



Feedback and future directions for the APP Oxy-fuel Working Group (OFWG)

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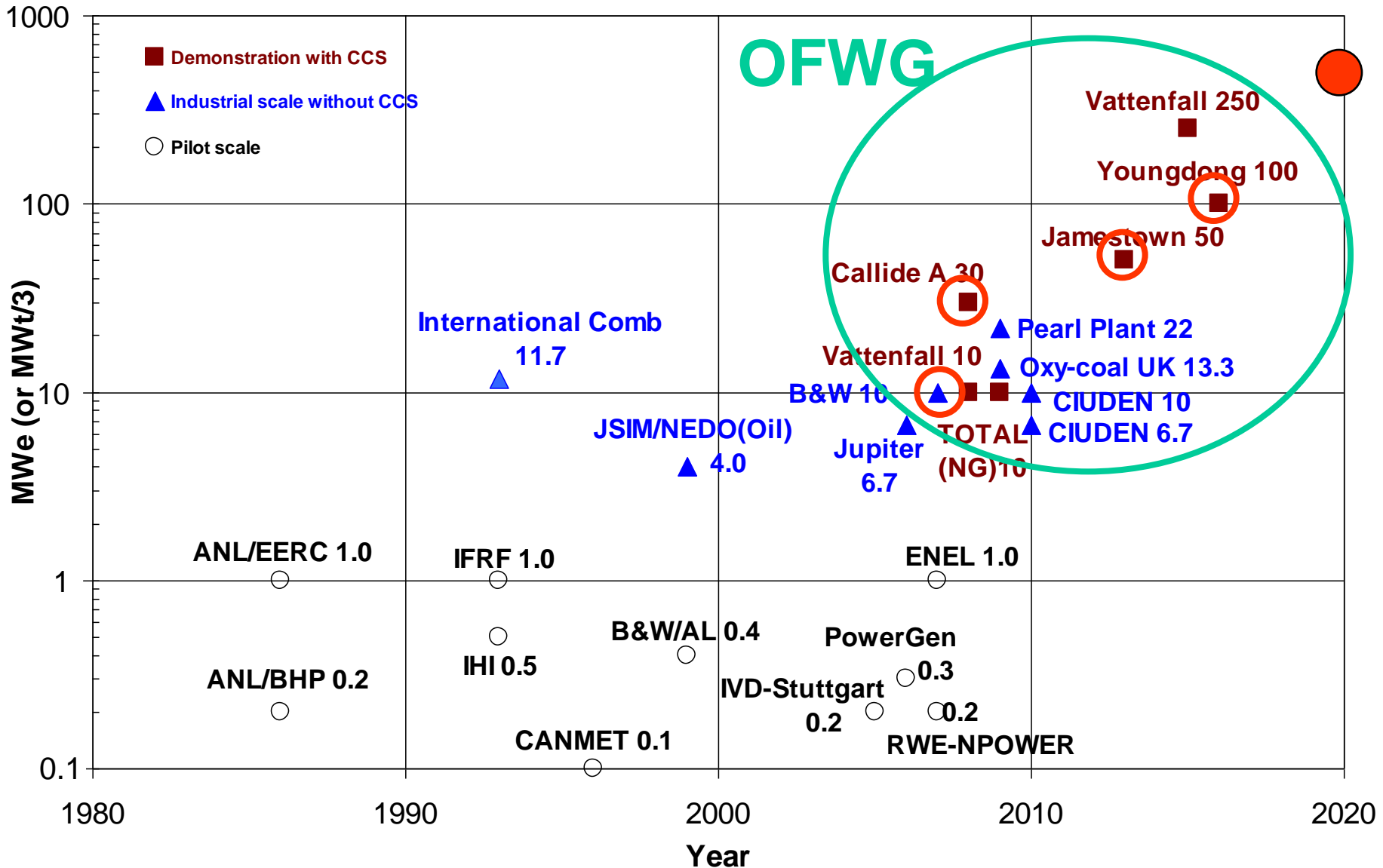
APP CFE Task Force 5th Meeting, Project Updates,
Grand InterContinental, Seoul, Korea,
Wednesday, April 1, 2009



Oxyfuel technology development projects

○ - Discussed yesterday

Target ~ 5



Feedback; Kim, Korean oxyfuel activities

Rapid progress

- Program with laboratory, pilot-scale efforts
- Repowered plant identified with capacity of 100MWe
- Design of plant targeted by 2015

Capture ready or dual firing (air/oxyfuel) plant planned

BUT

.... Storage site awaited



Feedback: Dalton, EPRI activities

Industry led program to accelerate technology deployment

- Technology evaluation, with gas treatment, and technology development project aspects
- B&CW burner test program
- Thermal integration, ASU and compression
- CO2 transport/storage gas quality regulations, legal, and permitting

Involvement in demonstrations

- Jamestown FBC and B&W 150 MWe PC

... Indicating value of national electrical research organisations



Feedback: Kiga, Callide A project

The first oxyfuel demonstration with power generation

- Integrated capture and storage operation
- Engineering design and costing
- Geotechnical design and costing

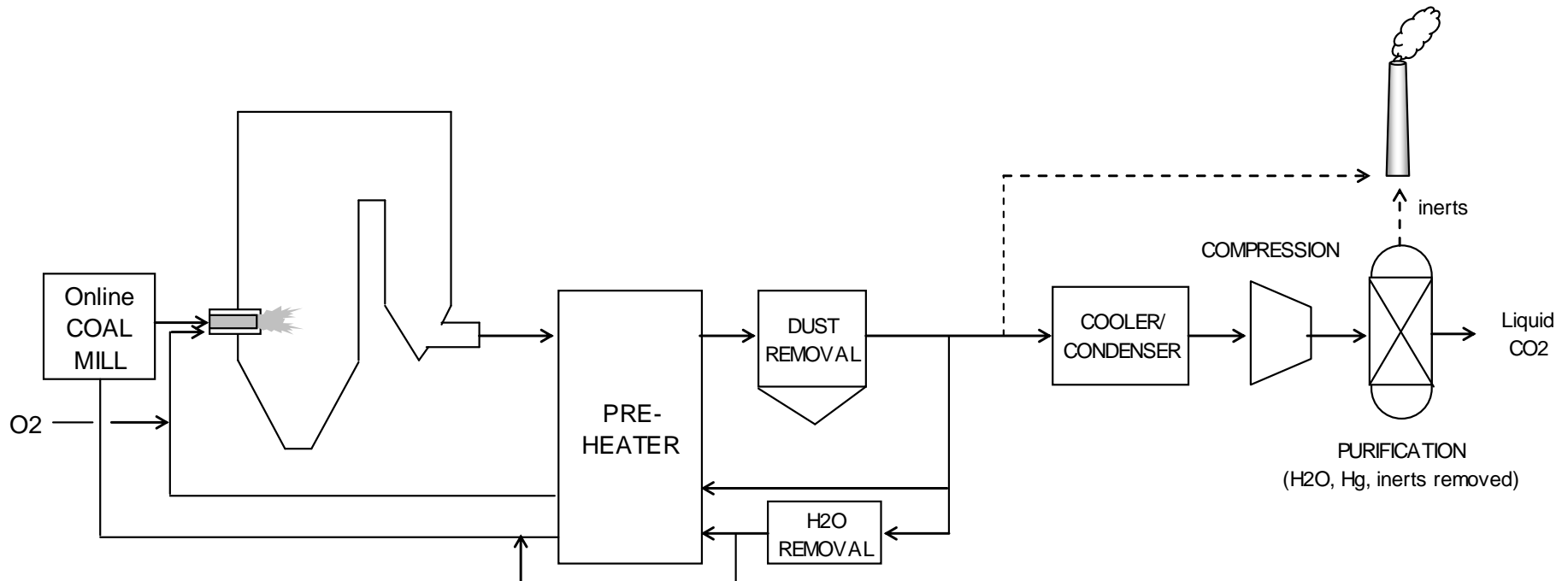
Start up, mid-2011 – power generation and CO₂ injection (now linked)

CO₂ liquid, but SC CO₂ option possibility

... Emphasizes collaboration: Australia/Japan/ technology companies



Flowsheet: Callide A demonstration, focus –operation with power generation, liquid storage



Feedback: Dalton/Victor, Jamestown PFB oxycoal

Targetted to US DOE project award of 2009

- New integrated 50 MWe PFB CCS with biomass/coal, in bed S capture, low NOx and Hg
- With close storage site identified

Start-up in mid-2014

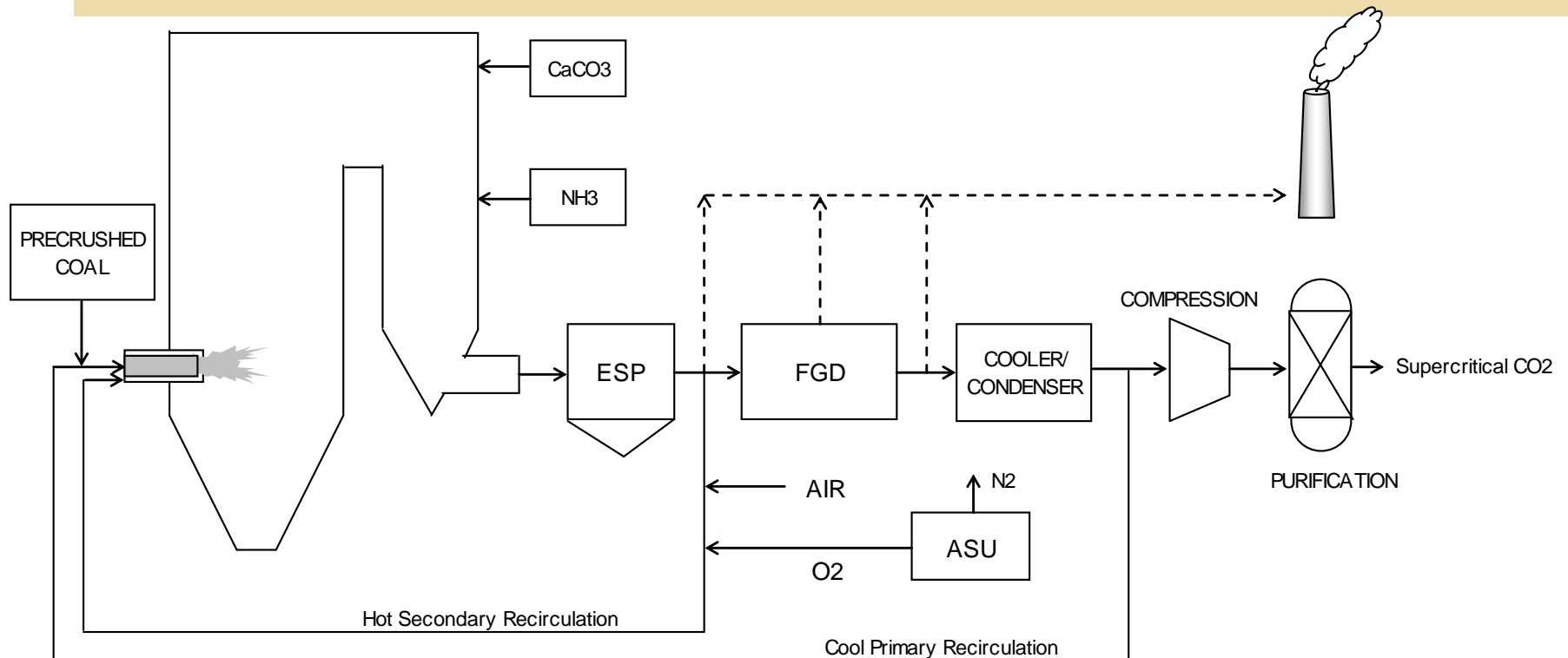
... gives momentum to PFB as oxyfuel technology, comparison with PF awaited



But what else!!

Flowsheet: Vattenfall 30 MWt pilot-plant, focus-combustion performance, gas quality control, SC CO₂ generation and storage

... now operating



Suggested APP country oxyfuel status and needs

xxx high
 xx moderate
 x low

APP country	Demonstration status	Existing capability	Need for capacity building
Australia	XX	XX	
Canada	X	XX	
China		X	XXX
India			XXX
Japan	XX	XX	X
Korea	X	X	
USA	XX	XX	
Related OFWG activity	Roadmap OFWG projects Collaboration	Status report Roadmap	Courses Status report



Work planned – 2009/10

Technology status report, May 2009

OFWG meeting, IEA Oxyfuel Conference, Cottbus, Sept 2009

- Roadmap development
- Regulations meeting

Technology status report published with IEA Clean Coal Centre – end 2009

Roadmap, end-2009

Complete identification of issues, end-2009

Second capacity development course, Tsinghua University, Beijing, Mar 2010

Projects progressed from identified issues - 2010



Potential new / emerging issues for projects involving demonstration proponents

Regulations and operational

Guidelines and regulations development (ongoing)

Operational issues addressed and shared (safety, load following, transfer from air to oxyfiring)

Technical

Gas quality, and optimum clean-up operations – eg SO_x removal in-furnace during combustion, post combustion, and during compression

- Vattenfall have in-furnace cleaning
- compression processes now have SO_x removal
- regulations require “overwhelmingly” CO₂ (influences O₂, inerts and impurities)

For estimation of changes in furnace heat transfer (air to oxyfuel), CO₂/H₂O emissivity values for large furnaces are uncertain

Next generation oxyfuel

Next generation oxyfuel for lower energy penalty and cost/CO₂ avoided – alternative O₂ production, avoidance of recycle, thermal integration

... But only in pre-competitive area

