



**MINISTRY OF FOREIGN AFFAIRS  
OF DENMARK**  
*Invest in Denmark*

# INVEST IN DENMARK SUPPORT FOR FOREIGN INVESTORS

&

# PTX VALUE PROPOSITIONS



**POWER-TO-X OPPORTUNITIES: A  
CONFERENCE AND WEBINAR IN COPENHAGEN**

**10 NOVEMBER, 2020 – EIGTVEDS PAKHUS**

# INVEST IN DENMARK

- **Denmark's** national investment promotion agency
- Integrated part of the **Trade Council** under the Ministry of Foreign Affairs
- Based on a strong global and regional Danish set-up – approx. **60 employees** (half in Denmark and half abroad)
  - Investment Managers abroad
  - Project Managers at home (10 located regionally)
  - Management and services in Copenhagen
- Approx. **60** successful investment projects per year (**1500+ direct jobs**)
- Collaboration with Copenhagen Capacity



# GLOBAL OUTREACH

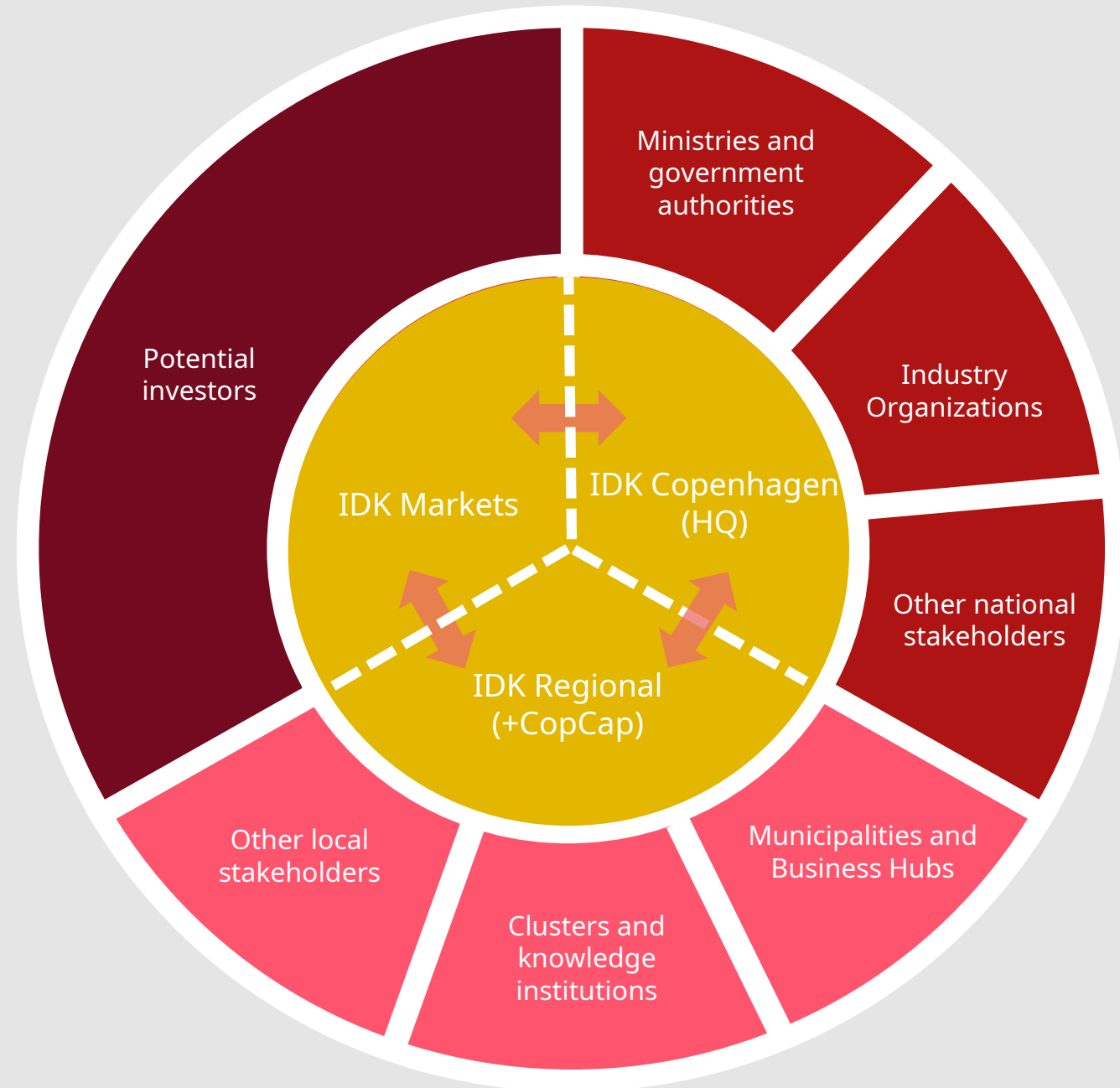


# LOCAL EXPERTISE

- Invest in Denmark has project managers located around Denmark embedded in leading knowledge clusters
- They ensure that Invest in Denmark are able to connect investors at the global level with deep knowledge on the local level
  - **SILKEBORG** – Wind
  - **AARHUS** – Food, Robotics, Life Science
  - **AALBORG** – Data Centres, Sound, ICT
  - **ODENSE** – Data Centres, Robotics, eHealth
  - **KOLDING** - Automated sustainable manufacturing
  - **COPENHAGEN** – Quantum Computing, Life Science, CCUS, Bioenergy, Maritime, Design, VC etc.



# OUR DANISH NETWORK



# THE INVESTMENT PROMOTION PROCESS



# ASSISTING IN THE INVESTMENT PROCESS

## BEFORE

*Information gathering and analysis*

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Market overview

Benchmarking services

Mapping potential partners, costumers  
and service providers

Identifying business and funding  
opportunities

Delivering industry insights

## DURING

*Business establishment*

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Practical assistance

General advice on legal, financial and  
corporate structure matters

Arrange fact-finding missions

Land and property search

Introductory meetings with business  
clusters and public authorities

## AFTER

*Expansion and retention*

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Expansion support

Identify new business opportunities

Aftercare



# PTX - WHY DENMARK?

- World leader in terms of **wind power** generation/use (48% wind power, 2019)
- **Lowest power prices** in Europe (non-household consumers)
- **Energy storage** is required when wind and solar power are the dominant power sources
- Salt caverns available for green hydrogen **storage**
- **Green power** and sites available for PtX
- **Strong players** working with PtX
- **Develop and test** in Denmark – implement globally
- Generate green fuels for **export** (gas system, hydrogen pipes, tank vessels etc.)
- Make use of the PtX **waste heat** for district heating (improved business case)





# DENMARKS 2030 VISION

- 70% reduction in CO2 emissions by 2030
- 100% renewable electricity expected by 2027
- A series of action plans to achieve 2030 goal
- First action plan: Industry & Energy, announced June 2020
- Second Action Plan: Transport, under negotiation
  - 500.000 – 1.000.000 EV's by 2030
- Additional Action Plans e.g. Agriculture: Under development
- Institutional investors in Denmark heavily engaged
- Model for scalable green transition



# DENMARK: CO2 EMISSIONS TO BE CUT BY 70% BY 2030

- Law adopted by 172 of 179 members of the Danish parliament.
- The law: Denmark must deliver a 70 percent reduction in greenhouse gases by 2030.
- Climate action plan: June 2020.
- Annual follow-up by the Danish Climate Council to monitor progress.
- Denmark refrains from using purchase of CO2 allowances as a way to achieve the goal.

## Denmark adopts climate law to cut emissions 70% by 2030

Published on 06/12/2019, 11:15pm

New law binds Denmark to international climate process, including climate finance to developing countries



The Danish Parliament (Photo: Commons/News Øresund – Johan Wessman)

By [Jocelyn Timperley](#)

Denmark's parliament **adopted** a new climate law on Friday, committing to reach 70% below its 1990 emissions in the next eleven years.

The law targets carbon neutrality by 2050 and includes a robust monitoring system. New legally-binding targets will be set every five years, with a ten-year perspective. The first of these will be set in 2020.



# POWER TO X – A KEY PRIORITY IN DENMARK

Statement by Danish Prime Minister, Mette Frederiksen at the Danish Parliament, Oct. 6, 2020:

- "First of all we have to be able to capture CO2 from the atmosphere, store it underground, or transform it into green energy."
- "Secondly we have to become excellent in terms of developing green fuels for transport and industries. For example transform power from wind turbines into fuel for planes, vessels and cars – what the whole world talks about: **"Power-to-X"**."



# FIRST PORTION OF CLIMATE ACTION PLAN ANNOUNCED – JUNE 2020

## Establishment of the world's first energy islands and offshore wind

- The world's first energy islands will be built by 2030 with 5 GW wind power combined. The construction of the energy islands will commence immediately. One island will be placed in the North Sea with 3 GW in 2030 and capacity for 10 GW in the longer run. The island will expand in correlation with increased electricity consumption and will connect to other countries. The other island will be built on Bornholm with 2 GW capacity in 2030.
- It is a condition for both energy islands that they are commercially viable without government support.
- In the longer run, the energy islands will make use of CCS technologies as well as Power-to-X technologies.
- In addition to the energy islands, new offshore wind parks agreed upon in 2018 will also be constructed; one is planned to be finished by 2027 near Hesselø and another by 2030. A total of DKK 314m in funds will be dedicated to feasibility studies of the two energy islands as well as the offshore park near Hesselø.

## Transition to market driven build out of onshore wind and solar

- Solar energy and on-shore wind are the cheapest available green technologies on the market and for that reason; expansion of solar energy and on-shore wind will in the future be market-based. Current subsidy schemes will continue until they expire.
- Geographically differentiated feed-in tariffs scheme will provide financial support to a larger share of the electricity companies' expenses in connection with expansion of renewable energy. Furthermore, the actions will provide financial incentives to place new renewable energy plants where the capacity of the electricity grid is most accommodating.

## Investments in next generation technologies: Power to X and Carbon Capture

### Support for biogas and other green gases

### Green transport fund (including buildout of charging infrastructure for EVs)

### Green tax reform (a CO2 tax will be introduced)

In total these measures are expected to reduce 3,4 million tons of CO2e by 2030. More to come in Q4 2020/Q1 2021



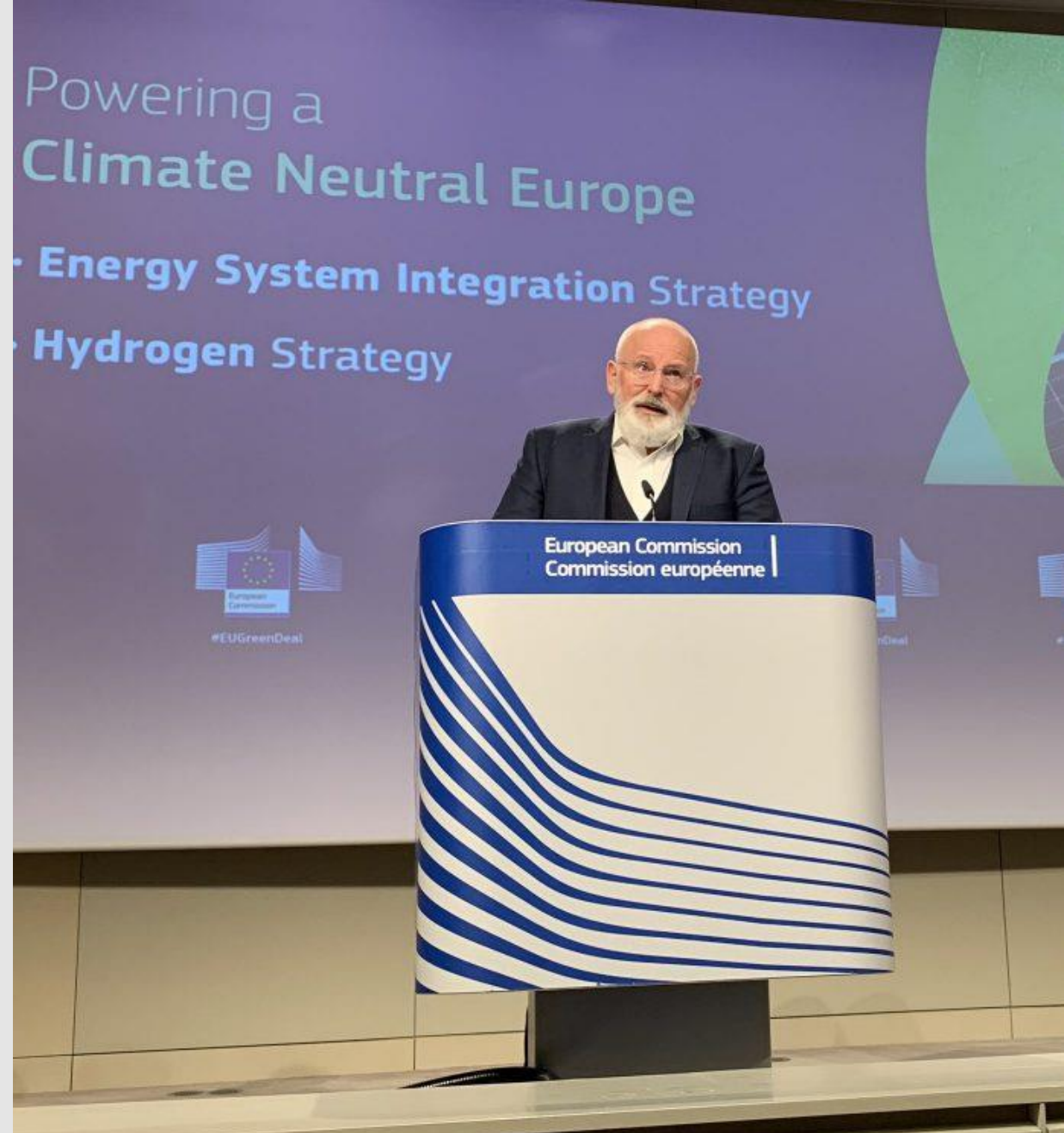
### Overview of dedicated government funds

Targeted sector	Total funds allocated, DKK	Timeframe
<b>Energy islands</b>	314 million	2020-2022
<b>Carbon Capture and Storage</b>	14.5 billion	2024-2044
<b>PtX</b>	750 million	
<b>Biogas</b>	3 billion	2024-2030
<b>Green transition of industry</b>	950 million	2021-2030
<b>Energy efficiency</b>	456 million	2021-2030
<b>Total (for 1<sup>st</sup> action plan)</b>	<b>27.97 billion</b>	<b>2020-2044</b>



# THE EU PTX STRATEGY

- ... the EU can turn **clean hydrogen** into a viable solution to decarbonise different sectors over time ...
- ... installing at least **6 GW** of renewable hydrogen electrolyzers in the EU by **2024** and
- ... and **40 GW** of renewable hydrogen electrolyzers by **2030**.



# DANISH INSTITUTIONAL INVESTORS

- As of September 2019, Danish Pension Funds had green investments of at least DKK 126 billion, and commitments for an additional DKK 35 billion. Current investments include (DKK);
  - 32.6 B in green equity investments in e.g. Vestas & Ørsted
  - 6.5 B in green bonds
  - 53.9 B in green energy infrastructure in OECD countries e.g. Burbo Bank Extension in GB
  - 2.5 B in green energy infrastructure in growth economies e.g. Lake Turkana Wind Project in Kenya
  - 26.4 B in sustainable buildings e.g. Slagelse Hospital (DGNB Gold) and UN City in Copenhagen (Platinum LEED)
  - 4.1 B in other investments e.g. forestry in USA, Australia, and South America
- Expectation of additional DKK 350 billion in green investments by 2030
- [Action plan for the financial sector's climate partnership](#)





# DANISH TSO (POWER AND GAS) STRATEGY

- By 2040 the Danish electricity consumption is expected to be the equivalent of **13 GW** of offshore wind power
- The potential for offshore wind power is **40 GW** in the Danish part of the North Sea

Energinet (TSO) will:

- Ensure market players can establish PtX clusters
- Develop gas storage facilities, and seek out partnerships to support a growing PtX market
- Engage in partnerships within e.g. passenger transport, aviation, shipping, industry and agriculture
- Examine scenarios for the development of markets and infrastructure for hydrogen in Denmark

# THE ENERGINET ACTION PLAN

## ▪ Energy Intense Zones

- Large wind projects off the west coast of Denmark
- Large supply of wind power directly for PtX without the need for transition through the power grid

## ▪ Hydrogen Infrastructure

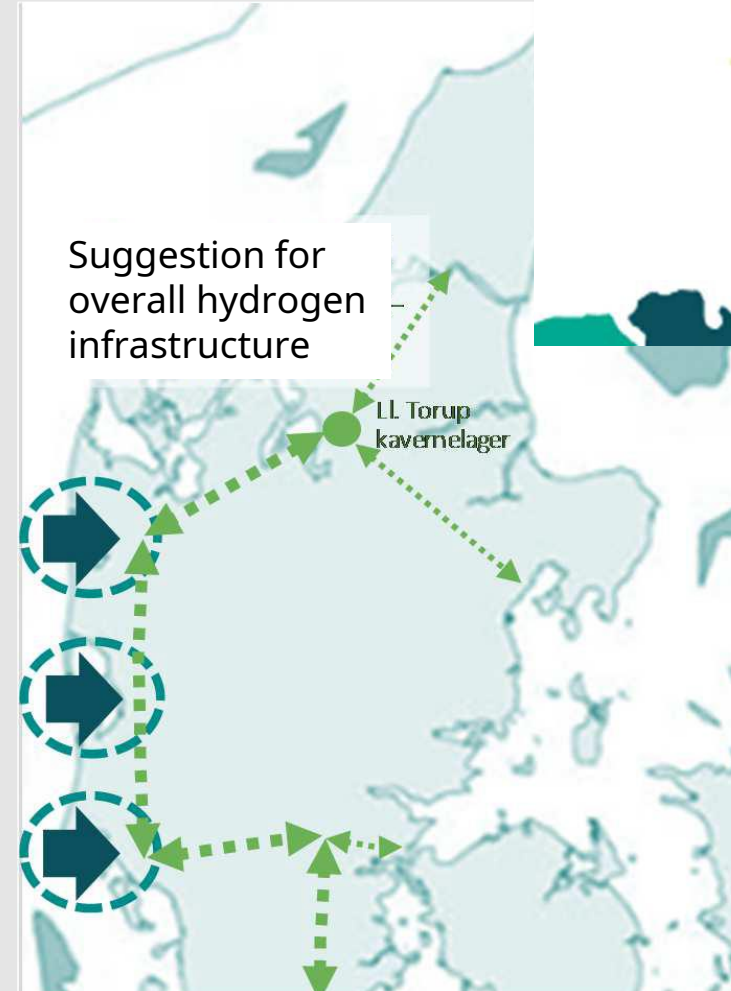
- Construction of hydrogen pipeline grid

## ▪ Green fuels production

- Production of green fuels on the basis of hydrogen and CO<sub>2</sub>
  - Using CO<sub>2</sub> from industries (i.e. biogas plants, concrete production, waste incineration plants etc.)

## ▪ Green Certificates

- Insuring that the energy used for producing the hydrogen can be certified 100% green



# ENERGY EFFICIENCY - USE OF WASTE HEAT

- 64 % of Danish households are heated by district heating. Heat mainly from CHP plants, waste incineration and industrial processing
- Waste heat from electrolysis plants etc. could be used for district heating
- Major advantages:
  - Use waste heat and conserve natural resources
  - Reduce carbon emissions
  - Increase overall energy efficiency
  - Improve business case – usually possible to sell 55+ degrees C waste heat to the local district heating company





# LARGE DANISH PTX PROJECTS ANNOUNCED DEC 2019

## ■ GreenLab

*Consortium: GreenLab Skive, EuroWind Energy, Everfuel Europe, Eniig Holding, E.ON DK, GreenHydrogen*

- Grant: DKK 80 Million (10.5 million EUR)
- 12MW electrolysis plant & 1.6MWh battery storage
- Green power



## ■ Shell & EverFuel

*Consortium: Everfuel Europe, Dansk Shell, Energinet Electrical System Responsibility, TVIS, TREFOR Elnet, EWII Energi and Active Energy Anlæg*

- Grant: DKK 48 Million (6.5 million EUR)
- 20MW electrolysis plant & 500MWh hydrogen storage
- Ambition: 1000 MW plant
- Green power



<http://www.everfuel.com/news>

## ■ Ørsted & Everfuel

*Everfuel Europe, NEL Hydrogen, GreenHydrogen, DSV Panalpina, Hydrogen Denmark and Energinet Elsystemansvar*

- Grant: DKK 34.6 Million (4.5 million EUR)
- 2MW electrolysis plant - Daily production: 600kg of hydrogen
- Powered by nearby wind power



<https://orsted.com/en/Media/Newsroom/News/2019/12/945369984118407>

## Everfuel, Shell to collaborate on a large-scale hydrogen plant in Denmark



Bioenergy International Storage & Logistics November 22, 2019

In Denmark, hydrogen infrastructure developer Everfuel Denmark A/S and A/S Dansk Shell – the Shell Refinery in Fredericia, and partners have entered into strategic cooperation on the future supply of the transport sector with green energy in the form of a hydrogen plant. The ambition is to be able to install the largest of its kind Power-to-X (P2X) plant in Fredericia to store and utilise excess wind power.



*Located in Fredericia Harbour, the Shell refinery was opened in 1966 and has the capacity to refine 3.4 million tonnes of crude oil per annum. According to Dansk Shell, the refinery refines around 35 % of all fossil fuels in Denmark. The company has entered into a strategic collaboration with Everfuel for a green hydrogen plant on site (photo courtesy Dansk Shell).*


With the cooperation, it is now possible to apply for Danish Energy Agency funding through the energy storage fund pool. The ambition is to be able to install a Power-to-X (P2X) plant in Fredericia with up to 1 GW of electrolysis capacity, but the start could be 20 MW.

# NEW LARGE SCALE GREEN HYDROGEN PROJECT - COPENHAGEN

- Announced May 2020
- Ørsted, Copenhagen Airport, SAS, DSV, DFDS and Maersk aiming to develop a new large hydrogen and e-fuel production facility, which could reduce annual CO2 emissions by 850,000 tonnes.
- When scaled-up to 1.3 GW capacity by 2030, the project could deliver more than 250,000 tonnes of sustainable fuel for buses, trucks, ships and planes every year.



# PTX ECOSYSTEM – CORPORATE PLAYERS

Danish	International
	



# DENMARK ON THE BUSINESS CHARTS





MINISTRY OF FOREIGN AFFAIRS  
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**THANK YOU  
FOR YOUR  
ATTENTION**

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