

A voice for Africa's physicists

On 12 January in Dakar, Senegal, some 110 physicists from 20 African countries joined with 10 national African physical societies to launch the African Physical Society with the help of several international physical societies (see photo). The AfPS takes the place of a combined math and physics association. "This will give more of a focus on physics and give us a continental voice," says Akin Adedoyin, an atmospheric physicist at the University of Botswana and the new organization's general secretary.

The AfPS will be an umbrella "so we can find out what others are doing and help each other," says Adedoyin. "Let's say I have some equipment and my colleague in Rwanda wants to use it. We can find a way to bring him to Botswana to do research." On a more formal level, the AfPS will set up commissions to explore physics aspects of issues such as energy, water, and climate, adds physicist Paul Wofo, vice dean of research and cooperation at the University of Yaoundé I in Cameroon and one of five AfPS vice presidents. The new society will also work to increase funding for physics research and training and to form networks of physicists across the continent who could, among other things, collaborate to fabricate and distribute research equipment at low cost, train secondary-school teachers, and attract international physicists to spend a couple of months teaching in Africa.

The AfPS has adopted the pre-existing *African Physical Review* as its official publication, and the society plans to offer members such benefits as fee waivers for attending conferences. The number of physicists in Africa is unknown, but the bulk are in Nigeria, Egypt, Tunisia, and South Africa. "Apart from those," says Adedoyin, "it's not a large community."

Unlike its predecessor, the AfPS allows both national societies and individuals to be members. Indeed, says Adedoyin, "we encourage countries that do not have national societies to have them, so Botswana will establish its own physical society."

A key aim of the AfPS, Adedoyin says, is to gain the observer status that its predecessor organization had in the African Union. "That will give us a platform to interact with policymakers, so the voice of physicists could be heard." For example, he says, "many governments do not appreciate basic sciences. We need a forum to drum into the government the importance of funding science. If we do not have that voice at the continental level, it can be very difficult."

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AFRICAN PHYSICAL SOCIETY

ble, responsible" motto, Parker notes that the most basic aim is to be responsible—that is, to use as little energy as possible. In line with the European Union's 20-20-20 initiative to reduce energy consumption and greenhouse gas emissions by 20% and to have 20% of energy come from renewable sources by 2020, the ESS team is working on reducing the design power needed to 32 MW.

"Low-hanging fruit"

"Our goal for recapturing heat is 60%," Parker says. Some will be recycled in-house, but the plan is to feed most of it into Lund's district heating system. "This is the low-hanging fruit," says Bengtsson. "You invest in heat exchangers to move heat, but you get paid for the heat." The waste heat from the ESS will provide a quarter to a third of Lund's heat demand of roughly 1 TWh, according to Mats Didriksson, who is in charge of business development at Lund Energy Group. "It's tremendously important to both parties."

Redirecting waste heat from the ESS also means, says Didriksson, "that we can substitute gas fuel with waste energy and reduce emissions in the whole system." Adds Lars Lavesson, an archi-

tect from Lund University who heads up licensing and planning for the ESS, "It's not just a question of morals. It is highly economical." In total, says Parker, the energy-saving measures could amount to 7.5% of the construction costs but will save money in the long run.

The ESS and Lund Energy Group are looking into storing hot water underground in limestone aquifers. "If you go down about 70 to 100 meters, the ground looks like Swiss cheese," says Didriksson. "Put the water there, it works like a storage facility. In the winter, when you have demand for the energy, you pump it up."

The ESS plan also calls for buying windmills. In fact, the idea for the ESS's focus on sustainability was hatched about two years ago around the idea of "owning our own means to produce power," says Carlile. He and colleagues "were sitting around a coffee table, drawing on paper napkins, and we realized that would give us more control of the research budget. It factors out the fluctuations in energy costs." Carlile and his team calculate that "25 state-of-the-art windmills, for about €125 million, would supply all the power we

need." The ESS will feed power into the public power grid and take it out, according to need. Another advantage of buying windmills, notes Parker, "is that we're not just shifting who uses renewable energy. If we bought renewable energy, then the utilities could just sell other customers more energy from non-renewable sources."

Energy-conscious culture

Besides the big-ticket measures, the ESS is also looking at smaller ways to improve energy efficiency and otherwise be environmentally conscious. Parker is spending a year at the SNS to get ideas for the ESS. "I spend a lot of time going out and feeling things, finding stuff that is hot. It's a tactile exercise," he says. "I'm also trying to build up an understanding of flows—benchmarking where the energy is coming from and going. This is nothing but a big plumbing project, as someone at the SNS put it to me."

Among the smaller-scale measures the ESS is either adopting or considering are green roofs—a mat of sedum, a succulent, which, Lavesson says, will not only act as an insulator but also help control flooding and water runoff