

1. Project description

The Green Fuels for Denmark (GFDK) project brings together leading Danish companies representing the demand and supply side of sustainable e-fuels behind a vision to establish an ambitious sustainable fuels production facility. The project aims to establish a 1.3 GW electrolyser in 2030 powered by 2-3 GW offshore wind from the Bornholm energy island, which holds the potential to replace >270.000 tpa. of fossil fuel consumption in 2030, equivalent to a 1.77% reduction in Danish CO₂ emissions.

The project is intended to be established in three phases:

- Phase 1 (2021-2023): Establishing a single electrolyser module of 10MW producing renewable hydrogen for use in fuel cell buses and trucks in Denmark.
- Phase 2 (2023-2027): Scale-up and commercial operation of a 250MW electrolyser coupled with offshore wind, CO₂ capture and chemical synthesis to produce sustainable renewable e-methanol for maritime transport and renewable e-kerosene for aviation.
- Phase 3 (2027-2030+): Further scale-up to reach a combined electrolyser capacity of 1.3 GW, corresponding to 30% of Copenhagen Airport's fuel consumption, a large proportion of truck and bus operations in Greater Copenhagen and a full-sized container vessel.

Copenhagen Airports, A. P. Moller-Maersk, DSV Panalpina, DFDS, SAS, Everfuel, NEL, Molslinjen, Haldor Topsoe, COWI, the Municipality of Copenhagen, Denmark's Capital Region and Ørsted have formed the first partnership of its kind which combines leading competencies across the value chain. The project aims to draw upon these to become a frontrunner for a large industry-coordinated heavy-duty transport sector decarbonization. The project holds the potential to establish new solutions to global challenges in relation to energy, climate and transport. As the project will be located in Copenhagen, the project should be seen in a larger regional context where several Northern European regions (i.e. Oslo, Gothenburg, Malmö, Copenhagen and Hamburg) are cooperating on solutions facilitating a green transformation through renewable hydrogen.

Please select which part of the value chain for hydrogen your project focuses on (select one or more, where applicable):

Production	Transmission	Industrial application	Mobility	Energy	Housing application	Other
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. Partnerships and spillover effects

Currently, the GFDK project includes the necessary partners to execute phase 1 and to conduct initial design preparation for phase 2. Yet, the project strives to include additional partners to cover the entire value chain for production of sustainable fuels for maritime and aviation sectors in phase 2 and 3. The GFDK partners have deliberately left open spaces for midstream commercial partners within methanol synthesis and further processing into sustainable jet fuel, as the most promising technology route is currently uncertain. Furthermore, additional partners may be needed in phase 2 and 3 for the selection and scale-up of an electrolyser technology.

The Bornholm energy island that will power the project's 1.3 GW electrolyser can be connected to nearby countries such as Germany, Poland and Sweden. Thus, the project can demonstrate the potential for large scale development of offshore wind that is connected to several countries and closely integrated with the energy system in Greater Copenhagen.

The project partners are continuously interested in strengthening the offtake side with the addition of more partners in the heavy transportation sector. In the longer term, the project may consider onboarding infrastructure companies (e.g. electricity and gas TSOs) to support distribution of produced e-fuels.