

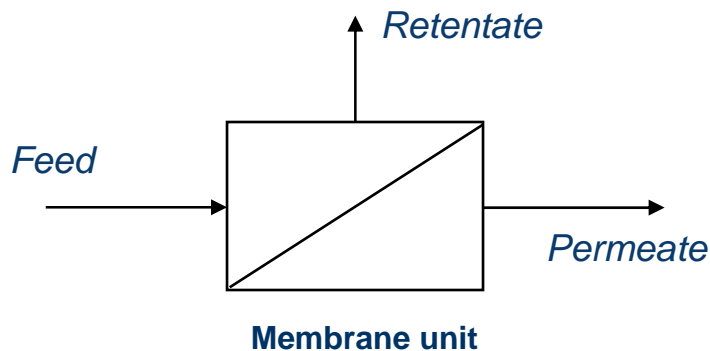
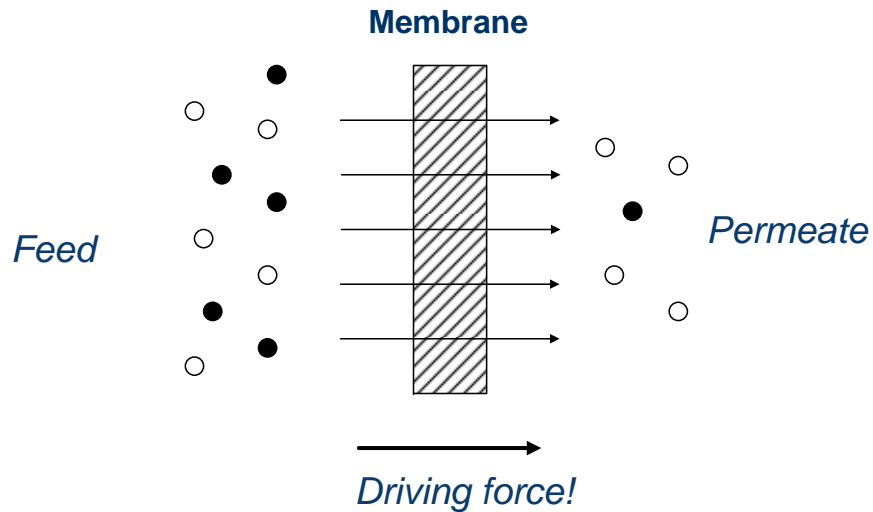
Selective membranes for CO₂ capture

CCS Conference

Oslo, February 10th 2009

Paul Raats

Selective membranes for CO₂ separation



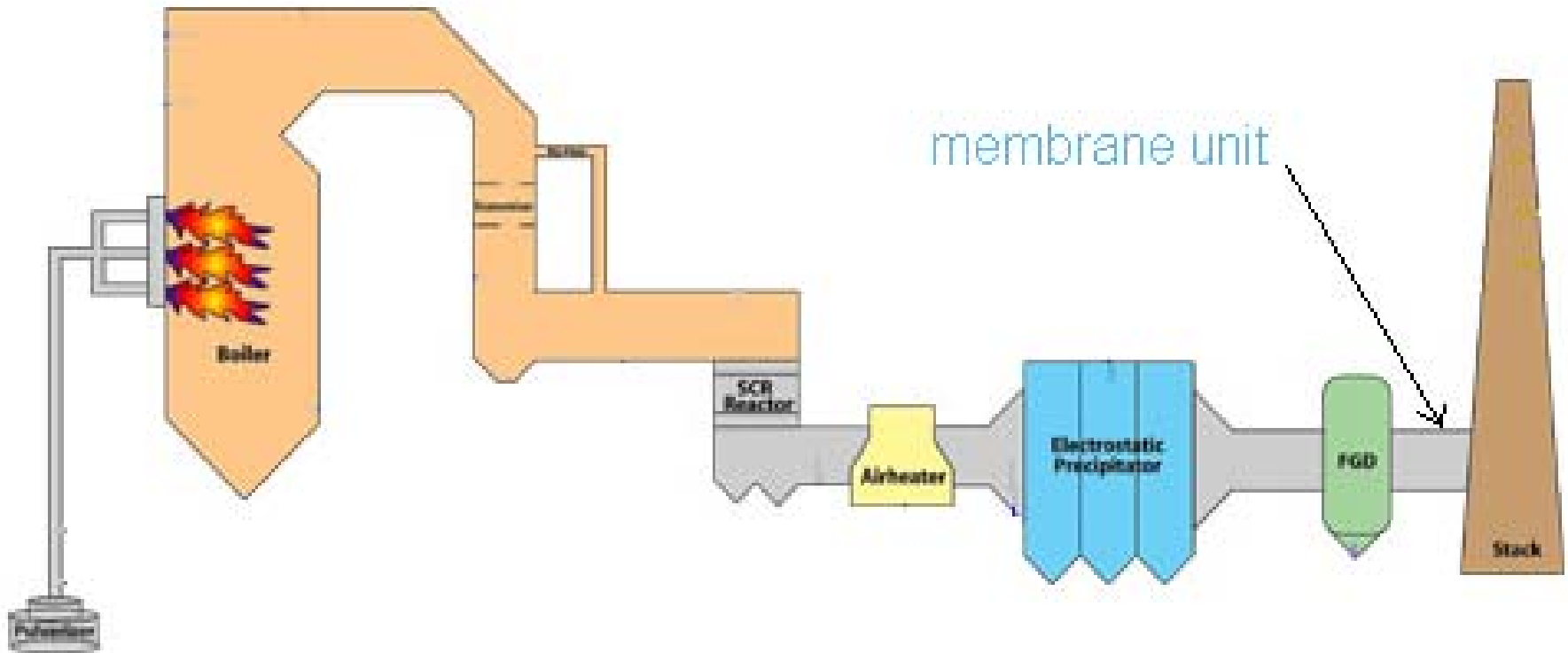
Appealing potential

- High energy efficiency
- Continuous process
- No separate regeneration step
- No chemicals, no waste streams
- Intensified
- High selectivity (α) achievable

How it could look like ...

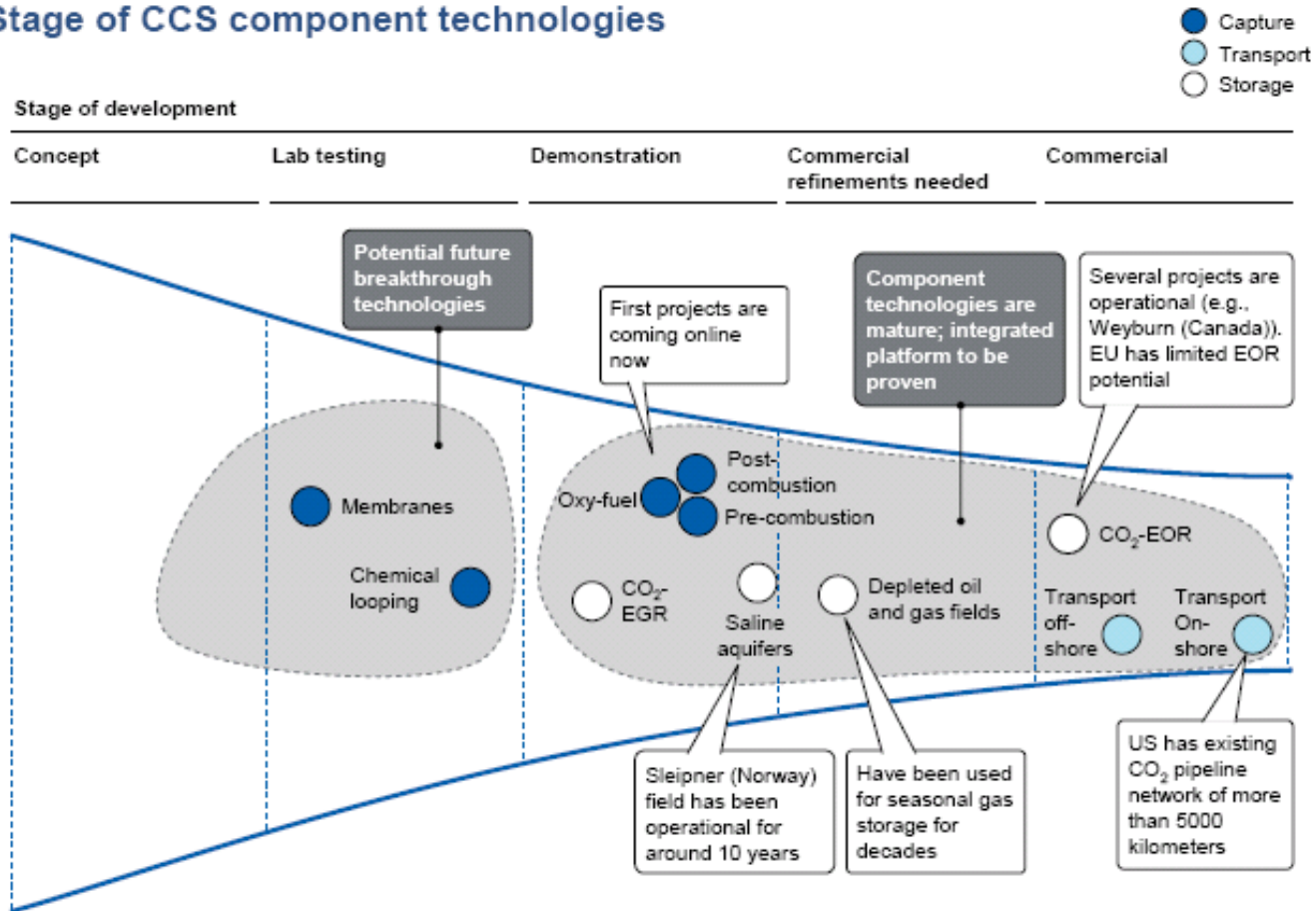


... in a power plant



... and in the technology funnel

Stage of CCS component technologies



Overall objective of NanoGLOWA

... to develop optimal nano-structured membranes and installations for different applications in CO₂ capture from power plants

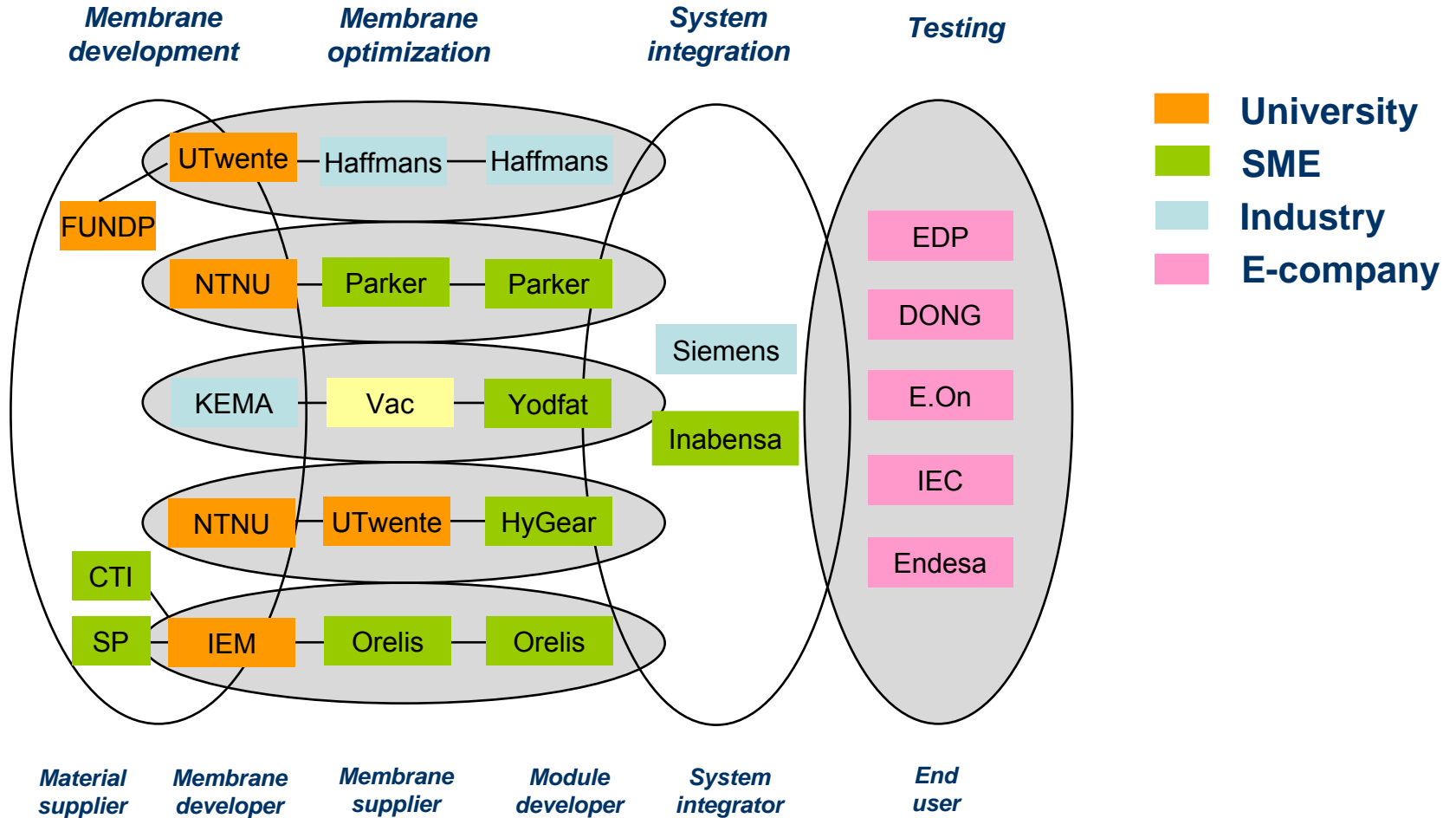
Content

- Post and pre-combustion capture
 - CO₂/N₂, CO₂/H₂
- 5 membrane materials
 - polymer (3), ceramic and carbon
- 4 module types
 - fibers, spiral, tubular and flat sheet

Process

- 5 development paths
- 6 universities
- 5 end users
- Budget 13 mio EUR
- 26 partners, 14 countries
- Duration 5 year¹⁾
- IP: aimed at industrial breakthrough

Complementary partners...

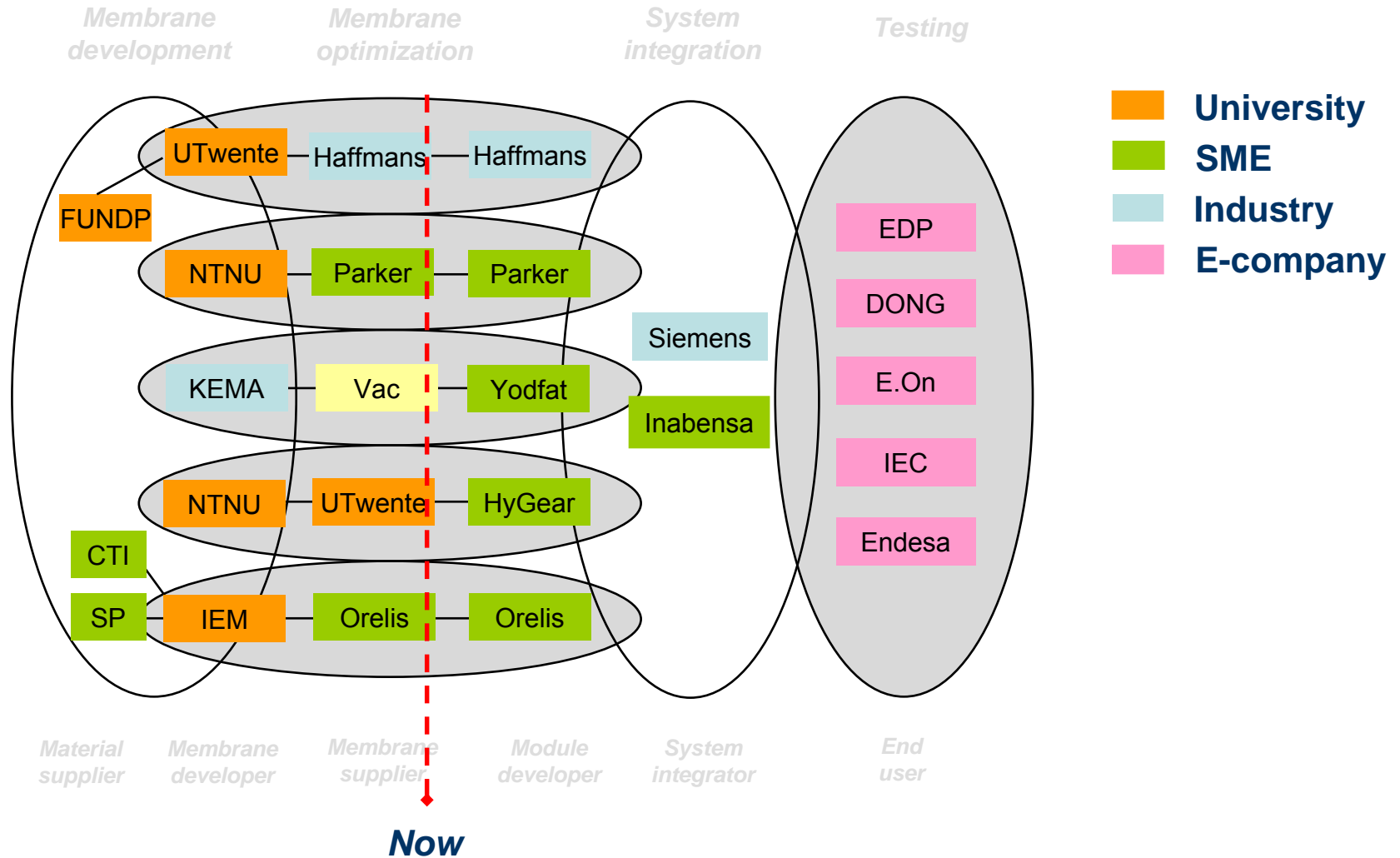


... in comprehensive but 5 parallel membrane tracks

Note: not all partners presented

NANOGLOWA

We aim for the most suitable solutions ..



...leading to 'survival of the fittest'

Perf. criterion Membrane type	Energy consumption	Permeance	Selectivity	Durability	Price level	Module design
1 Diffusion Transport						
2 Fixed-Site Carrier						
3 Ionomeric High Voltage						
4 Carbon Molecular Sieve						
5 Ceramic						
Target ¹⁾	< 2GJ/ton CO ₂	> 0,15 m ³ (stp) / m ² .hr.bar	> 150	> 3 years	low	smart

1) at $\geq 95\%$ purity and $\geq 60\%$ recovery rate