

CASE STUDY 5 - BIODIESEL MANUFACTURE

Celtic Biodiesel, Pembroke Dock

Celtic Biodiesel started in 2005 when one of the Directors was driving a vehicle fuelled with biodiesel, and he realised how difficult it was to buy. After discussions with Pembrokeshire County Council it was discovered that it was illegal for used cooking oil to go to landfill, so here was an opportunity to manufacture and supply biodiesel and eliminate the problem of waste oil disposal.



Celtic Biodiesel has now been manufacturing bio-diesel from the Port of Pembroke at Pembroke Dock since 2006. The aim is to provide a sustainable alternative to mineral diesel.

Used cooking oil is collected from various sources in Pembrokeshire and the UK. It is then refined and turned into reliable, affordable and safe bio-diesel.

BIODIESEL

Biodiesel is a renewable fuel made from natural oils such as vegetable oil, used cooking oil and tallow. At Celtic Biodiesel only used cooking oil is processed. Using biodiesel ensures that there will be less CO₂ emissions and less atmospheric pollution.



The concept of using vegetable oil as a fuel dates back to 1895 when Dr Rudolf Diesel developed the first diesel engine to run on vegetable oil. He demonstrated his engine at the World Exhibition in Paris in 1900 using peanut oil as fuel.

THE PROCESS

The process is a chemical transformation known as Transesterification. The source oil is carefully filtered before being reacted under controlled conditions with Methanol and a catalyst. This process breaks up the large vegetable oil molecule into three smaller molecules, which is why Biodiesel is a thinner fluid than the original, more like conventional diesel. No changes are needed to users' vehicles, although pre 1996 vehicles' fuel pipes need to be of sufficient quality. Biodiesel is non-toxic, biodegradable and has a higher flashpoint than fossil fuel diesel. It can be stored in the same conditions as those for conventional diesel.

The Diesel Fuel Injection Equipment Manufacturers group released a report declaring general support for the use of B5 (5% biodiesel blend). Many vehicle manufacturers individually approve up to B100 (100% biodiesel) on different models, with variations occurring over time. Celtic Biodiesel recommend that customers refer to their manufacturers handbook before using more than 5% biodiesel blend. Warranty will be unaffected if used in line with manufacturers guidelines.

OTHER SERVICES PROVIDED BY CELTIC BIODIESEL

Celtic Biodiesel also collects cooking oil free from any catering establishment. Collected containers are recycled or reused to supply biodiesel to smaller users. This helps to make the whole process more sustainable. Pembrokeshire's hospitals, schools and nursing homes are among the suppliers of waste oil to the company, as is Oakwood Theme Park. Celtic Biodiesel also supply new vegetable oils that can be delivered at the same time as collecting waste oil.



SUPPLY & COST OF BIODIESEL

The refinery has a maximum capacity of 15,000 litres per week. Biodiesel is mainly delivered in 1000litre IBC's to registered Pembrokeshire customers. The cost is generally 5 - 10% below mineral diesel pump prices. If more than 1000litres is needed then delivery is not free. There are also pumps in Pembrokeshire run as consortiums where members can fill up their vehicles with Celtic Biodiesel fuel, i.e. St Davids Biodiesel Pump and Us Energy's Pump in Goodwick.

Haulage company Frenni were the first to supply their fleet with fuel from Celtic Biodiesel. Pembrokeshire County Council and the Pembrokeshire Coast National Park Authority now run most of their fleet on Celtic Biodiesel fuel, including some of the coastal buses.

Biodiesel is not tax free. When bought from Celtic Biodiesel road excise duty and VAT have already been included in the price.

GRANTS

Funding was obtained from the Pembrokeshire Coast National Park Authority's Sustainable Development Fund to help set up the company.

The grant was £173,302 and the total spend on project £931.902

USEFUL CONTACTS

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 - Us Energy www.usenergy.org.uk
 - Emma Taylor 01646 624874
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