

Broad Character: Industry

Character Type: Energy Industry

Regional Perspective: Southern England

Compiled by Seazone Solutions Ltd / M A Ltd, January 2011, after comment from D Hooley, English Heritage

INTRODUCTION: DEFINING/DISTINGUISHING ATTRIBUTES

This Character Type is predominantly represented in the Southern England region by the onshore oil field at Wytch Farm (coastal Dorset), the large oil refinery at Fawley, and renewable energy sources in the form of proposed offshore wind farms. Other forms of energy industry are concentrated elsewhere in England (eg oil and gas exploration in the North Sea, coal mining in the Midlands and the North), with no examples present in this region. There are no nuclear power stations in the Southern England region from Hastings to Purbeck.

Wytch Farm oil field in the Purbeck district of Dorset is Western Europe's largest onshore oilfield and comprises three oil reservoirs that lie under Poole Harbour and Poole Bay. It has a sea-water pumping station, a gathering station where crude oil and liquid petroleum gas (LPG) from the reservoirs is separated and an export pipeline that takes oil via the refinery at Fawley across Southampton Water to the coastal terminal at Hamble (www.bpnsi.com/index.asp?id=7369643D312669643D313531). A well site on the cliffs at Kimmeridge, also in Dorset, still produces 65 barrels of oil a day. This is taken by road tanker to the gathering station at Wytch Farm



**Poole Harbour around which there are several exploratory oil wells
(© Hampshire & Wight Trust for Maritime Archaeology)**

The oil refinery at Fawley, on the west shore of Southampton Water is the largest in the UK, covering 5 square miles. Over 11 million gallons of petrol, diesel, jet fuel and petrochemical feedstocks are produced every day by the refinery.



**View of Fawley oil refinery across Southampton Water
(© Hampshire & Wight Trust for Maritime Archaeology)**

In January 2010, the Crown Estate announced the building of two offshore wind farms in this area as part of Round 3 UK offshore wind farm development. These will be located off Hastings, and west of the Isle of Wight, and are expected to begin generating electricity from 2015 onwards (www.thecrownestate.co.uk/our_portfolio/marine/offshore_wind_energy.htm)

HISTORICAL PROCESSES; COMPONENTS, FEATURES AND VARIABILITY

Oil and gas occurrences have long been known in the 'Wessex-Channel basin' which covers the Weald and Wessex areas in Southern England and extends into the English Channel (BGS, 2006).

A number of oil seeps have been documented inland, but most occur along the Dorset coast, from near Osmington in Weymouth Bay to Durlston Head and include the Mupe Bay oil seep and the occurrences of gas bubbling on the seabed between Durlston Head and Anvil Point. Many oil and gas seepages are also known from East Sussex, the first discovery of which was in a water well being excavated in 1836 (BGS, 2006).

The practice of refining oil began with the simple distillation of many raw materials in Europe in the 18th Century, with mineral oils derived from oil-bearing shales first exploited in the UK on a small scale for kerosene (lamp oil) in the early 19th Century. Oil shales of significant oil production capacity occur in England, with the Kimmeridge Shales (Dorset) being worked from 1848. The last oil shale works in Britain closed in 1964 (BGS, 2006).

The Wytch Farm oilfield and processing facility in Dorset is the largest onshore oil field in Western Europe. Discovered in 1973 by the nationalised British Gas Corporation, Wytch Farm began producing oil in 1979 (BGS, 2006). The oil field consists of three separate reservoirs (Bridport, Sherwood and Frome) that lie under Poole Harbour and Poole Bay. Its facilities include a sea-water pumping station and a gathering station where crude oil and liquid petroleum gas (LPG) from the reservoirs is separated (www.bpnsi.com/index.asp?id=7369643D312669643D313531). Oil is also transported to Wytch Farm for processing from two smaller onshore coastal oilfields – by pipeline from Wareham and by road from Kimmeridge where a well site on the cliffs produces 65 barrels of oil a day. A pipeline takes oil from Fawley refinery, across Southampton Water, to the coastal terminal at Hamble, where it is then exported by tanker (www.bpnsi.com/index.asp?id=7369643D312669643D313531).

Fawley refinery, situated on Southampton Water is now the largest in the UK, and has a mile-long marine terminal. Refining activity on the site dates back to 1921 when it was owned by the *Atlantic Gulf and West Indies Company*. Esso acquired the site in 1925, and rebuilt and extended it in 1951. The site was initially chosen for a refinery because of the large amount of land available for development, the low population of the area and access to the large amounts of water required for the refining process. It also made it possible for crude oil to be brought to the site in ocean tankers by sea. Proximity to Southampton was also a factor, as at the outset much of the plant's output was used to supply liners using Southampton docks. The site houses a chemical facility operated by Exxon Mobil and Nalco which produces a wide range of products for the plastics, synthetic rubber and solvents industries, as well as speciality chemicals, lubricating base oils and additives. The refinery handles around 2,000 ship movements and 22 million tonnes of crude oil and other products every year. It processes around 330,000 barrels of crude oil a day and provides 20 per cent of UK refinery capacity (www.exxonmobil.com/UK-English/about_what_refining_fawley.aspx).



Construction of Fawley oil refinery (© Eric de Mare, English Heritage)

The UK's offshore wind industry was launched in December 2000. Offshore wind farm developments require a lease from the Crown Estate, which has vested rights under the Energy Acts of 2004 and 2008 to lease areas of the UK continental shelf out to 200nm for renewable energy production and for methane gas and carbon dioxide storage. The Crown Estate have made areas of seabed available for offshore wind farms to be built through three rounds of licensing. Successful Round 1 and Round 2 applicants were announced in April 2001 and December 2003 respectively, with leases awarded for 33 sites. Successful Round 3 applicants were announced in January 2010 and include two within this region:

- The Hastings Zone: won by E.On Climate and Renewables UK, potential yield of 0.6 gigawatts
- The Isle of Wight Zone: won by Eneco New Energy, potential yield of 0.9 gigawatts (www.thecrownestate.co.uk/our_portfolio/marine/offshore_wind_energy/round3.htm).

The turbines will be erected in water depths of up to 60m and will be positioned up to 205km off the coast. It is hoped that about a third of the country's energy will be provided by these new wind farm zones by 2020 (www.thecrownestate.co.uk/our_portfolio/marine/offshore_wind_energy/round3.htm).

VALUES AND PERCEPTIONS

Wind energy is one of the most popular energy technologies - an analysis of opinion polls carried out in the UK in the decade since the first wind farm started operating reveals a consistently high level of support (www.bwea.com), and wind energy now receives more good press than bad, a complete reversal of situation in mid 1990s (Hill 2001). However, it can provoke mixed feelings among the local populace. Within the Southern England region, there has been opposition to the proposed offshore wind farm development to the west of the Isle of Wight. Concerns included the threat to local wildlife, the impact on tourism and the perceived change to the character and appearance of the area through highly visible landmarks within the seascape.

Other energy industries can be viewed as noisy, dirty and environmentally unfriendly. This issue is being addressed by some companies, for example at Wytch Farm where local liaison committees have been formed to consult fully with all statutory and non-regulatory bodies and to keep local residents informed of all relevant activities through (www.bpnsl.com).

RESEARCH, AMENITY AND EDUCATION

Public access to most energy generation sites is limited due to health and safety restrictions but they often have highly visible effects on land and seascape perceptions which generate much public debate which need to be informed. This need for understanding is growing fast: policy trends show an expansion of renewable energy with an encouragement of wind power, especially in offshore locations where more consistent strong wind speeds are available. The Collaborative Offshore Wind Research into the Environment (COWRIE) is a company set up by The Crown Estate to raise awareness and understanding of the potential environmental impacts of the UK offshore wind farm programme, including recognition of the impact of future developments on seascape and the historic environment. COWRIE recently published a guidance note for best practice in survey, appraisal and monitoring of the historic environment during the development of offshore renewable energy projects in the UK (Oxford Archaeology & George Lambrick Archaeology and Heritage 2008; Wessex Archaeology 2007). Historic Seascape Characterisation (HSC) will be able to complement that for future planning with

information on the typical historic character of areas under consideration for renewable energy developments, adding area-based context to the more traditional point-based records of the historic environment.

Some public education programmes from the wind industry's perspective in the Southern England region can be found on the British Wind Energy Association and Cowrie websites (www.bwea.com and www.offshorewindfarms.co.uk) which contain educational documents relating to wind energy development, schools information and fact sheets. First Wind (www.firstwind.com) is also committed to teaching the benefits of wind and other renewable energies. They offer teachers and school the opportunity to tour an operating wind farm to learn how wind energy is produced, how a turbine works and how the wind farm affects their local community.

From an educational perspective, society's need for sustainable sources of energy and address the long-term cultural causes of climate change, together with the conflicting views surrounding both issues, constitute a stimulating educational case-study, where the discussions can be related to the local environment, economy and historic cultural landscape/seascape.

CONDITION AND FORCES FOR CHANGE

Pressures on Government to increase reliance on renewable sources of energy to reduce CO2 emissions from fossil fuel use are growing fast; this will produce continuing and significant changes in the patterns and forms of energy generation of energy in the region, onshore and offshore. (www.bwea.org.uk). Potential sources of renewable energy of relevance to this area include wind, wave and tidal power (www.crownestate.co.uk).

The UK has potentially the largest offshore wind resource in the world, with relatively shallow waters and a strong wind resource extending far into the North Sea (www.bwea.com). Round 3 offshore wind energy generation aims to deliver a quarter of the UK's total electricity needs by 2020 (www.crownestate.co.uk). This will contribute to the UK Government's target of cutting CO2 emissions by 34 per cent of 1990 levels by 2020 (www.direct.gov.uk/en/NI1/Newsroom/DG_179190).

The announcement of the construction of wind farms off Hastings and the Isle of Wight in Round 3 offshore wind farm development marks a significant increase in the generation of offshore renewable energy in the region.

RARITY AND VULNERABILITY

Wytch Farm is the only oil field within this area. It is coincident with major environmental designations with the development facilities being wholly located within the Dorset Area of Outstanding Natural Beauty (AONB) and the oilfield underlies areas designated as Heritage Coast, Ramsar sites and Special Areas of Conservation (SAC) and Special Protection Areas (SPA), as well as other national and local designations including Studland and Brownsea Island nature reserves.

Oil refining is carried out at relatively few locations in the UK, with a strong coastal bias, the location of refineries being largely dictated by proximity to deep water ports and product markets. Fawley is the largest refinery in the UK.

Remains of oil and gas installations in the area could potentially be vulnerable to present and future coastal and offshore developments, and the new marine licensing system will give the MMO powers to order the removal of redundant installations at sea.

The offshore energy industry is rapidly increasing in the region with the proposed construction of the two new offshore wind farms, off Hastings and the Isle of Wight, in Round 3 of the UK offshore wind farm development. The future expansion of offshore wind industry depends on Government energy and climate change policy.

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