Delta Energy & Environment Ltd
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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

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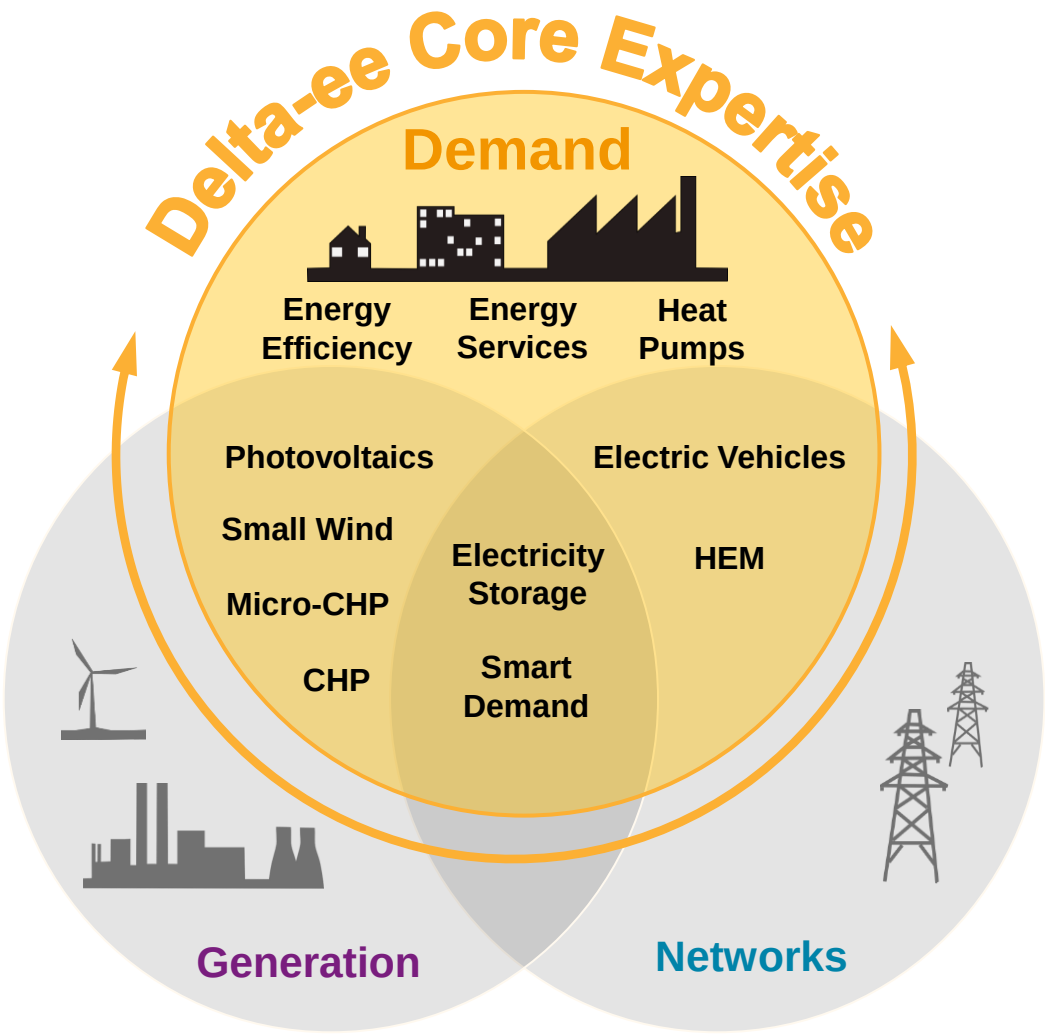
Delta Energy & Environment



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

Agenda

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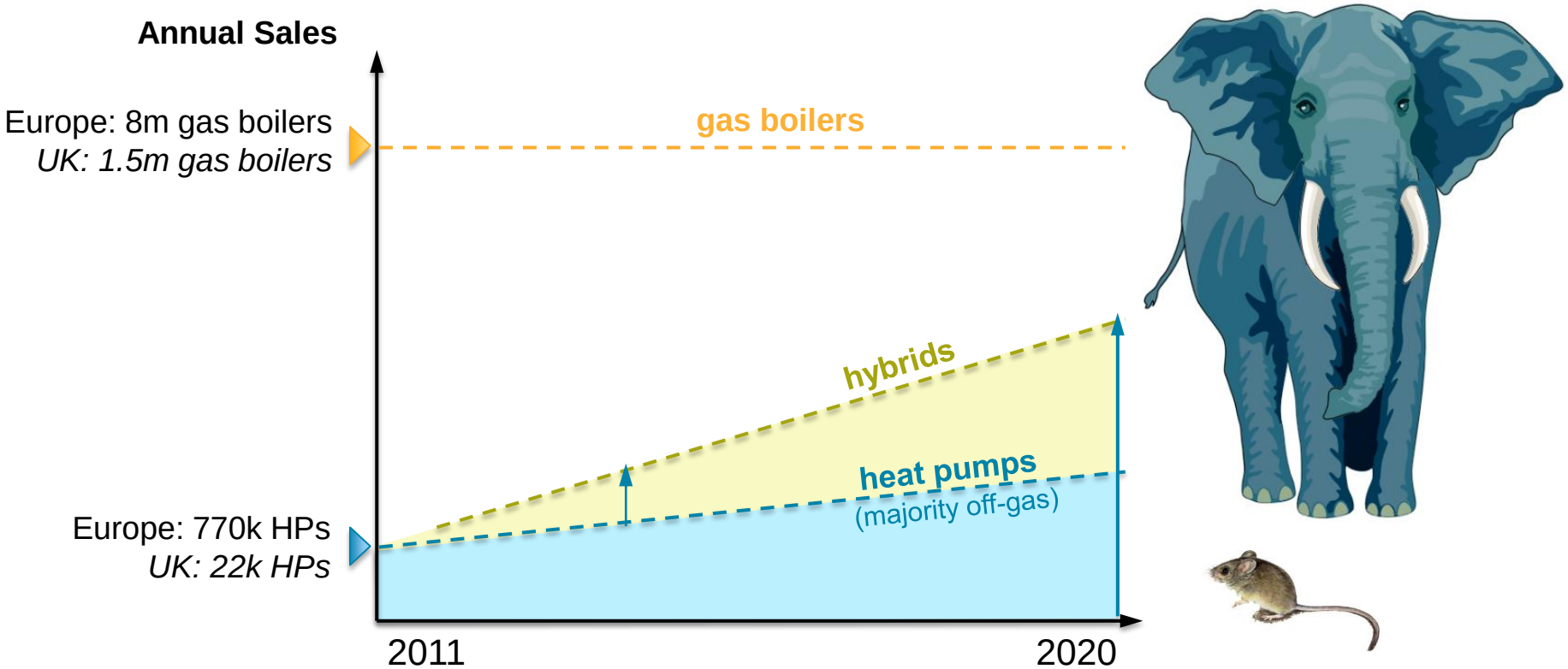
Scene setting: Challenges for heat pumps penetrating the gas grid

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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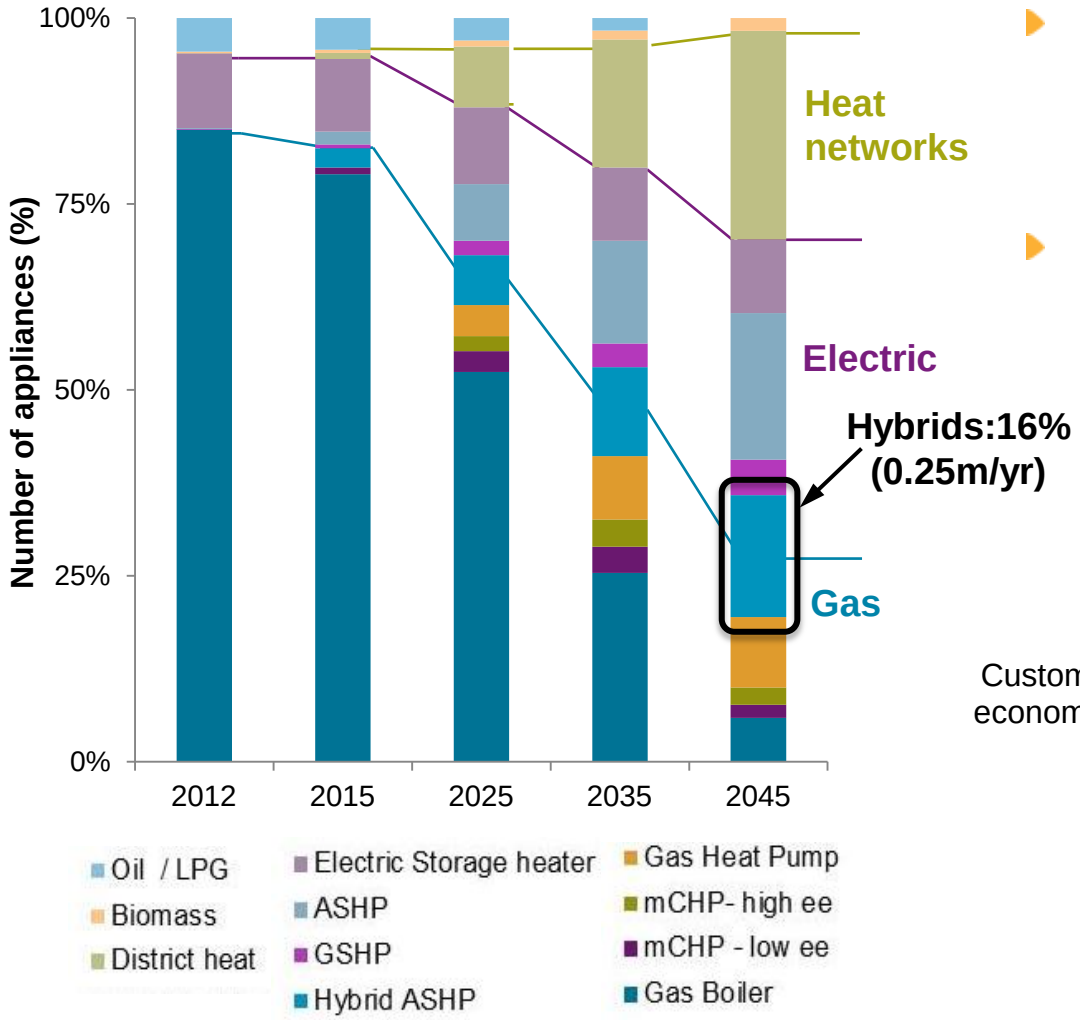
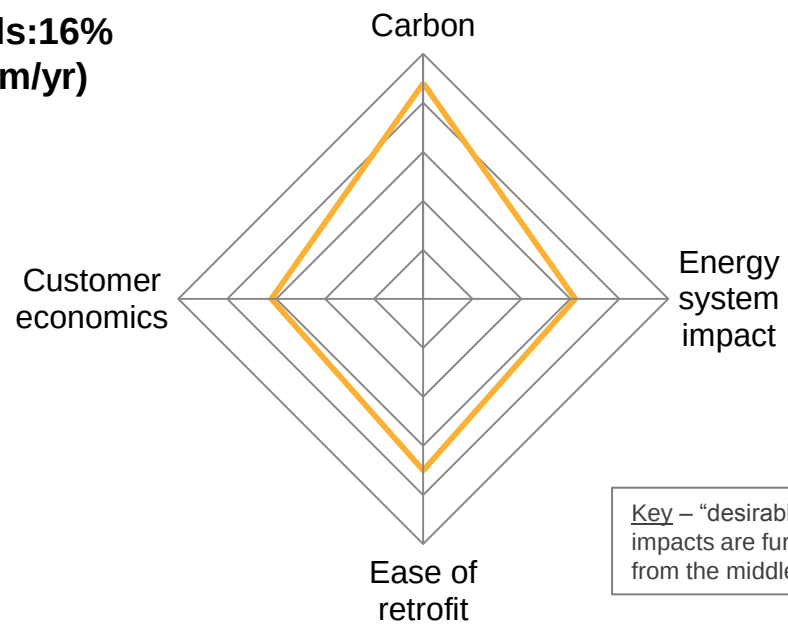
Hybrids in a low carbon future

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.

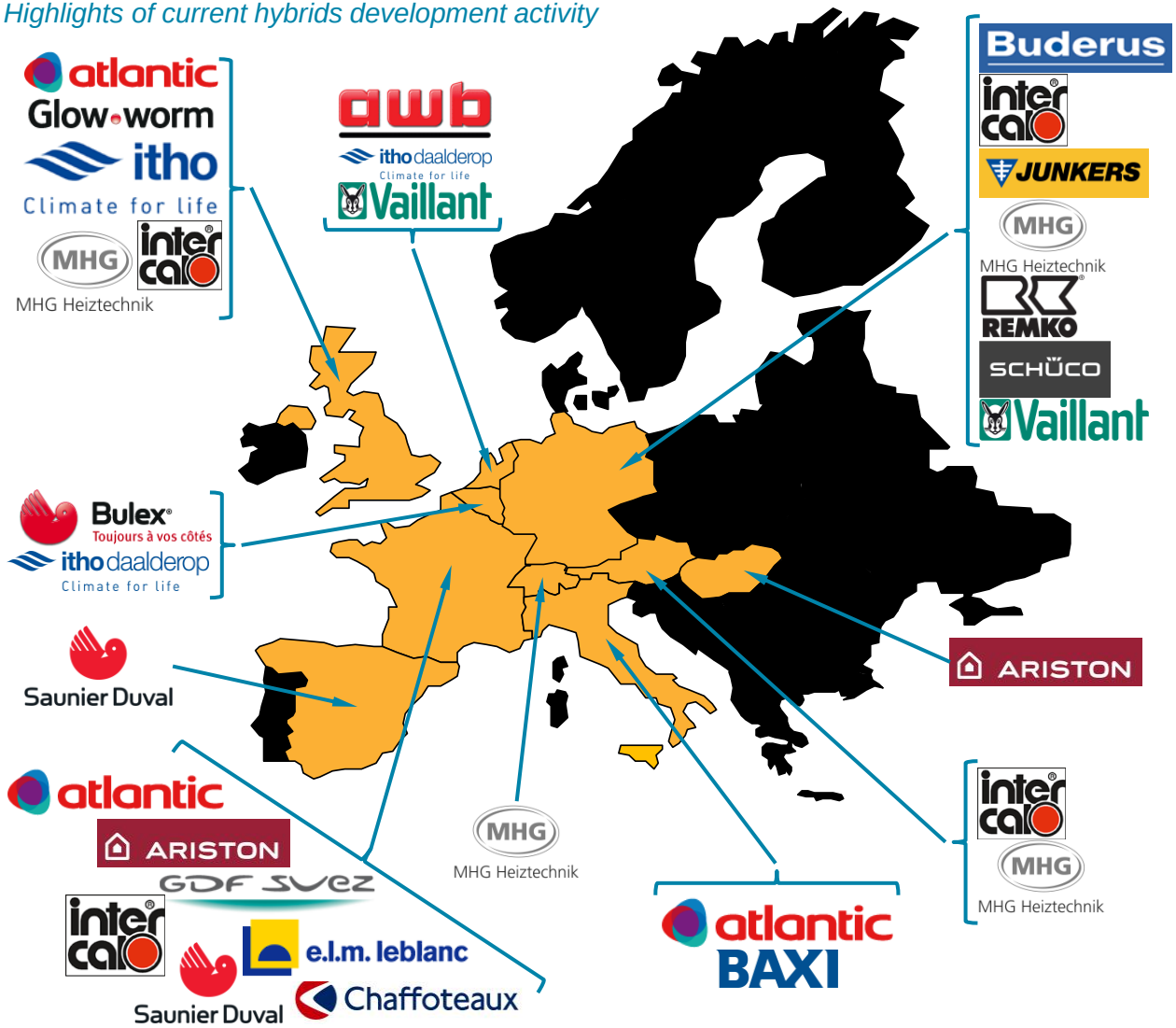


Key – "desirable" impacts are furthest from the middle

Source: Delta-ee Heat Study for Energy Networks Association

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**

Source: Delta-ee

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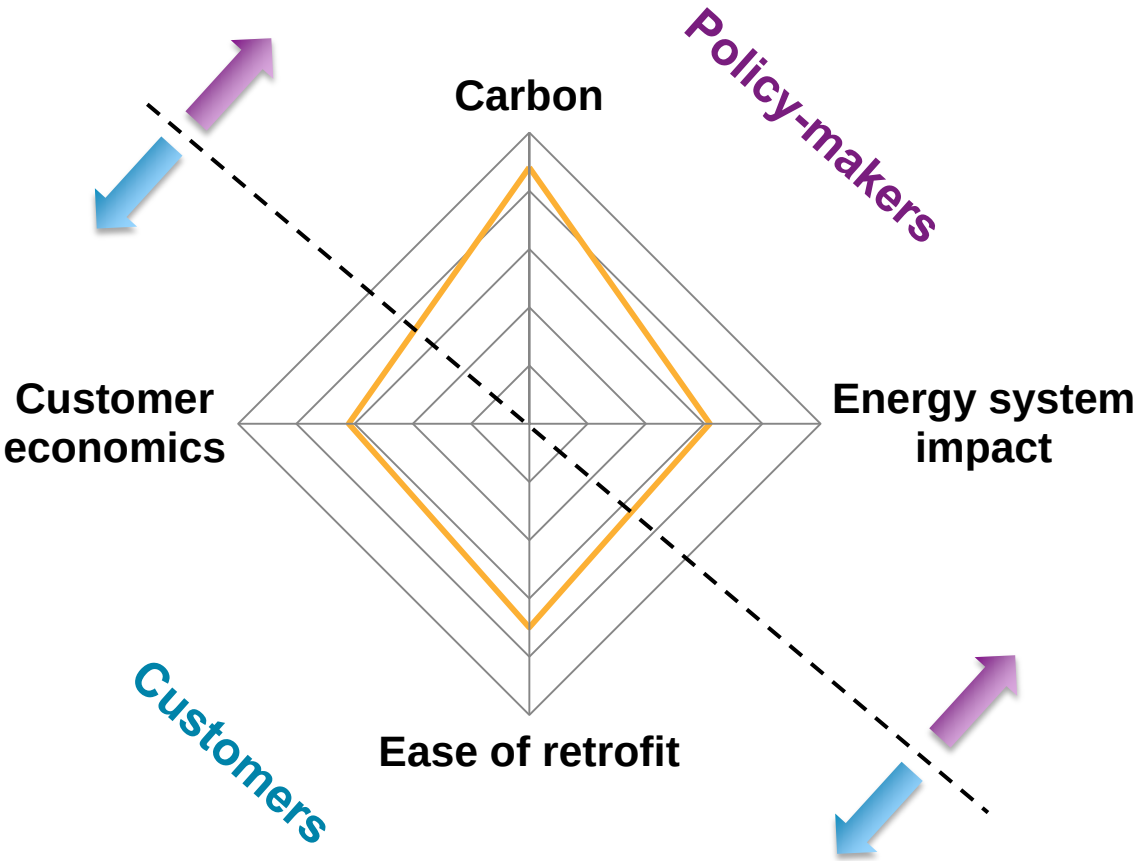
What problems do hybrids address?



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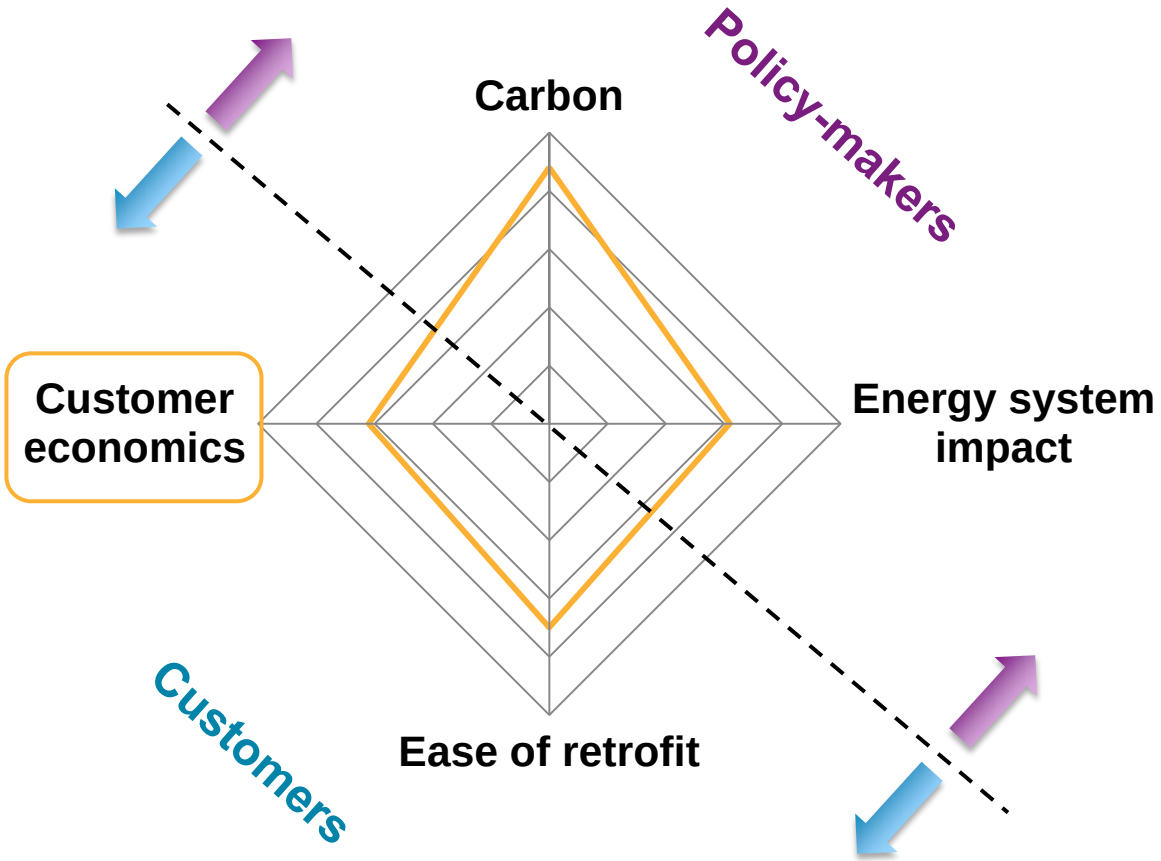
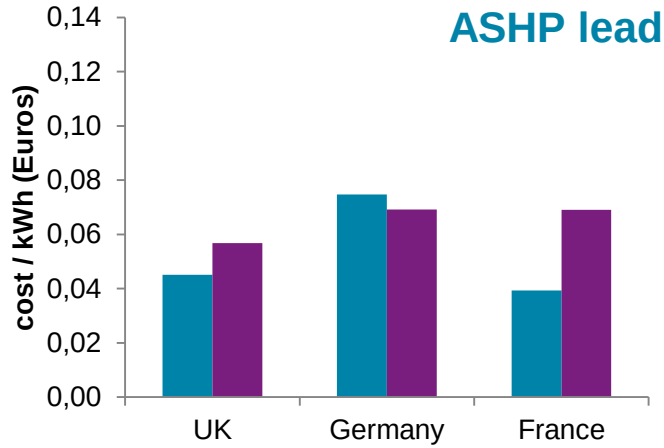


Customer Economics: Running cost

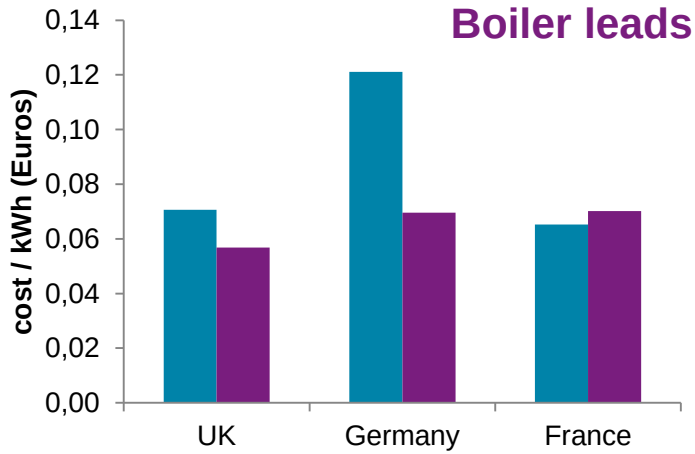
RUNNING COST: Space Heating

ASHP leads



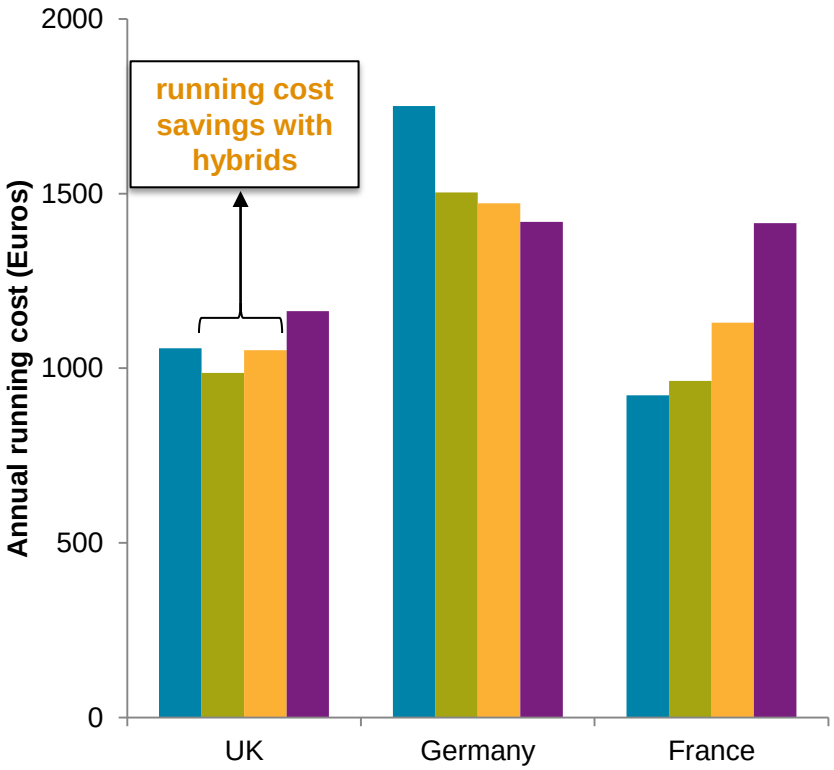
RUNNING COST: Domestic Hot Water

Boiler leads



ASHP **Boiler**

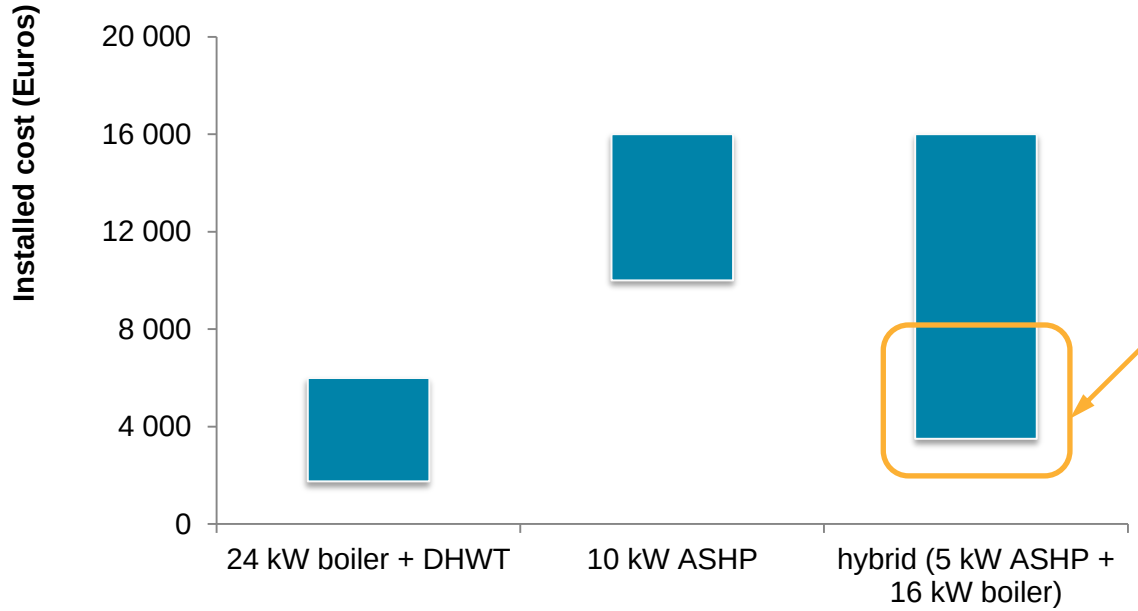
ANNUAL RUNNING COST: Hybrid ASHP / Boiler



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

Customer Economics: Upfront cost

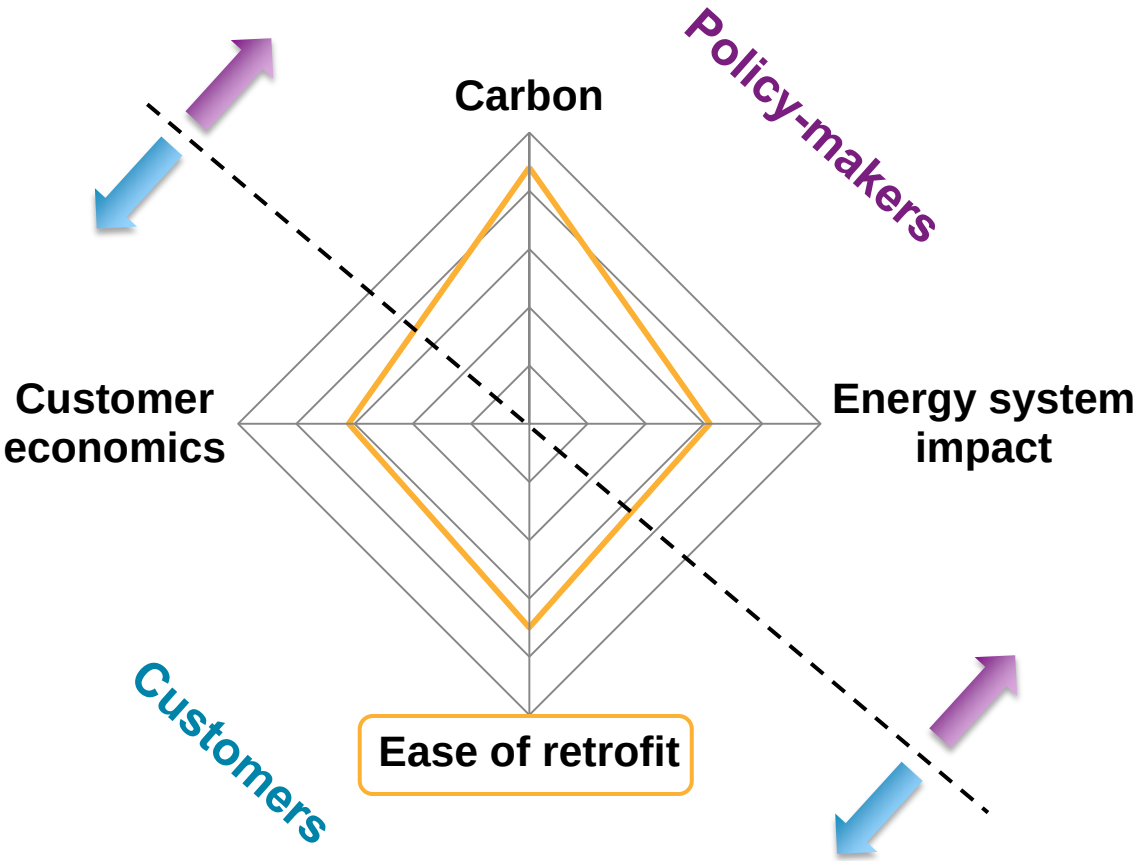
Comparing upfront cost of boilers, ASHP & hybrids



If hybrids are priced in this range, they can compete with boilers

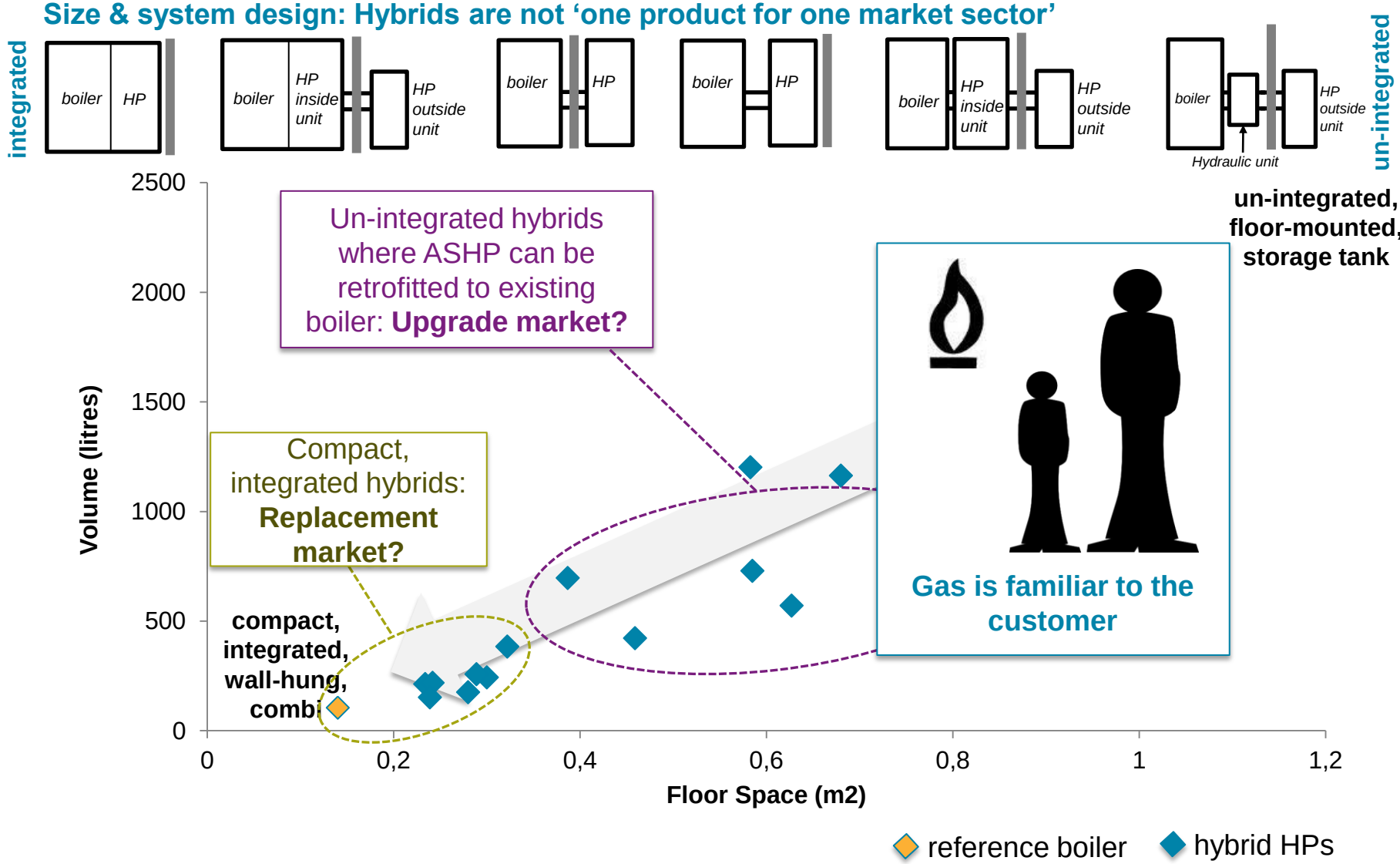
Avoided cost of heat distribution system upgrade?

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'



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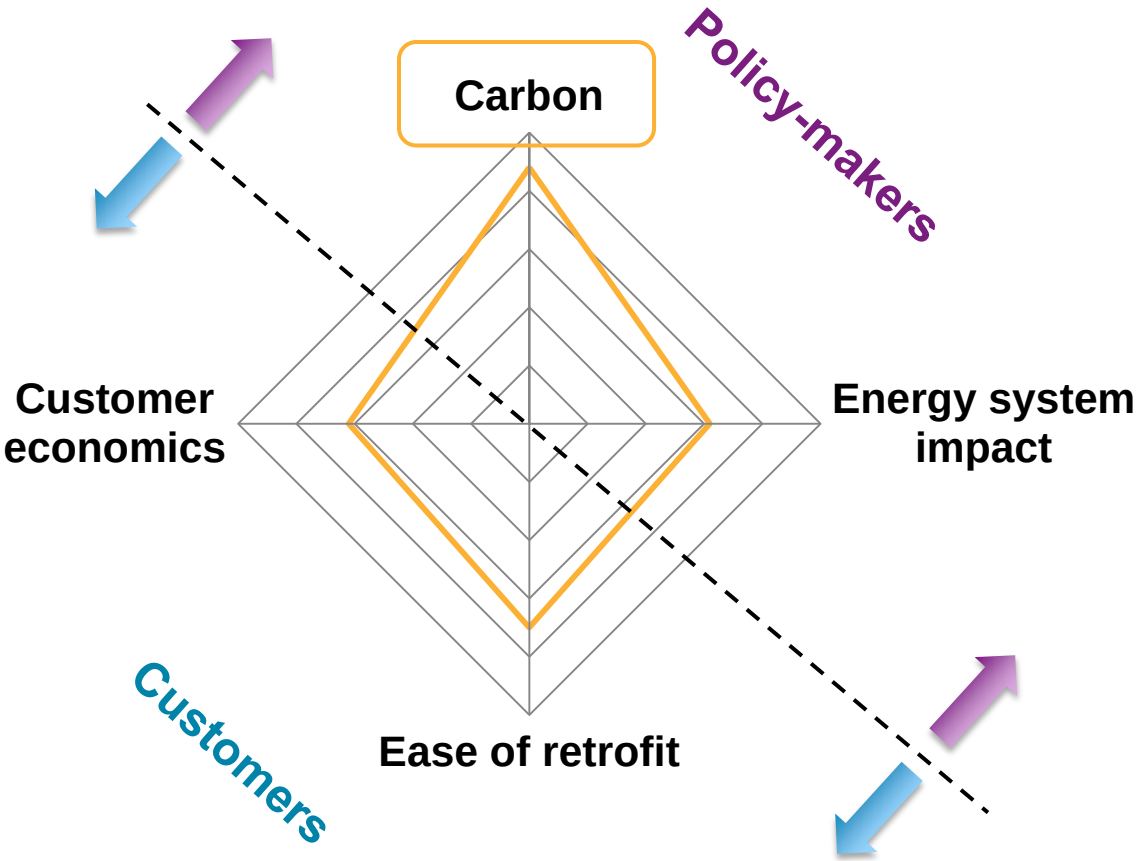
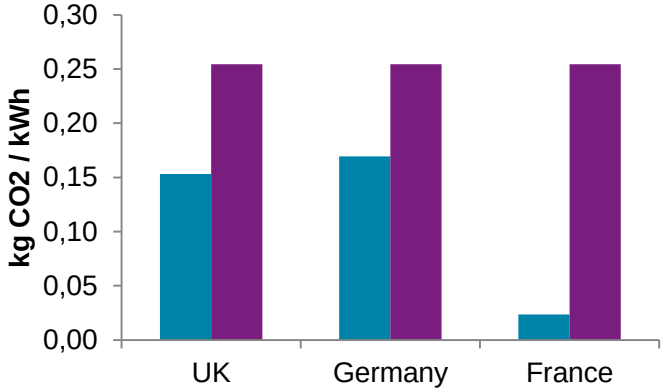


CO_2 emissions

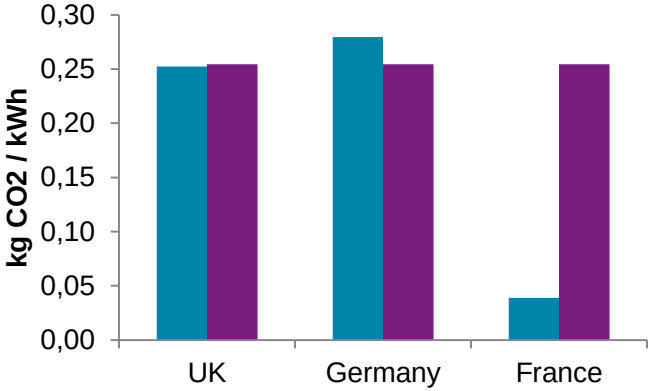
CO_2 EMISSIONS: Space Heating

ASHP leads



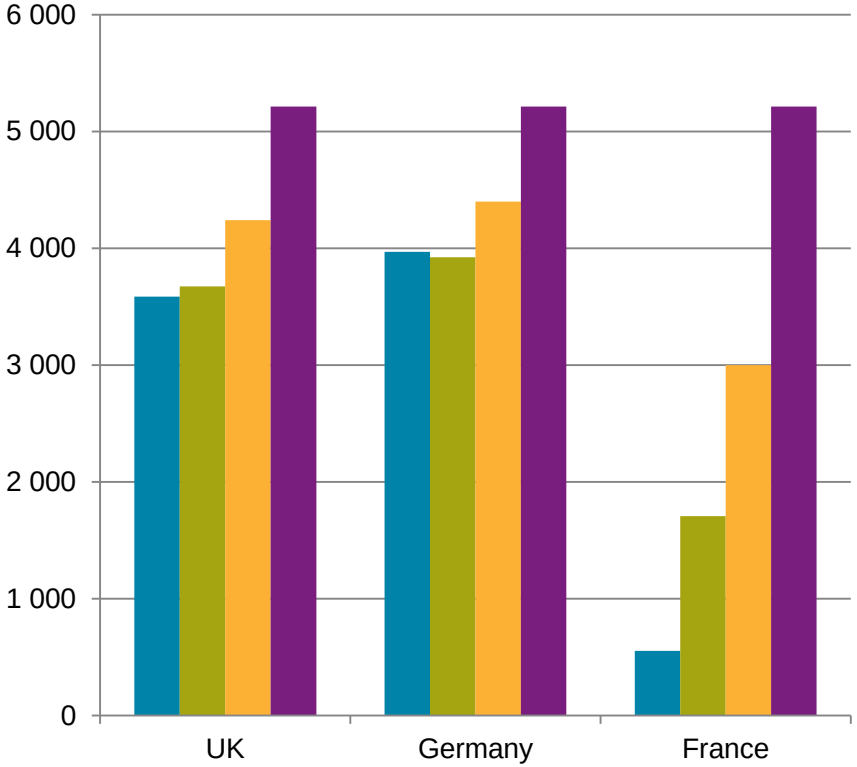
CO_2 EMISSIONS: Domestic Hot Water

A closer battle



ASHP **Boiler**

ANNUAL CO_2 EMISSIONS: Hybrid ASHP / Boiler



ASHP

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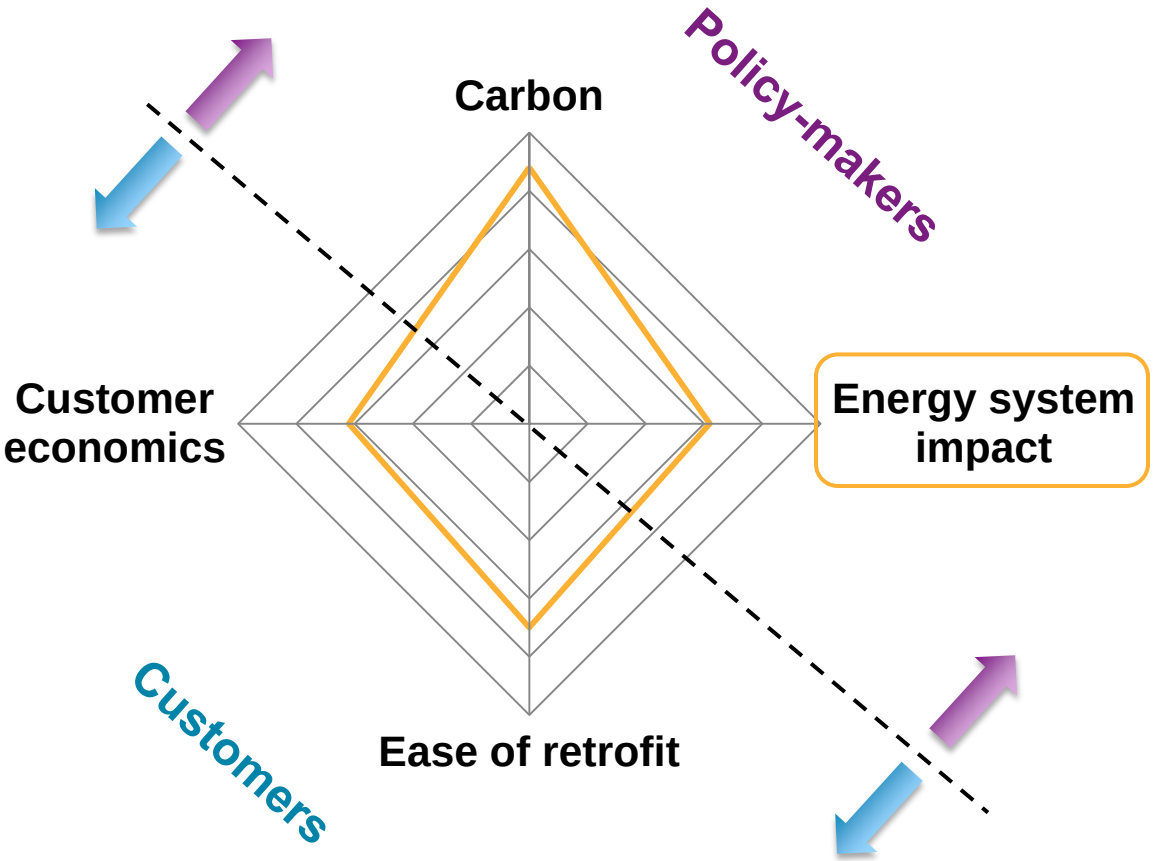
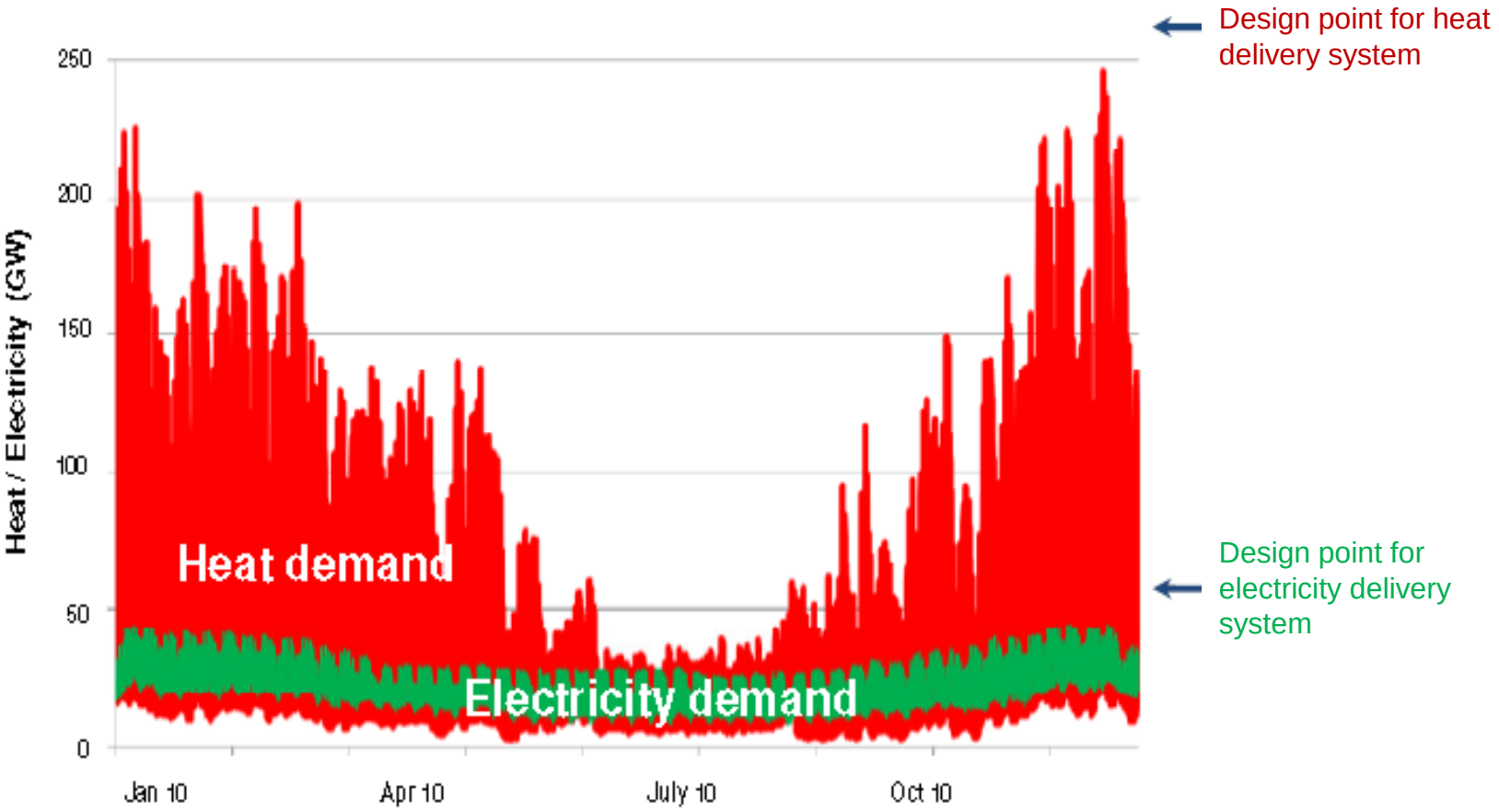


Energy system impact: Smart operation of hybrids will increase flexibility & help manage grid congestion

2010 UK heat & electricity hourly demand variability



Source: Energy Technologies Institute, 2012

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- **Policy impact**
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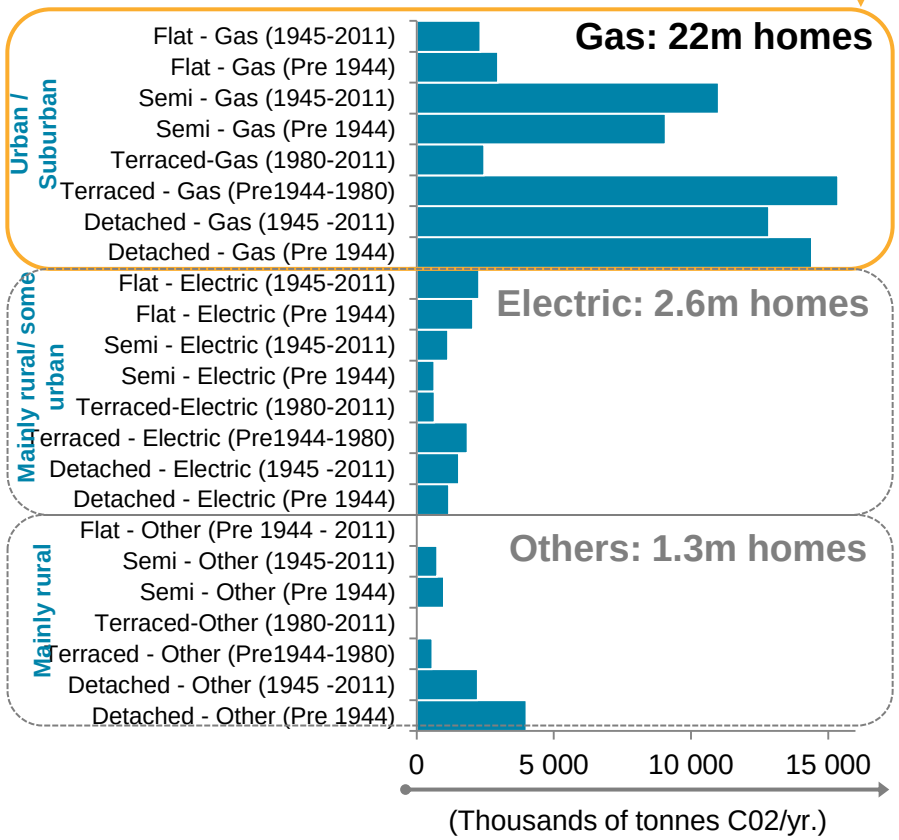
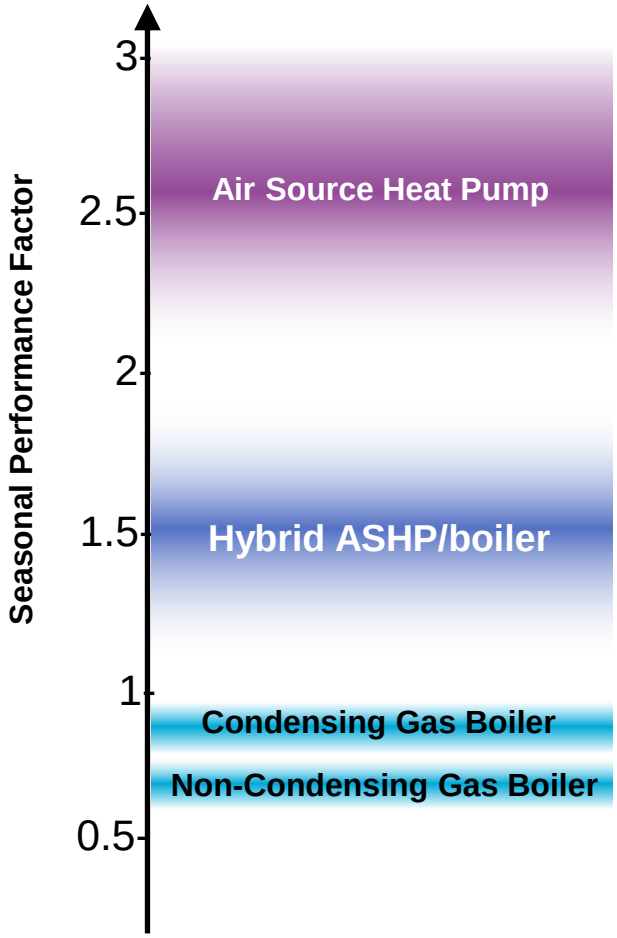
Policy impact

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?



Source: Delta-ee Heat Study for Energy Networks Association

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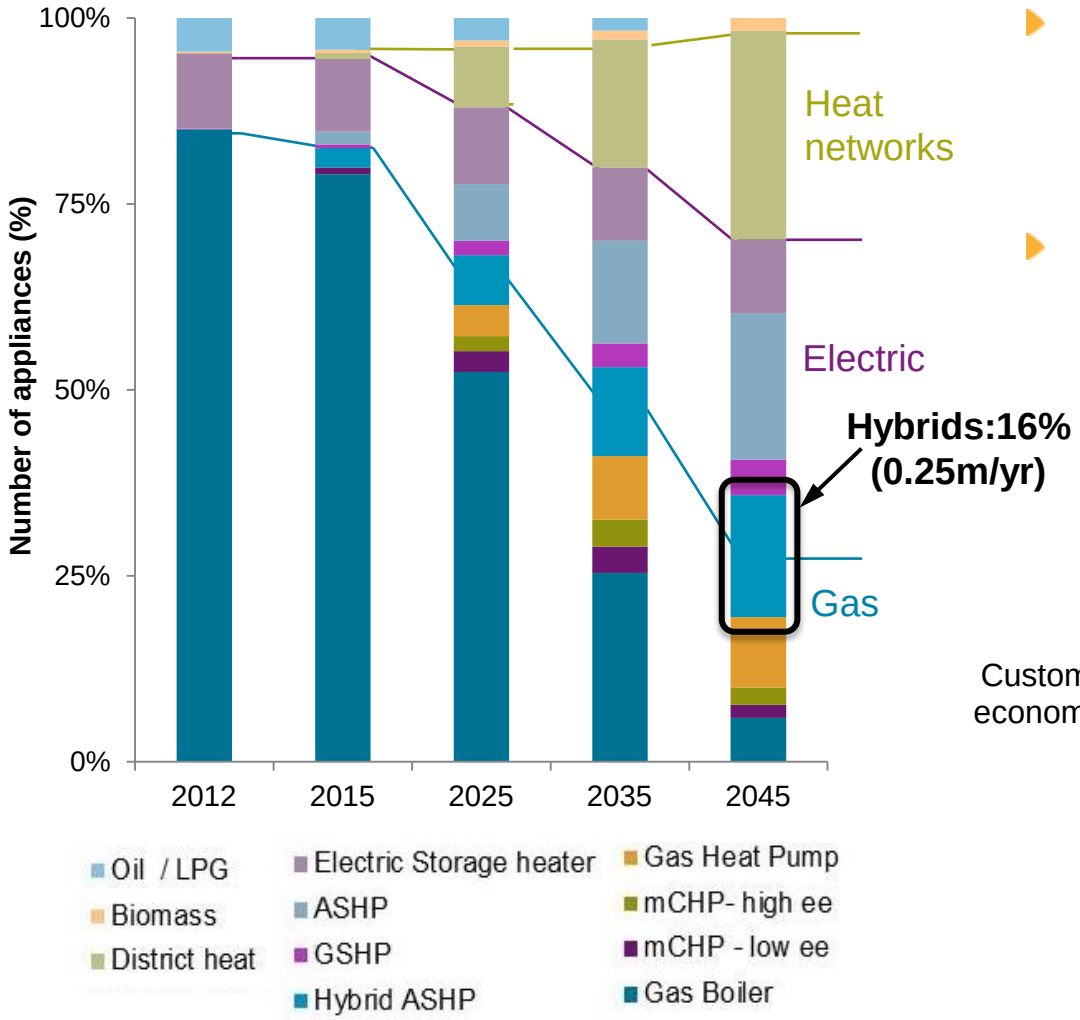

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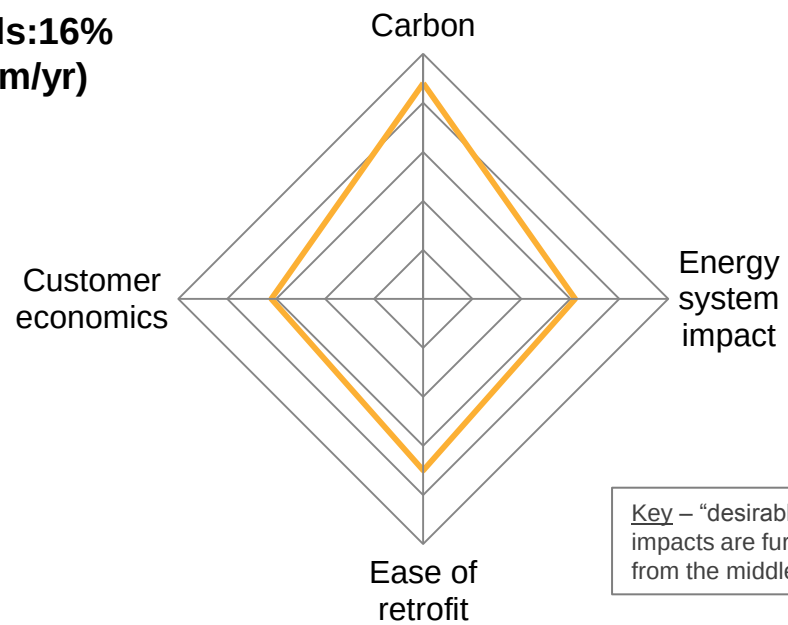

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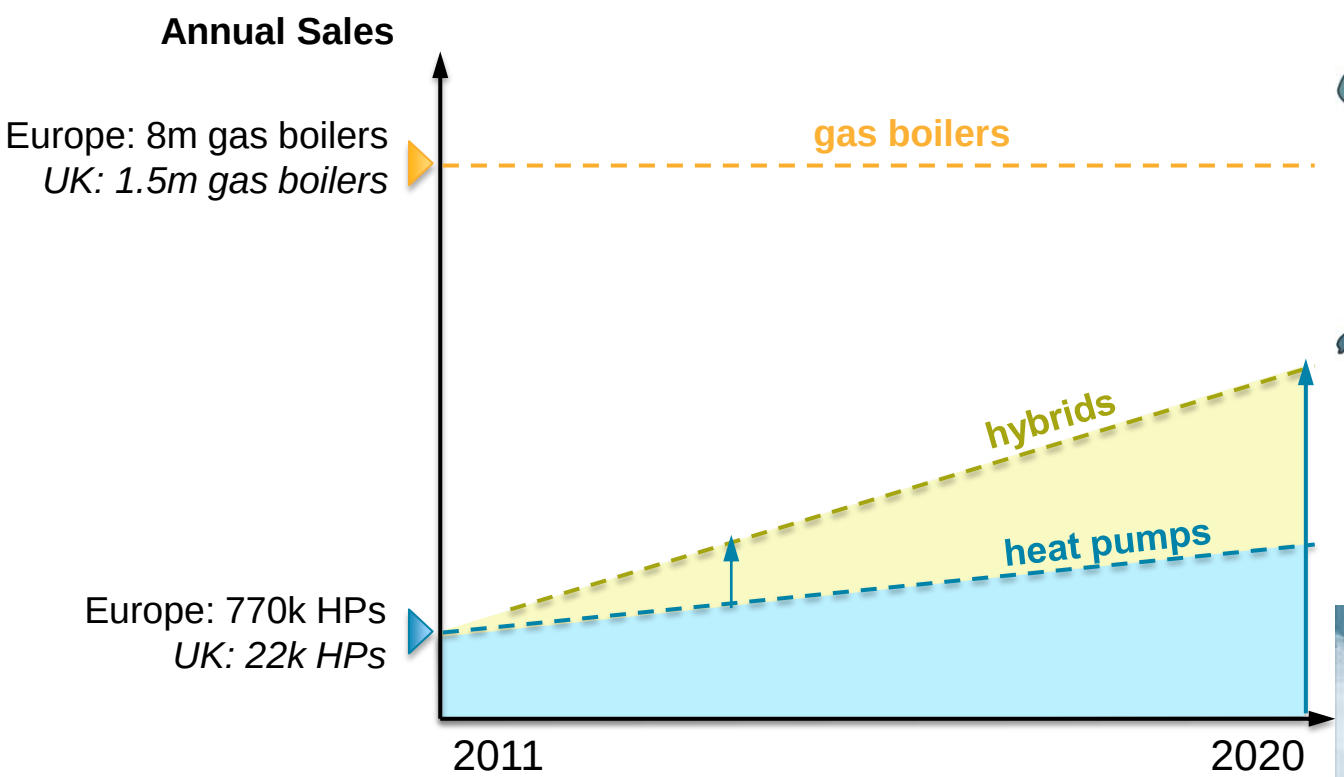

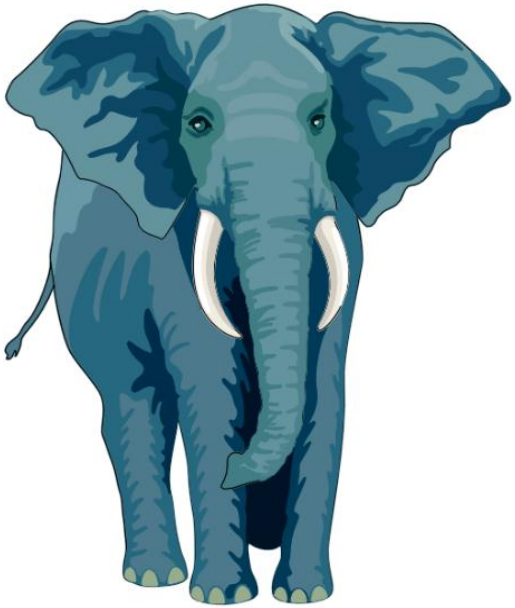

Research taken from Delta-ee ASHP Innovation Monitor

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

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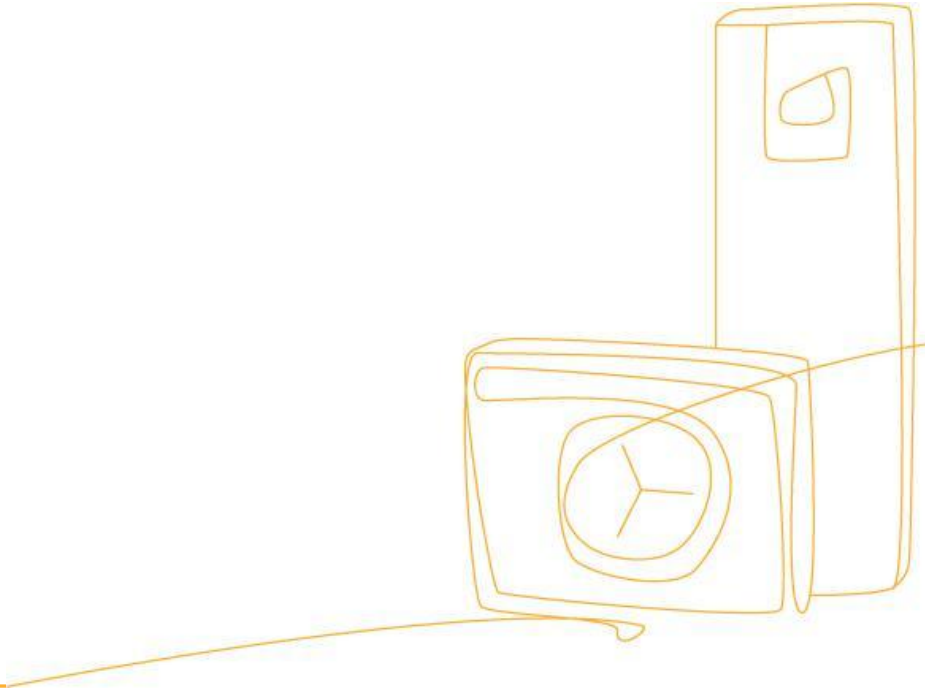
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