



guide to hydro generation and the feed-in tariff

june 2012

foreword

The British Hydropower Association (BHA) is the professional trade body representing the interests of the UK hydropower industry at regional, national and global levels.

We are pleased to have helped our industry grow through recent effective lobbying on the Renewable Obligation, Feed-in Tariffs and environmental regulation issues.

These efforts will continue to ensure that hydropower continues to be regarded as a significant part of the UK's renewable energy mix.

BHA support covers the following:

- Lobbying and liaison with decision makers in central and devolved governments and other agencies – especially those involved in environmental regulation
- Co-ordination of hydropower events and creation of marketing opportunities
- Improving the image of hydropower
- Assisting with exporting opportunities for the UK hydropower sector
- Networking and bespoke seminars

The membership of the BHA covers a wide range of interests and expertise; design and consulting engineering in all disciplines, developers, contractors, generators, equipment manufacturers and suppliers, project managers, financiers, insurers, operators and investors and specialists in hydrology, fish protection and other services.

We welcome this Guide to Hydro Generation and the Feed-in Tariff as a very useful and informative tool for all those involved in, or contemplating joining, a very vibrant renewable energy sector.

David Williams

**Chief Executive
British Hydropower Association**

the renewables revolution

The significant rise in energy costs seen in recent years and introduction of financial incentives including the Feed-in Tariffs (FiTs) have seen an increasing number of landowners, businesses and communities look to generate their own electricity.

Investing in renewable energy projects provides opportunities to control costs as well as generating a valuable new long-term income stream.

Although hydro has been providing clean energy for many decades, the introduction of the FiTs has

stimulated a new wave of interest in the technology and meant some projects which were previously unviable are now cost-effective.

By the end of 2011, there were 255 hydro installations with a total installed capacity of 18 megawatts (MW) covered by the FiTs scheme. The Environment Agency believes that by 2020, there could be more than 1,200 hydro schemes consented in England and Wales alone.

smartestenergy's role in independent generation

Since SmartestEnergy was launched a decade ago, we have helped many energy entrepreneurs and we are now the UK's largest purchaser of electricity from the independent generation sector.

Our hydro customers range from sporting estates and family farms keen to diversify their income to investors looking for reliable, long term revenue streams.

As most of the electricity we buy is generated from renewable sources, we fully embraced the introduction of the FiTs support scheme in April 2010. We believe it is playing a valuable role in encouraging a new generation of energy entrepreneurs and helping meet the UK's climate change targets.

During the first two years of the FiT scheme SmartestEnergy has been among the leading energy suppliers taking part, paying out more than £17.85m to generators with a significant proportion going to projects developed by landowners and farmers.

Since the FiTs were launched we have seen a significant increase in the number of hydro projects in our portfolio and we are working on healthy pipeline of future projects.

We hope this guide will both stimulate interest and answer initial questions you may have about becoming a hydro generator.

why become a generator?

"Renewables are now the fastest growing energy source on the planet, and I am proud that Britain has played a leading role at the forefront of this green energy revolution."

- David Cameron, Prime Minister, April 2012

Significant change is underway in the way energy is generated and consumed in the UK.

Electricity and gas costs are continuing to rise with long-term forecasts suggesting further substantial increases. There are also stretching targets in place to reduce carbon emissions.

By 2020 the UK Government, along with the devolved administrations, wants to see the consumption of renewable energy increase by more than four-fold.

While much of the expansion will come from large on and offshore wind farms, smaller scale generation projects including hydropower schemes established by businesses, communities, landowners and investors will also have an increasingly important role to play in meeting the UK's energy needs.

Financial incentives for those looking to establish renewable energy projects include guaranteed and stable long-term returns on investment and a reduction in energy costs.

Renewable energy projects have already provided many landowners, farmers and investors with valuable, steady income streams from an investment which typically pays for itself in less than 10 years.

At a time when there are concerns over a potential energy gap in the future, ensuring security of supply is also a factor for many looking at independent generation projects.

Generating your own electricity can also have a big impact on reducing your carbon footprint, an issue which is becoming increasingly important to customers such as retailers who are keen to encourage sustainability throughout their supply chain.

With advances in renewable technologies, a wide pool of financial backers willing to support investments and incentives such as the FITs, renewable energy projects are within reach of more potential generators than ever before.

Why hydropower?

Small-scale hydro is one of the most cost-effective and reliable renewable technologies.

Key advantages that small hydro schemes can offer over wind, wave and solar power projects include:

- High efficiency (70 - 90%) compared with other renewable technologies.
- High capacity factor (typically >50%), compared with 10% for solar and 30% for wind.
- High level of predictability, varying with annual rainfall patterns.
- Slow rate of change; the output power varies only gradually from day to day (not minute by minute).
- Long-lasting and robust technology; systems can readily be engineered to last for 50 years or more.

With most small hydro schemes being 'run-of-river' with little or no water stored, environmental impact tends to be minimal.

getting started...

Site Feasibility

The first stage in developing any renewable energy project is to assess the feasibility of a potential site and the generating technology.

For hydropower schemes, establishing whether there is a significant energy resource involves estimating or measuring the flow and available head and what annual energy capture could be expected.

Other issues such as visual impact and potential environmental impacts also need to be considered.

Even if a potential generator owns the land, it may be sited within an area protected under designations including SSSI or conservation areas where restrictions apply.

There are many renewable energy consultants, including ones with significant experience of working with the hydropower sector, who can help make an initial assessment to establish if it is worth proceeding further.

Planning

The UK Government and the devolved administrations in Scotland, Wales and Northern Ireland are keen to ensure that the planning system allows renewable energy developments provided any impact on the local environment can be addressed satisfactorily.

Permitted Development Rights, which are at different stages of being introduced in England, Wales and Scotland, may also allow some renewable installations without the need for planning permission.

As part of the planning process for larger schemes, an Environmental Impact Assessment may be required covering a range of issues including potential effects on ecology, wildlife, archaeology, noise impact, aviation issues and visual impact.

Hydro installations on rivers populated by migrating species of fish, such as salmon or trout, are also subject to special requirements.

Most consultants will carry out the planning assessment and prepare submissions for renewable projects and will also be able to carry out an initial feasibility study to assess a project before significant expense is incurred on detailed planning applications.

Licensing

All micro hydro and small hydro systems have to be licensed by the Environment Agency or the Scottish Environment Protection Agency.

There are different licences required dependent on the specific nature of a scheme including Abstraction Licences (if water is being diverted away from the main line of flow of the river) and Impoundment Licences (if changes are being made to structures which impound water, such as weirs and sluices, or if new structures are to be built). Land Drainage Consent may also be required.

Both the Environment Agency and the Scottish Environment Protection Agency provide detailed information on licensing:

> [Environment Agency](#)

> [SEPA](#)

getting started... (cont'd)

Finance

Guaranteed returns under the FiTs scheme (plus the potential additional uplift from power purchase agreements covering export electricity for sites opting out of the Export tariff) can be used to secure long term financing for projects from banks, venture capital firms and investment funds. A number of lenders also have dedicated teams which specialise in landowner and agricultural schemes.

In addition to lenders, there are also private investors willing to lease sites from landowners and businesses or to establish a joint venture. Depending on individual circumstances there may be tax advantages to investing in new generation assets.

A number of grant schemes are also available for renewable projects but accepting grants for the capital costs of a project may affect eligibility for FiT payments.

Grid Connection

Electricity generated by a scheme can be used locally, in place of power currently supplied to a site, or exported via the local distribution network.

If the scheme is to produce power for export, prospective generators need to ensure they have any necessary physical connections to the electricity distribution and transmission system.

A grid connection can be arranged with your local Distribution Network Operator (DNO) company or an Independent Connections Provider (ICP). Network capacity is scarce in certain parts of the country and should be assessed and reserved as early as possible to prevent delays to a project.

The costs of grid connection are site-specific and can depend on factors including connection voltage, physical location and ease of access to the network, and whether any capacity upgrade is required.

In addition, Connection Agreements will have to be signed for import and export access to the network.

Metering Connections

To benefit from exporting electricity under the FiTs scheme, the appropriate metering is required: a Generation meter which records all electricity generated and an Import/ Export meter which records electricity exported to and imported from the grid through the connection point. For sites exporting 100% of output then a single meter is sufficient.

A Meter Operator will install and maintain appropriate metering under a services contract, for an annual fee.

Application procedure

Hydro installations of all capacities must be accredited through a process based on the existing Renewable Obligation process, known as the ROO-FIT process. Further information on the ROO-FIT process is available from Ofgem.

In order to become eligible to receive the FiTs (as well as LECs and REGOs) you also have to apply to be accredited via the Renewables Register administered by Ofgem.

You should start the process of applying for accreditation around two months before the expected commissioning date.

The Central FiTs Register includes details of the site, technology and ownership in order to identify the generator and assign the correct tariff.

SmartestEnergy has produced a comprehensive step-by-step guide for customers to the application process for Feed-in Tariffs and Power Purchase Agreements which is available on request.

selling your power

The Feed-in Tariffs scheme

FiTs were introduced in the UK in April 2010 to encourage and support the development of renewable energy for electricity generation.

The scheme places a legal obligation on utilities and energy companies to purchase electricity from renewable energy generators who produce their own electricity from renewable or low carbon sources.

Installations of up to 5MW are covered by the scheme which guarantees a set, index-linked payment for all electricity generated by the system as well as a separate index-linked payment for any electricity exported to grid.

These payments are in addition to the bill savings made by using the electricity generated on-site.

The financial incentive is aimed to give a return of 5-8% on well sited installations based on a UK average resource and UK average installed cost.

The scheme, designed to be as simple as possible to encourage new generators, covers the following technologies:

- Hydroelectricity
- Wind turbine (building mounted or free standing)
- Anaerobic digestion
- Micro combined heat and power (mCHP) (limited to a pilot at this stage)
- Solar electricity (PV) (roof mounted or stand alone)

Landfill gas, sewage gas biomass and biomass CHP are not included but are covered under the Renewables Obligation regime.

The Government hopes that the scheme will deliver around 6TWh (about 1.6% of all renewable generation) of electricity by 2020 from an estimated additional 780,000 installations.

For larger schemes of more than 5MW, the Renewable Obligation Certificates (ROCs) scheme currently continues as the main form of subsidy.

Future Policy

As part of a Comprehensive Review of the Feed-in Tariffs, the Government is currently considering the tariff rates for a number of technologies including hydro.

A consultation document published in February 2012 proposes to maintain the middle tariff bandings at the same levels as previously and introduce a slight reduction in the low and high band tariffs.

For further details on the consultation visit:

> [DECC FiTs Consultation](#)

For the latest updates on the FiTs review, visit the Department of Energy & Climate Change website:

> [DECC FiTs Review information](#)

selling your power...(cont'd)

How the FiTs Work in Practice

There are two types of tariff – Generation and Export.

A set Generation tariff rate is paid by an energy supplier for each unit (or kWh) of electricity generated whether or not it is used onsite or exported to the grid. This rate may change each year for new entrants to the scheme, but once joined generators will continue on the same tariff.

In addition, an Export tariff will provide generators with a guaranteed further 3p/kWh from the energy supplier for each unit which is not used onsite and which is exported back to the electricity grid. Whilst the export tariff will remain a guaranteed option, generators will also be able to negotiate to export electricity by way of a Power Purchase Agreement (PPA) with a licensed electricity supplier such as SmartestEnergy which may provide more favourable terms.

Generators using some or all of their electricity on site will also see a reduction in their energy bills as they won't have to buy as much electricity from their energy supplier. The amount saved will vary depending how much of the electricity is used on site. Both the guaranteed generation and export tariffs will be linked to the Retail Prices Index.

There is further potential for greater returns on the exported electricity under a PPA through embedded

benefits – effectively a reward for bringing down transmission costs as energy goes to local users.

FiT projects can also gain accreditation under the Climate Change Levy scheme and the value from the associated Levy Exemption Certificates.

All suppliers must take part in a levelisation process which ensures that the costs of the scheme are borne equally by suppliers. The total cost of the scheme will be divided among all suppliers according to their share of the electricity market.

Suppliers who have paid out less than their calculated share will pay into a fund administered by Ofgem, who will then redistribute this to suppliers who have paid out more than their share.

Key Benefits of FiTs

The benefits of participating in the FiTs scheme are:

- Long term rates provide financial security for developers and investors
- Different technology rates encourages investment in wide range of renewable
- Easy of entry into the market
- Smaller generators encouraged
- Decentralisation of generation will lead to wider acceptance of renewable energy

smartestenergy and the feed-in tariff

SmartestEnergy aims to work in partnership with customers to maximise their energy potential whatever their generation profile.

We have significant experience of working with developers on new projects and have developed strong relationships with many of the leading advisors, consultants and funders in the independent generation sector.

Our involvement with hundreds of projects over the past decade means we have built up a depth of knowledge on different technologies and their application.

We know the leading manufacturers and suppliers in the market and can provide objective guidance where required. Essential in this market, we are also able to structure Power Purchase Agreements to meet the requirements of lenders.

Our products and our service

SmartestEnergy offers a range of electricity trading products designed to meet the diverse needs of independent generators and to help them achieve the best value for their energy.

Our Power Purchase Agreements for those looking to benefit under the Feed-in Tariffs provide commitment for up to 10 years and can be geared towards helping projects secure finance.

They offer the ability to switch between a market rate and the Export Tariff, providing the opportunity to benefit from wholesale prices, together with the security of a guaranteed minimum income.

We also provide opportunities to optimise prices, allowing generators to fix when market conditions are favourable, and to gain from the value of embedded benefits.

Portfolio generators can also benefit from volume flexibility, providing the ability to split output to improve potential returns. We also provide detailed market information to support flexible selling strategies.

Underpinning our product range is an approach to customer service we believe sets us apart in the power purchase market. Each customer has a dedicated Account Manager and named Customer Service Executive and our state-of-the-art integrated IT and trading platforms provide the information needed to make informed decisions.

We're here to help

You can contact us for guidance and assistance at any stage of your project and we can provide indicative pricing and terms and conditions as and when required for financial modelling.

If you'd like more detailed information on our products and services or just an informal chat about how we could help you achieve your energy goals, our account management team is on hand to talk or to meet in person.

For further information please contact us:

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Web: www.smartestenergy.com

what our customers say

“There were a number of companies we could have signed a Power Purchase Agreement with but we found SmartestEnergy very approachable and they also understood our needs as a smaller generator.

“We also like the personal service rather than having to deal with someone in a call centre.”

David Murray, Camserney Hydro, Perthshire

“SmartestEnergy proved very helpful in assisting us as the project progressed and it was good to be able to deal with someone we could meet with face-to-face to discuss issues.”

Diarmid Baird, JS Baird

“We were impressed with the people from SmartestEnergy we were dealing with and also the clarity of the information we were provided with on both pricing structure and terms and conditions.

“The fact that they provided a personal level of service and had the backing of a major global company in the Marubeni Corporation was also attractive.”

Garth Entwistle, Udney Community Wind Turbine Company

“I was already aware of SmartestEnergy and their focus on independent generators and felt they were able to offer a more innovative package than some of the big players in the market.

Although securing the best price for the client was obviously a critical factor, the flexibility provided by SmartestEnergy when it came to areas such as the terms and conditions of the contract was also very important.”

Sean Cameron, General Energy Management, Boston