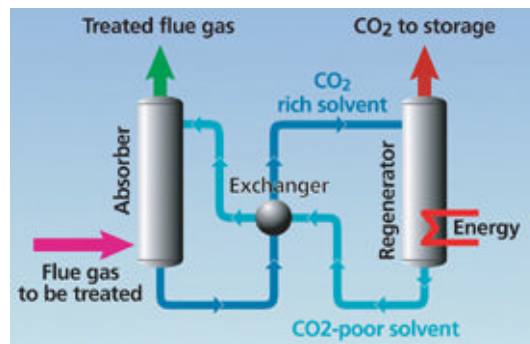


## Presentation of the CO<sub>2</sub> capture unit Castor project

The pilot CO<sub>2</sub> capture unit of the European Castor project, coordinated by IFP, is being implemented at the Elsam power station in Esbjerg (Denmark). It is the first installation in the world to capture CO<sub>2</sub> in the flue gases of a coal-fired power station.

### Capture of CO<sub>2</sub> by absorption

The Esbjerg pilot unit captures CO<sub>2</sub> in the flue gases emitted by the power station: this is called "post-combustion" capture.



The flue gases to be treated are directed to an absorber, where they are mixed with a solvent. Having more affinity with the CO<sub>2</sub> molecules than with the other components of the flue gases (in particular nitrogen), the solvent captures the CO<sub>2</sub> (the solvent is "enriched") and the other molecules are discharged from the absorber (treated flue gases). Nearly 90% of the CO<sub>2</sub> in the flue gases is trapped by the solvent.

The CO<sub>2</sub>-rich solvent is then fed to a regenerator. The device is heated to 120°C in order to break the bonds between the CO<sub>2</sub> and the solvent. The CO<sub>2</sub> is then isolated and transported to its storage place. The solvent, restored to its initial form ("CO<sub>2</sub>-poor" solvent), is reinjected into the absorber with the flue gases to be treated.

### Specific features of the pilot installation

The Castor pilot at Esbjerg takes up the challenge of capturing combustion flue gases at atmospheric pressure, i.e. with a low CO<sub>2</sub> concentration of approximately 10% when they enter the absorber.

#### A suitable solvent

To tackle this constraint, the type of solvent favored is a member of the amines family. These solvents have two useful properties: they are both effective at atmospheric pressure and resistant to corrosion. Over the course of the pilot stage, several solvents will be tested. Their performance will be compared to that of the reference solvent used in the project: MonoEthanolAmine (MEA).

#### A low-energy system

Another innovative feature of the pilot is the use of a system that can be regenerated with a limited quantity of energy. Indeed, the quantity of energy used shall not exceed 2 billion joules (heating to

120°C) per tonne of CO<sub>2</sub> captured. The operation of the pilot thereby reduces the generation of secondary CO<sub>2</sub> in connection with this energy production.

## Expected results

With its 420MW of power, approximately half that of a French nuclear reactor, the Esbjerg power station becomes host to a pilot installation intended to capture one tonne of CO<sub>2</sub> per hour. The cost of conventional processes for CO<sub>2</sub> capture in the flue gases of large industrial facilities, already operational, in particular in Japan, is estimated at between €50 and €60 per tonne of CO<sub>2</sub>. The Elsam industrial pilot is expected to halve the cost per tonne of CO<sub>2</sub> avoided, to between €20 and €30. Furthermore, the process is being tested on a scale large enough to ensure reliable industrial extrapolation.

### Press Contact IFP :

Mrs. Anne-Laure de Marignan  
E-mail : [presse@ifp.fr](mailto:presse@ifp.fr)  
Tel. : +33 1 47 52 62 07  
Fax : +33 1 47 52 70 96



### Press Contact EnergiE2 :

Mrs. Marianne Grydgaard  
E-mail : [mae@e2.dk](mailto:mae@e2.dk)  
Tel. : + 45 4480 6380  
Mob. : + 45 2333 0880



### Press Contact Elsam :

Mr. Jørgen Broen  
E-mail : [jbr@elsam.com](mailto:jbr@elsam.com)  
Tel. : + 45 9954 5460  
Mob. : + 45 2142 2498

