

EPPSA Position on “European Energy Infrastructure” A necessary CO₂ infrastructure in Europe

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EPPSA members have dedicated considerable investment and best engineering resources to develop, test and demonstrate CO₂ capture technologies for fossil fuel-fired power plants – coal and gas. Moreover, these technologies can be used for industrial processes as cement and steel production. EPPSA members made a clear commitment to further work on the deployment of these technologies and to channel the substantial investment needed. EPPSA welcomes the funding schemes made available by the EU to support demonstration projects.

Technologies are identified and developed; test and pilot plants validated technology and process feasibility. The first demonstration plants are now under design or construction phase. The first reliable operational results are expected in 2015. By that time, EPPSA expects to have enough experience to get basic design started for the first commercial CO₂ capture plants. This is a major prerequisite to enable the commissioning of a considerable number of CO₂ capture plants together with newly built power plants at the end of this decade.

EPPSA is quite confident that these technologies will work at reasonable cost – investment and operation costs – thus achieving high reliability and flexibility of fossil fuelled power plants with CO₂ capture needed for a safe energy supply in Europe.

EPPSA is concerned that despite CO₂ capture technologies will be ready and optimised for best efficiency, reliability and flexibility, CO₂ transport and storage infrastructures will not be available to store the captured CO₂ safely underground. EPPSA considers that a solution can be worked out for smaller plants and for a short period of time. For the continuous operation of commercial plants a comprehensive transport and storage infrastructure cannot be disregarded.

A reliable CO₂ infrastructure is necessary from 2015 on with further development depending on the needs of future commercial CO₂ capture plants.

EPPSA believes that transport and storage infrastructures for CO₂ do not encounter any basic technical hurdle. Nevertheless, EPPSA is concerned about the lack of public acceptance of transport and storage facilities, which may delay their timely deployment.

EPPSA considers that near-zero emission power generation based on fossil fuels is achievable if and when the full CO₂ Capture and Storage (hereafter CCS) value chain is address.

1. Time schedule – CO₂ capture

Figure 1 shows the overall time schedule to introduce CCS in the power sector in order to meet the ambitious goals and binding targets on greenhouse gas emissions reduction set by the EU:

- build up operational experience and optimise processes through large demo plants – currently under construction phase
- technologies demonstrated and ready for commercial use between 2015 to 2017
- from 2015 to 2017 start engineering phase of commercial plants to meet the 2020 deadline, having CO₂ capture plants in operation.

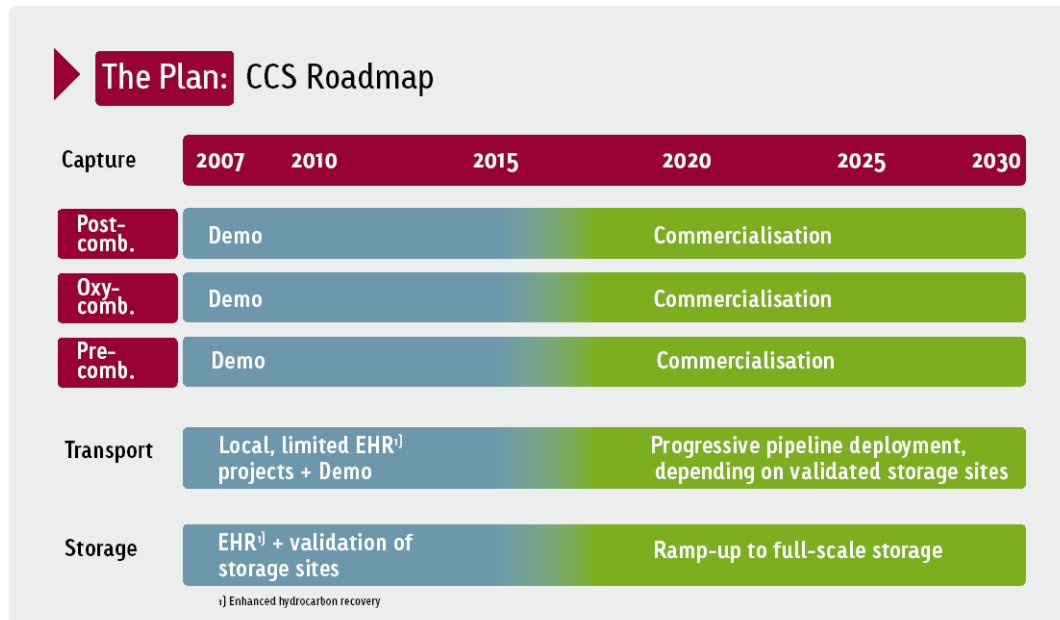


Figure 1: CCS roadmap

To meet the EU climate change targets EPPSA estimates that all new power plants need to be equipped with CO₂ capture or be Carbon Capture-Ready (hereafter CCR). It means that 149 GW of coal and gas power plants equipped with CO₂ capture need to be built between 2015 and 2025 compared to 131,5 GW of coal and gas power plants built

between 2000 and 2010.

Potential 2025 (period 2020 - 2025)		
Fuel	GW	Units
Coal	52	65
Gas	48	120

Unit size is 800 MW for coal and 400 MW for gas

Figure 2: Power Plants equipped with CO₂ Capture Plants from 2020 to 2025
 Based on the *EU-27 Energy Baseline scenario Trends to 2030 - update 2007*, DG TREN, European Commission, 2008

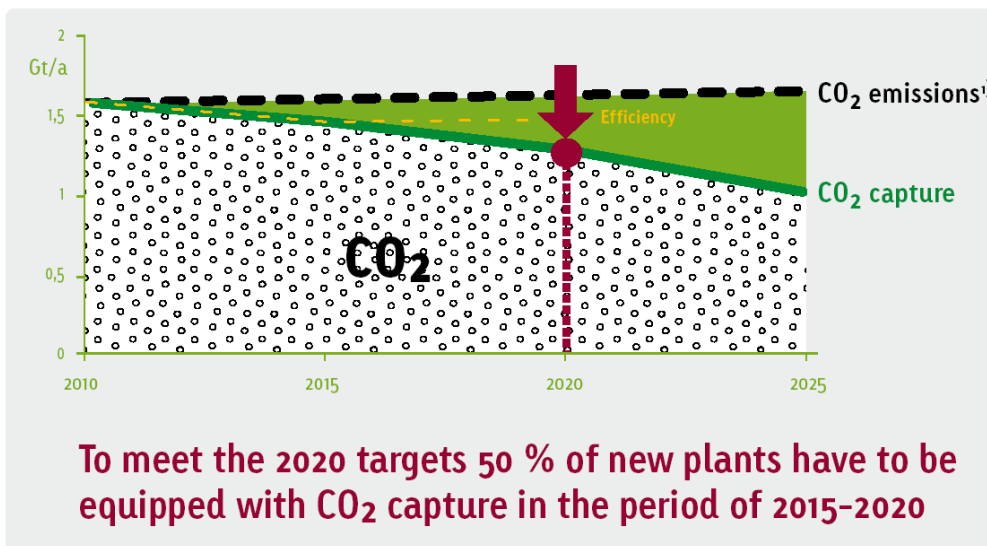


Figure 3: CO₂ abatement from 2010 to 2025 in EU-27 countries

Considering the estimates, for each and every of these locations a connection to a transport and storage infrastructure is needed. If we have 2 units at one location, roughly 100 connection points are needed to set up a European transportation infrastructure.

2. Transport facilities

Some power plants may be locate close to storage facilities, e.g. in the North or Baltic Sea – UK east coast; use of depleted oil/gas field in Norway, UK, Denmark. Most of the power plants though will not be close to the storage areas increasing the urgency of the deployment of such an infrastructure.

Power plants have to be located according requirements set by

- network
- consumer
- other power generators – a.o. wind and photovoltaic to ensure a reliable energy supply and balance the gaps of these intermittent power generators.

The CO₂ captured has to be transported from the power plant locations to the storage facilities.

In particular cases, CO₂ transport can be done by truck, rail or ship. As volumes accrued are quite high, transport via pipelines is the most feasible way to bridge the distance between the plant sites and the storage areas. This is supported by the fact that most storage locations are close to the sea or below sea level and power plants are located where electricity demand is higher.

The “Europe-wide CO₂ Infrastructures Feasibility Study”¹ concludes

- existing gas pipelines are not available or not suitable for dense phase CO₂ transportation
- role of container ships for movement of CO₂ might be feasible only for short term approach.

3. Storage facilities

Various sources state that in EU-27 countries the storage volume size available is bigger than needed to safely store underground the CO₂ captured from fossil power generation.

EPPSA believes the critical issues are

- the connection between the power generation location and the suitable storage sites via a appropriate transportation network
- to raise public awareness on CO₂ storage as a safe and reliable means to reach the necessary CO₂ abatement

These are critical actions that should be prioritised to meet the time schedule and the CO₂ reduction targets.

¹ Stuart Haszeldine, SCCS/University of Edinburgh; Dom Ainger, Arup; Steve Argent, Arup – Presentation at the Berlin Forum Sustainable Fossil Fuels Working Group Meeting, Brussels 7 May 2010; slide 22

4. Time schedule for CO₂ transport and storage infrastructure

EPPSA shares the strategy presented in the “Europe-wide CO₂ Infrastructures Feasibility Study” to

- start with linear links, short term – pear to pear (power plant to storage facility)
- build up hubs with multiple sources and/or multiple sinks, medium term
- set up national and international strategic networks, long term

We cannot afford to wait for regional or European wide networks set up. EPPSA supports an immediate start of short term actions, followed by medium term actions. Only an immediate start will enable experts responsible for this part of the CCS chain to gain experience and have the chance to optimise processes and operation facilities.

Experience shows that the set up of such an infrastructure is a challenging task. Public involvement is necessary to reach positive supportive conclusions.

5. Conclusion

CO₂ capture plants are planned to be ready for commercial operation in 2nd half of this decade. Transport and storage infrastructure have to be ready in that time period as well.

Incentives and trust building actions are needed to enable investors to start projects on setting up an EU-wide infrastructure for transport and storage of CO₂. Investors need safe commitments to convince their shareholders that this investment will pay off.

Discussions show that the development of a transport and storage infrastructure in Europe is behind schedule. Creativity is needed to find the right instruments to raise public awareness. CO₂ capture, transport and safe storage are prerequisites to limit CO₂ emissions and meet the targets set by the EU.