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Mental Health
NHS Foundation Trust

Opportunities in Renewable Energy for NHS Trusts

Jonathan Stewart

Norfolk and Waveney Mental Health NHS Foundation Trust

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The Trust

- Specialist Mental Health Trust
- Providing care across Norfolk and the Waveney area of Suffolk
- Annual turnover £130 million
- 25 sites across catchment area
- 2500 employees

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Case Study

- Justin Gardner House
- Psychiatric intensive care and low secure unit
- Opened May 11th 2009
- Total project cost £8 million
- 2640 m² of building area

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Key Principles

- Exemplary patient environment
- Safe and secure
- ‘Statement’ building
- Low carbon in operation
- To undercut NHS energy targets
- Third new building with ‘Renewables’

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Design Brief

- To embrace natural light & ventilation
  - Health benefits
  - Reduced energy use
- To reduce operational energy use
- To utilise renewable energy systems
- To build the best mental health building in the country

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Design Features

- Grid connected photovoltaic arrays
- Ground source heat pumps
- Rainwater harvesting
- High levels of insulation
- Energy controls
- Natural light and ventilation

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PV System

- 246 Sharp monocrystalline modules installed on 2 roof elevations
- Total area of arrays - 323 m²

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PV System

- 246 Sharp monocrystalline modules
- Total area of arrays - 323 m²
- Total installed output - 42 kWp
- Estimated yield - 33,300 kWh/yr
- Estimated carbon offset - 18,900 kg/yr

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Eqivalency

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Input of kWh Generated by PV	
Annual Yield :	33,291 kWh
Annual CO_2 Offset :	18,909 kg
Equivalent CO_2 Saved :	
31.5	Hot Air Balloons 10m Wide (volume)
110.3	Double Decker Buses (volume)
1.3	Million Party Balloons (volume)
10.9	Olympic Swimming Pools (volume)
25.9	Trees 100 yrs to remove CO_2
Distances	
192,952	km on plane (Int. but short-haul)
94,546	km in car
315,155	km on train

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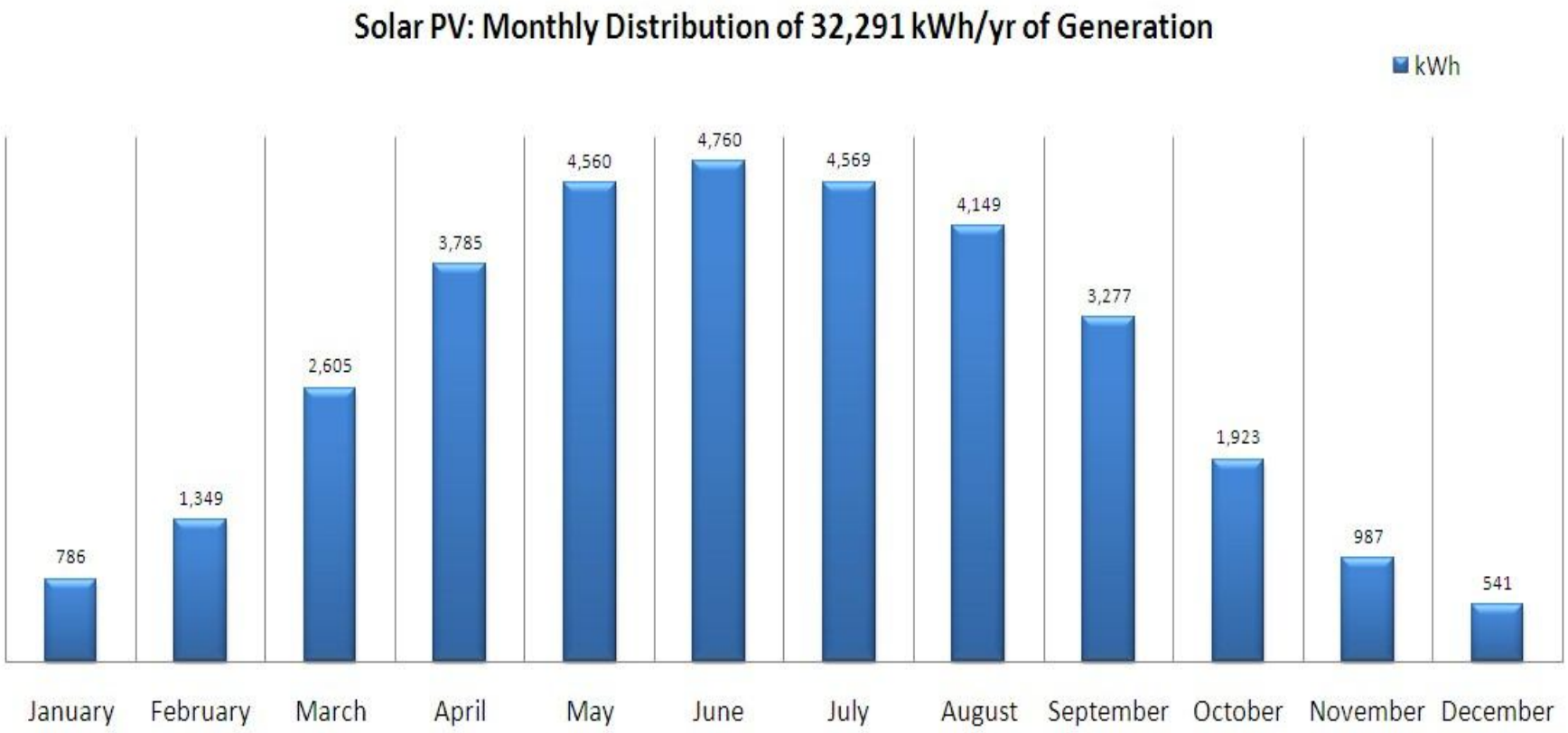

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Heat Pumps

- Two 50 kW Dimplex heat pumps to provide the total building load of 80kW

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Econic Ltd
ECONIC

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Heat Pumps

- Two 50 kW Dimplex heat pumps
- 120 bores sunk to a depth of 25 m by hydraulic insertion method

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LANKELMA
LANKELMA
MAN
W183 BKN
2008/11/05

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Heat Pumps

- Two 50 kW Dimplex heat pumps
- 120 bores sunk to a depth of 25 m
- Annual energy supplied 160,000 kWh
- Annual energy consumed 45,700 kWh
- Efficiency factor 350%
- Estimated annual carbon offset (compared to gas boilers) 30.4 Tonnes

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Rainwater Harvesting

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- Below ground storage tanks
- 6,500 litres for each ward
- Water used to flush WC's throughout building
- Topped up with mains water during dry periods

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Additional Design Features

- High levels of wall and floor insulation
- Prefabricated ‘warm’ roof construction
- State of the art heating and lighting controls to minimise wastage
- High levels of natural ventilation to eliminate mechanical systems
- Reduced reliance on artificial light

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Treatment Room

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Funding

- Project largely funded by Trust capital
- Grants secured for renewable systems
  - 50% of first 45kW installed for GSHP
  - 50% of total installation for PV
- Total grants received from BERR £142,000

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Energy Performance Certificate

HM Government

Non-Domestic Building

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Hellesdon Hospital
Drayton High Road
NORWICH
NR6 5BE

Certificate Reference Number:
0590-0431-7750-7994-6006

This certificate shows the energy rating of this building. It indicates the energy efficiency of the building fabric and the heating, ventilation, cooling and lighting systems. The rating is compared to two benchmarks for this type of building: one appropriate for new buildings and one appropriate for existing buildings. There is more advice on how to interpret this information on the Government's website www.communities.gov.uk/epbd.

Energy Performance Asset Rating

More energy efficient

A+

Net zero CO_2 emissions

A 0-25

B 26-50

C 51-75

D 76-100

E 101-125

F 126-150

G Over 150

33 This is how energy efficient the building is.

Less energy efficient

Technical information

Main heating fuel:	Natural Gas
Building environment:	Heating and Natural Ventilation
Total useful floor area (m^2):	2636
Building complexity (NOS level):	4

Benchmarks

Buildings similar to this one could have ratings as follows:

36 If newly built

67 If typical of the existing stock

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Performance

- Only estimated at this time
- 70% of buildings heat will be free
- Total Heating cost £900 per year
- Renewable energy will save over 49 Tonnes of carbon dioxide per year
- Energy performance estimated at 14 GJ/100m³

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Further Options

- Planning consent for 18kW wind turbine achieved
- Review of option to use solar heating for DHWS

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Summary

- Primary function to provide exemplary mental health care environment
- High performance building
- Enhances reputation of Trust
- Minimises operating costs
- Some lessons learnt for next project

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