# Grow your own energy

Information sheet

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Arguably, the biggest issues facing mankind at the moment are food security and energy security, and they are both inextricably linked. In the UK, agriculture accounts for about 7% of our total greenhouse gas emissions. So it's good news that growing numbers of ecologically-aware farmers are choosing to generate their own renewable energy which works in harmony with the environment, not against it. But the motive isn't purely ecological – generating your own energy on-site has financial benefits too, making it a good option for diversification.

Here's a list of things to consider to ensure you choose the best renewable technology for your organic farm.

## What are your power needs?

Firstly, you need to consider what your power needs are to select a technology which is likely to be generating when your needs are at their highest. For example, solar tends to particularly benefit dairy farmers, due to the need for refrigeration during the day.

It's also important to consider your heat requirement. If the farm has large areas of woodland, it may be that a biomass boiler may be the most useful option. This type of energy generation will be supported by the government's new Renewable Heat Incentive, which should provide a Return on Investment (RoI) of 10 – 12%.

## Identify your best resources

Outbuildings with south-facing roofs, windy hillsides and even streams are all potential sources of abundant natural resources for generating clean, green energy.

A large south-facing roof (ideally sloping at 30 – 40$^{o}$) is best for a **solar PV** array. There should be a minimum of around 10m$^2$ of roof space facing south, south east or south west with no casting shade for the majority of the day. The roof needs to have a planned life span of at least 25 years to ensure a good return on investment (RoI). It is a good idea to carry out any necessary roof repairs whilst the solar panels are being installed and the scaffolding is up. A reputable certified installer will do a survey and provide an accurate estimate of how much electricity can be generated at your particular location.

To install a **wind turbine** you need a west-facing site, with a wind speed of over 4.5 meters per second at a height of 10 meters – you can make your initial check quickly and easily online (http://www.bwea.com/noabl/index.htm). The site should be free from any tall obstacles (ie trees or buildings) within 50m. Once you have established that the wind speed is good, it is important to make detailed measurements using an anemometer over a number of weeks.

**Hydro power** can be particularly useful for hill farmers with a fast-flowing river or stream on their land. It is a constant, long-lasting and reliable way to generate energy, and if there is a history of the use of even small- scale hydro power generation in the past such as an old water mill, it is worth looking into the possibilities.

**Anaerobic digestion (AD)** should definitely be considered by dairy farmers or those who have access to slurry. Feedstocks are digested by bacteria to generate two byproducts - digestate and biogas. The biogas is then ready to be burned to produce electricity and heat. Organic feedstocks are very flexible, ranging from farm manures and sewage sludge to catering and food wastes. AD plants typically need to be large-scale to be cost-effective. Only sites that have access to large amounts of high energy organic wastes are suitable for this technology.

Farms with sustainably managed woodland may wish to consider **biogeneration**. Plant life and organic matter, such as waste wood, straw and other crop residues can be processed into fuels to heat water, drive a turbine and create electricity. This process returns the same amount of CO2 to the atmosphere as it absorbed during its life making biomass materials carbon neutral.

## Getting paid for your generation

Generators can access a range of funding, depending on the size of the system. Domestic and smaller scale generators can access funding via the Feed-in Tariff. Further information can be found here: http://www.goodenergy.co.uk/generate/home-generation/selling-your-energy

Larger generators will have a Power Purchase Agreement. Further information can be found here: http://www.goodenergy.co.uk/generate/commercial-generation/selling-your-energy/our-power-purchase-services

## Costs and return on investment

The upfront investment costs will vary according to the technology you choose, the maintenance it needs and its scale. You will be eligible to receive payments under the Feed in Tariff (or FiT), which was launched in April 2010. Once registered, generators are entitled to a sum of money for every unit of electricity they generate – even if it is used on site – and a further sum for the units exported to the grid.

Information on FiT payment levels can be found here:
http://www.goodenergy.co.uk/generate/selling-your-energy

For a small, well-positioned domestic solar system, (say, 2 kilowatt peak, costing around £6,200) you could expect a return of around £395 a year. Taking into account the money you'd also save on your electricity bill, your investment could pay for itself in around 11 years. And payments are not only index-linked, but guaranteed for 25 years so
you could expect to be in profit for another 14 years.

For a larger 10kW solar system where 80% of generation is used on site, expect to pay around £22,000. FIT payments (at 16.8p per kWh) are likely to be in the region of £1,471 per annum. This combined with savings on electricity bills and your export payment (for the electricity you are deemed to produce) combines to a benefit of over £1,830 per annum, meaning the system should pay for itself in just over ten years.

The initial investment in a 5KW wind turbine starts at around £18,000 - £20,000 (subject to model and installation). A well-sited 5KW turbine with winds at five meters per second can generate approximately 8,500 Kilowatt hours (kWh) which would add up to £2,380 in FiT payments per annum. FiT payments (which are currently 28p per kWh) are made on all the energy you generate, including what you use yourself, are inflation-linked, and are guaranteed for 20 years.

The cost of building an AD plants varies greatly depending on the complexity of the plant and the speed at which the feedstock is treated. AD qualifies for both the FiT and the new Renewable Heat Incentive. This, plus savings made in waste disposal mean that payback time for AD installations could be as little as five years, depending on the circumstances.

**The FiT rates are subject to regular government review. Figures indicated here are for illustrative purposes only based on Feed-in Tariff rates current from 3 March – 1 July 2012. For the latest information on rates please visit: www.goodenergy.co.uk/feedintariff**

## Planning requirements

Many microgeneration technologies now come under 'permitted development rights'. This means permission to install these technologies is automatically granted providing certain conditions are met. There are some restrictions that apply within permitted development rights, such as how much a system protrudes above a property. Installers recommended by Good Energy will be aware of these restrictions and should ensure your installation adheres to them.

However, it is worth noting that 'permitted development rights' do not automatically apply to listed buildings, properties in conservation areas or areas of outstanding natural beauty. This probably won't prohibit you from installing a microgenerator, but you will need to get approval from your local planning authority.

Small-scale wind turbines are not yet covered by permitted development, but once standards have been established to address the potential impacts of turbines, these technologies will be included in permitted development rights. For now you need to consult your local planning authority.

Planning permission is always required for anaerobic digestion and specialist advice should be sought regarding emissions and odour control. Hydro schemes also require planning and the Environment Agency, responsible for water courses, should also be contacted.

For more information on planning we recommend that you visit the Planning Portal and the Energy Saving Trust website.

## Choosing an installer

Once you've decided on the right technology, the next step is to find a reputable installer. In order to qualify for the FiT, the installer, and the technology chosen, must be registered with the Microgeneration Certification Scheme (MCS) for projects under 50KW. As with all major investments, we recommend obtaining quotes from three established installers. The installer should also be able to forecast accurately the power output for the renewable technology of your choice in your situation.

Wind and hydro schemes do take time to install depending on planning, site access and the scale of the chosen development but a domestic-sized solar system can be installed in one to two days. Good Energy can provide a list of reputable installers: http://www.goodenergy.co.uk/generate/our-installers/recommended-installers

Good Energy is the UK's only 100% renewable electricity supplier, and source their energy from a community of over 2000 independent small-scale generators.

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