



# Experience in Heat Pumps

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Presented by:

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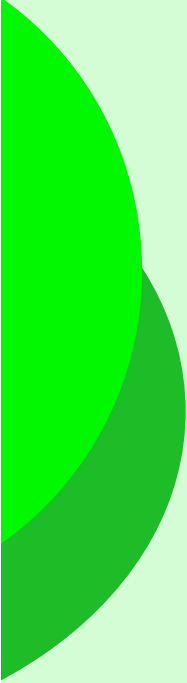
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# Background

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- Enconsult formed in 1993 with specific intent of bringing low energy and renewable technologies into Scotland
- First CHP into residential project in Scotland
- First minewater heat pump community heating scheme in Scotland
- Pioneers of solar ventilation systems
- Experience in solar, hydro, wind, biomass, biogas, etc.



# Glenalmond Street Project

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- 18 dwellings in Glasgow heated by central heat pumps
- Boreholes drilled into flooded mineworkings
- Off-peak tariff used
- Heat storage tank to cover off-peak periods
- Radiators used in dwellings
- CoP of 4.5
- Operational for 7 years
- Similar project in Fife operational 5 years



## Other Projects

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- Nursing Home, Fife:
  - Borehole heat pumps with CHP to provide power for compressors.
  - Superb synergy between technologies.
- Farm, East Lothian
  - Borehole heat pumps with wind turbine to provide power
  - Heating via underfloor heating.



## Other Projects (cont.)

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- House with Swimming Pool

- Two heat pumps: one with ground loop + one for heat recovery from pool hall.

- Controls allow use of one for heating and one for cooling with heat exchange.

- Golf Club, Inverness

- Heat pump with ground loop to provide base load. Gas boiler back-up.

- Heat pump provides heating & cooling via underfloor heating system.



# Procurement

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- Skills needed:
  - Geotechnical desk study
  - Driller
  - Thermal testing
  - Design of boreholes (no's; depths, etc.)
  - Design of ground loops
  - Pipework and pumps
  - Heat pump selection and connection



# Challenges

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- Overall responsibility for effectiveness of system.
- Ensuring sufficient heat exchanger size
- Knowledge of main and ancillary systems and plant interactions
- Maintenance