Heat pumps in high rise homes

Webinar with case studies

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Speakers

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Glen Dimplex

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Market Intelligence Manager –
Glen Dimplex Deutschland

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Introduction – Marek Miara, Fraunhofer ISE

CASE STUDY

Savona, Italy

CLAUDIO CARANO - CLIVET S.p.A.

The challenge

- **Revamping** the dock area
- **Multipurpose** = Residential, Hotel, Shopping units
- Archistar Ricardo Bofill = **19-floors** core tower
- Glass facade = **Different** comfort needs
- **No outdoor** units allowed
- **Sustainability** as a key driver

The process

- Heat Pump + **Sea water** as the thermal source (WSHP)
- Optimal energy **efficiency** + **Stability** (14 to 24°C)
- **Titanium** heat exchangers feed the backbone closed loop
- Heat Pumps are **specialised** by application:
  - Hotel = **Central**
  - Residential and Shopping units = **Local**

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The outcome

- Architectural integration = '**Invisible**' equipment
- Minimise tech rooms → Larger **leasable** space
- Fulfill load **diversity** (cool / heat / DHW / ventilation)
- Sea Water → **70% Energy Saving** vs Gas boiler design
- CO_2 emission = **– 100% Direct** (on site) / **– 50% Indirect**

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Boosting Energy Performance

Touron de Gloire Lourdes France

Hervé Pierret
Section Manager, Marketing & Business Intelligence
Daikin Europe

The challenge

- Social housing renovation project
- Reduce the building's energy consumption and tenants' energy bills.
- Complex :
  - 197 apartments in total, situated on a hill side
  - Current heating system : Electric heaters and hot water tanks
  - Energy rating : F
- Renovation target :
  - obtain energy rating = C
  - drastically reduce greenhouse gas emissions

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The process

- Choice for air-to-water heat pumps.
  - Currently off-grid location
  - Gas connection installation = too expensive
  - Gas = not reducing CO2 emissions

- Daikin Altherma 3
  - Meeting energy performance requirement of the project
  - Provide heating
  - Hot water provide by separate domestic hot water tank.
  - Running on R-32, low GWP refrigerant
  - Allows to have a phased implementation: renovation work divided into 3 phases

- Installation
  - Outdoor unit : on apartment balconies
  - Indoor unit : kitchen
  - + new low temperature radiators
  - Replacement of electric heating with hydronic heating/piping

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The outcome

- 85% completed (167 apartements)
  - Project work initiated October ‘19
  - Phase 1 finalized October ’21 (60 apts)
  - Final completion by end ‘23

- Energy level improvement (F -> C):
  - Awaiting confirmation from the Social Housing authorities

- Air-to-water heat pumps are a viable solution
  - Apartments in individual set up
  - Financially affordable
  - Tenants of social housing to have reducing heating bills

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Deep renovation and new clean heating system

Dimplex®

Arthur Enns – Glen Dimplex

The challenge

- Block of nine apartments was built in 1952 and was in such poor condition that it was no longer an attractive residential property.
- It is owned by a non-profit housing association.
- The property was in such a bad state, that it was only 50% occupied when a decision was made to carry out a full refurbishment.
- A gas condensing boiler was used for heating, and hot water preparation was decentralised.

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The process

- As the building was nearly entirely unoccupied, a deep renovation could be carried out without too much disruption.
- Measures included: new heat pump system, insulation, underfloor heating, external stairwell.
- The system was designed for a low flow temperature of 35°C for very high efficiency.

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The outcome

- A Dimplex 40kW LA 40TU air-to-water heat pump was installed to provide highly efficient clean underfloor heating.
- In each apartment, a ventilation hot water heat pump was installed which recovers waste heat through a central ventilation unit.
- The running costs were reduced significantly, and the apartments were made comfortable and habitable again!

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CASE STUDY
DAISYFIELD, TOGETHER HOUSING

DAVID BROOM, KENSA CONTRACTING

The challenge

Kensa Contracting
A KENSA GROUP COMPANY

The aim was to move away from fossil fuels, maintain residents' comfort and safety, and save money on their heating bills.

- Replacing redundant gas boiler system
- De-gas building
- Safeguarding residents
- Reduce compliance costs
- Reduce carbon emissions
- Tackling fuel poverty

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The process

- Part of £4.6m retrofit upgrade scheme
- 183 flats across 3 high-rise tower blocks – residents in-situ
- Kensa's Shoebox ground source heat pumps
- Shared Ground Loop Array system architecture
- Heating system upgrade & additional measures

The outcome

- Kensa's GSHP system was the lowest carbon and also lowest lifetime ownership cost solution, plus a path to net zero
- Non combustion GSHPs ensured tenant safety and improve air quality
- Estimated lifetime CO_2 savings of 6,556t
- Reduced lifetime ownership cost to landlord
- NDRHI income

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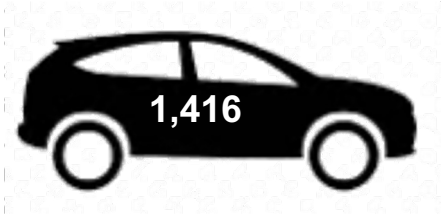

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CASE STUDY
THE WAVES - BELGIUM

Yannick De Mol and Leandro Depaepe, Vaillant

The challenge

New build holiday accommodation with 118 apartments at the Belgian seaside with fluctuating occupancy of the building

- Holiday periods: high occupancy
- During working days: low occupancy
- Ready to connect to district heating
- Complex system due to high rise building

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The process

Chosen system: Hybrid installation: 5 ecoTEC pl condensing boilers combined with 8 aroTHERM p monobloc air/water heat pumps

A sustainable system with the aroTHERM plus air/water heat pumps during low occupancy

Ability to absorb peaks with the 5 ecoTEC plus gas condensing boilers

Collective boiler room: building will eventually be connected to district heating

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The outcome

Consumption:

- 90 %/year = heat pump
- 10 %/year = gas condensing boilers
- Only 30 € energy costs/month for the residents

- Use of **Natural refrigerant R290**
  In line with the future fgas regulations
- **COP**: maximum 5,4 (A7/W35)
- Capacity: 600 kW with gas condensing boiler and 96 kW with air/water monobloc heat pumps
- Reduced Energy costs of 60% compared to the old gas fired systems

#WHY WAIT

Leandro Depaepe, Sales Manager North West Flanders
Yannick De Mol, Sales Engineer Projects

Q&A

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Thank you!

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