

Delta's Decentralised Energy Outlook **FEBRUARY 2009**

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2009 – A Rapidly Changing Market Environment for Global Combined Heat and Power (Cogeneration)

Delta analysis shows policy conditions improving but investment outlook is dim

The current economic turmoil suggests that CHP will have to contend with a very different business landscape in 2009 than in previous years. At the same time, we expect that the election of President Obama will give a strong drive to low carbon energy policy in the short / medium term.

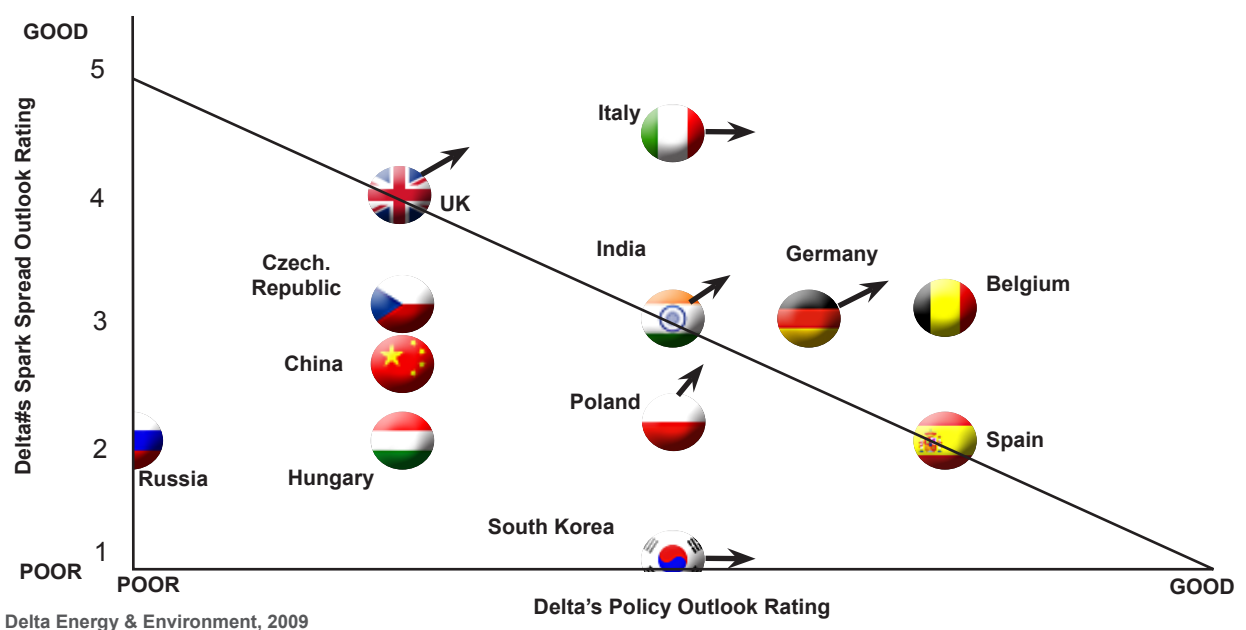
On the one hand, the economic downturn is making potential CHP users much more cautious about investment and is pushing energy prices down as industries shut down or halt production, in turn affecting CHP spark-spreads. CHP projects will also find it increasingly difficult to access financing. On the other hand, increasingly decisive action from governments is having a growing impact on energy markets and prices through CO₂ emissions caps, financial support and other incentives for CHP.

The interaction between these various factors will play out differently in each country, depending on the existing market framework, the generation fleet and policy environment. Delta's CHP Policy and Markets Service analyses the prospects for CHP in 12 major markets to help CHP equipment suppliers, investors and developers to make the best strategic decisions in 2009 and beyond.

Overall, Delta expects an improving policy framework through new support mechanisms (see the horizontal axis of Figure 1), while CHP spark-spreads are likely to remain steady (vertical axis of Figure 1). We expect the economic outlook, however, to affect the market for many applications of CHP (eg industrial) in most countries.

For more information on [Delta's CHP Policy and Markets Service](#), please contact [syetze.dijkstra@delta-ee.com](mailto:sytze.dijkstra@delta-ee.com) (+44 131 476 4259)

Figure 1: Delta rating of CHP markets: 5-year spark-spread and policy outlook



Electricity Storage – Will Europe Follow in the Footsteps of Japan and the US?

2009 will herald the beginning of a market for emerging storage technologies in Europe. A handful of utilities will begin to discover the multiple value streams available from storage by installing systems on their networks. Over the next few years, we expect this to become a major market development, with a range of opportunities and implications for utilities.

Delta's first [Electricity Storage in Europe Summit](#), held in Amsterdam towards the end of 2008, brought together over 20 utility and technology developer stakeholders. The Summit highlighted the rapidly growing level of interest among major utilities that are keen to see for themselves what storage can bring to their business. Technology developers, meanwhile, are working to drive costs down to make their solutions competitive with traditional alternatives (flexible fossil generation and grid upgrades).

We will see storage technologies first appear in markets with specific network constraints and those with high peak / base load spreads. Poorly interconnected network systems with high penetration of renewables will be ideal testing grounds. Examples include Ireland, the UK and Portugal. And some markets in Northern Europe, including Germany, are experiencing significant price differentials between peak and off-peak – enough to make compressed air energy storage economically attractive for bulk arbitrage applications.

Delta has now established strong electricity storage expertise, and our team of analysts continues to research, analyse and report on electricity storage developments. Delta's Electricity Storage Service, to be launched in March 2009, will analyse, in-depth, the issues that will shape future storage markets, providing utilities with deeper understanding and insight of this emerging sector.

Free Storage Research Brief

For well developed storage markets, one must look to Japan, and to a growing extent the US. Here, specific grid issues have driven electric utilities (including network operators and wind generators) to install hundreds of megawatts of distributed storage. A [Free Delta Research Brief](#) examines the drivers behind storage development in these markets and explores what implications there are for developments in Europe.

For further information on [Delta's Electricity Storage Service](#) and consulting capability, please contact cian.reville@delta-ee.com (+44 131 625 3332).

Are Utilities Charging Ahead With Electric Vehicles?

Electric vehicles (EVs) have come and gone in the past, but there now appears to be a perfect storm that will enable the take-off of electric vehicle transportation. Batteries are improving rapidly in terms of cost and performance. EV environmental benefits are pushing them fast up the policy agenda as concerns over biofuels mount, and fuel cells and the hydrogen era remain as elusive as ever. And the automobile industry is in a frenzy to develop new EV models.

EVs already on roads have battery capacities ranging from 10 to over 25 kWh, and can charge in as little as a few hours - potentially causing a short spike in demand. A critical issue for utilities is when this increase in demand takes place.

Utilities leading the development of electric transportation will not only capture the early market and demand for electricity, but also stand to benefit from battery leasing strategies and the array of storage applications that electric vehicles can offer.

Delta brings a deep utility perspective to EVs – we have coupled our strong background in electricity storage and decentralised energy together with dedicated EV expertise. In March 2009, Delta will launch its [Electric Vehicles Service](#), covering electric vehicles and plug-in hybrids, designed to keep utilities at the front of the pack - and at the same time manage the potential threats. Some questions the service will address include:

- **How should utilities prepare themselves for the take-off of EVs?**
- **What EV business models are available to utilities?**
- **How can value be created through EV charging and storage strategies?**

Download our [Free Research Brief](#), or for more details of the Electric Vehicles Service, contact stephen.harkin@delta-ee.com (+44 131 625 1005)

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

Carbon restraints and security of supply will drive significant changes in the utility industry over the next decade. Low carbon generation, smarter networks and decentralised energy will dominate the landscape. “Life or death” may sound dramatic, but Delta believes that huge value is at stake.

Delta's forthcoming multi-client study, [Life or Death in a Low Carbon Future](#), will help utilities understand and respond to the challenges and opportunities they face, 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 are:

- Providing a clear and robust view of value, opportunities and threats in a low carbon 2020 future – and the 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.

A [Delta Research Brief](#) introduces some of these issues. It:

- 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 that the next decade will bring.

Download our [Free Research Brief](#), or for further information, please contact lindsay.sugden@delta-ee.com (+44 131 625 1006).

Global PV Market – In retreat?

The silicon shortage is easing, thin film is increasing market share, manufacturing is being shifted to low cost Asian markets – yet the ever-upward growth in incentive-driven demand now looks more uncertain. Throw the economic slowdown into the mix and our view of the sector is clear: the boom is over for now, and margins will be squeezed.

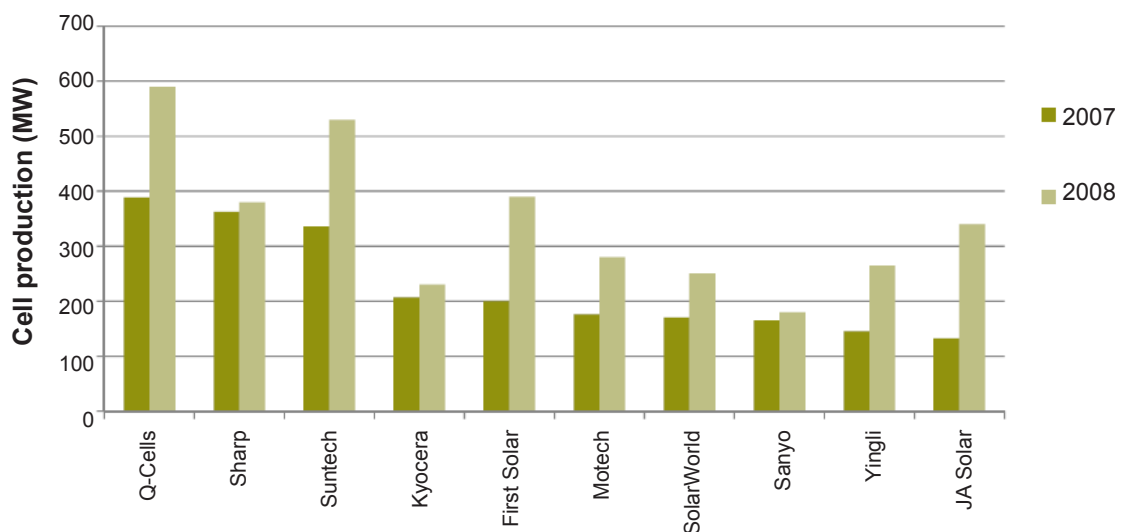
Delta provides clients with our analysis of current and future trends - and what they mean for both industry players and sector investors.

Even before the global economic slowdown took hold at the end of 2008, the prospects for the global PV market looked very different to a year before.

1. The silicon shortage was unravelling on the back of heavy investment in new production since 2006. Thin film production has also been accelerating. And the cell producers have been continuing to invest in expanding production (see Figure 2). In short, supply is going through the roof.
2. Demand is notoriously dependent on a very small number of policy-driven markets, most notably Germany, Spain and the U.S. We are far from confident that there will be sufficient new short-term markets, or growth in existing markets, to accommodate the surge in supply. Our view of demand growth is shown in Figure 3.

Figure 2: Top 10 PV cell manufacturers in 2007 and 2008

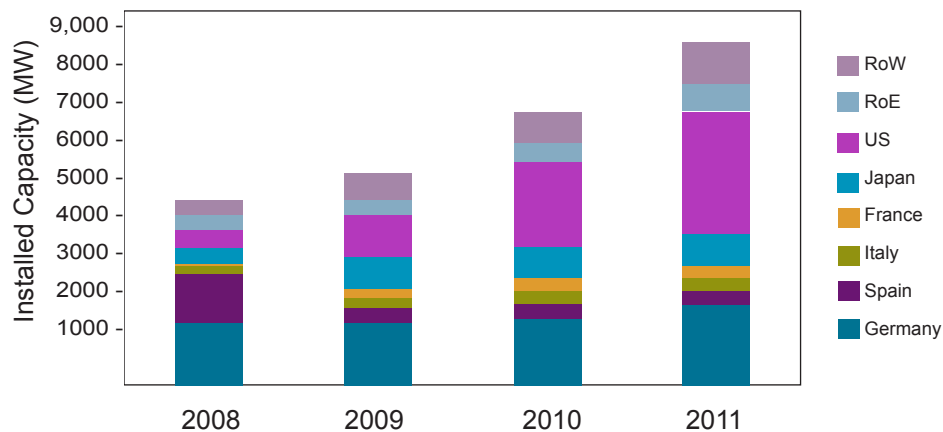
Most leading manufacturers invested in large increases in production capacities between 2007 and 2008



Delta Energy & Environment, 2009

Figure 3: Projected annual PV demand worldwide

Some analysts predict sales of well over 10 GW of PV in the next couple of years. Our expectations are more muted, with steady but unspectacular growth rates below the levels seen in the last few years.



Delta Energy & Environment, 2009

3. This scenario is putting acute cost pressure on the producers through the value chain – and favouring lower cost thin film producers. Overall, therefore, we expect thin film margins to hold up better than silicon but no-one will be spared price pressure except some local distributors and installers in a few high growth national markets.

The next 1-2 years will be tough for many industry players. Naturally, there will be winners and losers. Indeed, some will not survive. And we expect consolidation in what is now a highly fragmented market. The sector is likely to be increasingly dominated by a smaller number of players. For those that get through the next turbulent years, our view remains that PV remains a long-term very high growth sector. But care will always be needed to separate some of the industry growth hype from market reality.

For more information about Delta's global PV market analysis and capability, contact david.morgado@delta-ee.com (+44 131 625 3213) or stephen.harkin@delta-ee.com (+44 131 625 1005).

Micro-CHP Markets – Is 2009 Set to be a Turning Point?

Will micro-CHP move from an insignificant niche market into the mainstream?

The focus of Delta's 4th Annual 'Micro-CHP in Europe' Summit, held in Amsterdam on 4th February 2009, was on the imminent market introduction of micro-CHP products. Delta's Summit is an invitation-only event, bringing together 50 representatives from major utilities across Europe and beyond, leading boiler manufacturers, product developers and key micro-CHP influencers.

The global micro-CHP market (defined as products generating 5 kW electric and below) is still a dot on the power generation landscape, comprising some 33 MW and a market value of €185M per year. The Japanese and German markets account for the vast majority of this capacity.

However, global market size is set to jump forwards in the next two years. Several manufacturers are establishing volume production facilities – set to produce thousands of products in 2009, with the potential to rapidly ramp up to tens of thousands of units. Technologies include Stirling engines, fuel cells and organic Rankine cycle engines.

While micro-CHP's history has been littered with missed commercialisation timescales, investment over the last year in manufacturing plant gives current plans a stronger chance of success. Introducing new technology into residential heating markets is extremely challenging – and not all plans will be successfully realised. But the involvement of well capitalised companies with mass-manufacturing experience, together with some utilities eager to develop the market, suggests a good chance of success for some. And a positive policy backdrop in several markets will help.

Delta has a global perspective on micro-CHP. The Delta Micro-CHP Service is now in its fifth year. A membership-based Service, it helps subscribers – utilities, heating equipment manufacturers and others – understand micro-CHP markets, how they will evolve, together with the implications for their businesses.

For further information on the 2009 Summit and [Delta's Micro-CHP Service](#), please contact david.morgado@delta-ee.com (+44 131 625 3213).