

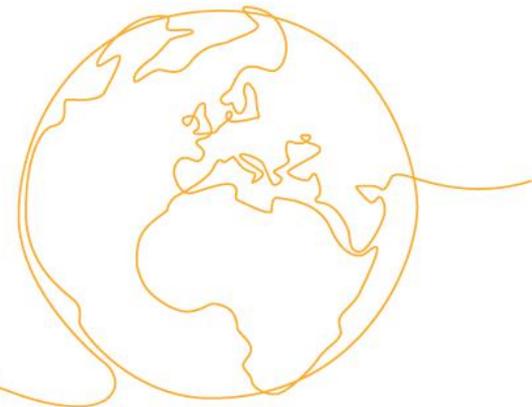
Heat Pumps in the Building Sector: Hybrid Heat Pumps opening UK retrofit opportunities?

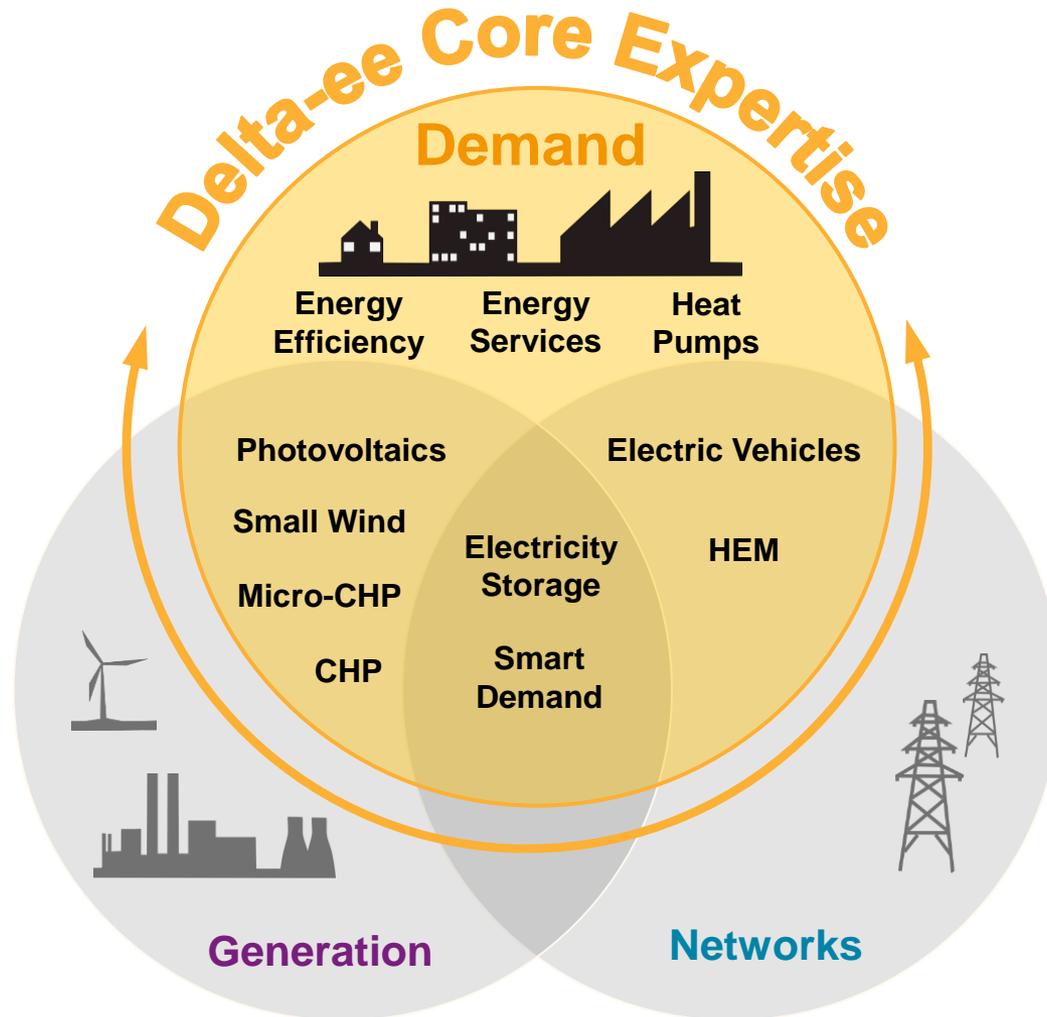
Dr. Lindsay Sugden, Delta Energy & Environment

DECC IEA Heat Pump Workshop

13th November 2012

Contact: lindsay.sugden@delta-ee.com, +44(0)131 625 1006





Delta provides:

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

Clients:

- ▶ Energy companies
- ▶ 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

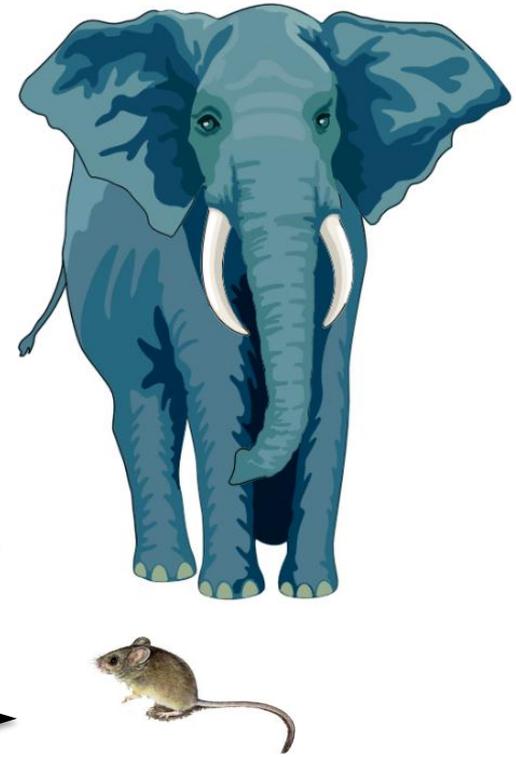
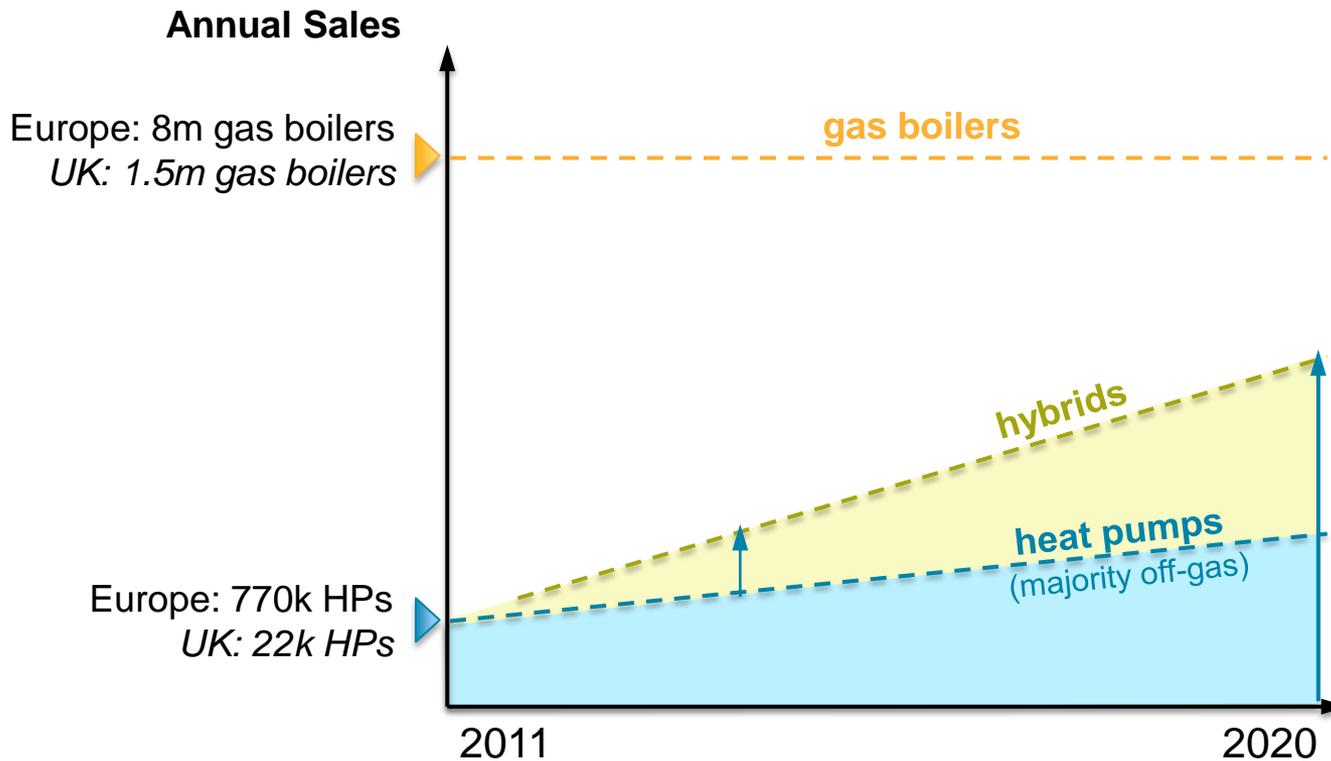
- ▶ **Scene setting: Heat pumps in the building sector**
- ▶ Hybrids (ASHP/gas boiler) in a low carbon future
- ▶ What problems do hybrids address?
- ▶ Policy impact
- ▶ Market outlook

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

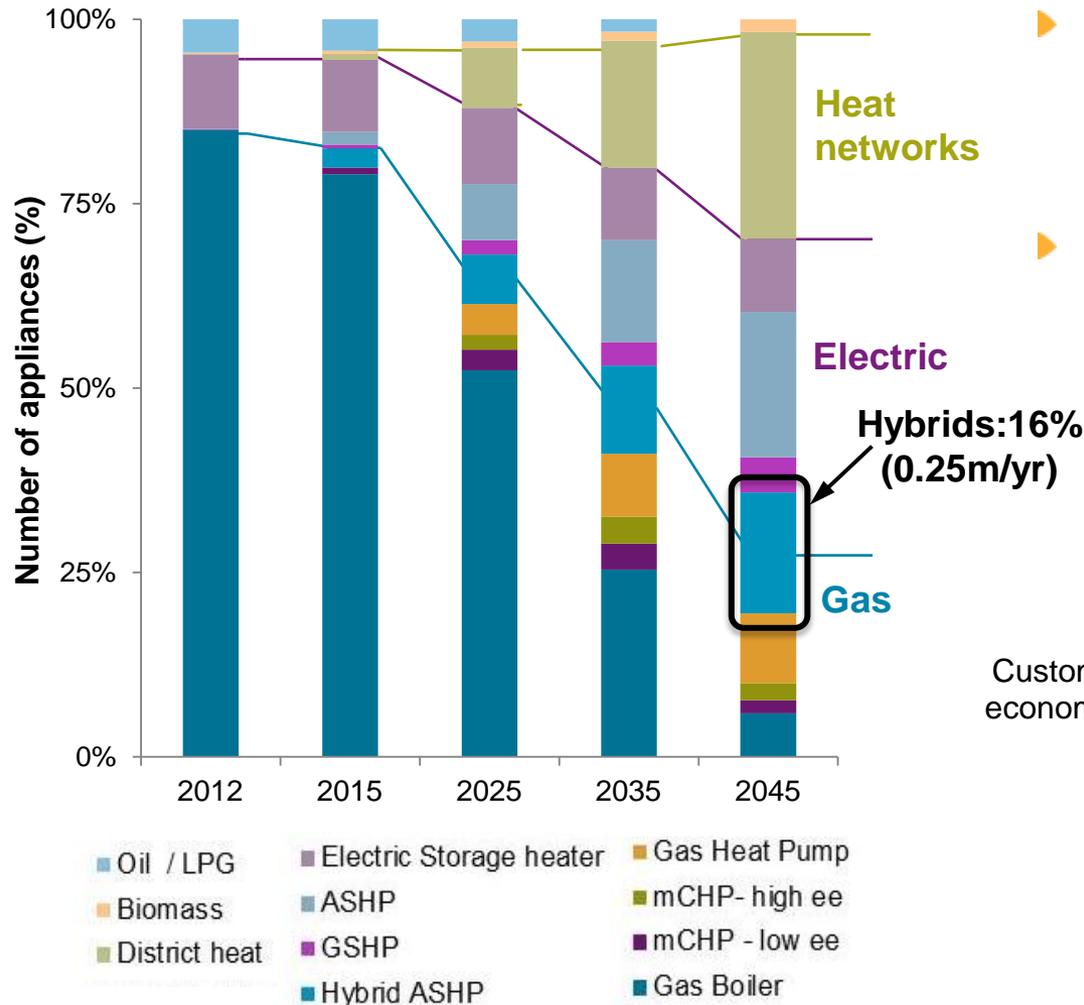
Hybrid heat pump / boiler systems can increase penetration of renewables on the gas grid



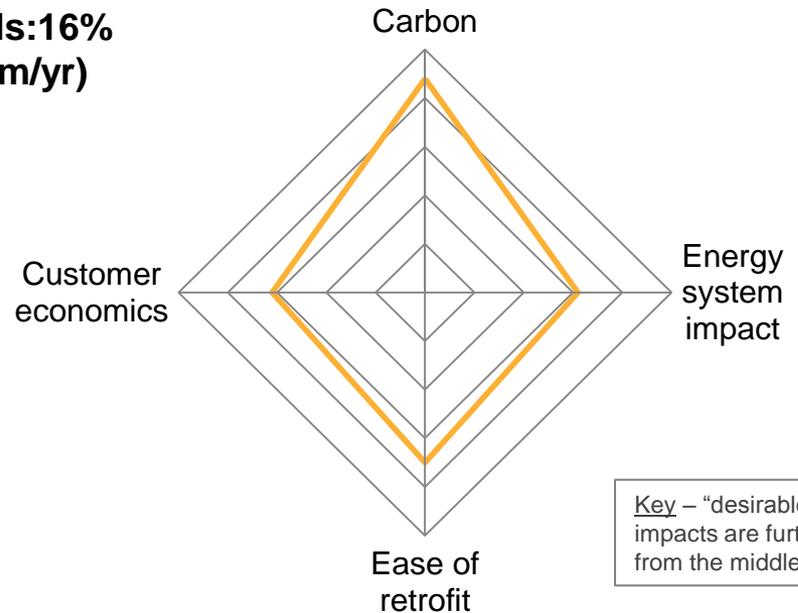
- ▶ Scene setting: Heat pumps in the building sector
- ▶ **Hybrids (ASHP/gas boiler) in a low carbon future**
- ▶ What problems do hybrids address?
- ▶ Policy impact
- ▶ Market outlook

Hybrids in a low carbon future

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

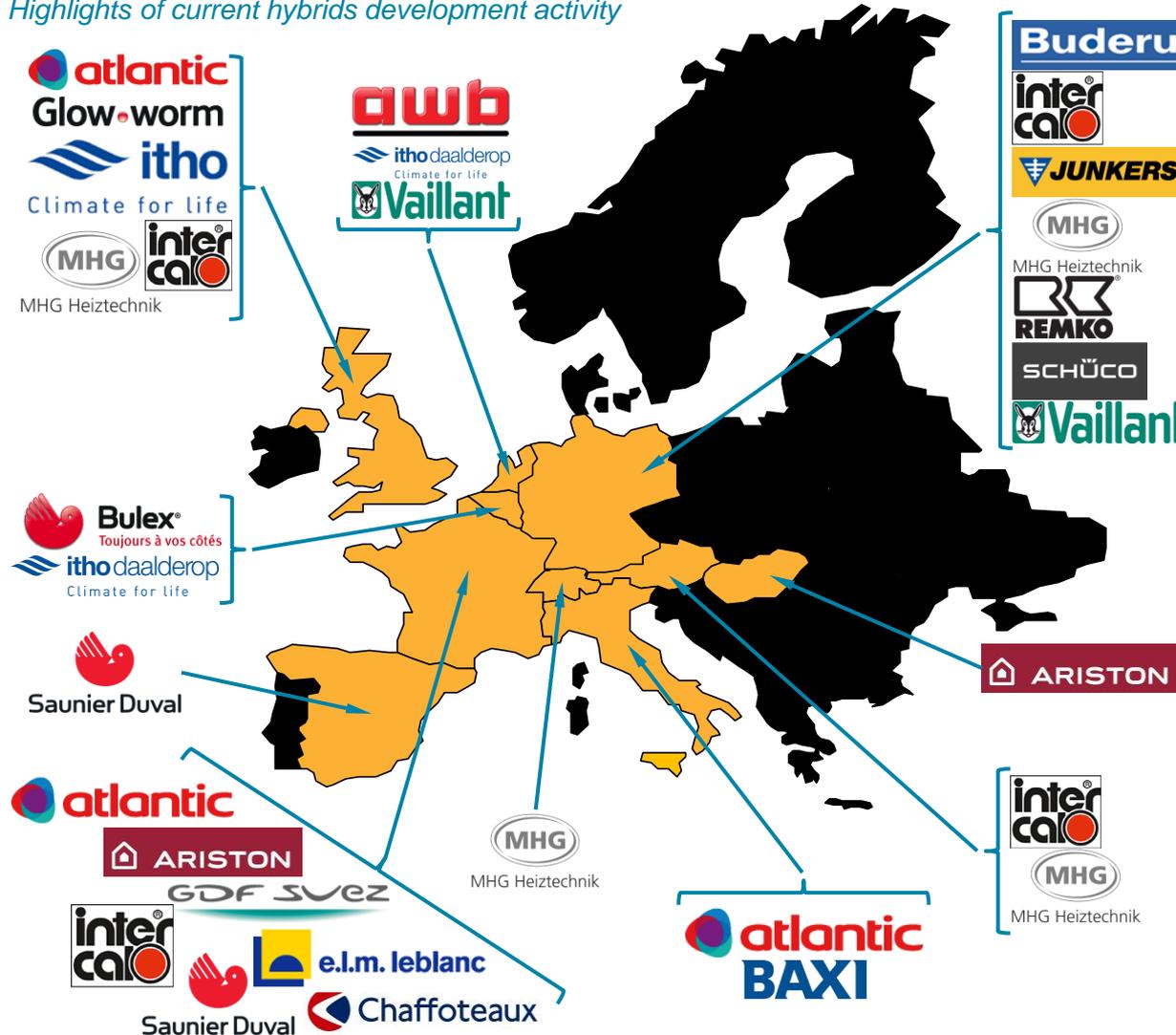


- ▶ Very strong growth in heat networks and electrification of heating – but with gas still playing a significant role in suburban homes.
- ▶ Scenario achieves significant carbon reductions while minimising impacts on the customer and the energy system.



Rapidly growing interest from wide range of players

Highlights of current hybrids development activity

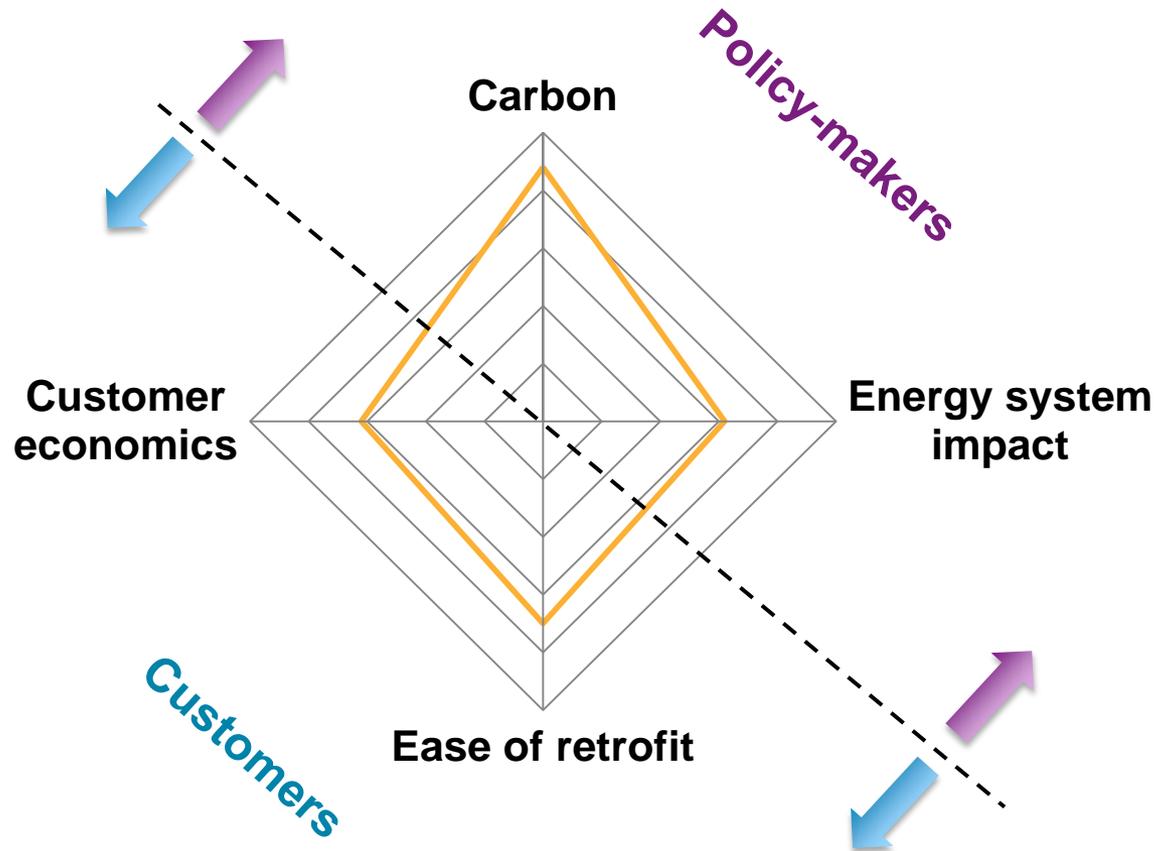


Who is currently involved in hybrid development in Europe?

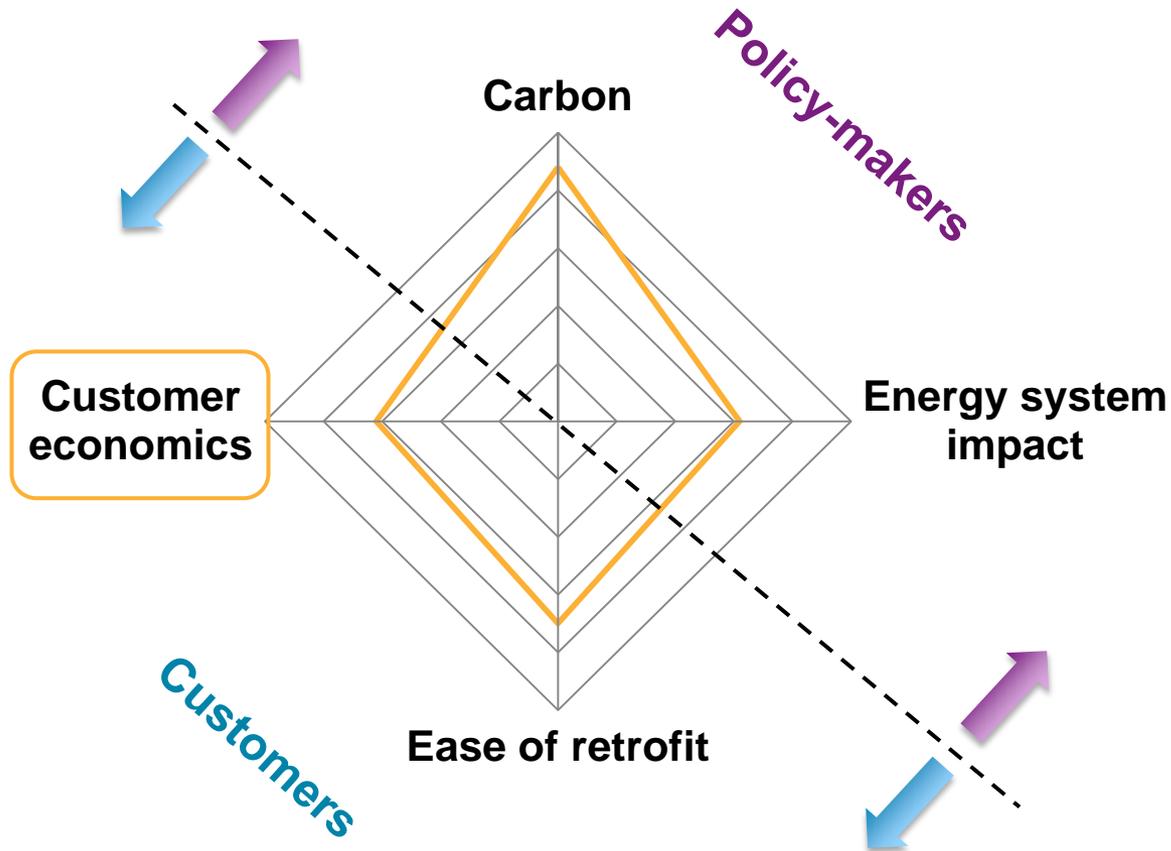
- ▶ 4 of the top 5 boiler companies in Europe have a hybrid on the market
- ▶ Growing interest from pure heat pump / air conditioning companies
- ▶ Energy companies are engaging

- ▶ 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

What problems do hybrids address?

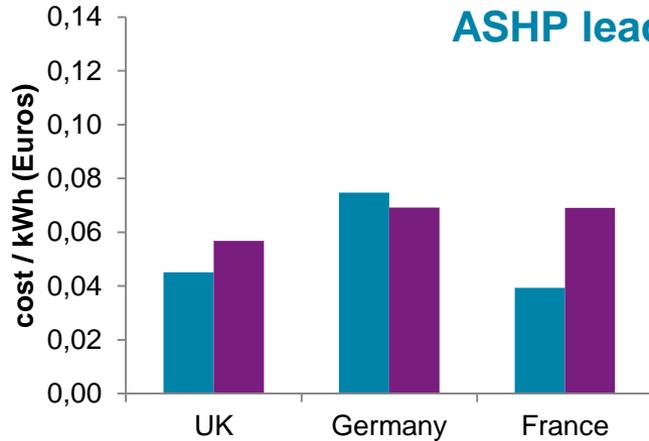


What problems do hybrids address?



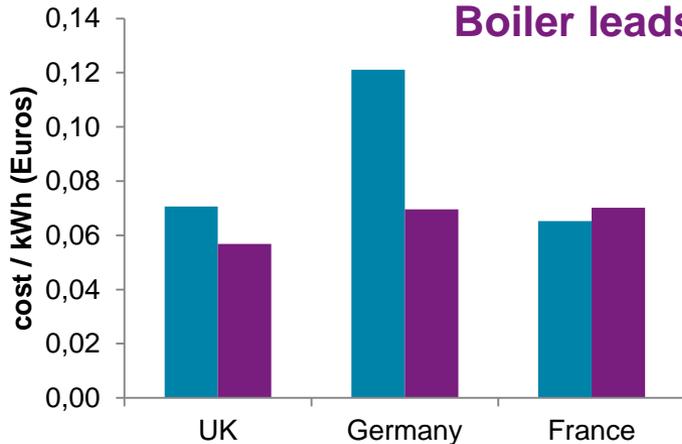
RUNNING COST: Space Heating

ASHP leads



RUNNING COST: Domestic Hot Water

Boiler leads



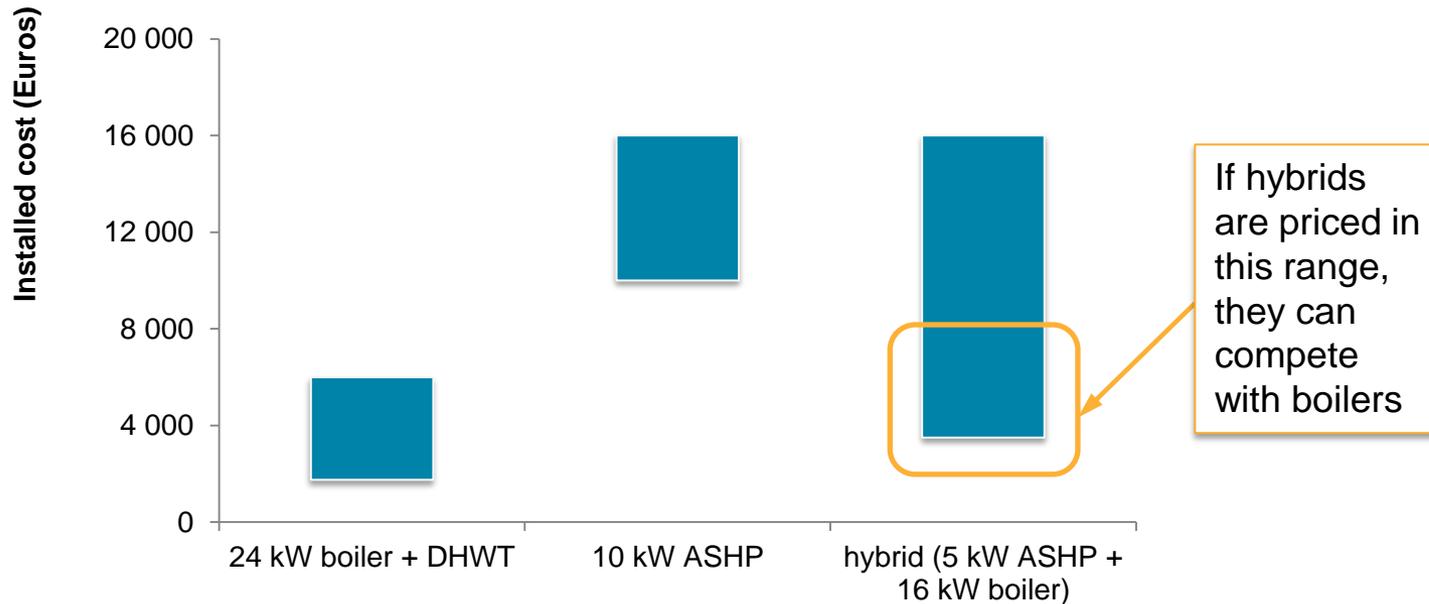
ASHP Boiler

ANNUAL RUNNING COST: Hybrid ASHP / Boiler



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

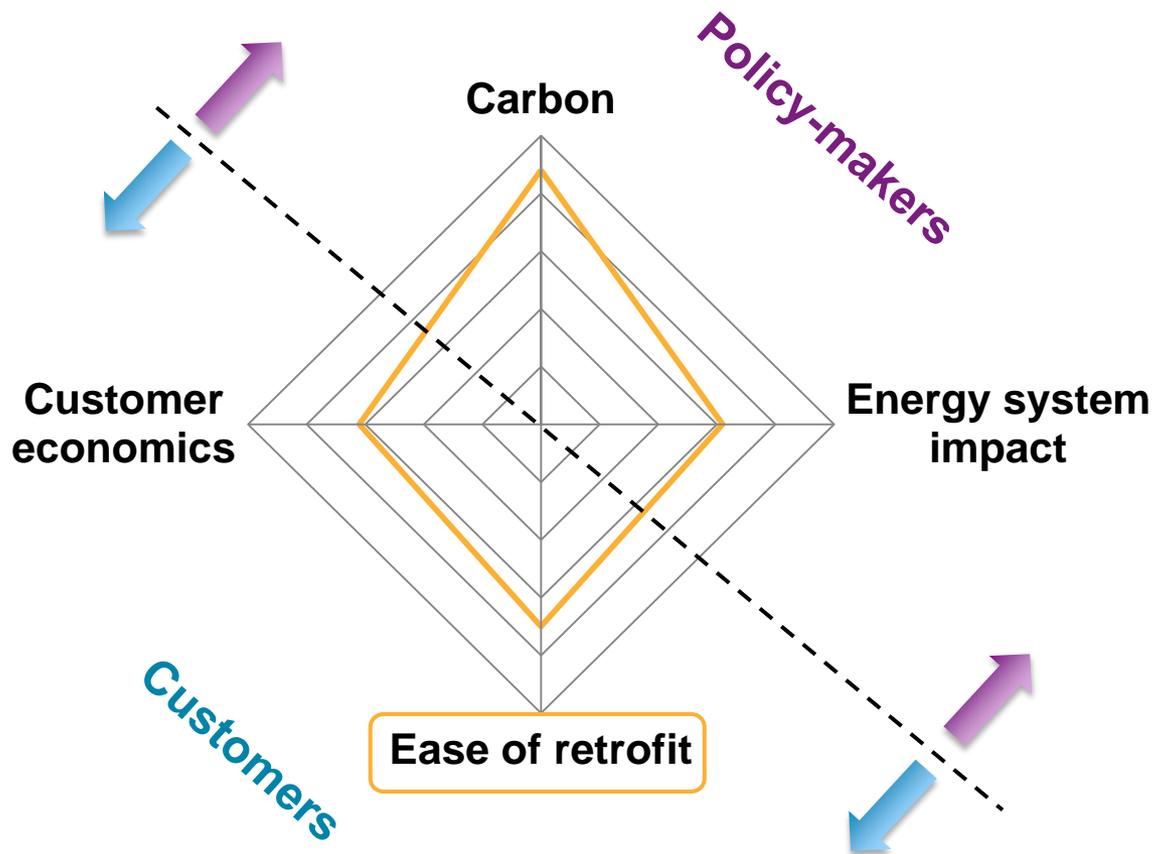
Comparing upfront cost of boilers, ASHP & hybrids



Avoided cost of heat distribution system upgrade?



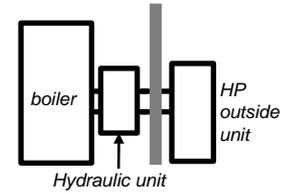
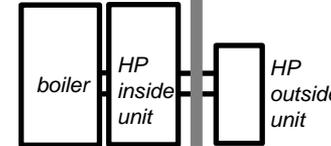
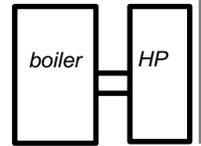
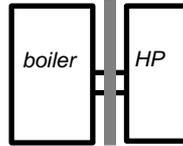
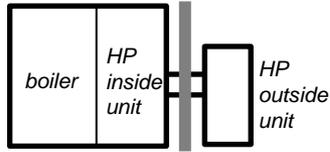
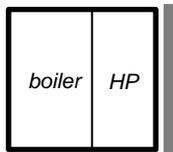
What problems do hybrids address?



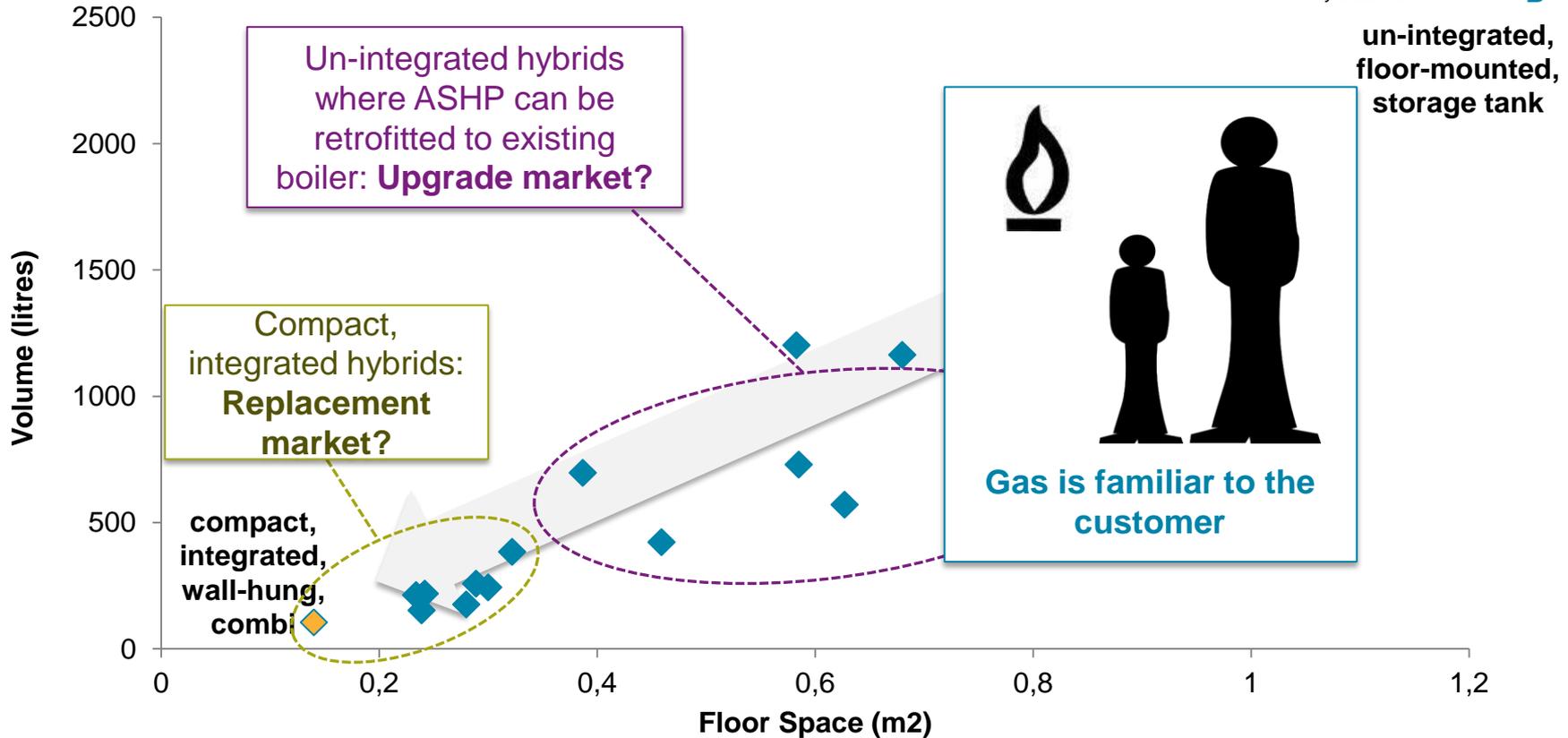
Ease of retrofit: Hybrids - physical fit & customer appeal

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

integrated

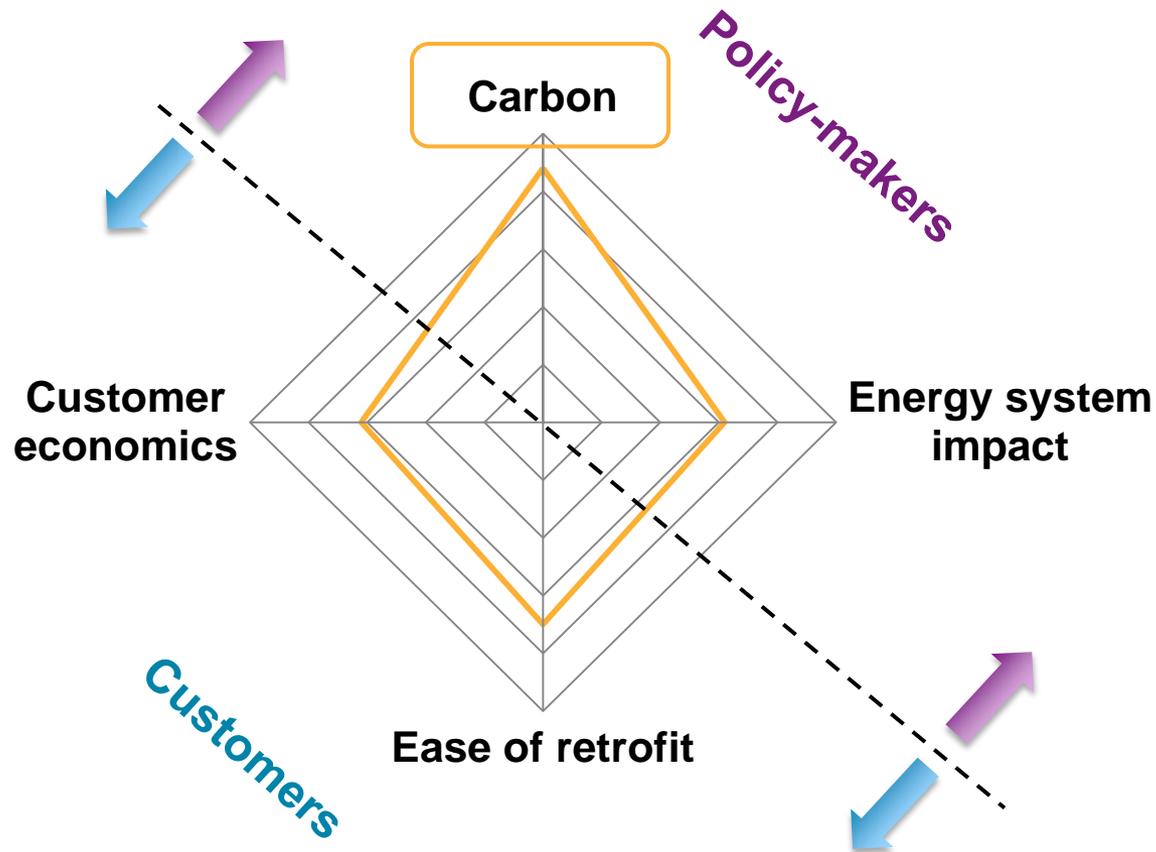


un-integrated



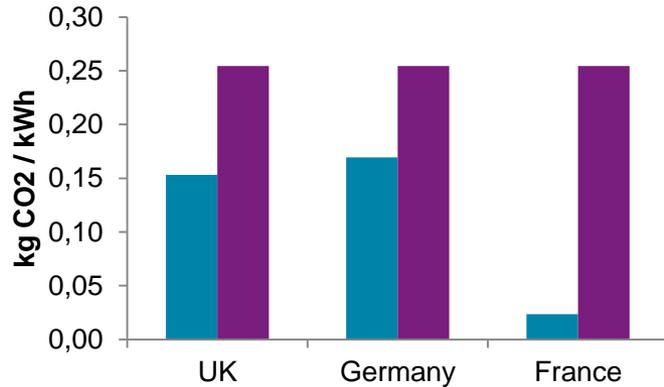
◆ reference boiler ◆ hybrid HPs

What problems do hybrids address?



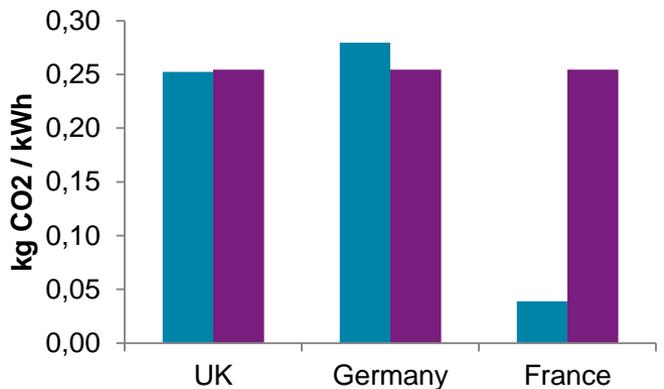
CO₂ EMISSIONS: Space Heating

ASHP leads



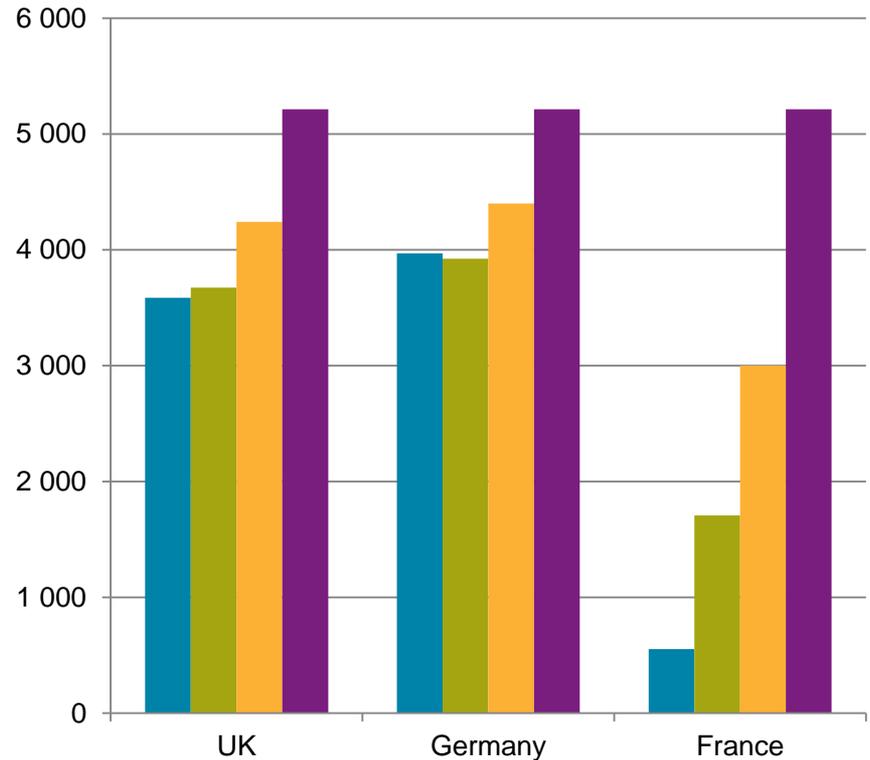
CO₂ EMISSIONS: Domestic Hot Water

A closer battle



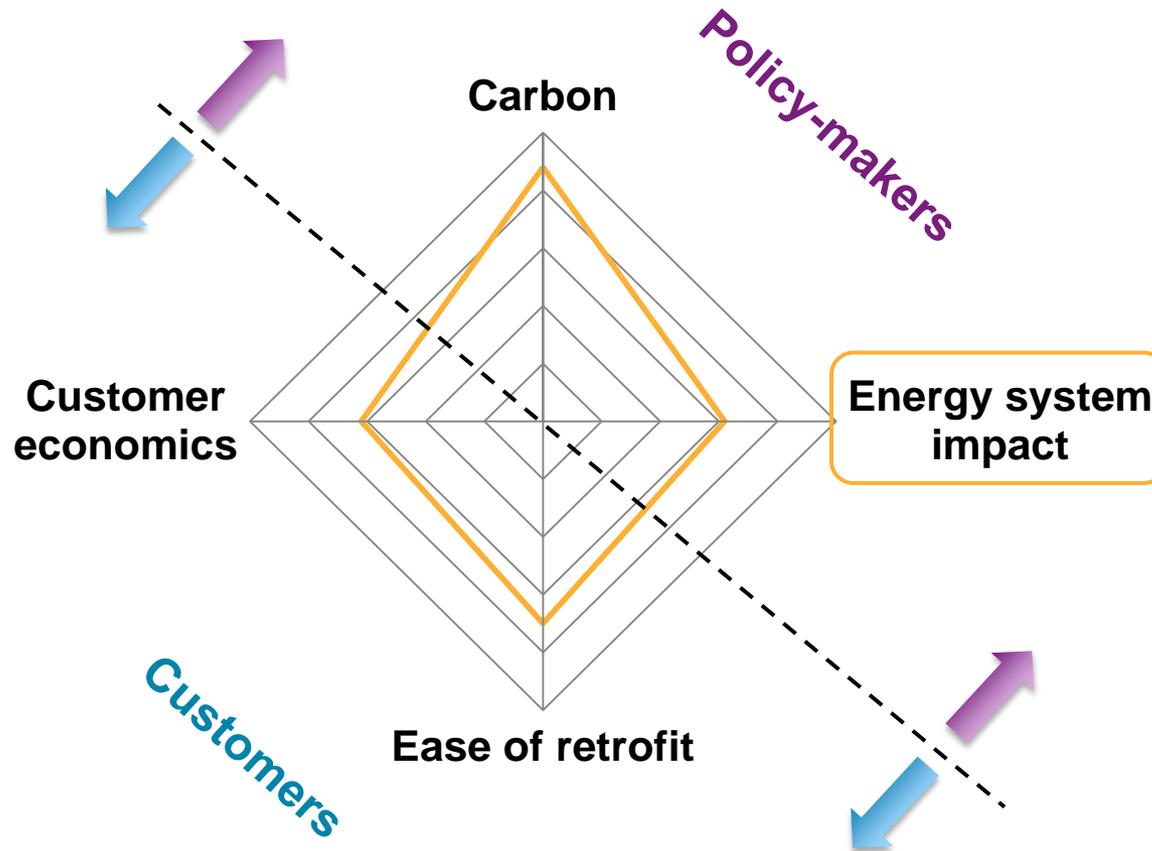
ASHP Boiler

ANNUAL CO₂ EMISSIONS: Hybrid ASHP / Boiler



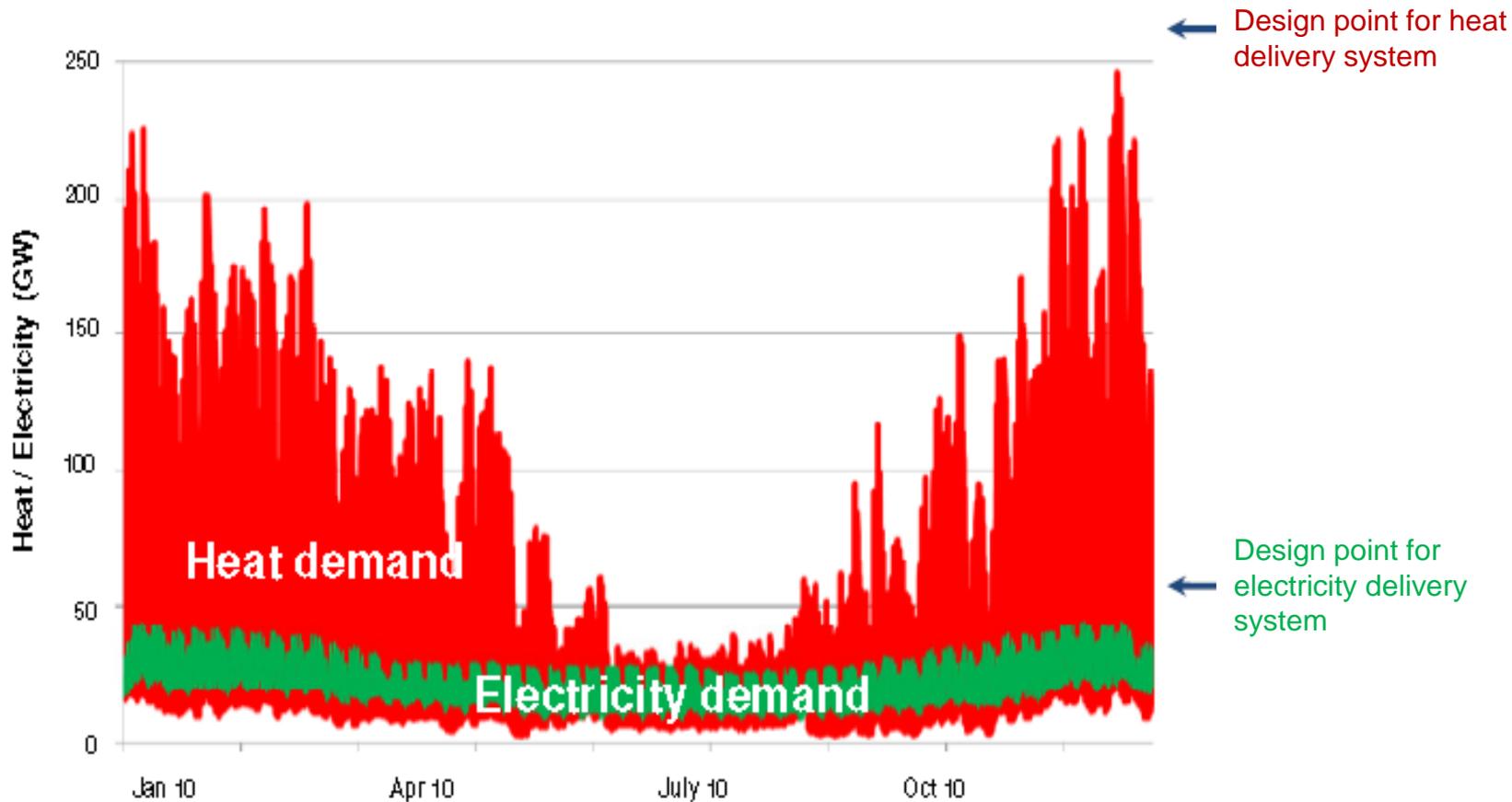
ASHP
 HP (95% space heating) + Boiler
 HP (60% space heating) + Boiler
 Boiler

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



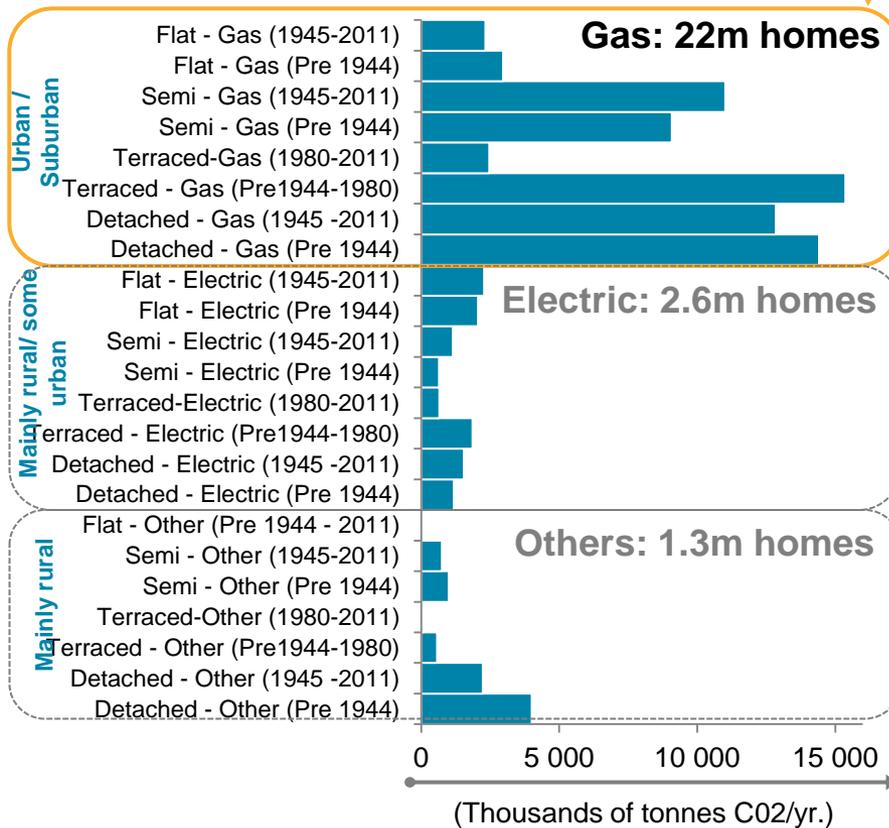
Source: Energy Technologies Institute, 2012

- ▶ 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

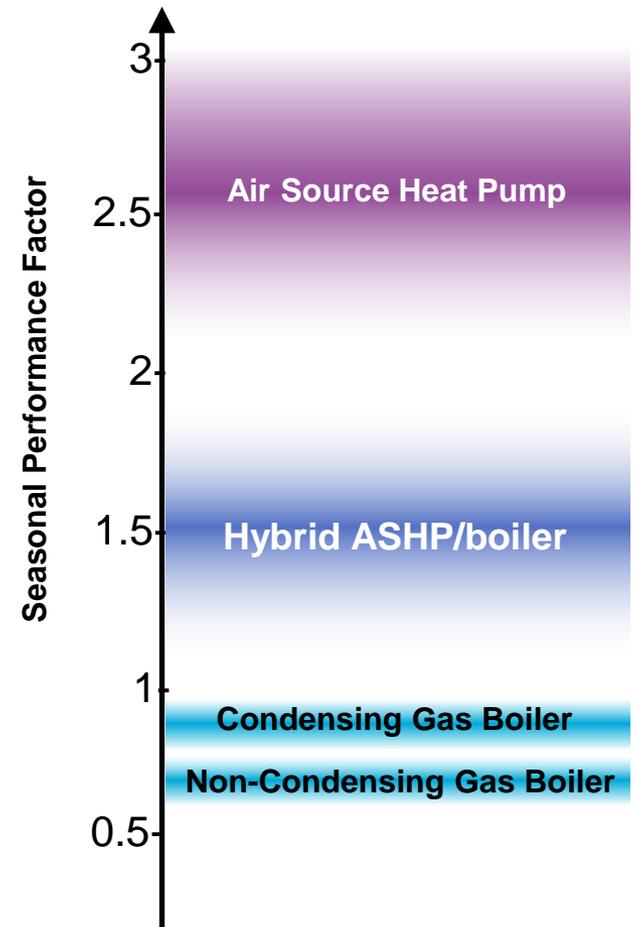
The scale of the challenge: 2015 residential heat emissions

On-gas homes - hard to switch from gas:

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

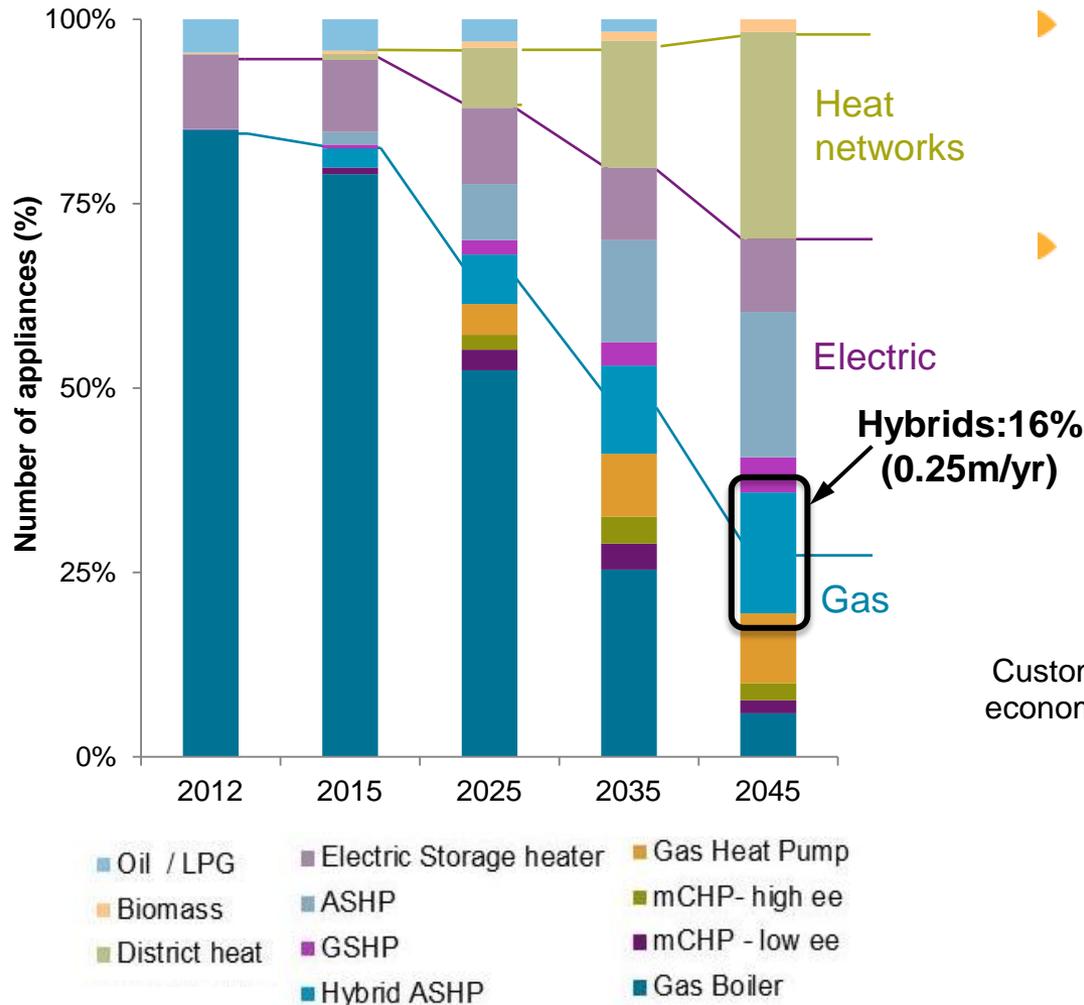


Hybrids: A step beyond gas boilers?

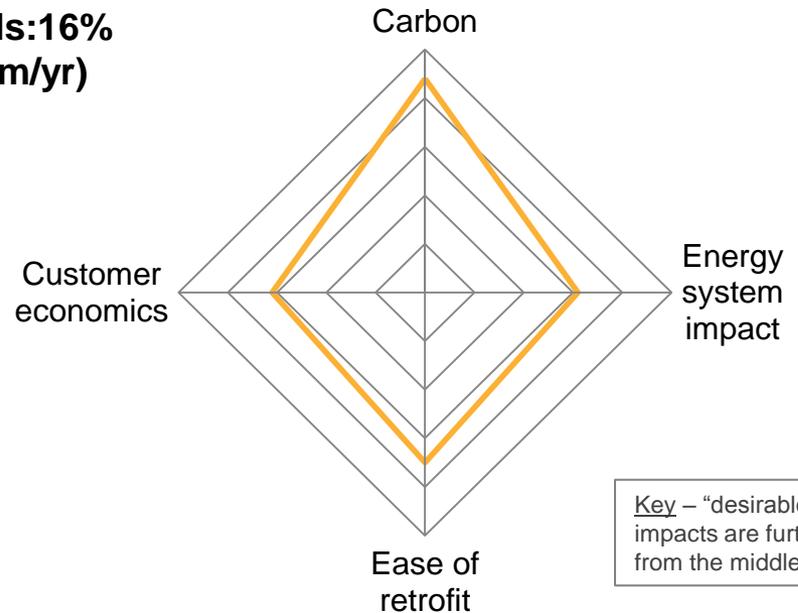


- ▶ Scene setting: Heat pumps in the building sector
- ▶ Hybrids (ASHP/gas boiler) in a low carbon future
- ▶ What problems do hybrids address?
- ▶ Policy impact
- ▶ **Market outlook**

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.
- ▶ Achieves significant carbon reductions while minimising impacts on the customer and the energy system.

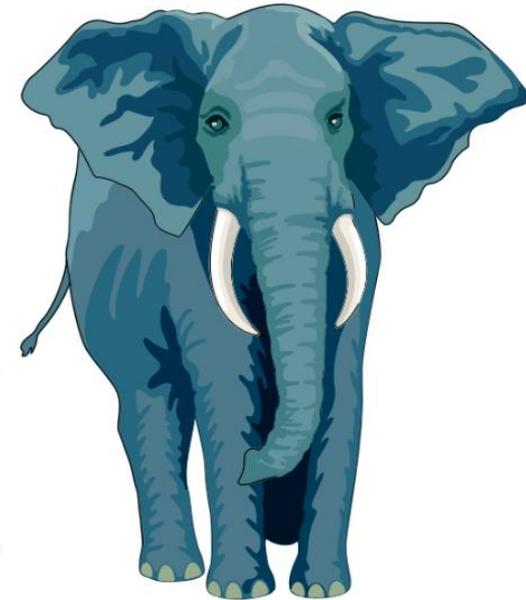
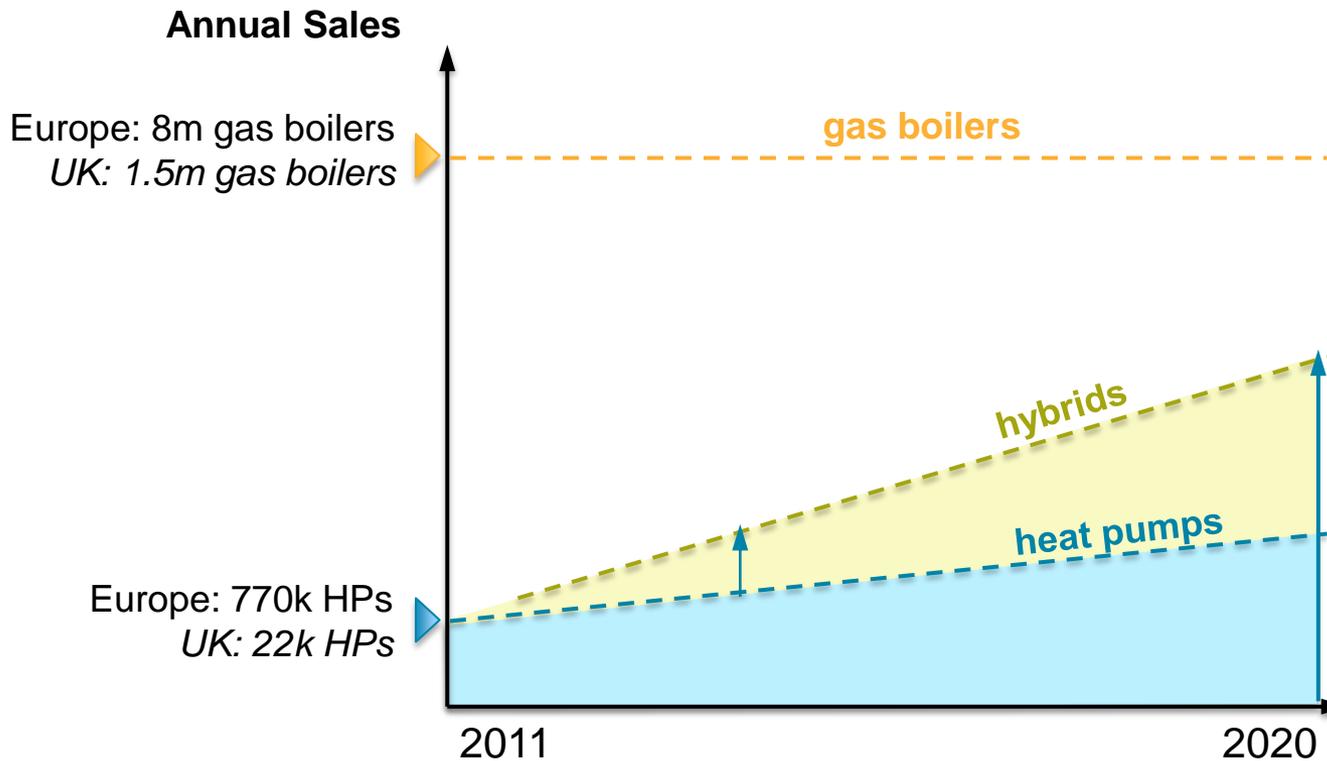


Scene setting: Challenges for heat pumps penetrating the gas grid

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



Research taken from Delta-ee ASHP Innovation Monitor

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

Thank you

Contact:

Lindsay.Sugden@delta-ee.com

+44 (0)131 625 1006

