

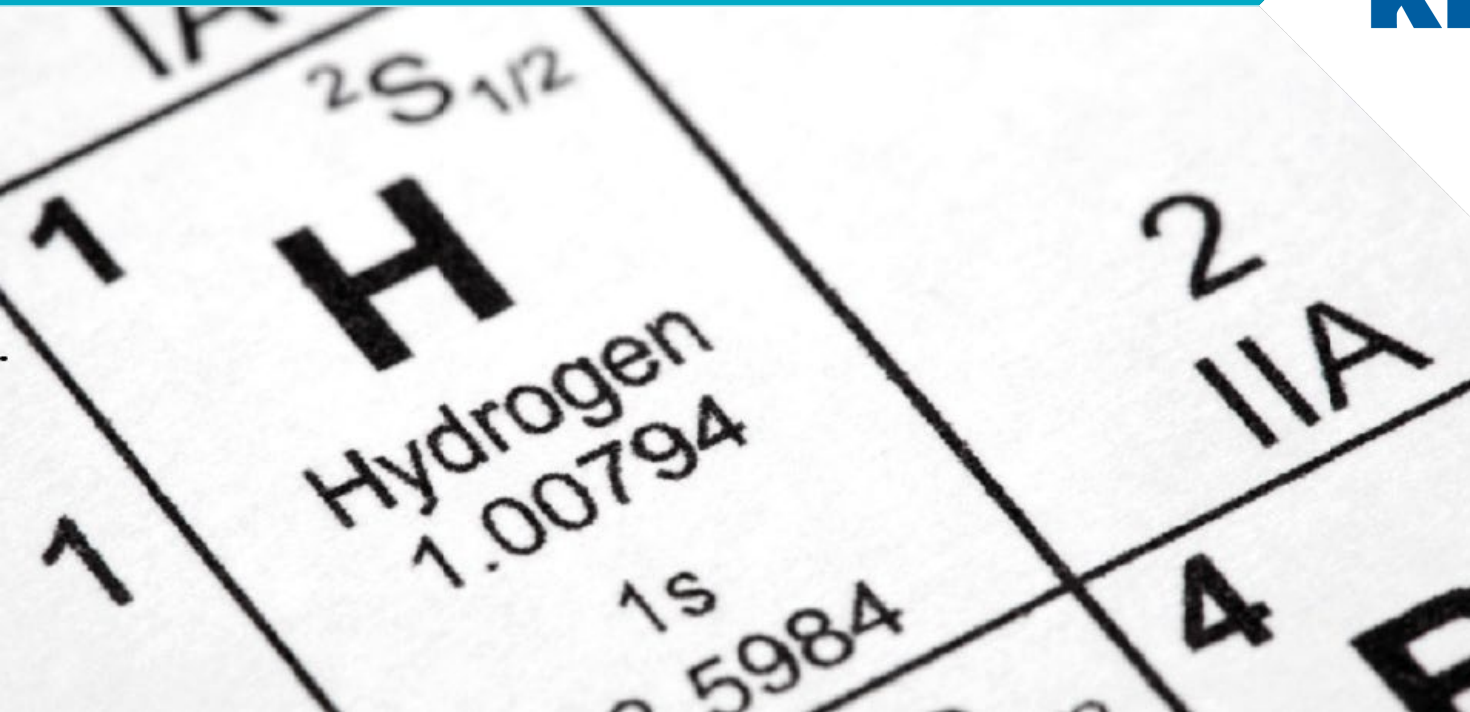
Demonstrating the Potential of Local Hydrogen

16th November 2021

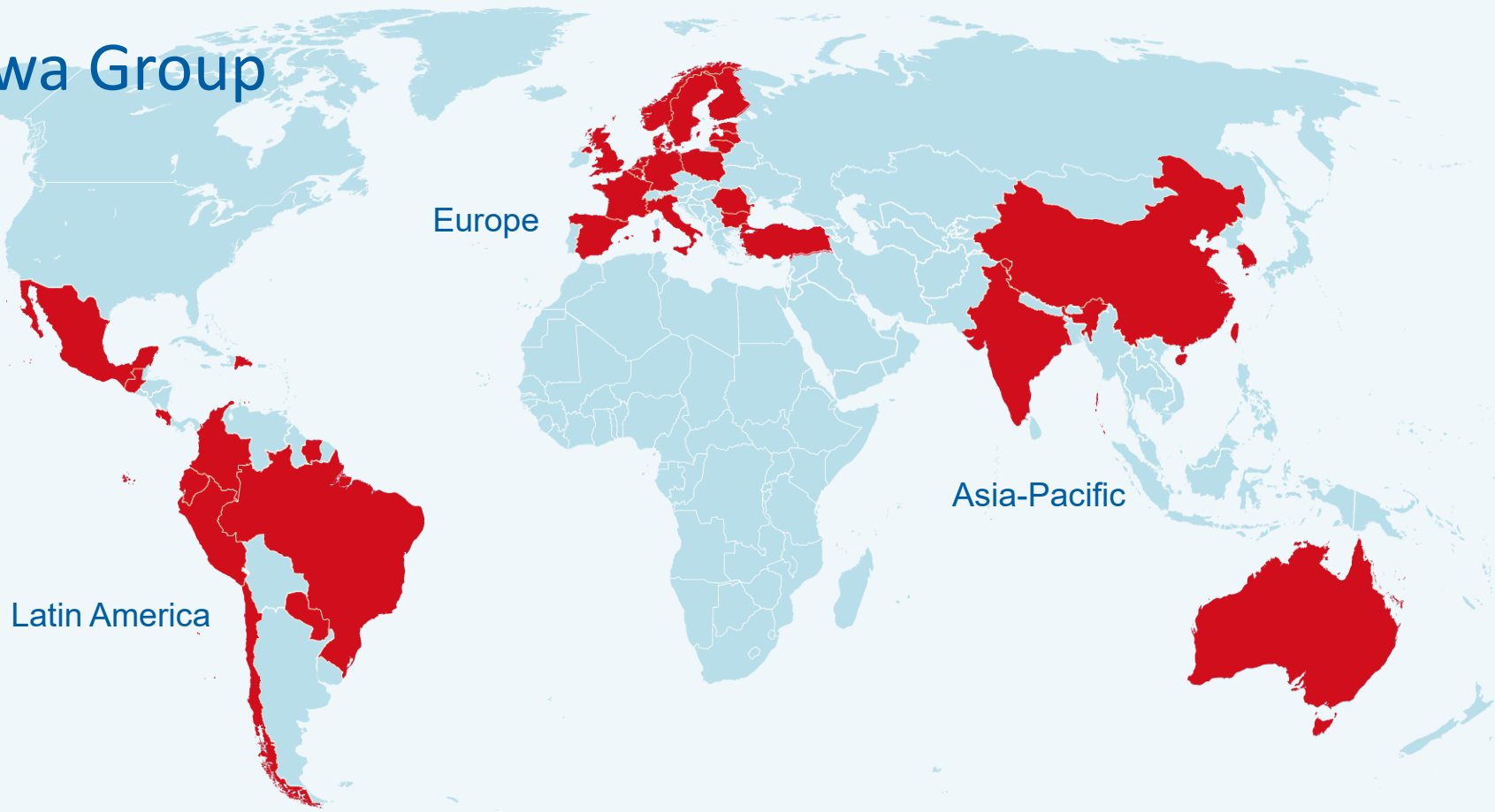


Kiwa Gastec

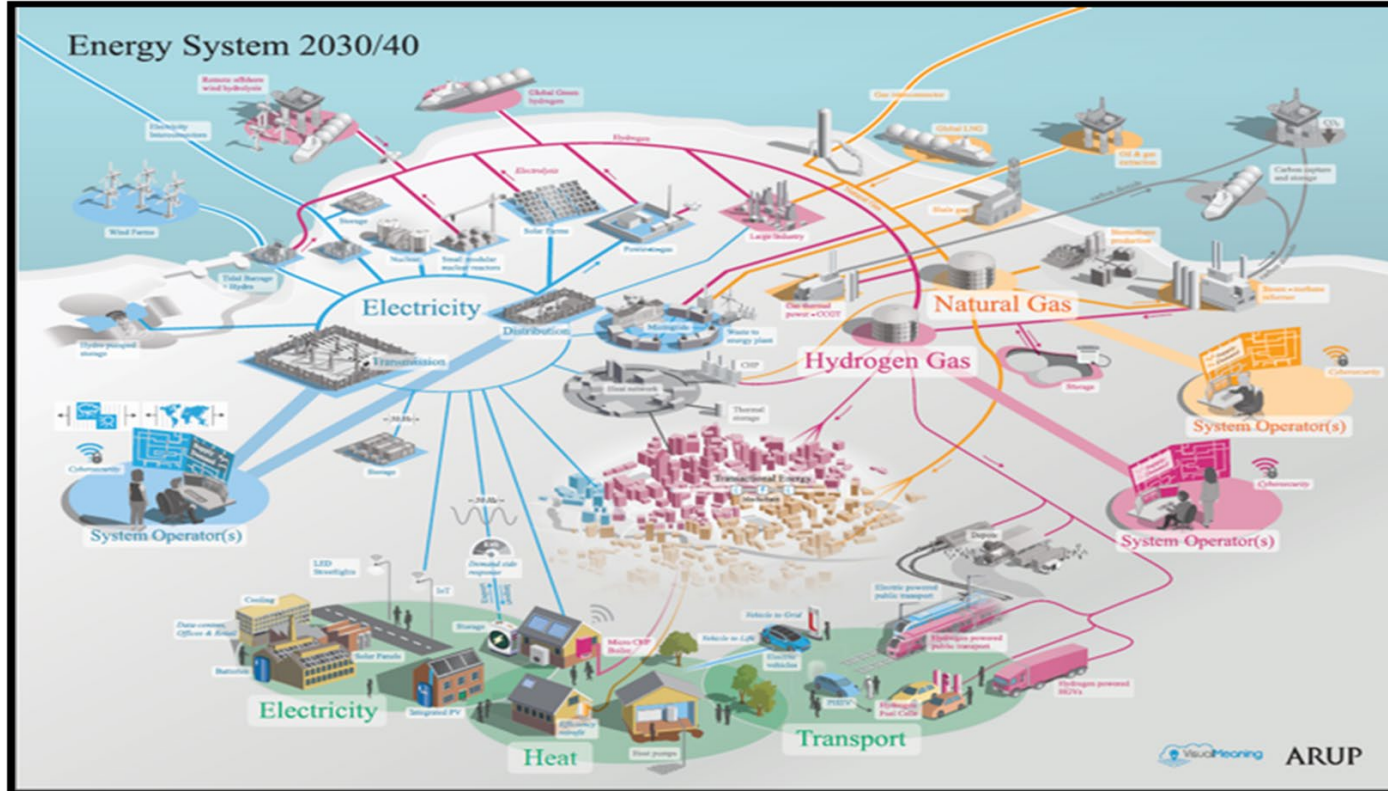
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Kiwa Group



What does the future Energy System look like?



Source: <http://hearyou.imeche.org/docs/default-source/Power-Industries-Division-NW-Centre/imeche-hydrogen-for-decarbonisation-11-dec-final.pdf?sfvrsn=2>

Kiwa's Local Hydrogen Project is a UK first

- The hydrogen plant will be the first to produce biogas-derived hydrogen from a local source
 - It will act as a template for thousands of waste treatment, water treatment and other anaerobic digestion sites to produce hydrogen across UK.
- The pipeline will be the first hydrogen pipeline to be operated under the Gas Act 1986
 - It will create a useful source of real data on the reliability of hydrogen production plants and distribution networks to guarantee security of supply to customers.
- The upgraded labs will be the first to be fed by pipeline quality, odorised hydrogen
 - They will provide appliance manufacturers with a more realistic and cheaper test gas than the bottled gas they currently use.

Local Hydrogen Project Aim and Objectives

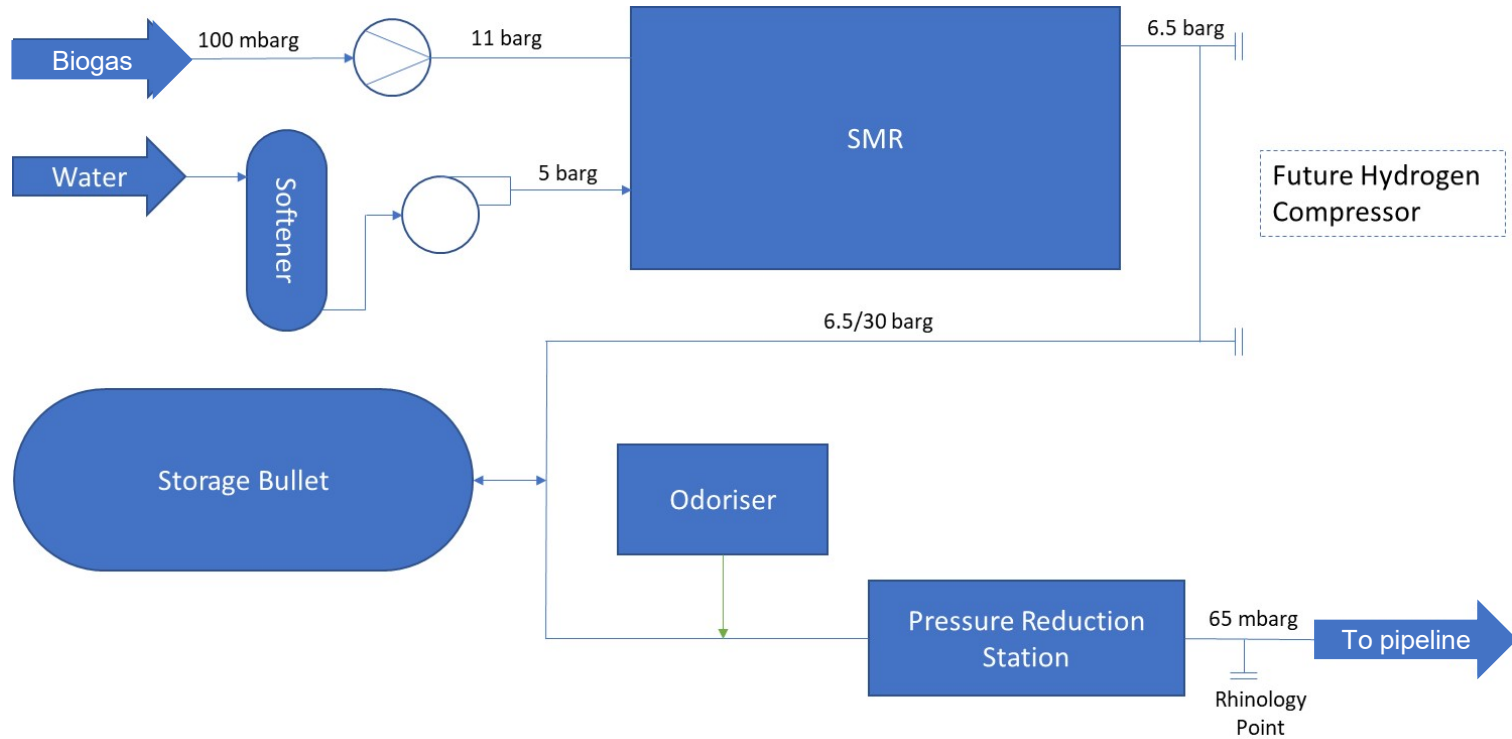
- To provide Kiwa Gastec with a low cost, plentiful supply of hydrogen to facilitate business growth, research & development:
 - Testing, Inspection and Certification of hydrogen products, appliances and systems
 - Demonstration of production of local low carbon hydrogen from biogas and local scale carbon capture and usage technology
 - To provide bulk hydrogen and enable R,D&D on the distribution and local clean-up of hydrogen to fuel cell quality
 - Provide evidence to support UK Government decarbonisation effort (e.g. evidence of operational reliability of local systems helps to understand security of supply)
 - Development of hydrogen expertise within Kiwa Gastec
 - To provide a secure, localised energy supply to Kiwa House

Production & Storage – Technical Specs

- Biogas is reformed to produce hydrogen
- 100Nm³/h or 300kW hydrogen output
 - Site could be expanded to 900kW
- Nominal biogas consumption of ~ 480kW
- Efficiency greater than 60%
- Generated hydrogen stored in bullet with a capacity of 106m³ at up to 30 bar
 - 3,180 Nm³ or 9,540 kWh of hydrogen storage
 - 318 boiler running hrs (30kW boiler) stored



Production & Storage – Process Flow Diagram



Hydrogen, Natural Gas & Test Gases in Test Labs



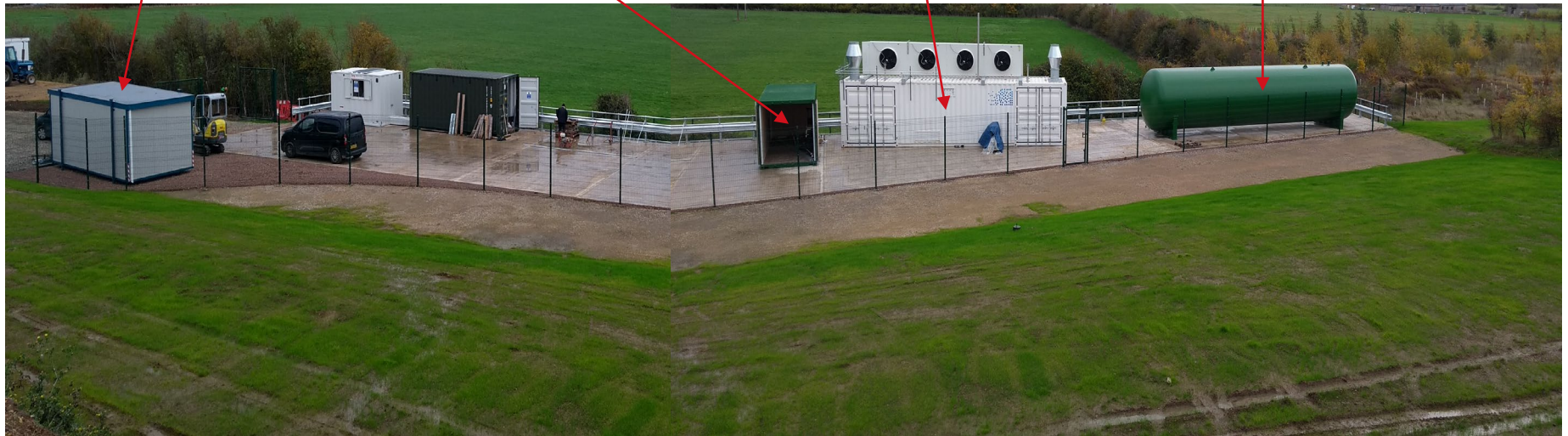
Production Site – panoramic view

Site office

Services Cabin

Production (SMR)

Storage Bullet



There is interest in both ends of the pipe

■ Upstream Opportunities

- Learning about local hydrogen production and distribution
- Providing evidence for organisations such as IGEM, OFGEM, HSE and network operators on how to modify existing practices, regulation and standards to accommodate hydrogen
- Providing evidence to UK Government on costs of local clean up of pipeline hydrogen for refueling compares with local production of pure hydrogen
- Assessing technical and economic feasibility of CCUS at this scale
- Scope for expanding production if required

■ Downstream Opportunities

- Accelerated lifecycle & functional testing of hydrogen fueled products, appliances & systems
- Staff training on hydrogen installations and pipelines
- Demonstrating hydrogen heating of a commercial premises

Thank you



Kiwa Gastec

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