4th Meeting of the Oxy-Corrosion Working Group

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IEA Greenhouse Gas R&D Programme
Cheltenham, UK

Imperial College London
June 2014
1980’s
ANL/Battelle/EERC completed the first industrial scale pilot plant

1990 - 1995
EC Joule Thermie Project - IFRF / Doosan Babcock / Int’l Combustion
NEDO / IHI / Jcoal Project

1998 – 2001
CANMET US DOE Project / B&W / Air Liquide

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2003 - 2005
Vattenfall (ENCAP ++) CS Energy / IHI Callide Project

2007
B&W CEDF (30MWe)
large scale burner testing started

2006
FutureGen2 - Illinois (PC - 168MWe)
UK: White Rose Project (PC – 426MWe)

2015 – HUST Industrial Project for 35 MWt Oxyfuel Pilot Plant

2012 – CIUDEN – World’s first 30MWt Oxy-CFB Pilot Plant

2012 – Callide – World’s first 30MWe retrofitted Oxy-coal power plant

2009 – Lacq – World’s first 30MWt retrofitted Oxy-NG boiler w/storage

2008
World’s FIRST 30 MWt full chain demonstration at Schwarze Pumpe

2007
Alstom Schwarze Pumpe 2008 30MWth Lignite
Hitachi Babcock Schwarze Pumpe 2010 30MWth Lignite
Doosan Babcock Schwarze Pumpe 2012 30MWth Lignite
IHI Callide 2011 90MWth Coal
Alstom / AL Lacq 2009 30MWth Gas/Oil?
CIUDEN El Bierzo CFB Facility 2012 30MWth Coal
CIUDEN El Bierzo PC Facility 2012 20MWth Coal

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Can we still achieve our goal to commercialise the technology by 2020???

By 2015-2019
Demonstration of 100–300MWe full scale power plant.

Target: “Commercialised by 2020”

Updated by S. Santos (02/06/14)
Efficiency Improvement with Increasing Steam Conditions

Steam Conditions:
- 1960: 167/540/540
- 1980: 2400/1000/1000, 3500/1000/1050, 270/580/600
- 2000: 3900/1075/1110
- 2010: 280/600/620
- 2020: 5075/1290/1330
- 20XX: Vattenfall’s 250MWe Janschwalde Oxyfuel Power Plant (280 Bar / 600°C / 600°C)
- 20XX: KOSEP’s 100MWe Young Dong Oxyfuel Power Plant (125 Bar / 538°C / 538°C)
- 201X: Drax’s 426MWe White Rose Project Oxyfuel Power Plant (166 Bar / 538°C / 538°C)
- 2017: FutureGen2 168MWe Oxyfuel Power Plant (166 Bar / 538°C / 538°C)
- 2013: CIUDEN’s 20/15MWe Oxy-PC Pilot Plant (30 Bar / 420°C)
- 2012: COSPL’s 22MWe Callide Oxyfuel Power Plant (42 Bar / 460°C)
- 2010: TOTAL’s 30MWe Lacq Oxyfuel Steam Generation Plant (60 Bar / 420°C)
- 2008: Vattenfall’s 30MWt Schwarze Pumpe Oxyfuel Pilot Plant (30 Bar / 330°C)

S. Santos (16/04/2014) - figure of steam conditions adapted from Alstom’s paper
This meeting…

IEAGHG Oxy-Corrosion WG Meeting
Imperial College London
18th – 19th June 2014

Previous Meetings…

IEAGHG Special Workshop on SO₂, SO₃, Hg and Corrosion Issues in Oxyfuel Combustion
London, UK
25th – 26th January 2011

OxyCORR Workshop
Berlin, Germany
27th – 28th August 2012
http://oxycorr.eu-projects.de/

3rd Oxyfuel Combustion Conference (OCC3) Special Session – Oxy Corrosion
Ponferrada, Spain
10th September 2013
http://www.ieaghg.org/conferences/occ/18-conferences/occ/340-workshop-1-corrosion
Steering Committee

- Axel Kranzmann (BAM)
- John Oakey (Cranfield University)
- Bettina Bordenet (Alstom Power)
- Alexander Gerhardt (Vattenfall)
- Steve Kung (B&W)
- Jeorg Maier (IFK)
- Marta Eugenia Escoto de Tejada (IFK)