

Energy Research, Development and Demonstration

UCD Response

to April 2005 Consultation Paper issued by
Department of Communications, Marine and Natural Resources



University College Dublin

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1. Introduction

In April 2005 the Department of Communications, Marine and Natural Resources (DCMNR) issued a Consultation Paper on energy research, development and demonstration (RD&D). The DCMNR paper was warmly welcomed in UCD.

In the Consultation Paper, DCMNR expressed the belief that Ireland "...must be more focused on research in the energy field generally, both from a technology and a policy perspective...[and] ensure that the research enriches the undergraduate and postgraduate training and education helping to build the necessary capacity and capability within the economy." UCD strongly endorses this view.

The DCMNR paper requested feedback from interested parties on a number of specific issues. This document constitutes the consensus response of those in UCD with an interest in energy RD&D to these specific questions.

The following UCD Groups and individual academics are currently active in Energy Research, Development and Demonstration;

Group	Academic Staff
Bioresources Research Centre	Prof. Shane Ward
Chemical and Biochemical Engineering	Prof Don MacElroy
Electricity Research Centre	Prof. Mark O'Malley
Energy Conversion Research Centre	Dr. David J. Timoney Dr. Donal P. Finn Dr. William J. Smith Dr. Malachy O'Rourke
Energy Research Group	Prof. J. Owen Lewis Mr. Paul Kenny Ms Vivienne Brophy
Marine & Petroleum Geology Research Group	Prof Pat Shannon
Radiation Physics and Radioecology Research Group	Prof Peter I Mitchell

Urban Institute Ireland Building Environment and Energy Cluster	Prof. Frank Convery Prof Peter Clinch, Planning & Environmental Policy Mr Pat Connolly, Mechanical Eng Dr James McLaughlin, Physics Dr Gerard Mills, Geography
Wind Energy	Mr Rick Watson

An Appendix associated with the DCMNR paper attempts to summarize energy-related activity in Ireland, although the author acknowledges that it may be incomplete. UCD noted that our activity in several fields including combustion, power generation, and exhaust emissions, for instance, had been omitted. An Appendix to the current document therefore includes some additional (although still not comprehensive) information concerning UCD activity in the energy R&D area.

2. The UCD Context

UCD has a significant track record in a wide range of energy-related areas. Individual groups have been successful and it is recognized that greater achievement is possible if greater levels of cross-fertilization and inter-disciplinary activity can be stimulated. UCD itself is currently undergoing a radical internal restructuring process, a key objective of which is to encourage precisely this type of synthesis. The timing of the DCMNR Consultation Paper is therefore opportune: it has arrived during a particularly dynamic and creative period in UCD, and its vision of an Energy Research Council providing a focus for the many disparate strands of Irish energy RD&D is entirely pertinent.

3. Institutional and Governance Options

Of the three alternatives listed in the DCMNR paper, UCD favours option 2 – i.e. the establishment of *“an energy research coordination council, served by a small secretariat, which would meet on a quarterly basis to identify needs and priorities in energy research, set a balance between short-term or responsive research and long term opportunities and which would arrange the coordination of projects on a domestic level as well as ensuring that Ireland’s position is represented on an EU and international basis.”*

This concept has several potential advantages, including the potential for a non-permanent evolving membership, and the ability to incorporate participants who represent a wide variety of stakeholders, both academic and industrial. However, it is clear that the composition of the proposed Council will greatly influence its thinking and strategy; its membership, and their tenure, needs careful consideration, and some degree of checks and balances should be incorporated within this body to ensure that inappropriate biases or agendas do not prevail.

Finally, UCD suggests that the title be changed to Irish Energy Research Council - i.e. that the word Coordination be dropped from the title.

4. All Island Perspective

UCD supports the strategic goal of cooperation on Energy RD&D on an all-island basis. It is accepted that in the short term this may result in a significant portion of funding being diverted towards Northern Ireland, which benefits from significant structural and capacity advantages. Of course, a key objective of the proposed Energy Research Council would be to make good the structural and capacity weaknesses in the Republic, so that in the longer term this apparent drain on resources will disappear.

UCD believes that all-island activity should focus on areas where genuine synergies exist, and which offer the potential for Ireland to become an international leader.

5. EU Perspective

UCD supports participation in the EU Framework programmes where such programmes align with Irish research trajectories; it is therefore very important to be in a position to influence the future direction of these programmes. This can best be achieved by developing clusters of expertise in Ireland that are internationally competitive, and by ensuring that issues of key interest to Ireland are included in future Framework Programmes. Ireland needs to be lobbying and setting the agenda: the proposed Irish Energy Research Council should play a key role in this on behalf of the Irish research community.

UCD further recommends that critical analysis should be made, not just of EU direction, but also of US and Asian approaches, and that of small independent nations. Ireland may need to consider strategic alliances with similar EU smaller countries (*e.g.* Scandinavian countries) to gain significant weight when considering how to influence overall EU strategy.

UCD also argues that the allocation of Irish funding for Energy RD&D must not be forced into alignment with the FP7 agenda. The funding must focus on developing strengths which will give Ireland – rather than the EU – a strategic advantage.

6. Links with Environment

Energy and the environment are intricately – and inextricably – linked. Much of the energy RD&D in progress worldwide is focused on minimising, measuring, or modelling the environmental impact of energy conversion processes. Environmental policy drivers – Kyoto compliance and associated instruments, voluntary agreements, emissions trading, taxes, air pollution [National Emissions Ceilings (NEC) Directive] – are all integral to energy policy. Furthermore, a direct link exists between building energy consumption, indoor environmental quality, and occupant health. UCD therefore strongly supports the inclusion of energy-related environmental research in the Energy RD&D arena, and linkage with both the Environmental Protection Agency and Health Research Boards as appropriate.

7. Long vs shorter term

As a research-focused university, UCD's capacity to contribute is biased toward the longer term research areas. However, UCD believes that it is important to provide funding for both long-term and short-term projects. (The National Research Council in the US drew the same

conclusion following their evaluation of US Energy R&D over the period 1978–1999¹.) A major reason for supporting shorter-term programmes is their favourable cost:benefit ratio: UCD is confident that, in Ireland, significant benefits are attainable in the short term at relatively modest cost. UCD has been successful in short-term projects which facilitate the establishment of links with private industry. Successful completion of these projects has and will provide a favourable track record for future potential investors, and build confidence in the potential to complete long-term projects effectively.

UCD further believes that attracting a large increase in foreign direct investment by multinational Power and Energy companies, in Irish Energy RD&D, should constitute a key long-term objective of the proposed Irish Energy Research Council.

8. Funding

The DCMNR paper acknowledges that, in the past, *“funding of R, D & D in the broader energy area from the State sector’s point of view could be described as haphazard”*. UCD concurs with this assessment, and is of the view that public funding should be directly devoted both to research, and to capacity building, in this area. The latter issue is discussed more fully in the following section. Further support for this assessment is provided in the recent Eurostat review² of international R&D expenditure.

UCD is also aware that it will be necessary to supplement any state allocation with funding attracted from private industry; or viewed from a different perspective, a vibrant and dynamic research sector will tend to attract private sector funding. UCD cautions that IP and Patent issues will need to be clarified and resolved before such funding will become available. It is also believed to be essential that any state funds are disbursed transparently via a competitive international peer review process, if better coordination between public and private funding of Energy RD&D is to be achieved.

9. Capacity Building

The challenge of developing a vibrant research community in the energy sector is a critical aspect of this initiative, and should be considered at an undergraduate, postgraduate and post-doctoral level.

¹ NRC (2001) ‘Energy Research at DOE: Was It Worth It?’, National Academy Press. Available at: www.nap.edu/books/0309074487/html

² “R & D expenditure in the European Union”. Available at http://epp.eurostat.cec.eu.int/cache/ITY_OFFPUB/KS-NS-05-002/EN/KS-NS-05-002-EN.PDF

Undergraduate

Within the proposed 3+2 Bologna scenario, scope exists for +2 (senior cycle) energy specialisation options. All degrees should be considered to consist of a major and minor component realisable within a modular framework. Other inter-disciplinary possibilities could exist at university level such as a +2 Science Degree with engineering or economic inputs (e.g. Geology with Economics or Energy Studies).

Postgraduate

In Ireland, long term financial support for postgraduate work and associated capital equipment in energy-related areas has – to date – been lacking. Many of the research postgraduates attracted to the subject area (*e.g.* those involved with UCD's Energy Conversion Research Centre) have very strong academic credentials and are highly motivated. Properly supported, these young researchers could form the basis of a dynamic entrepreneurial Irish energy industry.

For the Universities' part, serious consideration should be given to structured (3-4 year) Ph.D. programmes, based on a clearly defined route of progression within the framework of a supervisory committee. Advanced courses could be considered as part of a PhD programme; in the energy domain, courses in associated fields would potentially offer significant dividend: economics, energy policy, experimental statistics, thermodynamics, etc. Additionally, outside university involvement in part-provision of some courses, (eg ESRI, Department of the Environment/SEI, ESB, etc.) should be considered.

Postdoctoral

At post-doctoral level, and above, it may initially prove necessary to import some capacity in order to achieve critical mass.

10. Conclusions

Irish energy RD&D is at a crossroads. The DCMNR Consultation Paper acknowledges that *“Ireland...must be more focused on research in the energy field generally and...develop the necessary capacity and capability within the economy.”* UCD is confident that a positive outcome from this consultation process will allow Ireland to achieve these goals. The establishment of an Irish Energy Research Council, appropriately constituted and adequately resourced, will represent a first major step along that road.