

SP5:
„High-Temperature Oxygen Generation
for Power Cycles“.

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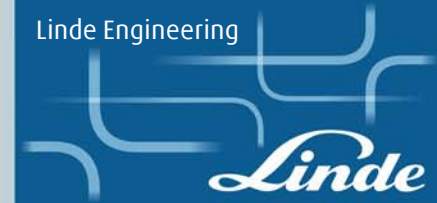
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Ilaria Ciattaglia

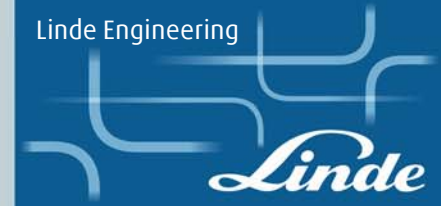
ENCAP-CASTOR Training Seminar, Billund, 16.03.2006

Summary

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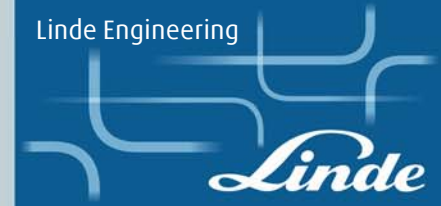
1	Structure of SP5
2	Scope and goals of the work in SP5
3	Main results of first 18-months
4	Next steps



Scope of the work

Phase I (first 18-months) : development of three promising high temperature oxygen generation routes, based on ceramic materials and either O₂-transport or O₂-storage, to enable economic comparison and selection of the most promising option.

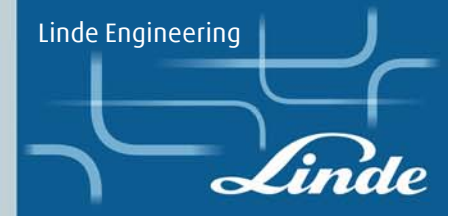
Phase II (months 19-30): further validation of the selected option for preparation to a potential scaled-up verification in Phase II of ENCAP (month 31).



Goals

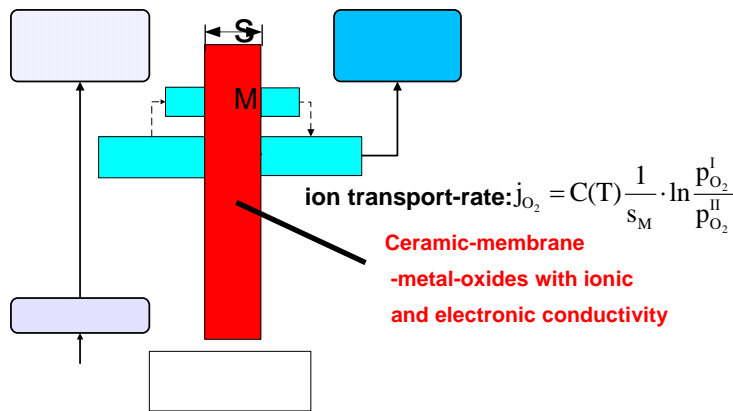
Identification and development of promising, cost effective high-T oxygen generation options integrated in power plant process scenarios with CO₂-sequestration, meeting the targets set by ENCAP for CO₂-capture through reduction of cost for oxygen production:

- at least 90% capture rate;
- 50% reduction of CO₂ capture costs (reference: 60 Euro/t captured CO₂).

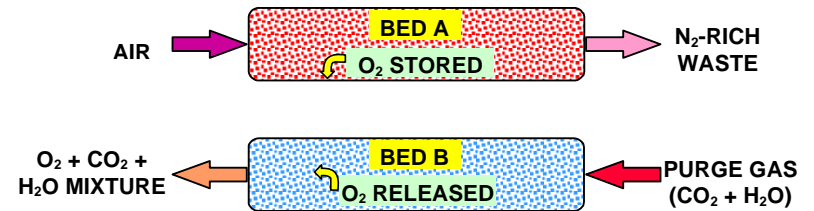


Investigated high-Temperature O₂ generation routes

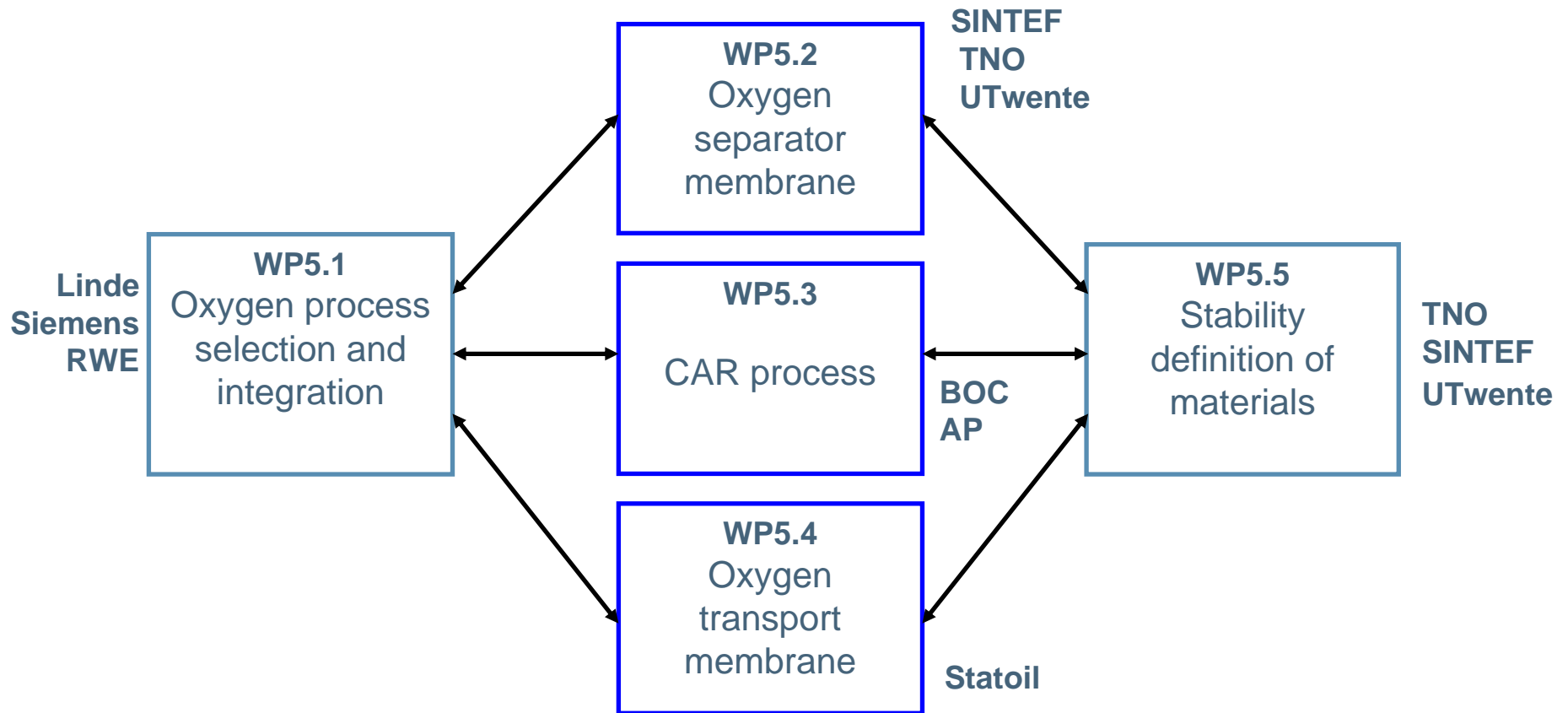
O₂-production by a pressure-driven ceramic membrane



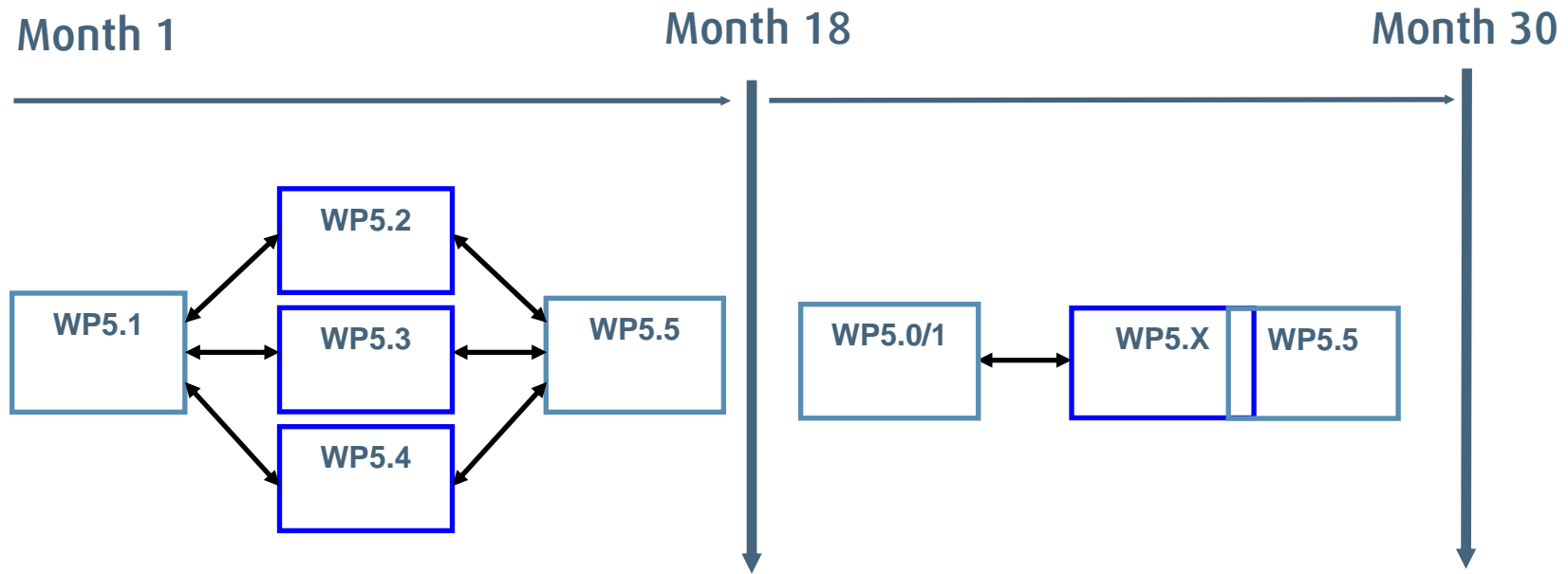
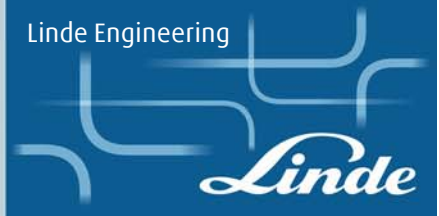
O₂-production by CAR process



Main structure of SP5 (months 1-18)



Timeline - main milestone month 18



Milestone: selection of process option



Methodology adopted

1. Initial screening of different integration options
2. Definition of a stepwise selection procedure, based on criteria defined in SP1.
3. Collection of technical/cost information provided by WP5.2,3,4:
 - Verification/discussion
 - Implementation
4. Analysis of results and comparison.

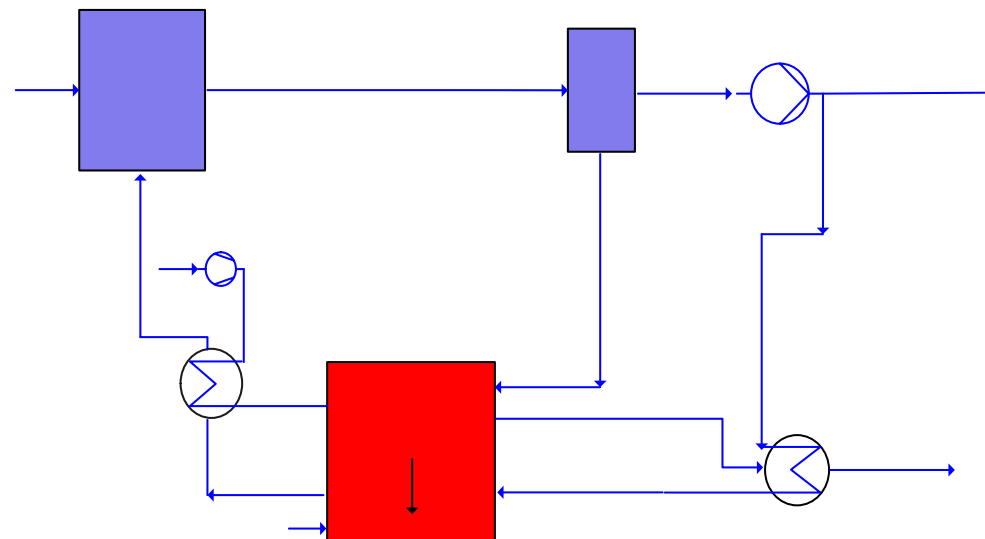
Results of implementation work in WP5.1 (month 18)

Option selected by SP5 group: CAR Unit in oxyfuel PF-boiler power plant (WP5.3)

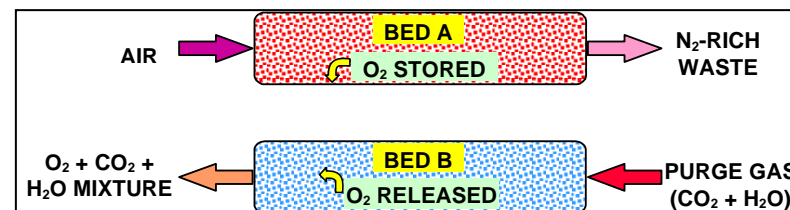
Net electricity: 713 MW

Net efficiency: 38%

CO₂ capture: 96%



„10-bed CAR unit“





Main tasks months 19-30

- Preliminary engineering study for scaled-up CAR test facility
- Prosecution of material development issue
- Monitoring of optimisation chances for CAR-operating conditions within the selected scenario, in terms of:
 - ceramic material performance (dynamic capacity, kinetic)
 - integration and heat management system

Thanks for Your Attention

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