Where can it go wrong….
  • Specifying Heat Pumps to “Strength of Product”
  • Share the Experience

Decarbonisation of the Network
  • Aggregation / DSR
  • NEDO Project learnings
  • FREEDOM Project learnings

Heat as a Service

Air Source Heat Pumps (ASHP) – future applications
  • Collective housing
  • Commercial Buildings
Specifying Heat Pumps (HPs) to “Strength of Product”

- Designing HPs to work at the lowest practical flow temperatures to deliver highest efficiencies
- DHW, increase storage volume not reheat capacity
- Not designing a Heat pump as if it were a boiler
- Use the energy efficient features built in a heat pump
- Ensure Manufacturers “golden rules” are followed:
  - Min water volume / Min flow rate / outdoor unit airflows
- Design for the correct ΔT for HPs typically 3–8 deg C.
- Having realistic expectations on COPs achievable
- Co-ordination and Responsibility at installation phase
Decarbonisation of the Network

60% of homes could use heat pumps by 2050

ASHP forecast to 2021: High and Low scenarios

DELTA

Deltave. 2017

Installations per year


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Reliable quality and service

• DAIKIN provided
  • Special seminar courses for all engineers
  • Complete commissioning services for all installation
  • Continuous maintenance services after demonstration

117 Hybrid heat pumps
253 Split heat pumps
170 Monobloc heat pumps
7 use cases of Demand Side Response were tested in winter 2016-2017
Technical and Economical feasibility were demonstrated

Advanced System Integration

- Unstable
- Capacity limited
- CO2 emission

Monetize → Contract → Incentive

- HITACHI Electric Power Aggregator
- DAIKIN Heat Pump Aggregator
- No-DAIKIN 10 Splits

<table>
<thead>
<tr>
<th>117 Hybrids</th>
<th>253 Splits</th>
<th>170 Monoblocs</th>
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Economical Analysis

Implementation
Demonstration
Economical Analysis

7 use cases of Demand Side Response were tested in winter 2016-2017
Technical and Economical feasibility were demonstrated
To see the ecologic and economic impact of these units, some assumptions have been taken to calculate the \( \text{CO}_2 \) emissions per kWh and the price per kWh (final energy).

(*assumptions made)

**Figure 1:** Average \( \text{CO}_2 \) emissions of split, monobloc, hybrid and estimated boiler units per range of delivered heat and capacity.

**Figure 2:** Average cost of split, monobloc, hybrid and estimated boiler units per range of delivered heat and capacity.
Network Innovation Allowance Project

Project Aim
- Evaluate Hybrid Heating Systems
- Demonstrate Smart, lowest cost and low carbon ways to heat homes

Stakeholder Benefits
Homeowners: Project gave a chance to
- Reduce their heating bills and to,
- Reduce their carbon emissions Via Smart Controls managed via Smartphone App

Gas Network: Use of renewable electricity supported whilst gas met peak heat demand

Electricity Network: Network reinforcement potentially thus reducing cost and disruption

Overall: Step towards delivering Affordable, low carbon, secure future energy system
Heat as a Service

Electric Vehicles – the race to seize opportunities within & around this new global industry is on.

What is being invested in?
5 themes stand out

Smart everything – coupled with connectivity, the application of intelligent data is fast becoming standard.

Energy services – developing deeper, richer, ongoing relationships with consumers.

Time of Use Optimisation – could be constructed as an optimal ‘win-win’ that preserves supplier margins whilst saving customers money.

B2B direction of travel

Unbundled
Dynamic time of use
Mobility comfort

“Smart” bundles
Static use
Cross & upsell
“Commodity+”

Traditional
Pay as you go

Source – Delta EE
Large Collective Application

Primary heat source
Low temperature

- Centralized solution
- Preheat the loop
- Flexibility

Winter 0 - 30°C
Summer 15 – 25°C

R32 HP is the best solution to heat the central energy loop

Secondary heat source
High temperature

- Decentralized solution
- Complete autonomy

Winter 35 - 65°C
Summer 7 – 12°C

Water cooled VRV Daikin Altherma 3 GEO

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Thank you!

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