

# Hydrogen – Pathways to Commoditisation Simon Ellis – Head of Global Gas Analysis - ICIS All-Energy *'Hydrogen: From Hype to Reality'*, 30 March 2021

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ICIS pricing data is widely acknowledged as a benchmark across many of the world's most established commodities, bringing certainty to planning and decision making.

### **Commoditisation in practice – the European Gas Market**



#### 1996

UK virtual NBP hub created to concentrate liquidity. Trade on NBP expands rapidly with ICIS assessment the main reference.

#### 1986-1994

UK pioneers liberalisation of gas market, opening up infrastructure to competition. Gas traded through opaque bilateral contracts.

# 1994-1995



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#### 2005-present

Trade develops across Europe. Exchange trade grows using use assessments to settle exchange-traded financial contracts. Oil indexation gradually phased out from European gas contracts.

1998-2003

First UK gas pipeline to mainland Europe opens. ICIS Indices for new hubs like Dutch TTF challenge practice of linking gas contracts to gasoil and fuel oil.

# Hydrogen market development faces unique challenges



Existing Grey Hydrogen market	Low carbon H <sub>2</sub> 'Market formation' stage
Practice in the conventional hydrogen market	Support mechanisms for emerging clean hydrogen
	New projects targeting 5-10 year sales contracts
<ul> <li>Hydrogen pricing opaque with no accepted industry benchmark</li> </ul>	<ul> <li>Discussion of Carbon CfDs to support investment</li> </ul>
<ul> <li>&gt;85% of hydrogen consumed in situ, limiting opportunity for price discovery</li> </ul>	<ul> <li>Blue/ Green guarantees of origin (GOs) another potential revenue stream</li> </ul>
<ul> <li>Transportation networks limited outside of US</li> </ul>	<ul> <li>Lack of transparent price limits incentive for cost efficiency, market for spot sales</li> </ul>
Lack of international seaborne trade	<ul> <li>EU has called for Euro-denominated benchmark to</li> </ul>

spur market development

# **Considerations for pricing of clean hydrogen**



# Blue H<sub>2</sub> cost-plus pricing

- Current low-cost low carbon option, with production technology mature at scale
- Linkage to NBP reflects largest component of variable cost
- Logical mechanism for applications where hydrogen displacing gas
- Product can be differentiated with GO

### Green H<sub>2</sub> cost-plus pricing

- Economics to improve from learning rates and changing load structure
- Integrated projects have diverse economics and availability assumptions
- Indexation to traded power price implies grid sourcing with REGO
- Product can be differentiated with GO

### Theoretical pathway to mature traded market

#### **Physical market development**



Hydrogen shipping and pipelines allow global arbitrage

# Price



discovery as decentralised clusters develop

Cost-plus

indicators

provide early

indication of

market pricing

Network growth increases liquidity regional or national trading zones Financial/ regulatory developments

- Support policies gradually withdrawn as hydrogen transitions from market formation to diffusion phase. Competes on cost with other decarbonized commodities
- Move to standardised trading contracts then OTC brokered trade
- Emergence of active futures exchange and liquidity on forward curve







# Thank you