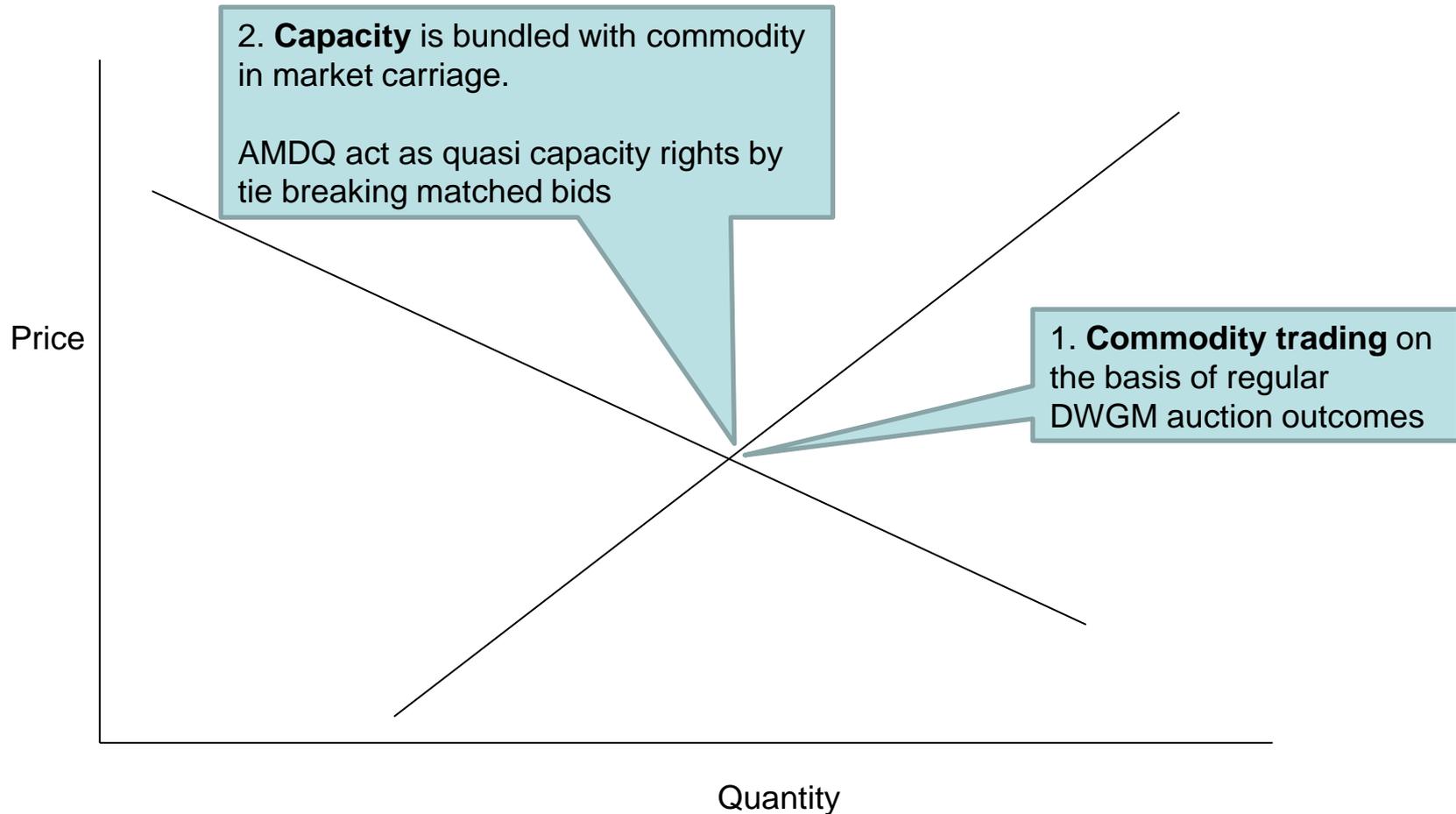
Efficient investment in pipeline capacity

- Ability of market to signal the need for investment in new pipeline capacity is limited, and most capacity expansions are progressed through the regulatory process.
- This places risks on consumers and may threaten the timeliness of investment.

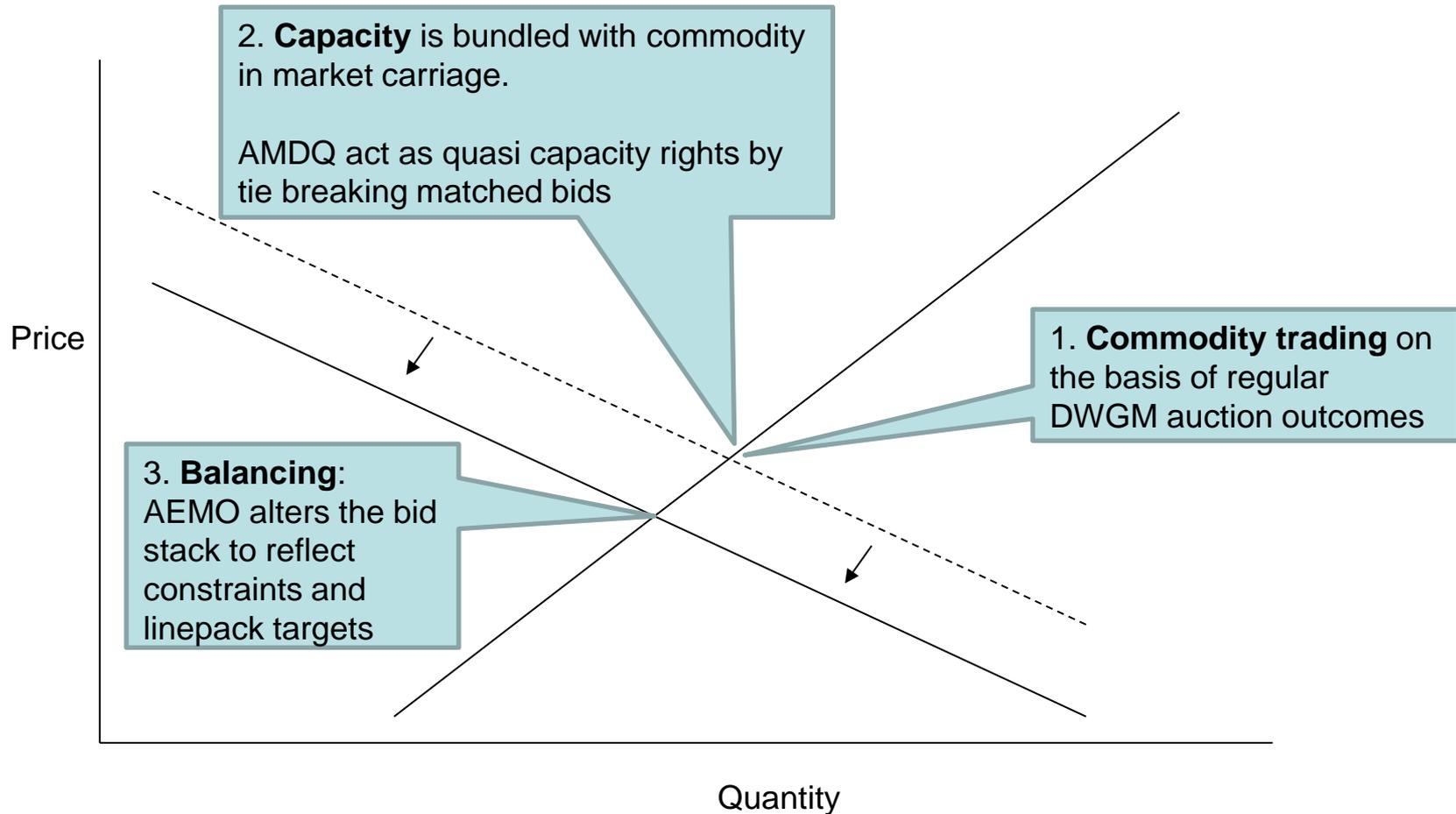
Current DWGM: auction integrates 3 elements into 1



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Effects of current combined DWGM mechanism

DWGM issues primarily a symptom of bundling these 3 elements into 1:

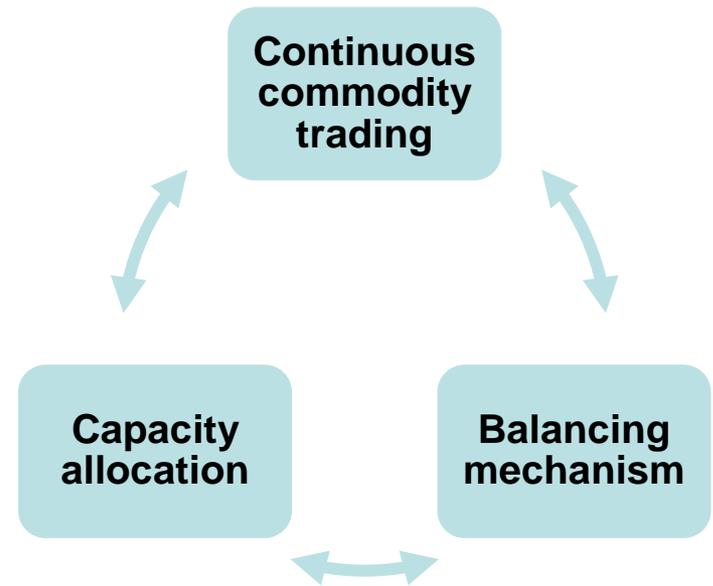
- Regular auction used to manage balancing, but its regularity is inflexible for MPs to buy and sell gas other than for the day.
- No “clean” price for gas commodity or capacity.
 - Scheduling and pricing subject to actions taken by AEMO to manage system security that are difficult to hedge
 - Commodity bundled with capacity so no explicit price signals for capacity investment: investment regulatory led, with risks borne by consumers.
- Auction is compulsory so that AEMO can manage balancing: results in transaction costs for participants not trading.

The DWGM was designed to allow the Victorian gas industry to be privatised at a time when there was less international experience of developing gas markets. It has been particularly successful in encouraging retail competition

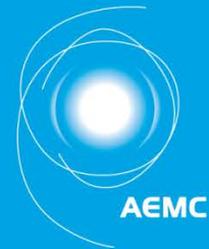
- While arrangements have been adequate to-date, the likely future changes to the east coast market and a multi-connected DTS mean these issues are likely to be more costly going forwards.

The Southern Hub: unbundling the DWGM auction

- **Virtual hub** – all gas inside the hub is fungible
- Unbundles the three elements of the DWGM auction:
 1. **Continuous commodity trading** inside the hub, replacing existing daily auction
 2. **Capacity allocated** on the basis of entry and exit rights
 3. **Balancing mechanism** on the day guarantees system security and gas delivery
- Takes many elements currently managed by AEMO and AER and puts into hands of MPs
- A **substantial change** to the existing DWGM but:
 - common in European markets
 - better able to accommodate changing demand and supply patterns
 - has the potential to be more efficient



Understanding any one element of the design requires an understanding of all the elements



Continuous commodity trading in the Southern Hub – an overview

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Commodity trading – key differences to the DWGM

- Currently, gas can only be traded on the day through the DWGM, with bilateral trade occurring on the periphery of the system (eg, at Longford).
- The proposed entry-exit market will provide more options for commodity trading through an anonymous trading platform and by facilitating bilateral trading at the hub.

DWGM	Southern Hub
Daily trading – gas trading occurs through MPs being scheduled to inject and/or withdraw by AEMO, with further reschedules across the day	Continuous trading – bilateral or exchange based trading at any time for a variety of products of different lengths
Mandatory “trading” – all gas must be offered into and bid out of the market on a daily basis, even if one MP on both sides of the trade	Voluntary trading – trading or otherwise determined by need of MP. No need to “trade” with oneself
Access to DTS capacity is implicitly bundled with the gas commodity through the outcomes of the DWGM – hence “market carriage” (note AMDQ operate as quasi-capacity rights)	Capacity (the subject of later slides) sold distinctly from commodity. Trading of pure commodity product on the exchange

- These Southern Hub characteristics are **identical to commodity trading at Wallumbilla.**

Commodity trading in a virtual hub

- Despite sharing many characteristics with Wallumbilla, it is appropriate that the Southern Hub would be a **virtual hub**, like the existing DWGM:
 - All gas inside the hub is equivalent and fungible
 - Trades happen at a “notional point” (ie, nowhere and everywhere) rather than at a specific geographical point on the network (eg, at specific points within the Wallumbilla compound)
 - Pools liquidity
- A virtual hub is appropriate on the DTS because of the likely difficulty in efficiently allocating point-to-point capacity rights within the complex pipeline system.
- The virtual hub means that:
 - MPs are responsible for the delivery and receipt of gas to and from the system
 - MPs are not responsible for ensuring that gas is transported across the system
 - The system operator (SO) manages the system to ensure the physical delivery of gas and system security

Commodity trading platform and location

Trading platform

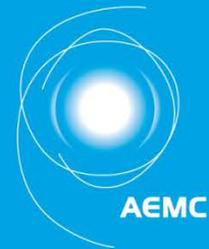
- Intention is to use the existing Trayport GSH system operated by AEMO.
 - Although likelihood is that trading hours will need to be longer than for the existing GSH, and a more robust system.
- Trayport will continuously match buy and sell orders submitted.
- Existing AEMO settlement and credit risk management process could be utilised.
- Trayport functionality might also be used to notify AEMO of bilateral transactions.

Trading location

- Title transfer for trading products (and notified off-market transactions) will occur at a single notional location (ie, the “Southern Hub”, not a specific location).
- Additional, more granular locations may be required for congestion management purposes (to be discussed later).

Commodity trading products

- Trading products to be based on a uniform flow rate.
- Consideration will need to be given to the minimum trade size (ie less than 1TJ may be appropriate).
- Products might initially be based on those offered at the GSH:
 - Monthly
 - Weekly
 - Daily
 - Day-ahead – consideration will need to be given to the time at which trading of the day-ahead product closes
 - Balance of day – delivery to occur from the hour after the time of the transaction through to the end of the gas day
- Hourly products also likely to be required for participant and system operator balancing purposes (to be discussed later).
- As with the GSH, objective is for products to be easily developed (or removed) to suit MP requirements.



Balancing mechanism – an overview

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Current balancing action undertaken by AEMO

- Currently, balancing action to ensure system security is taken by AEMO through the DWGM auction, every 4/8 hours.
- An objective of the auction is to balance supply and demand.
- When actual flows deviate from nominations, or there are local balancing requirements, AEMO alters the auction outcomes by:
 - Applying constraints to the operating schedule
 - Overriding MPs demand forecasts
 - Buying/selling linepack to meet end-of-day linepack requirements
- These actions result in:
 - MPs scheduled differently to the lowest price gas to meet demand (this is the whole point!)
 - Altered settlement outcomes for MPs
 - Ancillary payments and matching uplift charges

A voluntary exchange underpinned by compulsory balancing mechanism

- By replacing the scheduled auction with continuous trading, existing balancing actions through the auction would no longer be available
- While trading will be **voluntary**, market participants would instead be subject to a **compulsory** balancing mechanism
- The aim of the mechanism is to ensure **system security** and the **delivery of gas** given the limited useable linepack in the system
- The mechanism achieves these through:
 - **Financial incentives** on MPs not to cause system security issues; and
 - **Residual balancing** by the SO, if despite these incentives, system security is threatened
- Providing the system is physically capable, and an MP has exit capacity rights, it will be guaranteed delivery of gas even if it or its counterparty is short of gas: the SO will secure gas if needed.

Financial incentives for MPs to manage the system

- The cost of SO residual balancing if it is required will be passed to those MP that caused the issue
 - At the time that action needs to be taken if the system is short (long), MPs who are short (long) are charged a proportion of the cost of the action
 - MP is short (long) based on its injections, withdrawals and trades, included traded for the day entered into in the past
 - MPs would be provided information in near real time as to their own position and the system's position, to inform their actions.
 - If no residual balancing is undertaken, no costs will be passed on.
- Being charged a proportion of costs of residual balancing action creates an incentive on MPs to be “in balance” by adjusting their injections or withdrawals, or trading through the exchange.
 - System balancing is primarily done by MPs, acting on these incentives

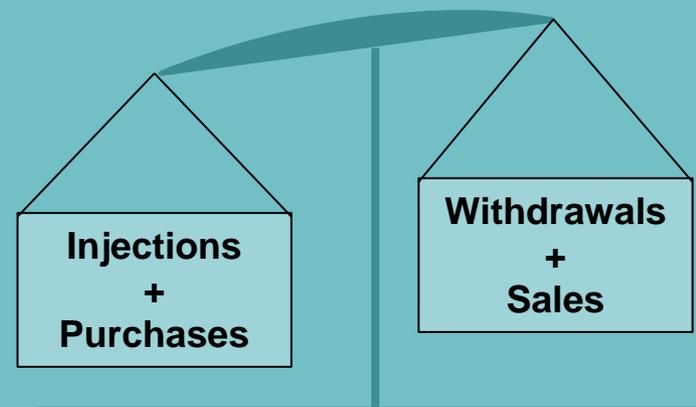
System Balancing Signal and individual position

MPs must compare the system's position with its own position:

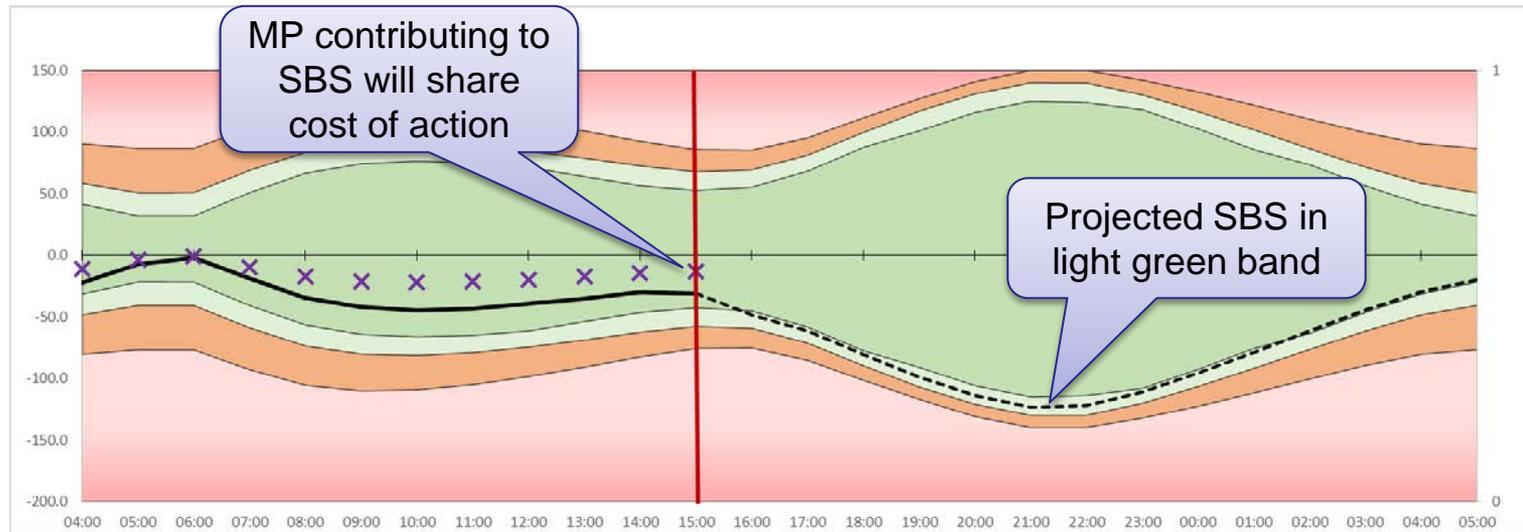
- The System Balancing Signal (SBS) indicates the system's position.
- SBS is a measure of actual/forecast linepack in the system
- Put another way, SBS is the sum of all injections and withdrawals by all MPs
- SO determines in advance and publishes the limits for SBS at which will it undertake residual balancing

Vs.

- The individual position (POS) is the sum over time of a MP's near real time injections, withdrawals and trades.
- Balancing actions by a MP are to change physical injections, physical withdrawals or trades



System Balancing Signal and individual position



Residual balancing undertaken by the SO

- The SO acts as a residual balancer only when, despite incentives on MPs, system security is threatened.
- When linepack is no longer adequate for the system to meet injections and withdrawals, SO must undertake residual balancing.
 - For example, it could buy or sell gas on the commodity exchange.
 - This is analogous to current action taken through the auction, but only on residual balancing issues not already addressed by MPs.
- Action must be timely and cost effective – more rapid action may be more expensive, but may be necessary in some circumstances
- Ultimately, if market-based mechanisms fail, the SO could direct a MP to inject, cease injecting, withdraw or cease withdrawing gas.
 - This is analogous to AEMO's current emergency directions.

Examples of balancing and trading

Short due to higher withdrawals

- A MP has an expected demand on 15 June of 10TJ and sources it in advance from a combination of GSAs, bilateral trades and trades on the exchange.
- On 15 June, the MP now expected to withdrawal 13TJ
- The MP has 4 choices on 15 June (ie, the Gas Day):
 1. **Inject** more gas, sourced from its portfolio or through a bilateral trade outside of the exchange
 2. **Withdraw** less gas
 3. **Trade** (purchase) gas on the exchange
 4. Take no further actions and risk being charged by the system operator if action is required.

Short due to high NEM prices

- The NEM price unexpectedly spikes, prompting a gas fired generator to start consuming 10TJ of gas.
- The MP has some flexibility in its GSA, and promptly increases its injections by 7TJ, but remains 3TJ short of gas.
- The MP can:
 1. bilaterally trade outside of the hub and **inject** additional gas
 2. **Withdraw** less gas, perhaps from elsewhere in its portfolio
 3. **Trade** (purchase) gas on the exchange for the day
 4. Take no further actions and risk being charged by the system operator if action is required.

Note that regardless of action taken by the MP, delivery of gas is ultimately ensured by the SO

Examples of balancing and trading

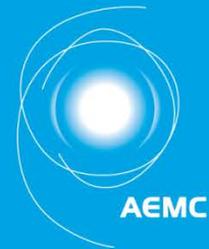
Long due to unexpected plant failure

- A manufacturer has a long term purchase from the exchange of 10TJ of gas per day. It sources all its gas needs in this manner
- Its plant unexpectedly shuts down, meaning it is long by 10TJ of gas
- As the MP cannot adjust its injections or withdrawals, it has 2 remaining choices:
 1. **Trade** (sell) gas on the exchange
 2. Take no further actions and risk being charged by the system operator if action is required.
- To the extent this reduces the exchange price of gas, this may provide signals to other MPs to reduce their injections or increase their withdrawals (eg, Gas Fired Generation, storage)

Short due to committed trade

- A week ago, a MP traded 10TJ of gas with a counterparty through the exchange, for today.
- The MP is short of gas to fulfil this trade. It can:
 1. bilaterally trade outside of the hub and **inject** this gas
 2. **Withdraw** less gas, to the extent the MP would otherwise have done so
 3. **Trade** (purchase) gas on the exchange for the day
 4. Take no further actions and risk being charged by the system operator if action is required.

Note that regardless of action taken by the MP, delivery of gas is ultimately ensured by the SO

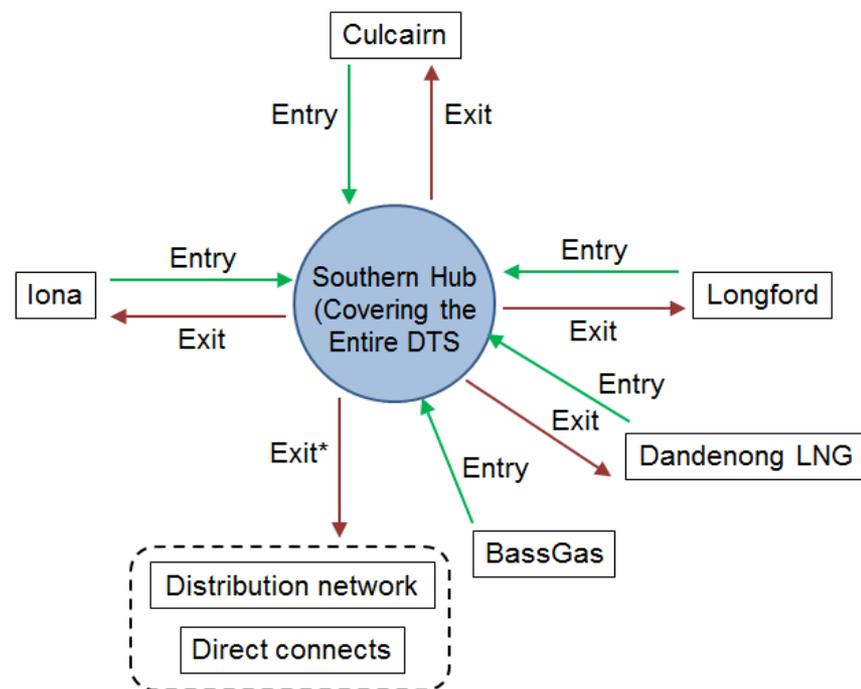


Capacity allocation – an overview

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Explicit capacity rights

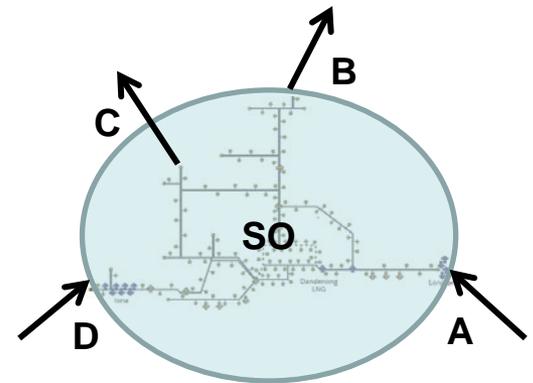
- In the DWGM (and the NEM), access to transmission capacity is **bundled** with the commodity product, and determined through the auction.
 - MPs bid/offer gas
 - winning bids/offers are automatically granted access (“*market carriage*”)
 - AMDQs act as quasi capacity rights
- In the proposed Virtual Hub, there would be explicit capacity rights for entry to and exit from specific locations in the hub.
 - MPs would need to hold sufficient entry and/or exit rights
- As the hub is virtual, all gas inside the hub is equivalent and fungible – the SO manages the flows.
 - Point-to-point rights not required



- Entry/exit rights are at any point where gas enters or exits the Declared Transmission System.

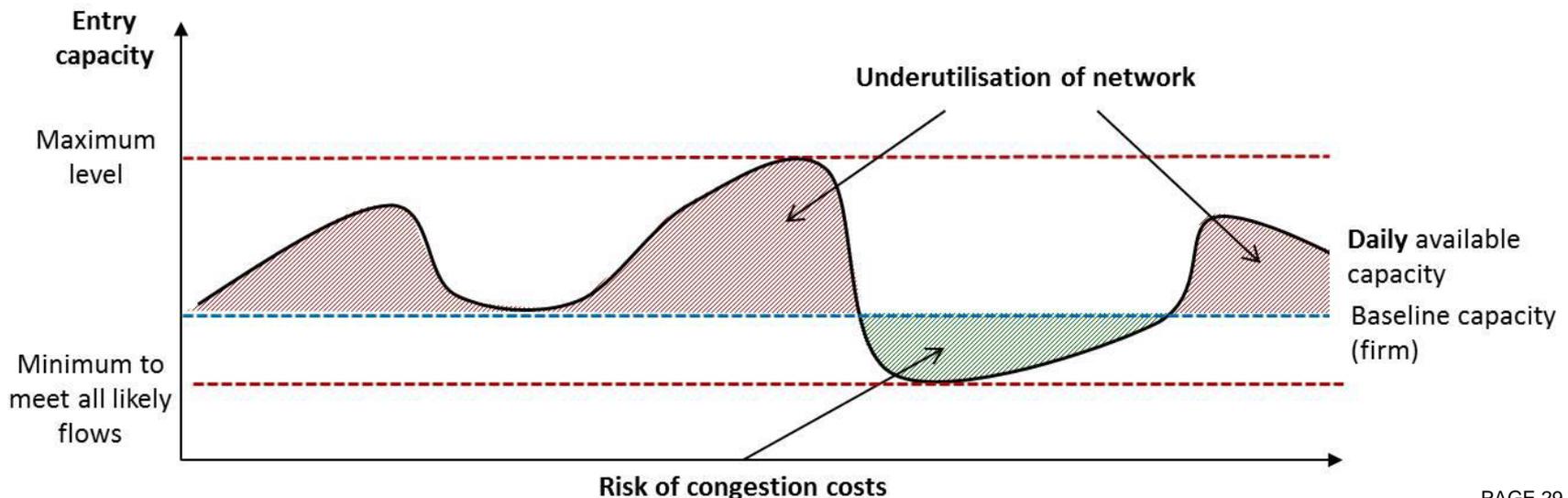
Relationship of entry and exit rights to commodity trading

- Entry and exit rights are not linked to one another.
- A MP could:
 - Hold sufficient entry rights to inject gas at location A and sufficient exit rights to withdraw from location B.
 - Only hold exit rights at C and withdraw gas purchased at the Virtual Hub (ie, entry rights are not required for purchases at the hub).
 - Only hold entry rights at D and inject gas to be sold at the Virtual Hub.
 - The MPs at C and D would be natural counterparties to trade at the hub.
- The SO would be responsible for managing the flows of gas on the system to enable all injections and withdrawals.
- Molecules injected at A don't necessarily need to flow to B.



Determining the amount of capacity rights to be made available

- Determining the appropriate amount of capacity to be released is a trade-off between issuing too many rights (which risks having to compensate holders) and issuing too few (which risks underutilising the network)
- It may be possible to sculpt firm rights (eg, by season) to maximise their release
- Would also look to release interruptible rights to maximise use of the system
 - Congestion risk sits with purchasers of interruptible rights



Obtaining rights to existing capacity

- MPs will need to purchase (ie, obtain and pay for) entry and exit capacity rights
 - Charges will be incurred irrespective of usage
- “Long-term” capacity rights will be available to underwrite capacity expansion (see later)
- Unsold existing capacity will be regularly re-offered to the market
- Where demand for capacity exceeds supply, an approach must be adopted to ration it (eg, auctions, pro-rata, first-come-first served)
- For entry points and exit points with multiple users, it is envisaged that unsold capacity would be auctioned
- For (single) large users, unsold exit capacity seems unlikely to be common
 - But likely to be a mechanism required for users to move rights to different MPs
- Exit to distribution networks should not require rationing and so may be allocated on a pro-rata or deemed basis
 - Charges in this instance might resemble existing volumetric tariffs

Capacity auctions

- Unsold capacity would be auctioned in tranches for different time periods
- In many European markets, 10% of capacity is also held back to monthly auctions to facilitate new entry
- Capacity sold is MDQ (ie, a daily granularity)
 - However, some profiling of capacity across the day likely to be needed
- Likely to be a requirement for a bespoke system to give effect to auctions
 - May be possible to leverage off similar developments outside of the DWGM

Illustrative example

Capacity product	Offer period	Frequency of release	Auction allocation times
Yearly	15 years	Annually	1 st Monday of October
Quarterly	2 years	Annually	1 st Monday of December
Rolling monthly	1 month	Monthly	3 rd Monday of each month
Rolling day-ahead	Single gas day	Daily	16:00 each day
Within day	Remainder of gas day	Continuous	First-come-first-served

- Objective would be to develop of suite of products that are most useful to MPs

Secondary trading and transition

Secondary trading

- MPs could trade any unused capacity between themselves
- At points with multiple MPs, secondary trading might be relatively liquid
 - Entry/exit capacity is more fungible than point-to-point rights
- Secondary trading might be conducted through Trayport or the capacity auction system

Transition

- There will be a need to consider transitional issues, as:
 - AMDQcc may have been sold for the period following market start
 - AMDQ has been allocated to Tariff D customers in perpetuity
- AMDQ(cc) and entry/exit rights do not offer the same benefits or operate in the same way (eg, AMDQ needs to be validated)
- However, our preliminary view is that prevailing holders of AMDQ(cc) would get priority allocation of entry/exit rights at the reserve price for a defined period

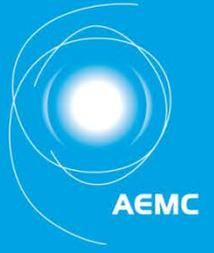
Creating new capacity

- MPs would be able to underwrite a new investment, and be provided with firm entry or exit rights as a result
- Mechanism would be required to identify when the collective willingness to pay for the investment exceeds the cost:
 - open season; or
 - integrated auction: bids from the auction of annual capacity is used to determine whether capacity expansion is warranted.
- We have previously indicated a preference for integrated auctions, but need to further test whether this is appropriate in the context of the DWGM
- Revenue generated from this mechanism would be used to underwrite investment.
- The costs would relate not only to investment at the entry/exit point, but also deeper into the network.
 - Modelling of likely/feasible flows to identify required upgrades.

Charging and network regulation

- The underlying policy rationale for economic regulation of the DTS remains.
- However, APA would now largely recover its costs (including the costs of any expansions) through the sale of entry/exit rights.
- Auction reserve prices would be set on a locational basis, similar to the existing charging model.
 - Interruptible capacity likely to have a zero reserve price.
- However, auction outcomes are inherently uncertain and, under a simple revenue cap, there may be a need to return excess revenue or recover shortfalls.
- Further consideration of the means of pricing capacity expansions is also required.

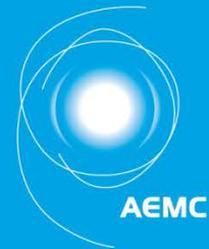
Recap



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Recap – commodity trading, balancing and capacity

- Commodity trading, balancing and capacity allocation would be separate processes
- Commodity trading would happen at a notional point in the hub at any time, for a variety of products
- MPs would be incentivised to keep the system secure by remaining in balance – trading gas and adjusting their injections and withdrawals (to the extent they have sufficient entry/exit rights)
- The SO would ensure system security by undertaking residual balancing – and charging MPs who are out of balance
- Sufficient entry and/or exit rights are required to inject and/or withdraw gas from the hub
- Entry and exit rights can be acquired in advance and traded.
- New entry and exit rights can be created by investment underwritten by MPs



Examples of how model addresses issues in DWGM

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DWGM compared with the Southern Hub: Capacity to Iona CPP constrained

DWGM

- MP bid at \$800
- Market price set to meet demand that cannot be delivered – likely high
- Constraint applied in operating schedule
 - Iona withdrawals & injections elsewhere reduced
 - Can result in Iona injections being reduced (depends on relative bid price)

Southern Hub

- Exit capacity at Iona limited by conditions
 - Seasonal firm pre-sold
 - Interruptible sold on day/day ahead
 - Counter flow capacity set by withdrawal limits
- MP with capacity can nominate
 - Those who value it the most can obtain it
- MP willing to sell at Iona able to do so
- Commodity price unaffected by capacity constraint

DWGM compared with Entry Exit: Expanding Capacity to Iona CPP

DWGM

- Expansion has to meet AER criteria to be approved
 - If approved, all MP will pay a share (and thus consumers)
- No capacity right can be created under current rules so difficult to justify MP investment
 - ‘Free rider’ can access capacity

Southern Hub

- MP can underwrite expansion resulting in firm exit capacity rights
- MP is better able to manage their own capacity position

DWGM compared with Entry Exit: Managing balancing

DWGM

- AEMO buys/ sells linepack to meet EOD linepack target using bid stack
 - Will influence price
- MP generally forecast high
 - Early injections increase linepack
- MP reduce forecast and/or AEMO sells excess linepack
- Higher initial market prices fall during day
 - Price takers pay higher price
 - Deviation prices affected
 - MP can buy back cheaper gas later
- Prices affected by on the day activities

Southern Hub

- MP manage commodity price risk through GSA / OTC and trading
 - Forward price unaffected by on day activities
 - Causers only pay for residual balancing actions
- EOD positions can be carried through to next day
 - Within limits
 - Allows MP to manage their next day position using forward markets
- System operator manages residual balancing on the day
 - Only causers pay costs

DWGM compared with Entry Exit: Transporting cross system loads

DWGM

- MP manage commodity price risk through GSA or bilateral trade
- MP must bid to inject and withdraw
 - Inject at low price, withdraw at high price
 - Bid strategies important
 - Scheduling may be affected by constraints and tie breaking
- If scheduled, capacity is bundled with commodity
 - But no uplift hedge unless also hold AMDQ
- If surprise event happens, ancillary payments / uplift charges needed
 - With flat injection and withdrawal profiles, MP does not cause linepack depletion
 - But subject to congestion uplift charges

Southern Hub

- MP manage commodity price risk through GSA / OTC / trading
 - Forward price unaffected by on day activities
- MP manage capacity risks by obtaining entry and exit rights
 - Portfolio suited to needs
 - Can contract with DTS SP for expansion
- Flat profiles mean MP remains in balance
 - POS will be small
 - Causers pay for residual balancing actions
 - Likely no payment for residual balancing
- Greater certainty and ability to control commodity, capacity and balancing risks