

tended to focus on solving problems for India's upper and middle classes. He points out that government-funded research in areas such as sustainable development can make a huge difference in eliminating poverty.

In the 2003–04 budget, science and technology funding received a 9.5% increase to INR 146 billion (\$3.1 billion), despite a generally weak economy. Nearly 80% of the R&D money in India is provided by the government, yet almost all the increase proposed in the 2003 strategy document would come from industry. “We are seeing a very encouraging response to industry participation in R&D,” says Ramamurthy. “Indian industries [are looking] to technology to give them the competitive edge,” he adds. There is more than an even chance that the 2% GDP goal can be met, says Predhiman Kaw, director of the IPR, “but the contribution from industry may be slow coming and tend to be very selective.”

“The strength of India's current R&D effort lies in the large, diverse, and qualified scientific human resource that the country possesses,” says Pachauri. “Its weakness is essentially in the largely inefficient institutional structure, symbolized by government-funded research laboratories, which have remained essentially stagnant and unproductive for much too long.”

Most of the funding goes to India's 200 state-run and 1350 industrial laboratories. The government also funds 230 universities. The policy calls for a radical shakeup at these institutions and increased mobility of scientists among industry, academia, and research laboratories, and between fields. The universities will welcome the report, says Kaw, because it gives “clear recognition of the fact that they are the ultimate source of trained manpower, and that their infrastructure needs considerable upgrading with new investments.” However, according to Katepalli Sreenivasan, the new director of the International Centre for Theoretical Physics in Trieste, Italy, “the report does not recognize the importance of first-rate undergraduate science education in the universities, which is where most of the raw talent for scientists exists.”

Pachauri agrees. “India had some excellent universities half a century ago, but many of these have declined in quality and caliber for a variety of reasons, particularly lack of government support. . . . It is hoped that the new policy will correct this historical trend and bring about a strengthening of the university system as far as

science and technology is concerned.”

The document's influence may be felt beyond India's borders. “Many developing countries view Indian science policy as visionary,” says Sreenivasan, “and the document is well in that spirit.” **Paul Guinnessy**

DESY Laser Gets the Nod, Collider Bid Deferred

The German Electron Synchrotron (DESY) in Hamburg recently received good news and not-so-good news in a single breath: On 5 February, Germany's science ministry announced that it will ante up €337 million (\$363 million), or half the cost of the lab's proposed x-ray free electron laser (X-FEL), but that, at least for now, it will not commit to the lab's ultimate goal of building a superconducting electron-positron collider, a contender to become the world's next-generation particle accelerator. Both projects got conditional endorsement last year from Germany's national science council (see PHYSICS TODAY, November 2002, page 24).

Because DESY had hoped to garner greater support for TESLA, its proposed TeV-Energy Superconducting Linear Accelerator, the government's decision to defer is disappointing. “Some people took the announcement as bad news, others took it as good news,” says Allen Caldwell, a particle physicist from Columbia University and the Max Planck Institute for Physics in Munich. “But the realists say that, given the state of the economy in Germany—and everywhere else—it's as much as could be expected for now.”

For his part, DESY Director Albrecht Wagner says “the outcome is very good. The decision provided the lab with a clear direction and perspective: Build the X-FEL, and keep going with the linear collider R&D.” Next, DESY needs to enlist international partners for the X-FEL and to sort out financial, design, and organizational aspects of the project.

Superconducting accelerator cavities are the backbone of the 1.4-km X-FEL and 33-km TESLA alike. “Going through the process of bringing something from the lab into industry is a major step,” says Wagner. “Clearly the linear collider will benefit from building the free electron laser.”

Meanwhile, collider designs being developed in the US and Japan would rely on “warm,” nonsuperconducting

technology. But whichever technology is used, and wherever it is sited, the consensus is that the multibillion-dollar next-generation linear collider has to be an international project (see PHYSICS TODAY, September 2001, page 22). Indeed, Wagner says Germany plans to participate in the next linear collider wherever it is sited, but that the government “felt that a unilateral German move might be counterproductive for the international negotiations.”

And whether or not TESLA ever gets built, the X-FEL secures DESY's future. The X-FEL will provide femtosecond light flashes orders of magnitude more intense than today's light sources, says Wagner. “This makes it an ideal stroboscopic lamp for rapid processes.” To be sure, research on the X-FEL would stray from DESY's historic strength in particle physics and put more emphasis on condensed matter physics, plasma physics, chemistry, and biology. **Toni Feder**

European Spallation Source: Dead or Alive?

The aspiring European Spallation Source has no doubt suffered setbacks, but whether it is dead or just delayed is a matter of perspective.

“Chances are [the ESS] will be shelved,” says Peter Tindemans, chair of the ESS council and an independent policy expert in the Hague. “Of course, I am not happy about this. It would be a setback for Europe vis-à-vis the United States and Japan,” which expect to complete, respectively, 1.4 MW and 1 MW spallation sources in 2006. If it's built, the ESS will outdo them, with two 5 MW experimental stations. If it's not, Europe will cede its long-held leadership in neutron science.

Low marks in Germany's review of big facilities last year were followed in February by no money for the ESS when that government announced which facilities it would fund (see PHYSICS TODAY, November 2002, page 24). The ESS received another blow early this year, when the European Strategy Forum on Research Infrastructures concluded that the countries of Europe are not presently willing to pay for the project, which would cost an estimated €1.5 billion (\$1.6 billion).

“It would be unwise to say there haven't been setbacks,” says Bob Cywinski, a neutron physicist at Leeds University in the UK and a scientific adviser to Yorkshire's bid to host the