DECOMMISSIONING THE BRENT FIELD

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The Brent oil and gas field, lying north-east of the Shetland Islands, has been **a cornerstone of the UK's hugely successful oil and gas industry** for almost 40 years. It has created and sustained thousands of jobs, contributed billions of pounds in tax revenues, and provided the UK with a substantial amount of its oil and gas.

Now, after many years of service to the UK, the Brent field is reaching the stage where almost all the available reserves of oil and gas have been retrieved.

The next step in the lifecycle is to retire or 'decommission' the Brent field's four platforms and their related infrastructure. **This will be a complex, major engineering project and will take over ten years to complete**. It follows the decommissioning of other operators' platforms in the North Sea with some 40 programmes submitted to the government's Department of Energy and Climate Change (DECC) so far. This is the body that regulates the decommissioning of offshore oil and gas installations and pipelines in the UK. Shell is now carefully planning the Brent field's decommissioning process following a tightly defined regulatory process. Our task is to find a way to carry out this work that will:

- ensure the safety of people working on the project
- have minimal impact on the environment
- be technically achievable
- consider the impact on affected communities, and
- be economically responsible.

We have also been carrying out **a thorough and transparent process of in-depth consultation** with interested parties, as well as with technical specialists and experts from across the industry. Different risks, challenges and benefits have been weighed up and we have listened to many diverse points of view. Various options are being considered before our recommendations are submitted to DECC for approval.

We will make our final detailed recommendations on how best to decommission the Brent oil and gas field when we are confident the proposals are safe, technically achievable, environmentally sound and financially responsible.

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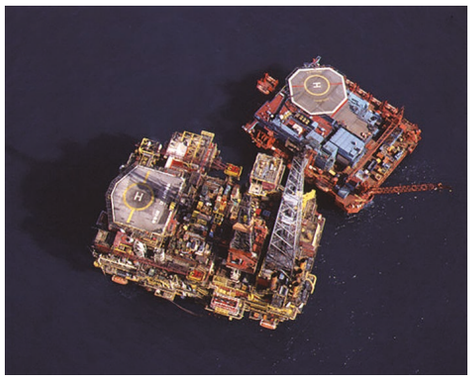

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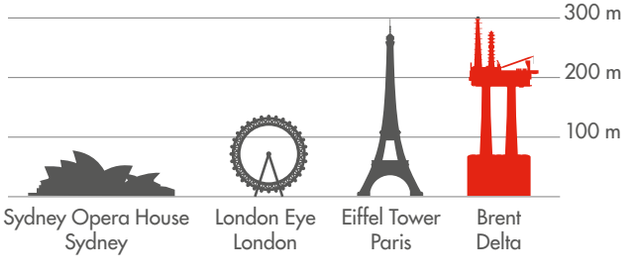
A CORNERSTONE OF THE UK OIL AND GAS INDUSTRY

The Brent field, operated by Shell, lies off the north-east coast of Scotland, midway between the Shetland Islands and Norway. It is one of the largest fields in the North Sea and is served by four large platforms – Alpha, Bravo, Charlie and Delta. Each platform has a 'topside' which is visible above the waterline and houses the accommodation block, helipad, as well as drilling and other operational areas. The topsides sit on much taller supporting structures, or 'legs', which stand in 140 metres of water and serve to anchor the topsides to the sea bed.

When the Brent field was discovered in 1971, it was one of the most significant oil and gas finds made in the UK sector of the North Sea. At that time the expected life span of the field was 25 years at the most. Continuous investment and a redevelopment in the 1990s by the field's equal partners, Shell and Esso Exploration and Production UK (Esso), have extended the life of the field well beyond original expectations. Since production began in 1976, two thirds of the revenue generated from the field has been paid to the Government as tax – amounting to more than £20 billion.



To date, the Brent field has produced around three **billion barrels of oil equivalent**.

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While some of the North Sea's most mature fields are coming to the end of their lives, this does not signal the end of domestic oil and gas production. Oil and Gas UK estimate that a third of the UK Continental Shelf's (UKCS) total reserves still remain – some 15-24 billion barrels of oil equivalent.

HISTORICAL BRENT

1976

Brent Bravo begins production in November and a month later the first tanker loads crude oil at the Brent Spar.

1982

Brent field production peaks at 504,000 barrels of oil and 26.6 million cubic metres of gas per day.

2006

Brent decommissioning project established.

THE DECISION TO DECOMMISSION

The decision to decommission Brent has not been taken lightly. Having extended the field's life for as long as possible, our next step before considering decommissioning was to **explore potential ways to re-use the platforms.** Options given consideration ranged from carbon capture and storage facilities, to wind farms and even offshore prisons and casinos.

However, eventually Shell and DECC concluded that the age of the infrastructure, its distance from shore, the lack of demand for re-use, as well as the cost of modernising the facilities, made its re-use prohibitive. **So decommissioning is the only viable option.**

Shell has been working for years on the long-term planning necessary to stop production and subsequently decommission the Brent Field. Production from Brent Delta stopped in December 2011 and both Alpha and Bravo in November 2014. Production from Charlie is expected to stop within the next few years.

As operator of the Brent field, Shell is required to submit a Decommissioning Programme to DECC. The programme will include detailed recommendations for closing down and making safe the four platforms and subsea infrastructure of the Brent field. These recommendations will be the result of eight years of engineering studies, expert input, consultations and scientific assessments, including extensive discussions with more than 200 non-governmental organisations, academia and local communities. This comprehensive programme of stakeholder consultation reflects one of the major lessons learnt from the decommissioning of Brent Spar two decades ago.

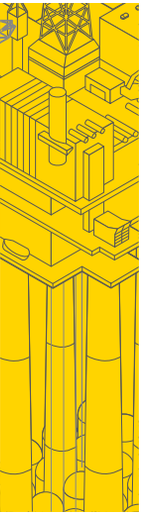
DECOMMISSIONING IS A DIALOGUE

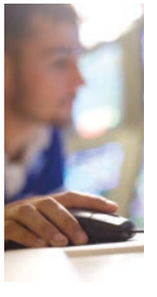
The expertise and input of people from outside Shell have already made, and will continue to make, a significant contribution to our recommendations for decommissioning. Their insights and experience are contributing to our decision-making.

We have been, and continue to be, in dialogue with a range of organisations which are affected by and take an interest in the Brent field's decommissioning to understand their views. These include non-governmental organisations, local fishermen and community groups, as well as local and national government. We have also worked with industry bodies and technical experts to explore the full range of options and test our recommendations.

In 2007, we set up an independent group of externally appointed experts and scientists, called the Independent Review Group (IRG). **Its role is to review objectively all the scientific and engineering methods that we use to assess the decommissioning options, and verify that they are based on sound science.** By July 2014, we had responded to more than 2,000 review comments from the IRG since its work began. An independent task group has also been established to contribute to the discussions on how best to decommission the large underwater tanks or 'subsea cells' which had been used for oil storage.

97%
of the platforms' topsides will be recycled





DECOMMISSIONING CHALLENGES

The North Sea is an extremely harsh marine environment of strong winds and rough, cold seas. It is a challenging place to work, and decommissioning the enormous Brent structures will require advanced engineering and significant investment.

The field infrastructure is extensive. It comprises four topsides with a combined weight of more than 100,000 tonnes, three concrete gravity base structures weighing 300,000 tonnes each, 17,000 tonnes of steel jacket, 103 km of pipelines, 140 wells, and 64 oil storage tanks, each taller than Nelson's Column and each with the capacity of four Olympic-size swimming pools. The age of the infrastructure adds to the engineering challenges of the project.

We are working hard to find the best solutions for decommissioning the field in a safe, responsible and cost-effective way. Each option involves different risks, challenges and benefits. Inevitably difficult decisions will need to be made, where differing options compete - which is why **consultation and collaboration with all interested parties is vital to the project's success.**

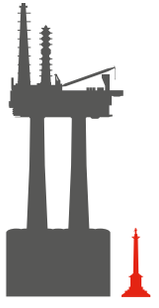
DECOMMISSIONING OPTIONS

When the Brent platforms and infrastructure were built in the 1970s, during a period of global energy shortages, decommissioning did not feature highly in the design considerations. The technology, expertise and environmental standards we rely on today were only in their infancy in the 1970s.

Since then, society's expectations, legislation and technology have moved on and **all offshore installations in the north-east Atlantic, built after 1999, are designed to be completely removed.**

Elements of the Brent field infrastructure present particular decommissioning challenges and have been the focus of detailed research. Three of the platforms (Bravo, Charlie and Delta) have giant concrete 'legs' which support the topsides above the surface of the sea, and have clusters of large concrete oil storage tanks or 'cells' at their base. Together these concrete legs and storage cells are commonly referred to as gravity base structures.

The storage cells contain large quantities of sand ballast, used to anchor the structure to the seabed. Many cells were originally used for oil storage and contain some oily sediment. Accessing the cells to remove this sediment presents a significant technological challenge. This is because of their location deep beneath the ocean's surface, their size and the thickness of the cell walls.



Each oil storage cell is taller than Nelson's Column, with the capacity of four Olympic-size swimming pools.

There are also considerable engineering challenges and safety risks associated with cutting through, lifting and transporting the reinforced concrete legs for removal which we are currently investigating. This type of operation – to remove gravity base structures – has never been attempted before in the North Sea.

In cases such as these, there may be no 'ideal' solution and no clear consensus among experts on the best solution.

The Oslo/Paris (OSPAR) Convention, which provides the framework for protecting and conserving the north-east Atlantic (including the North Sea), recognises that there are difficulties in removing major concrete installations such as gravity base structures. In these instances, operators may make a case for an exemption from the general rule of complete removal. If our assessments conclude that the safest and most responsible solution is to leave some parts of the structure in place, then we will seek an exemption from removal of these parts.

This is a long-term project that is expected to take over a decade to complete.

THE BENEFITS OF DECOMMISSIONING

Decommissioning is an intrinsic part of the lifecycle of any oil and gas field. For the Brent field, this is a long-term project that is expected to take over a decade to complete. It is likely to create and sustain thousands of full-time UK jobs – many of which are highly skilled – for years to come.

The field has a long history of providing employment and supply chain opportunities to local people and businesses. Several major contracts have already been awarded to UK companies after a competitive tendering process. For example, the Brent Delta decommissioning services contract was awarded in 2010 to Wood Group PSN, an Aberdeen-based company that provides services to the global oil and gas sector.

DEVELOPING A UK DECOMMISSIONING SECTOR

Hundreds of oil and gas installations in the North Sea are scheduled for decommissioning by 2040. In fact, some 470 installations will require decommissioning over the next 30 to 40 years. This presents the UK with a potential opportunity to become a global leader in decommissioning skills – skills that could later be deployed around the world.

As one of the first major fields to be decommissioned, Brent will enable UK companies to develop specialist skills and gain invaluable expertise, just as they did when the platforms were being installed and production offshore was starting. This knowledge and experience will give the UK an opportunity to become a leader in decommissioning projects, both in the North Sea and worldwide.

WHAT HAPPENS NEXT?

Our recommendations for decommissioning will be submitted to the UK Government in two phases: first, we will put forward our plan for the removal of the Brent Delta topside since it is ready to be decommissioned, and secondly we will submit our plan for decommissioning the remainder of the Brent field.

Until then, we will continue to engage with stakeholders, ensuring that we share the rationale for the approach we are taking, and listen to any feedback or concerns they may have.

Once we have submitted our recommended approach for each phase of decommissioning, DECC will carry out a formal consultation exercise, including a period of public consultation. The approval process for the full plan is expected to take more than a year.

The North Sea is an extremely harsh marine environment of strong winds and rough, cold seas. It is a challenging place to work, and decommissioning the enormous Brent structures will require advanced engineering and significant investment.

TO FIND OUT MORE ABOUT THE BRENT DECOMMISSIONING PROJECT, VISIT:

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