



BESSY II's construction in Berlin is the reason that the city's older synchrotron light source, BESSY I, is up for grabs. The new third-generation light source went on-line last January in Adlershof, a budding research and industrial area in East Berlin.

would also be installed.

The rebuilt machine, for now called BESSY IA, "would be at least as good as new, and it would be proven and debugged," says Voss. Adds Winick, "It would be a 'two-and-a-half' or a 'super second' generation machine. Newer [so-called third-generation] machines have a smaller beam focus, but that isn't necessary for everything—it's not necessary for studies in structural biology, environmental science, or other hard x-ray applications."

Germany would donate the synchrotron. Relocating and refurbishing it would cost about \$21 million, or about one-third the price of a comparable new machine, says Voss. That estimate includes packing, shipping, reassembling, and upgrading the synchrotron,

as well as minimal local infrastructure. But it doesn't include the salaries for 35–60 scientists and engineers to run BESSY IA, which would add up to several million dollars a year, money that everyone agrees will be tough to raise. Says Voss, "Only if annual [operating] funds can be secured over a reasonable period such as ten years does it make sense to go through the trouble of upgrading and relocation."

It's not clear where the money would come from, except that it's not likely to be from the Middle East. Unless the region's wealthier countries, such as Saudi Arabia and the United Arab Emirates, can be persuaded to join the project. But they and several other Middle East countries did not attend the Paris meeting, which participants

ascribe variously to Israeli–Arab relations, Arab–US relations, or internal problems; in addition, science is a low priority in much of the Middle East. The project's planners hope to drum up funding from the European Union and the US. Assaf, who is heading up a committee to look into financing the project, has his sights set on a chunk of the \$1.7 billion or so associated with last October's Wye River Memorandum between Israel and the Palestine Liberation Organization. However, if it is okayed by the US Congress, the Wye money would be tied to specific steps being taken toward peace, and would go toward building infrastructure such as roads and schools. An undeterred Assaf says, "Palestinians are in the best political position to raise the money." (Some of Assaf's colleagues are floating a proposal for equipment to prepare and study materials—such as crystal growth equipment, microscopes, and spectrometers—that they are hoping to piggyback on proposals to fund BESSY IA.)

More apparently available than cash is training, another necessary ingredient for the project's success. Synchrotron users from around the world—including Germany, France, Italy, Israel, Greece, the US, and Iran (home to the region's only synchrotron light source, a small, 0.3 GeV machine used for medical and agricultural research)—are offering to help train sci-

Thailand Recycles Japanese Synchrotron Light Source

A hand-me-down synchrotron light source from Japan is being beefed up for use in Thailand, with startup scheduled for 2001. Located 250 km northeast of Bangkok in the city of Nakhon Ratchasima, the Siam Photon Source will be Thailand's first synchrotron light facility and is intended to serve scientists throughout Southeast Asia.

Thailand's Ministry of Science, Technology, and Environment got the machine *gratis* and is investing about \$14.9 million to move and upgrade it, including doubling the circumference to 81 m and tailoring the machine to produce narrow bright beams of soft x rays and ultraviolet radiation (longer-term plans to add a superconducting wiggler to produce hard x rays are not included in this estimate). By comparison, building such a facility from scratch would have cost at least \$35 million. The facility's acting head is Weerapong Pairsuwan, a physicist at the nearby Suranaree University of Technology, with which the light source will be loosely affiliated.

The original synchrotron light source, called SORTEC, was located in Tsukuba Science City, near KEK, Japan's High Energy Accelerator Research Organization, whose scientists have helped in the redesign and are training scientists from Thailand to operate their new facility. The Japanese government closed SORTEC following a 1995 decadal review, partly because some of the 13 companies that used it—mainly for microolithography—had acquired their own machines.

The plan is to use the Siam Photon Source for physics and chemistry research, with some industrial research in semiconductors, medicine, pharmaceuticals, and agriculture, says Takehiko Ishii, a retired director of the University of Tokyo's



THE SIAM PHOTON SOURCE, shown here in an architect's rendering, is scheduled to go on-line in 2001.

Synchrotron Radiation Laboratory who was key in orchestrating the donation and is overseeing technical and scientific aspects of the synchrotron's transfer and upgrade. The idea to have a synchrotron light source in Thailand was homegrown, Ishii notes. At this stage, however, he adds, "Users are not real, but potential. We are now enlightening and stimulating scientists in various research fields to come and use the facility."

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