

SGN Energy Futures

Hydrogen Vision

Ally Scott

Energy Futures

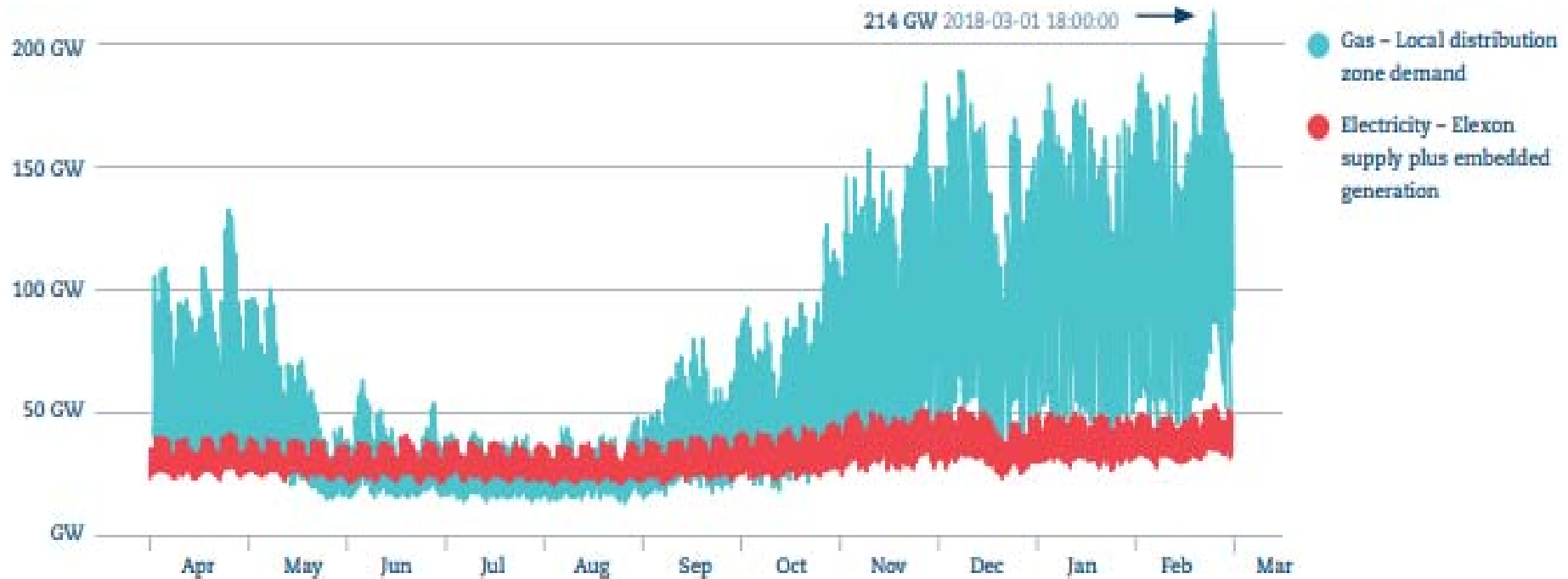
June 2019



SGN

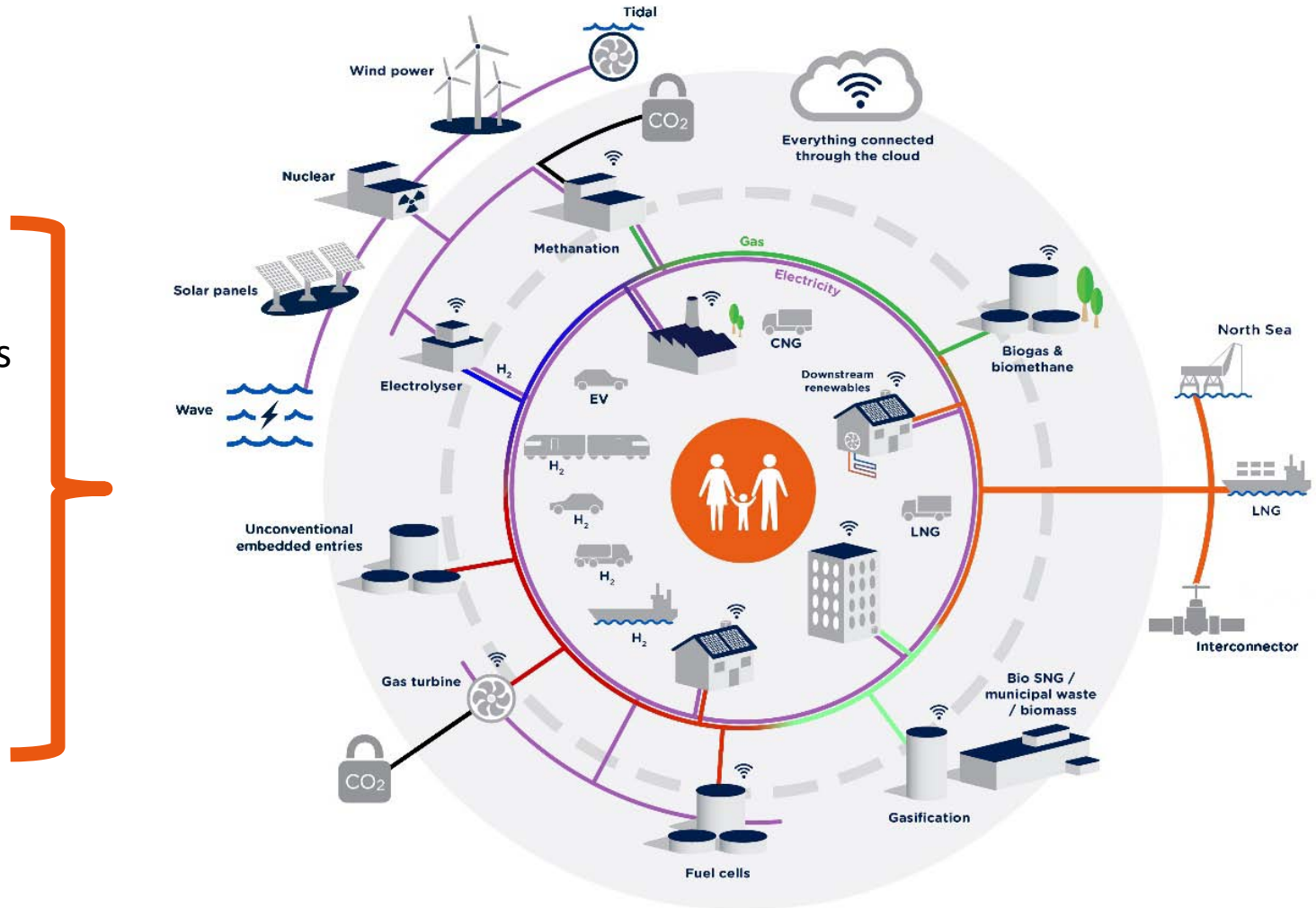
Your gas. Our network.

Meeting customer demand: 1 March 2018



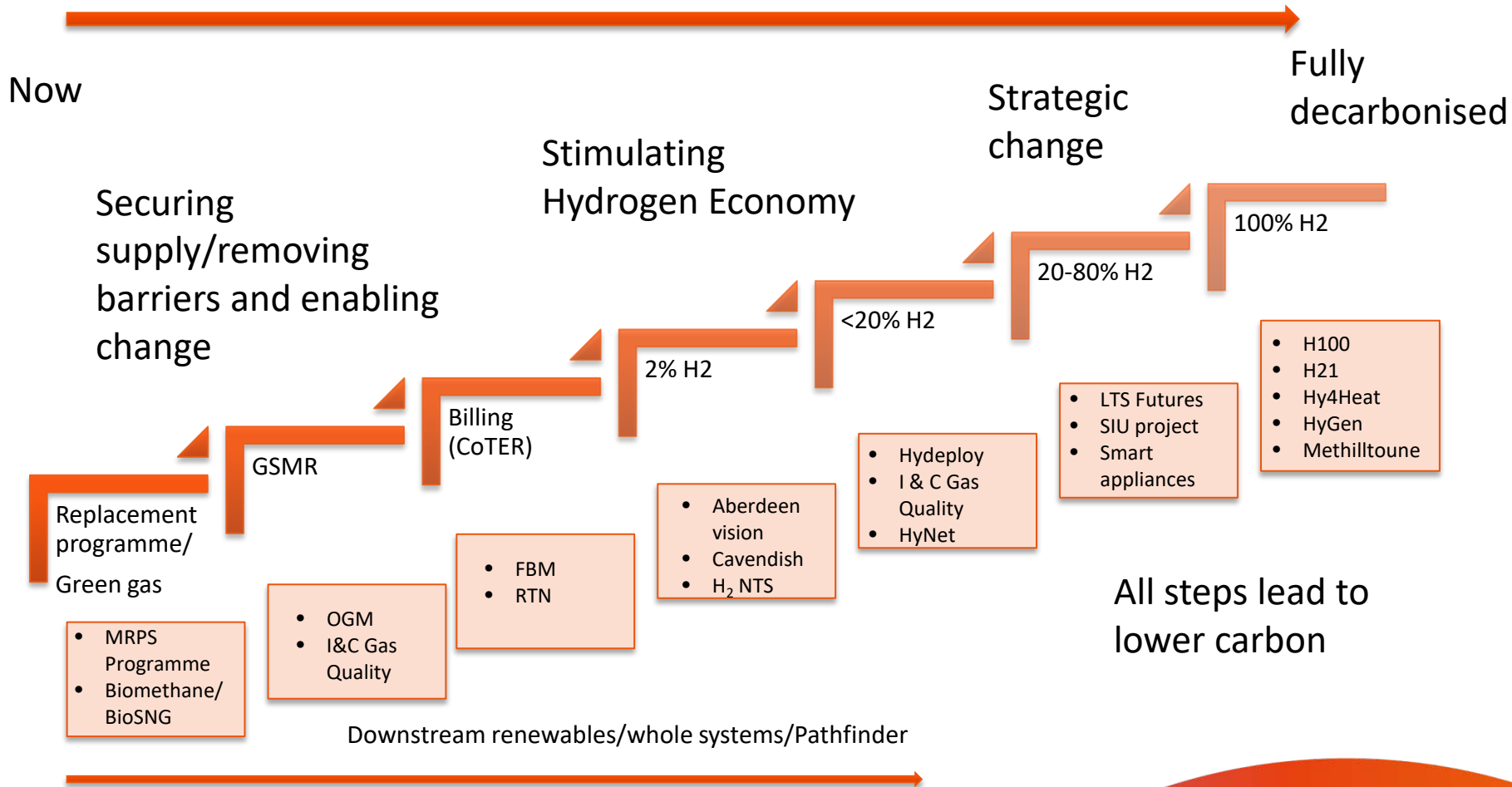
Whole system evolution

Gas networks
 Power networks
 Downstream
 Renewables
 Upstream
 Generation
 Transport



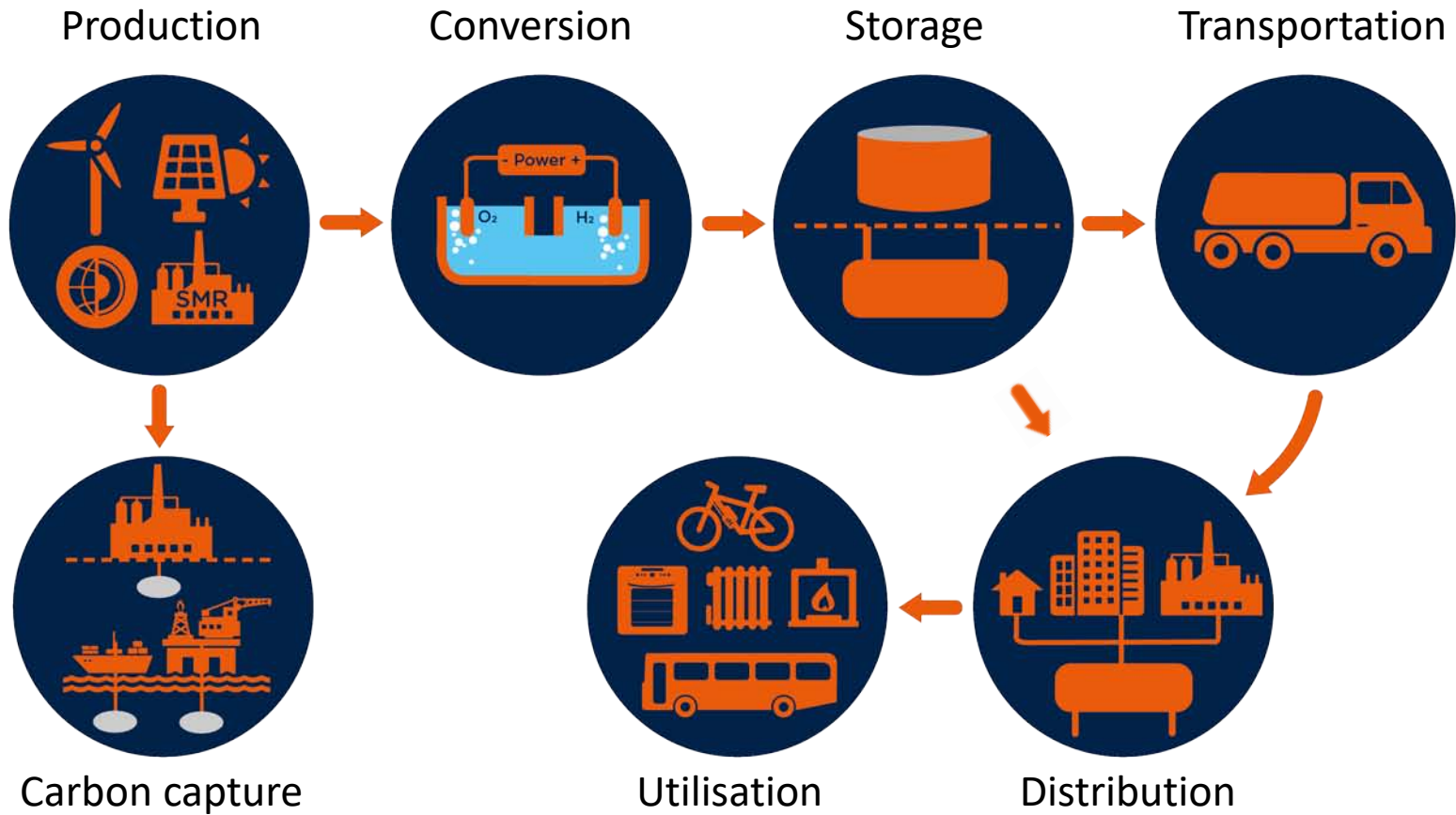
Future Energy Scenarios – Networks

Gas quality decarbonisation pathway

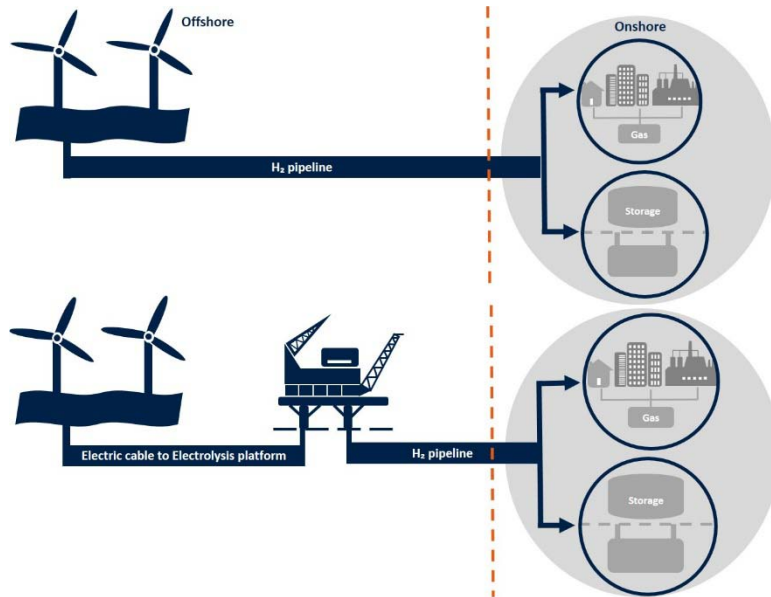


No regrets/no disruption
for domestic customers

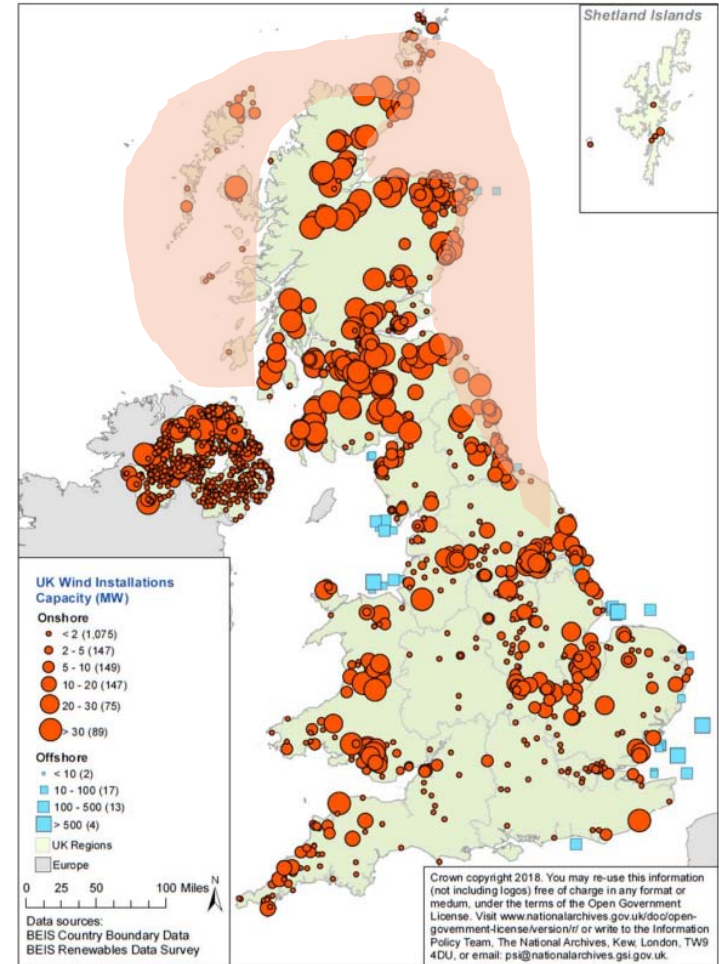
Hydrogen network



Bulk Hydrogen from Offshore Wind emerging



SGN LCITP – HyGen Project



HyGen Project



EUROPE & SCOTLAND
European Regional Development Fund
Investing in a Smart, Sustainable and Inclusive Future

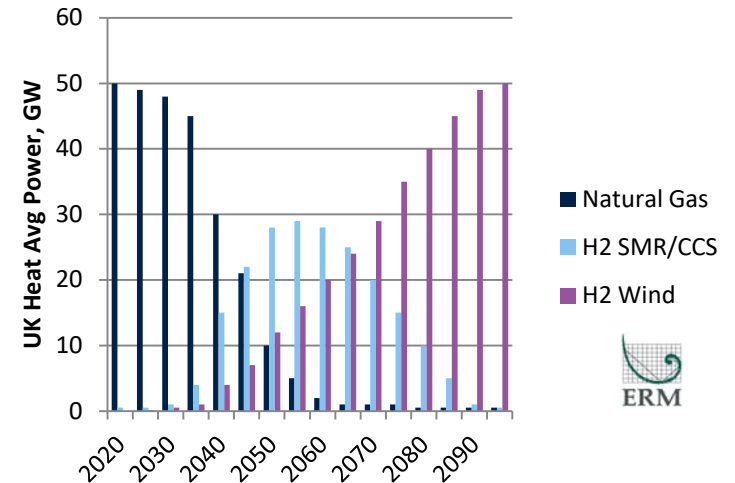
- Evaluate 3 sites in Scotland for local hydrogen generation and storage options for new pilot network



- Funding received from the Low Carbon Infrastructure Transition Programme (LCITP)

Transitioning to Clean Energy

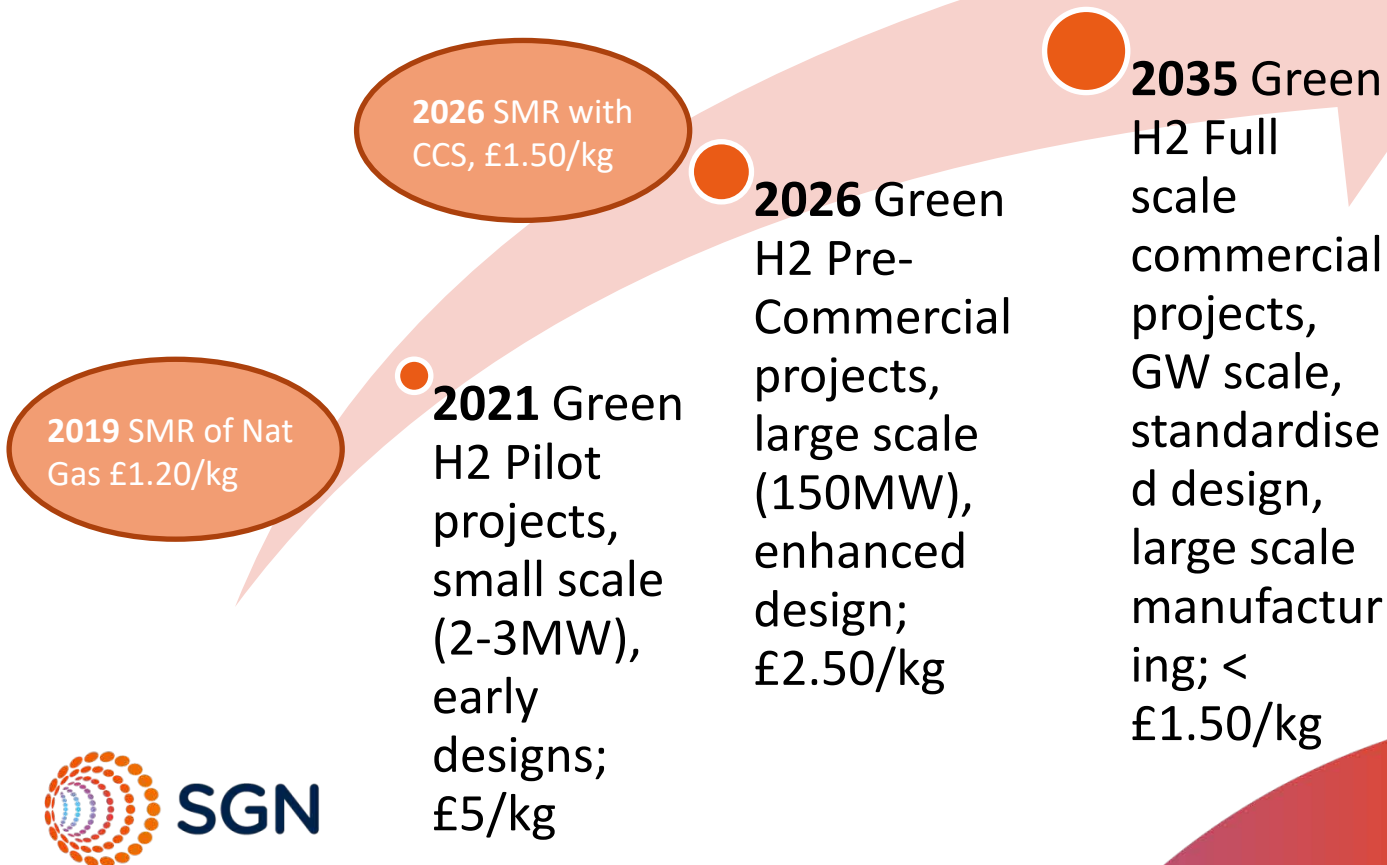
- H100 Pilot Project – green hydrogen to 300 homes
- ‘Blue Hydrogen’ - natural gas plus SMR and CCS to provide UK clean energy ‘bridge’
- ‘Green Hydrogen’ – to replace blue hydrogen over time (several decades)
- Offshore wind will enable green hydrogen at scale



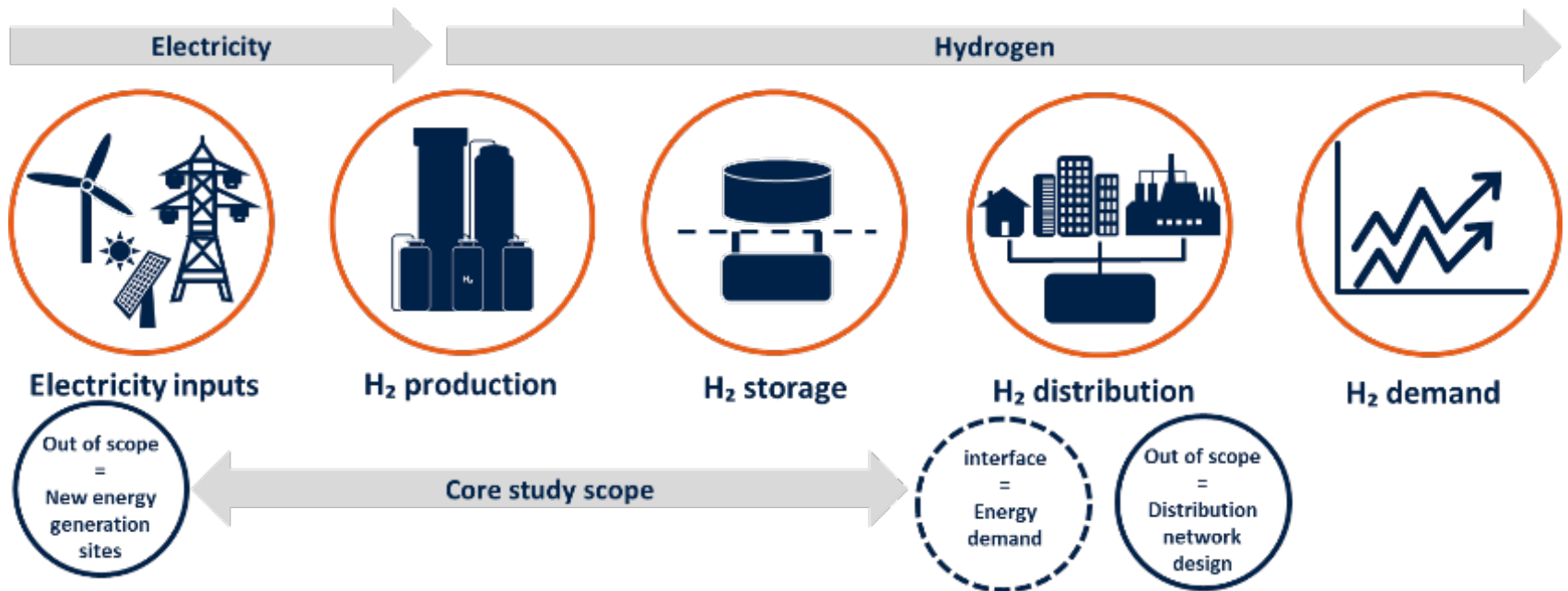
Latest Cost Projections for Hydrogen Production



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Methilltoun Project (BEIS H2 supply bid pending decision)



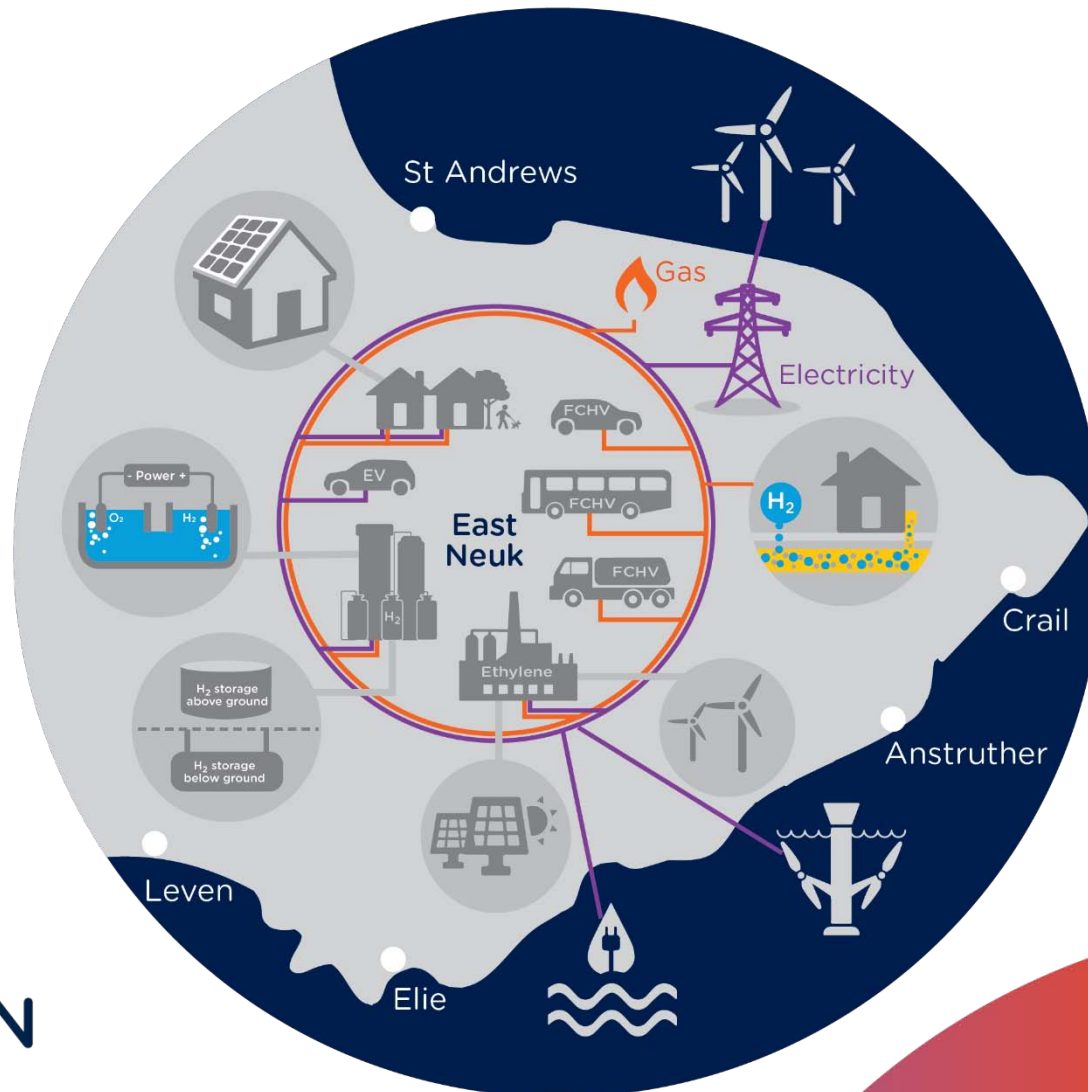
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Aberdeen Vision example

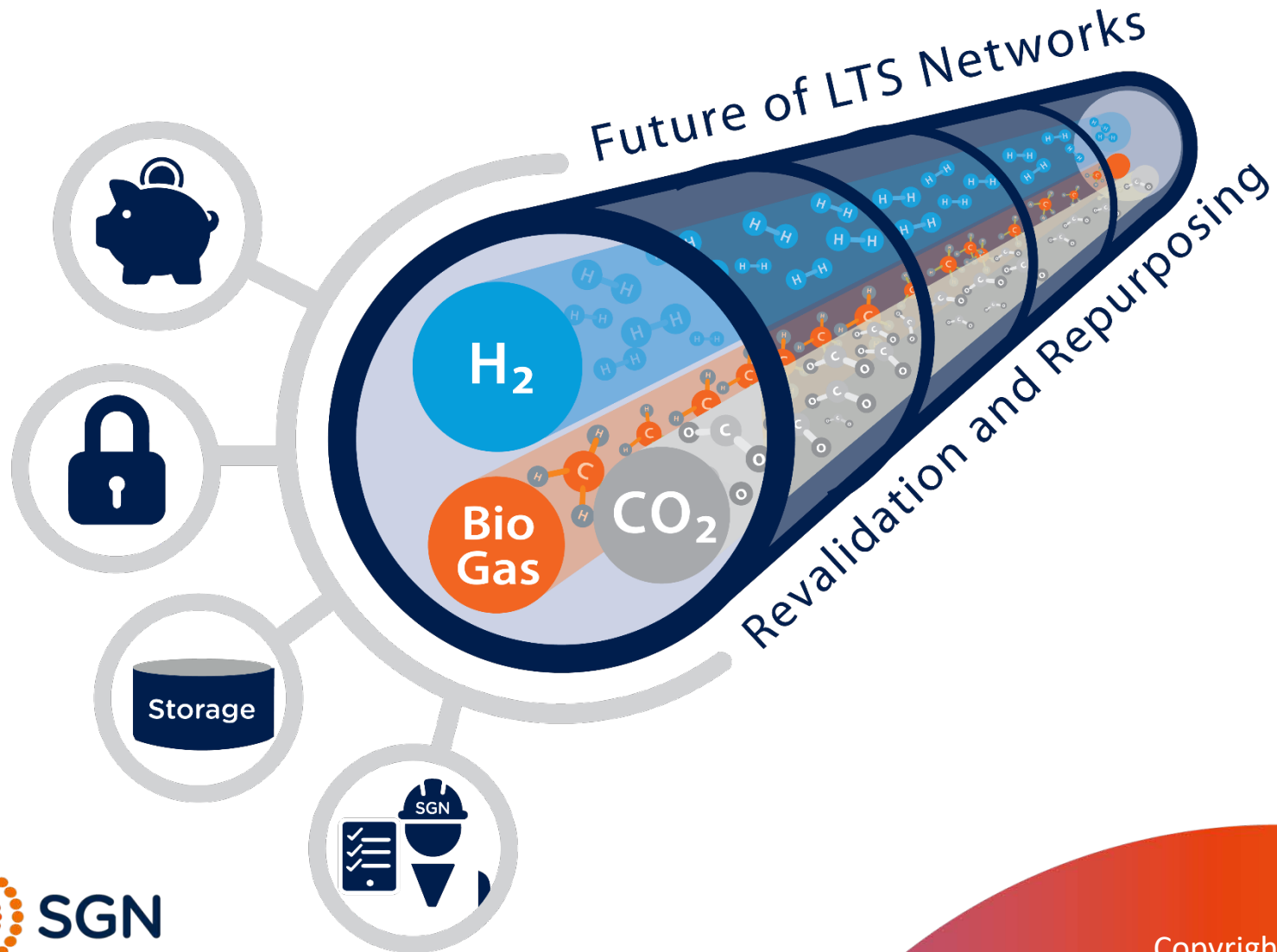
Project Cavendish Hydrogen for South London



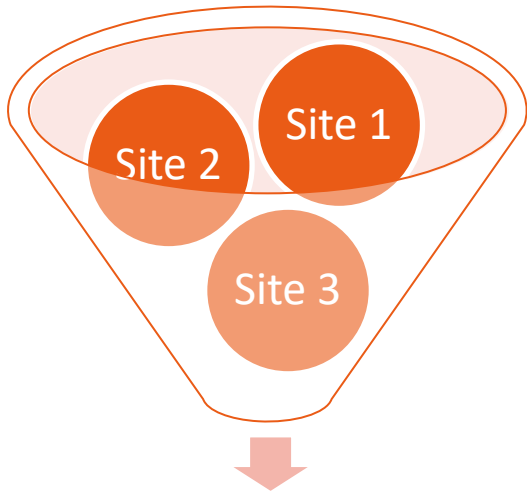
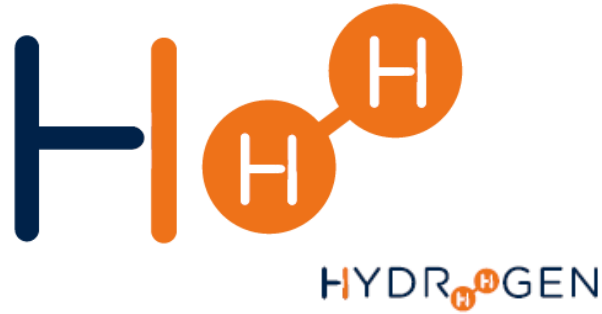
Macro Gas & Power Whole Systems – East Neuk project (with SPEN)



LTS Future Granton to Grangemouth

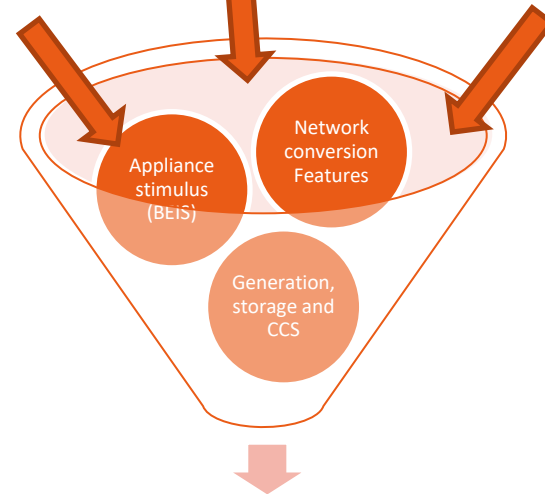


100% H₂ Projects



Construction Demonstration

100% H₂

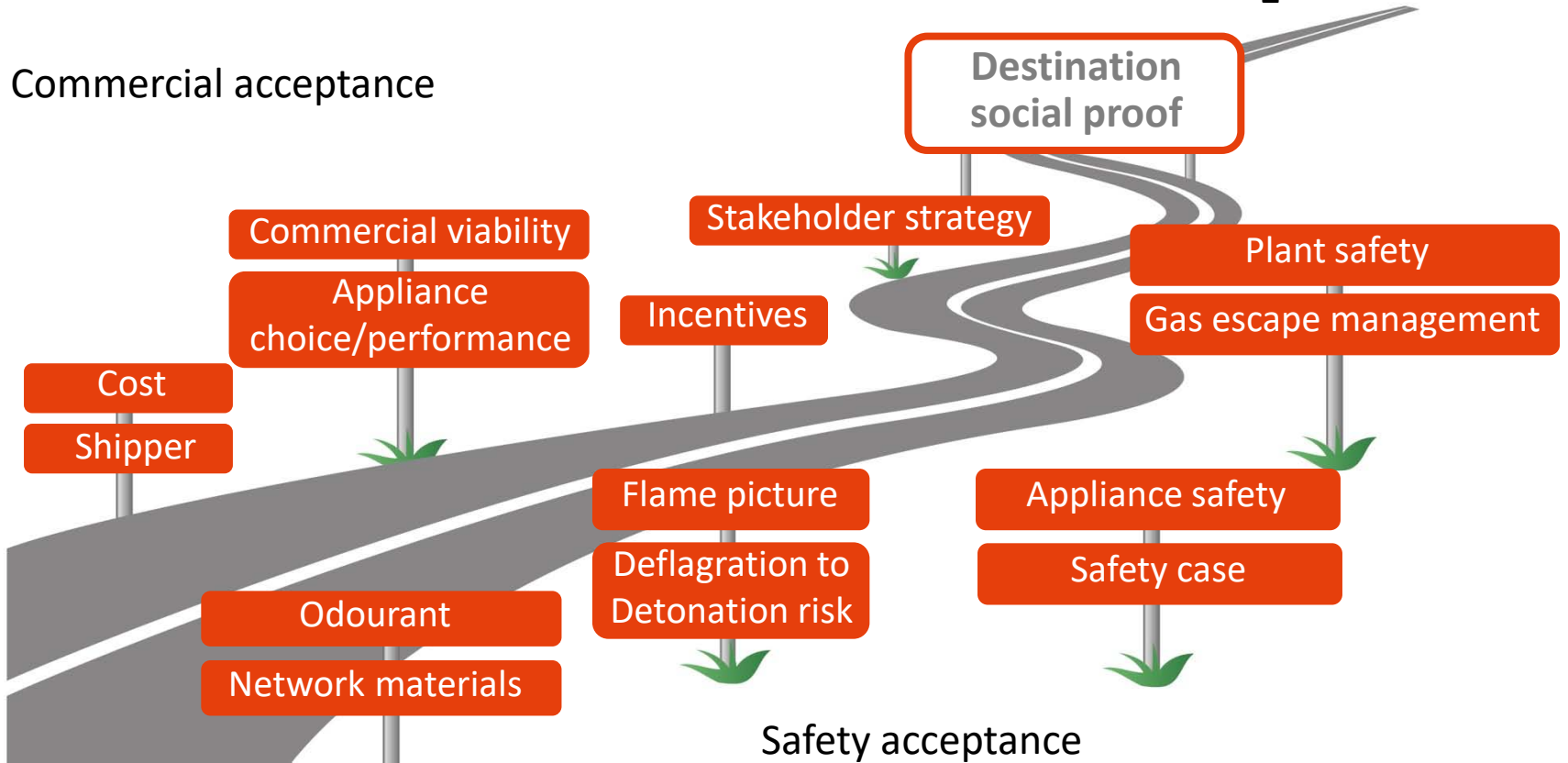


Collaborative Parallel evidence toward conversion

H₂ Road to social proof



H₂ conversion



Levenmouth Innovation Zone



Fife H₂ vehicles



Levenmouth example future vision



- Wind farm expansion
- Neart Na Gaoithe (NNG) wind farm array
- Industrial byproduct expansion (Mossmorran Ethylene Plant, circa 50000 tonnes p/a)
- Hydrogen vehicle fuel (Fife Council)

MACC Business Park and Airport



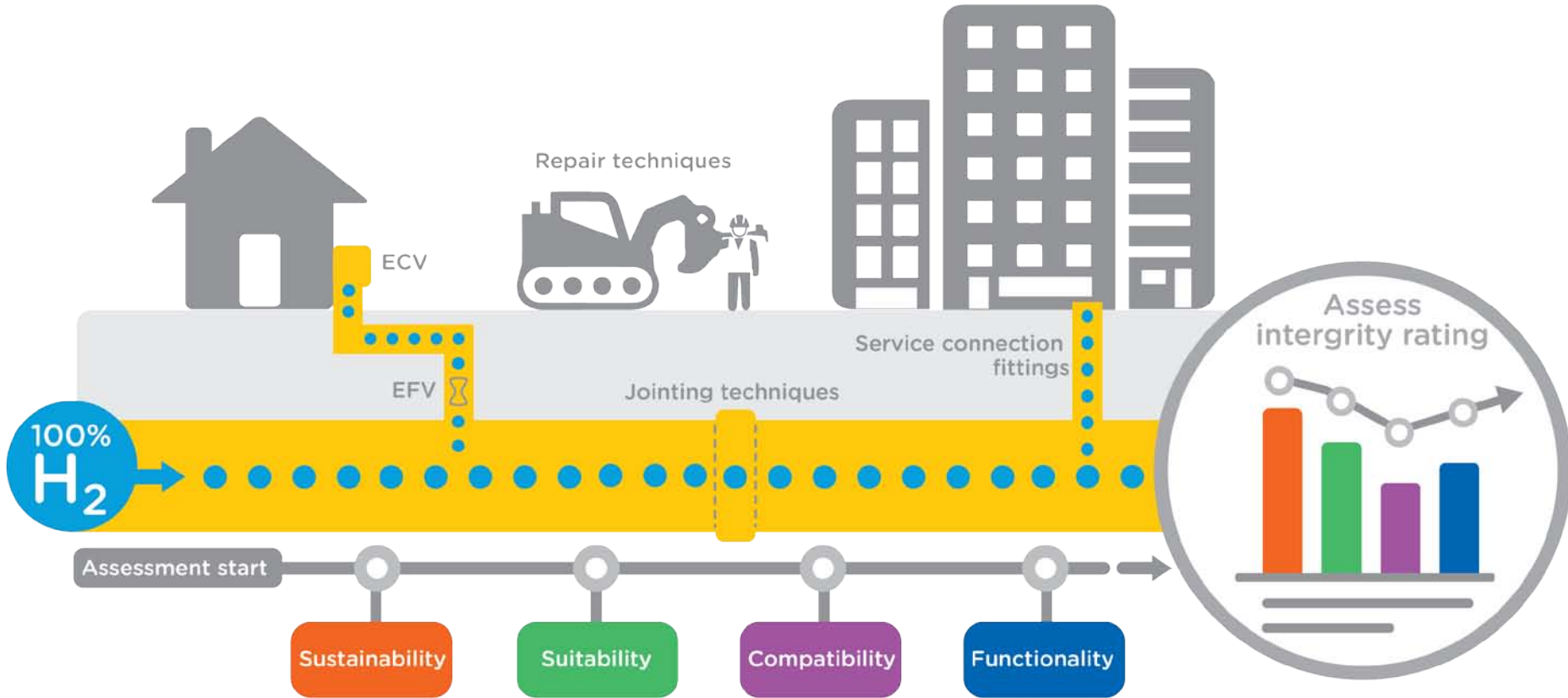
MACC Business Park and Airport



Aberdeen H₂ Buses



Material testing - Hydrogen



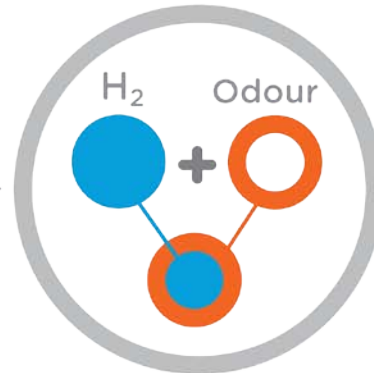
Odorant selection process



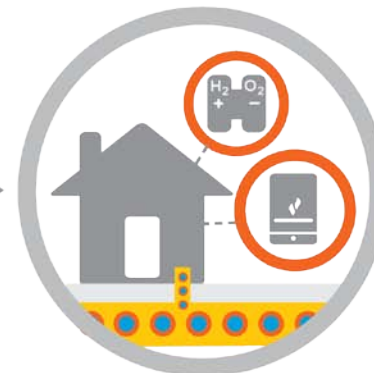
Odour selection



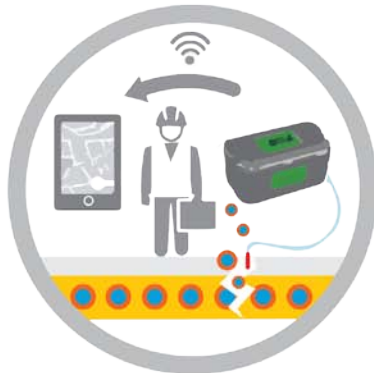
Odourisation



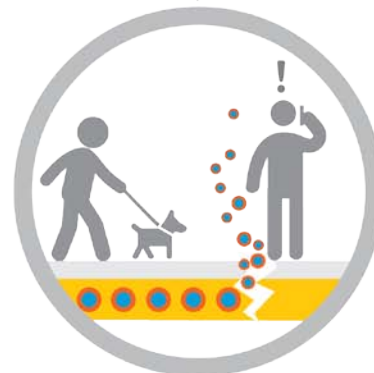
Odour impact on appliances



Repair

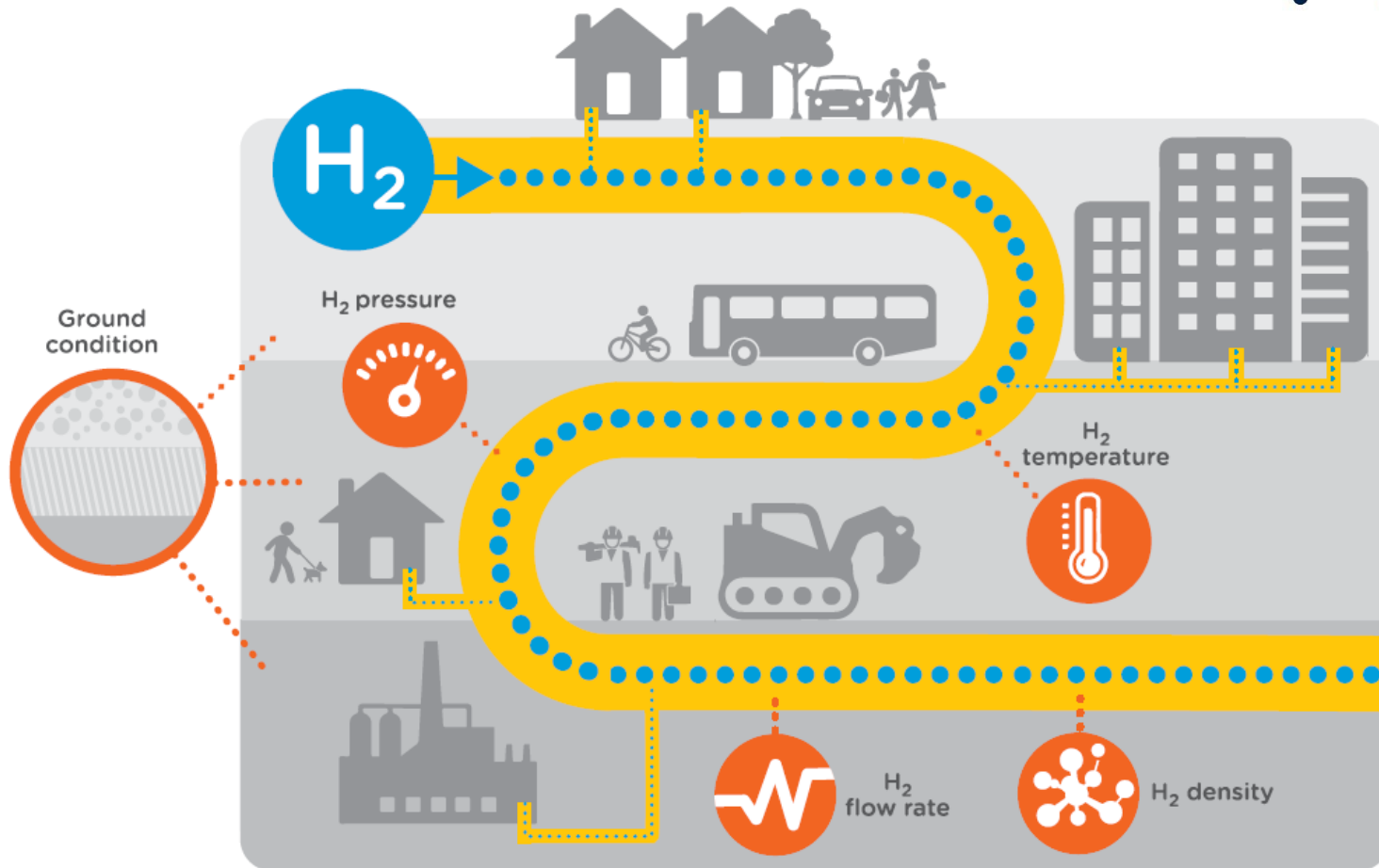


Gas leak detection






Gas leak odour

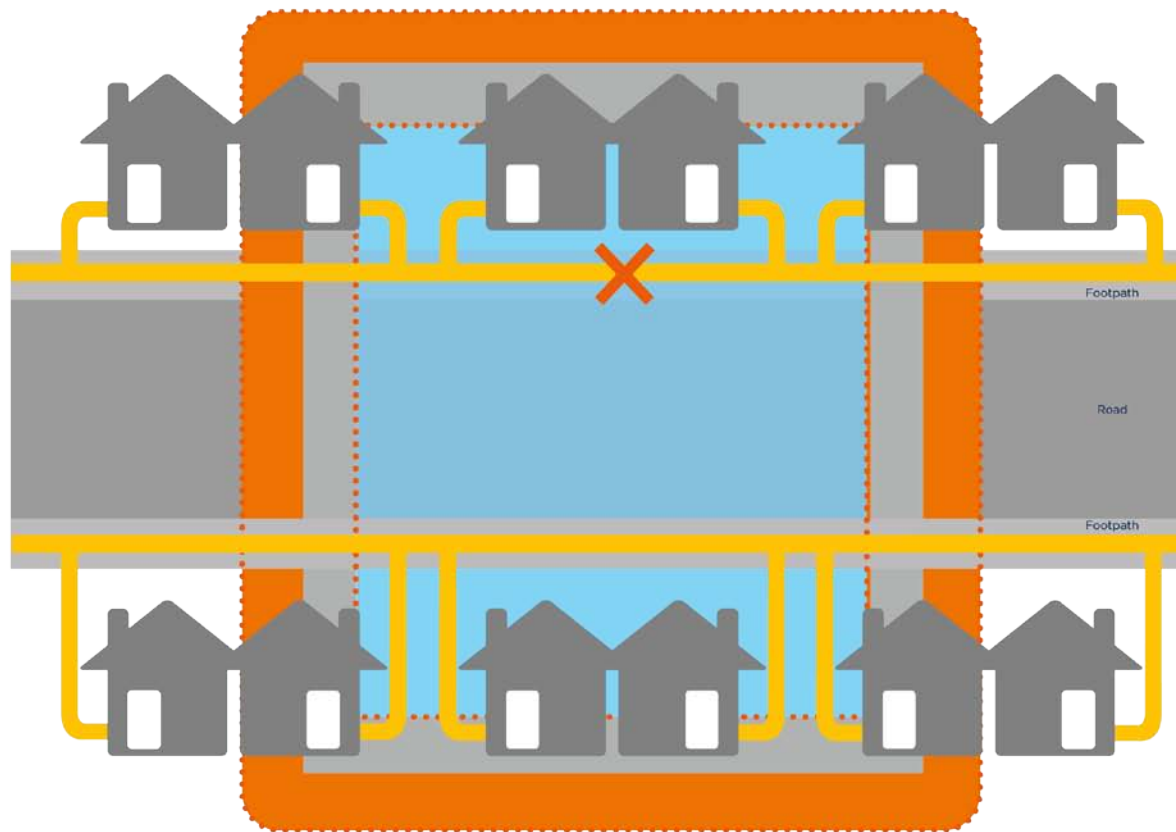
Hydrogen characteristics



Search zone for gas escape



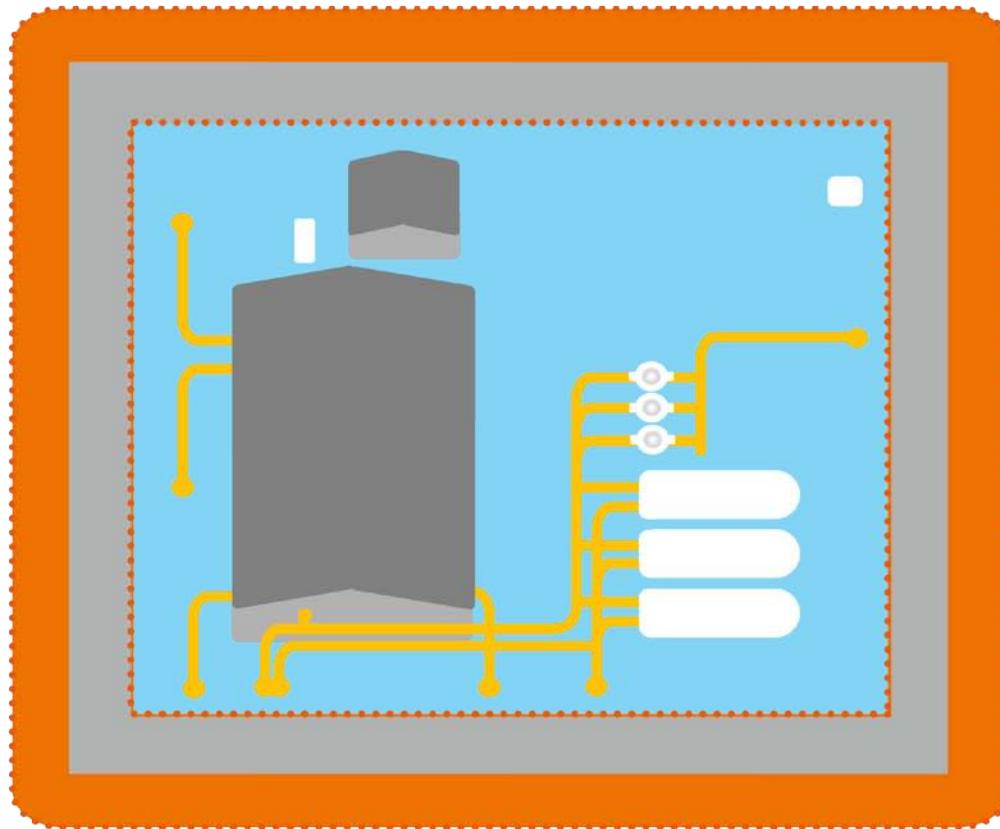
 H₂ search zone?  Natural gas search zone  Gas escape location



PRS Hazardous Area



 H₂ Hazardous Area?  Natural Gas Hazardous Area



Consequence testing



Relative risks to the home



Risk = number of fatalities per million people per year

CO poisoning
from solid fuel
appliance = **9.40**



x 64

Electrocution
in the home = **0.364**

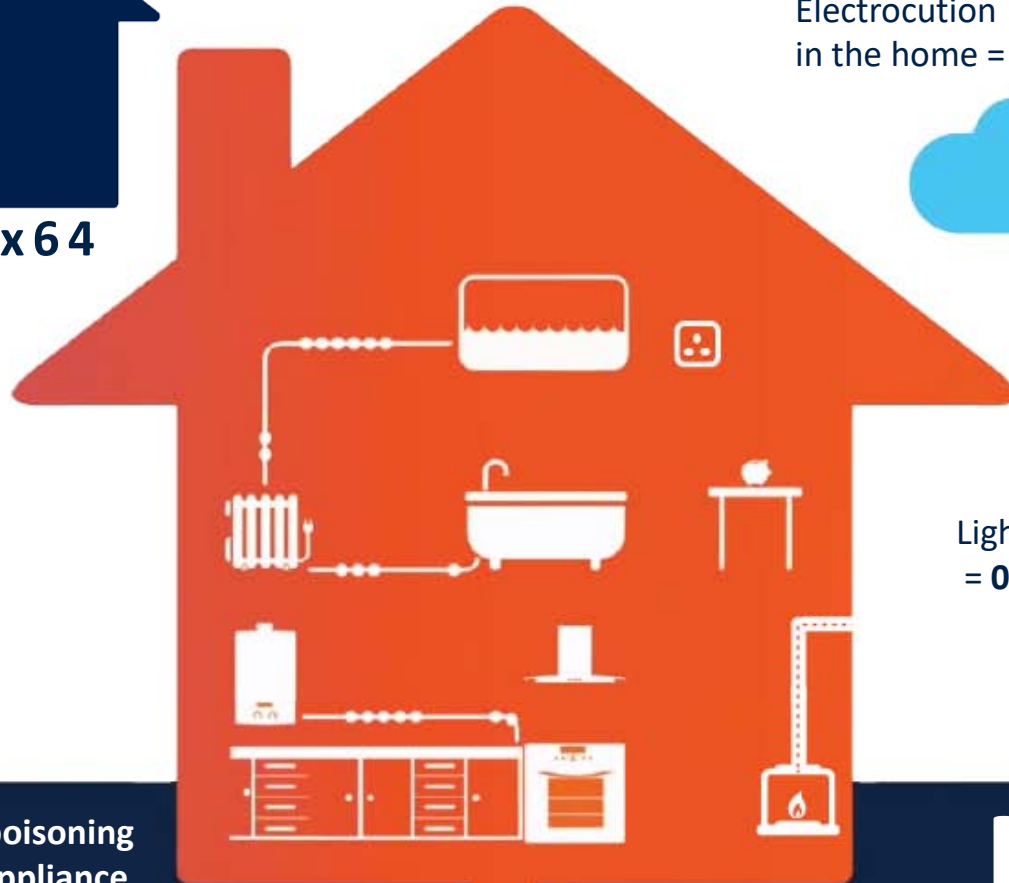


x 2

H₂?



Baseline risk; CO poisoning
from natural gas appliance
at Wobbe Index (WI) of
 $51.4 \text{ MJ/m}^3 = 0.147$



Lighting strike
= **0.0012**



x 123

H₂?

Safety management Framework and Safety Case



Thank you



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Your gas. Our network.