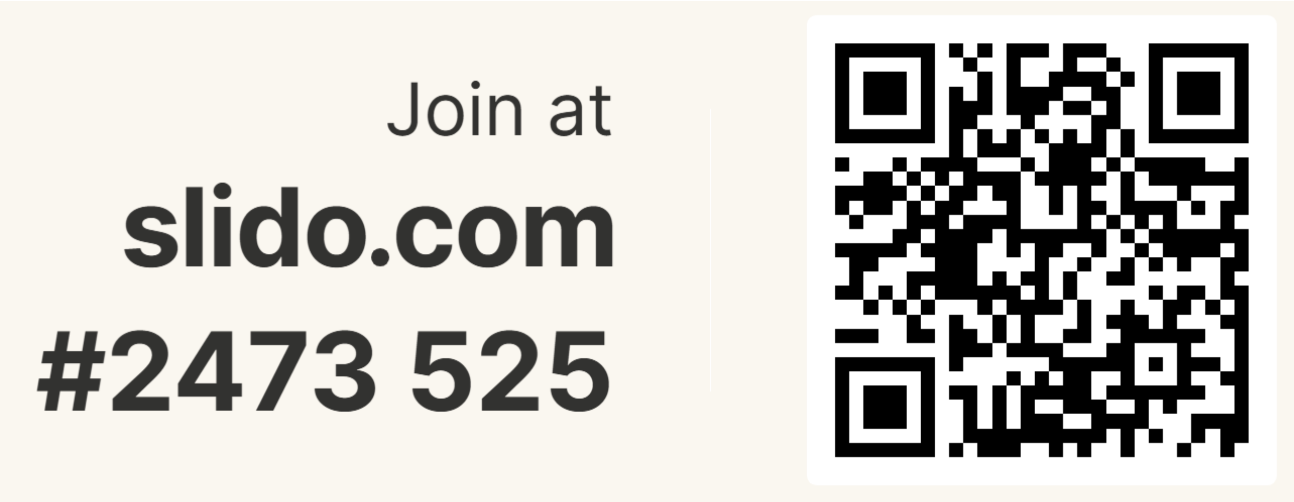
Parameters & Scalars Consultation

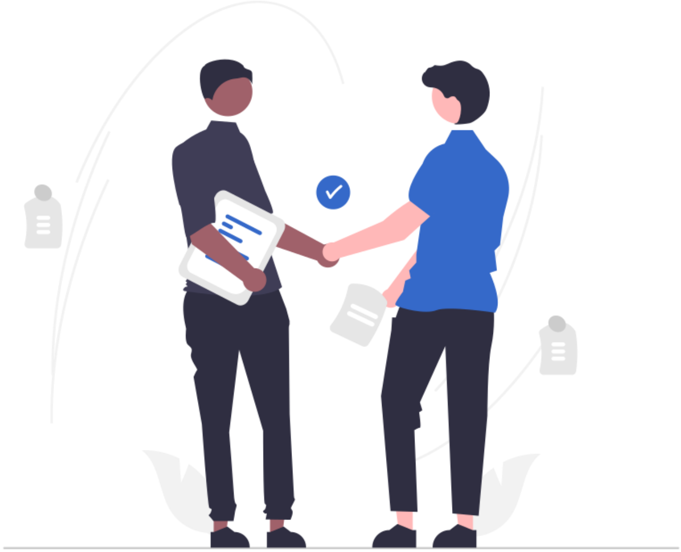
Workshop 2

9 July 2025

For Q&A during this Workshop, we will be using Slido

Please join via the Codes below, or via the link pasted in the chat window:





Please Note..

- **Question Submission:** We are reviewing all questions as they come in. Please ensure **<u>your name is included</u>** – only named submissions will be accepted.

- **Referencing Slides:** If your question relates to a specific slide, please begin it with the relevant slide number (e.g. *"17: What does X Mean")*. If excluded, we will consider it a general question on the relevant section of the workshop.

- **Post-workshop Summary:** A log of all questions and answers will be circulated after the workshop

P&S Consultation Process

Opened:	Monday 9 June 2025
Duration:	Seven weeks
Project Panel:	Monday 9 June 2025 Introduction to consultation
Workshop 1:	Wednesday 18 June 2025 Presentation of proposals and Q&A
Workshop 2:	Wednesday 9 July 2025 Deep dive, worked examples and Q&A
Closes:	**Friday 25 July 2025**

TSOs will submit a recommendations paper to the **SEMC for decision in October 2025**.

Summary of P&S Consultation Proposals

1	DASSA Qualified Volumes	Min and Max Service Volumes		
2	DASSA Pricing	Price Cap	Price Floor	Scarcity Price
3	DASSA Bidding	Max Number of P/Q Pairs	Min Step Size in P/Q Pairs	Auction Gate Window
4	Secondary Trading Matching	Schedule of Batch Matching	Batch Matching Clearing and Pricing	
5	Volume Insufficiency	Threshold for TSO Participation in Secondary Trading		
6	Commitment Obligations & Incentives	Pre-gate Closure: Compensation Payment	Post-gate Closure: Availability Incentives	Post-gate Closure: Delivery Incentives
7	Service Quality Value Function	Objective Function: Quality Value Function		
8	Bundles of Services	Implicit and Explicit Bundles		
9	Auction Fallback	DASSA Fallback Mechanism		

P&S Consultation Workshop 2 - Agenda

1. DASSA Pricing (25 mins) - Joe Deegan
   - Further detail and rationale for Price Cap and Scarcity Price proposals (15 Mins)
   - Q&A (10 Mins)
2. DASSA Bidding and Secondary Trading (15 mins) - Sam Bouma
   - Day-in-the-life from a participant’s perspective (10 mins)
   - Q&A (5 Mins)
3. Secondary Trading Matching and Volume Insufficiency (65 mins) - Kasra Haji Bashi
   - Worked examples (50 Mins)
   - Q&A (15 Mins)
4. Break (15 Mins)
5. Commitment Obligations & Incentives (60 mins) - Joe Deegan
   - Further detail and rationale for proposals and worked examples (45 Mins)
   - Q&A (15 Mins)
6. Next Steps

DASSA Pricing

Further detail and rationale for Price Cap and Scarcity Price proposals

1. DASSA Pricing:
Bid Price Cap - Overview

	FFR Cat1*	FFR Cat2*	FFR Cat3*	POR	SOR	TOR1	TOR2	RR
Bid Cap MWh**	135	135	135	94	81	74	72	44

Total Bid Price Cap of €500 per MWh

- Total Bid Price Cap of **€500/MWh for Ireland**, and the **£/MWh equivalent for Northern Ireland**.
- Total Bid Price Cap is set at the level of the Reliability Option Strike Price, reflects the underlying costs of reserve provision in Ireland and Northern Ireland, and offers a good balance between allowing market efficiency (providing required price signals) and protecting consumers from excessively high prices.
- Total Bid Price Cap to be allocated across reserve services (**applies to positive and negative reserves**) per Trading Period within each jurisdiction, as shown in the table above. This allocation of the Total Bid Price Cap reflects the relative scarcity of services.
- Annual revision of the Total Bid Price Cap to be conducted.

- Note *: Bid Price Cap to apply to each FFR sub-category.
- Note **: Bid Price Cap values are on a per hour basis and will be halved accordingly when applied to a 30-minute Trading Period.

1. DASSA Pricing:
Bid Price Cap - Illustrative Bidding Scenarios

System Service	Bid Price Cap €/MWh	Bidder 1	Bidder 2	Bidder 3
FFR Sub-category 1	135	60	-	75
FFR Sub-category 2	135	-	-	65
FFR Sub-category 3	135	-	-	65
POR	94	55	94	-
SOR	81	45	81	-
TOR1	74	-	74	-
TOR2	72	-	50	-
RR	44	-	40	-

- Each service has its own individual Bid Price Cap.
- If a service provider bids for just one service, it is limited by that service's Bid Price Cap.

- Note: While the Bid Price Cap is currently set at RO Strike Price level, any changes to the Strike Price will not impact the Bid Price Cap, which will remain unchanged and be reviewed annually.

1. DASSA Pricing:
Bid Price Cap - FFR Sub-Categories Example

- Service providers will be limited to maximum qualified volumes of 75 MW for FFR (each sub-category), POR, SOR, TOR1 and TOR2 and 300 MW for RR that may be bid into the DASSA.
- A service provider may obtain DASSA Orders for the three FFR sub-categories with a maximum of 75MW to be allocated across them.
- The example in the table below illustrates that if a service provider has **75 MW** of reserve capacity, they could be awarded the following volumes: (purely illustrative scenario):

System Service	Volume (MWh)	Bid Price Cap (€/MWh)	Bid Price (€/MWh)	Total €/h
FFR Sub-category 1	40	135	80	3,200
FFR Sub-category 2	20	135	75	1,500
FFR Sub-category 3	15	135	70	1,050
POR	40	94	50	2,000
SOR	40	81	45	1,800
TOR1	40	74	40	1,600
TOR2	50	72	35	1,750
RR	60	44	20	1,200

1. DASSA Pricing:
Bid Price Cap - Rationale

- Guiding principles:
  - Ensure consumer protection, by managing cost to consumers and minimising any potential impact from exercise of market power.
  - Maintain market efficiency, by allowing bids to reflect actual operating and opportunity costs.

- The objectives are to ensure that:
  - Any cap applied is **at least equal to the short-run cost of operation**, so that all providers can recover such costs in any given period; and
  - When considering remuneration over a longer period, **efficient providers can recover their long-run marginal costs**, assuming a reasonable operational profile.

- AFRY assessed actual and opportunity costs faced by ‘traditional’ service providers to help inform the choice of the Bid Price Cap:

Actual and opportunity cost for a synchronised CCGT	Cost recovery of dedicated BESS

- For demonstrative purposes, the cost of provision from unsynchronised CCGT and GT was also explored. These were not used to inform the cap, as synchronisation costs are expected to be recovered through the energy markets.

1. DASSA Pricing:
Bid Price Cap - Rationale cont.

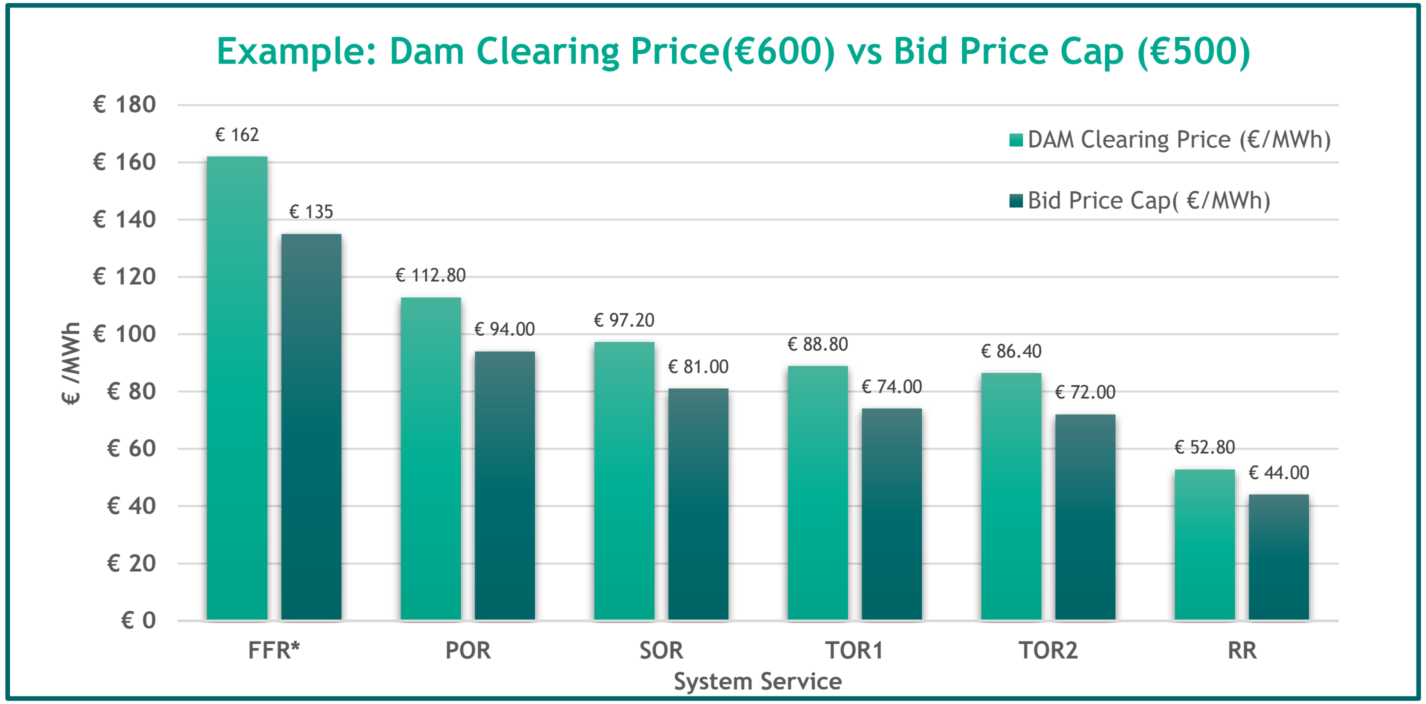
- Actual and opportunity costs of a synchronised thermal unit:

	Upward reserve	Downward reserve
'Actual' cost *(change in variable operating cost as a result of efficiency at different loading levels)*	Higher average variable operating cost (operating at lower loading level)	Lower average variable operating cost (operating at higher loading level)
Opportunity cost *(foregone inframarginal rent)*	Depends on expected intraday market prices and variable operating cost	Depends on expected intraday market prices and variable operating cost

- **Upward Reserves**: The cap should, at minimum, reflect the inframarginal rent that the most efficient CCGT earns from its participation in the energy market, when the least efficient CCGT/GT clears the market. This reflects the foregone value that the unit would require to provide reserves in the DASSA.
- **Downward Reserve**: The rationale for downward reserve provision is similar, should prices in the intraday market drop below its variable cost of operation. The only difference is we considered the variable operating cost of the most expensive unit against an intraday price set by the 'cheapest' unit.

1. DASSA Pricing:
Scarcity Price - Distribution Example

- The TSOs propose that in instances of Volume Insufficiency, the DASSA Scarcity Price will be the maximum of the DASSA Total Bid Price Cap or the DAM Clearing Price.
- Where the DAM Clearing Price exceeds €500/MWh, the individual service Price Caps will increase relative to the distribution of the Total Bid Price Cap across services.
- In the figure below, we assume a DAM Clearing Price of **€600/MWh**:



DASSA Bidding & Secondary Trading

Day-in-the-life from a participant’s perspective

2. DASSA Bidding & Secondary Trading
'Day in the Life'

EirGrid SONI

D-1		. . .	D				BM Gate Closure		
15:30	16:00 – 16:30		08:30 – 09:00	09:30	10:00	10:30	11:00	11:30 – 12:00	12:00 – 12:30
DASSA Auction Run	Secondary Trading Period 1	. . .	Secondary Trading Period 34	Secondary Trading Period 35	Secondary Trading Period 36	Secondary Trading Period 37	Secondary Trading Period 38		Trading Period

➢ Trading Period #34 – POR Upward Reserve

X is the marginal bidder, and so sets the clearing price at €20

By default, the portion of Unit X's bid not cleared is moved to the next batch

Unit X Active Bids (Before)

Buy/Sell	Price	Quantity
Buy	€20	50 MW

Order Book

Service Provider	Buy/Sell	Price	Quantity
X	Buy	€20	50 MW
Y	Buy	€22	30 MW
Z	Sell	€30	35 MW
V	Sell	€18	20 MW
W	Sell	€15	40 MW

Cleared Volumes

Service Provider	Volume Cleared
X	30/50 MW
Y	30/30 MW
Z	0/35 MW
V	20/20 MW
W	40/40 MW

Unit X Active Bids (After)

Buy/Sell	Price	Quantity
Buy	€20	20 MW

- Unit V and W sell their full amount
- Unit Y buys their full amount
- Unit X buys 30/50 of their desired amount
- Clearing price for all trades is €20

2. DASSA Bidding & Secondary Trading
'Day in the Life'

EirGrid SONI

BM Gate Closure								
08:30	09:00	09:30	10:00	10:30	11:00	11:30	12:00	12:30
Secondary Trading Period 34	Secondary Trading Period 35	Secondary Trading Period 36	Secondary Trading Period 37	Secondary Trading Period 38			Trading Period	

- NB – in the context of Secondary Trading, a 'Fill-Or-Kill' Order refers to an order that will not persist on the order book if that order is not cleared in that batch

. . .

➢ Trading Period #35 - POR Upward Reserve

Unit X Active Bids (Before)

Buy/Sell	Price	Quantity
Buy	€20	20 MW
Buy (FOK)	€18	30 MW

- Unit X's uncleared bid of €20 is carried over from previous period
- Unit X adds a Fill-Or-Kill bid order, which will not remain on the order book if it is not cleared this batch

Order Book

Service Provider	Buy/Sell	Price	Quantity
X	Buy	€20	20 MW
X	Buy (FOK)	€18	30 MW
Z	Sell	€15	35 MW
-	-	-	-
-	-	-	-

X is the marginal bidder, and so sets the clearing price at €18

Cleared Volumes

Service Provider	Volume Cleared
X	20/20 MW
X	15/30 MW
Z	35/35 MW
-	-
-	-

As it is a 'Fill-Or-Kill' bid, the remainder of Unit X's bid that was not cleared is not moved to the next batch

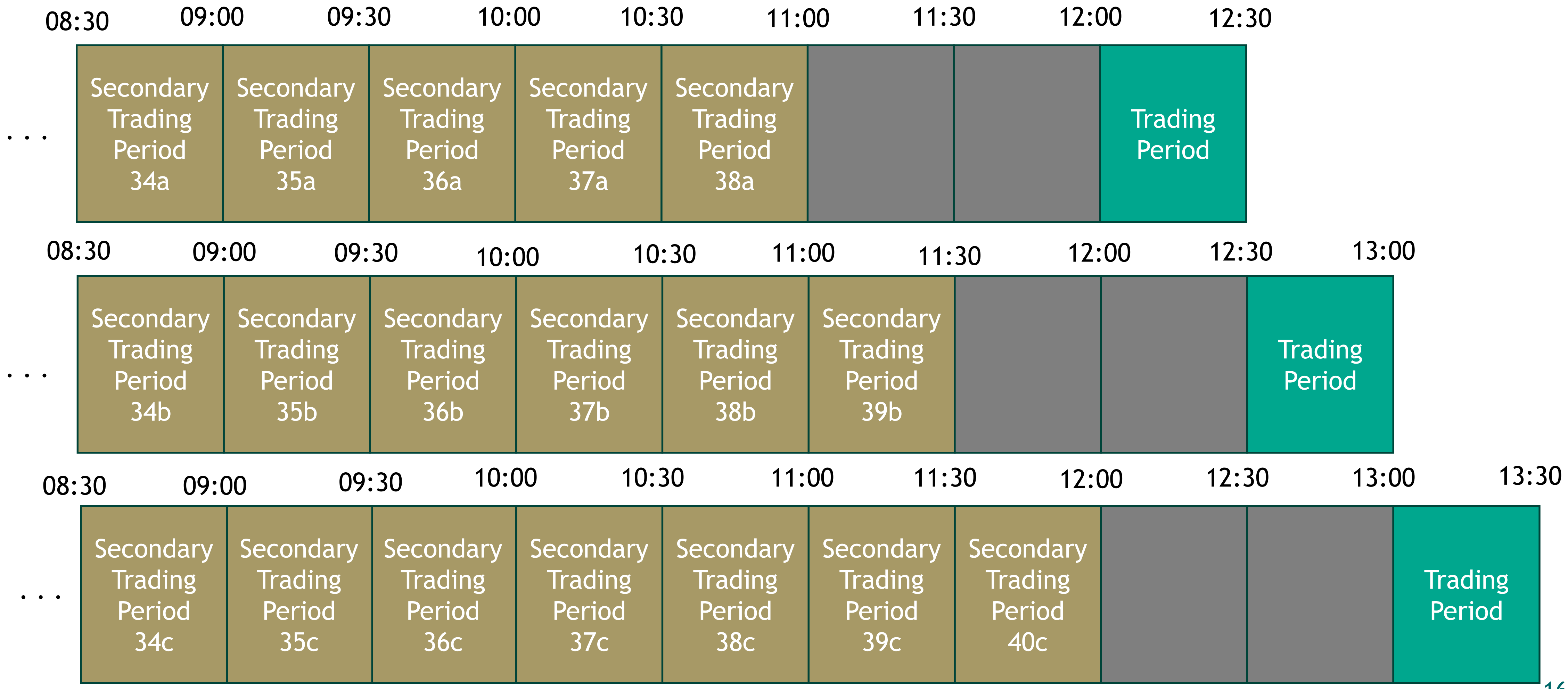
Unit X Active Bids (After)

Buy/Sell	Price	Quantity
-	-	-
-	-	-

- Unit Z sells for its full amount
- Unit X's previous order for 20MW is bought in full
- Unit X's new FOK order is partially cleared – and the remainder does not carry over to the next period

2. DASSA Bidding & Secondary Trading
‘Day in the Life’

➢ Secondary Trading Batches running for Multiple Trading Periods



Secondary Trading Matching & Volume Insufficiency

Worked examples

3. Clearing Secondary Trading

Overview and proposed options

Background

TSOs' DASSA Design Recommendation:

- Participation in the secondary trading by submitting a sell order at a price of zero to help cover volume deficit in case of scarcity conditions in DASSA for a trading period.
- The DASSA scarcity price to apply to trades who purchase obligations in the secondary market that are matched with TSOs' zero-prices sell order.

SEM-24-066 Decision Paper:

- Recommend introducing a competitive element to the TSOs' approach. The SEMC noted that more cost-effective providers might be available closer to real-time who are willing to address the volume deficit. To reflect this, SEMC suggested implementing a demand curve based on the economic merit of submitted buy orders to determine procurement during scarcity condition in DASSA.

Two options (for batch matching) are presented in the consultation paper

Option	*Considerations*
Option 1 **Without Optimisation**	• Scoped as part of initial IT design. • Resourcing, programme schedule and funding arrangements implications known to TSOs.
Option 2 **With Optimisation** ***(Focus of today's workshop)***	• Option 2 is additional to baseline IT design. • May require additional TSO resourcing and divert key personnel from other in-flight programmes. • Any increase to scope may have a knock-on impact on programme schedule, potentially delaying timelines and therefore FASS go-live.

3. Secondary Trading Batch Schedule

- Batches run every 30 minutes, resulting in a total number of 48 batches per day.
- The gate closure for secondary trading is 1 hour before the Trading Period.
- Each batch will include Buy and Sell orders, for all Trading Periods starting at least one hour after the batch time.

Secondary Trading Optimisation & Clearing

Worked examples

3. Secondary Trading Clearing Process

Buy and Sell orders → Optimisation → Pricing

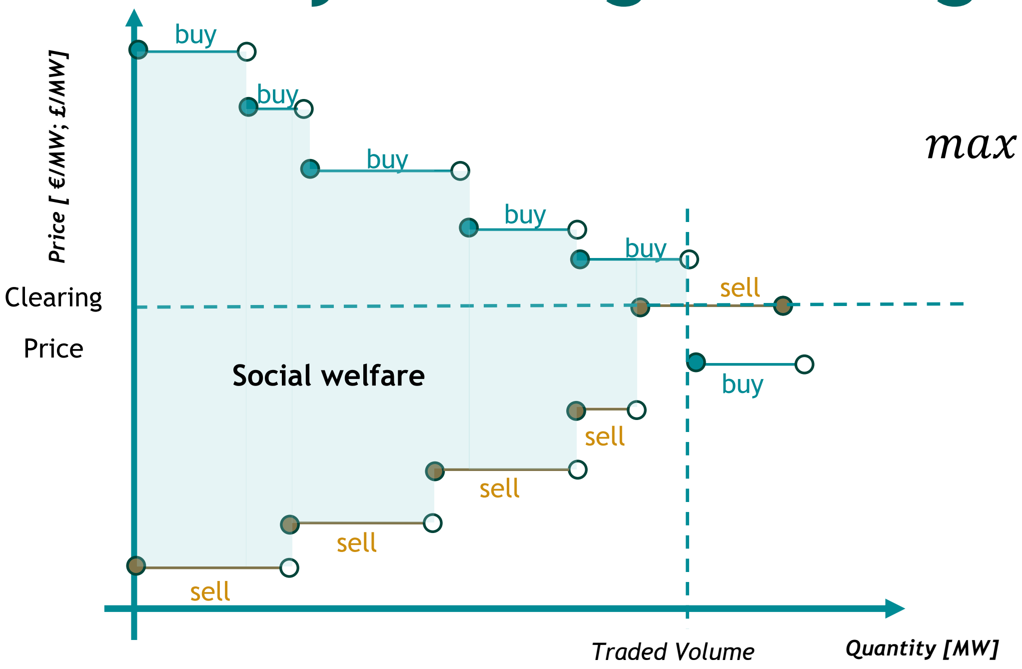
Buy and Sell orders: Buy and Sell orders submitted to order book for each batch

Optimisation: Maximising the gain to trades subject to volume balance constraint

Pricing: To deal with paradoxically accepted sell/buy bids in the presence of non-divisible bids

Optimisation setup for clearing the secondary trading and pricing mechanism presented here has not been considered in the baseline IT design

3. Secondary Trading Clearing Optimisation



$$max\left\{\sum_{i} a_i . p_{i.}^{b} q_i^{b} - \sum_{k} b_k . p_{k.}^{s} q_k^{s}\right\}$$

Maximizing gain to trades

$$\sum_{i} a_i q_i^{b} - \sum_{k} b_k q_k^{s} = 0$$

Volume Balance

$$0 \leq a_i \leq 1$$

$$0 \leq b_k \leq 1$$

Acceptance Proportion

$$if\ i \in FOK \quad a_i \in \{0,1\}$$

$$if\ k \in FOK \quad b_k \in \{0,1\}$$

Non-divisible bids

Nomenclature

Symbol	Type	Description
a_i and b_k	optimisation decision variables	Accepted proportions on the buy and sell side respectively
i, k	Indices	Representing the ith and kth p-q pair on the buy and sell side respectively
p_i^b, p_k^s	Parameters	Prices offered for the buy and sell orders respectively
q_i^b , q_k^s	Parameters	Quantity of buy and sell orders respectively

3. Secondary Trading Pricing

No non-divisible bids

01 **Marginal Pricing**

No non-divisible bids: market clearing price is determined by the marginal partially accepted bid regardless of whether it is a buy or sell bid.

02 **Merit order**

all accepted bids on both the buy and sell sides are in merit:

all buy offers priced above the clearing price and all sell offers priced below the clearing price are accepted.

03 **Clearing Price**

the price of the marginal partially accepted bid

Non-divisible bids

01 **Marginal Pricing**

Optimiser gives the price of the marginal partially accepted bid regardless of whether it is a buy or sell bid, as the clearing price.

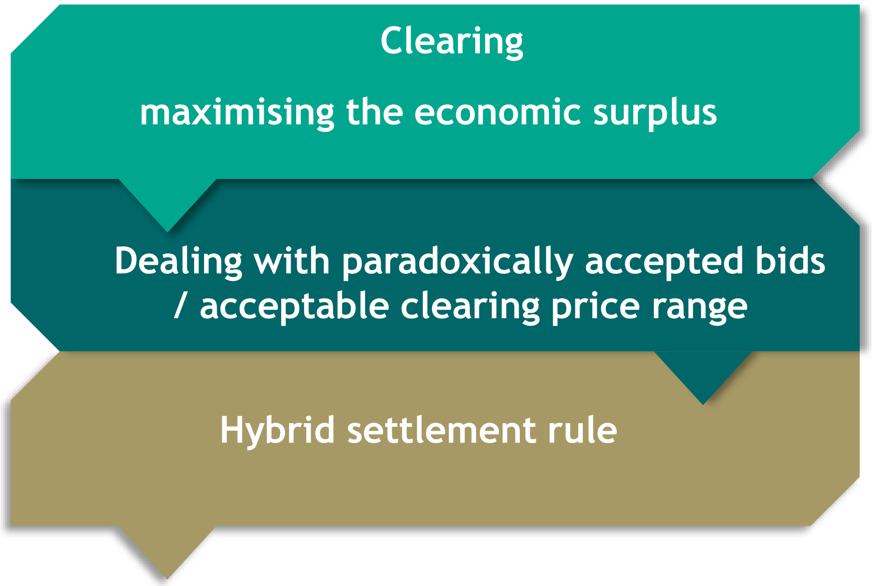
02 **Merit order**

Not all buy offers priced above the lowest accepted buy order may be accepted. Not all sell offers priced below the highest accepted sell order may be accepted

03 **Clearing Price**

A more complex pricing mechanism is required to address the possibility of paradoxically accepted sell/buy bids

3. Proposed Secondary Trading Pricing Mechanism



a) **Clearing:** Secondary trading is cleared by maximising economic surplus given the trading orders made (gains to trade).

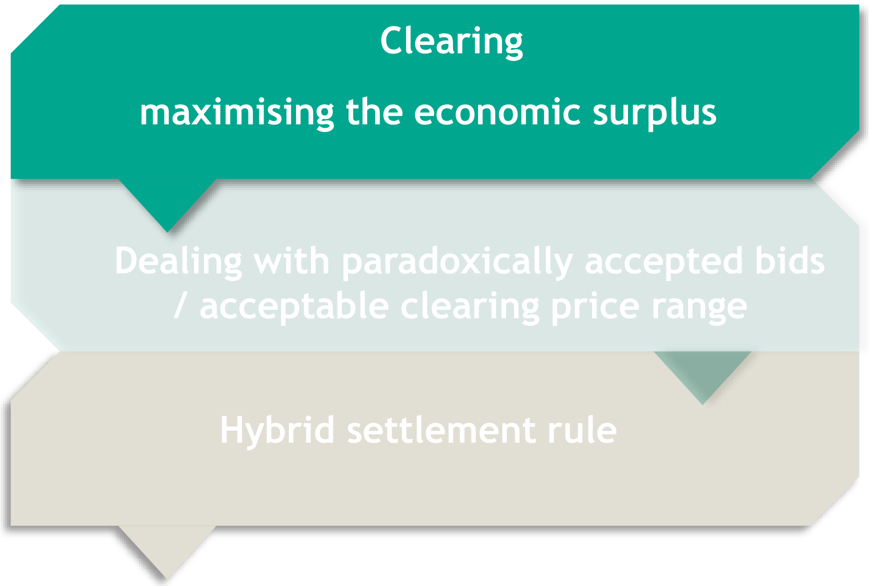
b) **Standard marginal clearing price:** If all secondary trading orders were divisible, a clearing price would be set the partially accepted (i.e. marginal) sell or buy order. The presence of non-divisible orders requires a more complex settlement rule

c) **Paradoxically accepted bids:** With non-divisible orders, the lowest accepted buy order can sometimes be below the highest accepted sell order. In this case there is no clearing price that can be applied uniformly to all accepted orders which balances payments and receipts.

d) **Hybrid settlement rule:** To settle this paradoxical case, we allow for separate buy and sell clearing prices. There is a hybrid rule that accepted orders are settled at the relevant buy/sell clearing price unless they would be out-of-merit at that price, in which case they are settled pay-as-bid. With this settlement rule, it is always possible to choose combinations of sell and buy prices that balance payments and receipts. We choose the combination closest to the conventional marginal price.

e) **Price Range**: Where the highest accepted sell order has a lower unit price than the lowest accepted buy order, this defines a potential range for the clearing price. Within this range, we select a clearing price to be as close as possible to the marginally accepted order (whether buy or sell). This controls incentives for making non-divisible orders in place of divisible orders

3. Proposed Secondary Trading Pricing Mechanism



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Example 1: No non-divisible bids

Marginal pricing still applies

Service	order	Type	Price	Quantity	Acceptance ratio	Traded volume	Accepted in merit
POR-Dynamic	Buy	Divisible	12	150	0	0	N/A
POR-Dynamic	Buy	Divisible	15	9	0	0	N/A
POR-Dynamic	Buy	Divisible	25	17	1	17	yes
POR-Dynamic	Buy	Divisible	36	6	1	6	yes
POR-Dynamic	Buy	Divisible	48	45	1	45	yes
POR-Dynamic	Buy	Divisible	59	55	1	55	yes
POR-Dynamic	Buy	Divisible	65	5	1	5	yes
POR-Dynamic	Buy	Divisible	70	30	1	30	yes
POR-Dynamic	Sell	Divisible	10	15	1	15	yes
POR-Dynamic	Sell	Divisible	18	115	1	115	yes
POR-Dynamic	Sell	Divisible	24	120	0.23333	28	yes
POR-Dynamic	Sell	Divisible	35	12	0	0	N/A
POR-Dynamic	Sell	Divisible	40	25	0	0	N/A
POR-Dynamic	Sell	Divisible	46	23	0	0	N/A
POR-Dynamic	Sell	Divisible	58	30	0	0	N/A
POR-Dynamic	Sell	Divisible	90	68	0	0	N/A

Volume	Marginally accepted Bid	Merit Order Applies	Paradoxically Accepted bid
158 MW	28 MW @ €24	Yes	No

Example 2: Non-divisible bids

Marginal pricing still applies

Service	order	Type	Price	Quantity	Acceptance ratio	Traded volume	Accepted in merit
POR-Dynamic	Buy	Non-divisible	12	150	0	0	N/A
POR-Dynamic	Buy	Divisible	15	9	0	0	N/A
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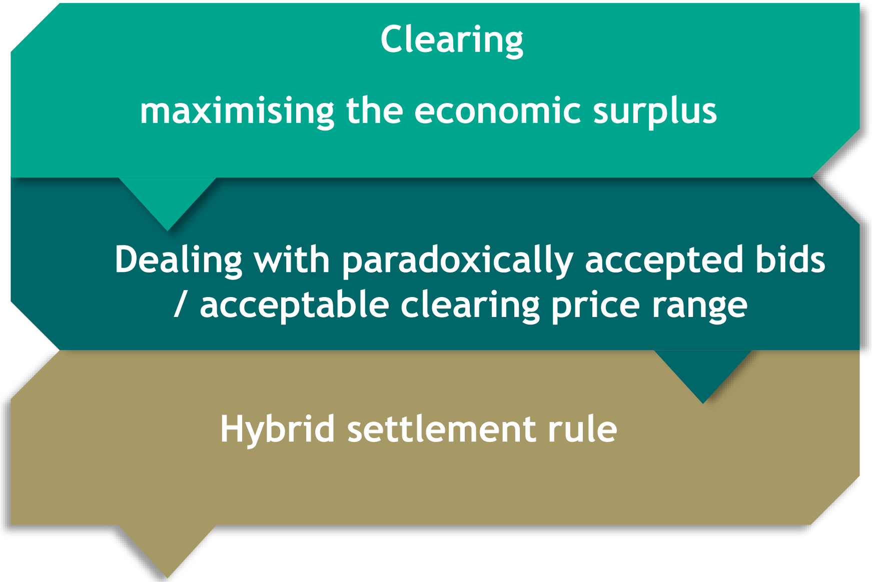
POR-Dynamic	Sell	Non-divisible	90	68	0	0	N/A

Volume	Marginally accepted Bid	Merit Order Applies	Paradoxically Accepted bid
158 MW	28 MW @ €24	Yes	No

3. Proposed Secondary Trading Pricing Mechanism



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c) **Paradoxically accepted bids:** With non-divisible orders, the lowest accepted buy order can sometimes be below the highest accepted sell order. In this case there is no clearing price that can be applied uniformly to all accepted orders which balances payments and receipts.

d) **Hybrid settlement rule:** To settle this paradoxical case, we allow for separate buy and sell clearing prices. There is a hybrid rule that accepted orders are settled at the relevant buy/sell clearing price unless they would be out-of-merit at that price, in which case they are settled pay-as-bid. With this settlement rule, it is always possible to choose combinations of sell and buy prices that balance payments and receipts. We choose the combination closest to the conventional marginal price.

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Example 3: Non-divisible bids

Pricing requires adjustments

Service	order	Divisibility	Price	Quantity	Acceptance proportion	Traded volume	In merit where accepted?
POR-Dynamic	Buy	Non-divisible	12	150	0	0	N/A
POR-Dynamic	Buy	Divisible	15	9	0	0	N/A
POR-Dynamic	Buy	Non-divisible	25	17	0	0	N/A
POR-Dynamic	Buy	Divisible	36	6	1	6	yes
POR-Dynamic	Buy	Non-divisible	48	45	1	45	yes
POR-Dynamic	Buy	Divisible	59	55	1	55	yes
POR-Dynamic	Buy	Non-divisible	65	5	1	5	yes
POR-Dynamic	Buy	Non-divisible	70	30	1	30	yes
POR-Dynamic	Sell	Divisible	10	15	1	15	yes
POR-Dynamic	Sell	Non-divisible	18	25	1	25	yes
POR-Dynamic	Sell	Divisible	24	50	1	50	yes
POR-Dynamic	Sell	Divisible	35	35	0.171	6	yes
POR-Dynamic	Sell	Non-divisible	40	45	1	45	No
POR-Dynamic	Sell	Non-divisible	46	23	0	0	N/A
POR-Dynamic	Sell	Divisible	58	30	0	0	N/A
POR-Dynamic	Sell	Non-divisible	90	68	0	0	N/A

Volume	Marginally accepted Bid	Merit Order Applies	Paradoxically Accepted bid
141 MW	6 MW @ €35	partly	Yes

Payment imbalance - standard marginal pricing approach

- Using the standard marginal pricing, the clearing price would be set at €35.
- Setting the clearing price at €35 leads to a payment imbalance:
  - The total payment from buyers would be 141x35 = €4935
  - Only 96 MW (=141-45 MW) of the sell bids are willing to trade at €35
  - The 45 MW sell at €40 would incur a loss of (€40-€35)x45= €225

order	Divisibility	Price	Quantity	Acceptance proportion	Traded volume	In merit where accepted?
Sell	Non-divisible	40	45	1	45	No
Buy	Divisible	36	6	1	6	yes

- Adjusting the clearing price does not achieve payment balance
  - If λ refers to the adjusted clearing price, the following condition must be satisfied:
  - $45.(40-35) = 141(\lambda - 35)$
  - This results in the clearing price of $\lambda = €36.5957$.
  - However, this clearing price will push the 6MW sell bid offered at €36 out of merit.
- In this scenario, it is impossible to have a single clearing price that meets the payment balance condition and clear the secondary trading on both sides

Set the clearing prices for Example 3

- The clearing price must be split for the buy and sell sides
- We also need a hybrid pay–as–clear and pay–as–bid mechanism

- λ_B and λ_s are the clearing prices designated for the buy and sell side respectively
- Paradoxically accepted bid of 45 MW at €40 in the sell side should be paid as bid.
- Payment balance could be achieved if $141\lambda_B = 40 \times 45 + 96\lambda_s$ **and**
  - λ_B must be below €36 to keep the accepted 6 MW buy bid offered at €36 in merit.
  - λ_s must be above the lowest accepted sell-bid which is €35.

mutually incompatible

Service	order	Divisibility	Price	Quantity	Acceptance proportion	Traded volume	In merit where accepted?
POR-Dynamic	Sell	Divisible	35	35	0.171	6	yes
POR-Dynamic	Buy	Divisible	36	6	1	6	yes

- So we consider a buy-side clearing price above €36, but this would require the 6 MW buy order submitted at €36 to be settled pay-as-bid…

Set the clearing prices for Example 3

- Total buy-side payments become $6 \times 36 + 135\,.\,\lambda_B$
- This must equal payments to sellers, requiring $6 \times 36 + 135\,.\,\lambda_B = 40 \times 45 + 96\,.\,\lambda_s$

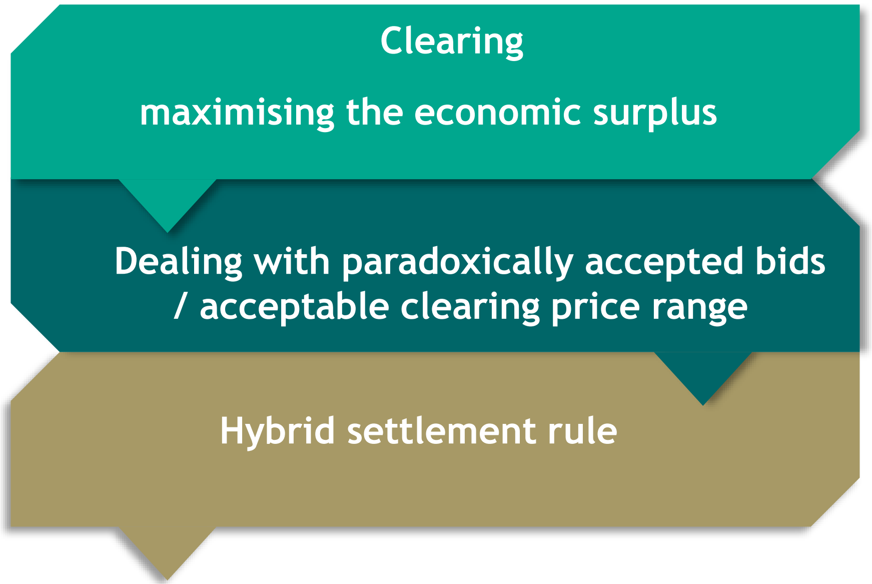
- Assuming λ_s is set at €35, the buy-side clearing price λ_B must be set at €36.622 in order to satisfy the payment balance.
- Since this €36.622 is still below the next accepted buy order (i.e., 45 MW at €48) no conflict arises.

Service	order	Divisibility	Price	Quantity	Acceptance proportion	Traded volume	In merit where accepted?
POR-Dynamic	Buy	Divisible	36	6	1	6	yes
POR-Dynamic	Buy	Non-divisible	48	45	1	45	yes

clearing prices

- The buy-side clearing price should be set at λ_B= €36.622.
- The sell-side clearing price should be set at λ_s= €35.
- The 45 MW sell order offered at €40 should be settled at €40, under the pay-as-bid mechanism.
- The 6 MW buy bid at €36 should also be settled at €36, under pay-as-bid mechanism.

3. Proposed Secondary Trading Pricing Mechanism



a) **Clearing:** Secondary trading is cleared by maximising economic surplus given the trading orders made (gains to trade).

b) **Standard marginal clearing price:** If all secondary trading orders were divisible, a clearing price would be set the partially accepted (i.e. marginal) sell or buy order. The presence of non-divisible orders requires a more complex settlement rule

c) **Paradoxically accepted bids:** With non-divisible orders, the lowest accepted buy order can sometimes be below the highest accepted sell order. In this case there is no clearing price that can be applied uniformly to all accepted orders which balances payments and receipts.

d) **Hybrid settlement rule:** To settle this paradoxical case, we allow for separate buy and sell clearing prices. There is a hybrid rule that accepted orders are settled at the relevant buy/sell clearing price unless they would be out-of-merit at that price, in which case they are settled pay-as-bid. With this settlement rule, it is always possible to choose combinations of sell and buy prices that balance payments and receipts. We choose the combination closest to the conventional marginal price.

e) **Price Range:** Where the highest accepted sell order has a lower unit price than the lowest accepted buy order, this defines a potential range for the clearing price. Within this range, we select a clearing price to be as close as possible to the marginally accepted order (whether buy or sell). This controls incentives for making non-divisible orders in place of divisible orders

Example 4: Possible Range for Clearing Price

Service	order	Divisibility	Price	Quantity	Acceptance proportion	Traded volume	In merit where accepted?
POR-Dynamic	Buy	Non-divisible	120	140	1	140	No
POR-Dynamic	Buy	Divisible	150	9	0	0	N/A
POR-Dynamic	Buy	Non-divisible	250	17	1	17	No
POR-Dynamic	Buy	Divisible	360	6	0	0	N/A
POR-Dynamic	Buy	Non-divisible	480	45	1	45	No
POR-Dynamic	Buy	Divisible	590	55	0.982	54	yes
POR-Dynamic	Buy	Non-divisible	650	5	1	5	yes
POR-Dynamic	Buy	Non-divisible	700	30	1	30	yes
POR-Dynamic	Sell	Divisible	10	15	1	15	yes
POR-Dynamic	Sell	Non-divisible	18	25	1	25	yes
POR-Dynamic	Sell	Divisible	24	50	1	50	yes
POR-Dynamic	Sell	Divisible	35	35	1	35	yes
POR-Dynamic	Sell	Divisible	40	45	1	45	yes
POR-Dynamic	Sell	Non-divisible	46	23	1	23	yes
POR-Dynamic	Sell	Divisible	58	30	1	30	yes
POR-Dynamic	Sell	Non-divisible	90	68	1	68	yes

Volume	Marginally accepted Bid	Merit Order Applies	Paradoxically Accepted bid
291 MW	54 MW @ €590	partly	Yes

Price range: [90,120]

Set the clearing prices for Example 4

1. $\check{P}_b$ is defined as the lowest price amongst accepted buy order = €120
2. $\hat{P}_s$ is defined as the highest price amongst accepted sell order= €90

Price range: [90,120]

Service	order	Divisibility	Price	Quantity	Acceptance proportion	Traded volume	In merit where accepted?
POR-Dynamic	Buy	Non-divisible	120	140	1	140	No
POR-Dynamic	Sell	Non-divisible	90	68	1	68	yes

Clearing rule

- If the partially accepted order is a sell bid, the clearing price should be set to $\hat{P}_s$.
- If the partially accepted order is a buy bid, the clearing price should be set to $\check{P}_b$.

In the Example 4

POR-Dynamic	Buy	Divisible	590	55	0.982	54	yes

- ❑ The partially accepted bid is on the buy side.
- ❑ The clearing price should be set at €120 which is at the high end of $[\hat{P}_s = 90, \check{P}_b = 120]$.

Volume Insufficiency Condition

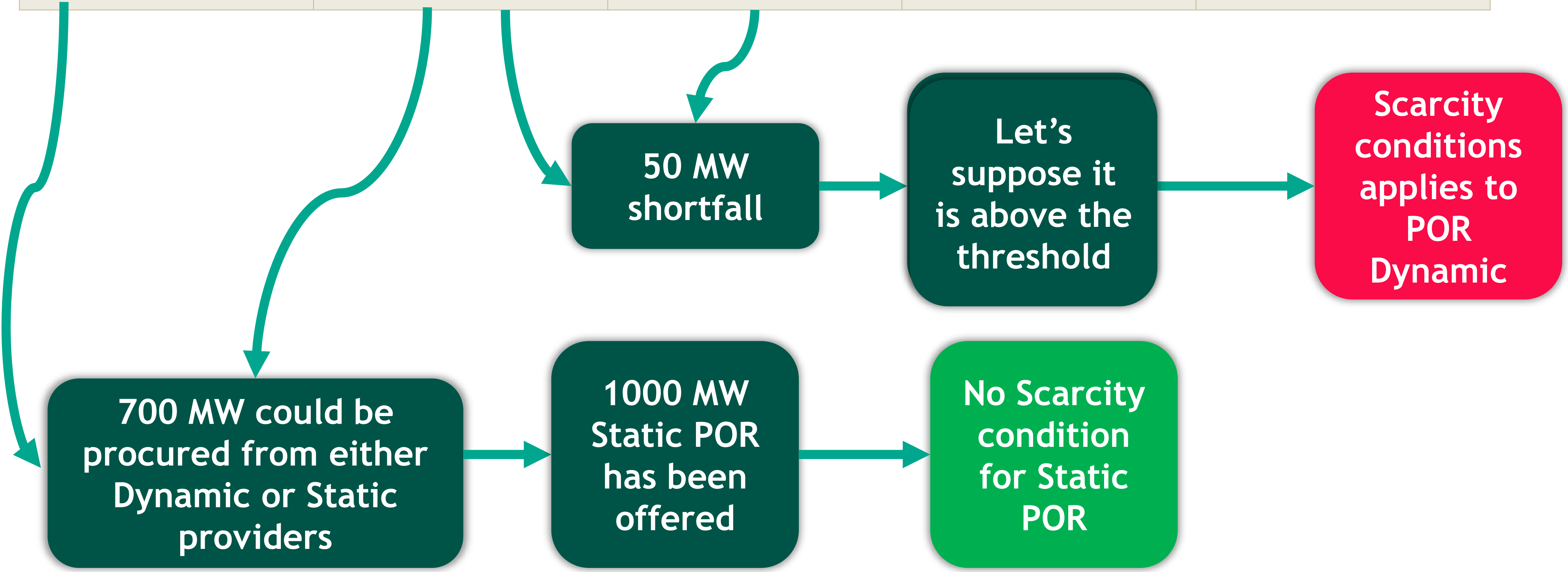
Worked examples

Volume insufficiency condition

- If insufficient volumes have been offered in DASSA for a specific service
  - ❑ Volume insufficiency applies only if the identified shortfall exceeds the corresponding Volume Insufficiency Threshold for that service
- Voule insufficiency in lower quality/lower sub-category services could trigger the volume insufficiency condition for the higher quality/sub-category services

Volume insufficiency in higher quality products

Total Volume POR Requirement [MW]	Min Requirement Dynamic POR [MW]	Total capacity offered for Dynamic POR [MW]	Total capacity offered for Static POR [MW]	Volume Insufficiency Dynamic POR
1050	350	300	1000	50



Volume Insufficiency in a Lower Quality Sub-category Product

Quality variations for FFR	Min. requirement constraints [MW, cumulative]	Capacity offered in the DASSA [MW, cumulative]
Total FFR response	**1050**	**1340**
Total Dynamic Response	840	890
Total Static Response	0	450
FFR Sub-category 1	**630**	**654**
Dynamic Response	504	504
Static Response	0	150
FFR Sub-category 2 or faster (i.e. cumulative with FFR Sub-category 1)	**735**	**790**
Dynamic Response	588	540
Static Response	0	250
Remaining volumes - can be provided by any provider (FFR sub cat 1, 2, i.e. any qualified provider able to provide response in <1s)	315	
FFR Sub-category 3		1340
Dynamic Response	0	280
Static Response	0	100

84 MW Dynamic Sub-Cat FFR-2

36 MW Dynamic Sub-Cat FFR-2 is offered

84-36=48 MW shortfall in Dynamic Sub-Cat FFR-2

No excess capacity in Dynamic Sub-Cat FFR1

Let's suppose it is above the threshold

Volume insufficiency for FFR Dynamic Sub-Cat 1 & 2

Secondary Trading under Volume Insufficiency Condition

In case of volume insufficiency

- TSOs place a sell order to resolve the volume insufficiency
- TSOs’ sell order will be prioritised to resolve the volume insufficiency condition
  - While the volume insufficiency has not been met (the sell order has not been fully cleared):
    - ❑ Unmatched portion of the TSOs’ sell order will be carried over to the subsequent batches (if any)
    - ❑ All sell orders other than TSOs’ sell order are not being considered in the order book.
    - ❑ Bilateral contracts are not being validated.
- The net price/prices applicable to buyers is
  - ❑ Using optimisation: *scarcity price – the determined buy side secondary trading clearing price is* applicable to all buyers
    - ❖ Buy side secondary trading clearing price is determined based on the marginally accepted buy bid
  - ❑ Using simple Matching: *scarcity price – the offered price of accepted buy bids*

Example 1: TSOs sell order is fully cleared in a batch - optimisation based clearing

Service	order	Type	Price	Quantity	Acceptance ratio	Traded volume	Accepted in merit
POR-Dynamic	Buy	Non-divisible	-€12	150	0	0	N/A
POR-Dynamic	Buy	Divisible	€15	9	0.444	4	yes
POR-Dynamic	Buy	Non-divisible	€25	17	0	0	N/A
POR-Dynamic	Buy	Divisible	€36	6	1	6	yes
POR-Dynamic	Buy	Non-divisible	€48	45	0	0	N/A
POR-Dynamic	Buy	Divisible	€59	55	1	55	yes
POR-Dynamic	Buy	Non-divisible	€65	5	1	5	yes
POR-Dynamic	Buy	Non-divisible	€70	30	1	30	yes
POR-Dynamic	Sell	Divisible	0	100	1	100	yes
POR-Dynamic	Sell	Divisible	€20	10	0	0	N/A
POR-Dynamic	Sell	Divisible	€50	30	0	0	N/A

Volume	Marginally accepted buy bid	Applicable price to the buy side
100 MW	4 MW @ €15	The scarcity price - 15

Example 2: TSOs sell order is fully cleared in a batch - simple matching

Service	order	Type	Price	Quantity	Acceptance ratio	Traded volume	Accepted in merit	Secondary Trading Clearing Price
POR-Dynamic	Buy	Non-divisible	-€12	150	0	0	N/A	N/A
POR-Dynamic	Buy	Divisible	€15	9	0.444	4	yes	€15
POR-Dynamic	Buy	Non-divisible	€25	17	0	0	N/A	N/A
POR-Dynamic	Buy	Divisible	€36	6	1	6	yes	€36
POR-Dynamic	Buy	Non-divisible	€48	45	0	0	N/A	N/A
POR-Dynamic	Buy	Divisible	€59	55	1	55	yes	€59
POR-Dynamic	Buy	Non-divisible	€65	5	1	5	yes	€65
POR-Dynamic	Buy	Non-divisible	€70	30	1	30	yes	€70
POR-Dynamic	Sell	Divisible	0	100	1	100	yes	N/A
POR-Dynamic	Sell	Divisible	€20	10	0	0	N/A	N/A
POR-Dynamic	Sell	Divisible	€50	30	0	0	N/A	N/A

Volume	Applicable price to the buy side
100 MW	The scarcity price – ST clearing price

Pay as bid

TSOs’ sell order carried over to the subsequent batches

- TSOs’ sell order will still be prioritised to resolve the volume insufficiency condition until being fully cleared
- When the TSOs’ sell order is fully cleared
    - ❑ If there are subsequent batches applicable to the same trading period
    - ❑ Secondary trading can be done normally as there is no need to prioritise TSOs’ sell order anymore
        - ❖ Bilateral trades could be validated subject to meeting validation conditions
        - ❖ All sell orders submitted by providers are considered in the order book
    - ❑ The net of *scarcity price and secondary trading clearing price/prices* will be applicable to the secondary trades

Example 3: TSOs sell order is not fully cleared in a batch- optimisation

Service	order	Type	Price	Quantity	Acceptance ratio	Traded volume	Accepted in merit
POR-Dynamic	Buy	Non-divisible	-€12	150	0	0	N/A
POR-Dynamic	Buy	Divisible	€15	9	1	9	yes
POR-Dynamic	Buy	Non-divisible	€25	17	1	17	yes
POR-Dynamic	Buy	Divisible	€36	6	1	6	yes
POR-Dynamic	Buy	Non-divisible	€48	45	1	45	yes
POR-Dynamic	Buy	Divisible	€59	55	1	55	yes
POR-Dynamic	Buy	Non-divisible	€65	5	1	5	yes
POR-Dynamic	Buy	Non-divisible	€70	30	1	30	yes
POR-Dynamic	Sell	Divisible	0	500	0.334	167	yes

Batch Number
1

Volume
167 MW

Applicable price to the buy side
The scarcity price – 15

Example 3: TSOs sell order is not fully cleared in a batch- optimisation

Service	order	Type	Price	Quantity	Acceptance ratio	Traded volume	Accepted in merit
POR-Dynamic	Buy	Non-divisible	-€15	150	0	0	N/A
POR-Dynamic	Buy	Divisible	€22	90	0	0	N/A
POR-Dynamic	Buy	Non-divisible	€29	35	0	0	N/A
POR-Dynamic	Buy	Divisible	€40	60	0	0	N/A
POR-Dynamic	Buy	Non-divisible	€50	145	1	145	No
POR-Dynamic	Buy	Divisible	€62	155	0.697	108	yes
POR-Dynamic	Buy	Non-divisible	€70	50	1	50	yes
POR-Dynamic	Buy	Non-divisible	€75	30	1	30	yes
POR-Dynamic	Sell	Divisible	0	333	1	333	yes

Batch Number

2

Volume

333 MW

Applicable price to the buy side

The scarcity price – 50

Normal Secondary/Bilateral Trading at the Scarcity Price

Batch Number

3 onward

Break

15 minutes

Commitment Obligations & Incentives

Further detail and rationale for proposals & worked examples

5. Commitment Obligations & Incentives: Overview

➢ TSOs propose an incentive structure for DASSA Orders, summarised as follows:

	Pre-Gate Closure Incentives	Post-Gate Closure - Availability Incentives	Post-Gate Closure - Service Delivery Incentives
Proposed Incentive	Compensation Payment	Availability Performance Scalar & Compensation Payment	Event Performance Scalar

➢ **Structured Hierarchy of Incentives** to be as follows:

- Post-Gate Closure Availability Incentives to be stronger than Pre-Gate Closure Incentives.
- Service Delivery Incentive to be sufficiently strong and exceed the applicable Availability Incentives over the subsequent Trading Periods.

➢ **Pre-Gate Closure: Application of Compensation Payment**:

- Option 1 (TSOs' preferred option): Compensation Payment to be payable to the TSOs when a DASSA Order is not compatible with the service provider's FPN or has been self-lapsed, with exceptions.
- Option 2: Compensation Payment to be payable to the TSOs for any incompatible DASSA Order at gate closure, regardless of the reason for the lapsed Order.

5. Commitment Obligations & Incentives:
Pre Gate-Closure: Value of Compensation Payment

- TSOs collaborated with our partner AFRY to identify and evaluate various options for the value of the Compensation Payment, summarised as follows:

Assessment Criteria	Compensation Payment Options						
	1) No Compensation	2) Dynamic Compensation	3) DASSA price	4a) Ex-Post Adjusted DASSA price minus DASSA price	4b) Ex-Ante Adjusted DASSA price minus DASSA price	5) RAD Price	6) System security cost
Appropriate incentives	○	◕	◔	◕	◑	◔	◔
Cost-reflectivity	○	○	◑	◕	◑	◑	◑
Ability to Implement	●	◔	●	◔	◔	◕	◕
Predictability	●	●	◕	◑	●	◑	●

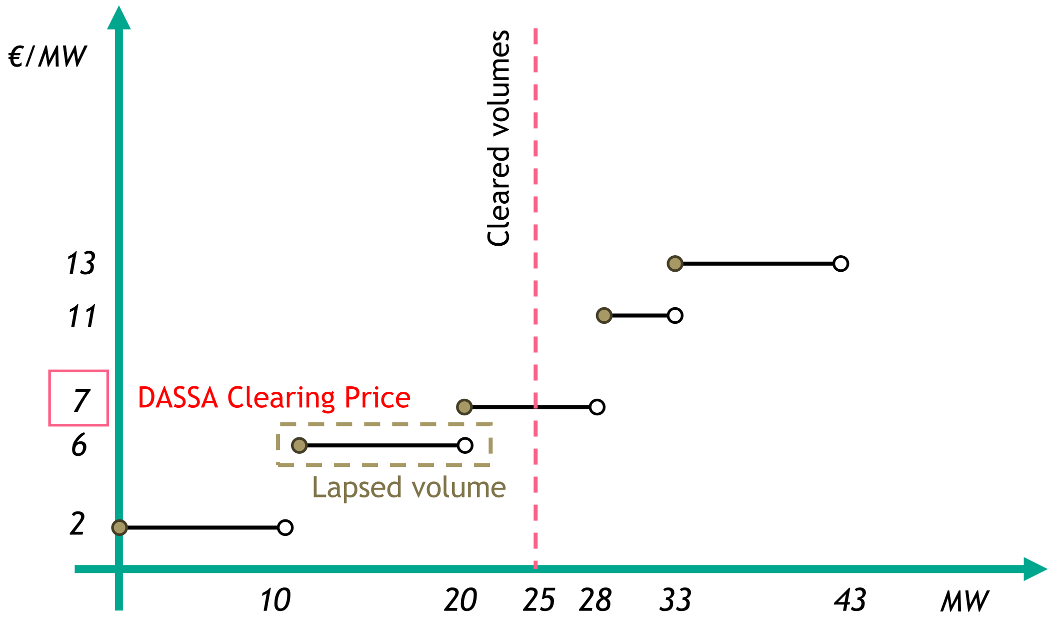
Note: The greater the shaded area within the Harvey Ball, the higher the score i.e. ● > ◕ > ◑ > ◔ > ○

- TSOs propose **Option 4a (shown in green)**, as our preferred option (subject to feasibility for DASSA go-live): the **Delta between an Ex-Post Adjusted DASSA Price and the DASSA Price**.
- Option 4a scores well in terms of creating appropriate incentives and cost-reflectivity.
- If Option 4a is not feasible to implement, the **DASSA price (Option 3)** is preferred due to its ease of implementation and predictability for service providers.

5. Commitment Obligations & Incentives:
Pre Gate-Closure: Value of Compensation Payment

- **Option 4a** is our preferred option: the delta between an Ex-Post Adjusted DASSA Price and the DASSA Price, where:
  - The Adjusted DASSA Clearing Price reflects what the price would have been if the lapsed volumes had not participated in the auction.
  - In this example, the volume requirement is 25MW; the lapsed volume is 10MW; the delta is **€6/MW**.

DASSA Clearing Price formation



Ex-Post Adjusted DASSA Price formation

5. Commitment Obligations & Incentives:
Post Gate-Closure: Service Availability Incentive

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- TSOs collaborated with our partner AFRY to identify and evaluate various options for the design of the Service Availability Incentives, summarised as follows:

Assessment Criterion	Availability Incentive Options			
	1) Availability Performance Scalar & Compensation Payment	2) Temporary exclusion	3) Volume derating	4) Availability One-off payment
Appropriate incentives	◕	◑	◕	◑
Proportionality	◕	◑	◕	◑
Ability to Implement	◕	◑	◑	●
Predictability	◕	●	◕	◕

Note: The greater the shaded area within the Harvey Ball, the higher the score i.e. ● > ◕ > ◑ > ◔ > ○

- TSOs' propose **Option 1 (shown in green)**, as our preferred option: application of an Availability Performance Scalar on subsequent DASSA income, in addition to the Compensation Payment and forfeit of DASSA Payment for the applicable Trading Period.

- Option 1 is preferred by the TSOs because:
  - Service providers are financially motivated to maintain availability.
  - Scalar-based approach can be designed to manage the participation of units with varying availability.
  - Incentive is proportional to DASSA payments, i.e. it aligns the incentive with the revenues earned through DASSA.
  - Incentive is smoother and more consistent than alternatives.

5. Commitment Obligations & Incentives:
Post-Gate Closure: Service Availability Incentive

1 **Assessment Criterion:** Appropriate Incentives

➢ Considerations:
- Does the measure incentivise availability in operational timeframes, as well as long-term availability? Does it support efficient dispatch?
- It is assumed that under all options the Compensation Payment applies in addition to the availability incentive, or that the incentive is designed to have a greater financial impact than the Compensation Payment.

➢ Scoring rationale:
- In general, all measures have the potential to provide availability incentives. It is the detailed design of the measures that will determine whether the incentives are appropriate or not.
- Poorly calibrated parameters can distort incentives: for instance, excessively high one-off payments may discourage participation, while overly lenient exclusion thresholds can weaken the signal to remain available.
- The availability scalar is scored slightly higher due to its **dynamic nature—it adjusts future payments based on past availability performance, offering a more continuous and responsive incentive mechanism compared to static or one-off measures**
- Similar effects can be achieved with volume derating, if the derating factor could be calibrated to reflect the extent of underperformance, offering a degree of scalability in its application.

Availability Performance Scalar & Compensation Payment	Temporary exclusion	Volume derating	Availability One-off penalty
◕	◑	◕	◑

5. Commitment Obligations & Incentives:
Post-Gate Closure: Service Availability Incentive

2 Assessment Criterion: Proportionality

- Considerations:
  - Does the impact of the measure align proportionally with the DASSA earnings a service provider can reasonably expect, ensuring that it does not become overly punitive and risk discouraging market participation?
  - Is the incentive or penalty proportionate to the extent that unavailability affects the wider system's efficiency and secure operation?
- Scoring rationale:
  - The scalar-based incentive is **proportional to DASSA payments, meaning providers who frequently clear the DASSA receive stronger absolute incentives and are proportionate across providers in relative terms.** The Compensation Payment ensures that all service providers have a base level incentive to maintain availability.
  - Furthermore, a scalar approach offers **flexibility—it can be designed to tolerate limited unavailability without penalty, while scaling down sharply at higher unavailability levels, even to zero.**
  - Temporary exclusion is a binary mechanism with limited flexibility and is highly sensitive to DASSA price volatility, which can amplify financial penalties at time of system tightness.
  - Volume derating allows for proportional adjustment based on underperformance but shares the same exposure to DASSA price fluctuations during the derating window.
  - One-off payments are uniform across providers, lacking differentiation based on reliability, which may result in over-penalising reliable providers or under-penalising those with frequent unavailability.

Availability Performance Scalar & Compensation Payment	Temporary exclusion	Volume derating	Availability One-off penalty
◕	◑	◕	◑

5. Commitment Obligations & Incentives:
Post-Gate Closure: Service Availability Incentive

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③ **Assessment Criterion:** Ability to Implement

- Considerations:
  - Is it implementable, given the resulting system requirements and decisions made by the SEMC?
- Scoring rationale:
  - The implementation of the Availability Performance Scalar is expected to be **manageable, since a scalar-based performance mechanism is currently in place under the current DS3 Arrangements**, and the TSOs have experience with this.
  - TSOs analysis highlighted that an uplift to the IT design would be required to implement temporary exclusions, along with the added administrative burden of tracking and enforcing the exclusions.
  - Volume derating, like temporary exclusion, introduces complexity due to the need for oversight and varying derating parameters across providers, making implementation and monitoring more challenging. Furthermore, introducing this functionality to the scope of IT system design is difficult, considering the IT workstream progress
  - Dynamic one-off penalties appear impractical for DASSA go-live due to the complexity of required data and calculations, whereas a static one-off penalty offers a simpler, more feasible option with minimal implementation burden.

Availability Performance Scalar & Compensation Payment	Temporary exclusion	Volume derating	Availability One-off penalty
◕	◑	◑	●

5. Commitment Obligations & Incentives:
Post-Gate Closure: Service Availability Incentive

4 Assessment Criterion: Predictability

- Considerations:
  - Can providers easily predict the resulting impact of the incentive?
- Scoring rationale:
  - Although the scalar-based measure involves consideration of service provider's performance over the persistence period, the **calculations are expected to be easily followed and familiar to the industry, given usage of a similar scalar-based approach under current DS3 Arrangements**. Applying the scalar to monthly revenues reduces complexity by avoiding the need to forecast DASSA prices at a granular level.
  - Temporary exclusion is simple and transparent, offering providers a clear understanding of the consequences of unavailability after Gate Closure. It, therefore, scores the highest under this criterion.
  - Volume derating may require tailored adjustments to ensure fairness across providers with different capacities and clearing profiles. This adds complexity and makes the impact harder to predict, particularly due to variability in derating factors, the timing of their application, and the interaction with DASSA price forecasts. These elements introduce uncertainty in estimating the financial impact over the derating period.
  - One-off penalty, when set dynamically rely on the predictability of the applicable Compensation Payment, which may not be accurately known in real time. This uncertainty reduces its effectiveness under this criterion.

Availability Performance Scalar & Compensation Payment	Temporary exclusion	Volume derating	Availability One-off penalty
◕	●	◕	◕

5. Commitment Obligations & Incentives:
Post-Gate Closure: Service Availability Incentive

➢ **Walkthrough - Availability Performance Scalar Calculation Example**

- The Availability Performance Scalar (S_A) is defined as:

$$S_A = \begin{cases} 1, & F_A > b \\ \frac{F_A - a}{b - a}, & F_A > a \\ 0, & a > F_A \end{cases}$$

➢ b and a constants are set at 0.97 and 0.50 respectively

➢ F_A is the Availability Factor

- F_A is the Availability Factor determined using the expression below:

$$F_A = \left(\sum_{m=M}^{M-4} \left[1 - \frac{capacity\ unavailable_m}{confirmed\ capacity_m} \right] \frac{V_m}{3} \right)$$

Number of months between the unavailability incident month and the settlement month (M)	Dynamic Time Scaling Factor (V_m)
M	1
M-1	0.8
M-2	0.6
M-3	0.4
M-4	0.2

- *confirmed capacity*$_m$ refers to the total volume of the confirmed DASSA Orders held by the service provider in the month m
- capacity unavailable$_m$ represents the total volume of confirmed DASSA Orders that the service provider did not make available in month m

5. Commitment Obligations & Incentives:
Post-Gate Closure: Service Availability Incentive

- Walkthrough - Availability Performance Scalar Calculation Example[1]

- Determining Availability Performance Scalar for May 2027 as current settlement month (M)

$$S_A = \begin{cases} 1, & F_A > b \\ \dfrac{F_A - a}{b - a}, & F_A > a \\ 0, & a > F_A \end{cases}$$

- Calculation:

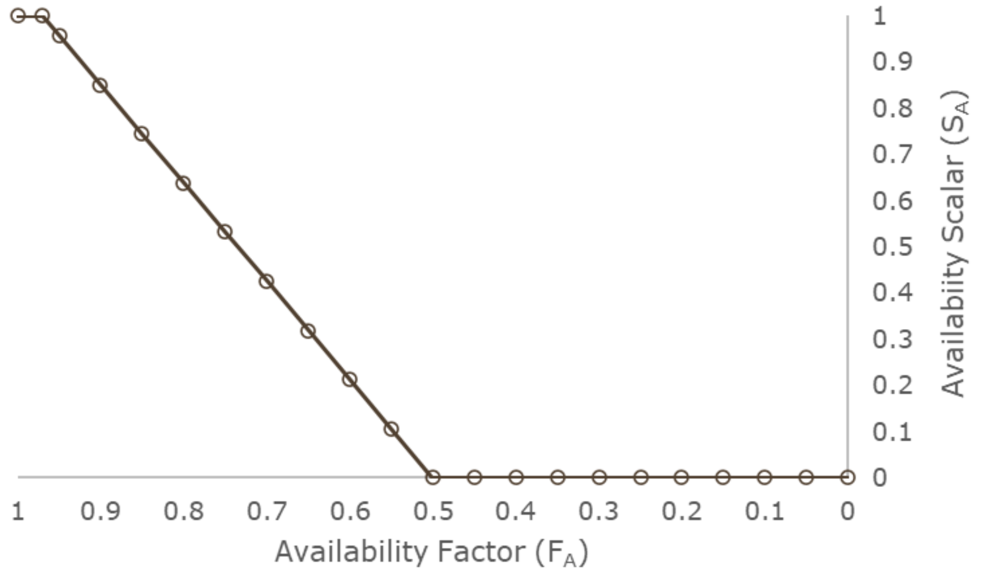
$$S_A = \frac{F_A - 0.5}{0.97 - 0.5}$$

Example F_A to be illustrated in next slides

$$S_A = \frac{0.93 - 0.5}{0.97 - 0.5}$$

$$\boldsymbol{S_A = 0.91}$$

- Relationship between the Availability Performance Scalar and the Availability Factor



- The Availability Performance Scalar has a tolerance such that if the monthly weighted average of a unit's performance (Availability Factor) is 0.97 or above, it does not scale down the DASSA Payments.

Note: 1) Values used in the example were selected arbitrarily

5. Commitment Obligations & Incentives:
Post-Gate Closure: Service Availability Incentive

➢ Walkthrough – Availability Performance Scalar Calculation Example[1,2]

DASSA order book of the service provider			Performance history of the service provider	
Month	**Total confirmed DASSA Order volume (MW)**		**No. of occasions on partial availability**	**Total Volumes unavailable (MW)**
Mar 2027	n/a		n/a	n/a
Apr 2027	n/a		n/a	n/a
May 2027	1000		4	70+60+50+40= 220
Jun 2027	1000		0	0
Jul 2027	200		1	50
Aug 2027	1000		0	0
Sep 2027	1000		0	0
Oct 2027	1000		0	0
Nov 2027	1000		0	0
Dec 2027	1000		0	0

Note: 1) Values used in the example were selected arbitrarily; 2) "n/a" marks data fields not applicable in a given month

5. Commitment Obligations & Incentives:
Post-Gate Closure: Service Availability Incentive

- **Walkthrough - Availability Performance Scalar Calculation Example**[1]

- Determining Availability Factor for May 2027 as **current settlement month** (M)

M	1
M-1	0.8
M-2	0.6
M-3	0.4
M-4	0.2

$$F_A = \left(\sum_{m=M}^{M-4} \left[1 - \frac{capacity\ unavailable_m}{confirmed\ capacity_m} \right] \frac{V_m}{3} \right)$$

Month	Total confirmed DASSA Order volume (MW)	No. of occasions on partial availability	Total Volumes unavailable (MW)
May 2027	1000	4	70+60+50+40= 220

- Calculation:

$$F_A = \left(1 \times V_{M-4} + 1 \times V_{M-3} + 1 \times V_{M-2} + 1 \times V_{M-1} + \left[1 - \frac{220}{1000} \right] \times V_M \right) \times 1/3$$

$$F_A = \left(1 \times 0.2 + 1 \times 0.4 + 1 \times 0.6 + 1 \times 0.8 + \left[1 - \frac{220}{1000} \right] \times 1 \right) \times 1/3$$

$$\boldsymbol{F_A} = \quad \mathbf{0.93}$$

  - For M=May, months M-1, M-2 etc. are assumed to have zero number of failures, as there is no historical data to consider in this case.

Note: 1) Values used in the example were selected arbitrarily

5. Commitment Obligations & Incentives: Post-Gate Closure: Service Availability Incentive

➢ **Walkthrough - Availability Performance Scalar Calculation Example[1]**

Month	Total confirmed DASSA Order volume (MW)	Volumes unavailable (MW)	Availability Factor (F_A)
Mar 2027	n/a	n/a	n/a
Apr 2027	n/a	n/a	n/a
May 2027	1000	70+60+50+40= 220	$\left(1\times 0.2 + 1\times 0.4 + 1\times 0.6 + 1\times 0.8 + \left[1-\frac{220}{1000}\right]\times 1\right)\times\frac{1}{3} = 0.93$
Jun 2027	1000	0	$\left(1\times 0.2 + 1\times 0.4 + 1\times 0.6 + \left[1-\frac{220}{1000}\right]\times 0.8 + 1\times 1\right)\times\frac{1}{3} = 0.94$
Jul 2027	200	50	$\left(1\times 0.2 + 1\times 0.4 + \left[1-\frac{220}{1000}\right]\times 0.6 + 1\times 0.8 + \left[1-\frac{50}{200}\right]\times 1\right)\times\frac{1}{3} = 0.87$
Aug 2027	1000	0	$\left(1\times 0.2 + \left[1-\frac{220}{1000}\right]\times 0.4 + 1\times 0.6 + \left[1-\frac{50}{200}\right]\times 0.8 + 1\times 1\right)\times\frac{1}{3} = 0.90$
Sep 2027	1000	0	$\left(\left[1-\frac{220}{1000}\right]\times 0.2 + 1\times 0.4 + \left[1-\frac{50}{200}\right]\times 0.6 + 1\times 0.8 + 1\times 1\right)\times\frac{1}{3} = 0.94$
Oct 2027	1000	0	$\left(1\times 0.2 + \left[1-\frac{50}{200}\right]\times 0.4 + 1\times 0.6 + 1\times 0.8 + 1\times 1\times\frac{1}{3}\right) = 0.97$
Nov 2027	1000	0	$\left(\left[1-\frac{50}{200}\right]\times 0.2 + 1\times 0.4 + 1\times 0.6 + 1\times 0.8 + 1\times 1\right)\times\frac{1}{3} = 0.98$
Dec 2027	1000	0	$(1\times 0.2 + 1\times 0.4 + 1\times 0.6 + 1\times 0.8 + 1\times 1)\times\frac{1}{3} = 1$

5. Commitment Obligations & Incentives:
Post-Gate Closure: Service Availability Incentive

❖ Walkthrough – Availability Performance Scalar Calculation Example[1]

Month	Total confirmed DASSA Order volume (MW)	Volumes unavailable (MW)	Availability Factor (F_A)	Availability Scalar (S_A)
Mar 2027	n/a	n/a	n/a	n/a
Apr 2027	n/a	n/a	n/a	n/a
May 2027	1000	70+60+50+40= 220	0.93	$\frac{0.93-0.5}{0.47}=0.91$
Jun 2027	1000	0	0.94	$\frac{0.94-0.5}{0.47}=0.94$
Jul 2027	200	50	0.87	$\frac{0.87-0.5}{0.47}=0.79$
Aug 2027	1000	0	0.90	$\frac{0.90-0.5}{0.47}=0.85$
Sep 2027	1000	0	0.94	$\frac{0.94-0.5}{0.47}=0.94$
Oct 2027	1000	0	0.97	$\frac{0.97-0.5}{0.47}=1$
Nov 2027	1000	0	0.98	1
Dec 2027	1000	0	1	1

Note: 1) Values used in the example were selected arbitrarily

5. Commitment Obligations & Incentives:
Post-Gate Closure: Service Delivery Incentive

➢ TSOs collaborated with our partner AFRY to identify and evaluate various options for the design of the Service Delivery Incentives, summarised as follows:

Assessment Criterion	Delivery Incentive Options			
	Event Performance Scalar	Temporary exclusion	Volume derating	Delivery One-off payment
Appropriate incentives	◕	◑	◕	◑
Proportionality	◕	◑	◕	◑
Ability to Implement	◕	◑	◑	●
Predictability	◕	●	◕	◕

Note: The greater the shaded area within the Harvey Ball, the higher the score i.e. ● > ◕ > ◑ > ◔ > ○

➢ TSOs' propose **Option 1 (shown in green)**, as our preferred option: application of an Event Performance Scalar on subsequent DASSA income.

➢ Option 1 is preferred by the TSOs because:
- Service providers are financially motivated to maintain availability.
- Incentive is proportional to DASSA payments, i.e. it aligns the incentive with the revenues earned through DASSA.
- Persistence of scalar maintains the hierarchy between the incentives for delivering a response and for availability in subsequent trading period.

5. Commitment Obligations & Incentives:
Post-Gate Closure: Service Delivery Incentive

➢ **Assessment Criteria**

- The assessment of different options considered for the post-Gate Closure service delivery incentive remains unchanged to the one undertaken for post-Gate Closure service availability.

Criterion	Considerations
Appropriate incentives	Does the measure incentivise both operational and long-term availability, while supporting efficient dispatch? *Options were also evaluated on the ability to achieve the desired hierarchy between the different incentive measures – whereas previously*
Proportionality	Is the incentive proportionate to DASSA earnings and to the impact of unavailability on system efficiency and secure operation, ensuring it remains effective without discouraging participation?
Ability to Implement	Can the measure be easily implemented? What is the required effort and cost?
Predictability	Can providers easily predict the resulting impact of the incentive?

➢ Scoring rationale:

- The scores allocated to each of the considered options and the rationale behind them largely remains the same to what has been previously discussed under section covering post Gate-Closure service availability Incentive.
- The only shift being the expanded refocus on the ability of the options to achieve the desired hierarchy:
  - **Service Delivery Incentive to be sufficiently strong and exceed the applicable Availability Incentives over the subsequent Trading Periods.**

5. Commitment Obligations & Incentives:
Post-Gate Closure: Service Delivery Incentive

1 **Assessment Criterion:** Appropriate Incentives

- While the resulting scoring remains unchanged from the previous discussion, below we share the expansion in the rationale for the scoring – particularly with the focus on the maintenance of the desired hierarchy between the different incentive mechanisms.
  - Service Delivery Incentive to be sufficiently strong and exceed the applicable Availability Incentives over the subsequent Trading Periods.

➢ Scoring rationale:

- The scalar based approach is **easier to optimise**, such that it provides a sufficiently strong penalty and maintain the desired hierarchy, **while not becoming overly penal and having a disproportionate impact**.
- Temporary exclusion and volume derating measures can also derive their financial impact by limiting the DASSA payments to a service provider and can generally have a similar effect to that of a scalar based approach, depending on their period of persistence. However, **both these measures could lead to an increase in the risk of volume insufficiency**, as they prevent the affected reserve capacity to participate in the market.
- The design of the one-off penalty is **very difficult to calibrate** the impact for the range of service providers expected in the market, while maintaining a sufficiently strong incentive and not being excessively high.

5. Commitment Obligations & Incentives:
Post-Gate Closure: Service Delivery Incentive

➢ **Walkthrough - Event Performance Scalar Calculation Example**

- The Event Performance Scalar (S_E) is defined as:

$$S_E = max\left(1 - \sum_{m=M}^{M-2} [\, K_m \times V_m \,], \quad 0\right)$$

Monthly Scaling Factor (K_m)

- The Monthly Scaling Factor is the average of the Q_i values resulting from all applicable performance assessments undertaken within each calendar month

$$K_m = average(Q_{i,m})$$

  - ➢ Performance Incident Scaling Factor (Qi) is based on the service providing unit's response in line with the Performance Assessment methodologies, under Regulated Tariff Arrangements.
  - ➢ A Qi of 0 represents a Pass and a Qi of 1 represents a Fail, whilst other values between 0 and 1 represent Partial Passes.

Dynamic Time Scaling Factor (V_m)

Number of months between the unavailability incident month and the settlement month (M)	Dynamic Time Scaling Factor (V_m)
M	1
M-1	0.5
M-2	0.1

- The persistence of the Event Performance Scalar is allowed for in the design to strengthen the impact of the measure and establish the required hierarchy under expected market conditions, while adhering to the proportionality principle.
- While the persistence of the Event Performance Scalar is shorter than the Availability incentive, it provides a much stronger impact since monthly performance of the provider is considered as a weight sum instead of a weighted average.

5. Commitment Obligations & Incentives:
Post-Gate Closure: Service Delivery Incentive

➢ Walkthrough - Event Performance Scalar Calculation Example[1]

System event profile | Performance history of the service provider

Month	No. of Performance Incidents		Performance Incident Scaling Factors (Q_i)[2]
Mar 2027	n/a		n/a
Apr 2027	n/a		n/a
May 2027	3		0; 0; 0.5
Jun 2027	0		n/a
Jul 2027	1		1
Aug 2027	0		n/a
Sep 2027	0		n/a

Note: 1) Values used in the example were selected arbitrarily; 2) The calculation of the Performance Incident Scaling factor is done as set out in the Regulated Tariff Arrangements. Since, it is assumed to be determined through the established performance assessment regime and directly inputted into the Event Performance Scalar, we have not included the calculation steps for it in this example

5. Commitment Obligations & Incentives:
Post-Gate Closure: Service Delivery Incentive

➢ **Walkthrough - Event Performance Scalar Calculation Example[1]**

a Determining Monthly Scaling Factor for May 2027 as current settlement month (M)

$$K_m = average(Q_{i,m})$$

Month	No. of Performance Incidents		Performance Incident Scaling Factors (Q_i)
May 2027	3		0; 0; 0.5

➢ Calculation:

$$K_m = average(0, \quad 0, \quad 0.5)$$

$$\boldsymbol{K_m = 0.17}$$

Note: 1) Values used in the example were selected arbitrarily

5. Commitment Obligations & Incentives:
Post-Gate Closure: Service Delivery Incentive

M	1
M-1	0.5
M-2	0.1

- Walkthrough - Availability Performance Scalar Calculation Example[1]

b Determining Availability Performance Scalar for May 2027 as current settlement month (M)

$$S_E = max\left(1 - \sum_{m=M}^{M-2} [\, K_m \times V_m] \,, \qquad 0\right)$$

- Calculation:

$$S_E = \max([1 - \{K_M \times V_M + K_{M-1} \times V_{M-1} + K_{M-2} \times V_{M-2}\}], \qquad 0)$$

$$S_E = \max([1 - \{0.17 \times 1 + 0 + 0\}], \qquad 0)$$

$$S_E = \max([0.83], \qquad 0)$$

$$S_E = 0.83$$

For M=May, months M-1, M-2 etc. are assumed to have Monthly Scaling Factor (K_m) as zero, since there is no historical data to consider in this case.

Note: 1) Values used in the example were selected arbitrarily

5. Commitment Obligations & Incentives:
Post-Gate Closure: Service Delivery Incentive

M	1
M-1	0.5
M-2	0.1

➢ **Walkthrough - Event Performance Scalar Calculation Example**[1]

C Similarly, Event Performance Scalar can be calculated for the subsequent months from the delivery performance history of the service provider

Month	No. of Performance Incidents	Performance Incident Scaling Factors (Q_i)[2]	Monthly Scaling Factor (K_m)	Event Performance Scalar (S_E)
Mar 2027	n/a	n/a	n/a	n/a
Apr 2027	n/a	n/a	n/a	n/a
May 2027	3	0; 0; 0.5	Avg.(0, 0, 0.5) = 0.17	$\mathrm{Max}([1 - 0.17 \times 1], \quad 0) = 0.83$
Jun 2027	0	n/a	0	$Max(1 - [\{0 \times 1\} + \{0.17 \times 0.5\}], \quad 0) = 0.92$
Jul 2027	1	1	Avg.(1) = 1	$Max(1 - [\{1 \times 1\} + \{0 \times 0.5\} + \{0.17 \times 0.1\}], \quad 0) = 0$
Aug 2027	0	n/a	0	$Max(1 - [\{0 \times 1\} + \{1 \times 0.5\} + \{0 \times 0.1\}], \quad 0) = 0.50$
Sep 2027	0	n/a	0	$Max(1 - [\{0 \times 1\} + \{0 \times 0.5\} + \{1 \times 0.1\}], \quad 0) = 0.90$

Note: 1) Values used in the example were selected arbitrarily; 2) The calculation of the Performance Incident Scaling factor is done as set out in the Regulated Tariff Arrangements. Since, it is assumed to be determined through the established performance assessment regime and directly inputted into the Event Performance Scalar, we have not included the calculation steps for it in this example

Commitment Obligations & Incentives

Process Flow Examples

DASSA Orders – Gate Closure Status and Outcomes*

The key evaluation of a DASSA Order will focus on the status of the Order at gate closure, i.e. **one hour** before the applicable Trading Period.

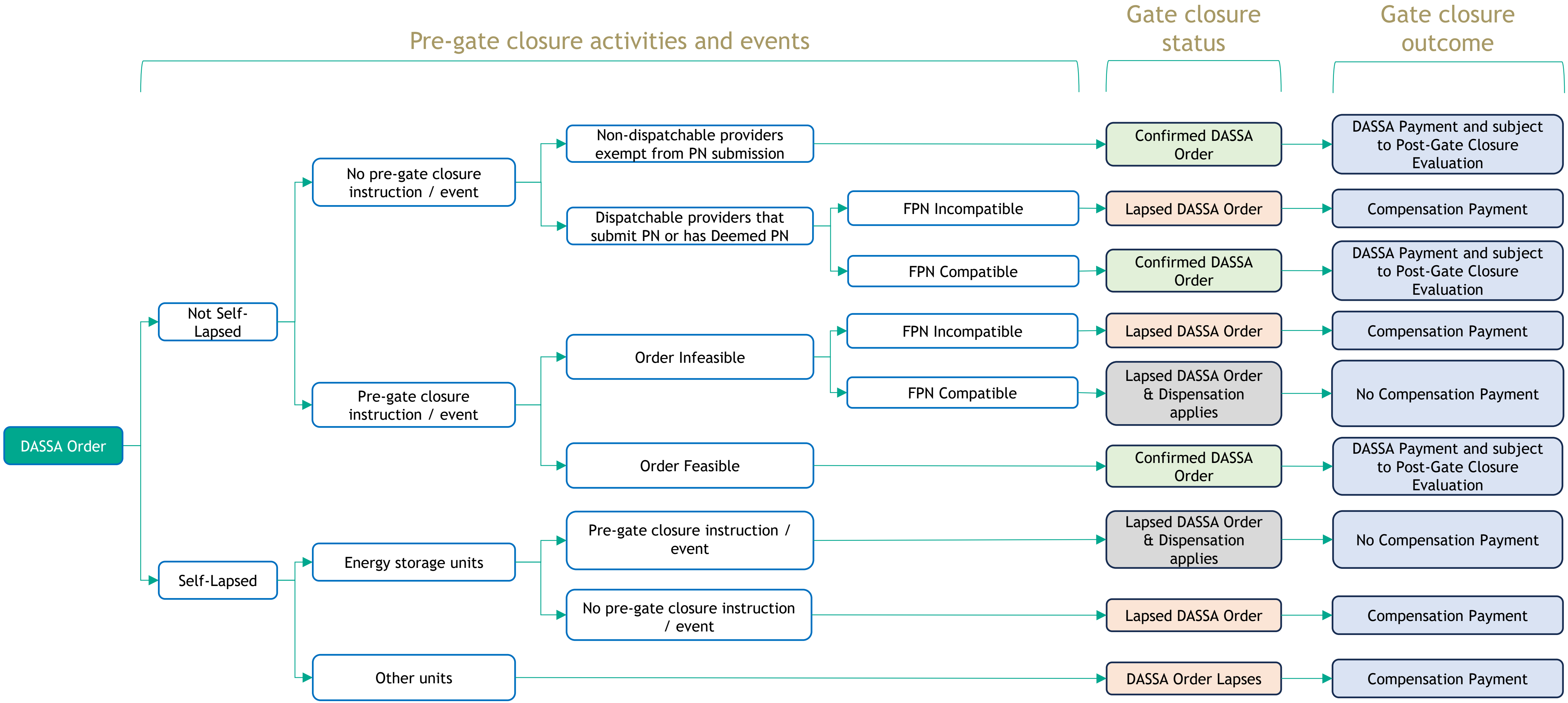
Confirmed DASSA Order →	Unit receives a DASSA Payment and is subject to Post-Gate Closure Evaluation
Lapsed DASSA Order →	Unit does not receive a DASSA Payment and pays the TSOs a Compensation Payment
Lapsed DASSA Order & Dispensation applies** →	Unit does not receive a DASSA Payment and no Compensation Payment is payable to the TSOs

* These outcomes may apply fully or partially to a DASSA Order i.e. a DASSA Order may be partially confirmed.
** Reflects TSOs’ preference for application of the Compensation Payment.

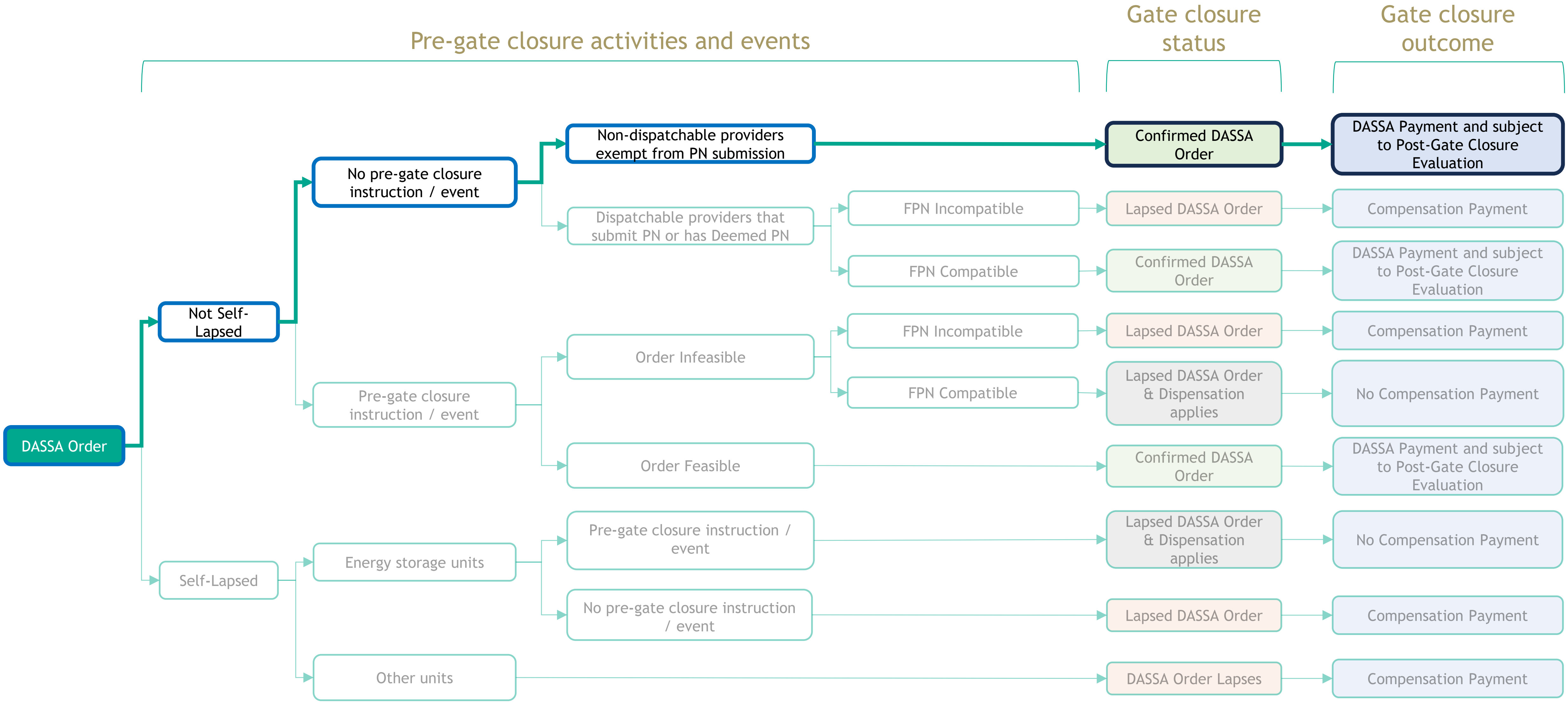
Terminology

Term	Definition
Gate closure	One hour before the start time of the Trading Period. At this point DASSA Orders will either be confirmed or lapsed (or partially thereof).
Self-lapse	The service provider elects to lapse a DASSA Order by gate closure. An Order can be self-lapsed partially or fully.
FPN compatibility	The Final Physical Notification (FPN) or deemed FPN is compatible with the provision of system services specified in the DASSA Order.
Deemed FPN	An FPN that is deemed by the TSOs for some units e.g. interconnectors.
Pre-gate closure instruction / event	An instruction or event before gate closure that impacts the ability of a service provider to meet their commitment obligations. Examples of these instances may include the following before gate closure: • Sync instructions. • The automatic response to a frequency event. • An instruction / event within the specified grace period (for energy storage units). • A change in interconnector flows.
Pre-gate closure instruction / event compatibility	The service provider’s position following an instruction or response to an event before gate closure is compatible with the provision of system services specified in the DASSA Order.
Grace period (for energy storage units)	The period to apply where a service provider is impacted by a previous instruction or event it is assumed this prevents the unit from fulfilling its obligation.

Pre-gate Closure DASSA Order Commitment Obligations & Incentives Proposal



Example A: Priority-dispatch wind unit that does not submit a PN



Example A: Priority-dispatch wind unit that does not submit a PN

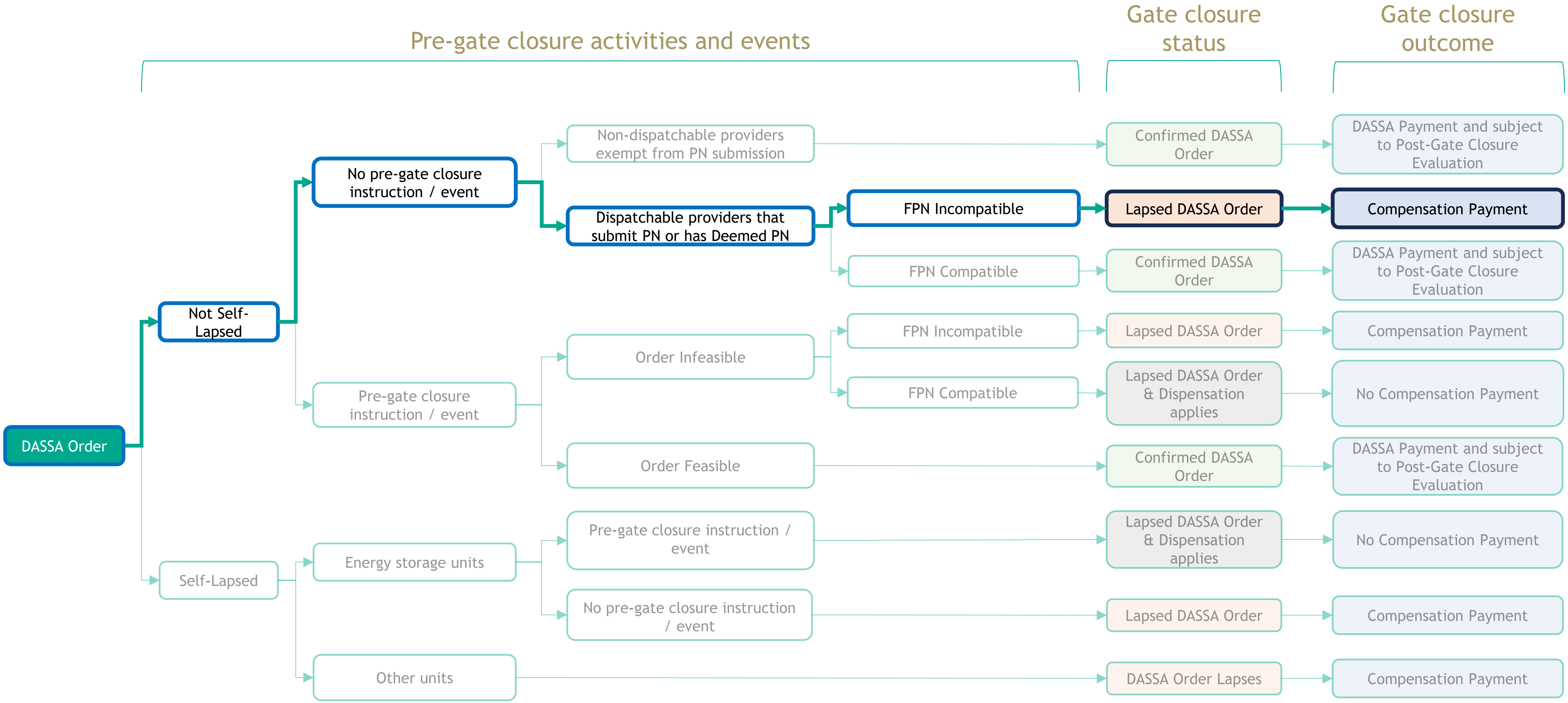
DASSA Order	Unit Type	DASSA Order volume	DASSA Clearing Price
	Priority-dispatch wind	2 MW POR	€10 per MW

DASSA Order → Unit does not self-lapse → No pre-gate closure instruction/event → Priority dispatch unit exempt from PN submission → DASSA Order automatically confirmed → Confirmed DASSA Order → DASSA Payment and subject to Post-Gate Closure Evaluation

Outcome	Confirmed DASSA Order	DASSA Payment*	Compensation Payment to TSO
	Yes	2 MW × €10 = **€20**	N/A

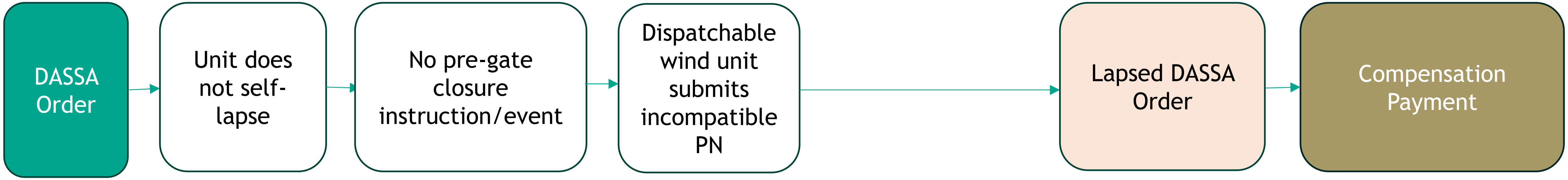
*Per 30 min Trading Period and subject to post-gate closure evaluation– which may account for auto confirmation of Order

Example B: Non-priority dispatch unit submits an incompatible FPN



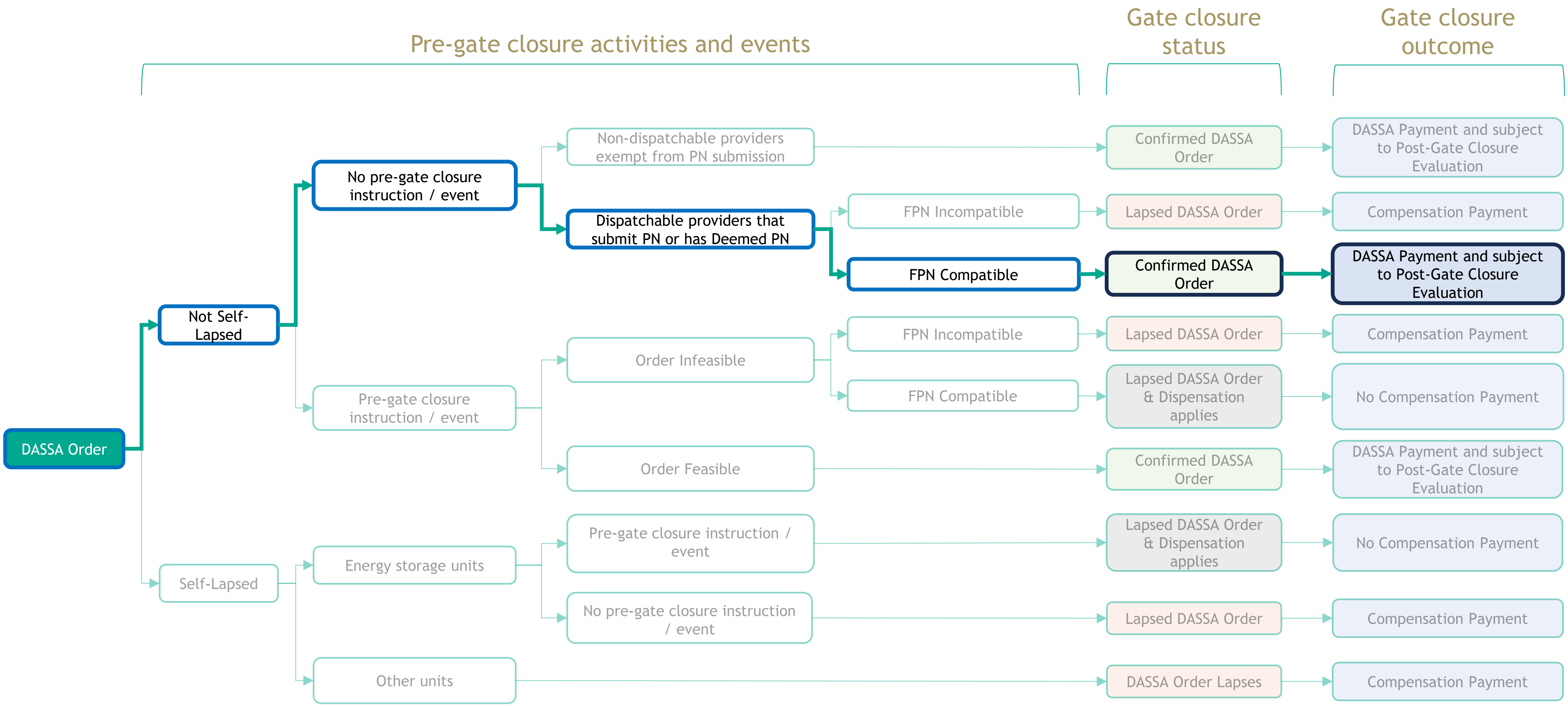
Example B: Non-priority dispatch unit submits an incompatible FPN

DASSA Order	Unit Type	DASSA Order volume	DASSA Clearing Price
	Dispatchable wind unit	10 MW POR	€10 per MW



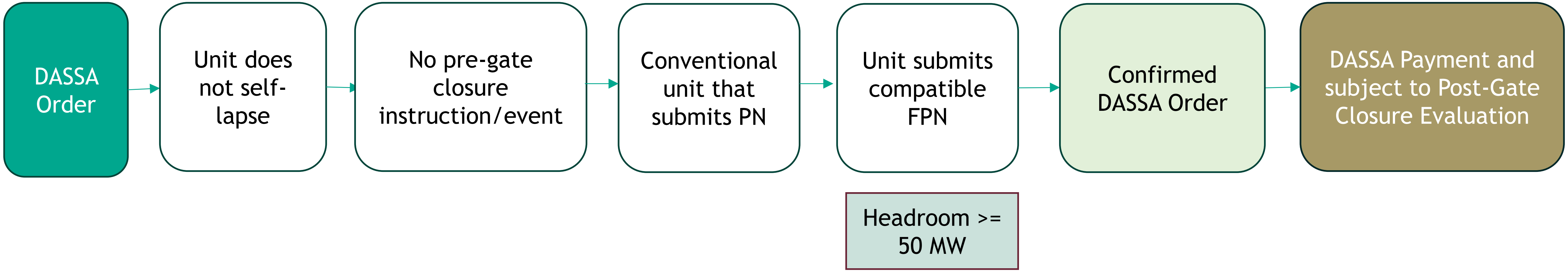
Outcome	Confirmed DASSA Order	DASSA Payment*	Compensation Payment to TSO
	N/A	N/A	Yes; for 10 MW

Example C: Conventional unit submits a compatible FPN



Example C: Conventional unit submits a compatible FPN

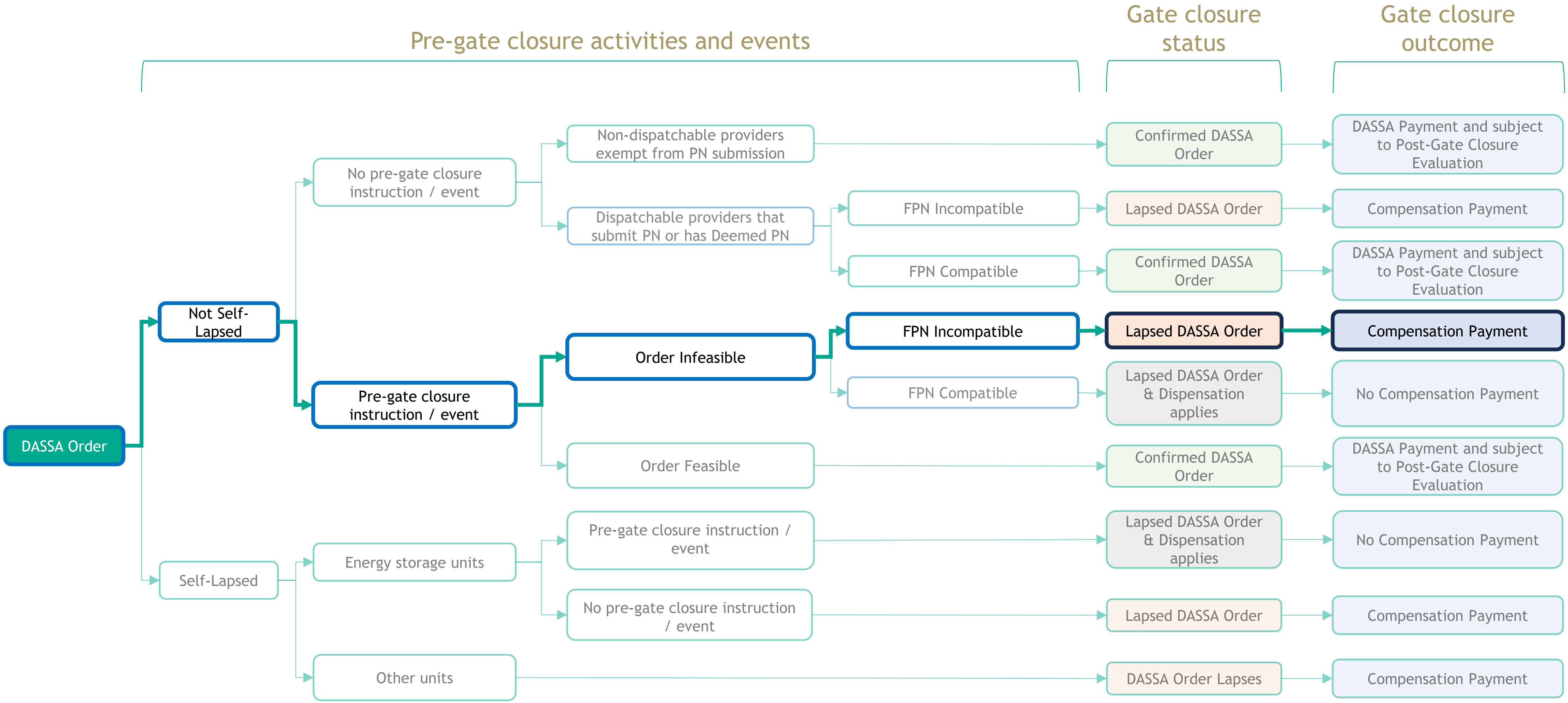
DASSA Order	Unit Type	DASSA Order volume	DASSA Clearing Price
	OCGT	10 MW POR	€10 per MW



Outcome	Confirmed DASSA Order	DASSA Payment*	Compensation Payment to TSO
	Yes	10 MW × €10 = **€100**	N/A

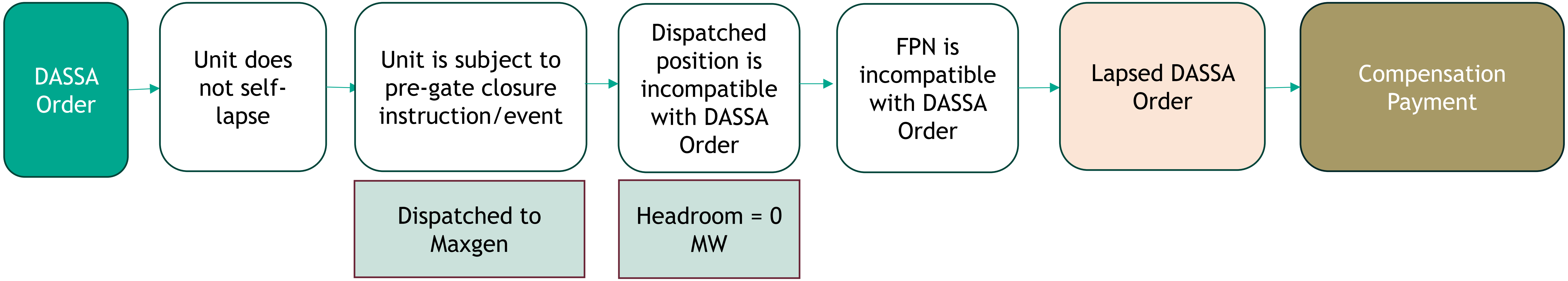
*Per 30 min Trading Period and subject to post gate-closure evaluation

Example D: Conventional unit receives a pre-gate closure instruction to Maxgen and submits an incompatible FPN



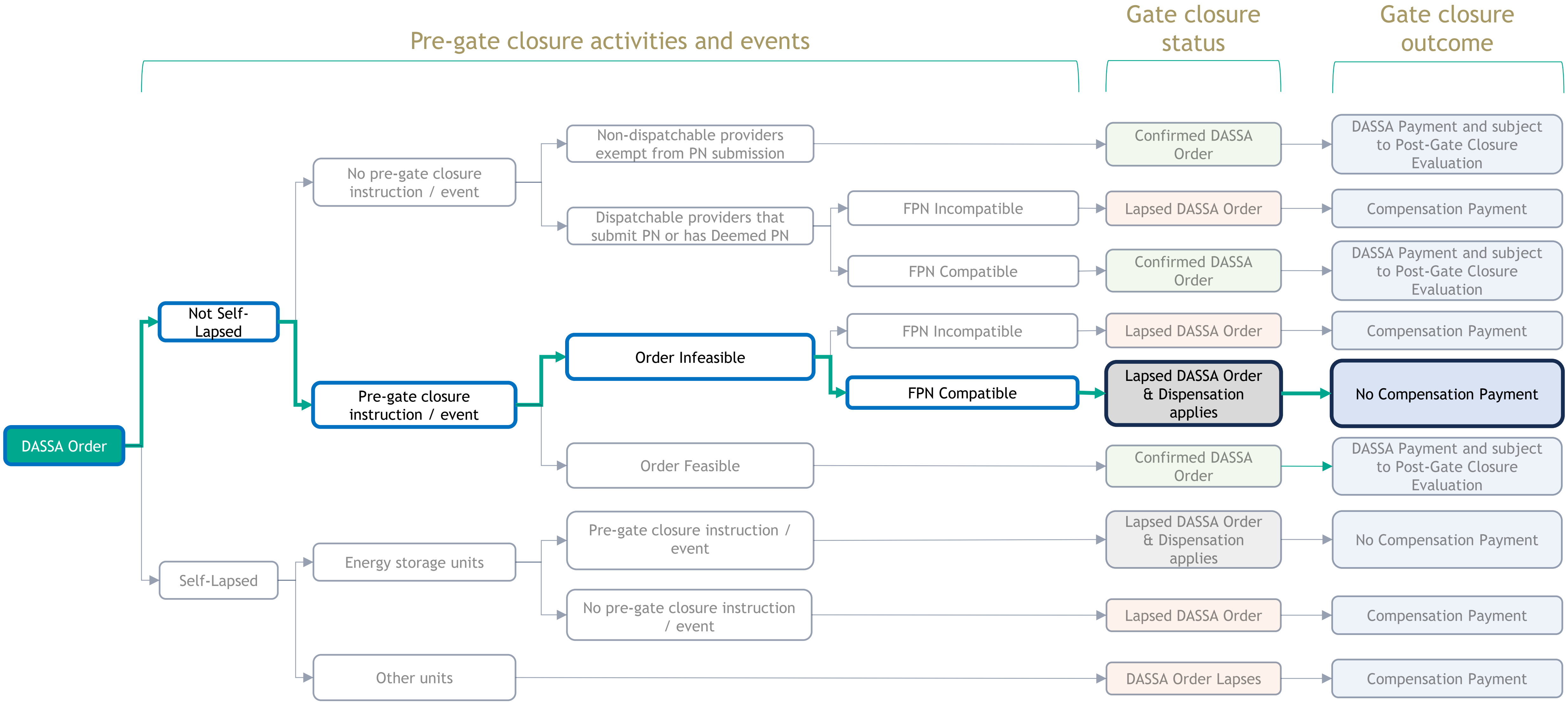
Example D: Conventional unit receives a pre-gate closure instruction to Maxgen and submits an incompatible FPN

DASSA Order	Unit Type	DASSA Order volume	DASSA Clearing Price
	OCGT	10 MW POR	€10 per MW



Outcome	Confirmed DASSA Order	DASSA Payment*	Compensation Payment to TSO
	N/A	N/A	Yes; for 10 MW

Example E: Conventional unit receives a pre-gate closure instruction to Maxgen and submits compatible FPN



Example E: Conventional unit receives a pre-gate closure instruction to Maxgen and submits compatible FPN

DASSA Order	Unit Type	DASSA Order volume	DASSA Clearing Price
	OCGT	10 MW POR	€10 per MW

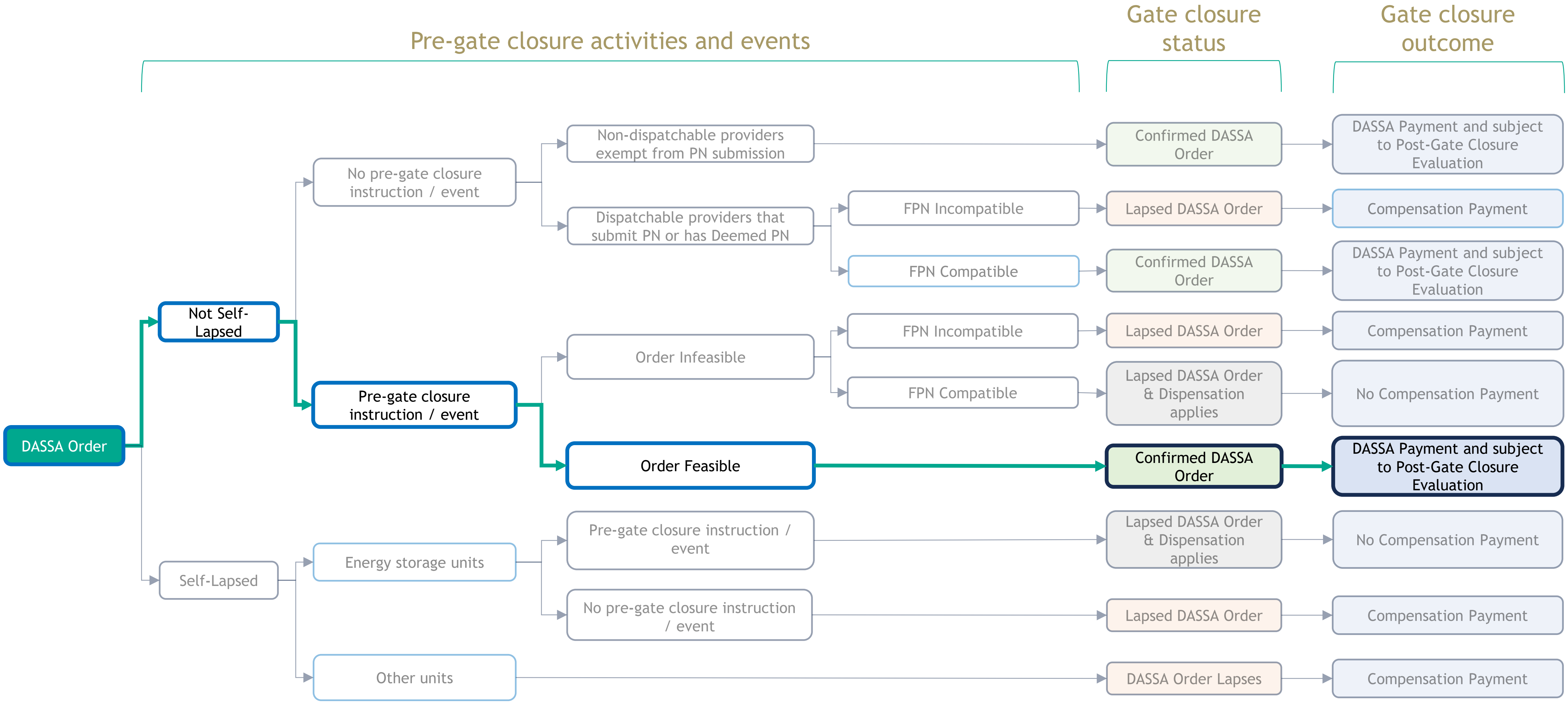
DASSA Order → Unit does not self-lapse → Unit is subject to pre-gate closure instruction/event → Dispatched position is incompatible with DASSA Order → FPN is compatible with DASSA Order → Lapsed DASSA Order & Dispensation applies → No Compensation Payment

Dispatched to Maxgen

Headroom = 0 MW

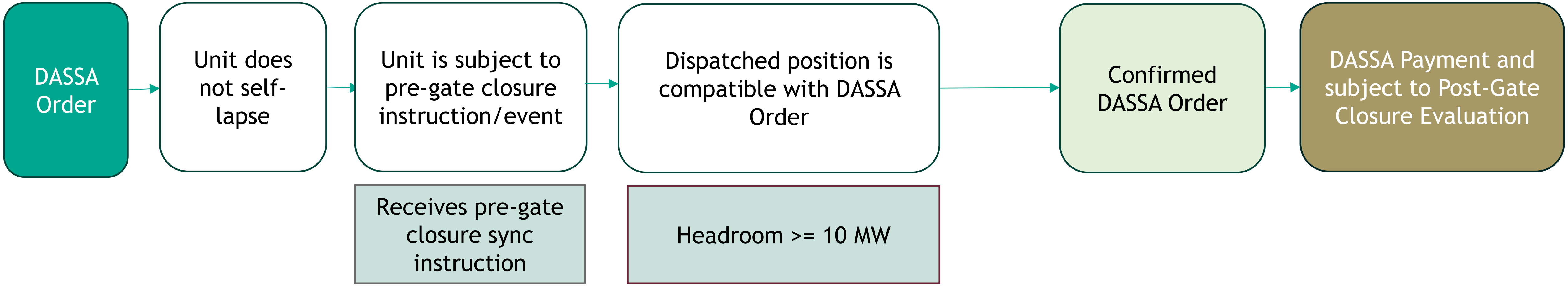
Outcome	Confirmed DASSA Order	DASSA Payment*	Compensation Payment to TSO
	N/A	N/A	N/A

Example F: Conventional unit receives a compatible pre-gate closure Sync instruction



Example F: Conventional unit receives a compatible pre-gate closure Sync instruction

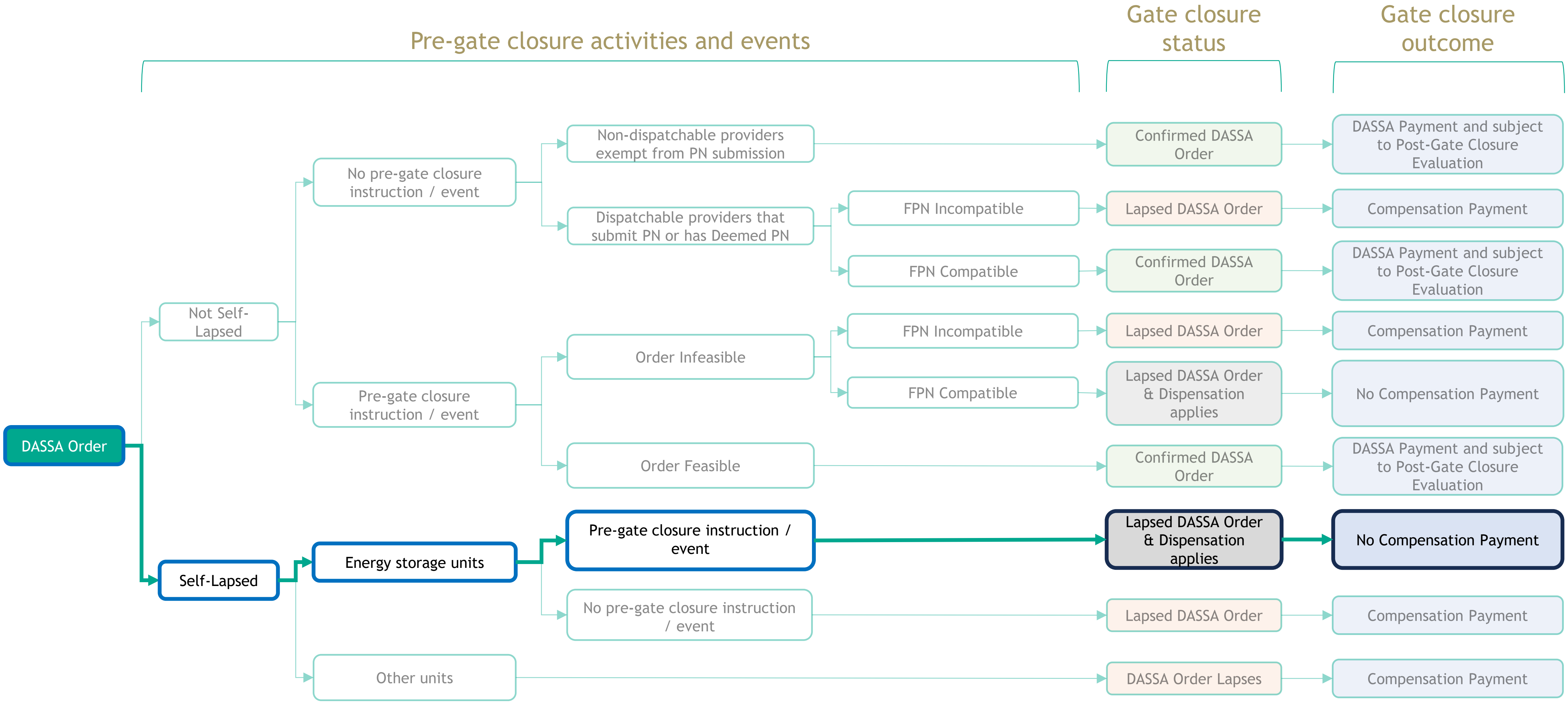
DASSA Order	Unit Type	DASSA Order volume	DASSA Clearing Price
	Conventional	10 MW POR	€10 per MW



Outcome	Confirmed DASSA Order	DASSA Payment*	Compensation Payment to TSO
	Yes	10 MW × €10 = **€100**	N/A

*Per 30 min Trading Period and subject to post gate-closure evaluation

Example G: Energy storage unit Self-Lapses Order in full-Dispensation applies



Example G: Energy storage unit Self-Lapses Order in full-Dispensation applies

DASSA Order	Unit Type	DASSA Order volume	DASSA Clearing Price
	Battery	10 MW POR	€10 per MW

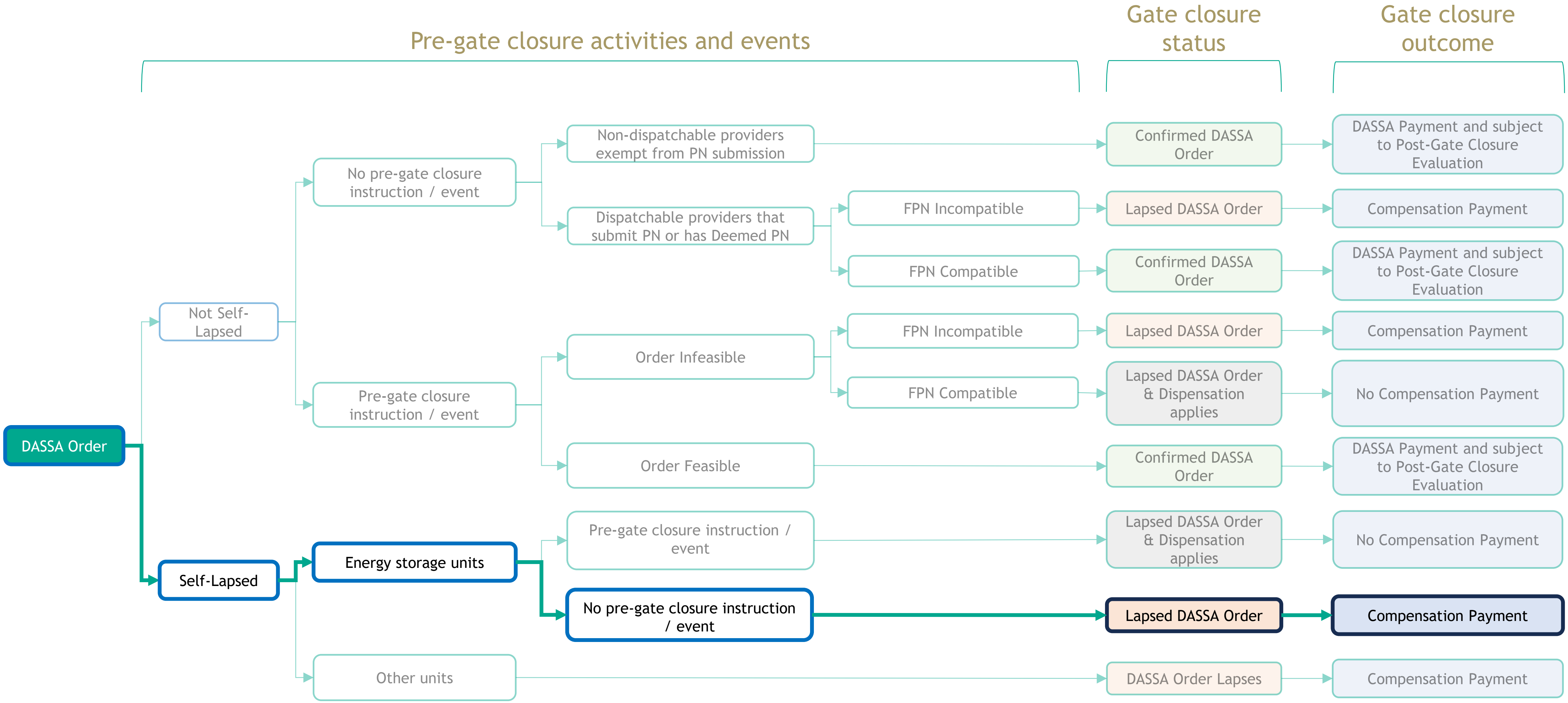
DASSA Order → Unit Self-Lapses Order in full → Unit is subject to pre-gate closure instruction/event → Lapsed DASSA Order & Dispensation applies → No Compensation Payment subject to Grace Period design

Lapsed Volume = 10 MW

Unit responded to event within last 8 hours

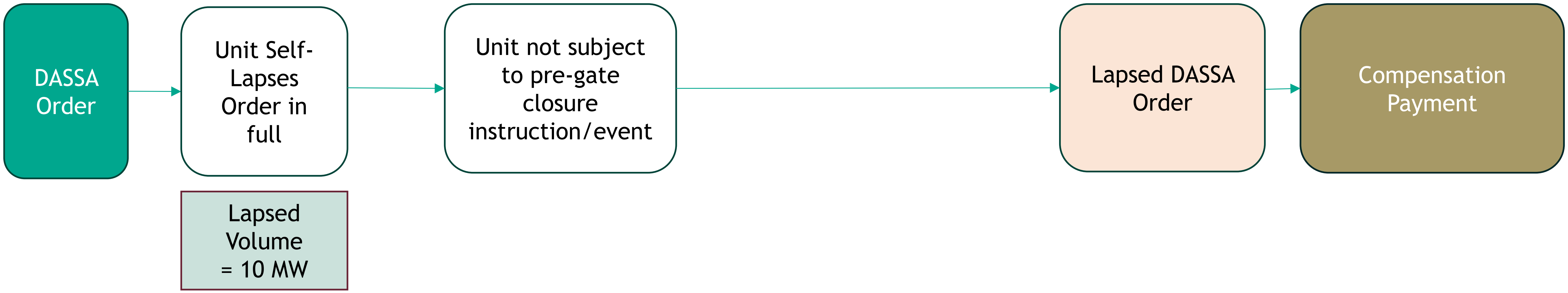
Outcome	Confirmed DASSA Order	DASSA Payment	Compensation Payment to TSO
	N/A	N/A	N/A

Example H: Energy storage unit Self-Lapses Order in full- No Dispensation



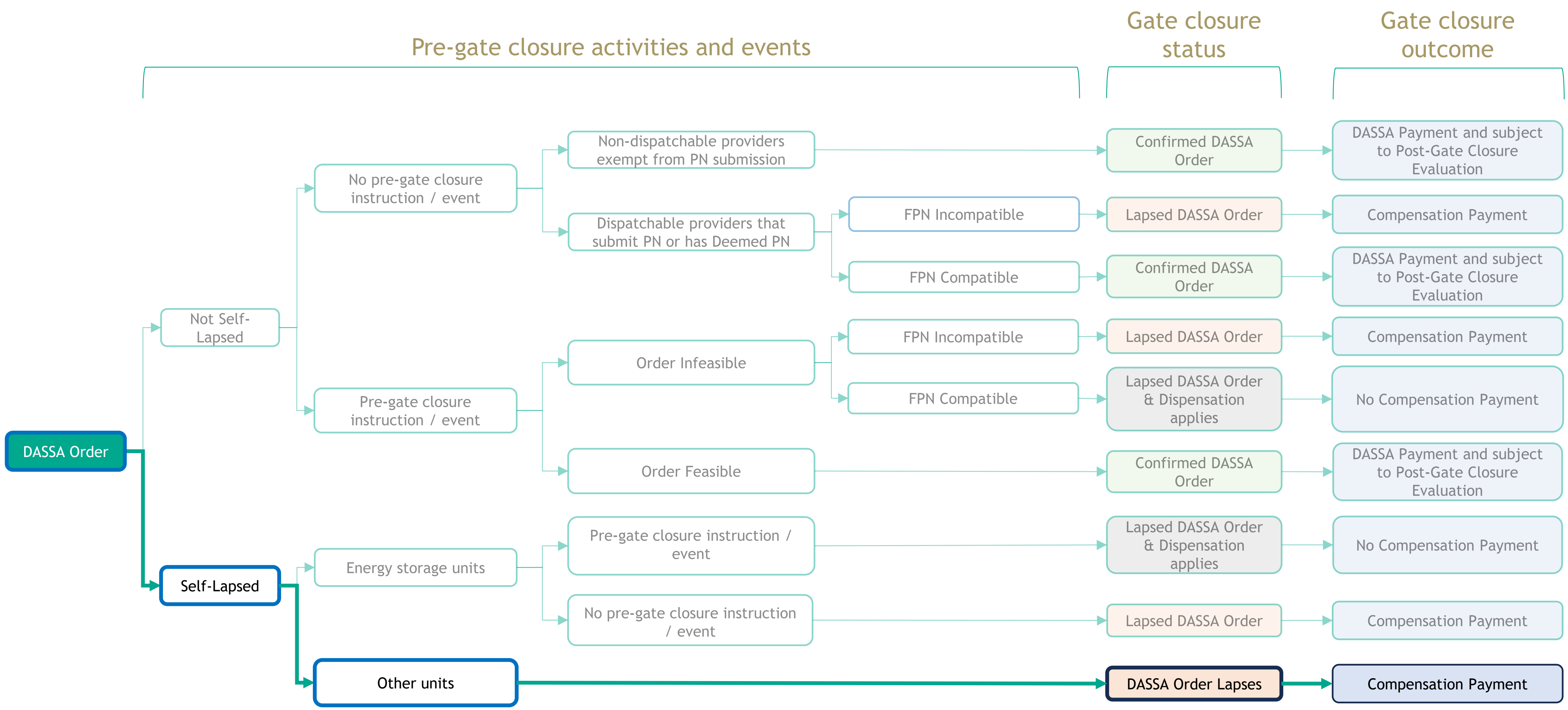
Example H: Energy storage unit Self-Lapses Order in full- No Dispensation

DASSA Order	Unit Type	DASSA Order volume	DASSA Clearing Price
	Battery	10 MW POR	€10 per MW



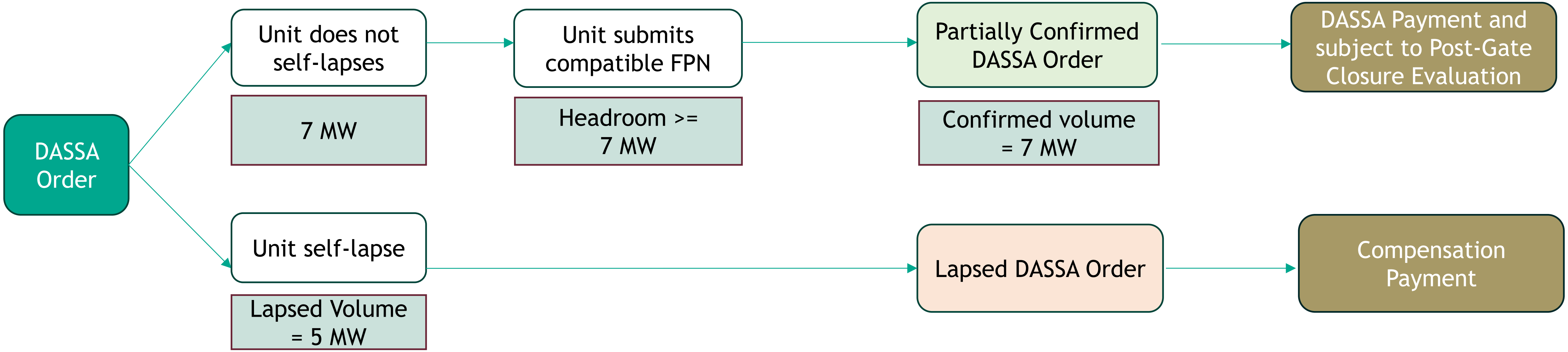
Outcome	Confirmed DASSA Order	DASSA Payment	Compensation Payment to TSO
	N/A	N/A	Yes; for 10 MW

Example I: Conventional unit partially Self-Lapses Order



Example I: Conventional unit partially Self-Lapses Order

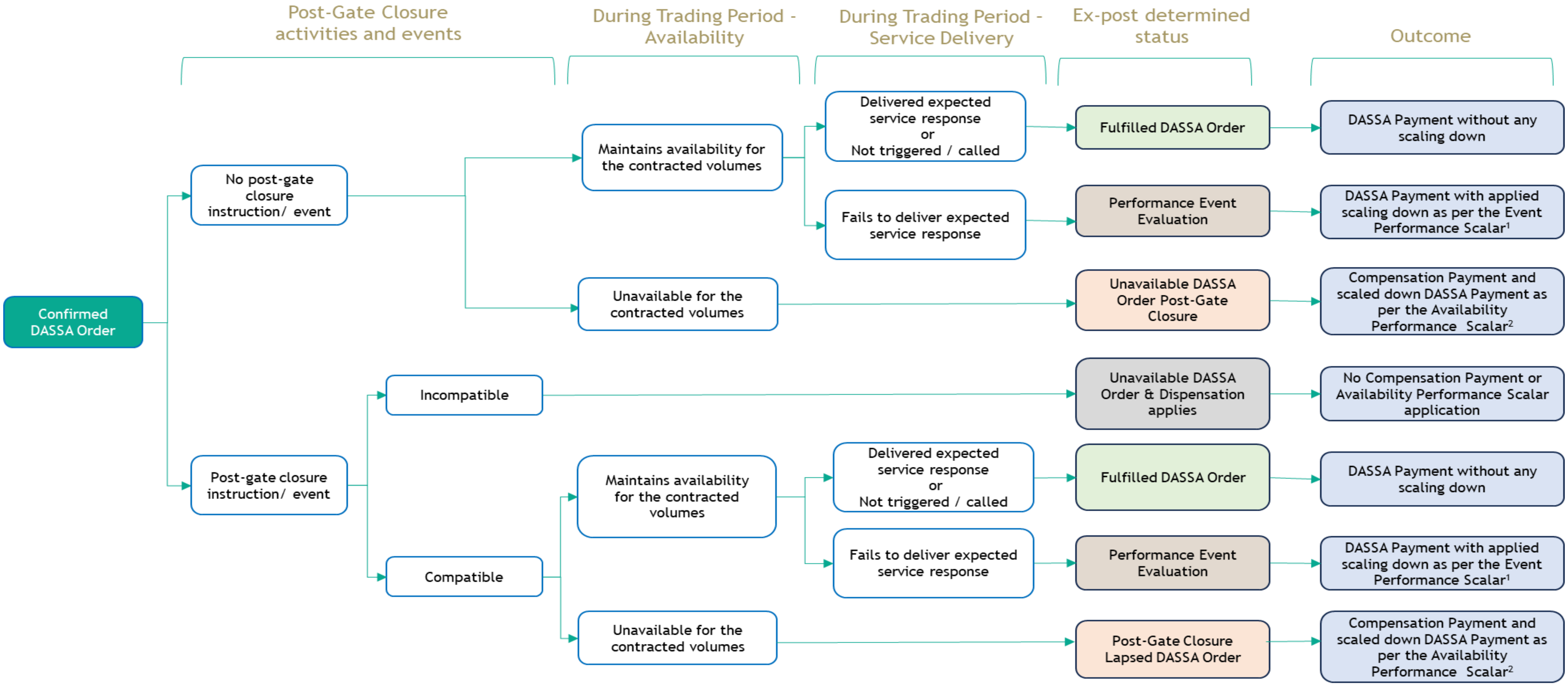
DASSA Order	Unit Type	DASSA Order volume	DASSA Clearing Price
	OCGT	12 MW POR	€10 per MW



Outcome	Confirmed DASSA Order	DASSA Payment*	Compensation Payment to TSO
	7 MW POR	7 MW × €10 = **€70**	Yes; for 5 MW

*Per 30 min Trading Period and subject to post gate-closure evaluation

Post-gate Closure DASSA Order Commitment Obligations & Incentives Proposal



Note: (1) The Event Performance Scalar applies to the monthly DASSA and RAD settlement payments of the current and subsequent months, as proposed in the consultation paper. (2) The Availability Performance Scalar applies to the monthly DASSA settlement payments of the current and subsequent months, as proposed in the consultation paper.

P&S Consultation Next Steps

P&S Consultation Process - Next Steps

Opened: Monday 10 June 2025

Duration: Seven weeks

Project Panel: Monday 9 June 2025
Introduction to consultation

Workshop 1: Wednesday 18 June 2025
Presentation of proposals and Q&A

Workshop 2: Wednesday 9 July 2025
Deep dive, worked examples and Q&A

Closes: **Friday 25 July 2025**

Workshop slides, including written responses to the Q&A, will be made available shortly under FASS Key Publications (EirGrid link, SONI link)

Consultation Queries:
Should stakeholders have any questions or comments during the consultation period these can be submitted to:
FASS@Eirgrid.com
FASSProgramme@soni.ltd.uk

TSOs will submit a recommendations paper to the **SEMC for decision in October 2025**.