

# Heat Pumps in the Building Sector: Hybrid Heat Pumps opening UK retrofit opportunities?

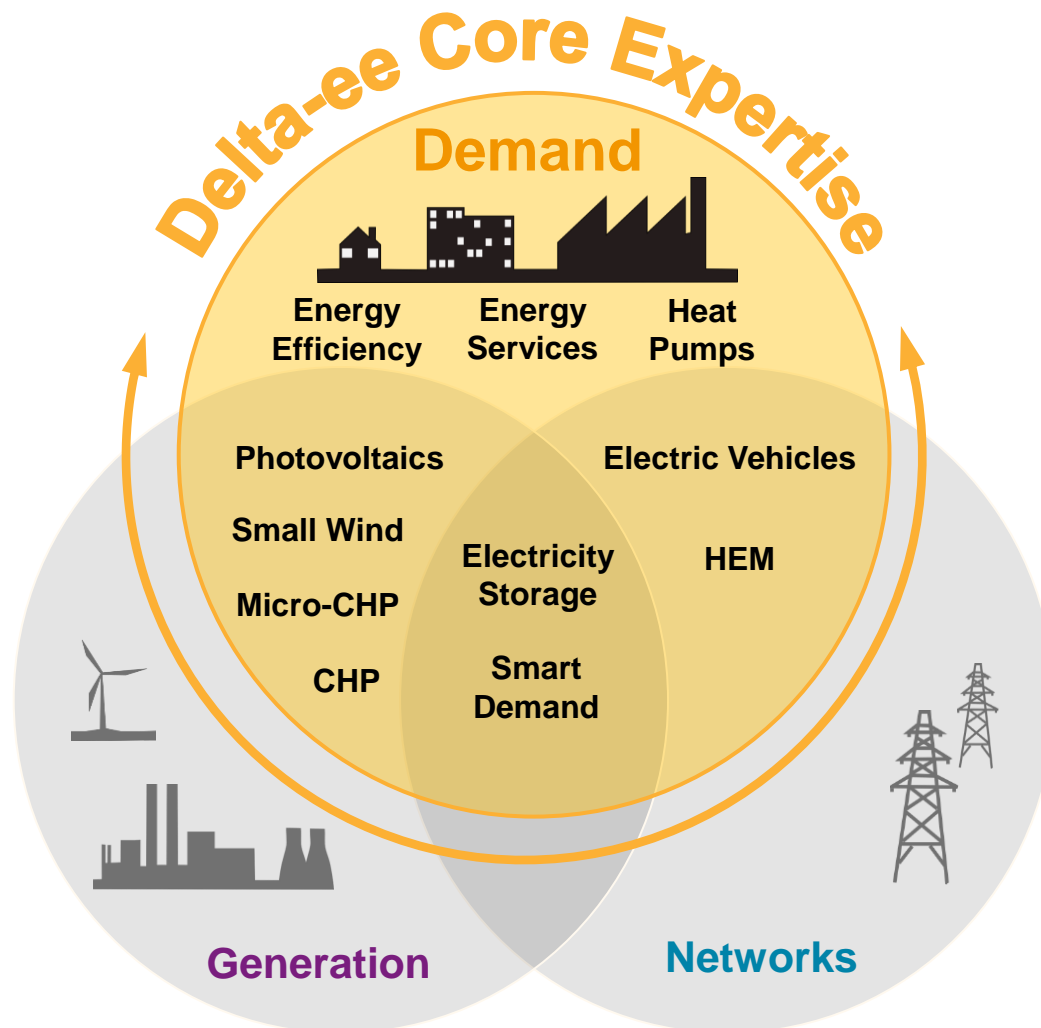
Dr. Lindsay Sugden, Delta Energy & Environment

DECC IEA Heat Pump Workshop

**13<sup>th</sup> November 2012**

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**Delta provides:**

- ▶ Market expertise
- ▶ Commercial insight
- ▶ Strategy & tactics

**Clients:**

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- ▶ Manufacturers
- ▶ Finance sector
- ▶ Policy makers

**Research Services:**

- ▶ ASHP Innovation Monitor
- ▶ Home Energy Management
- ▶ Micro-CHP
- ▶ GB Microgeneration

- ▶ Scene setting: Heat pumps in the building sector
- ▶ Hybrids (ASHP/gas boiler) in a low carbon future
- ▶ What problems do hybrids address?
- ▶ Policy impact
- ▶ Market outlook

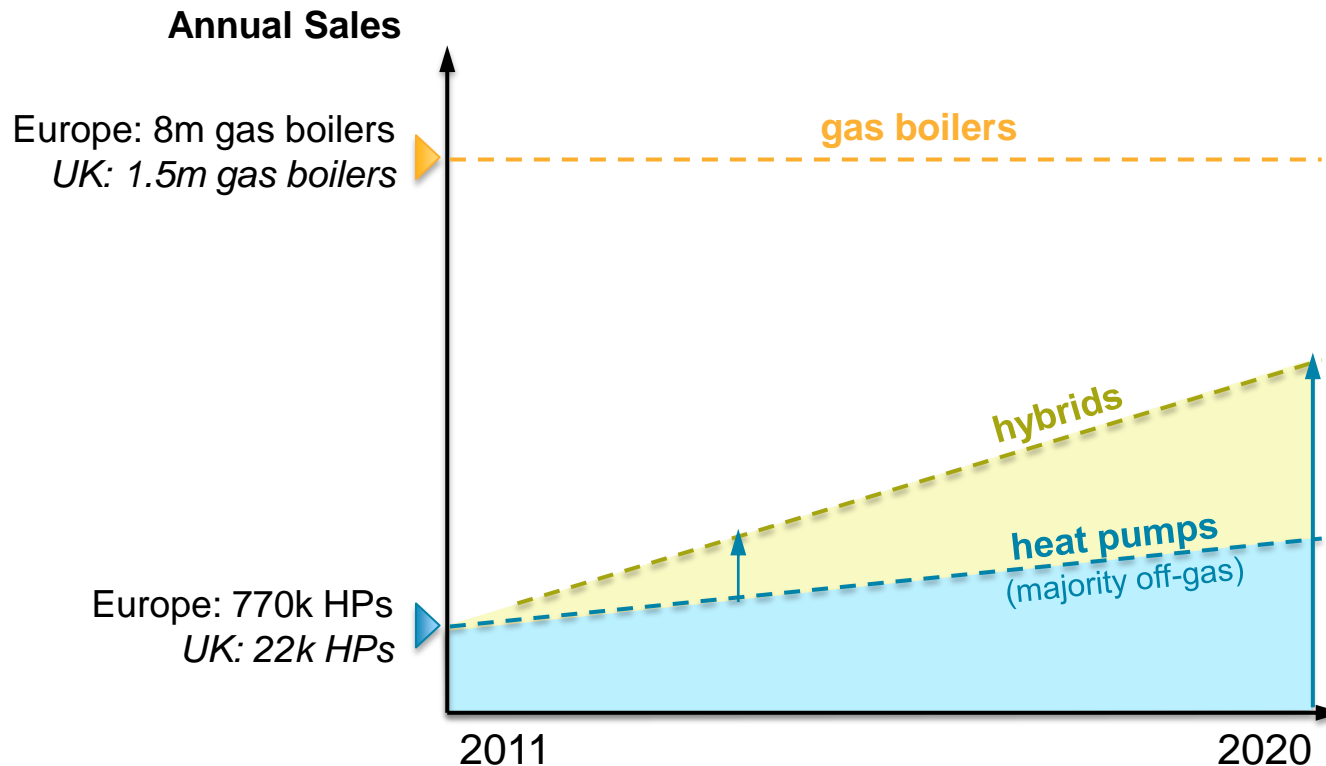
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## Scene setting: Challenges for heat pumps penetrating the gas grid

Electric heat pumps struggle to compete with gas

Gas will still play a key role in a lower carbon future

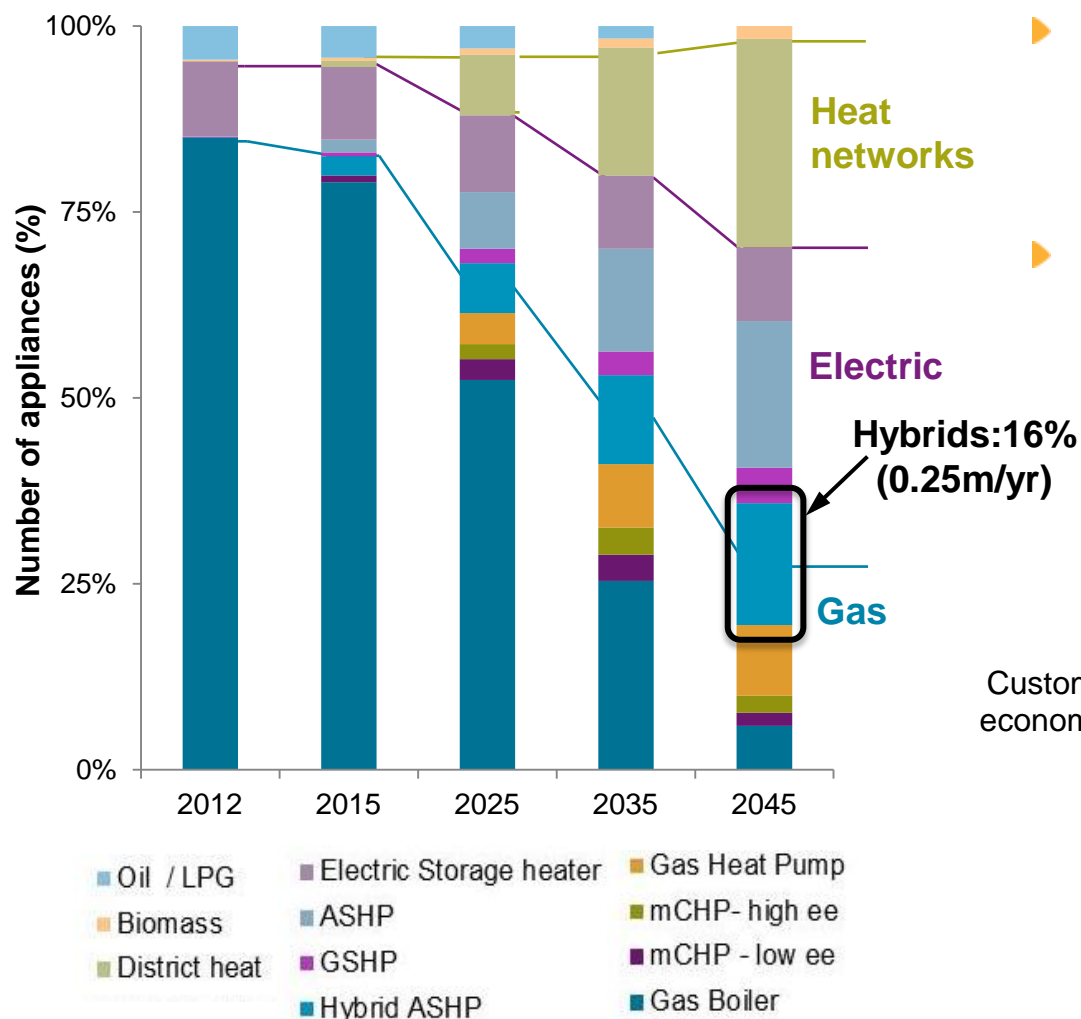
Hybrid heat pump / boiler systems can increase penetration of renewables on the gas grid



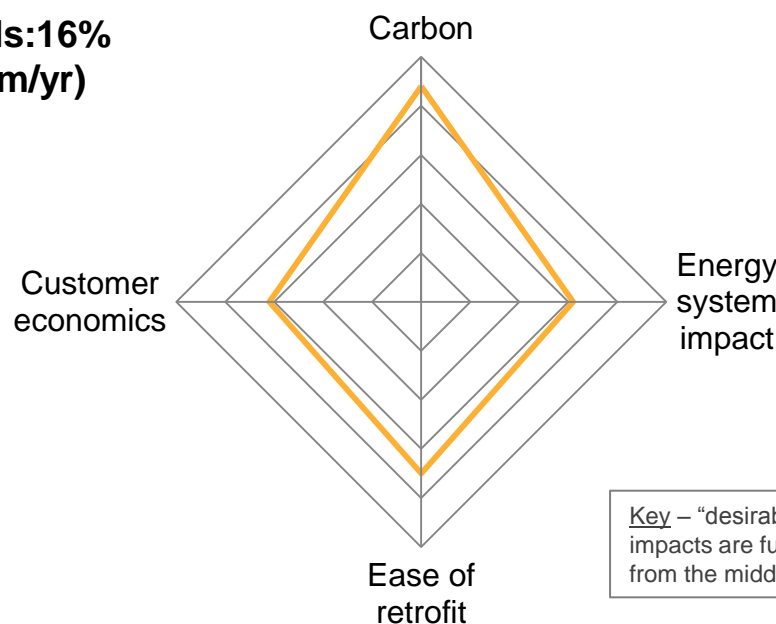
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# Hybrids in a low carbon future

## The future of UK domestic heat: Delta-ee Balanced Transition Scenario – growing role for hybrids

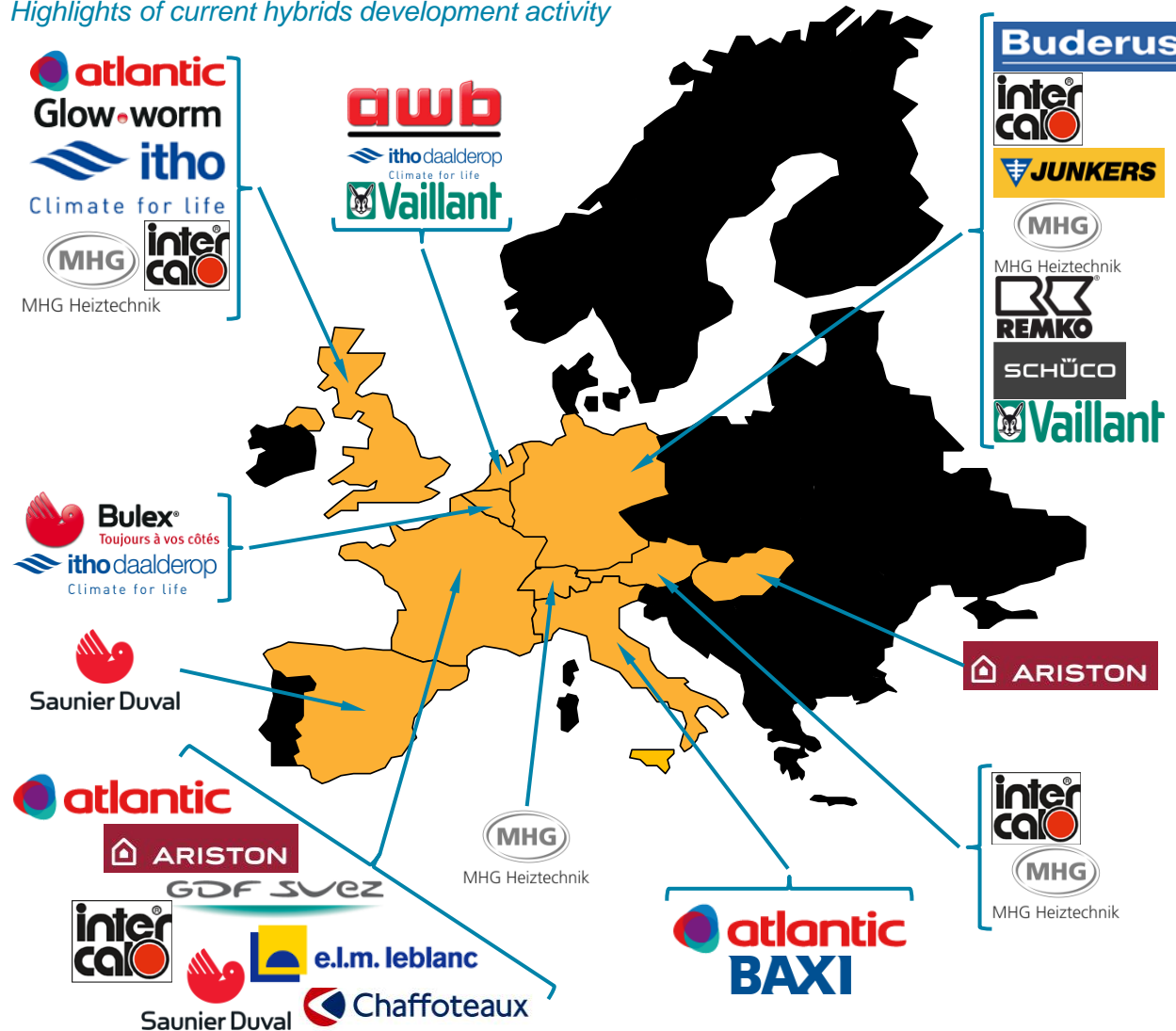


- ▶ Very strong growth in heat networks and electrification of heating – but with gas still playing a significant role in suburban homes.
- ▶ Scenario achieves significant carbon reductions while minimising impacts on the customer and the energy system.



## Rapidly growing interest from wide range of players

### Highlights of current hybrids development activity



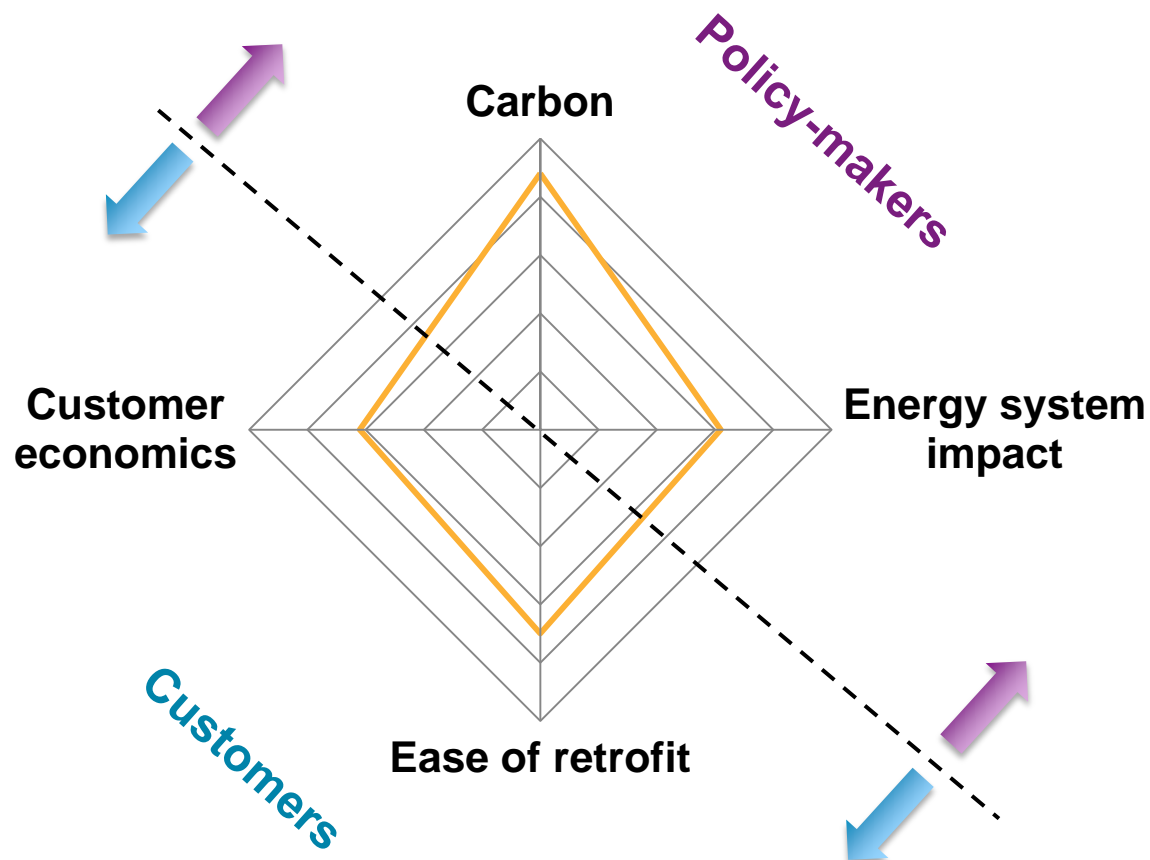
### Who is currently involved in hybrid development in Europe?

- ▶ 4 of the top 5 boiler companies in Europe have a hybrid on the market
- ▶ Growing interest from pure heat pump / air conditioning companies
- ▶ Energy companies are engaging

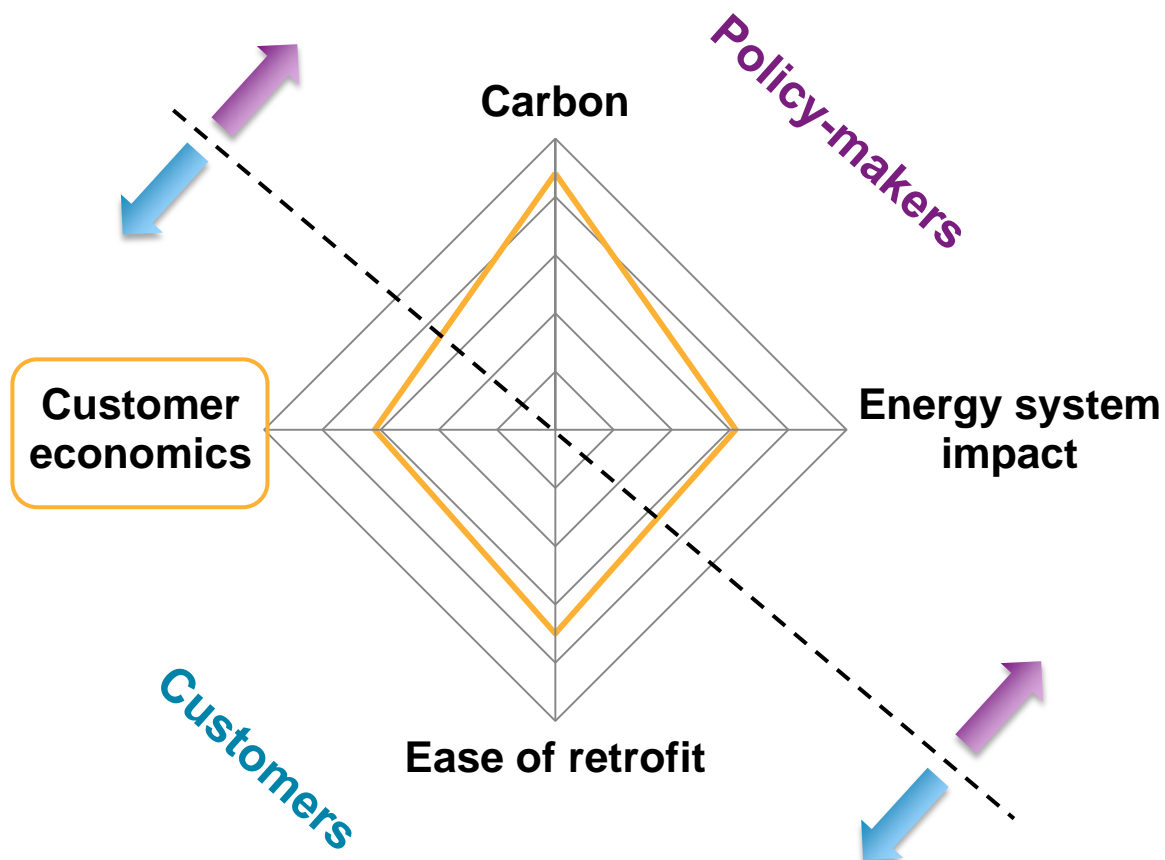


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## What problems do hybrids address?

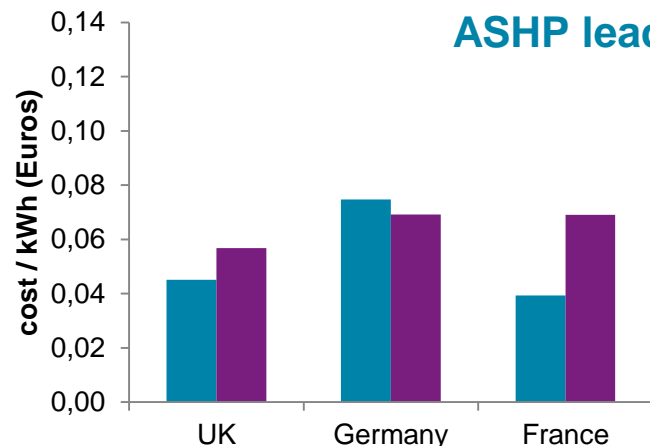


## What problems do hybrids address?



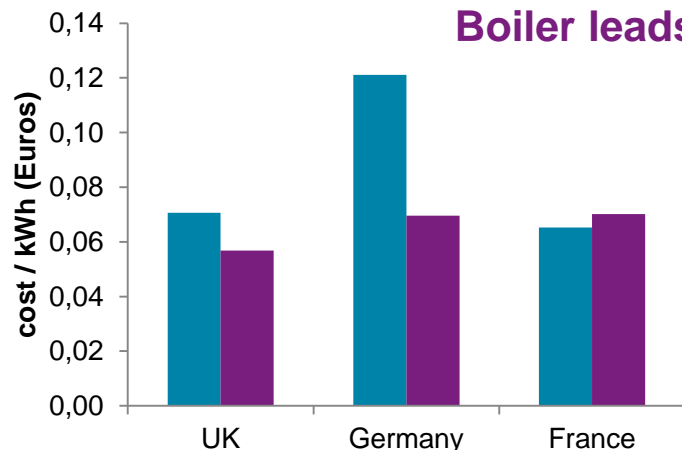
## RUNNING COST: Space Heating

**ASHP leads**



## RUNNING COST: Domestic Hot Water

**Boiler leads**



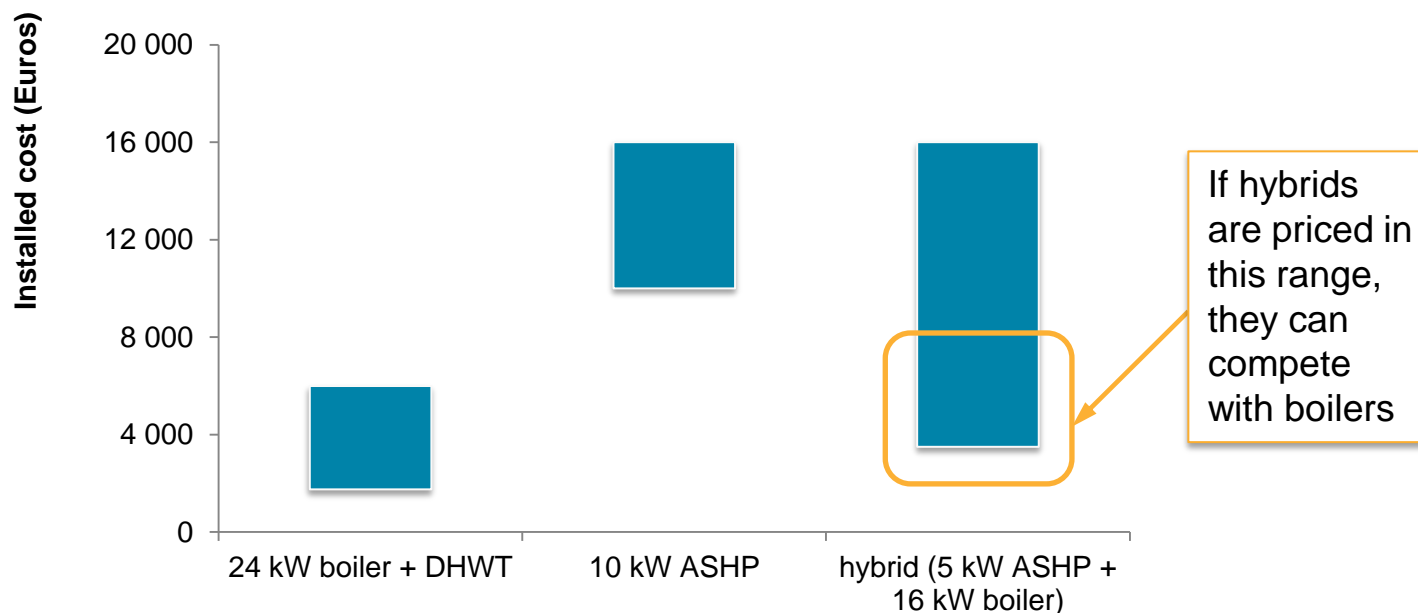
**ASHP** **Boiler**

## ANNUAL RUNNING COST: Hybrid ASHP / Boiler



- **ASHP**
- **HP (95% space heating) + Boiler**
- **HP (60% space heating) + Boiler**
- **Boiler**

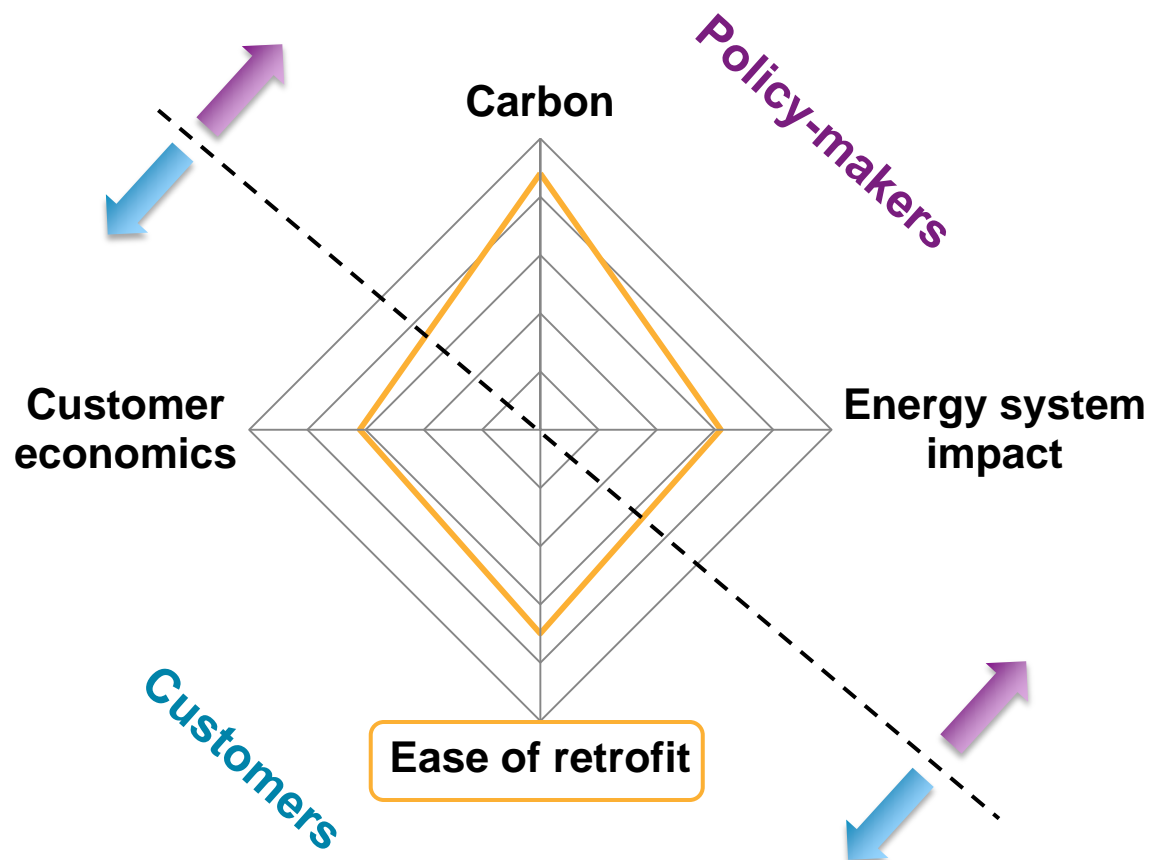
### Comparing upfront cost of boilers, ASHP & hybrids



### Avoided cost of heat distribution system upgrade?

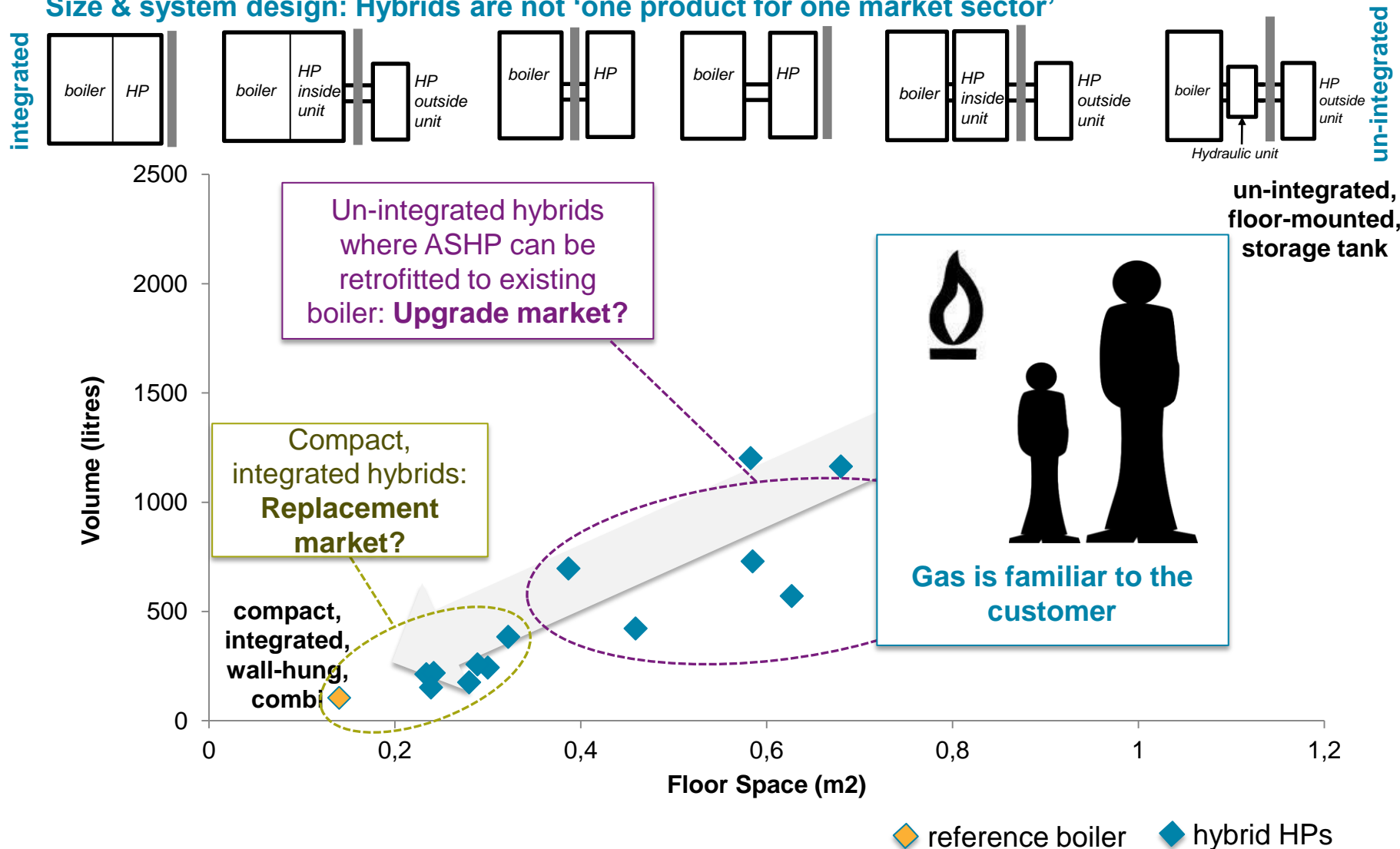


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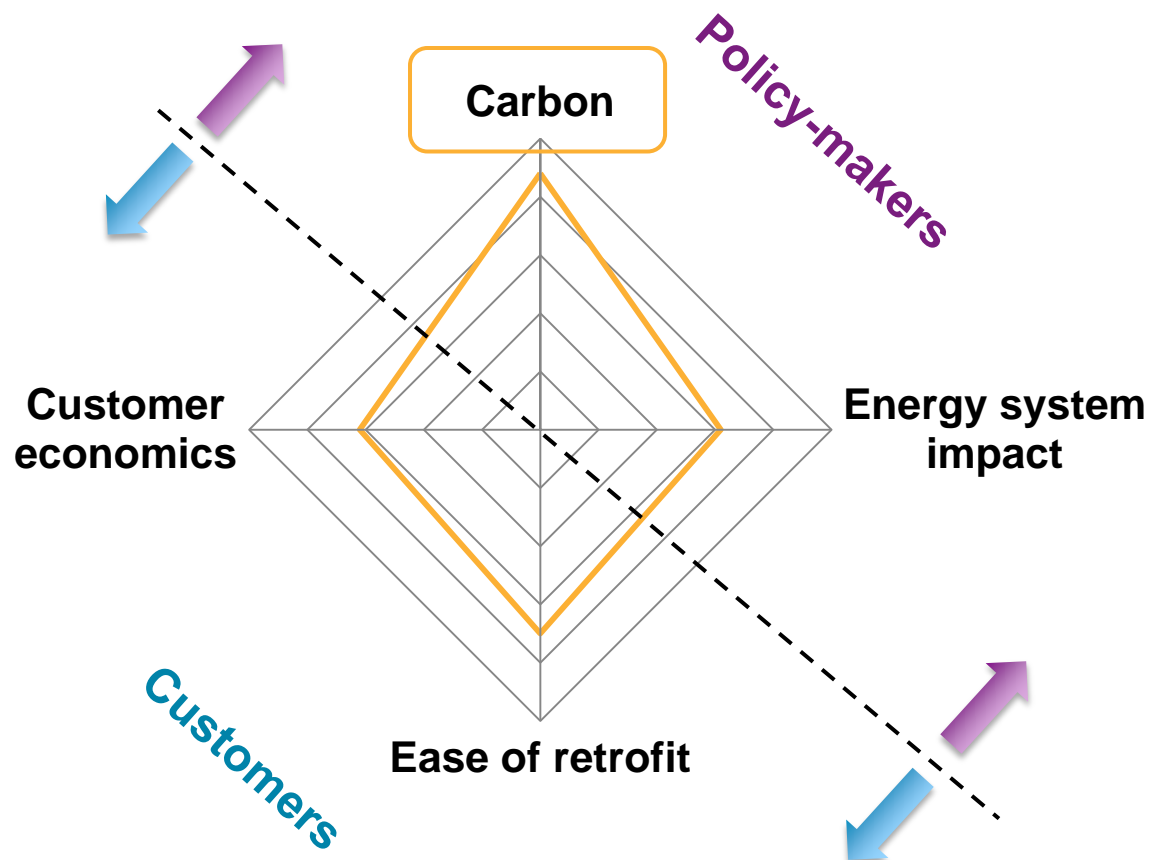


## Ease of retrofit: Hybrids - physical fit & customer appeal

### Size & system design: Hybrids are not 'one product for one market sector'



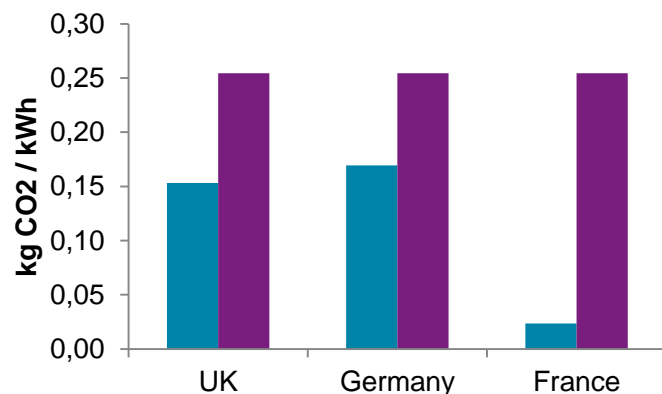
## What problems do hybrids address?





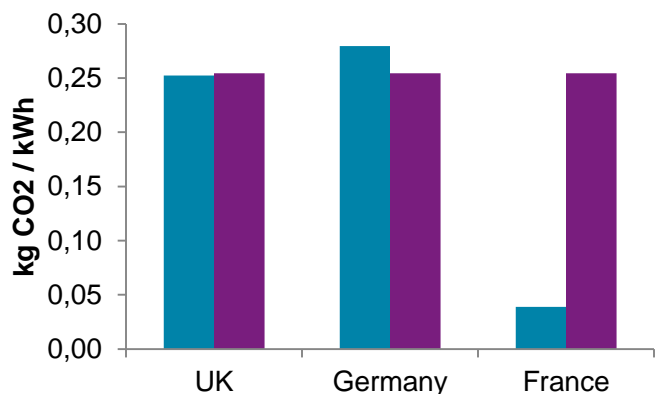
## CO<sub>2</sub> EMISSIONS: Space Heating

**ASHP leads**



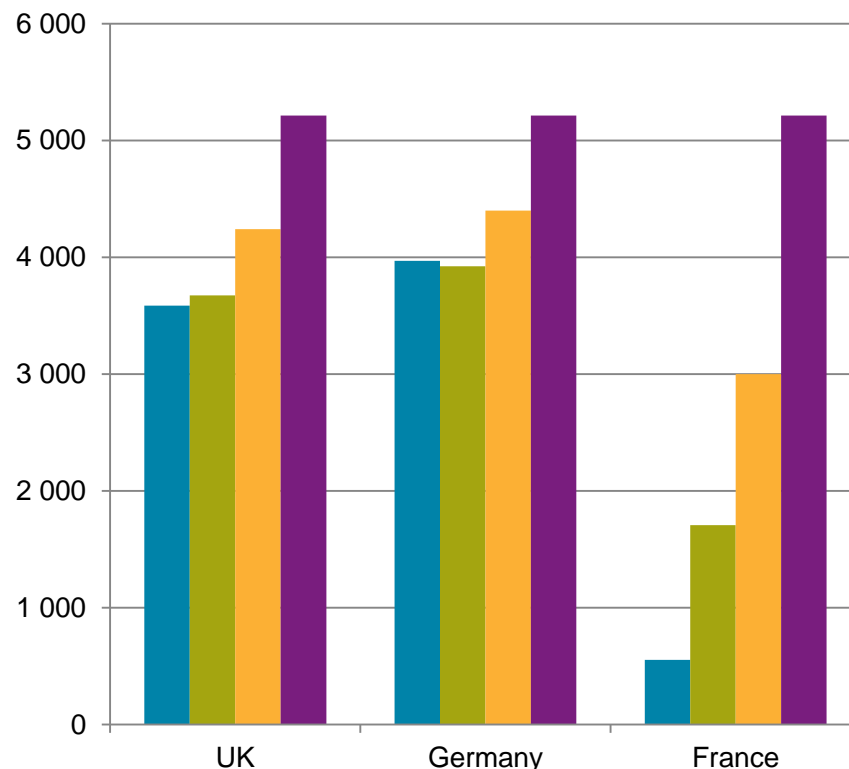
## CO<sub>2</sub> EMISSIONS: Domestic Hot Water

**A closer battle**



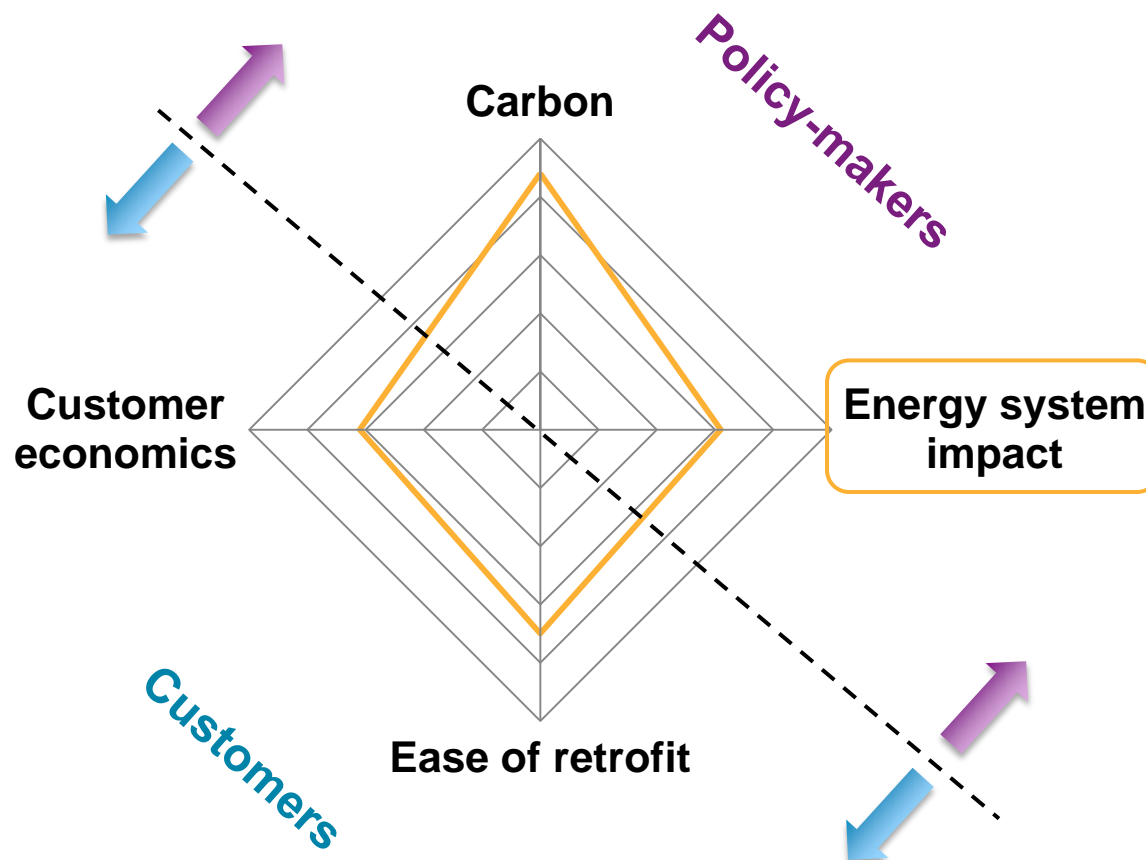
**ASHP** **Boiler**

## ANNUAL CO<sub>2</sub> EMISSIONS: Hybrid ASHP / Boiler



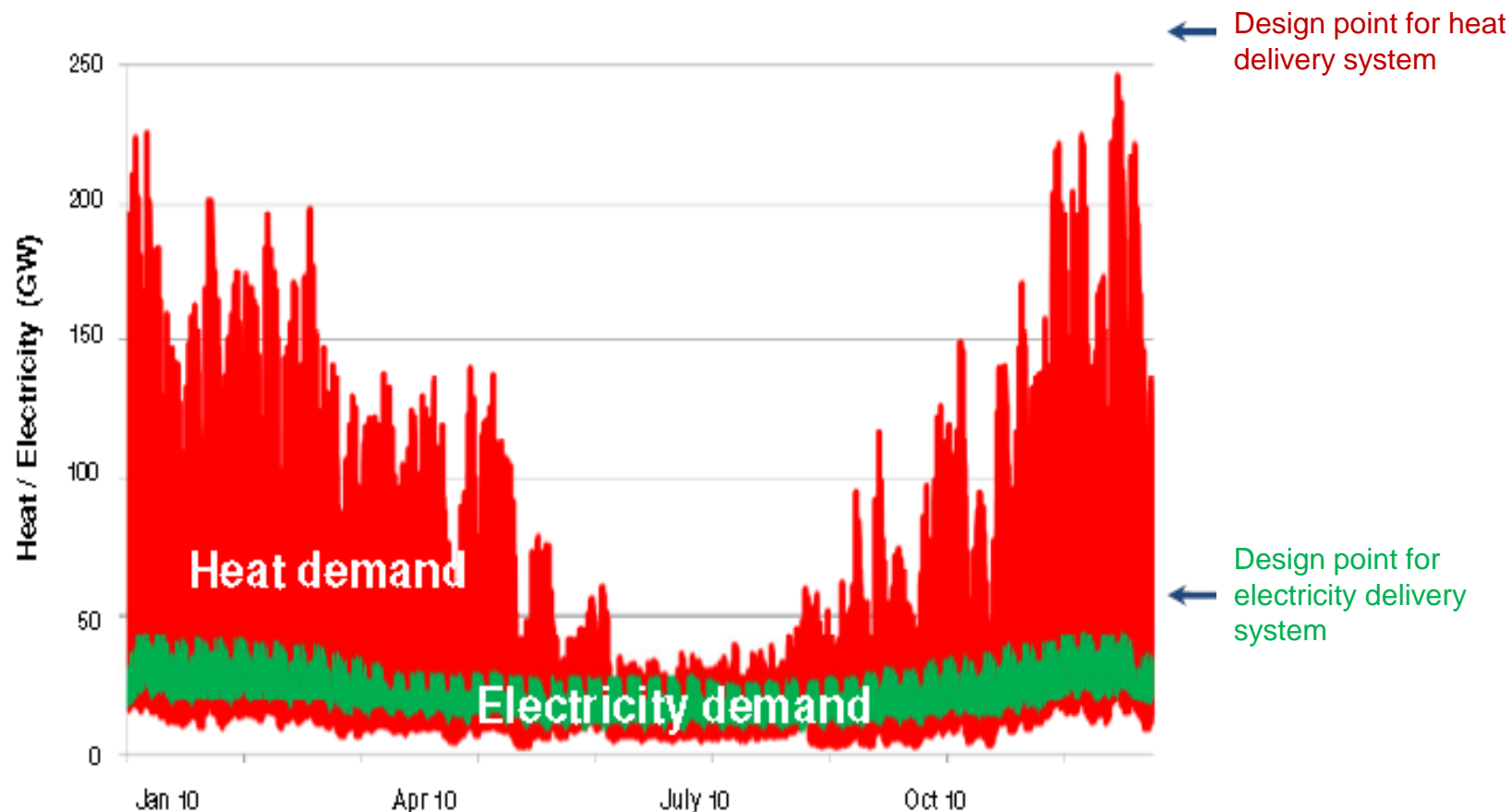
**ASHP**  
**HP (95% space heating) + Boiler**  
**HP (60% space heating) + Boiler**  
**Boiler**

## What problems do hybrids address?



## Energy system impact: Smart operation of hybrids will increase flexibility & help manage grid congestion

### 2010 UK heat & electricity hourly demand variability



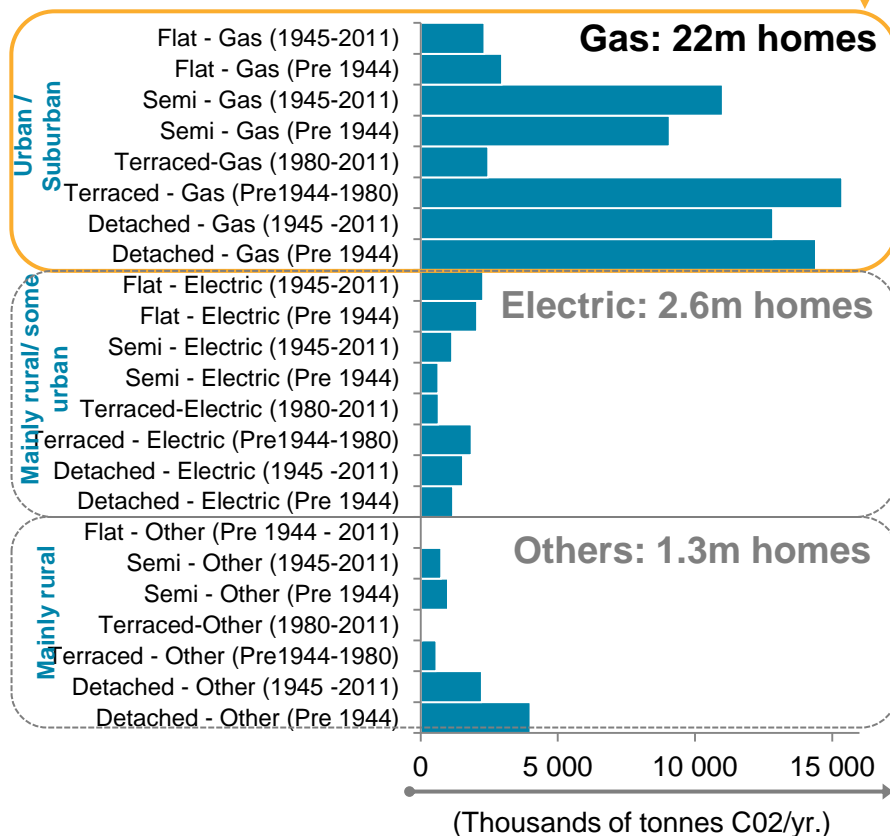
Source: Energy Technologies Institute, 2012

- ▶ Scene setting: Heat pumps in the building sector
- ▶ Hybrids (ASHP/gas boiler) are a possible solution
- ▶ What problems do hybrids address?
- ▶ **Policy impact**
- ▶ Market outlook

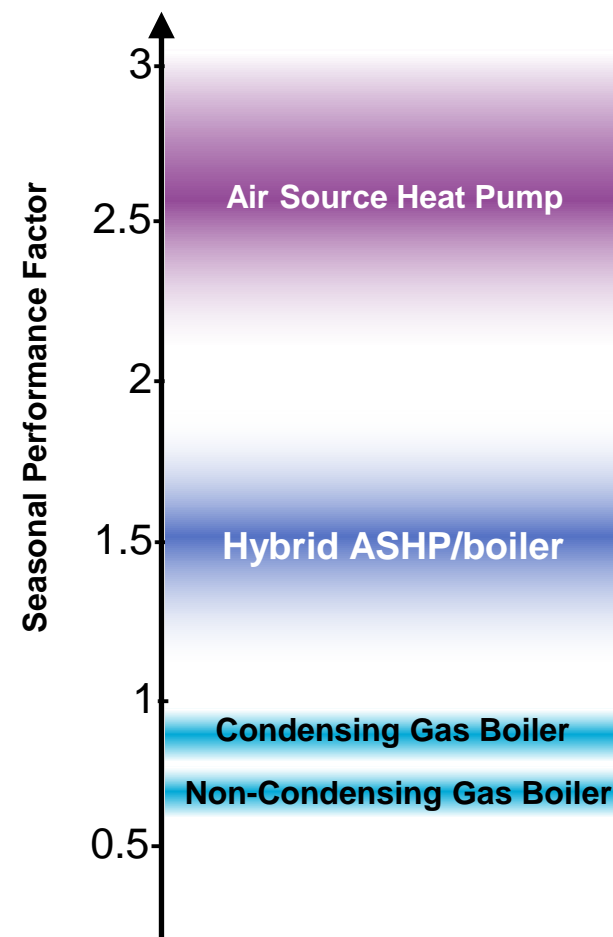
## The scale of the challenge: 2015 residential heat emissions

### On-gas homes - hard to switch from gas:

- ▶ Significant incentives needed
- ▶ Policy needs to allow hybrids potential to be realised

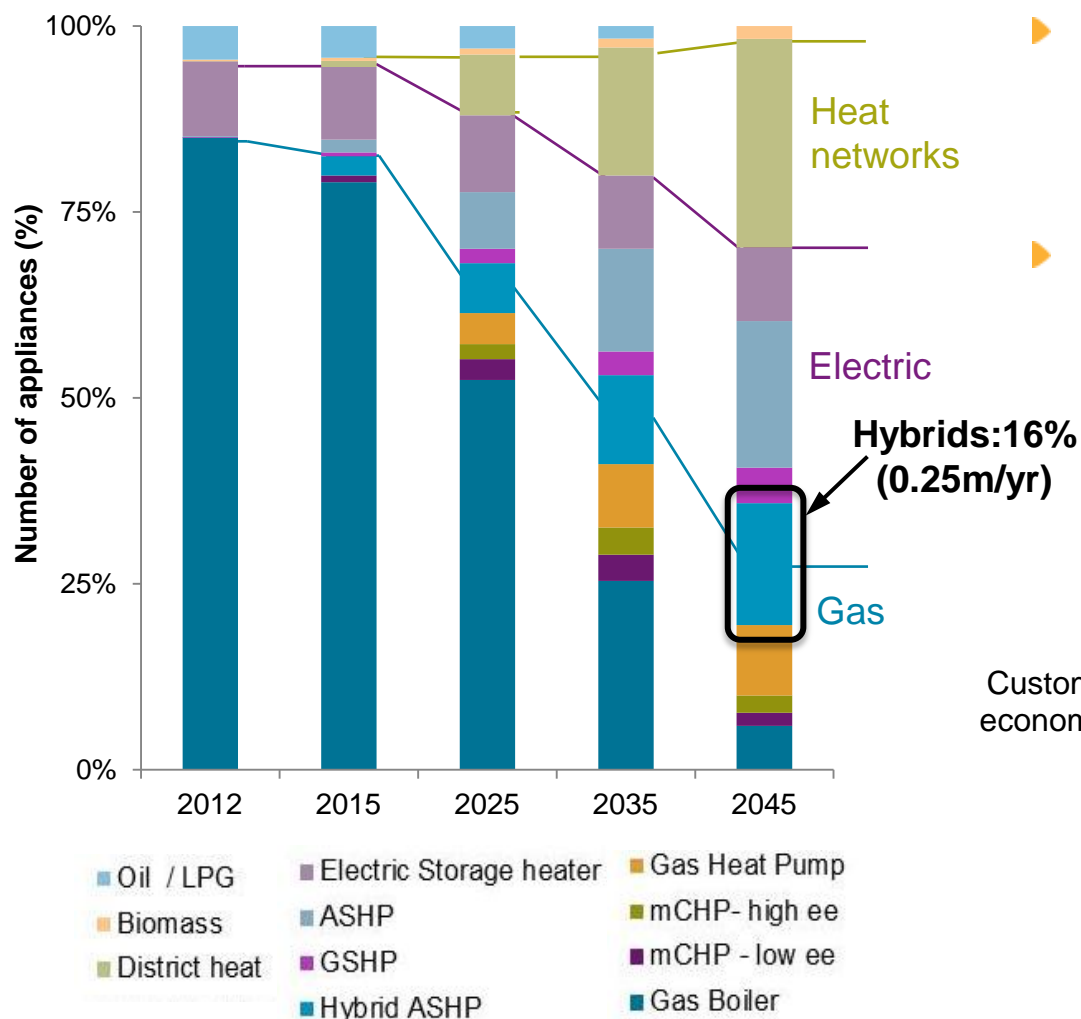


## Hybrids: A step beyond gas boilers?

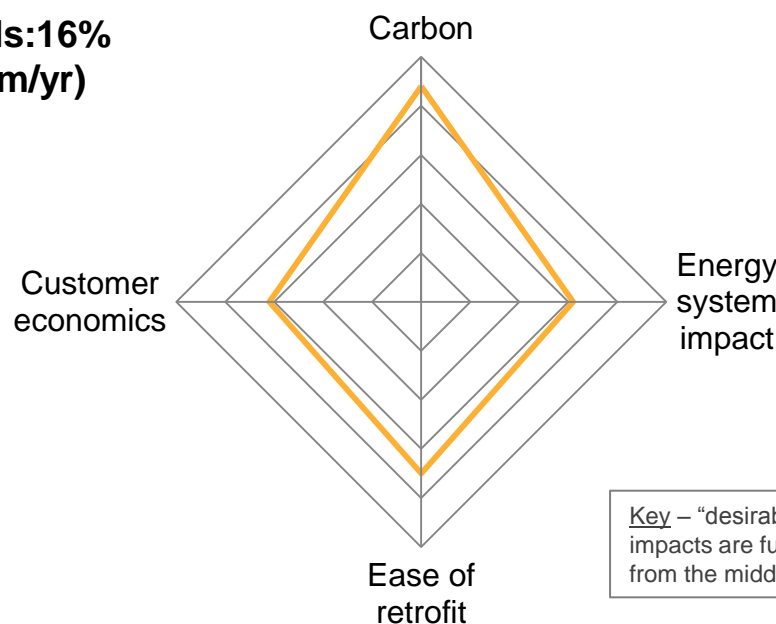


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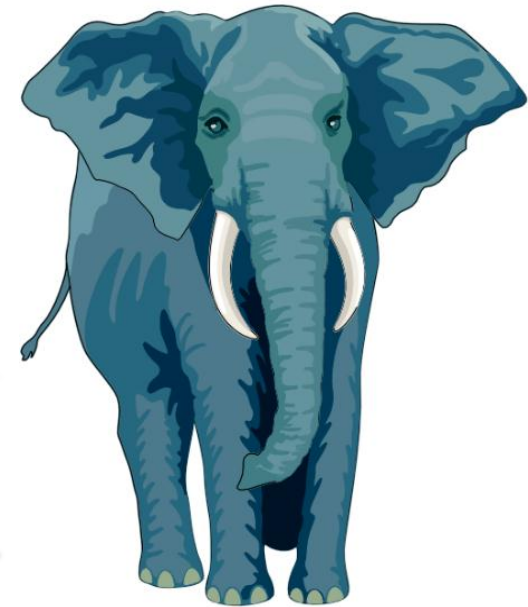
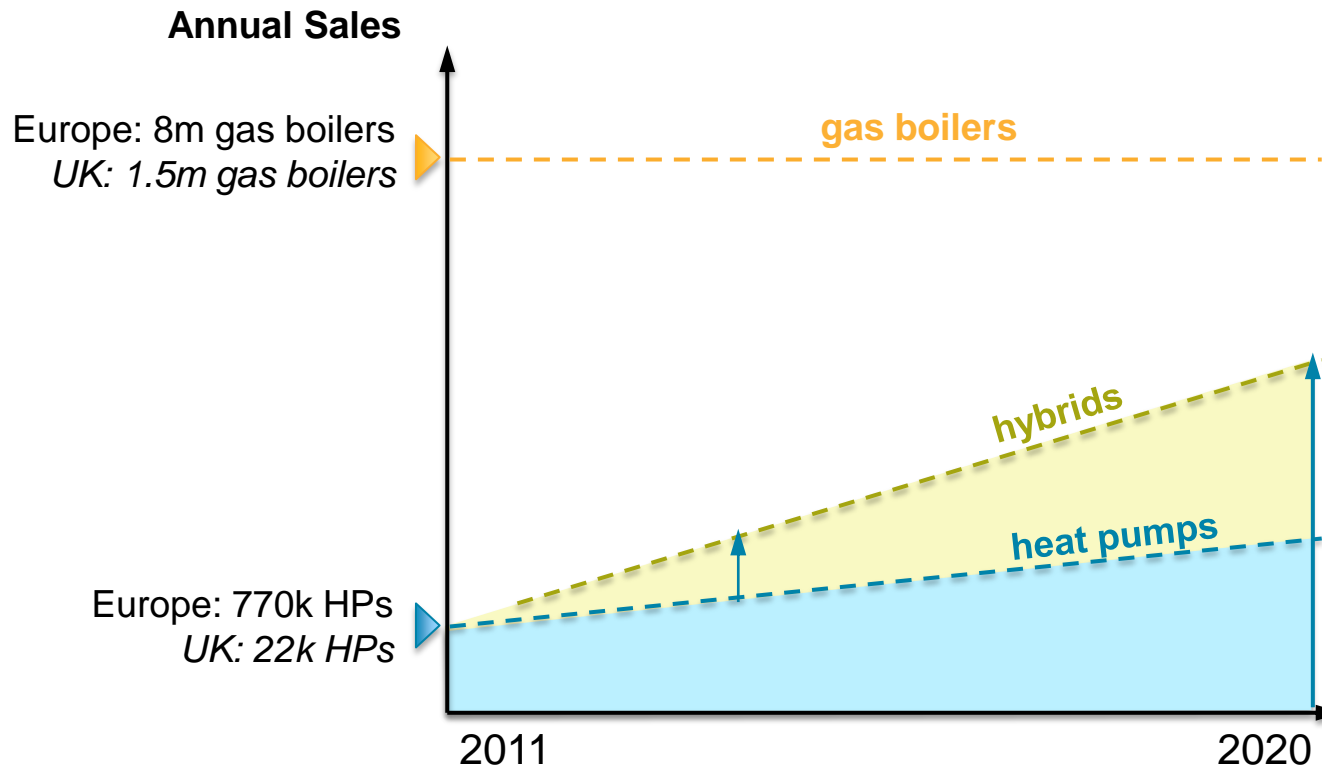


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## Research taken from Delta-ee ASHP Innovation Monitor

Insight into key technology, policy and customer drivers shaping future ASHP markets

## Thank you

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