低炭素エネルギーシステム構築とSATREPS
（SATREPS and Low Carbon Energy System）

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2013年度国際シンポジウム
「新興国への低炭素技術の適用促進」
IGES関西研究センター/APNセンター/兵庫県

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@ANAクラウンプラザホテル、神戸
Fundamental Objectives of Energy Policy in Japan

Damaged Items by Fukushima Disaster; (Targets in 2010 Strategic Energy Plan)

3E
- Energy Security: (semi-)domestic resources, upstream investment, reserve, diversification, fuel cycle, diplomacy ...
  (energy independence ratio of 70% in 2030)
- Economics/Growth: green innovation/growth, export of power plants, energy service co. ...
  + review of power costs
  (top-class global market shares for energy-related goods/systems)
- Environment: low carbon society, zero emission power (70% in 2030; 50% by nuclear), energy saving, CCS ...
  (energy related CO2 in 2030 reduced by 30% from 1990 level)

+S
- Safety (Trust?): risk of low level radiation exposure (scientific uncertainty)
  risk of Severe Accident (low probability, but high consequence)
Power Generation in Japan by sources for 1965-2011

(Source: エネルギー経済統計要覧 2013)
Power Generation Mix in 2030

Targets in current strategic energy plan

Renewables: 20%

Nuclear: 50% \rightarrow Impossible after Fukushima

Fossil-fired: 30% \rightarrow 0, 15, 20-25%? depending on the recovery of public trust on nuclear safety

How to fill the gap of reduced nuclear power?

1. Further energy savings: ambitious targets are incorporated in current strategic energy plan \rightarrow behavioral change using ICT as well as efficiency improvements

2. More renewables: PV: 53GW and wind power10GW in current strategic energy plan \rightarrow power system stability issue \rightarrow smart grid?; more geothermal, more small hydro, more biomass by FIT policy

3. Clean use of fossil fuels: notably natural gas, clean coal incl. CCS, international applications of Japanese efficient technologies
Process for Energy/Environment Policy Making in Japan

Political Power Shift from LDP to DPJ in Sept. 2009

Too ambitious **Climate Target for 2020** (25% reduction from 1990) in 2009

Fukushima Accident in 2011 → Energy and Environment Council (ministerial members, political)

**Full scope FIT** implemented in 2012

Start of **Power System Reform** (continuing)

Innovative **Strategy for Energy and the Environment** in 2012

(Zero Nuclear by the end of 2030s)

Ordinary Administrative Process

- Advisory Committee for Energy and Natural Resources (METI)
- Atomic Energy Commission (CAO)
- Central Environmental Council (ME)
- Industry Structure Council (METI)

→ Strategic Energy Plan

- Long-term Nuclear Plan
- Basic Environmental Plan
- Climate Change Policy

National Debates (incl. deliberative poll)

Political Power Shift from DPJ to LDP in Dec. 2012


(Keep Nuclear Option)

**Re-examination of climate change policy**: zero-based review of the 25% reduction target by COP19: minus 3.8% from 2005 (3.1% increase from 1990)
Low Carbon Society (renewable energies • • •)

Stability of Power System (smart grid, smart meter, smart energy network • • •)

Integrating Supply Side with Demand Side (power grid and automobile integration • • •)

Energy Saving by behavioral change

Resilient Energy System

ICT Security (cyber-terrorism, privacy protection • • •)

Reform of Energy Systems

New Economic Growth (global standards, systems competitiveness • • •)

Energy-Information Integration + Smart Community
Reconstruction of Energy Policy as well as Climate Response Strategy

- **Keep Nuclear Option:** enhanced safety measures, risk communication of low level radiation exposure and severe accident

- **Further Energy Saving:** behavior change using ICT as well as further energy efficiency improvements

- **Maximum Introduction of New Renewables:** FIT, using the opportunities of restoration (biomass in debris, damaged land), smart grid to maintain power stability

- **Clean Use of Fossil Fuels:** natural gas, clean coal (A-USC, IGCC, CCS), carbon free H₂ (brown coal + CCS), bilateral offset credits

- **Resilience of Energy System:** strengthened power grid, gas pipeline, and liquid fuel supply chain, decentralized energy system with ICT to secure local energy supply in emergency

**Common Key Direction:** Mobilization of Demand-side Resources
ACE(エース)：「Actions for Cool Earth(美しい星への行動)」
攻めの地球温暖化外交戦略

理念

気候システムの温暖化については、疑の余地がない。(IPCC 第5次評価報告書)
クールアース50から6年。日本は、「美しい星」実現のため、東日本大震災及び原発事故を乗り越えつつ技術革新及び普及の先頭に立ち、国際的なパートナーシップを強化し、国際社会をリードする。
「2050年世界半減、先進国80％削減」の目標実現に向け、今こそ具体的なアクションが必要。日本は「エース」として、その努力の先頭に立つ。

イノベーション：革新的な技術開発は、この目標実現に不可欠。日本は技術のブレーキングループの先頭に立つ。

技術の創造（革新的な技術開発の促進）
- 2020年度までの国際的財政を前提としつつ、官民両業で1100億ドルの投資を目指す。
- 改訂された環境エネルギー技術革新計画を着実に実行し、これらの技術が世界中で開発・普及されることにより、2050年世界温暖化に必要な量の約8割の削減が可能。
(CCS(二酸化炭素固定), 革新的構成材料, 人工光合成, 途上国ニーズに応える技術開発)
- イノベーションの加速による世界の産学官トップによる、いわば「エネルギー・環境技術部ダボス会議」を毎年開催。

アプリケーション：日本の誇る低炭素技術を展開し、温暖化対策と経済成長を同時実現。

技術の普及 → 直ちに確実な排出削減を実現
- 3年で二酸化炭素排出削減を40%を達成する目標を掲げ、国連気候変動枠組条約の下、JBCやNECと連携したJCM特別金融スキーム（JSF）の創設、JICA等の支援プロジェクトに調達化を促進するための資金の準備等によりプロジェクトを加速する。
- 技術の国際普及に向けた基盤づくり（例えばLEDや遮熱窓等のエネルギー効率性の評価手法を戦略的に国際標準化）

世界最先端の温室効果ガス覘察の新衛星の2017年度打ち上げを目指す。
- アジアを中心に国別・大都市別の排出量を測定し、削減対策を提案。対策効果の検証・評価を行う。

パートナーシップ：脆弱国を支援し、日本と途上国のWin-Win関係を構築。技術展開と技術革新の基礎を作る。さらに、気候変動における国際議論に積極的に関与する。

官民合わせた途上国支援で2013年からの3年間に計1兆6000億円
(約160億ドル、公的資金は約130億ドルで、先進国に期待される3年間計約500億ドルの1／3を日本が担う)
- 脆弱国への防災支援の強化（災害復旧スパードパイク、優先条件等、円借款の新制度も活用）。
- 公的金融手段を活用し、気候変動分野への民間資金の幅広い増大を促す。
- 国際枠組みの構築に向けた議論を日本がリード。

美しい星（Cool Earth）の実現に技術で貢献

出所：第27回地球温暖化対策推進本部会合(2013年11月15日)
SATREPS

= Science and Technology Research Partnership For Sustainable Development

SATREPS is a JST and JICA program for research projects targeting global issues and involving partnerships between researchers in Japan and developing countries
Mission of SATREPS

- to enhance science and technology addressing global issues
- to realize social implementation with the developed knowledge

through

- International Cooperation
Program Description

(1) Research Areas: 5 areas

- Environment and Energy
  - Global-scale Environmental Issues
    - Climate change mitigation & adaptation,
      Safe water supply, Biodiversity conservation..
  - Low-carbon Society
    - Biomass energy, Energy efficiency, Renewable energy..

- Bio Resource Utilization
  - Breeding and cultivation technology,
    Bio resource management..
  - Natural disaster mechanisms (Earthquakes, Volcanic..),
    Natural disaster mitigation..

- Infectious Diseases Control
  - Diagnostic tool, Vaccines, Therapeutic products
development (Avian influenza, HIV/AIDS, Dengue fever..)

(2) Research Period: 3-5 years
SATREPS aims

Enhancing cooperation in science & technology

~ Building win-win relationships between Japan and developing countries ~

New technology, new knowledge

~ Addressing global issues and advancing science ~

Capacity Development

~ Boosting self-reliant research and development capacity and sustainable research systems, training human resources and coordinating networking between researchers ~

Practical utilization

~ Expecting outcomes to make a real contribution to society ~
SATREPS in the world

78 projects in 39 countries since 2008
## Selected programs

<table>
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<th>Research Areas</th>
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<td>Energy systems for low carbon society</td>
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<td>20</td>
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<td><strong>Total (78)</strong></td>
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SATREPS Projects: Beginning to End

Project Progress

Follow-up Evaluation

Project Ends

Terminal Evaluation

Mid-term Review

About 3-6 Months before End

Start of International Joint Research

R/D signed (JICA and developing country research institution)

MOU signed (Research institute)

Formal Approval

Ex-ante Evaluation

Examination of Project Details

Joint Approval

MOU and R/D signed after about 1 year

Project Selection (Provisional)

Project Selection (Provisional)

Request Review

Peer Review

Request for Technical Cooperation

Call for Proposals

JICA

Collaboration/Cooperation

JST

Here
Global-Scale Environment Issues

Research Partnership for the Application of Low Carbon Technology in India

Director SUZUKI Yutaka / Kansai Research Centre, Institute for Global Environmental Strategies (IGES)

The Energy and Resources Institute (TERI)

General Description of the Research Project

This project aims at formulating an international scheme to accelerate application of Japanese low carbon technologies to India by developing strategies, which include identifications of appropriate technologies for Greenhouse Gas (GHG) reductions both in India and Japan, improvement of engineers’ knowledge in demand side energy management, establishment of knowledge sharing scheme, compiling technical information of low carbon technologies and construction of a joint working system with private firms. In particular, our research combines several surveys such as on electricity consumption of Indian energy-intensive manufacturing industries and urban infrastructure related industries, investment opportunities and success factors as to introduction of these technologies and its barriers through the selected pilot studies.

<Research Period : 4 Years (2010-2014)>
Applying Japanese low carbon technologies to small and medium-sized enterprises in India

India is the world’s third largest emitter of greenhouse gases. Conversely, this also means that there is the potential for substantial reduction in emission. To this end, an effort is underway to introduce Japanese low carbon technologies to small and medium-sized enterprises in India. This project will determine the needs of small and medium-sized enterprises, analyze the factors which lead to successful technology application, propose specific strategies on assessment systems for costs and investment periods, as well as conduct a study to select technologies that have high energy-saving effect and are highly applicable to India.

Searching among case studies of technology introduction to locate technologies that match Indian needs

In addition to inspection tours by Indian researchers to relevant Japanese facilities, case studies of the introduction of technologies in a number of industrial sectors will be collected and the process of introduction, differences in preconditions and so on will be identified to develop mechanisms for the application of low carbon technologies in accordance with Indian needs. Pilot projects will be implemented on a trial basis to enable the Indian side to select the most appropriate technologies for them.
Thank you for your attention!