

Ireland's Cleantech Advantage

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The world is changing rapidly and is now embracing a sustainable and cleantech-driven economic growth model. With its natural resources, talent and Government commitment to the green economy, Ireland is well positioned to become a global hub for green enterprise.

The cleantech or green economy sector in Ireland already provides strong levels of employment and exports and Ireland has the ability to attract further investment from the leading overseas cleantech companies, further grow its indigenous base, and ensure that the sector becomes an engine for future green job creation and economic growth.

Ireland's active plan to become a major player in cleantech is underpinned by its research and manufacturing expertise in Information Communication Technologies (ICT), Engineering, Software/Sensor Development and Biotech. Utilising its embedded high value manufacturing skills, Ireland is well positioned to capture a significant share of the global investment into the enabling technologies and infrastructures that underpin the rapidly growing cleantech sector.

Ireland is well placed to thrive in a number of key areas of cleantech. A non-exhaustive overview of its key capabilities and strengths include:

- **Attractive investment environment:** A low corporation tax rate helps Ireland attract international investors and has spurred the influx of many global hi-tech companies such as Google, Intel, Microsoft, IBM and Wyeth. The 2010 IMD World competitiveness yearbook ranked Ireland 1st for corporate taxes.
- **A young and skilled workforce:** In 2009, Ireland's graduates were ranked 1st in terms of 'employability' by the OECD (OECD Economic survey of Ireland 2009). The 2010 IMD World competitiveness yearbook ranked Ireland 4th for the availability of skilled labour and 6th for labour productivity. The share of the population aged 25-34 with a 'third level' qualification is higher than both the US and the UK.
- **Good wind and ocean energy natural resources:** Ireland has one of the best wind energy resources in the world. Wind statistics from GWEC show that wind power in Ireland currently accounts for approximately 15% of all electricity consumed. Research by Vattenfall shows Ireland to be at the centre of an "ocean energy hotspot" in the North Atlantic and it is clear that investors are starting to explore this potential. Irish ocean wave power company, Wavebob and Spanish technology company, Abengoa, have recently announced a collaboration to work on the research, development and commercialisation of wave energy systems in the area. Openhydro and Bord Gais Energy have also formed a JV focussed on the development of a utility-scale tidal farm off the coast of Ireland. According to Bord Gais, Ireland's ocean energy industry could eventually be worth as much as €120bn.
- **Strong R&D Base:** Ireland's technological and R&D capabilities for innovation in the environmental sector are in line with the more advanced EU member states according to the Eco-innovation Observatory. The same organisation reports that the amount of cleantech venture capital investment between 2007 and 2009 was significantly higher than most Western European countries. There is significant low-carbon technology research in areas such as wind, marine, energy storage and bio-energy.

- ICT presence: There are many major global software and hardware companies with their EU headquarter operations in Ireland, and the sector contributes to approximately 25% of Ireland's total turnover, representing one third of all exports by value. The concentration of high profile “born-on-the-internet” companies with European HQ's in Dublin, (including Twitter, Facebook, Google and LinkedIn) is a globally unique attribute.
- A strong and mature financial services sector: In 2011, the Irish Government announced its support for the ‘Green’ International Financial Services Centre (IFSC), a new initiative that aims to position Ireland as a specialist in the management of carbon and green finance. Ireland considers itself a world leader in fund administration and asset financing, and we already administer 80% of the world's aviation finance for example. Information published by the Irish Funds Industry Association in February 2012 indicated that total assets under management in the IFSC is fast approaching the €2 Trillion mark. The country intends to build on this success to provide high-quality services in respect of funding renewable energy generation, energy efficiency measures, carbon credits trading, and water and waste projects. It is anticipated that there will be growing demand for such services in the next decade or so and Ireland intends to be at the forefront. It is also hoped the initiative will serve as a means of generating high-value employment and revenue growth in the country, by leveraging the huge commercial opportunities that are emerging in the sector; for example, global carbon trading volumes are expected to reach US\$1t (€0.71t) by 2020. The initiative includes the creation of a government-supported International Carbon Standard and an associated Dublin International Voluntary Offset Registry, which will aid the IFSC's goal of acting as a hub for green finance.
- A number of domestic but globally-focussed cleantech businesses: There are a number of large players in Ireland involved in the cleantech sector including Mainstream Renewable Power, NTR , ESBI, Eirgrid, Glen Dimplex and Kingspan. There are also a number of newly formed innovative Irish companies in this sector including Wavebob, OpenHydro, Imperative Energy, Crowley Carbon, IKON Semiconductor, Ecocem, Treemetrics, and SolarPrint.
- A number of existing cleantech initiatives and clusters throughout Ireland: The Shannon Energy Valley is a cluster of organisations undertaking a number of sustainable energy related activities in the mid-west of Ireland. There is also the emerging Ocean Energy cluster in Galway/Smartbay, in which IBM is involved. The International Energy Research Centre in Cork is working with leading international and Irish researchers to create sustainable energy systems and is recognised globally as a platform to commercialise technologies created through partnerships between ICT and energy research companies.
- Ideal conditions to be a smart grid/electric vehicle test-bed: Ireland has a small, relatively isolated system with a single owner of the electricity distribution networks. Given the nature of the local electricity market and having a strong base of ICT companies, smart grid companies and significant renewable energy generation makes Ireland an attractive test-bed for the early deployment of a smart grid, energy storage technologies and electric vehicles and their integration with renewable energy.

Dublin - the hub of cleantech growth in Ireland

Dublin, Ireland's capital city, is well placed to capitalise on the continued growth of the cleantech sector both domestically and internationally. The Dublin region, as the largest economic area, is the main hub of cleantech growth in Ireland by virtue of access to an international airport, critical academic institutes and large local authorities alongside a number of established cleantech initiatives and capabilities.

Two main differential levers exist for Dublin when compared to many other cleantech centres:

- Dublin can leverage the existing ICT base of major companies and R&D centres in the region to develop the city as a centre of excellence for clean technology and data management including green data centres, cloud computing, sensor and monitoring technologies, smart cities applications, smart grid technologies and such like.
- Dublin can also leverage the involvement of Ireland's largest local authorities (incl. Dublin City Council and Fingal County Council), the large research driven academic institutions (incl. DIT and DCU) and a major International Airport to promote the city as a major 'deployment platform' for foreign direct investment (FDI) from cleantech multinational corporations in areas such as waste, water, transport, energy and green ICT. This is borne out by a recent decision by Glen Dimplex, the world's largest electrical heating company, to base a globally significant commercial demonstration project for its thermal storage and demand side management technology, in Dublin.

Dublin already has a large number of established cleantech initiatives and capabilities, some of which are detailed below:

- IBM Smart Cities: IBM's Smarter Cities Technology Centre, currently the only one of its kind, is based in Dublin and consists of a highly skilled and cross-disciplinary team which will help other major cities better understand, interconnect and manage their operational systems (e.g. transport, communication, water and energy). Dublin City is collaborating with IBM as an international 'test bed' for this purpose.
- ESB eCars: ESB, Ireland's leading electric utility has established 'ESB eCars' to support the introduction and demand for electric vehicles in Ireland through the roll-out of a national charging infrastructure. ESB is installing a comprehensive network of charge points with open systems and accessible platforms. It has recently also facilitated the launch of the first electric taxi service in Dublin.
- Intel Energy & Sustainability Lab: On October 14th 2011 – Intel Chief Technology Officer Justin Rattner and Taoiseach (Irish Prime Minister) Enda Kenny together with EU Commissioner Máire Geoghegan Quinn announced the creation of the new Intel Energy and Sustainability Lab (ESL) headquartered in Ireland. The new ESL initiative has an extensive research portfolio leveraging a growing ecosystem of academic and industrial partners in Europe and beyond. The lab will drive Intel's research agenda in the application of Information Technologies to enable a 'High Tech, Low Carbon' economy with strong alignment to the EU 2020 sustainability goals. One of the focus areas of the Energy and Sustainability Lab is the 'Personal Energy Management' research program which drives ground breaking research into energy management solutions for future smart grids with a strong emphasis on citizen inclusion.
- Data Centre/Cloud Computing capabilities: Given the physical communication infrastructure in place and experienced ICT talent pool, Dublin is home to a number of large data centres including those hosted for companies such as Amazon.com, Google, Microsoft, IBM, Digital Realty Trust, Interxion, TelecityGroup and SunGard. Dublin is consequently becoming a key hub for the growth of cloud computing. Demand for remote data centres is increasing, boosted by the rising trend of cloud computing, where information is stored and processed at massive remote

data centres. Ireland's temperate climate suits the centres, which require significant amounts of power to run and to prevent from overheating.

- Indigenous players: Given the ambitious domestic targets and entrepreneurial nature of the city, Dublin and the surrounding regions are the home of a number of indigenous innovative growth companies in the cleantech space, including OpenHydro (Tidal power), Ecocem (Green Cement), Mainstream Renewable Power (Wind Developer), and Glen Dimplex (Electric Heating technology).
- Water and wastewater: Given Ireland's strong research base in this area – for example the National Centre for Sensor Research in DCU and IBM's Centre of Excellence for Water Management – it is well placed to meet demands for modernising the water and waste water sector both domestically and internationally. There are also areas of opportunity in terms of water metering, energy from wastewater, energy efficient water treatment and distribution. The impending formation of a new utility 'Irish Water plc' to oversee the water network represents a major opportunity for the entire water sector, especially in Dublin.
- Smart cities - open data: Across the EU, public sector bodies are estimated to be sitting on a potential treasure trove of data, worth up to €27 billion (2009 EC Report "Re-use of Public Sector Information – Review of Directive). Dublin's Local Authorities alongside academia, businesses, technologists, application developers, researchers and entrepreneurs have established "Dublinked", an online facility that allows stakeholders to mine, exploit and utilise public data to generate new revenue streams and address regional challenges. This open data sharing initiative sees previously unreleased public operational data being made available online for others to research or reuse. With the initial data coming from the Local Authorities of Dublin City Council, Dun Laoghaire-Rathdown, South Dublin and Fingal County Council, it is expected that other public and private organisations in Dublin will link up with Dublinked to share their data and invite research collaborations. The information is managed in a way that ensures ideas can be commercialised as easily as possible and to minimise legal or technical barriers that can be impediments for small and medium businesses seeking to develop and prove business ideas in a variety of areas such as environmental management, traffic and planning controls, Water flow, rainfall and energy monitoring, Air, water pollution and noise maps for the Dublin region.
- Smart cities – transport: Dublin is also well placed to be a large test bed for the roll out of electric, alternative fuel and low emission vehicles. There are a number of initiatives in place that will accelerate this: Ireland's target of 10% penetration of electric vehicles (EVs) by 2020 (c. 250,000 vehicles), the charging point infrastructure roll out, the ESB eCars program, financial incentives and Vehicle Registration Tax Relief for EVs, to name a few. Research centres such as The National Institute of Transport & Logistics in DIT and the Intelligent Transport Systems research area at the Institute of Technology Blanchardstown are two of a number of academic institutions focussed on this area.

The Green Way – Dublin’s cleantech cluster

The Green Way is a collaborative venture established by industry, academic institutions and public/semi state players in the Dublin region, whose vision is to create jobs and trade opportunities by activating and developing an internationally recognised cleantech cluster.

The objectives of the cluster are to:

- Support existing cleantech companies in the region
- Foster and accelerate job creation by new business start-ups focussed on the cleantech sector
- Facilitate multinational corporations capable of bringing cleantech-related green jobs and investment to the region

The original founding partners of The Green Way are:

- Dublin Airport Authority
- Fingal County Council
- Dublin City Council
- Ballymun Regeneration Ltd
- Dublin City University
- Dublin Institute of Technology
- North Dublin Chamber of Commerce

There are numerous embedded opportunities for cleantech solutions within each founding organisation and across the emerging collaboration projects underway or planned between these organisations. These green enterprise opportunities exist in relation to:

- The waste, water, data, transport, housing and public infrastructure of the two Local Authorities;
- The aviation, MRO, ground transport and campus development activities of DAA
- The R&D, education and facilities management operations of the Academic Institutes
- The collective procurement budgets and joint venture capabilities of the founding organisations in areas such as renewable energy, energy management and building retrofitting

The Green Way aims to support and act as a spring board for the transformation of the Irish economy into a sustainable green economy. Within The Green Way, Irish cleantech companies benefit from access to cleantech R&D capabilities provided by the academic institutions, access to potential procurers of cleantech products and services, as well as access to test beds and talent pool provided by all cluster members.

Simultaneously, The Green Way, through its collaborative approach to municipal waste, water, transport, energy and data assets under the control of the local authority members within the cluster aims to attract innovative global cleantech companies seeking a large-scale test bed and deployment platform through which they can validate and commercialise their technologies and use Dublin as a corporate base and reference site from which to access other European and Global markets.

The Green Way is in a unique position to test-bed a variety of cleantech/green enterprise solutions in partnership with the all relevant bodies and interested companies. It is particularly well placed to provide a base for community-based residential energy technology trials given its access to a wide number of communities through the Local Authorities. Access to community-wide data and existing R&D and incubation facilities enhances the attractiveness of the cluster from this perspective.

In particular the synergies with the existing ICT cluster in Dublin are being leveraged in the context of a world class test-bed for ‘Smart City’ technologies. Similarly, joint projects with state utility players in the context of Government programmes relating to water, bioenergy, smart metering, electric vehicles, broadband infrastructure, electricity generation and grid development can be delivered at a municipal scale within the Green Way which is proving attractive to investors and multinationals alike.

Finally, through our membership of the Global Cleantech Cluster Association (GCCA) and the EU Eco Innovation Cluster partnership (EcoClup), we have established strong connections with other cleantech clusters throughout the world allowing us to exchange knowledge, find partners for local companies, develop academic and municipal level linkages etc. Also as a result of Dublin City Council and Fingal County Council 'twinning' activities, The Green Way – Dublin's cleantech Cluster, is also now in the process of forging relationships with peer organisations in Dublin and Fingal twinned cities – including San Jose, Chengdu and Beijing.

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