

FUNDING FOR RENEWABLE ENERGY PROJECTS

Rising energy costs and attractive incentives to support the adoption of alternative 'greener' energy sources have encouraged businesses, landowners and homeowners to consider switching to renewable energy. The initial capital cost of purchasing new equipment is often seen a barrier, however good quality renewable energy projects represent attractive investment opportunities for companies and landowners.

The purpose of this paper is to provide an overview of the options and incentives open to businesses, landowners and investors.

Renewable Energy Types

The most common forms of renewable energy are:

Solar

This is the most common type of renewable energy in the UK and has seen rapid growth in recent years for both commercial and domestic use, leading to a significant reduction in the cost of panels as volumes have increased.



Photovoltaic (PV) cells use light to generate electricity and are arranged in panels often located on the roof or walls of buildings. Solar Farms are large groups of solar PV cells, often located on unutilised farmland, can produce large amounts of power to support commercial requirements as well as feeding power directly into the electricity grid.

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Wind

The UK has the most wind in Europe, accounting for over 40% of the total wind in Europe. Wind is currently the second biggest source of renewable energy in the UK.



Wind energy is produced by turbines being operated by winds as slow as 5mph. When the wind is blowing the blades are pushed around like a windmill and each circulation powers a turbine which then generates electricity. The UK has more usable wind power than any other European country and large scale wind turbine farms on and offshore will become a major supplier of electricity to the national grid in the next twenty years.

Biomass

Biomass refers to organic matter such as timber and crops grown that are burnt to generate heat and power. Biomass is sustainable and carbon neutral because the carbon released in the combustion process is offset by the carbon trapped in the organic matter during its growth.

The most popular UK biomass crops are short rotation coppice, willow and poplar, Miscanthus (Elephant Grass), Reed Canary Grass and Oil Seed Rape. As well as specially grown crops, other agricultural by-products are also referred to as biomass, such as straw, grain husks, forest products, waste wood and animal wastes such as slurry and chicken litter.



Biomass boilers are particularly suitable for rural properties running LPG or oil-fired boilers. Biomass boilers provide an alternative to existing gas or oil fired boilers and can usually directly replace the current boiler without changes to the rest of the system for either space or water heating.

Systems vary in size from those feeding an individual house or business premises to those supporting an entire community. See CHP below.

Biogas

Anaerobic Digestion (AD) is a natural process where plant and animal materials (biomass) are broken down by micro-organisms in the absence of air. The products of AD are biogas and digestate. Biogas is a mixture of 60% methane, 40% carbon dioxide and traces of other contaminant gases. The exact composition of biogas depends on the type of feedstock being digested.

Biogas can be combusted to provide heat, electricity or both. Alternatively, the biogas can be 'upgraded' to pure methane, often called biomethane, by removing other gases. This pure stream of biomethane can then be injected into the mains gas grid or used as a road fuel.

Digestate is made from left over indigestible material and dead micro-organisms. It contains valuable plant nutrients like nitrogen and potassium can be used as a fertiliser and soil conditioner.

Combined Heat and Power

Combined Heat and Power (CHP) is the use of a single plant to generate both heat and electricity. In conventional power generation large quantities of energy in the form of heat are wasted. By using this technique, the total energy conversion efficiency can reach 90%.

Combining this with sustainable fuels such as Biomass can provide low cost heating that has a minimal carbon footprint. CHP plant is available in a range of capacities from large CHP plants where the electricity output feeds into the national network and the heat is used locally; through building or community sized CHP plants to Micro CHP that effectively replace the boiler of a single home.

Hydroelectricity

Hydroelectric power supplies approximately 20% of world electricity. There are three methods of hydroelectricity generation.

Tidal power use tides to drive turbines which convert kinetic energy into power in the same way as wind turbines. Tidal power can create a lot of energy, quickly and as the tides operate on a timetable with the moon the level of power produced can be predicted. Tidal power stations tend to be high cost to set up and often encounter opposition from environmental groups.



Wave power uses the movement of the sea around a cavity to trap and then compress air which in turn drives a turbine to produce electricity. This form of energy production is currently not used on a large scale due to the high cost of constructing the turbines and air traps.

The most common most common form of hydroelectricity generation uses dams to move water and allow it to fall driving a turbine to generate electricity.

Incentives

The UK Government has a long term commitment to the increased use of renewable energy. This is driven partly by the commitments given to the EU to generate 15% of all power from renewable energy by 2020 and partly by the needs of energy security. A potential shortage in energy supply predicted to hit the UK in the next few years as demand for power continues to increase and old coal and nuclear power stations are decommissioned.

To encourage the generation of renewable energy the UK Government has introduced subsidies to encourage efficient generation of energy from renewable sources at the point of use. The three subsidies are outlined below:

Feed In Tariffs

Feed-In Tariffs (FITs) are available to households, landlords, landowners businesses and organisations such as schools and care homes. Most forms of renewable electricity generation qualify up to 5 megawatts in size (enough for a large factory). Larger generators are supported by the Renewables Obligation (see below).

The Tariffs give three financial benefits:

- A payment for all the electricity produced, even if used by the producer
- Additional bonus payments for electricity exported into the grid
- A reduction on the standard electricity bill, resulting from using energy produced

Once a system has been installed and registered, the tariff levels are fixed and guaranteed for 20 years, subject only to index-linking for inflation. The FITs are scheduled to be open to new installations until the end of March 2021.

The costs of renewable energy technologies are expected to reduce as volumes build in the future. To compensate for this, and to ensure that the support costs decrease over time, the tariffs for new registrants will reduce through a mechanism called 'degression'.

The owner of the eligible installation is the beneficiary of the FITs, however the beneficiary is entitled to nominate another party (such as an investor) to receive the tariffs.

Renewable Heat Incentives

RHIs operate in a similar way to FITs to encourage the generation of heat from renewable sources. The RHI provides for a guaranteed base level generation tariff of between one and two times the wholesale price of heat. In addition, there is a variable export tariff providing upside, which is earned by selling heat to other users. The premium is paid quarterly over 20 years for the heat is generated.

Renewables Obligation Certificates

Larger scale (generating in excess of 5MW) projects benefit from ROCs. A fixed number of ROCs are earned by a renewable energy producer for each MW of energy produced, depending on the technology. The minimum price of ROCs is guaranteed by the Government, but the price of a ROC is set each year by a market for ROCs. On top of the ROCs there is a variable export tariff, which is earned by selling the electricity.

Funding Options

There are three ways to fund the purchase and installation of renewable energy systems:

- **Outright purchase** – the landowner/business retains full ownership and receives all income (including FITs/RHIs/ROCs) and energy generated. External funding may be obtained to fund the project depending on factors such as security available and ability to part fund from own resources. Responsibility for maintenance falls to the owner, although this can be outsourced to a specialist maintenance provider.
- **Joint Venture** - risks and rewards are shared with an investor. Typically the site owner would invest between 50% and 20% of the purchase costs and then take the same share of the profits (including FITs/RHIs/ROCs) over the next 20 years. Energy generated can also be made available to the landowner at reduced rates.
- **Land rental** - Investors lease the site and install, own and operate the generating equipment. The investor will receive the benefit of the FITs/RHIs/ROCs. The site

owner receives a rental for the next 20 years. On top of this the land owner can agree terms to access electricity generated at a discount on the market price charged by most energy companies.

Suitability for renewable energy

First stage is to assess the site for suitability. Climate factors significantly affect the likely power output. For example in the case of solar a South facing location will produce a significant higher output and locations in the south of the UK benefit on average from longer day light hours boosting returns. Similarly location is critical to power output from wind turbines. Using historical data detailed forecasts can be produced to show the expected power output.

An industry of specialist companies has developed to advise on these matters and it is important to select suitably qualified and experienced experts to determine at an early stage where a project is viable and can be expected to generate attractive returns.

All renewable energy installations that involve development require planning permission. A connection to the national grid is also required if surplus energy is to be sold back to the grid. This requires permission from the local Distribution Network Operator (DNO) and the cost of this can be significant depending on the grid infrastructure in the area.

Funders

There are a range of funders seeking to invest in renewable energy projects. These include high street banks, merchant banks, private equity, hedge funds and trade investors. Many having developed specialist knowledge and experience and have teams dedicated to this industry.

Funders will typically want to see a detailed site assessment and require planning permission to be obtained and a grid connection to be in place or fully costed before investing. Some investors look to fund the build and installation, whilst others look to invest in completed, operational projects that are income generating. Sites are more attractive where there is an off take agreement (e.g. power or heat supply to a factory). This gives a retail price rather than the wholesale price when sold to the grid and hence boosts prices.

Pension funds and insurance companies are increasingly attracted to purchasing completed renewable energy generators, attracted by the reliable income stream.

It is vital success of a project to identify the funders best placed to support the project and to put in place a strong advisory team.

Typical returns for investors are 10-15% pa depending on the project. Major attractions are long term guaranteed income provided by the incentive schemes and asset backing provided by the capital equipment. The technology is now proven and reliable, with very low operating and maintenance cost.

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