



Fortum Oslo Varme AS

# CCS from waste incineration









part of tomorrow's climate solution

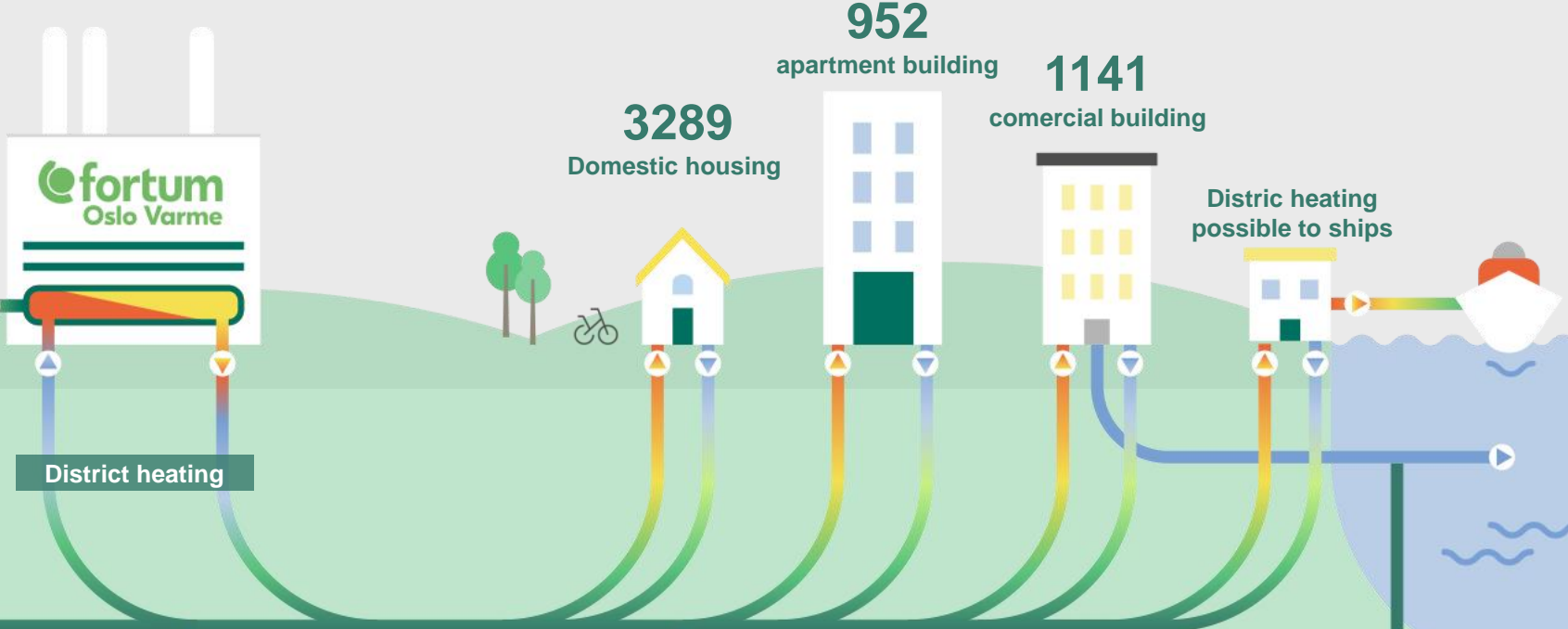


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## Energy sources:

-  WASTE HEAT
-  ELECTRICITY
-  HEATPUMP/ SEWER
-  DATACENTER
-  WOOD PELLET
-  BIOFUEL
-  FOSSIL OIL
-  LNG



**ENERGY RECOVERY FROM 400.000 TONNES WASTE/ YEAR**

**600 km district heating network**

**30 mill liters hot water distributed throughout Oslo**

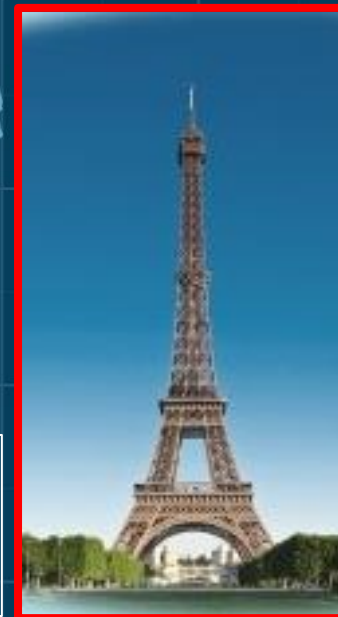
**District cooling**

Production approx **150 GWh** electricity (est. 2017)

# The Norwegian CCS project



## Infrastructure for Europe



### Paris agreement

- Below 2° C
- CCS key technology

# Carbon Capture in Oslo

- Goal to capture about **400 000 tons CO<sub>2</sub>** per year starting in 2024
- CCS at Waste-to-Energy plants will capture both fossil and biological CO<sub>2</sub> (appr. **50 % BIO-CCS**)
- CO<sub>2</sub> transport to port via **emission free cars**
- Pilot testing on **real flue gas**
- **90% cleaning** of CO<sub>2</sub>, technology supplier with full scale experience (Shell), EPC contractor TechnipFMC



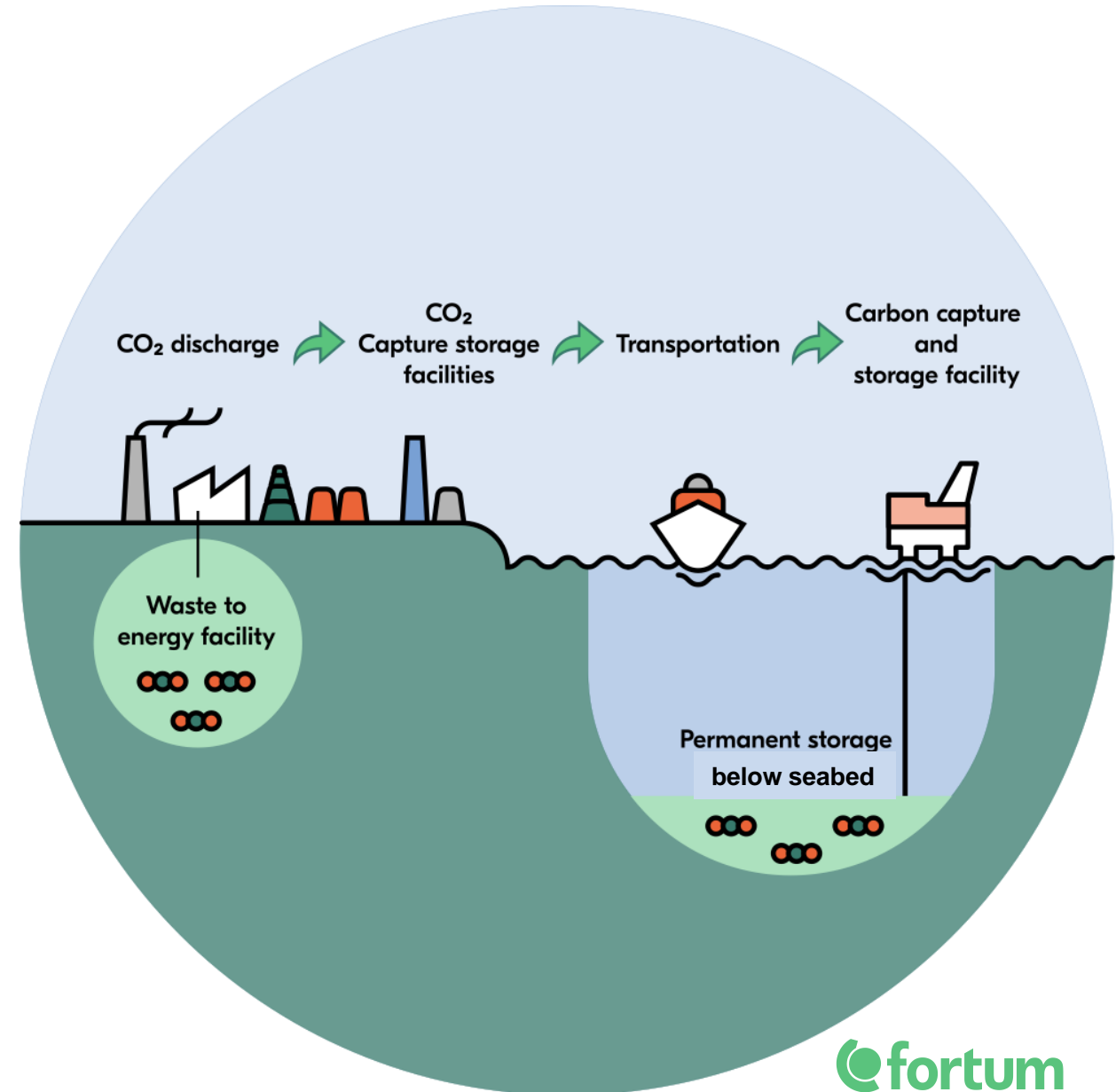
# Waste is one of the world's biggest climate challenges



- **2.2 billion tons** of waste produced yearly, and **5% of global emissions** is from household waste alone
  - Landfilling has to reduce and **waste-to-energy** is the best solution for waste that cannot be recycled (including **unrecyclable plastics**)
  - Significant **BIO-CCS** potential; **waste-to-energy** with **CCS** can contribute to achieve negative emissions
  - EU's targets for recycling and reduced landfills; **40 mill. tons** missing capacity of **waste-to-energy**
- 1 ton waste** is equivalent to **1 ton CO<sub>2</sub>**

# CCS is part of the climate solution

- New technologies emerging
- Significant change in EU on CCS and BIOCCS, and funding from Innovation Fund for new projects
- BIOCCS on Waste-to-Energy will give negative CO<sub>2</sub>-emissions, and can neutralize other emissions that are difficult to reduce/remove
- The Fortum project shows how cities can cut emissions from waste handling as part of sustainable city solutions





**Join the change!**

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