entists from the Middle East and the Mediterranean, who have little experience running a large research facility or using synchrotron radiation. Winick announced in Paris that he's received positive preliminary feedback about bringing scientists from the region to work at the US Department of Energy's four synchrotrons. (However, scientists from some participating countries could have trouble gaining entry to US labs due to DOE's recent security woes.)

Science large and small

Then there are the questions of whether a big project is the best way to boost science in the Middle East, and whether the region has enough potential synchrotron users to sustain a large facility like BESSY IA. "If everybody knew they needed a machine, it would be easier," says UNESCO's Siegbert Raither. The advantage of this particular project, he continues, "is the opportunity—the Germans are making a gift. It's a large project, in terms of cost, size, and sophistication. But the fact that you can do tabletop experiments is a powerful argument in its favor."

Khaled El-Shuraydeh, of Jordan's Council for Science and Technology, guesses that about a dozen scientists from his country would use the synchrotron. That's Assaf's estimate for the number of potential Palestinian users, too—out of 400 science PhDs, including 70 physicists, he notes. That's enough, says Schopper. "We don't have to start big." And the region's scientists hope that the center would lure home their colleagues, many of whom are working in the US and Europe.

At the end of the Paris meeting, the participants set up committees to look into the scientific, technical, and financial aspects of the proposed Middle East facility. An Israeli nominated a Palestinian to serve on one of them, which "wouldn't have happened ten years ago," observes Israel's Rabinovici, a string theorist who says his main interest in the project is its potential for fostering peace. About the hurdles ahead, Rabinovici sums up, "We have to make sure we have the human resources in the region. We have to build a first-class machine that will attract people from around the world. And we have to raise the finances. None of these obstacles is insurmountable. But it's important to me that if we do this, it should succeed." Or, as Palestinian physicist Ghassan Saffarini puts it, "We don't want to end up with a cathedral in the desert."

Toni Feder

Germany Narrows Reactor Fuel Choices

Converting the Technical University of Munich's new research reactor, the FRM2, to burn low enriched uranium (LEU) instead of highly enriched uranium (HEU) is feasible. That is the key finding of a six-member panel commissioned by Germany's Social Democrat–Green coalition government in its effort to reduce the risk of nuclear proliferation (see PHYSICS TODAY, March, page 78).

In its 21 June report, however, the panel ruled out converting the FRM2 to burn LEU (less than 20% uranium-235 enrichment) with the originally planned neutron flux of 8×10^{14} cm^{-2} s^{-1}, since the changes would require upping the reactor power from 20 MW to 32 MW, which would be tantamount to starting over.

The panel outlined other conversion options that would not require increasing the power. The reactor could be refitted before startup to burn LEU or a medium enriched uranium (MEU, 26% ^{235}U), and later be switched to burn a new type of LEU. Specifically, low enriched uranium molybdenum alloys, with higher uranium densities than the uranium silicide fuels currently used, are expected to become available around 2005. Or the reactor could be started up in 2001 with weapons-usable HEU (93% ^{235}U) as originally planned, and eventually be switched to burn high-density LEU or MEU (50% ^{235}U).

Not surprisingly, the FRM2 team is pushing for the HEU-to-MEU option. Requiring the least modification, it would be the cheaper choice (DM 12 million, or about $6.2 million), and operations would barely be disrupted, says Klaus Böning, the FRM2's deputy head. Using MEU (50% ^{235}U) would reduce the neutron flux by 7%. "We are not very happy about that, but we could accept it," says Böning. With the LEU options, on the other hand, the neutron flux would drop by about 25%, resulting in a great loss for cutting-edge experiments, he claims. Depending on who's calculating, converting the FRM2 before startup, as most of the panel members favor, would cost less than DM 100 million or as much as DM 300 million—the panel and the FRM2 team disagree about the cost, as well as the neutron flux reduction and time delays associated with the conversion options.

Burning HEU would be bucking an international trend: Last fall, for example, the Institut Laue-Langevin in Grenoble, France, announced plans to convert its reactor, the world's premier neutron source, to LEU. Panel members argue that switching the FRM2 to LEU now would not only best meet international nonproliferation goals, but would also be safer and cheaper than modifying a "hot" core; the fuel would be available; and the spent fuel could be disposed of. Indeed, notes panel member Peter Armbruster, of the Heavy Ion Research Center in Darmstadt, "Germany cannot get rid of the HEU spent fuel—this has to be safely stored in a now nonexisting long-term deposit for HEU fuel. The Technical University of Munich may be surprised to see the future fuel bill eating up the necessary investment budget for the FRM2." And if the FRM2 starts off using HEU, worries panel member Wilfried Krull, director of the Geestacht Research Center reactor, "conversion will never take place even if there are political commitments. There will be enough reasons to delay and delay."

Germany's federal government, together with the Bavarian state government, which has put up most of the DM 800 million for the FRM2, is expected to decide among the conversion options by the end of the year.

Toni Feder

Bean Counting Begins in UK Universities

Universities and colleges in the UK must now account for how they spend their money, a requirement the government attached to a budget hike last year, and for which it adopted a plan this past June.

The so-called transparency review requires academic staff time to be attributed to teaching, research, or administrative and other activities, and for funds from public and private sources spent in those categories to be tracked separately. Says Jim Port, whose consulting firm in Bristol devised the procedures to be followed, "We tried to come up with something that is sufficiently rigorous and auditable to satisfy government, but at the same time is sensitive—academic time is a rather more subtle thing than other commodities."

The plan is for heads of departments to ensure that their colleagues' time is tallied retrospectively at least once a year, with surveys or diaries being filled out periodically as validation. The costs of maintaining infrastructure such as buildings, libraries, and computing facilities are also supposed to be folded into the ledgers. Eight universities will test the new record keeping this coming academic year, followed in 2000–1 by the country's 30