



# **NTS Charging Methodology Forum**

**UNC 678 Quantitative impact  
analysis**

03/09/2019



# Agenda

1. Scope
2. Modelling approach





# Scope





## Scope

- CEPA have been commissioned to model the impacts of UNC678 and support Ofgem's impact assessment.
- Ofgem's impact assessment will be a combination of quantitative and qualitative analysis.
- Analysis is ongoing. Therefore today's discussion is in relation to the modelling approach. No results will be discussed.



# Modelling approach





# High-level modelling process

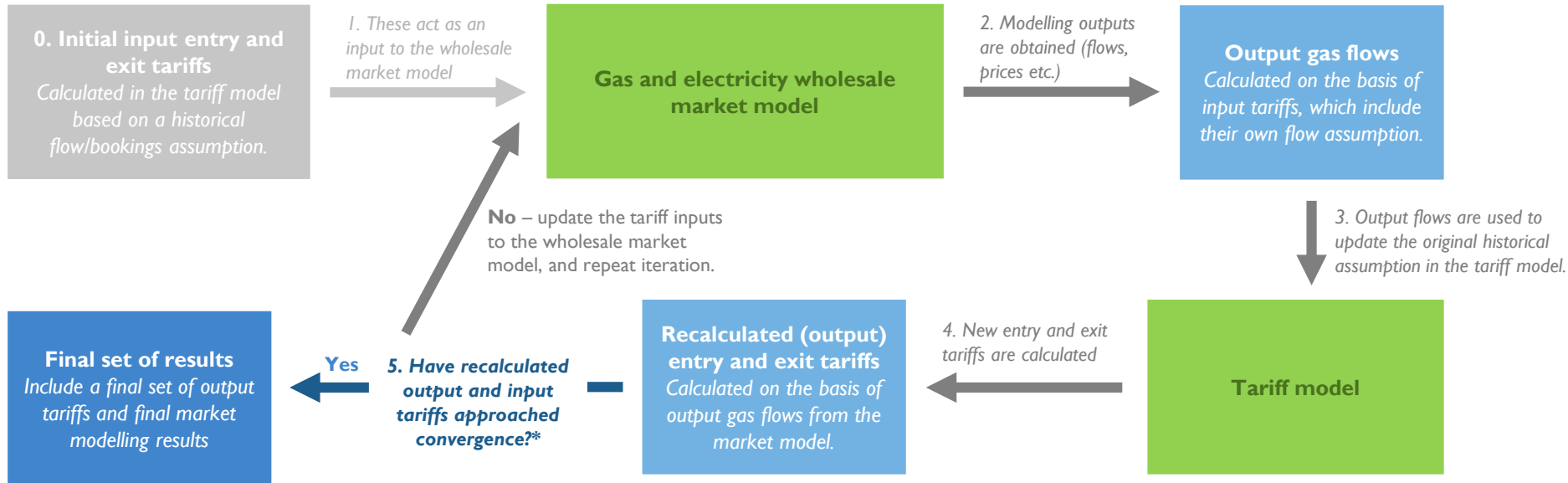
- 1 Gas tariff modelling:** calculates NTS capacity tariffs under each modelled charging option, for each entry and exit point and each capacity product, for years modelled. We use a global gas market model for this.
- 2 Gas and electricity market modelling:** simulates market outcomes, including gas flows for all entry and main exit points and wholesale gas market prices, for each set of tariffs.
- 3 Impact assessment modelling:** calculates a range of distributional and market impacts associated with each charging option, on the basis of outputs from the gas tariff and market modelling. This also includes quantitative evaluation of wider system impacts.



# High-level modelling process

The gas tariff and gas and electricity market models work together in an iterative manner to dynamically produce the final set of output tariffs and results

Start at step 0 and iterate until output tariffs converge with input tariffs



End iteration when this point is reached.

\* In the case that convergence is not achieved, any remaining differences will be considered within the impact assessment



# Gas Market Model

- Covers all (2018) gas consumption and production regions in the world
- Maximises social welfare while meeting network and infrastructure capacity constraints
- Covers entire GB gas market supply chain at transmission level
- Models price elasticity of gas fired power generation demand by running parallel Pan-European electricity dispatch model





# Gas Market Model points

Entry points	Exit points	Demand assumption
Beach terminals	One aggregate exit point for gas-fired power stations	Defined by demand curves* derived from Pan-European electricity dispatch model
Onshore fields	One aggregate exit point for LDZs and industrial and commercial (I&C users)	I&C: inflexible with some DSR capacity at high prices LDZs: Inflexible
LNG import	Storage exit points	Defined by gas dispatch model
Storage entry	Interconnector exit points	Defined by gas dispatch model
Interconnector entry		

*\* relationship between gas prices and power station gas demand*





# Key elements of the modelling approach

Key element	Proposed approach & considerations
Time horizon and years modelled	Three model years: <ul style="list-style-type: none"><li>• 2022/23</li><li>• 2026/27</li><li>• 2030/31</li></ul> Using gas years
Counterfactual	<ul style="list-style-type: none"><li>• ‘Status quo’ where none of the charging proposals are adopted</li><li>• Original UNC 678 mod proposal presents an additional form of counterfactual</li></ul>
Scenarios	Using two National Grid scenarios for modelling: <ul style="list-style-type: none"><li>• Two Degrees; and</li><li>• Steady Progression</li></ul>





# Key elements of the modelling approach

## Grouping proposed modifications

Option	RPM	Capacity used for tariff calculation	Storage discount	Revenue recovery exclusions	Optional charge (short-haul)	Mods covered
<b>Status quo</b>	LRMC plus commodity charge	Obligated capacity	None	N/A - existing contracts are liable for commodity charges	Optional commodity charge	
Capacity Weighted Distance (CWD) baseline	CWD	Forecasted Contracted Capacity (FCC) by National Grid, excluding existing contracts.	50%	Existing contracts	N/A	678
Postage stamp (PS)	PS		50%	Existing contracts	N/A	0678A
CWD with storage discount	CWD		80%	All storage contracts	N/A	0678E, 0678F
PS with storage discount	PS		80%	All storage contracts	N/A	0678C
CWD with NTS Optional capacity charge (NOC)	CWD		50%	Existing contracts	Using methodology 2	0678D, 0678G
PS with NTS Optional capacity charge (NOC)	PS		50%	Existing contracts	Using methodology 2	0678J, 0678H
CWD with NTS Optional capacity charge (NOC)	CWD		50%	Existing contracts	Using methodology 1	0678B
CWD with Ireland Security Discount	CWD		50% (and 95% Ireland Security Discount)	Existing contracts	Wheeling charge	0678I



## Modelling of the status quo

- We model the status quo based on the arrangements currently in place.
- We derive capacity tariffs and assume that these remain constant (given constant obligated capacity).
- We incorporate a constant proportion of interruptible:firm contracts.
- We can then identify the shortfall in revenue requirement and calculate the remaining commodity charge.



# Key elements of the modelling approach

Key element	Proposed approach & considerations
Distributional analysis segmentation	<ul style="list-style-type: none"><li>• Residential consumer groups</li><li>• Industrial and Commercial (I&amp;C) consumer &amp; power station groups: impacts on I&amp;Cs/power stations connected to the distribution vs. transmission network, as well as bill impacts based on low vs. high group (defined in terms of gas consumption for I&amp;C, and on the basis of typical plant &amp; technology characteristics and modelling outputs on efficiency and load factors for power stations).</li><li>• Storage and interconnector groups: tariff impacts for each.</li></ul>
Types of analysis	<ul style="list-style-type: none"><li>• <b>'Static analysis'</b>: Market impacts, distributional impacts</li><li>• <b>'Dynamic analysis'</b>: E.g. incentives for investment/closure</li></ul>





# Key assumptions

Assumption	Implication
Shippers book capacity to reflect their flow requirements	Bookings in the model are equal to flows. (Note that this does not apply to GDNs.)
Shippers maintain proportion of interruptible capacity bookings	Weighted proportion of interruptible and firm product capacity bookings to reflect existing proportion
Existing contracts are utilised first	Existing contracts netted off Forecasted Contracted Capacity and NG revenue requirement outside of model





Thank you

