

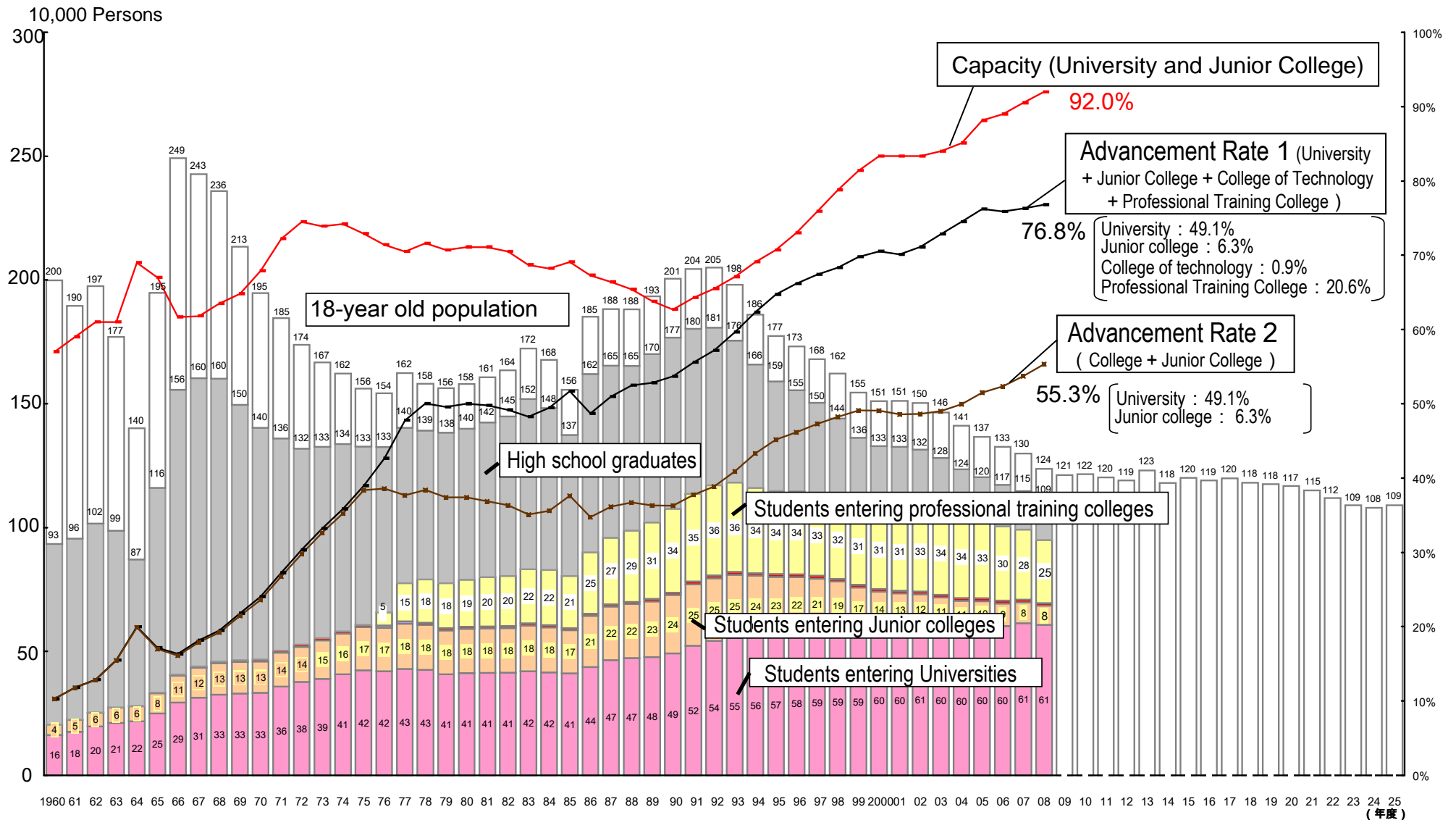


# Prioritized and Systematic Improvement of National University Facilities in Japan

December 2009

# **1. The Current Situation of National Universities**

# Shifts in the population of 18-year-olds and higher education advancement rate



Source : Created from the data of "School Basic Survey," Ministry of Education, Culture, Sports, Science and Technology and "Population Projections for Japan" National Institute of Population and Social Security Research

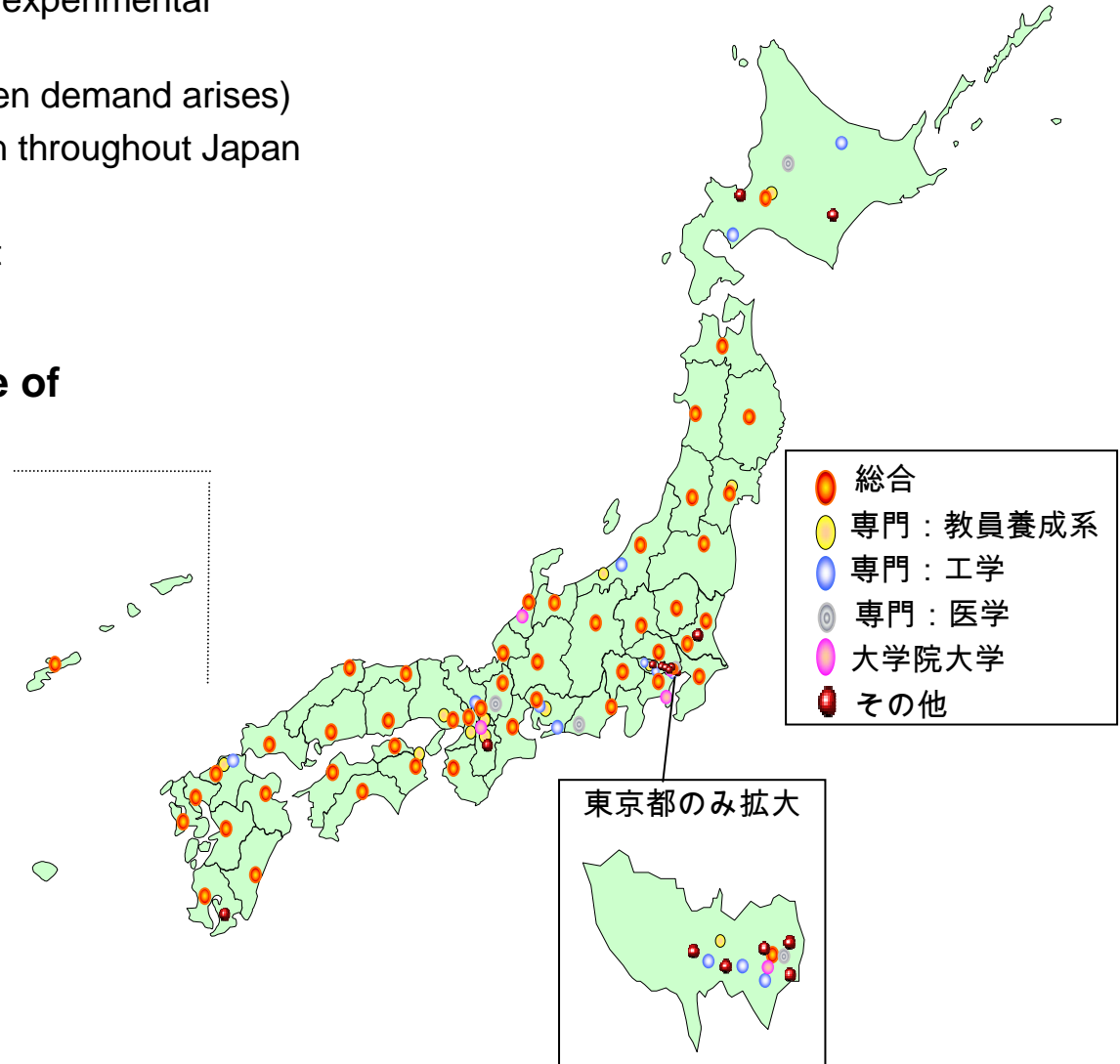
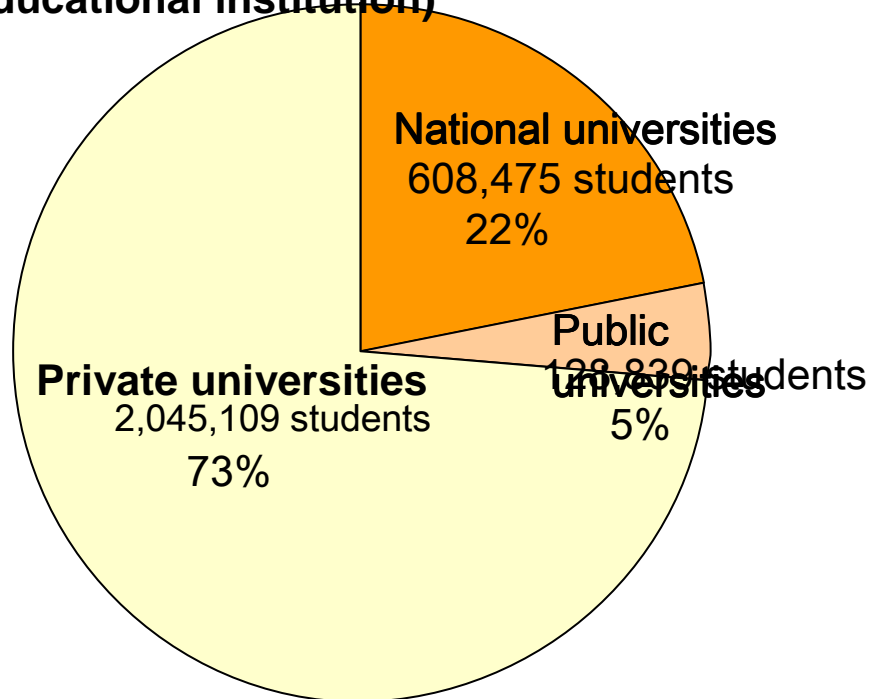
# The Current Situation in National Universities

## ■The Mission of National Universities

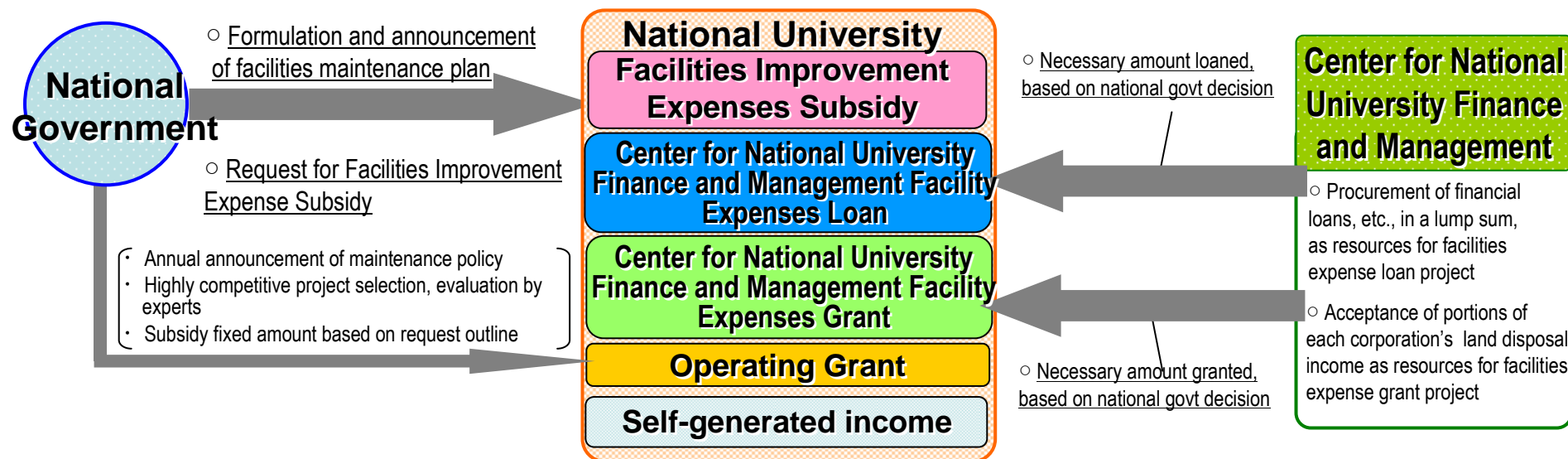
- 1.To conduct the world's most advanced research and education
- 2.To implement large-scale basic research and leading experimental education and research
- 3.To inherit and develop important academic fields (when demand arises)
- 4.To preserve equal opportunity for high-level education throughout Japan
- 5.To contribute to the livelihood of local communities
- 6.To respond to strategic human resource development

## ■National University Locations

## ■Student Population and Percentage (by type of educational institution)



# Structure of National University Facilities

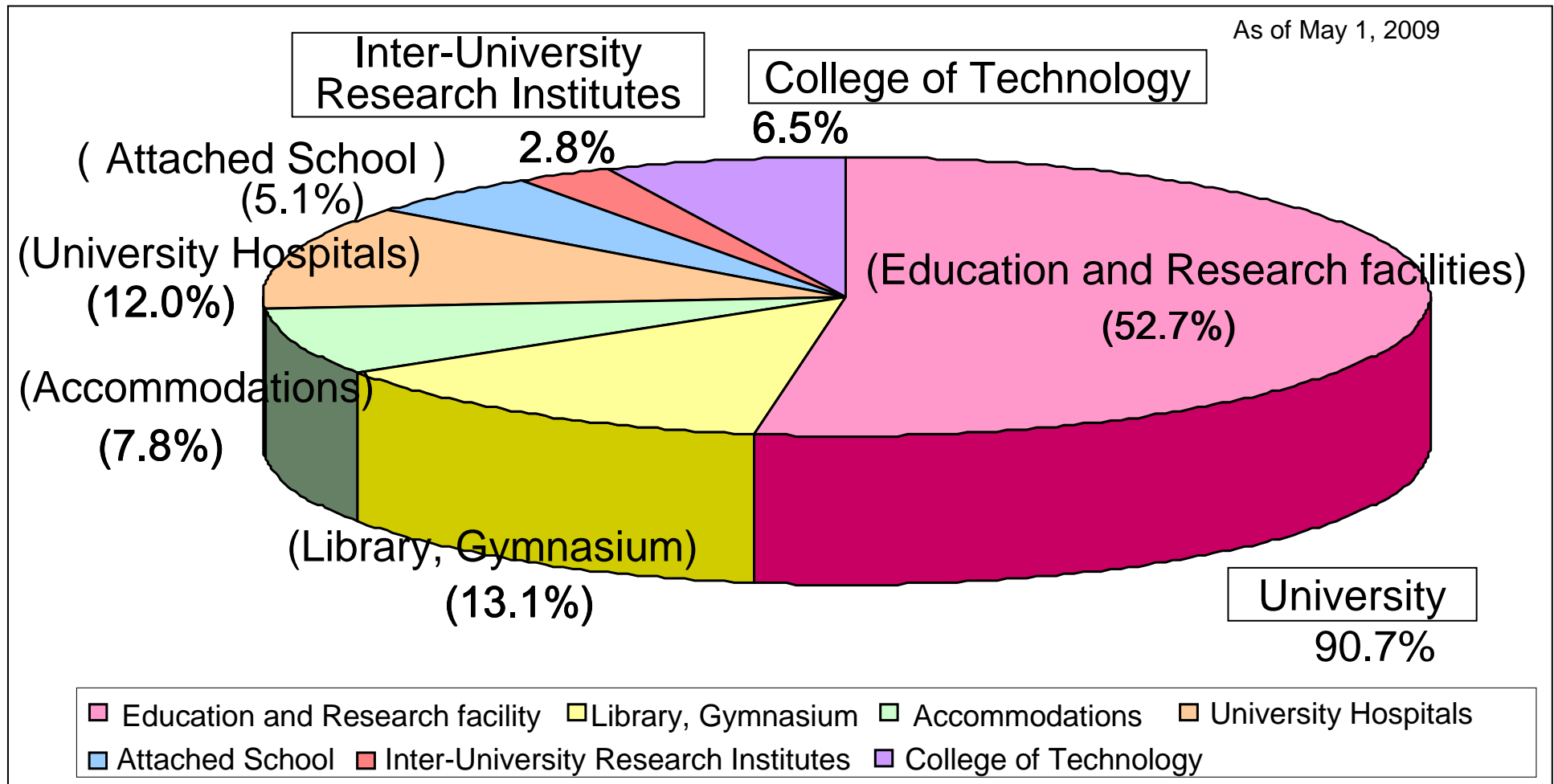


Type	Source of Donation	Source of Funding	Target	Outline
<b>Facilities Improvement Expenses Subsidy Project</b>	National Govt	General Account Budget	<ul style="list-style-type: none"> <li>• Facilities maintenance</li> <li>• Large-scale equipment</li> <li>• Real estate purchases<sup>Other</sup></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Basic Fund for Facilities Maintenance in National Universities</b></li> <li>• <b>National government provides a fixed amount.</b></li> </ul>
Facilities Expenses Loan Project	Center for National University Finance and Management	Long-term debt loans	<ul style="list-style-type: none"> <li>• Hospital facilities maintenance</li> <li>• Medical equipment</li> </ul>	<ul style="list-style-type: none"> <li>• Implementation of stable advances in necessary operations such as hospital development and other large amounts of expenses.</li> <li>• Centers lend necessary amounts in lump sums to each university, and each university uses hospital income and other incomes for repayment.</li> </ul>
Facilities Expenses Grant Project	( Undertakes projects based on decisions by the national govt )	Income from land disposal	<ul style="list-style-type: none"> <li>• Facilities maintenance</li> <li>• Real estate purchases</li> </ul>	<ul style="list-style-type: none"> <li>• A portion of the money received by national universities from the income that they received from disposing of their land is paid to the center, and it is used for general university facilities maintenance.</li> <li>• Implementation of facilities maintenance that is balanced through the entire university.</li> </ul>
Operating Grant Amount (Educational Facilities Basic Expenses)	National Govt	General Account Budget	<ul style="list-style-type: none"> <li>• Maintenance and operating costs, etc.</li> </ul>	<ul style="list-style-type: none"> <li>• In order to utilize facilities for a long period of time while maintaining their good condition, expenses related to forming good-quality stock.</li> </ul>
Maintenance through self-generated income	Each university	<ul style="list-style-type: none"> <li>• Contributions</li> <li>• Collaboration with industry and local public authorities</li> <li>• Collaboration with other govt. ministries</li> <li>• Business-related income</li> <li>• Transfer income from vacant lot disposal, Other</li> </ul>	<ul style="list-style-type: none"> <li>• General university facilities maintenance</li> </ul>	<ul style="list-style-type: none"> <li>• Using contributions and other self-generated income, each university makes its own decisions as to implementation.</li> <li>• Long-term loans are available from commercial banks for facilities and equipment maintenance on the income-generating facilities such as Student dormitories and facilities for academia-industry collaboration, as facilities that can be anticipated to generate business-related income for reimbursement, and maintenance of facilities and equipment that have been moved to the campus.</li> </ul>

## **2 . Current Condition of National University Facilities**

# Breakdown of facilities areas owned by national universities

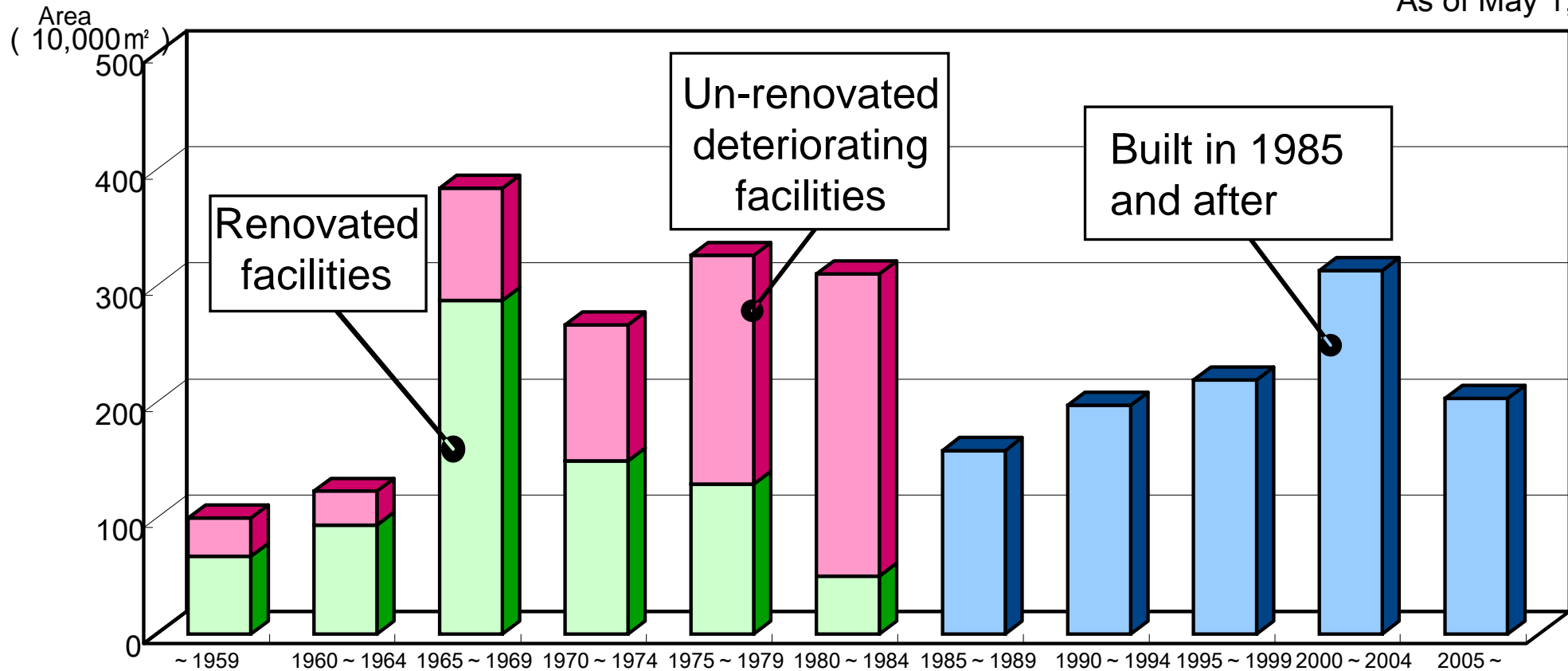
As of May 2009, the total land area owned by national universities covered 25.75 million square meters, and approximately 90% of that area is used for university facilities.



# Deterioration of national university facilities

- National university facilities cover approx. 25.99 million m<sup>2</sup>
- Deteriorated facilities older than 25 years comprise 15.09 million m<sup>2</sup> (approximately 58%)  
 Within that percentage, unrenovated deteriorating facilities comprise 7.33 million m<sup>2</sup>  
 (approximately 30% of the total area of facilities owned)

As of May 1, 2009



旧耐震基準 ( ~ 1981 )

※Neither Earthquake Resistant nor Renovated  
 (approximately 4.38 billion m<sup>2</sup>)



# Major problems in unrenovated facilities

## ■ Lack of earthquake resistance features



Masonry chipping on outside walls



Ageing facilities with low earthquake resistance



Ageing facilities (exterior)

**In danger of collapsing during earthquakes**

## ■ Functional and structural deterioration



Iron sashes allow drafts (reinforced with vinyl)



Deteriorating waterproof roof (leakage)



Rusty pipes, damage to lagging material



Deteriorating infrastructure

( Photographs within the dotted lines are of infrastructure facilities )

**Non-functionality for education and research**

## ■ Lack of education and research space



Lack of space in a research room



Research room where lab benches also provide work space due to lack of space



Prefab building used as laboratory



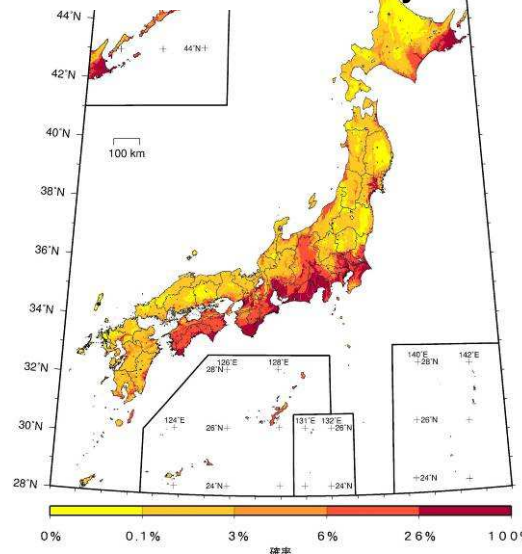
Overflowing lecture halls

**Unsuitable environments for education and research**

# Earthquake-resistance measures in national university facilities

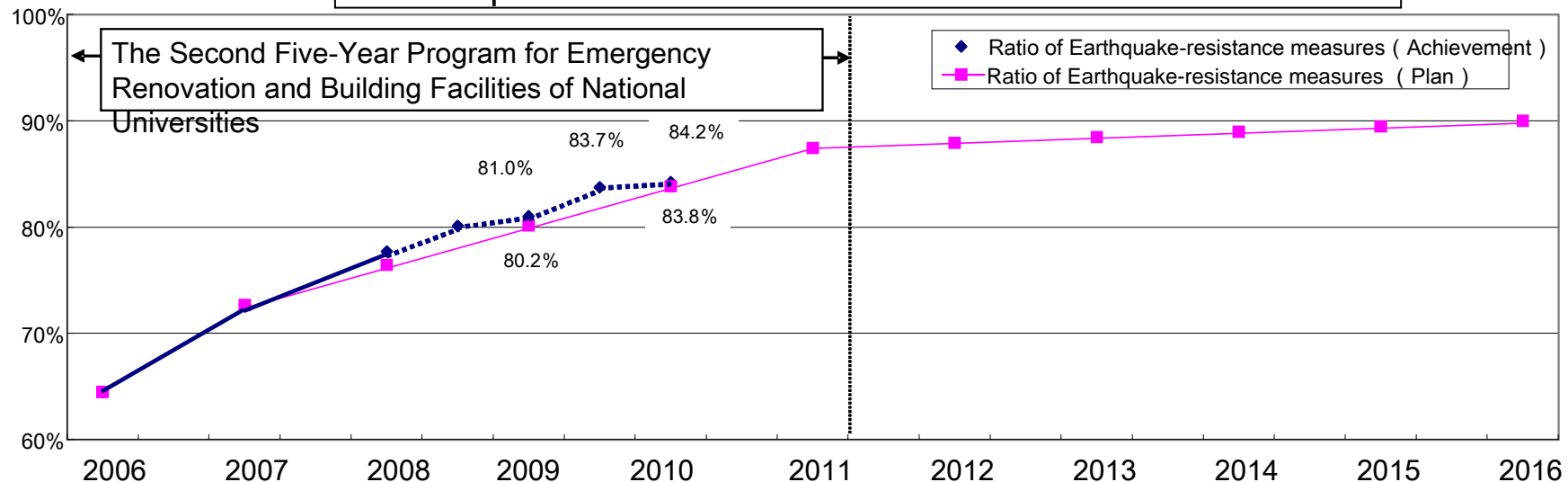
As of May 2009, earthquake-resistance improvements had been carried out on 77.7% of the facilities. The forecast for the end of 2009 is 84%. The goal of the Act for Promotion of the Earthquake Proof Retrofit of Buildings is that by 2015, 90% of the facilities will undergo earthquake-resistance renovations.

A number of areas in Japan where major earthquakes may occur over the next 30 years



Facility damaged by earthquake

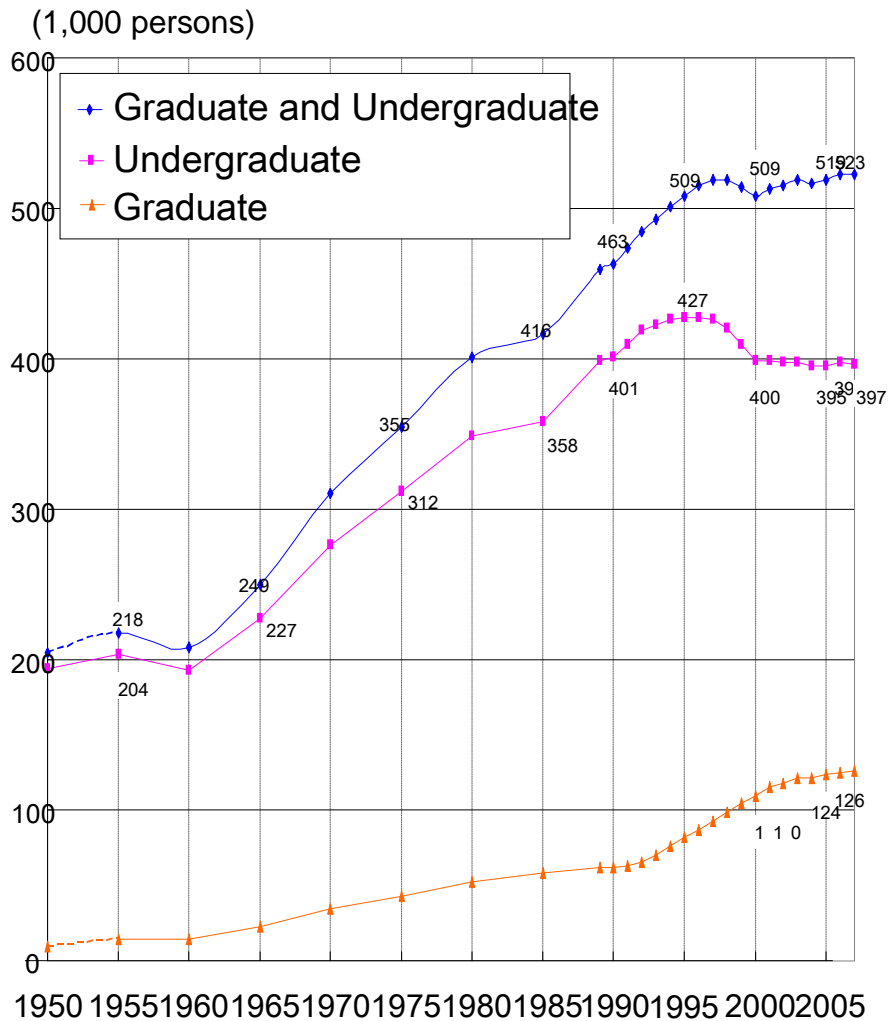
## Earthquake-resistance measures at National Universities



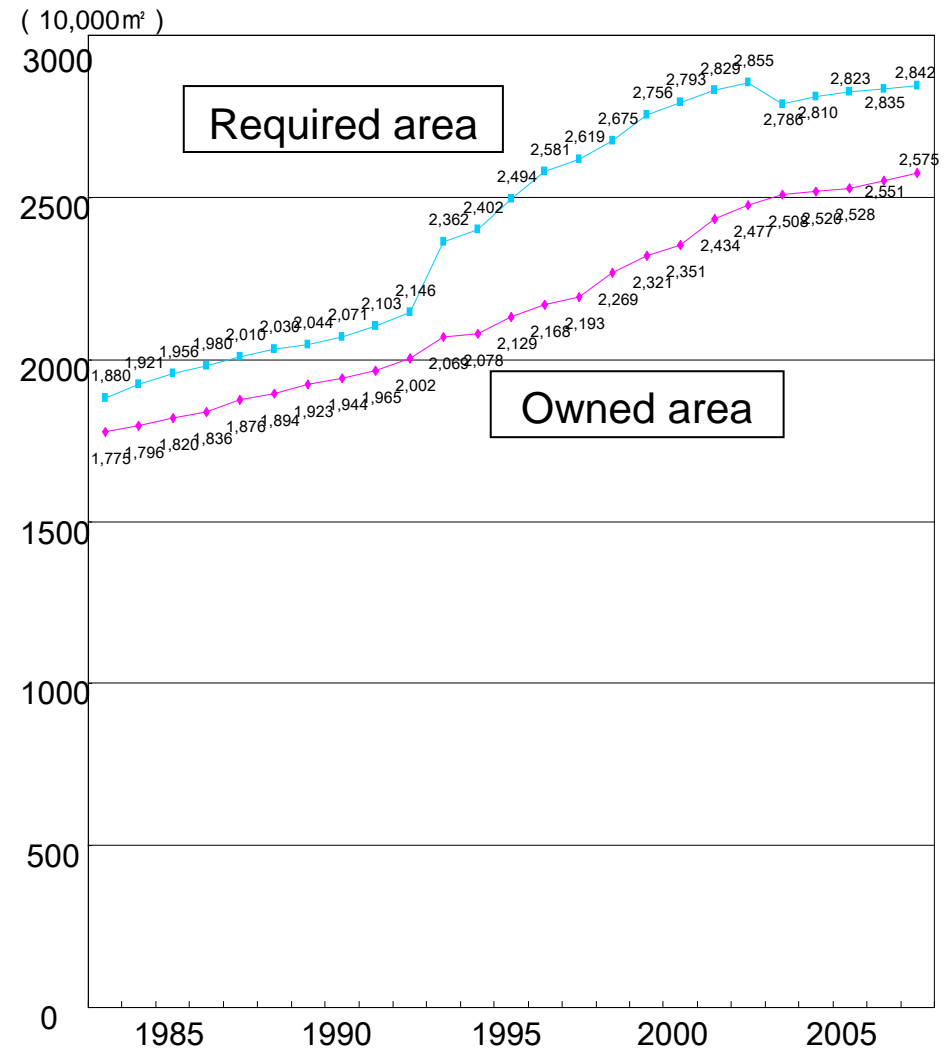
# Shifts in student quotas, required area, and owned at national universities

The total land area occupied by facilities increases in response to demand and is only 90% of the total area estimated to be necessary to conduct education and research activities

## Shifts in student quotas



## Shift in required and owned area



3 . Promotion of “The Five-Year Program for the Emergency Renovation and Building Facilities of National University”



# “Basic Plan for Science and Technology” and “5-Year Program for the Emergency Renovation and Building Facilities of National University”

	(ST measures in accordance with the Basic Law on Science and Technology)	(Measures for Renovation and Building of national university facilities)
1996~2000	<b>1st Term Basic Plan for Science and Technology (1996 Cabinet decision)</b> “Systematic Improvement of Cramped/Decrepit University Facilities”	Systematic improvement in accordance with the Basic Law on Science and Technology
2001~2005	<b>2nd Term Basic Plan for Science and Technology (2001 Cabinet decision)</b> “Top Prioritization of University Facility Refurbishment and the Systematic Formulation & Implementation of Plans for Improvement”	<b>1st 5-Year Program for the Emergency Renovation and Building Facilities of National University (2001 MEXT)</b> Improvement goal 6 million m <sup>2</sup> Cost 1.6 trillion yen
2006~2010	<b>3rd Term Basic Plan for Science and Technology (2006 Cabinet decision)</b> “Systematic Formulation & Implementation of Refurbishment Plans Centered Around Reviving Decrepit Facilities”	<b>2nd 5-Year Program for the Emergency Renovation and Building Facilities of National University (2006 MEXT)</b> Improvement goal 5.4 million m <sup>2</sup> Cost 1.2 trillion yen

# The First 5-Year Program (FY2001~2005)

**Focused** :Prioritized emergency renovation of 6 million m<sup>2</sup> (of 11 million total) over 5 years at a total cost of 1.6 trillion yen

**Prioritized goal ( 2.1 million m<sup>2</sup> )**

1. Alleviate small/decrepit, etc., graduate school facilities ( 1.2 million m<sup>2</sup> )

3. University hospitals capable of leading-edge medical care ( 0.5 million m<sup>2</sup> )

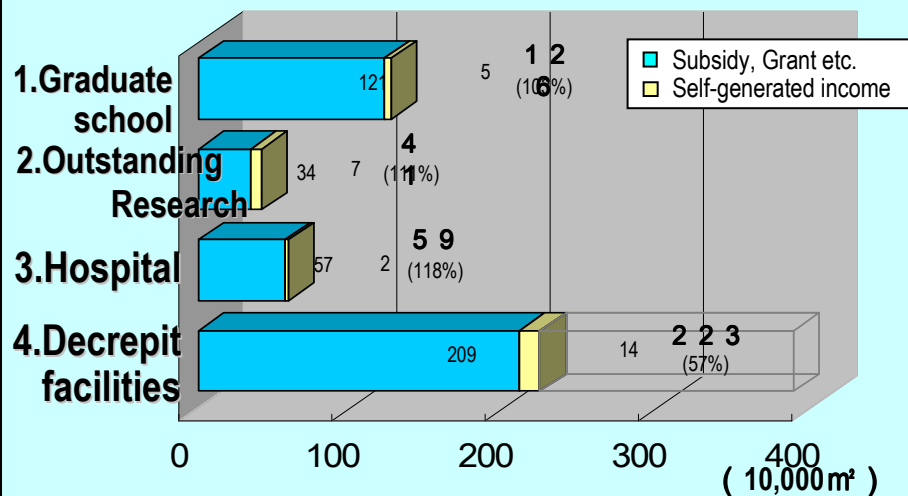
2. Outstanding research centers ( 0.4 million m<sup>2</sup> )

4. Improvement of decrepit facilities ( 3.9 million m<sup>2</sup> )

**System Reform: Strive for flexible, optimal use of facilities in integration with university reform**

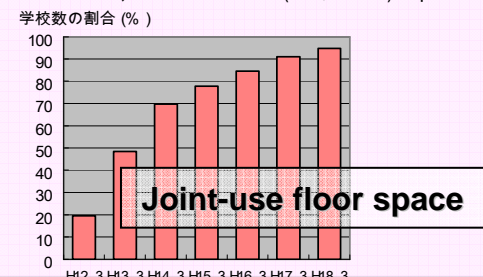
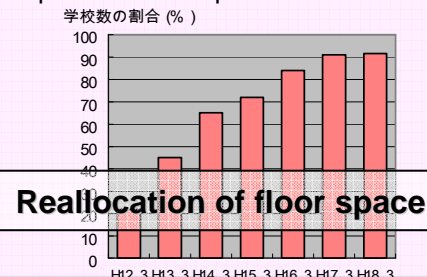
- Build a facility operations/management system from a comprehensive perspective
- Organize comprehensive multi-use research facilities for different departments to share
- Adopt various methods such as PFI, etc.

## Implementation of a focused, systematic facility improvement scheme



## Promotion of system reform

1. Establishment of a committee for the inspection/maintenance/evaluation of facilities  
52% in 2000 → 100%, achieved in 2003
2. Building a facility operation/management system from a comprehensive perspective  
Percentage of schools that re-allocate space in line with the inspection/maintenance/evaluation results as well as changing educational/research circumstances: 22% in 2000 → 92% in 2006
3. Securing flexible, fluid shared-use space  
Percentage of schools that have secured shared-use space: 20% in 2000 → 95% in 2006
4. Adoption of new improvement methods such as PFI, etc. 25 cases (420,000 m<sup>2</sup>) implemented



# The Second 5-Year Program (FY2001~2005)

## ■ Circumstances & issues

- The implementation of the “5-Year Plan for the Emergency Upgrading & Maintenance of National University Facilities, as stipulated in the Second Basic Science & Technology Plan (2001~2005) resulted in the prioritized resolution of cramped facilities as scheduled. However, the improvement of aging/ decrepit facilities fell behind, and these delays coupled with increasing demand over the intervening years, ended up boosting the number of facilities requiring renovation.

Facility deterioration and degradation

Buildings with questionable earthquake resistance

1/3 of the total area

- New educational/research needs in line with new graduate universities established in 2001 onwards

## 3rd Term Basic Plan for Science and Technology (extract)

- Highest priority should be placed on promoting the refurbishment of university facilities, among all other public facilities.
- The national government should place the highest priority on the systematic improvement of decrepit facilities and make special efforts to secure a budget for such, from a long-term perspective.

## ■ 2<sup>nd</sup> 5-year Program ( FY2004~2010 )

### Basic policies

- To resolve the issue of cramped quarters caused by new educational/research needs, and **create a revitalized facility which may serve as a center that emphasizes outstanding research (educational research center) and the cultivation of personnel, while keeping the revitalization of decrepit facilities as the top priority**
- Continue the systematic improvement of university hospitals for the purpose of facilitating their leadership role as centers for leading-edge medical care

### Improvement goals

⊙ Demand for renovation: 10 million m<sup>2</sup>

⇒ Prioritize urgent cases Goal: 5.4 million m<sup>2</sup>

I Revitalization of educational/research centers

① Revitalizing decrepit facilities: 6.8 million m<sup>2</sup> → 4 million m<sup>2</sup>

② Resolving cramped facilities: 2.8 million m<sup>2</sup> → 0.8 million m<sup>2</sup>

II Revitalization of university hospitals

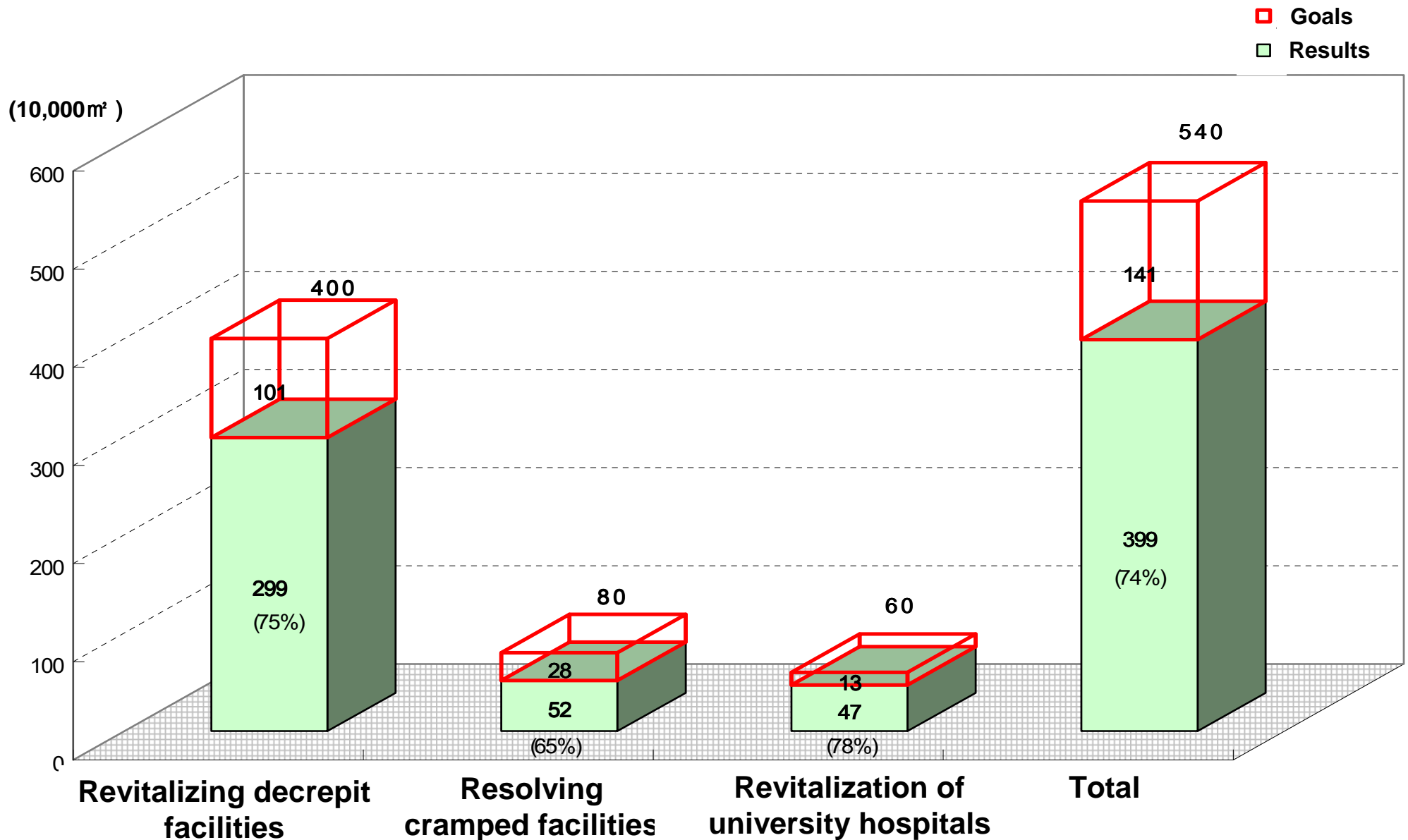
0.8 million m<sup>2</sup> → 0.8 million m<sup>2</sup>

⇒ Cost over the next 5 years 1.2 trillion yen

### Implementation policies

- Utilizing MEXT assistance as a firm basis, while further advancing the efforts below:
  - Facility management: comprehensive facility operations/management/assistance; flexible & fluid utilization of shared-use facilities, etc.
  - New improvement methods: improvements funded through income & donations; coordination & cooperation with industry and municipalities

# Progress on the On the Second 5-Year Program



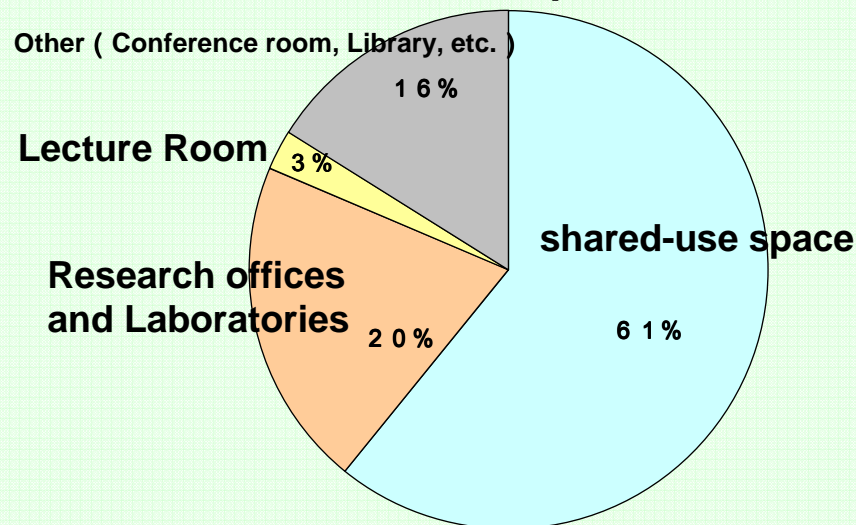
※Results: Includes FY2005~2009 supplementary budget & new improvements made through methods from 2006~2008



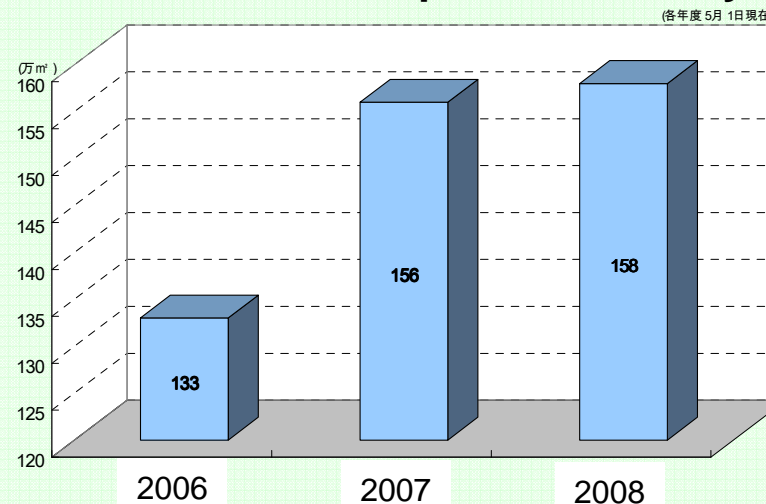
# Promotion of Strategic Facility Management by Universities

There has been progress in universities' efforts to optimize the use of existing facilities through the inspection, evaluation, and securing of flexible-use space at their respective facilities, as well as the re-allocation of occupied space.

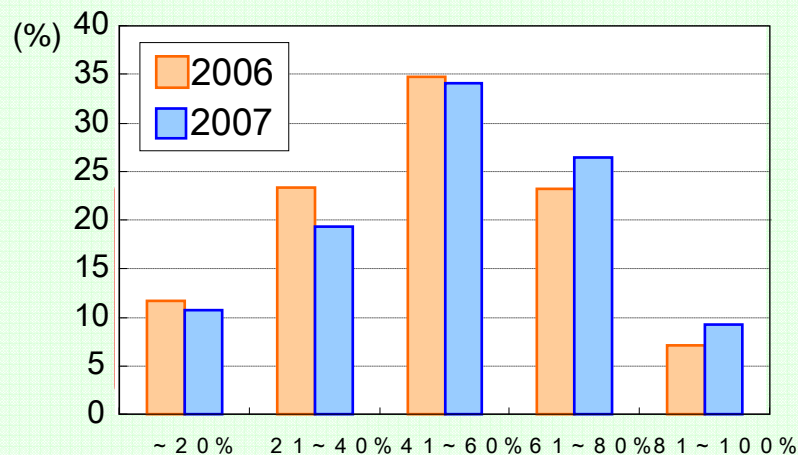
## Reallocation of floor space



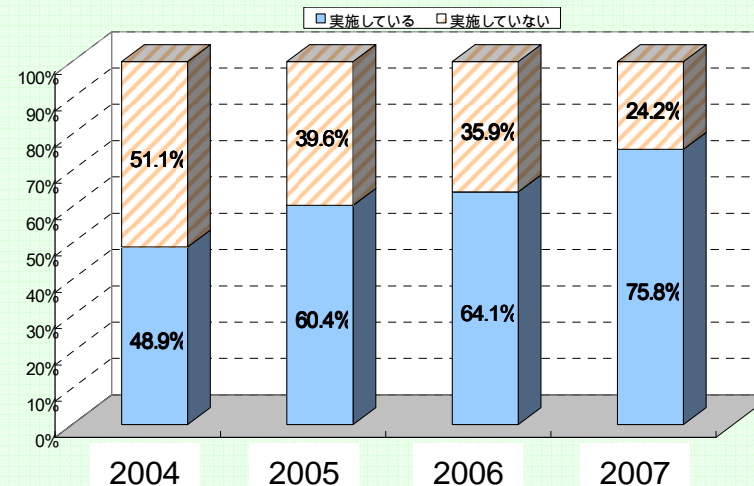
## State of shared-use space availability



## The Rate of Operation of Lecture Room



## State of rental space policy implementation



# Results attained from “New Improvement Methods” (FY2006~2008)

## 1. Improvements financed through donations

221 cases, 101,000 m<sup>2</sup>

### ○ Main points

- Educational/research facilities 43 cases 41,900 m<sup>2</sup>
- Welfare/extra-curricular facilities 45 cases 18,300 m<sup>2</sup>
- Auditoriums, etc. 16 cases 13,400 m<sup>2</sup>
- Affiliated hospitals, etc. 30 cases 21,400 m<sup>2</sup>

## 2. Improvements financed through coordination with local governments

### 2-1. Donations, etc., from municipalities (facility-related)

9 cases, 5,000 m<sup>2</sup>

### ○ Main point

- Office for the Fisheries Research Center provided free-of-charge

### 2-2. Improvements by municipalities

5 cases, 15,000 m<sup>2</sup>

### ○ Main points

- Improvement by the city govt., and subsequent rental of partial space
- Improvement of shared research facility by foundations utilizing prefectural subsidies

### 2-3. Securing space by leasing from municipalities

40 cases, 23,000 m<sup>2</sup>

### ○ Main points

- Educational/research space 28 cases 20,100 m<sup>2</sup>
- Medical care space, etc. 3 cases 700 m<sup>2</sup>

## 3. Improvements in conjunction with other ministries

44 cases, 37,000 m<sup>2</sup>

### ○ Main points

- Ministry of Land, Infrastructure, Transport and Tourism 2 cases
- Ministry of Economy, Trade and Industry 2 cases
- Agency for Cultural Affairs 1 case
- Organization for Small & Medium Enterprises and Regional Innovation 5 cases
- Japan Institute of workers' Evolution 14 cases

## 4. Improvements by corporations

11 cases, 9,000 m<sup>2</sup>

### ○ Main points

- Shared research facilities 2 cases
- Welfare benefit facilities, etc. (independent accounting type) 7 cases

## 5. Leasing off-campus space

66 cases, 10,000 m<sup>2</sup>

### ○ Main points

- Educational/research space 32 cases 4,200 m<sup>2</sup>
- Accommodations for intl. students, etc. 7 cases 2,900 m<sup>2</sup>

## 7. Improvements financed through long-term loans

12 cases, 34,000 m<sup>2</sup>

### ○ Main points

- Student accommodations 9 cases 32,600 m<sup>2</sup>
- Veterinary hospitals 3 cases 1,500 m<sup>2</sup>

## 8. Improvement through commissioned research costs (overhead/indirect expenses)

68 cases, 15,000 m<sup>2</sup>

### ○ Main points

- Univ. of Tokyo World Premier International Research Center Initiative
- Kumamoto Univ. Shared building for Young Researchers Support

## 9. Improvements through appropriated surplus

168 cases, 100,000 m<sup>2</sup>

### ○ Main points

- Educational/research facilities 67 cases 41,900 m<sup>2</sup>
- Welfare benefit facilities, etc. 23 cases 13,000 m<sup>2</sup>
- Accommodation facility, etc. 17 cases 26,100 m<sup>2</sup>

## 10. Improvements financed through other sources

172 cases 35,000 m<sup>2</sup>

### ○ Main points

- Educational/research facilities 28 cases 9,300 m<sup>2</sup>
- Affiliated hospitals 67 cases 7,600 m<sup>2</sup>

## 11. Improvements financed through land sales

23 cases 73,000 m<sup>2</sup>

### ○ Main points

- University of Tokyo's Ocean Research Institute
- Kyushu University's Ito (New) Campus

Results achieved through new upgrade/maintenance methods, in numbers: 839 cases 460,000 square meters





# Achievements

## ■ New facilities



General research building



Creating a safe research environment



Information media center



Creating a comfortable research environment

## ■ Renovated facilities

Before



General research building



Renovation

After



A harmonious campus environment



Ample space for educational/research activities

Before



General research building

Renovation

After



Transformed into a safe, organized research environment

Before



Restrooms

Renovation

After



Upgraded amenity space

## **4. Future Issues**

# Circumstances & Issues

**【Degradation】** There are 6.5 million m<sup>2</sup> (approx. 25% of total) of facilities that are of questionable value in terms of safety and function. 85% have been earthquake-proofed (FY2009 tally).

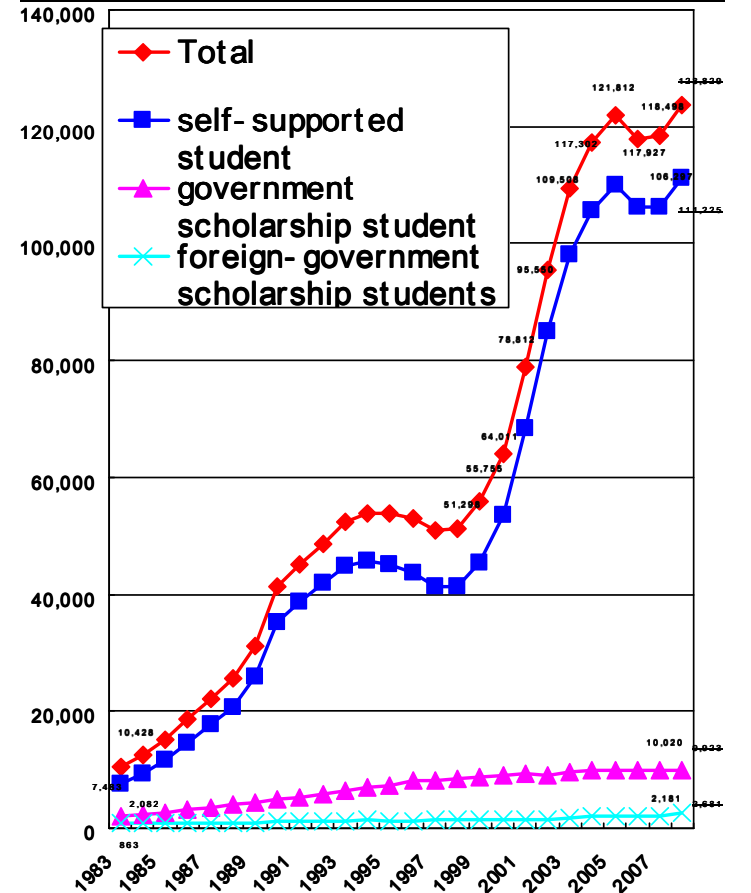
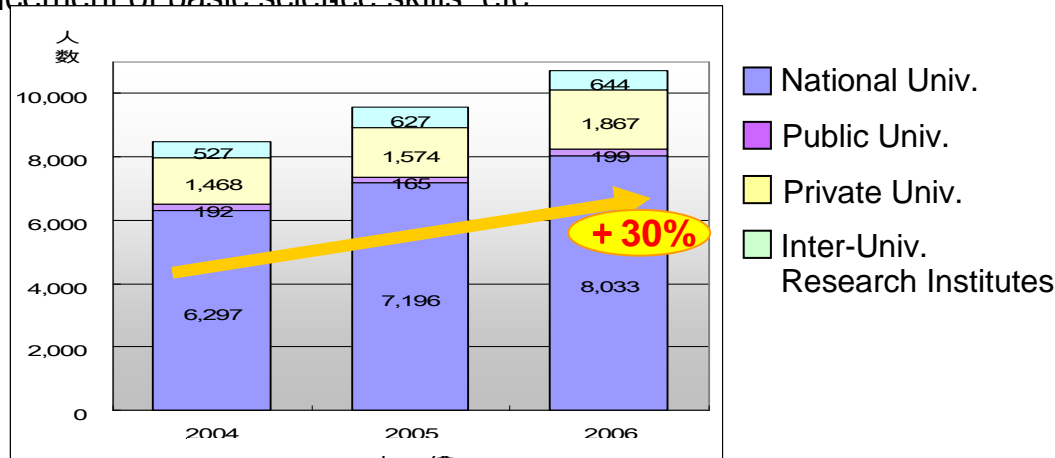
**【Cramped】** There is a shortage of research space accompanying the growth of post-doctoral students.

**【Medical care】** Deteriorating service in degraded environments that cannot support adoption of leading-edge medical equipment

**【Global environmental problem】** Active measures for upgrading environmentally-unfriendly, decrepit facilities are indispensable.

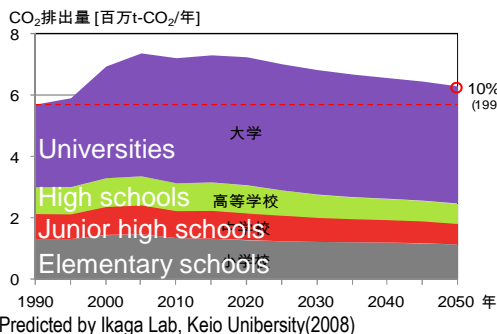
**【Policy issues】** Responses needed to various socially-urgent issues such as the globalization of higher education, enhancement of basic science skills, etc.

## Shift in Number of International Student

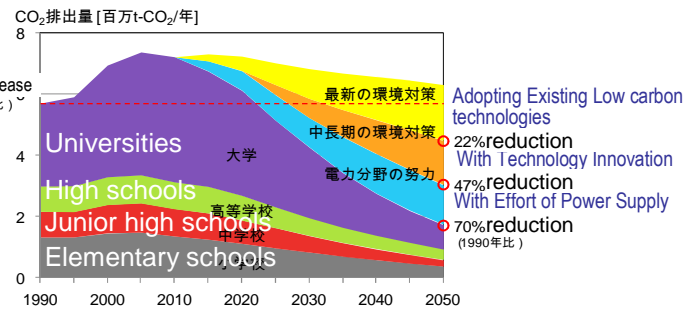


## Prediction of CO<sub>2</sub> emissions from Schools in Japan

### ◆ Business as Usual Case

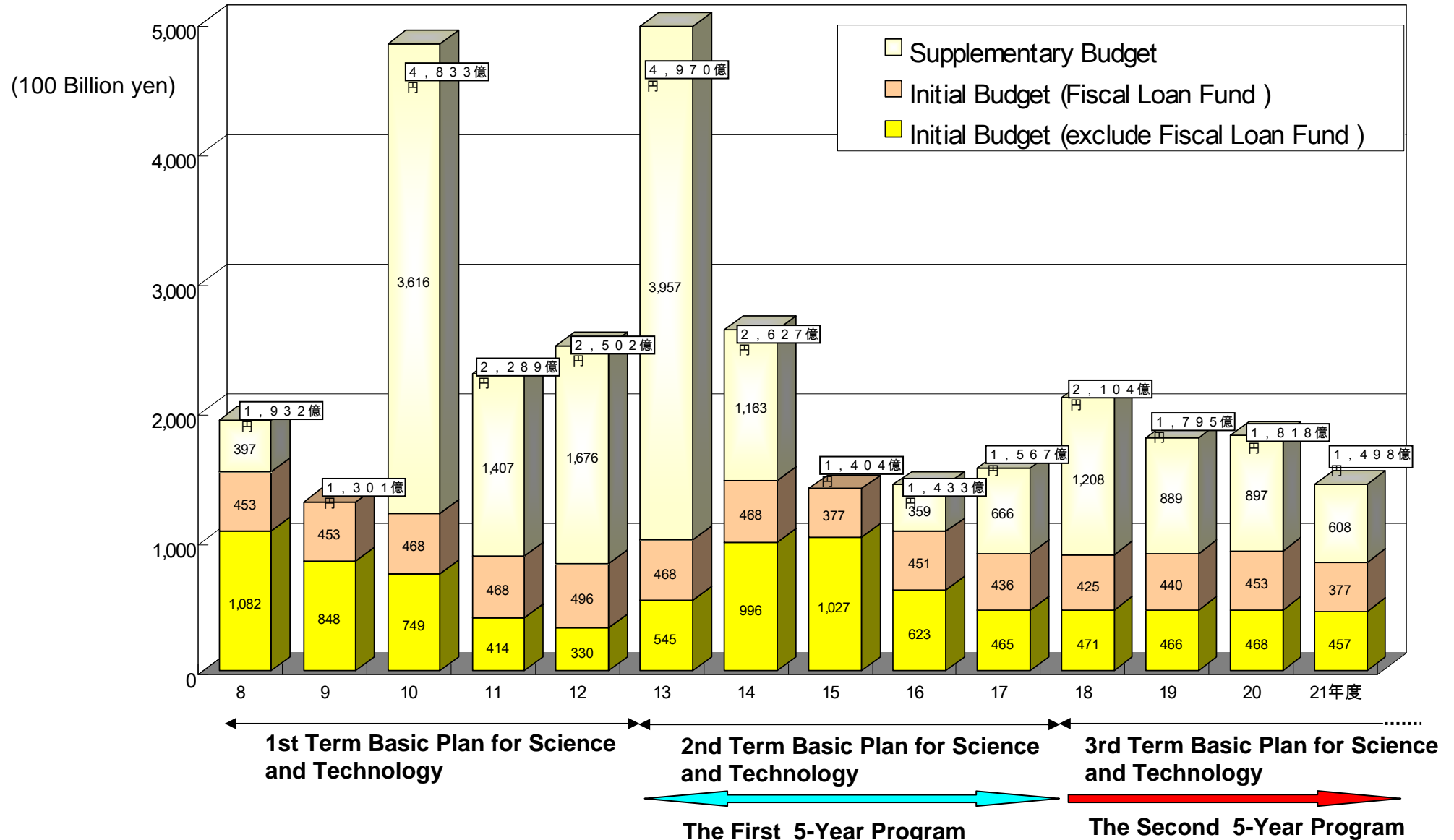


### ◆ Adopting low carbon technologies



# Trends in the national university facility improvement budget

The initial budget has been decreasing; it mainly consists of the supplementary budget for quake-proofing measures in recent years.





# Medium- to long-term measures for improvement of national university facilities -1

## Points to strive for in improving facilities

### ●Development of educational functions

- Cultivation of people who can contribute to the creation of knowledge, etc.

### ●Development of research functions

- Formation of outstanding research center; cultivation of excellent researchers
- Revitalized education/research & community contributions through coordination with industry, etc.

### ●Promotion of community contributions

- Community centers of knowledge & culture; facilities for local coordination

### ●Promotion of internationalization

- Formation of intl. centers of education/research & exchange

### ●Contributions to global environmental issues

- Realization of sustainably developing society through the minimization of environmental burdens

### ●Enhanced campus environment

- Creation of universities abundant in character/individuality and charm

## Systematic promotional measures for facility improvement

### Improvement of campus environment from a long-term perspective

- Improvement of campus environment with the future vision of each university firmly in mind

### Higher value through efficient & effective improvements

- Creation of higher-value facilities through optimal, efficient, and effective utilization of limited funds

### Promotion of facility management based on the PDCA cycle

- Establishment of PDCA cycle for the suitable maintenance & enhancement of a facility's respective functions

### Promotion of strategic improvements utilizing diverse funding sources

- Further promotion for utilization of diverse funding sources for facility improvement, maintenance, and management

### Cultivation of personnel necessary for strategic management

- Cultivation of personnel with strategic management ability for the further promotion of systematic reform efforts



# Medium- to long-term measures for improvement of national university facilities-2

- It will be necessary clarify which facilities require focused improvements, in order to realize the ideal state of national universities and formulate new facility improvement plans following the second 5-year plan, including specific improvement goals.
- Stable guarantee of a budget is indispensable to the steady promotion of focused, strategic improvements based on the plan.
- Further discussions are planned for the materialization of focused improvements, with policy discussions on ST and higher education firmly in mind.

## Image of issues that require focused improvements

### Diversification & sophistication of the educational/research environment Strategy

Strategic improvements in quality such as the diversification & sophistication of facility functions

Revitalize educational research and achieve an educational/research environment that enables the transmission/exchange of "knowledge"

Formation of an intl. educational/research center that is globally competitive

Improve university hospitals to handle both local and leading-edge medical care

### Achieving an educational/research environment that is sensitive to the environment (Sustainability)

Shift to a sustainable campus that is conducive to sustainable development and less of an environmental burden

### Securing a safe educational/research environment (Safety)

Resolve the issue of decrepit facilities that pose safety risks through earthquake-proofing, etc.

Quality boost

Organization of basic conditions

Policy issues . Active responses to societal demand