Future Energy Scenarios: ESO Pathways to Net Zero

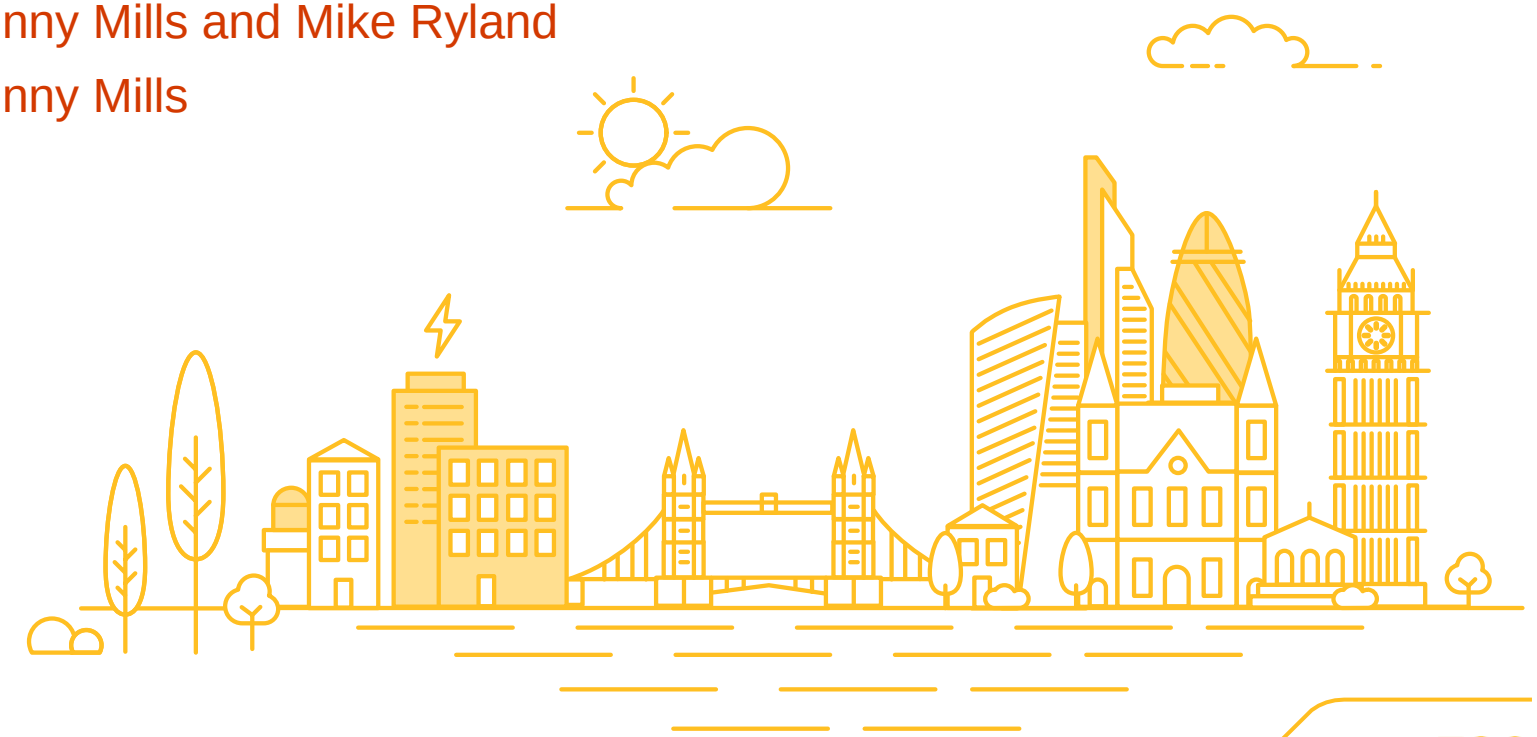
Energy consumer and demand side flexibility

18 July 10am

ESO

Agenda

10:00	Welcome:	Sian Ramirez-Bower
	Key actions:	Jenny Mills
	Framework	Mike Ryland
	Core content	Jenny Mills and Mike Ryland
	Conclusion	Jenny Mills
	Q&A	
	Re-cap and close	



Key Message and actions:

Decisive action is needed within the next two years to deliver the fundamental change required for a fair, affordable, sustainable and secure net zero energy system by 2050.

Actions:

1. Accelerate the delivery of whole system infrastructure through a strategic approach to network investment and introduction of planning reforms.
2. Deliver market reform, considering electricity, gas, hydrogen and CO_2, to ensure we have markets that provide for and work with a reliable and strategically planned energy system.
3. Prioritise the use of hydrogen for hard-to-electrify applications. Agree business models and kick-start delivery of the hydrogen and CO_2 transport and storage infrastructure needed for system flexibility.
4. Accelerate progress on low carbon heating including faster rollout of heat pumps irrespective of a decision on hydrogen for heat.
5. Deliver innovation and build consumer trust in affordable smart technology, enabling consumers to save on energy costs while helping with the management of Great Britain's electricity system.
6. Focus on energy efficiency improvements across all sectors to reduce overall energy demand.
7. Expedite the delivery of clean, low-cost and reliable new technologies and long-duration energy storage connected to the system by reforming the connections process.
8. Invest in supply chain and skills to deliver the low carbon technologies and infrastructure needed, enabling the UK to become a world leader.

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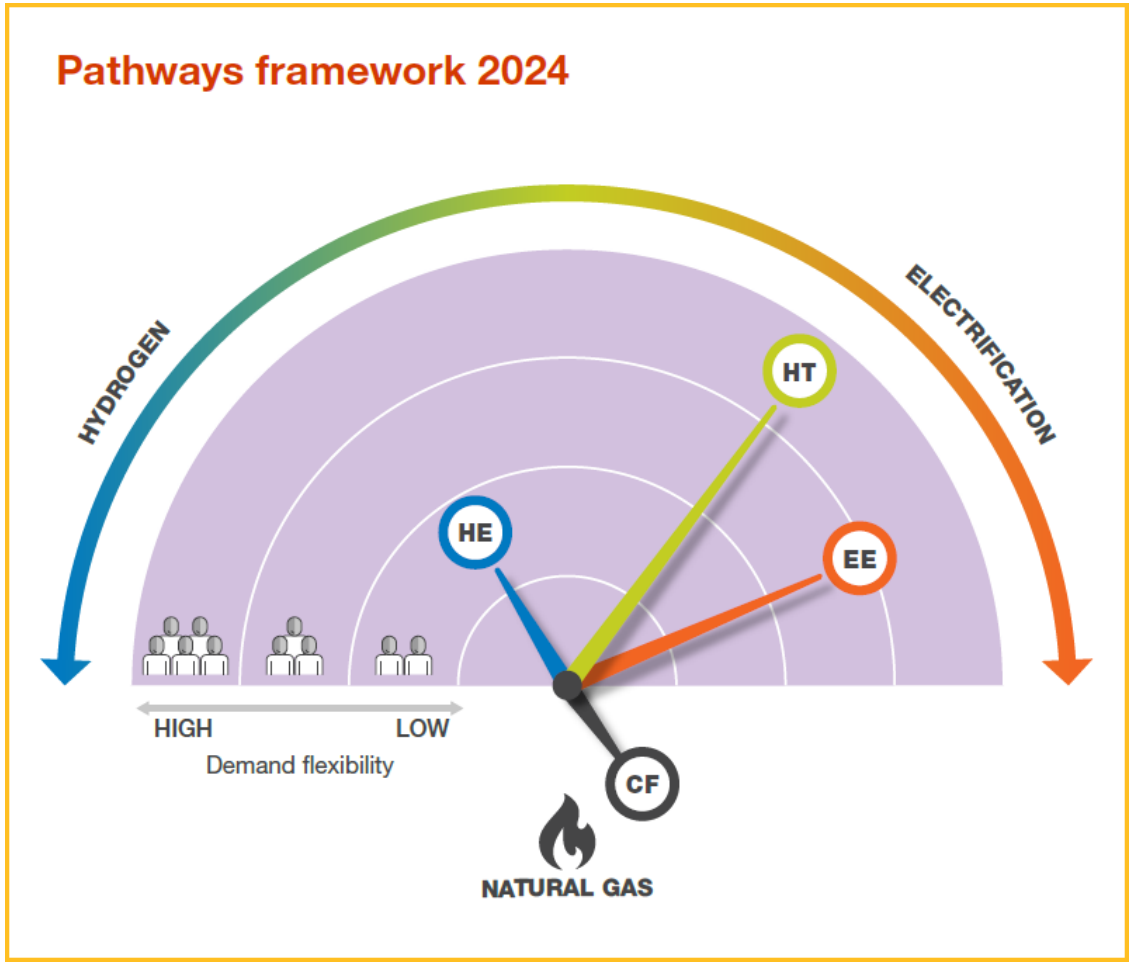
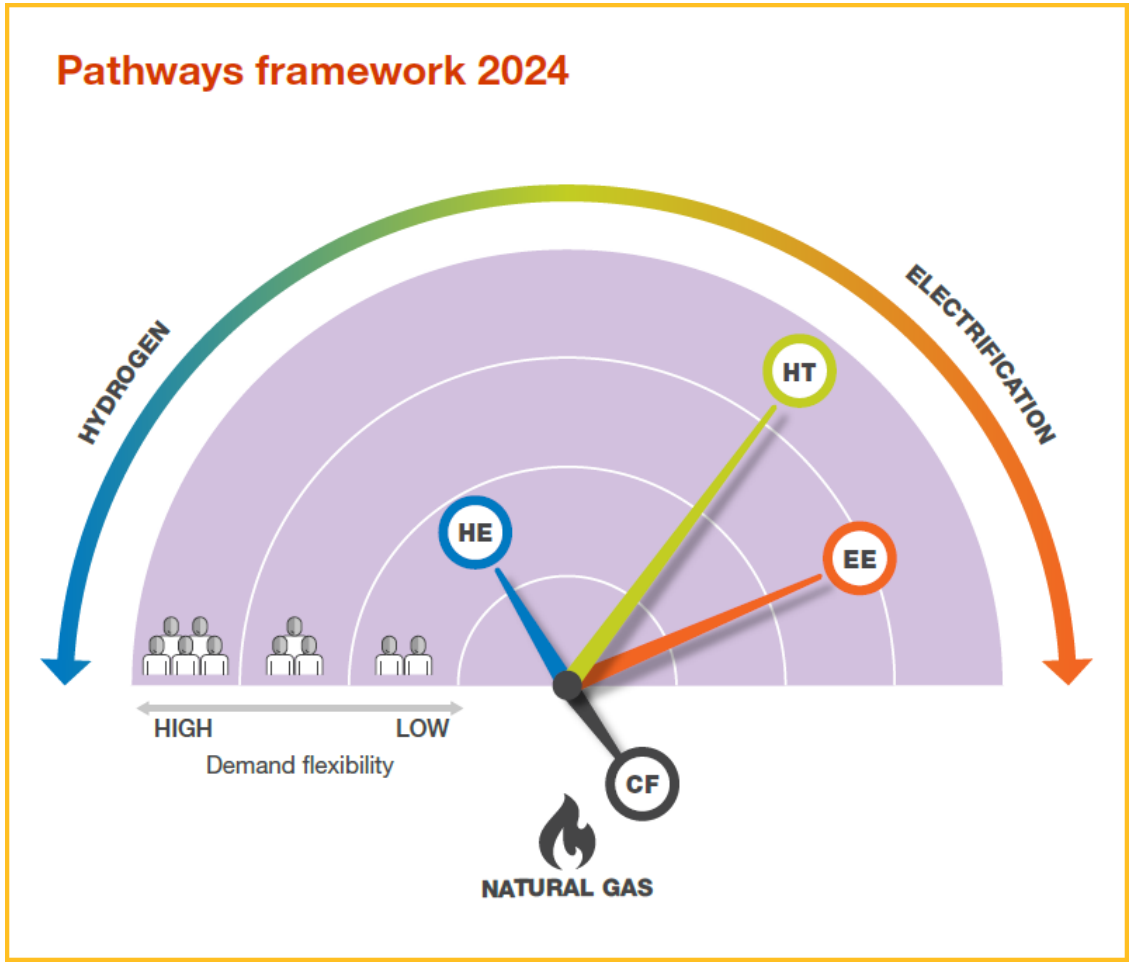
FES 2024: ESO Pathways to net zero



FES 2024: ESO Pathways to net zero

Holistic Transition

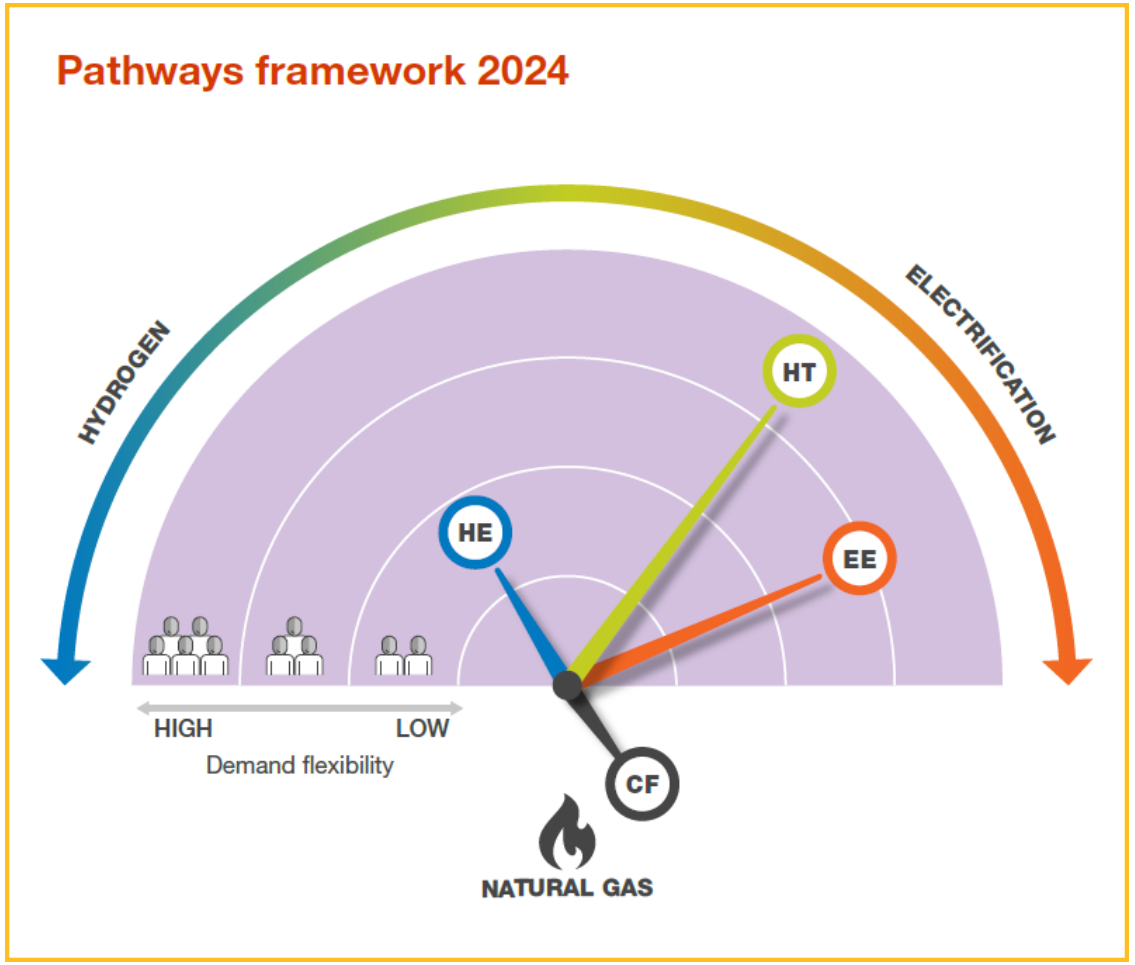
- Net zero by 2050
- Mix of electrification and hydrogen
- Very high consumer engagement in the transition



FES 2024: ESO Pathways to net zero

Electric Engagement

- Net zero by 2050
- High levels of electrification
- Strong consumer engagement in the transition



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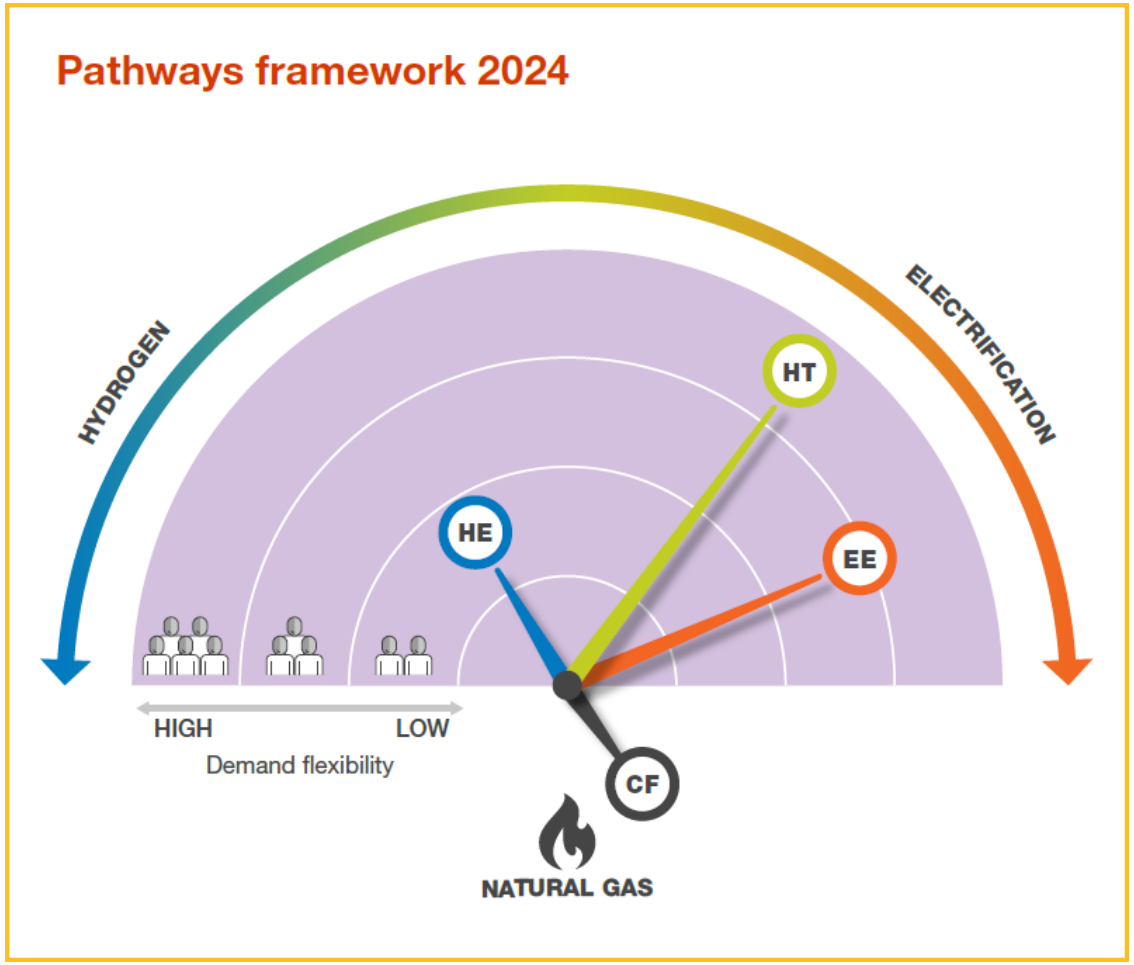
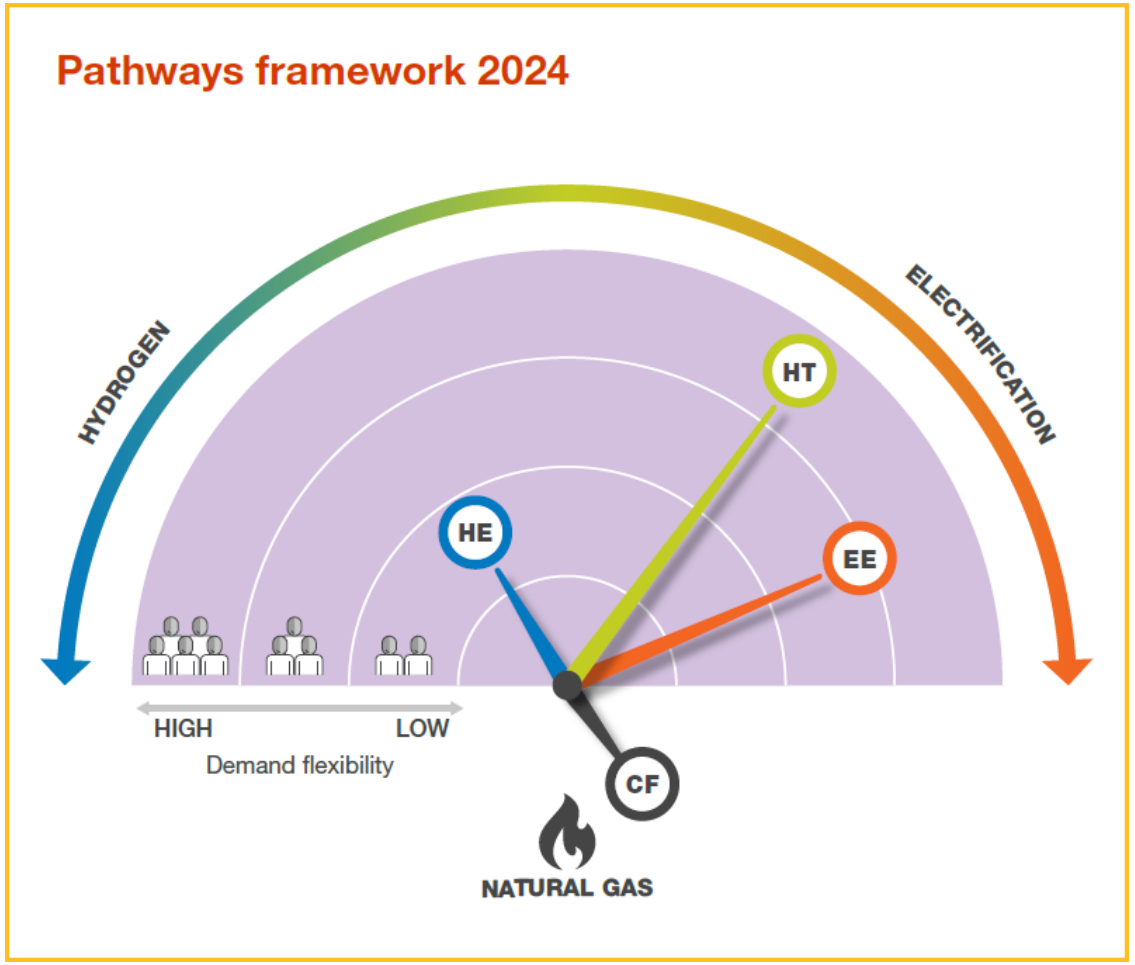


Hydrogen Evolution

- Net zero by 2050
- Fast progress for hydrogen in industry and heat
- Lower levels of consumer engagement

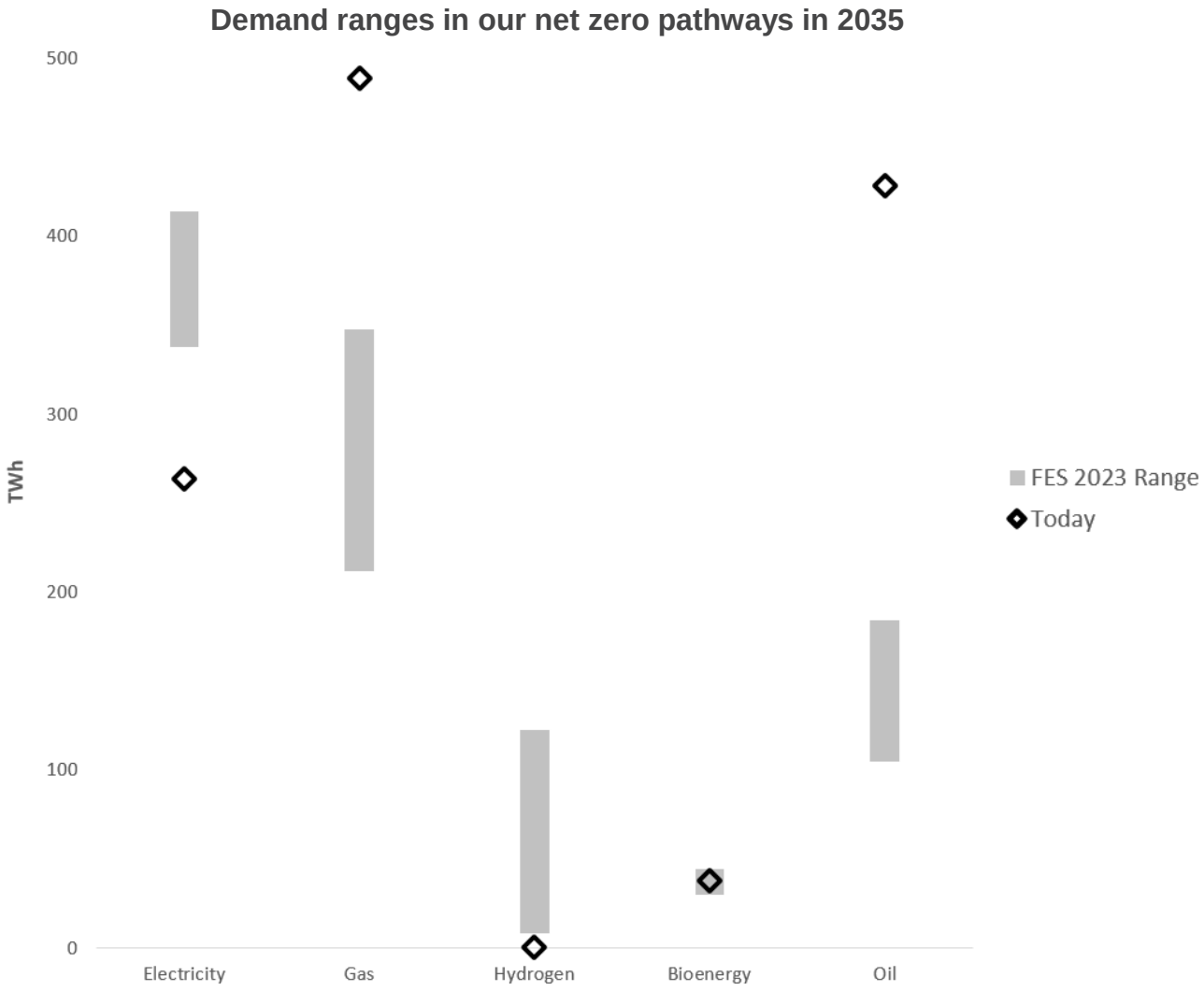
FES 2024: ESO Pathways to net zero



Counterfactual

- Net zero not achieved by 2050
- Some progress is made compared to today
- Heavy reliance on gas across all sectors, particularly power and space heating
- Electric vehicle uptake is slower than the net zero pathways, but still displaces petrol and diesel

What the change to net zero pathways mean for demand in 2035



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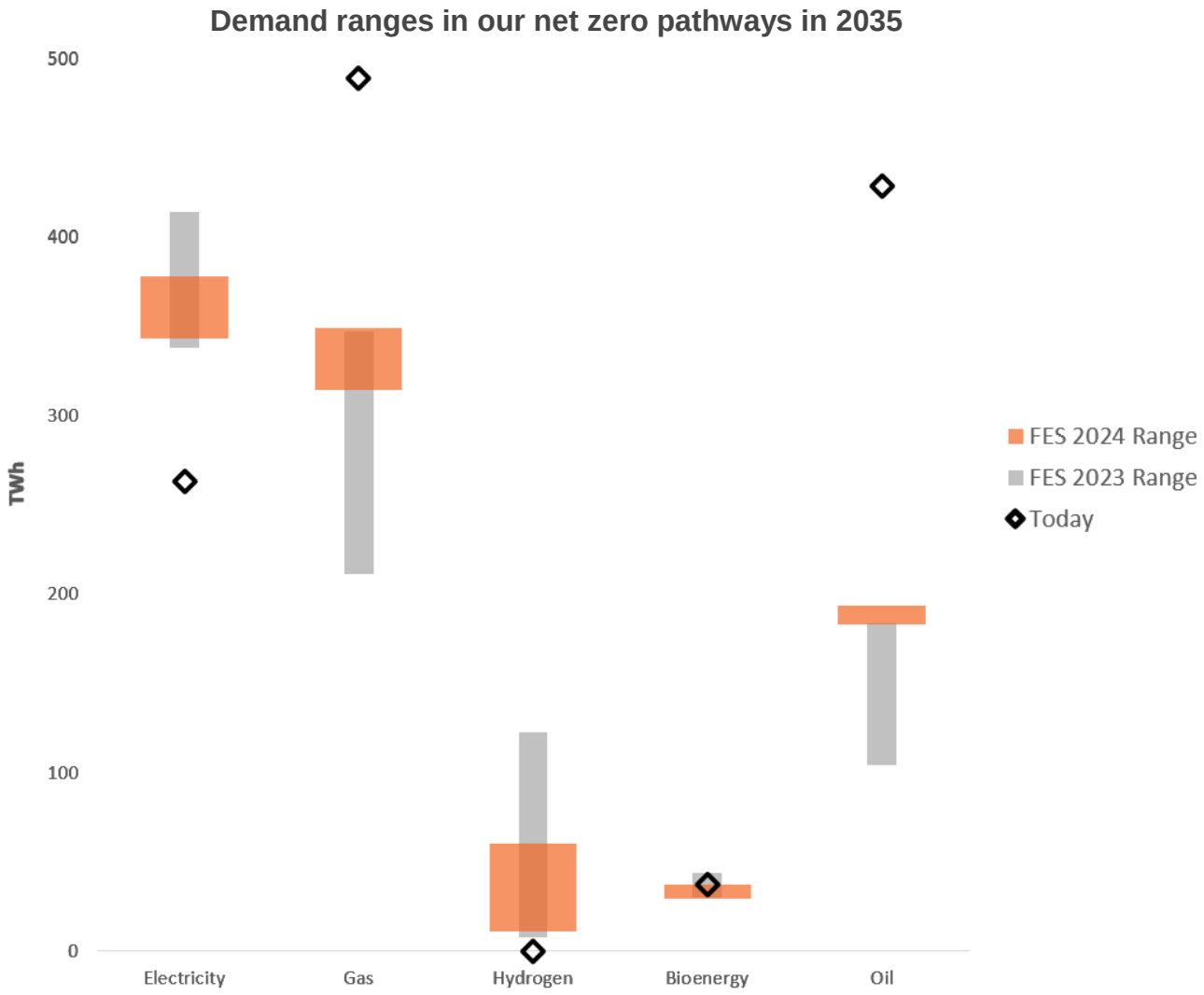
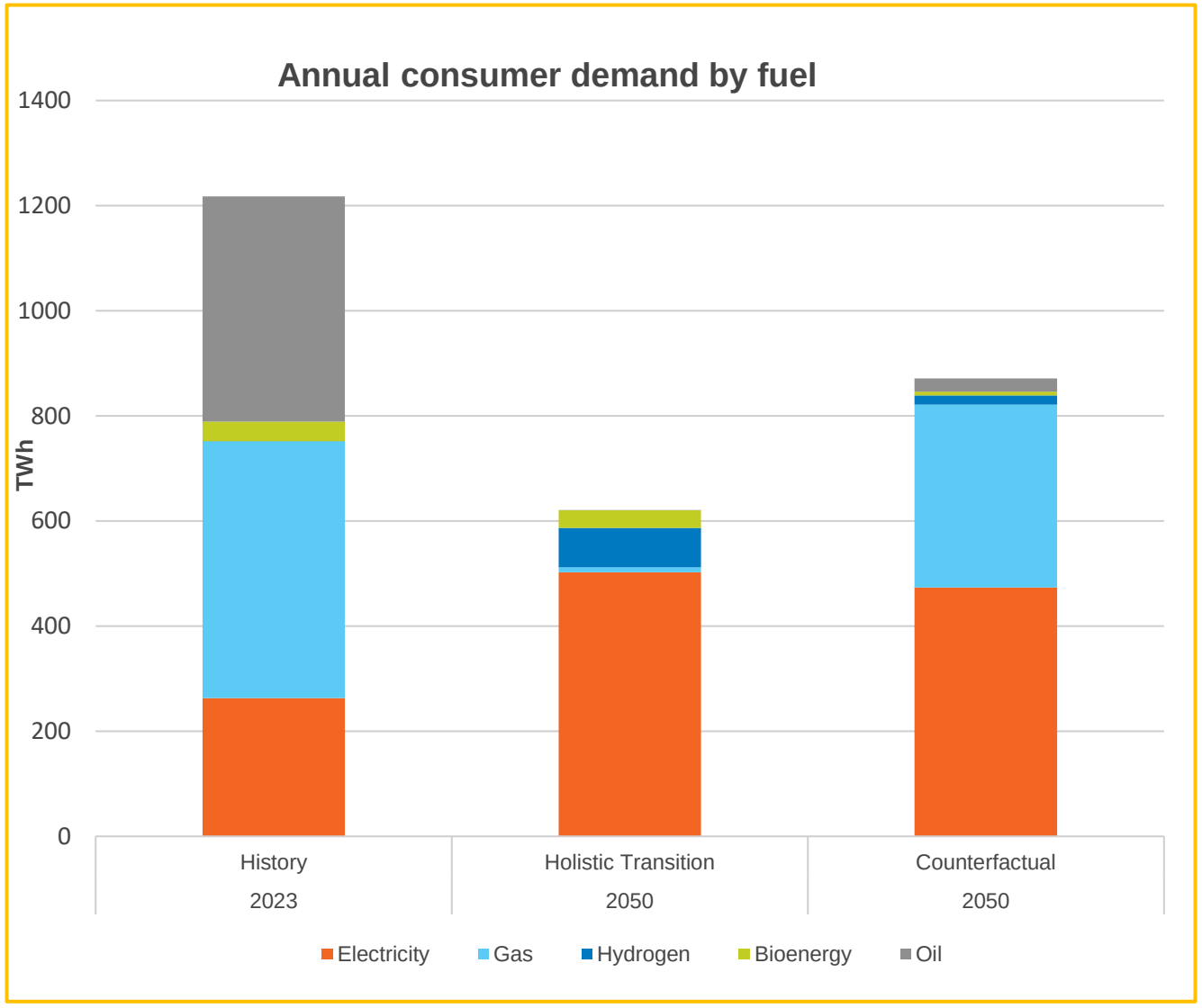


- All pathways follow the Zero Emissions Vehicle Mandate as the policy gives a clear route to decarbonisation
- Due to limited time to accelerate heat pump sales to achieve the Sixth Carbon Budget, we have reduced the uptake range
- Energy efficiency measures are more consistent as the pathways are now saying what should happen
- We have reduced the range of hydrogen in industry as there is more likelihood it will be used

6 Focus on energy efficiency improvements



- Today, 75% of our energy demand is met by unabated fossil fuels
- Holistic Transition changes to use more electricity, hydrogen, biofuel and abated fossil fuel use

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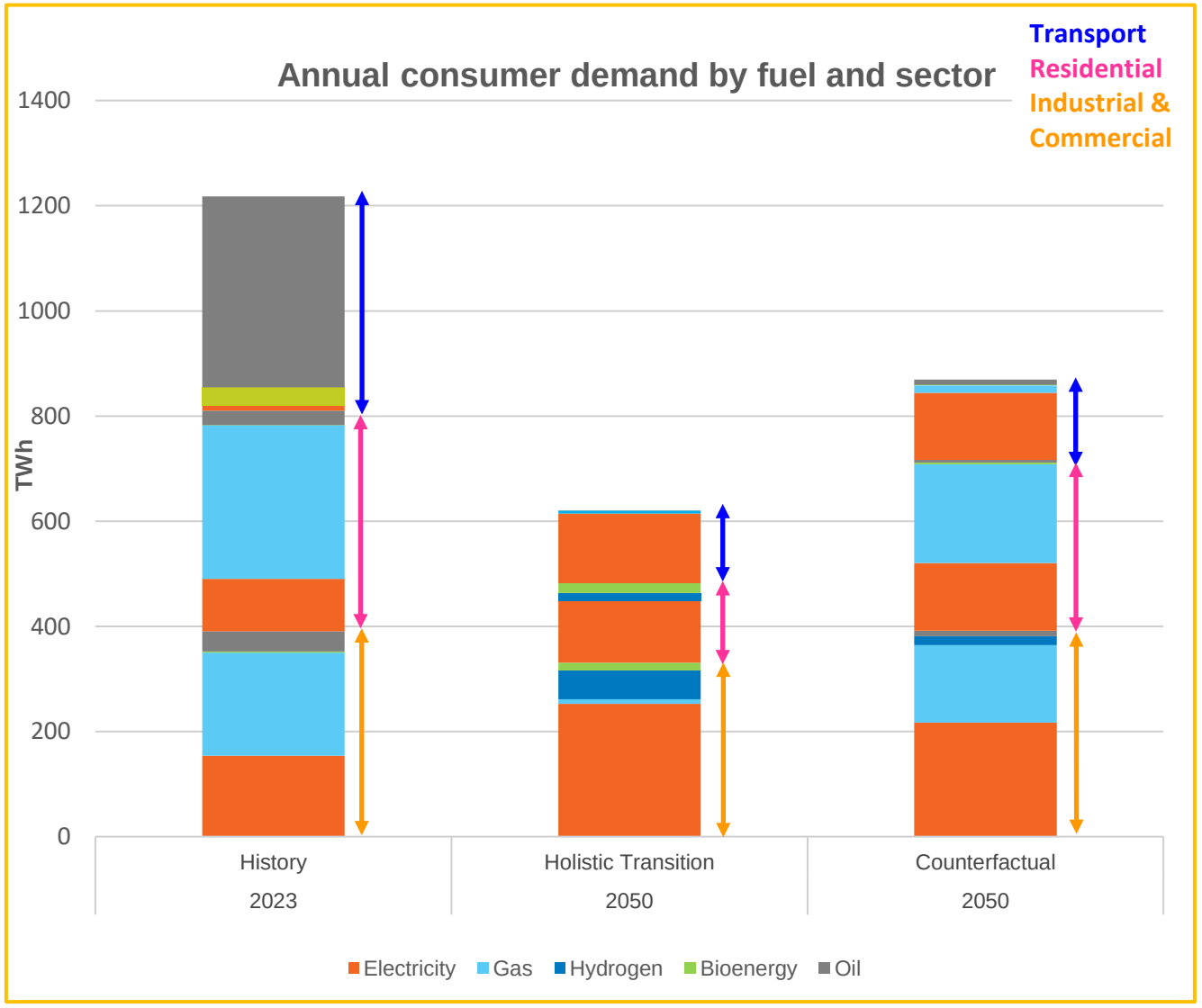
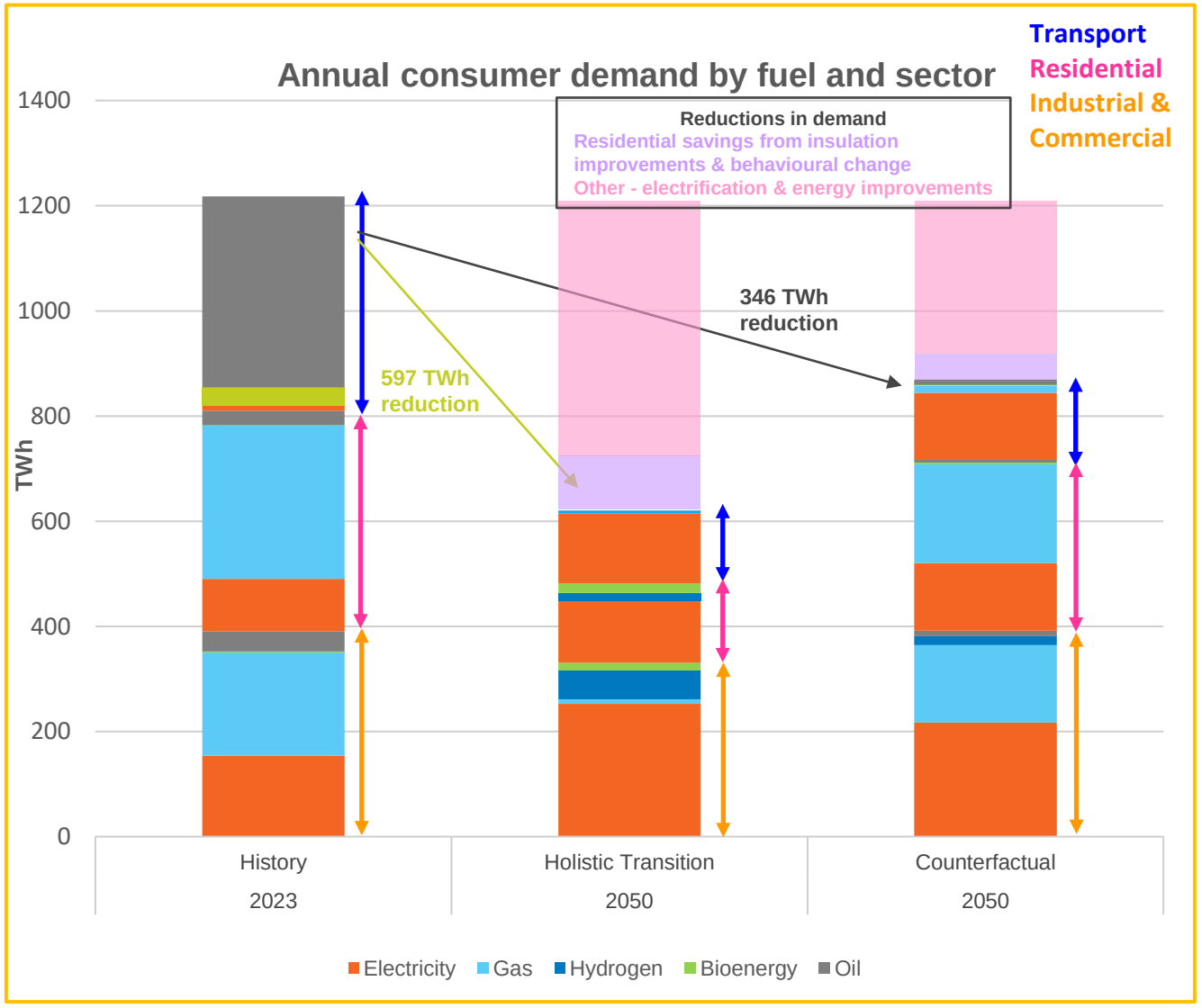


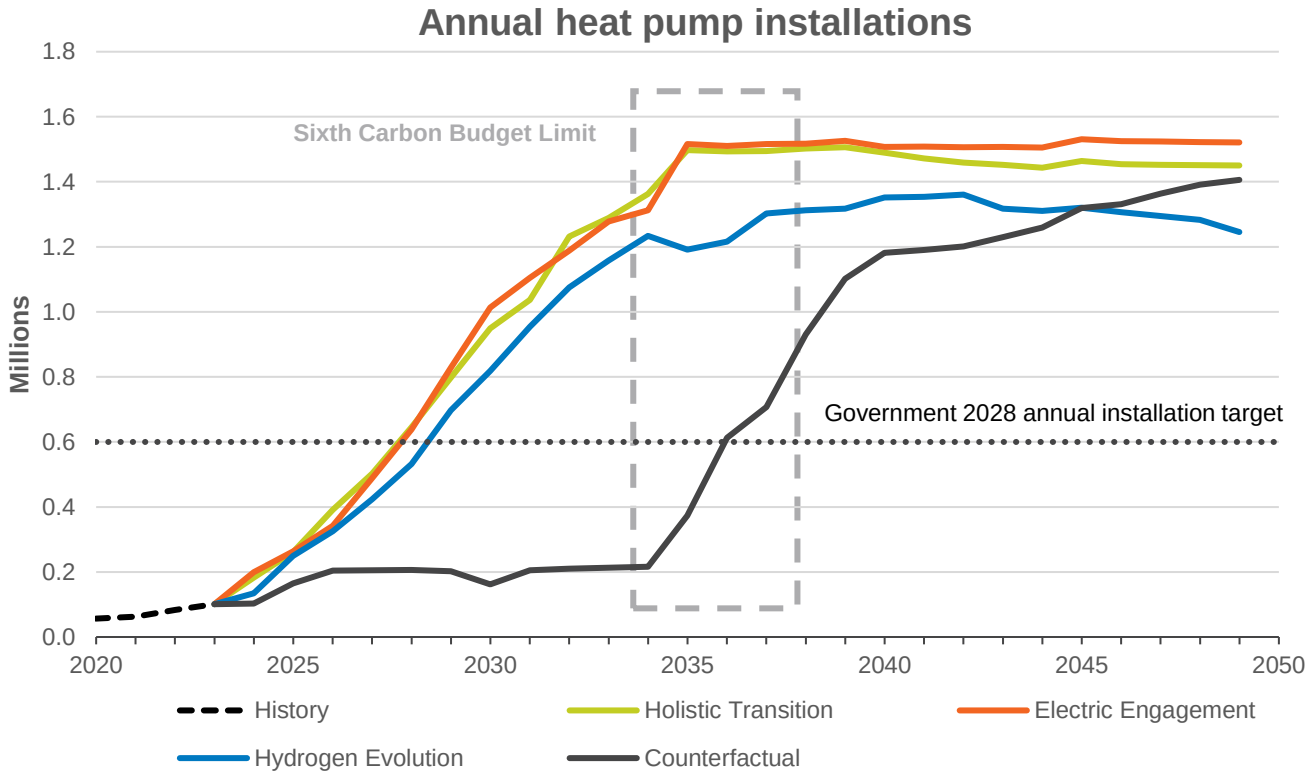
- Transport sector energy demand falls as electric vehicles are over twice the efficiency of petrol and diesel vehicles
- Heat pumps offer over three times the efficiency of gas boilers, decreasing residential demand

6 Focus on energy efficiency improvements



- Residential insulation is required to aid heat pump installation and reduce bills for hydrogen boilers
- Residential appliance and light bulb efficiencies must continue to improve
- Industrial consumers can benefit from efficient equipment and automation

4 Accelerate progress on low carbon heating



- Heat pump uptake now is essential to achieve the Sixth Carbon Budget, even if hydrogen is used for home heating
- **Decisive action is needed within the next two years to deliver the fundamental change required for a fair, affordable, sustainable and secure net zero energy system by 2050.**
- Heat network zoning and developing networks for the most suitable households increases the portfolio of solutions to decarbonise heating

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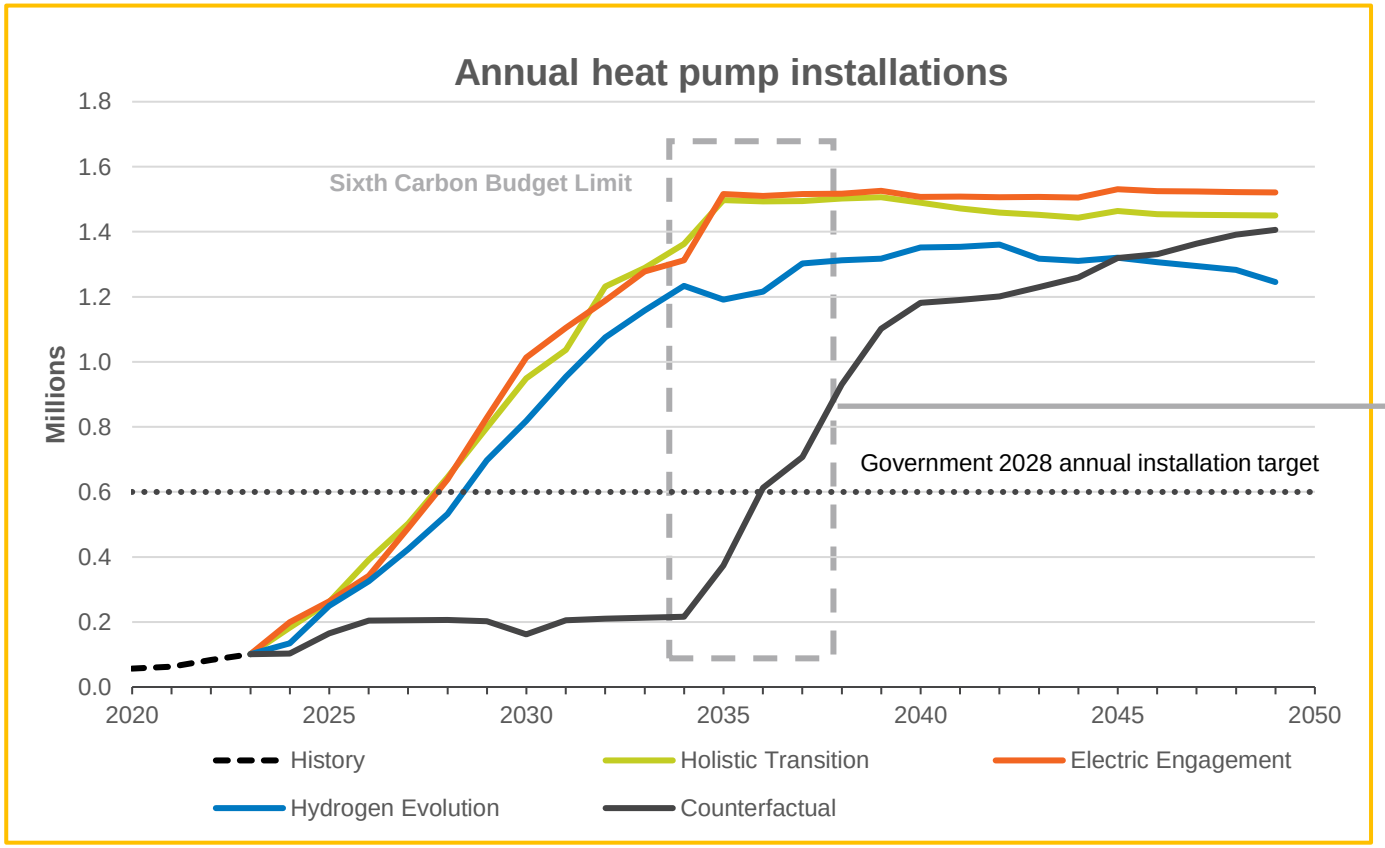

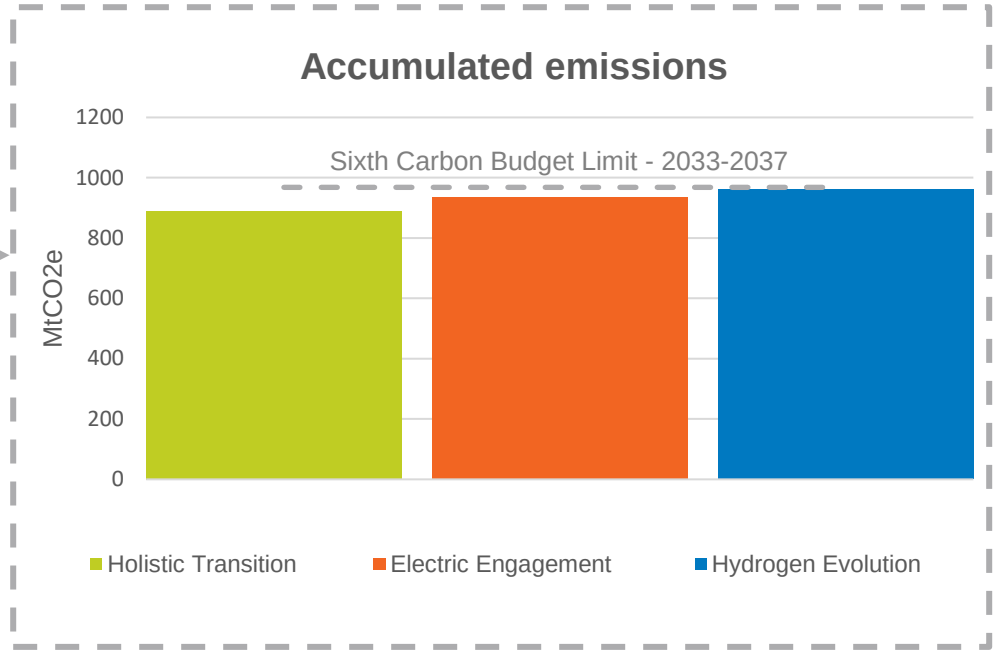

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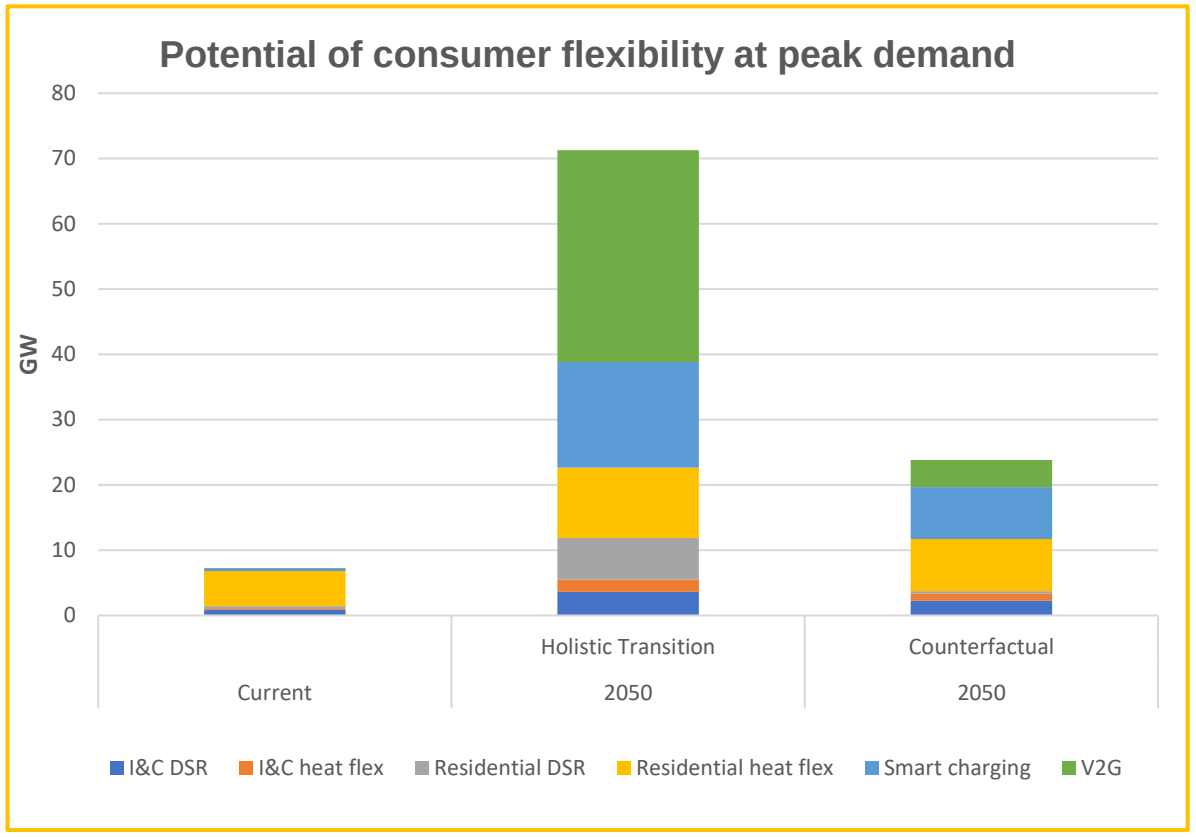
5 Deliver innovation and build consumer trust in affordable smart technology



- Peak demand drives network and dispatchable capacity requirements
- In an unmanaged decarbonised household, new electrified heat and transport demand coincide with the morning and evening peaks
- What's needed: cost signals and equipment to respond to them
- The aggregation of consumer flexibility has 70 GW potential, which can reduce peak demand and turn up demand at times of oversupply

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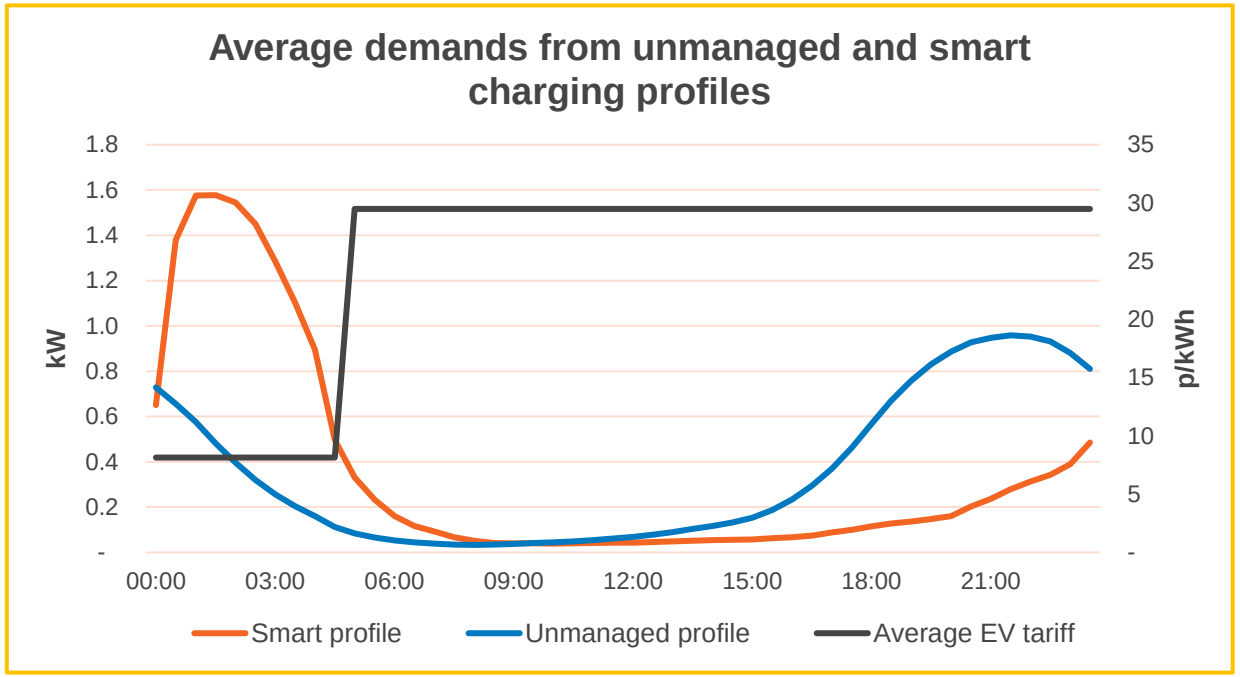
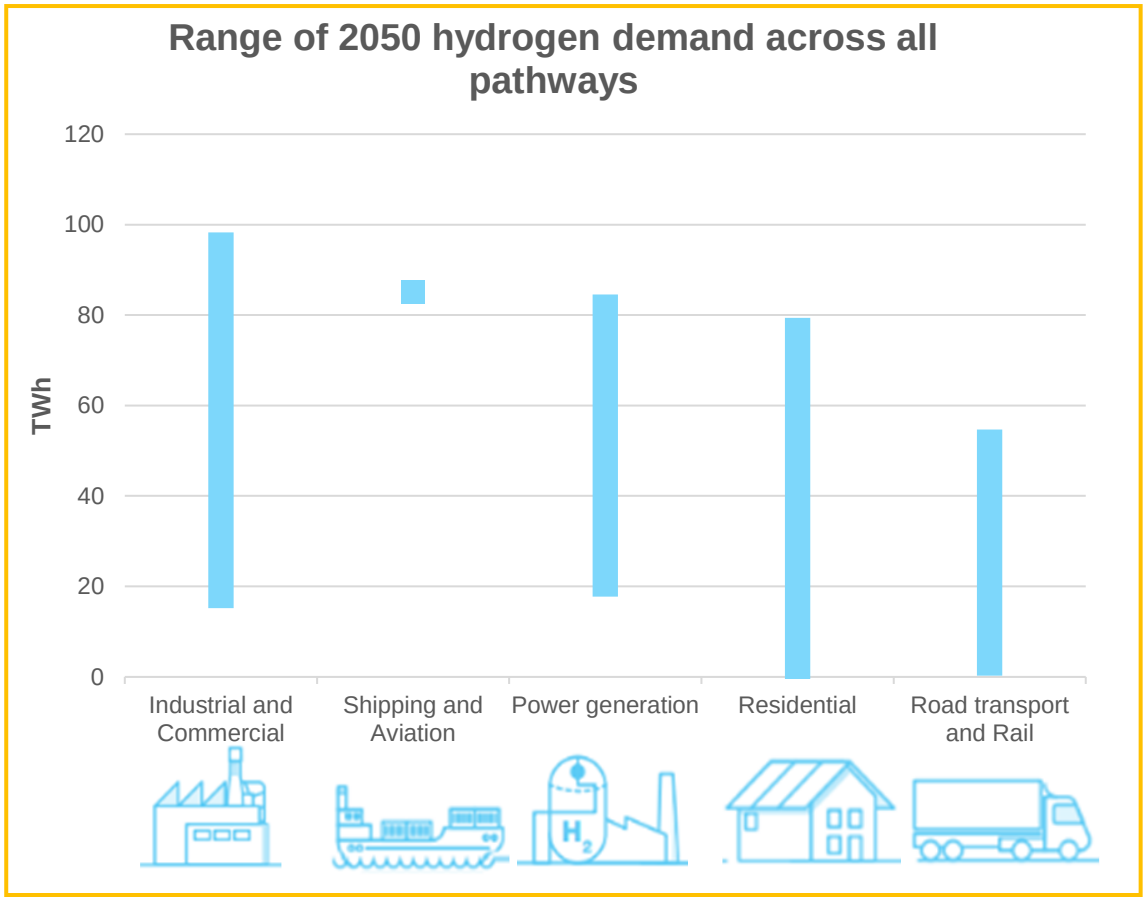


- Without smart charging, EV drivers arrive home and plug in
- With smart charging, EVs are charged overnight
- Opportunity to benefit the consumer and the energy system

Source: EV.Energy

3 Prioritise the use of hydrogen for hard-to-electrify applications

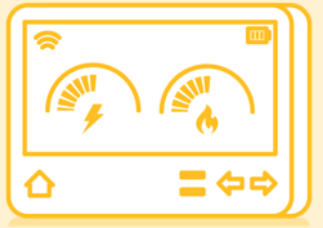


- We must move away from fossil fuels
- Some applications are harder to electrify than others
- Hydrogen plays a critical role in dispatchable power generation in all our pathways

Conclusion

Focus on energy efficiency across all sectors

Accelerate low carbon heating deployment



Deliver innovation and build consumer trust in affordable smart technologies

Prioritise hydrogen for hard to electrify applications

Thank you for joining us today

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