

Chaire CTSC Mine
ParisTech

Programme « Sociétés
innovantes » (2011-2014)
(ANR)

Les sites d'une contriverse : le cas de la démonstration du CCS dans l'Union Européenne

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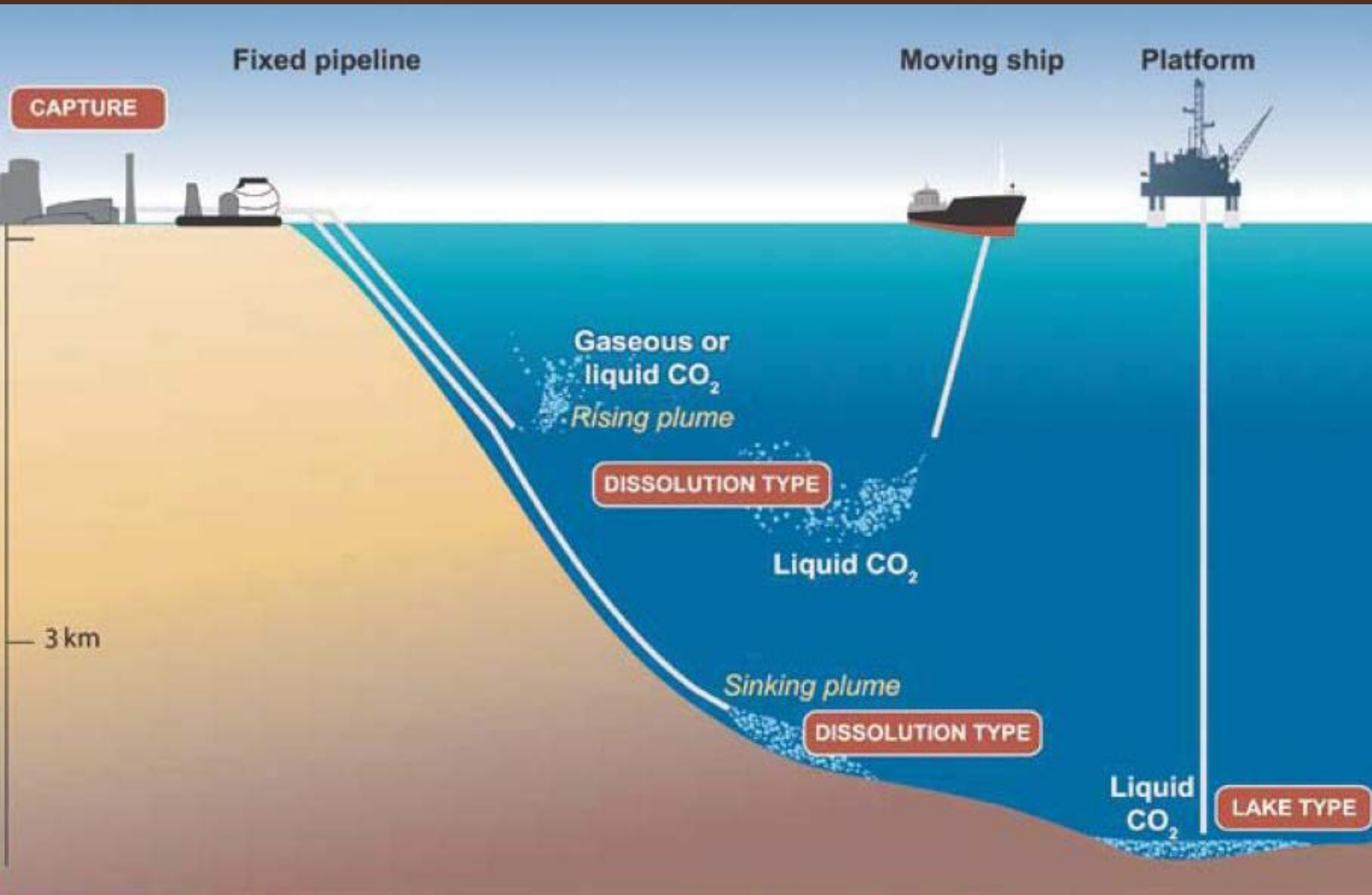
Paris, 22 octobre 2013,
« La recherche controversée d'énergies « propres »,
CNRS, CIRED PACTE

COLLÉNER
CO2, Collectifs, associot
echnique et trans
ition ÉNERgétique

Site « collener collectifs et transition energetique »

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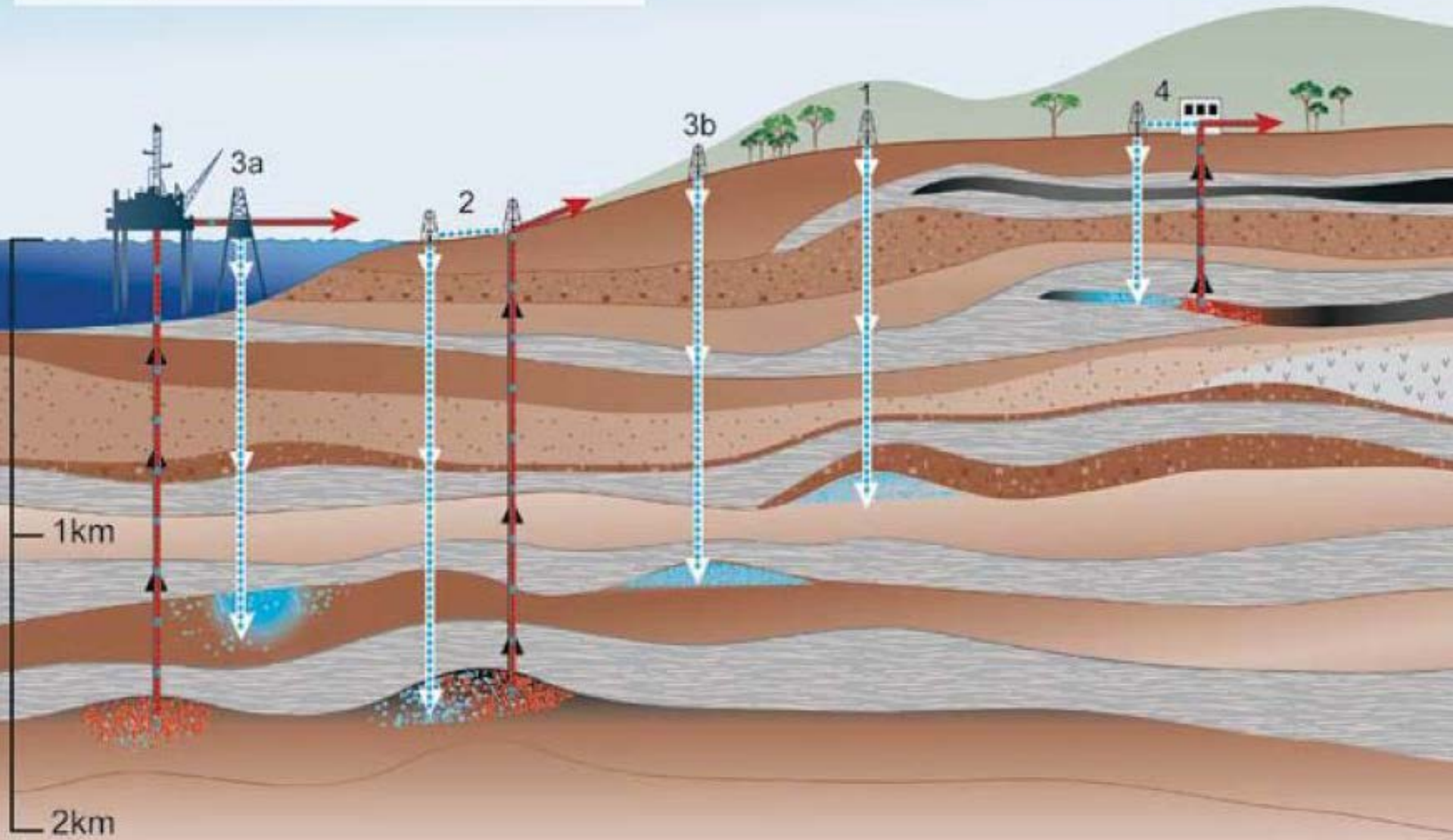
Introduction



Source : IPCC, SRCSS, SPM

Overview of Geological Storage Options

- 1 Depleted oil and gas reservoirs
- 2 Use of CO₂ in enhanced oil and gas recovery
- 3 Deep saline formations — (a) offshore (b) onshore
- 4 Use of CO₂ in enhanced coal bed methane recovery



75 CCS industrial projects worldwide

21 in Europe

mostly EOR-CCS projects.

part of many scenarios of energy mix, but not all
controversial

Oppositions

emergence of EU « CCS demonstration policy »

framing which underpins EU CCS policy.

Rebeca O'neill (CIRED) doctoral work

Zero Emission Platform for Fossil Fuels (ZEP)

ULCOS Florange (Moselle, France)

Barendrecht (Rotterdam, Netherlands) (documentary analysis)

Claye-souilly (Seine-et-marne, France) (documentary analysis)

Build on this work

role of « sites » in the demonstration of CCS

actual sites

notion(s) of site in policy discourse

2

Demonstration, site

Demonstration

between R&D and commercial development

since 2000's category of EU technological policy

2004, European Technology Platforms (ETPs)

Strategic Energy Technology Plan (SET-Plan)

industry-led stakeholder fora

agendas roadmaps

demonstrating low carbon technologies

ZEP = CCS ETP

Claude Rosental

demonstration (theorem, software, technology ...).

construction of a **collective and unstable statement** about an object
'demos'

situated, selective and framed process of construction of evidence

follow the collectives involved

follow the uncertainties associated with the object

translations, circulation, sharing or back-staging.

Rosental, C., 2003a, La trame de l'évidence. Sociologie de la démonstration en logique. Paris, Presses Universitaires de France, 367 p.

Rosental, C., 2003b, Certifying Knowledge: The Sociology of a Logical Theorem in Artificial Intelligence, American Sociological Review, 68, pp. 623-644.

Rosental, C., 2007, Les capitalistes de la science. Enquête sur les démonstrateurs de la Silicon Valley et de la NASA. Paris, CNRS Editions, 268 p.

Site, politicisation

Andrew Barry
Technological EU

on site opposition movement (Newbury highway, England)
bring damages caused by the project into public existence

spatiality of the **site**
play of relations
potential damages pointed at and rendered manifest

« **politics** », set of institutions, rules, technics and practices of government

« **political** », repertory of contestation and dissension
expands the space of politics beyond conventional exercise

role played by the sites, spatiality, local history, resources
endowing local actors with the possibility of rendering publicly manifest
projects impact

site = place for emergence of political sight
perspective on EU choices and policy

BARRY A., "The Anti-political economy", *Economy and Society*, 31(2), 2002, p. 268-284.

BARRY A., *Political Machines: Governing a Technological Society*, London: Continuum, 2001.

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A chronology of EU CCS demonstration

genesis

regime

politicisation

1996

2002

2005

2008

2010

Démonstration

Emergence of concept, feasibility
 scientific networks and programs
 DoE, IEA, GHG R&D Program, Climate arenas (CoP, Climate Init)

Association with industrial referentials
 international support (consortia, R&D)
 industrial referentials Sleipner (Ustira, visualisation), way to risk management
 Weyburn (EOR-CCS, know-how, data)
 Hawaï (ocean storage)

Political legitimacy
 SRCCS (IPCC Special report)
 translating science into politics potential solution
 need for on-site demonstration geological storage
 low-risk sites = cost benefit promise

Assemblage of demonstration programme
 ZEP/SRA, « demonstration programme »
 aligning interests MS / Commission / industry
 potential demonstration projects and sites

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 3rd climate energy package
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Ocean and /or geological storage

modeling, analogs
 envt'al impact (ocean)
 reports, papers, first conferences

Values vs risk management
 geological storage , « Sleipner CO2 plume »
 ocean storage >> Hawaï >> Norway >> OSPAR internat.
 ethical, OSPAR convention

Technological potential, need for CCS
 lock-in, alternative path to CCS
 technological maturity of CCS
 possibility of managing risks

Technological potential, need for CCS
 anti-CCS NGO collective (2007)
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 Greenpeace "False Hope"
 EOR (ZEP, EU parliament), a CCS captured by industrial interests

Local oppositions
 Expertise, environmental justice, need for CCS
 Risk management, Ustira leaks (GreenPeace « Reality Check »)

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The « low-risk site » (risk management , cost-benefit optimisation, socially optimal leakage rate)
 The « demonstration site » (telling set of demonstrators, aligning interests, knowlegde sharing, control over project / site selection ...)

Claye Souilly, Barendrecht, Florange ... projects abandoned
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1998-2002 SACS 2

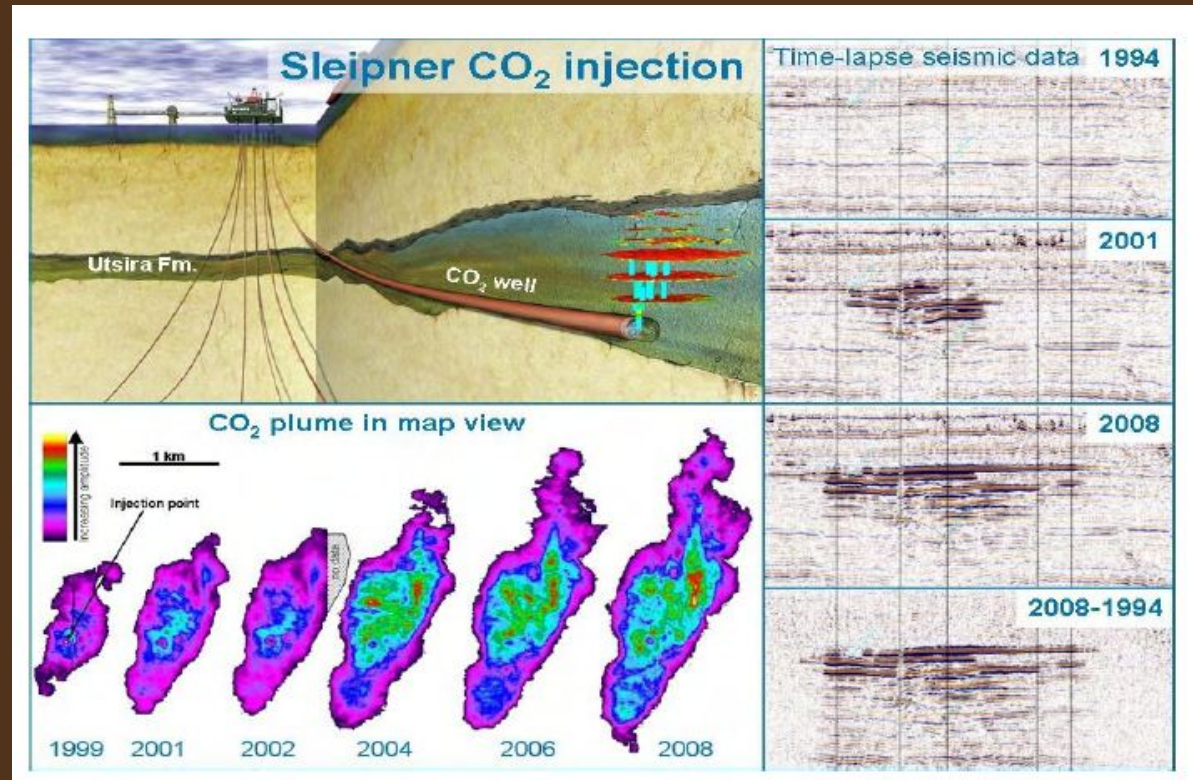
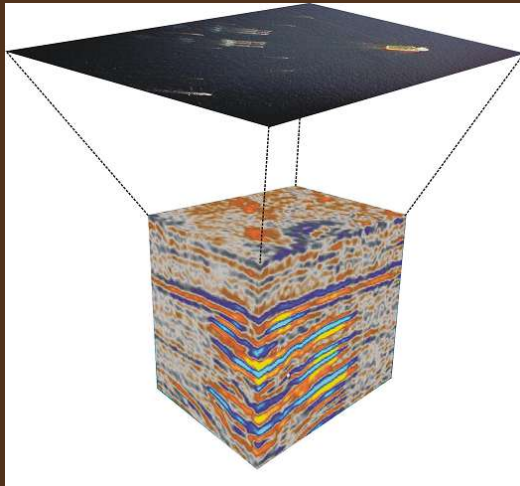


1994-1998 SACS 1
1998-2002 SACS 2



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Natural Gas containing carbon dioxide being produced from Sleipner field (GREEN) and carbon dioxide after being captured on Sleipner platform being injected into Utsira formation



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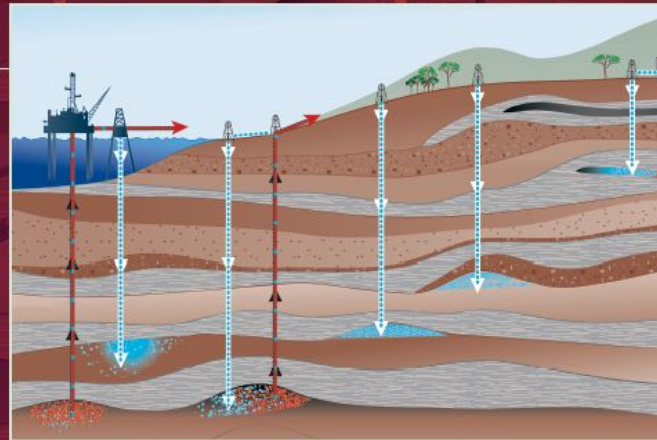
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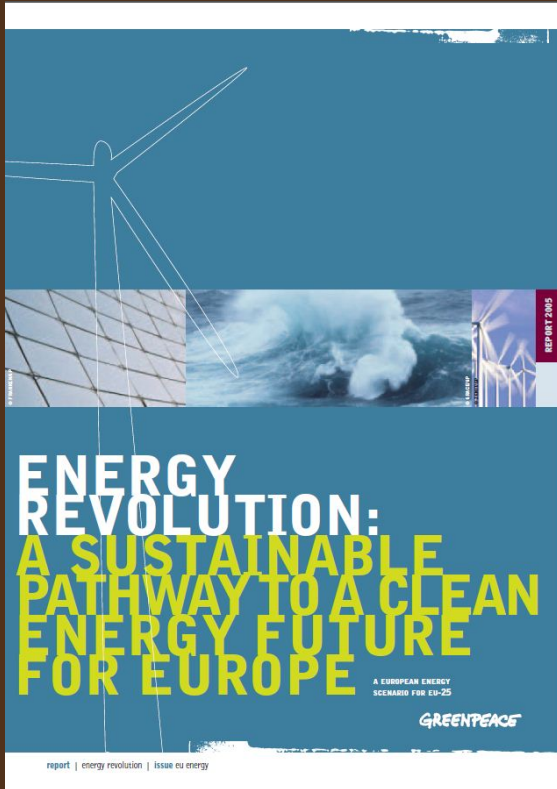
CARBON DIOXIDE CAPTURE AND STORAGE



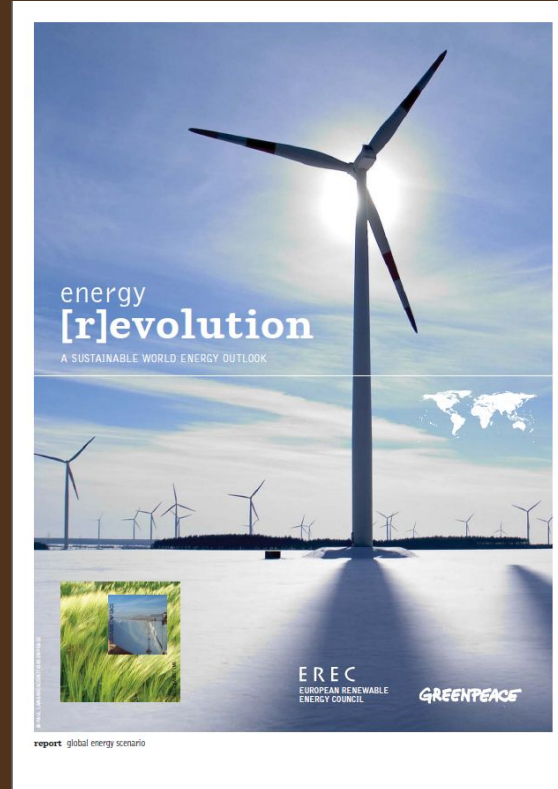
Intergovernmental Panel on Climate Change



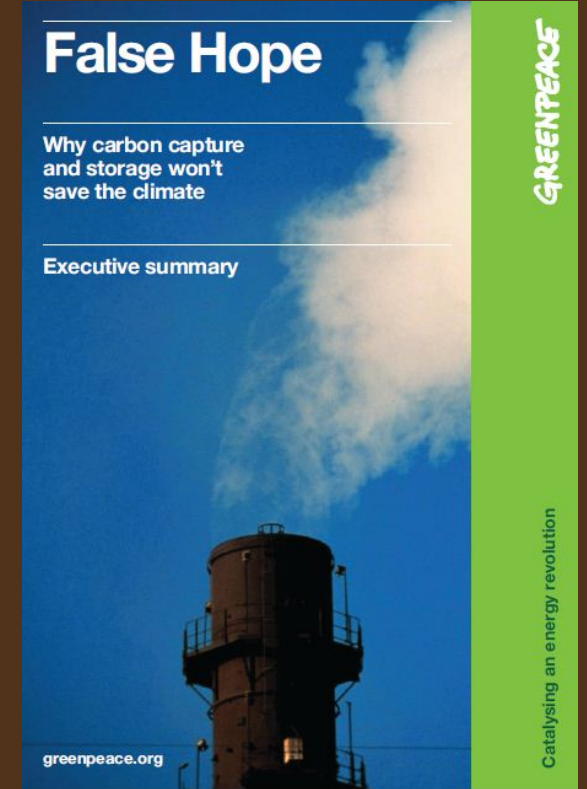
2005




2007




2008



2005


COMMISSION EUROPEENNE
 Recherche communautaire



Les Plateformes Technologiques européennes
 Des connaissances au service de la croissance

2006


EUROPEAN COMMISSION
 Community research

Climate change is one of the most serious single challenges faced by humankind today. Probably one of the greatest impacts in reducing CO₂ emissions will be made by the introduction of Zero Emission Fossil Fuel Power Plants including carbon dioxide capture and storage.

The formation of the European Technology Platform on Zero Emission Fossil Fuel Power Plants (ZEP) confirms the EU's continued commitment to its leadership role in reducing CO₂ emissions and the immense challenge of keeping the average global temperature increase below 2°C relative to pre-industrial level.

The ZEP Technology Platform will play a crucial role in enabling the EU to fulfil this commitment and has the goal that new competitive options will be developed and deployed for Zero Emission Fossil Fuel Power Plants within the next 15 years and hence help European industry to compete effectively on world markets.



report by
the Zero Emission Fossil Fuel Power Plants Technology Platform


 Publications Office
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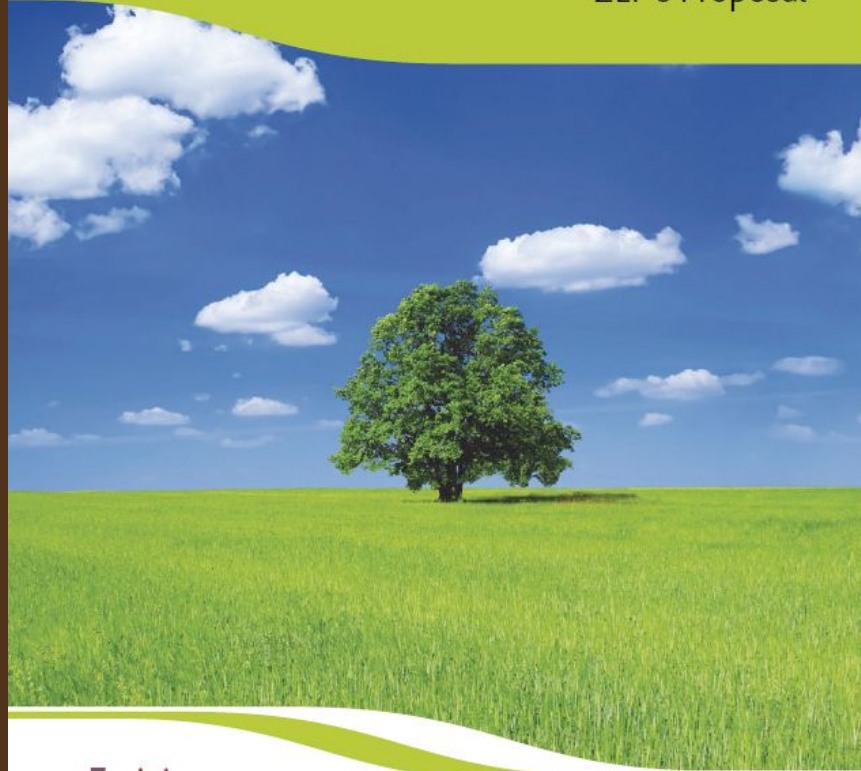

 EUR 22043

2008

European Technology Platform for
Zero Emission Fossil Fuel Power Plants (ZEP)

EU Demonstration Programme for CO₂ Capture and Storage (CCS)

ZEP's Proposal

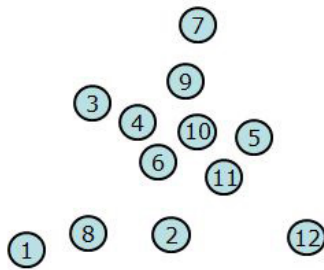




Why an EU Flagship program?

DRAFT

ZEP taskforces



“a series of independent demo projects, to verify technology”

EU Flagship program



“a well known coherent set of demo projects spread over Europe”

- *Visibility* – easier to communicate
- *Momentum* – create a step change
- *Knowledge* – quicker transfer/learning
- *Spread* - Ensure geographical & technological spread
- *Funding* - Ensure effective use of public funding

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Implementation of
**New Entrant
Reserve Funding**

Zep recommendations

EU Demonstration Programme for
CO₂ Capture and Storage (CCS)

**Maximising the benefits
of knowledge sharing**

Leakages in the Utsira formation and their consequences for CCS policy

The Sleipner CO₂ project in the North Sea is one of only three large-scale CO₂ storage projects worldwide. The oldest in operation, Sleipner has been injecting about 1 million tonnes of CO₂ into a sub-seabed saline aquifer since 1996. Carbon capture and storage (CCS) proponents point to Sleipner as proof that CO₂ can be stored safely and permanently while heralding the Utsira formation, that it is a part of, as large enough to hold Europe's emissions for years to come. However, recent developments in the North Sea indicate otherwise:

- A StatoilHydro-operated project was abandoned in the spring of 2008 after leaked process-water from the Utsira formation revealed an incomplete understanding of the geology of the storage site.
- A study by the Norwegian Petroleum Directorate has reversed previous estimates of CO₂ storage capacity in the Utsira formation from "able to store all European emissions for hundreds of years" to "not very suitable".

While neither of the above issues received much international attention, they call into question the presumption that Sleipner is flawless and the storage space in Utsira infinite. This briefing provides information on developments related to leakage from Utsira injections and revised storage capacity estimates.

Utsira leakage from Tordis-processed water injection

In May 2008, workers on the Gullfaks platform in the North Sea outside Norway happened to notice oily water at the sea surface near their platform. The produced water¹ originated from the Tordis field and had been injected into the Utsira formation by StatoilHydro. An internal investigation² conducted by the company revealed that injection activities had caused cracking in the seabed above the reservoir, thereby allowing a stream of processed water to escape back into the sea.

The project utilised an injection method that created cracks in the reservoir in order to increase permeability. When several unexpected pressure drops occurred in the process, injection was stopped and the cause for the drop investigated. The exact reason for the pressure drops was not ascertained, but each time the injection process was allowed to begin again.

StatoilHydro claims that the technology used has functioned very well. "The problem is the injection well. [...] It's probably located in the wrong place of the formation," said Gisle Johansen, a spokesperson for StatoilHydro³.

¹ Produced water is oil-polluted water that often comes up with oil extraction. In the past, this had often been released to sea, but now it is often re-injected to avoid pollution.

² StatoilHydro internal investigation of the event: «EPN OWE SNO/Tordis: Utslipp av oljeholdig vann og tap av injeksjonsbrønn» (11.08.2008) (Norwegian only so far. Available in full from Greenpeace).

³ Stavanger Aftenblad: <http://aftenbladet.no/energi/olje/article652315.ece> (Norwegian news).

Reality check on carbon storage

Report 2009

Recent developments in the Sleipner project
and Utsira formation

4

Conclusion

CCS demonstration policy developed in spite of voices calling for concerns
controversy never been properly staged

the figures of the « site » have played an important role
three sites emerge from our exploration

the « political site »
site of politicisation
local process opens up a new political perspective on CCS
Hawaiï and Barendrecht

the site of the policy [« policised » site]
“low risk” site, “demonstration” site
procedural and risk management category
a promise
anti-political character
allows postponing the debate, while keeping up the demonstration process

the site as an industrial referential
Sleipner akin to a laboratory
Weyburn and other RAP-CCS sites, more stabilised, less innovative referentials

sites role point to the fragility of this demonstration policy, as it bets on a site to which it denies a
political construction.

CCs case points to issues associated with EU post-Lisbon technological governance