Part 3 discusses the measures adopted in FY2004 for the promotion of science and technology, in line with the Second Science and Technology Basic Plan.

3.1 Development of Science and Technology Policies

The Science and Technology Basic Law was promulgated and put into effect on November 15, 1995. Based on a recognition of the important role that science and technology should play in the development of Japan's economy and society, in the improvement of the welfare of the nation, and in the sustainable development of human society, the objective of this law is to achieve higher standards of science and technology through the promotion of such measures as the implementation of the Science and Technology Basic Plan, etc., for the comprehensive and systematic promotion of science and technology.

Article 9 of the Law stipulates that the government must draw up a basic plan for science and technology, for the purpose of the comprehensive and systematic promotion of measures for the promotion of science and technology.

3.1.1 The Science and Technology Basic Plan

With the launching of the Council for Science and Technology Policy (CSTP) in January 2001, the Prime Minister submitted an inquiry regarding the general strategy for science and technology, which called for the adoption of a five-year science and technology basic plan to be launched in FY2001. Based on the recommendations contained in the "Basic Plan for Science and Technology" submitted by the previous Council for Science and Technology on December 26, 2000, the CSTP examined and discussed the general strategy in view of the comprehensive integration of the natural sciences with the social sciences and the humanities, and in strategic consideration of anticipatory investments in science and technology for the future, and then issued a recommendation in March 2001. In response to the comprehensive strategy, the Cabinet officially launched the Second Science and Technology Basic Plan (hereinafter referred to as the "Basic Plan") on March 30, 2001 after the consultation of the CSTP.

The Basic Plan was adopted in consideration of the form science and technology should take in the 21st century, and for the comprehensive promotion of the government's science and technology policies, while also emphasizing the building of a new relationship between science and technology, and society.In this plan, the basic direction of Japan's science and technology policy is to have a clear vision, with three essential qualities comprising the basis for being an advanced science- and technology-oriented nation, as "a nation contributing to the world by the creation and utilization of scientific knowledge," "a nation with international competitiveness and the ability for sustainable development," and "a nation securing safety and quality of life." Toward the realization of this vision, the plan emphasizes the need for high-quality basic research, and calls for prioritized and efficient investment in research and development activities covering topics of interest to the state and society in each sector, including the life sciences, information and communications technology, the environment, and nanotechnology and materials. Moreover, in order to enhance the level of Japan's scientific and technological activities, and to better promote the restoration of the results of these activities to society, the plan focuses on expansion of investment, reform of the science and technology systems that cover research and development activities, human resources development, and the interface between science and technology, and society, and on strengthening independent international cooperation activities and information dissemination capabilities, as well as internationalization of the domestic research environment, in order to promote the internationalization of scientific and technological activities. The plan calls for continued efforts to promote science and technology with an updated understanding of future trends in the major countries of Europe and North America, and for this purpose asserts that a total of about 24 trillion yen[1]

1 figures are based on the presumption that government research and development investment will be 1% of GDP during the period of the Basic Plan, with a nominal GDP growth rate of 3.5%

for governmental research and development investment will be required in the five years from FY2001 to FY2005 (Figure 3-1-1).

In view of the above, while taking into consideration future social and economic trends, the necessity for the promotion of science and technology, and a fiscal situation that is even more severe than it was during the period of the First Basic Plan, Japan should be striving to expand the funds necessary for the promotion of the policies presented in the Basic Plan, based on prioritized and efficient allocation of funds, and in accordance with trends in the effects of rationalization and financial resource assurance achieved in research system reforms under the Basic Plan.

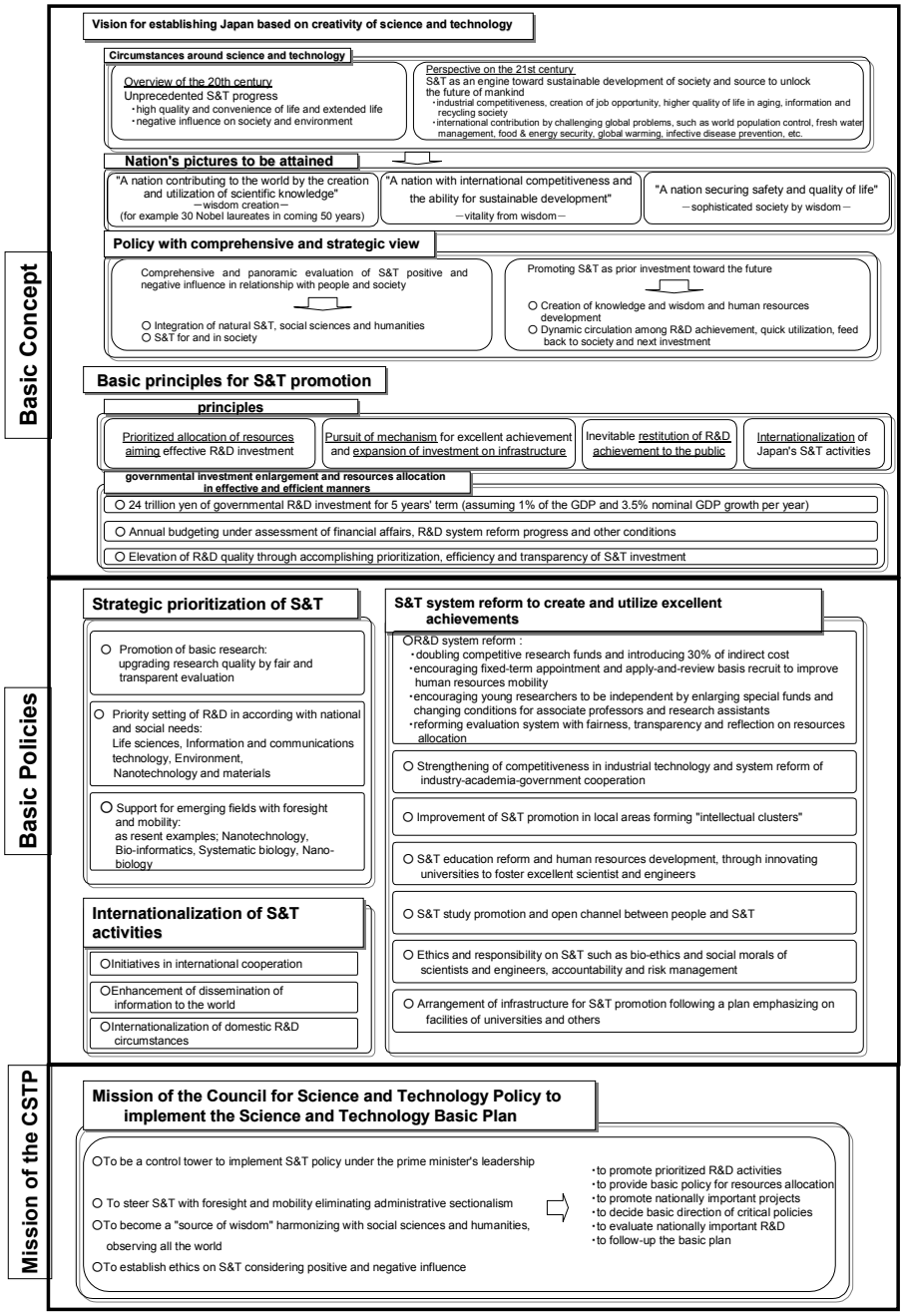


Figure 3-1-1 Main points of the Second Science and Technology Basic Plan

3.1.2 The Council for Science and Technology Policy

Since its establishment in January 2001, the Council for Science and Technology Policy has generally met once a month with the participation of the Prime Minister as council chairman (a total of 44 sessions as of March 2005). The major items discussed and ratified during FY2001 are as presented below.

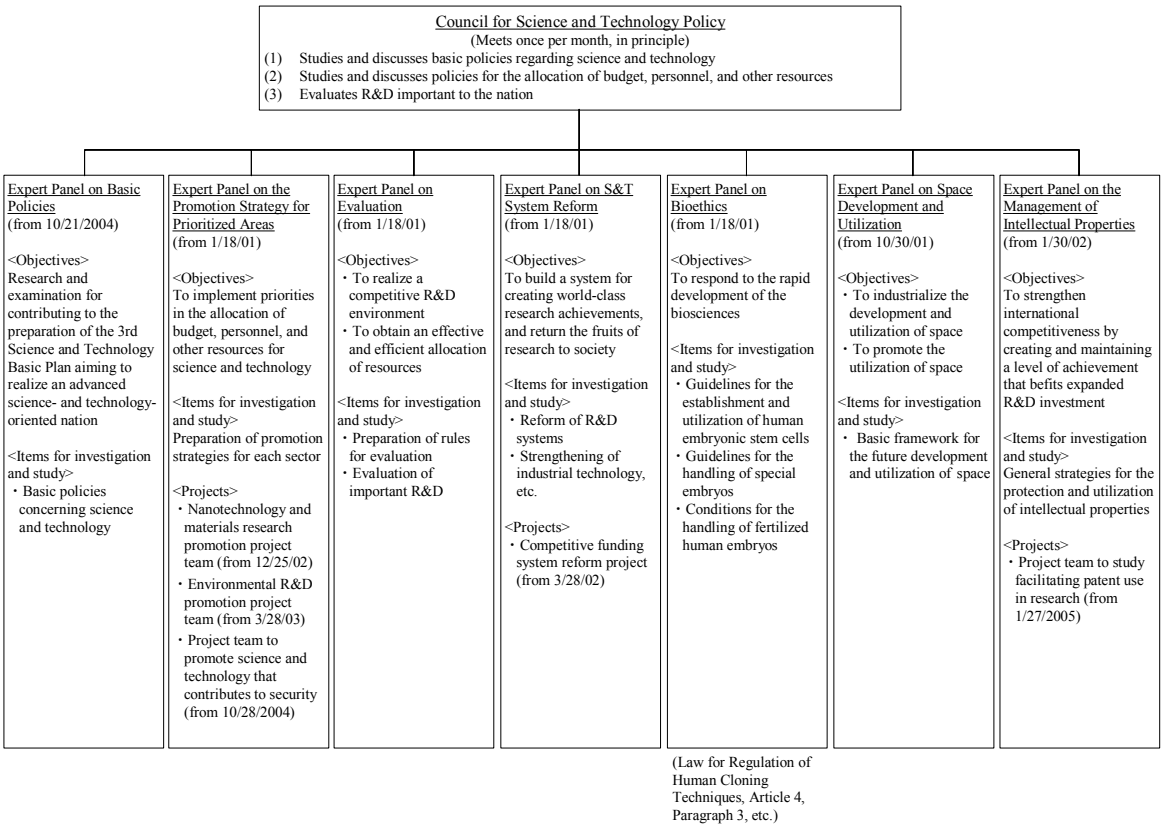


Figure 3-1-2 Organization of the Council for Science and Technology Policy

Table 3-1-3 Chairman and Members of the Council for Science and Technology Policy (as of the end of March 2005)

●Chairman: Junichiro Koizumi, Prime Minister

●Members

・Six cabinet ministers: Hiroyuki Hosoda, Chief Cabinet Secretary; Yasufumi Tanahashi, Minister of State for Science and Technology Policy; Taro Aso, Minister of Internal Affairs and Communications; Sadakazu Tanigaki, Minister of Finance; Nariaki Nakayama, Minister of Education, Culture, Sports, Science, and Technology; and Shoichi Nakagawa, Minister of Economy, Trade, and Industry

・Seven noted members of society: Hiroyuki Abe, professor emeritus, Tohoku University; Taizo Yakushiji, visiting professor, Keio University; Tadamitsu Kishimoto, visiting professor, Osaka University; Ayao Tsuge, former representative director & managing director, Mitsubishi Heavy Industries, Ltd.; Reiko Kuroda, professor, University of Tokyo; Kazuko Matsumoto, professor, School of Science and Engineering, Waseda University; and Hiroyuki Yoshino, director and advisor, Honda Motor Co., Ltd.

・One head of a government institution**:** Kiyoshi Kurokawa: President of the Science Council of Japan

(1) Reform of Science- and Techno logy-Related Budget for FY 2005

As Fiscal 2005 is the final year of the 2nd Science and Technology Basic Plan and in order to achieve the various objectives for realizing an advanced science and technology-oriented nation as set forth in the Plan, the Council strengthened efforts for high-quality measures by promoting the reform of the science and technology-related budget, includeeeing thorough elimination of unnecessary duplication.

(Improvement of prioritization (SABC, etc.))

In formulating the FY2005 budget, the Minister of State for Science and Technology Policy and the eminent members of the Council examined every science- and technology-related budget and, with the cooperation of outside experts, prioritized (in 4 levels: S, A, B, and C) the science- and technology-related measures for which relevant ministries and agencies made budget requests, and then, with regard to independent administrative agencies, state-run universities and inter-university research institutes, summarized opinions on their main projects related to science and technology. (October 21, 2004). The prioritization results were as follows:

S: 25 items (9%) — Particularly important research topics that require aggressive implementation

A: 120 items (44%) — Important research topics that require steady implementation

B: 105 items (38%) — Items for which problems must be solved and that need effective and efficient implementation

C: 25 items (9%) — Items requiring review of research details, plans, and promotion systems

In addition, working to enhance the science and technology budget, the CSTP made a summary of "Toward Formation of the FY2004 Science and Technology-Related Budget (Opinion)," and submitted its opinion to the Prime Minister and the relevant ministers (November 26, 2004). In view of the importance of science and technology, expenses for the promotion of science and technology were increased 2.6% in the FY2005 budget from the previous fiscal year, despite the fact that the general expenditures for the fiscal year were reduced. Incidentally, the total science- and technology-related budget, including expenses other than for the promotion of science and technology, was reduced by 0.8%.

(Creation and Promotion of the Coordina-tion Program of Science and Technology Projects)

Eight themes were decided from the standpoint of their national and social importance (① Post-Genome - Promoting the health sciences -, ② Emerging and Re-emerging Infectious Diseases, ③ Ubiquitous Networks - RFID tags and other technologies, - ④ Next-Generation Robots-Shared platform technology-, ⑤ Biomass Utilization Technologies, ⑥ Hydrogen & Fuel Cell, ⑦ Nanobiotechnology, ⑧ Local Science & Technology Cluster) and relevant measures were examined to eliminate unnecessary redundancy and reinforce collaboration in order for it to be reflected in prioritization.

(Thorough reform and focused expansion of competitive research funding)

In order to promote creative R&D activities, it is necessary to develop a competitive R&D environment. To this end, institutional reform was implemented thoroughly to maximize the effect of competitive research funding, and focused expansion of funding was carried out toward achieving the goal of doubling competitive research funding as laid down in the Basic Plan.

As a result, progress has been made in institutional reforms, such as establishment of a screening system, and 467.2 billion yen was appropriated for competitive research funding (up 29.6% over the previous year and up 157.4% over FY2004) in the FY2005 budget.

(2) Guidelines on Budgetary/Perso-nnel Resources Allocation in Scie-nce and Technology

As shown in the Basic Plan, the CSTP relies on the Basic Plan and the promotion strategies for each sector, etc., examines the science and technology measures set forth for the next fiscal year, and presents opinions to the Prime Minister regarding those measures that it believes merit particular priority, and then clarifies its ideas regarding the next fiscal year's important measures and allocation of resources, and presents those ideas to the relevant ministers. Furthermore, to ensure that the resource allocations settled upon in the CSTP are carried out, the council coordinates when necessary

with the finance authorities during the budget formulation process.

(FY2005 Guidelines on Budgetary/Person-nel Resources Allocation in Science and Technology (May 26, 2004))

The FY2005 guidelines maintain that in order to achieve various goals set forth in the Basic Plan, it is necessary to accelerate efforts for science-and technology-related measures and strengthen and enhance government investment in science-and technology-related measures in particular, while promoting prioritization in a strategic way. In doing so, priorities were placed on measures that are in line with the basic policies of ① steadily promoting R&Ds of foundations for the future development of Japan, ② promoting scientific and technological activities to ensure Japan's economic development and international competitiveness, ③ promoting scientific and technological activities to realize a safe and secure life, and ④ reforming the science and technology system.

(R & D projects for Economic Stimulus (The Mirai Creation Project))

In an effort to develop Japan's economy and to ensure and strengthen the nation's international competitiveness, R & D projects for economic stimulus (the Mirai Creation Project) were pro moted. Funding for the project was 105.9 billion yen in the FY2004 government budget (up 43% from the previous year).

(3) Major Efforts of the Council for Science and Technology Policy in FY2003

(Examination of Promotion Measures in Priority Areas)

Based on the prioritized strategies determined in the Basic Plan, in FY2001 the CSTP prepared the "Promotion Strategy for Prioritized Areas" for eight major areas, which are the life sciences, information and communications technology, the environmental sciences, nanotechnology and materials, energy, manufacturing technology, infrastructure and the frontier – outer space and the oceans (Figure 3-1-4). CSTP promotes measures based on the promotion strategies for these areas (see section 3.2.2).

Life Sciences Sector

1. Current Situation, and Issues

The 21st century is being called the "Century of Life." While Japan had a late start in analysis of the genome, the country is using its leading-edge R&D performance in SNPs, proteins, etc., to catch up in post-genome research and industrial applications.

2. Thoughts on Prioritizing, and Areas of Priority

Strive to extend the "healthy life expectancy" in an aged society with fewer children, and seek to overcome the infectious diseases, allergies and stress-related illnesses that are now coming to the fore as social problems. Furthermore, achieve a prosperous lifestyle by utilizing diverse bio-resources and bio-functions, and strengthening industrial competitiveness.

(1) Develop technologies to "protect the people's health"
- Technologies for the prevention and treatment of diseases that utilize genome-related technologies to achieve active, long lives
- Elucidation of physiological defense mechanisms and technologies for prevention and medical treatment in relation to infectious diseases and environmental factors
- Promotion of basic research and technologies for the treatment and prevention of mental health and brain diseases

(2) Develop technologies for "competitiveness" and "sustainable development"
- Materials production and environmental response technologies that utilize bio-functions
- Food sciences and technologies that contribute to the improvement of food supply capabilities and to the peoples' diet

(3) Emerging and interdisciplinary areas and the development of advanced analyzing technologies. Build systems and structures that accelerate the return of the fruits of research to society

3. Five-Year R&D Objectives

(1) Realize healthy, secure lives by:
- Developing countermeasures for "lifestyle related diseases," and ailments that lead to "dementia" and "bed-ridden status": Analyze tens of million of SNPs each year/Perform structural and functional analysis of large-scale, highly purified proteins/Identify approximately 10 genes related to each ailment/Shorten drug development times/Realize effective treatment using medicines tailor-made to the constitution of individual patients, etc.
- Developing countermeasures for infectious diseases and environmental factors such as toxic substances: Elucidate the mechanism for the incidence of hepatitis C infections, etc./Use vaccines, etc., to prevent infections and control incidence, etc.
- Developing countermeasures for mental and nervous system diseases: Promote brain science/ Set out to develop new diagnostic and treatment methods for Alzheimer's and other nervous system diseases/Develop non-invasive diagnostic technologies for the measurement of brain functions

(2) Advance technologies for the production of useful substances and technologies for separating environmental pollutants, utilizing genome-related technologies and microorganisms and other plants and animals/Develop crops resistant to environmental stresses to improve food supply capabilities

(3) Promote research into interdisciplinary sectors such as bio-informatics and nanobiology/Promote clinical research/Arrive at consensus in bioethics/Promote social acceptance of genetically modified organism/ Promote accumulation of intellectual properties, etc.

4. Promotion Measures

(1) Build up comprehensive systems of promotion for the evaluation of, and guidance on, measures proposed by various ministries that serve to strengthen national efforts

(2) Develop effective collaboration among industry, academia and government, the development of systems and structures that return the fruits of research to society, etc.

(3) Develop education and research centers for developing human resources for such interdisciplinary sectors as bio-informatics, advanced analysis, and medical treatment device development, in which engineering, physical sciences, medical science, agriculture, etc., are utilized and integrated

Information and Communications Sector

1. Current Situation and Issues

While the gap between Japan and the United States in information and communications technology continues to widen, R&D investment growth in the private sector is stalling, and collaboration among industry, academia, and the government remains insufficient. Since Japan's economy relies heavily on the information and communications industry, strengthening international competitiveness is an urgent task.

2. Thoughts on Prioritizing and Areas of Priority

Prioritize from the viewpoints of strengthening international competitiveness in the core technologies in which Japan has an advantage, such as mobile, optical and device technologies, the achievement of safe, secure and comfortable lives, strengthening the foundation for next-generation information and communications technologies and R&D infrastructure.

○ Building a "high-speed, highly reliable information systems" suitable for a society with a ubiquitous information-network, and the creation of a global market
- Technologies that realize an ultra-high-speed mobile internet system, in which vast amounts of information can be exchanged and utilized with high quality through wireless and optical networks anywhere and anytime, whether at home, in the office or on the move
- Technologies for devices with advanced-function and low-power-consumption
- Technologies for improved convenience, security, and reliability, for software and content, for the flexible and safe utilization of distributed computing power, etc.

○ Next-generation information and communications technologies, including next-generation human interfaces, quantum information and communication, and advanced traffic information systems (ITS, etc.), and so on

○ R&D infrastructures including science and technology databases, supercomputer networks, computational sciences, etc.

○ Human resource development in software, the Internet, interdisciplinary sectors, etc.

3. Five-Year R&D Objectives

(1) Information and communications system with high-speed and highly reliability
- Realize wireless access in the class of tens of megabits per second, fully optical networks at 10 terabits per second, ultra-large scale connections (nodes) with IPv6, and high-quality real-time transmissions, and mobile terminals with 1-gigahertz-class high-speed and advanced functionality that do not require recharging for a week at a time, etc.
- Realize databases that can be accessed by approximately 100,000 people at the same time, advanced coding and authentification technologies, the establishment of development methods for the improvement of software reliability and productivity, digital authorization control systems, etc.

(2) Next-generation information and communications technologies: Realize technologies that can understand user intention by considering surrounding conditions, quantum code key distribution over relatively short distances, advanced ITS using next-generation Internets, gigabit-class high-speed space communications, etc.

(3) R&D infrastructure: Realize electronic science and technology information and search systems, and joint supercomputer networks linking national research institutions and universities, etc.

4. Promotion Measures

(1) Promotion of R&D applications: Strengthen collaboration among industry, academia, and government, etc., to promote R&D activities specifically intended for practical use, promote international standardization, and promote technology development in test beds for real environments

(2) R&D systems: Promote greater movement of researchers between institutions, support and develop venture companies, utilize excellent universities and research institutions as R&D bases, develop high-level instructors in the information and communications field, and expand the scale of human resource development capabilities

(3) Investigation of effects on society: Research the effects of information and communications development on society, coordinate with IT strategy headquarters, form strategic international collaborations to encourage international standardization and technology transfers, etc.

Figure 3-1-4 Strategies for the Promotion of Each of the Four Priority Sectors (September 21, 2001)

Four Priority Sectors: the sectors that receive particular priority and preferential allocation of R&D resources.
Each section below features the current situation and issues, thoughts on prioritizing and areas of priority, five-year R&D objectives, and promotion measures for one of these sectors.

(Figure 3-1-4)

Environmental Area

1. Current Situation, and Issues

With environmental problems becoming both broader in geographical scope and more complex, research is requested to coordinate individual projects and develop planned and integrated programs. Other issues also requiring attention from a comprehensive viewpoint are research on human-environment interactions, and forecasting and preventive research (scenario-driven environmental research).

2. Thoughts on Prioritizing, and Areas of Priority

Engage in research that contributes to the solution of urgent and serious environmental problems, and to the building of sustainable societies. Perform research promoted by scenario-driven initiatives in which natural sciences, humanities and social sciences are merged under inter-ministerial collaboration.
[Important issues]

- ○ Research into global warming
- ○ Research into waste-free and resource recycling technologies
- ○ Research into eco-harmonious river basin and urban area regeneration
- ○ Research into chemical substance risk management
- ○ Research into global water cycle
- ○ Development of intellectual infrastructure such as standard materials and environmental biological resources
- ○ Advanced research

3. Five-Year R&D Objectives

(1) Research into global warming: Seek possibilities for controlling the emission of greenhouse gases into the atmosphere so as not to endanger mankind and ecosystems, and examine obtaining and systemizing scientific knowledge, developing and advancing remedy technologies and creating scenarios for the control of global warming
(2) Research into waste-free and resource recycling technologies: Develop technologies and systems that contribute to the reduction of waste volumes, improvement of recycling and reutilization rates, and reduction of environmental risks from toxic wastes
(3) Research into eco-harmonious river basin and urban area regeneration: Propose measures for the resolution of such environmental problems as high environmental loads in urban areas and the retreat or deterioration of natural environments, and systematically develop riparian district and urban renewal technologies and systems in order to contribute to the preparation of specific plans for coexistence with nature in major urban areas
(4) Research into chemical substance risk management: While determining the chemical substances that are expected to need risk management, urgently build up the technological infrastructure, knowledge systems, and intellectual infrastructure for comprehensive management of chemical substances, to ensure "safety and security"
(5) Research into global water cycle: Provide the scientific knowledge and technological infrastructure required for assessing the effects on human society of water resource supply and demand and changes in the water cycle, and for establishing water management methods that lead to sustainable development
(6) Intellectual infrastructure for the environmental area: Broaden and upgrade the intellectual infrastructure for environmental research
(7) Promotion of advanced research: Develop innovative knowledge for the resolution of environmental problems, and build new paradigms

4. Promotion Measures

(1) Improvement of R&D quality: □Establish promotion and evaluation systems for initiatives, □Foster international cooperation, □Disseminate R&D results, reflected in environmental policies, and basic efforts on societal understanding, □Define roles and foster cooperation among industry, academia, and government, □Cooperate with initiatives by local governments and NGOs, etc.
(2) Necessary resources: □Enhance and expand competitive funding, □Assure and develop human resources, strengthen international research networks, improve systems for accepting foreign researchers, and support and actively utilize environment-related university institutions, □Cooperate with other sectors: actively utilize new methods and technologies in other sectors in order to engender reform of environment research paradigms, □Develop important large-scale facilities and equipments specific to environmental research

Nanotechnology and Materials Area

1. Current Situation, and Issues

Nanotechnology offers great possibilities for technological innovation in a wide range of industries. Nations everywhere are actively engaged in strategic efforts. In materials technology, competitiveness arises from high value-added functional materials.

2. Thoughts on Prioritizing, and Areas of Priority

Assign priorities from the perspectives of "strengthening industrial competitiveness and forming the basis for sustainable economic growth," "responses to environmental and energy problems, and to an aged society with few children," and "assurance of safe and secure lives for the people, and retention of strategic technologies." Clarify the timetable for technological development, and steadily implement basic measurement, evaluation, and processing technologies, as well as materials technologies, etc.

- ○ Nano-devices and materials for next-generation information and communication systems
- ○ Materials for environmental preservation and advanced energy utilization
- ○ Ultra-small medical systems and materials, and nano-biology utilizing and controlling biological mechanisms
- ○ Basic technologies such as measurement, evaluation, processing, numerical analysis and simulations, and areas spreading from them
- ○ Substance and materials technologies that can generate innovative properties and functions

3. Five-Year R&D Objectives

- ○ Nano-devices and materials for next-generation information and communication systems
  - – Ensure international competitiveness in high-speed and high IC density device technologies
  - – Use the competitive development of various devices based on new principles, to select and focus next-generation, cutting-edge core technologies
- ○ Materials for environmental preservation and advanced energy utilization
  - – Realize materials for the reduction of CO2 emission volumes required to meet the COP3 objectives, and encourage the use of these materials into society
  - – Realize technologies for the reduction and elimination of risks arising from chemical substances, and incorporate them into society and national life
- ○ Ultra-small medical systems and materials, and nano-biology utilizing and controlling biological mechanisms
  - – Establish the groundwork for bio-functional materials, pinpoint therapies, and other technologies to extend healthy life expectancy
  - – Elucidate the basic principles to construct the systems that utilize the motive principles, etc., of bio-molecules
- ○ Basic technologies for measurement, evaluation, processing, numerical analysis and simulations, and areas spreading from them
  - – Realize highly precise measurement and processing technologies, improved by at least one order of magnitude compared to the levels required by the above three objectives
  - – Utilize simulations in the development of new materials and new devices
- ○ Substance and materials technologies that can generate innovative properties and functions
  - – Develop new materials through R&D activities that go beyond the boundaries of traditional materials classification
  - – Build up research and production methods that lead to the rapid resolution of social issues

4. Promotion Measures

- ○ Encourage competition at daily R&D activities, and prepare environments suitable for that purpose
  (Emphasis on competitive funding, promotion that goes beyond the boundaries of government ministries/agencies or systems, and the strategic acquisition of intellectual property)
- ○ Promote cooperation between different areas and researchers
  (Support for cooperative efforts among different areas building up networks among researchers and among institutions, etc.)
- ○ Build a system for the industrialization of R&D results, and promote collaboration among industry, academia, and the government
  (Acceleration of technology transfers, improvement of incentives such as support measures, and promotion of human resources mobility)
- ○ Ensure and develop human resources
  (Personnel capable of working in interdisciplinary areas, research assistants, and personnel capable of research evaluation and management)

(Figure 3-1-4)

Four Other Fundamental Areas: areas that are fundamental to the existence of the nation, and that are emphasized as areas in which it is essential for Japan to be involved:

Energy Area

1.Areas of Priority and Five-Year Objectives

(1) R&D that brings about a reform of the total energy system, including supply, transportation, conversion, and consumption
Vigorous and efficient efforts to fulfill 3E goals
(2) R&D essential for upgrading the energy infrastructure
Energy infrastructure-related R&D; upgrades in efficiency and environmental soundness
(3) R&D for safe and secure energy
R&D that reassures people by ensuring safety in all aspects of energy
(4) R&D that comprehensively evaluates and analyzes energy both socially and economically
R&D that comprehensively analyzes and evaluates social, economic, and environmental facets, and deepens social understanding; R&D with the aim of creating industries
* Five-year objectives have been established for the above items.

2. Promotion Measures

1. Important items for improving the quality and efficiency of R&D:

(1) Creation of results that are transferable to developing countries, and active use of international cooperation through participation in international joint research
(2) R&D efforts and evaluation under the conditions of the level of social understanding of R&D results and the diffusion of them
(3) To recognize each role for, and collaboration among, industry, academia and the government in order to promote the efficient development of system technologies
(4) Efficient promotion through inter-ministerial coordination of cross-ministerial themes
(5) Consistent efforts for short-, mid-, and long-term R&D themes
2. Points of concern relating to necessary R&D resources:
Securing and fostering personnel; enhancement of education on energy utilization and safety

Infrastructure Area

1.Areas of priority and Five-Year Objectives

○ Building of Safety
Mechanisms for the generation of abnormal natural phenomena; immediate response systems for disasters (disaster prevention IT, emergency rescue systems, etc.); measures to reduce massive disaster damage to densely populated urban areas; systems for the protection of core functions and cultural assets; ultra-advanced disaster prevention support systems; intelligent transport systems (ITS); measures for land, sea, and air traffic safety; countermeasures against deteriorating social infrastructure; and safety measures in response to toxic or dangerous substances, or to criminal activity
○ Regeneration of the beauty of Japan, and the establishment of a basis for high-quality lives
Rebuilding beautiful living spaces in co-existence with nature; wide-area local topics; restoration of drainage area water cycles and general water management; transportation systems consonant with modern traffic and physical distribution; barrier-free systems and universal designs; and information infrastructure technologies and systems for society
■ A policy of proactive R&D cooperation for social infrastructure building in developing countries is indispensable.
* Five-year objectives have been established for the above items.

2.Promotion Measures

○ Enhancement of policy studies on the development of infrastructure
○ Promotion of collaboration between the science and technology community and the humanities and social science community
○ Enhancement of R&D in cross-governmental areas
○ Stimulation of exchanges among industry, academia, and government researchers (including academic societies)
○ Establishment of international scheme of science and technology for infrastructure, particularly in the east Asia region
○ Promotion of R&D to support developing countries for infrastructure buildup

Manufacturing Technology Area

1.Areas of Priority and Five-Year Objectives

○ Strengthening competitiveness through manufacturing technology innovations
Dramatic progress in productivity through high utilization of IT; changes to manufacturing processes through breakthroughs in technology; upgrading of quality control, safety, and maintenance technologies
○ Pioneering new areas of manufacturing technology
High value added commercialization technology (nanotechnology applications, etc.); technologies for cultivating new demand
○ Manufacturing technology to minimize the environmental burden
Manufacturing systems adapted to the formation of an environmentally-based society; minimization of harmful substances; prevention of global warming
* Five-year objectives have been established for the above items.

2.Promotion Measures

(1) Develop human resources; improve environments that encourage creativity
(2) Accumulate fundamental knowledge, technology, and know-how
(3) Intellectual property rights-related strategies
(1) Incentives for the acquisition of intellectual property rights; (2) Support measures for launching businesses based on patents; (3) A society and system that pay due recognition to inventors
(4) Review the status of collaboration among industry, academia, and government
(1) Collaborate and clarify the sharing of responsibilities among industry, academia, and the government from the initial stages of research; (2) Promote personnel mobility; (3) Promote matching funds at times of collaboration among industry, academia, and the government; (4) Clarification of the relations of rights in conflict of interest issues
(5) Promote the development and standardization of the intellectual infrastructure
(6) Promote practical applications such as through the formation of venture businesses
(1) Support measures for the market entry of venture business in the field of new manufacturing technologies; (2) Smooth the transfer of university research results into the manufacturing world through active utilization of TLOs; (3) Actively utilize subvention systems for practical applications

Frontier Area

1.Areas of Priority and Five-Year Objectives

○ Ensuring security Information-gathering technology using satellites (including transport capability); advanced positioning and surveying technology
○ Technology innovations enabling global market entry
Low-cost, reliable transportation technology; next-generation satellite technology; technology for the utilization of marine resources
○ International contributions to human intellectual creation, and securing international status
International projects that give people, and particularly the next generation, dreams, hope, and pride; construction of a worldwide network for global environmental information
* Five-year objectives have been established for the above items.

2.Promotion Measures

○ Restructure the space development and utilization scheme so that it can be promoted by the nation as a whole
○ Establishment of public-private burden sharing and cooperation systems needed for nurturing space-related activities into a key industry
○ Promotion of marine utilization through collaboration with other sectors
○ Return to society of the fruits of research activities on global environmental change
○ Strategic promotion of basic research and training/securing human resources
○ Continual and seamless acquisition, processing, and accumulation of information, and the establishment of a system to transmit it to the world
○ Establishment of R&D methods and systems incorporating the latest advanced information technology
○ Clarification of international relationships in each cooperative project in order to promote smooth interaction
○ Nurturing interpreters who can explain things to the public in an easy to understand manner, and the stimulation of public relations activities
○ Significant progress in the efficiency of R&D, especially in big projects

(Promotion of the Environmental Area)

"Strategy for Promotion of Earth Observation" (opinions presented on December 27, 2004)

Amid on-going international efforts to establish a global earth observation system, the Council conducted research and examination to identify Japan's efforts for earth observation and presented its opinions to relevant ministers. The report maintains that it is important to "establish an integrated earth observation system guided by use requirements" through cooperation among relevant ministries and organizations and that it is necessary to establish a promotion system and organization in order for the global earth observation system to be effective and efficient.

(Promotion of the Nanotechnology and Materials Area)

In order to promote R&D and industrialization in the nanotechnology and materials areas, the Council has been implementing projects for the "utilization of structural materials in the construction market" as "collaborative projects" among ministries and agencies based on the "Report on the Promotion of Industrial Development in the Nanotechnology and Materials Area" (opinions presented on July 23, 2003).

(Evaluations)

(1) Examination of the state of implementation of midterm evaluations of R&D (July 15, 2004)

The Minister of State for Science and Technology Policy and the eminent members of the Council examined the state of midterm evaluations by each ministry and agency regarding ongoing R&D projects with funding of 1 billion yen or more in the FY2004 budget and instructed to conduct midterm evaluations appropriately with regard to those R&D projects that have not been evaluated for a long time.

(2) Follow-up study of evaluations of large-scale R&D projects (August 4, 2004)

The Council conducted follow-up studies on the evaluations of large-scale R&D projects (regeneration medicine realization project, rice genome function analysis) implemented in FY2004 and presented improvements, etc. to relevant ministries.

(3) Regarding the follow-up results of the "Broad Guidelines Concerning National R&D Evaluation" and review of the broad guidelines (opinions presented on March 29, 2005)

The Council grasped the progress and problems involved in evaluation implementation by studying the state of overall implementation of R&D evaluations in Japan, identified challenges and improvement for future R&D evaluation, worked out a specific plan to revise the broad guidelines, and presented its opinion to relevant ministers.

(Management of Intellectual Properties)

"Report on the Management of Intellectual Properties" (opinions presented on May 26, 2004)

Taking the opportunity of the incorporation of national universities, the Council conducted research and examination with regard to problems, such as clarification of the treatment of intellectual properties and other research results held by universities, and presented its opinions to relevant ministers. The opinions were reflected in the "Intellectual Property Strategic Program 2004" compiled by the Intellectual Property Policy Headquarters in May 2004 (See Section 3.3.6.4).

(Fostering and Ensuring S&T Related Personnel Resources)

"On Utilization of Science-and Technology-Related Personnel Resources" (opinions presented on July 23, 2004)

Investigations and examinations were conducted in regards to fostering and ensuring the availability of the scientists, technologists, and specialists who are needed for promoting world-class research results and their utilization. The Council then presented its opinions to the relevant ministers. The report calls for ① fostering human resources capable of exercising international leadership, ② higher education of a world-class standard and elementary and secondary education that fosters children's diversity and creativity, and ③ establishment of research and education environments conducive to the creation of innovative values (See Section 3.3.4).

(Response to Bioethics)

"Basic Conceptual Approach Relating to the Treatment of Human Embryos" (July 23, 2004)

Based on Article 2 of the Supplementary Provisions of the "Law Concerning Regulation Relating to Human Cloning Technologies and Other Similar Technologies," the Council started a discussion on the basic conceptual approach relating to the treatment of human embryos. The Council then presented its opinions to the relevant ministers. While the report in principle prohibits treating human embryos in a way that would damage the embryos, it has set forth social norms concerning the treatment of human embryos, saying that there are cases where it is necessary to approve exceptional treatment of human embryos in order to respond to people's requests in the pursuit of happiness with regard to health and welfare (See Section 3.2.2.1.2).

(Promotion of Space Development and Utilization)

"Basic Strategy for Space Development and Utilization in Japan" (opinions presented on September 9, 2004)

The Council presented its opinions on the significance of space development and utilization in consideration of recent changes in the domestic and overseas situations surrounding space development and utilization, such as importance as a national strategic technology, contribution to overall national security, and sustainable development of the earth and mankind. The report also calls for promoting space development and utilization under the basic policy of strengthening basic technologies by maintaining Japan's capability of launching satellites when necessary and by giving top priority to ensuring reliability.

(Promotion of science and technology conducive to safety)

With various events that represent a threat to the safety of the public, such as large-scale disasters, various types of terrorism, violent crimes, and emerging and re-emerging infectious diseases becoming increasingly common in recent years, strengthening the country's crisis management system and building a safe society have become pressing national issues. For this reason, the Science and Technology Promotion Project Team, established under the Special Research Committee on Promotion and Strategy for Priority Sectors in October 2004, has been conducting research and examination on science and technology to construct a safe society where people can live without anxiety.

(Special Coordination Funds for Promoting Science and Technology)

The Special Coordination Funds for Promoting Science and Technology (Chosei-hi) is a competitive research fund for promoting the systematic reform of science and technology by taking on policies which become policy initiatives for each of the other administrative agencies, based on policies laid down by the CSTP. In FY2004, the Special Coordination Funds for Promoting Science and Technology supported two topics as meriting emergency R&D efforts, "Emergency Survey Research on the Chuetsu earthquake in Niigata Prefecture" (November 4, 2004) and "Emergency Survey Research on Damage Caused by the Sumatran Earthquake and the Indian Ocean Tsunami" (January 19, 2005) (See Section 3.3.1.1.5).

(4) Efforts towards Formulation of the 3rd Science and Technology Basic Plan

(Follow-up to the 2nd Science and Technology Basic Plan)

"Progress of Scientific and Technological Policies Based on the Science and Technology Basic Plan (FY2001~2005) (opinions presented on May 26, 2004)

With regard to the state of implementation of measures laid down in the Basic Plan, the Council conducted a detailed follow-up study mainly on the state of measures implemented during the three years from FY2001 to FY2003 and worked out a list of basic problems that should be dealt with in the future.

Also, as a follow-up study on the 1st and 2nd Science and Technology Basic Plan, the "Survey for Evaluation of Effects Achieved in the Basic Plan" was conducted by the National Institute of Science and Technology Policy by using FY2003~2004 Special Coordination Funds for Promoting Science and Technology (published in March 2005).

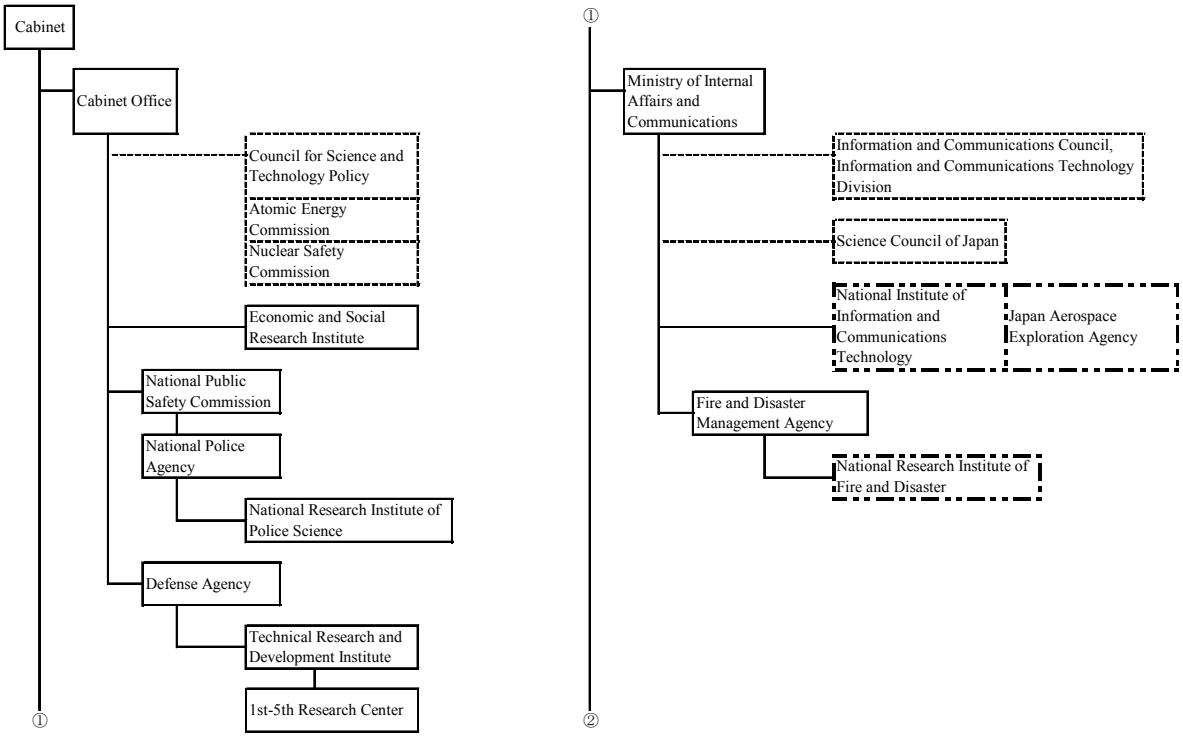
(Study and examination of Basic Policy)

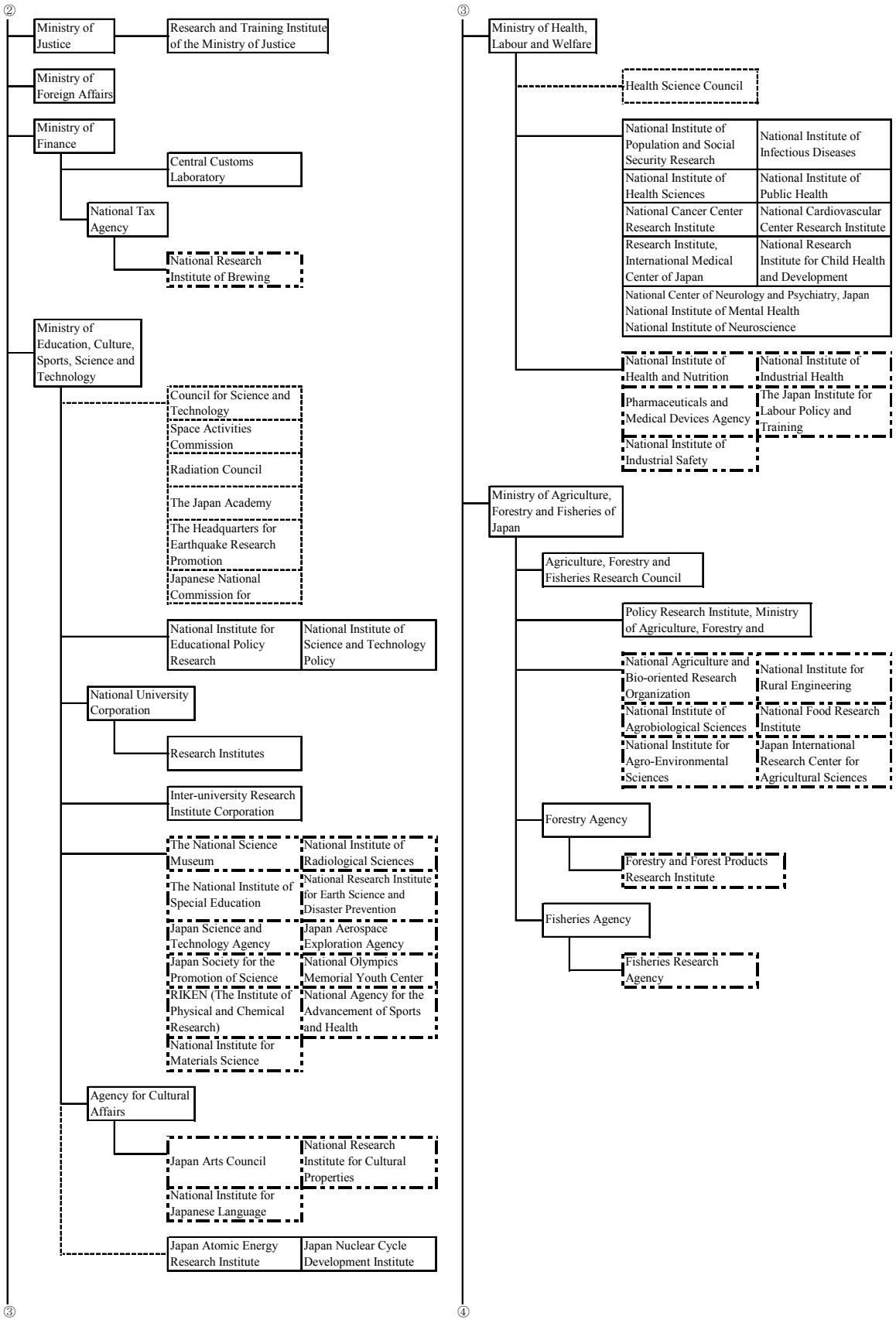
The Council for Science and Technology Policy, which is required to formulate basic policies on science and technology that serve as the basis for the Science and Technology Basic Plan, established a task force on basic policies in October 2004 to formulate the 3rd Science and Technology Basic Plan for five years starting in FY2006. The task force is composed of experts in various fields, including international politics, national security, economy, fiscal policy, laws, and business management as well as researchers. The task force has been conducting research and study on basic policies concerning science and technology after being instructed by the Prime Minister to study "basic policy on science and technology" in December 2004.

3.1.3 Administrative Structure and Budget for Science and Technology

3.1.3.1 Administrative Structure of Science and Technology

Japan's policy concerning science and technology is based on the Science and Technology Basic Law and on the Science and Technology Basic Plan, and is also promoted through programs of the administrative organs based on the various recommendations and advice offered by the former Council for Science and Technology, and now by the CSTP. Research is carried out at national research institutions, public corporations, independent administrative institutions, universities, and university joint research institutions, and various research programs are used to promote research, and carry out preparations for a research and development environment (Figure 3-1-5).




②
Ministry of Justice
Research and Training Institute of the Ministry of Justice
Ministry of Foreign Affairs
Ministry of Finance
Central Customs Laboratory
National Tax Agency
National Research Institute of Brewing
Ministry of Education, Culture, Sports, Science and Technology
Council for Science and Technology
Space Activities Commission
Radiation Council
The Japan Academy
The Headquarters for Earthquake Research Promotion
Japanese National Commission for
National Institute for Educational Policy Research
National Institute of Science and Technology Policy
National University Corporation
Research Institutes
Inter-university Research Institute Corporation
The National Science Museum
National Institute of Radiological Sciences
The National Institute of Special Education
National Research Institute for Earth Science and Disaster Prevention
Japan Science and Technology Agency
Japan Aerospace Exploration Agency
Japan Society for the Promotion of Science
National Olympics Memorial Youth Center
RIKEN (The Institute of Physical and Chemical Research)
National Agency for the Advancement of Sports and Health
National Institute for Materials Science
Agency for Cultural Affairs
Japan Arts Council
National Research Institute for Cultural Properties
National Institute for Japanese Language
Japan Atomic Energy Research Institute
Japan Nuclear Cycle Development Institute
③
③
Ministry of Health, Labour and Welfare
Health Science Council
National Institute of Population and Social Security Research
National Institute of Infectious Diseases
National Institute of Health Sciences
National Institute of Public Health
National Cancer Center Research Institute
National Cardiovascular Center Research Institute
Research Institute, International Medical Center of Japan
National Research Institute for Child Health and Development
National Center of Neurology and Psychiatry, Japan
National Institute of Mental Health
National Institute of Neuroscience
National Institute of Health and Nutrition
National Institute of Industrial Health
Pharmaceuticals and Medical Devices Agency
The Japan Institute for Labour Policy and Training
National Institute of Industrial Safety
Ministry of Agriculture, Forestry and Fisheries of Japan
Agriculture, Forestry and Fisheries Research Council
Policy Research Institute, Ministry of Agriculture, Forestry and
National Agriculture and Bio-oriented Research Organization
National Institute for Rural Engineering
National Institute of Agrobiological Sciences
National Food Research Institute
National Institute for Agro-Environmental Sciences
Japan International Research Center for Agricultural Sciences
Forestry Agency
Forestry and Forest Products Research Institute
Fisheries Agency
Fisheries Research Agency
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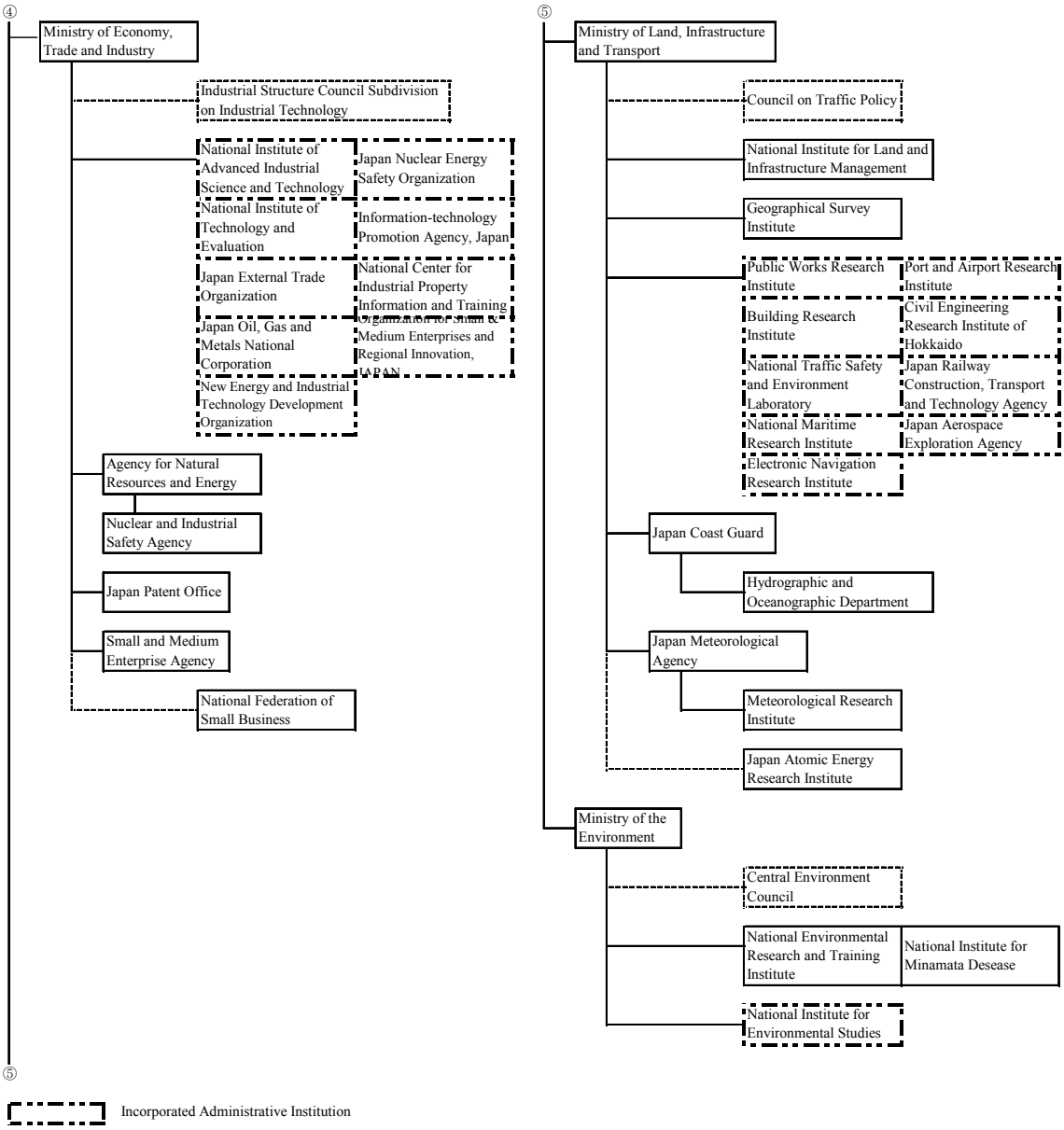

Figure 3-1-5 Japan's Science and Technology Administrative Structure (as of March 2005)

Notes: The Japan Atomic Energy Research Institute and the Japan Nuclear Cycle Development Institute are planned to be merged in October 1, 2005 to form the National Institute of Japan Atomic Energy Development.

The Council for Science and Technology Policy coordinates the science-and technology-related measures of relevant ministries and agencies by acting as a control tower under the leadership of the Prime Minister by examining and discussing the overall strategy and policies on allocation of budget, personnel and other resources related to science and technology. The Ministry of Education, Culture, Sports, Science and Technology acts in line with those strategies to prepare specific research and development plans for individual sectors, coordinates policies for estimating costs planned by test and research institutions, etc., and administers allocations of the Special Coordination Fund for Promoting

Science and Technology (SCF), in order to coordinate the management of science and technology with relevant administrative institutions. The Ministry comprehensively promotes the implementation of research and development in advanced and important science and technology fields, and the admi nistration of science and technology that advances and strengthens creative and basic research.

In recent years, cooperation between ministries and agencies has been strengthened with the establishment of roundtable groups and inter-ministerial liaison committees concerning various research sectors and related measures, including programs for the promotion of research in brain sciences, and for basic research conducted by public corporations through public canvassing methods. Depending on the character of the respective fields or policies, these programs are promoting lateral, long-term thinking between ministries and agencies and the adoption of priority guidelines on how to promote research and development, and also promoting cooperation through the promotion of information exchanges concerning the progress of research, etc., and researcher exchanges.

The Science Council conducts surveys and discussions on important issues regarding the comprehensive promotion of science and technology in response to inquiries posed by the Minister of Education, Culture, Sports, Science and Technology, and presents opinions on these issues to the minister.

The Science Council's recommendations are shown in Table 3-1-6.

Incidentally, in anticipation of the preparation of the next (3rd) Science and Technology Basic Plan for five years starting in FY2006, councils, etc. of relevant ministries and agencies are conducting research and examination of basic policies to realize an advanced science-and technology-oriented nation.

Table 3-1-6 Recommendations of the Council for Science and Technology (FY2004)

Principal Reports

Date (m/d/y)	Principal Reports
	Subdivision on R&D Planning and
9/6/04	Overview of the Preliminary Evaluation Results for Priority Topics, Etc., in Budget Requests for FY2005
	Subdivision on Resources
1/24/05	STANDARD TABLES OF FOOD COMPOSITION IN JAPAN Fifth Revised and Enlarged Edition - 2005 -
1/24/05	STANDARD TABLES OF FOOD COMPOSITION IN JAPAN Fifth Revised and Enlarged Edition - 2005 - - FATTY ACIDS SECTION -
	Subdivision on Science
6/25/04	Ideal form of grants-in-aid for scientific research (interim report by Research Funds Section)
6/30/04	Promotion of future academic research (report by Special Committee on Basic Problems)
12/10/04	Ideal form of grants-in-aid for scientific research (report by Research Funds Section)
1/11/05	Measures for comprehensive promotion of diversified areas in academic research (progress report by Academic Research Promotion Section)
1/17/05	Academic research promotion measures that should be incorporated into the 3rd Science and Technology Basic Plan （Summary of opinions）
	Bioethics・Biosafety Section
12/24/04	Handling of personal information in medical research（Subcommittee on Handling of Human Genetic Code in Life Science Studies）
12/28/04	Ethical guidelines for human genome/gene analysis studies (revised)
12/28/04	Ethical guidelines for epidemiological study (revised)
12/28/04	Ethical guidelines for gene-related medical research (revised)
	Promotion of Internationalization Committee
1/19/05	Strategic promotion of international endeavors in science, technology and academic fields
	Committee on Human Resources
7/16/04	Human resources development from the viewpoints of science and technology and society (3rd proposal)

3.1.3.2Budget for Science and Technology

The Basic Plan aims to expand the funding required for the promotion of the measures raised in the Basic Plan based on prioritized and efficient allocation of funding, taking into account future socioeconomic trends, as well as the need for the promotion of science and technology.

In FY2004, Japan's budget for science and technology totaled 3.6084 trillion yen. Of this total, the general account budget was 2.9664 trillion yen, while the special account budget was 641.9 billion yen. In the general account budget, the amount singled out for the promotion of science and technology was 1.2841 trillion yen (Table 3-1-7).

Trends in the budget for science and technology by ministry or agency are shown in Table 3-1-8.

Since the administration of science and technology in Japan is not concentrated in a single ministry, but rather is spread among a large number of ministries and agencies, there is a need for the coordination of science and technology measures between the relevant ministries and agencies that

can eliminate unnecessary duplication and promote stronger cooperation, so as to ensure consistency among ministries as a whole, and to efficiently and effectively promote science and technology.

For this reason, the Council for Science and Technology Policy conducts overall coordination to ensure that important measures stipulated in overall strategies or in the Science and Technology Basic Plan prepared based on the overall strategies are properly and firmly realized throughout Japan, by formulating resource-allocation policies and prioritizing science-and technology-related measures of relevant ministries and agencies after budget requests are made. In addition, the Ministry of Education, Culture, Sports, Science and Technology contacts the relevant ministries and agencies each fiscal year, before budget requests for science and technology related expenditures are made, to hear the reasoning behind their budget requests. The ministry then coordinates with the ministries and agencies to eliminate any duplication and to promote inter-ministerial cooperation, as part of government-wide efforts.

Table 3-1-7 Trends in the Science and Technology Expenditures

(Billion yen)

Item \ Fiscal		2000	2001	2002	2003	2004
Science and Technology Promotion Fund	(A)	1,024.4	1,112.4	1,183.2	1,229.8	1,284.1
Percentage increase over the previous year	%	107.5	108.6	106.4	103.9	104.4
Other research appropriations	(B)	700.4	725.2	669.7	655.4	1,682.3
Percentage increase over the previous year	%	109.2	103.5	92.3	97.9	256.7
Science and technology appropriations from the General Account Budget	(C)=(A)+(B)	1,724.8	1,837.6	1,852.9	1,885.2	2,966.4
Percentage increase over the previous year	%	108.2	106.5	100.8	101.7	157.4
Science and technology appropriations from Special Accounts	(D)	1,561.2	1,630.9	1,691.5	1,712.2	641.9
Percentage increase over the previous year	%	99.9	104.5	103.7	101.2	37.5
Science and Technology Budget	(E)=(C)+(D)	3,286.0	3,468.5	3,544.4	3,597.4	3,608.4
Percentage increase over the previous year	%	104.1	105.6	102.2	101.5	100.3
General Account Budget	(F)	84,987.1	82,652.4	81,230.0	81,789.1	82,110.9
Percentage increase over the previous year	%	103.8	97.3	98.3	100.7	100.4
General Budget Expenditure	(G)	48,091.4	48,658.9	47,547.2	47,592.2	47,632.0
Percentage increase over the previous year	%	102.6	101.2	97.7	100.1	100.1

Notes: 1. Amounts shown for Other research appropriations (B) and Science and technology appropriations from Special Accounts (D) are MEXT's estimates.
2. All amounts represent initial budgets or appropriations for the respective fiscal year.
3. Since amounts have been rounded, the sum of the amounts and percentages for each column and the totals and percentages shown above do not necessarily agree.
4. Of the expenditures related to science and technology in the general accounts budget for FY2004, those for national university corporations, etc. were calculated from the aggregate of subsidies for administrative costs, grants for facility maintenance costs, and self generated income. (The amount corresponds to the science and technology budget in the National Schools Special Account (abolished at the end of FY2003)). The same in Table 3-1-8.
5. Based on policies of the Second Science and Technology Basic Plan, the subjects of calculation were revised starting in FY2001.

Table 3-1-8 Science and Technology Expenditure Breakdown by Ministry and Agency

(Million yen)

Ministry or agency	FY2003				FY2004			
	Science and Technology Promotion Fund	Other research appropriations from General Account Budget	Science and technology appropriations from Special Accounts	Total amount of Science and Technology Budget	Science and Technology Promotion Fund	Other research appropriations from General Account Budget	Science and technology appropriations from Special Accounts	Total amount of Science and Technology Budget
Diet	908	80	–	988	956	77	–	1,033
Cabinet Secretariat	–	64,440	–	64,440	–	63,169	–	63,169
Cabinet Office	4,163	4,285	–	8,448	6,416	3,536	–	9,952
National Police Agency	2,230	–	–	2,230	2,164	–	–	2,164
Defense Agency	–	160,812	–	160,812	–	185,522	–	185,522
Ministry of Internal Affairs and Communications	32,900	36,662	10,500	80,061	51,843	17,902	10,400	80,144
Ministry of Justice	2,178	–	–	2,178	2,167	–	–	2,167
Ministry of Foreign Affairs	–	10,403	–	10,403	–	10,345	–	10,345
Ministry of Finance	1,309	341	–	1,650	1,196	351	–	1,547
Ministry of Education, Culture, Sports, Science and Technology	785,237	285,322	1,219,634	2,290,193	810,041	1,318,787	155,164	2,283,991
Ministry of Health, Labour and Welfare	106,378	2,870	24,746	133,994	107,675	1,660	19,684	129,020
Ministry of Agriculture, Forestry, and Fisheries	112,162	5,095	1,520	118,777	113,436	4,088	1,518	119,042
Ministry of Economy, Trade and Industry	130,569	55,850	424,877	611,296	137,659	44,973	422,697	605,328
Ministry of Land, Infrastructure and Transport	29,601	20,961	30,098	80,659	28,525	25,058	30,116	83,699
Ministry of the Environment	22,148	8,288	800	31,236	22,036	6,866	2,334	31,236
Total	**1,229,782**	**655,409**	**1,712,175**	**3,597,366**	**1,284,115**	**1,682,333**	**641,913**	**3,608,361**

Notes: 1. All amounts represent initial expenditures or appropriations for the respective fiscal year.
2. Since amounts have been rounded off, the sum of the amounts for each column and the totals shown above do not necessarily agree.
3. Overlapping is avoided in total amounts, but some amounts include overlapping expenditures.