

# ISCN – GULF Conference

**Sustainable academic & corporate campuses:**

**Time to implement**

**Track B: University & Sr. corporate leaders**

Lausanne – EPFL

June 11 & 12, 2009

## Agenda – June 11

- 13:30** Welcome and opening remarks P. Aebischer  
H. B. Püttgen
- 13:50** Setting the stage presentations R. Stulz  
Y. Loerincik  
S. Dimolitsas  
R. Eichler
- 15:30** Break
- 16:00** Briefing by ISCN Working Group leaders
- 16:30** Open discussion
- 17:30** Plenary panel discussion
- 18:15** Transfer to evening reception and dinner

## Agenda – June 12

**9:00** Setting the stage presentations J. Newman

M. Lehni

J. Mullinix

**10:00** EPFL campus visit

**11:40** Closing discussion: where do we go from here?

**12:45** Buffet lunch

# Main R & D Challenges of the 21<sup>st</sup> Century



- Availability and broad access of reliable and affordable preventative and clinical health services world-wide



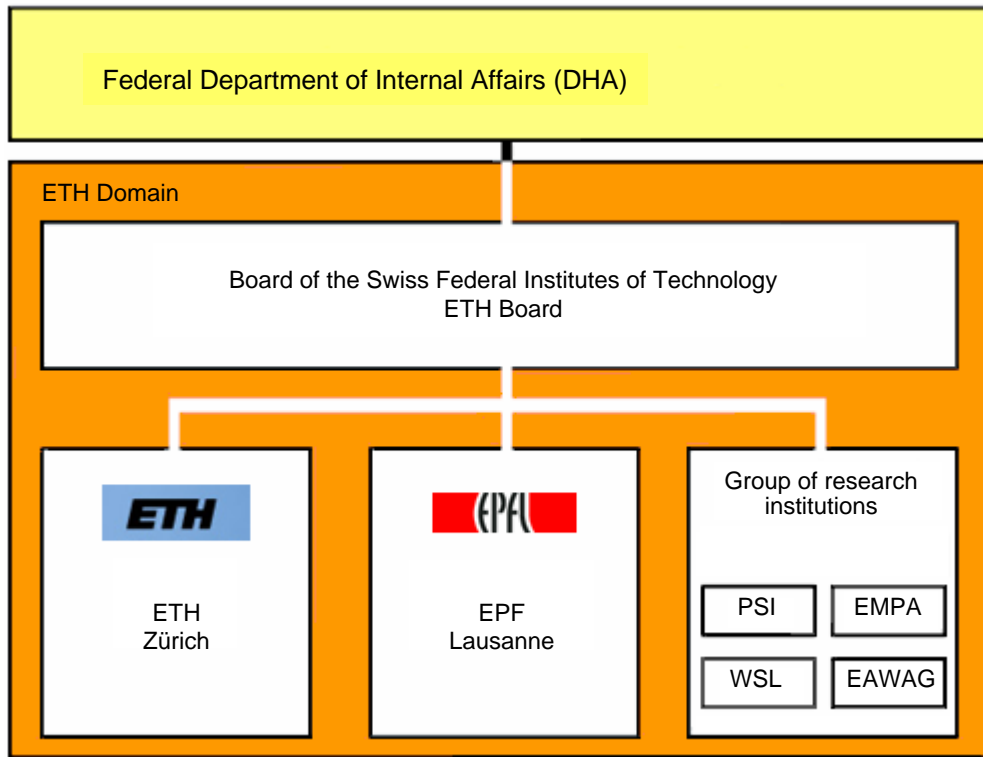
- Production and distribution of food world-wide; conflicts with energy production



- Production, storage, transport, delivery and end-use of energy
- Water resources and cycle**

# Major players in the Swiss energy R & D arena

ETH (Swiss Federal Institutes of Technology) Domain



Competence Center Energy & Mobility

Universities - Cantons



Universities of Applied Sciences

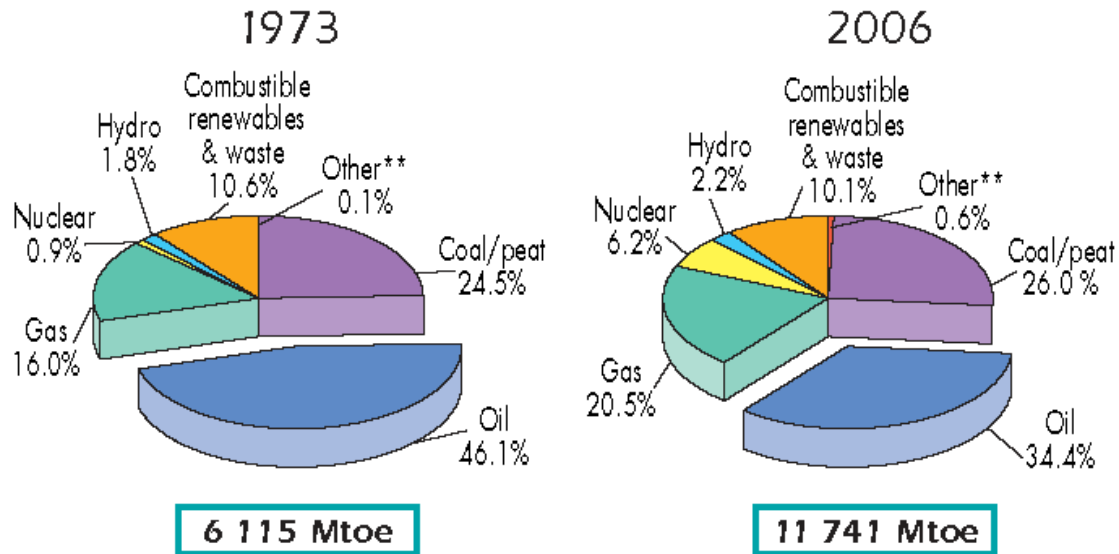


## *Background: demographic explosion*

By 2050, the world population will consist of:

- 3 billion people who will be « energy affluent »
- 3 billion people who will be « energy poor »
- 3 billion **new** inhabitants of the our planet, primarily living in « energy poor » regions of the world.

# Primary energy world wide



Source: IEA 2008

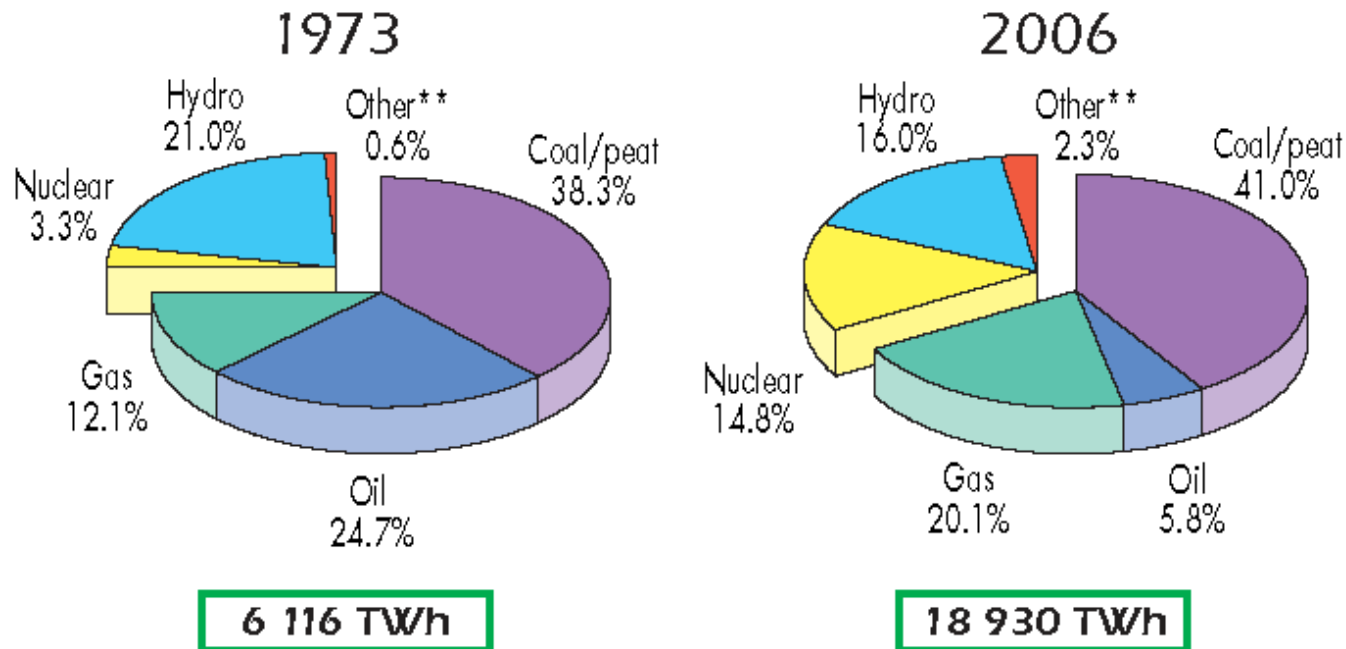
	1973	%	2006	%	croiss.
OECD	3'747	61%	5'590	48%	149%
Non OECD	2'368	39%	6'151	52%	260%
	6'115		11'741		192%

\*Exclude electricity trade

\*\*Other includes geothermal, solar, wind, heat, etc.

**The energy growth primarily takes place outside of the OECD**

# Electricity production world wide



\*Excludes pumped storage.  
\*\*Other includes geothermal, solar, wind, combustible renewables & waste, and heat.

Source: IEA 2008

Primary energy growth: 192 %

Electricity growth: 310 %

**The electrification of the world increases quickly**

# Green house gas emissions: CO<sub>2</sub>

## Switzerland

CO<sub>2</sub> emissions per capita: 5.95 tons

CO<sub>2</sub> emissions per GDP: 0.18 kg/US\$

## Austria

CO<sub>2</sub> emissions per capita: 9.19 tons

CO<sub>2</sub> emissions per GDP: 0.37 kg/US\$

## France

CO<sub>2</sub> emissions per capita: 6.22 tons

CO<sub>2</sub> emissions per GDP: 0.27 kg/US\$

## Germany

CO<sub>2</sub> emissions per capita: 10.29 tons

CO<sub>2</sub> emissions per GDP: 0.43 kg/US\$

## World

CO<sub>2</sub> emissions per capita: 4.18 tons

CO<sub>2</sub> emissions per GDP: 0.76 kg/US\$

## Europe 25

CO<sub>2</sub> emissions per capita: 8.46 tons

CO<sub>2</sub> emissions per GDP: 0.44 kg/US\$

## North America

CO<sub>2</sub> emissions per capita: 19.49 tons

CO<sub>2</sub> emissions per GDP: 0.55 kg/US\$

## China

CO<sub>2</sub> emissions per capita: 3.65 tons

CO<sub>2</sub> emissions per GDP: 2.76kg/US\$

## *Two types of challenges*

From the data given above, one should come to the conclusion that there are two types of challenges:

- In industrialized countries, the challenge is the rational – sober - utilization of energy.
  - Energy efficiency
  
- In emerging countries, the challenge is a massive increase in energy production while avoiding a catastrophic impact on the environment.
  - Environmental impact

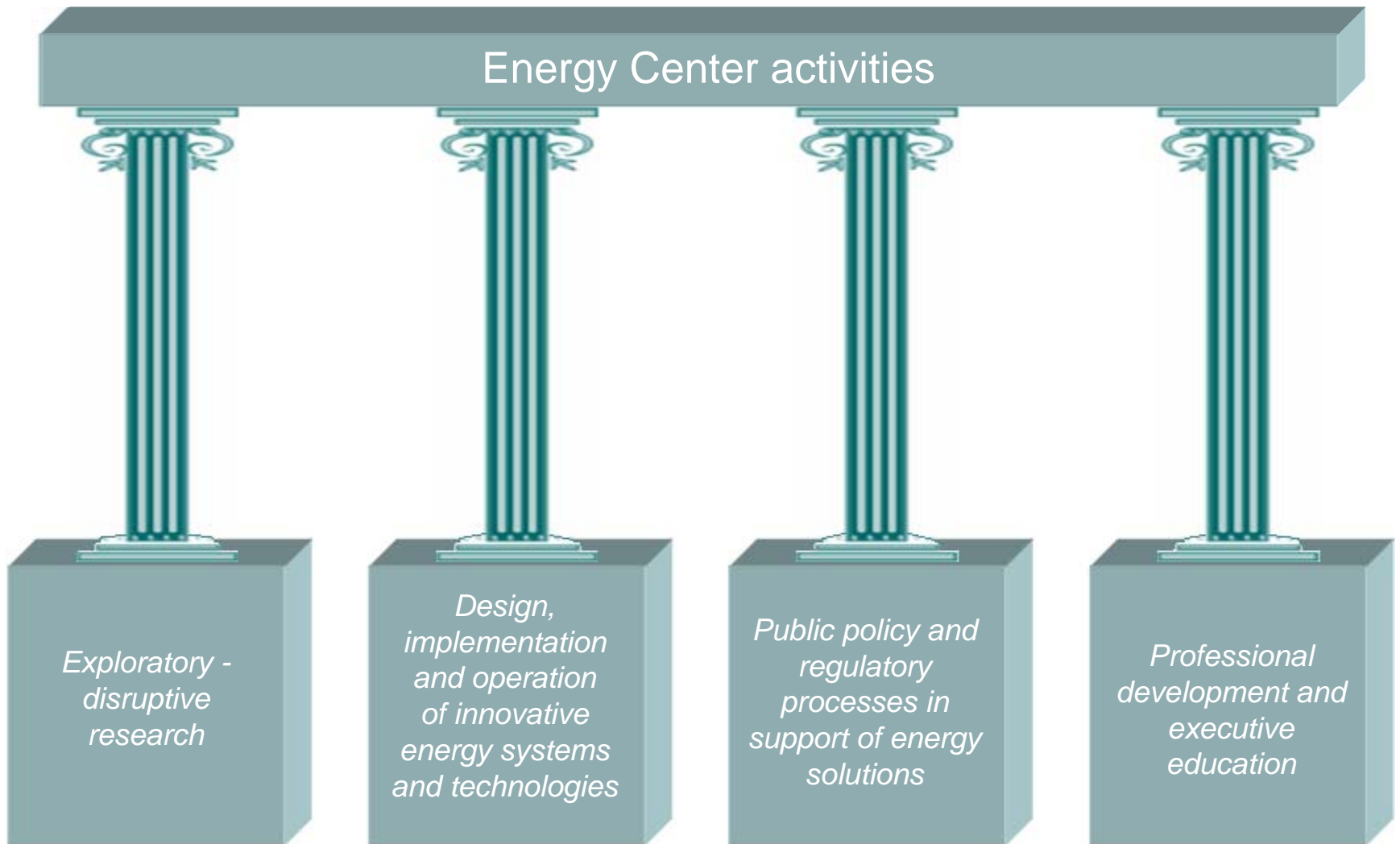
# *EPFL Energy Center vision*

*Development of sustainable energy production, storage, transportation, distribution, and end-use systems and technologies.*

*Proactive engagement in the formulation and implementation of the private and public sector policies and strategies required to achieve such development.*

*Position EPFL as the indispensable partner for the private and public sectors in these activities*





# *EPFL energy research focus areas*

## **Renewables**

- Hydro      Turbines  
Civil engineering  
Electrical machines  
Power electronics
- Wind        Environmental simulations  
Environmental monitoring
- Solar        Thin-film  
Dye cell
- H<sub>2</sub>          PEC technologies  
Materials for storage

# *EPFL energy research focus areas*

## **Energy processes**

- Electric power systems – distributed electric systems
- Buildings Energy management
  - PV integration
  - Renovation technologies and processes
  - Heat pump technologies & integration
- Industry Multi-energy systems and networks
  - Heat pump systems development
  - Energy balance studies
- Clean transportation systems
- Urban energy systems

# *EPFL energy research focus areas*

## **Nuclear**

- Controlled fusion
- Nuclear reactor safety

## **Regulatory and Public policy issues**

## **Behavioral modification & energy conservation**

# *The Roundtable on Sustainable Biofuels*

## *An EPFL Energy Center initiative*

**Ensuring that biofuels deliver on their promise of sustainability**



# Energy Center RSB Sponsors



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United Nations Environment Programme

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Rethink Tomorrow



*Energy Center*

*ISCN – GULF; Lausanne – EPFL; Track B; June 11 & 12, 2009*



# *Federating projects*

## *ECLEER : Context and objectives*

- In the of a post-petroleum economy:
  - Reduce the CO<sub>2</sub> emission by a factor 4 by 2050
  - Reduce the hydrocarbon dependency
- Two world-leading academic partners with EDF :
  - Ecole Polytechnique Fédérale de Lausanne
  - Ecole des Mines de Paris
- **ECLEER** : European Centre and Laboratories for Energy Efficiency Research

### Objectives :

- Accelerate the research and innovation pace
- Federate the efforts of leading institutions

# *Federating projects*

## *ECLEER – EDF & Ecole des Mines & EPFL*

- Four main subjects
  - Heat pumps
  - Industrial processes energy efficiency
  - Buildings and solar systems integrations
  - Socio-economic aspects

# Topics for discussion

- How important is it to include sustainability within the « corporate image » of academic or corporate organizations?
  - Marketing & sales
  - Recruitment of best talents
- What are the key elements when implementing a sustainability « état d'esprit » on campus?
  - Positive drivers
  - Obstacles
- Is there a need to propose and establish broadly-agreed upon indicators to « rank » academic institutions as to how « green » they are? If so, how?
- Can joint ISCN – GULF activities, such as this conference, be a « win-win » situation?