21st Century Innovation Systems for Japan and the United States
Lessons from a Decade of Change

Government-Industry R&D Partnerships
Japanese Experiences
“Introduction of NEDO”

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(NEDO)

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Outline of NEDO

History of NEDO

１９８０：Established (New Energy Development Organization)

１９８８：Added industrial technology R&D
(New Energy and Industrial Technology Development Organization)

１９９０：Added global environment R&D

１９９３：Added promotion of new energy and energy conservation

２０００：Added support for private companies to strengthen international competitiveness

２００３：Re-organized as an “Incorporated Administrative Agency”

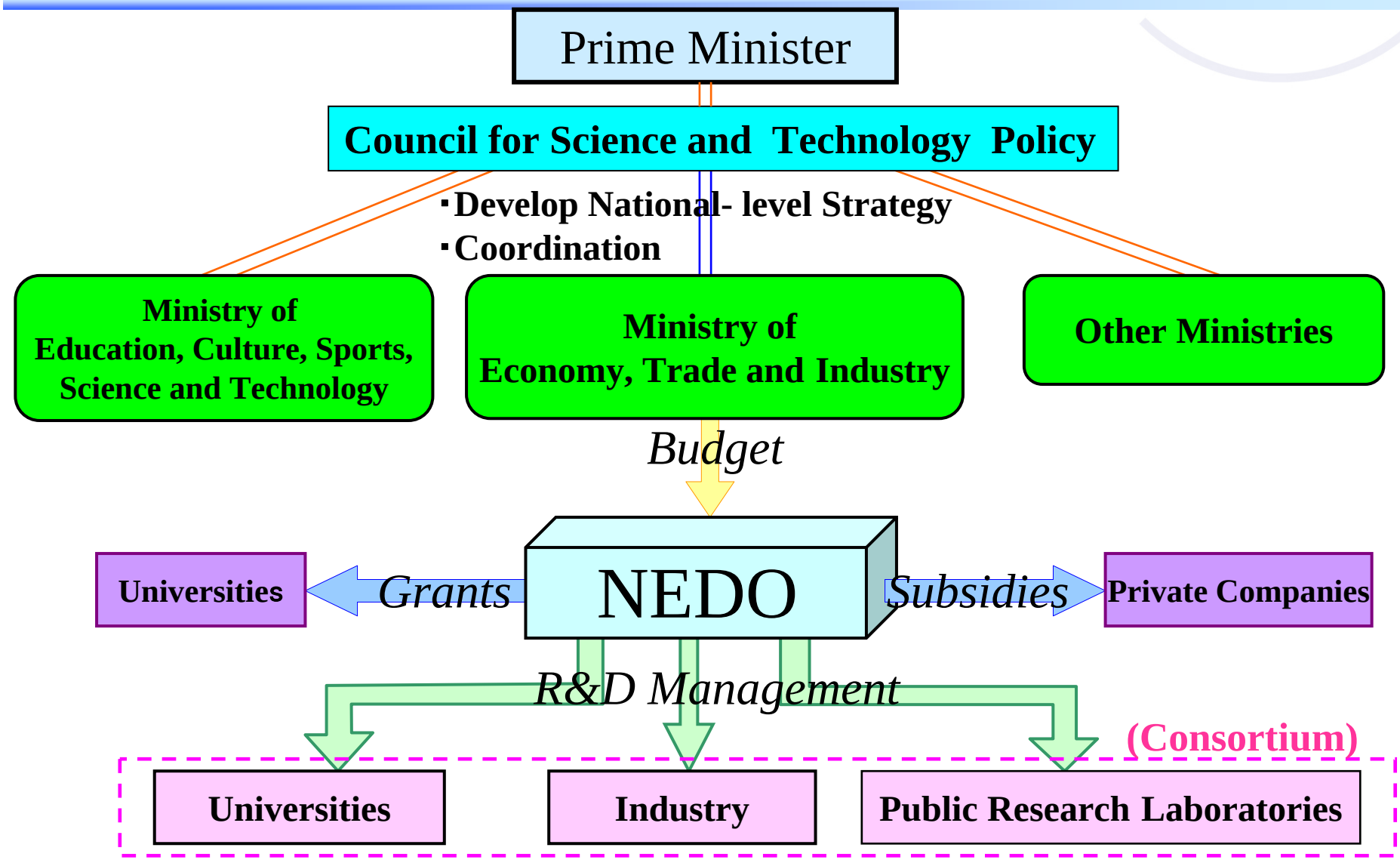
NEDO's Mission

- To strategically prioritize and promote R&D projects on industrial, new energy, energy conservation and environmental technology by means of government ,industry and academic cooperation.
- To contribute to solve energy and environmental problems.
- To yield successful results through flexible operation management and stringent evaluation systems.
- To disseminate information about NEDO's activities and achievements to the public.

NEDO's Main Activities

- R&D of industrial technology, new energy, energy conservation, environmental technology
  - ・Industrial Technology--- IT, Nano, Bio, Mechanical system
  - ・Energy Technology---New energy, Energy conservation, Fuel cell
  - ・Environmental Technology
- Penetration support of new energy and energy conservation

Japan's R&D Promotion Scheme



Basic Principles of NEDO's R&D Scheme

Competitive Research Grants for Exploration of Industrial Seeds (Universities, Research Organizations)

Mid-to-Long Term / High Risk Projects

(Having a Clearly Defined Purpose)

Support for Commercialization / Application for Swift Economic Revitalization

Best Mix

- **Enhancement of Industrial Competitiveness**
- **Sustainable Economic Growth**
- **Contribution to Solving Energy / Environmental Problems**

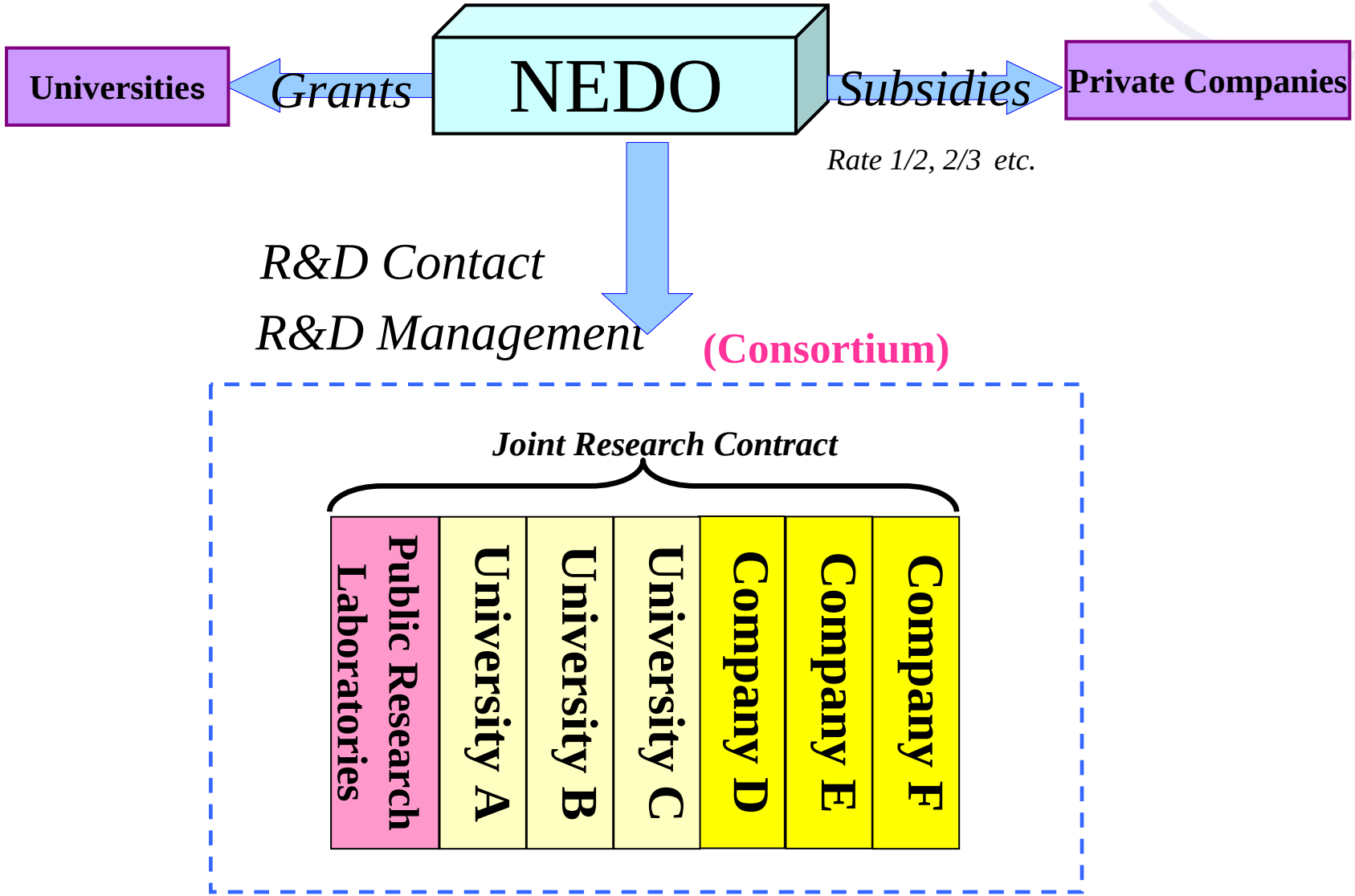
Intellectual Property Strategy

International Standardization
Public Relations

Human Resource Development

Support for Young University Researchers

Project Style & Formation



NEDO's Energy Related Activities

R & D
(with a view to commercialization)

(New Energy) Cost comparable to existing energies
Development based on realistic / applicable conditions

(Energy Conservation) Increasing Energy Efficiency of
Industry / Commercial & Household / Transportation sectors

Verification

**Field Tests,
Overseas Verification**

- Verify developed technology in all aspects

Penetration Support

- Geological balance & recipient characteristics to be considered
- Comprehensive support for Industry / Commercial & Household / Transportation sectors

Contribution to realization of the "Long-term Energy Supply/Demand Outlook" (2010)

NEDO 's "Plan-Do-See" Approach to Optimal Project Management

- Development of fundamental project plans based on industrial technology policy
- Selection of projects quickly and in a fair way
- Preparation of budget requests for the next fiscal year that properly reflect the latest evaluation results

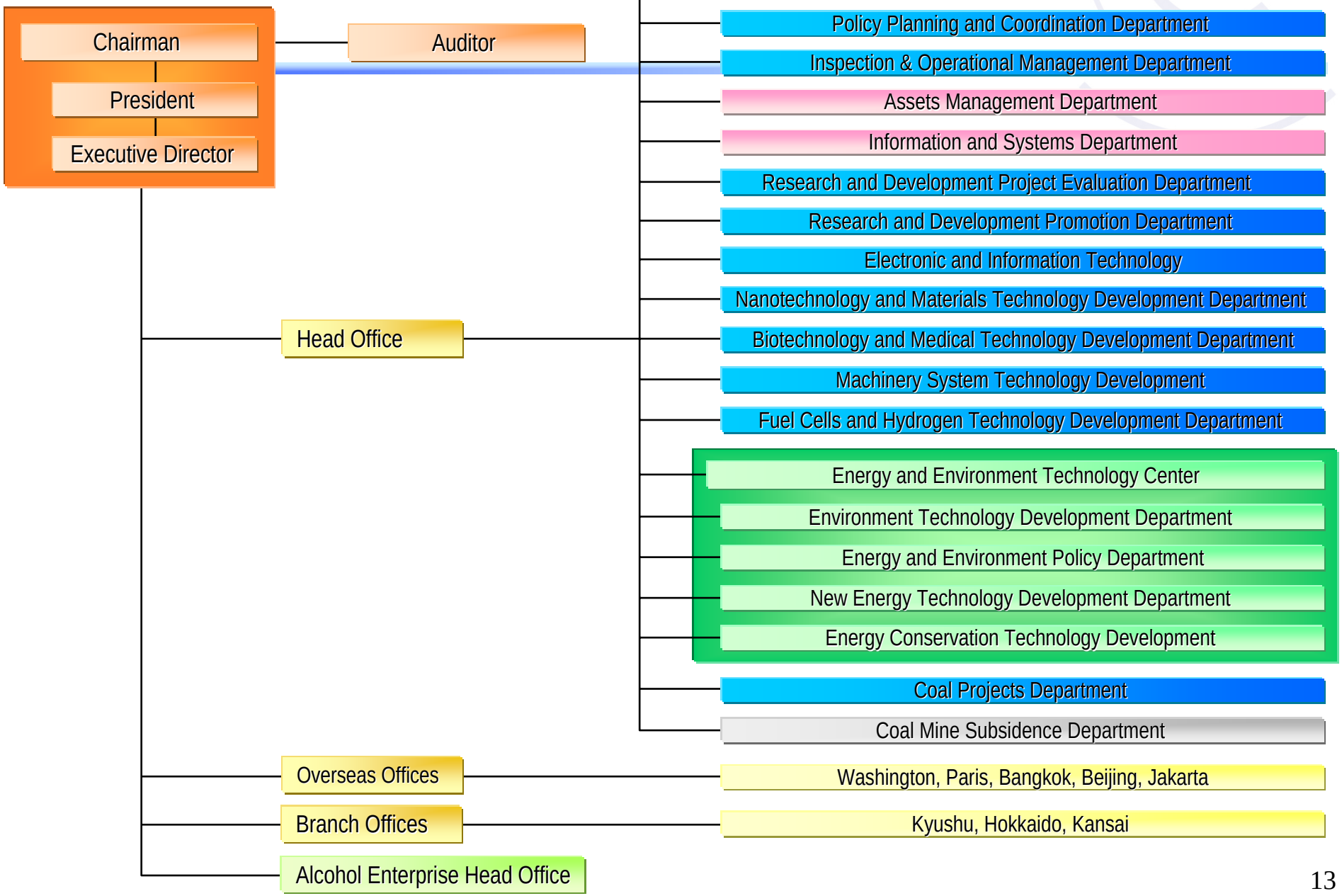
- Implementation former evaluation in order to decide if a project should be start or not
- Implementation of midterm evaluations for all projects after 3 years and post-project evaluations after project completion
- Implementation of follow-up surveys in order to improve evaluation methods and project management tools

- Organization of project implementation groups
- Effective management through appropriate assignment of roles to NEDO and project managers
- Promotion of smooth and continuous R&D through multi-year contracts

Budget of NEDO

		(Billion yen)
	FY2004	FY2005
R&D	162.9	148.8
Introduction of new energy and energy conservation	59.4	63.9
International affairs	14.8	12.0
Coal related activities	5.0	5.0
Alcohol production & sales	56.0	56.3
Others	3.4	2.2
Total	301.5	288.2

Organization of NEDO (October 1, 2005)



METI's 1 9 R&D Programs

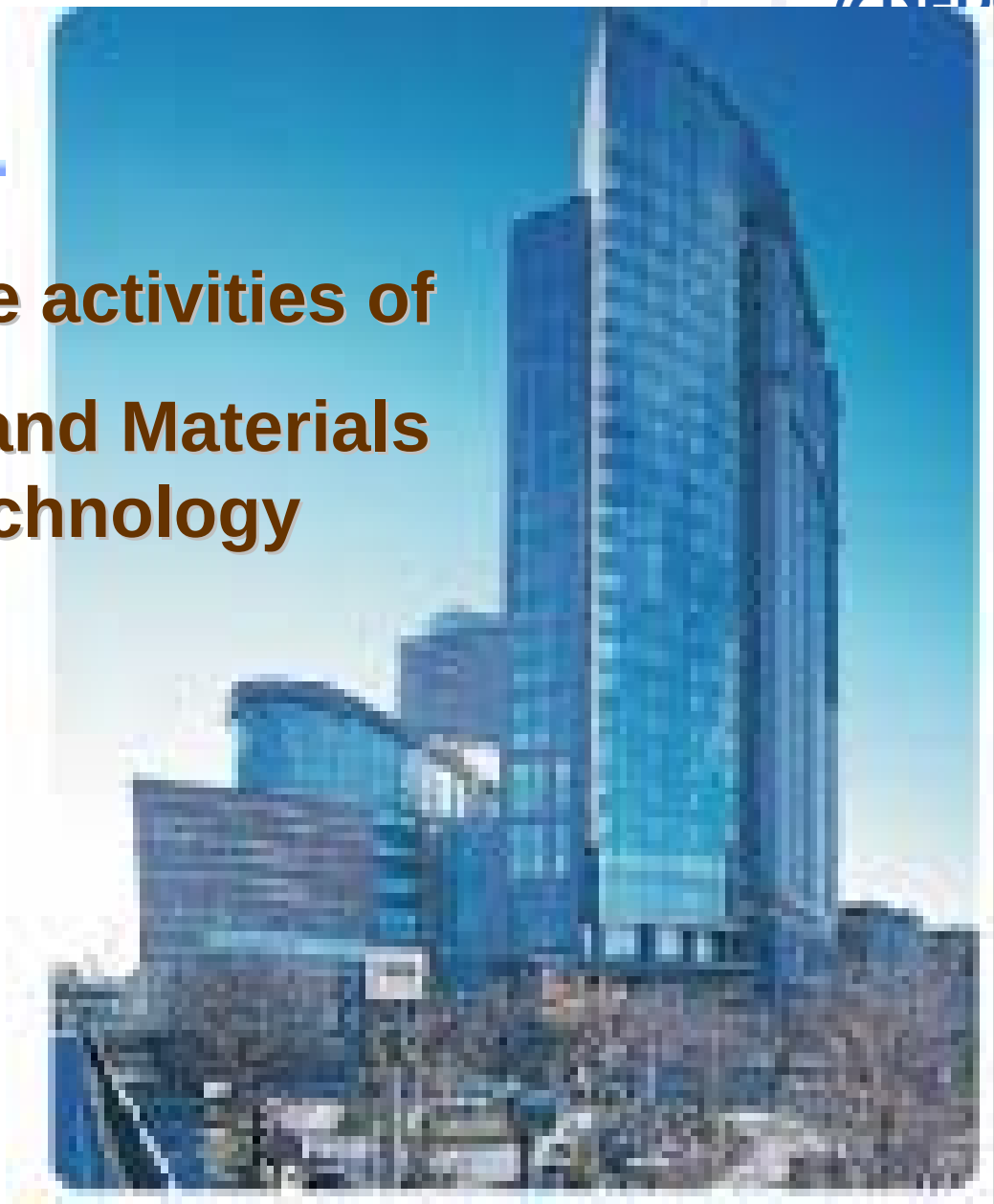
①	Healthy and Comfortable Society Creation
②	Bioscience-Driven Recycling-Based Industrial System Creation
③	Basic Equipment and Devices for Advanced Information Communications R&D
④	Basic Software Development Promotion Program for Information Communications
⑤	New Manufacturing Technology Development
⑥	21st Century Robot Challenge
⑦	Basic Technology Program for a More Sophisticated Space Industry
⑧	New Technology Program for Prevention of Global Warming
⑨	3R ('Reduce', 'Reuse', 'Recycle')
⑩	Comprehensive Assessment and Management Program for Chemical Substances
⑪	Next-Generation Low-Emission Vehicle Technology Development
⑫	Basic Technology Program for Commercial Aircraft
⑬	Energy Consevation Technology Development
⑭	New Energy Technology Development
⑮	Fuel Technology Development
⑯	Electroric Power Technology Development
⑰	Nuclear Power Technology Development
⑱	Nanotechnology Development
⑲	Innovative Material and Materials Industry Creation

NEDO's FY2005 R&D Budget

Technology Development & Research Development Projects	Amount
1. Biotechnology and Medical Technology Development Projects	16.6
2. Electronic and Information Technology Development Projects	18.2
3. Mechanical System Technology Development Projects	17.4
4. Environment Technology Development Projects	7.7
5. Nanotechnology and Materials Technology Development Projects	16.3
6. Fuel Cell and Hydrogen Technology Development Projects	20.8
7. New Energy Technology Development Projects	14.4
8. Energy Conservation Technology Development Projects	7.5
9. CO2 Fixation and Development for Effective Commercial Uses	0.7
10. R&D Promotion Projects	27.4
11. Research Evaluation and Surveys	1.7
TOTAL	148.8

Introduction of the activities of

Nanotechnology and Materials Processes Technology



NEDO
技術開発機構

Council for Science and Technology Policy

Cabinet Office, Japanese Government

March 30, 2001

(1) Life Sciences

(2) Information and Telecommunications

(3) Environmental Sciences

(4) Nanotechnology and Materials

Budget related to S&T

(Billion Yen)

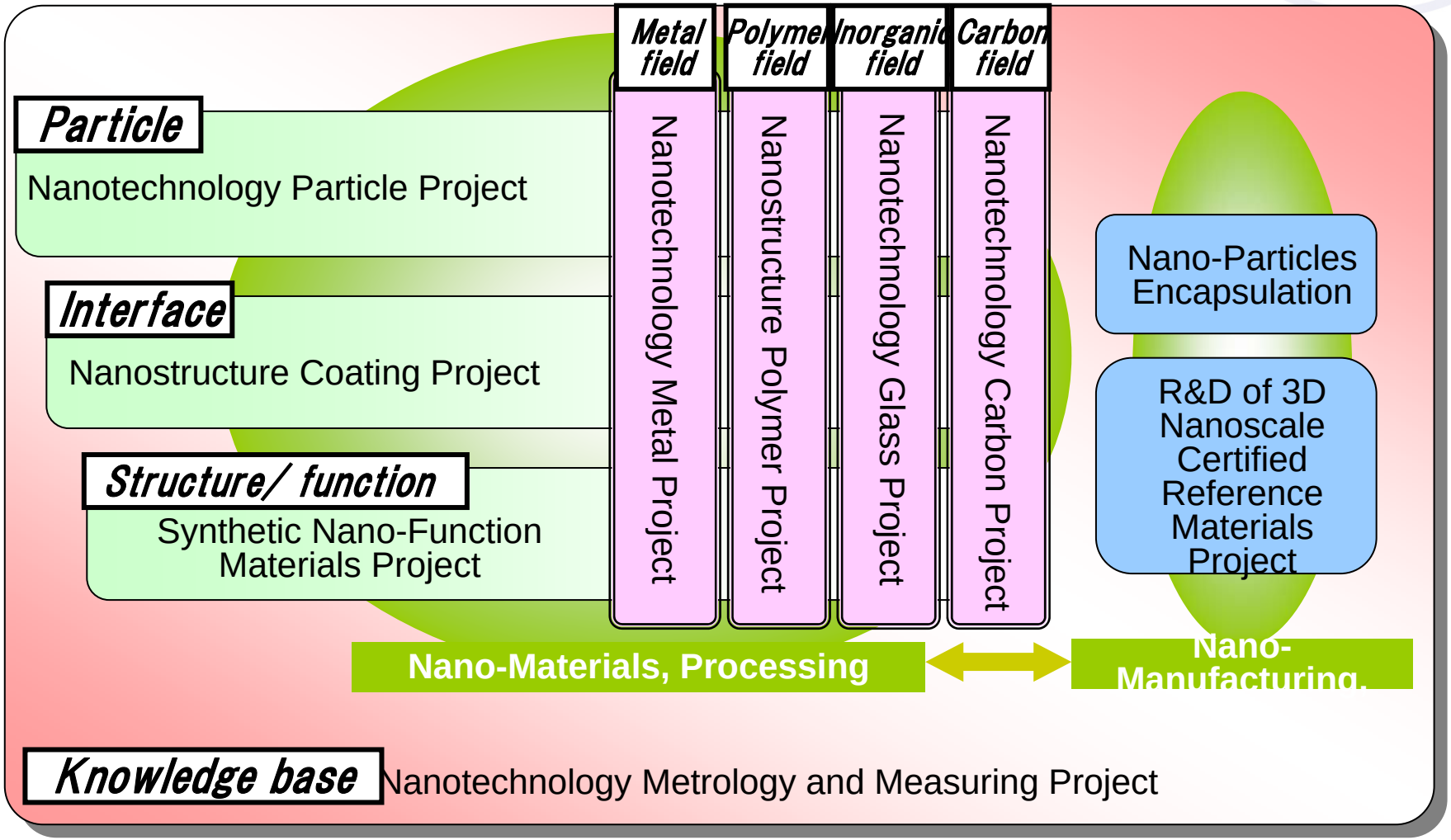
	FY2001	FY2002	FY2003
Life sciences	390.7 19.5%	393.4 19.4%	406.8 20.1%
Information & telecommunication	166.3 8.3%	175.8 8.7%	175.3 8.7%
Environmental sciences	84.7 4.2%	100.6 5.0%	108.8 5.4%
Nanotechnology and materials	80.4 4.0%	85.6 4.2%	90.4 4.5%
Total amount of above 4 priotisized areas + Energy + Manufacturing Technology + Infrastructure + Frontier	2003.1 100%	2027.5 100%	2019.8 100%
Total Budget for Science and Technology	3468.5	3591.6	3591.6

Not Including University Budget except below two (total)

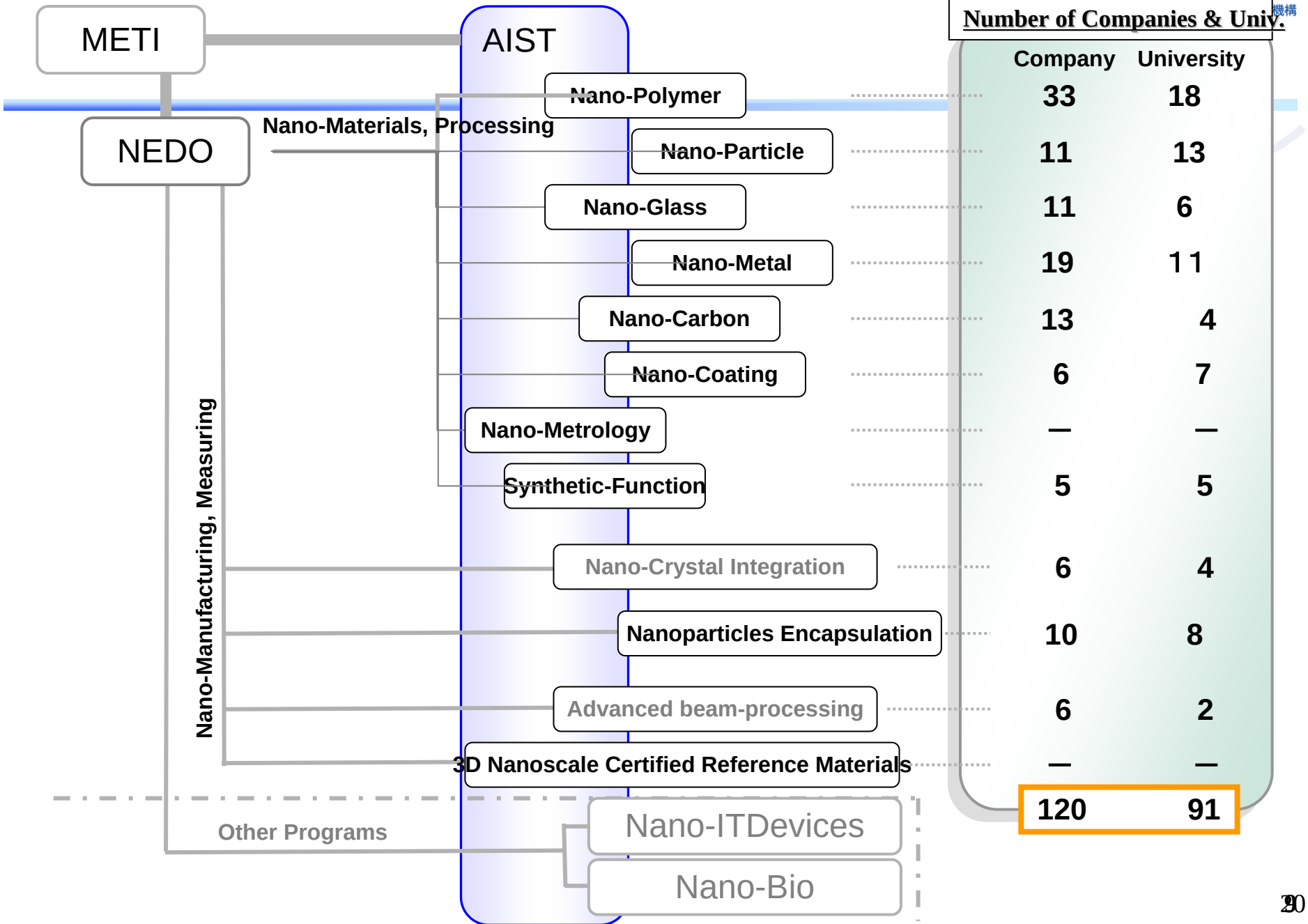
Based on S&T Basic Plan, Council for Science and Technology Policy (2003.5.27)

Structure of the Nanotechnology Program

FY2006:about $67million
(FY2005:about $65million)



Nanotechnology Program Research Structure (March,2005)



Schedule of Nanomaterials and Processing Sub-Program

Project	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007
Nanostructure Polymer Project		10.8	9.6	7.8	7.5	5.5		
Nanotechnology Glass Project	2.5	5.0	5.2	3.6	3.4	3.4		
Nanotechnology Metal Project		2.5	5.6	4.0	3.3	2.6		
Nanocarbon Technology Project			8.5	10.4	9.4	9.0		
Nanotechnology Particle Project		7.5	7.6	5.3	5.1	4.6		
Nanostructure Coating Project		4.2	4.3	3.0	3.0	2.7		
Synthetic Nano-Function Materials Project		2.1	3.0	2.1	2.1	2.0		
Nanotechnology Material Metrology Project		1.9	1.9	1.4	1.4	1.8		

Budget in million $ ($1=¥120)

R&D activities of Fuel Cell and Hydrogen Technologies in Japan

Current Topics

Fuel Cell Vehicles (FCV)

- December 2001: Prime Minister Koizumi took a test ride in a FCV.
- October 2002: Fuel cell commercialization and diffusion scenario was decided by concerned ministries.
- December 2002: FCV supplied for Government use.

Introduction Target

2010: 50,000 vehicles

2020: 5 million vehicles

2030: 12.5 million vehicles

Support by Government

R&D, Demonstration test,

Examination of related regulations

Fuel Cell Commercialization and Diffusion strategy

1: To 2005 (Basic work and technology demonstration stage)

- Drawing up FC R&D Strategy and its Implementation
- Soft-infrastructure/Codes & Standards (Millennium project)
- Demonstration

2: 2005 to 2010 (Introduction stage)

- Acceleration of the Introduction and Gradual Establishment of Fuel Supply System
- Leadership of Public Sector as well as FC Industry in Promotion of FCV and Buses

3: After 2010 (Diffusion stage)

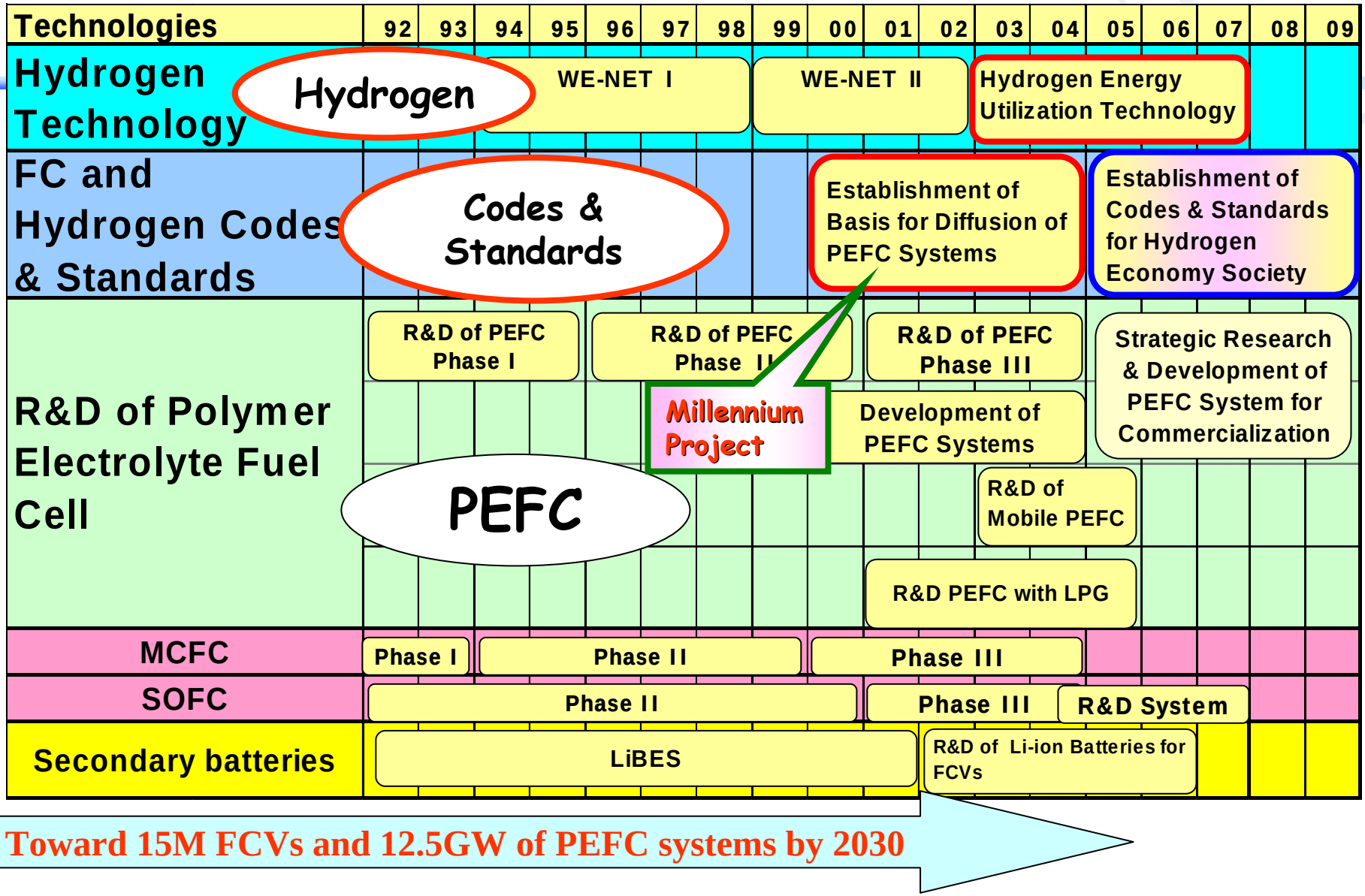
- Establishment of Fuel Supply System and Self-sustained Growth of the Market
- Private Sector Promotion of the Introduction

New Target

Forecast of Fuel Cell Introduction

	2010	2020	2030
FCV	50,000 vehicles	5,000,000	15,000,000
Stationary FC	2.2 million kW	10 million	12.5 million

NEDO R&D of FC/Hydrogen Projects



Toward 15M FCVs and 12.5GW of PEFC systems by 2030

R&D Target for FCV and Stationary FC System

- Commercialization period: 2005-
- diffusion period: 2010-

	FCV	Stationary FC
Power generation efficiency of stack	65％(LHV) @25％ of rated output	55％(HHV) @ rated output
Cost of stack	YEN 4,000/kW	YEN 80,000/kW
Efficiency of system	60％(LHV) Pure H2	40％(HHV,net)
Economy	YEN 5,000/kW	YEN 300,000/unit