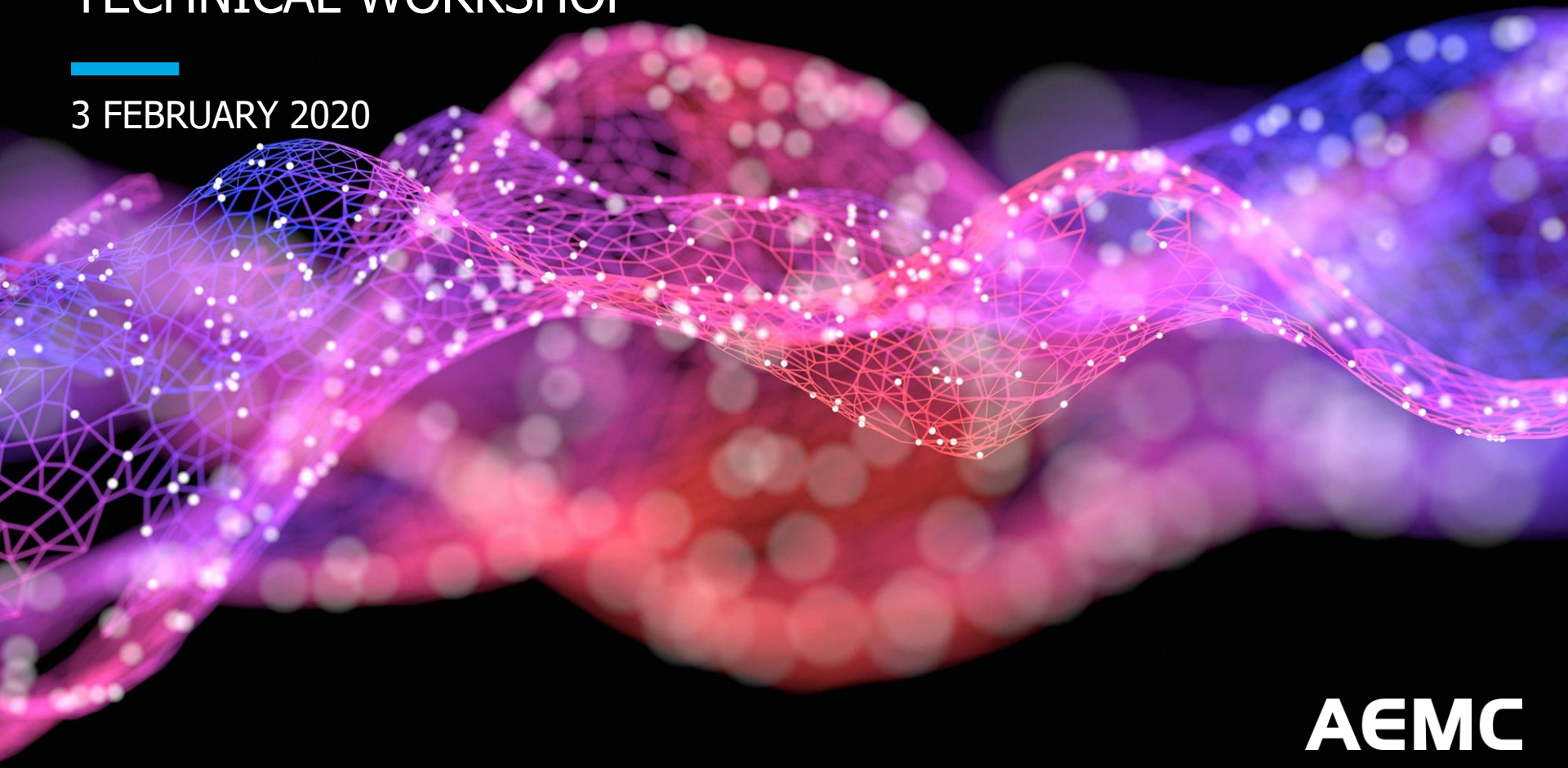
DWGM RULE CHANGES

TECHNICAL WORKSHOP

3 FEBRUARY 2020



AEMC

Agenda

1. Introduction and competition health warning
2. Axiom/NERA presentation on capacity certificate auction design
3. Transmission constraints and uplift payments
4. Next steps

DWGM IMPROVEMENT TO AMDQ REGIME

GRC0051

NERA
ECONOMIC CONSULTING

ENTRY-EXIT CAPACITY CERTIFICATES AUCTION DESIGN

PREPARED FOR DWGM TECHNICAL WORKING GROUP

3 FEBRUARY 2020

AXIOM economics

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Agenda

1. Tenure of the auction product and implications for auction format.
2. Allocation of capacity certificates to system points.
3. What should be specified in the rules versus procedures.
4. Other issues.

Any views expressed in these slides represents the views of Axiom Economics and NERA Economic Consulting and not the AEMC.

Snapshot of what the draft rule determination provided for

Auction product

Product to be auctioned:

- Entry capacity certificates: Provide injection tie-breaking rights.
- Exit capacity certificates: Provide withdrawal tie-breaking rights.

Product tenure: Products should be available for a range of tenures, with tenure and auction timing to allow new or small players to access capacity certificates at regular intervals.

Zones: Capacity certificates released in auction to be determined on a zonal basis, with the location to be determined by AEMO, in consultation with stakeholders.

Auction design

Auction format: Sealed bid combinatorial with potential for partial fulfillment of bids.

Reserve price: Zero reserve price.

Pricing rule: Pay as cleared pricing rule (with all winners paying the same price).

Auction quantities: To be determined by AEMO through system capability modelling and taking into account certificates already sold, or allocated at direction of DTS owner and constraints on the release of short and longer-tenure products set out in NGR.

Auction revenue: Retained by AEMO to offset costs of operating DWGM.

AEMO's role

AEMO will be responsible for:

- conducting the auction
- determining the location of zones and products available in each zone
- determining the auction quantities
- developing procedures and notices that will provide more detail on those aspects of the auction that:
  - are more operational in nature
  - may need to change over time in response to changing conditions.

Potential entry and exit capacity certificate zones

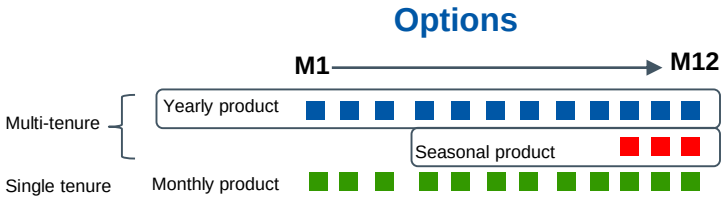
Potential entry zones:	**System Injection Points (SIPs)**
Longford entry	Longford, Tas Hub, Vic Hub
Bass Gas entry	Bass Gas
Culcairn entry	Culcairn
Iona South West Pipeline entry	Iona UGS, SEA Gas, Otway, Mortlake
Iona Western Transmission System entry	Iona UGS, SEA Gas, Otway, Mortlake
Potential exit zones:	**System Withdrawal Points (SWPs)**
Culcairn exit	Culcairn withdrawal
Iona UGS exit	Iona UGS withdrawal

1 Tenure of the auction product

Should a single tenure product or multiple tenure products be adopted?

There are broadly two options for making entry and exit capacity certificates available:

- multiple tenure products (e.g. a three yearly product, an annual product and a seasonal product); and
- a single tenure product (e.g. a monthly product), which could be made available on a rolling basis for a specified forward period (e.g. three years).



Of the two options, a single monthly product that is made available on a rolling basis for at least a 36-month forward period is likely to be of most use to market participants, given the nature of demand and operational constraints in the market. This option also:

- provides for relatively straightforward bidding by market participants;
- minimises substitution risk (e.g. the risk of winning relatively expensive products when a combination of cheaper shorter-term alternative was available);
- offers the most flexibility in terms of allowing participants to work around constraints on the availability of capacity certificates in some months; and
- enables competition between short- and long-term demand to determine the optimal split between short and longer-dated products, which is efficiency-enhancing and ensures a fair pricing outcome (i.e. there is a common clearing price for each month).

How can the demand for short- and longer-dated capacity certificates be balanced if a single tenure product is adopted?

- One of the broader objectives of the rule change is that:

  "the tenure and auction timing should allow new or smaller market participants with increasing portfolios to access capacity at regular intervals".

- To give effect to this objective, the draft rules stated that capacity certificates with:
  - a tenure of at least three years should account for **no more than 50%** of available capacity certificates; and
  - a seasonal tenure should account for **at least 10%** of the available capacity certificates.

- While the draft rules contemplated the use of multiple-tenure products, similar constraints can be imposed if a single tenure product is auctioned on a rolling basis, by withholding some of the capacity certificates to be allocated in future auctions that are closer to delivery.

- The rules could, for example, say that:
  - from month 25 onward of a rolling auction, no more than 50% of available capacity certificates in a zoneare to be auctioned (taking into account products sold in prior auctions and capacity certificates allocated at direction of the DTS owner)
  - in months 1-3 of the rolling auction, at least 10% of available capacity certificates in a zone are to be auctioned.

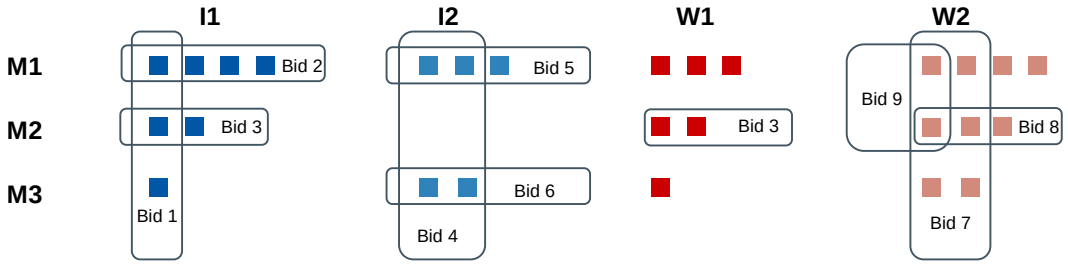
- AEMO, in consultation with industry, would determine the percentage of capacity certificates to release at each auction.

What effect would a single tenure product have on the auction format?

- If a single tenure product is adopted and capacity certificates are auctioned using individual uniform price auctions, participants wanting capacity certificates for a number of months will face the risk of winning different quantities of capacity certificates in each month.

- A combinatorial auction format reduces this aggregation risk, by allowing bidders to submit bids for combinations of products (e.g. a bid for the same quantity of entry capacity certificates and exit capacity certificates, or a bid for the same quantity of entry and/or exit capacity certificates over multiple months)

Types of combinatorial bids



- There are two combinatorial auction formats that could be used in this context:
  - **A partial combinatorial auction,** which allows participants to bid the same quantity across a number of products at the same time. Under this auction format a participant's bid may be partially filled, but if this occurs it will win the same quantity for all products in the bid. Prices are set by lowest winning bids
  - **A fully combinatorial auction,** which allows participants to bid for mutually-exclusive packages and only win bids in their entirety. It therefore shields auction participants from aggregation risk.

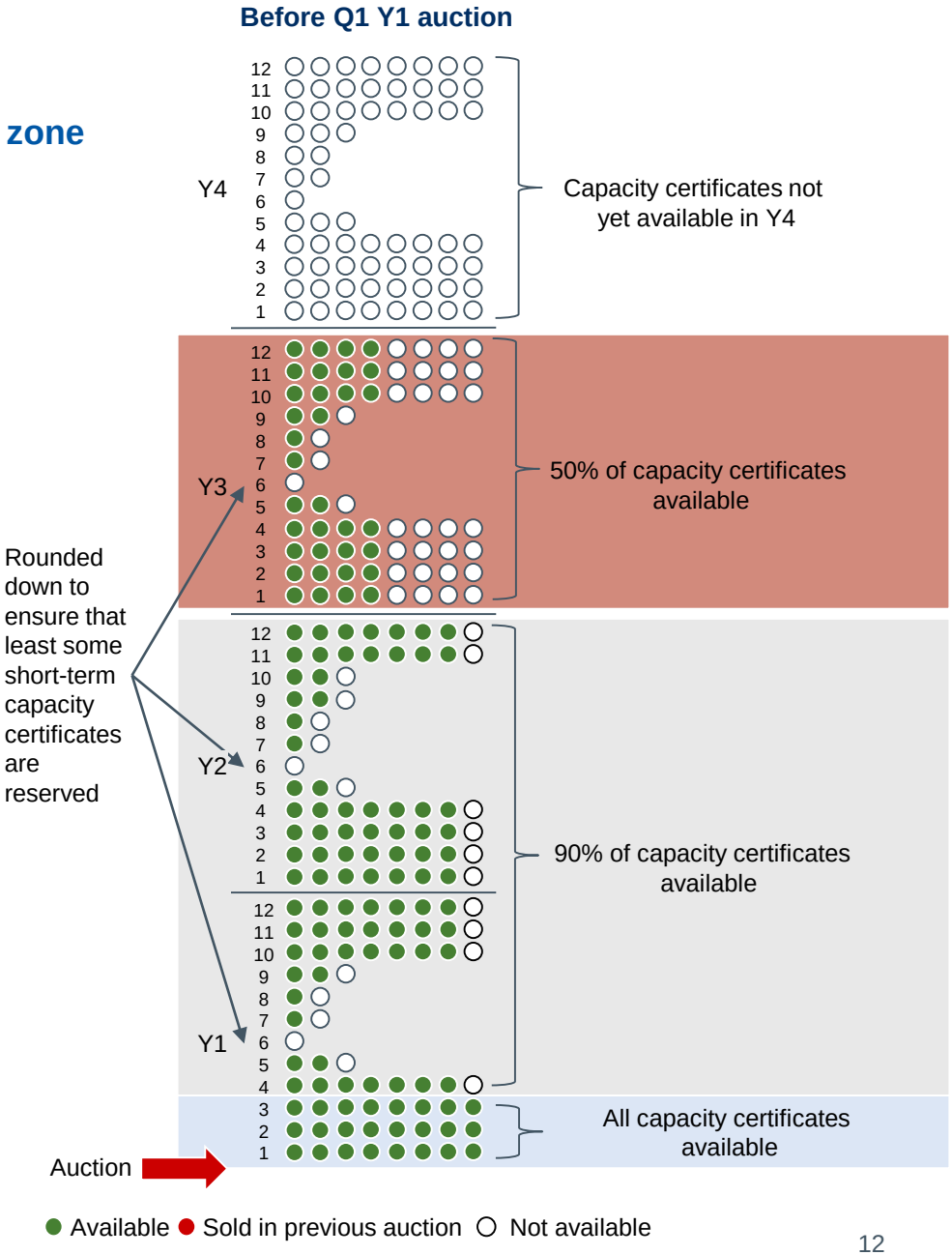
  Of the two options, the **partial combinatorial auction** is the simplest for bidders to understand, relatively straightforward to implement and can accommodate the demand participants are expected to have.

  It is also the **format used in the DAA and the SRA**, which most market participants will have familiarity with.

How a single tenure partial combinatorial auction could operate

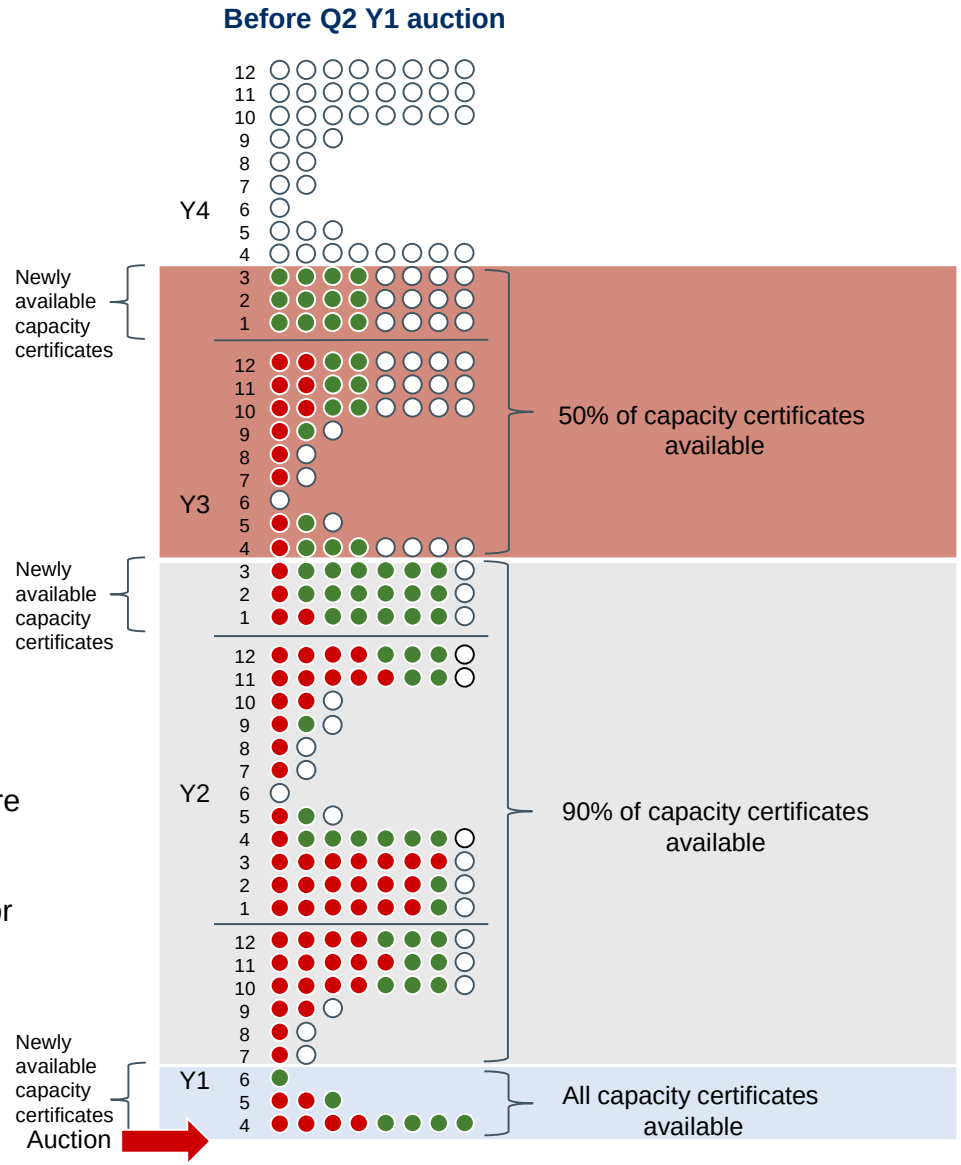
Stylised example: First quarterly auction in one zone

- Quarterly auction
- Assume the following policy constraints restrict how much is released on a short versus longer-dated basis:
  - No capacity certificates released beyond 36 months
  - Up to 50% of capacity certificates available in months 25 – 36
  - Up to 90% of capacity certificates available in months 4 - 24
  - 100% of capacity certificates available in months 1-3
- Actual available capacity is reduced by the capacity sold in prior auctions and any capacity certificates allocated at the direction of the DTS owner.



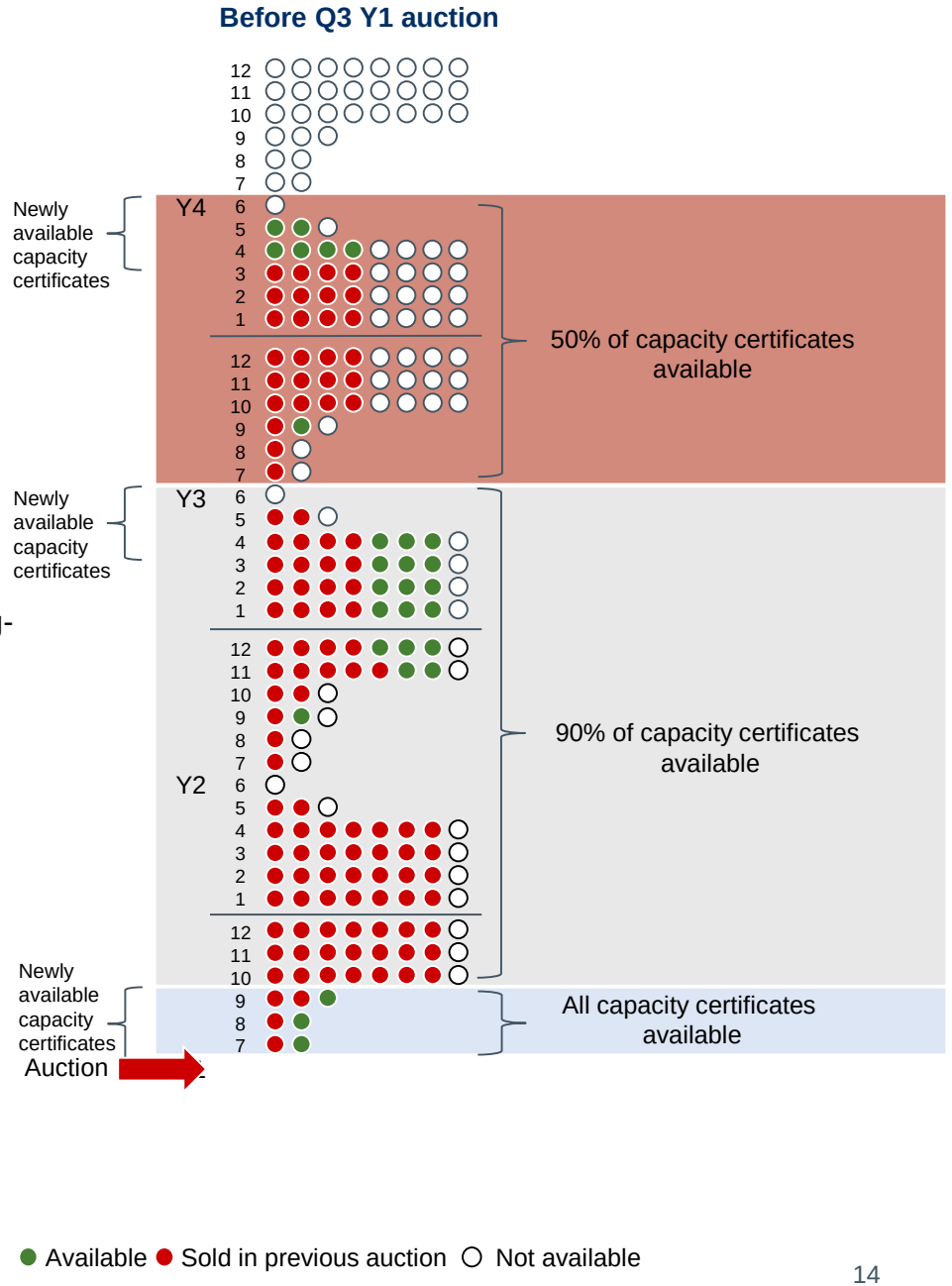
Stylised example: Second quarterly auction

- Capacity certificates sold in previous auctions (red) are no longer available and removed from the available supply
- Updated policy constraints:
  - 50% of capacity certificates in Q1 Y4 are made available
  - Supply in Q1 Y3 is increased from 50% to 90%
  - Supply in Q1 Y2 is increased from 90% to 100%
- Policy constraints ensure that:
  - Supply of short-dated products (10%) is reserved for auctions that are closer to delivery (e.g. M3 in Y2)
  - Supply of longer-dated products are restricted to 50%
- If more than one quarter is included in the same % step, there may be no additional capacity certificates available in an auction (e.g. Y1 M7-9) but additional capacity will become available when the % step changes (e.g. from 50% to 90% or from 90% to 100%)



Stylised example: Third quarterly auction

- Updated policy constraints:
  - 50% of certificates in Q2 Y4 is made available
  - Supply in Q2 Y3 is increased from 50% to 90%
  - Supply in Q2 Y2 is increased from 90% to 100%
- Auction setup incentivises market participants to secure long-term products when they become available
- With monthly auctions, shippers might have to bid each month to maximise their chance of winning products 36 months ahead of delivery
  - Conducting the auction less frequently will mean those participants that want longer dated products don't have to participate every month.
  - Conducting the auction too infrequently, however, will mean participants that want shorter dated products (or new entrants) may not be able to secure the capacity certificates they require.



Questions

- **Product tenure:** Should the rules:
  - specify that the auction product has a monthly tenure?
  - provide flexibility in this area by, for example, requiring the product tenure to be no more than one month?

- **Auction frequency:** Should the rules:
  - specify how frequently the auction is to be conducted, if so how frequently do you think it should be conducted (e.g. quarterly, semi-annually or something else)?
  - provide some flexibility in this area by, for example, requiring the auction to be conducted at least twice a year and then allowing AEMO (in consultation with stakeholders) to determine if it should be conducted more frequently?

  How far in advance of the rights commencing should the auction be conducted (e.g. the quarter before)?

- **Constraints on the release of short-dated versus longer-dated products:** Do you agree with the proposal in the draft rule determination for:
  - longer-dated products to account for **no more than 50%** of the available capacity certificates?
  - shorter-dated products (e.g. products with a tenure of less than one year) to account for **at least 10%** of the available capacity certificates?

  If not, what percentages do you think should be specified in the rules given the objective of ensuring new and small players can access certificates at regular intervals (e.g. at least 15% or 20% for shorter-dated products)?

2 Allocation of capacity certificates to system points

What is the issue and what are the options?

What is the issue?

The draft rules do not currently specify how capacity certificates are to be allocated from zones to SIPs or SWPs, in those cases where there is more than one system point in a zone.

What are the options?

Capacity certificates could be auctioned on:

- **A pure zonal basis** – Under this option:
  - auction participants would bid for the zones they want to use, with the capacity certificates released in the auction based on the capacity certificates available in the zone; and
  - if there is more than one system point within a zone, a separate process would be required to allocate the zonal capacity to system points after the auction is conducted (*ex post* process), which could involve:
    - a first come first served approach, with total capacity certificates allocated to a system point capped by the amount of capacity at the point
    - an all come all served approach, with pro-rating of rights if the total capacity certificates allocated to the system point exceeds the system point capacity at the time of scheduling.

  This may not yield the most efficient allocation if there is a constraint on system point capacity.
- **A hybrid zonal-system point basis** – Under this option auction participants would bid for the system points they want to use, with the capacity released in the auction reflecting both the capacity certificates available in the zone and the capacity certificates available at a system point.
  - This option could also allow participants to bid for capacity certificates at either a specific point or a zone.

Note that the hybrid approach was used for the DAA.

Key differences between the options

Option	Form of bids	Auction quantity	Clearing prices	Main benefit	Main deficiencies
Zonal basis	Bids made for zone	Based on capacity certificates available in zone	Single clearing price for zone	Maximum amount of capacity certificates available in the zone will be released in the auction	• Auction winners have no guarantee they can allocate capacity certificates at the system points they want to use because a separate process is required to allocate the zonal capacity to individual points –auction winners may therefore end up paying for capacity certificates they are unable to use. • May not result in the most efficient allocation of capacity at system points if allocation based on first come first served or all come all served approach.
Hybrid system point – zonal basis	Bids made for system points (or for zones)	Based on capacity certificates available in zone and at each system point in the zone (the key difference between this option and pure system point option is that capacity certificates can be moved from one system point to another)	Separate clearing prices for each point and zone	Auction winners guaranteed allocation of capacity certificates at system points they want to use Maximum amount of capacity certificates available in the zone released in the auction	Additional complexity in the auction solver, but not for bidding.

Questions

- We are interested in the working group's views on these two options and, in particular, whether:
  - Capacity certificates should be auctioned on a zonal basis with a separate process then used to allocate capacity certificates to the SIP/SWP that the auction participant wants to use?
    - If a separate process is to be used to allocate capacity certificates to SIP/SWPs, what do you think this should involve (e.g. a first come first served approach, an all come all served approach with pro-rating approach, or another approach)?
  - Capacity certificates should be auctioned using the hybrid zonal-system point approach, which will result in capacity certificates being allocated to the SIP/SWP that the auction participant wants to use through the auction, or potentially a zone with the option to move it to an SIP/SWP at a later point?
    - If a hybrid approach is used, do you think market participants that procure longer-dated products should still have the ability to move the capacity certificates to another point in the zone at a later point in time? If so, how do you foresee this working?

3 What should be specified in the rules versus the procedures

Approach to determining what is in the rules versus the procedures

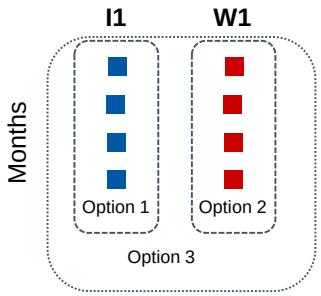
- Consistent with the approach that has been used for the DAA, the draft rules:
  - specify key elements of the auction design that the auction must comply with, such as:
    - the rights to be auctioned;
    - how the auction quantities are to be calculated;
    - the auction format in broad terms;
    - the reserve price and pricing rule to be used in the auction; and
    - how the auction proceeds are to be treated; and
  - provide for other elements of the auction design to be developed by AEMO, in consultation with stakeholders, through the Procedures (in some cases having regard to principles in the NGR), including those elements that:
    - are more operational in nature (e.g. the procedures for conducting the auction, the timing of the auction, the information to be published after each auction, and billing requirements); and
    - may need to change over time, such as the location of the capacity certificate zones and the amount of capacity certificates to be released on a short-term basis versus a long-term basis.
- This approach is intended to provide sufficient:
  - guidance to AEMO and market participants on how the auction is intended to operate; and
  - flexibility in the regulatory framework for the auction to adapt to changing market conditions.

See separate table on what is likely to be dealt with in the rules versus the procedures

Annex | Partial combinatorial auction format

Why a combinatorial auction?

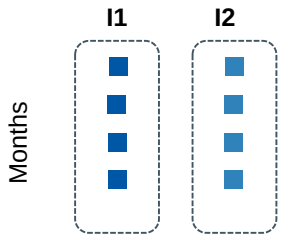
Type 1: Simple



- A shipper may only want to acquire entry and exit tie-breaking capacity certificates (CCs) across a number of months for either a specific injection point (Option 1) or withdrawal point (Option 2)
- Alternatively, a shipper may only want to acquire CCs at both an injection point and a withdrawal point across a number of months (Option 3)

Very likely that combinatorial format will need to be able to cater for this type of demand

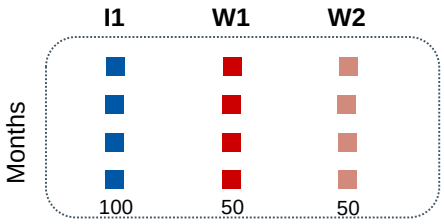
Type 2: Substitutable



- A shipper may be able to inject gas at two different injection points and wants to win CCs at the cheapest one (either I1 or I2), but not both

Potential that combinatorial format may need to be able to cater for this type of demand, but unlikely to be required by many participants.

Type 3: Complementary



- A shipper wants to inject at I1 and withdraw part at W1 and the rest at W2
- If the shipper cannot get CCs at I1 or W1, the shipper would not want CCs at W2 either

Unlikely that combinatorial format will need to be able to cater for this type of demand

High-level combinatorial format options

	Partial combinatorial auction	Fully combinatorial auction
Bidding language	• Bid consists of a quantity, a price per unit and a nomination of the products included in the bid • Bid amount caps the sum of prices paid for one unit in each product included in the bid • Bidders can submit multiple bids - more than one of their bids may win	• Bid consists of a quantity for each product (Q_P1, Q_P2, Q_P3 etc) and a total bid amount for the entire bid • Bidders can submit multiple mutually-exclusive bids – at most one may win
Key features	• Winning bids determined simultaneously using a linear program - maximum value ∑(bid amount * amount allocated to bid) • Bids may only be partially filled - if a bidder wins part of its bid, the quantity won across all products in the bid is the same	• Winning bids are identified using an integer linear program (ILP) - maximum value. • Bids always honored in full – i.e. no partial filling of winning bids • Usually implemented with mutually exclusive bids – bidders win at most one of the bids they submit • Identifies combination of bids that maximises value
Pricing rule	• Clearing price - marginal (partially-filled) bids determine price	• First price • Second price
Advantages	• Simple for bidders to understand. • Identification of price for individual products relatively straightforward. • Accommodates simple demand (Type 1). • Implementation relatively straightforward	• Removes all aggregation risks. • Mutually exclusive bids can accommodate: o simple demand (Type 1); o substitutable demand (Type 2); and o complementary demand (Type 3).
Disadvantages	• Does not fully remove aggregation risk because participants may win less than the quantity specified in their bids • Does not accommodate type 2 or type 3 demand	• Bidding language complex and requires bidders to submit a very large number of bids to express their demand • Significantly more complex to implement

Variations of the partial combinatorial format are used for the SRA and DAA

Partial combinatorial auction for entry and exit capacity certificates

- A product is a unit of capacity certificate in a month at a specific entry or exit zone (or SIP/SWP) (for ease of reference the examples that follow are based on injection and withdrawal points within zones)
- A bid consists of a quantity (GJ per gas day), a price ($ per GJ) and a nomination of the products included in the bid.
- A bid amount caps the sum of prices paid for one unit of each product included in the bid
  - For example, a bid of 50 GJ per gas day for $2 per GJ for months M1, M2, M3 at injection point I1 is interpreted as the bidder wishing to acquire up to 50 GJ per day in M1-M3 at a total price across all months of no more than $2/GJ. If the bid wins, the sum of prices across M1 to M3 will not exceed $2/GJ.
- Bidders can submit multiple bids – more than one of their bids may win
  - Bidders can easily express a demand curve with decreasing bids for incremental units
- Winning bids are identified using a linear program (LP) - maximum value (bid amount * amount allocated to bid)
- Pricing based on shadow prices of supply constraints (each product has its own price which is 0 if units remain unsold)

Partial combinatorial format - Example 1

A and B compete for M1.

Bid	Price (per unit)	Q	M1 (C_1=100)	M2 (C_2=200)	M3 (C_3=255)
A	$40	150	X	X	X
B	$50	100	X		

As B>A, B wins

Result:

- B wins 100 in M1

Prices:

- M1: $50 (clearing price could be $50 or $40)
- M2: $0
- M3: $0

Partial combinatorial format - Example 2

B competes against A for M1 and C competes against A for M3.

Bid	Price (per unit)	Q	M1 (C_1=150)	M2 (C_2=200)	M3 (C_3=255)
A	$40	150	X	X	X
B	$20	150	X		
C	$40	255			X

As B+C > A, B and C win

Result:

- B wins 150 in M1
- C wins 255 in M3

Prices:

- M1: $20
- M2: $0
- M3: $40

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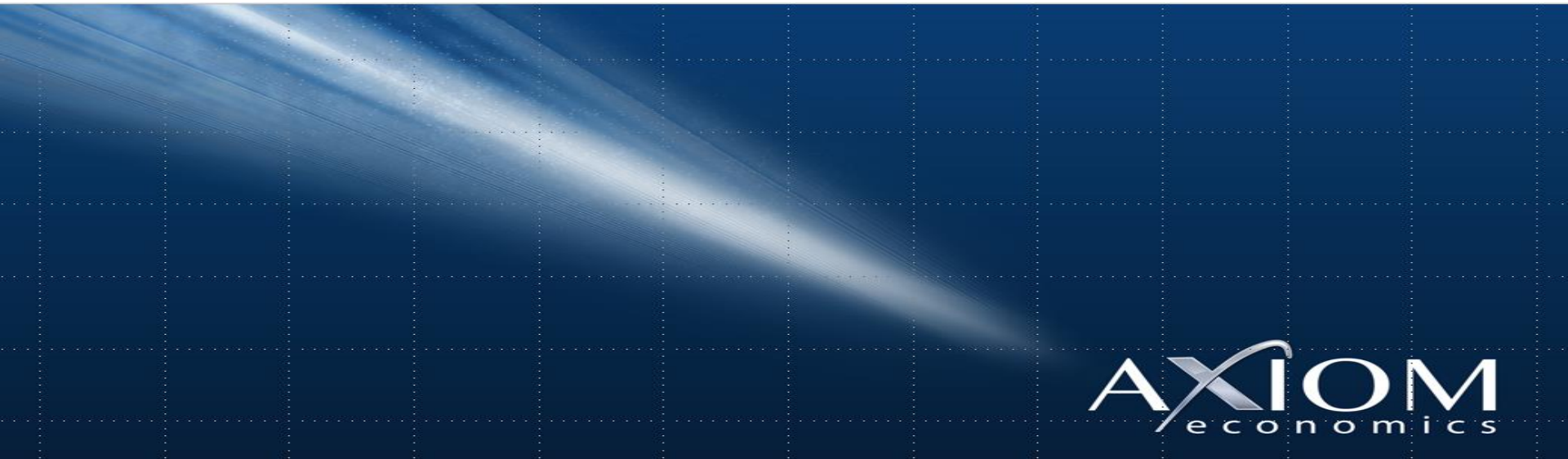


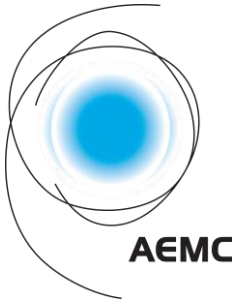
DWGM SIMPLER WHOLESALE PRICE

GRC0049

Transmission constraints and uplift payments

- Current Rule 240(1) requires AEMO to consider if ancillary payments are attributable to a 'transmission constraint' (as defined in Rule 200) in the uplift payment procedures.
- We are considering deleting this as all ancillary payments must be recovered through uplift payments regardless of whether they are attributed to a transmission constraint.
- Do stakeholders have any concerns with this approach?

- Current Rule 240(9)(a) requires AEMO to determine and publish the extent (measured in GJ) to which transmission constraints are caused by the failure of the declared transmission system service provider (DTS SP) to fulfil its obligations under its service envelope agreement (where there is ancillary payments attributable to transmission constraints).
- We are considering deleting this as the attribution to transmissions constraints and publishing of transmission constraints amounts caused by the DTS SP is not necessary for determining uplift payments.
- Do stakeholders have any concerns with this approach?



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