

Modification P462: Digital Meeting Etiquette

- Welcome to the P462 Workgroup meeting 3 – we'll start shortly
- No video please to conserve bandwidth
- Please stay on mute unless you need to talk – use IM if you can't break through
- Talk – pause – talk
- Lots of us are working remotely – be mindful of background noise and connection speeds

ELEXION

**P462 'The removal of subsidies from Bid
Prices in the Balancing Mechanism'**

Meeting 3

02 April 2024

Meeting Agenda

Objectives for this meeting:

- To provide further understanding on the Modelling done to derive the potential benefits of P462;
- To provide analysis for Wider Impacts regarding Day-ahead market impact and Carbon impact; and
- To provide an high level view of what is involved for the CBA.

Agenda Item	Lead
1. Welcome and meeting objectives	Patrick Matthewson (Chair)
2. Action review	Jacob Snowden/NGESO
3. P462 – Data Methodology & Assumptions	NGESO
4. Wider impacts: • Day-ahead market impact • Carbon impact	NGESO
5. Workgroup discussion	NGESO/Workgroup
6. CBA intro and overview	Jacob Snowden
7. Next steps	Jacob Snowden
8. AOB	Patrick Matthewson
9. Meeting close	Patrick Matthewson

Action Review

No.	Workgroup raised	Action	Owner	Due by	Status
1.	WG1	To consider ToR (m) 'Is the BSC an appropriate route to amend the issue identified in P462?' in more detail at WG2. NGESO to show other routes considered prior to raising P462. Along with their impacts. To allow Workgroup feedback on these other solutions to the issue identified as part of P462.	NGESO/Workgroup	WG2	Closed
2.	WG1	NGESO to provide a detailed list of the assumptions in the analysis presented at WG1.	NGESO	WG3	Open
3.	WG1	NGESO to present back an issues case illustrating the carbon impact of the proposal and what percentage of transactions might displace conventional units in the same settlement period (as opposed the renewable generators with support mechanisms). To consider this has a Wider Impact as per ToR (e).	NGESO	TBC	Open
4.	WG1	Review of the Wider Impacts as per ToR (e). This includes suggestions raised prior to the Workgroup. Along with issues raised from WG1. WG1 Issues raised: • Impacts on Wind curtailment • Impacts on Storage • Impacts on Flexibility markets • Impacts on the interaction between the Wholesale market and Balancing Mechanism • Potential Carbon impact (as per Action 3) • Interaction with TCLC (as per action 6)	NGESO/Workgroup	WG2	Closed
5.	WG1	To review the potential REMA impacts once the consultation is published by DESNZ	NGESO/Workgroup	WG4	Open
6.	WG1	Consider if the issue identified is covered as part of TCLC.	NGESO/Workgroup	WG2	Open (Agree to close WG3)
7.	WG1	Elxon to engage with DESNZ on how P462 interacts with government policy.	Elxon	TBC	Open
8.	WG2	Present proposed Cost Benefit Analysis process to the Workgroup	Elxon	WG3	Open
9.	WG2	NGESO to present further analysis on specifically RO and REGO impacts	NGESO	WG3	Open



DATA & ASSUMPTIONS

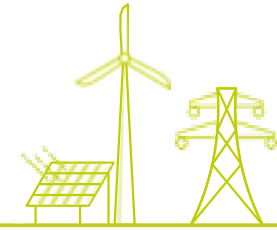
Agenda

Analysis

- Assumptions
- Simplifications
- Results

Outstanding Actions

- Worked Example of Demand Bids
- Impact on ROCs
- Impact on REGOs
- Carbon Impact
- Map of Interactions



The Analysis

- This analysis is **not a cost benefit analysis** but it aims to provide an insight into the identified issue between the Balancing Mechanism and support mechanism arrangements.
- The pack that was sent out was a comprehensive look at the analysis and methodology used however, for the purpose of the workgroup we will be focusing on the assumptions, simplifications and results.
- As a full model has been built settlement period by settlement period since 2018 retrospectively **updates or changes in approach** suggested by the workgroup **are likely to be possible**.

Assumptions for model

Reason for assumption

- | | |
|---|---|
| <ul style="list-style-type: none">A. Everyone is complying with TCLC and all other market rules (REMIT, Grid Code, BSC)B. There is sufficient subsidised bid volume available that it creates a floor price we cannot buy beyondC. The market is rational, if paid a subsidy amount explicitly it will reflect that in its pricing behavioursD. A unit with existing contract types should be kept whole for its subsidyE. That we can adjust P462 proposal to work for all identified subsidy [or other distortive characteristics based on metered output]F. FES predicted constraint levels occur (various scenarios modelled)G. Future units hold a subsidy regime on metered outputH. A unit would not hold intentional imbalanceI. All units can fulfil all requirements in a half hour period (stacks are not split for what could have delivered the system specific needs) | <ul style="list-style-type: none">A. TCLC may apply to some of the reasons for high costs. However, it is not for the workgroup to consider potential enforcement actions by OFGEMB. There are and will be future occasions where wind or other subsidised assets are not available for downwards energy but typically this is associated with higher prices including higher bid prices as conventional machines dispatch.C. If we do not consider the market rational or TCLC effective there is increased cost from introducing P462 as there would be double paymentsD. We are not directly discounting subsidy amounts from any costsE. Benefits case would increase the more asset classes the principles of P462 can be extended to, however this may change the calculation on the marginal subsidy price used in the analysisF. FES gives a big range of wind curtailment volumes, while there is uncertainty it is the best estimate for future extrapolationG. The benefits case for P462 may be eroded or increased dependant on future subsidy types awarded, this is dependent upon their bid pricing behaviour so will not be modelled.H. Intentional imbalance in any significant volume is a breach of REMIT according to German case law , if holding significant imbalance it may affect trading decision on Day Ahead /Intraday marketsI. The MWh impacted is scaled to 100% of the market, therefore £/MWh benefits impact calculated are lower for some system needs and lower for others |
|---|---|

Data simplifications for analysis

Simplifications:

1. Every **accepted** BOA 01-Jan-2018 to 01-Mar-2024 has been added to the data set
2. Every unit holding subsidy is given a **Static** subsidy assumption (ROC rate or CfD strike)
3. If the unit holds a ROC contract the ROC buy out price is **assumed at £50/MWh** as their subsidy expectation
4. If the unit holds a CfD **the contract award strike price** is assumed and the intermittent market reference price is used to calculate their subsidy expectation
5. **Volume Weighted Day Ahead Price** is used to represent the Intermittent Market Reference Price (IRMP)
6. A best endeavours approach is used to account for which units hold ROCs – no **complete BMU mapping presently exists** in ESO

Expected consequence:

1. As a full bid stack is not re-priced the benefits case will be significantly reduced by this assumption as it does not consider available assets with lower marginal consumer costs and high bid prices that were not dispatched.
2. CfD strike increases and ROC buy out prices (inc recycle rates) are not directly considered so the analysis will indicate they charge a higher marginal consumer cost than true values reducing benefits
3. ROC buy out prices have averaged below £50/MWh so this makes some allowance for recycle rates but would reduce the benefits calculations.
4. CfD units will hold a slightly higher/lower [dependant on IRMP] subsidy expectation than is actually indicated by the analysis
5. IRMP is derived from this value but it means on occasion extremes may be higher / lower and that the 6hrs continuous negative pricing rule is excluded from the analysis
6. There will be a minor increase in benefits outcomes and some units will look more expensive than they really have been on an individual BMU base, if any errors are known they can be corrected quickly

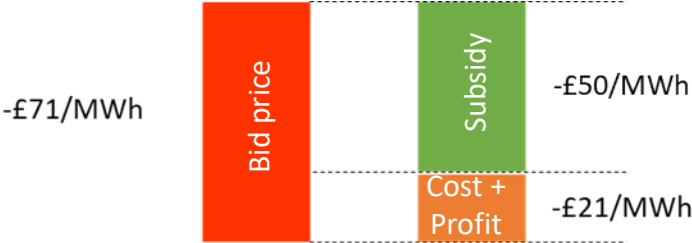
Example Re-Pricing in Model

ROC Unit Windfarm A , WINDA-1 11/04/2023 04:00

Bid price: -£71/MWh,
ROC rate: 1

subsidy expectation £50/MWh³

Marginal consumer price -£21/MWh

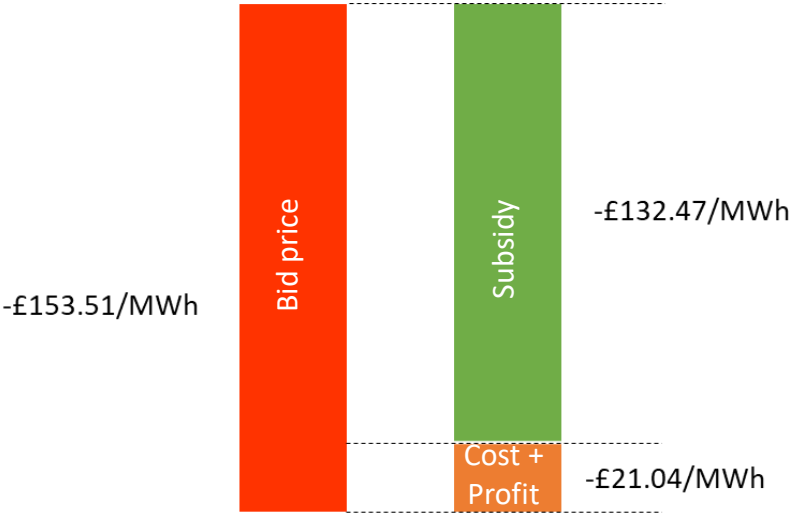


CfD Unit Windfarm B, WINDB-2 11/04/2023 04:00

Bid Price: -£153.51/MWh,
Day ahead price: £43/MWh⁵
Strike Price: £175.47/MWh⁴

Subsidy Expectation: £132.47/MWh

Marginal consumer price -£21.04/MWh



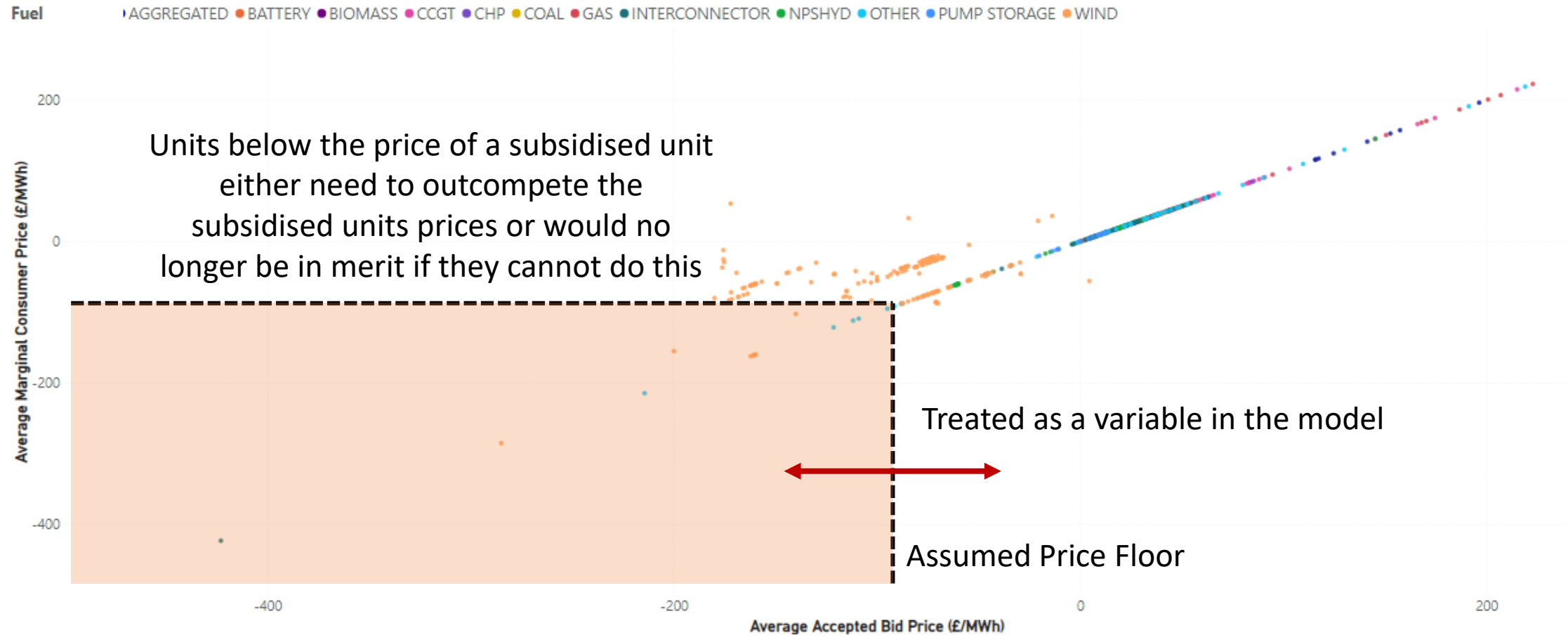
Merchant Unit Windfarm C, WINDC-3 11/04/2023 04:00

Bid price: -£72.55/MWh
No subsidy as CfD not yet active



^{3, 4, 5} refers to respective simplification outlined in slide 4

Methodology for analysis



Results

Year	Historic Potential Benefit			
Subsidy Floor Price assumption	-£50/MWh	-£25/MWh	-£12.51/MWh	£0/MWh
2018	£6.26M	£17.23M	£35.81M	£63.47M
2019	£5.76M	£19.51M	£44.92M	£77.21M
2020	£14.67M	£48.82M	£100.81M	£176.17M
2021	£19.60M	£45.00M	£74.04M	£110.23M
2022	£65.08M	£129.37M	£177.48M	£228.99M
2023	£49.42M	£132.505M	£195.26M	£264.20M

Base case based on
Volume weighted average
price beyond subsidy
recovery

Results

Scenario ID

Floor	FES	Market		2024	2025	2026	2027	2028	2029	2030	Total
		Price									
-50LW	H			£82,887,339	£113,548,841	£122,945,584	£89,124,594	£82,263,751	£97,748,070	£24,581,210	£613,099,390
-50LW	L			£14,773,901	£20,239,030	£21,913,912	£15,885,634	£14,662,752	£17,422,688	£4,381,373	£109,279,289
-50FS	H			£7,860,180	£19,299,263	£22,179,485	£22,939,472	£44,577,734	£36,158,858	£2,070,861	£155,085,853
-50FS	L			£1,401,004	£3,439,915	£3,953,288	£4,088,749	£7,945,568	£6,444,982	£369,112	£27,642,617
-25LW	H			£189,708,223	£259,884,672	£281,391,448	£203,983,727	£188,280,988	£223,720,689	£56,260,194	£1,403,229,939
-25LW	L			£49,495,459	£67,804,711	£73,415,895	£53,219,982	£49,123,089	£58,369,416	£14,678,458	£366,107,009
-25FS	H			£17,989,969	£44,171,148	£50,763,249	£52,502,669	£102,027,196	£82,758,510	£4,739,679	£354,952,420
-25FS	L			£4,693,638	£11,524,388	£13,244,288	£13,698,108	£26,619,209	£21,591,950	£1,236,597	£92,608,179
-12LW	H			£269,959,458	£369,822,268	£400,426,938	£290,273,851	£267,928,467	£318,360,033	£80,059,637	£1,996,830,651
-12LW	L			£105,527,862	£144,564,497	£156,527,943	£113,468,812	£104,733,943	£124,447,774	£31,295,523	£780,566,353
-12FS	H			£25,600,168	£62,856,628	£72,237,350	£74,712,586	£145,187,204	£117,767,391	£6,744,680	£505,106,007
-12FS	L			£10,007,173	£24,570,821	£28,237,770	£29,205,347	£56,754,060	£46,035,583	£2,636,513	£197,447,267
0LW	H			£357,259,780	£489,416,533	£529,918,236	£384,143,504	£354,572,002	£421,312,282	£105,949,569	£2,642,571,906
0LW	L			£183,618,480	£251,542,225	£272,358,621	£197,435,732	£182,237,060	£216,539,127	£54,454,209	£1,358,185,453
0FS	H			£33,878,829	£83,183,398	£95,597,687	£98,873,373	£192,138,290	£155,851,374	£8,925,795	£668,448,746
0FS	L			£17,412,481	£42,753,229	£49,133,720	£50,817,303	£98,752,064	£80,101,914	£4,587,533	£343,558,244

Outstanding Actions: Worked Example of Demand Action

NGESO to provide a worked example of a demand unit interaction

Wind Unit, WINDY-2 29/07/2023 23:00

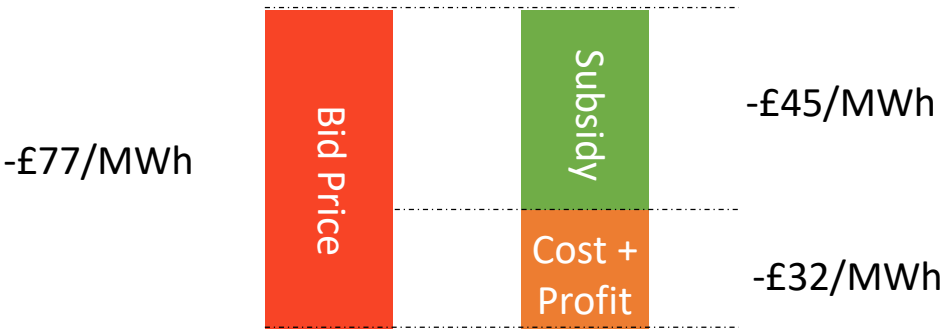
Bid price: -£77/MWh,

ROC rate: 0.9

subsidy expectation £45/MWh

Marginal consumer price -£32/MWh

More expensive in bid price but with lower incremental supplier cost



Paid if the unit generates (metered output based subsidy) **or** if the unit is bid (implicitly)

Incremental supplier cost from the bid

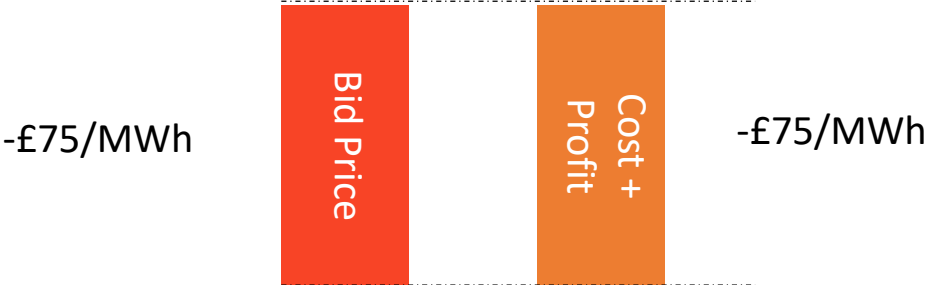
Demand Unit, XAMPL-1 29/07/2023 23:00

Bid price: -£75/MWh,

No subsidy held

Marginal consumer price -£75/MWh

Cheaper in bid stack and not presently covered by TCLC as demand increase not generation turn down



Incremental supplier cost from the bid

Outcome: Supplier pays £43/MWh more than it would have cost to take more bid volume on WINDY-2 as while it avoids the cost and profit of WINDY-2 it still pays the subsidy expectation (£45/MWh) and it now pays the cost and profit of XAMPL-1 (£75/MWh)

Outstanding Actions

NGESO to consider impact on Renewable Obligation Certificates

- If a renewable unit does not generate it does not generate any ROCs
- The value of a ROC can be considered as the buy out price (fixed yearly) + the recycle rate (which is dependant on the number of ROCs presented by suppliers and mutualisation and calculated at the end of the year)
- Typically the buy out price has been considerably higher than the recycle rate making this the over-riding factor in setting the value of a ROC at point of generation
- As the recycle rate is influenced by supplier trading behaviour rather than MWh energy produced this means that it is not presently included in the P462 proposal which only looks to compensate for direct lost subsidy based on energy volumes
- Should recycle rates be important in the cost assigned to not generating for any unit then this would increase their cost within a bid price, if this means the unit is less competitive than a CfD unit for example then because it generates, the number of ROCs generated increase and thus the value of the recycle rate decreases providing a reduced cost to suppliers
- This is the premise of design for P462s base methodology but any alternatives that better deal with recycle rates should be considered
- If a methodology to incorporate recycle rates effectively were developed this would improve the benefits analysis by increasing the marginal subsidised unit expected price
- The updated analysis methodology includes ROCs and CfDs equivalently

Outstanding Actions

NGESO to consider impact on Renewable Energy Guarantee of Origin (REGOs):

- If a renewable unit does not generate it does not generate a REGO
- This interaction is not proposed to change under the current P462 proposal
- REGOs are not directly supported by an obligatory supplier payment so are valued based on contracts between suppliers and generators and can be traded on secondary markets to demonstrate that any energy MWh is renewable irrespective of the source
- P462 has minimal impact on REGO value as the change to total renewable output is expected to be negligible (see carbon analysis)
- As these are traded and not an obligatory support mechanism, they form part of the profit and cost base for a generating asset in the base proposal of P462 rather than a direct subsidy considered as a sunk cost
- The value of REGOs may set the 'floor bid price' of a renewable unit at a level below £0/MWh even if direct subsidies are paid

Carbon Impact of P462

NGESO to present back an issues case illustrating the carbon impact of the proposal and what percentage of transactions might displace conventional units in the same settlement period (as opposed the renewable generators with support mechanisms).

Every single **Bid Acceptance** from 2018 to Feb 2024 is included in the analysis

The same methodology is used to evaluate costs and carbon with all of the same limitations described in the detailed pack circulated

This assumes that there is no price response from units with a fuel cost and that these low price periods could/would not be adjusted

It also assumes a £0/MWh analysis case as this displaces the most MWh of non renewable energy.

Extended durations with negative fuel prices would be needed to lead to any significant increase the carbon impact from P462

FUEL I	Year	Worst Case Percentage of MWh impacted
CCGT	2018	0.1082%
CCGT	2019	0.12519%
CCGT	2020	0.30425%
CCGT	2021	0.20369%
CCGT	2022	0.00103%
CCGT	2023	0.04725%
CCGT	2024	0
COAL	2018	0.08067%
COAL	2019	0.01467%
COAL	2020	0.01389%
COAL	2021	0
COAL	2022	0
COAL	2023	0
DIESEL	2022	0
OCGT	2018	0
OCGT	2019	0
OCGT	2020	0
OCGT	2021	0
OCGT	2022	0
OCGT	2023	0

Map of market interactions & rules

Accounted for in P462

Legislation

Subsidy

Undergoing consultation

REMA

Transparency and competition potentially reduces need for TCLC enforcement on units holding subsidy

Call for input completed

TCLC

Avoided repayments subject to TCLC

Enforcement cases reduce some benefits from anti competitive behaviour but increase the case for change

Profits must be reasonable during constrained periods for a reduction in output from a PN

CfD subsidies (repayments)

To maintain compliance bid prices may need to be positive when there is a repayment obligation

Deemed CfD

Capacity based CfD

Subsidy not based on Metered output so should not be included in P462 but without P462 there is a significant competitive advantage for units with new subsidy regimes if implemented. Risks raised around impact on storage/demand/hydrogen assets equally apply to these REMA options as bid prices should tend to £0/MWh on units holding these support mechanisms

Priority dispatch EU CEP

Priority dispatch was removed from the EU clean energy package in 2018 introducing market based dispatch – P462 does not impact this.

P462

Bid prices

Actions should be taken in incremental cost order

Prices should be derived from the competitive interplay of supply and demand and not set artificially

PPAs should be consistent with TCLC but have potential to make a unit less competitive in the bid stack if P462 is introduced

It is reasonable that a unit seeks to recover subsidy through its bid price

Expectation of future value may be acceptable to include in bid price but this level is not fixed so is excluded from the base modification

Increases value of renewable energy resulting in some priority market access

REMIT

Power Purchase Agreements

CfD subsidies (top ups)

Renewable Obligation Certificates

Recycle rates

Renewable Energy Guarantee of Origin

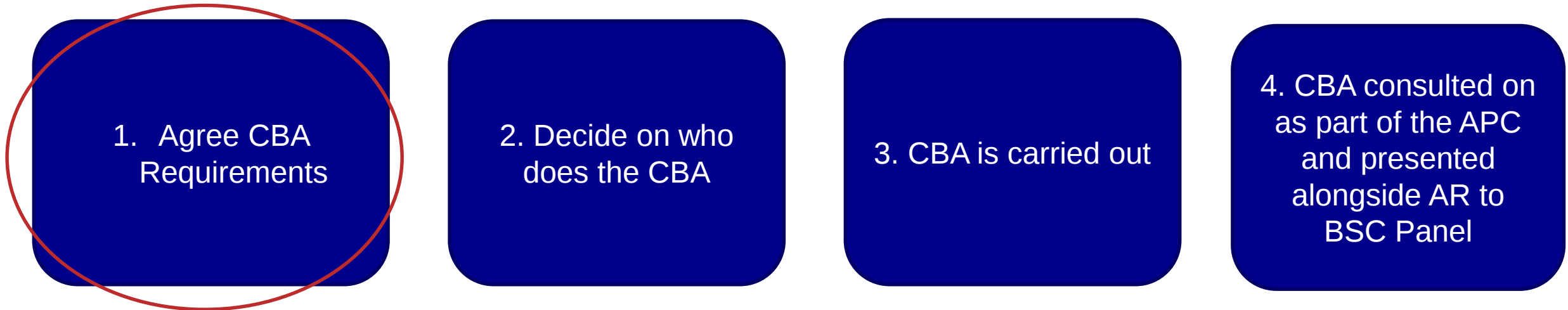
Introduces competition at bottom of bid stack enabling compliance



CBA INTRO AND OVERVIEW

Cost Benefit Analysis

- The Cost-Benefit Analysis will require Workgroup input
- The Workgroup will agree the CBA Requirements
- The performer of CBA may interact with the Workgroup members during the process
- Plan to follow a similar process to [P415 'Facilitating access to wholesale markets for flexibility dispatched by Virtual Lead Parties'](#)



APC: Assessment Procedure Consultation
AR: Assessment Report

The CBA Requirements will:

- Be agreed with the Workgroup (Plan to hold a Workgroup meeting to agree the CBA requirements - currently planned for Workgroup 5)
- Determine the scope of the CBA required for P462
- Determine the route for the CBA to be performed (currently envisaged to be similar to P415 where Elexon procure an external party to carry out the CBA)



NEXT STEPS AND AOB

Next steps

- Housekeeping – Doodle poll and meeting invite timescales? E.g., Doodle poll for 2 WD then invite on the 3rd WD
- Workgroup summary shared by end of W/C 8 April
- Plan for next Workgroups:
 - Workgroup 4: REMA interactions
 - Workgroup 5: CBA Requirements

Progression plan

Event	Date
Present IWA to Panel	9 November 2023
ToR agreed by Panel	14 December 2023
Workgroup meeting 1	16 January 2024
Workgroup meeting 2	27 February 2024
Workgroup meeting 3	2 April 2024
Workgroup meeting 4	May 2024
Workgroup meeting 5	June 2024
Workgroup meeting 6	...
Assessment Procedure Consultation	22 November 2024 – 12 December 2025
Workgroup meeting	W/C 13 January 2025
Present Assessment Report to Panel	13 February 2025
Report Phase Consultation	17 February – 17 March 2025
Present Draft Modification Report to Panel	10 April 2025
Issue Final Modification Report to Authority	14 April 2025

MEETING CLOSE

ELEXON

THANK YOU

Jacob Snowden

jacob.snowden@elexon.co.uk

bsc.change@elexon.co.uk

2 April 2024