



## Approaching Near Zero Energy In Historic Buildings

Deliverable No: DT 2.1.1

Deliverable Title: Narrative Harvest (Initial Scoping and Identification of Demonstartors )

Submission date: 30/10/2019

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Deliverable Type: R

R = Document, report

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Dissemination Level: PU

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This project has received funding from the European Union's Northern Periphery and Arctic Programme (2016-2020) under Grant Offer Letter 304\_1175\_20194.



## Connect – Narrative Harvest and Open Space:

**Descriptions of the demonstrator buildings and sites of the Energy Pathfinder project by partners and regions**

### **Contents**

1. Wooden Vicarage, Viðareiði, Faroes – Lansverk	1
2. Town Hall, Raahe, Finland - OUAS	2
3. Rectors House, Raahe, Finland - OUAS	3
4. Tegs Kyrkan, Umeå, Sweden - Umeå University	4
5. Myross Wood House, West Cork, Ireland - NCE Insulation & CCAE	5
6. The Cathedral of St Mary & St Anne, Cork, Ireland - NCE Insulation	6
7. Bayview (former Harbour Master's House), Orkney Islands, Scotland - HES	
8. Lighthouse Keepers' Cottage, North Ronaldsay Lighthouse, Orkney Islands, Scotland - HES	7

## 1. Wooden Vicarage, Viðareiði, Faroes – Landsverk

The pilot project of Landsverk is a wooden Vicarage built in 1854 in Viðareiði. The building is being renovated by Landsverk and will include removal of most modern materials, poglas windows, insulation and the substitution of fossil fuel for renewable district geothermal heating. Works will be completed by July 2019. Energy monitoring appliances will be installed, which will be centrally monitored. The Pilot will provide an example of renovation/ retrofit of a historic building and monitoring of actual energy saving results from retrofitting.





*Figure 1 - Wooden Vicarage, Viðareiði, Faroes*

## **2. Town Hall, Raahe, Finland - OUAS**

Two (2) buildings in Raahe town (75 km south-west from Oulu) will be available to pilot and demonstrate methods and approaches of Energy Pathfinder.

Erected in 1838, the Town Hall of Raahe is a timber log construction, faced externally with render on a wooden lath substrate. The use of inappropriate render has caused decay of the exterior wall surfaces, which are to be replaced, alongside other construction work, due to commence in the summer of 2019. The work will foremost consist of structural repairs, including the replacement of load-bearing timber logs at lower heights. During this process, insulation and air- and vapour-control membranes are to be installed behind the replacement render. The building accommodates ca. 30 persons and is connected to the town's district heating system. The project Energy Pathfinder will support this case study with measuring air-tightness, thermal transfer (infrared sensing) and ambient indoor environmental quality (humidity and temperature) to be carried out before and after the renovation



Figure 2 - Town Hall, Raahen, Finland

### 3. Rectors House, Raahen, Finland - OUAS

Another demonstrator is the Rector's House (built 1899) in the Seminar Campus (a total of 12 buildings), which is a historic timber building.

This building will be very good pilot for the Co-Design process proposed. Several thesis projects will be done as plans how to retrofit.

The timber-boarded log building is currently unoccupied, due to dampness problems which have caused mould growth. Fungal investigations have commenced to inform the renovation process. The support of the project Energy Pathfinder for this case study will be determined once the fungal investigation has been concluded and its conclusions are available.





*Figure 3 - Rectors House, Raahé, Finland*

#### **4. Tegs Kyrkan, Umeå, Sweden - Umeå University**

This is an iconic church building in Umeå built in the 1960's but considered of architectural and historical interest. There is a particular interest to understand the air movements in

this church building and thereby its occupants' thermal comfort. The heating and ventilation of the building will be studied in detail and suggestions would be provided to improve the system.

Furthermore, the energy use of the building will be studied. The study results may be also useful to similar buildings in the region. The Pilot will not apply the Co-design process.



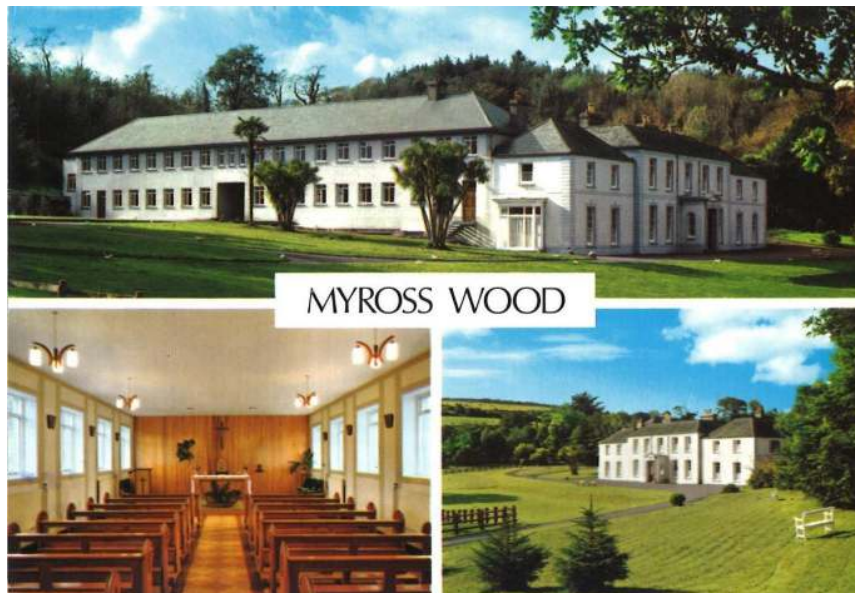
*Figure 4 -Tegs Kyrkan, Umeå, Sweden*

## **5. Myross Wood House, West Cork, Ireland - NCE Insulation & CCAE (UCC)**

This historic manor house was built in the 1800's and purchased by the Irish Missionaries' Society in 1946 and was used as a study house for young religious. The south wing was totally rebuilt in 1959 and the interior of the house has been adapted to the needs of the community over the years. The west wing was reconstructed and refurbished in 1987. But, apart from these relatively small modifications, the house basically remains as it was built by the Rev. Arthur Herbert in the 18th century and extended by the Earl of Kindston in the early 19th century.

It stands on 100 acres of woodland and it has served as a community facility and retreat centre since 1970.

It will be the main Pilot for developing the Co-design process, which will consult with residents and future users/residents on proposed energy works and energy management.



## 6. The Cathedral of St Mary & St Anne, Cork, Ireland - NCE Insulation



The early Neo-Gothic Revivalist Cathedral of St Marys & St. Anne was dedicated in 1808 after construction began in 1799 on the site of a former church. The building was extensively damaged by fire after an arson attack in 1820 requiring extensive restoration which included enlargement of the sanctuary and the creation of a channel arch, reopening in 1828. In 1869 a new main entrance was added along with four pinnacles and in 1870 nine circle ringing bells were cast and hung for change ringing by John Murphy a renowned bellfounder from Dublin. In 1964 a large renovation led to demolition of everything east to make way for a 70ft extension which brought the length of the cathedral to 215ft and the internal layout was reorganised. In 1996 large scale works were completed with the renovation of the tower and sanctuary and the removal of the high altar, altar rails and side altars. The roof and gothic ceiling were also repaired, and the external stonework was repointed.

In 2008 the cathedral celebrated its bicentenary and in 2017 a visitor centre and café were installed in the crypt of the cathedral. In 2016 the cathedral Church began installing sustainable energy measures which included a LED lighting upgrade and the installation of photo voltaic panels, and, in 2018 an air to air heat pump was installed however the insufficient levels of insulation in the attic and cavity walls means that these measures are not functioning at their full potential.



*Figure 6 - The Cathedral of St Mary & St Anne, Cork, Ireland*

## **7. Bayview (former Harbour Master's House), Orkney Islands, Scotland - HES**

Overlooking the harbour of Pierowall, the largest settlement on the island of Westray, Bayview is a traditionally constructed house of two storeys. Probably built in the late 19th century, the building was the house of the harbour master, before being used as a guest

house. Unoccupied since 2018, the Westray Development Trust has purchased the building with the aim to redevelop it into four flats, as the trust had identified a shortage of affordable rental accommodation on the island. The house has external stone walls, with a render finish, and a slated timber roof, while much of the interior was constructed from wood. The building is not statutorily designated as cultural heritage. The redevelopment, planned for 2020, will alter the interior layout dramatically, moving the building access to an extension at the building's rear. The house will contain four flats of different sizes and layouts, including a maisonette. The redevelopment allows the introduction of internal insulation in the building as well as improvements of doors and windows and the technical building services. With the help of Energy Pathfinder, the building's energy performance will be investigated before and after the redevelopment to quantify the improvements achieved. The redevelopment process will also be documented to extract practical observations about the refurbishment process for analysis and integration into Energy Pathfinder's online toolkit.



*Figure 7- Bayview (former Harbour Master's House), Orkney Islands*

## **8. Lighthouse Keepers' Cottage, North Ronaldsay Lighthouse, Orkney Islands, Scotland - HES**

Built in 1852, the complex of a lighthouse with two houses for the lighthouse keepers and a separate foghorn is located prominently at the north-eastern edge of the island of North Ronaldsay. At 42.3 metres, the North Ronaldsay is Britain's tallest land-based lighthouse. The complex is statutorily designated as cultural heritage through listing at Category B, Scotland's second highest listing category. Standing on a rectangular plan, the



symmetrical keepers' accommodation blocks are single storey stone structures of eight bays. The southeastern block currently contains two flats used as holiday lets. The western block contains a visitor centre with café and a commercial unit, used as a mill processing the island's sheep wool. The complex is owned by the North Ronaldsay Trust operating the holiday lets and visitor centre and letting the commercial unit. The trust also owns two wind turbines just north of the complex.

The building's energy use will be investigated, especially with regard to improving the space heating provisions, for which an oil-fired boiler appears to be still used occasionally. The wool mill is planning to relocate within the island to bespoke premises, allowing the redevelopment of the north-western block into a flat for a caretaker for the complex. Through community engagement, Energy Pathfinder plans to extract practical observations of the planning processes for analysis and integration into Energy Pathfinder's online toolkit.