HORIZON
NUCLEAR POWER

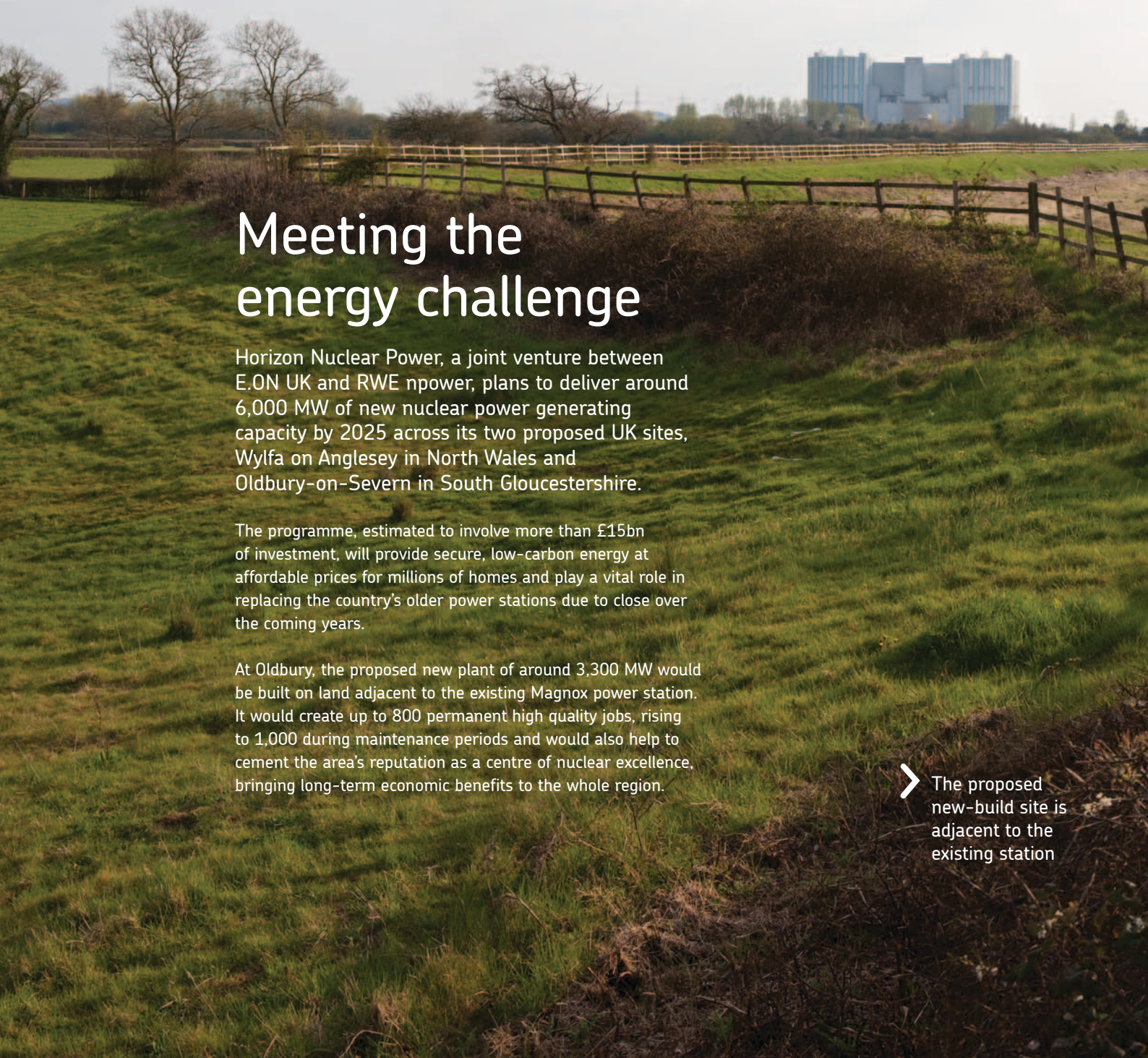
INFORMATION ABOUT HORIZON'S RECENT ANNOUNCEMENT ON COOLING TOWER PREFERENCE AND AN UPDATE ON GENERAL PROJECT PROGRESS

ENERGY WORKING FOR BRITAIN

A UK company of E.ON and RWE

NEW NUCLEAR BUILD AT OLDBURY

DROP-IN EVENT INFORMATION OCTOBER 2010



Meeting the energy challenge

Horizon Nuclear Power, a joint venture between E.ON UK and RWE npower, plans to deliver around 6,000 MW of new nuclear power generating capacity by 2025 across its two proposed UK sites, Wylfa on Anglesey in North Wales and Oldbury-on-Severn in South Gloucestershire.

The programme, estimated to involve more than £15bn of investment, will provide secure, low-carbon energy at affordable prices for millions of homes and play a vital role in replacing the country's older power stations due to close over the coming years.

At Oldbury, the proposed new plant of around 3,300 MW would be built on land adjacent to the existing Magnox power station. It would create up to 800 permanent high quality jobs, rising to 1,000 during maintenance periods and would also help to cement the area's reputation as a centre of nuclear excellence, bringing long-term economic benefits to the whole region.

The proposed new-build site is adjacent to the existing station

The need for indirect cooling at Oldbury

Deciding on the type of cooling tower is a key milestone for our Oldbury project, and will help to shape the future development of our proposals.

We are carrying out a cooling tower study, evaluating all design options, although our focus is on two main cooling tower types, 'natural draught' (NDCT) and 'hybrid'.

Why are cooling towers needed at Oldbury?

Cooling water is used to condense the steam used in power generation. Advances since the original power station was built mean that any new station would have a much greater electricity generating capacity, ruling out the current system of 'direct' cooling where water passes directly through the station condensers, back to the estuary.

As a result, either reactor design available to use at Oldbury would need an 'indirect' cooling system, where the heat from condensing the steam is passed to cooling water and then to the air instead of the estuary.

How does a cooling tower work?

In a hybrid cooling tower, water is cooled by evaporation and a 'dry' cooling section like a car radiator. As the towers are smaller, electric fans are used to assist the air flow through the tower.

In a NDCT the cooling tower cools the water by transferring the heat from the water into the air by evaporation. The size and shape of the towers maintain an upwards flow of air, like a chimney.

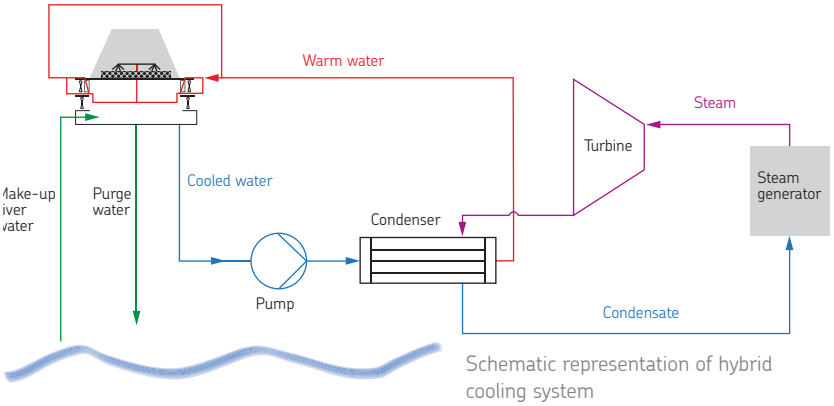
As some of the cooling water is evaporated, a small amount must be purged from the system to prevent impurities building up. Some water from the estuary is needed to make-up for the water evaporated and that purged back to the estuary.

Compared to direct cooling, only a small amount of water would be needed from the estuary, and the heat passed back would also be far less, making it an environmentally attractive option.

Evaluating cooling systems

Our cooling tower studies are evaluating each cooling system on a range of issues including water usage, energy consumption, noise, emissions to air and emissions of heat to surface water. More 'subjective' planning issues have also been considered, the key one being visual impact.

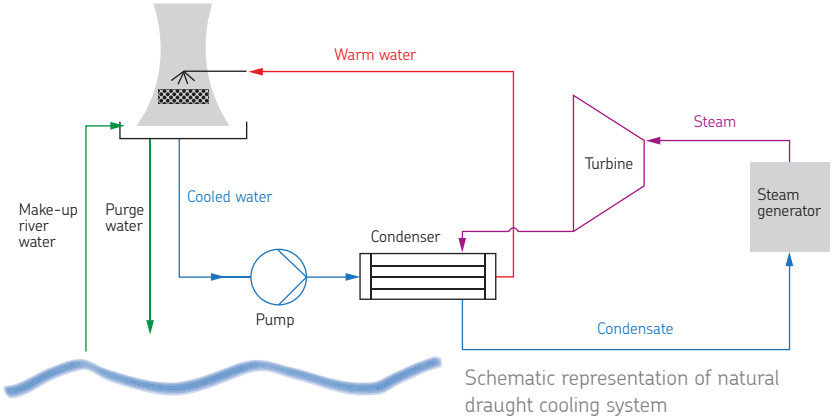
1. Circular hybrid tower



Schematic representation of hybrid cooling system

A **circular hybrid cooling tower** is a forced draught cooling tower that uses fans to force air up through the tower to cool the falling water. Warm cooling water also passes through a bank of heat exchangers to create a warm dry air flow that is mixed with the warm moist air from the wet section, and this has the effect of reducing the visibility of the water vapour plume from the tower.

2. Natural draught cooling tower (NDCT)



Schematic representation of natural draught cooling system

NDCTs transfer heat from the water to the air by evaporating a small portion of the water flow. The size and shape of the towers maintain an upwards flow of air, like a chimney.

Cooling systems: stating our preference

Horizon Nuclear Power recently announced that the 'hybrid' cooling tower is its preferred option for its proposed new nuclear power station.

Circular Hybrid towers, which use fans, are up to 70m in height, more in keeping with the height of the existing Magnox power station.

Why are 'hybrid' towers now the preferred chooice?

We've always been open about the need for cooling towers and the two main cooling tower options - natural draught and hybrid. We've received very clear feedback from the public and a range of other interests against the use of the taller 200m natural draught cooling towers. Taking this into account, together with the initial findings of our technical studies, we wanted to let people know now of our preference for the shorter hybrid cooling tower.

What will they look like?

These initial visualisations, based on an indicative generic site layout and using four cooling towers, provides a good indication of the visual differences between natural draught and hybrid cooling towers from four viewpoints around Oldbury.

Visuals of viewpoints

Additional visualisations taken from other viewpoints from around the site are available to look at. Please speak to our staff.

Please note: The visualisations are based on a generic design and layout incorporating the maximum four cooling towers, with no prejudice to any future decisions on reactor type. Three or four cooling towers will be required depending upon final designs and layout, shape and size of buildings will change.

Additionally, these visualisations do not show a water vapour plume, which would be visible from the natural draught cooling tower design under most weather conditions and from hybrid cooling towers only under occasional atmospheric conditions.

Hybrid cooling tower looking south from Lydney at a distance of 6.7km

Natural draught cooling towers looking south from Lydney at a distance of 6.7km

Hybrid cooling tower looking north from the old Severn Bridge footpath at a distance of 7.4km

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As the development of our project continues, we will treat hybrid towers as our preferred option.

Work on the design of the cooling system will now assume hybrid towers as the base case, placing less emphasis on the alternative natural draught tower.

This has been a big decision for Horizon. Natural draught cooling towers may have certain advantages in terms of cost, operational simplicity and sustainability, but our early view is that the hybrid cooling tower option would be more preferable at this site, when an overall balance of technical, commercial and environmental factors is considered.

When will Horizon make a final decision on cooling towers?

As we move forward through the pre-application phase of development, we will need to carry out a process of formal consultation, presenting our ideas and seeking views.

This process, which has yet to begin, requires us to consult formally with both the community and a wide range of statutory bodies including the EA who are responsible for licenses to operate the cooling system.

The consultation on the cooling system will need to step back again and consider all the options, and based on all of the feedback we receive, we will then confirm the choice of cooling tower to take forward into our planning application.

The cooling towers are such a significant part of the overall design that we would need to decide which type of cooling tower to use before submitting the application – we couldn't make an application which leaves the option to run with more than one type.

Ultimately, our objective is to develop an appropriate and acceptable design for our project to take forward into the formal planning process.

Review of cooling tower designs based on cooling tower study evaluations

This chart summarises the issues considered as part of of our on-going cooling tower studies, along with early findings. In addition to the systems highlighted above, our studies revisit the potential for direct cooling, the feasibility for combined heat and power or district heating, and a range of other cooling technologies. Further details of the studies will be included as part of our formal pre-application consultation.

'Hybrid' towers	'Natural draught' cooling towers (NDCT)
Visual Impact • The height of 'hybrid' towers at Oldbury would be approximately 70m. This is closer to height of existing Magnox station and other proposed new buildings and would be significantly lower than for NDCTs. • Water vapour plumes from the towers are only visible under occasional atmospheric conditions.	• NDCTs would be approximately 200m in height and would be considerably more visible in the landscape than hybrid towers. • NDCTs produce a visible water vapour plume under most weather conditions.
Noise • Noise due to the use of electric fans is lower frequency with specific tones which is less readily attenuated. • Noise levels can be controlled to acceptable levels through careful design, use of silencers and through site layout and landscaping.	• Noise tends to be a higher frequency which is more easily attenuated, associated with water falling through the towers. • Noise level can be controlled through measures to reduce pond splash and through site layout and landscaping.
Efficiency • Energy is required to operate electrical fans. • However, the number of fans operating can be varied dependent upon weather conditions.	• More efficient design than for hybrids as the shape and height of the tower produces a chimney effect to draw air upwards, without the need for fans. This means that no additional energy is required for the towers to operate.
Operation • A more complex technology with a greater maintenance requirement.	• Lower on-going maintenance costs.
Cost • Overall cost (construction, maintenance and operation) is higher than for the NDCT due to the more complex design. However, this represents a small percentage of the overall capital and operating cost of a nuclear power station.	• A simpler technology, the NDCT is a cheaper option overall than other forms of indirect cooling system. • Minimal maintenance and no energy so they are low-cost to run.
Construction • Considerably lower structures than NDCT, but more complex design to construct.	• Larger structures, greater requirement for concrete.
Traffic • Large components, including the fans themselves, will need to be transported to site.	• Some large pre-fabricated concrete components but probably less issues than for hybrid design.

What's happening next at Oldbury?

The Government recently announced that it is carrying out a review of the draft National Policy Statements (NPSs), including the Nuclear NPS.

They will carry out a further consultation on a revised draft to be concluded by the end of this year. The Nuclear NPS is expected to be ratified by parliament in spring next year.

For further information go to:
www.decc.gov.uk

At Horizon, our development works continues, with the intention that, subject to final investment conditions being satisfied, a planning application would be submitted around 2014.

Our formal pre-application consultation has yet to begin, and the first stage is likely to be on aspects such as the principles of the cooling tower design, transport options (including a marine offloading facility) and flood protection measures.

Consultation on the more detailed layout and plant design will only be undertaken once sufficient information exists, following the decision on reactor type and number, which is some way off.

Have your say

We want to know what you think about the issues raised today. Please complete a feedback form to give us your views and to help us improve future events.

Keep in touch

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0800 130 3125

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oldburyenquiries@horizonnuclearpower.com

Proposed timing plan for Oldbury

Site studies and activity		Community engagement
• Cooling tower studies • Initial archaeology surveys • Transport Options: Phase 1 • Flood risk assessment and mitigation work	2010	• Launch Project Liaison Group • Update on cooling tower studies • Publish Statement of Community Consultation (SOCC)
• Site studies continue	2011	• On-going community liaison • First formal consultation
• Ground Investigations: Phase 2 • Environmental Impact Assessment (EIA) Baseline Surveys • Transport Options: Phase 2	2012	• On-going engagement activities providing updates on site studies
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• Site Licence Application (SLA) submitted • Submit application for Development Consent Order (DCO)	2014	• Final consultation prior to submitting DCO application
• Possible timing for SLA approval • Possible timing for DCO approval	2015	• On-going community liaison throughout project development and operation
• Early site works could commence	2016	
• Earliest expected timing for main construction	2019	
• First new nuclear reactor generating electricity at Oldbury	2025	

More information can be found at:
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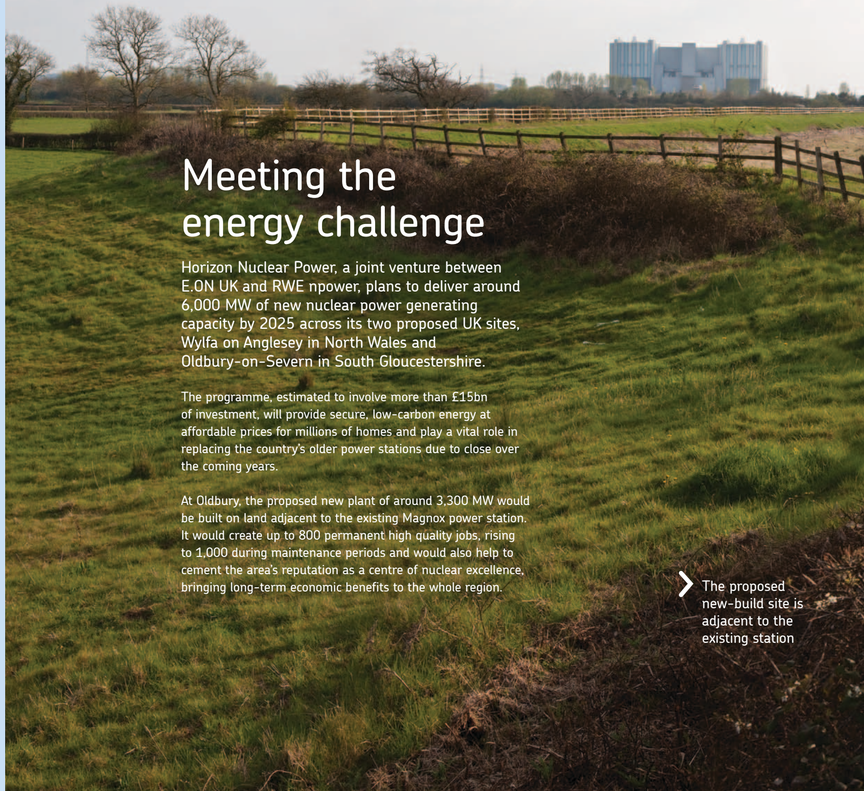

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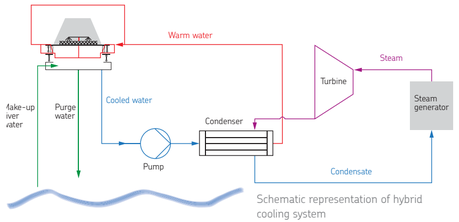

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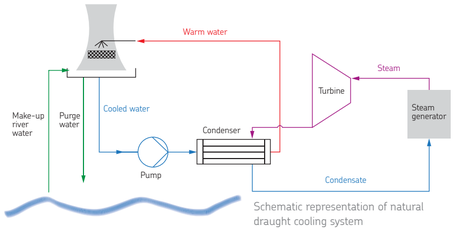

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