

# CO<sub>2</sub> TO SYNTHETIC METHANE

APGTF WORKSHOP | 21<sup>ST</sup> FEB 2013



# CLEAN FUEL | ENERGY STORAGE | RENEWABLE HEAT



Wind Power



Grid



Solar Power



Electrolyser



Clean Fuel



Energy Storage

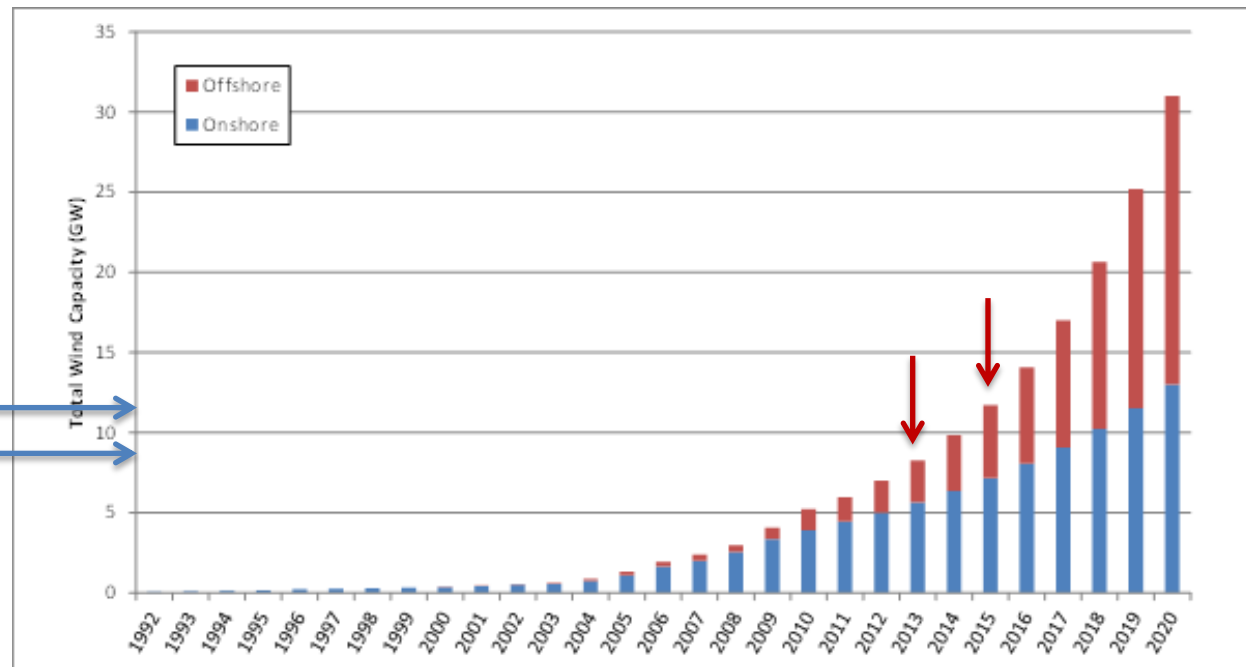


Renewable Heat

ENERGY STORAGE: THE NEED  
HYDROGEN ENERGY SYSTEMS

# GROWING WIND GENERATION

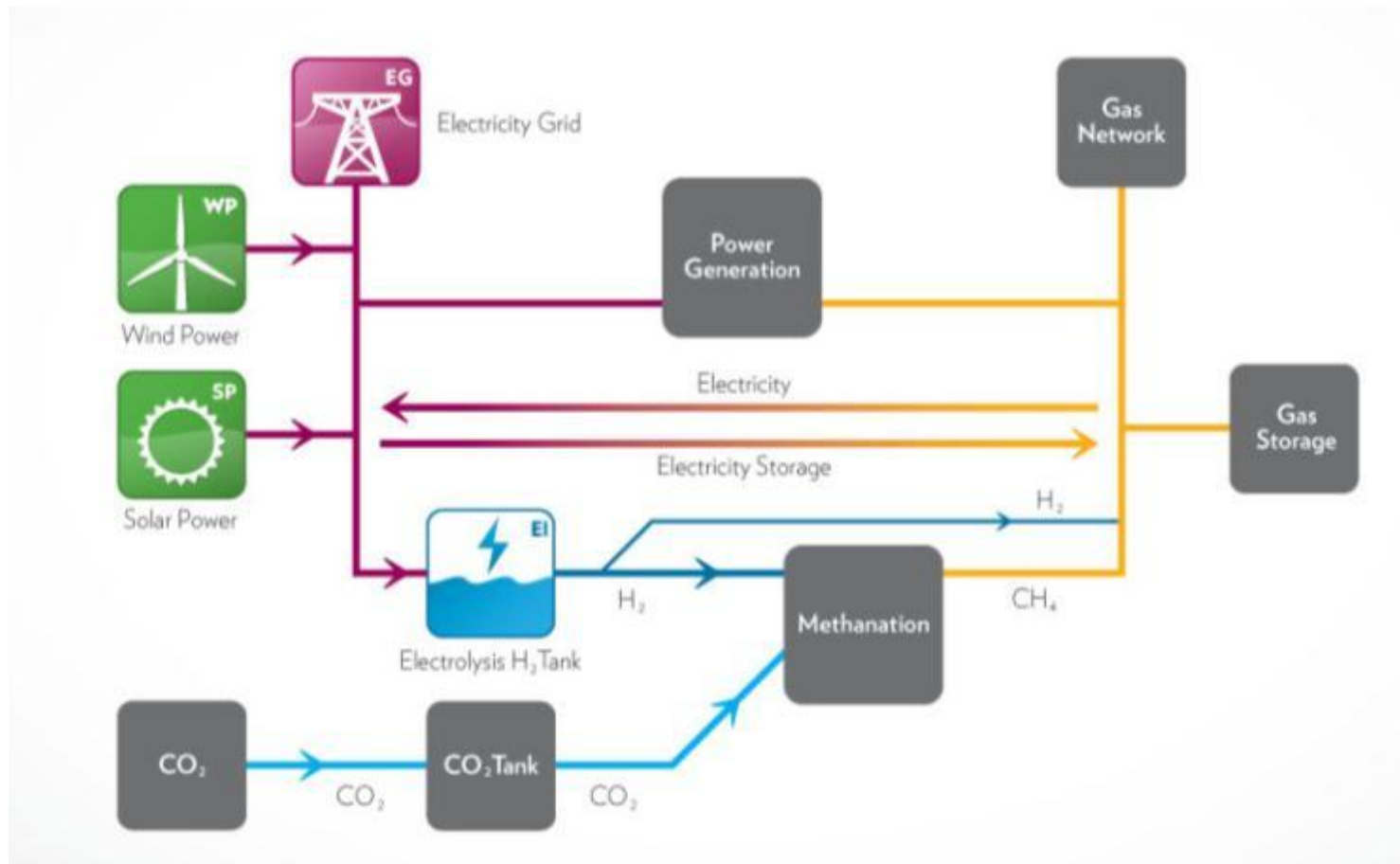
- Evidence from Germany and Denmark
- Problems start at 20% capacity; UK hits threshold from 2013
- Problems start at 8% energy; UK at 10% by the end of 2013 (DECC)



20% of peak capacity (60GW) in Winter  
20% of peak capacity (40GW) in Summer

ENERGY STORAGE: THE NEED  
HYDROGEN ENERGY SYSTEMS

# POWER TO GAS: RATIONALE

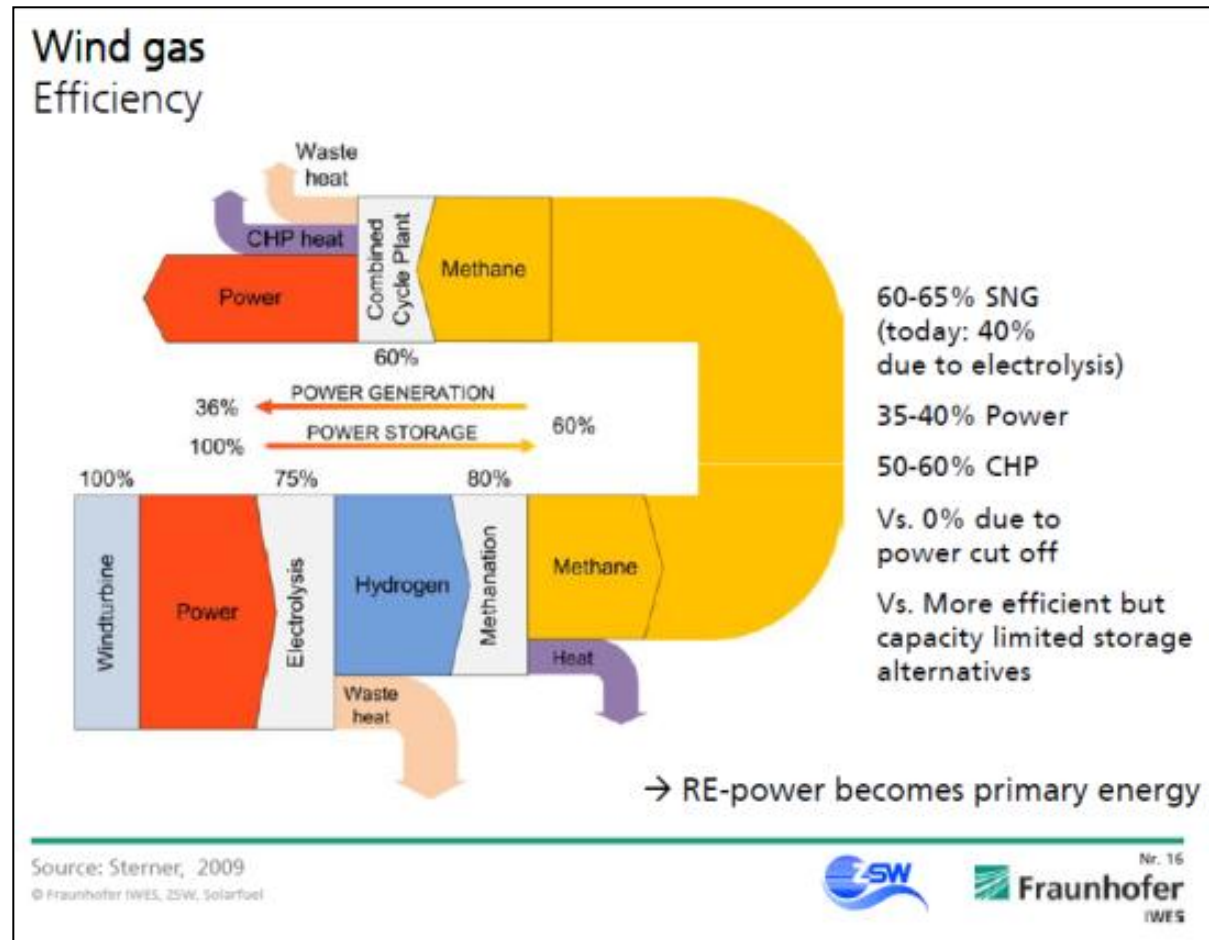


POWER TO GAS: RATIONALE  
ENERGY STORAGE | CLEAN FUEL

# SYNTHETIC METHANE

## Utilising wind and CO<sub>2</sub>

- Counters wind curtailment
- Best with pure CO<sub>2</sub>
- Best with CHP
- Big in Germany



SNG SYSTEM

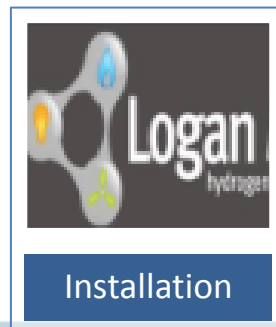
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# POWER TO GAS



## The DECC funded Methanation study

- CO<sub>2</sub> utilisation – industrial sources and CC
- Opportunity analysis
- Modelling available/constrained RE sources
- Compliance of gas injection
- Rapid response electrolysis
- Gas mixing
- Location of stranded gas assets in the UK
- Potential in Scotland



METHANATION: POWER TO GAS  
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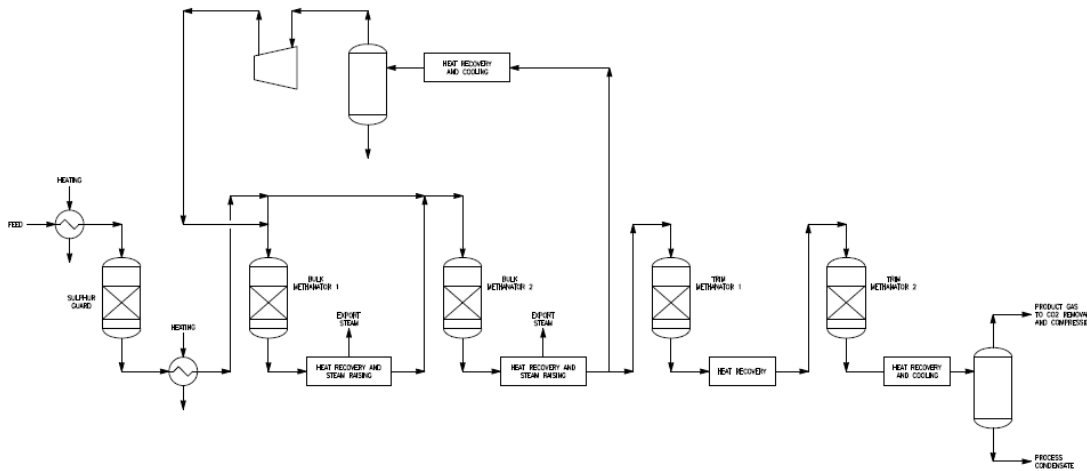




# SYNTHETIC METHANE

## Reactor technology

- Most designed for syn gas ( $H_2|CO$ )
- Pressure 30bar to 40bar
- Temp 200°C to 650°C
- Purity 2% to 0.1%



SNG SYSTEM

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# SNG SYSTEM SUPPLIERS

Supplier	Technology	Comments
BASF	Methanation catalysts	Contacted. NDA in place. Sending details of their catalyst and contacting micro-plant manufacturers they have used.
Davey Process Technology / JM	HICOM Reactor	Contacted. Organising NDA. Have offered use of simulation software.
GL Nobel Denton (British Gas)	HICOM Reactor	NDA in place. Provided details of HICOM technology.
Haldor Topsoe	Equilibrium Fixed Bed Reactor and catalysts	Contacted. Pilot plant too small for them to be involved with
Lurgi / Air Liquide	Equilibrium Fixed Bed Reactor and catalysts	Contacted. Do not have experience working with pure H <sub>2</sub> / CO <sub>2</sub> streams. Interested in development.
MAN SE	Unknown.	Contacted. Supplied the reactor for Audi e-gas project.
RWE	COMFLUX Reactor	Contacted. Awaiting further details.