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**ccsp**

Carbon Capture and Storage Program

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## D125, Updated figures about CCS investments and costs per avoided CO<sub>2</sub> emissions

WP1 Task 1.6.

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# Introduction

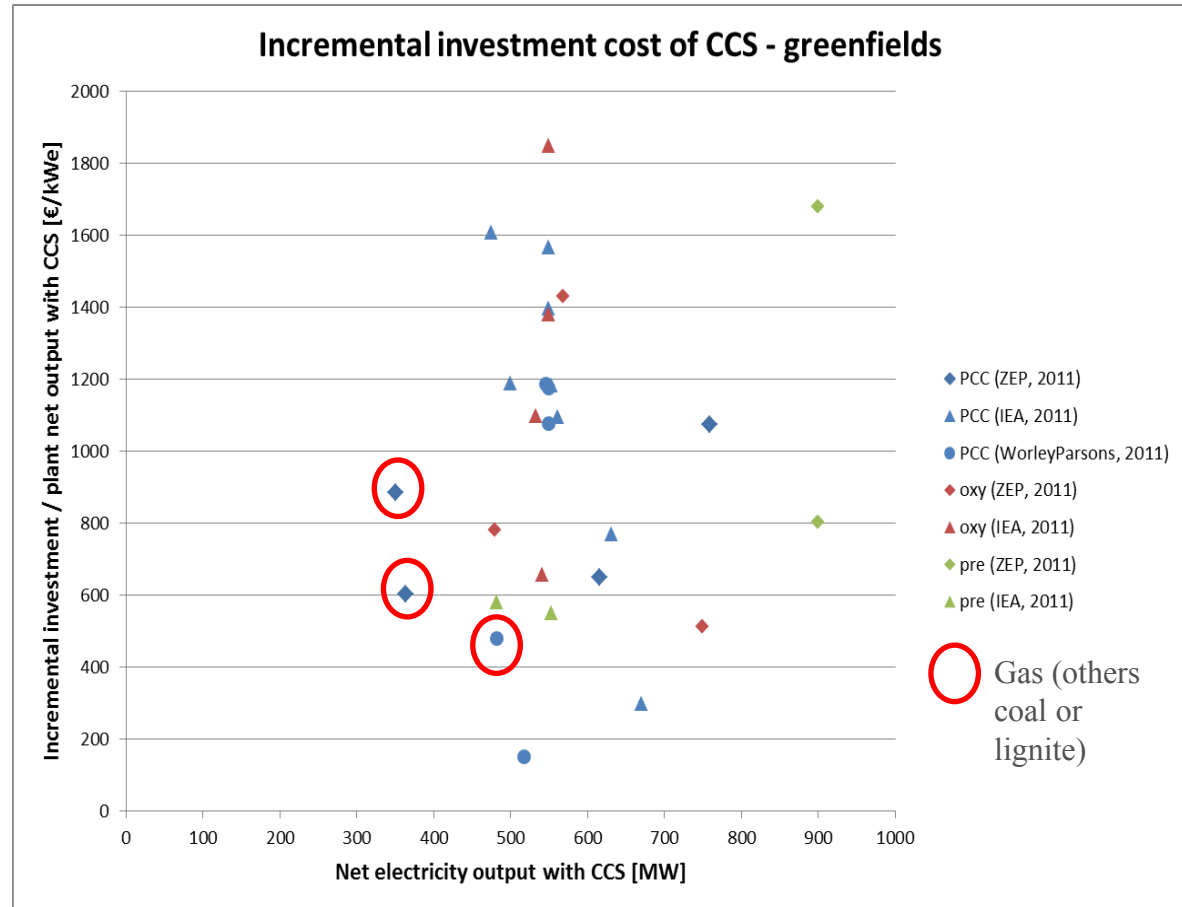
- Values from three different sources:
  - ZEP: The Costs of CO<sub>2</sub> Capture (2011)
  - IEA: Cost and Performance of Carbon Dioxide Capture from Power Generation (2011)
  - WorleyParsons: Economic Assessment of Carbon Capture and Storage Technologies (2011) / Global CCS Institute: The Global Status of CCS (2012)
- Values only for greenfield NOAK plants based on following technologies:
  - PCC
  - Oxy-combustion
  - Pre-combustion

# Incremental investment cost of CCS

- No trend in incremental investment costs can be found.
- The plant having lowest cost is found in WorleyParsons publication and there is stated that corresponding costs are higher in other studies. Other costs of this case are not significantly lower than others.
- The plant having lowest cost of IEA's cases is based on ammonia. Also other costs of this case are the lowest.

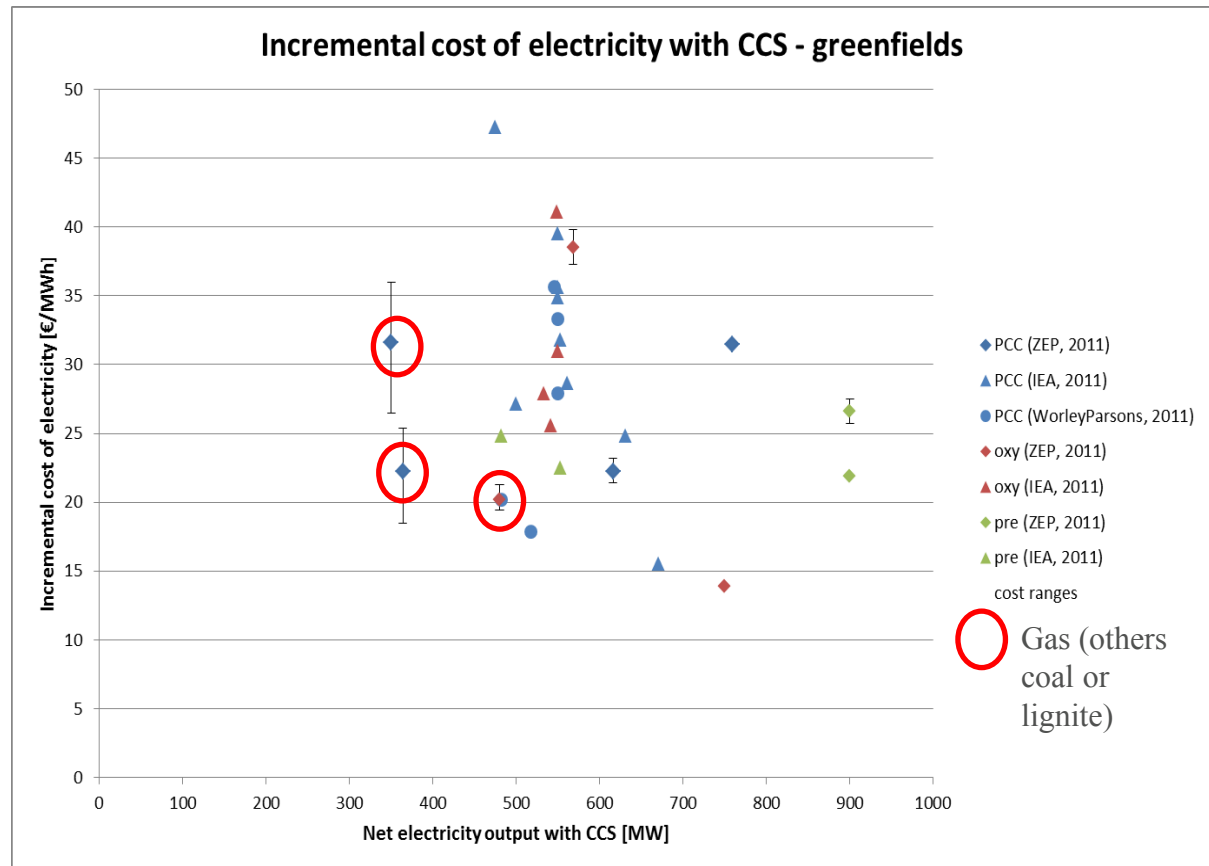
For comparison: Investment for Boundary Dam project (FOAK, retrofit) ~ 10 000 €/kWe

- incl. boiler and turbine improvements



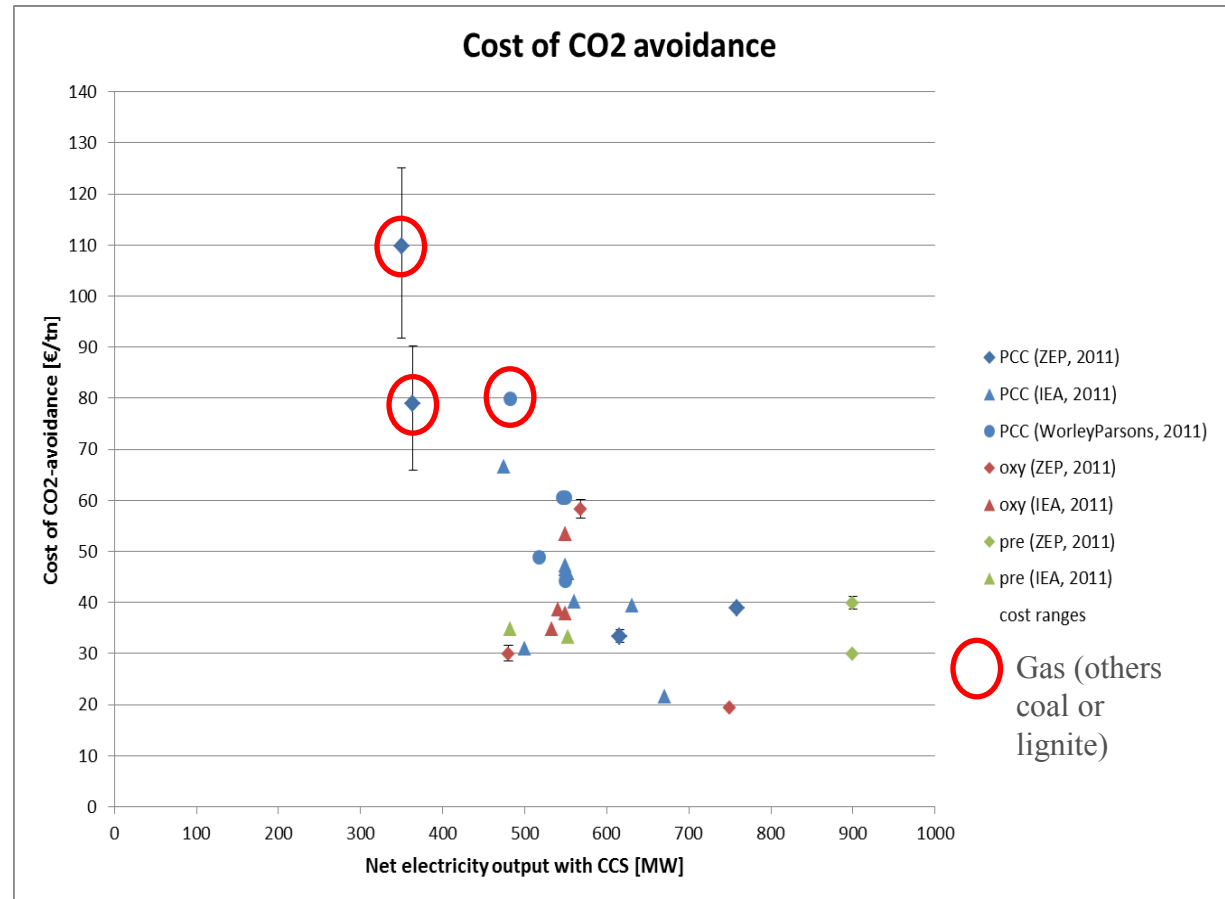
# Incremental cost of electricity with CCS

- Trend of lower costs for larger plant capacities can be seen in chart
- Only few estimations for NGCC, average incremental COE seems to be lower than for coal/lignite



# Cost of CO<sub>2</sub> avoidance

- Trend of lower costs for larger plant capacities can be seen
- For gas-CCS, cost of CO<sub>2</sub> avoidance is higher than for coal/lignite (lower CO<sub>2</sub> emissions per kWh<sub>e</sub> in GTCC)





# Conclusions

Based on average values of the previous figures:

- The costs (investment, COE, avoided CO<sub>2</sub>) of CCS are lowest for pre-combustion technology
- The range of estimates is broad, even if only three major publications are included
- No clear difference between oxy-combustion and PCC technologies
  - Incremental costs for NGCC generally lower than for coal and lignite
- Cost of CO<sub>2</sub> avoidance is in turn higher for NGCC
- General trend about economy of scale can be seen in COE and cost of CO<sub>2</sub> avoidance, but not clearly in incremental investments