Introduction

The Department of Communications, Energy and Natural Resources has requested input to a consultation on the challenges identified, and directions proposed in the Irish Energy Research Council's strategy document 'An Energy Research Strategy for Ireland' ("Strategy") as a precursor to the Government adoption of the Strategy.

The Strategy focuses on the national approach towards basic and applied research to support the deployment of new energy conversion, distribution and end use technologies. It identifies priority research areas for the short to medium term, a set of strategic actions for advancing these along with implementation, institutional and coordination arrangements.

ESB supports the adoption of the Strategy given the new importance of energy policy in Ireland and in other European countries resulting from concerns around environmental sustainability, security of supply and energy pricing. From an Irish perspective these concerns are acute given our greenhouse gas emission reduction objectives, the non-availability of nuclear power and the intermittent nature of renewable resources. Accordingly it is important that Ireland maximises the benefits it can achieve in the energy research field.

The energy industry is witnessing significant technological development and change which present challenges and opportunities for all participants. Research and innovation that will support and develop new viable and sustainable energy solutions is particularly valuable.

Government has an important role to play in achieving innovation and development by providing financial support for delivery of research, development and demonstration ("RD&D") breakthroughs in underpinning basic science and earlier phases of technology development.

General Comments

ESB welcomes the opportunity to input to this consultation. We wish to comment on a number of areas in the Strategy, including:

- Areas of commercial interest to ESB;
- Project Funding; and
- Industry's Role in RD&D.

Moreover, overarching our comments is a concern that the pool of talented resources needed to roll out RD&D and subsequent commercialisation of energy innovation has diminished significantly in recent years. The lack of science, technology, engineering and maths graduates has become an issue in OECD countries and across the globe. Significant National Development Plan led investment in science and innovation is particularly welcome, but continues to lag international benchmarks. Specific interventions and programmes are required to address the shortfall in science, engineering,

technology and maths graduates through the education pipeline. This will require building on programmes already in place (e.g. Engineers Ireland 'STEPS to Engineering' programme) and also initiating new interventions and programmes at first and second level to increase the level of interest in and capability to acquire proficiency in related third level educational programmes. There is also an opportunity through effective marketing of the initiatives associated with this Strategy to nurture and grow the highly skilled resource base needed to implement the Strategy's ambitious goals.

ESB provides targeted funding to academic and research groups to support technological and skills development in Irish institutions.

ESB contributes at national level to energy research through its support for the Energy Research Centre, ESRI and in other specific projects (wave at UCC/UL, photovoltaic DCU, Dundalk 20/20 Concerto, Marine institute Project).

ESB's engagement in early stage investigation and development initiatives in the energy sector has been given renewed focus through our recently released Strategic Framework to 2020. The Strategic Framework commits ESB to reduce its carbon dioxide emissions by 30% by 2012; 50% by 2020; and to be carbon net-zero by 2035. This plan contains a very important and ambitious programme with capital investment of €22 billion in the period to 2020. By 2020, ESB will deliver one third of its electricity from renewable generation. This will include over 1,500MW of wind generation, in addition to wave, tidal, biomass and district heating.

ESB is committed to the promotion and development of new technologies e.g.

- SMART metering & networks technology;
- R&D with others will also cover micro-Combined Heat and Power, micro wind, photovoltaics, and plug in hybrids;
- Fleet electric vehicles and bio diesel initiative; and
- Wave energy commercial-scale test site.

Other areas under investigation include ocean energy technology, energy storage systems (e.g. compressed air storage, batteries, fuel cells), energy efficiency technologies, co-firing biomass, clean coal/carbon capture ,micro-generation, solar thermal and photovoltaic technology suitable for the Irish climate.

ESB broadly agrees with the main research activity areas identified in the strategy. We would note, in relation to Strategic Line '1' (energy systems modelling), that ESB has developed and maintains extensive modelling capability in relation to electricity generation, supply and demand. We acknowledge that for the purpose of policy analysis the capacity to model the overall Irish energy system needs development. Given the disparate sources of input to such energy models it is appropriate that SEI takes responsibility for this activity. However, this activity is critical for policy formulation and impact analysis. Consequently it should be funded on "as required" basis and

not as some percentage (Section 5.3.1 - 10%) of the overall amount of available funding.

In relation to Line '2' (Fundamental Research), ESB considers that energy storage is a priority concern for Ireland given our potential future energy structure, in particular for electricity generation. Ireland should be prepared to commit significant resources to fundamental research in this field because of its critical importance. Additional funding should be applied to support such research over that identified in the strategy. SFI is the appropriate body to co-ordinate effort in this area.

In this context also, the need for large scale energy storage systems development and demonstration should be highlighted under Strategic Line '3'. More weight should also be given in this Strategic Line to social analysis, in particular why more efficient energy options are not adopted despite availability. While SEI should play a lead role in this area the proposed strategic actions will have little impact without active engagement of industry; both project developers and demonstration technology end-users. Emphasis should be given to this aspect, which was not well developed in the strategy report, in strategy implementation.

However, we would place limited emphasis on Strategic Line '4' ("watching brief"). Researchers in all fields do this as a matter of course as does industry in respect of relevant emerging technologies. We consider better value would be achieved from research on those issues which currently prevent uptake of more efficient technologies.

A strategic benefit exists in identifying and mapping Ireland's fossil energy resources as proposed in Strategic Line '5'. However, in a global economy the residual benefit to Ireland, given our current exploration tax regime, is essentially the security provided by physical proximity to such energy sources. In this context also it is noteworthy that EU commitments to 2050 require effective full decarbonisation of the Irish economy. Consequently equal focus should be given to identifying and mapping all potential non-fossil energy resources.

Areas of interest to ESB

Illustrated below are three areas of interest to ESB where government supported RD&D effort could bear fruit, namely:

- Ocean Energy;
- Transport; and
- Large Scale Energy Storage

Ocean Energy

ESB's Ocean Energy Strategy driven by the Strategic Framework is based on assisting with the delivery of the Government target of 500 MW of ocean energy by 2020 and includes:

- Supporting the development of the ocean energy sector;
- Assisting with the development of a grid-connected wave energy test site off the west coast of Ireland in partnership with the Marine Institute and SEI;
- Investing in companies involved in ocean energy sector; and
- Developing potential wave and tidal sites to ensure ESB has 150 MW of ocean energy by 2020.

ESB believes that Ireland can capitalise on its early mover advantage in the ocean energy sector to become a world leader in the field.

Transport

The European Council has set the objective for 2050 to reduce greenhouse gases by up to 80% in order to stabilize concentrations in the atmosphere at levels that will not give rise to dangerous climate change. This can only be achieved if energy use in the economy is substantially decarbonised. The transport sector represents an area of significant opportunity towards achieving these reductions.

Transforming the transport sector in Ireland to a system that is predominantly powered by electricity represents a huge challenge. It will require significant research effort to ensure the implementation of such change is completed in a cost-effective manner. ESB recognises that this carries consequences for the electricity sector and a number of initiatives in this regard with the aim of facilitating the uptake of electric vehicles are underway:

- Preliminary studies of the implications of progressive penetration of electric transport for electricity generation and networks infrastructure;
- Collaboration with our European colleagues in an industry working group on similar studies and learn from their experiences; and
- Evaluation of the use of electric vehicles for business/commuting purposes.

Large Scale Energy Storage

Large scale energy storage could be used to enable penetration of renewable energy while assisting with stable operation of the electricity grid. ESB is reviewing areas such as energy storage using pumped storage and air, electric cars as micro generation and its potential to act as peak generation support.

There are a number of areas identified in the Strategy such as grid/Infrastructure research in the sector-specific field and energy system modelling and analysis which would inform high level exploratory work currently undertaken by ESB on energy storage.

These examples show that there is a rich stream of research orientated activity ongoing in ESB. We would welcome the opportunity to discuss how RD&D activity from the Strategy could be applied areas of interest to ESB.

Programme Funding

The Strategy's vision states that energy researchers of world class standard operate 'in a stable, adequately resourced and continuous research environment'. The roll out of the Strategy depends on the availability and timing of funds committed in the National Development Plan 2007-2013.

A funding programme which fulfils the objectives and timelines in the Strategy will facilitate the creation of such a stable and adequately resourced environment.

It will also send a clear signal to industry as to the priority areas in the Strategy and likely roll out schedules.

Industry's Role in RD&D

ESB supports the Strategy's objective to institute industry engagement with Government at an early stage to guide research and development in meeting the expectations of the commercialisation agenda.

While the Strategy identifies overarching organisational and coordination arrangements with various government departments, there is a need to define and coordinate industry's role in execution of the Strategy.

Our suggestion is to create an energy sector forum under the auspices of the Energy Research Council, to fulfil this role.

Conclusion

ESB welcomes the publication of this Energy Research Strategy. It represents an important step in building a long-term energy research and development capability in Ireland.

We believe that a strong resource base with the necessary skill set along with a stable and predictable funding environment will be essential to the Strategy's successful implementation. In parallel, active industry engagement at an early stage will keep the research agenda relevant to the evolving needs of the commercial world. We have suggested the creation of an energy sector forum to promote this on-going dialogue.

We have outlined research areas where ESB is involved – namely ocean energy, Transport and Energy Storage – which are amenable to closer co-ordination with relevant Government agencies.

In conclusion, this Strategy offers the opportunity to grow Ireland's capability as a knowledge-based economy and to expand our energy research capabilities to deliver sustainable, secure and competitive energy for Ireland.

Yours sincerely,

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Fergal McNamara

ESB Regulatory Affairs, Electricity Supply Board.

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