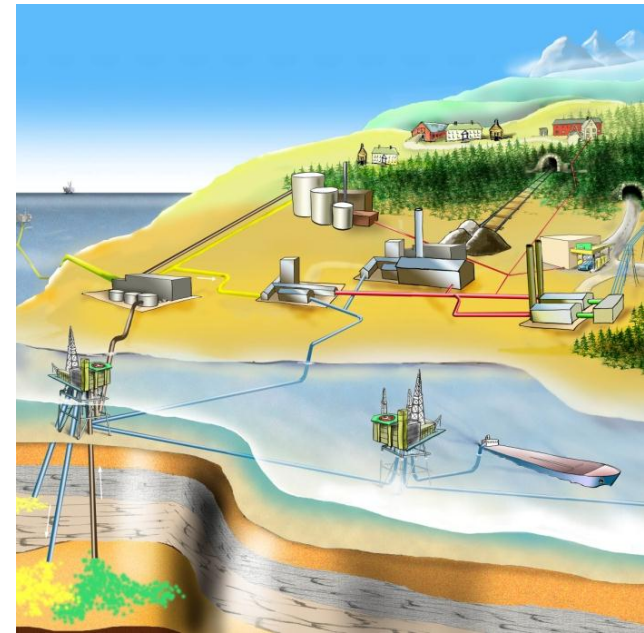
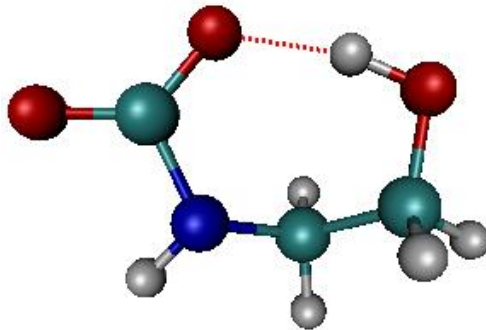
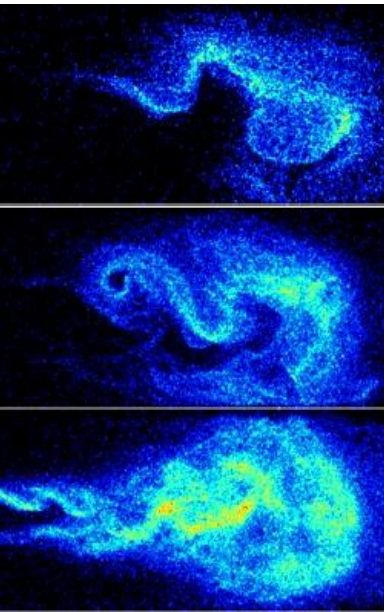


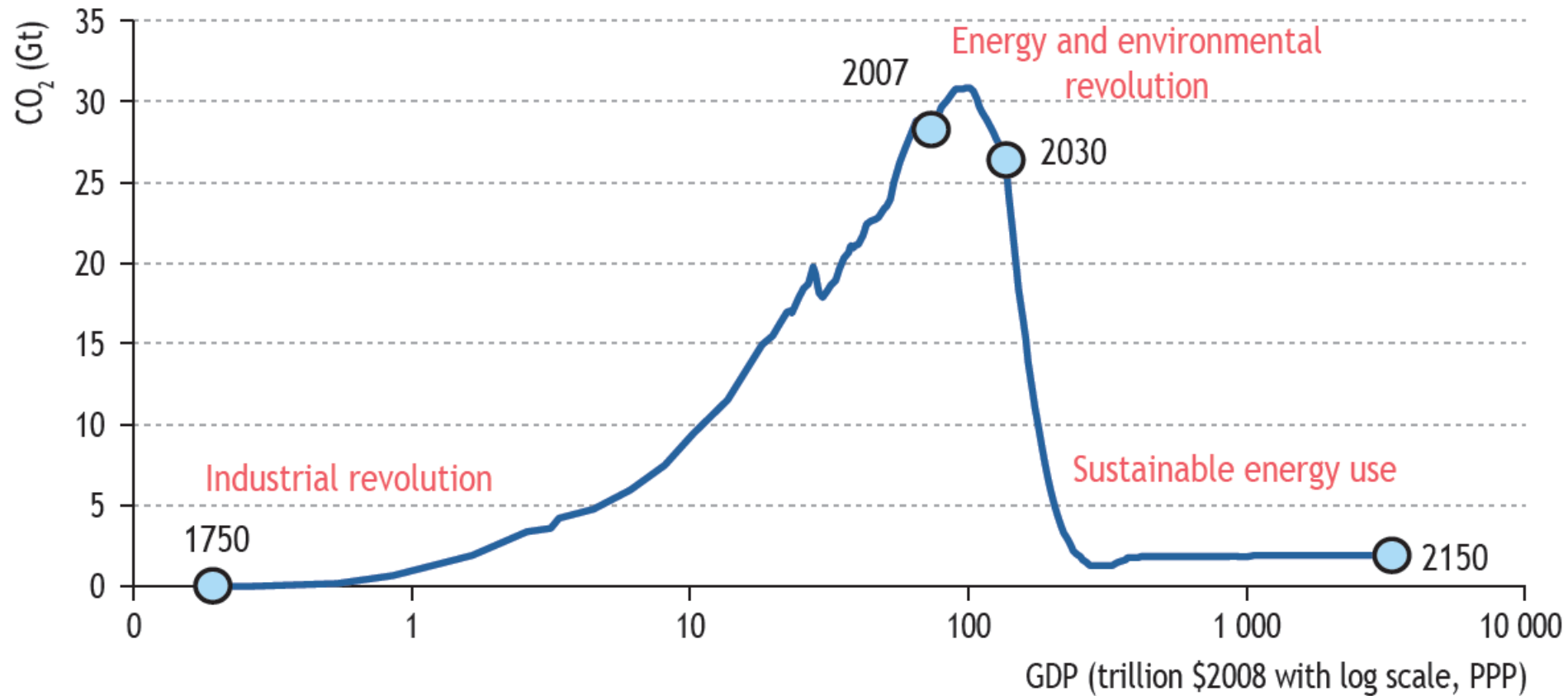
CCS reboot- What can and should we do to enable it?



Nils A. Røkke, VP Climate Technologies SINTEF

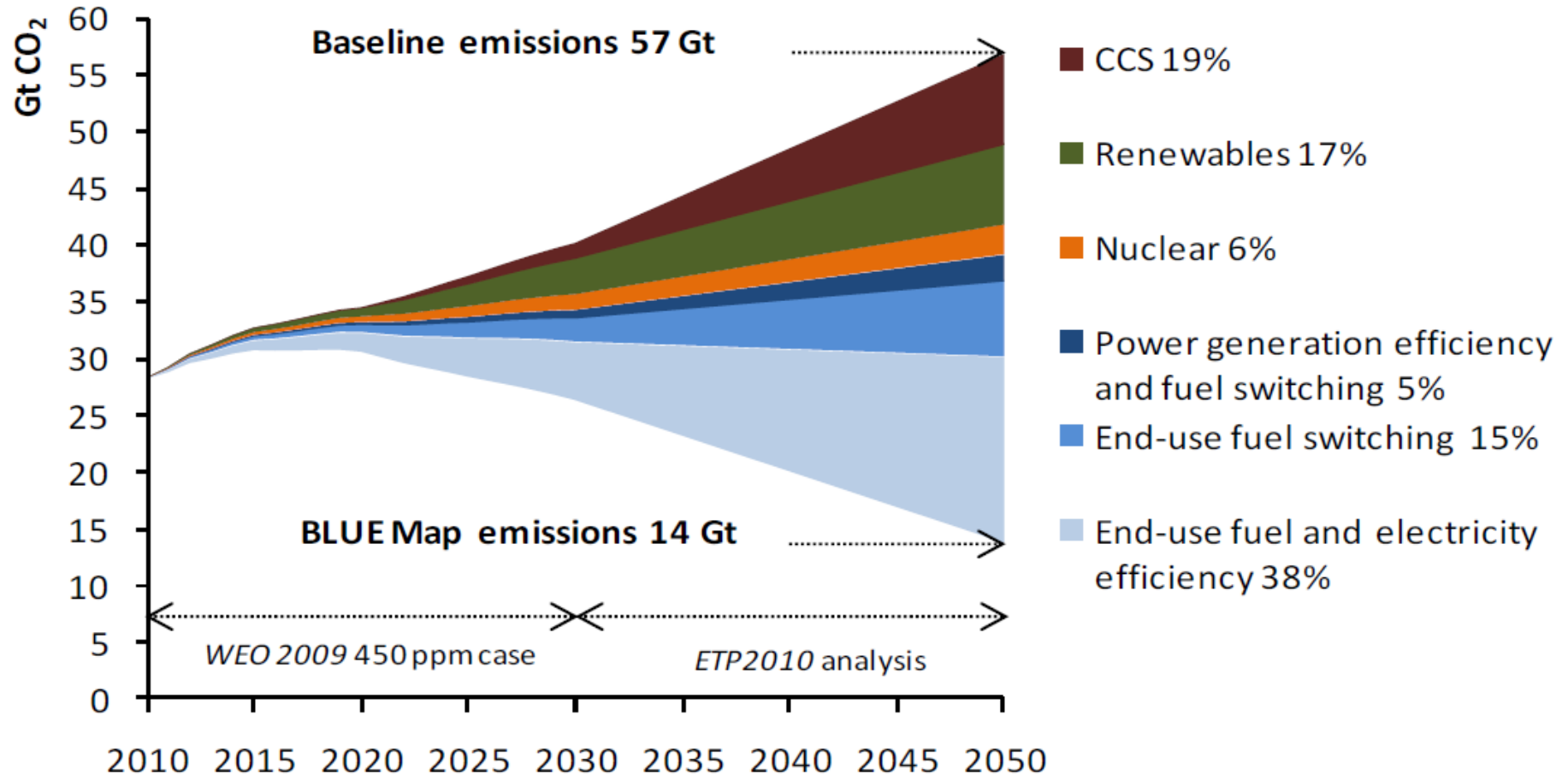
CCS- Transition Technologies- Technoport- 17/4/2012

An uncomfortable curve!



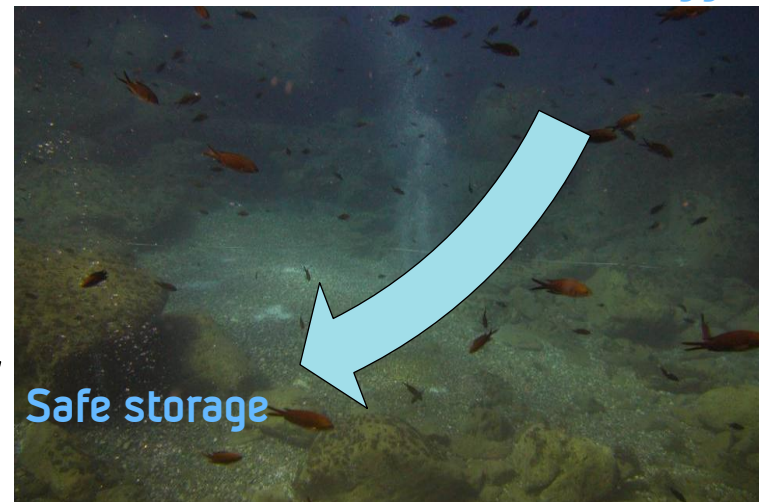
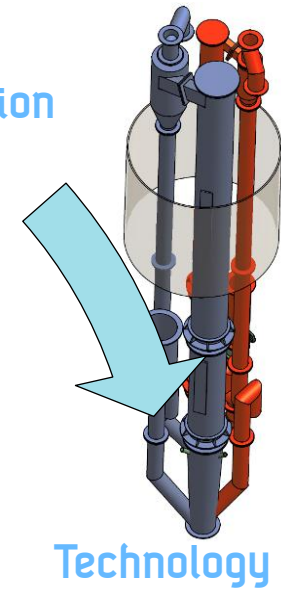
IEA WEO2009

International Energy Agency – Low carbon path



IEA ETP2010

What are the issues?- why don't we just do it?



Needed but deliver in time?

- Not at present pace
- Need a shift



Why not?

- Policy
- Initial cost
- Operating costs
- Burden sharing (who will pay)
- Legal obstacles
- Public acceptance/perception
- Storage
- Technology



So what can we do?- Acceptance and safe storage

- Need to develop sizeable storage demos in different countries
 - EU- ZEP: 6 pilots up to 100 000 ton/yr
 - Different geological settings and conditions
- Information urgently needed
 - Less than 10 % of the European population know what the term CCS means
 - Develop interactive information centers around storage pilots
- Develop monitoring and mitigation/remediation strategies and technologies, especially for off-shore storage (monitoring)
- Make sure CCS does not imply an increased environmental footprint by other substances

So what can we do? - Legislation



- Storage
 - The storage directive is there but only a handful countries have adopted it into national law
- Transport
 - By incentives to develop cross- border transport (and storage)
- Capture
 - Make CCS mandatory
 - Coal, Gas, Industry
 - By imposing emission performance standards
 - Implicitly by significantly reducing the total quota allowances

So what can we do?- Funding

- NER300, EEPR
 - Issues: low quota price, less value
 - 200 million ETS*8€= €1.6Bn (1st tranche)
 - Funding up to 50% of extra cost
 - Snag: only 15% max to 1 single project
 - Funding then max: €240 million << project cost
 - EEPR can add €180 million in addition
 - Typical cost of 1 project: €1-1.5 Bn
 - Industry and national states must invest more to make this fly – find niches
- Separate report on measures to finance CCS by ZEP recently developed
 - Restricting quotas, set prices, carbon bank, withdraw 1.4 bn quotas from the ETS..
- In an ideal world we would do it the american way, get a global agreement, set a carbon price and let the market work-however.....



So what can we do ?- Technology

- It is not the prime hurdle as regards doing it
- However:
 - Need more efficient processes
 - Can use the period now to boost R&D thus achieving better processes when CCS resurfaces
 - EOR with CO₂ applied for offshore applications
- Support pilots and demo plants to scale up technology of lower maturity
- ...and remember R&D is never finished, also needed during pilot, demo and deployment, not a serial activity





So what can we do ?- Supporting actions

- Strengthen international links and work together avoiding too much duplication of work
- Transport, we need to include CO₂ transport infrastructure as part of the EU infrastructure package, on same terms as electric grids, roads and gas pipelines
- Bring on board early opportunities like use of CO₂ and capture from other industries and carbon negative solutions using biomass.

Summary

- CCS needed and can deliver
- Need to support the projects under the NER300 mechanism
- Support key issues related to perception and storage, legislation, technology, funding.
- No need to slow down support to CCS as it is needed and can deliver with the right framework

