

# ENERGY HUB



# Energy hub

**Pembrokeshire is poised to become the largest single source of energy provision in the UK and in the next few years will be in the position to provide over 20% of the country's entire energy.**



The Queen attending the official inauguration of the South Hook LNG Terminal on 12th May 2009

**T**he major key to this is Milford Haven, one of the finest deep water ports in the world—a fact that did not escape Admiral Nelson's attention.

It is this deep water port that attracted the world's leading oil companies when they were looking for a location for their refineries. Currently the two strategic refineries operated by Chevron and Murco supply the UK with over 25% of its refined product and still manage to export refined products to Europe and America. In addition, based on the northern shore of the Waterway, is the UK's largest Tank Farm operated by SEM Logistics where both crude and refined products can be stored for future shipment around the world.

As the UK's North Sea gas fields near the end of their productive lives, the country has begun to look further afield for gas to heat our homes and power our factories. Pipelines from Northern Europe and Russia can play a part here but the actions by Russia to turn off the gas in the winter is causing some concerns throughout Europe and the UK which is seeking security of supply. Once again the deep water port facilities in Pembrokeshire have a role.

Back in the 1950s, before North Sea gas became a practical proposition, the UK developed Liquefied Natural Gas as an alternative and in the Thames estuary

a LNG storage and re-gasification plant was built. Then the North Sea gas fields came on line and LNG was forgotten. Now, as the demand for gas once again becomes greater than our domestic supply, very large LNG import, storage and re-gasification plants have been built along the Milford Haven Waterway. These facilities incorporate vast insulated concrete storage tanks where gas that has been liquefied by reducing the temperature to minus 160 degrees C can be stored before it is warmed and fed into the UK's underground distribution system. The LNG is delivered to Milford Haven in a new fleet of specialist LNG super tankers able to navigate their way into the port before docking at the specialist jetties equipped to handle the super-cooled cargoes in safety.

South Hook, the first of these new LNG terminals, has just been completed and on May 12th 2009 the official inauguration

of this £1 billion facility took place. Reflecting the importance of the project, the inauguration was attended by six members of two royal families: The Queen accompanied by the Duke of Edinburgh and the Duke of York met the Amir of Qatar, his consort Sheikha Mozah and one of their daughters.

Also attending the official opening were numerous Government ministers from Qatar, the UK and Wales together with various diplomats and some of the highest ranking oil executives in the world, representing ExxonMobil, Total and Qatar Gas. These are the companies that have invested in excess of \$15 billion in the world's first dedicated LNG supply facilities. This has involved a new "train" in Qatar where the gas is processed and cooled, the fleet of specially designed and highly efficient ships to transport the LNG as well as the impressive import, storage and re-gasification plant at Milford, which itself is the largest plant of its type in Europe and possibly the world.

Since the South Hook LNG plant become operational in April 2009, three ships have discharged their cargoes of LNG, including the world's largest LNG carrier, the Mozah, whose 266,000 CBM load is enough to supply all of the homes in the UK with gas for a day. The Mozah and her sister Q-Max ships have been designed and built specifically for the Qatar- Milford route with "Q-Max" standing for the maximum size ship that can dock at the Qatar gas fields.

Later in 2009 a second LNG terminal will open in Milford. The smaller but equally important Dragon LNG plant is owned and operated by a consortium comprising the British company BG, together with the Malaysian Petronas and the Dutch 4Gas.

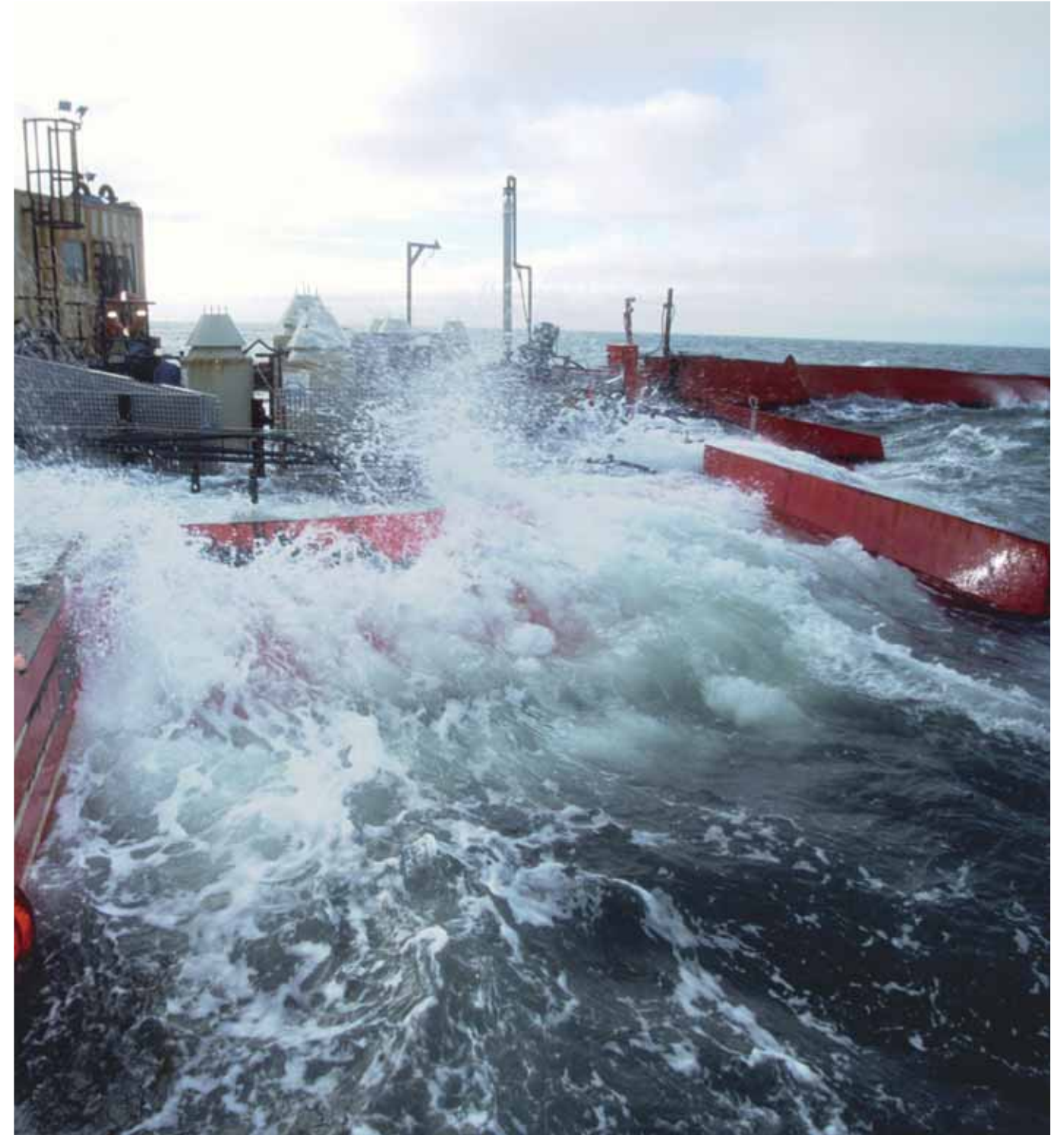
Together, South Hook and Dragon will be able to supply over 20% of the country's entire energy requirements.



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# There is more to come

Pembrokeshire's energy businesses do not stop at oil refining and LNG. At the beginning of May 2009 RWE N-power began construction of the UK's largest gas-fired power station. Located on the site of a former oil-fired power station that was demolished just over ten years ago, RWE's 2,000MW Combined Cycle Gas Turbine power station will be one of the most efficient of its type in the world.



Wavedragon overtopping device - picture shows 1/5th scale model - full-size prototype to be deployed off Pembrokeshire Coast

**R**WE and their contractors are sourcing leading edge technology to achieve the highest levels of efficiency whilst at the same time considering the environment and causing the least possible damage to the Milford Haven Waterway, which is protected by various environmental designations. One of the biggest challenges was to bring the high pressure gas supply across the Waterway from the LNG facilities on the north bank to the power station site and the existing National Grid connection on the south.

The solution is a "direct drilled" pipeline under the bed of the river. This pipeline will also supply gas to the neighbouring Chevron oil refinery.

Pembrokeshire is also attracting emerging renewable technologies to complement the hydrocarbon energy companies. Many experts are predicting that marine energy technologies will eventually become far more important than wind in generating green electricity and it is in this field that some major investments are planned.

The first project to be announced was Wavedragon, an "overtopping" wave generation device that will see its first full size prototype built and deployed in Pembrokeshire. Some experts have suggested that Wavedragon may be the only wave generation technology currently in development that will be capable of operating in deep waters.

The second technology is tidal flow, and with the tides being predictable this form of generation is seen as reliable, if and when the technologies can be perfected.



So far, two companies have announced plans for major projects to develop this technology off the coast of Pembrokeshire. EON, with their partners Lunar Energy, are proposing to create a tidal flow farm in Ramsey Sound using large contained turbines, each standing some 18 metres high from the sea bed. Tidal Energy Limited is also looking at Ramsey Sound where they are planning to test their underwater turbines in a configuration that looks like three robust wind turbines mounted on a tubular triangular base that can be lowered easily onto the seabed. When in position these turbines are far enough below the surface not to present a danger to shipping passing overhead.

The wind industry has not bypassed Pembrokeshire and two companies are developing alternative wind farm concepts. Infinergy, based in Technium Pembrokeshire is looking at small wind farms comprising about three or four direct drive turbines, a type of turbine not normally used in Britain. The second company, Quiet Revolution produce a vertical axis wind turbine from a factory in Pembroke Dock. These turbines are less visually intrusive and can be used in built-up areas where wind turbulence precludes the use of the normal windmill type of turbine (picture left).

With so much potential generation capacity in Pembrokeshire, together with a 400 KVA connection into the National Grid, the Irish company Imera Power is proposing an undersea interconnector linking Ireland and Wales as an integral part of a European super-grid. It is also hoped that the interconnector will be available as part of a marine grid providing a way for offshore generators to bring their power ashore.

This varied selection of energy companies would not be able to function in Pembrokeshire without the presence of a comprehensive support infrastructure, with engineering and other companies available to build and service the specialist plant and machinery that is employed.

To find out more about the opportunities provided by the world class energy industry in Pembrokeshire, and how your business can benefit from co-locating with them contact Tony Streatfield, Inward Investment Officer.



Delta Stream - Tidal Energy Ltd device to be tested in Ramsey Sound

[ Many experts are predicting that marine energy will eventually become more important than wind in generating green electricity and it is in this field that some major investments are planned in Pembrokeshire. So far four companies have announced plans to develop marine generation technologies off the coast of Pembrokeshire. These are Wavedragon, Eon/Lunar Energy, Delta Stream - Tidal Energy Limited and Far Offshore Ltd. ]



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# Port of success

Many people are surprised when they learn of the significance of Milford Haven to the UK's economy. The port is the sixth largest in the UK and one of the most significant energy ports in northern Europe. Whilst largely thought of as an oil port, Milford Haven is in fact much more than this. Its strategic value is now being realised, with the recent arrival of a new power source – Liquefied Natural Gas. When 'Tembek', the first LNG Carrier to enter the Haven arrived at the South Hook terminal in March 2009, a new era began in the history of the port – a port now being defined as the UK's new energy capital.

The commissioning of the two LNG terminals, South Hook and Dragon, will mean an even greater level of shipping using the port than ever before. The potential of the LNG terminals to deliver up to 30% of the UK's gas requirements, coupled with the 25% of the UK's petrol and diesel already provided by the Haven's two refineries, and the Waterway being home to the UK's largest petroleum storage facility, means the value of the port as a strategic asset to UK plc, is evident. An announcement in 2009 by the Department for Energy and Climate Change that RWE will be creating the UK's largest gas-fired power station (2000MW) on the Haven, has given yet further credence to the significance of the port.

Milford Haven Port Authority also provides and operates a range of other activities including a ferry terminal, in which the major customer is Irish Ferries on its twice daily service between Pembroke Dock and Rosslare in Southern Ireland. The Authority also operates a dry dock and a ship repair division, capable of taking coastal tankers, tugs and a wide range of other commercial and leisure vessels. An increasing amount of general cargo is handled on the Waterway, particularly at Pembroke Port including sand, fertiliser, marine aggregates and agricultural materials. Heavy lift operations, supporting the engineering fabrication industry, whose market is throughout the UK and Northern Europe, also make use of the port facilities.

Milford Haven is a Trust Port – a commercial port business run for profit but not for dividend, there being no shareholders. What characterises the business approach of the port is the importance given to the way in which it supports the local economy, through the success of its own operation, and the synergy that it brings to the local community, particularly in terms of economic development. The continuing success of the port translates into an ability to support a diversity of community ventures and local economic sustainability.

A record breaking level of shipping entered the port during 2008 (just under 53 m gross tons), and the Authority is set to handle even greater levels during 2009. Looking to the future, building on the vision and progress that has defined its 50 year history, Milford Haven Port Authority is capitalising on its position as the UK's energy hub and the potential to develop other complementary opportunities in this sector.



Pilot boat

## MILFORD HAVEN PORT AUTHORITY STATISTICS FOR 2008

<b>Tonnage of shipping handled</b>	52,836,757 m gross tons
<b>Shipping movements</b>	Approximately 10,000
<b>Cargo handled (total)</b>	36,000,000 m gross tons
<b>BREAKDOWN</b>	
<b>Petroleum products</b>	19,294,050 tonnes
<b>Crude oil</b>	14,880,796 tonnes
<b>Gas</b>	650,914 tonnes
<b>Miscellaneous</b>	1,173,730 tonnes
<b>Total property portfolio</b>	618,702 sq ft
<b>External lets</b>	410,426 sq ft
<b>Internal lets</b>	208,240 sq ft
<b>Fish landed at Milford Docks</b>	3,103 tons (434 fishing vessels)
<b>No. of ferry passengers</b>	344,271
<b>Ferry freight</b>	85,840 units
<b>No. of cruise vessel visits in 2008</b>	6
<b>Cruise passenger &amp; crew figures</b>	5,928
<b>Moorings</b>	780 Marina berths in total (360 at Milford Marina and 420 Neyland Marina) 1200 swinging moorings through the Haven
<b>Berths at Milford Marina</b>	360



## Milford Haven Port Authority

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# Water haven

Milford Haven Port Authority is working hard, so that leisure users of the famed Haven Waterway gain maximum enjoyment from their precious leisure time.



Milford Marina

There are many tributaries waiting to be explored in an area that has become famed for its natural beauty and endless leisure opportunities. Watersports enthusiasts will find a variety of activities in and around the Haven – from marinas, sailing schools and visitor moorings, to opportunities for rowing, kayaking, water-skiing, power boating, windsurfing, diving and angling.

The Waterway attracts both experienced and novice users in every activity, all of whom will interact with each other and commercial vessels, as Milford Haven is a busy port. It is important that all users have

an understanding of the basic 'Rules of the Road' applicable when on the water and the various zoning areas that have been designated for certain high-speed activities to ensure the tranquillity of the sensitive area. Details of these are shown in Milford Haven Port Authority's Leisure User Guide which is widely available at no charge around the Haven in the marinas, yacht clubs, chandleries and hostelrys or on the Authority's website [www.mhpa.co.uk](http://www.mhpa.co.uk)

The un-spoilt scenic qualities of the Haven were recognised in 1952, through the designation of the Pembrokeshire Coast National Park, the only coastal National Park in the UK. Many foreshores are

designated as Sites of Special Scientific Interest. The whole Haven is included in a European Marine Special Area of Conservation - the highest designation in Europe.



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