SEI Response to:

DCENR Consultation on Energy Research Council Strategy

June 2008

INTRODUCTION

Sustainable Energy Ireland (SEI) is committed to supporting the Department for Communications, Energy and Natural Resources (DCENR) in the development of an Energy Research Strategy for Ireland by virtue of its remit and associated mission. The DCENR consultation on the Energy Research Council Strategy is an important development in the delivery of Ireland's commitment to strengthen national Energy RD&D[1] and support long term energy objectives as outlined in the Government's Energy White Paper.[2]

Sustainable Energy Ireland was established in 2002 with a statutory remit to promote the development of a sustainable national energy economy. SEI, being the independent statutory Authority, has been entrusted with the delivery of energy research demonstration and development (RD&D) initiatives within the built environment and sustainable energy supply since its establishment in 2002. SEI disperses public funding for energy research under published strategies, undertakes an annual RD&D Inventory, and represents Ireland on international programmes through the International Energy Agency and European Union. SEI has developed a multi-tiered approach to delivery of sustainable and renewable energy programmes across the industrial, residential, and public sectors, covering electricity and heat with a limited activity in transport.

SEI is supportive of the main thrust, approach and key priorities of the ERC Strategy, and acknowledges the potential impact of engaging with all sectors of the economy. This paper is SEI's response to the approach presented to strengthen basic and applied research for the period 2008-2013. The comments and priority emphasis that are placed within this submission are informed by SEI's experience with national and EU RD&D Programmes.

IRISH ENERGY POLICY PRIORITIES

The Irish energy market is characterised by an over reliance on imported fossil fuels, lack of competition, relatively low level of renewable energy deployment and substantial potential for increased energy efficiency. The threats of climate change and rising fossil fuel prices emphasises the need to tackle these issues by reducing demand, switching from fossil fuels and considering carbon capture and sequestration. Ireland must meet its national, EU and international obligations in the environment, energy and competitiveness arenas and in doing so maintain and advance the three pillars of Irish energy policy – security of supply, competitiveness and the protection of the environment.

Security of Supply: Ireland relies on imported energy resources for 91% of its total primary energy requirement (TPER 2006). The finite nature of conventional oil and gas reserves enhances Ireland's vulnerability to external disruptions in this area. The instigation of an Energy Research Strategy, with a focus on developing a range of alternative, indigenous and sustainable energy technologies, is, therefore, a critical policy priority.

Competitiveness: Investment in focused energy research supports competitiveness and innovation as part of the wider sustainable development agenda and, thereby, ensures that Ireland develops a world class research capacity.

Environmental Protection: Over 90% of all EU CO_2 emissions that cause climate change, are attributable to energy. Development and application of low carbon technologies and carbon capture are critical to environmental protection.

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[1] RD&D will be used in this submission rather than R&D, to include the notion of demonstration.

[2] Delivering a Sustainable Energy Future for Ireland (2007).

Enhanced RD&D, coupled to building research capacity, focussed through a strategy with clear priorities to achieve maximum return for the investment, is a necessity for Ireland.

KEY POINTS IN RELATION TO ERC STRATEGY

It is anticipated that with clear research priorities, building from the ERC Strategy, DCENR can formulate an innovative programme in energy research that delivers on the three pillars of Irish energy policy. SEI gives particular emphasis to the following points arising from the ERC Strategy:

- Recognising the need to reduce demand, switch from fossil fuels, and consider carbon capture and sequestration.
- The criticality of enhanced and focussed RD&D in achieving those aims and the need to build capacity to do that.
- Stimulation and commissioning of RD&D along the five lines of research activity and the five identified sector specific priorities. SEI has suggestions listed below to supplement the five sector specific priorities.
- The strength of using existing organisations to cover the full research spectrum, including fundamental research (Science Foundation Ireland) applied RD&D (SEI), and the commercial development of products and services (Enterprise Ireland).
- Supporting of best-practice RD&D through international cooperation, thereby maximising the utilisation of opportunities for international funding, and supporting best-practice RD&D through engagement in International Energy Agency (IEA) Implementing Agreements.
- Production and communication of early, ongoing and measurable results (ex post and ex ante) that are appropriate to relevant technologies and markets, and act as precursors to market stimulation.
- Encouragement of energy research, development and capacity building within third level institutions and industry (and initiation of public good research) to inform strategic, policy and market actions.
- Supporting of emerging technology opportunities as identified within the European Union's Strategic Energy Technology (SET) Plan and Framework 7 instruments (such as JTIs and ERA-NETs) and the IEA Committee on Energy Research and Technology (CERT).
- Positioning of energy RD&D within the national RD&D framework, notably the Irish Government Strategy for Science, Technology and Innovation (SSTI) 2006-2013.
- Supporting of Ireland's obligations under EU legislation, including the meeting of Ireland's current Greenhouse Gas (GHG/ climate change) obligations.

REQUIREMENT FOR RESEARCH FRAMEWORK

Energy research needs to be set within a framework covering, for example, production, supply and use, markets, technologies and the status of development. Such a framework would be multi-dimensional ensuring that Ireland covered each of the areas and stages necessary to achieve its targets. A framework would need to include:

- Production, supply and use of energy and disposal of wastes.
- Relationship with climate change and emissions.
- Key uses including heat, electricity and transport.
- Markets including industry, commerce, public sector, and residential.
- Technologies and systems e.g. insulation, renewable energy sources, motor and drives, carbon capture.
- Status of development of the technology and systems in the Irish and international markets, e.g. fundamental research, applied research and demonstration, market stimulation, commercial application.

THE ROLE OF SEI IN RELATION TO THE ERC STRATEGY

SEI's role in RD&D stems from the National Development Plan (NDP) 2007-2013, specifically the Energy Research Sub Programme of the Enterprise, Science and Innovation Priority. This engagement involves the stimulation and acceleration of the generation, delivery and implementation of the demand and supply side solutions contributing to an Irish sustainable energy economy.

The ERC Strategy identifies a future role for SEI that is consistent with both the requirements of the Energy White Paper and the activities as outlined in the NDP 2007-2013. The five lines of research priorities and activity portfolios outlined in the Strategy go beyond the historic level and spectrum of activity of SEI. These enhanced research responsibilities, particularly sustainable transport activities, would require additional resources. SEI will bring forward options for consideration.

SEI is happy to consider the actions necessary for building on and coordinating RD&D activities and assist in establishing liaison structures between agencies such as Science Foundation Ireland and Enterprise Ireland. This communication will result in better coordination of funding and establish a larger presence in energy RD&D.

In the sector specific RD&D proposed it will be necessary to cover the full range of types of research as required, including:

- Research to support and inform policy advice including resource estimation, economic appraisal, capacity building and the evaluation of options.
- RD&D into innovative technologies, systems and market approaches in areas to increase potential for market replication, application and technology transfer.
- Field and pilot trials.
- Demonstrations with associated monitoring and marketing.

SEI will bring forward a set of options for proposals updating its current programmes in line with the above requirements for the period commencing in 2009.

PRIORITIES IN MAIN LINES OF ACTIVITY FOR SEI

SEI proposes the following key elements to cover the three main activity lines and the five sector specific main priorities proposed for SEI in the ERC Strategy, with the addition of carbon capture and secondary priorities of other alternative energy technologies and industrial process.

Energy Systems and Analysis

- Integrated methodologies to represent energy systems for electricity, heat and transport.
- Key energy databases required and links with national modelling and database groups.
- Co-operative energy research with national and international groups.
- Scenario models for applied research areas e.g. wind, bioenergy.
- Behavioural models for energy users and monitor the impact of the awareness, marketing and information campaigns.

Sector Specific Research - Main Priorities:

Ocean Energy

- Implement Ocean Energy Initiative announced 2008 in collaboration with the Marine Institute including:
    - Development of prototypes;
    - Establishment of grid connected test site;
    - Establishment of advanced wave tank test facility.

Grid/Infrastructure

- RE integration – including electricity systems studies of the impact of intermittent generation and storage.
- Autogeneration - demonstrators investigating DSM and integrated heat, electricity and transport.
- Micro-generation – infrastructure studies and field trials including wind, PV and CHP.
- Storage including:
    - Application of battery storage in industrial systems;
    - Technical and economic assessment of large scale storage systems (compressed air and pumped hydro).
- Smart metering.

Bioenergy

- Identification of sustainable bioenergy resource nationally and internationally.
- Development of sustainable bioenergy supply chain, standards and certification.
- Biomass supply logistics demonstration at small / large scale.
- Expanded biomass resource utilisation (organic fraction of MSW, non-wood pellets).
- Biogas upgrading to NG pipeline/transport use quality.
- Biogas for transport.
- Marine algae / Freshwater algae for biofuels.
- Novel thermochemical conversion (pyrolysis/gasification).
- Integrated 2nd generation biofuel / biorefinery development.

Energy in Buildings

- Low carbon eco-passive housing.
- Public sector buildings.

Energy in Transport

- Electrification of vehicles including:
    - demonstration and investigations of hybrid and electric vehicles;
    - electricity system operation with increased use of electricity in transport.
- Traffic management systems.
- Public transport optimisation studies.

Carbon Capture and Sequestration

- Technical and economic evaluation of CCS plants.
- Demonstration of post-combustion capture technologies.
- Demonstration of pre-combustion gasification technologies.
- Appraisal of technology options for Ireland.
- Investigation of hydrogen storage and supply networks.

Sector Specific Research - Secondary Priorities:

Energy in Industry

- Energy efficient design
    - Advanced process design;
    - New process technologies.
- Advanced Energy management
    - Energy management systems and productivity techniques.

Alternative Energy Technologies

- Solar Photovoltaic – including demonstrations and optimised production technologies.
- Geothermal - including deep technology demonstration.
- Wind.

Watching Brief

- Fuel cells - for use in CHP, energy storage and transport applications.