

Dulas Ltd

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Diverse renewable energy services from employee-owned business

Summary

Dulas is an employee-owned business which was founded in 1982 as a spin-off from the Centre for Alternative Technology. It has grown consistently over the years to have over 50 employees, and all parts of the business are growing significantly at present. Dulas deliberately works with a range of renewable energy technologies.

In solar photovoltaics (PV) Dulas is an installer but also a wholesaler, selling modules and other equipment to its network of installers across the UK. It also sells PV-powered vaccine refrigerators for use in developing countries, and is the largest supplier in the global market. Vaccine refrigerators are vital for keeping vaccines cold, and thus effective, right until the point of use.

Dulas is one of the few businesses in the UK that can take a micro hydro project through specification, installation and commissioning at a high quality level, and has built numerous new schemes as well as refurbishing old ones.

In wind power, Dulas installs small turbines for commercial and public sector projects, but also provides services to developers of large wind farms, including site identification and wind resource assessment, environmental impact assessment and the preparation of planning applications. To date Dulas has achieved planning consent for over 235MW of capacity.

In biomass, Dulas has installed a range of schemes in Wales, and operates several of them as ESCOs, including a district heating scheme.

Within the past five years Dulas has directly sold or installed renewable energy equipment with a capacity of over 11 MW. The CO₂ saving associated with these installations is about 4,500 tonnes per year. In addition to this, the Dulas wind assessment service has led to planning consent for over 235 MW of wind capacity.

Although Dulas has grown significantly since its humble beginnings, it is still driven by the passion of its staff for renewable energy and their desire to make a difference for people and the environment. The company prides itself on minimising its own environmental impact, and maintaining high ethical standards. Dulas actively pursues working with community groups, helping them to work together to achieve renewable energy projects, and its overseas work with vaccine refrigerators is driven by an interest in the humanitarian objectives of the customers, and Dulas staff alike.

Dulas has taken a range of approaches to enabling customers secure funding for renewable energy technologies, including Low Carbon Buildings Programme grants, Energy Service Companies, an independent investment club and an independent business which attracts private investment to fund hydro schemes. By becoming a framework supplier to the Low Carbon

Buildings Programme, Dulas also guaranteed the continued participation of smaller installers in the UK grid-connected PV market. Dulas itself, however, remains owned by its employees, allowing the enthusiasm and experience of the staff to guide the business's future direction.

The organisation

Dulas is one of the longest running renewable energy businesses in the UK, founded in 1982 by six engineers from the Centre for Alternative Technology, with which it still has close links. The business has now grown to 52 employees, but still holds to its original principle of 'improving people's lives through the development of renewable energy technology'. The company is owned by its employees, who elect the board of five directors on an annual basis, and is based in Machynlleth, Powys, near the west coast of Wales. Its turnover in 2007 was £7.8 million.

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Context

The oil shocks in the 1970s stimulated the initial increase in interest in renewable energy in the UK. This was when work in sustainability first started in Machynlleth, Wales, with volunteers establishing the Centre for Alternative Technology (CAT). Dulas was spun out of CAT in 1982, as a renewable energy business to disseminate and implement the good practice being developed there. Despite the slump in oil prices in the late 1980s shifting the focus away from the need for alternative energy sources, Dulas remained committed to working in renewable energy. It was well placed to take advantage of the resurgent interest in recent years due to climate change and rising prices of all fossil fuels. It is now one of the largest employers in the area.

Dulas operates in several sectors of renewable energy; hydro, solar, biomass and wind, and also provides planning guidance, feasibility studies, project management, environmental impact assessments, consultancy and meeting new planning regulations in the built environment.

Technology and use

Dulas is divided into departments that deal with different renewable energy technologies. Departments collaborate on projects and frequently draw on each other's strengths. The key technology departments are hydro, solar, biomass and wind, and a consultancy department has recently been established, with a focus on replacing gas, oil and LPG heating systems in Wales.

Hydro

Dulas is one of the few companies in the UK that is able to specify, build and operate small run-of-river hydro schemes. A typical scheme uses a small screened intake, from which water is captured and fed down a penstock to the turbine, which drives a generator to feed electricity into the national grid. Various types of turbine are used according to the volume of water and the head (the height from which it is falling). Dulas also refurbishes existing schemes, including some with reservoirs and others over 100 years old. The capacity of the Dulas hydro team's experience ranges from 10 kW to several megawatts, and the total capacity installed in the last five years is about 7 MW, 3.1 MW of which was installed in 2007 alone. Dulas uses SCADA monitoring technology (Supervisory Control And Data Acquisition) in its hydro schemes to allow remote control and fault diagnosis, and an easy-to-use touch screen interface at the installation for a local operator to use.

In addition to the design and construction of complete hydro schemes, Dulas is also one of only a few companies worldwide producing the Coanda Aquashear screen, a device for screening debris and silt out of water. Screening is required to prevent damage to turbines, and the advantage of the Coanda screen over the alternatives is that it has no moving parts, requires almost no maintenance and removes all particles greater than 1 mm in size.

Solar

Dulas has been working with solar power for many years, and is the main UK distributor for Kyocera solar photovoltaic (PV) modules, as well as inverters and charge controllers from Fronius and Steca. Dulas carries out its own solar PV installations, but also sells modules through its wholesale channel to its UK-wide network of installers. Over the last five years, Dulas has installed 550 kWp of solar PV through 93 projects across the UK. A typical system uses an inverter to connect the PV modules to the building's electricity supply; energy generated is used within the building, and any surplus is exported to the national grid. Customers include housing associations, schools, community groups and industrial clients. Dulas has a nationwide installer network through which almost 500 kWp of solar PV modules were sold in 2007 alone. The installer network allows Dulas to maintain flexibility and capacity in solar PV – especially important over the past few years when government grant programmes have been erratic. Dulas' particular expertise in solar PV is in modularisation and installation techniques for small systems, resulting in a streamlined installation process, which reduces the cost to the customer. Dulas also works with solar thermal systems, but installations are only carried out by the installer network.

In addition to the work in the UK, Dulas also has a significant global business in solar PV, which has accounted for over 2 MWp of sales over the past five years. Products include solar-powered water pumps, lanterns and DVD players, but the most significant is the vaccine refrigerator. Unless vaccines are kept cool, right until the point of use, they deteriorate and lose their integrity. Maintaining the vaccine 'cold chain' is a major challenge for immunisation programmes in developing countries, where many rural health centres and the people they serve are far from the electric mains grid. Diesel generators may be available, but these require maintenance and a reliable supply of diesel, neither of which can be guaranteed. The solution that the World Health Organisation recommends is to use PV-powered vaccine refrigerators. These use a small array of PV modules to supply the power, and rechargeable lead-acid batteries for storage, so that they can be operated reliably and with minimal maintenance in places without mains or diesel power. The refrigerator unit is similar in design to a highly-insulated domestic model, with a cold compartment for storing vaccine and a freezer to produce ice so that vaccines can be carried to even more remote places. A 150 litre vaccine refrigerator can hold 30,000 doses of polio vaccine, costing over \$300,000 it is vital that it does not fail. The refrigerators and systems that Dulas produces are thoroughly tested in an environmental test chamber, which can simulate the range of temperature and humidity that the equipment will experience in real-life operation. This thorough testing helps maintain the Dulas reputation for reliability and good design. Dulas currently has about 75% of the world market in vaccine refrigerators, with the World Health Organisation and UNICEF being the main customers. It has recently received an order from UNICEF for 2,000 similar refrigerators for use with blood and drugs in up to 15 countries.

Biomass

Dulas has been working with biomass energy for six years, initially carrying out feasibility studies and resource assessments, but now also installing boilers burning wood chips, wood pellets or logs. Some boilers supply single buildings with heating and hot water, others supply district heating schemes in which a number of buildings are supplied from a single boiler using an underground 'heat main'. Dulas usually uses Froling and KWB boilers, with capacities up to 1 MW, and designs and builds its own control systems when required. Over the past five years there have been 14 biomass projects, with a combined capacity of 1.29 MW. Dulas is interested in biomass combined-heat-and-power, but does not plan to install such systems itself until there is more experience of their practical operation in the UK.

Dulas currently limits its biomass operations to Wales so that it can ensure that a reliable supply of good quality fuel will be available for the customer. It works to help local wood-fuel suppliers build

up their businesses and when necessary has purchased equipment to lease to them, to ensure fuel quality.

Wind

Dulas has two distinct areas of operation in wind energy. The first is working with small turbines, where Dulas carries out both site assessments and installations. Seven such systems have been installed in the past five years, four of them grid connected and the rest standalone; the total capacity is 20kW. The second area of operation is large-scale wind power, where Dulas offers a range of services, including site identification and feasibility studies; environmental impact assessment; wind monitoring and wind resource assessment; and planning services. This range of services has been widely used by the wind farm industry, and Dulas has achieved consent for turbine applications for a total capacity of over 235MW to date.

Consultancy

The Dulas built environment consultancy division, established in 2007, gives planners and developers an entry point to access the extensive practical experience of all the technology-based departments. The consultancy team offer planning advice and technological expertise to architects, developers and design teams wishing to integrate renewable energy into their project.

How users pay

Payment for products and services is usually staged, for example at progressive stages such as specification, installation and commissioning. However, many customers are able to access grants, and Dulas has also created some alternative models for funding renewable energy installations.

Dulas initiated and is the lead partner in The Low Carbon Partnership (TLCP), which was successful in being accepted as an approved framework supplier for the government-funded Low Carbon Buildings Programme (LCBP). This means that Dulas customers are eligible for LCBP grants. Sundog Energy Ltd is the other main partner, while Rayotec and AES are associate partners. Between them they are able to design, supply and install solar PV, solar thermal and small-scale wind energy systems. Dulas also provides information on the available grants on its website, along with forms to fill in for site surveys and links to relevant official websites.

One of the alternative funding models available is known as Dulas Hydro Generation, an independent company which was set up by Dulas. It takes private investment and uses it to fund the capital expenditure for hydro schemes, which include new build and refurbishment. Dulas carries out the surveys, engineering specification, construction and operation, and is paid for its work from the investment fund. Once each scheme is operational, the income from sale of electricity is used to pay operational costs (operation, maintenance and land rental), and the remainder reinvested by Dulas and the investors to build more schemes. Dulas invests 10% in each scheme from its own funds.

Another alternative funding model is that offered by the Renewable Energy Investment Club (REIC) which was set up by Dulas and Groundwork Bridgend in 2002. It aims to promote community-owned renewable energy installations by enabling a developer to issue shares to local investors. The level of investment is capped at a low level to encourage large numbers of small investors, rather than several large ones, and if a project is over-subscribed then the larger investors' contributions are reduced to allow the smaller ones to stay in. The club has already delivered one successful project, owned by Bro Dyfi Community Renewables, and several other community groups are currently interested in developing their own projects.

Dulas also works with the Energy Services Company (ESCO) payment model, through which a business sells an energy service to a customer, rather than just providing technology or fuel. The ESCOs which Dulas operates are associated with four of the biomass boilers it has installed, at a Forestry Commission visitor centre, a recycling centre, a farm, and a district heating system that includes 28 houses, a school and a community centre. In all four cases the customer pays for the heat delivered, while Dulas manages the fuel supply and operation, and organises a local supervisor for day-to-day management. This means that the customer does not have to concern

themselves with the operation of new technology, or fuel sourcing, and makes the transition to a renewable heat supply very simple. The ESCOs typically have five-year contract agreements. Two of them are both owned and operated by Dulas, while the other two are owned by the customer but operated by Dulas.

Training, support and quality control

Dulas provides detailed training to all of its installers to ensure they are competent to carry out work on its behalf. Products that are sold directly to customers come with full instructions, and Dulas is always ready to provide further advice by telephone when required. The Hydro, Wind, Solar and Solar International departments are now certified under ISO90001 for quality control, and the remainder will be certified shortly.

Benefits

Within the past five years Dulas has directly sold or installed renewable energy equipment with a capacity of over 11 MW, which generates approximately 10 GWh/year of electricity and 2 GWh/year of heat. The carbon saving associated with these installations is about 4,500 tonnes/year CO₂. In addition to this, the Dulas wind assessment service has led to planning consent for over 235 MW of wind capacity. As well as the environmental benefits from these installations, Dulas goes to great lengths to reduce the environmental impact of its business, occupying buildings that are rated 'Excellent' by BREEAM and have solar PV and rainwater harvesting installed.

Dulas has always had a commitment to community development and education. Within the UK, it has enabled many communities to install renewable energy equipment, on occasion accepting a lower profit margin or flexible payment term. Installations have also been carried out in over 15 schools, universities and other learning establishments. Dulas is also working on providing education resources on renewable energy through The Low Carbon Partnership, and provides three-month placements to EU students through the Leonardo da Vinci training programme. It also offers a six-month trainee position to new graduates, enabling them to get crucial work experience in renewable energy, and most of these trainees continue to work for Dulas after their training. Dulas is also providing a bursary for local school leavers to study engineering or another subject related to renewable energy, before a guaranteed first job after University.

Internationally, Dulas' products make an incredible difference to their users, most of whom have no access to grid electricity. The vaccine refrigerators especially are vital to improving health in developing countries.

As part of the principles of the company, a percentage of Dulas profits are donated to charities, both local and international.

Potential for growth and replication

Dulas is an employee-owned business, and has opted for organic, planned growth rather than rapid, step-change expansion. It is a matter of pride for Dulas that in 26 years not one employee has been made redundant. A key strength is that it does not rely on a single technology for policy support or market growth. Although being a provider of multiple technologies is a more complex business model it does mean that Dulas has not limited its market to a single sector. Policy changes, reform and increasing carbon focused regulation, combined with spiralling costs of oil and other fossil fuels underpin Dulas' position in the UK renewable energy market.

Expansion has been more rapid during the past few years, and all the divisions within Dulas are now growing, both in staff numbers and the volume of business. With the increasing demand for renewable energy services this can be expected to continue. By using a network of installers, who they train and supply, Dulas is able to multiply its influence on the renewable energy sector, creating jobs outside its own business.

Management, finance and partnerships

As an employee-owned company, Dulas is driven by the passion of its staff for renewable energy, and their belief that their work can make a difference to people and the environment. Although the board is elected annually by the employees, there is significant continuity and several members of the board have served for more than five years.

Dulas has no external investors; it is financed largely through its sales and has grown organically over the years. As a result has been able to keep a stable workforce, with very few employees departing, despite the competitive market for experienced renewable energy engineers. All employees are shareholders, and benefit from the company profit-sharing scheme. Dulas is one of a small number of companies selected for preferential support by the National Assembly of Wales, and through this has been able to secure cash flow support when particularly large orders have been received.

Dulas has a range of partnerships, developed for specific purposes. The Low Carbon Partnership has enabled a group of small renewable energy companies get access to the Low Carbon Buildings Programme benefits. The REIC enables small investors to own a share in renewable energy plants. Dulas has a new agreement with Airtricity for wind farm planning, and established relationships with a number of equipment suppliers, including exclusive UK import agreements. Dulas is a key distributor for a large number of independent installers for solar PV and solar thermal equipment.

This report is based on information provided to the Ashden Awards judges by Dulas, and findings from a visit by two members of the judging team to see their work.

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