



UNIVERSITY OF  
**REGINA**

# Impact on Highly Qualified Personnel

April 28, 2009

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# Impact on Highly Qualified Personnel Outline

- ◆ Quality of Research
- ◆ Quality of HQP
- ◆ Ability to Attract HQPs
- ◆ Ability to Develop Research Confidence



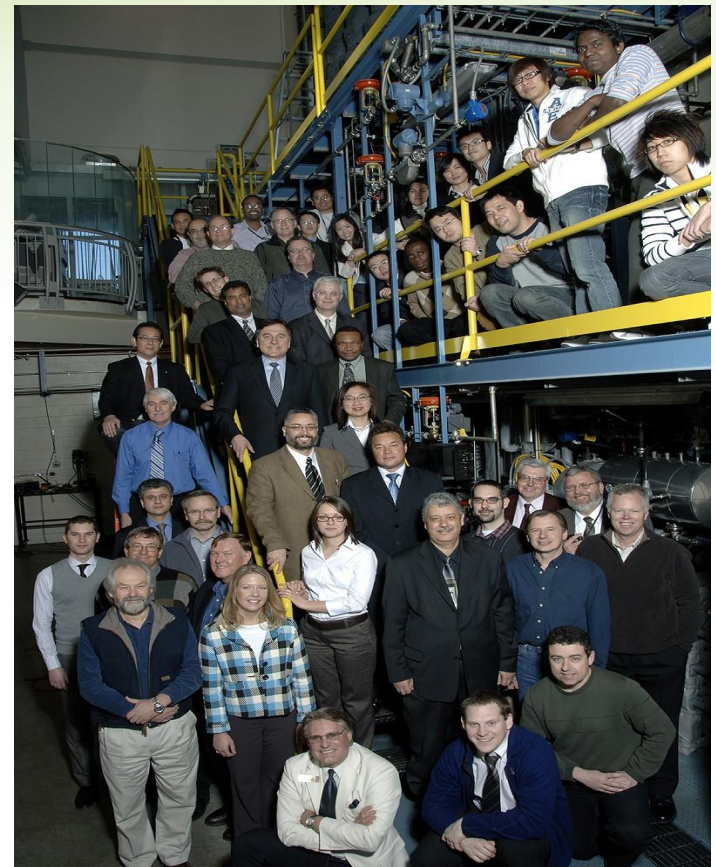
# Quality of Research

- ◆ Example 1 – As Adjudged in International Conferences
  - ◆ GHGT-9
  - ◆ Best Presentation
- ◆ Example 2 – Cited Publications



# Quality of HQP

- ◆ Exemplified by the Following Examples:
- ◆ NTNU – Norway
- ◆ CSIRO – Australia
- ◆ IFP - France
- ◆ Local Industry
  - ◆ HTC Pureenergy, Regina
  - ◆ SaskPower
  - ◆ Others in Alberta, Sask, etc
- ◆ Academia



# Ability to Attract HQPs

- ◆ As Graduate Students
  - ◆ Locally
  - ◆ Internationally
- ◆ As Interns
  - ◆ Locally
  - ◆ Internationally
- ◆ As Exchange Students
  - ◆ Western Provinces
  - ◆ Internationally



# Research With Confidence

- ◆ Produce cutting edge research results
- ◆ Confidence in accuracy of research results
- ◆ Can compete internationally in their areas of research
- ◆ Other HQPs bounce their ideas off our HQPs





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# Impact on Highly Qualified Personnel Student Perspective

April 28, 2009

Hussameldin Ibrahim  
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# Impact on HQP: Outline

- ◆ Quality of Research Achievements
- ◆ Publications / Conferences
- ◆ Recognition and Awards
- ◆ Practical Experience



**Made possible by CFI funded infrastructure.**

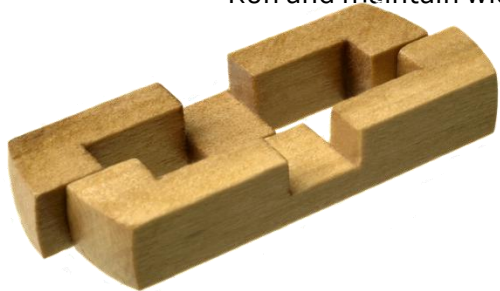
# Impact on HQP: Quality of Research Achievements

## ◆ **Doctoral of Philosophy – Hydrogen Technology**

- ◆ Designed, set-up and operated hydrogen production platform.
- ◆ Developed high performance catalysts for hydrogen production.
- ◆ Performed surface and bulk analysis on a wide variety of equipment such as ASAP 2010, GC-MS, NMR-LC, XRD, TPD/TPR, TGA-DSC, and FTIR.
- ◆ Developed detailed kinetic models for different systems.
- ◆ Developed reactor models for hydrogen production.

## ◆ **Master of Applied Science – Asphaltenes Remediation**

- ◆ Developed environment friendly and economic sound asphaltene remediation processes.
- ◆ Conducted intensive phase equilibria (PVT) studies
- ◆ Developed an inhibitor selection criteria based on the physico-chemical of the asphaltene system
- ◆ Developed kinetic models for asphaltene deposition
- ◆ Developed new methods for analyzing heavy hydrocarbons using LC-MS, CE-MS and GC-MS
- ◆ Run and maintain wide variety of equipment namely, FTIR, UV-VIS, TG/DSC, and high pressure PVT-Cell.



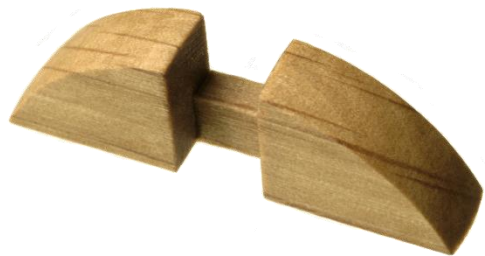
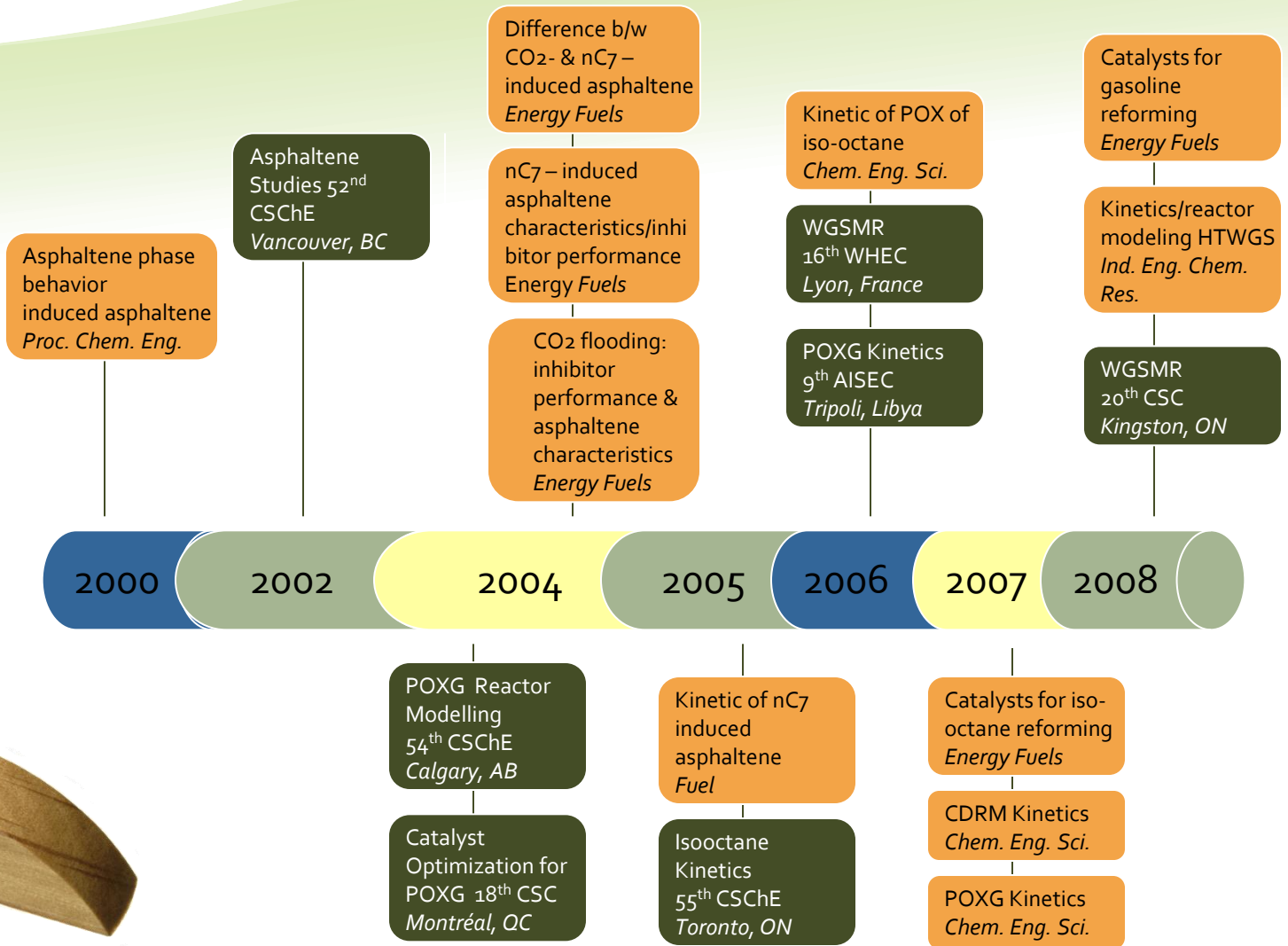
**Groundbreaking research at the University of Regina.**

# Impact on HQP: Publications /Conferences

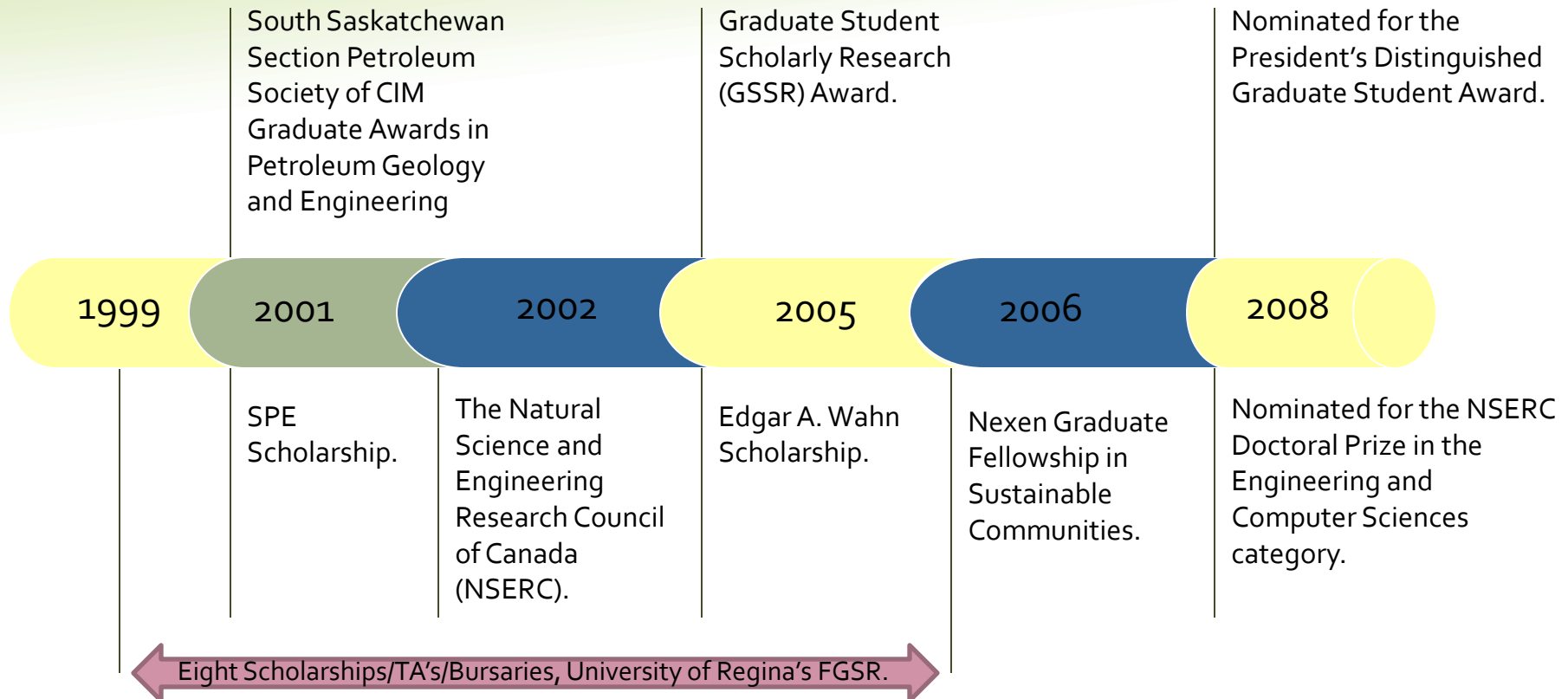
Publication

Conference

High quality  
publications  
and  
prestigious  
conferences.



# Impact on HQP: Recognition and Awards

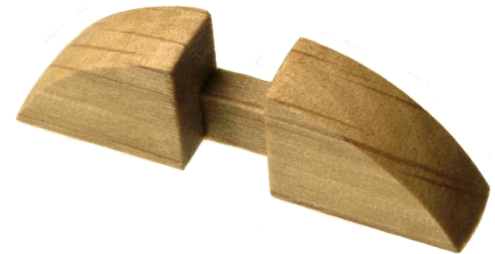


**Recognized by prestigious awards.**

# Impact on HQP: Practical Experience

- ◆ Senior Project Engineer – HTC Pureenergy Inc.
  - ◆ **Hydrogen (H<sub>2</sub>) Demonstration Plant / H<sub>2</sub> Technology**
    - ✓ Technical lead
    - ✓ Project management
    - ✓ Process design and optimization
    - ✓ Construction and operation of the H<sub>2</sub> demo plant
    - ✓ Product development and commercialization
  - ◆ **Carbon Capture and Storage (CCS) Projects**
    - ✓ Techno-commercial client interface
    - ✓ Headed multidisciplinary teams in CCS project deliverables
    - ✓ Leadership in business development strategic alliance

**Marketable/ competent in the labour market**



# Impact on HQP: Practical Experience Cont.

- ◆ Adjunct Professor – Faculty of Engineering, University of Regina
  - ✓ Developed teaching material.
  - ✓ Developed labs and lab material.
  - ✓ Delivered lectures and labs.
  - ✓ Prepared and marked assignments, labs and exams.

**Marketable/ competent in the labour market**



# Conclusion

The CFI funded infrastructure enabled an HQP such as myself to:

- Carry out groundbreaking research work at the University of Regina;
- Produce large number of high-quality scientific papers;
- Publish articles in prominent journals;
- Represent the University of Regina at important conferences;
- Be recognized by many prestigious awards; and
- Obtain high level of training which made me marketable/ competent in the labour market.

**Which otherwise would not be possible.**





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# Impact on Highly Qualified Personnel Industry Perspective

April 28, 2009

Jeff Allison  
Senior Vice-President, HTC Pureenergy Inc.  
[jallison@htcenergy.com](mailto:jallison@htcenergy.com)





# Canada's National Champions

*“Providing Global Solutions for CO<sub>2</sub> Capture ”*

**University of Regina /HTC Pureenergy**

- Founded in 1997, commercializing CO<sub>2</sub> Capture and CO<sub>2</sub> Management
- Publicly traded on the Toronto Stock Exchange – Venture -- \$50 – \$60 million market cap.
- Head Quartered in Regina, Sask. – Offices in Sydney Aus., Vermont USA, Beijing China

## HTC's Business Profile

### CO<sub>2</sub> Capture

- 1. Technology Licensor**
- 2. OEM Supplier**
- 3. Engineering Services**

### CO<sub>2</sub> EOR

- 1. Oil Field Analysis/  
Simulation**
- 2. Oil Field Economics/  
project validation**
- 3. CO<sub>2</sub> Compression  
& Injection**

### CO<sub>2</sub> Storage

- 1. Geological Profiling**
- 2. Risk Assessment**
- 3. CO<sub>2</sub> Audit & Monitor**
- 4. Carbon Credit Validation**

# Impacts on Research Capacity

Canada's National Champions  
*Providing Global Solutions for CO<sub>2</sub> Capture*

- ◆ **Highly Qualified Personnel - Hired by HTC  
University of Regina Graduates**

Dr. Ahmed Aboudheir Ph.D. – Chief Technology Officer

Aihua Yang M.A. Sc. – Process Engineer

Salim Kadiwala M.A. Sc. – Process Engineer

Mohamed Edali – PhD. Student – Process Engineer

Walid Elmoudir M.A. Sc. – Process Engineer, PhD. Student

Dr. Hussan Ibrahim PhD. – Senior Project Engineer

Anothai Setameteekul M.A. Sc. – Solvent Process Engineer

# Impacts on Research Capacity

Canada's National Champions

*"Providing Global Solutions for CO<sub>2</sub> Capture"*



**Knowledge Transfer – Statoil Hydro**

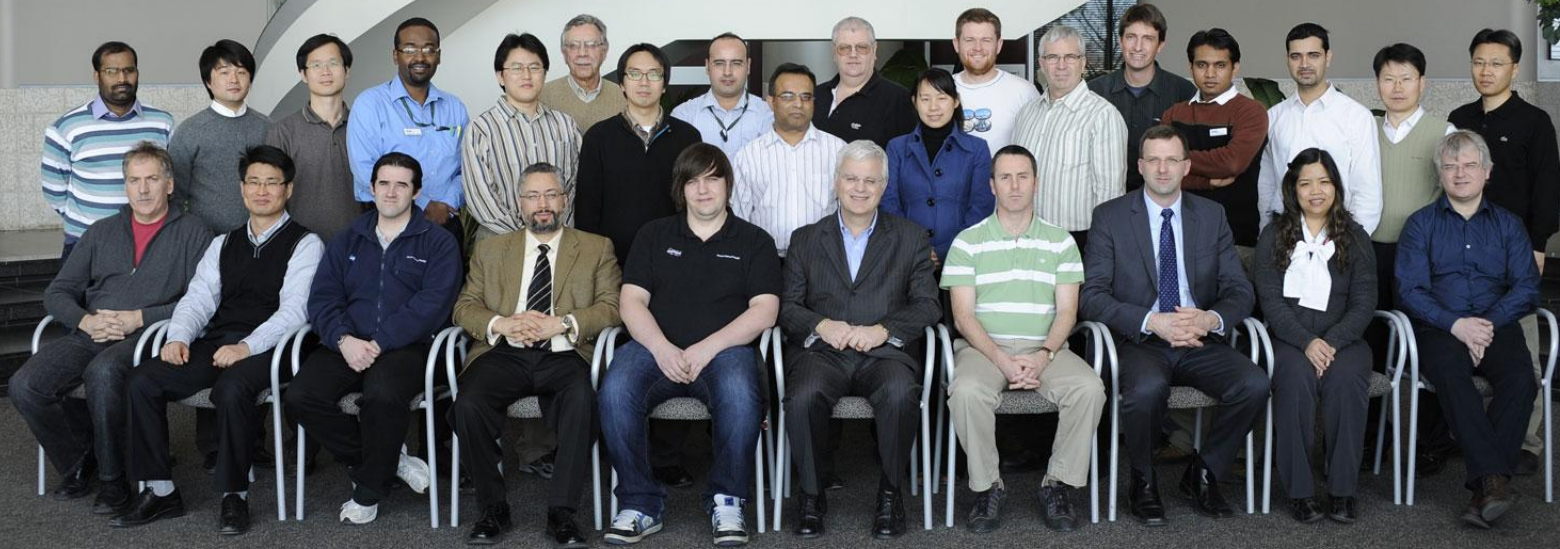
**Statoil Hydro-HTC Engineering Team – Technology Transfer – Mongstad Project**

# Impacts on Research Capacity

Canada's National Champions

*"Providing Global Solutions for CO<sub>2</sub> Capture"*

Knowledge Transfer – Doosan world wide



**Doosan-HTC Engineering Team** – 18 Engineers from Doosan's global locations. Completed 6 month technology transfer program (March, 2009)



# HTC's Collaborative Partners

**“World's largest energy infrastructure builders”**



**Doosan Babcock Energy**



**Doosan Heavy Industries  
& Construction**



# Impacts on Local, Regional and National Innovation

Canada's National Champions  
*Providing Global Solutions for CO<sub>2</sub> Capture*

## ◆ HTC's contributions

### **New Products as a result of CFI investment:**

- ◆ Solvent Reclaimer
- ◆ FEED engine (software)
- ◆ H<sub>2</sub> Demonstration plant
- ◆ H<sub>2</sub> Technology
- ◆ Square Columns and Internals
- ◆ Wash System for emissions overspray
- ◆ Modular CO<sub>2</sub> capture system
- ◆ Etc.....

# CCS Pureenergy 1000



**World's first Pre-Engineered, Modularly Designed and constructed, 1,000 ton/day CO<sub>2</sub> Capture System (future scalability up to 3,000 tons/day).**



# CO<sub>2</sub> Capture – natural gas turbine final engineering package and bid

## Karsto, Norway – UofR/HTC licensed Technology



# UAE – Abu Dhabi

## Masdar – Carbon Capture Project

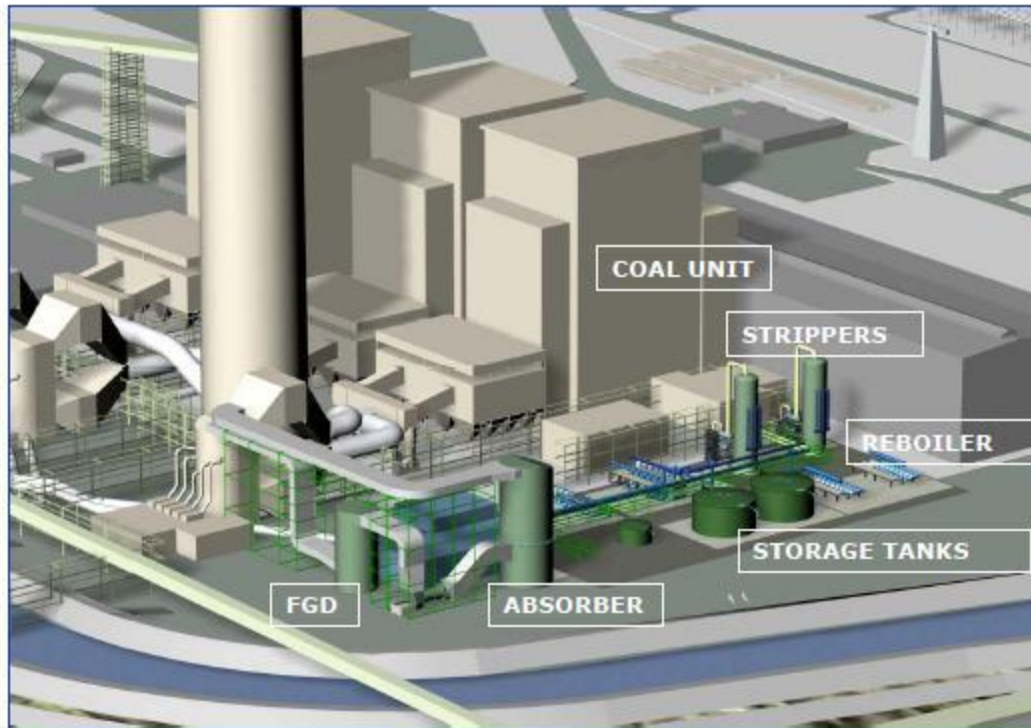


**EMAL AND TAPCO PROJECTS – 2009**

# Enel - Porto Tolle, Italy

4,500 CO<sub>2</sub> tpd coal plant FEED

Porto Tolle power plant



Storage site area



# E.ON UK – Kingsnorth Project Coal Fired Power Plant



Doosan Babcock Energy



# Vattenfall – Sweden Engineering Design Study awarded



**Vattenfall A/S, Generation Nordic, Thermal Power  
Clean Coal CO<sub>2</sub> capture plant to be located at the  
Nordjyllandsvaerket power plant**



**Doosan Babcock Energy**





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