Alliance to boost declining

In October 2008, ten leading European research institutes signed an intention to closely work together in developing a new generation of energy technologies, needed to achieve the EU goals on climate change and energy security. They have some catching up to do.

by Leen Preesman

Despite the success of some of the national wind and solar power programmes in some of the EU member states, Europe has hardly been leading the world in energy research. In fact, according to figures from the International Energy Agency, spending on energy research in the EU has dropped by 40% since 1991. At the same time, spending in Japan rose 22%, in the US it declined only 13%. The OECD-countries, which include the EU, Japan and the US, together spent a mere $ 7.5 billion on energy research in 2006, and almost half of this was on nuclear technology.

One of the problems of EU research is its highly fragmented nature. Each country has its own "national champion" in energy research. Hence, one of the recommendations of the EU Strategic Energy Technology Plan (SET), which was adopted in November 2007 to help the EU move towards a low-carbon economy, was to create an alliance of leading European energy research institutions. This led to the creation in October 2008, of the European Energy Research Alliance (EERA). 'With over 10,000 scientists employed by our members, we are the research community pillar of the SET', says EERA Chairman, Ton Hoff, who is Managing Director of the Energy Research Centre of the Netherlands (ECN). Fighting climate change and enhancing energy security are the most important tasks of the new alliance.

The big research issues, says Hoff, are carbon capture and storage (CCS), solar power, wind power, bio-energy, fuel cells, nuclear power, smart grids, geothermal power and marine energy. EERA will focus on the stage between basic research and industry-driven applied research. Hoff: 'We focus on the laboratory scale and the pilot phase of technologies under development, such as upgrading gas from biomass to natural gas quality. Setting up demonstration plants and further commercial development is beyond our resources and will be left to the industry.'

Flexibility

The main challenge of the transition to a sustainable energy supply is to develop the system in a direction where it can easily absorb low-carbon technologies, says Hoff. 'We must look for technology with the flexibility that allows us to easily connect with future innovations. For example, all newly planned wind farms should be provided with increasingly advanced technology when they are built. Our research must help companies to take these innovations to the market as soon as possible.'

Hoff does not believe a major breakthrough in energy research is imminent. 'Although we never can say never, a breakthrough in areas we aren't familiar with now, is highly unlikely within the next twenty years. Even a brilliant idea is seldom applicable straight away. It usually takes between ten and fifteen years before technologies can be introduced into the market. That's why we are looking at increasing the perfection of the design of wind turbines, biomass power plants and solar panels for now.'

Smart grids will be needed quite soon, Hoff thinks. 'The present grid, based on the supply from large power plants, needs to be

NRG high flux nuclear research reactor, Petten, The Netherlands. Photo: NRG

energy research in EU

EERA chairman Ton Hoff. Photo: ECN

adjusted and fine-tuned to an increased decentralized power generation. Solar panels, wind turbines and small biomass installations will play a much more important role in the future power supply. Within five to six years, EERA needs to come up with results that support the capacity to build a computer-guided grid.' Nuclear power is on EERA's list as well, and could even be selected as one of the new research priorities for 2009, Hoff expects.

Independence |

By developing low-carbon technologies, energy research has the added benefit of helping to make the EU less dependent on external suppliers, says Hoff. 'Our research will provide us with technologies that we could exchange for energy. Even abundant supplies in energy-rich countries will dry up eventually. In Russia, for example, we have already noticed a growing interest in new technologies for energy saving. And it is very likely that China would like to buy CCS technology.'

But climate and energy independence aren't EERA's only concerns. Improving the conditions under which Europe can successfully compete with technology leaders such as the US and Japan is at least as important. 'Europe is already leading in technologies for generating power from biomass, sun and wind. But in order to keep our lead, we need to increase our research efficiency.'

The researchers will of course need money. An increase of funding for R&D is essential, the EERA chairman stresses. 'The combined European budget of €1.3 billion has hardly risen since 1980. Funding in Japan has gone up and since the appointment of Stephen Chu as the US energy minister, we expect a quick increase in the research budget over there as well. If we want to compete, we need additional funds.' ■

European Energy Research Alliance

The current members of the EERA are:

- Commissariat à l'Energy Atomique (CEA), France
- Centro de Investigaciones Energeticas, Medioam bientales y Technologicas (CIEMAT), Spain
- Centre for renewable energy sources (CRES), Greece
- Energy Research Centre of the Netherlands (ECN), Netherlands
- Ente per le Nuove tecnologie, l'Energia e l'Ambiente (ENEA), Italy
- Forschungszentrum Jülich (FZ Jülich), Germany
- INETI – Instituto Nacional de Engenharia, Tecnologia e Inovação, Portugal
- Risø DTU National Laboratory for Sustainable Energy, Denmark
- Energy Research Centre (ERC), United Kingdom
- Technical Research Centre of Finland (VTT), Finland
- European University Association (EUA)
- European Heads of Research Councils (EUROHORCS)

The combined budget for energy research and development of the ten research institutes that participate in the EERA, is €1.3 billion a year. The alliance has calculated that the EU's combined investments in energy research have decreased by 75% since 1980. According to the Organisation for Economic Cooperation and Development (OECD), funding for energy research has almost halved since 1980 to €7.5 billion in 2006. Some €3 billion of this was spent on nuclear technology, fossil fuels, renewables and energy efficiency got about €800 million each, hydrogen almost €400 million.

According to Eurostat, the EU's statistics office, Japan spent 17% of its entire R&D budget on energy research. For France this figure is 4.5%, for the UK only 0.4%, the other EU fall somewhere in between.