

Public Summary INNER Report D2

Innovative energy research programmes in INNER participating countries

Written by: G. Breembroek, P. Ramsak, SenterNovem, the Netherlands
With contributions from: S. Semke, H.-J. Krebs, G. Glaze, A. Mercier, J.M. Merillot, D. Clement, B. Gindroz, F. Yguel, J.B. Saulnier, M. Forss, L. Amlund Hagen, G. Wisniewski, P. Azevedo, I. Cabrita, M. Bobis, P. Starinsky, R. Moreno Carrasco, R.Y. Valentin, P. Rohlin, C. Baker, J. Skea
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ERA-Net INNER “Innovative Energy Research” has been established June 2005. Its goal is to structure and strengthen approaches to stimulate innovative energy research throughout Europe. There are ten participating countries, plus the Nordic Energy Research. This ERA-Net is financed by the European Commission through the Sixth Framework Programme ERA-Net scheme.

The first task in INNER is information exchange on participating programmes. This public summary brings together and compares information on seventeen national programmes which stimulate innovative energy research:

Germany	Networks of basic research into renewable energy and energy conservation
France	ADEME’s R&D Framework Programme Ecodev (finalised 2001) ENERGIE National Research Agency (ANR) Non thematic research (NT) (White Programme)
Netherlands	New Energy Research (NEO) Energy Research Strategy – Long Term (EOS-LT)
Nordic Energy Research	Project Portfolio 2003-2006
Norway	Clean energy for the future (RENERGI)
Poland	National Framework Research Programme (NFRP)
Portugal	Energy and changes towards sustainability (PIDDAC P2 M7) Applied company development and research (IDEIA)
Slovakia	Grant scheme for support of research and pre-competition development (ŠP – 006/03)
Spain	Energy National Programme (ENP)
Sweden	Swedish Energy R&D Programme
UK	Towards a Sustainable Energy Economy (TSEC) UK Energy Research Centre (UKERC)

Participating programmes, general

There are only few countries which have separate programmes for INNER-related activities. Most countries have incorporated the INNER related activities in larger (energy) research framework programmes. In most cases, Ministries (Research, Economy) are programme owners, and there is a separate programme management organisation (see Figure 1). Exceptions are the Nordic countries and the UK, where the agency has the full ownership, and Spain, where the Ministry takes the implementation of the programme at hand.

The amount of money which is devoted to INNER related activities is quite comparable between the countries, though countries with more inhabitants spend more than the smaller countries.

It is important to note that seven of the seventeen reported programmes will certainly finalise in the course of the INNER project. This may create possibilities for enhanced international collaboration in the future, but could also imply a dead-end road. Most programmes have monitoring included in the programme activities or as an end-of-term requirement. It will be interesting to see the conclusions during the INNER operation period.

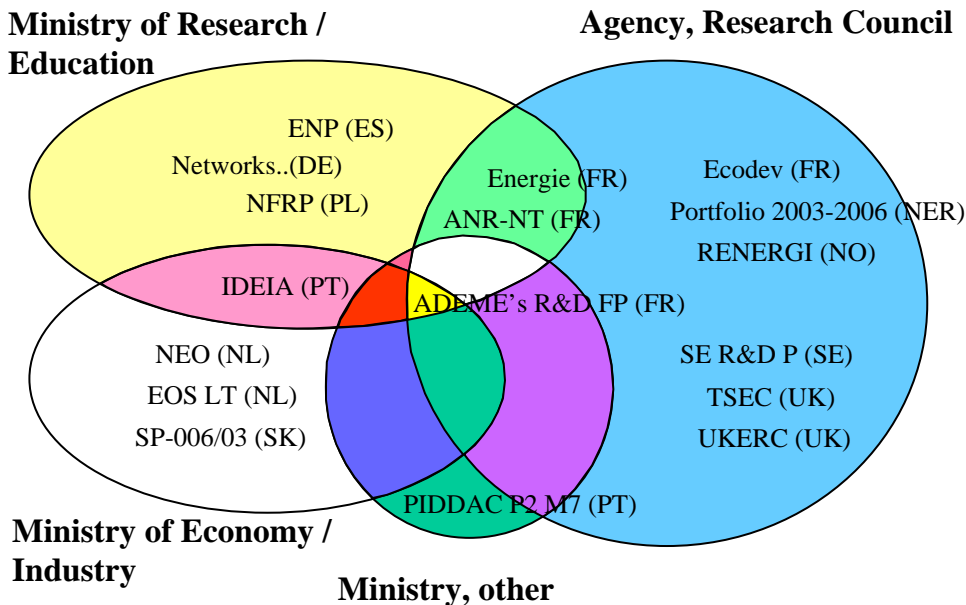


Figure 1: Programme ownership of the various INNER participating programmes

Participating programmes, brief description

Germany: Networks of basic research into renewable energy and energy conservation

The programme "Networks of basic research into renewable energy and energy conservation" has been initiated to:

- Link basic science more closely with energy research
- Create an environment for innovative ideas to solve existing problems in energy R&D
- Develop very innovative energy technologies
- Develop new approaches for systems' analysis

The programme subsidises networks: collaborations between basic scientists and energy experts. The programme is part of the German 5th Energy Research Framework Programme.

France: ADEME's R&D Framework programme

Innovative energy research is an integral part of ADEME's R&D Framework Programme. The Framework programme 2005-2010 has eight priority areas:

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| • Clean and efficient transportation | • Capture and storage of CO ₂ |
| • GHG-emission-less buildings | • Advanced technologies for renewable electricity production (Photovoltaic) |
| • New energy-efficient industrial processes | • Bio-resources |
| • Hydrogen and fuel-cell technologies, electrochemical storage | • High-grade enhanced geothermal systems |

The innovative energy research projects are mainly related to the above-mentioned research topics. However, there is room for projects on new technologies and concepts. The projects are national collaborations.

France: ECODEV (past programme, 1997-2001)

ECODEV is a past programme dedicated to sustainable development in energy and clean technologies. The three themes were:

- Energy systems
- Industrial technologies
- Environment and transportation

ECODEV – though principally intended for universities and research institutes - promoted collaboration with industrial partners. Also, the programme invested in foresight studies through CLIP (Club for Foresight Engineering). During each of the 4 years of the programme duration, 750 people have been involved (Engineers, researchers, PhDs), which corresponds to 300 full time people.

France: ENERGIE

The ENERGIE programme succeeded the ECODEV programme and it is similar in target groups and requirements. The programme supports research projects, but also five Thematic Action Groups (TAGs/GATs) on five themes, which together gather about 1000 researchers: These groups organise about three workshops per year each, and they also issue foresight studies. The TAG themes are:

- Hydrogen
- Biomass and CO₂
- Buildings
- Efficiency
- Nuclear

During each of the 4 years of the programme duration, 950 people have been involved (Engineers, researchers, PhDs), which corresponds to 380 full time people. Both ECODEV and ENERGIE supported marginal cost (EU acceptance). The mean annual total cost (EU acceptance) for each of the two programmes is around 16 M€(that is around 4 times the marginal cost).

France: ANR-NT

The programme ANR-NT (National Research Agency – Non Thematic/Agence Nationale de la Recherche – non thématique) is one of the programmes of the recently established GIP-ANR (Groupement d'intérêt publique – agence nationale de la recherche). ANR-NT implements a bottom-up approach covering all scientific fields. It is also called “White programme” (programme blanc). Projects should be ambitious and have an original target. Interdisciplinary approaches and possibilities for international collaboration are an asset.

Netherlands: NEO

The NEO programme "New Energy Research" aims to stimulate future energy research priorities. The programme has a bottom-up philosophy and it covers all energy research topics, except nuclear research. The target group of the programme includes all researchers: university staff and researchers in SMEs, large companies or research institutes. Unlike some other programmes, collaboration or networking is not required in NEO-projects, though it is an asset.

Netherlands: EOS-LT

The EOS-LT programme “Energy Research Strategy – Long Term” aims to stimulate energy research in:

- specific spearheads, which are important for the future Dutch sustainable energy economy and where the position of Dutch research is good.
- So-called “knowledge import themes” which are important for the Netherlands, but where Dutch research does not have a top-position. Projects on these themes should be international collaborations.

These spearheads and knowledge import themes are grouped in the following five thematic areas:

- Energy efficiency in the industrial and agricultural sector
- Biomass
- New gas / Clean fossil fuels
- Built environment
- Generation and networks

Nordic Countries (Nordic Energy Research): energy research portfolio 2003-2006

Innovative energy research is an integral part of the energy research portfolio 2003-2006 of the Nordic Energy Research (NER). NER is a legal entity with a mandate from the Nordic Council of Ministers (Finland, Sweden, Denmark, Norway and Iceland).

General objective of the portfolio, with totally 15 projects, is to strengthen the Nordic Energy sector: universities, R&D institutions, industry and authorities. Of the eight current INNER type projects, the ones on CO₂ sequestration and on production of bio-hydrogen have the strongest direct relation to INNER.

Norway: RENERGI

The RENERGI-programme (Renergi = “cleanergy”/clean energy) is to develop knowledge and solutions as the basis the Norwegian energy system of the future. The programme subsidises a broad scala of projects, from researcher projects through user-driven projects. It focuses on fields where Norwegian researchers and/or Norwegian businesses possess special competence. New and innovative energy technologies as such are not specifically promoted by the RENERGI work programme. However, efforts will be made to finance such projects should they emerge. Furthermore, RENERGI features a special systemised 'foresight process' that aims to recognise new research needs and opportunities so that the programme can adapt to them.

Poland: National Framework Research Programme (NFRP)

In September 2005, the National Framework Research Programme was approved. The programme philosophy is a bottom-up approach, which is common in Poland. Many details of the programme are still under development. Concerning highlights of the programme, the national energy policy up to 2025 states: “the use of biomass in the heat and electricity production, wind power and fuel cells are among the most promising new technologies...” Part of the budget for the National Framework Research Programme will come from the National Development programme, which is in turn partly financed through the EU.

Portugal: PIDDAC P2 M7

PIDDAC P2 M7 part concerns science and technology for public policies, in particular concerning energy. (PIDDAC as a whole is very, very broad and includes such issues as health and pre-school education). It is a five-year programme, open to public organisations only. Proposals are made in advance of the publication of the programme, and selected projects are then published as integral part of the programme. General objective of PIDDAC P2 M7 is to contribute to the security of supply through diversification, to stimulate economical development of the nation and to decrease environmental impact of the use of energy. Some of the projects developed within the scope of PIDDAC P2 M7 receive a contribution from the EU.

Portugal: IDEIA

This programme IDEIA (Applied corporate development and research) concerns joint development projects, where companies and research institutes together develop new products, processes or services.

The programme is not focussing on energy but on innovation and it is completely bottom-up. It is worth mentioning that collaboration is obligatory.

Slovak Republic: ŠP – 006/03

The programme ŠP – 006/03 (grant scheme for support of research and pre-competitive development) is a sub-programme of the SOP IS, measure 1.3 (Sectoral Operational Programme Industry and Services, Measure 1.3: Support of business, innovation and applied research). The primary objective is to increase the competitiveness of industry through research and development carried out by enterprises, by promoting new innovative technologies, procedures, products and developing stronger links between enterprises and R&D organisations. The SOP programme is co-financed from Slovak and ERDF sources (European Regional Development Fund). The contribution from the private sector in any project should be above 50%. The programme is bottom-up and not limited to energy. However, two ongoing projects involve original energy research ideas concerning biomass and nuclear energy.

Spain: Energy National Programme (ENP)

The Spanish Energy National Programme (ENP) is an integral part of the National R&D Plan (PN I+D+i). It is managed by the Education and Science Ministry (MEC). The Energy National programme has 13 priority areas:

- Transport fuels
- Coal and oil clean use
- Nuclear fission
- Poli-generation
- Efficiency and end-use of energy
- Distributed generation
- Evaluation and prediction of natural resources
- Wind energy
- Solar
- Biomass
- Other renewable energies
- Hydrogen
- Fuel cells

Besides, the PN I+D+I has a cross-cutting instrument called PSE “Strategic and exceptional projects” to promote new projects with a high risk and a potentially high reward. This is the most INNER relevant instrument. Cooperation of industry with a research organisation is a requirement.

Sweden: Swedish Energy R&D Programme

The Swedish Energy R&D Programme 2005-2011 is now in its first year. It is a large programme covering long-term and short-term activities, and targets universities as well as companies. There are currently more than 50 sub-programmes and 700 projects in operation. The programme is divided into six thematic areas: Bioenergy systems; Buildings and community systems; Transport; Energy-intensive industry; Power production and distribution; and Energy systems.

The Swedish Energy Agency and The Swedish Research Council are in the final stage to launch a joint programme dedicated to Energy-related basic science to stimulate researchers to enter the “twilight zone” between basic science and energy technologies.

UK: Towards a sustainable energy economy

The Towards a Sustainable Energy Economy programme (TSEC) is aimed at enabling the UK to access a secure, safe, diverse and reliable energy supply at competitive prices, while meeting the challenge of global warming. Three research councils (NERC, EPSRC, ERSC) jointly own the programme, which has been approved by the UK Office of Science and Technology in the biennial Government Spending Review. Within the programme, the UK Energy Research Centre (UKERC) has been set up, which is described in further detail below. Besides the UKERC, TSEC funds large, multidisciplinary projects in which academic institutions participate.

UK: UK Energy Research Centre

The UK Energy Research Centre has been awarded from the funds of the wider TSEC programme, mentioned above. The UKERC provides a focus for UK Energy research activity by various means, which all focus on enhancing the network and promoting interdisciplinarity e.g. a “research hotel” where UK and overseas researchers can work alongside on research challenges requiring innovative solutions.

Projects

The budget of the projects varies significantly between programmes, ranging from projects with a budget of less than 100 k€ in some programmes and 2000-6000 k€ in others. Many programme stimulate only collaborative projects, see Table 1. In the Spanish and Slovak programmes, the private sector must be involved. On the other hand, there are programmes where industrial partners can be involved but do not receive any money. Examples are the programmes in the UK (one programme has industry co-funding, though), France (ECODEV, ENERGIE) and Portugal. There are no examples of international collaboration on project level from any of the current INNER relevant programmes (except, of course, from NER).

Table 1 Project budgets and formal eligibility criteria

Country	Programme	Eligibility criteria
Germany	Networks of basic research into renewable energy and energy conservation	Collaboration basic researchers and energy experts Well-known, qualified organisations, German location
France	ADEME's R&D Framework programme	National collaboration (foreign parties can participate at their own cost)
France	ECODEV	Universities/research institutes
France	ENERGIE	Universities/research institutes
France	ANR-NT	Ambitious, original projects
Netherlands	NEO	(No collaboration or specific type of organisation required)
Netherlands	EOS-LT	Research on spearhead or “knowledge import theme” area
Nordic Countries	Portfolio 2003-2006	Collaboration between at least 3 Nordic countries Baltic/Russian participation advantageous
Norway	Renergi	Type of organisation (depending on instrument)
Poland	NFRP	n.a.
Portugal	PIDDAC P2 M7	Public organisations
Portugal	IDEIA	Company proposer, collaboration obligatory
Slovak Republic	ŠP – 006/03	More than 50% private sector
Spain	Energy national programme	Cooperation of industry with research organisation
Sweden	Swedish Energy R&D programme	N.a.
United Kingdom	TSEC	Academic institutions, multidisciplinary collaboration
United Kingdom	UKERC	UK residence status. (Research hotel open but must benefit UK research community.) Interdisciplinary research.

Research areas

All participating programmes cover a significant energy research area. There is a striking harmony on popular research areas.

- The research areas which are most generally supported among INNER relevant programmes are photovoltaics, production of biofuels and application of biomass for heat and electricity and industrial energy efficiency, with 15 out of 17 programmes that could support the topic.
- Most actual projects are reported in the area of photovoltaics, with 8 out of 17 programmes reporting actual projects. In the field of hydrogen production and fuel cells, 7 out of 17 programmes report actual projects.
- Least popular are nuclear research and research on fossil fuels (where CO₂ capture stand out as the single most popular topic).

The conclusion is that there is sufficient scope for collaboration between the INNER participating programmes.

Specific instruments

Obviously, all programmes provide subsidies on innovative energy technology research projects. However, there are some specific instruments:

- The UKERC has a research hotel which brings together researchers to work on research challenges requiring innovative solutions
- Furthermore, UKERC implements the following activities, which are all singular and not reported by any other programme:
 - A “technology and policy assessment” function which synthesises the results of existing research to cast light on controversies/difficult issues in the energy field
 - A programme of competitively tendered interdisciplinary PhD studentships
 - A summer school for PhD students working on energy
 - Developing an “Energy research atlas” which comprehensively describes UK competences and capabilities, participation in international activities and covers energy technology roadmaps.
 - UKERC is also involved in the organisation of international events, such as the G8 “Energy Research and Innovation” workshop etc.
- In the French ECODEV programme, there was a CLIP (Club for Foresight Engineering) which has edited and published 20 studies in different energy areas
- Also in the French ENERGIE programme and in the Norwegian RENERGI programme, there are foresight activities.
- The Dutch NEO programme has an “idea-service” which advises any individual with an energy research idea on the feasibility and further steps.
- The Norwegian RENERGI programme has “independent funding” distributed to projects regardless of field priority.
- The Swedish Energy R&D programme has initiated six thematically oriented senior advisory groups for scenario work, analysis, strategies and road maps. Their input is used by the Swedish Energy Agency when specifying the (sub-)programmes. The groups are proposed to be established for a period of 3+3 years.
- The Spanish programme offers credits.

The various instruments also offer scope for collaboration. Programmes could learn from experiences of others and specific interesting instruments could be tried by a broader group of countries.

Look ahead

This comparison of national INNER participating programmes is a necessary step in the INNER programme which aims to enhance collaboration and structuring of European efforts on innovative energy research. The actual – confidential – report also contains information on actual projects and their budgets.

This summary reveals scope for collaboration on programme planning, project selection, programme evaluation and on specific research areas/projects.

The next step will be an analysis of the various programmes and identification of common strategic issues, identification of strengths and weaknesses of individual programmes. This will provide the basis for decision-making on joint transnational activities.