

# 'Heat solutions for Rural Areas'

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Northern Periphery and  
Arctic Programme  
2014-2020



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## HEATER is a Cluster of Projects with Common Synergies



**Housing**  
Executive



**Project value is €153k across four partners**



## Communicate the Message

1. Develop network
2. Virtual Workshop & Webinars
3. Knowledge sharing, collaborate
4. Virtual Final Conference

Common Challenges of  
fuel inequity, fossil fuel  
dependence,  
decarbonise

Result: Educate &  
Empower rural  
communities





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## ***HANDIHEAT Project***

Transnational EU funded project with 7 partners across 5 northern European and Arctic regions - focused to **reduce carbon emissions and energy efficiency in rural communities**

### ***Deliverables & Outputs***

1. Policy Review, Fuel Poverty, Health/Housing and Winter Deaths
2. Benchmark existing Best Practice across Partner countries
3. Demonstration Pilots in N Ireland and Finland
4. Toolkit of Best Practice Policies and Sustainable Solutions for Retrofit

protect *rural communities* from energy *price fluctuations* & improve the *social wellbeing and quality of living* throughout the *participating regions*



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# *Off Gas Grid Bio Gas Heating in rural Finland – 1<sup>st</sup> Pilot*



CBG solution for remote areas



## *HANDIHEAT – 2<sup>nd</sup> PILOT*



- 6 dwellings Rural & off gas grid*
- Energy Efficiency Retrofit & Low Carbon Heating (**within budget**)*
- Rural Social Housing - Co Fermanagh*
- 1-2 years data monitoring*
- Householder **FOCUS***
- Pilot Outputs:*
  - *Capital Costs*
  - *Household bills*
  - *Improved thermal comfort*
  - *Carbon emissions*





## *DESIGN - SAP*

- Existing:** SAP Range 51 (Band E) - 57 (Low Band D)
- Requirement:** Thermal envelope non intrusive measures under £10k
- Aim:** Try to achieve SAP Band C with CWI, Loft & Windows
- Interventions:**
  - Cavity Wall Insulation
  - Loft Insulation
  - Passive House fitted double glazed windows
  - Non intrusive air tightness measures
- Designed Outcome:** SAP Range 65 - 69 (High Band D)

**Airtightness**



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## *Thermal Improvement Measures*

- ❑ Issue: Walls heat loss - 35%, Roof 25%, Windows/Doors 15%, Draughts 10%



## *Low Carbon Heating Hybrid Oil/ASHP*

- Only need 6kw ASHP for 90m<sup>2</sup> house
- Utilise existing oil boiler
- Don't need deep retrofit (Aim for low Band C)
- Need control system to manage heating primacy



# *Low Carbon Heating Hybrid Oil/ASHP*



## *Low Carbon Heating Electric Battery, Solar PV and Electric heating*

- ❑ 11Kw battery, 2.5 Kw Solar PV
- ❑ Electric Storage heating
- ❑ Householder/Landlord 'Prosumer'
- ❑ An electricity demand profile that is both reduced & smooth control and planning
- ❑ A measurable, 40% reduction in carbon emissions and energy bills



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## *Measuring Data*

- Grant data loggers
- Data from heat & electric loggers
- Sonnen data loggers
- Climote temperature & energy use
- Open source at project end

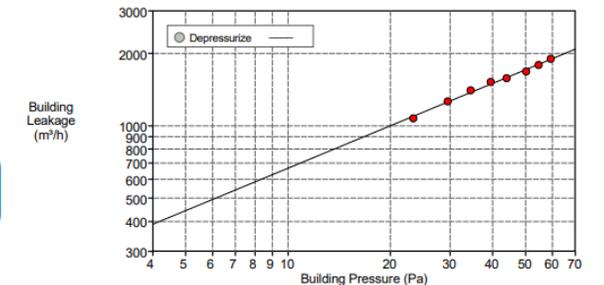


# Initial Findings & Feedback After 1<sup>st</sup> heating season

- ❑ Hybrid Oil/ASHP tenant bills £13-16 extra per week (Nov - March 2020), which is offset by savings in oil - (Oil data based on previous bills and current oil data usage)
- ❑ ‘Heat feels different, doing our bit for the planet’
- ❑ ‘house feels warmer after the battery and PV was fitted’
- ❑ Air test from 10-12 to 5.45 - 7 with £7k of energy efficiency measures
- ❑ Carbon reduction 40-55%

## BUILDING LEAKAGE TEST

Date of Test: 24/08/2021	Test File: 152 Carrowshee park
Technician: Timothy Elliott	
Project Number:	
Customer: CFM 152 Carrowshee Park Lisnaska Enniskillen, Phone: Fax:	Building Address: 152 Carrowshee Park Lisnaska
<b>Test Results at 50 Pascals:</b>	
V50: m <sup>3</sup> /h Airflow	1710 (+/- 1.8 %)
n50:	
w50:	
q50: m <sup>3</sup> /(h·m <sup>2</sup> Envelope Area)	5.45
<b>Leakage Areas:</b>	
	743.5 cm <sup>2</sup> (+/- 7.0 %) Canadian EqLA @ 10 Pa or 2.37 cm <sup>2</sup> /m <sup>2</sup> Surface Area 420.0 cm <sup>2</sup> (+/- 11.5 %) LBL ELA @ 4 Pa or 1.34 cm <sup>2</sup> /m <sup>2</sup> Surface Area
<b>Building Leakage Curve:</b>	
	Air Flow Coefficient (Cenv) = 171.9 m <sup>3</sup> /(h·Pa <sup>n</sup> ) (+/- 18.3 %) Air Leakage Coefficient (CL) = 173.1 m <sup>3</sup> /(h·Pa <sup>n</sup> ) (+/- 18.3 %) Exponent (n) = 0.586 (+/- 0.049) Correlation Coefficient = 0.99645
Test Standard:	EN 13829
Test Mode:	Depressurization
Type of Test Method:	B
Regulation complied with:	Part F Building Regs



- ❑ **Capital Costs** of Heat Pumps & Additional Insulation more than the status quo of fitting a gas/oil boiler.
- ❑ **Additional Energy Efficiency** measures essential for heat pumps, but with current energy price crisis, **this should be a focus**
- ❑ **Householder energy bills**, based on early analysis oil costs in line with electrical costs, but the additional energy efficiency/capital cost isn't considered in this analysis
- ❑ **Issue with converting oil to oil hybrid**, as tenants don't appreciate their oil use. However householders who convert gas to gas hybrid have no issue as aware of weekly gas bills (based on evidence from another trial).
- ❑ **Thermal comfort increased** with energy efficiency
- ❑ **Thermal comfort issue about perception**, low temperature radiators indicate a cooler house, but data shows the ambient temperature is similar. Trials indicate tenants not using condenser boiler properly, which is compounding this issue
- ❑ **Time of Use tariffs** are essential for electrification of heat
- ❑ **Hybrid and Electric Generation/Storage** significantly reduce household carbon emissions 40 - 55% compared to Oil boilers

## ❑ **Two key issues: Tariff Change and Education/Behaviour Change**



## *Any Questions*



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