Net Zero levels of innovation: what needs to happen?

Accelerate Net Zero energy innovation

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October 2024

To have a chance of meeting Net Zero we must implement, innovate and integrate low carbon technologies. Now…

Implement

Implement **low regret investment decisions** and technology choices.

Innovate

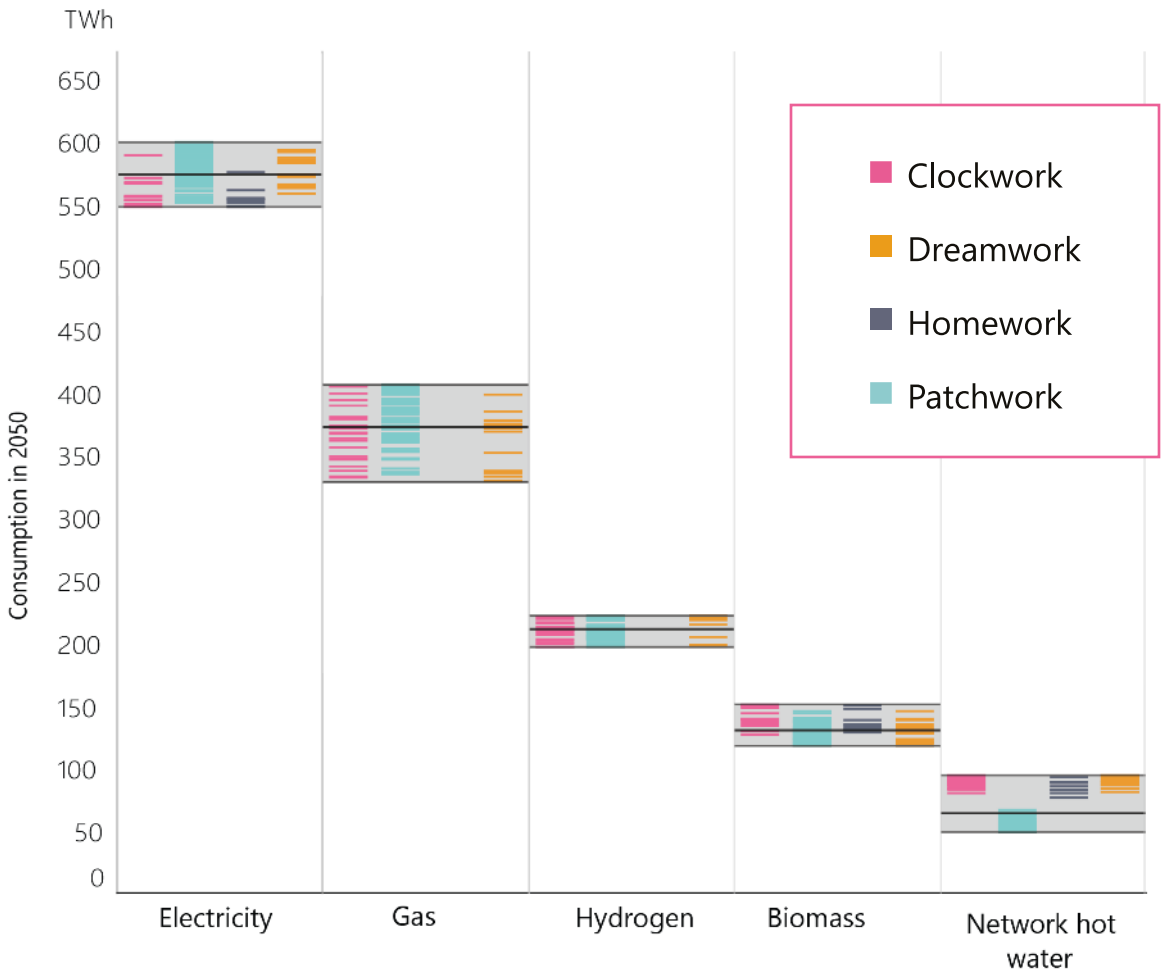
Reaching Net Zero at least cost to consumers requires significant deployment of unproven technologies. **We need to fast track innovation now.**

Integrate

Our energy system design and operation must be integrated across space, time, scale, energy vectors and systems.

Multi-vector energy systems cost less – all energy vectors have valuable roles to play

- We could reach Net Zero at less than 1% GDP
- **Power**: Reaches double the size of our current system in 2050
- **Space heat**: Mostly electrified in 2050 with hybrid heating systems providing important system value in the transition. Step change in heat network ambition to city-scale.
- **Transport:** Electrifying cars and light goods vehicles is no regret. Many areas requiring critical innovation across heavy goods, freight and aviation.



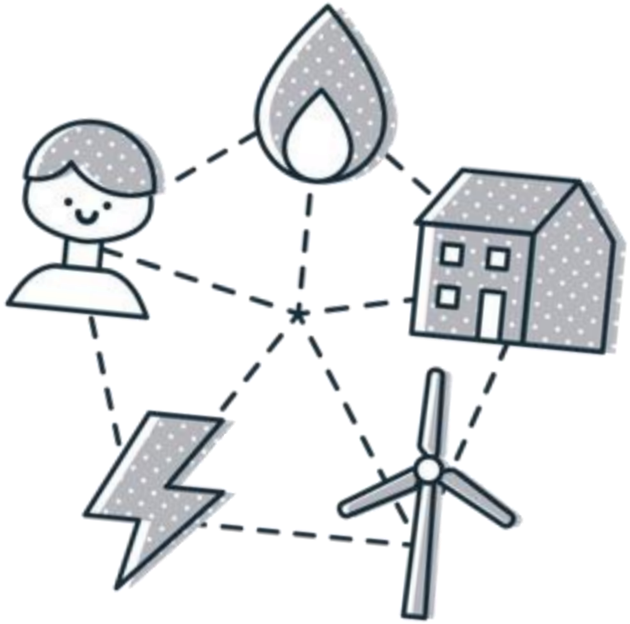
Our expertise – whole systems thinking

Joining up the system from sources of energy to the consumer

Generation + Transmission + Distribution + Buildings + Consumer

Breaking down silos between different parts of the energy system

Electricity + Heat + Transport



Joining up physical requirements of the system, with policy, market and digital arrangements

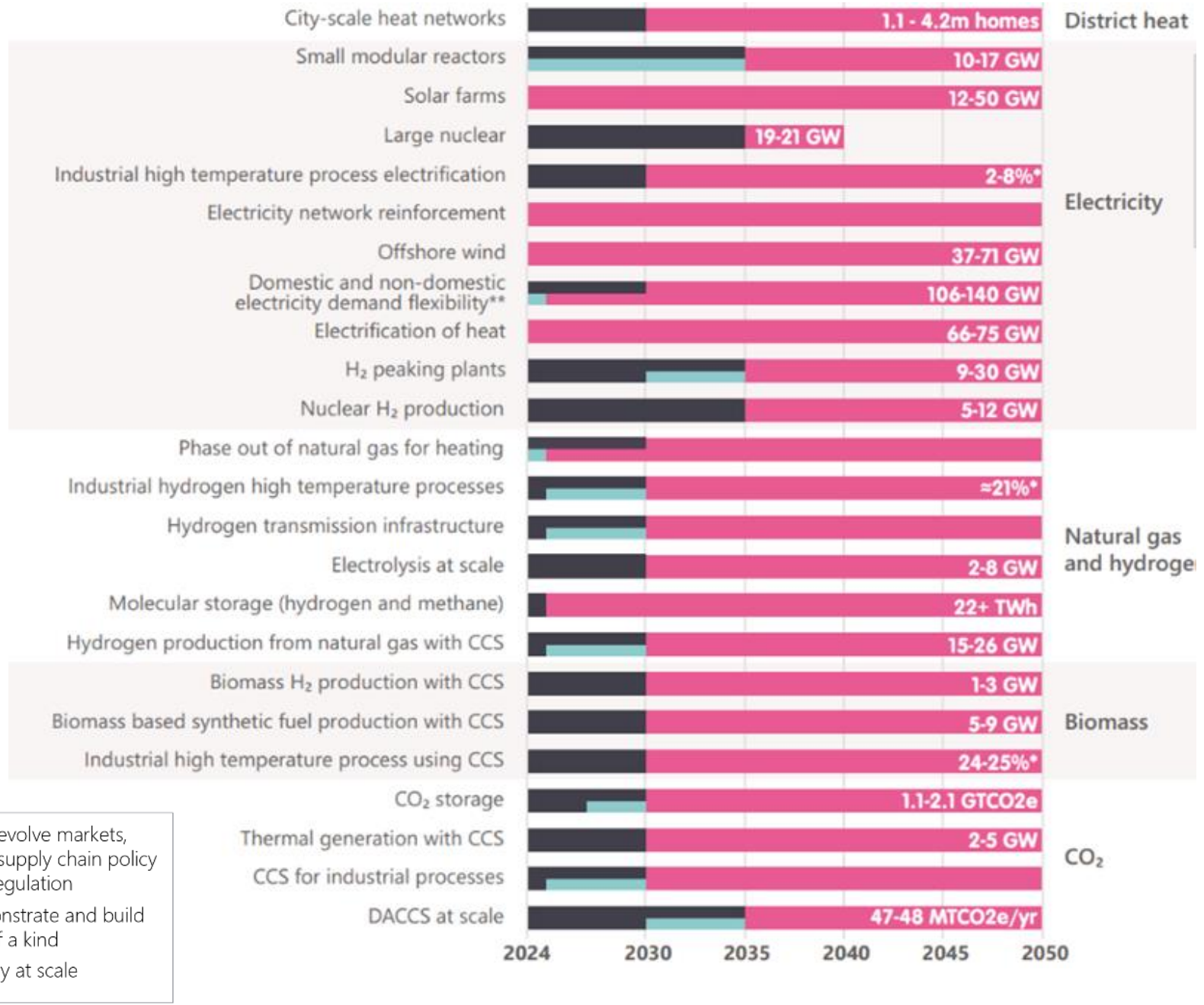
Physical system + Digital system + Market system + Policy

Implement – at pace

We have 26 years until we need to have delivered Net Zero

There are **established low regret technologies that we should implement now at even faster pace:**

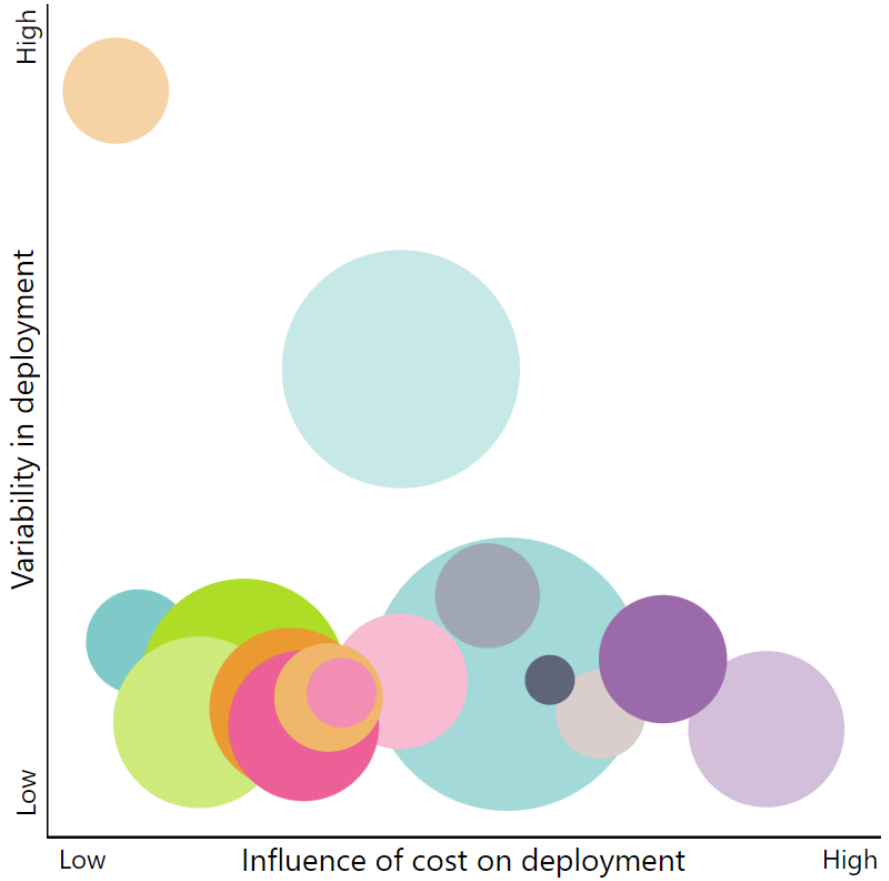
- Solar farms and offshore wind
- Electricity network reinforcement
- Heat pumps
- Build more molecular salt cavern storage
- Town-city scale heat networks
- Large scale nuclear

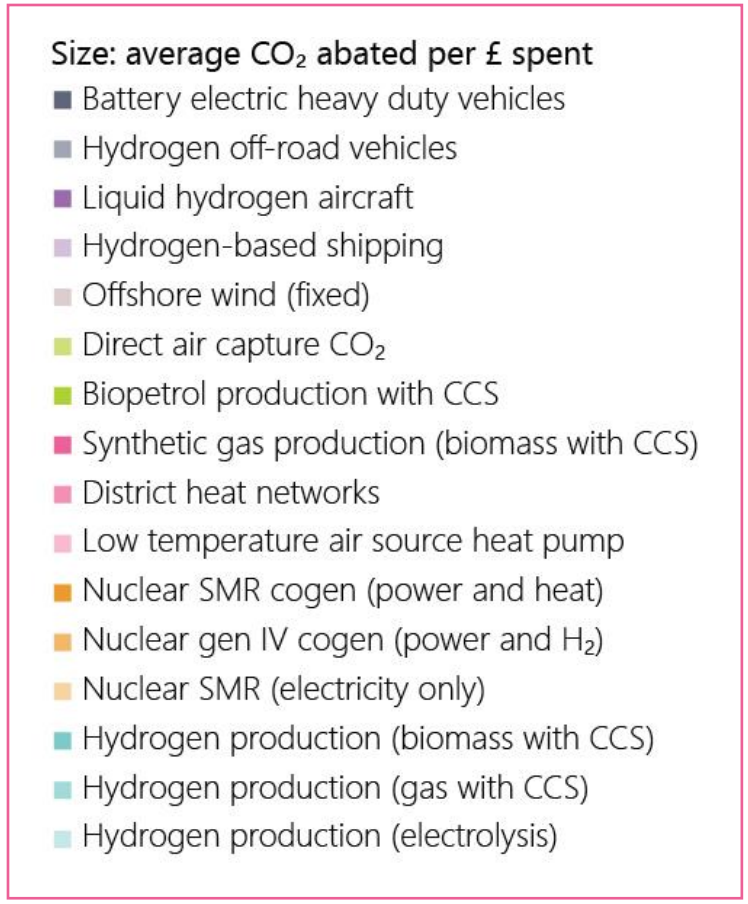


Innovate – fast-tracking innovation in technologies that we know can create system value

Key innovation areas include:

- Hydrogen production
- Maritime
- Liquid hydrogen in aviation
- Small modular reactors
- Hydrogen off-road vehicles
- Battery electric heavy duty vehicles
- Carbon capture technologies





Integrate – whole system approaches will create opportunities, making Net Zero affordable and deliverable

Plan

Design to meet peak demands throughout the transition

Integrate planning at local, regional and national scale

Design systems that work for the most vulnerable

Enable

Develop markets and incentives that reflect the physics of the future energy system and provide long-term clarity to investors and companies

Create the digital infrastructure and data flows that underpin a more complex system

Switch to a more agile and outcome-based energy policy and regulatory framework

Build and Operate

Investment in UK supply chains and skills is vital

Enable cross-vector operation via markets, regulations and control systems

Maximise the opportunities to the UK economy by **capturing the high value parts of supply chains** in emerging sectors

Thank you

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