

# Delta Research Brief

## **Life or Death for Utilities in a Carbon Constrained Future?**



## Life or Death for Utilities in a Carbon Constrained Future?

“Life or death” for utilities may be a little strong, but huge value is at stake for utilities. Decarbonising European energy will drive massive changes in the utility industry over the next decade. Part of this change will be transformational, rather than incremental changes to “business as usual”. Utilities with the best strategies to manage this change will capture market share and grow profits. Others will lose market share and have value eroded.

### INTRODUCTION

Policy, customer attitudes and new technology will all drive change across the utility value chain. A combination of low carbon generation, smarter networks, and decentralised energy (including electric vehicles and energy efficiency) will increasingly dominate the energy landscape. Different utilities have different starting points and national policy frameworks to play in, but all will be heavily impacted by these changes. Business as usual is not an option for any.

This article:

- **Explores how changes are already beginning to take shape.**
- **Lays out two different elements of a low carbon strategy that utilities Iberdrola and Scottish & Southern Energy have embarked upon.**
- **Explains how Delta’s forthcoming research will help utilities ensure they “win” out of the transformational changes the next decade will bring.**

### Policy and Regulation Will Drive Transformational Change

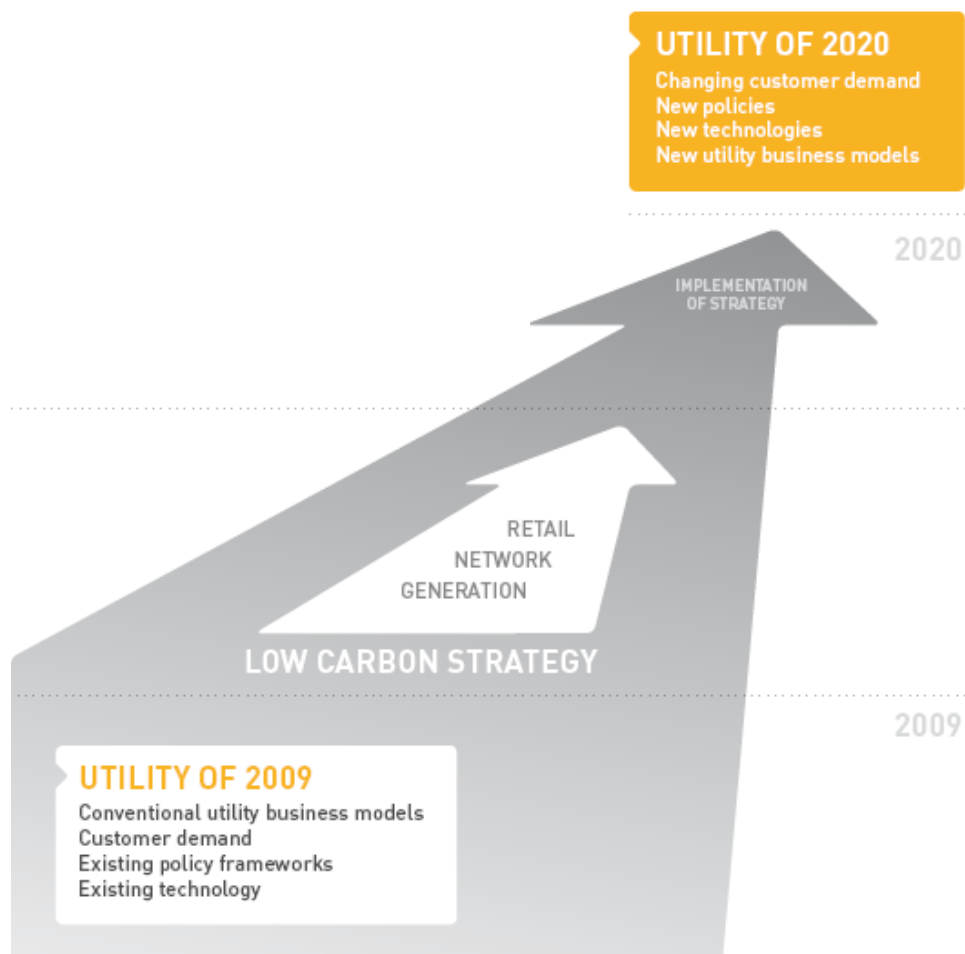
Reducing greenhouse gas emissions (GHG) and improving security of energy supply are driving bold European energy policy. The European Commission’s 20/20/20 targets aim to:

- **Reduce GHG emissions by 20% from 1990 levels by 2020.**
- **Increase in the share of renewable energy generation to 20% of total energy use by 2020.**
- **Improve energy efficiency by 20% by 2020.**

EU member states are developing national level policy to achieve these objectives. Some policy, such as the EU Emissions Trading Scheme and incentives for renewable, are already entering the mainstream. New nuclear is firmly back on the agenda with a wave of interest in new plants sweeping across Europe – Sweden, for example, recently removed a 29 year ban on developing new nuclear power plants.

**Figure 1: Factors driving change in the utility industry**

Utilities dominating the 2020 landscape will look substantially different from utilities today. The utility of 2020 will have new opportunities, but also face new threats.



Two striking examples of national policy that may create more drastic change include:

- The cap on electricity sales in Finland
- The UK Supplier Obligations - an initiative that may link energy retailer profitability to success in reducing customer consumption

Future policy and regulation can be hard to read, but

the examples of Finland and the UK demonstrate how utilities may need to adopt new business models to respond to carbon-driven policy initiatives.

*“Policy, customer attitudes and new technology will all drive change across the utility value chain”*

**National Policy example 1: Cap on electricity sales in Finland**

In November 2008, the Finnish Government approved a new climate and energy strategy which sets out the policy measures up to 2020. The objective of the strategy is to halt and reverse the increase in energy consumption. In doing so, 2020 electricity consumption will be almost equal to current levels. While the implementation of the strategy has yet to be worked out, there are two major implications for utilities:

1. They will not be able to grow by selling more commodity.
2. The strategy will create demand for services to help customers limit their consumption, creating new opportunities for growth and value creation.

**National Policy example 2: UK Supplier Obligation**

In the UK, the Carbon Emissions Reduction Targets (running to 2011) requires energy suppliers to achieve targets for installing energy saving measures in households. Beyond 2011, the UK Government is considering a number of options for this supplier obligation model. One option is to introduce a cap and trade system on household emissions or electricity and gas consumption amongst energy retailers. This could have major implications for retailers.

1. This could link retailer profitability to how effectively they can manage customer's emissions or consumption.
2. Retailers that best understand how to engage with customers, that have access to the best technology to reduce emissions or consumption, and have the capability to deliver such services, will have major advantages over their competitors.

**Changing Customer Attitudes – Creating Markets for Energy Services**

Energy consumers are becoming more carbon aware. At one end of the spectrum, supermarkets are competing with each other in setting stringent carbon reduction targets. This is creating new and rapidly growing markets for energy management services. At the other end of the spectrum, the majority of residential customers have yet to show they are ready to buy low carbon services.

But the direction of customer attitudes is clear – there is, and will be a rapidly growing end user market for low carbon services. And while the current decline in energy prices may take the edge off this growth, underlying upward pressure on prices will fuel this growth.

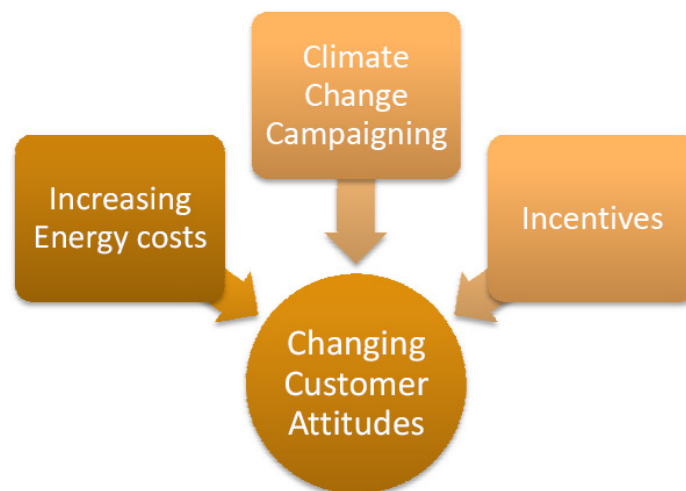
The types of services that customers buy will vary from one segment to another, but will broadly comprise to:

- Better understand their energy consumption.
- Improve energy efficiency.
- Generate electricity / heat onsite.
- Purchase energy from renewable sources.

Electricity and gas retailers should be able to nimbly respond to growing demands for such services, and understand in detail the different requirements of different market segments.

## Figure 2: Customers' views on energy are changing

Shifts in customer attitudes will be driven by: increased energy costs; increased awareness of climate issues through campaigning by NGOs and the public; and / or the introduction of incentives to reduce consumption, increase efficiency or install their own renewable generators.



Delta Energy & Environment, 2009

### New Energy Technologies Will Open Up New Opportunities

Development of new technology across generation, transmission/distribution and retail technologies has never been faster. Emerging from large corporations through to venture capital backed start-ups, new, cheaper and better performing products will open up new opportunities for utilities. Examples include:

- **Generation - carbon capture and rapid improvements in large-scale renewable.**
- **Networks – smart grids, electricity storage, demand response, virtual power plants.**
- **Retail – smart metering, electric vehicles, photovoltaics, micro-cogeneration, heat pumps.**

Winning utilities will build deep expertise in new technologies, develop profitable innovative business models to deploy them, and secure

access to winning products. As electricity gradually de-carbonises, its more widespread use as an energy vector on the demand side will bring opportunities and threats. For example increased use of electric vehicles could be either a positive development (new sales, storage and load shaping opportunities) or an issue for concern for utilities (by increasing demand during system peaks). Utilities must understand how to exploit the opportunities and mitigate the threats.

### RESPONDING TO A CHANGING UTILITY LANDSCAPE

Some changes to the utility landscape will be incremental – for these relatively slow responses and business-as-usual strategies will suffice. But other changes will be transformational. These will require visionary leaders, nimbleness and fundamental changes to the nature of mainstream utility businesses. The history of utilities has few

examples of such words. Hence the scale of the challenges utilities will face through to 2020.

The utility of the future will need to be one that has a diverse range of low-carbon energy resources; transmits and distributes this energy via intelligent networks; goes beyond just providing energy by assisting end users in reducing energy consumption and also generating energy; and embeds low-carbon electricity and fuels in transport and buildings applications.

Some utilities are already responding more quickly than others to these challenges.

- **UK-based Centrica has set up a new business unit, British Gas New Energy, to develop and provide low carbon services to its customers**
- **Electricité de France is at the forefront of electric transportation, and is working closely with Toyota, Citroen and Renault.**
- **Danish DONG Energy is a leader in off-shore wind. Swedish Vattenfall is on the leading edge of carbon capture and storage.**
- **Netherlands-based Essent is building a formidable position in access to biomass resources.**
- **German utility EWE is working on active**

**management of distributed generation and demand response.**

- **E.ON UK is driving forward a sustainable energy solutions business, providing a range of energy services to its customers.**

In the following section, we outline two contrasting examples of utility strategies to succeed in a low carbon future. Spanish-based Iberdrola has adopted a stunningly successful strategy that makes it the world's leading wind farm operator. UK-based Scottish & Southern Energy, while also growing its large renewable business and pushing forward a range of low carbon initiatives including nuclear, has adopted an innovative approach - investing in small to medium businesses developing new, 'clean tech' technologies and services.

### Iberdrola Renovables

Iberdrola Renovables (IBR) is one of the world's biggest provider of renewable energy, with 8,000 MW of installed capacity. The company began life in 2001 as the renewable branch of the Spanish utility Iberdrola, but was separated and floated independently on the stock market in 2007, creating €12 billion of value (Iberdrola retains a significant stake). This branching off of the 'low carbon' arm of a major utility is not a unique occurrence - EDF

**Table 1: Comparative market capitalisation of the renewables businesses of EDF & Iberdrola**

Main Utility	Market Capitalisation (EUR bn.)	Renewables Business	Market Capitalisation (EUR bn.)	Installed Renewable Capacity (MW)
Iberdrola	29,565	Iberdrola Renovables	12,292	>8,000
EDF	77,005	EDF Energie Nouvelles	1,988	1,735

Iberdrola is less than half the size of EDF in market capitalization terms, yet its renewables business is more than 6 times the size of EDF's.  
Business Week, 2008

Energie Nouvelles (the renewables arm of Electricité de France) has also been separately floated on the stock market.

What is unique about Iberdrola is the scale of its renewables' business (the early Spanish support for wind energy clearly gave this business a major push) compared with other major utilities. EDF Energie Nouvelles is less than a quarter of the size of IBR in terms of market capitalisation and installed renewable capacity, despite the fact that the parent company EDF is nearly three times the size of Iberdrola.

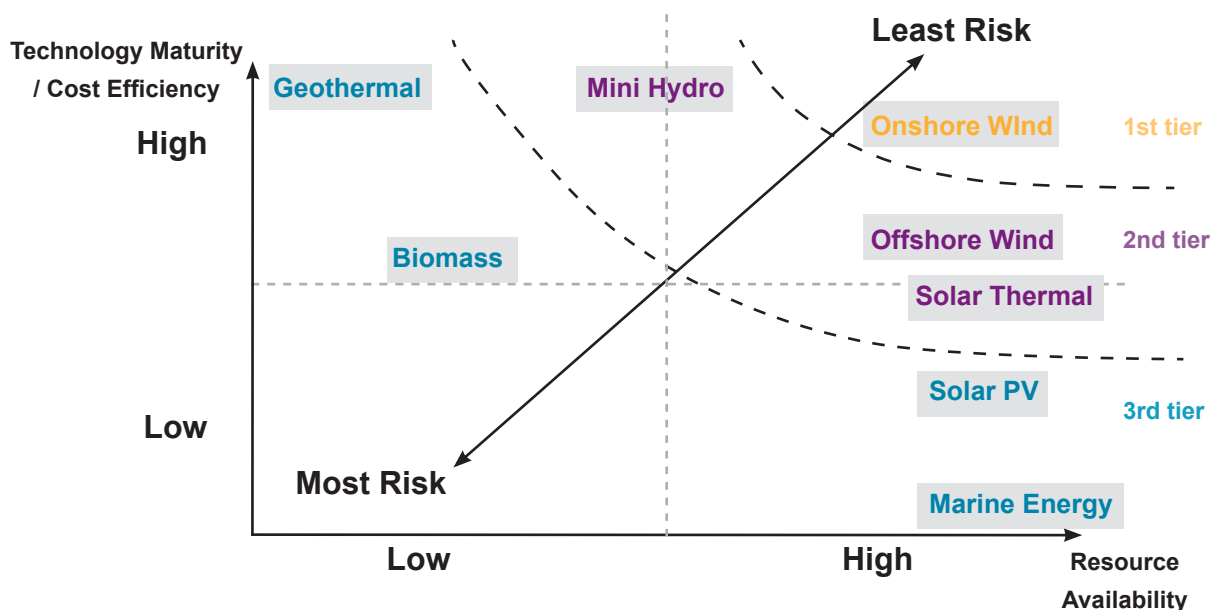
IBR has achieved their market leading position

primarily through tried and tested on-site wind. This technology will continue to soak up the €18,800 million of renewable investment IBR plans between 2008 and 2012 in IBR's key markets (Spain, Europe and the US). But the scale of IBR enables it to also invest heavily in research and development and introduce new technologies into its portfolio. Over the same period, some €120 million will also be invested to ensure the company has access to the best technologies and is a leader in exploiting new renewable opportunities.

IBR prioritises technologies into first, second and third tiers – each brings different levels of engagement, as shown in Figure 3.

**Figure 3: IBR's view of technology risk & safety**

Onshore wind is seen by IBR as the least risk technology because of its maturity, cost and the availability of wind resources. Mini hydro, offshore wind and solar thermal are also seen as reasonably low risk. The higher risk technologies either have question marks over technology maturity and cost (solar PV and marine), or low resource availability (geothermal and biomass).



Iberdrola Renewables Strategic Plan, 2008-2012

**1st & 2nd tiers: investment in mature, cost-efficient technologies**

Onshore wind is a clear front-runner, as shown in Figure 3, and as such, will make up the majority of the proposed new capacity to 2012 (see Figure 4). 80% of new capacity will be wind, with a plan to install 2,000 MW per year, tripling the installed capacity by 2012. Iberdrola spreads its assets across different markets, reducing its exposure to changes in policy and incentives in a particular market.

A second tier of technologies which will make up the remaining new capacity, including mini hydro, offshore wind and solar thermal. Strong relationships with key suppliers help to deliver growth, and risk is minimised by increasingly diversifying their supplier base.

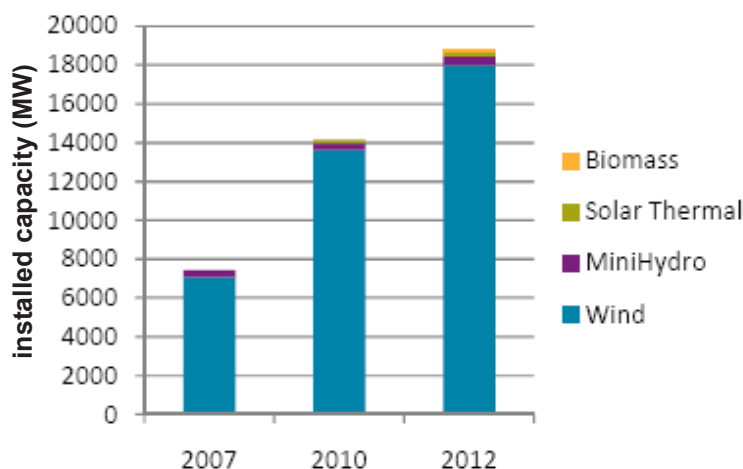
**3rd tier: R&D to develop less tested technologies**

Before making significant investment in less ‘safe’ technologies, IBR aims to gain deep understanding of the risks associated with them. As such, engagement with technologies in the third tier (biomass, photovoltaics and marine energy) is focused more on R&D, with €120 million to be invested between 2008 and 2012. R&D capital is also being spent on technologies to improve efficiency of generation. These developments are being driven by a need to improve cost-effectiveness of generation, and lengthen technology life-times. Technologies include remote control and monitoring systems and advanced wind prediction systems.

In a carbon-constrained future, Iberdrola looks set to be amongst the winners through its renewables business. Its large investment programme and focus on R&D will consolidate its position as one of the world’s leading renewable generators.

**Figure 4: IBR's plan for renewable capacity installed, 2007-2012 (MW)**

Wind continues to receive the most investment and will comprise the majority of new capacity. The 2nd tier technologies – mini hydro & solar thermal – make up the remaining new capacity with slowly increasing proportions of investment. Biomass is the only technology from the ‘3rd tier’ included.



Iberdrola Renewables Strategic Plan, 2008-2012

### Scottish & Southern Energy

Scottish & Southern Energy (SSE), a UK-based vertically integrated utility also has a strong renewable base - it is the UK's number one provider of renewable generation (predominantly through hydro) and acquired international wind developer Airtricity in 2008, adding 400 MW of installed capacity and a 10 GW pipeline to its' portfolio. But in addition to this (and nuclear and carbon capture initiatives), SSE has established a Ventures business to help it exploit decentralised energy opportunities in a low carbon future.

The company has grown a portfolio of investments which will support the future competitive position of the company, whilst also building a progressive and sustainable brand. It invests in small and medium enterprises (SMEs) developing new, mainly 'cleantech' technologies or services. This allows SSE to engage with and be amongst the fore-

front of decentralised and demand-side focused technologies and services. This effectively out-sources innovation, recognising the challenges of engaging with such technologies from within a utility business. It brings expertise in a wide variety of technologies into the company, where SSE would not have the resources itself. For the SMEs, SSE can offer experience, cash input, and a route to market.

SSE Ventures committed £44million (€48million) in 2007/8. Investments are either direct to product developers, or through external investment funds in which SSE has stakes. Examples of recent investments, and drivers, are highlighted in Table 2.

Whilst SSE will continue to grow its large renewables, fossil fuel (including CCS) and nuclear portfolios in parallel, its model of working with SMEs in the decentralised energy space gives it access

**Table 2: Technology Developers Invested in by SSE's Venture Capital Business**

Technology / Company	Investment	Drivers for Investment
<b>Smart Metering: Onzo</b>	£1m, 24.5% share (+£1m through Sigma Capital investment fund whom SSE are a major partner in). Exclusive rights to Onzo's technology in the UK & Eire.	SSE's interest in the smart metering technology is driven by their aim to move more towards customer-end energy services. Smart metering is expected to be important for SSE's energy efficiency drive.
<b>Fuel Cells: Intelligent Energy</b>	£1m, 50% share, to create joint venture company IE CHP	IE's fuel cell technology will be used for CHP applications in light industrial, commercial and residential settings, in line with SSE's aim to engage in low carbon heat technologies, and support a distributed generation approach.
<b>Storage: Premium Power Corporation</b>	£1m invested, acquired from investment partner Vantage Point Venture Partners	PPC develops energy storage systems, which will form an important part of SSE's drive to enable integration of distributed and intermittent renewable resources on the grid. A trial system will be installed in Scotland, before wider roll out.
<b>Smart Grids: Smarter Grid Solutions Limited</b>	£300k invested, 25% stake in the Active Network Management technology, following 5 yrs of collaborative research.	SGS is a spin-out company from the University of Strathclyde, and the first such investment for SSE. It supports SSE's aim to embrace and enable the integration of decentralised energy into the grid.

SSE invested £44 million (€48 million) in new technology companies in the last financial year. Investments include those in distributed generation (DG), and technologies enabling easier grid-integration of DG.

**Delta Energy & Environment and SSE, 2009**

to emerging technology. Outsourcing innovation through its Ventures business gives it a nimbleness not traditionally associated with a utility, which allows it to respond to a changing energy landscape. As the technologies and services it has invested in mature, SSE will be well placed to bring them into their mainstream business and exploit the opportunities that will grow rapidly over the next decade.

### HOW TO DEVELOP THE BEST STRATEGY?

Ensuring success and avoiding failure in a low carbon 2020 future is no easy task. Utilities will need to drive incremental changes through some parts of their business and transformational change through other parts.

A strong vision of where value will lie in future low carbon markets is critical. From this, incremental and transformational changes a utility will have to undertake can be identified. Next, strong foundations must be laid down to be able to drive these changes. And finally, these foundations can be used to drive initiatives and change across the business.

Delta's forthcoming multi-client study will help utilities with the above challenges, ensuring they "win", rather than "lose" out of the changes that carbon and security of supply will drive through to 2020.

The three elements of Delta's multi-client study, "Life or Death in a Low Carbon Future", are:

- **Providing a clear and robust view of value, opportunities and threats in a low carbon 2020 future – and actions required to respond to these.**
- **Benchmarking and comparing current utility low carbon preparedness, strategies and initiatives.**
- **Identifying gaps between actions required to "win", and utility positions today.**

For further information, please contact [lindsay.sugden@delta-ee.com](mailto:lindsay.sugden@delta-ee.com), or call +44 131 625 1006.

Delta Energy & Environment  
15 Great Stuart Street  
Edinburgh EH3 7TS, UK  
Tel: +44 131 625 1011  
Fax: +44 131 466 7755

[info@delta-ee.com](mailto:info@delta-ee.com)  
[www.delta-ee.com](http://www.delta-ee.com)

Delta Energy & Environment Ltd  
Registered in Scotland: No SC259964  
Registered Office: 15 Great Stuart Street, Edinburgh, EH3 7TS

