Introduction of Japan's STI Policies, an International Cooperation program and its Energy Research Projects

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The International Science and Technology Center
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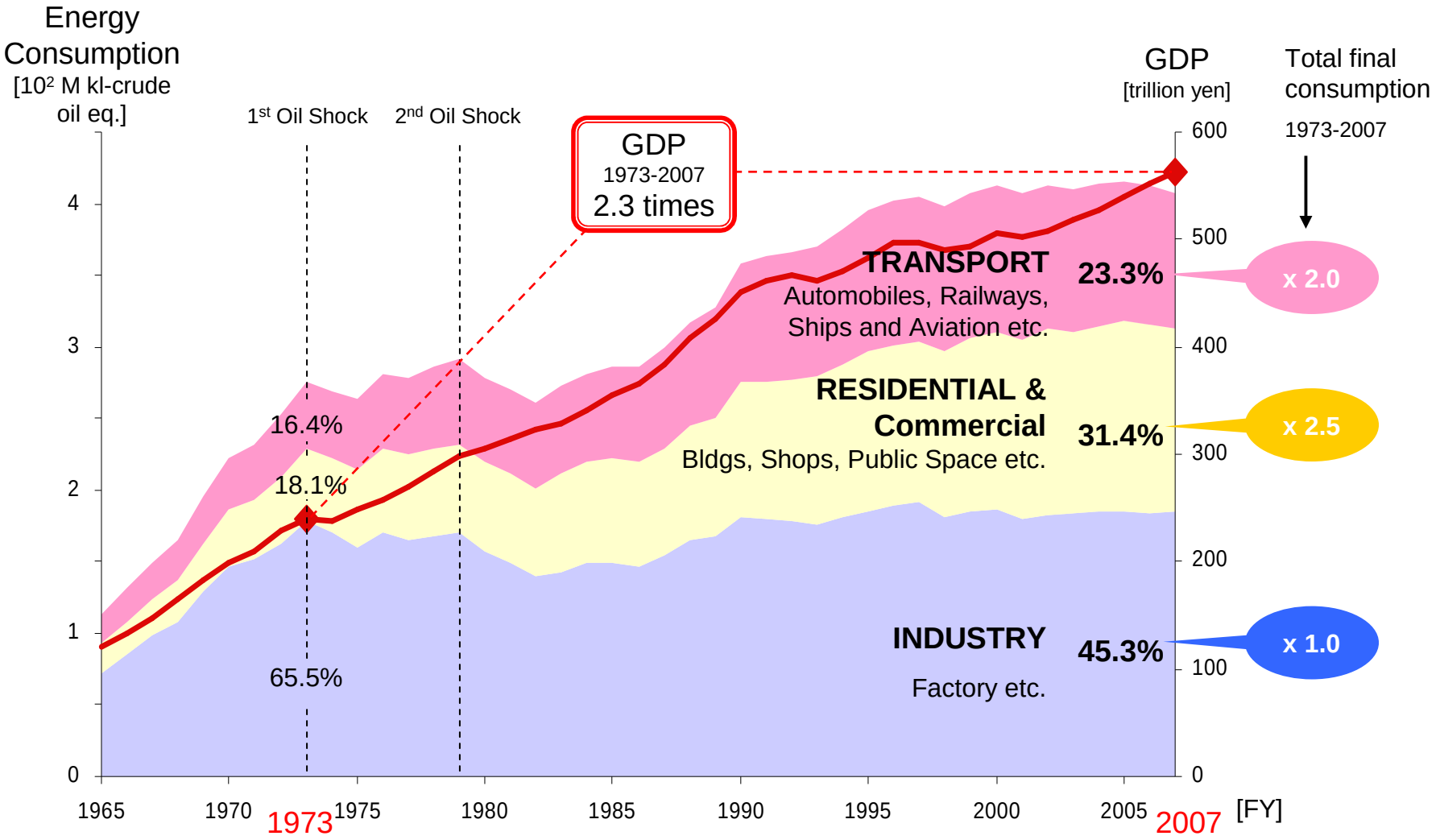
Energy Consumption in Japan



(Made by JST-CRDS based on the Sources: Energy Balances in Japan, Agency for Natural Resources and Energy, METI; Annual Report on National Accounts, Cabinet Office; Handbook of Energy & Economic Statistics in Japan, Institute of Energy Economics, Japan)

Strategic Energy Plan of Japan

The Strategic Energy Plan of Japan articulates the fundamental direction of energy policy in Japan, based on the Basic Act on Energy Policy.

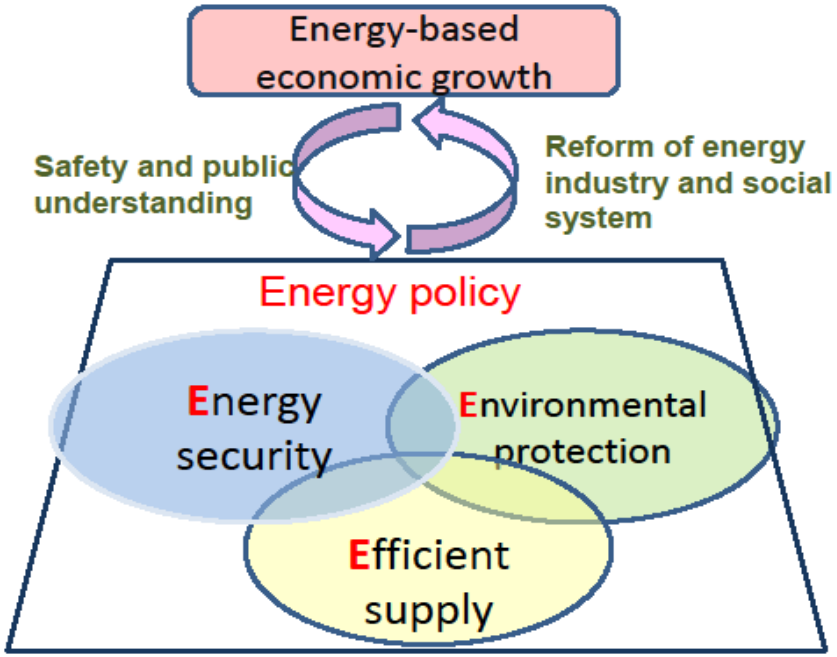
The Strategic Energy Plan of Japan is required to be reviewed at least every three years, and to be revised if needed. (Formulation: 2003, revision: 2007 and 2010)

Basic point of view

○The basic point of view in energy policy is **energy security**, **environmental protection**, and **efficient supply**.

○In this revision, two new points of views were added. These are: **energy-based economic growth** and **reform of the energy industrial structure**.

○Japan will **fundamentally change its energy supply and demand system by 2030**.



-Formulating the revised Strategic Energy Plan of Japan is consistent with the "New Growth Strategy"
-Directing bold and quantitative policy targets and specific policy measures

(Source: Minister of Economy, Trade and Industry: http://www.meti.go.jp/english/press/data/pdf/20100618_08a.pdf)

Ambitious targets toward 2030

◎**Doubling the energy self-sufficiency ratio** (18% at present) **and the self-developed fossil fuel supply ratio** (26% at present) and as a result, raising **its "energy independence ratio"** (※) **to about 70%** (38% at present).

(※) The "energy independence ratio" is an indicator that combines the self-sufficiency energy with the self-developed energy supply divided by total primary energy sources. An average energy self-sufficiency rate among the OECD countries is almost 70%.

◎Raising **the zero-emission power source ratio to about 70%** (34% at present).

◎**Halving CO2 emissions from the residential sector.**

◎**Maintaining and enhancing energy efficiency in the industrial sector at the highest level in the world.**

◎**Maintaining or obtaining top-class shares of global markets for energy-related products and systems**.

○**Domestic energy related CO2 emissions will be reduced by 30% or more in 2030** compared to the 1990 level, if we promote policies sufficiently.

○**A 30% emissions reduction** means that about **a half of the reduction to be achieved from the current level to 2050 (▲80% compared to 1990) will have been realized in 2030**.

(Source: Minister of Economy, Trade and Industry:
http://www.meti.go.jp/english/press/data/pdf/20100618_08a.pdf)

Specific measures to achieve targets (supply side)

Securing resources and enhancing supply stability

- Deepening strategic relationships with resource-rich countries through **resource diplomacy by the PM and ministerial level** and **public- private partnership with the relevant industrial sectors**
- Enhancing **support for risk money** for upstream concessions (JOGMEC, ODA, policy-based finance, trade insurance, etc.)
- Raising **self-sufficiency ratio of strategic rare metals** (including recycling and alternative materials development) to more than **50%**
- Enhancing development of domestic and overseas resources including methane hydrate and sea-floor hydrothermal deposits, etc.

Independent and environment-friendly energy supply structure

○Expanding the introduction of renewable energy

- **Expanding the feed-in tariff system** (wind, middle-small size hydro, geothermal, and biomass in addition to photovoltaic)
- Strengthening support for introduction (R&D support, FS, initial cost support, tax reduction for introduction, etc.)
- Power grid stabilization and relevant deregulation

○Promoting nuclear power generation

- Building **9 new or additional nuclear plants** (with the overall plant capacity utilization rate at about **85%**) **by 2020** and **more than 14** (with the rate at about **90%**) **by 2030**
- Achieving long-term cycle operations and shortening operation suspensions for regular inspections
- Improving the power source location subsidy system (by considering measures to promote the construction and replacement of nuclear plants and place a greater weight on electricity output in calculating subsidies)
- Achieving the nuclear fuel cycle establishment including the development of "pluthermal" and fast breeder reactors
- International cooperation for nonproliferation and nuclear safety

○Advanced utilization of fossil fuels

- Requiring to **reduce CO2 emissions of the plants to the IGCC plant levels in principle**, when planning to construct new coal fossil power plants by the beginning of the 2020s.
- Accelerating the CCS (carbon capture and storage) technology development for an early commercialization (around 2020s), requiring **new coal thermal plants for future planning to be CCS-ready** and to be equipped with CCS technology by 2030, on the precondition of commercialization.
- Spreading its advanced clean coal technologies overseas and promoting further technology development and demonstration domestically.

○Enhancing electricity and gas supply systems

- Building **the world's most advanced next-generation interactive grid network as early as possible in the 2020s**
- Considering specific measures to double the electricity wholesale market in three years.

(Source: Minister of Economy, Trade and Industry:
http://www.meti.go.jp/english/press/data/pdf/20100618_08a.pdf)

Specific measures to achieve targets (demand side)

Realizing a low carbon energy demand structure

Industrial sector

- **Enhancing the world's most advanced energy efficiency** through introducing the most advanced technologies for replacing equipment
- Enhancing the energy conservation law operations, commercializing innovative technologies and enhancing support for fuel conversion, etc.

Residential sector (i.e. households and offices)

- Making **net-zero-energy houses available by 2020** and realizing **net-zero-energy houses in average by 2030**.
- Setting **compulsory energy-saving standards for houses and compiling compulsory standardization targets,** timing and support measures within this year under the cooperation with the Ministry of Land, Infrastructure, Transport and Tourism (MLIT)
- Prevailing **highly efficient water heaters to the amount of 80-90% of all family units** in 2030
- Replacing **100% of lights with highly-efficient lights** (including LED and organic EL lighting) on **a flow basis by 2020** and on **a stock basis by 2030**

Commercial sectors (i.e. offices)

- Realizing **net-zero-energy buildings in new public building by 2020** and realizing **net-zero-energy buildings in average by 2030**
- Introducing **new integrated standards for energy consumption at all buildings for implementation in two years**
- Enhancing support and regulatory measures (including top-runner standards) to diffuse energy-saving consumer electronics, energy-saving information technology equipment, heat pump water heaters, fuel cells, hybrid construction machines and other highly efficient equipment

Transportation sector

- Raising **next-generation vehicles' share of new vehicle sales to up to 50% by 2020 and up to 70% by 2030** by mobilizing all possible policy measures (including 2020 fuel efficiency standards, introduction support measures and diffusion of battery chargers)

Cross-sectional efforts

- Considering municipal-level energy use optimization policy measures

Building next-generation energy and social systems

- Realizing the smart grid and smart communities by promoting an intensive cross-sectional mobilization of relevant policies, consideration of special zones, **demonstration projects both home and abroad**, and **strategic international standardization.**
- Promoting the development, installation of smart meters and relevant energy management systems (that can record detailed energy supply-demand data and control a variety of equipment), seeking to **introduce them for all users, in principle, as early as possible in the 2020s**
- **Diffusing fixed fuel cells and developing a hydrogen supply infrastructure**, including hydrogen stations for fuel cell vehicles

Developing and diffusing innovative energy technologies

- **Drafting a new energy innovation technology roadmap** (within 2010) to accelerate the development of innovative energy technologies
- **Developing the public-private cooperation** arrangements for supporting the international diffusion of highly efficient and low carbon technologies
- **Building a new mechanism to appropriately evaluate how Japan's international diffusion of its technologies, products and infrastructure contributes to reducing global greenhouse gas emissions**

(Source: Minister of Economy, Trade and Industry: http://www.meti.go.jp/english/press/data/pdf/20100618_08a.pdf)

STI Policy Under Abe Administration

- Greatest Mission of Abe Administration :

  Restoration of robust economy

- Launch of "Three Arrows" for economic revival :

  1st arrow *Aggressive monetary policy ;*

  2nd arrow *Flexible fiscal policy ;*

  3rd arrow *Growth strategy*

  "Japan Revitalization Strategy"

- Role of STI to contribute to the formulation of the Growth strategy :

  Formulation of "Comprehensive STI Strategy"

Comprehensive STI Strategy

Shape of the nation to be attained in 2030

- Remaining a world top-class economic power in a sustainable manner
- People enjoying wellness, security and safety
- Contributing actively to the progress of humankind and international community

3 perspectives to promote STI policies

- Acting "**smart**"
  (utilization of IT to create knowledge industry)
- Implementing "**system**" thinking
  (combining strengths to multiple added value)
- Thinking "**global**"
  (always looking outside Japan for interaction)

Source: Cabinet office of Japan (http://www8.cao.go.jp/cstp/english/doc/20130607cao_sti_policy.pdf)

Comprehensive STI Strategy

Challenges to be addressed by STI

- Five grand policy challenges to tackle toward realizing the shape of the nation to be attained in 2030:

1. Realization of **clean and economical energy system**
2. Realization of **a healthy and active ageing society** as a top-runner in the world
3. Development of **next generation infrastructures** as a top-runner in the world
4. **Regional revitalization** taking advantage of the regional resources
5. Early **recovery and revitalization** from the Great East Japan Earthquake

For more information:
http://www8.cao.go.jp/cstp/english/index.html

Source: Cabinet office of Japan (http://www8.cao.go.jp/cstp/english/doc/20130607cao_sti_policy.pdf)

Comprehensive STI Strategy

Challenges to be addressed by STI
1. Realization of clean and economical energy system

Focused policy challenges	Focused measures
Stable and low-cost supply of clean energy (production)	(1)Increasing supply of renewable energy through innovative technology
	(2)Realizing highly efficient and clean innovative technology for electric generation and combustion
	(3)Diversifying sources and resources of energy
Improved utilization efficiency and consumption reduction through new technology (consumption)	(4)Efficient energy utilization through the development of innovative device
	(5) Efficient energy utilization through the evelopment of innovative structure material
	(6)Sophisticating technology for energy utilization on the demand side
Integration of sophisticated energy networks (distribution)	(7)Establishing network systems to promote diverse energy utilization
	(8)Sophisticating innovative technology for transformation, storage and transportation of energy

Source: Cabinet office of Japan (http://www8.cao.go.jp/cstp/english/doc/20130607cao_sti_policy.pdf)

Background: Japan S&T Structure and Policy
~ Recent Major Events Related to S&T Policy ~

1995 ***The Science and Technology Basic Law***

1996 ***The 1st Science and Technology Basic Plan （1996～2000）***

1999 Act on Special Measures for Industrial Revitalization
(Japanese version of the Bayh-Dole Act)

2001 ***The 2nd Science and Technology Basic Plan （2001～2005)***
National Administrative Reform: CSTP, MEXT

2001 - 2005
National Research Institutes ➪ Independent Administrative Institutions
2001 NIMS, NIED etc. 2003 RIKEN, JST etc. 2005 JAEA

2004 National University ➪ National University Corporation

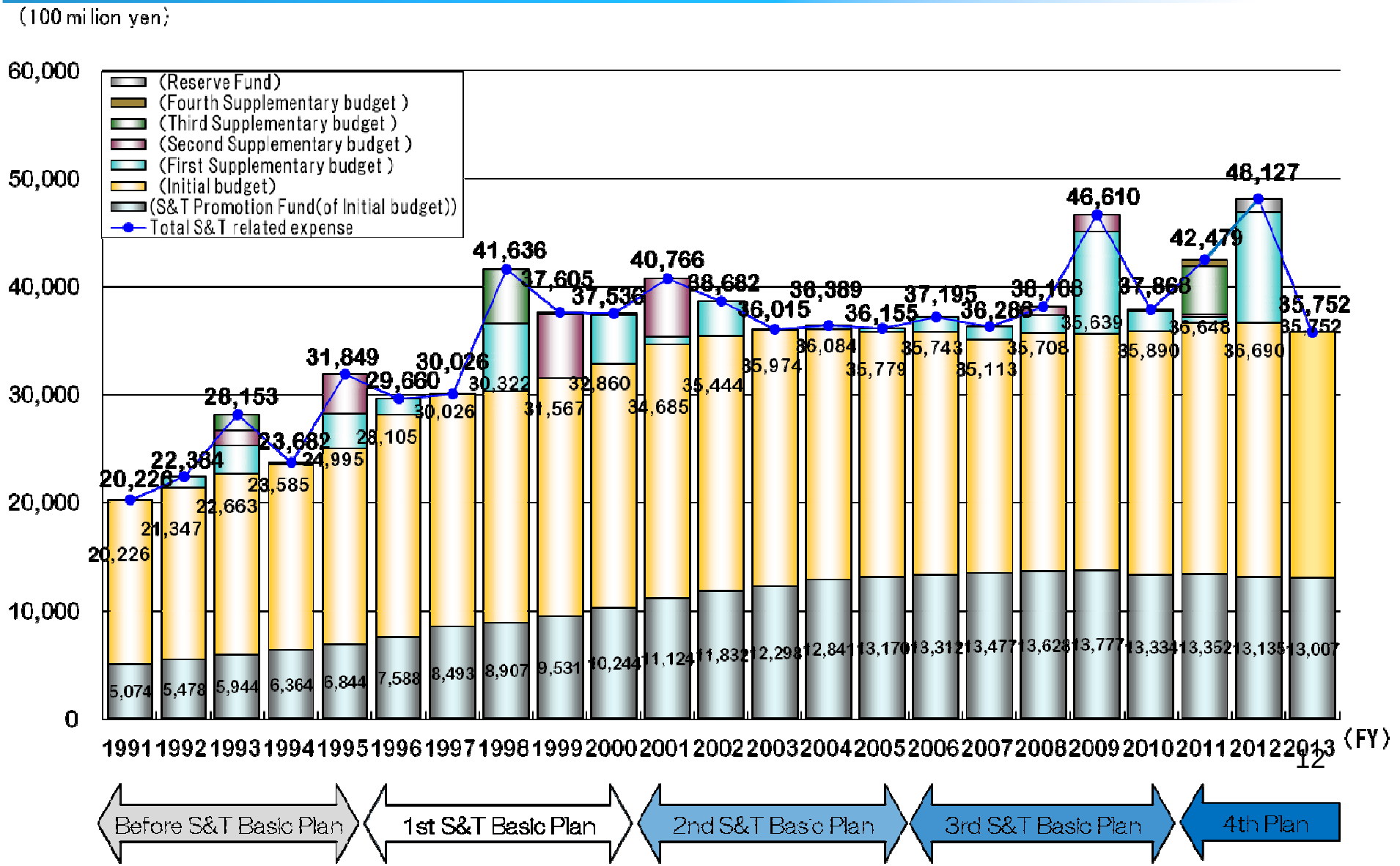
2006 ***The 3rd Science and Technology Basic Plan (2006～2010)***

2011 Great East Japan Earthquake, Fukushima nuclear power plant Accident

2011 ***The 4rd Science and Technology Basic Plan (2011～2016)***

2013 Comprehensive STI Strategy

Trends in Japan's S&T Related Budget



Science and Technology Basic Law

Law No. 130 of 1995. Effective on November 15, 1995

The Science and Technology Basic Law stipulations:

1. Basic principles for the promotion of S&T
 Promotion of the creativity of the researchers.
 Harmonic development of basic research, applied research and development research.
 The harmony between S&T, human, society and nature.
.
2. Responsibilities of the nation and regional public entities

3. Science and Technology Basic Plan
The Government must settle the “Science and Technology Basic Plan” for the systematic promotion of S&T measures. This plan needs to pass through a science and technology council before its deliberation. The Government must endeavor to take the necessary measures to secure funds for its implementation.

4. Measures to be taken by the government
 Promote balanced and diverse R&D.
 Ensure the nurturing of researchers.
 Maintain research facilities and installations.
 Promote the “informatization” of R&D.
 Promote research exchange.

Science and Technology Basic Law

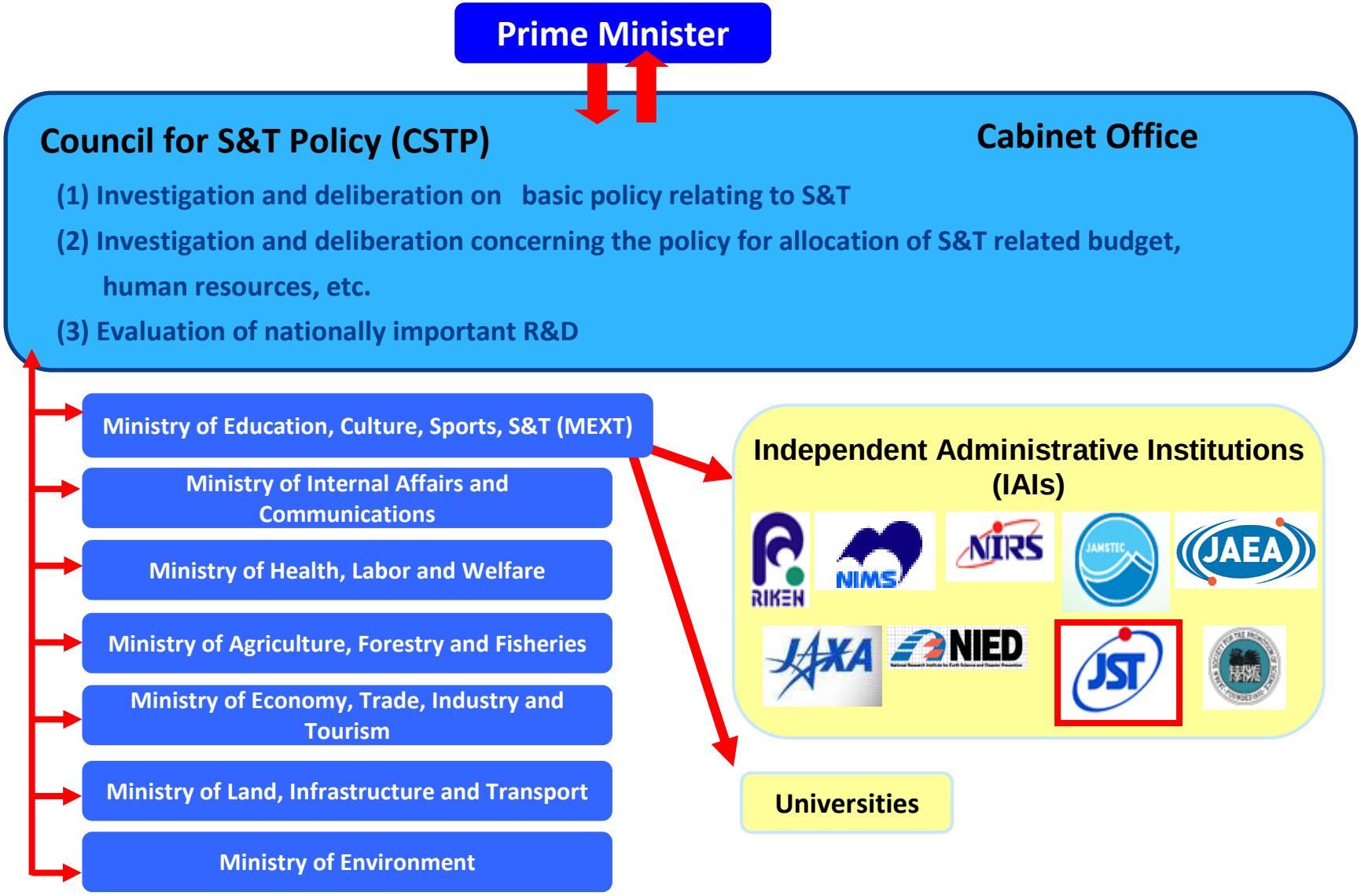
Law No. 130 of 1995. Effective on November 15, 1995

(OBJECTIVE) to achieve a higher standard of science and technology, to contribute to the development of the economy and society in Japan and to the improvement of the welfare of the nation and to contribute to the progress of S&T in the world and the sustainable development of human society through prescribing the basic policy requirements for the promotion of S&T and comprehensively and systematically promoting policies for the progress of S&T.

Chapter 1 General Provisions
(Objective)
Article 1
(Guidelines for Promotion of S&T)
Article 2
(Responsibility of the Nation)
Article 3
(Responsibility of Local Governments)
Article 4
(Necessary Consideration to be given by the Nation and Local Governments in Formulating Policies)
Article 6
(Legislative and other Measures)
Article 7
(Annual Report)
Article 8
Chapter 2 S&T Basic Plan
Article 9

Chapter 3 Promotion of R&D
(Balanced Promotion of various levels of R&D)
Article 10
(Securing Researchers)
Article 11
(Improvement of Facilities)
Article 12
(Promotion of Information Intensive R&D)
Article 13
(Promotion of Exchange in R&D)
Article 14
(Effective use of R&D funds)
Article 15
(Making public the results of R&D)
Article 16
(Support of efforts by private enterprises)
Article 17
Chapter 4 Promotion of International Exchange
Article 18
Chapter 5 Promotion of Learning on S&T
Article 19

Science and Technology Administrative System in Japan



The 3rd Science and Technology Basic Plan

Science and Technology Basic Law
（enacted in 1995）

1st Basic Plan (FY1996-2000)

 # Increase in governmental R&D expenditure
The total budget for governmental R&D expenditure exceeded 170 billion dollars

 # Construction of new R&D system
- Increase in competitive research funds
- Support plan for 10,000 postdoctoral fellows (including Ph.D students)
- Promotion of industry-academia-government collaboration
- Implementation of evaluation systems

2nd Basic Plan (FY2001-2005)

 # Three basic ideas
(i) Creation of knowledge
(ii) Vitality from knowledge
(iii) Sophisticated society by knowledge

 # Key policies
Strategic priority setting in S&T
- Promotion of basic research
- Prioritization of R&D on key national/social agenda

S&T system reforms
- Doubling of competitive research funds
- Enhancement of industry-academia-government collaboration

Total budget : 240 billion dollars

3rd Basic Plan (FY2006-2010)

 # Review of the 1st and 2nd plans
(i) The 1st and 2nd S&T Basic Plans have solidified the foundation of S&T in Japan.
(ii) “Mega-competition for knowledge” that Japan faces involves not only the United States and Europe but also Asian nations

Our decision for the future: stronger emphasis on the role of “Knowledge”

#Main Challenges
- How to form creative S&T human resources?
- Further reform of S&T related systems, leading to higher performance

NOTE: The exchange rate : 1 USD = 100 JPY

Outline of the 3rd Basic Plan

Chap.1 Basic Ideas

- Recent situation revolving around S&T
- Basic stance in the 3rd plan
- Clarification of fundamental ideas and policy goals
- Total governmental R&D investment: 25 trillion yen (250 bln dollar)

• Securing popular support to S&T, S&T beneficial to the society
• Putting emphasis on human resources development and competitive environment

Chap.2 Strategic Priority Setting in S&T

- Promotion of basic research
- Prioritization of R&D for resolving key national/social agenda
  Primary prioritized areas: Life science, IT, Environmental sciences, Nano-tech. & materials
  Secondary prioritized areas: Energy, Manufacturing & Production tech., Social Infrastructure, Frontier (outer space & oceans)
- Promotion strategy for each prioritized area

Chap.3 Reforming the S&T System

- Fostering S&T human resources and providing opportunities
- Creating scientific development and incessant innovation
- Enhancing infrastructures for S&T promotion
- Strategic commitment on international S&T activities

Chap.4 Securing Public Support and Engagement

- Responsible action regarding ethical, legal and social issues
- Reinforcement of accountability and public relations on S&T activities
- Promotion of public understanding of S&T
- Facilitation of public engagement with S&T-related issues

Chap.5 Role of the CSTP

- More efficient and effective management of governmental R&D
- Resolving institutional or operational bottlenecks
- Follow-up of the Plan and promotion of progress in S&T

NOTE: The exchange rate : 1 USD = 100 JPY

Status of the Japanese Economy (2012)

Population: **127.5Million** (a rapidly aging population)
Estimated Growth of the proportion above 65 years old:
23%(in 2012) to 30%(by 2025)

GDP: **474 JPY** **（Ranked 3rd in the world）**
3,710,000 JPY per capita（Ranked 16th in the world）
（growth has been stagnant since 1990）

GNI: **45,180 USD per capita（Ranked 13th in the world, 2011）**

Employed Population: **62.7Million** (16.5% in manufacturing, slowly declining)

Unemployment Rate: 4.3% (8% among 15-24 year olds)
(a high rate of unemployment among young people)

Overseas Production Ratio: 18.4 % in 2011
（both local production for local consumption and overseas production are gradually increasing）

Value of Exports: 63.7 trillion JPY
（vehicles, electronics, machinery, iron and steel）

Value of Imports: 70.7 trillion JPY
(mineral resources, food, chemical products, raw materials）
(a deficit of 6.9 trillion JPY)

Figures from Cabinet Office, Ministry of Finance and Ministry of Economy, Trade and Industry materials

Sustainable Thriving in the Globalized and Interdependent World

Issue-driven S&T and Innovation

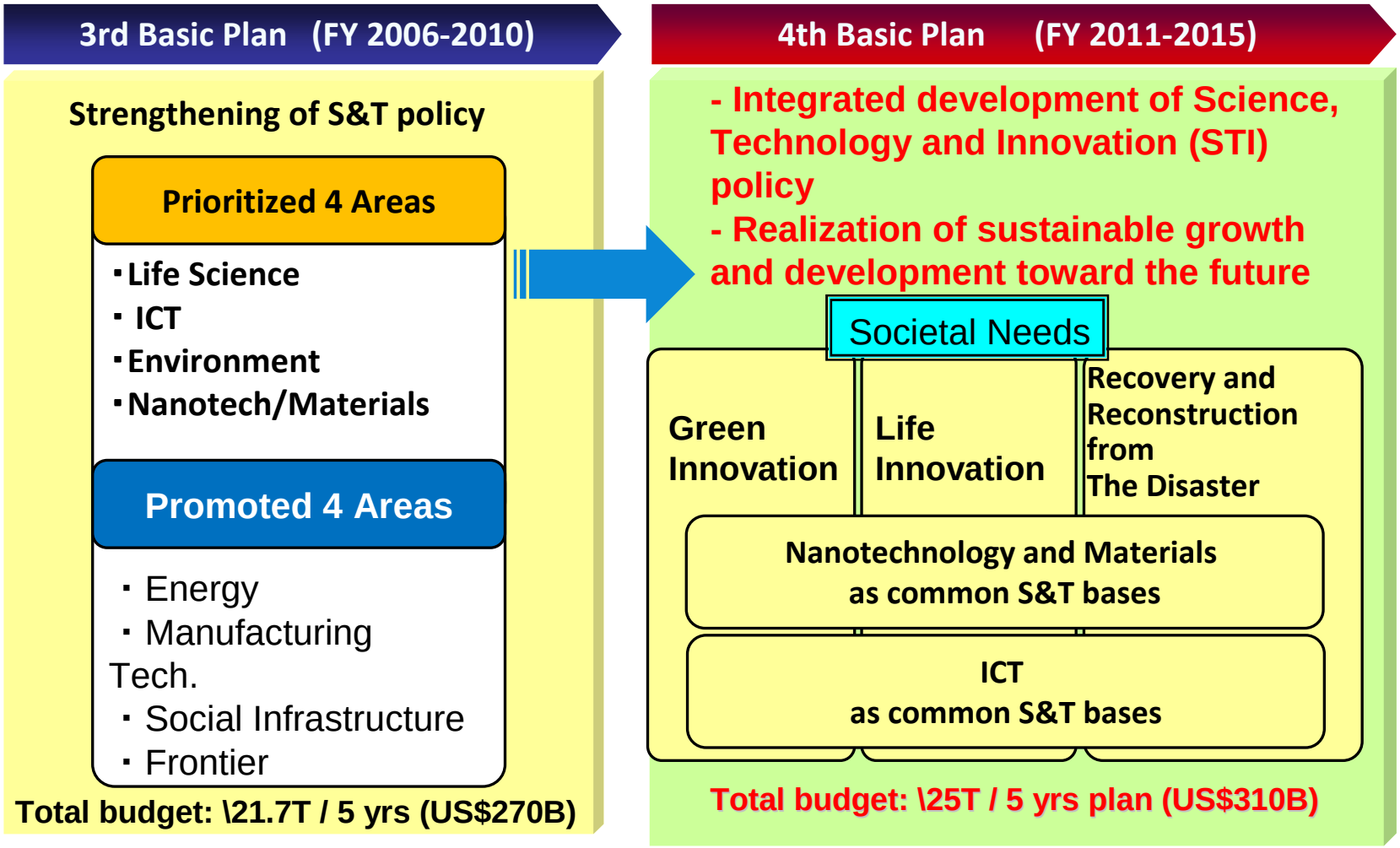
1) Recovery from the Earthquake
2) Energy and Environment Challenges
3) Ageing & Demographic Decline and Health

Transforming Times

International Symposium on Biomass Fuel, Sep 3, 2012
Green Innovation, Masuo Aizawa, Executive Member Council for Science and Technology Policy Cabinet Office, Government of Japan

Shift from "S&T-pushing" to "Needs-pulling" Policy

Change from **8 Areas** to **3 Societal Needs**



Prioritized Strategy for Green Innovation

Secure Clean Energy (Renewable Energy, Low Carbonization of Fossil Energy)

Enlargement of the Decentralized Energy System

Innovation for Energy Use

Innovation for Greener Social Infrastructures

Incentives for Renewable Energy Dissemination: Feed-in Tariff (FIT) and Deregulations

Prioritized STI Strategies in Japan

- ✓ **Tackle Global Issues on Sustainable Society**
  Energy, Environment, Aging Society, Natural Disaster, Food, Water, Critical Materials

- ✓ **Increase Competitiveness**
  Industrial Reform towards Growing Markets, Domestic employment, Global Business Development

- ✓ **Globalization of STI System**
  Mobility of Scientists, Bilateral/Multilateral Collaboration, Big Science

- ✓ **Human Capacity Development**
  Reform of Education System, More Students from/to Overseas

- ✓ **Science (incl. Risk) Communication**
  Light & Shadow of Science and Technology

Tackling Global Challenges - "Science and Technology Research Partnership for Sustainable Development (SATREPS)"

SATREPS For the Earth, For the Next Generation

Background

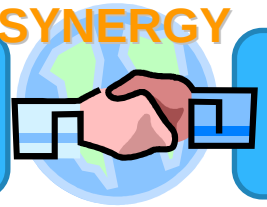
- ✓ The issues of global concern (climate change, infectious disease, biodiversity degradation, food/water shortage, natural disaster) are becoming imminent threat for humankind and solution by science and technology is craved for.
- ✓ Traditional technology transfer used in ODA may not be adequate for addressing these global issues: technical and social innovation through new knowledge and technologies requires high commitment of researchers.
- ✓ Most of critical events and phenomena occur in the Developing Countries, hence their collaboration is crucially essential.
- ✓ S&T capacity development in DC with an win-win research arrangement is the steadfast approach towards the solution of these challenges.

Creation of SATREPS

SATREPS =Created by the strong policy directive from the Council for the Science and Technology Policy (CSTP) chaired by the Prime Minister

" To link S&T with foreign policy for mutual development"

Utilize S&T
for diplomatic purposes



Utilize diplomacy for the further development of S&T

"Strengthening S&T cooperation with developing countries for resolving the global issues" "in the areas of the environment and energy, disaster prevention … and infectious diseases"

From Council for Science and Technology Policy (CSTP)'s
"Toward the Reinforcement of S&T Diplomacy" (May 19, 2008)

Memorandum of Understanding between JST and JICA

Japan Science and Technology Agency (JST) ex-President, Koichi KITAZAWA, and Japan International Cooperation Agency (JICA) ex-President Sadako OGATA officially signed the Memorandum of Understanding to implement the “Science and Technology Research Partnership for Sustainable Development (SATREPS)” program.

Photo by JICA (Jan.2009)

JST: Science Funding Agency for the government of Japan

JICA: ODA Agency for the government of Japan

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 R&D capacity and sustainable research systems, training human resources and coordinating networking between researchers～

Practical utilization

～Expecting outcomes to make a real contribution to society ～

Science & Technology × Official Development Assistance

SATREPS joins and coordinates functions, activities, and capabilities that were once separate, using scientific research potential as a mediator for developmental diplomacy

Science and Technology
Promoting science and technology, encouraging innovation

×

International Cooperation
ODA, development assistance

Meeting Global Needs
Resolving global issues and contributing to the science and technology community

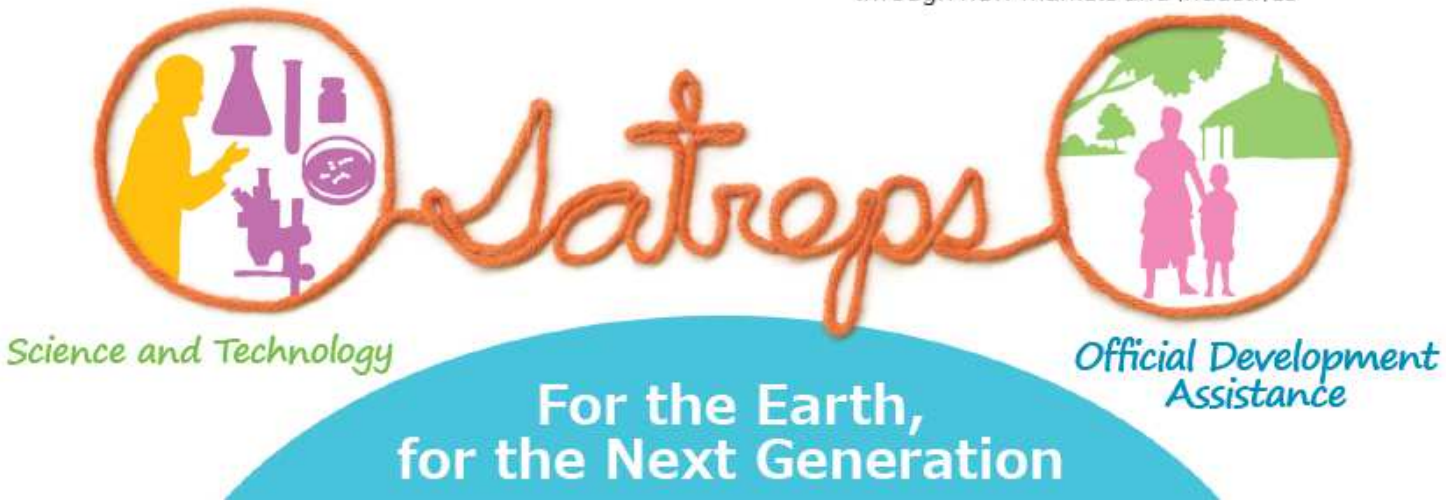
×

Meeting Local Needs
Capacity development to address issues emerging as local needs in developing countries

Japan's Capabilities
·World-leading technology, proven research capacity
·Soft power

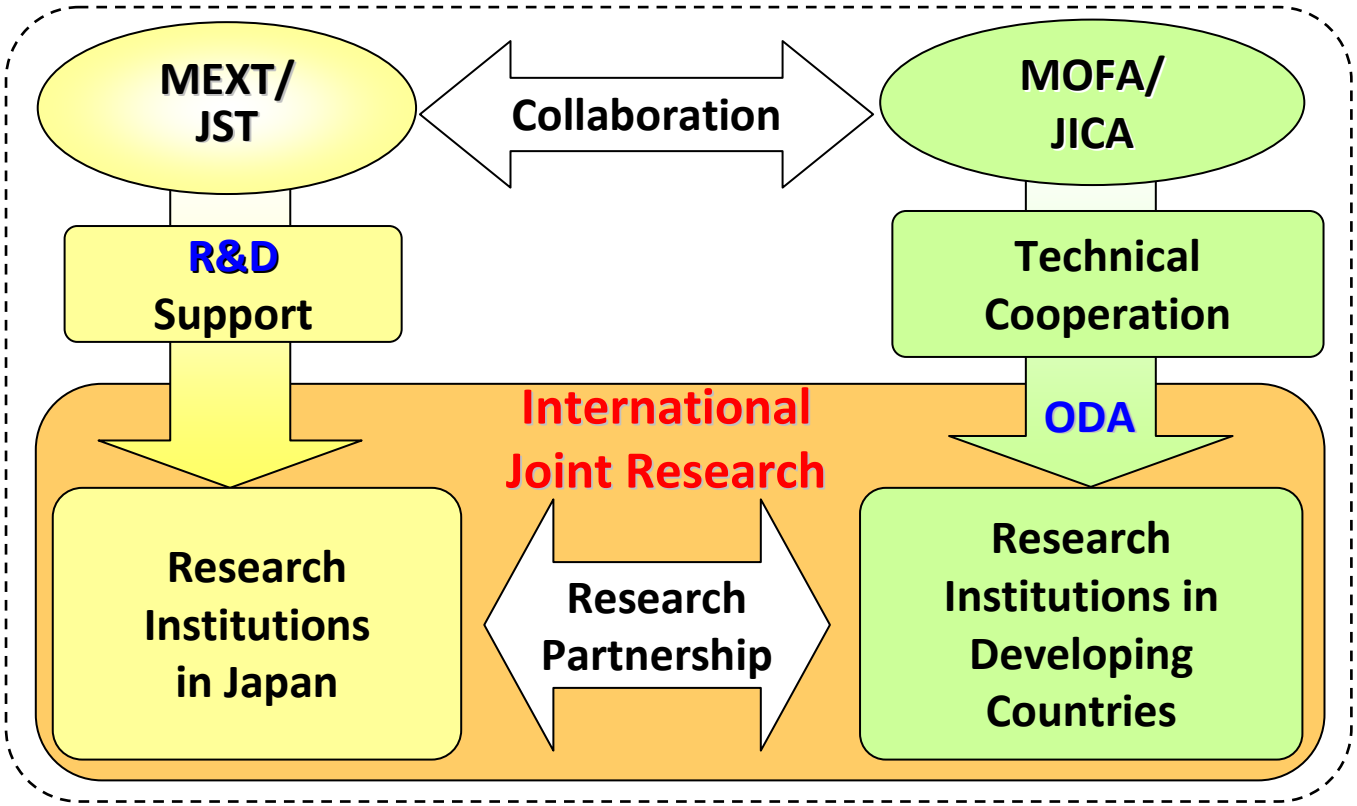
×

Developing Countries' Capabilities
·Direct experience, knowledge, and data needed for research on global issues
·Potential to contribute to the global economy through new markets and industries



SATREPS For the Earth, For the Next Generation

SATREPS program structure



Research Period

3-5 years

Research Funding

Approx. 100 million JPY / project / year (JST + JICA total)

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

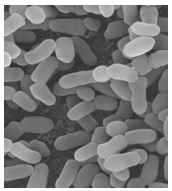
Breeding and cultivation technology, Bio resource management..

■Natural Disaster Prevention

Natural disaster mechanisms (Earthquakes, Volcanic..), Natural disaster mitigation..

■Infectious Diseases Control

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



OECD Report

Report on Opportunities, Challenges and Good Practices in International Research Cooperation between Developed and Developing Countries

http://www.oecd.org/science/scienceandtechnologypolicy/47737209.pdf

◇ **issued by OECD Global Science Forum in May 2011**

◇**based on workshop in Pretoria (September 2010) with STRONG African presence**

-19 government officials, 8 researchers; keynote speech by Executive Director of TWAS

◇ **Dr. Mohamed Hassan (Former TWAS Director), Dr. Crispus Kiamba (Min. of High. Edu., Kenya), etc.**

describes issues and options that deserve the attention of scientists and administrators in industrialized countries and in developing countries, as they seek to design, initiate and manage collaborative research programs and projects that include both scientific and development goals.

SATREPS projects (FY2008-FY2013)

78 projects supported so far in 39 countries!

Half of the projects in Asia,

1/4 in Africa

Research Areas	Region			FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
	Asia	Africa	Others						
Environment/Energy (Climate Change)	41	20	17	4	4	0	–	–	–
Environment/Energy (Low Carbon Society/Energy)				–	–	4	3	2	1
Environment/Energy (Global Environment Issues)				3	2	4	1	2	3
Bioresources				–	6	5	2	3	1
Natural Disaster Prevention				3	4	2	2	1	2
Infectious Diseases Control				2	4	2	2	1	3
Total				12	20	17	10	9	10

SATREPS For the Earth, For the Next Generation

SATREPS Achievements

In the tropical Thailand, the Dengue virus infects 50 million people annually, and a quarter million people are seriously affected. Our project aims for developing new therapeutic drugs, and has successfully created antibodies against the virus. In Sept. 2012, the international application under the Patent Cooperation Treaty has been filed. Drug development in collaboration with major pharmaceutical companies is now under consideration.

“Research and Development of Therapeutic Products against Infectious Diseases, especially Dengue Virus Infection” (Adopted in FY2008/Thailand)

The Carbon Capture and Storage (CCS), which might become the first plant in Southeast Asia if successful, is currently under development. The inquiries from the foreign governments have been increasingly received. This project aims to capture the CO2 emitted from the Gundih gas field and sequester it underground.

“Pilot study for carbon sequestration and monitoring in Gundih area - East Java Province, Indonesia”（Adopted in FY2011/Indonesia)

Manufacturing technology for High Bio-Diesel (HiBD) derived from Non-food biomass is under development. In July 2012, our research institutions concluded an agreement with an automobile manufacturer (Isuzu Motors Co. (Thailand) Ltd.) to begin driving tests (50,000kms in 2 months) using practical vehicles in Thailand.

“Innovation on Production and Automotive Utilization of Biofuels from Non-food Biomass” (Adopted in FY2009/Thailand)

Research Area : Low Carbon Society／Energy

Population levels are growing, cities are becoming increasingly overcrowded, and production and consumption levels are increasing. There is a growing global need to pursue research into technology that can resolve environment and energy problems, and to deploy the outcomes of such research. In this context, SATREPS supports joint research for the purpose of reducing the negative impact of climate change on the natural environment.

Potential collaboration topics (examples)

■Research relating to the utilization of natural energy and new energies, including utilizing biomass energy
■Research on basic technologies relating to the advanced utilization of energy, energy-saving, carbon dioxide capture and storage, systemization, and simulation, etc.
■Research contributing to the optimization and streamlining of energy systems (including smart communities) related to sectors such as industry, transportation, and residential/commercial in the developing country

Ongoing 10 projects in “Low Carbon” research area (1)

－**Development of New Biodiesel Synthesis in Thailand**
(Kitakyushu Univ.—CU,2010)

－ **Sustainable Production of Biodiesel from Jatropha in Mozambique**(Tokyo Univ.—UEM,2010)

－ **Sahara Solar Energy Research Center (SSERC)**
(Tokyo Univ.-USTO, 2010)

－ **Development of Low Carbon Society Scenarios for Asian Regions**
(Kyoto Univ.-UTM,2010)

－ **Information-based Optimization of Jatropha Biomass Energy Production in the Frost- and Drought-prone Regions of Botswana**
(Tottori Univ.-EAD etc,2011)

Ongoing 10 projects in “Low Carbon” research area (2)

– **Multi-beneficial Measure for Mitigation of Climate Change in Vietnam and Indochina Countries by Development of Biomass Energy** (Osaka Prefectural Univ.-VNU-Hanoi,2011)

– **Pilot Study for Carbon Sequestration and Monitoring in Gundih Area ～ East Java Province, Indonesia** (Kyoto Univ.-ITB,2011)

– **Decentralized Biomethane Energy System for Rural Development** (Nagoya University-IITD,2012)

– **Creation of Green Innovative Industry from Oil Palm Plantation for the Bornean Bio-diversity Conservation** (Kyushu Institute of Technology-UPM,2012)

– **Project for Development of a Model System for Fluidized Bed Catalytic Gasification of Biomass Wastes and Following Liquid Fuel Production in Indonesia** (Gunma Univ-BPPT,2013)

SATREPS projects in the world

SATREPS For the Earth, For the Next Generation

Site of defoliant warehouse at Da Nang International Airport

10 = Multi-beneficial Measure for Mitigation of Climate Change in Vietnam and Indochina Countries by Development of Biomass Energy =

Four Birds with One Stone: Energy Production System Resolves All Problems at Once

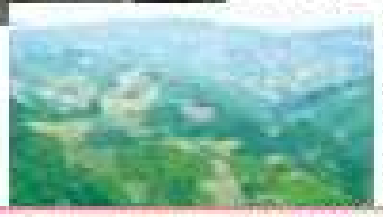
Project Coordinator: Research Prof. IWADA Yasushi / Research Organization for University-Community Collaborations, Osaka Prefecture University

Socialist Republic of Vietnam

Revitalizing devastated land + Preventing atmospheric pollution + Creating jobs + Mitigating climate change

Vietnam faces serious problems: the 9 million ha of land contaminated with defoliants or devastated by activities such as slash-and-burn agriculture, the atmospheric pollution in urban areas resulting from rapid economic development, and the poverty in mountainous regions. The goal of this project is to plant trees in the devastated land and use them to produce oil as a feedstock for fossil-fuel alternatives, manufacturing clean fuels that can be used in urban areas. Not only would this resolve three issues at once — *revitalize devastated land, prevent atmospheric pollution and create local jobs* — it would also create a biomass energy production and utilization system that would be an effective means of *mitigating climate change*.

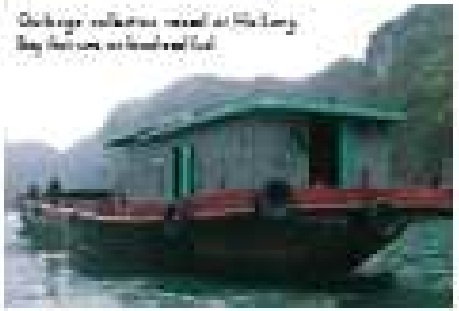
Top: Motorcycles in Hanoi. Bottom: Devastated land abandoned after slash-and-burn agriculture in a mountainous region



Establishing a production process and making the technology available to neighboring countries

After studying the devastated land and cleaning the contaminated soil, trees will be planted to produce inedible oil in order to manufacture biodiesel fuel that is energy efficient and produces little waste, which will then be used for the public transport system. Technical development will address issues such as vehicle exhaust emissions, and the technologies will be made available to neighboring countries.

Discharge collection vessel at Da Nang Bay that runs on biodiesel fuel



Counterpart Institutions	Vietnam National University, Hanoi (VNU-Hanoi), etc.
Collaborators	Shiga University, Osaka City University, Japan International Research Center for Agricultural Sciences (JIRCAS)
Research Period	5 Years Adoption Fiscal Year FY 2011

14 = Sahara Solar Energy Research Center (SSERC) =

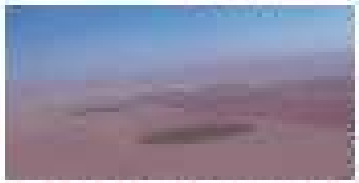
Transforming the Desert into an Energy Treasure-House with Sunlight, Sand, and Superconductors

Project Director: Visiting Prof. KOMIYAMA Hideomi / Graduate School of Frontier Sciences, The University of Tokyo

A major power project that uses the most abundant raw material on earth

Deserts such as the Sahara Desert, the world's largest, cover vast areas of land, have an abundance of sunlight, and are a treasure-house of sand that contains large quantities of silica, the raw material for silicon. In this project, solar breeders (silicon factory + photovoltaic power plant) will be constructed in the desert, and the power that is produced will be used to construct more solar breeders. Then high-temperature superconducting power transmission systems that have little power transmission loss will be used to send the power to various parts of the world. The project represents an attempt to provide an ultimate solution to the world's energy problem by transforming barren deserts into a new energy resource.

Studying purification of silica in sand and silicon manufacture in preparation for the project



A circular farm that uses groundwater in the desert. Electricity is needed to pump up the groundwater.

Currently, the establishment of basic data is underway in anticipation of the project's realization from cooperative basic research. Instead of introducing built-in technology, Japanese and Algerian researchers work together to discover new knowledge, including the development of new technologies for efficiently converting silica into silicon. Collection of the basic data required to enable high-temperature superconducting cables to pass through desert regions, and studies to analyze and separate the components of Sahara sand and to identify its untapped resources are also proceeding.

Counterpart Institutions	University of Science and Technology, Oran (USTO), etc
Collaborators	The University of Tokyo, Hirosaki University, National Institute for Materials Science (NIMS), Tokyo Institute of Technology, Chubu University, National Institute of Information and
Research Period	5 Years　Adoption Fiscal Year: FY 2010

Everything you see, all the way to the horizon in every direction, is pure material for photovoltaic cells.

With people living at an oasis in the Sahara Desert

09 = Information-based Optimization of Jatropha Biomass Energy Production in the Frost- and Drought-prone Regions of Botswana =

Using the Energy Hidden in Plants in the Arid Regions of Botswana

Principal Investigator: Associate Prof. AKASHI Kinya / Faculty of Agriculture, Tottori University

Jatropha: an ideal biofuel utilizing the environmental tolerance of wild plants

Crops in Botswana grow slowly due to dryness and cold-weather, and this is a barrier to the achievement of a low carbon society based on bioenergy. However, the country has an abundance of wild plants that can withstand dryness and winter cold. It also has large numbers of Jatropha trees, whose seeds have abundant quantities of an oil considered to hold great promise as a biofuel. The goal of this project is to utilize these resources to develop Jatropha varieties that are resistant to dryness and cold weather and offer high productivity as well as to develop methods of cultivating these varieties. In this way, a biological approach will help to achieve a low carbon society.

Creating a bioenergy production model based on the country's own biological resources

A database of biological resource data relating to Jatropha will be constructed and suitable varieties will be developed. Moreover, in this arid region that is subject to cold weather, efforts will be made to establish a cultivation system that is flexible with respect to climate change. The project will work to build a sustainable bioenergy production model using plant genetic resources that are indigenous to Botswana.

Counterpart Institutions:	Energy Affairs Division (EAD) in the Ministry of Minerals, Energy and Water Resources (MMEWR), Department of Agricultural Research (DAR) in the Ministry of Agriculture, University of Botswana (UB)
Collaborators:	University of the Ryukyus, RIKEN
Research Period:	5 Years Adoption Fiscal Year: FY 2011

11 = Pilot Study for Carbon Sequestration and Monitoring in Gundih Area - Central Java Province, Indonesia =

CO_2 with Natural Gas Production Should be Sealed Deep Inside the Earth

Project Manager: Prof. Mitsuhiro Toriumi / Graduate School of Engineering, Kyoto University

The mission is to resolve CO_2 emissions problems associated with natural gas production

Indonesia plans to reduce CO_2 emissions by 26% by the year 2020. However, the large quantities of CO_2 that are released into the atmosphere during production of natural gas in gas fields is seen as a problem for the achievement of this goal. This problem can be resolved by creating a system for carbon dioxide capture and storage (CCS) technology – in which the CO_2 that is emitted during natural gas production is captured and sealed into the ground – as a means of directly reducing CO_2 emissions. This project will conduct research and development of CO_2 underground storage and monitoring technologies in the Gundih gas field in Central Java, where natural gas production is scheduled to begin.

A drilling rig operation for natural gas production

Imaging the subsurface CO_2 storage is indispensable for the safe operation of CCS

The project goal is to develop technologies for geologically and geophysically evaluating deep subsurface CO_2 storage in and around the gas fields and for monitoring injected CO_2 movement for ascertaining the distribution and behavior of CO_2 in the storage. The achievements will be used to systematize CCS technologies for safe underground storage of the CO_2 that is emitted during natural gas production, helping to reduce CO_2 emissions on a global scale.

Indonesian and Japanese joint research team standing in front of a drilling rig that is prepared for producing natural gas. The team was visiting there to formulate a research plan.

Co-enterprise Institutions	Institute Teknologi Bandung (ITB), etc.
Co-laborators	Akita University, The University of Tokyo, University of Toyama, Waseda University, Kyushu University, Japan Petroleum Exploration Co., Ltd. (JAPEX), Yokoda Geological Institute (JPX)
Research Period	5 Years Adoption Fiscal Year FY 2011

12 = Development of New Biodiesel Synthesis in Thailand =

New "HiBD" Biofuel Can Use Waste Food Oils, Animal/Vegetable Fats and Oils, Etc.

Principal Investigator: Prof. ADAM Nanji / Faculty of Environmental Engineering, The University of Kitakyushu

Manufacturing High Bio Diesel from biomass resources (oils and fats, etc.)

Currently we rely on fossil fuels for most of our primary energy needs, but this is seen as a cause of climate change. For this reason, oils, fats, and other biomass resources have attracted a great deal of attention as new and environmentally friendly sources of energy. The goal of this project is to manufacture high quality light diesel oil (HiBD : High Bio Diesel) from waste food oils, almost all of which are treated as industrial wastes, and from natural oils and fats. The project will work to develop simpler, highly efficient processes and deploy them in Thailand and Japan.

HiBD created all (produced still derived from waste food oil)

Successful use of low quality oils as fuel

The project has succeeded in developing a method for the manufacture of light diesel oil that works smoothly even when using waste food oils, other very poor quality oils, and crude oils that still have many impurities derived from the raw materials. In the future, the project will also investigate the possibility of using coconuts and other oil plants that are cultivated in large quantities in Southeast Asia for the manufacture of light oil.

Testing of research plant from Chulalongkorn University (Thailand)

Counterpart Institutions:	Chulalongkorn University (CU)
Co-Collaborators:	Kitakyushu Foundation for the Advancement of Industry, Science and Technology (FAIS), Kitakyushu International Techno-Cooperative Association (KITA), Kitakyushu Institute of Technology (KIT)
Research Period:	4 Years
Adoption Fiscal Year:	FY 2010

13 = Sustainable Production of Biodiesel from Jatropha in Mozambique =

Creating Environmentally Friendly Fuel from Land Unsuitable for Agriculture

Principal Investigator: Prof. HATTORI Kenji / Graduate School of Agricultural and Life Sciences, The University of Tokyo

Enriching the people and forests of Mozambique through biodiesel fuel production

In this project, biodiesel fuel plants will be cultivated in the arid regions in southern Mozambique that are not suitable for crop cultivation, in an effort to reduce CO_2 emissions, improve the lives of local residents through the creation of industry and so on. At the same time, the solid fuels that are produced as a byproduct will be made available for use in place of the firewood and charcoal that are currently major sources of fuel in Mozambique, thereby reducing tree cutting and preventing deforestation. This is an effort to build a sustainable production system by ensuring both economic viability and a positive environmental impact.

Jatropha seeds hold great promise as biofuel

Helping to improve the environment through the cultivation of Jatropha

The project is studying the breeding of varieties of Jatropha, a biodiesel fuel suitable for cultivation in arid regions, as well as cultivation methods that are low-risk with regard to climate change. Technologies for inspecting the quality and safety of the manufactured fuel are also being developed. The project is being conducted with a view to future industrialization of fuel production and deploying the approach to other countries in Africa.

When trees are cut down to produce firewood and charcoal, the land is left denuded. Similar practices are a serious problem in various parts of Africa.

Counterpart Institutions	Eduardo Mondlane University (UEM), etc
Collaborations	Kanazawa Institute of Technology (K.I.T.), Kururia University, Mopan Biodiesel Fuel Co., Ltd. (MBF), Association of African Economic and Development (AFRIDEV)
Research Period	5 Years Adoption Fiscal Year FY 2010

15 = Development of Low Carbon Society Scenarios for Asian Regions =

Achieving a Low Carbon Society, the Scenario for a Future Vision

Project Investigator: Prof. MATSUOKA Yuzuru / Graduate School of Engineering, Kyoto University

Using statistics to paint a picture of the low carbon society of 2025

Malaysia is the world's top producer of palm oil, which can be used as a biofuel

To achieve reductions in greenhouse gases worldwide, effective measures in emerging nations are indispensable. In a special economic zone in Malaysia known as Iskandar Malaysia, data on the economy society and technology for creating a low carbon society will be gathered and analyzed for five categories (power generation, industry, transportation, commercial, and residential), creating an integrated assessment model and scenarios for achieving a low carbon society in 2025. The project will also provide assistance in devising solutions to the problems of atmospheric pollution, waste treatment management, and poverty and other social problems in connection with the establishment of a low carbon society.

From Iskandar, which holds the key to a low carbon society, to the entire Asian region

This project will prepare a policy roadmap based on the quantitative analysis and, in the process of implementing this policy roadmap, will work to improve the practicality and effectiveness of methods. Disseminating the achievements of research in Iskandar Malaysia, which symbolizes the growth of Asia, will help to achieve a low carbon society in Asia as a whole.

Malaysia is experiencing rapid growth and cities are developing throughout the country. It is essential to incorporate the low carbon perspective into development of the planning stage.

Counterpart Institutions: Universiti Teknologi Malaysia (UTM), etc
Collaborators: National Institute for Environmental Studies (NIES), Okayama University
Research Period: 5 Years Adoption Fiscal Year: FY 2010

FY2014 SATREPS Invitation for Application of Research Proposals (1)

Guidance for Application and the Project Selection Process

http://www.jst.go.jp/global/english/koubo.html

JST calls for research proposals for FY2014 from Japanese research institutions from **September 10th, 2013 (Tues) to October 25th, 2013 (Fri) at 12:00 hour (noon) in Japan**.

Based on the needs of developing countries, JST and JICA cooperate to promote international joint research targeting global issues[1] with an objective of future utilization of research outcomes[2]. Implemented through collaboration with Official development Assistance (ODA), the aim of the program is to acquire new knowledge and technology, and to apply the knowledge and technology acquired to create innovations, leading to the resolution of global issues and the advance of science and technology. International joint research under this program also aims to enhance the research and development capabilities of developing countries, and helps create sustainable research systems able to address and resolve issues.

[1] Global issues: Issues that are difficult to resolve by a single country or region acting on its own and that need to be handled by the international community as a whole
[2] Utilization of research outcomes: The research projects should lead to future social and economic benefits, achieved by using newly obtained knowledge and technology to enhance government services or to develop products that can be deployed in the market.

Research fields (number of research areas)	Cooperation request from recipient country	Research period	Research budget from JST
Environment and Energy (2 research areas)	Compulsory	3 to 5 years	Approx. ¥36M/year (including indirect costs) (Approx. ¥180 M in total for a 5-year project)
Bioresources (1 research area)			
Natural Disaster Prevention (1 research area)			
Infectious Diseases Control (1 research area)			

Note1: From FY2014 onwards, “interdisciplinary” proposals (proposals where multiple fields are selected on the research proposal form) are no longer accepted. When submitting a research proposal for a project involving interdisciplinary research that merges or extends over multiple fields or areas, select the area that is the closest match.

Note2: The number of proposals to be selected and the research budget from JST are tentative, and may change due to budgetary considerations.

FY2014 SATREPS Invitation for Application of Research Proposals (2)

Schedule for application and selection

Applications start date	**Tuesday September 10, 2013**
Applications deadline (Deadline for ODA applications to reach MOFA is the same) *1	**12:00 noon (Japan time) on Friday October 25, 2013 (applications received after the deadline will not be accepted)**
Document screening	**Early November 2013 to late February 2014**
Notification of document screening results	**Late February 2014**
Interviewing for selection	**Late February 2014 to mid March 2014**
Conditional approval and notification	**Late March 2014**
Start of research	**April 2014 or later, following signing of the R/D*2**

*1 MOFA must receive an application for ODA from the government of the recipient country by the deadline. This is one of the conditions for selection.
*2 Around the same time as the selection of research projects in Japan, notification regarding selections for the corresponding ODA technical cooperation will be made to governments of recipient countries. Subsequently, when the R/D is signed between JICA and the counterpart, the research project will be formally approved for awarding, and international joint research will begin. Selection of the research project in Japan will be announced to the public at an appropriate time after notifying the PI of conditional approval.

SATREPS For the Earth, For the Next Generation

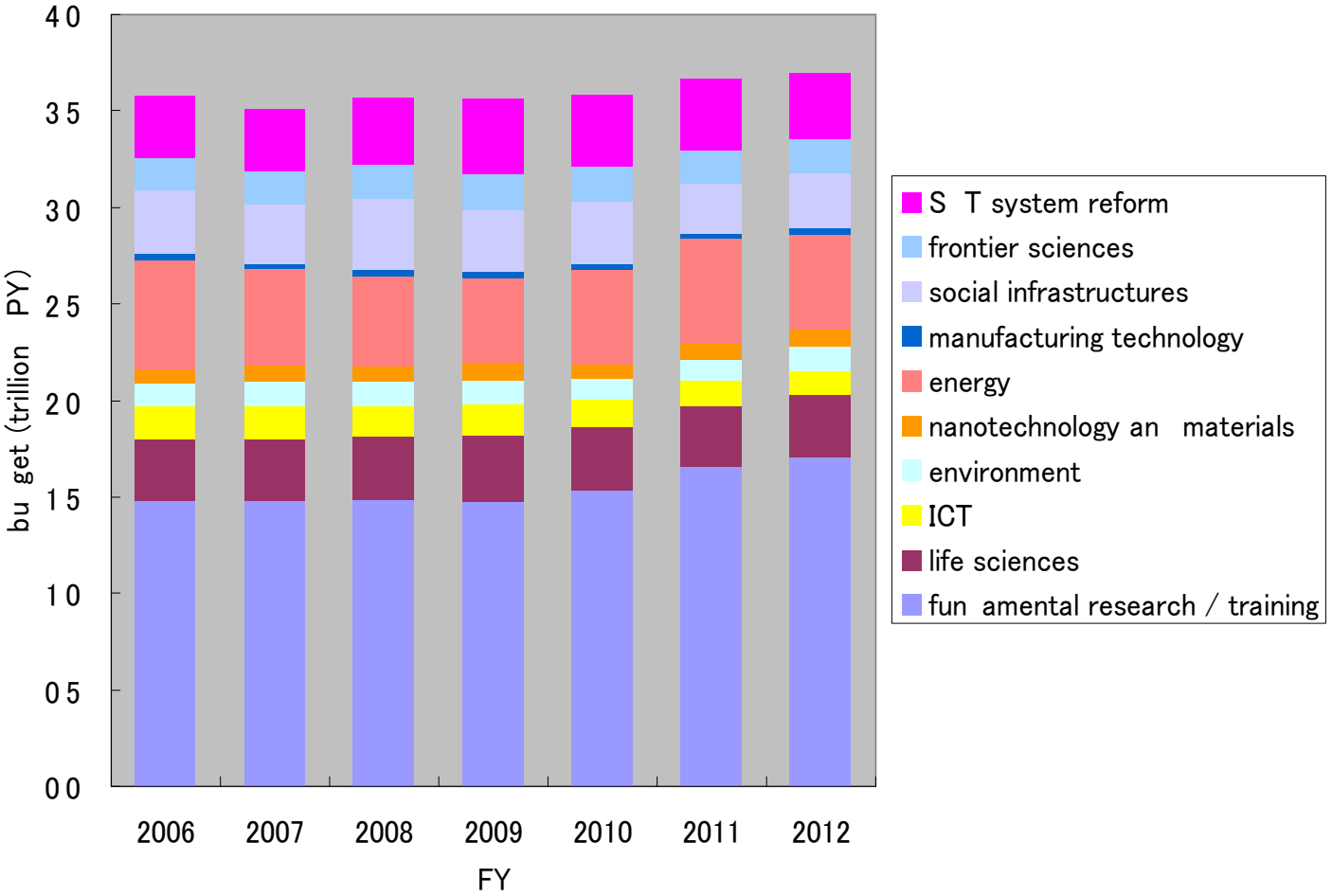
Thank you for your attention !

Japan Science and Technology Agency

REFERENCE

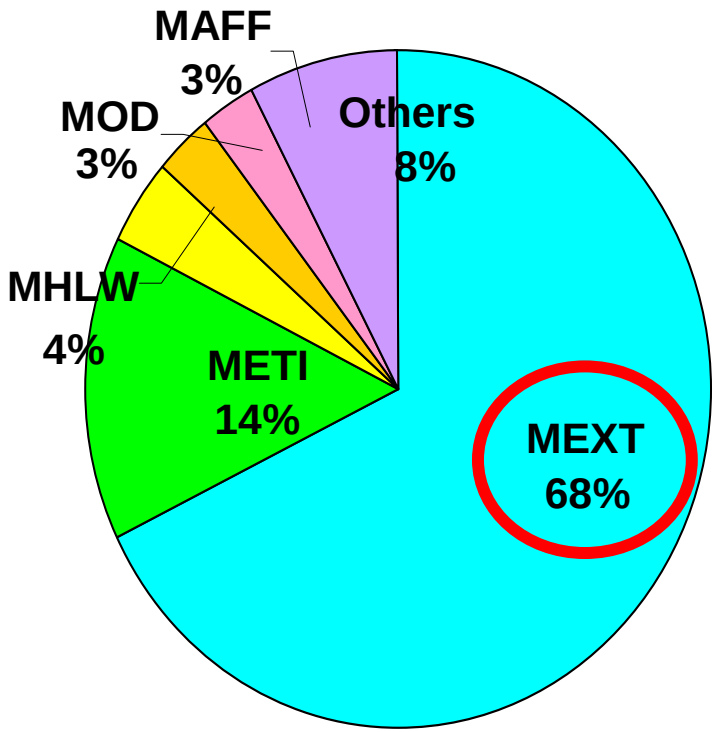
Budget for Science and Technology -2

Transition of S&T Budget Allocation in Japan (by field of research)



http://www8.cao.go.jp/cstp/budget/index.html

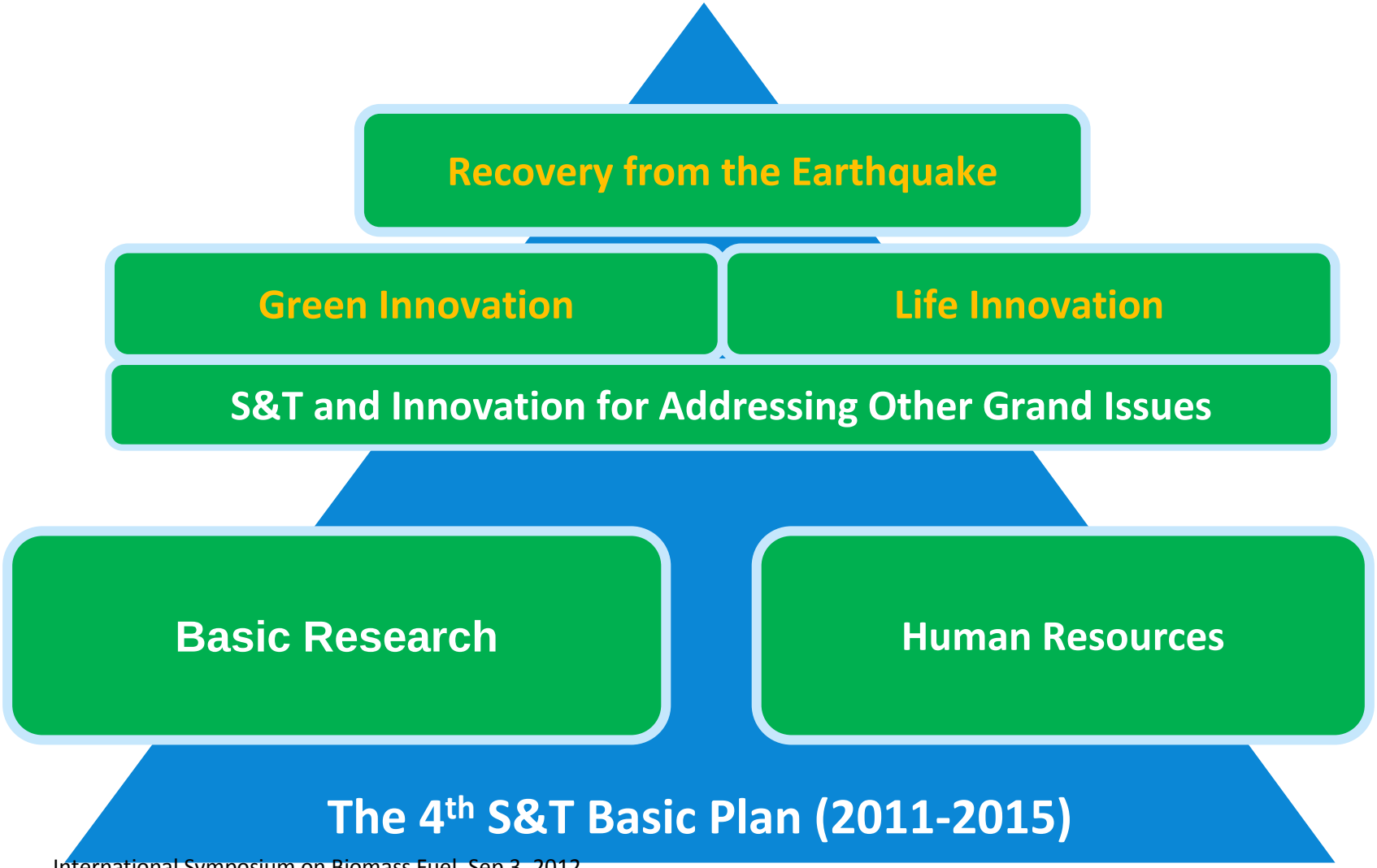
S&T related Budget of Japan in FY2012



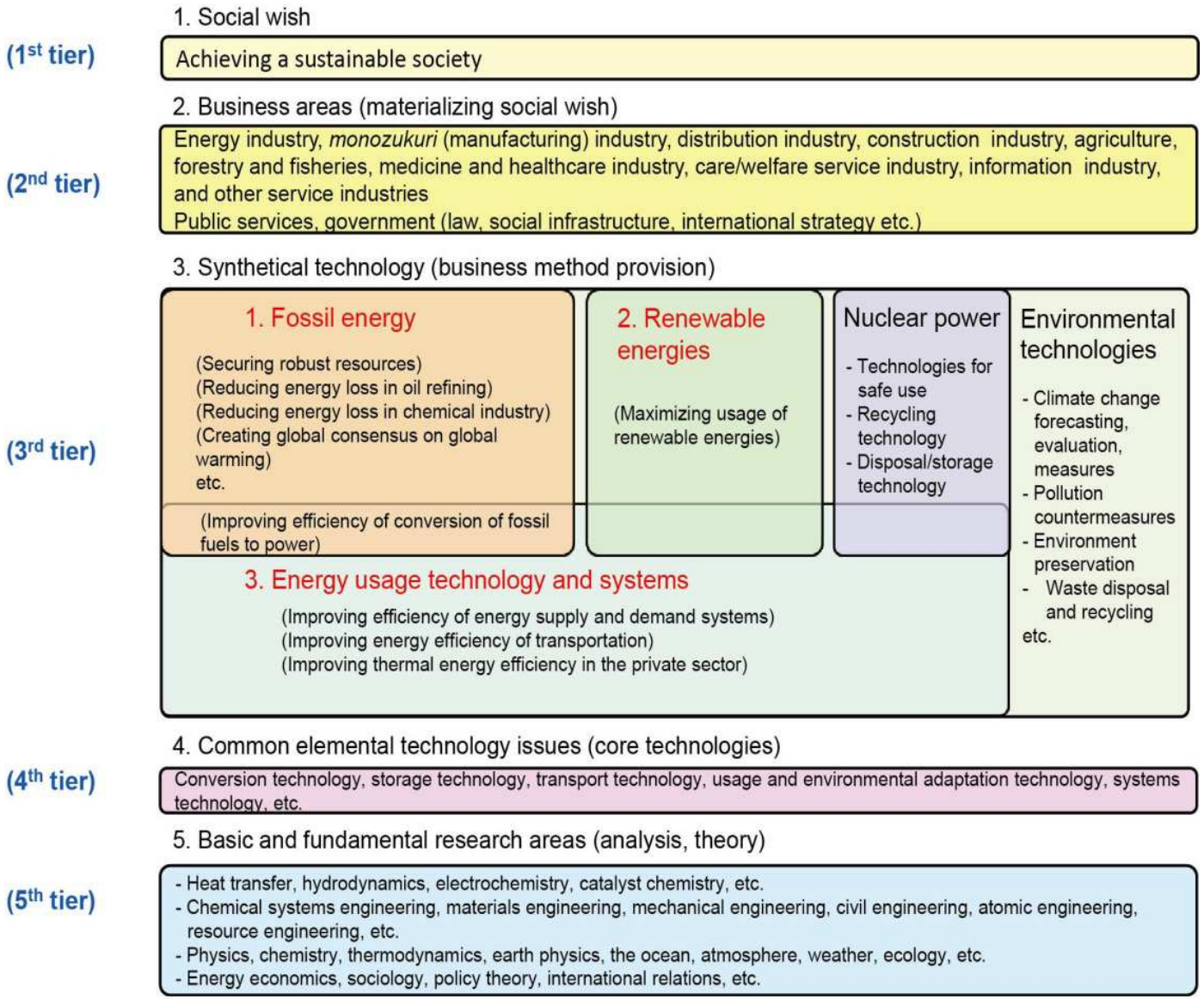
- MEXT: Ministry of Education, Culture, Sports, Science and Technology
- METI: Ministry of Economy, Trade and Industry
- MHLW: Ministry of Health, Labor and Welfare
- MOD: Ministry of Defense
- MAFF: Ministry of Agriculture, Forestry and Fisheries
- Others

Ministry	Trillion JPY
MEXT	2.49
METI	0.53
MHLW	0.16
MOD	0.11
MAFF	0.11
Others	0.28
Total	3.67

Issue-driven S&T and Innovation Strategy for Sustainable Thriving in the Globalized and Interdependent World



Structure and Scope of the Environment and Energy Fields in the Bird-eye Overview



Key Research and Development Areas

Overview category	Short term	Mid- to long-term
Fossil energy	● Innovative conversion, transport and usage technologies for low-grade/unused solid state carbon resources ● Ultra-efficient solid oxide fuel cells ● Coal-fired generation technologies that have outstanding load management ability and can greatly reduce CO_2 emissions	● Methane hydrate usage technologies ● Ultra-high temperature materials and heat transfer technologies ● Fundamental technologies for innovative electrochemical reactors ● Sophisticated steelmaking technologies using inferior/ unused solid state carbon resources ● Low-temperature catalysts for exhaust heat recovery through endothermic reaction ● Innovative manufacturing processes for petrochemical products ● Next-generation biomass fuels
Renewable energies	● Innovative technologies for the large-scale popularization of floating wind turbine generation system ● Regional environment-friendly high performance solar fuel cell system technologies ● Binary power generation systems utilizing unused hot spa energy ● Innovative technologies and systems for solar thermal use	● Fundamental analytical technologies of biofunctions for accelerating biomass energy production ● Fundamental technologies for the popularization across wide areas of ultra-efficient solar power generation ● Innovative usage technologies for high temperature geothermal energy
Energy usage technology and systems	● Low cost/high efficiency fuel cells ● High-efficient gasoline engines ● Fundamental technologies for mid/low-temperature thermal usage	● Next generation rechargeable cells ● Chemical product manufacturing technologies using renewable power ● Fundamental technologies for international electricity network
	● Fundamental energy carrier technologies ● Fundamental technologies for next-generation energy network	

Human Resource Development through MEXT Scholarship Program

- ✓ Human resource development through the Japanese Government (MEXT) Scholarship Program From FY 2010, MEXT established a "**Global-Issue Section**" within Japanese government scholarship program (University Recommendation) for SATREPS projects.

- ✓ The aim of the Global-Issue Section is to develop young researchers with the potential to be future key players in relevant research in their own countries by taking a doctorate at Japanese institution.

- ✓ Invitation for this Japanese government scholarship program is implemented by MEXT, and scholarship is budgeted separately from SATREPS. To be eligible for this program, a doctoral degree needs to be received within the term of the SATREPS project.

Japanese Government (MEXT/Monbukagakusho) Scholarship Program website

http://www.mext.go.jp/a_menu/koutou/ryugaku/06032818.htm (Japanese)
http://www.studyjapan.go.jp/en/toj/toj0302e.html (English)

*Please note that the availability of this scholarship program can be altered depending on the final budget.

Online Community (SNS): Friends of SATREPS

Launched June 1, 2011

Interested in global issues? Join Friends of SATREPS!
Membership is free, and anyone can take part, communicate with other project participants, researchers, students, people from the private sector, NGOs, etc.
Join the conversation. Join the SATREPS community.

URL https://fos.jst.go.jp/
Friends of SATREPS Search

- Registered members: **Over 4,300!**
- Countries involved: **Approx. 95**
- Number of communities: **Approx. 300**

Community Categories

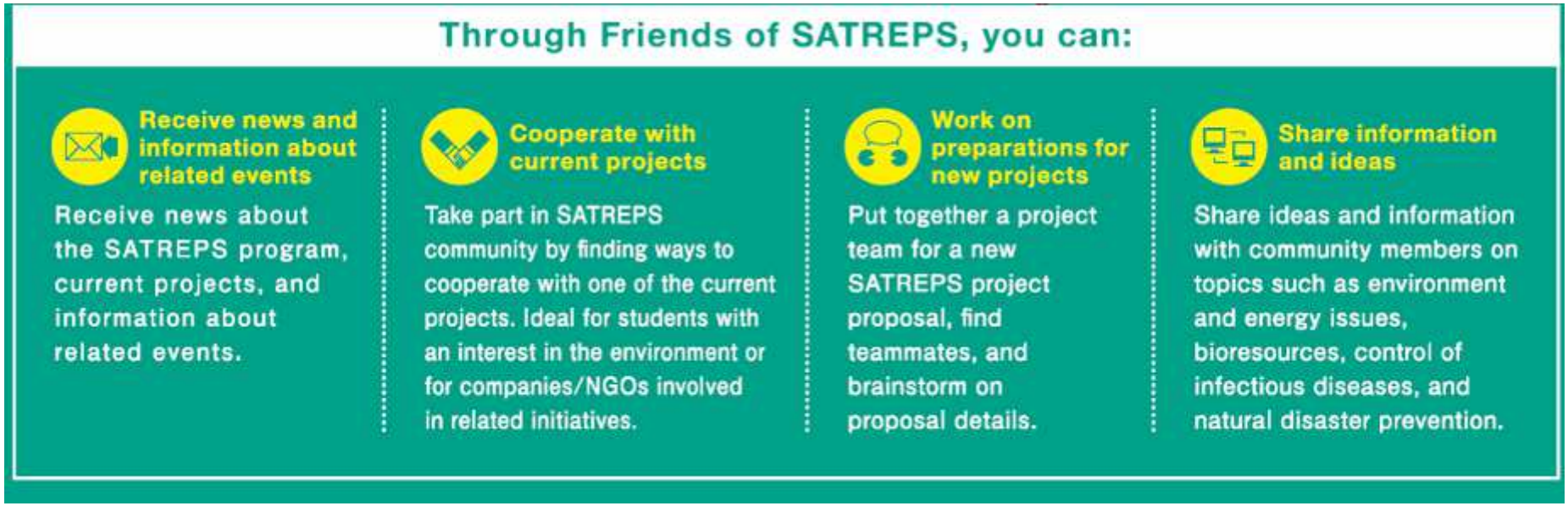
- Nature/Environment
- Energy
- Bioresources
- Natural Disaster Prevention
- Life/Health
- Developing Country Assistance
- Others

Membership ranking by country

1. Japan
2. Indonesia
3. Thailand
4. Malysia
5. Vietnam
6. Phillipines
7. Ghana
8. Algeria
9. South Africa
10. Brazil
11. USA
12. Srilanca
13. Egypt
14. Turky
15. Agfhanistan
16. Mexico
17. Bangladesh

(As of August 15, 2012)

Friends of SATREPS (FOS) services



◇ **FOS is created as a platform for communication among like minded people.**

◇**Members are a rich source of information about life and culture in the field. Discoveries and encounters are not limited to research topics.**

◇**Stay up to date on developing country news. Communication channels between researchers, companies, and other entities outlast research projects.**

Friends of SATREPS communities

海面上昇に対するツバル国の生態工学的維持 (10)

ndian's DHS (14)

アフリカサヘルの水・衛生システム Water and Sanitation System for Sahel, Africa (27)

o-Hazard Damage in Malaysia/マレーシアにおける災害による被災低減 (16)

非食糧系バイオマスの輸送用燃料化基盤技術プロジェクト (1)

インドネシアにおけるCCSの開発研究 Development CCS in Indonesia (4)

気候変動予測とアフリカ南部における応用 (Climate Variations in South Africa) (38)

Earthquake/Volcano Monitoring in the Philippines フィリピン地震火山監視 (13)

ペルーにおける地震・津波減災技術/Earthquake and Tsunami Mitigation in Peru (16)

天然ゴムを用いる炭素循環システムの構築プロジェクト/ESCANBER (10)

Friends of SATREPS community sample
～ Ghanaian Young Scientists ～

Young researchers from Ghana keep in touch with each other and talk about their experiences while working in Japan.

2012年 01月24日 17:29
4: Mildred Amoa-Bosompem
thank God for your safe arrival. learn hard and be good. Take care dear

2012年 01月24日 18:23
5: ISAAC TUFFOUR
Welcome to Japan.. Kofi. We thank God for His travelling mercies.I am sure you will have a wonderful time here. As for me I am wrapping up to come back to Ghana. My stay here has been a wonderful one. Last week was a "marathon week"..so much work in the lab with good results obtained.We wounded up the weekend at Huis Ten Bosch(a beatiful amusement park here in Sasebo). Yesterday, I finished my sight-seeing adventure at the Nagasaki Peace Park and Penguin aquarium. Today has been very busy for me. I just finished giving a presentation in my departments journal club. It was awesome. I also gave a progress report on my experiments and work I have done here. I am grateful to all who made this trip possible. It has really given me good exposure. Dr Suzuki...your hometown(Sasebo) is a wonderful place

2012年 01月24日 [illegible]
6: ISAAC TUFFOUR
Lest I forget...I saw snow fall for the first time today.It was really an amazing feeling eventhough the weather was quite cold...

2012年 01月24日 21:13
7: Kofi Dadzie Kwofie
Hello everyone,
I thank you all for your advice and well wishes. Mitsuko-Sensei, Thank you so much for everything. Your advice really got me reflecting deeply. I will never lose focus. Infact, This opportunity has inspired me to work harder, read more and learn as much as I can. I will once again, on behalf of my colleagues and on my own accord express our deepest and profound appreciation to ALL who made it posible for us, RAs, to visit Japan, Most especially Mr. Shig Okaya. This kind gesture will forever remain with us. I believe this will be a land mark in our journey to a bright and succesful future as Scientists (As Mitsuko-sensei will put it). Doomu arigatou gozaimas- imashte to all of you, Yamaoka-Sensei, Ohta-Sensei and Shoyama- Sensei. We really appreciate you all.

2012年 01月24日 21:33
8: Kofi Dadzie Kwofie
Just Like Isaac, I also had the opportunity to see snow fall, it was really a sight to behold. Even the people of Tokyo were really excited because it's really hadn't snowed in Tokyo in last six years. So you see, I brought snow to Tokyo...hahaha! I have also been to TMDU and the reception was really great. I have started some parasite culturing to be used for Bioassays. I have also had the opportunity to visit AKIHABARA. They really got lots of amazing stuff. So far so good...Wish you all the best this week. Sayonara....

First snow!

2012年 01月24日 21:33
9: Keren Minta-Asare
eiiii Ghananyiii.....A friend in need is a friend indeed.

About this community:
Open to all young scientists in Ghana with interests in "sustainability of the earth" & "health of the population"

Voices of Friends of SATREPS members

I use to wor on groun water ro ects in Africa Now I m ho ing to ut that e erience to use again an meet lots of new eo le too
(Engineer a an)

Communication is one of a researcher s obs but it s easily forgotten when the research wor is interesting
Frien s of SATREPS is a great o ortunity to ee communicating
(Researcher a an)

I am a science ournalist in Nigeria I am also the station hea of my station I stu ie chemical engineering but ractice ournalism now
(ournalist Nigeria)

facebook

http://www.facebook.com/Friends.of.SATREPS

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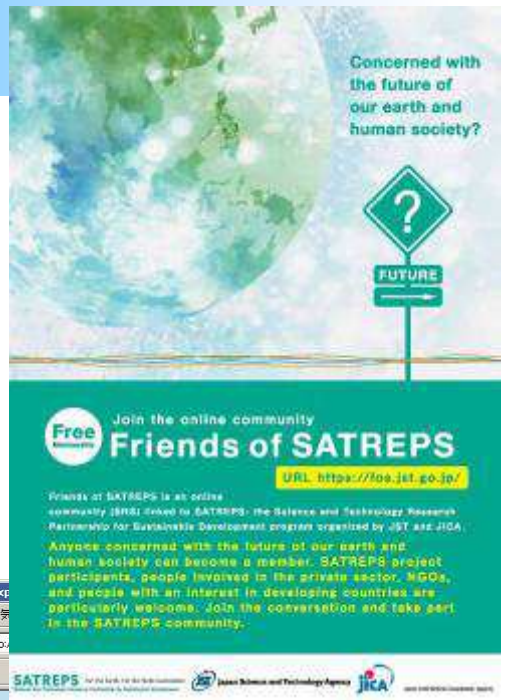

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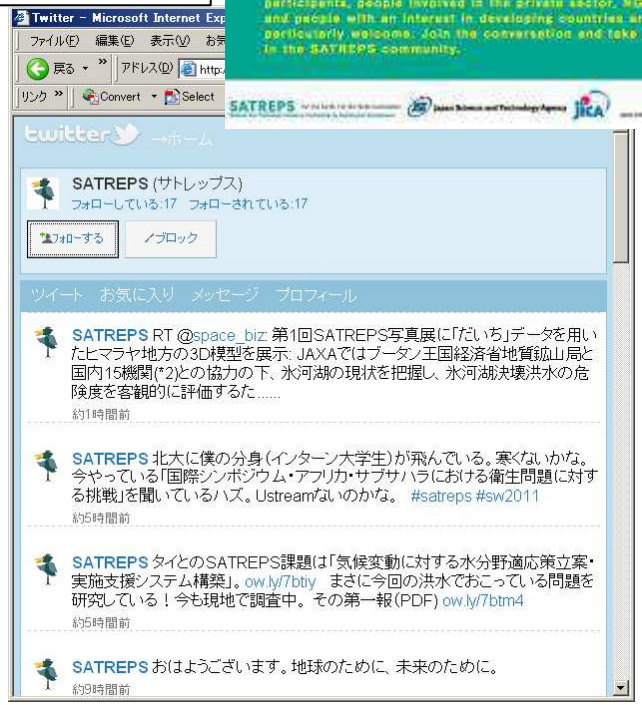

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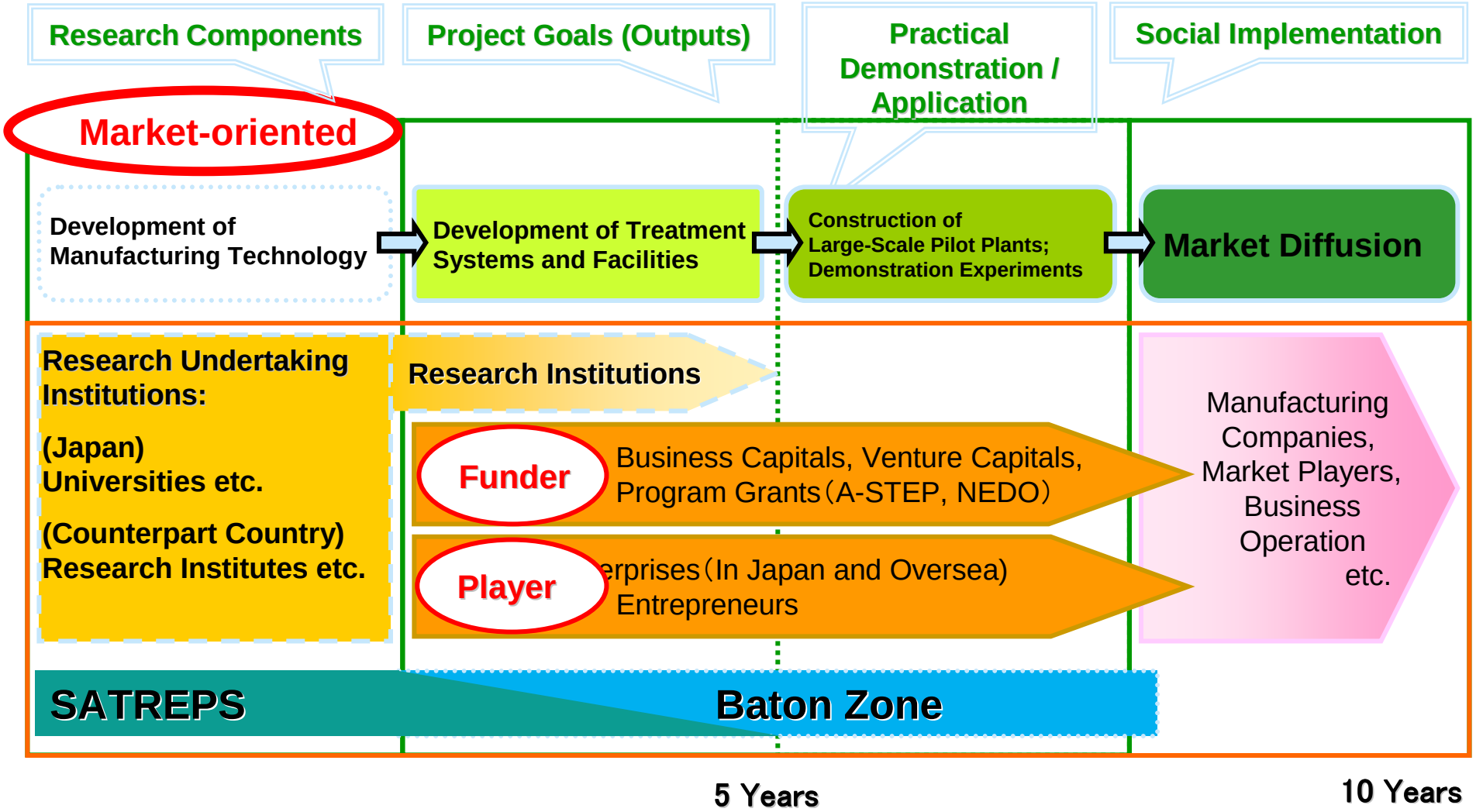
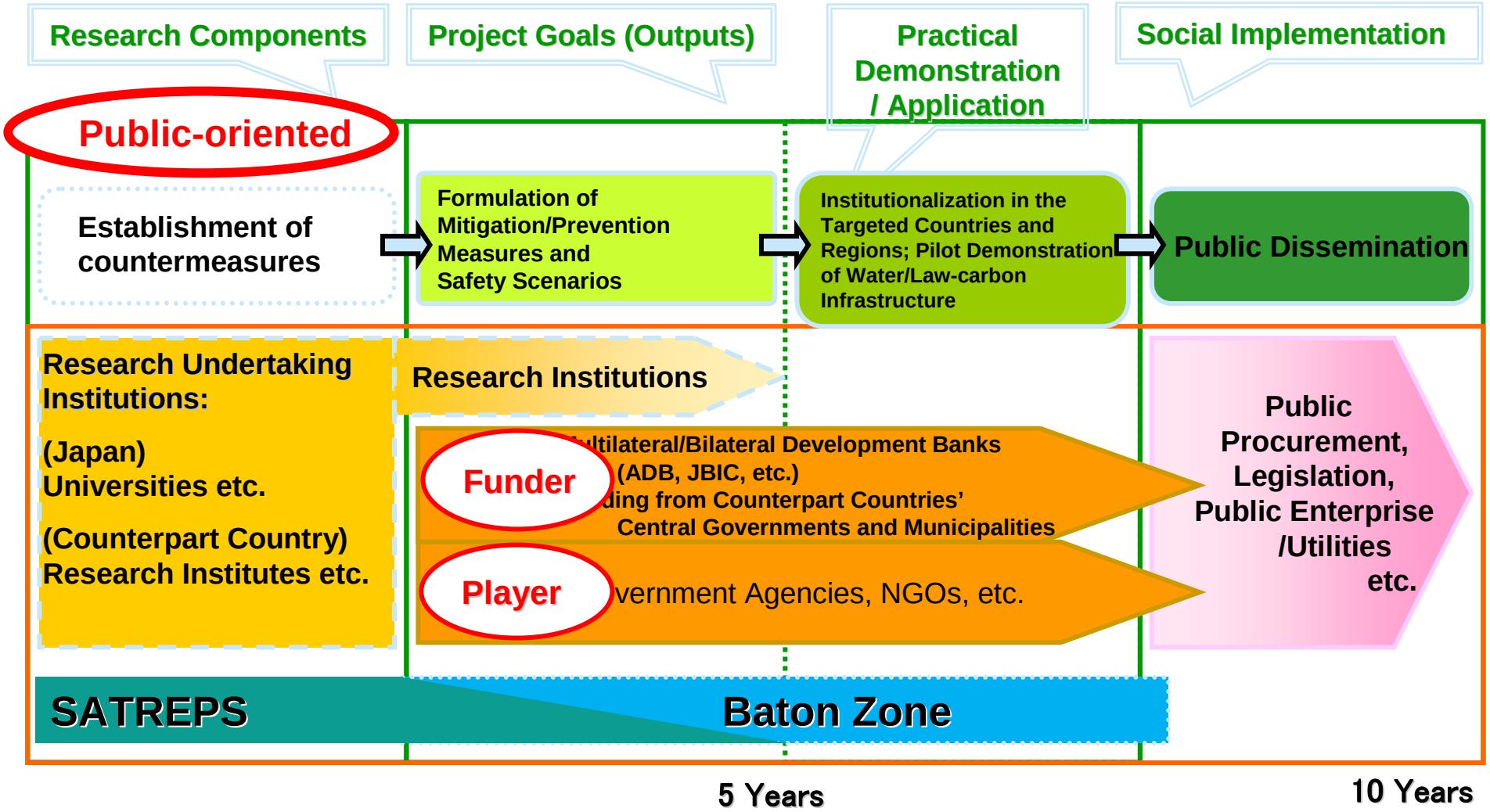
Exit Strategy (Target-oriented): Market Goods

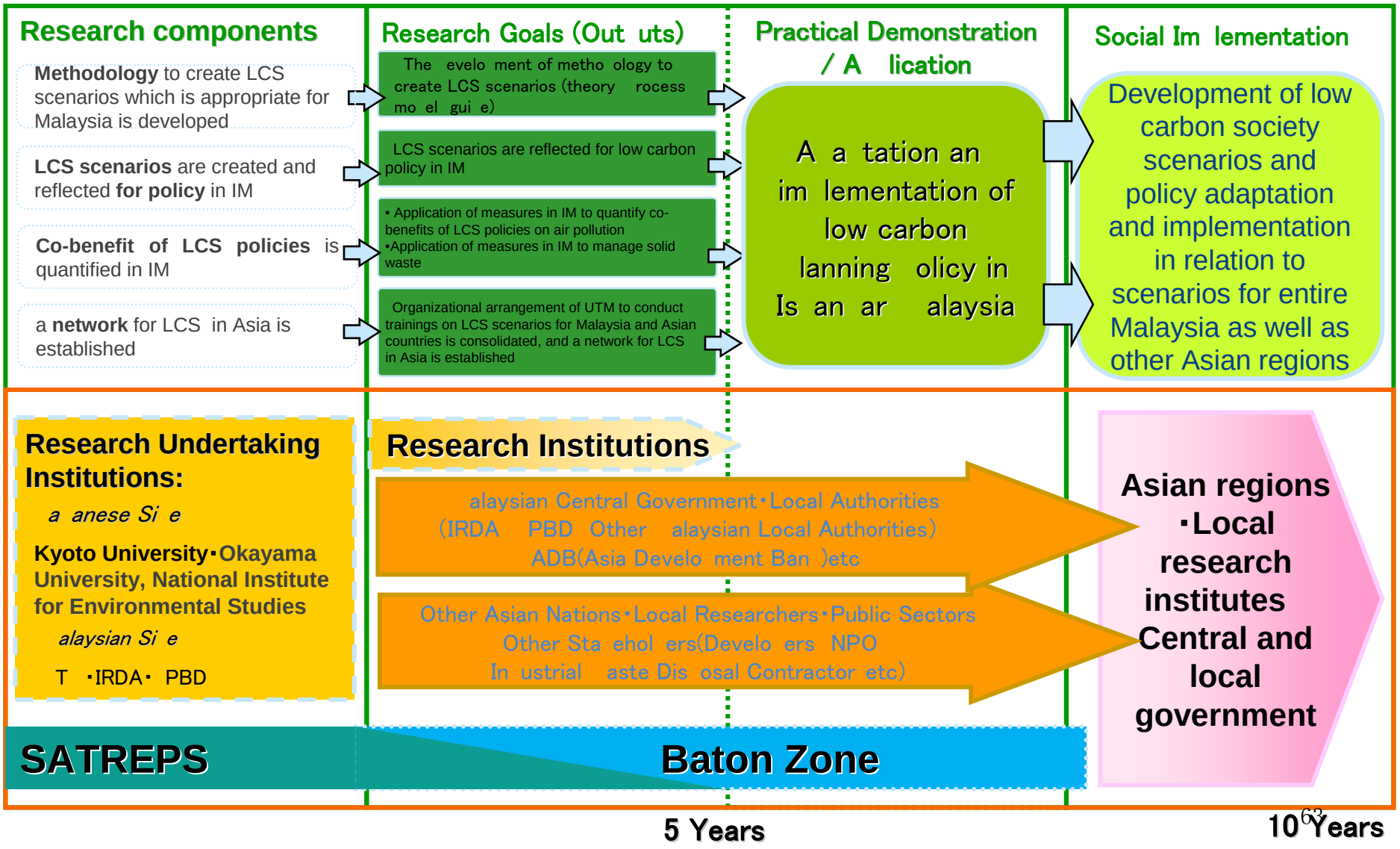


Exit Strategy (Target-oriented): Public Goods



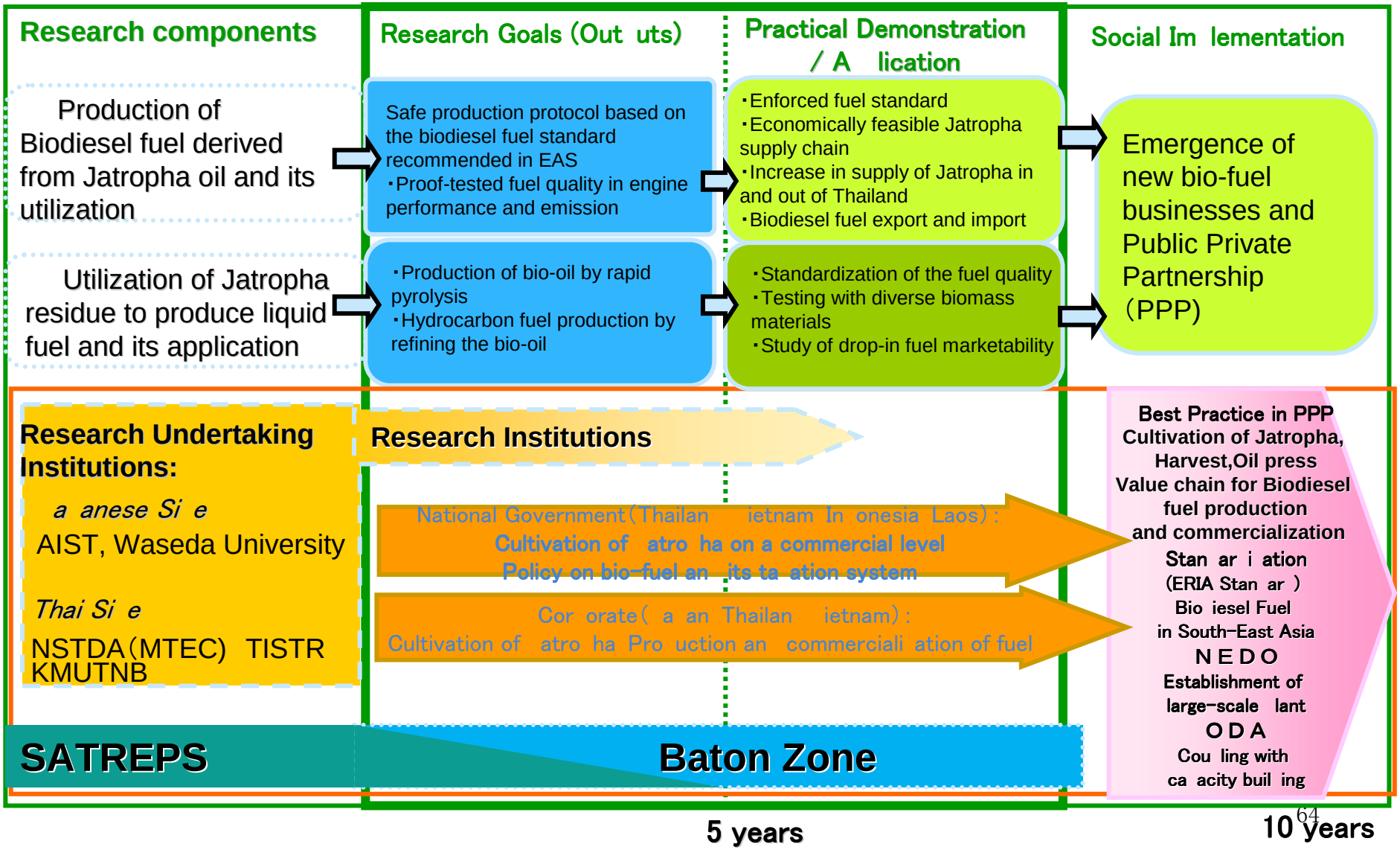
Exit Strategy of SATREPS Projects（ ）

“Development of Low Carbon Society Scenarios for Asian Regions “（Malaysia）



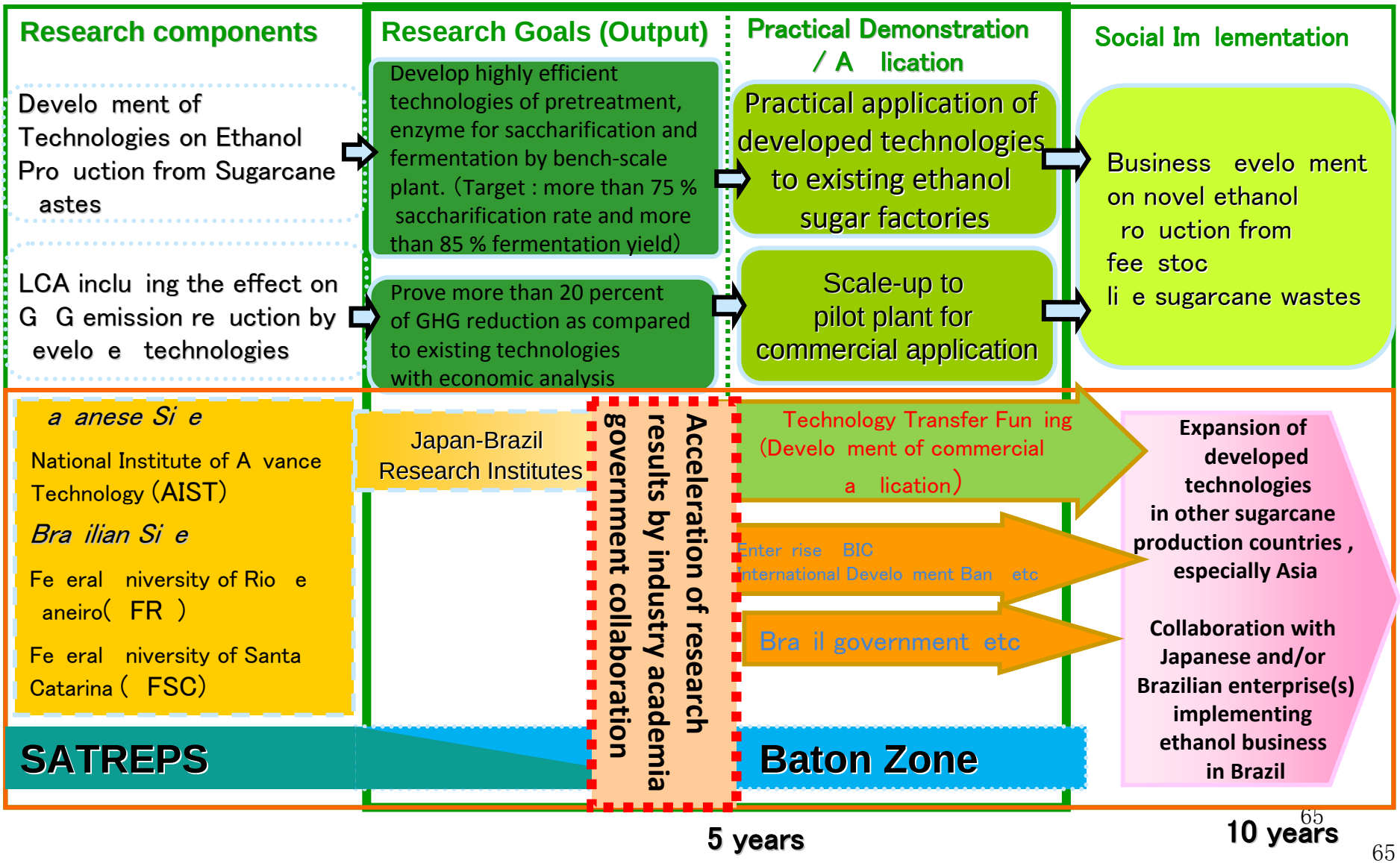
Exit Strategy of SATREPS Projects（2）

"Innovation on Production and Automotive Utilization of Biofuels from Non-food Biomass "(Thailand)



Exit Strategy of SATREPS Projects（3）

“ Research on Ethanol Production from Sugarcane Wastes “（Brazil）



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