



Photo: DIN Forsyning

# Sea water heat pump Esbjerg, Denmark

Client: DIN Forsyning  
2022 - 2023

Sustainable thermal energy recovery with Denmark's  
largest seawater heat pump



The heart of the new plant: Currently the largest CO<sub>2</sub> heat pump in the world.

Photo: MAN Energy Solutions



### Initial situation

Great things are being built in the North Sea port of Esbjerg. Where previously a coal-fired power plant provided heat for the city, Denmark's largest seawater heat pump is being built as part of an ecological district heating system.

With the help of this sustainable heat source, the entire population of the port city will be supplied with green heating energy. The constant 10°C cool North Sea water serves as the basis for the heat pump, and CO<sub>2</sub> is used as the refrigerant. The plant itself is powered by green electricity, mainly from wind power.

Connected residents

**100 000**

Annual heat production

**235 000 MWh**

Seawater flow per second

**4 000 l**

Difference in water temperature between inlet and outlet

**3°C**

### Special challenges

The main inlet of the facility leads directly into the sea. The valves installed there are not only exposed to the aggressive salt water, but also to contamination by flotsam, algae and mussels. The main pipe is cleaned weekly by pigging.

Challenge

Delivery of one of the DN 1200 Wey knife gate valves without actuator



## Approach

**Seawater is considered one of the most corrosive natural environments on our planet. Therefore, only materials with extreme corrosion resistance were considered for the inlet and outlet of the plant.**

For regular removal of mussels and other debris from the pipeline, the valves must have a free passage that is passable for pipe-cleaning pigs. In addition, the available space in the new facility is limited. Our Danish Wey sales partner Grønbech has already successfully implemented many energy projects. For Esbjerg, Wey knife gate valves of the MG series were selected, whose body and gate were made of Super Duplex stainless steel for this application. With a nominal size of DN 1200, the knife gate valves are optimal for the confined installation site due to their short face to face dimension and relatively low weight.

## Step 1

Selection of the suitable valves and materials by Grønbech and Sistag

## Step 2

Production and pressure testing of four identical knife gate valves in the Swiss plant

## Step 3

Installation of the valves by the Grønbech installation team

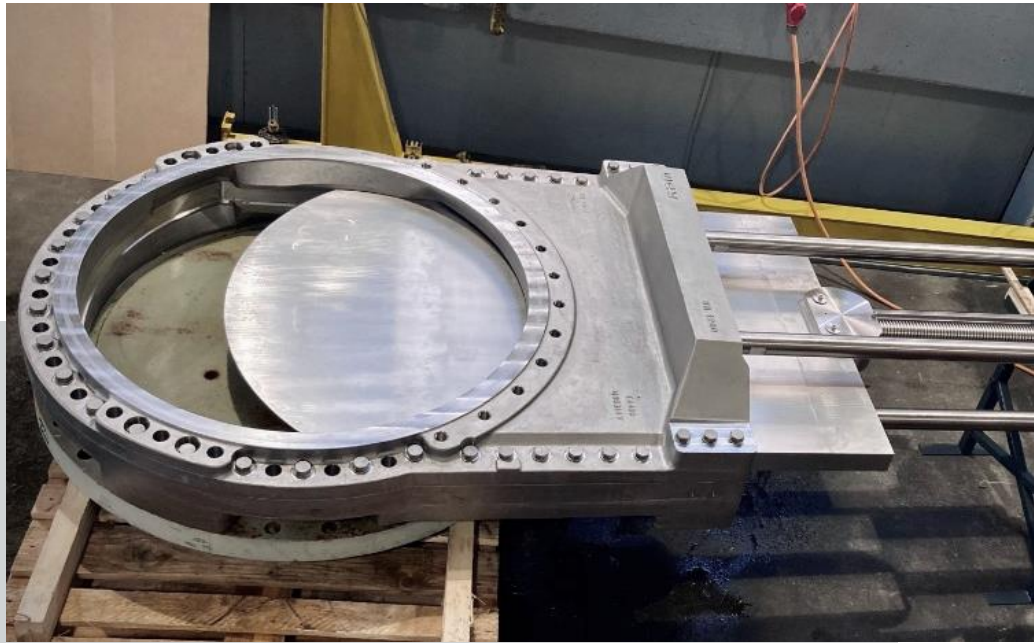
## Step 4

Function test of the knife gate valves during salt water flow and cleaning by pigging

## Step 5

Subsequent manufacturing of customized protective grids to keep out flotsam even better

One of the four stainless steel knife gate valves shortly before delivery at the Swiss Sistag factory



Category

## Knife Gate Valves

Product series

### MG

Nominal size

### 1200

Actuator

### Electric

Number of valves

### 4

Body material

## Super Duplex stainless steel

Maximum pressure

### 10 bar

Sealing type

### NBR

Special features

Double transverse seal with glider system guarantees tightness against the environment

Two scrapers remove debris from the gate each time the valve is opened

Just like the body, the gate is made of Super Duplex stainless steel with a PREN value of >42

«With the high demands and confined space, Wey knife gate valves were the best possible option.»

**Christian Djurhuus**

Key Account Manager, Grønbech  
Wey sales partner in Denmark

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**Commissioning**

**2023**

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**Next steps**

The installed valves are to be additionally protected from mussels and other flotsam with custom-made protective grids.

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The Wey valves were successfully installed and passed all pressure and functional tests. The seawater heating plant in Esbjerg has attracted a lot of attention due to its size and new technology and is considered a showcase for similar projects worldwide.



One of the Wey knife gate valves installed at the plant

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