Department for
Business, Energy
& Industrial Strategy

HPBM – Payment mechanism

Hydrogen production business model team

October 2022

Department for Business, Energy & Industrial Strategy

Agenda and aims

Agenda

Today, we will be discussing:

- **Payment mechanism : summary of positions**

What will not be covered:

- RTFO/HPBM interactions
- CO2 T&S related cashflows
- Detailed sliding scale explanations
- Volume cap

Aims

- Work together with projects, investors and other interested parties to deliver an investable and value for money hydrogen business model
- Stakeholder workshops aim to improve policy development by enabling us to test initial policy thinking with projects and potential investors
- Today we'll go through each agenda item and briefly outline what the issue is, what we're thinking and why
- We'll then invite views from you to understand the issue more as projects and investors

Note: The content in the following slides does not represent BEIS policy, but provides ideas for discussion

The session will be recorded for BEIS internal use only

Department for Business, Energy & Industrial Strategy

Summary of cashflows

Start Date:	1 January 2025, subject to XXXX
Expiry Date:	1 January 2040, subject to XXXX
Billing periods:	Monthly

Volume (V)	Sum of Qualifying Volumes
Strike Price (SP)	• **Electrolytic hydrogen:** A x **CPI_Index** + (Transport_Cost + Storage_Cost) x **CPI_Index** • **CCUS-enabled hydrogen:** A* x **CPI_Index** + **1.15** x Gas_Price + (Transport_Cost + Storage_Cost) x **CPI_Index**
Reference Price (RP)	Volume Weighted Average Price of "Floored" Achieved Sales Prices
Floor Price (Floor)	the lower of the (i) Gas_Price; and (ii) SP.
Feedstock Floor Price	the lower of: (i) 1.20 x Gas_Price ; and (ii) SP

QV Cashflows:

Cashflow 1: Difference Amount	If SP > RP, Project receives: **V x (SP – RP)** If SP < RP, Project pays: **V x (RP– SP)**
Cashflow 2: PDI Amount	V x **PDI** With: • if **RP < SP** , PDI = **10%** x (**RP** – Floor) • if **RP > SP** , PDI = **10%** x (**SP** – Floor)
Cashflow 3: Sliding Scale top-up	Sliding Scale Top Up

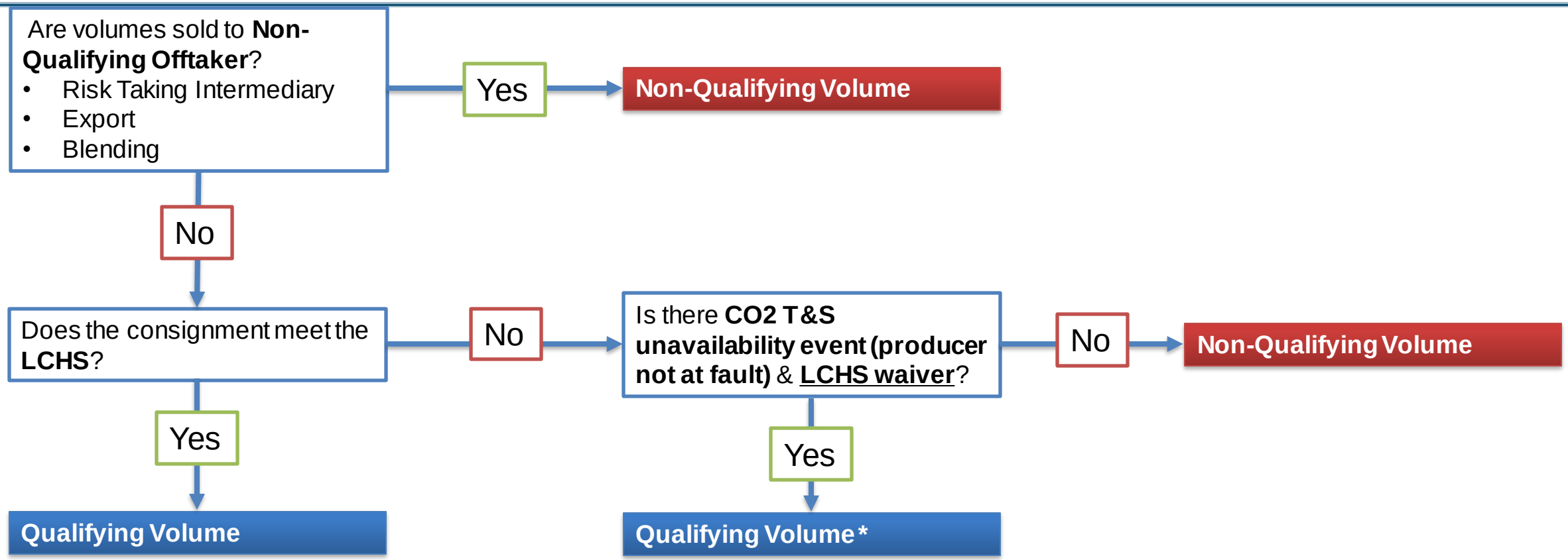
NQV Cashflows:

Cashflow 4: NQV Diff Amount	**For each sale to a Non-Qualifying Offtaker/end-user, where the price is higher than the strike price:** Project pays: **Volume x (Price – SP)**

* 'A' is the strike price excluding the gas cost in the case of CCUS-enabled projects (gas cost is indexed separately) and any agreed transport and storage costs (also presented separately).

Department for Business, Energy & Industrial Strategy

What is a Qualifying/Non-Qualifying Volume?



*We expect such volumes to be treated similarly to other qualifying volumes, however a reduction will be applied to the Strike Price. See stakeholder workshop minutes/slides on CO2 T&S interface treatment.

Department for Business, Energy & Industrial Strategy

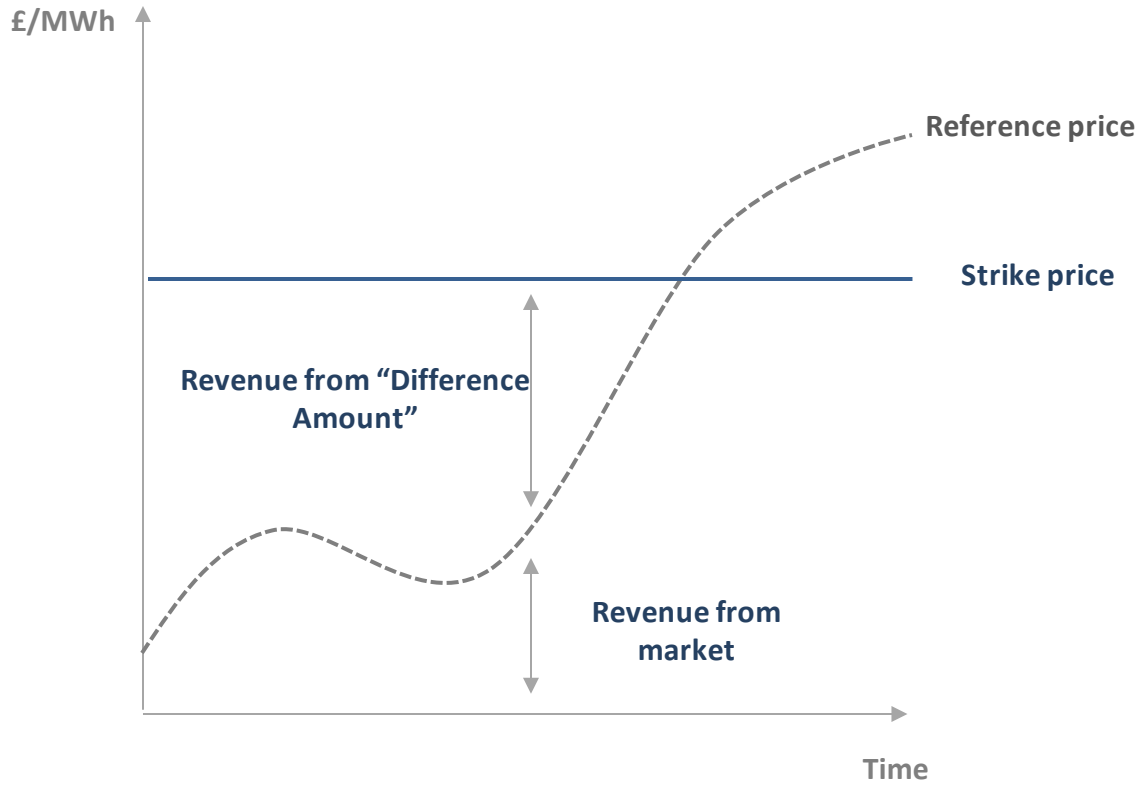
Cashflow 1: Difference Amount

Minded to position for price support is a variable premium

- Producer is paid a premium for the hydrogen produced on top of the revenue received from the sale of the hydrogen.
- Premium is calculated as the difference between a 'strike price' and a 'reference price' for each unit of hydrogen sold.
    - Strike price intended to reflect the price the hydrogen producer needs to achieve to cover their production costs and return on investment,
    - Reference price is intended to represent the market price received by the producer for each unit of hydrogen.

Cashflow 1: Difference Amount	If SP > RP, Project receives:	**V x (SP – RP)**
	If SP < RP, Project pays:	**V x (RP– SP)**

Figure: Variable premium price support



Department for Business, Energy & Industrial Strategy

Cashflow 2: Price Discovery Incentive (PDI)

Intention:

- Promote price discovery and to also incentivise the Producer to seek higher price sales to accelerate the reduction in the Difference Amounts payable by the Hydrogen Counterparty and to encourage investment in hydrogen production on a merchant basis.

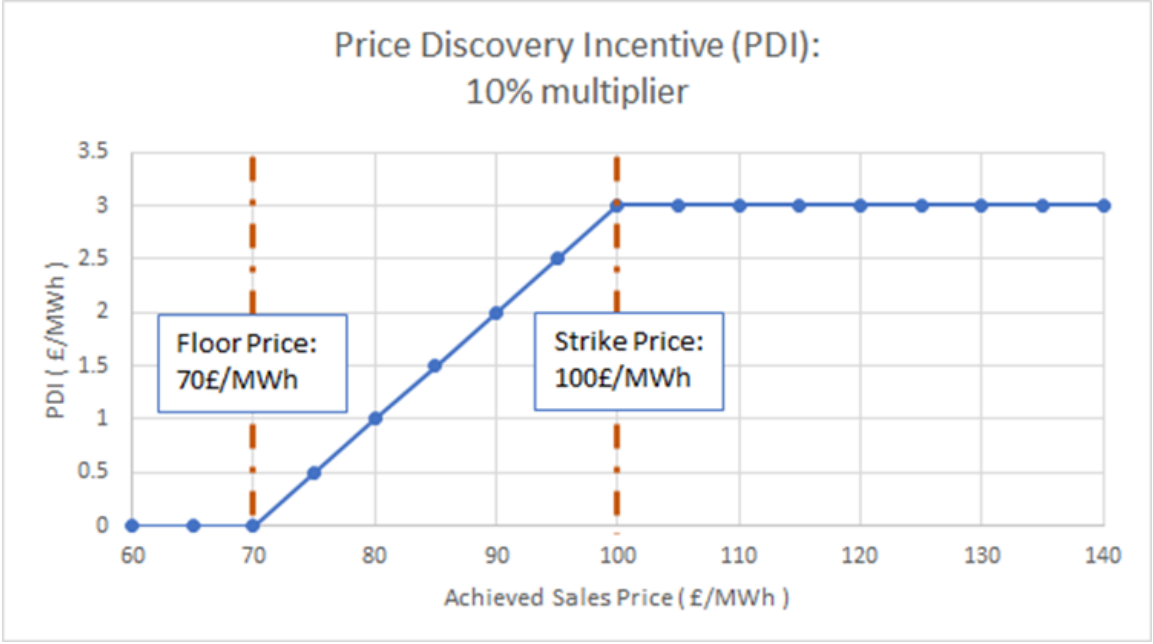
Cashflow 2: PDI Amount	V x **PDI** With: • if **RP < SP** , PDI = **10%** x (**RP** – Floor) • if **RP > SP** , PDI = **10%** x (**SP** – Floor)

Current thinking:

- If reference price < strike price: **PDI = 10% * (reference price – floor)**
- If reference price > strike price: **PDI = 10% * (strike price – floor)**
- Maintain PDI for feedstock sales.

Rationale:

- Limit incentives for prices above the strike price which may be passed on to consumers.
- Achieving value for money for government and avoiding unnecessary complexity.



Department for Business, Energy & Industrial Strategy

Strike Price definition & indexation

Invoiceable Charge Category	Recommendation
Production costs	**Counts towards ASP.**
Producer margin	**Counts towards ASP.**
Sales, general and administrative (SG&A)	**Counts towards ASP.**
HPBM-supported hydrogen transport (capex) and/or storage costs (capex and/or opex)	**Counts towards ASP.**
Direct and indirect taxes and duties	**Does not count towards ASP.**
Non-HPBM supported hydrogen transport and storage costs	**Does not count towards ASP.**
Ancillary services/charges	**Does not count towards ASP.**

Indexation

- **Electrolytic hydrogen:**
  A x CPI_Index + (Transport_Cost + Storage_Cost) x CPI_Index

- **CCUS-enabled hydrogen:**
  A x CPI_Index + **1.15 x Gas_Price** + (Transport_Cost + Storage_Cost) x CPI_Index

Amount of natural gas indexed

Strike price indexation position in the indicative HoTs

4.12	Strike Price Indexation	BEIS' minded-to position in respect of Strike Price indexation for: (a) CCUS-Enabled Facilities, is for the natural gas cost component of the Strike Price to be indexed (in a certain proportion, to be determined) to the market price of natural gas, on the basis of a natural gas price benchmark (which may be based on UK NBP Month Ahead Natural Gas Price), and for all other components of the Strike Price to be indexed to CPI (except for CO_2 T&S fees, which are a pass-through – see discussion in item 4.17 (*CO_2 T&S Fees*)); and

Current thinking:

Only index an amount of natural gas reflecting the best available thermal efficiency conversion rate for CCUS-enabled technologies
Technical advice suggests 1.15MWh of natural gas to 1MWh of hydrogen is most appropriate, taking into account manufacturing / operation uncertainties.

Gas Price

Definition:

- The Gas Price is used for the calculation of the **Floor** for all technologies & **Strike Price** indexation of natural gas costs for CCUS-enabled hydrogen production only.
- For each Billing Period, the Gas Price will be the following average of daily gas prices:

$$\frac{1}{N}\sum_{t=1}^{N} Gas\ Reference\ Price_t$$

Where:

- $\boldsymbol{Gas\ Reference\ Price_t}$: the **Settlement Price** for the day t of the **Month ahead UK NBP Natural Gas Futures contract** for delivery over the calendar month of the Billing Period, as published by ICE Futures Europe. **(Source to be confirmed)**
- "t": means the relevant Observation Day
- "N": means the number of Observation Days in the Observation Period
- **Observation Day**: Each Fixing Business Day during the Observation Period
- **Observation Period**: Month preceding the billing period, excl. the last 2 business days (or until expiry of contract).

Reference Price

Definition

- Volume weighted average of Achieved Sales Price, floored at the relevant floor.
- Let's assume: Gas Price: 100£/MWh
- **Example 1:**

Offtake	Achieved Sales Price	Floor Price	Floored ASP	Volume
A	110 £/MWh	100 £/MWh	110 £/MWh	60GWh
B	90 £/MWh	100 £/MWh	100 £/MWh	40GWh
Ref Price			**106 £/MWh**	100GWh

- **Example 2: B is a feedstock offtake.**

Offtake	Achieved Sales Price	Floor Price	Floored ASP	Volume
A	110 £/MWh	100 £/MWh	110 £/MWh	60GWh
B	90 £/MWh	**120 £/MWh**	120 £/MWh	40GWh
Ref Price			**114 £/MWh**	100GWh

Department for Business, Energy & Industrial Strategy

Treatment of volumes sold to Feedstock Offtakers

Alternative Reference Floor Price (Feedstock Offtakers)	the lower of: (i) 1.20 x Gas_Price ; and (ii) SP

Definition: Set an Alternative Reference Floor Price for sales to feedstock offtakers

Alternative Reference Floor Price = Gas Reference Price x 1.20

- This will be capped at the relevant Strike Price, in the same way as the Gas Reference Price
- The Price Discovery Incentive will be applied from the Gas Reference Price (not the higher Alternative Reference Floor Price)

Rationale: To avoid overcompensation of hydrogen feedstock offtakers and ensure value for money for government

- The 20% uplift on the Gas Reference Price ensures feedstock users pay a price that is more reflective of the cost of unabated hydrogen production. This is a price that existing hydrogen feedstock users already pay - and so they should still be incentivised to buy LCH at this price
- Government does not view it as good value for money to provide support for sales below this price

Department for Business, Energy & Industrial Strategy

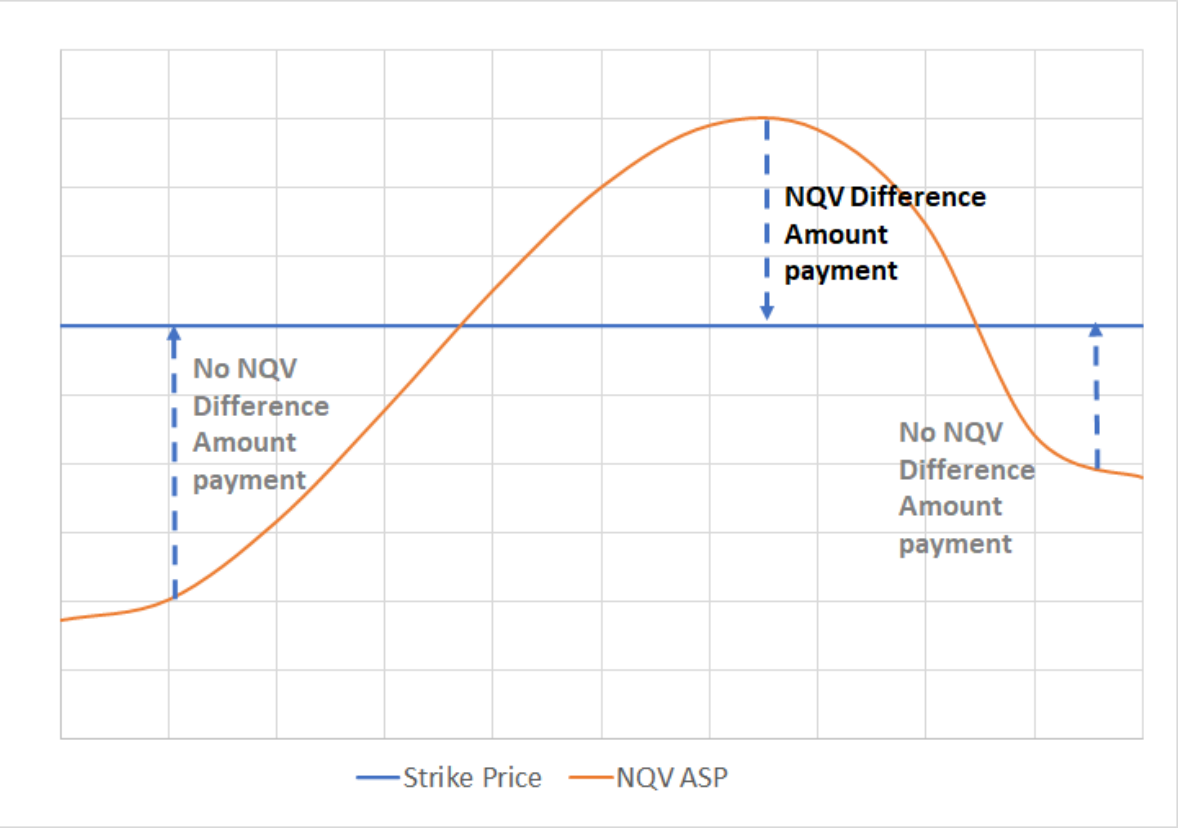
Payments for NQV

Cashflow 4: NQV Diff Amount	For each sale to a Non-Qualifying Offtaker/end-user, where the price is higher than the strike price: Project pays: **Volume*(Price – SP)**

Definition (calculation of ASP when ASP>SP): separate ASP calculated as volume-weighted average across non-qualifying volumes sold at ASP>SP – projects pay the counterparty for NQV sales above the strike price

Rationale

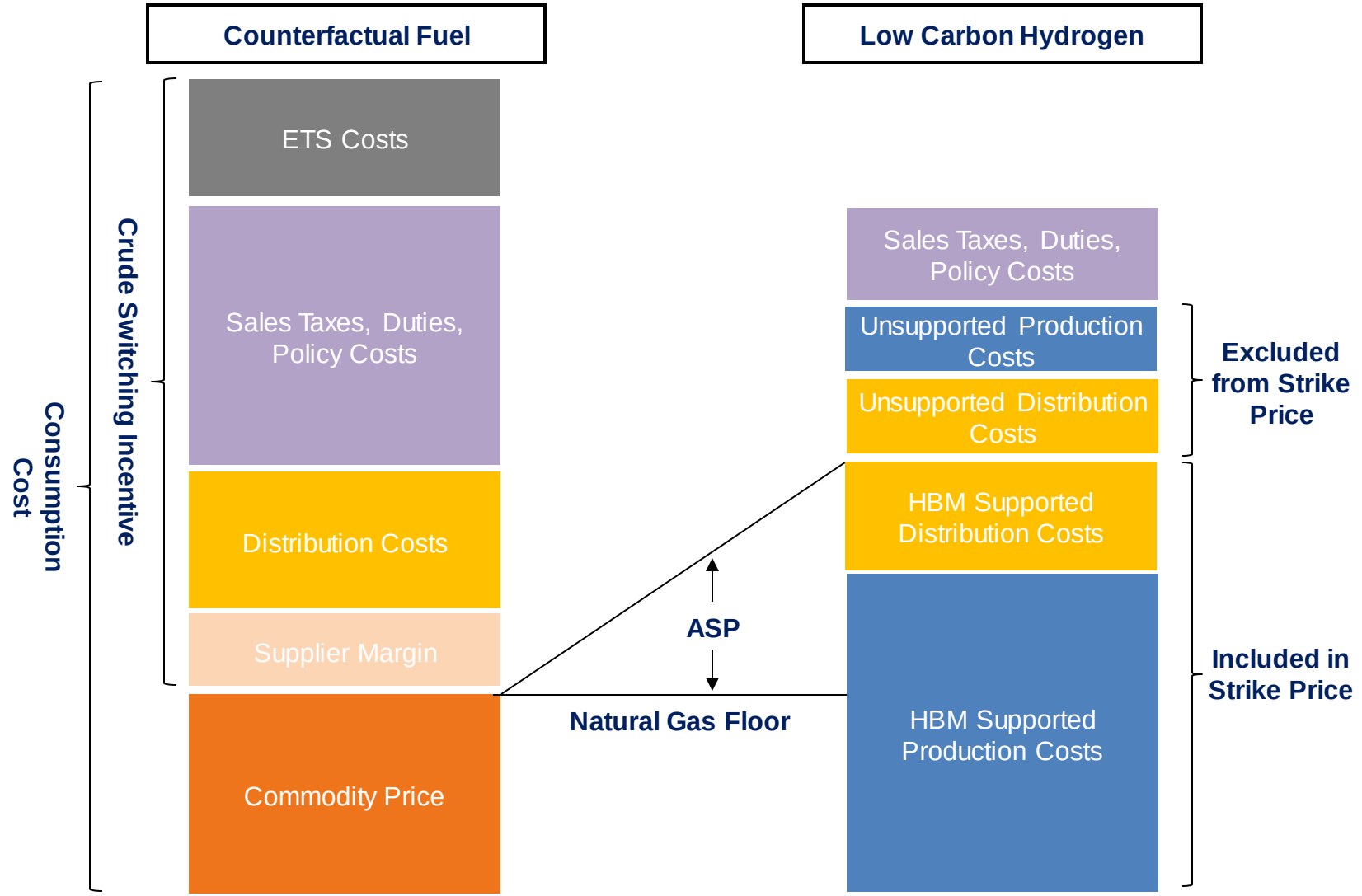
- Delivers VfM outcomes by protecting the two way payment principle
- Protects offtakers from high H2 prices (avoids price competition between NQV and QV)
- Aligns with decisions on PDI, volume cap



Department for Business, Energy & Industrial Strategy

Desired hydrogen pricing structure reflects today's commodities structures

- Reference Price is intended to provide competitiveness at the Commodity Price of the predominant counter-factual fuel (Natural Gas), but with potential for subsidy to reduce via the ASP
- Many of the costs normally incurred in consumption of the counterfactual fuel be covered by the HPBM
- Costs incurred by the producer but excluded from HPBM support should be excluded from the ASP to facilitate their recovery from offtakers without impacting subsidy payments



Note: size of bars are not proportional, and intended only as an illustration

Department for Business, Energy & Industrial Strategy

Policy Costs Incurred by Producer

- Government has previously decided to fund energy and climate change via levies on electricity and natural gas consumers
- Levies varies with deployment levels within the schemes, and to an extent with energy prices
- EII exemption provides 85% relief against many of these levies for eligible industries such as hydrogen
- BEIS recently consulted on whether there is a rationale for increasing the subsidy level of the current EII scheme in order to address the increased risk of carbon leakage and the higher costs of industrial electricity prices – this consultation closed on 16th September 2022 and the feedback is being analysed
- Under the Energy Bill Relief Scheme for business and other non-domestic customers, the charge for green levies will be covered by the discount for eligible energy use. This scheme only applies until 31 March 2023, and will be subject to review

Current Thinking: Producer Policy Costs should be recovered from offtakers outside of the ASP

Rationale:

- **Avoids IDHRS funding envelope being eroded by costs of other decarbonisation schemes**
- **Consistent with position on residual ETS costs**
- **Reduces risk of excessive subsidy to end users**
- **Protection against impact of removal/reduction of EII exemption can constrain downside risk of this position**