

Clean power plant to balance the offshore wind farm grid

With an offshore clean power plant, Circular Energy wants to improve the use of offshore wind farms. The installation of Circular Energy acts as a kind of super battery. It only produces in times of low wind speeds, ensuring a better balance in the offshore grid and a higher utilization of the transport cables to the coast. The power plant generates electricity from natural gas. Because the CO₂ that is released during this process is captured and stored, the central is climate-neutral.

An interview with Arnold Groot, director of Circular Energy.

FOR WHAT PROBLEM HAVE YOU FOUND A SOLUTION?

“Over the next few years, about 50 GW of wind power will be built on the North Sea, of which 20 GW on the Dutch part. Even at sea there are periods of low wind speeds. Balancing supply and demand is therefore a challenging task for TSOs. There are still no large-scale storage systems to store a surplus of electricity for a long time nor to deliver quickly. In addition, the transport cables to the mainland are not fully utilized. The average load factor of a wind farm is 40% -45%. Under-utilization means a cost item for park and net owners.”

WHAT'S THE CORE OF YOUR SOLUTION?

“Circular Energy has designed a clean power plant that extracts natural gas from small

fields on the North Sea. The natural gas is immediately converted into electricity and transported to a nearby wind farm. From there, the electricity is transported via the wind farm cable to the coast. We capture the CO₂ and store it in the same gas field. We are therefore deliberately looking for gas fields that are close to (planned) wind farms.”

WHAT IS SO PIONEERING ABOUT YOUR INSTALLATION?

“The way we are combining existing techniques. As our basic principle is that the installation must facilitate wind energy farms and has to clean up its own waste (CO₂), the design has been optimized accordingly. That starting point makes our design unique. Furthermore, we have a completely different business model than traditional oil & gas companies: they sell gas that causes CO₂ emissions at onshore power plants.”

WHAT ARE THE BENEFITS OF YOUR INSTALLATION?

“We offer security of supply for electricity from wind turbines. We only produce electricity when wind speeds are low. That is the case in 70% of the time. Our plant acts as a super battery that can deliver at the moment it is needed. This stabilizes the offshore energy supply considerably. The Circular Energy plant delivers approximately 4 GWh on a wind-free day. And 0 GWh when wind speeds are high.

Moreover, we enable park owners and managers of transport cables to make better



Arnold Groot, director of Circular Energy

use of their transport cables. Thanks to our plant, the load factor of the transport cables increases up to 60% -70%. In addition, the power we produce is completely clean. Because we capture and store CO₂, we are climate neutral and we prevent soil subsidence. We also avoid 640 kton CO₂ emissions per year, for only 6 euros / ton. That is 3.2% of the objective of the Electricity Table. So, we are a piece of the puzzle the energy transition is.”

HOW FAR ARE YOU NOW?

“The conceptual design of the installation is ready. We will spend the coming year on the detailed design and obtaining a concession. If everything goes according to plan, we hope to have our first installation running in 2021.”

WHAT ARE THE CHALLENGES?

“Attracting investors is the biggest challenge. We announced a share issue in September, which is expected to generate 5 million euros by the end of this year. Investors have the choice. As long as ‘classic’ gas production is financially more attractive than what we do, we appeal to the green feeling of the investor. The rising CO₂ prices help enormously: with the current ETS prices

of around €20 /ton there is almost no difference in return.

In addition, it is a challenge to convince the outside world that an installation with CO₂ capture and storage is part of the solution to the climate problem and not part of the problem.”

WHAT ARE YOUR NEXT STEPS?

“At the moment we are very busy to optimize the design and attract investors. We want to engage with all parties involved in the development of the offshore electricity grid. Numerous steps are required before an offshore installation can be built.”

WHAT IS THE ADDED VALUE OF TKI WIND OP ZEE & OFFSHORE WIND INNOVATORS?

“Thanks to a subsidy from TKI Wind op Zee for system integration in the North Sea, we have been able to investigate the economic feasibility with a number of parties. Our business model - selling electricity on the day ahead and imbalance market - appears feasible.

Furthermore, we have extended our network within the wind through Offshore Wind Innovators. Because most of our team members have a background in the oil & gas industry, that is essential.”

Art impression of the installation

