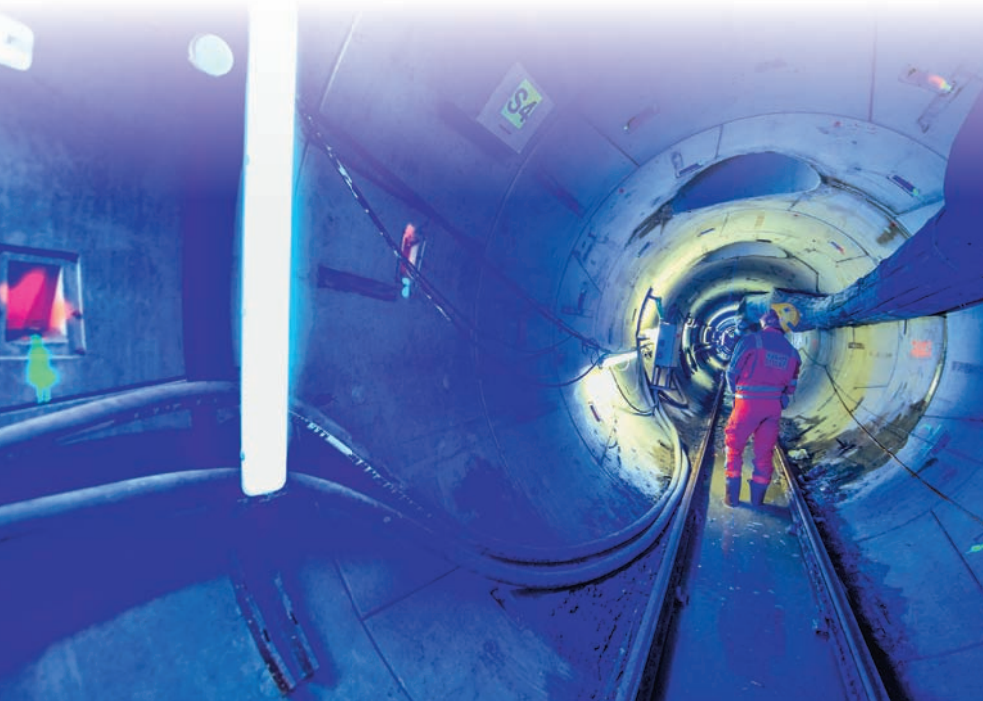
Warm water to regasify LNG

Liquefied natural gas (LNG) is natural gas chilled to the point at which it liquefies. Its liquefaction reduces its volume by a factor of 600, making it safer and easier to transport and store. The gas then has to be regasified by heating it with water. To avoid burning gas to heat the water used to regasify the LNG, the LNG terminal designers came up with an original solution. They turned their attention to the other side of Dunkirk's western outer harbour, where the Gravelines nuclear power plant is located. The idea involves recovering part of the warm water discharged by the power plant and using it to heat the LNG.



After use, the water, which was originally extracted from the sea to cool the nuclear power plant, will be discharged at its initial temperature at the LNG terminal dock, not far from where it was first extracted. This innovation required the construction of a 5 kilometre tunnel 50 metres below the seabed between the Gravelines power plant and the LNG terminal. The benefits are twofold, for water resources and for the climate. The solution will avoid up to an annual 500,000 tonnes of carbon emissions(1).

SPOTLIGHT ON THE FUTURE DUNKIRK LNG TERMINAL

The Dunkirk LNG terminal, continental Europe's largest, will have an annual regasification capacity of 13 billion cubic metres of gas. It will supply two markets: France and Belgium.

Aims:

— Improve competition in Europe

— Improve supply security for France and Europe.

INTERESTING FACTS

ADVANTAGES FOR THE ENVIRONMENT

— **Energy savings:** the gas not burnt to regasify the LNG is equivalent to the annual gas consumption of a city the size of Dunkirk.

— **Smaller thermal footprint for the discharged water:** after use, the terminal discharges the water at the same temperature as when initially extracted from the sea by the power plant.

— **Lower carbon emissions:** the volume of gas not burnt represents up to 500,000 tonnes of CO_2 emissions avoided each year(1).

12 m³ per second: maximum flow rate of water taken by the LNG terminal from the power plant's warm water outfall.

5 km: length of the underwater tunnel.

(1) Computed by EDF, on the basis of the average greenhouse gas (GHG) contents by country, Life Cycle Analysis (LCA) included; generation mix by country provided by the International Energy Agency (IEA) 2012, LCA of power generation by the Intergovernmental Panel on Climate Change (IPCC) 2012.