



Department for Business, Energy & Industrial Strategy

Transforming Heat – An Innovation Perspective

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Transforming Heat – An Innovation Perspective

1. Introduction

2. Clean Growth in the Industrial Strategy

3. BEIS Innovation Programme

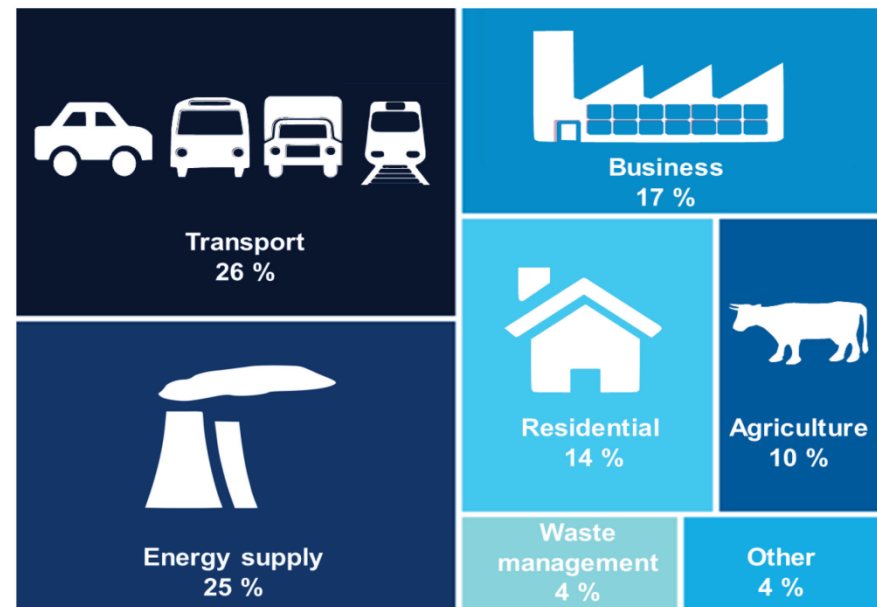
4. Transformation of Heat – Innovation Projects

5. Conclusions

Delivering against the Climate Change Act

- UK **Climate Change Act** sets a decarbonisation target of at least 80% by 2050 - the path to this target is based on 5 year carbon budgets. We are in the 3rd carbon budget, and at almost 40% decarbonisation (against 1990 baseline level).
- Over same period UK GDP has grown by 67%, so growth and emissions can be decoupled.
- Energy use, including transport, accounted for more than 80% of UK greenhouse gas emissions in 2016 – so it's a primary area to target for emission reductions.
- Achieving our targets with current technologies at current costs will be extremely difficult.

Transport becomes the largest emitting sector of UK 2016 greenhouse gas emissions



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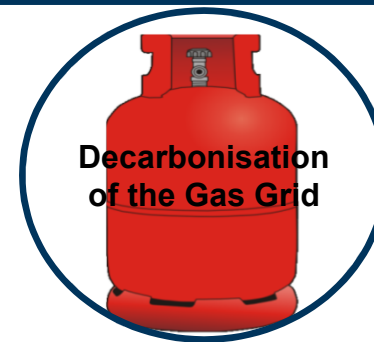
Longer term policy perspective

Meeting our 2050 targets implies decarbonising nearly all heat in buildings and most industrial heat processes.

We know there are some no-regret measures but more work is needed to understand the advantages and disadvantages of different approaches for the longer-term decarbonisation of heat.

The Department is undertaking work to strengthen the analysis of the range of potential approaches to decarbonising heat.

We have published findings from a number of studies, and will publish the remainder later this year.



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Industrial Strategy

We will create an economy that boosts productivity and earning power throughout the UK:



We will set Grand Challenges to put the future of the UK at the forefront of the industries of the future:



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Clean Growth Strategy

The **Clean Growth Strategy**, published by BEIS in October 2017

- Sets out government policies and proposals for decarbonising the UK economy through the 2020s;
- These proposals fall into eight areas:

**Accelerating clean growth;
Improving Business and Industry Efficiency;
Improving Our Homes
Accelerating the Shift to Low Carbon Transport
Delivering Clean, Smart, Flexible Power
Enhancing the Benefits and Value of Our Natural Resources
Leading in the Public Sector
Government Leadership in Driving Clean Growth**



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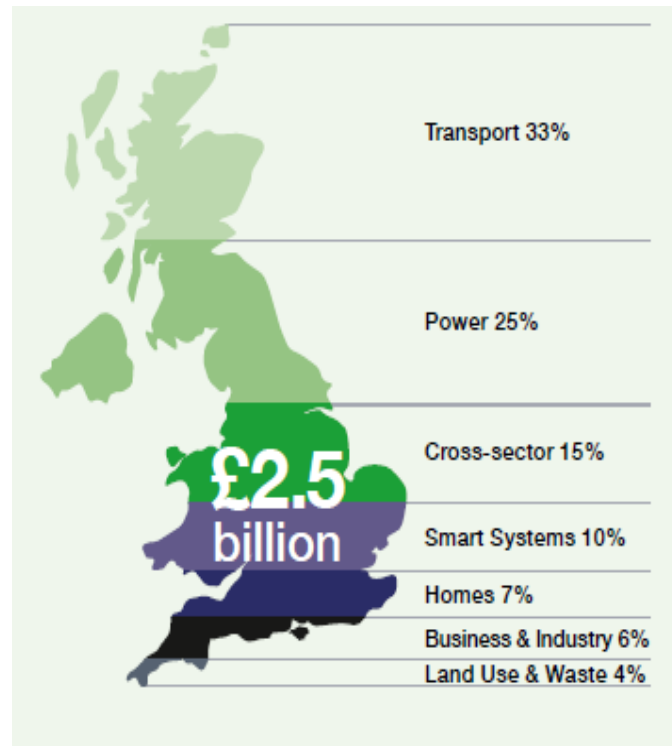
<https://www.gov.uk/government/publications/clean-growth-strategy>

And the key to our long term strategy is innovation



The Strategy sets out, for the first time, where Government funding is targeted

Over £2.5 billion of Government funding will be invested in low carbon innovation up to 2021, part of the largest increase in public spending on science, research and innovation in over 30 years.



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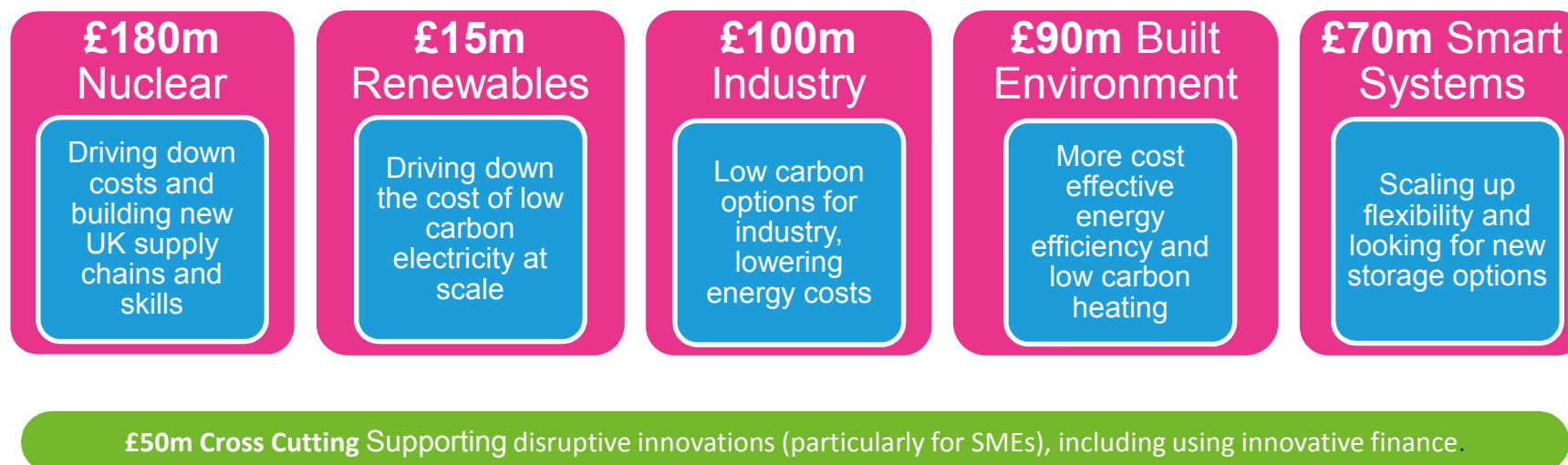
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BEIS Energy Innovation Programme

The overall aim of the BEIS Energy Innovation Programme is to accelerate the commercialisation of innovative cheap, clean, and reliable energy technologies by the mid 2020s and 2030s.

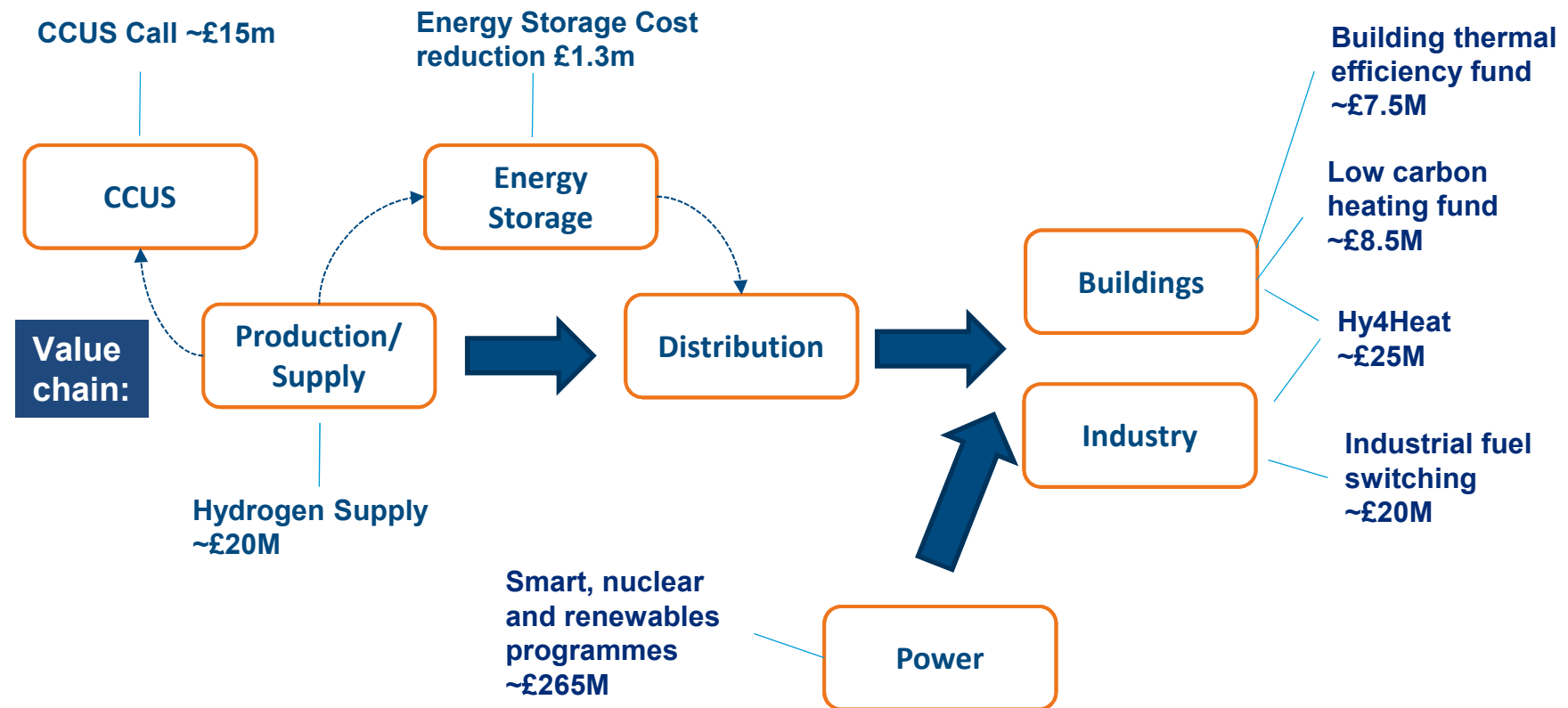
- Within each theme the budget is allocated to a mix of development and demonstration projects focused on specific objectives, underpinned by a programme of open, cross-cutting support
- This programme has a steep spend trajectory to 2021, and will be challenging to deliver in the compressed time frame.



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Innovation to transform the way we heat our homes and businesses



Stimulating innovation in low carbon heating technology

- £10 million call for innovative proposals for low carbon heating technology
- 8 successful projects shared £8.5 million of grant funding to develop their solutions
- Wide range of technologies including:
 - Smart electric heat – a mass market drop in replacement for central heating incorporating energy storage coupled to control software
 - A hybrid solar thermal/PV/heat pump energy storage system to provide heat and power to properties
 - Flexicell – an integrated micro-CHP, air source heat pump, energy storage and smart control system
 - Adsorption gas heat pump - the next generation of domestic gas boiler using at least one third less gas than a normal boiler but behaving in a similar way

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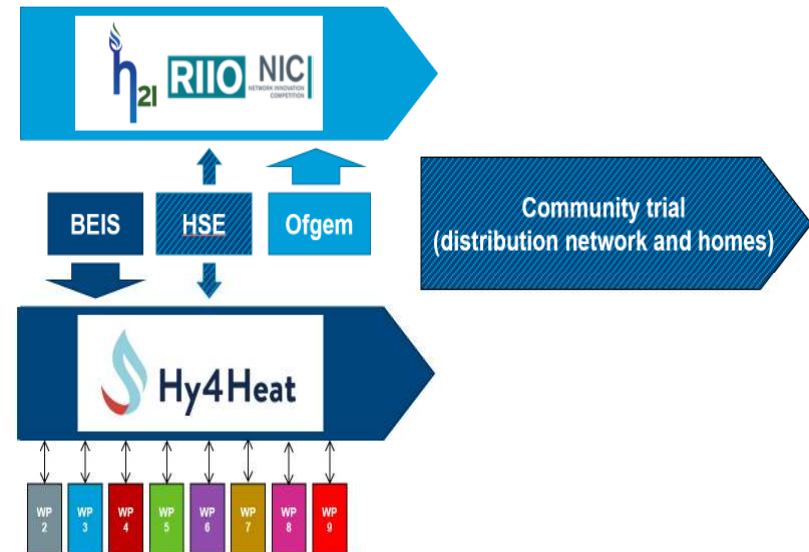
Stimulating innovation in building thermal efficiency

- £10 million call for innovative proposals for thermal efficiency technology
- 12 successful projects shared £7.5 million of grant funding to develop their solutions
- Wide range of technologies including:
 - Development and provision of energy services to customers that reduces the cost and hassle of running a home
 - Develop and pilot a Whole-House approach to retrofit and release toolkit for industry use across the UK
 - A solution to measure, predict and optimise energy consumption in commercial buildings adopting a complete “whole building approach” to drive down costs
 - Retrofit optimisation using data collected from a low cost, smart Thermostatic Radiator Valve

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De-risking the hydrogen pathway

- £25m innovation programme to de-risk the use of hydrogen in buildings – Hy4Heat
- Arup+ team acting as programme management contractor, competitions for best athletes to undertake work packages
- Output will be a range of hydrogen appliances that are safe to use in peoples homes
- Parallel £10m programme delivered by Gas Distribution Network Operators to de-risk use of hydrogen in the gas distribution network – H21
- Potential following successful completion of both programmes in 2021 to undertake a community trial / demonstration

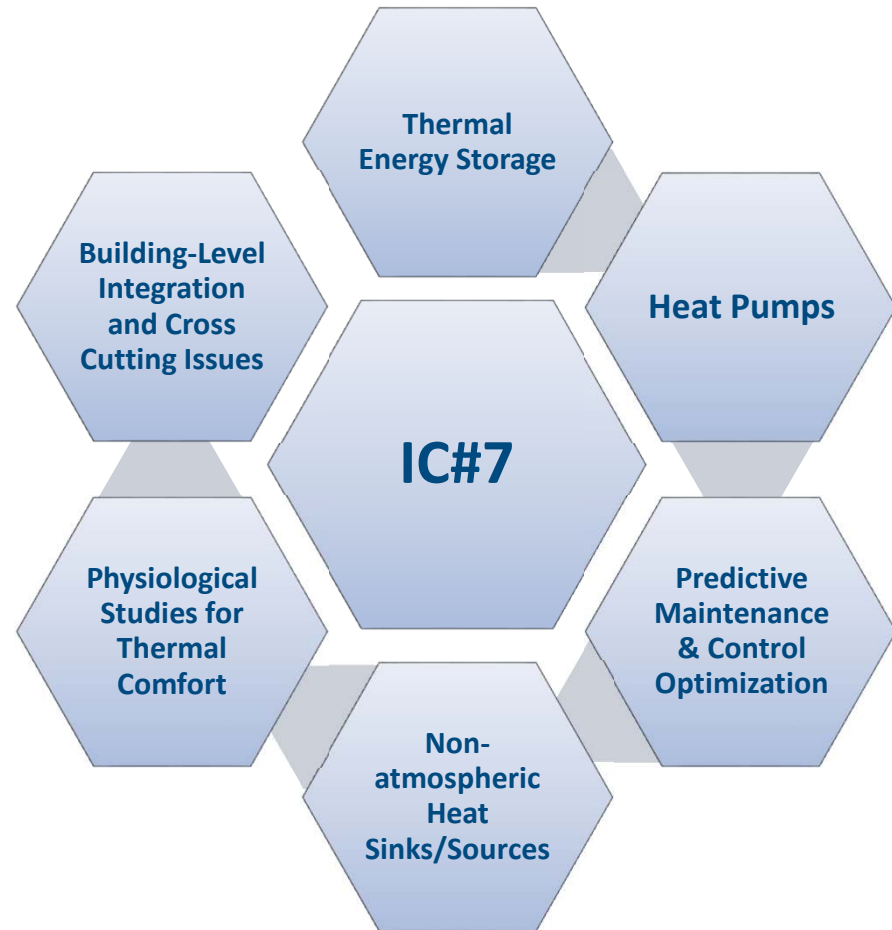


Industrial Fuel Switching

- £20m innovation competition launched aiming to stimulate early investment in fuel switching processes and technologies
- Ensure a range of technologies (including hydrogen, biomass and clean electricity) are available by 2030 and beyond
- Element Energy / Jacobs consortium appointed to deliver Phase 1 focusing on market engagement and understanding the scope for fuel switching in industry
- At the end of phase one (Autumn 2018) suitable projects will be identified for demonstration funding

International Programmes - Mission Innovation Affordable Heating and Cooling for Buildings

- Mission Innovation is an international initiative to accelerate innovation in clean growth.
- 23 Nations plus EC involved and pledged to double their spending on Innovation by 2021
- UK Co-leads Innovation Challenge #7 on affordable heating and cooling of buildings
- Strong focus on heating and cooling technologies
- Encourage UK researchers and industry to get involved



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Conclusions

- Clean Growth is at the heart of the Industrial Strategy
- Innovation is the means by which we can deliver clean growth
- Transforming heat represents one of the UK's biggest energy challenges
- No decisions have been made on best pathway – a work in process
- No silver bullets – many solutions will have a role to play
- Transformation needs to happen at many levels – products, systems and processes



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Find out more at:

<https://www.gov.uk/guidance/energy-innovation>

