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**carbon dioxide capture and hydrogen
production from gaseous fuels
“CACHET”**

Richard Beavis

BP exploration operating company ltd

Richard.beavis@bp.com



Sixth Framework Programme

cachet summary



- Objective: Develop technology to **reduce cost of CO₂ capture by 50%** - in line with EU target of 20 to 30 €/tonne at 90% capture rate
- Industrial application to **natural gas** fired 400 MWe CCGT with (H₂ side-stream)
- **4 main technology** areas:
 - Advanced SMR
 - Chemical looping and One-step
 - Membranes
 - SEWGS
- Technical optimisation and economics (including state of the art base case)
- Novel technology evaluation, HSE and dissemination
- 3 year project duration, commencing 1st April 2006
- Ready for **pilot plant trials 2009**
- 28 participating organisations (from 17 countries) – oil and gas companies, electricity utilities, equipment manufacturers, engineering contractors, research institutes and universities

project participants



HYDRO



TECHNISCHE UNIVERSITÄT WIEN
VIENNA UNIVERSITY OF TECHNOLOGY

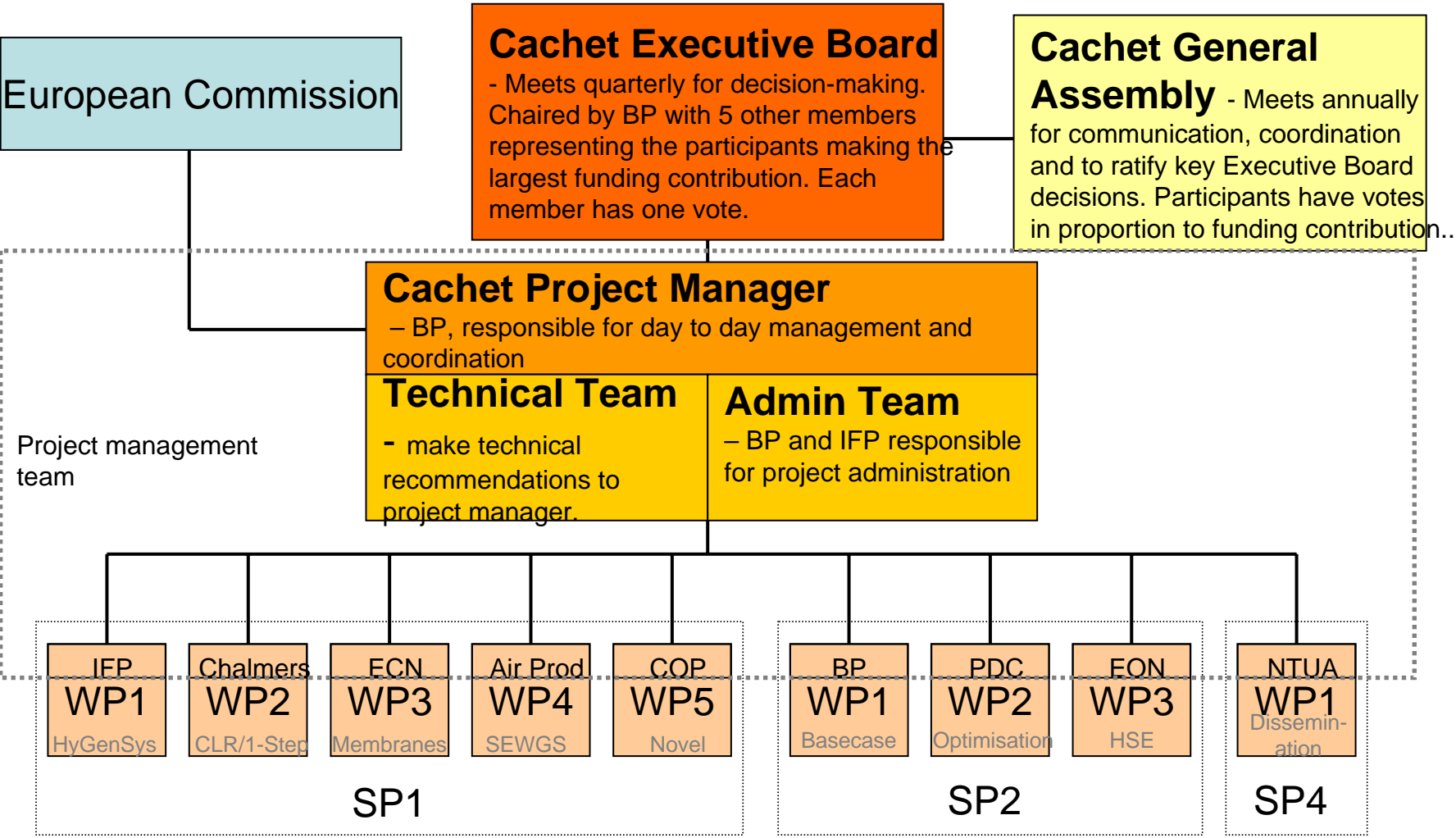


中国科学院大连化学物理研究所

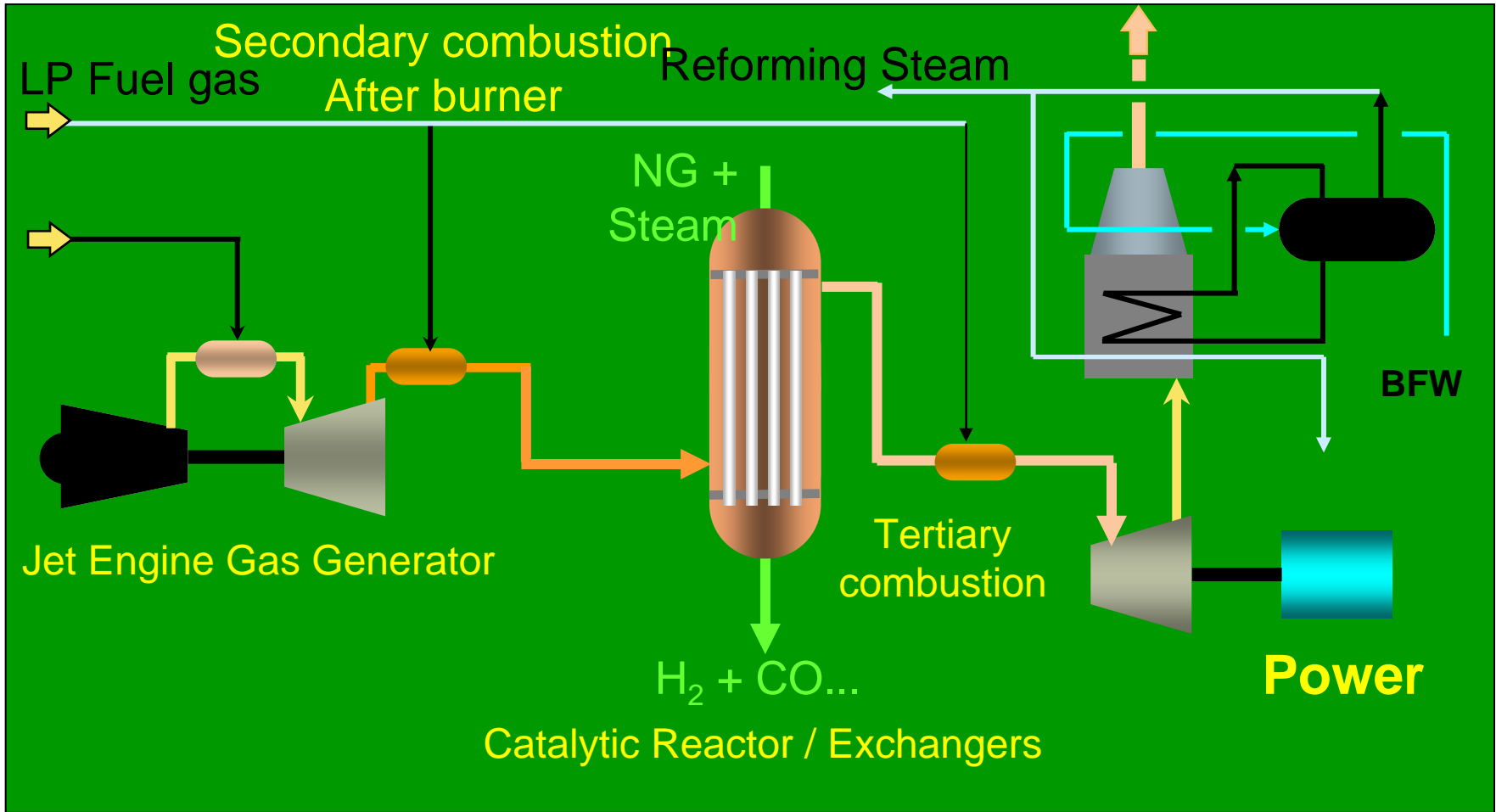
DALIAN INSTITUTE OF CHEMICAL PHYSICS, CHINESE ACADEMY OF SCIENCES



project organisation



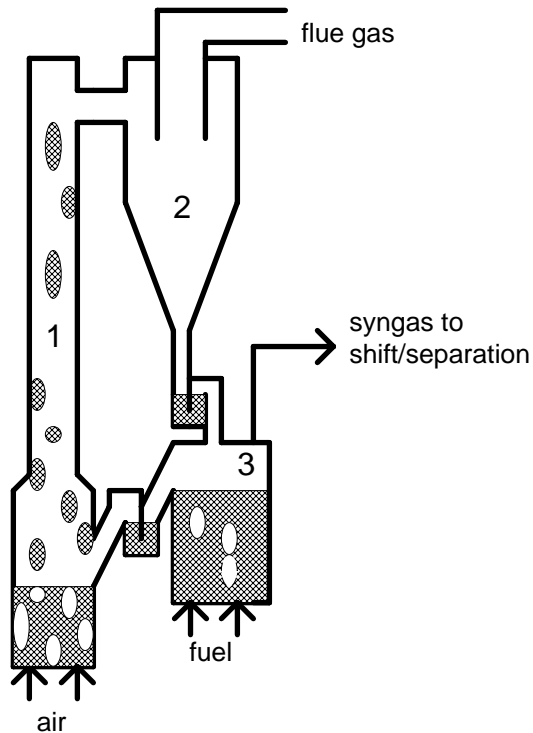
hygensys process flow



chemical looping reforming

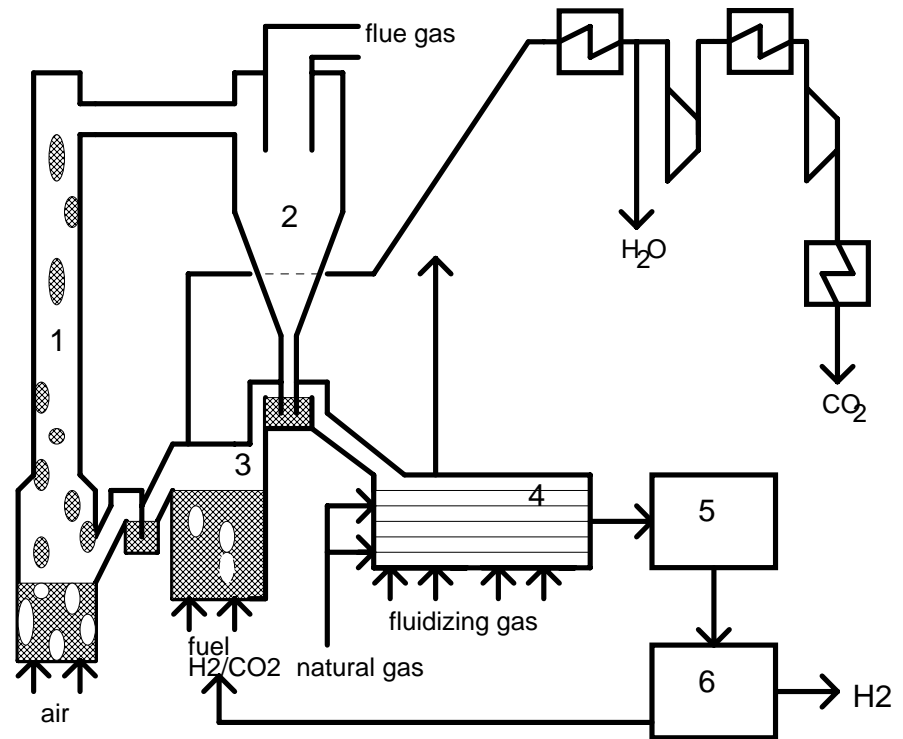


autothermal



- 1 Air reactor/riser
- 2 Cyclone
- 3 Fuel reactor

smr

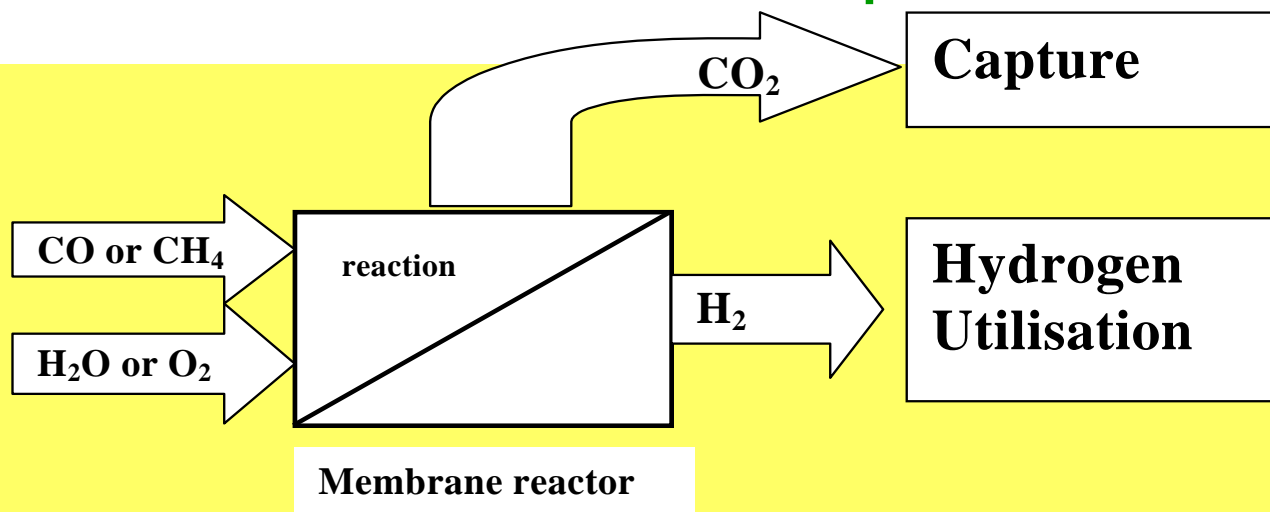


- 1) air reactor/riser, 2) cyclone, 3) fuel reactor,
 - 4) fluidized bed heat exchanger/reformer (FBHE/R), 5) shift reactor
 - 6) hydrogen separation (one pure hydrogen flow, one CO₂/H₂ flow)
- NOTE: return of particles from 4 to 1 not shown because of 2 D view, Fluidizing gas for FBHE/R can be gas recycled from outlet of fuel or air reactor or air.

metal membranes



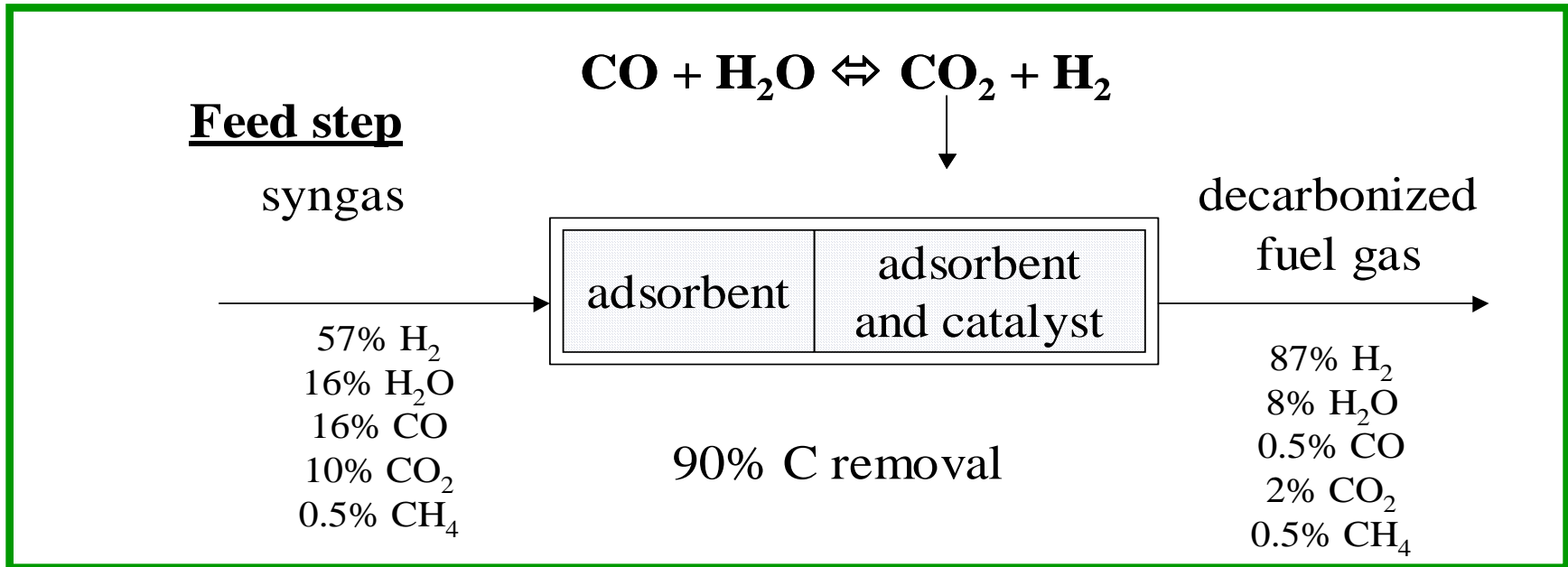
combined reaction and separation



Operating temperature	Type of reaction	Active membrane
300-400°C	Water gas shift	Metal membrane
400-600°C	Low temperature reforming of methane	Metal membrane

thin palladium supported membranes

sewgs process concept



- Water gas shift catalyst + high temperature CO₂ adsorbent
- Removes CO₂ from hot syngas (400-500°C), drives CO towards extinction
- Multiple beds undergo cyclic process steps (reaction/adsorption and regeneration)

beyond CACHET?



- ***Ready for pilot in 2009?***
 - What?
 - Where?
 - Who?
 - When?
 - How large, which aspects of technology?
 - €€€€€€?
 - How do we compare with similar or very different FP6 technologies?
 - What can we do now to ensure delivery of this technology program?
 - Combinations of CACHET or FP6 projects?
 - What about emerging ideas?
- ***Ready for Demo 2011-12????***
 - How to complement & integrate commercial plants?
 - How much risk to take.
 - How to share the knowledge?

thank you for your attention

www.cachetco2.eu