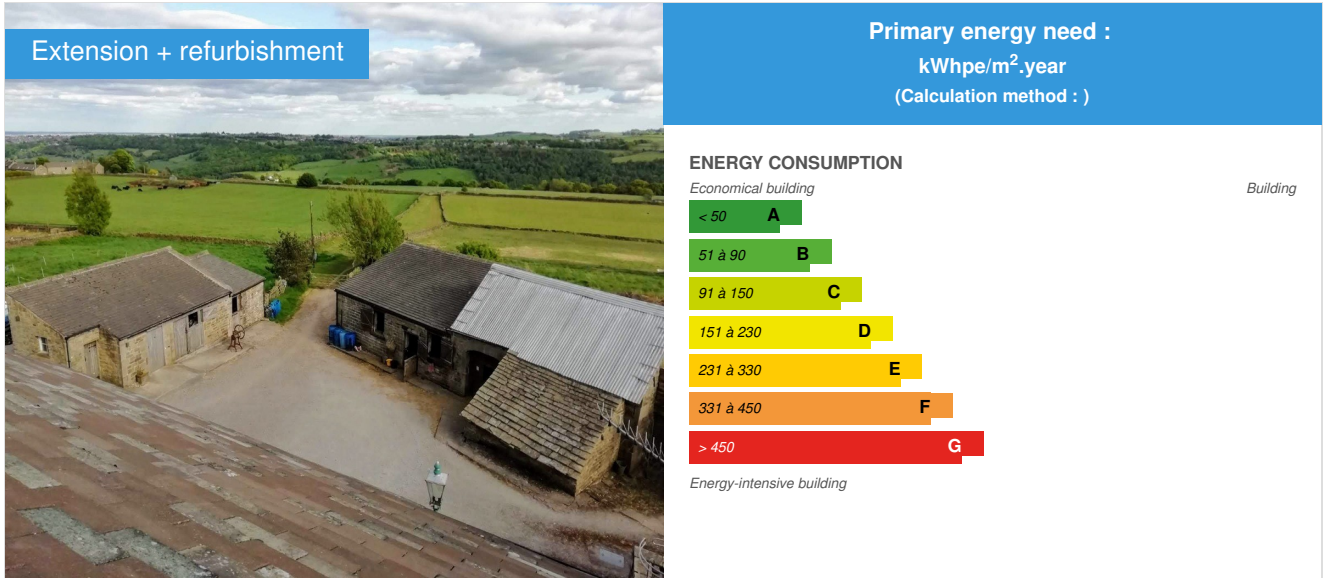


Townfield Head Farm

by Mark Woodward / 2023-03-15 17:52:51 / International / 10 / EN



Building Type : Isolated or semi-detached house
Construction Year : 1790
Delivery year : 2019
Address 1 - street : Stannington S6 6GR SHEFFIELD, United Kingdom
Climate zone : [Cfb] Marine Mild Winter, warm summer, no dry season.

Net Floor Area : 600 m² Other
Construction/refurbishment cost : 312 000 €
Cost/m2 : 520 €/m²

General information

Existing building

The house was built in 1790, with no footings except for cellar. The walls are made of stone with rubble interior wall with a total thickness of around 500 mm.

The insulation of the walls was achieved through building an interior stud wall with insulation panels and a breather membrane in between.

Renovation works over the years

The renovation was made on several stages, it started in 2005 with the insulations and it ends in 2019 with the installation of the battery storage.

What was done over the years is developing a sustainable model for the farm.

The next step would be to set up a water storage system so that excess renewable energy generated can be used to heat water so that less heat from the ground is needed.

Installation of energy system

The farm location is at a thousand feet on the edge of a Peak District and the wind is good so the strategy was to go all electric, by producing energy with two wind turbines and solar panels and installing ground source heat pumps for heating and an induction cooker.

With all the renewable energy generation, 3 times more energy than what's needed is produced and that surplus energy is exported to the grid. Now, less energy is consumed compared to a typical terraced house and energy has been turned from a cost to an income.

Green spaces

10 acres of the land was managed to be able grow fruits and vegetables and with help from Green City Heritage and the Woodland Trust, a tree nursery has been developed to be used for community projects.

Photo credit

Mark Woodward

Stakeholders

Contractor

Name : Mark Woodward

Construction Manager

Name : greendirections

<http://www.greendirections.co.uk>

Stakeholders

Function : Company

Rotary Engineering

Installation of the solar panels

Function : Company

Fraser Whelan

Wall and roof insulation

Type of market

Not applicable

Allocation of works contracts

Separate batches

If you had to do it again?

Feedback regarding the Xzeres Wind Turbine :

The impact of government regulatory policy on renewable energy installation

A short time after installing the Xzeres turbine in 2011, the UK government stopped supporting on-shore wind development. As a result many turbine companies left the UK.

Xzeres, manufacturers of our 10 kW turbine, went out of business leaving around 60 owners without a supply of spare parts.

In 2019, 3 Xzeres owners (including myself) did some research and discovered that there were spare parts for the turbines in a warehouse in Oregon, USA. We also discovered that a Belgian company had ownership of Xzeres residual assets.

We contacted other Xzeres turbine owners and proposed trying to buy the residual stock of spare parts and to import them to the UK, with a total budget of around £250k. Around 30 of them agreed to join the plan.

With my 2 fellow organisers, we formed a UK limited company and made a deal with the Belgian company to buy the spare parts.

We then procured a shipping company who organized land and sea transport from Oregon to a farm in Scarborough, England from where the different owners organized collection.

I bought 2 alternators, 2 controllers and 1 set of blades with at total expenditure of around £15k including transportation.

It took us nearly 2 years to execute the plan – COVID caused many extra problems such as poor supply of shipping containers and of very limited space on ocean tankers.

I now have spares that should enable the turbine to continue working for many more years.

Without our action, many of our turbines would now be useless.

Energy consumption

Breakdown for energy consumption :

No formal audit has been conducted, although energy consumption figures indicate good performance.

Envelope performance

More information :

Insulation work installed in 2005/2006 :

- Walls: 60mm Phenolic
- Floor: 100mm Polystyrene
- Roof: multifoil + 100m Phenolic

More information

Energy Purchase from the National Grid

Circa 12,000 kWh per annum – less than a typical small UK house (the graphs indicate more like 15,000 kWh but our actions since 2014 have reduced our energy demand further e.g. Tesla Powerwall battery).

Renewables & systems

Systems

Heating system :

- o Heat pump
- o Electric floor heating

Hot water system :

- o Heat pump

Cooling system :

- o No cooling system

Renewable systems :

- o Micro wind
- o Other, specify
- o Heat pump

Production : Circa 35,000 kWh/annum from wind and solar

Installations :

- 2 Ground Source Heat pumps - installed 2006 – replaced oil boiler and radiators
- Underfloor heating – Installed 2006 – ground and 1st floor
- Wind Turbine 1 – Proven 6kW – installed 2005
- Wind Turbine 2 – Xzeres 10 k – installed 2011
- Solar installation – 4 kW array – installed 2011
- Tesla Powerwall - Battery storage – installed 2019
- Electric Car – Renault Zoe – first vehicle November 2015
- EV Charger – installed 2015

Environment

Biodiversity approach

- o Exploitation of the 10 acres of land for the grazing of animals – horses, chickens, pigs; for growing vegetables and fruit, woodland creation and a woodland nursery – in partnership with a Charity that provides trees for community projects.

Products

Product

Wind Turbine

Xzeres

Product category : Structural work / Passive system

Wind turbine installation to provide and produce electricity



Costs

Construction and exploitation costs

Total cost of the building : 312 000 €

Additional information on costs :

- The estimation of the total cost is circa £275k

- This includes elements such as underfloor heating which is not essential to a decarbonized energy supply but when it means that you only have to circulate warm water at below 30°C (compared with 70°C+ for radiators) it has a substantial benefit for reduced energy consumption and the efficiency of heatpumps

- We have not paid back all of our investments. This is a crucial point. Holistic investments like this pay back over many years and in many ways other that are not fully measured in currency.

Contest

Reasons for participating in the competition(s)

- The renovation of the farm with installing renewable energy systems such as solar panels and wind turbine allowed to produce more energy than it consumes.
- Annual consumption of Primary Energy in use by m2 of equivalent standard building at minimum standard requirements calculated according to the thermal regulation
- Exploitation of the 10 acres of land for the grazing of animals – horses, chickens, pigs; for growing vegetables and fruit, woodland creation and a woodland nursery – in partnership with a Charity that provides trees for community projects.

