

JRC SJTU/NTNU

Milestones and future activities

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上海交通大學

Shanghai Jiao Tong University

JRC Seminar at NTNU, April 20 – 21. 2016



NTNU – Trondheim
Norwegian University of
Science and Technology



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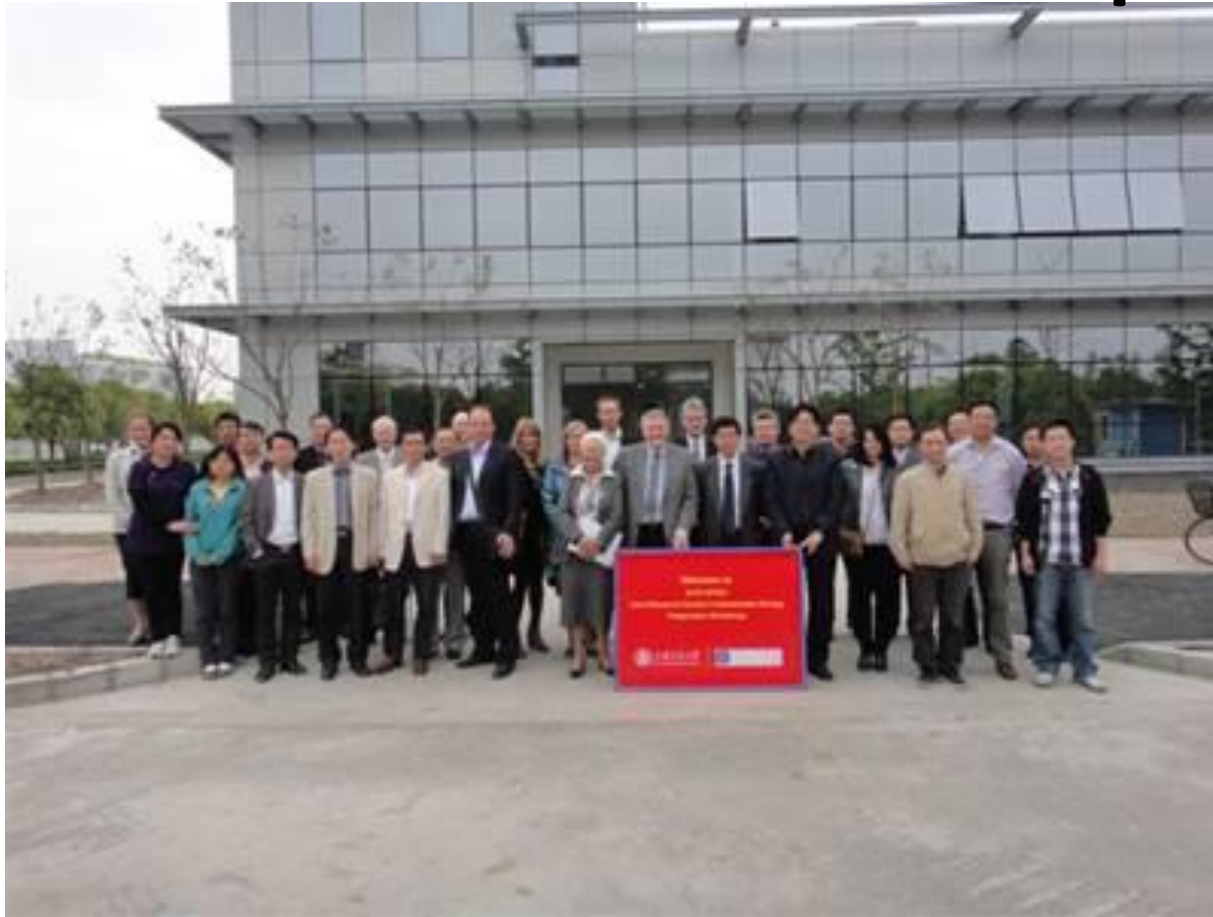
Historical development (1)

- **20-27 March 2004:** The NTNU China Study Tour - visited SJTU and other institutions
- **March 2007:** NTNU and Statoil organize workshop on «Utilization of Natural Gas» at SJTU Campus - First proposal for Cooperation between JRC and NTNU was formulated in October 2007
- **August 2007:** High level delegation from SJTU headed by Madam Professor Ma Dexiu visit NTNU and had meeting with NTNU Rector
- **November 2008:** Minister of Research and higher education, Tora Aasland visit SJTU with a delegation and had meetings with SJTU President Prof Jie Zhang.
- **November 2009:** Chinese Ambassador visit NTNU and advice NTNU to use «Joint Research Center» as model for cooperation
- **May 25 2010:** JRC-agreement was signed at World Expo by president of SJTU, professor Jie Zhang and Rector of NTNU, professor Torbjørn Digernes.

WS 1: May 2011 at SJTU

Preparation Workshop

Identified areas for fundamental projects



WS 2: September 2011 at NTNU

Started up 4 «PhD-projects»



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WS 3: November 2011 at SJTU

Plans for education



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Started PhD-projects Sandwich-model with own strategic PhD-positions

- **Group: Energy System Analysis (CenSES)**
Title: “Developing offshore wind industry in and between China and Norway”.
- **Group: Use of CO₂ as a Working Fluid (CREATIVE)**
Title: “Development of a concept for utilizing CO₂ as refrigerant in air conditioning and heat pump systems in combination with ground source storage.”
- **Group: Process Technology “LNG Technology”**
Title: “Cooling and Condensation of Multicomponent Mixtures for improved LNG Processes”
- **Group: Energy Use in Buildings (ZEB)**
Title: “Integrated performance simulation of BIPV/T systems, analyzing their potential to fulfill the energy requirements of a typical residential building in Shanghai and Trondheim, aiming to achieve zero energy/emission buildings”.

WS 2: November 2012 at NTNU

- Workshop for "Energy in Buildings" (> 20 p.pants)
- Start up activity within the news group
 - "Offshore Wind & Smart Grids"
 - «Catalysis»
- *Agreement on the curriculum for the Double Degree Master education.*
- Meeting with NTNU - Rector Torbjørn Digernes



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Education

Double Degree Master Program in Sustainable Energy

- **Established within "Refrigeration" as a pilot area**
 - 2013: 4 students from SJTU started at NTNU
 - 2013: 2 students from NTNU started at SJTU
 - 2014: 4 students from SJTU started at NTNU
 - 2014: 2 students from NTNU started at SJTU

- **"Sustainable Energy Use in Buildings"**
 - First year 2015
 - 2015: 6 students from SJTU started at NTNU



Summer schools

- **Summer schools have been one of the core activities:**
 1. **Energy Environment and Society Summer Course**
 2. **International Graduate Summer School Course on Sustainable Energy**
- **Decided to develop regular Summer schools based on the "Experts in Team" - model**

Technical Visit at Smøla



Publications – PhDs

April 2016 (preliminary)

	PhDs	Publications
Energy Use in Building Research Groups	2+2 = 4	5
Refrigeration Research Group (Use of CO2 and LNG)	2+2 = 4	18
Offshore Wind & Smart Grids Research Group	2+2 = 4	6
Catalysis Research Group	2+2 = 4	5
Energy System Analysis Research Group	2+1 = 3	?
Total	17	34

Workshop issues

- **Research projects progress**
- **Exchange of personnel**
- **Education,**
- **Joint Publications,**
- **Conferences**
- **Double Degree Programs**
- **Summer Schools**
- **Other activities?**
- **Plans for future work**



Final remarks

- **A quite successful collaboration where much have been achieved after the formal opening**
- **Important lesson: Patience is crucial to get things running well – years of preparatory work**
- **Very grateful for the support from the Norwegian Research Council that made this work possible – continuous support and patience when things sometimes moved slowly**

Main JRC strategy: Knowledge, Friendship and Collaboration



Thanks for the attention!