Japan's science spending climbs again

Tokyo. Despite facing the tightest budget in almost a decade, the Japanese government has agreed to a substantial increase in its spending on science and technology for the fiscal year 1997, beginning on 1 April.

Overall, science and technology expenditure across all ministries will grow by 11.9 per cent, according to figures released by the Ministry of Finance. This keeps the country on target to meet a promise made last June to boost spending on research by 50 per cent over the next five years.

The life sciences have done particularly well, with the Science and Technology Agency (STA) seeing its budgets for research in this area grow by 22.9 per cent. The Ministry of Education, Science, Sports and Culture, which now accounts for 42.9 per cent of all government spending on science and technology, will have an additional ¥10.4 billion (US$89 million) of research grants to allocate in the year ahead.

In contrast, total government spending will rise by only 3 per cent to ¥77,390 billion — the smallest increase for nine years. The figures were approved by the cabinet last month but still have to be formally accepted by the Diet, Japan's parliament. Public finances are under severe pressure because of economic recession, the need to bail out some banks, as well as housing and loan corporations, and the rapidly growing number of elderly people in the population.

The government is determined to reduce borrowing by raising taxes and controlling public expenditure. But, despite the austere financial climate, all Japan's science-related ministries have managed to win increases in their budgets of between 4 and 12 per cent.

The increases follow the launch of Japan's new five-year plan for science and technology, announced last June. Under the plan, the government has agreed to increase spending on science and technology to ¥17,000 billion over the next five years. Despite deteriorating government finances, the Ministry of Finance is backing the plan. "Support for scientific research is essential for Japan's economic future," says one ministry official.

The ambitious plan originated following lobbying by a small group of comparatively young and powerful politicians from various political parties (see *Nature* **378**, 227; 1995). Its acceptance by the government represents agreement that such increases are needed to build new creative industries and improve the quality of life.

Several ambitious new projects in the life sciences have won financial backing. The STA will set up a brain science research institute at the Institute of Physical and Chemical Research (RIKEN) in October (see *Nature* **383**, 7; 1996), in addition to receiving ¥1.9 billion for protein structure analysis, which received only ¥0.2 million this year.

The research and development budget for new industries at Japan's powerful Ministry of Trade and Industry (MITI) has more than doubled and includes ¥7.1 billion for special funding for national research institutes (up 108 per cent) of which ¥2.2 billion will be allocated by competitive tender under a new initiative. MITI also gets a new budget for interministry research projects conducted at national research institutes. These funds will into genetics, brain science, earthquake and biotechnology research. There are substantially more funds available at many ministries for postdoctoral fellowships and other schemes to encourage young researchers.

Richard Nathan

Highlights of Japan's budget for S&T 1997 (in billion yen: US$1 = ¥114)

Science and Technology Agency (STA)		
Total budget	**734.5**	**+6.0%**
General R&D budget	**571.4**	**+8.0%**
Space	180.6	+1.5%
Spring-8	19.2	+15.4%
Human genome	2.9	+17.5%
Protein structure analysis	1.9	+688.0%
STA fellowships	3.1	+23.3%
Brain	9.9	+296.0%
Ministry of Trade and Industry (MITI)		
Total R&D budget	**421.3**	**+12.1%**
Agency for Industrial Science & Technology	162.0	+13.8%
New industry R&D	26.8	+113.0%
Industrial scientific technology	28.0	+6.2%
Joint ministry research projects	3.4	New
Human Frontier Programme*	4.0	+12.0%
* includes 2.4 billion yen from STA		
Ministry of Education, Science, Sports and Culture		
Grants in Aid for Scientific research	112.2	+10.2%
Japan Society for Promotion of Science	39.0	+48.2%
(postdoctoral fellowships)	(14.4)	(28.0%)
Joint research with industry	48.1	+37.8%
Academic information network	36.2	+9.5%
Centre of excellence (COE) programme	13.4	+18.3%

France says goodbye to the fast-breeder as Superphénix

Paris. **Almost four decades of effort by France to build fast-breeder reactors to produce electricity commercially from plutonium came to an end on Christmas eve, when its 1,250-MW Superphénix prototype power plant in Creys-Malville was shut down. The plant will be converted into a research reactor intended to burn up plutonium from waste and dismantled weapons, as well as actinide wastes (see *Nature* 365, 381; 1993).**

Ironically, although 1996 was the last year in which Superphénix operated as a commercial prototype, it was the first year in which the troubled reactor operated smoothly. The 3 billion kilowatt-hours of electricity it generated equalled the total produced from its entry into service in 1986 until the end of 1995 — over this period, technical problems meant that it operated for a total of only ten months.

Now, 72 of the 220 fuel elements in the core will be replaced with stainless-steel dummies to reduce the reactor's capacity to produce plutonium. At the same time, three experimental fuel elements will be placed in the core in preparation for future research. Two will contain plutonium configured for experiments to boost the reactor's capacity to incinerate plutonium. The other will contain 2 kg of the highly radioactive actinide, neptunium. The reactor will begin to incinerate plutonium only around 2003, when it will be equipped with a core lacking a uranium blanket.

The conversion marks the end of the last programme in Europe to develop a generation of fast breeders for electricity production. A project to build a European Fast Reactor has also been abandoned following the withdrawal of the United Kingdom and Germany in 1992 (see *Nature* 360, 93 & 703; 1992). Only Japan is now actively pursuing the technology (see *Nature* 379, 196; 1996).

But the French government's decision in 1994 to reincarnate Superphénix as a research reactor has not dampened the controversy surrounding it. At the time, the decision was widely viewed as a political solution to the need to satisfy France's partners in NERSA, the consortium of French, German and Italian utilities that built Superphénix in the 1970s at a cost of FFr27.7 billion (US$5.2 billion) (see *Nature* 368, 281; 1994).

The French government has since agreed to pay its partners in the project an estimated FFr1 billion annually — in the form of electricity — to compensate for loss of income following the conversion. To these costs must be added that of the planned research programme (FFr500