

# Global COE Program

“ Energy Science in the Age of Global Warming “

-Toward CO2 Zero-emission Energy System

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Kyoto University, Japan



# Global COE Program

“ Energy Science in the Age of Global Warming “

-Toward CO2 Zero-emission Energy System

**Kyoto University**

**Graduate School of Energy Science**

**Institute of Advanced Energy**

**Department of Nuclear Engineering**

**Research Reactor Institute**

# 1. What is required ?

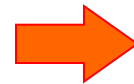
(Recognition of current situation)

Securing energy and conservation of the environment are the most important issues for the sustainable development of human beings.

Relied heavily on fossil fuels



Large amounts of CO<sub>2</sub>



Global Warming

The energy problem cannot be simply labeled as a **technological** one, as it is also deeply involved with **social** and **economic** elements.

It is necessary to establish the “**Low carbon energy science**” in the **interdisciplinary field** adding the **social science** and the **humanities** to the natural science.



# 2. What were we promoting ?

(21st COE Program “Establishment of COE on Sustainable Energy System” From 2002 to 2006)

## 【Research Programs】

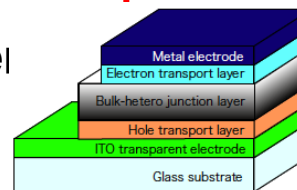
### ☐Solar Energy System

(solar cell, solar power satellite/station and plasma ene

### ☐Hydrogen Energy

### ☐Bioenergy

### ☐Total Energy



## 【Educational Program】

### ☐International Energy School

### ☐Publication of textbooks



Over 1000 Academic Papers  
110 Books  
184 Keynote Lecture  
124 Patents

## 【Development of the Platform】

### ☐International Platform(Kingdom of Thailand)

### ☐Establishment of SEE Forum

### ☐Symposium (International and Domestic)

### ☐industry-government-academia cooperation

### ☐Energy information and Related policy.



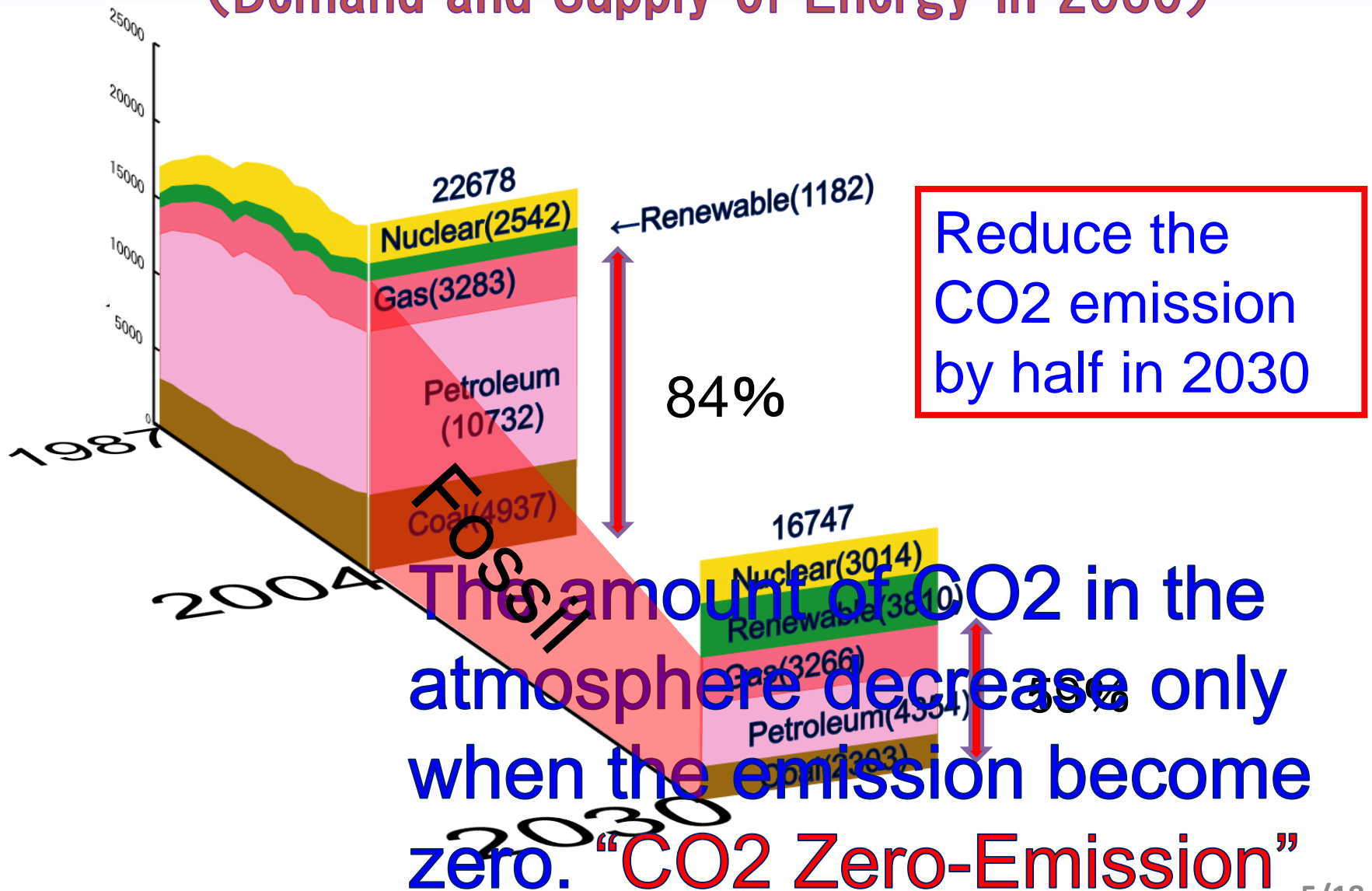
Congress of ASEAN COST+3  
Asian CORE

Turned out researchers at  
Universities(8), Public  
Research Institute(16),  
Industry(8), and PD(33)



# 2. What were we promoting ?

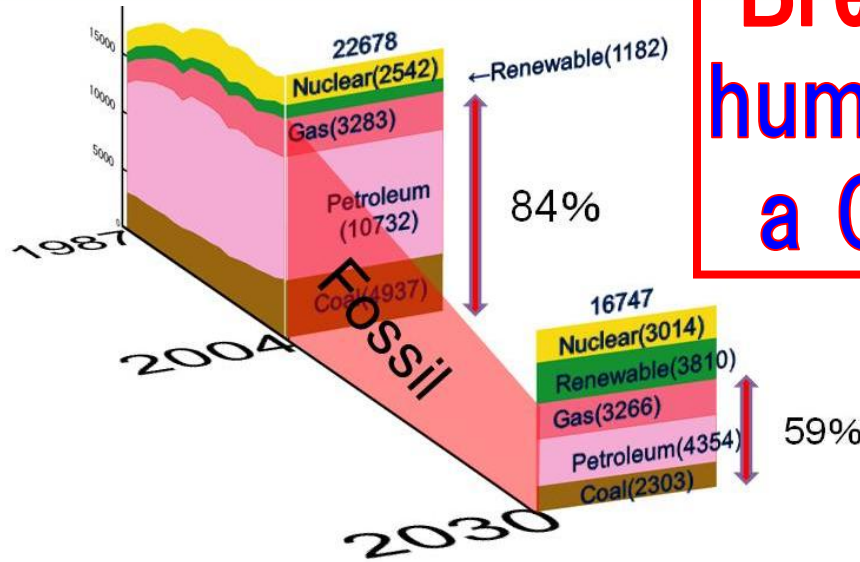
(Demand and Supply of Energy in 2030)



# 2. What were we promoting ?

(Motivation)

**Breakthrough to foster human resources toward a CO2 zero-emissions.**



The amount of CO2 in the atmosphere decrease only when the emission become zero. “CO2 Zero-Emission”



# 3. What shall we establish?

## (Concept of the Platform)

### International Education and Research Platform

We foster **educators, researchers, and policy makers** who can develop technologies and propose policies for establishing a **scenario** toward a **CO2 zero-emissions society** no longer dependent on fossil fuels, **by the year 2100**.

### Scenario planning in “Energy Science” Education

**Students** will acquire the faculty to **survey the whole “energy system”** through **participation in scenario planning** and interaction with researchers from other fields, and apply it to their own research.

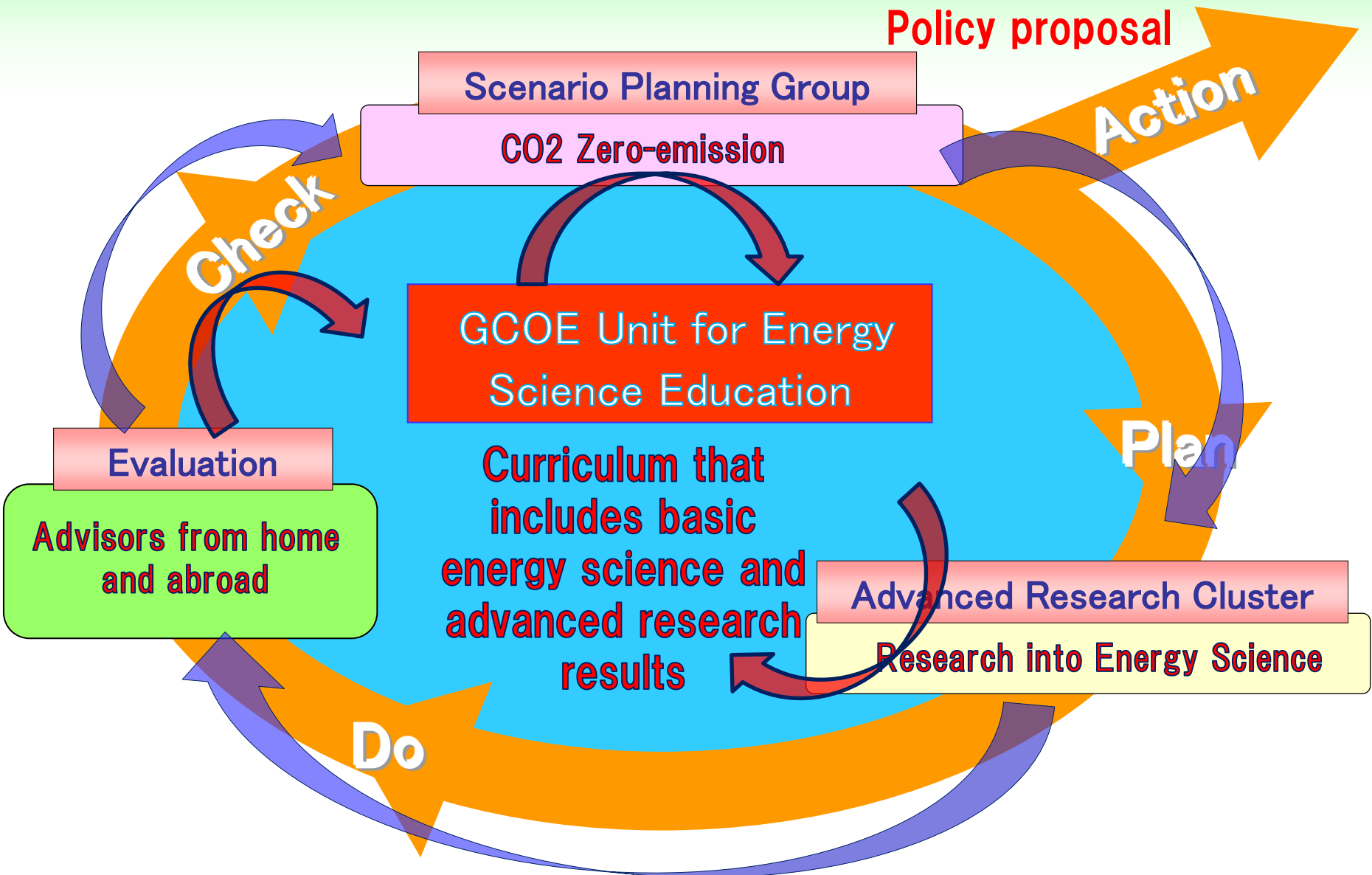
### Energy Science Research for no CO2 emission

- Renewable Energy (Solar Energy and Biomass Energy)
- Advanced Nuclear Energy (Fission and Fusion)
- Socio-economic Study of Energy

# 3. What are we doing ?

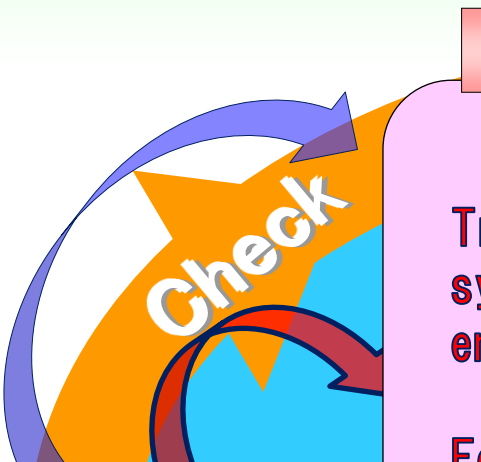
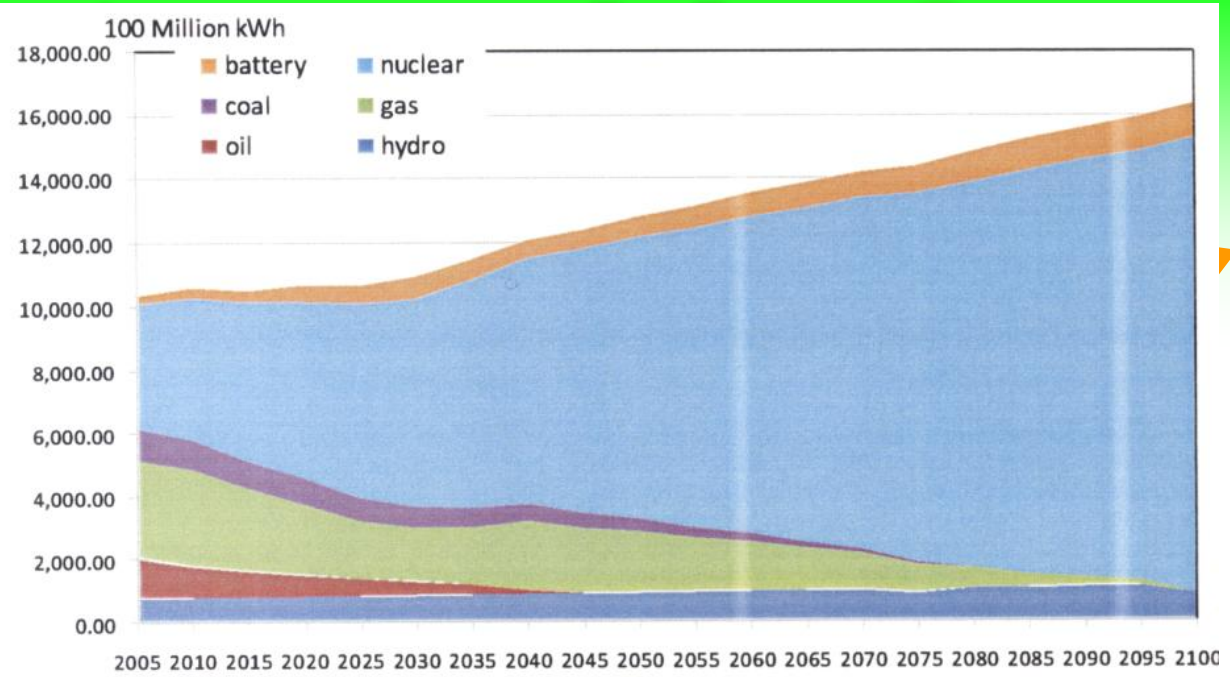
(Full Picture of the Platform)

Information transmission  
Policy proposal



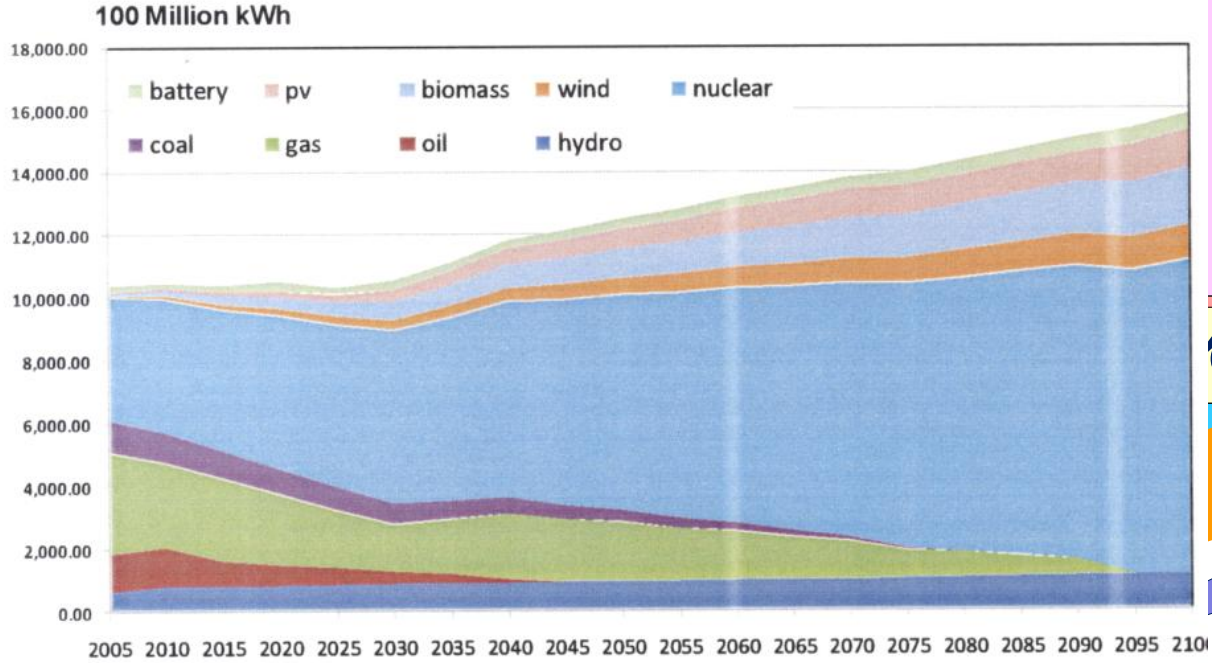


# 3. What (Scenario F



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Forecasting possible technology



Advanced Research Cluster  
research into Energy Science

# 3. What are we doing ?

(Group of Energy Scenario and Strategy Study)

Information transmission  
Policy proposal

Scenario Planning Group

CO2 Zero-emission

Group of Energy Scenario and Strategy Study

Government and Industries

Action

Plan

Evaluation

Advisors from home  
and abroad

Research Cluster

to Energy Science

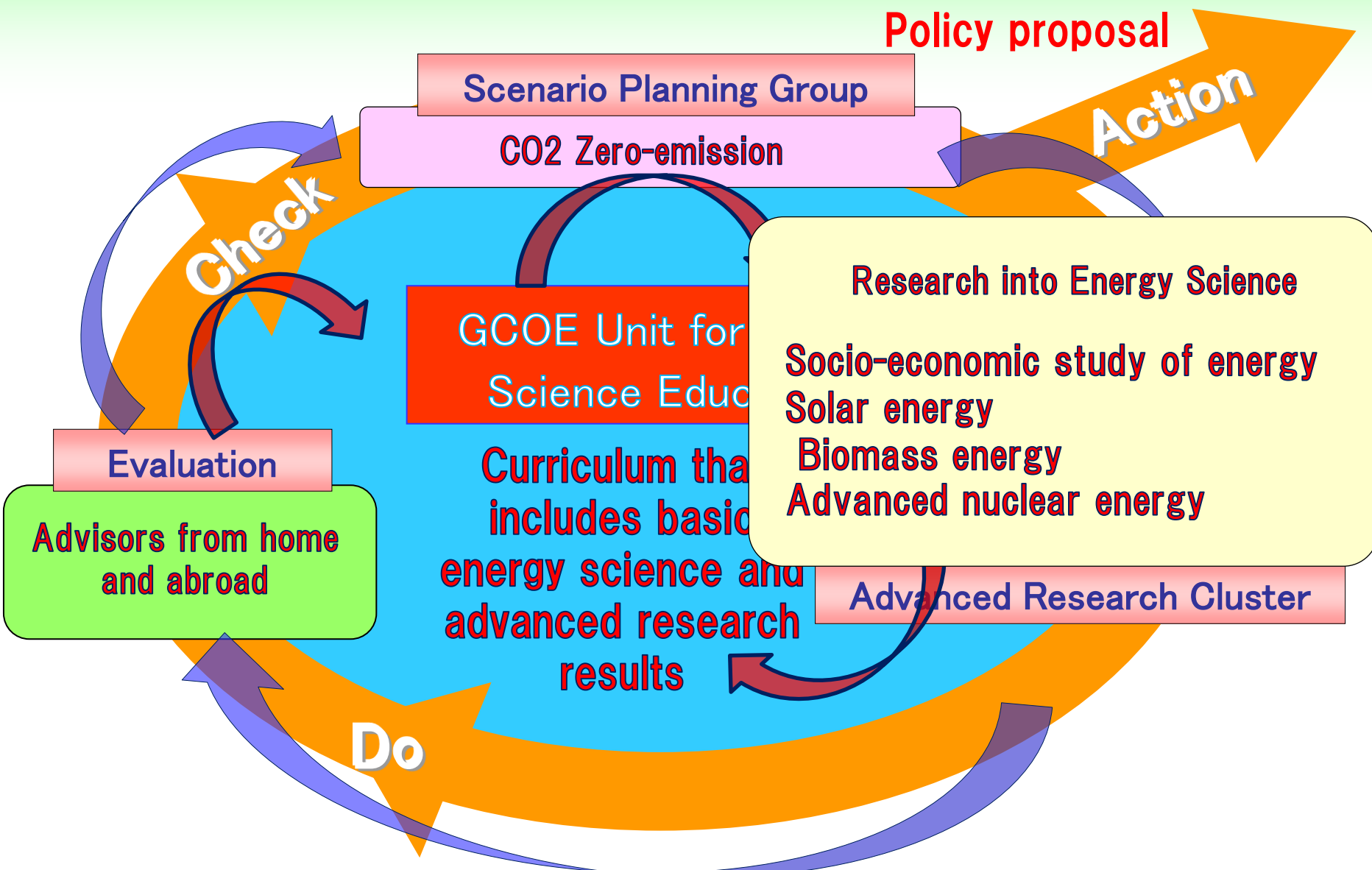




# 3. What are we doing ?

(Advanced Research Cluster)

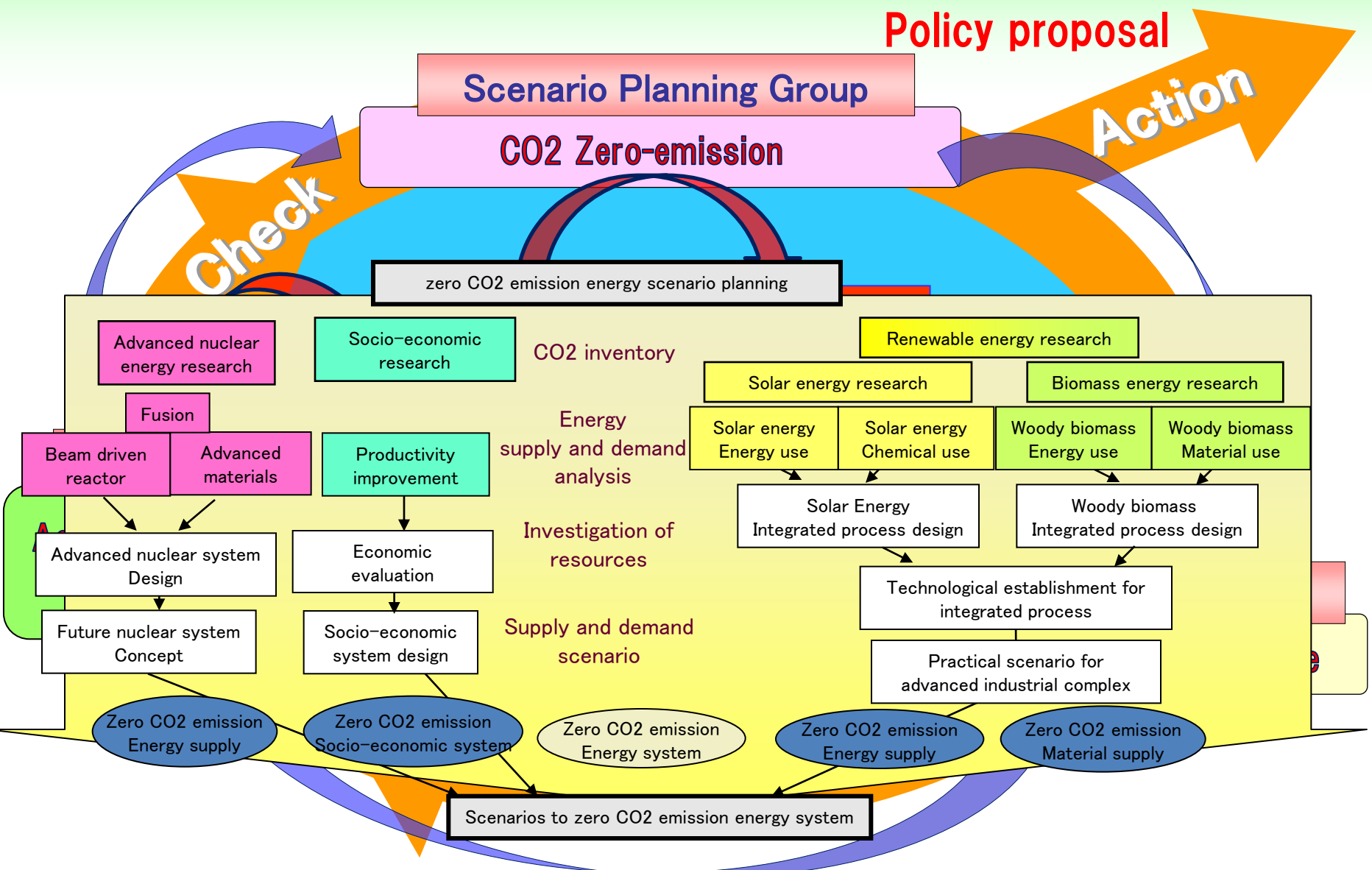
Information transmission  
Policy proposal



# 3. What are we doing ?

(Outline of the Research Tasks)

Information transmission  
Policy proposal

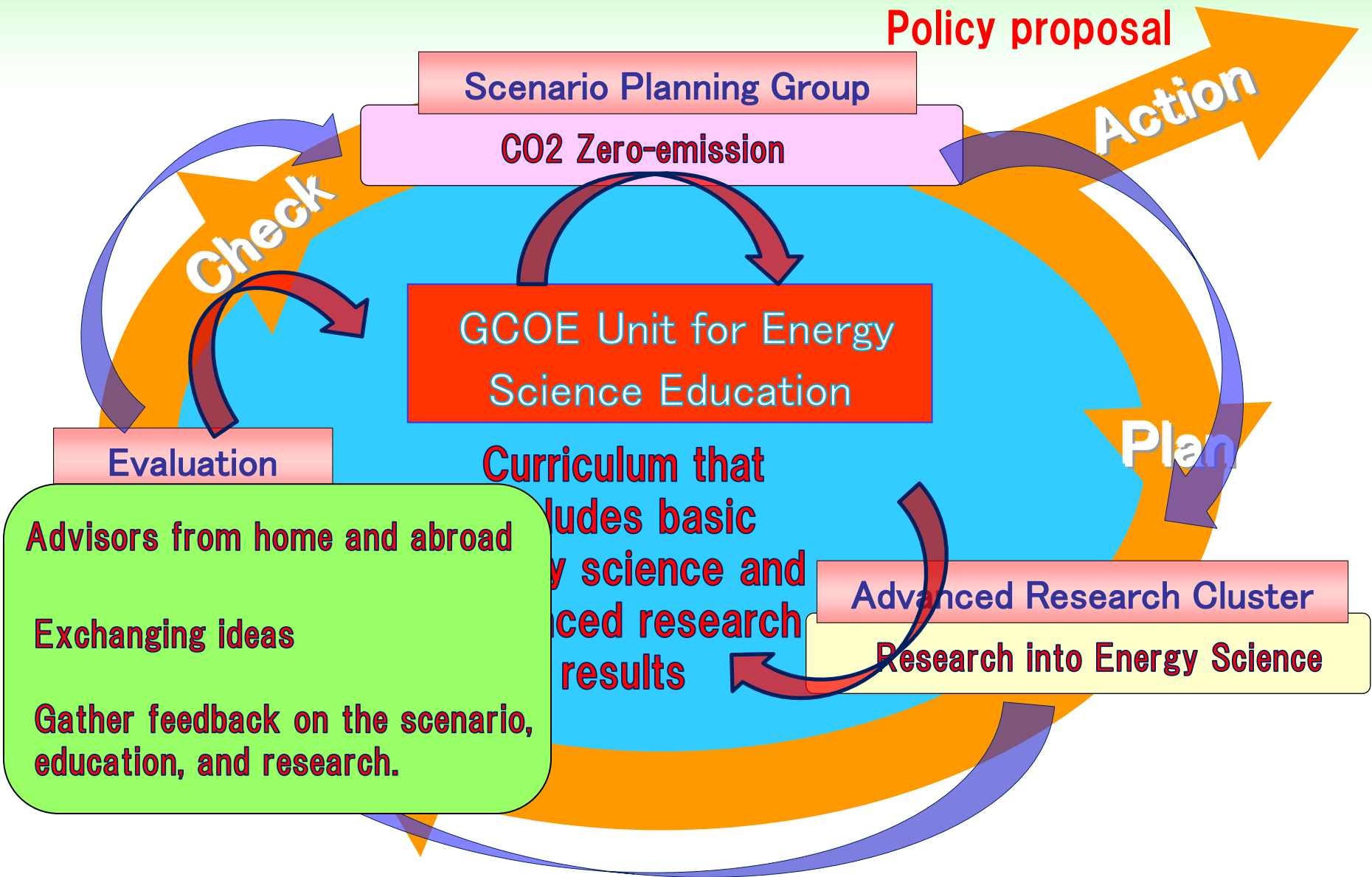




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(Full Picture of the Platform)

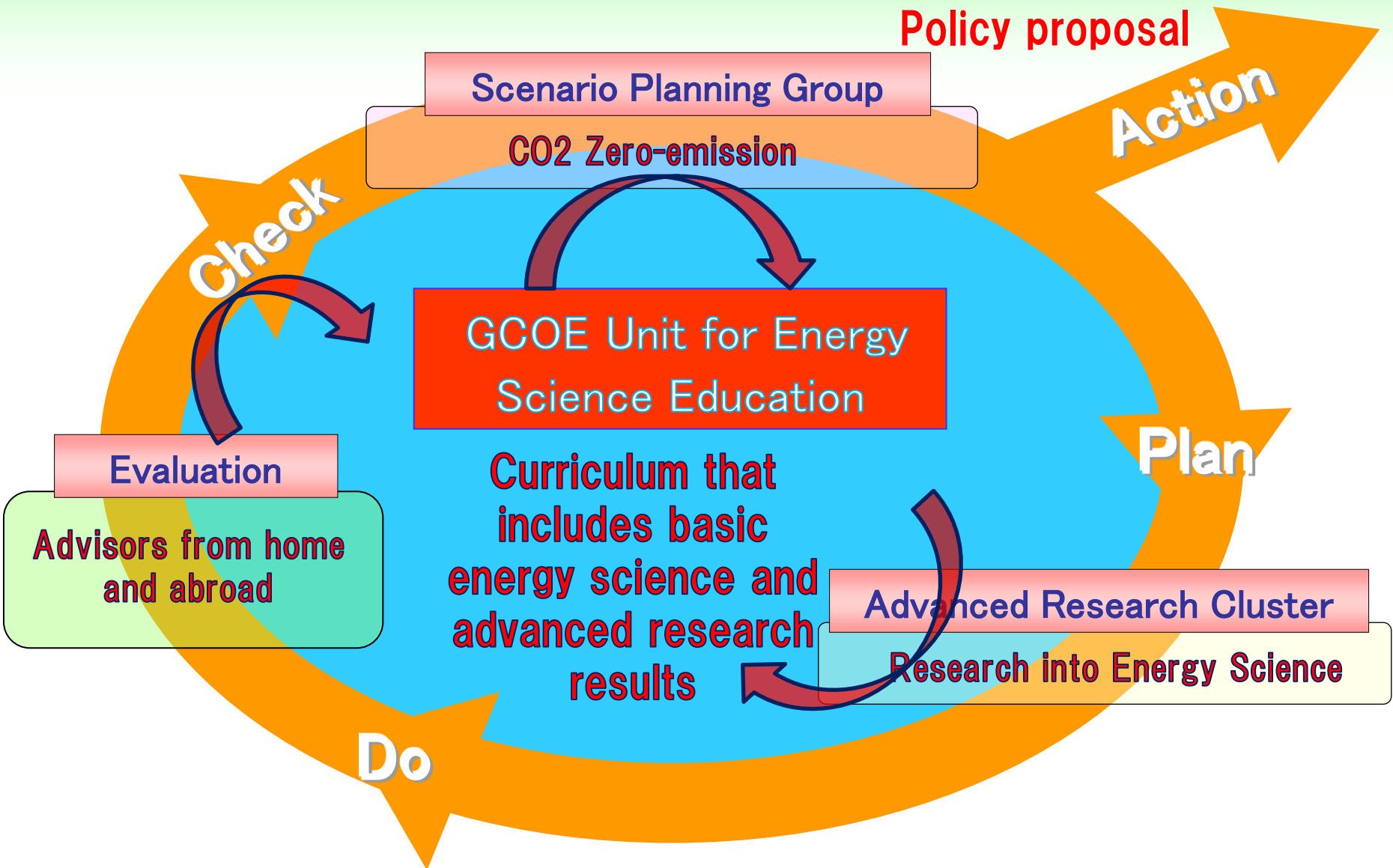
Information transmission  
Policy proposal



# 3. What are we doing ?

(Fosterage of Human Resources)

Information transmission  
Policy proposal



# 3. What are we doing ?

## (Fosterage of Human Resources)

### Fundamental Principle of the GCOE Unit for Energy Science Education

- Who has comprehensive ability to have a profound knowledge regarding the energy and environmental issues, to understand both the social and human scientist and the natural scientist, and to carry out collaborative work.
- Who has independence to organize a research group for the intended research, and to perform the research cooperating with other researchers.
- Who has internationality to have an international perspective, a communication ability, and a world-class standard research ability.
- Who has potential to contribute in solving the energy and environmental issues which relate deeply to the sustainable development of human beings.



# 3. What are we doing ?

## (Education Program)

Graduate School of Energy  
Science

Department of Nuclear  
Engineering

### GCOE Unit for Energy Science Education

(compulsory) "Open Recruitment Group Research" containing both the social and the human science and the natural science toward a CO2 zero emission

(compulsory) "Advanced Research"

(compulsory) "Field Training"

(compulsory) "Research presentation"

Course in English, International Internships

● RA-TA

Foreign Students Education

Self-Support backup for  
Young Researcher  
(Career Path Support)

- GCOE Assistant Professor
- PD

International Leader

- Research and Training at International Organization
- Accept Students from International Organization

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# What are we doing ?

(Program)  
Department of Nuclear Engineering

Science Education

Group Research" containing both the social and science toward a CO2 zero emission



(compulsory) "Field Training"

(compulsory) Research

Course in English, Intern

Self-Support backup for Young Researcher (Career Path Support)

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- PD



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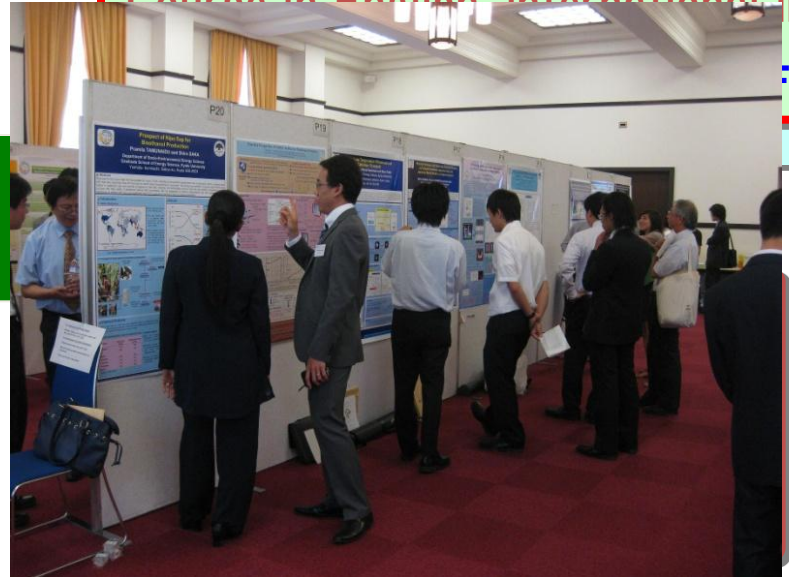
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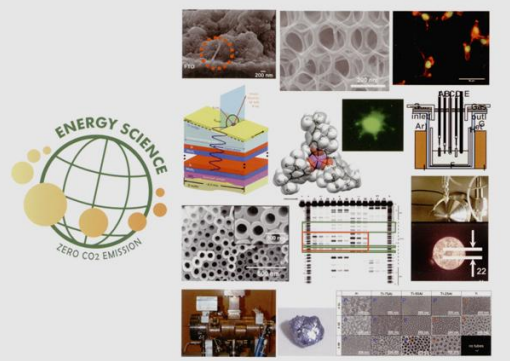




The 3rd Kyoto-Erlangen Symposium  
on Advanced Energy and Materials



**Report of Overseas Study**  
GCOE Unit for Energy Science Education



Kyoto University Global COE Program  
Energy Science in the Age of Global Warming  
—Toward CO2 Zero-emission Energy System—

September 3-4, 2009

@University of Erlangen-Nuremberg, Germany

(compulsory) Field Training  
(compulsory) "Research presentation"

Course in English, International Internships



Foreign Students

Education

International Leader

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GCOE Unit

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(compulsory) "Advanced Field Training"  
(compulsory) "Field Training"  
(compulsory) "Research project"  
Course in English, International



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# **3. What are we doing ?**

## **(Transmission the Achievement)**

- (1) Information transmission through website.**
- (2) Publication of Annual Reports, quarterly newsletters, Books, Self-Inspection and Evaluation Repots, in English and Japanese.**
- (3) Hosting domestic and international symposiums and activity report meetings.**
- (4) Hosting of an industry-government-academia collaboration symposium and citizen lectures.**
- (5) Co-hosting related meetings domestic and international such as SEE (Sustainable Energy and Environment) forum and so on.**



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- News Letter
- GCOE Energy Seminar
- Annual Report
- Self-inspection and Evaluation Report



### What's New

[The 2nd GCOE International Symposium](#) Aug. 19-20, 2010, Kyoto, Japan [detail](#)

[This Web Site is Renewal! Results in Fiscal year 2008 and 2009 are Shown!!!](#)

[GCOE Annual Report 2009](#) [pdf file](#)

[Industry-University Cooperation Symposium](#) Dec. 14, 2009, Kyoto Terra [Japanese info.](#)

[Sixth GCOE Energy Seminar](#) Oct. 26, 2009 [detail](#)

[6th SEE Forum Meeting](#) Nov. 2009, Yogyakarta, Indonesia [detail](#)

[Fifth GCOE Energy Seminar](#) Oct. 6, 2009 [detail](#)

### EMSES NEWS

[8th EMSES Web Site is Opened!!!](#) [detail](#)

### Closeup

The 2nd GCOE International Symposium

and

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# Sustainable Energy and Environment Forum (SEE Forum) – Since Nov. 2006

**SEE Forum** is an **Asia-Pacific academic forum** for global climate and energy security issues of common concern among an Asia-Pacific region.

**Objective:** To promote “**New Energy Initiatives\*1**” and to seek academic network that will contribute to solving the global climate and energy security issues.

## Participating members

- **Kyoto University (Chair), Japan**
- **Joint Graduate School of Energy and Environment (Co-chair), Thailand <Japan>**  
TIT, AGU, KIT, Osaka Univ., Saga Univ., Kumamoto Univ., AIST, NIAES, etc.
- <**ASEAN**>
- **ASEAN University Network (AUN);**  
22 Participating Universities, RUA, UM-Sabha, etc.
- <China, Korea, India>
- Peking Univ., Ajou Univ., IIT-D

**More than 40 academic & research organizations**

## Activity

### ● Information exchange



Pattaya, ( Nov. 2007)



Bangkok, ( May. 2009)

**6th SEE Forum**  
(Nov. 2009)  
Yogyakarta

**7th SEE Forum**  
(Sep. 2010)  
Hanoi

### ● Research Collaboration

**Establishment of Network of Excellences (NOEs)**

- Human Capacity Building (NECSE)
- Journal Publishing (JSEE)





# WREC

2009 - Asia [www.wrec2009asia.com](http://www.wrec2009asia.com)

## World Renewable Energy Congress 2009 - Asia

**19-22 May, 2009**  
**BITEC, Bangkok, Thailand**

### Important Dates

- 30 January 2009** Abstract submission
- 15 February 2009 Notification of acceptance
- 15 April 2009 Deadline for full paper submission
- 15 April 2009 Deadline for registration

Incorporating



ASIA INTERNATIONAL RENEWABLE ENERGY CONFERENCE AND EXHIBITION 2009



The 3<sup>rd</sup> International Conference on Sustainable Energy & Environment (SEE 2009)

Co-organised by



In Collaboration with



### Secretariat of WREC 2009 - Asia

The Joint Graduate School of Energy and Environment (JGSEE)  
King Mongkut's University of Technology Thonburi  
126 Pracha-Uthit Road, Bangkok, Tunghu, Bangkok 10140 Thailand  
Tel: +662 4706309-10 Ext. 4133, 4134, 4152. Fax: 662 8728905  
E-mail: [secretariat@wrec2009asia.com](mailto:secretariat@wrec2009asia.com)

Under Patronage of WREN



Officially Supported by



# 5<sup>th</sup> SEE Forum in Bangkok







November 23 - 26, 2009

Grha Sabha Pramana - Gadjah Mada University  
Yogyakarta - Indonesia

## International Symposium on Sustainable Energy & Environmental Protection 2009

*in conjunction with*  
Indonesian Catalysts Society (MKI) Meeting  
The 6th Sustainable Energy and Environment (SEE)  
Forum Meeting

6<sup>th</sup> SEE Forum  
in Yogyakarta



# Eco-Energy and Material Science and Engineering Symposium (EMSES)



MOU signing ceremony for JST joint research between Japan and Thailand



# Nuclear Energy Seminar in Thailand

Nov.7 - Dec. 19, 2009 at RMUTT, Thailand

Sponsored by Kyoto University Global COE program, “Energy Science in the Age of Global Warming”

Co-sponsored by Energy and Materials Science and Engineering Symposium (EMSES)

Co-sponsored by Nuclear Forum Thailand





# 4. What shall we accomplish ?

(Expected Results and Social Significance and Spillover Effect)

- **Fosterage of Human Resources**

Academic Researchers, Industrial Researchers, Policy Makers,  
Strategist who will support an International Organization

- **Social Value and Pervasive Effect**

- Contribution toward Realizing CO2 Zero-emission and Policy Proposals
- Spread of Energy Science and New Approach for Education and Research
- Establishment of Information Channel, Human Exchange Path and Education System
- Contribution to Utilization of Nuclear Power
- Contribution to Prevention of Global Warming and Energy Security
- Spread of Effective Achievements to the South-east Asian Nations through International Cooperation, Activities at Platform Universities and so on.

# 4. What shall we accomplish ?

(Action after the Global COE)

- **Organization of “ Education and Research Unit for Energy Science”**
  - **Development of System for Human Resources Cultivation and Advance of Energy Study**
- **Formation of Network including Southeast Asian Nations.**
  - **Global Network and NOE(Network of Excellence)**
- **Concept of CO2 Zero-emission**
  - **Global Policy and Technology**

# NOE Roundtable Meeting 2009.11.23





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(Action after the Global COE)

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# Energy Science in the Age of Global Warming

## – Toward CO<sub>2</sub> Zero-emission Energy System – “

**Thank you for your kind attention**

