PRIORITY AREA K
SMART GRIDS AND SMART CITIES ACTION PLAN
JULY 2013

Smart Grids & Smart Cities (Priority Area K)

Context

Smart Grids and Smart Cities involve the application of advanced electrical engineering and service technologies, facilitated by ICT and accompanying solutions to more effectively and efficiently manage complex infrastructure systems. They open up new markets for existing and new technologies, with the level of system benefits justifying their use within major infrastructural investments. They typically use a layer of technology, including software, sensor hardware and control and interface systems, which can be embedded in the design of new infrastructure or applied to existing infrastructure, harnessing and applying real time data to create more intelligent, interconnected and integrated systems which provide higher quality and higher efficiency services to the citizen. Among the projected benefits are improved operational reliability, reduced resource usage and costs, improved environmental quality (including enabling of a low carbon society), improved governance and new enterprise and job creation opportunities.

Ireland has particularly strong research and operational experience in active implementation of ambitious energy and community policies, a recognised industrial research base in software, data management and wider ICT, and an advanced electricity system. Together these can provide a potential competitive advantage with respect to developing world leading solutions in these fields, attracting future FDI and stimulating indigenous enterprise in this sector.

Smart Grids comprise a broad and evolving range of advanced technologies that can be applied along the full electricity supply chain – from generator, through transmission, distribution and metering, to end users (e.g. commercial & domestic buildings). Together, these technologies, which include advanced sensors, two-way communications and distributed computing, can increase the deployment of variable renewable energy generation, enable dynamic demand/pricing response and energy storage, improve the overall efficiency, reliability and safety of power delivery improve energy end use efficiency and cost in buildings, facilities and electric transport.

Electricity is the fastest-growing element of total global energy demand. The requirement to meet this demand in a cost effective, secure and sustainable way is driving the development of a high growth market for smart grids. One estimate projects global investment in smart grids at US$200bn between 2008 and 2015, and a JRC study for the EU Commission has projected such investment in the EU, USA and China to total €365bn by 2020. The annual market for smart grid technology infrastructure (including smart meters, sensor networks, fibre optic & wireless networks, data analytics) will grow to nearly US$16bn by 2020. The market for energy storage technologies is also growing rapidly, albeit from a low base.

Ireland has distinct advantages as an agile test bed and centre of excellence for the research, innovative development, trialling and deployment of these technologies. Our rich wind energy resource, with a target of 40% of electricity to come from renewable sources by 2020 is the highest in the EU for variable renewables within a single system; our island status means that this presents major early challenges for the grid system operator; we currently are bounded by a single all-island market with limited interconnection to neighbours; we have effectively single operators for the

transmission and distribution systems who, along with suppliers, are receptive to new thinking and technology, and indeed championing innovation (e.g. Eirgrid's 'DS3' process and ESBN/ EPRI (USA) smart grid demonstration project); our relatively small scale allows us to serve as a 'living laboratory' for others; early Irish academic research work is already being successfully applied in Ireland's electricity system, providing economic returns, and is recognised as world leading. A successful national trial led by the regulator and completed in 2011 assessed communications technology, variable tariff and other consumer behaviour change options, has quantified the national energy and cost saving benefits and confirmed the business case for a full scale national rollout of this key enabling technology.

This ability to have utilities, within the effective test bed provided by the Irish electricity system, assess and apply technologies in practice is attractive to active industry players not only in Ireland (ABB, Alstom, Google, IBM, Siemens etc.) and from other countries. Ireland has a strong FDI ICT enterprise base with significant R&D interest in smart grids such as IBM's Smarter Cities Technology Centre, Intel Innovation Open Lab, Bell Labs, UTRC (United Technologies Research Centre) and the IERC (International Energy Research Centre). A mix of such companies is working with ESBN/ Eirgrid as a holistic research community in this area, and unique opportunities now exist for the development and manufacture of new technologies in Ireland. A number of HEIs are active in this arena, addressing both electricity supply side and demand side management, monitoring and automation technology opportunities. A growing number of indigenous companies have invested in R&D to develop smart grid and smart building technologies. In addition, there are several electrical engineering oriented FDI companies (additional to above) with interests in smart grids. Most electricity generators in the Irish (all island) market also have smart grid initiatives and there is significant expertise in ESB Networks and Eirgrid. Smart Grid Ireland is a North-South industry led network of organisations focussed on the commercialisation of smart grid opportunities, and is a member of the international Smart Grid Global network. Moreover Ireland, through SEAI, is a founding member of the International Energy Agency's collaborative research network 'ISGAN', which is currently compiling an inventory of smart grid test beds and best practice case studies.

Smart Grids is one of seven European Technology Platforms (ETPs) in the energy sector. Several of the nine ETPs in the ICT sector are also relevant to smart grids and smart cities. Smart grids, energy efficiency in buildings and smart cities are all elements in the strategic energy technologies identified by the EU Commission in the 2009 EC Technology Roadmap to 2020 – altogether the EC has identified a research requirement exceeding €10bn in these technologies by 2020 (private & public funds). Research in this priority area is currently funded through two FP7 themes: energy (€2.3bn) and ICT (€9.1bn) and is set to be a prominent theme in Horizon 2020.

There are considerable synergies between Smart Grids and Smart Cities, the common principle being intelligent interconnectivity and integration, and the end-user element of Smart Grids is also a significant dimension of Smart Cities. ICT is seen as a common ingredient for leveraging the benefits of complementary technologies.

Smart Cities entail both the application of existing technologies in new ways, and the development and application of new technologies, including sensor, communication and analytical technologies and design solutions to urban infrastructure such as energy, water, waste and transport systems. In common with the rest of the developed world, over 70% of people in Ireland live in urban areas, but the benefits of these technologies extend to

all society. The Smart Cities concept entails deploying ICT technologies (often embedding them within the architecture) to exchange information and monitor and control various building systems; and ensuring that the requirements with regard to the design of buildings and municipal services, the materials used, and the way space and infrastructure is planned and operated to enable the desired outcomes to be achieved.

Relevant technologies include a variety of hardware and software systems, including wireless sensors, embedded software, middleware, databases/ GIS, data mining, data analytics, building management systems, energy management systems, data security systems, building performance diagnostics, maintenance management systems, forecasting, satellite, environmental monitoring, smart meters, smart appliances and advanced control systems.

Smart transport is centred on the development of infrastructure, technologies and systems which have a low impact on the environment, are energy efficient and provide the mobility required by society in an economically competitive manner. This is one of the strategic energy technology fields identified by the European Commission in its 2009 EC Technology Roadmap. Many of the leaders in telecommunications and software R&D are investing in research on intelligent transport systems (e.g. Nokia, Alcatel-Lucent & Ericsson), as are several of the vehicle manufacturers (e.g. Fiat). Ireland has a small cohort of highly innovative enterprises developing intelligent transport system technologies.

Ireland's waters are one of its major natural resources and availability of clean water is a global challenge. It is a resource that must be carefully managed and needs intelligent on-going investment. The technologies involved in achieving this include: water and wastewater treatment systems; monitoring and testing equipment for water quality (e.g. environmental sensing and monitoring); remediation systems; and the use of ICT to reduce consumption and manage water networks (e.g. data management, early warning systems, forecasting).

Sustainable waste management addresses the need to reduce resource consumption by reducing waste generation and increasing reuse and recycling of waste streams. It is closely linked to renewable energy - bioenergy (e.g. waste to energy) and water management (e.g. wastewater treatment). The EPA's waste & resource management research programme aims to provide research that supports the more effective management of waste, resources and chemicals and is aligned to the EU 2020 Resource Efficient Initiative. This work is complemented by SFI-funded research in the area of waste to energy.

Under its FP7/ Horizon 2020 programmes, the EU Commission has substantially increased funding from €81M in 2012 to €365M in 2013. Reflecting the holistic principle, under its Call for 2013, demonstration projects will be required to integrate all three aspects: energy, ICT and transport.

In summary, Smart Grids and Smart Cities can significantly improve the efficiency and quality of complex systems such as electricity, water, waste and transport services, thereby reducing their costs while contributing to the "green economy". Ireland's policy, research, enterprise, utility and local authority community is already engaged in this arena. The strong research, design and operational experience to date in active implementation of ambitious energy and community policies in Ireland provide a potential competitive advantage. With a strong research capability, the opportunity presented by the characteristics of Ireland's grid system and the presence of several large FDI ICT enterprises with global

smart grid and smart cities ambitions, positions Ireland well as a test bed and a locus of excellence to develop world leading solutions, attract future FDI and stimulate indigenous enterprise in this sector.

Smart Grids & Smart Cities

Vision/opportunity: To invest strategically in positioning Ireland as a research, development and innovation hub in Smart Grid and Smart Cities, capitalising on Ireland's unique resources and attributes, leveraging the enterprise base and maximising the economic benefit to Ireland from developing these technologies, and specifically to:

- Position Ireland as an innovation test bed and location of excellence in the development, testing and scale deployment of technology products and services enabling smart grid and smart cities implementation;
- Develop and apply intelligent flexible systems and components for real time end-to-end supply and demand management of electricity and other key municipal services;
- Enable achievement of renewable energy, energy efficiency and CO_2 abatement targets to 2020 and beyond, and enabling renewable energy export;
- Support an industry and research cluster leading to product and services commercialisation, a vibrant export industry and job creation.
- Position Ireland as an exemplar of sustainable, efficient and secure electricity services and of smart cities and communities.

Objective 1	To develop a **co-ordinated strategic research agenda** for smart grid and smart cities technologies, which is informed by the needs of all relevant stakeholders, facilitates economic growth within the sector and enables active participation in EU and International research activities.
Objective 2	To ensure the availability of graduates, postgraduates and researchers with **appropriate skills** to meet the needs of industry and ensure that **a critical mass of researchers** is in place to deliver on the Vision.

Objective 3	To support industry and research clusters, ensuring that **research outputs** from State funded research are leveraged and **exploited** in accordance with National IP Policy and that **technology transfer** supports are developed/adapted to connect research to industry.
Objective 4	To ensure that an adequate **infrastructure/ecosystem** is managed, developed and future needs identified in order to support research across the development spectrum from early stage research to full scale deployment, aligned to the needs of each category of smart grids and smart cities technology.
Objective 5	To ensure that the sector is **developed in tandem with** existing and emerging **protocols and standards** in an evolving national and European **regulatory** environment, facilitating the development and deployment necessary to establish a world leading smart grid and smart cities technologies and services industry.

Pre-existing or pre-requisite actions

A list of underlying policy documents, studies, roadmaps and progress reports, identifying existing or proposed enablers, programmes and research related actions in the arena of smart grids and smart cities, has been prepared to accompany this document. Several of these will help to inform the mapping, analysis and implementation of research, skills, infrastructure and other actions itemised below.

No	Action	Deliverable	Benefit	Lead	Support	Timeline
Objective 1		To develop a **co-ordinated strategic research agenda** for smart grid and smart cities technologies, which is informed by the needs of all relevant stakeholders, facilitates economic growth within the sector and enables active participation in EU and International research activities.				
K1.1a	**Conduct a 'research needs', research strengths and gap analysis for the smart grids and smart cities enterprise sector.** Include in the analysis the broad dimensions of the priority area,	A comprehensive cataloguing of the research needed for the industry to develop, including the ICT/ Big Data, electrical engineering and sectoral	A clear scoping and focus on the current and future research to be conducted to exploit the opportunity and	DCENR/ SEAI	SFI, EPA, Eirgrid, ESBN, DJEI, DECLG, EI, IDA, CCMA	Q4, 2013

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	including: ▪ Smart grid supply side – solutions to deliver enhanced grid, manage operational complexity, embed system intelligence, integrate user behaviour, dynamic tariffs ▪ Smart grid demand side – Demand Side Management as part of home/ building automation, security, health, micro-generation (e.g. photovoltaic power), electric vehicles infrastructure ▪ Smart cities - Operational management of infrastructure - energy, transport, water, waste etc. ▪ Smart cities – ICT and sectoral technologies to facilitate dynamic user management of services. Take account of actions identified in the SEAI and IEA smart grid roadmaps, the grid investment and operational innovation plans of the DSO and TSO, smart cities reference	(water, waste, transport etc.) technology dimensions. This would include needs definition to develop new solutions in a wide range of technologies and applications, e.g. including sensors/ actuators, software, middleware, data bases/ GIS/ mining/ analytics, data security systems, fibre optics, advanced materials, building management systems, building performance diagnostics, maintenance management systems, smart meters, smart appliances and advanced control systems, vehicle information systems. This should also include consideration of mechanisms for engaging different sectors of enterprise, including SMEs, in collaborative research.	orchestrate the development of a medium term work programme for this Priority Area.			

No	Action	Deliverable	Benefit	Lead	Support	Timeline
	studies and industry views.					
K1.1b	Build into the research needs analysis a mechanism for regular review and monitoring to keep the 'research needs' current.	A codified review process.	This will ensure that stated research needs are maintained current.	DCENR/ SEAI	SFI, EPA, Eirgrid, ESBN, EI, IDA, SGI, CCMA	Q1, 2014
K1.2a	Building on the Research Prioritisation Exercise analysis and SEAI's Energy Research Map of Ireland: **Compile a readily updatable map of the Irish Energy Research Landscape**, clearly identifying areas of research strength, research centres and clusters, areas of collaboration both national and international, and between academic institutions and industry.	Online website showcasing collaborative marine energy R&D projects. Agreed and documented review process.	Visibility of Irish energy research capacity for all actors in the smart grid and smart cities space. Ensure new activities are included.	SEAI	HEA, SFI,EI, IDA, DCENR, Eirgrid, ESBN , SGI, CCMA	Q4, 2013
K1.2b	As with 1.1b above - Build in to the research mapping exercise a mechanism for regular review and monitoring to keep the 'research map' current.	Agreed and documented review process. Maintained information portal.	Ensure intelligence is maintained live.	DCENR/ SEAI	HEA, SFI,EI, IDA, DECLG, Eirgrid, ESBN , SGI, CCMA	Q4, 2013
K1.3	**Conduct a 'Research Gap Analysis'** by aligning the 'research needs' analysis in 1.1	Documentation of gaps and recommended thematic focal points in smart grids	Inform resourcing decisions to close critical gaps and avoid	DCENR/ SEAI	HEA, SFI,EI, IDA, DECLG, Eirgrid, ESBN ,	Q4, 2013

No	Action	Deliverable	Benefit	Lead	Support	Timeline
	and the 'research strengths' map in 1.2 to identify the gaps and/or changes in focus required.	and smart cities R&D.	bottlenecks in R&D.		SGI, CCMA	
K1.4	**Develop a suite of co-ordinated funding instruments** across relevant funding bodies to facilitate the full spectrum of research (oriented basic, applied, industry) required to deliver smart grid and smart cities technologies and integrated applications. The identification and definition of a suite of research programmes that are aligned to the needs of the key deployment entities such as enterprise, utilities and municipal services providers. This will cover the range of engineering, component and systems research required to deliver on the Vision, including underpinning research and its aims will include: ▪ Incentivising research participation in priority areas	Establishment of a clearly defined, comprehensive set of complementary R&D support packages/ programmes, with an appropriate multiannual funding framework, a clear competitive process, aimed at collaborative R&D delivery. Increased opportunities for funding cooperation between State and Enterprise.	Scale, efficiency and focus of collective effort. Clarity of priorities, process and criteria for researchers and industry across the array of thematic focal points. Improved innovation arising from research that is well aligned to industry needs. Improved interaction and flow of ideas between academia and industry, yielding knowledge & technologies that will enable the growth of enterprise capacity and delivery of internationally competitive solutions.	DCENR/ SEAI	HEA, SFI,EI, IDA, DECLG, EPA, Eirgrid, ESBN, SGI, CCMA	Q2, 2014

No	Action	Deliverable	Benefit	Lead	Support	Timeline
	▪ encouraging industry co-financing at all stages of research ▪ Facilitating industry-academia exchange					
K1.5	Provide a framework for coordinating and enabling the co-funding of projects from non-exchequer sources, in order to maintain and strengthen Ireland's participation in EU and international collaborative research groups through such instruments as Horizon 2020 (9 billion), the Connecting Europe facility, Smart Cities and Communities European Innovation Partnership, EU ERA-NETs, JPI, IEA Smart Grids Implementing Agreement etc.	Active participation of Irish enterprises, utilities, local authorities and academia/RPOs in relevant EU and International research programmes Ensure availability of funding and advance preparation to enable Irish participation in key international research networks.	Knowledge sharing and capacity building from participation of Irish researchers within EU and wider international research activities. Enhanced ability to leverage non-exchequer funding. These groups provide funding efficiencies, accessing and leveraging of international expertise. They can also influence future research funding, industry support mechanisms (and possibly standards and regulation).	DCENR/ SEAI	SFI, IDA, EI, EPA, CER, Eirgrid, ESBN	Q1, 2014

No	Action	Deliverable	Benefit	Lead	Support	Timeline
Objective 2		To ensure the availability of graduates, postgraduates and researchers with **appropriate skills** to meet the needs of industry and ensure that **a critical mass of researchers** is in place to deliver on the Vision.				
K2.1a	Building on the report of the Expert Group on "*Future Skills Needs of Enterprise within the Green Economy of Ireland*" 2010: ▪ Address skills gaps as identified and validated by the Expert Group, specific to the range of research skills and associated needs for development of Ireland as an innovation hub for smart grid and smart cities. ▪ Build on the progress to date by HEIs in adapting third level curricula in line with the Expert Group recommendations. ▪ Continue to monitor implementation of Expert Group recommendations.	Profiled categories, curricula and numbers. Relevant skillsets identified and third level curricula revised (including core and specialist modules, and modes of delivery) – based on cataloguing of the nature and volume of research skills and support skills required to deliver the solutions for the industry.	Graduate and research formation processes well aligned with the needs of this enterprise sector to meet current needs and ensure future human capital is available.	HEA	DJEI, Forfás, DES, HEA, SEAI, SFI, IDA, EI.	Q2, 2014
K2.1b	Assess potential options , identify the most appropriate instruments and develop a self-sustaining graduate	Programme options and proposed initiatives to increase numbers as required. When	Leading to delivery of a pipeline of skilled post/ graduates to underpin innovation	HEA	All other relevant funders & stakeholders	Q3, 2014

No	Action	Deliverable	Benefit	Lead	Support	Timeline
	development programme to ensure delivery of sufficient industry ready graduates and postgraduates in identified areas of need to support the industry's application or delivery of research (e.g. power engineering, electrical networks, communication systems, urban and spatial design, planning and development, systems integration, GIS, information networks, IT/ data analysis/ security systems, software development) Develop new, industry sponsored, training courses required for this priority area focusing on SG systems and technologies and the integration of building energy management systems with control networks and urban planning and design. For example, MSc in SmartGrid/Power Technology.	implemented, critical mass of postgraduates and researchers with the analytical and practical/ creative skills to work in and develop this area. All relevant courses providing a systems perspective so that there is a greater appreciation of systems integration issues to foster more cogent ideas in relation to Smart Grids and Smart Cities. Graduate and post graduate courses of recognised excellence that attract foreign students and contribute to Ireland's status as an innovation hub. Examples might include: Industry Masters / PhD programmes that promote short-term industry-academia exchange. Appropriate HEI courses	(in products, processes and services), building Ireland's research and industrial/ utility/ infrastructure services technology capacity to be an innovation hub generating quality future jobs. Strengthened complementarity and active links between industry/ utility/ infrastructure services and academia. Widen and deepen Ireland's reputation as a locus of excellence at the leading edge of ICT applications, data management, power systems etc. and as strong contributors to future national		including HEI, SFI, EI, IDA, DJEI, ESBN, Eirgrid, SEAI, IPI, RIAI, Engineers Ireland DES, IRC, SFI, SEAI, EI, IDA.	

No	Action	Deliverable	Benefit	Lead	Support	Timeline
		delivering ICT, engineering / architectural / planning/ technical graduates at levels 8, 9 and 10 and post-doctoral level.	competitiveness. Possibly capitalise on global skills shortage in this area.			
K2.2	Develop training courses for the up-skilling of existing infrastructure network personnel in SG technologies	Workforce with skillsets aligned with evolving deployment and operational needs.	Avoid the skills deficit experienced in many countries.	SEAI	Eirgrid, ESBN, local authorities/ CCMA	Q4, 2014
K2.3	Identify the potential options for industrial – academic placement programmes to maximise the provision of on the job experience to graduates and post-graduates.	Programme options and proposals developed.	Practical experience for graduates. Strengthened complementarity and active links between industry and academia.	HEA	DES, DJEI, IRC, EI, SFI, Eirgrid, ESBN, CCMA	Q1, 2014
K2.4	Identify key senior and/or permanent researcher posts in RPOs and in the HEIs necessary to meet the Vision of this PA. Develop a mechanism to fill these positions. Identify and fill junior research positions where critical mass does not exist and is necessary to meet the Vision.	Critical mass of researchers to deliver on the Vision	Research capacity that can be exploited by enterprise (including utilities) enterprise and leverage international collaboration.	HEA	DES, IRC, SFI, SEAI, EI, IDA, Eirgrid, ESBN, CCMA.	Q2, 2014

No	Action	Deliverable	Benefit	Lead	Support	Timeline
Objective 3		To support industry and research clusters, ensuring that **research outputs** from State funded research are leveraged and **exploited** in accordance with National IP Policy and that **technology transfer** supports are developed/adapted to connect research to industry.				
K3.1	Ensure research outputs from State funded research are leveraged and exploited in accordance with National IP Policy, with due account of the diversity of outputs with commercialisation potential.	Embedding of facilitating IP conditions within the terms of funding.	Facilitation of faster track research synergies, leading to deployment and commercialisation.	EI	SFI	Q1, 2014
K3.2	Support the exploitation of research outcomes among relevant technical, financial, scientific, and social disciplines.	Co-ordinated dissemination of research outcomes to key actors and enablers (including SME) and monitoring of outcomes.	Maximum synergy and leverage of value deriving from R&D outcomes.	EI	IDA, SEAI, SFI, CCMA, prof bodies	Q4, 2014
K3.4	Progress targeted emerging business development opportunities.	Enterprise development supports for specific technology development.	Focus on selected opportunities for early wins and confidence building.	EI	MI, SEAI, EPA	Q4, 2013
Objective 4		To ensure that an adequate **infrastructure/ecosystem** is managed, developed and future needs identified in order to support research across the development spectrum from early stage research to full scale deployment, aligned to the needs of each category of smart grids and smart cities technology.				
K4.1	Conduct a mapping and gap analysis of research infrastructure for smart cities and smart grids, including	Cataloguing of all relevant infrastructure (communities, buildings, laboratories, equipment,	Informing national investment in the provision of facilities, and their optimum	SEAI	SFI, EI, HEA, Eirgrid, ESBN	Q4, 2013

No	Action	Deliverable	Benefit	Lead	Support	Timeline
	access procedures.	test facilities, *etc.*) and processes, assessment of fitness for purpose and identified actions. This would lead to facilitation of greater collaboration, exploiting synergies and eliminating unnecessary duplication of effort.	use.			
K4.2a	Identify and assess options available for ensuring that on-going, adequate support is available for the full range of infrastructure required to enable this Priority Area, supporting world class development, commercialisation and deployment.	Suite of sustainable, evolving test bed facilities to enable trialling of dynamic new product/ service concepts from prototype to scale development and demonstration. This may include high resolution datasets and real end use applications.	A clear picture of Ireland's research environment to help stakeholders identify opportunities and resource allocation. On-going credibility and capacity to host and service the needs of Irish and collaborative international product and system developers.	SEAI	DJEI, SFI, EI, EPA, HEA, Eirgrid, ESBN	Q2, 2014
K4.2b	Identify options for Smart Grid demonstration/test centres and Smart Cities demonstration zones:	▪ Principles, guidance and options for a coordinated network of research and demonstration test bed	Leading to: ▪ Building the capacity required to make Ireland a	SEAI	ESBN, Eirgrid, DJEI, DCENR, DJEISFI, IDA,	Q4, 2014

No	Action	Deliverable	Benefit	Lead	Support	Timeline
	Establish national smart grid/ smart cities test bed facilities to conduct specialised, controlled laboratory and 'living laboratory' evaluations of integrated smart grid and smart cities technologies in exemplar applications. Establish research centres/links which encapsulate all relevant players (industry, network asset owners and operators (TSOs, DSOs), local authorities, planners, policy makers, academia and funding bodies).	facilities that will enable the demonstration of Smart Grid and Smart Cities technologies, business models, products and services and other related activities in a live utility and/or exemplar community scale environment. ▪ Will ensure accurate monitoring data and will create a living laboratory where cutting-edge technology and techniques can be developed, trialled and tested giving rise to new research opportunities ▪ Informing a cohesive approach to planning and development of smart infrastructure (HAN / LAN standards, design standards, equipment specifications etc.) ▪ Platform for the development and analysis	market leader in smart grid development and deployment, attractive to indigenous enterprise and FDI ▪ Enabling collaboration – bringing knowledge/ people/ organisations together (Joining the enterprise perspective with the systems and ICT perspectives) to create a tailored vision/ roadmap with common goals An ultimate key benefit is that integrated end to end solutions with proven enterprise, jobs and quality of life benefits are		EI, EPA, CCMA, DECLG, SGI	

No	Action	Deliverable	Benefit	Lead	Support	Timeline
		of hardware and software systems (BMS, sensors, monitors, smart appliances etc.)	achieved.			
K4.3	Ensure appropriate mechanisms are in place to provide access by HEI and industry researchers to research infrastructure.	Published protocols for national and international researcher access.	Open, competitive, cost efficient delivery of key phases of R&D process.	SFI, HEA, SEAI, EI, IDA, EPA	HEI	Q3, 2014
Objective 5		To ensure that the sector is **developed in tandem with** existing and emerging **protocols and standards** in an evolving national and European **regulatory** environment, facilitating the development and deployment necessary to establish a world leading smart grid and smart cities technologies and services industry.				
K5.1	Ensure that the sector is developed in tandem with existing and emerging protocols and standards in a supportive national regulatory climate, benchmarked to best international practice. Such regulation may address: ▪ Interconnectivity and interoperability standards ▪ Power systems standards ▪ Grid connection and operational codes	Close engagement by research and industry stakeholders in the promotion of existing and evolution of new standards and regulatory provisions in ICT, energy and other infrastructural services. A well-coordinated and communicated regime duly anticipated, understood and complied with by all stakeholders.	Positioning at the leading edge of international best practice, and enablement of innovation. Where Ireland is involved in standards in areas where it is a leader, it can have significant influence. Establishing a compliance and	DCENR	DF, DJEI, DECLG, CER, NSAI, SEAI, NDA	Q2, 2014

No	Action	Deliverable	Benefit	Lead	Support	Timeline
	▪ Evolving electricity system market design and several other standards setting and harmonisation issues. Active participation in CEN, ISO etc. developments in these fields may be vital.	Enablement of on-going innovation, avoidance of technical/ cost/ regulatory barriers to interconnectivity and trade and possible early competitive advantage.	excellence culture that will facilitate the timely development and deployment necessary to establish a world leading smart grid and smart cities technologies and services sector.			

Forfás

An Roinn Post, Fiontar agus Nuálaíochta
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