



## Carbon storage project uniting academia and industry makes halfway status

**Esbjerg, January 9, 2023** - The EUDP-funded Project Bifrost is halfway into its two-year study that aims at providing a full-scale concept for CO<sub>2</sub> transportation and storage by using existing offshore infrastructure to permanently store CO<sub>2</sub> in the Harald depleted fields located in the Danish North Sea. The first part of the study confirms the partners' expectations that project Bifrost could contribute to the ambition of Denmark to become a major European CO<sub>2</sub> hub.

"Denmark has a great opportunity to develop a new industry that will contribute to Denmark's and EU's energy transition and promote our special expertise within climate solutions. I am proud that we have joined forces between academia and industry to blaze a trail towards new technologies and solutions which will be cost-efficient and can reduce emissions at scale" says Martin Rune Pedersen, Country Manager of TotalEnergies Denmark.

Amongst the important findings in this first phase of the project is the demonstration that storing permanently CO<sub>2</sub> into Harald West depleted sandstone reservoir is feasible, confirming the sealing character of the cap-rock and absence of containment threat from wells previously drilled and abandoned on the structure. Some studies are also carried out to understand the potential of chalk reservoir to become CO<sub>2</sub> stores which also shows encouraging results.

"These early findings of injecting CO<sub>2</sub> into both sandstone and chalk are highly promising, and it shows that we are on the right track. As most of the future depleted oil and gas fields offshore Denmark are chalk-based, this is the first step towards unlocking a larger storage potential in the entire Danish North Sea - it could be a game-changer" states Centre Director Morten W. Jeppesen, DTU Offshore.

Project Bifrost also studies different development concept to transport CO<sub>2</sub> to the injection site, including a full offshore concept using a floating unit for temporary storage and conditioning of the CO<sub>2</sub> as well as the possibility to re-purpose the existing offshore gas pipeline network. The first phase of the project indicated that both offshore storage unit and pipeline transportation concepts are safe and adequate.

"We have analyzed the possibility to reuse our existing gas pipeline infrastructure and found it feasible, and we are examining a generic concept that connects our existing pipelines with a new onshore CO<sub>2</sub> offloading facility and interim onshore storage facility. Our findings support the advantages of using the existing infrastructure for a cost-efficient, sustainable, and highly scalable transportation of carbon" says Johannes Sand Poulsen, Head of Infrastructure Assets at Ørsted.

With this development, the project partners are closer to finding long-term solutions to fulfill Denmark's CCS-potential by advancing concepts which could be scaled-up or replicated in other part of the North Sea. Over time this can help Denmark develop the prerequisites to become a major European CO<sub>2</sub> storage hub. In the next phase, the partners of Project Bifrost will further mature the transportation and storage solutions by further exploring the infrastructure and technologies.

## About Project Bifrost

- *Project Bifrost is a two-year study exploring concepts for large-scale CO<sub>2</sub> storing and transport in the Danish North Sea. Through 11 work packages, the study aims at overcoming technological barriers, securing CCS safety and mapping the socio-economic impact for society such as job creation.*
- *The study performs the groundwork necessary for transporting and storing CO<sub>2</sub> underground offshore in the Harald fields: CO<sub>2</sub> captured at emitters' sites is transported via specialized ships to the storage site location or the existing pipeline network – and finally injected into the empty gas reservoirs at the Harald field.*
- *Project Bifrost is founded via The Energy Technology Development and Demonstration Program (EUDP) by the Danish Energy Agency.*
- *The name Bifrost originates from Norse mythology, referring to a rainbow bridge connecting Asgard (the world of gods) to Midgard (the world of humans). Project Bifrost connects offshore and land: CO<sub>2</sub> is captured onshore and led back underground in a circuit. This makes Bifrost a bridge of transition – a solution that bridges a society dependent on traditional energy forms with the net zero society of the future.*

## About the Bifrost contributors

- *Bifrost is a partnership between the industry on one hand, namely the partners of the Danish Underground Consortium DUC (Nordsøfonden, Noreco and TotalEnergies) and Ørsted and academia on the other hand, as Denmark's Technical University (DTU Offshore and DTU Management) is the academic partner.*
- *TotalEnergies is a multi-energy company with +100.000 employees worldwide working with solar energy, wind and oil and gas. TotalEnergies is an operator in the Danish North Sea together with other DUC partners.*
- *Ørsted develops, constructs, and operates offshore and onshore wind farms, solar farms, energy storage facilities, renewable hydrogen and green fuels facilities, and bioenergy plants. Ørsted owns the North Sea gas pipelines.*
- *Denmark's Technical University (DTU) is recognized internationally as a leading university in the areas of the technical and the natural sciences. DTU leads the scientific part of Bifrost.*

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