

Hillcrest Nursery Biomass Boiler



Introduction

The project is owned by John & Jennifer Fleck who own a private company which specializes in looking after you children between the ages of 1 – 8. Hillcrest Day Nursery has been established now for 25 years specializing in providing childcare and education. John & Jennifer nursery was primary heated by an oil fired boiler.

However after years of use the boiler began to give problems and was not effective. They realized this was costing extra money with regards parts and servicing and so they decided they needed a change. From research and professional advice John & Jennifer decided they would install a biomass boiler which would be more efficient and environmental friendly.



Case Study Approach

The data on the market access of renewable energy technologies were collected both from the case studies in different renewable energy technology projects and from the secondary sources. To collect specific project data, a template was established with following subsections:

- **Technology description and a project summary**
 - Innovative characteristics
 - Technology readiness level
 - Available product / service supports from the manufacturer
 - Any standard procedures / requirements for integrating the technology into existing electricity networks, buildings and/or mainstream energy appliances / systems
- **Commercialisation of the technology**
 - Is the technology already a commercial solution?
 - Are there re-sellers of the technology, or is the technology available only from the manufacturer?
 - Identified main market area
- **Cooperation partners and networks**
 - Description of the roles of the co-operation partners and networks in the RE technology project.
 - How have they supported the market access of the technology?
- **Assessment of the technical and economic risks**
 - What kind of procedures have been made for assessing the technical and economic risks of the project
 - Who is bearing the risk of the investment (manufacturer, client, shared between them)?
 - Is the public sector involved in risk sharing? (e.g. co-financing, or platform for technology demonstration)
- **Drivers and barriers in the RE technology project**
 - Main drivers in carrying out the RE technology project
 - Barriers, and how they have been overcome (such as price of energy, availability of resource, specific expertise, policy enabling the technology)
- **Funding and support mechanisms**
 - The financial support received by the project: amount/support rate, type and purpose of the support, agency providing the support, significance of the support for the project
 - Types of soft support/advisories received during the project: the use of soft supports (advisory, training, mentoring etc.) during the technology development or implementation, and how successful these have been
- **Monitoring the performance**
 - How are the technical/non-technical aspects of the RE technology case monitored?
 - Information on the design, installation requirements and procedures, operational performance, and costs/financial arrangements
- **Conditions for the technology transfer & adaptation in different partner regions**
 - What are the main requirements/preconditions for transferring the technology and applying it in other partner regions?
 - Description of the main drivers and barriers for the technology transfer (such as. Energy price, resource needs, certain support etc.)
- **Project results**
 - Benefits & lessons learnt
 - Post- project benefits

Technology Description

The Biomass Boilers that are installed are called a Grant Spira Biomass Boiler. This installment took place on the 27/02/2016. These boilers are very popular and successful as they were award best renewable energy product in 2011 by SEAI. At the nursery there were 2 x 36KW burners and small feed hopper installed.

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They are fed with wood chips or pellets from a large hopper sited nearby. There are two main types of wood that are used in the biomass boilers:

- **Wood chips** are sourced from forestry 'thinnings' or made from untreated waste wood. Wood chips are typically used in larger heating systems such as those found in schools or blocks of flats. When they are used in smaller (e.g. domestic) systems the chips must be produced to a standard size and with low moisture content.
- **Wood pellets** are made from by-products such as saw dust and have a low moisture content of between 8-10%. As a consequence they are more energy-dense than logs or chips and require about a third of the storage space. The uniform shape makes pellets ideal for automated systems.

If you've got space, manufacturers recommend a hopper that's big enough to hold a year's supply of fuel. This minimises transport and delivery costs for fuel, as well as work for the owner. Maintenance is minimal – although you will need to clean it and remove the ash about once a month. If that isn't possible due to space or budget, you can get wood pellet delivered on pallets of 10 kg or 15 kg bags, from which you manually fill a smaller hopper.



Figure 1. Hillcrest Nursery¹

¹ Action Renewables 2017.

TRL and Technology Scale

TRL 9

The 2 x 36kW Grant Spira 9-36 biomass boilers supplying space heating at a day care. It provides space and water heating in a day care. The building is fully enclosed and permanent. The heat is used via a radiator system to provide space heat and also hot water to bathrooms and kitchen. The energy cabin is linked to the day care via 8m of pre-insulated above ground pipework.

Please see schematic below:

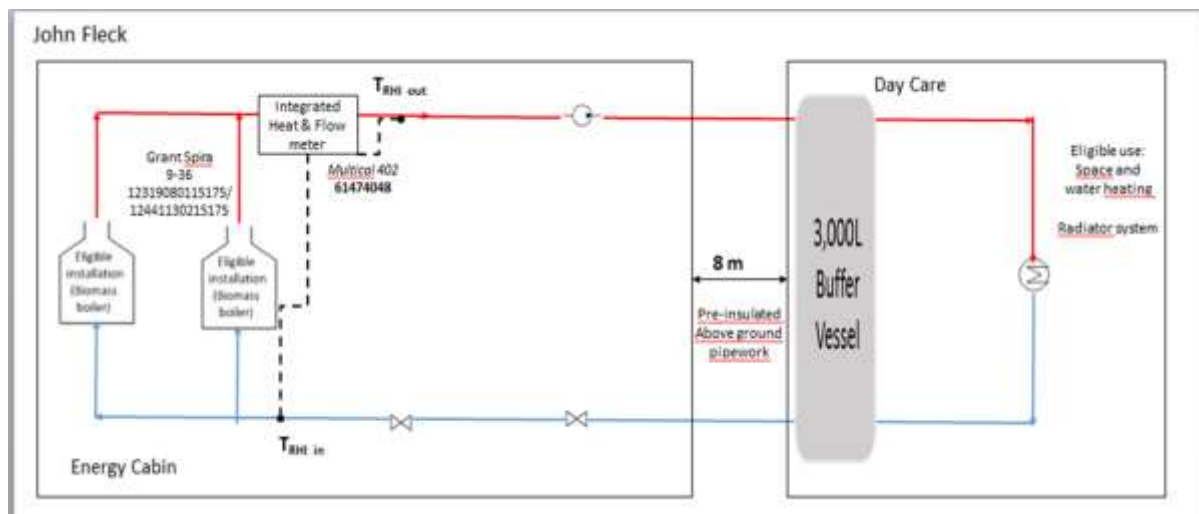


Figure 2. Biomass System Scheme ²

Risk assessments and supports received

When installing the biomass boiler, the installer give the client a brief run down on the operation & maintenance of the boiler and how it works. Mr Fleck has employed a service engineer who will service his boiler four times per year.

For this project John & Jennifer Fleck funded part of this from their own capital and the rest of the investment was from a bank loan.

Drivers and barriers

Driver include:

- The aspiration to create a Green Image.
- A move away from fossil fuels and towards a more sustainable fuel stock.
- Reduction of bills and savings on fuel costs.

Barriers encountered:

² Action Renewables 2017.

- The price of tendering.
- Securing a good installer.
- Loss of income as part of the nursery had to be closed, while the boiler was installed.

Conditions for the technology transfer, adaptation and new market deployment

The use of biomass in heating systems is beneficial because it uses agricultural, forest, urban and industrial residues and waste to produce heat and electricity with less effect on the environment than fossil fuels. Biomass in heating systems has a use in many different types of buildings, and all have different uses. There are four main types of heating systems that use biomass to heat a boiler. The types are Fully Automated, Semi-Automated, Pellet-Fired, and Combined Heat and Power.

Biomass boilers can be used in any other of the partner regions, they are most popular in Austria, Finland and Norway. One of the main objectives for the biomass boilers is the sustainable wood source and securing an agents who can give you a steady supply of quality wood fuel.

In terms of the cost of fuel, the average price of wood pellets are around 4.2p/kWh which is very much in line with mains gas, while oil costs a little more at 6p/kWh. However, the price of wood pellets is likely to become more attractive going forward since gas prices have continued to rise in recent years, and this trend looks to continue. A biomass boiler, you will have to feed it fuel from time to time. For example a fuel supplier will need to be refuelled every 3 -4 days. Bigger biomass boilers with auto-feed hoppers will only need to be refuelled every couple of weeks.

The main support for the biomass boilers in Northern Ireland was the RHI which was a Government environmental programme that provides financial incentives to increase the uptake of renewable heat. The RHI, which started in November 2011, provides payments for renewable heat energy generated over a 20 year period to eligible renewable heat generators

Project Results

Benefits

This project was installed and commissioned within 3 days. Since the installment the nursery is now benefitting from cheaper fuel costs and lower carbon emissions. An extra benefit from this project is that it was accredited for the renewable heat incentive so therefore it will generate a small income. Previous to the installment the Hillcrest Day Nursery monthly bill was averaging at £450. The main benefit is that they are now reducing the heating bills and are spending less on woodchip per month.

Lessons Learnt

This project was very successful and had no issues with regards installment. The reason for this Mr. John Fleck requested professional guidance to help him plan the project. So therefore the location of the boilers and the pipe work were carefully lined out so no problems could occur.

Post Project Benefits

Biomass is considered a carbon neutral, so for people who are concerned about their carbon footprint, this is definitely a plus.

The UK government is trying to promote the use of renewables through incentivising homeowners and businesses.

Signed into a 20 year contract.

A demand for biomass organic material can drive the local economy and create jobs.

Contact Information

John Fleck

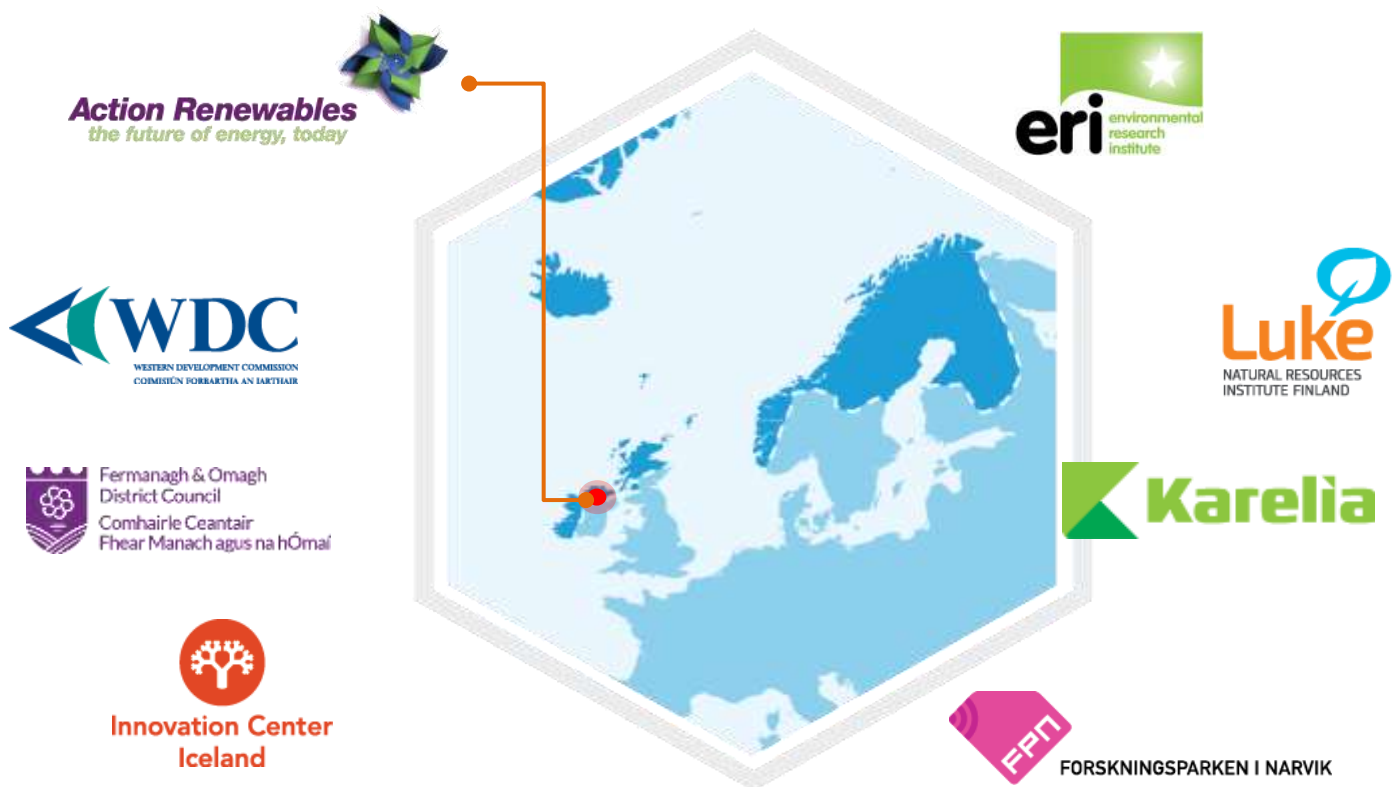
Telephone: 028 9002 3029

Email: admin@hillcrestdaynursery.co.uk

PARTNERS

GREBE will be operated by eight partner organisations across six regions:

● Action Renewables



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