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Heat and Energy Systems

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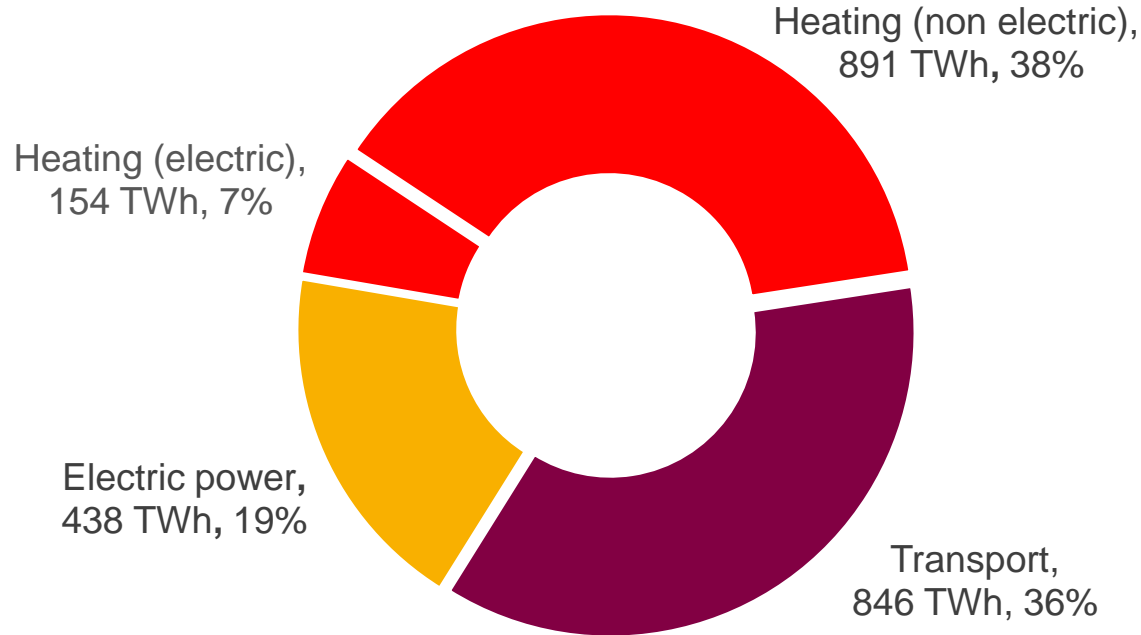
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What do we use energy for...?

45% goes into heating



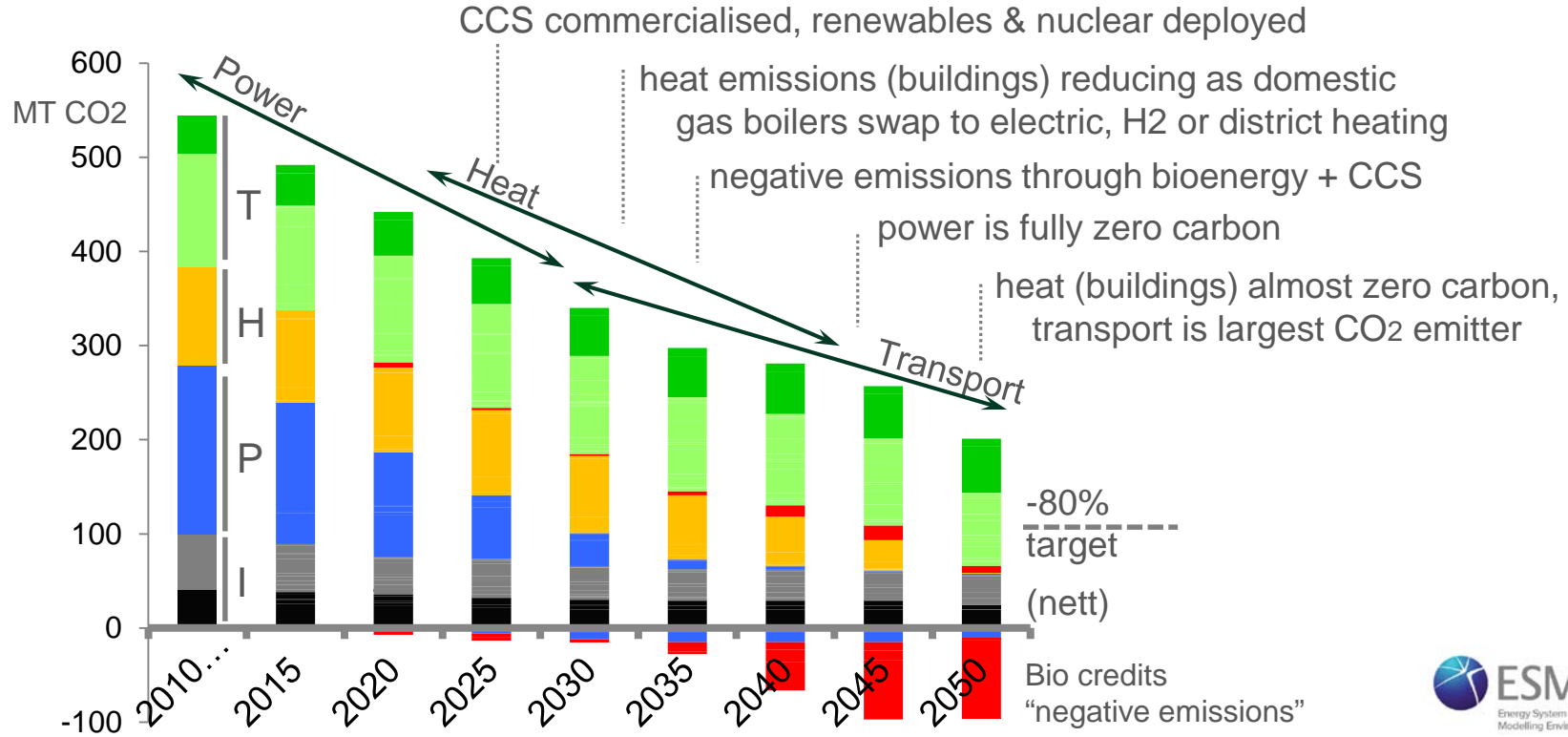
“On average, households use 80% of their energy for heat and hot water”

ETI SSH insight 'consumer challenges for low carbon heat' 2015



An emissions reduction plan

Power now, heat next, transport gradual – cost optimal





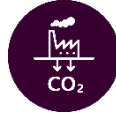
Priorities to 2030



Decarbonising electricity



Nuclear
CCS (gas / biomass)
Wind
Interconnectors



Proving CCS in UK context



Power
Heat
Industry
Hydrogen



Testing 'next step' options



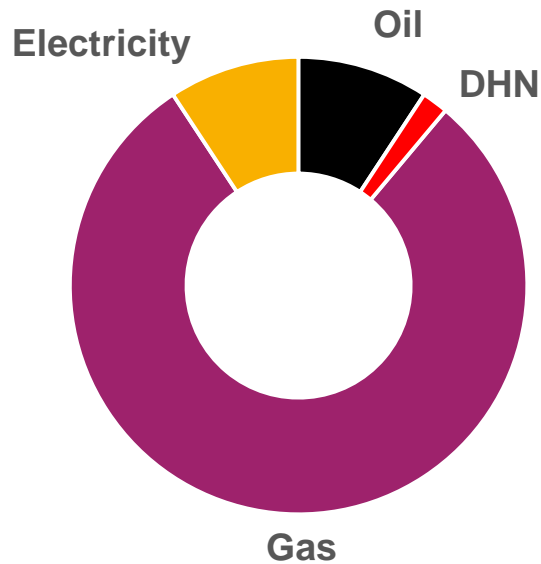
Low carbon heat
Smart Systems
Bioenergy
Small Modular Reactors
Low carbon heavy transport

+ efficiency
+ storage

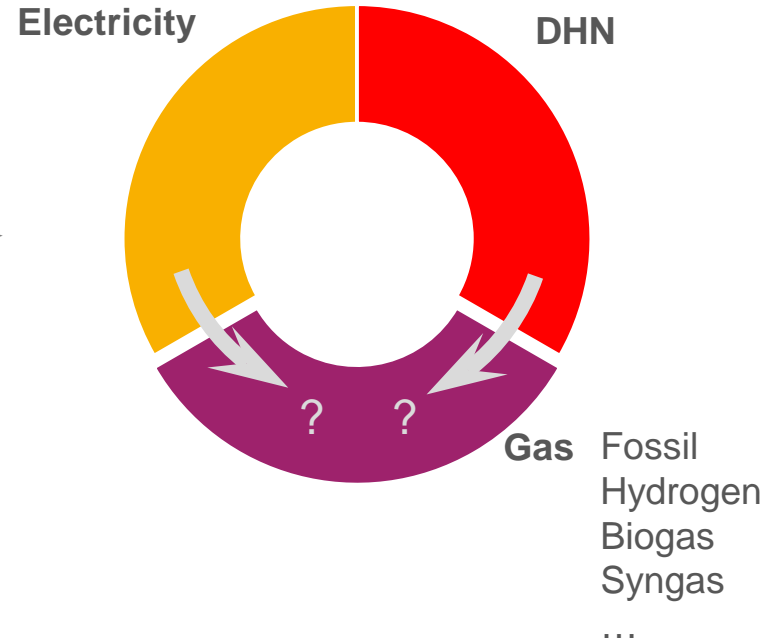


Heat - now and in the future

Today...



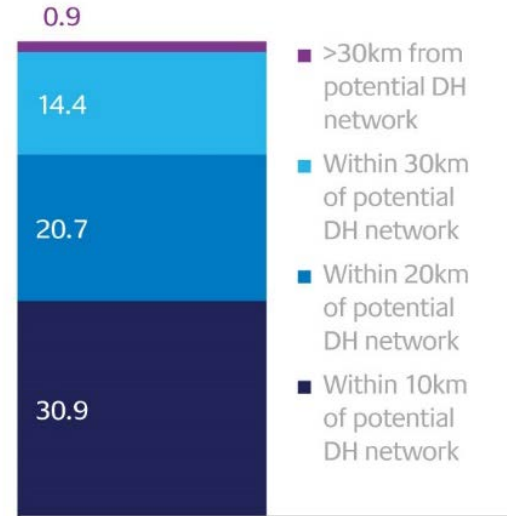
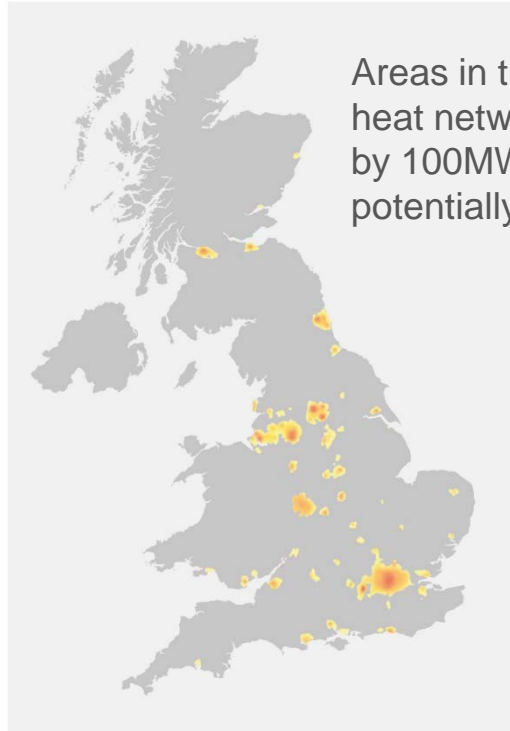
Cost optimal 2050...





Which system to pick...?

Resource driven – potential waste heat supply from power plants



SITE CAPACITY (GWE)

Almost 50% of potential UK SMR capacity could be within 10km of potential district heat networks

From ETI Powerplant Siting studies and Alternative Nuclear Technologies project 2016



Which system to pick...?

Infrastructure driven – integration with UK housing types



Pre 1919 Converted Flat

690,000 homes
4,250,000 tCO₂



Pre 1919 Detached

780,000 homes
13,940,000 tCO₂



Pre 1919 Mid Terrace

2,090,000 homes
13,450,000 tCO₂



1919-44 Semi Detached

1,920,000 homes
13,820,000 tCO₂



1945-1965 Semi Detached

2,040,000 homes
12,850,000 tCO₂



1965-1980 Bungalow

780,000 homes
4,880,000 tCO₂



1965-80 Low rise flat

1,050,000 homes
3,580,000 tCO₂



1965-80 Detached

1,050,000 homes
9,360,000 tCO₂



Post-1980 Detached

1,840,000 homes
12,720,000 tCO₂



Which system to pick...?

Consumer value driven – we all value different benefits

People use heat to clean themselves and their homes



shower to wake up in the morning



bathe to wind down at night



use hot water for cleaning



duration varies 1-30 minutes

“People hold different views on how heat should be used, 37% are relatively disinterested in heating”

ETI SSH insight 'consumer challenges for low carbon heat' 2015



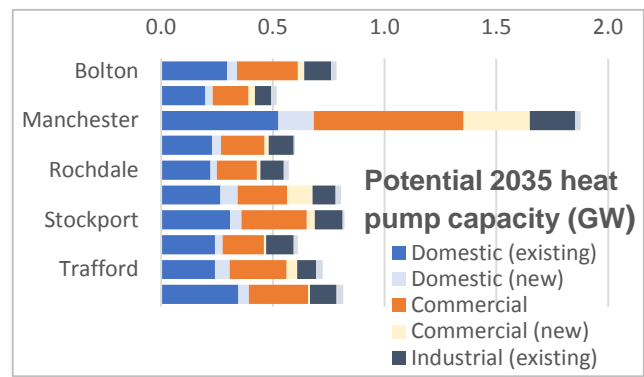
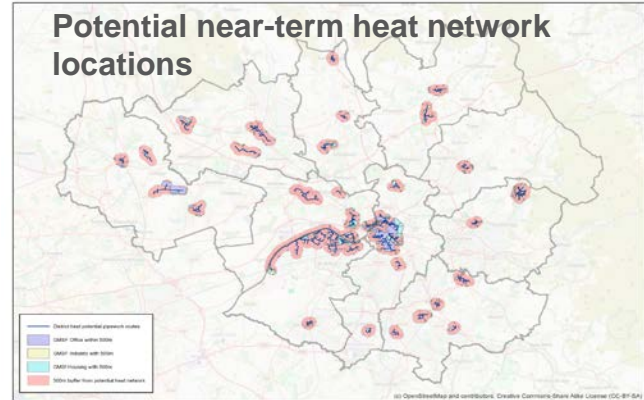
61%
consider health a significant factor in how they use heat at home



40%
stop pipes freezing and prevent damp



Requires local area energy planning... Enabled by EnergyPath Networks toolset





SSH Programme Structure

1

Consumer Solutions

Software platform and supporting design and integration capabilities to gather, process and use data to help service providers **create and deliver better domestic energy services**

2

Local Area Strategies

Local energy transition planning capability, building consensus among stakeholders to **make local infrastructure investment decisions with confidence**

3

Market, Business and ICT Solutions

System operations design capability, trading-off commercial, information and physical domains across gas, heat and power to **enable effective multi-party systems integration**



Where next in low carbon heating...

Now...

Establish feasibility of low carbon heating solutions through small-scale trials and developments

- Technology
- Business delivery models
- Consumer acceptance

Next 10 years...

Test potential solutions in increasingly large-scale demonstrations and trials

Proving investability and consumer acceptance

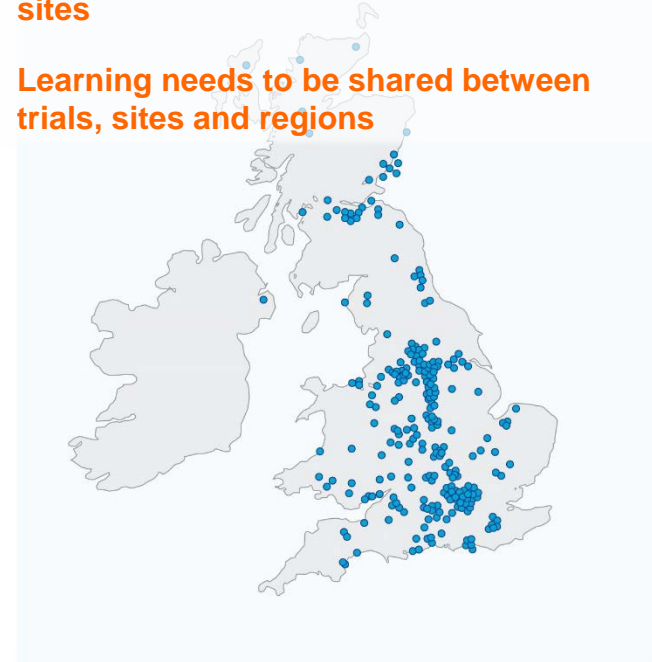
By 2030 and on to 2050...

Roll-out low carbon heating solutions across the UK

Equates to 1m homes per year to 2050

Low carbon heat demonstrators need to take account of local issues and opportunities meaning trials on many sites

Learning needs to be shared between trials, sites and regions





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