



## CASE STUDY KELLING ESTATE

### System Summary:

Boiler:	Gilles HPK-UTSK 550
Output:	550kW
Fuel:	G50, W50 Woodchip, locally sourced
Fuel Storage:	Converted Grain store with 6.4m sweep collector
Fuel Storage Capacity:	100m <sup>3</sup>
Annual Heat Load:	898MWh per year
Annual Fuel Requirement:	320 tonnes (G50, W50 Woodchip)
CO <sub>2</sub> Saving:	238 tonnes per year
Features:	Automatic ignition, pneumatic heat exchanger cleaning

The Kelling Estate installed their first biomass boiler (a 100kW woodchip system) in 2005 and having established fuel storage and processing procedures were ready to take on this ambitious project in 2007. The Gilles HPK-UTSK 550kW

heats two tilapia fish farms, retail units, the farm offices, a series of residential properties and holiday lets. The Boiler was installed by Energy Innovations (UK) Ltd who also designed and installed the district heating system. The heat is distributed through a network of pre-insulated PEX pipes. At each property termination there is either a heat exchanger or low loss header from which the individual units are able to draw heat as required by existing or new heating systems.



*Above: The Gilles HPK-UTSK 550kW in the central boiler room converted from an old grain store is at the centre of the system.*

The installation of this industry leading system was generously supported by the Bio-Energy Capital Grant Scheme. This scheme is run by DEFRA which has received funding to help develop a network of reference biomass heating plant in order to promote the use of this technology. Please contact Energy Innovations if you would like to view this installation.



*Kelling Hall, where a plate heat exchanger has been used as an interface between the existing heating system and the district heating network*

*The retail units and some of the residential units heated by the central 550kW wood chip boiler*



*Part of the district heating during installation prior to back filling with sand*



The use of pre-insulated heat transfer mains facilitates the heating of a network of properties from one central boiler. This is well suited to biomass systems where the cost of a boiler can be far greater than that of a traditionally fuelled alternative. District heating networks with a close grouping of heated units, as in this case, can significantly reduce the capital cost per property. The intensity of heat load placed on the boiler is greater due to system diversity, allowing more efficient boiler operation. This, together with much reduced fuel cost per kilowatt hour (kWh) leads to significant savings.

### **Heat metering**

The system at Kelling is providing heat to a series of different units including residential and commercial tenants. In order to monitor the heat usage (in kWh) of each unit heated, heat meters have been installed at the terminations. These heat meters allow tenants to be charged for their heat in pence per kWh. Heat meters have also been installed where the heat distribution mains leave the boiler house. These will be used to monitor system efficiency and identify any system discrepancies.



*Left: Kamstrup Heat Meters have been installed at every termination for system monitoring and charging for heat used.*

### **Remote access software**

GILLES boilers, installed by Energy Innovations, are equipped for remote access via a telephone or data network by an on or off-site PC. This allows the Energy Innovations office to provide remote assistance to the boiler operator. It is also possible, where required, to make remote adjustments to control parameters thereby maintaining efficient and reliable operation.

### **Woodchip fuel**

The boiler can be run on G50, W50 woodchips. The fuel is produced from sustainable managed woodland on the estate, meaning very little haulage and handling is involved. This reduces carbon emissions from fuel production to a bare minimum, creating a truly low carbon system.

### **The Woodchip Fuel Store**

Making good use of existing onsite resources and minimising fuel handling requirement, a disused grain store has been converted into the boiler's woodchip store. A 6.4m sweep collector has been installed, enabling the store to be filled once a month during winter.

### **Carbon savings**

With an estimated annual output of 898MWh, the system installed in North Norfolk will make an annual CO<sub>2</sub> saving of approximately 238 tonnes.

### **Green fish farming**

As part of farming operations on the estate, there has been a diversification into tilapia fish farming. Tilapia are herbivorous fish that provide a good replacement for cod. Fish farming enterprises such as this could offer a much needed respite to already depleted fish stocks in British waters. The farming of Tilapia requires a constant water temperature of 28°C. At Kelling this heat demand is met by the Gilles boiler, meaning that these fish will benefit from low carbon heating, in turn reducing the carbon footprint of their production.



# ENERGY INNOVATIONS

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**0844 800 6805**

**[www.energyinnovationsuk.com](http://www.energyinnovationsuk.com)**

5 & 6 Richmond Old Dairy, Gedgrave,  
Woodbridge, Suffolk, IP12 2BU



Authorised User No. 00557

