

LOCKED IN THE PAST

WHY EUROPE'S BIG ENERGY
COMPANIES FEAR CHANGE



GREENPEACE

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Disclaimer

This paper and the information contained herein is not investment advice. The purpose of this report is to highlight the risks posed by some utilities' business model because governments and other investors may want to have a better understanding of these risks.

EXECUTIVE SUMMARY

Large energy companies continue to dominate, for now

The 10 largest energy utilities produce more than half of Europe's power. Despite the financial crisis and momentous changes in European electricity markets, they more than doubled their revenues between 2002 and 2012 and significantly increased their earnings. Until recently, they also have been generally doing better than their US peers.

But after decades of growth and profitability, the past few years have impacted their earnings substantially. Ironically, it is their power generation business – traditionally a gold-mine – that is pulling them down. Since 2008, these top utilities have lost half of their €1tn share value¹ and seem unable to make a comeback, unlike most other industries². This poor performance has also hurt some of their largest shareholders: European governments.

Fast-changing environment

Large utilities have made a poor show recently of adapting either to government policies or to external market developments. For many years, they have been facing policy challenges, including market deregulation; nuclear phase-outs; support for renewable energy; and stricter regulations related to air pollution and CO₂ emissions. They have also been confronted with slowing demand; gas and coal market shifts; and the emergence of viable renewable energy generation by private individuals at the local level (distributed generation).

Sticking to their old business model, it seems, is not working. For example, with the emergence of distributed generation they face selling steadily less electricity at ever lower prices, while their costs keep increasing. As the large utilities' fossil and nuclear plants become more expensive and alternatives become cheaper, savvy consumers are looking to decrease their dependence on the utilities' power supply. To cope, the utilities are trying to decouple their increasing costs from the amount of electricity they sell, further increasing the cost advantages of renewables and other alternatives. Renewables, with zero-marginal-costs, helped push down wholesale prices to 8-year lows in 2013.

Combine this with lower electricity demand and the over-capacity in electricity production and you have utilities with lower earnings and lower credit ratings that make access to funding more difficult.

¹ THE ECONOMIST: EUROPEAN UTILITIES: HOW TO LOSE HALF A TRILLION EUROS. EUROPE'S ELECTRICITY PROVIDERS FACE AN EXISTENTIAL THREAT. 12 OCTOBER 2013: [HTTP://ECON.ST/1CYIVeV](http://econ.st/1CYIVeV)

² SEE THE DISAPPOINTING PERFORMANCE OF THE STOXX EUROPE 600 UTILITIES INDEX HERE: [HTTP://WWW.STOXX.COM/INDICES/INDEX_INFORMATION.HTML?SYMBOL= SX6P](http://www.stoxx.com/indices/index_information.html?symbol= SX6P)

Most energy companies have already been downgraded by credit rating agencies and have seen their bond yields grow. As a result, the utilities' profits are falling, their share prices are underperforming and business outlooks are getting gloomier. For example, Enel made more than €3bn on its generation and trading business every year between 2005 and 2010, but this dropped to €1.3bn in 2012. E.ON's earnings from power generation were down by two-thirds in the first nine months of 2013, year-on-year. Utility impairments grew to over €10bn per year in 2012, with E.ON, EdF and Vattenfall initially hit worst, followed by Enel, RWE and GdF Suez.

However, not all utilities are affected in the same way. Those with less-diversified portfolios and higher shares of generation earnings from the EU within their total EBITDA (Earnings Before Interest, Taxes, Depreciation and Amortization) are particularly vulnerable. Currently, those with more gas plants are being hit hardest, but coal is not a safe bet even in the near future. The nuclear phase-out has affected the German "Big Four" (RWE, E.ON, EnBW and Vattenfall) while companies that continue to operate nuclear plants are being hit by safety investments and increasing nuclear costs.

Failure to adapt

Large EU utilities have had a long grace period to prepare for the challenges they face. Market deregulation started in the early 1990s, when demand growth began to slow. It has fallen significantly during the past 5 years. The decision to phase out nuclear power in Germany was originally made in 2000. Air pollution regulation and renewable support systems started even earlier. Now that many of these changes have combined and are aggravated by high gas prices and a prolonged financial crisis, it has become clear that utilities are ill-prepared to adapt.

Utilities have invested large amounts during the past decade and even doubled their capital expenditures after the financial crisis. But instead of using these resources to fund a genuine change of business model, they have done the opposite: they have over-invested in fossil fuel capacities, thereby missing a chance to build up controlling stakes in renewables.

Despite slowing and then falling demand, and despite over-capacity, energy companies have added around 85 gigawatts (GW) of fossil fuel capacity to their European portfolios during the past decade. Now, they are building at least 20 GW more, although, during the 2000s, EU peak demand (EU-27) actually fell. In fact, analysts say over-capacity from thermal power stations (based on fossil fuels and nuclear energy) is so high that Europe's utilities need to shut down about 50 GW of their total fossil power capacity by 2017 if they want to maintain even their diminished 2012 profit levels.

In Europe the top 10 utilities produce only 4% of their power from non-hydro renewables, but they often make €1-2bn in annual EBITDA, mostly from wind. The "Big Four" in Germany dominate production with around a 70% market share, but control only 5-6% of the country's wind and solar capacity. J.P. Morgan estimated the value of E.ON's renewables business to be much larger than its conventional generation business.

Short-term firefighting does not make up for lack of strategic adaptability

Now, facing the consequences of their mistaken asset-allocation decisions, utilities are reaching for the usual remedies, including intense lobbying for fossil subsidies (e.g. capacity fees) and against renewables (e.g. solar "backup tolls"³); cost-cuttings and massive layoffs; divestment programmes and lately capital expenditure cutbacks. These moves, even if successful, will not ensure the companies' long-term viability. A strategic reorientation is unavoidable.

History shows that aggressive lobbying tends to offer good results for utilities, but this comes at the expense of customers, communities and companies that invested in renewables assets. Moreover, the success of anti-renewables lobbying can hurt the utilities themselves: Iberdrola, E.ON and Enel are estimated to have made a total of €4-5bn in annual EBITDA from their renewables businesses. Draft Spanish laws to limit returns on existing renewables assets will also hit Iberdrola significantly.

Better strategic responses start to emerge

Not all utilities have reacted in the same way. Some smaller companies have responded quickly and positively to political and market changes. For example, Dong Energy and EDP have built up more balanced portfolios which include higher shares of renewables. Their renewable assets are making more profits than their thermal ones.

Some utilities have started to reconsider their adaptability by increasing the flexibility of their power generation portfolios. They are building up renewables portfolios, offering innovative services for the newly emerged private producers/consumers of energy (known as "prosumers") and starting to invest in storage capacities, among other measures.

Government responsibilities

Governments must send energy companies clear and unequivocal signals in order to direct them towards new economically and environmentally sustainable business models consistent with agreed policies on energy, climate change, air pollution, nuclear safety and other relevant areas. Governments should not offer utilities temporary relief mechanisms or unsustainable fossil and nuclear subsidies that undermine the strategic reorientation of energy companies. Governments should also learn not to rely almost exclusively on a handful of utilities when millions of Europeans are becoming energy prosumers.

³ ACCORDING TO NEW DRAFT SPANISH RULES, PEOPLE WHO PRODUCE THEIR OWN POWER MUST PAY A "BACKUP TOLL" JUST TO REMAIN CONNECTED TO THE GRID.

I. INTRODUCTION

Europe's top 10 energy companies have seen their business environments change fundamentally since the mid-1990s. These changes have largely been driven by European Union (EU) policies, such as legislation on deregulation, air pollution, renewables and climate change. Some countries, such as Germany and Belgium, have also decided to phase out nuclear power generation. Key external changes also include significant improvements in renewable energy technologies, the US shale gas boom and the financial and economic crisis. Another key underlying trend is the slow-down of demand growth, which already started in the 1990s and since 2008 has decreased rapidly.

These changes started slowly, but combined they have become faster, more profound and have had substantial consequences. Genuine adaptation has become a must for EU utilities. As Reuters puts it: *“Every new solar panel installed on European rooftops chips away at power utilities’ centralised production model. Unless they reinvent themselves soon, these giants risk becoming the dinosaurs of the energy market.”*¹

Large utilities have had many years to prepare for and adapt to these changes. Instead, mostly they have fought to reverse change through aggressive lobbying. What so far they have called “adaptation” has consisted of using their market dominance to consolidate control, cut costs, diversify, and overbuild their capacities. Utilities have aimed to maintain their inflexible business models based on large-scale centralised fossil and nuclear power generation, and failed to shift towards in a meaningful manner. Even today, renewable energy, for example, represents only a fraction of their power generation businesses.

This briefing shows that, by failing to genuinely adapt to changed conditions, energy companies have been the architects of their own demise. As challenges around them have become almost overwhelming, large power utilities have no alternative to a genuine strategic re-orientation. European governments – often themselves large shareholders of these utilities – have the responsibility to shepherd energy companies towards new economically and environmentally sustainable business models.

¹ G. DE CLERCO: ANALYSIS: RENEWABLES TURN UTILITIES INTO DINOSAURS OF THE ENERGY WORLD, REUTERS, 8 MARCH 2013: [HTTP://REUT.RS/19YKRBZ](http://reut.rs/19YKRBZ)

2. CHANGING ENVIRONMENT

After many decades of fast demand growth and monopolistic structures, substantial changes to electricity markets emerged in the 1990s. These changes began slowly, giving utilities ample time to prepare, but utilities mostly used the long grace period to resist change instead of adapting to it.

Two decades of change combining into a paradigm shift

European electricity markets have been evolving significantly for almost two decades. Changes shifting the energy sector paradigm include: slowing demand; the emergence of low-to-zero marginal cost renewables; the move from centralised to distributed power production; market deregulation; and nuclear phase-outs. Early on, these changes were gradual, but recently they have accelerated, causing decreased market (and through fast and radical policy changes even reduced regulatory) predictability.

Combined, these individual changes strengthen one other. For example, while utilities have successfully constrained competition, renewable technologies have now developed to a point where they help intensify competition by reducing market-entry barriers for millions of new producers and by bringing low-to-zero marginal cost capacities to the market. The reverse is also evident: unbundling is helping to create more favourable conditions for the emergence of new large-scale renewable players.

Slowing demand

Total and peak electricity demand in the European Union started to slow in the 1990s, and have been falling since 2007 (with the exception of in 2009). Total demand in the EU-27 fell by around 2.5% from 2007 to 2012¹. Demand also fell in several large national markets: by 7.5% in the UK, 4.3% in Italy, 3.4% in Spain and 3.2% in Germany². In the first 11 months of 2013, demand fell by a further 2.6% in Spain and 3.5% in Italy (where Enel, the country's major electricity producer, reported an even larger drop in its nine-month report³); in the first nine months of 2013, demand in Germany fell by 1.1%⁴.

In some major markets, including Germany and the UK, demand is expected to decline even further; even the industry-lobby group Eurelectric⁵ is forecasting this. Meanwhile, the registered decrease in demand has been coupled with a significant increase in both renewable and fossil installed capacity, resulting in substantial over-capacities in several countries. Europe today has about twice as much installed generation capacity as peak demand would warrant.

Reserve margins also are sufficient across the EU, and there is no strong suggestion of the system experiencing even medium-term stress to meet prospective overall peak demand⁶. Low spot and futures wholesale prices across Europe (with Italy as an anomaly)

¹ DEMAND FELL FROM 3.161 TWH IN 2007 TO 3.082 TWH IN 2012. EURELECTRIC: [HTTP://WWW.EURELECTRIC.ORG/POWERSTATS2013/](http://www.eurelectric.org/powerstats2013/)

² EURELECTRIC: POWER STATISTICS & TRENDS 2013 AND EARLIER EDITIONS: [HTTP://WWW.EURELECTRIC.ORG/POWERSTATS2013/](http://www.eurelectric.org/powerstats2013/)

³ ENEL: 9M 2013 RESULTS, 7 NOVEMBER 2013: [HTTP://BIT.LY/1D4CE90](http://bit.ly/1D4CE90)

⁴ PLATTS: POWER IN EUROPE, DIFFERENT ISSUES FROM OCTOBER 2013 TO JANUARY 2014.

⁵ EURELECTRIC "REPRESENTS THE COMMON INTERESTS OF THE ELECTRICITY INDUSTRY AT PAN-EUROPEAN LEVELS": [HTTP://WWW.EURELECTRIC.ORG/ABOUT-US/OUR-MEMBERS/](http://www.eurelectric.org/about-us/our-members/)

⁶ INVESTEC: EUROPEAN POWER UTILITIES: SECTOR REVIEW, 21 JANUARY 2013

also confirm this. ENTSO-E⁷ has estimated spare capacity at over 100 GW to meet demand and reserves for the 2013/14 winter. In most markets, the real challenge is actually managing excess capacity and output (e.g. in Italy and Spain).⁸

Deregulation, renewables, nuclear phase-out: policy decisions drive many changes on electricity markets

Market deregulation within Europe started in around 1990, first in the UK and in the Nordic countries, and reached an important turning point with the 1996 Electricity Market Directive. The EU's liberalisation agenda has created enhanced competition, introduced new market participants and increased cross-border electricity trading.

As renewable electricity started to emerge decades ago, with some national incentive programmes dating back to the 1980s, the EU also introduced policies to promote these technologies and mitigate the climate impacts of Europe's power generation. In 2008, it adopted its climate and energy package, including a revised Renewable Energy Directive aiming for a 20% share of renewables in final energy consumption by 2020. EU countries subsequently set up support schemes for renewable power generation. Through these measures, which are backed up by broad public support, EU wind capacity grew from around 1 GW in mid-1993 to around 117 GW in 2013⁹. Solar PV capacity grew from 2 GW in 2005 to more than 70 GW in 2012¹⁰.

Additionally, several countries also announced decisions to phase out nuclear power. In Germany, nuclear power generation should stop by January 2023 and in Belgium by September 2025. In France, where nuclear power is the primary source of energy, the government has announced a steep reduction of the nuclear share in national power generation, from 75% now (the highest in the world) to 50%.

The strong policy signals weakened, however, during the economic crisis as several countries, including in Spain, Italy, Germany and the UK, where support for renewable was significantly reduced. A switch from coal- to gas-based power generation in the US led to a decline in the European price for coal, whilst the EU's failure to sustain the carbon price under its Emission Trading Scheme (ETS) further reduced the incentives for utilities to shift from polluting to clean power generation.

Resisting deregulation and decrying emerging renewables

Over the past two decades, large EU utilities focused on slowing the liberalisation process and lobbied hard to avoid having their monopolistic networks unbundled from their generation and trade businesses. Up until now, utilities have been successful at keeping customer-switching rates low, and most succeeded in avoiding effective unbundling and truly fair and transparent third-party access to their grids despite additional EU regulatory packages in 2003 and 2009. Most large energy companies could stay integrated, and in some countries, such as Poland, they could even reintegrate after initial unbundling steps.

From the outset, large EU utilities have decried renewable energy and lobbied against any support systems for emerging renewable technologies. Hypocritically, they have fought subsidies for renewables despite still being reliant on nuclear subsidies themselves – even after 50 years since the first commercial reactors came online. For a long time, the large EU utilities did not invest substantial resources in developing their own renewable businesses, apart from Iberdrola, which took a more balanced but cynical approach: Although it is the world's largest wind power owner, for years it has been leading the smear campaign against renewables, especially solar energy, in Spain and now seems to be successfully destroying billions of solar investments, often those of its customers – and in the case of wind, even its own (see box in 3.2.).

Failure to adapt

Large European utilities have had many years to prepare and adapt to these and other changes. Instead, mostly they have fought against them.

The examples of the airline and telecommunications industries from the 1970s also offer useful lessons for utilities – as is shared in a report¹¹ by the Edison Electric Institute,¹² a US association of the electric utilities. Both capital-intensive industries experienced very significant landscape shifts within a few years after deregulation and technology changes. In the airline industry, each major US carrier filed for bankruptcy following the 1978 deregulation. Nothing about the telecommunications industry of 1978 is recognizable today.

⁷ ENTSO-E: THE EUROPEAN NETWORK OF TRANSMISSION SYSTEM OPERATORS FOR ELECTRICITY: [HTTPS://WWW.ENTSOE.EU/](https://www.entsoe.eu/)

⁸ PLATTS: 100 GW SPARE THIS WINTER: ENTSO-E, POWER IN EUROPE, ISSUE 665, 9 DECEMBER 2013

⁹ EUROPEAN WIND ENERGY ASSOCIATION: WIND IN POWER, 2013 EUROPEAN STATISTICS, FEBRUARY 2014: [HTTP://BIT.LY/1GPKYWM](http://bit.ly/1GPKYWM)

¹⁰ EUROPEAN PHOTOVOLTAIC INDUSTRY ASSOCIATION: GLOBAL MARKET OUTLOOK FOR PHOTOVOLTAICS 2013-2017: [HTTP://BIT.LY/1DMEHPI](http://bit.ly/1DMEHPI)

¹¹ P. KIND: DISRUPTIVE CHALLENGES: FINANCIAL IMPLICATIONS AND STRATEGIC RESPONSES TO A CHANGING RETAIL ELECTRIC BUSINESS, EDISON ELECTRIC INSTITUTE, JANUARY 2013

¹² EDISON ELECTRIC INSTITUTE: [HTTP://WWW.EEI.ORG/PAGES/DEFAULT.ASPX](http://www.eei.org/pages/default.aspx)

3. THE “DINOSAURS” STILL DOMINATE, FOR NOW

Until recently, and despite the financial crisis and massive changes in European electricity markets, the largest utilities have been able to maintain their market dominance, to increase their size and, until 2012, even improve their results. From 2002 up to 2012, their revenues grew substantially; their EBITDA¹³ and Operating Cash Flows nearly doubled.

Size

The 10 largest utilities dominate EU electricity markets and most individual national markets. They produce more than half of Europe's total power¹⁴.

Top EU utilities have higher market shares than top US utilities do, and are generally larger (by market capital, sales, assets, number of employees, etc.). For instance, the largest US utility has annual revenues similar to those of the ninth or tenth largest European utilities (in \$ terms). While at least six EU utilities have above \$100bn in assets on their books, in the US only Duke Energy does (see Bloomberg Utility Leaderboard¹⁵).

Table 1: Shares in power generation by the 10 largest EU utilities

2012 Share in EU power generation	EdF	RWE	E.ON	Enel	GdF Suez	Vattenfall	Iberdrola	CEZ	EnBW	PGE	Others
	20.0%	7.4%	6.2%	5.9%	5.4%	5.3%	2.5%	2.2%	1.9%	1.9%	41.3%

¹³ EBITDA = EARNINGS BEFORE INTEREST, TAXES, DEPRECIATION AND AMORTISATION

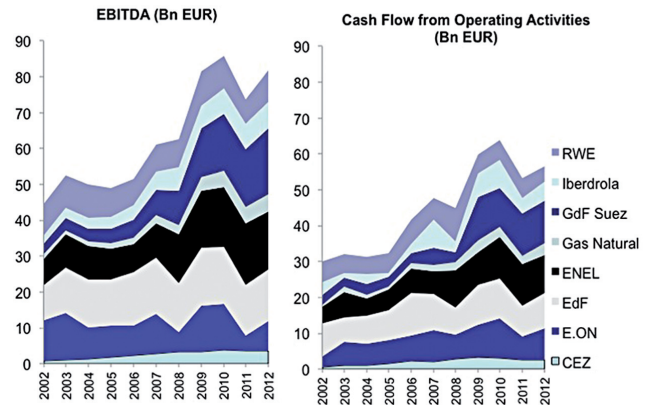
¹⁴ ONLY COMPANY PRODUCTION WITHIN THE EU BASED ON COMPANY REPORTS, ANALYST PACKS, DATA TOOLS, ETC. THE FIGURES FOR TOTAL PRODUCTION WITHIN THE EU WERE DERIVED FROM: EUROPEAN COMMISSION, EUROSTAT, “ELECTRICITY PRODUCTION AND SUPPLY STATISTICS, EXCEL-SHEET”: [HTTP://BIT.LY/119Y7QM](http://bit.ly/119Y7QM)

¹⁵ BLOOMBERG INDUSTRY LEADERBOARD: UTILITIES. [HTTP://BLOOM.BG/1GTASP4](http://bloom.bg/1GTASP4), ACCESSED IN DECEMBER 2013

Revenues

In terms of sales growth, European utilities have significantly outperformed US utilities. According to Bloomberg, all large European utilities grew their revenues during the past 12 months, while six out of 10 large US utilities shrank. The top eight European utilities produced strong revenue growth during the whole past decade as well. Their combined revenue (in 2002 at €270bn) grew dynamically until 2008 (€532bn), and – after a small glitch in 2009 – further to €698bn in 2012¹⁶. Each of the giants grew their revenues partly as a consequence of the integration of their acquired businesses, but most M&A activities happened in the earlier part of the past decade¹⁷.

Figure 1: EU utilities with strong EBIDTA and operating cash flows



Source: Bloomberg Professional/Bloomberg Industries/Utilities

Earnings

Until 2012, European utilities generated significant earnings. Annual EBITDA for the eight largest EU utilities was around €50bn annually a decade ago and mostly above €80bn since 2007. According to the Bloomberg Leaderboard, even recently they were on par with the large US utilities in terms of return on asset and return on invested capital, and showed a better performance in return on equity.

Their Cash Flow from Operations grew from a typical annual €30bn level a decade ago to around €50bn in 2008–2012. EdF, E.ON, GdF Suez, RWE, Enel, Iberdrola, Gas Natural and CEZ have all seen both their EBITDA and Operating Cash Flows grow during the past decade¹⁸. The following chart shows the significant growth in EBITDA and Operating Cash Flow even after the financial crisis.

¹⁶ BLOOMBERG PROFESSIONAL. BLOOMBERG INDUSTRIES – UTILITIES – POWER GENERATION EUROPE (BI EGENE) - PROFITABILITY, ACCESSED IN JAN, 2014

¹⁷ THE LARGEST ACQUISITION WAVE WAS HAPPENING AROUND 2000 UP TO 2007, E.G. EDF ACQUIRED ENBW, VIVENDI ENERGY, LONDON ELECTRICITY, EOS, ETC; E.ON POWERGEN, RUHRGAS, ZCE, SYDRAFT, HEINGAS, ETC; RWE ACQUIRED SE, THYSSENGAS, INNOGY, THAMES WATER; VEW AND MANY OTHERS. THE MOST IMPORTANT TRANSACTIONS SINCE 2008 INCLUDE THAT YEAR'S TAKEOVER OF BRITISH ENERGY BY EDF, THE 2009 TAKEOVER OF NUON BY WATTENFALL AND OF ESSENT BY RWE, AND THE 2011 TAKEOVER OF INTERNATIONAL POWER BY GDF SUEZ

¹⁸ BLOOMBERG PROFESSIONAL. BLOOMBERG INDUSTRIES – UTILITIES - POWER GENERATION EUROPE (BI EGENE) - PROFITABILITY, ACCESSED IN DEC, 2013

4. FAILURE TO ADAPT

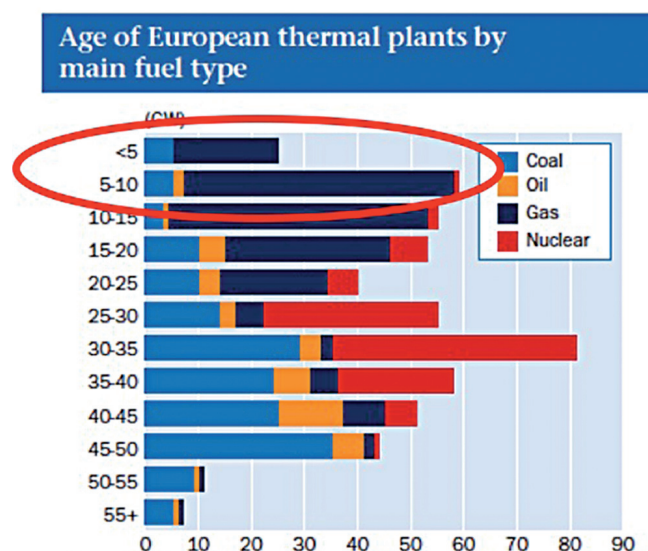
Favourable financials and easy access to funding have lulled utilities into a false sense of security. They have failed to use the past two decades to prepare for a shift in their core markets. In fact, they have made things worse by building up massive additional coal and gas capacities, and letting others control the majority of the 200 GW of wind and solar capacity in Europe today.

4.1. OVER-INVESTMENT IN OBSOLETE FOSSIL ASSETS

Large capacity growth during the past decade

According to Platts (please see chart below), fossil capacities grew by around 85 GW in Europe during the past 10 years (2003-2013)¹. Additionally, as of May 2013, Platts estimated that 8.7 GW of gas-fired and 11.9 GW of coal-fired capacity was being built in West Europe only along with 19 GW of other capacities, mostly renewables – and substantial additional capacities are also permitted².

Figure 2: Fossil capacities grew by 85 GW in the last 10 years



SOURCE: PLATTS POWERVISION, DECEMBER 2013

¹ PLATTS POWER PLANTS DATABASE, ACCESSED DECEMBER 2013

² PLATTS POWER GENERATION TRACKER: WEST EUROPE'S 20 GIGAWATTS NEW CAPACITY, 7 MAY 2013: [HTTP://BIT.LY/1K0BFZE](http://bit.ly/1K0BFZE)

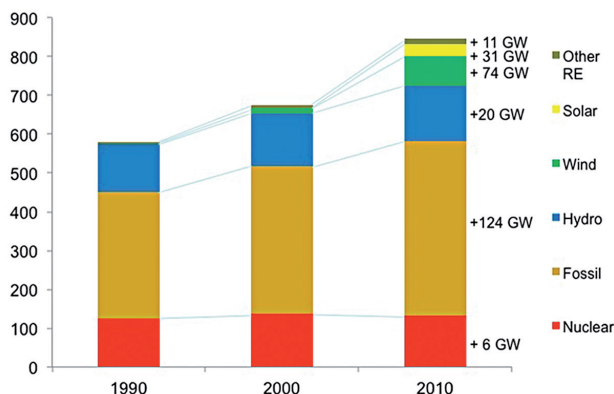
Over-capacities, low demand

This large addition in capacity happened in a market characterised by: already substantial over-capacities; demand that will be lower in 2020 than in 2010¹; significant growth in renewable capacities; plant emission rules that are getting stricter²; and a carbon allowance market that may be bottoming out³.

As *The Economist*⁴ weekly summarised it: “During the 2000s, European utilities overinvested in generating capacity from fossil fuels, boosting it by 16% in Europe as a whole and by more in some countries (up 91% in Spain, for example). The market for electricity did not grow by nearly that amount, even in good times; then the financial crisis hit demand. According to the International Energy Agency, total energy demand in Europe will decline by 2% between 2010 and 2015.”

Eurelectric statistics⁵ show that between 2000 and 2010 the peak demand of the EU-27 fell from 460 GW to 440 GW, while fossil capacity grew by 69 GW and zero-to-low marginal cost renewable capacity by 98 GW. As the following chart shows, between 1990 and 2010, 124 GW of capacity growth came from fossil and 116 GW capacity growth from non-hydro renewable power plants.

Figure 3: Substantial fossil capacity additions beyond renewables (installed capacity in GW)



SOURCE: EURELECTRIC POWER STATISTICS

¹ T. ANDERSEN: GERMAN UTILITIES HAMMERED IN MARKET FAVOURING RENEWABLE. BLOOMBERG, 12 AUGUST 2013. [HTTP://BLOOM.BG/1YAXIT](http://bloom.bg/1YAXIT)

² EUROPEAN COMMISSION: INDUSTRIAL EMISSIONS: [HTTP://EC.EUROPA.EU/ENVIRONMENT/AIR/POLLUTANTS/STATIONARY/](http://ec.europa.eu/environment/air/pollutants/stationary/)

³ “THE COST OF EMITTING CARBON DIOXIDE WILL JUMP TO €7.75 (\$10.54) A METRIC TON BY THE END OF THE YEAR, FROM TODAY’S CLOSE OF €4.65, ACCORDING TO THE MEDIAN OF NINE ANALYST AND TRADER ESTIMATES COMPILED BY BLOOMBERG NEWS.” IN E. KRUKOWSKA AND M. CARR: POLLUTION COSTS TO RISE AS EU BACKS MARKET FIX, BLOOMBERG NEWS, 8 JANUARY 2014

⁴ THE ECONOMIST: EUROPEAN UTILITIES: HOW TO LOSE HALF A TRILLION EUROS. EUROPE’S ELECTRICITY PROVIDERS FACE AN EXISTENTIAL THREAT. 12 OCTOBER 2013: [HTTP://ECON.ST/1CYNEV](http://econ.st/1CYNEV)

⁵ EUROLECTRIC POWER STATISTICS & TRENDS: [HTTP://WWW.EURELECTRIC.ORG/POWERSTATS2013/](http://www.eurelectric.org/powerstats2013/)

Capacities grew so large, that – according to UBS – 49 GW of coal, gas & oil plants would need to close by 2017 to maintain 2012 profit levels⁶. This also includes 24 GW of ‘mainly cash-flow positive capacity’ on top of the 7 GW that utilities already plan to shut and an additional 18 GW of closures expected to be announced.

The following boxes show case studies from five countries (Germany, the Netherlands, Italy, Spain and Poland) demonstrating the large new coal and gas capacities that have been built recently or which are under now construction.

⁶ R. MOSISON: UTILITIES NEED TO CLOSE 30% OF EUROPEAN POWER PLANTS, UBS SAYS, BLOOMBERG, 7 MARCH 2013: [HTTP://BLOOM.BG/1A0XPNW](http://bloom.bg/1A0XPNW)

Case study: Germany: large new and restored coal generation capacities

The map below shows a few selected coal power plants in Germany that have been commissioned or restored recently. In the past few years, Vattenfall, E.ON, RWE and others have built large new coal power plants. Approximately 20 coal and lignite blocks have also been rehabilitated. The map is not comprehensive, but it shows more than 15 GW of new or restored coal/lignite capacities created during the past six to seven years, signalling massive investments in assets that may become obsolete.

Substantial new gas capacities have also been built, e.g. Platts reported in October 2013 that there were more than 30 gas units under development, with 9 GW in total capacity¹. The Bundesnetzagentur listed a 10.9 GW thermal plant as scheduled for construction before 2016 and 9.9 GW of decommissionings were planned by 2018. So thermal capacities still would show a net increase^{2, 3}.

These new additions came and are coming online at a time when investors could lose €140mn on a single 750 MW coal plant annually, according to the owner of the €1.4bn Lünen plant that started commercial operation in December 2013⁴. The CEO of E.ON summarised, “when you invest in new generation, you can write it off the day you start”⁵. Still new plants are commissioned one after the other, with the potential of being closed down after only a few years of operation⁶, or production is delayed, as in the case of Statkraft’s new CCGT in Hürth⁷.

¹ PLATTS: SMALL GAS UNIT PROLIFERATE IN GERMANY, POWER IN EUROPE, ISSUE 662. 28 OCTOBER 2013.

² PLATTS: BNA: 1 GW NET ADDS TO 2018, POWER IN EUROPE, ISSUE 663, 11 NOVEMBER 2013.

³ BUNDESNETZAGENTUR – BUNDESKARTELLAMT: MONITORINGBERICHT 2013: [HTTP://WWW.BUNDESKARTELLAMT.DE/SHAREDDOCS/PUBLIKATION/DE/BERICHTE/ENERGIE-MONITORING-2013.PDF?__BLOB=PUBLICATIIONFILE&V=6](http://www.bundeskartellamt.de/shareddocs/publikation/de/berichte/energie-monitoring-2013.pdf?__blob=publicationfile&v=6)

⁴ FULDAER NACHRICHTEN: ÜWAFÜKOHLEKRAFTWERK LÜNEN RECHNET MIT 140 MILLIONEN EURO VERLUST JÄHRLICH, 27 APRIL 2013: [HTTP://WWW.FULDAER-NACHRICHTEN.DE/?P=108401](http://www.fuldaer-nachrichten.de/?p=108401)

⁵ HIGH-LEVEL STAKEHOLDER CONFERENCE ON THE ENERGY ROADMAP 2050: [HTTP://BIT.LY/1BIXCSZ](http://bit.ly/1BIXCSZ)

⁶ S. PATEL: EUROPE’S GAS POWER PLANT CARNAGE INTENSIFIES, 22 AUGUST 2013, POWERMAG: [HTTP://BIT.LY/K000GB](http://bit.ly/k000GB)

⁷ KÖLNER STADT ANZEIGER: NEUES KRAFTWERK PRODUZIERT NOCH NICHT, 13 JUNE 2013: [HTTP://BIT.LY/11CA29V](http://bit.ly/11CA29V)

Utilities actively lobby to avoid such massive losses, and authorities tend to bow to their demands. In 2010, E.ON completed Irsching-5 for €400mn but just three years later was threatening to close it down due to low usage⁸. In the end, E.ON forced a compensation deal with the Bundesnetzagentur and TenneT⁹ to keep it online for tens of millions of Euros annually¹⁰. For now, customers are compensating E.ON for an uneconomic investment.

⁸ T. ANDRESEN AND T. PATEL: EUROPE GAS CARNAGE SHOWN BY E.ON CLOSING 3-YEAR-OLD PLANT, BLOOMBERG, 12 MARCH 2013: [HTTP://BLOOM.BG/1GN2GJB](http://bloom.bg/1GN2GJB)

⁹ TENNET IS ELECTRICITY TRANSMISSION OPERATOR OF MOST OF GERMANY AND THE NETHERLANDS. [HTTP://WWW.TENNET.EU/NL/HOME.HTML](http://www.tennet.eu/nl/home.html)

¹⁰ STERN: ENIGUNG VON EON UND NETZBETREIBER TENNET: GASKRAFTWERK IRSCHING BLEIBT DOCH AM NETZ, 26 APRIL 2013: [HTTP://BIT.LY/1LCNZXB](http://bit.ly/1LCNZXB)

Map 1: Coal plants built (black)/renovated (yellow) or under construction in Germany since 2007

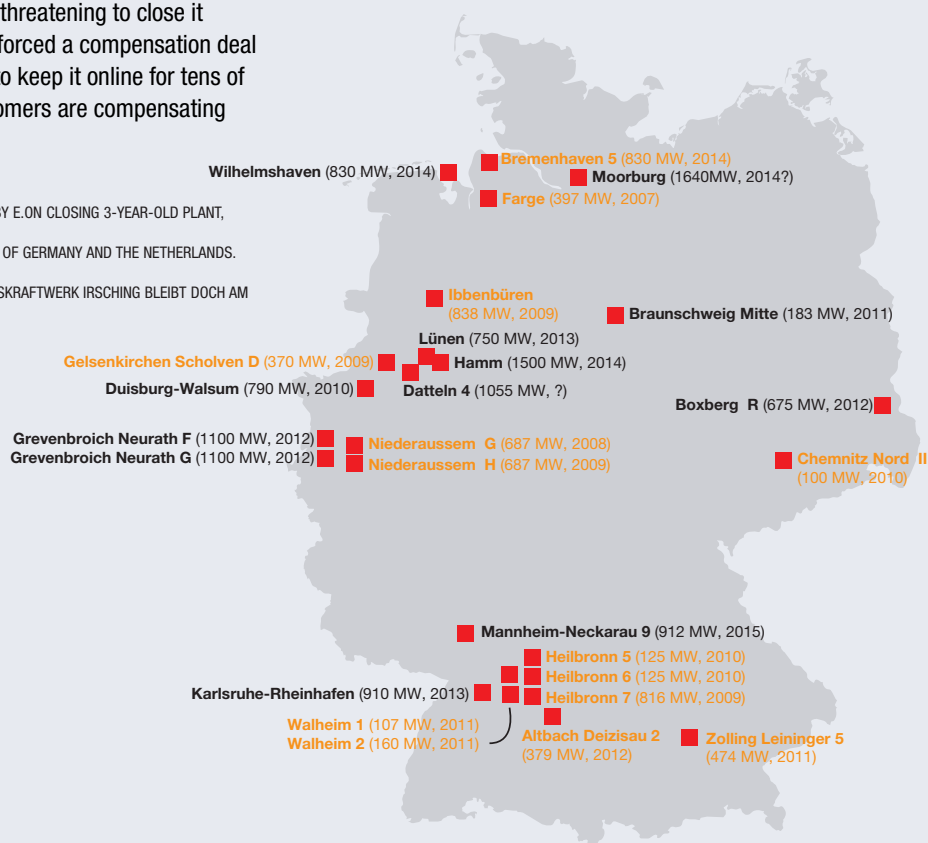


Table 2: Coal plants recently built/renovated or under construction in Germany since 2007

Plant (City)	Capacity	Owner	Date
Bremen Hafen 5	145 MW	SWB	Rehabilitation: 2007
Bremen Hafen Farge	397 MW	GdF Suez	Rehabilitation: 2007
Niederaußem G&H	2*687 MW	RWE	Rehabilitation: 2008/2009
lbbenbüren	838 MW	RWE	Rehabilitation: 2009
Gelsenkirchen Scholven D	370 MW	E.ON	Rehabilitation: 2009
Heilbronn 5&6&7	2*125 MW + 816 MW	EnBW	Rehabilitation: 2009/2010
Chemintz Nord II	100 MW	Eins Energie	Rehabilitation: 2010
Walheim 1 & 2	107 MW + 160 MW	EnBW	Rehabilitation: 2011
Zolling Leninger 5	474 MW	GdF Suez	Rehabilitation: 2011
Altbach Deizisau 2	379 MW	EnBW	Rehabilitation: 2012
Boxberg R	675 MW	Vattenfall	Commissioning: 2012
Neurath BoA 2&3	2*1100 MW	RWE	Commissioning: 2012
Westfalen D&E (Hamm-Uentrop)	2*800 MW	RWE + kommunale Partner	Commissioning: 2013/2014
Walsum 10 (Duisburg)	790 MW	Evonik Steag, EVN	Commissioning: 2013
Lünen	750 MW	Trianel	Commissioning: 2013
RDK 8 (Karlsruhe-Rheinhafen)	912 MW	EnBW	Commissioning: 2013
Datteln 4	1100 MW	E.ON	Commissioning: 2014
Wilhelmshaven	800 MW	GdF Suez-BkW FMB	Commissioning: 2014
Moorburg 1&2 (Hamburg)	2*820 MW	Vattenfall	Commissioning: 2014
Mannheim GKM9 (Mannheim-Neckarau)	900 MW	GKM	Commissioning: 2015

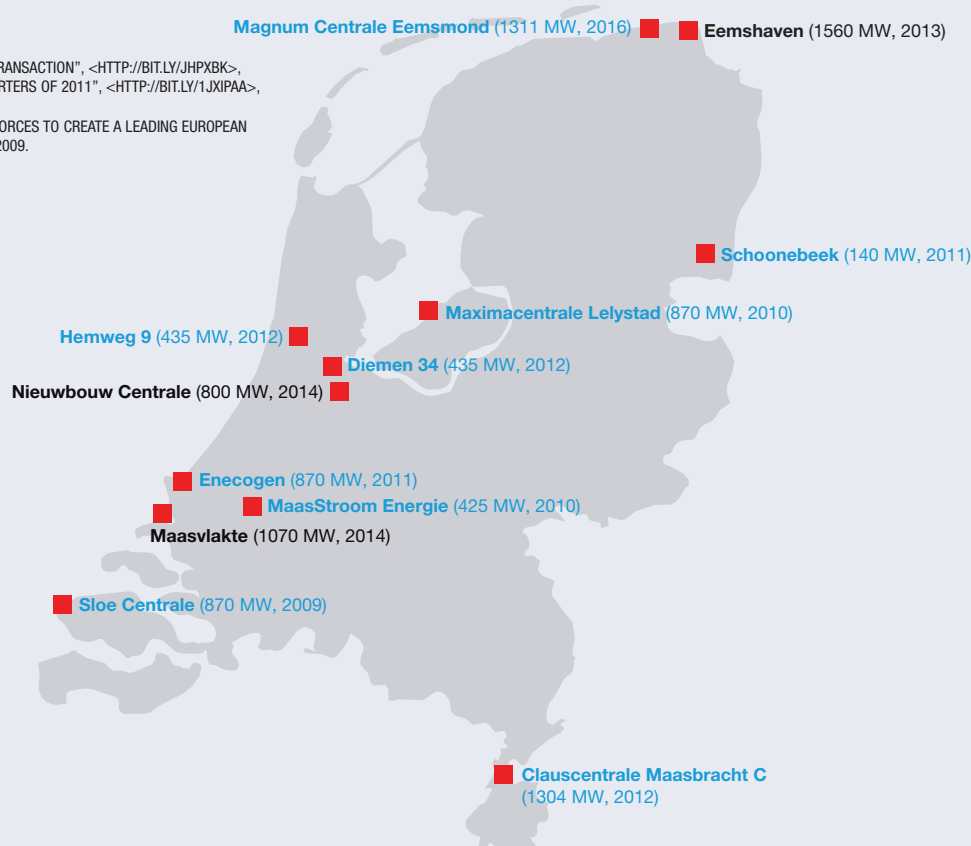
Case study: The Netherlands: over 10 GW of new coal and gas plants since 2009

The power plant building fever reached the Netherlands as well: RWE, Vattenfall, GdF Suez, E.ON, EdF, Eneco and others have completed/are completing at least 10 GW of gas and coal-fuelled capacities since 2009. RWE (with 3 GW) and Vattenfall (with 2 GW) built the most. Both continued large generation projects after acquiring local utilities, Essent and Nuon in 2009 (€8.1bn¹ and €10.3bn², respectively). RWE and Vattenfall have already had to acknowledge billions of impairment losses for these two transactions.

According to PwC³, total capacity (including wind and connections with neighbouring countries) is expected to reach 55 GW in 2020, while Dutch peak demand is estimated to be just over 20 GW that year. Even when corrected for the lower load factors of wind energy, total capacity would still reach 47 GW.

³ PRICEWATERHOUSECOOPERS, REPORT "ENERGIE-NEDERLAND, FINANCIAL AND ECONOMIC IMPACT OF A CHANGING ENERGY MARKET", <HTTP://BIT.LY/1JPB7KM>, MARCH 2013

Map 2: New coal (black) and gas plants (blue) commissioned in The Netherlands during the past 5 years



¹ RWE, PRESS RELEASE "ESSENT AND RWE COMPLETE TRANSACTION", <HTTP://BIT.LY/JHPXBK>, SEPTEMBER 2009. RWE, "REPORT ON THE FIRST THREE QUARTERS OF 2011", <HTTP://BIT.LY/1JXIPAA>, PAGE 47.

² NUON, PRESS RELEASE, "NUON AND VATTENFALL JOIN FORCES TO CREATE A LEADING EUROPEAN ENERGY COMPANY", <HTTP://BIT.LY/197EMZH>, FEBRUARY 2009.

Table 3: The Netherlands: new coal and gas plants commissioned during the past 5 years

Plant (City)	Capacity	Owner	Commissioning Date
Sloe Centrale	Gas: 870 MW	Delta, EdF	2009
Maximacentrale Lelystad	Gas: 870 MW	GdF Suez	2010
MaasStroom Energie	Gas: 425 MW	Intergen	2010
Enecogen (Rotterdam)	Gas: 870 MW	Eneco, Dong	2011
Schoonebeek	Gas: 140 MW	Shell, ExxonMobil	2011
Clauscentrale Maasbracht C	Gas: 1304 MW	RWE/Essent	2012
Diemen 34 (Amsterdam)	Gas: 435 MW	Vattenfall/Nuon	2012
Henweg 9 (Amsterdam)	Gas: 435 MW	Vattenfall/Nuon	2012
Eemshaven	Coal: 1560 MW	RWE/Essent	2014
Maasvlakte	Coal: 1070 MW	E.ON	2014
Nieuwbouw Centrale (Rotterdam)	Coal: 800 MW	GdF Suez	2014
Magnum Centrale (Eemmond)	Gas: 1311 MW	Vattenfall/Nuon	2013

SOURCES: PLATTS, COMPANY WEBSITES

Case study: Spain and Italy: large new capacities' addition peaking somewhat earlier

According to Platts' power plant database, in both in Spain and Italy around 20-20 GW of gas/LNG fuelled power generation capacity was added between 2003 and 2012.

In Spain: 27 GW gas power generation existed in 2013, all of which was commissioned between 2002 and 2011. The large new fossil capacities were hit by falling demand and growth in renewables. In 2013 electricity demand showed a third consecutive annual decline. Renewable capacities reached 32.9 GW in 2013, and their share in demand reached 42.4%, up from 31.9% in 2012. While in 2008 gas plants produced 95.5 TWh (32%), this fell to 42.5 TWh (14%) in 2012 and 28.9 TWh (10%) in 2013. In July 2013 Iberdrola asked for the closure of the third unit (800 MW) in their power plant at Arcos de la

Frontera (Andalusia)², while a few months later Endesa (Enel) applied to build an additional 800 MW coal power plant in a nearby location.

In Italy between 2002 and 2012, new fossil fuelled capacity totalling 23 GW was commissioned, most before 2007. Gas capacities grew especially fast, e.g. they doubled from 12 GW in 2000 to 24.4 GW in 2009. Total installed capacity increased by nearly 60%, from 77 GW in 2002 to 122 GW in 2011, while consumption grew by only 8% (from 291 TWh to 314 TWh) and peak demand by even less (from 50 to 51 GW). Demand fell significantly after the financial crisis, e.g. by 5.7% in 2009 alone. At the same time renewable competition grew significantly, e.g. between 2007 and 2012 18 GW solar PV and wind capacity was added.

1 REE: EL SISTEMA ELÉCTRICO ESPAÑOL EN EL 2008: [HTTP://BIT.LY/1LXycnL](http://bit.ly/1LXycnL); INFORME DEL SISTEMA ELÉCTRICO ESPAÑOL 2012: [HTTP://BIT.LY/1A5EHY0](http://bit.ly/1A5EHY0)

2 A. M. SEVILLA: IBERDROLA SOLICITA A INDUSTRIA EL CIERRE PARCIAL DEL CICLO COMBINADO DE ARCOS, DIARIO DE SEVILLAM 27 JULY 2013: [HTTP://BIT.LY/1DFPV8G](http://bit.ly/1DFPV8G)

Map 3: Combined cycle gas power plants commissioned in Spain 2002 – 2011

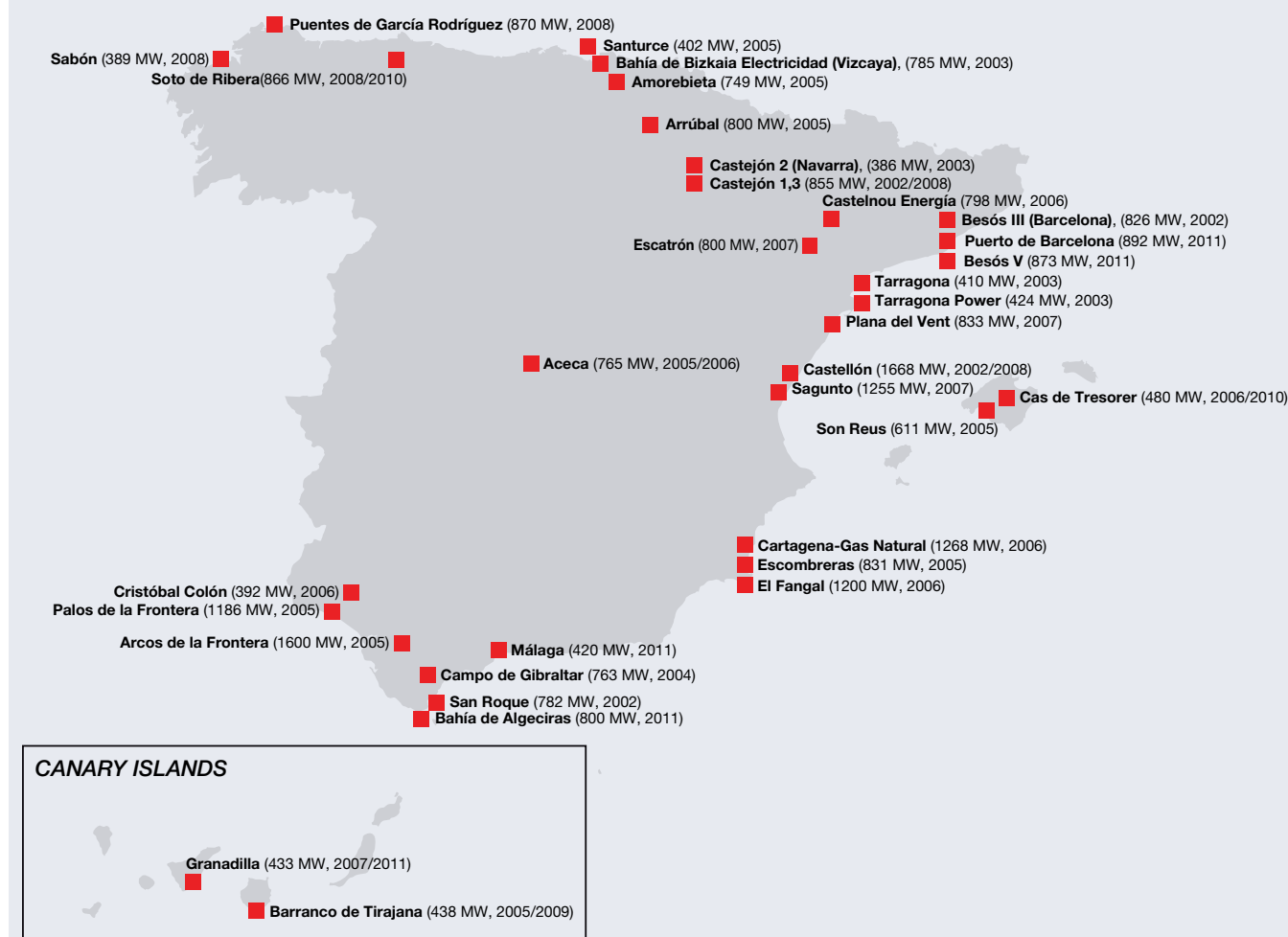


Table 4: Combined cycle gas power plants commissioned in Spain 2002 – 2011

Combined Cycle Power Plant	Power (MW)	Owner	Commissioning date
San Roque (Cádiz)	782	Endesa, Gas Natural Fenosa	2002
Besós III (Barcelona)	826	Gas Natural Fenosa; Endesa	2002
Castejón 2 (Navarra)	386	Iberdrola	2003
Bahía de Bizkaia Electricidad (Vizcaya)	785	EVE, Iberdrola, BP	2003
Tarragona	410	E.ON	2003
Tarragona Power	424	Iberdrola	2003
Campo de Gibraltar (Cádiz)	763	Gas Natural, Cepsa,	2004
Amorebieta (Vizcaya)	749	ESB, Osaka Gas	2005
Santurce (Vizcaya)	402	Iberdrola	2005
Arcos de la Frontera (Cádiz)	1600	Iberdrola	2005
Palos de la Frontera (Huelva)	1186	Gas Natural Fenosa	2005
Son Reus (Mallorca)	611	Endesa	2005
Arrúbal (La Rioja)	800	CountorGlobal	2005
Escombreras (Murcia)	831	Iberdrola	2005
Aceca (Toledo)	765	Iberdrola, Gas Natural Fenosa	2005/2006
Cartagena-Gas Natural (Murcia)	1268	Gas Natural Fenosa	2006
El Fangal (Murcia)	1200	GdF Suez	2006
Cristóbal Colón (Huelva)	392	Endesa	2006
Castelnou Energía (Teruel)	798	Electrabel (GdF Suez)	2006
Plana del Vent (Tarragona)	833	Alpiq, Gas Natural Fenosa	2007
Escatrón (Zaragoza)	800	E.ON	2007
Sagunto (C. Valenciana)	1255	Gas Natural Fenosa	2007
Castellón (C. Valenciana)	1668	Iberdrola	2002/2008
Castejón 1,3 (Navarra)	855	HC Energía	2002/2008
Puentes de García Rodríguez (La Coruña)	870	Endesa	2008
Sabón (La Coruña)	389	Gas Natural Fenosa	2008
Barranco de Tirajana (Gran Canaria)	438	Endesa	2005/2009
Soto de Ribera (Asturias)	866	HC Energía	2008/2010
Cas de Tresorer (Mallorca)	480	Endesa	2006/2010
Granadilla (Tenerife)	433	Endesa	2007/2011
Bahía de Algeciras (Cádiz)	800	E.ON	2011
Málaga	420	Gas Natural Fenosa	2011
Besós V (Barcelona)	873	Endesa	2011
Puerto de Barcelona	892	Gas Natural Fenosa	2011

SOURCES: PLATTS, COMPANY WEBSITES

Case study: Poland: the Opole II coal power plant, when “politics override business logic”

PGE's Opole II in Poland is a recent example of new plants that made no economic sense to build already from the moment of the investment decision. Here, the Polish government ordered the 70% state-owned PGE to build a 1,800 MW coal plant despite the management's opposition¹ and the CEO's resignation² over the matter.

PGE's share price plunged by 7% in June 2013 when the prime minister pushed ahead with the project³, and investment banks like JP Morgan warned of the project's potential to destruct shareholder

value⁴ even after the government made a state-owned coal mining company sell coal to the new plant at below market prices. The government is also ensuring financing from everywhere it can: from its newly created investment fund⁵; by using a government bank to buy up PGE's bonds at below-market yields⁶; and by issuing guarantees to the (nearly bankrupt) building companies⁷. Poland simply makes the taxpayers pay for the missing billions in the project. *The Economist* called the project an example of “politics overriding business logic”⁸.

¹ UPI: POLAND'S PGE OKS \$3.78 BILLION EXPANSION OF OPOLE COAL-FIRED PROJECT, 10 JANUARY 2014: [HTTP://BIT.LY/1D75D6E](http://bit.ly/1D75D6E)

² PLATS: POWER IN EUROPE: PGE'S KILIAN RESIGNS OVER OPOLE, 25 NOVEMBER 2013

³ P. BUJNICKI & M. MARTEWICZ: PGE DROPS MOST IN 3 MONTHS AS PREMIER BACKS OPOLE PLANT, BLOOMBERG, 6 JUNE 2013: [HTTP://WWW.BLOOMBERG.COM/NEWS/2013-06-06/PGE-DROPS-MOST-IN-3-MONTHS-AS-PREMIER-BACKS-OPOLE-PLANT.HTML](http://www.bloomberg.com/news/2013-06-06/pge-drops-most-in-3-months-as-premier-backs-opole-plant.html)

⁴ J.P. MORGAN CAZENOVE: PGE: KW CONTRACT LOOKS BROADLY IN LINE – STILL SEE RISK THAT OPOLE DESTROYS SHAREHOLDER VALUE – ALERT, 19 AUGUST 2013

⁵ M. MARTEWICZ: PGE WANTS PIR IN OPOLE, TALKS WITH FUTURE ENERGY BUYER, BLOOMBERG, 28 AUGUST 2013. ACCESSED IN BLOOMBERG PROFESSIONAL SERVICE.

⁶ M. MARTEWICZ & K. KRASUSKI: KFW CLONE DEPRESSES YIELDS AS IT CROWDS OUT FUNDS: POLAND CREDIT, BLOOMBERG BUSINESS WEEK, 2 JULY 2013: [HTTP://BUSWK.CO/1IAMGZZ](http://buswk.co/1IAMGZZ)

⁷ M. MARTEWICZ: POLIMEX IS CLOSE TO AGREEING “FINANCIAL PACKAGE” WITH CREDITORS, BLOOMBERG, 27 AUGUST 2013, ACCESSED IN BLOOMBERG PROFESSIONAL SERVICE.

⁸ THE ECONOMIST: POLAND'S ENERGY INVESTMENTS: POLITICS OVERRIDES BUSINESS LOGIC, 12 JUNE 2013: [HTTP://ECON.ST/KRNUPV](http://econ.st/krnupv)

Falling wholesale prices

As a consequence of high over-capacities and low demand, wholesale prices fell and are now at five to eight year lows – and getting worse¹ in most markets. The following chart shows how 2019 futures baseload German prices fell during 2013².

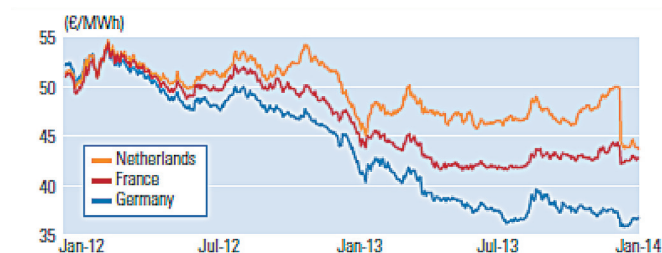
Figure 4: Fall of 2017 futures baseload German prices during 2013

Price



During the past two years, baseload futures prices have been falling in Germany, France and the Netherlands, as shown in the following chart from Platts³.

Figure 5: Germany, France and Netherlands day-ahead base



SOURCE: PLATTS

¹ R. MORISON, J. MENGWEIN: GERMAN POWER COSTS SEEN DROPPING FOR FOURTH YEAR, BLOOMBERG, 3 JANUARY 2013: [HTTP://BLOOM.BG/1DFXIH9](http://bloom.bg/1DFXIH9)

² 2019 PHELIX BASELOAD YEAR FUTURES PRICES: [HTTP://WWW.EEX.COM/EN/MARKET-DATA/POWER/DERIVATIVES-MARKET/PELIX-FUTURES/#/2014/02/11](http://www.eex.com/en/market-data/power/derivatives-market/pelix-futures/#/2014/02/11)

³ PLATTS SPECIAL REPORT: GERMAN ELECTRICITY. EUROPE'S POWER DISCOUNT-SUPERMARKET, FEBRUARY 2014

Market punishes overinvestment

These massive over-investments in fossil capacities with higher marginal costs (as compared to grid-connected renewables) have led to large utilities being more and more harshly punished.

According to a recent Oxford University study,¹ an increasing number of recently built CCGT gas plants are being mothballed or prematurely closed across the EU. Over the course of 2012–2013, 10 major EU utilities announced the mothballing and closure of over 20 GW CCGT of capacity, of which 8.8 GW was either built or acquired within the past 10 years.

Ernst & Young's annual analysis of European power and utility asset impairments² shows increasing write-downs, with a large share coming from generation assets. Annual impairments among the largest 16 European utilities grew from €8.5bn in 2010 to €9.3bn in 2011, and to €12.8bn in 2012. In 2010–2011 E.ON, EDF and Vattenfall represented 60% and in 2012 Enel, RWE and GdF Suez made up 59% of the impairments. For example, GdF Suez wrote down over €2bn mainly on EU assets³ in 2012 and Enel made a €2.58bn impairment on Endesa⁴.

In 2013 Vattenfall wrote down SEK29.7bn (or €3.4bn), mostly from its coal and gas plants in the Netherlands and Germany⁵. This large impairment pushed the company's net income to negative for the whole year.⁶ Still, the company plans to continue investing in fossil coal assets, including by completing its new Moorburg coal plant outside Hamburg.

RWE will announce its annual results in early March, but has already signalled that it will write down an additional €3.3bn, of which €2.9bn is attributable to deteriorated earnings from fossil-fuel power stations⁷. RWE already wrote down €0.9bn in Q3 2013. GdF Suez also announced that it is preparing to write down European power assets, while – after its large earlier write-offs – E.ON is not planning to write down any more plants in the near future⁸.

¹ B. CALDECOTT & J. MCDANIELS: STRANDED GENERATION ASSETS: IMPLICATIONS FOR EUROPEAN CAPACITY MECHANISMS, ENERGY MARKETS AND CLIMATE POLICY. WORKING PAPER. SMITH SCHOOL OF ENTERPRISE AND ENVIRONMENT, OXFORD UNIVERSITY, JANUARY 2014

² ERNST & YOUNG: BENCHMARKING EUROPEAN POWER AND UTILITY ASSET IMPAIRMENTS. LESSONS FROM 2012; 2013

³ W. HOROBIN: GDF SUEZ PROFIT HIT BY IMPAIRMENTS, THE WALL STREET JOURNAL, 28 FEBRUARY 2013: [HTTP://ON.WSJ.COM/1F6UIHM](http://on.wsj.com/1F6UIHM)

⁴ L. MOLONEY: ENEL SLASHES DIVIDEND AFTER EUR 3.58 BILLION ENDESA CHARGE, THE WALL STREET JOURNAL, 14 MARCH 2013: [HTTP://ON.WSJ.COM/1EEQGEQ](http://on.wsj.com/1EEQGEQ)

⁵ VATTENFALL: INTERIM REPORT JANUARY – JUNE, 2013: [HTTP://WWW.VATTENFALL.CO.UK/EN/FILE/Q2-REPORT-2013_35251329.PDF](http://www.vattenfall.co.uk/en/file/Q2-REPORT-2013_35251329.PDF)

⁶ VATTENFALL: FULL YEAR 2013 RESULTS. CONFERENCE CALL FOR ANALYSTS AND INVESTORS, 4 FEBRUARY 2014: [HTTP://CORPORATE.VATTENFALL.COM/GLOBAL/CORPORATE/INVESTORS/INVESTOR-PRESENTATIONS/Q4-ANALYST-AND-INVESTOR-CONFERENCE-CALL.PDF](http://corporate.vattenfall.com/global/corporate/investors/investor-presentations/Q4-ANALYST-AND-INVESTOR-CONFERENCE-CALL.PDF)

⁷ S. NICOLA: RWE WRITES DOWN \$4.5 BILLION AS POWER-PLANT EARNINGS DROP, BLOOMBERG, 28 JANUARY 2014: [HTTP://BLOOM.BG/1EchxyD](http://bloom.bg/1EchxyD)

⁸ C. STEITZ: UPDATE 2 – RWE TAKES €3.3BN CHARGE ON POWER PLANTS, REUTERS, 28 JANUARY 2014: [HTTP://REUT.RS/1JMNATB](http://reut.rs/1JMNATB)

4.2. MISSING THE RENEWABLES REVOLUTION

The top EU utilities have failed to respond properly to the emergence of renewables despite having plenty of time to understand the risks and opportunities. They have also had strong comparative advantages to build up renewable positions, including access to large amounts of cheap financing and tax/investment credits; established relationships with equipment producers; the ability to combine and hedge different energy sources; and experience with regulation and licensing. But most utilities missed this opportunity, and the mistake has started to haunt them, as renewables increase fast due to feed-in tariffs and low interest rates¹.

¹ DPA-AFX: AUSBLICK 2014: VERSORGER RUFEN AUS DEM 'TAL DER TRÄNEN' NACH DER POLITIK, 5 JANUARY 2014: [HTTP://YHOO.IT/1EHDA7G](http://yhoo.it/1EHDA7G)

Low renewable production by utilities

The 10 largest utilities generated more than half of all power within the EU in 2012, but only 4% of this was from non-hydro renewable sources. While the share of wind power within total EU-27 power production amounted to 6.4% in 2012, the share of wind power within the total power production by the 10 largest utilities was low at 2.7%. Even on hydro², the large utilities score lower than the EU-average, 9.2% versus 11.7%.³

² HYDRO IS EXCLUDED FROM THE TABLE BELOW. THIS IS BECAUSE POWER PRODUCTION FROM HYDRO HAS BEEN STABLE OVER THE LAST TEN YEARS WITHIN THE EU-27, WHILE EXTRA CAPACITY HAS BEEN BUILT FOR POWER GENERATION THROUGH OTHER RENEWABLES. HYDRO IS ALSO EXCLUDED, BECAUSE ITS APPLIANCE DEPENDS VERY MUCH ON GEOGRAPHICAL CIRCUMSTANCES (FOR EXAMPLE VATTENFALL HAS MORE POSSIBILITIES THAN OTHER UTILITIES)

³ PRODUCTION WITHIN THE EU BY THE 10 LARGEST EU-UTILITIES IS BASED ON INFORMATION BY THE COMPANIES: COMPANY REPORTS, ANALYST PACKS, DATA TOOLS, ETC. THE FIGURES FOR TOTAL PRODUCTION AND PRODUCTION OF WIND POWER AND HYDRO WITHIN THE EU WERE DERIVED FROM: EUROPEAN COMMISSION, EUROSTAT, "ELECTRICITY PRODUCTION AND SUPPLY STATISTICS, EXCEL-SHEET": [-<HTTP://BIT.LY/19Y7QM>](http://bit.ly/19Y7QM)

Table 5: Share of renewables of the 10 largest EU utilities

Share of renewables	EdF	RWE	E.ON	GdF Suez	Enel	Vattenfall	Iberdrola	CEZ	EnBW	PGE
Wind %	1%	2%	2%	4%	4%	2%	21%	1%	1%	0%
Other non-hydro %	1%	2%	1%	2%	3%	2%	1%	2%	1%	3%

Case study: German utilities and renewable asset ownership

In 2011 the German "Big Four" (RWE, E.ON, Vattenfall and EnBW) owned 74% of all generation capacity not covered by the Renewable Energy Law ("EEG")¹. In the same year, they only controlled 6.5% of non-hydro renewable capacities². In early 2013, *trend:research* estimated their renewable share to be even lower, at 4.9%³.

Utilities have allowed co-operatives, private individuals, industrial companies, financial firms and others to dominate both wind and solar power production. Even in onshore wind, where the utilities have especially large advantages, the Big Four only own 10% of the capacity while private individuals own 50% and other companies 40%. The large utilities own only a meagre 3.5% of all German solar capacity while private individuals and non-utility companies each have 48%⁴.

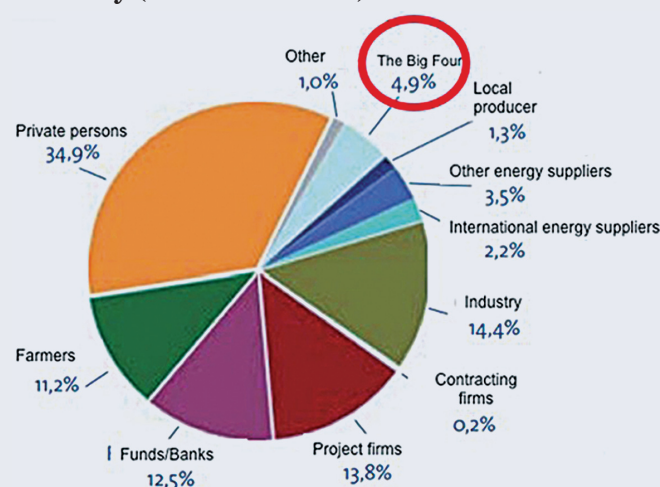
¹ BUNDESNETZAGENTUR UND BUNDESKARTELLAMT, "MONITORINGREPORT 2012", [-<HTTP://BIT.LY/191SUGC>](http://bit.ly/191SUGC), FEBRUARY 2013

² HEINRICH BÖLL STIFTUNG: ENERGY TRANSITION: THE GERMAN ENERGIEWENDE BY CRAIG MORRIS AND MARTIN PEHNT, NOVEMBER 2012: [HTTP://BIT.LY/19EZAYA](http://bit.ly/19EZAYA)

³ TREND-RESEARCH. ANTEILE EINZELNER MARKTAKTEURE AN ERNEUERBARE ENERGIEN-ANLAGEN IN DEUTSCHLAND (2. AUFLAGE) KURZSTUDIE, 2013 [HTTP://BIT.LY/1ECQNGD](http://bit.ly/1ECQNGD). THE FIGURES DO NOT INCLUDE PUMPED-STORAGE HYDROELECTRICITY.

⁴ TREND ANALYSIS COMPANY TREND:RESEARCH AND THE LEUPHANA UNIVERSITÄT LÜNEBURG: "DEFINITION UND MARKTANALYSE VON BÜRGERENERGIE IN DEUTSCHLAND", [-<HTTP://BIT.LY/1BYVFZM>](http://bit.ly/1BYVFZM), OCTOBER 2013

Figure 6: Ownership structure of renewables in Germany (In total 72.9 GW)



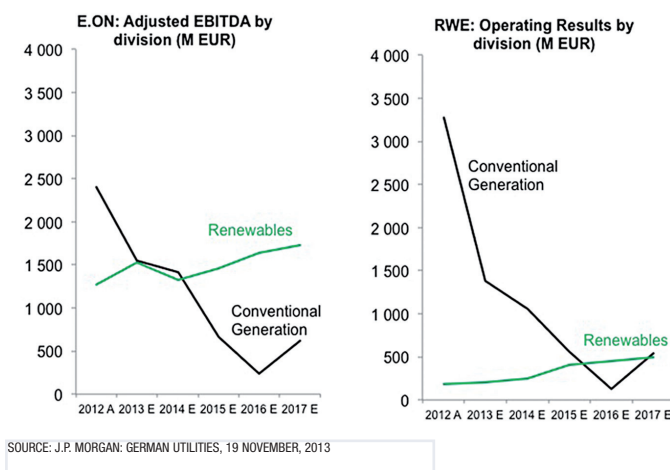
SOURCE: TREND RESEARCH

Blind to the benefits

Utilities have been so busy attacking the regulations related to renewable energy that they have ignored the benefits of controlling a substantial part of renewable capacities. Beyond the strategic value of being able to combine renewables and gas capacities or pumped storage facilities, renewables can also bring direct cash benefits. Recently, large utilities such as E.ON, Iberdrola and Enel have been making considerable earnings from their renewable businesses:

- During the past five years, 5-6% of Iberdrola's revenue and 20% of its EBITDA¹ came from its renewable business, contributing €1.5–1.6bn in earnings annually². Renewable EBITDA is also expected to remain in the €1.5–1.7bn range in the coming years while further deterioration of EBITDA from the Spanish liberalised segment is probable³.
- E.ON's renewable business, including hydro, produced €1.5bn (16%) of its total EBITDA in 2011 and €1.3bn (12%) in 2012. Non-hydro renewable EBITDA was €0.6bn in both years⁴. Based on results of the first nine months of last year, this is expected to grow in 2013⁵. The following chart shows that J.P. Morgan forecasts growing earnings for E.ON's and even RWE's renewable businesses but a significant fall in their conventional generation earnings⁶. The analysis also gave a sum of parts evaluation of the different divisions. It estimated the current value of E.ON's Generation business at €1.7bn and of its Renewable business at €15.3bn; RWE's Conventional Power Business was valued at €8.9bn and its Renewables business at €5.1bn.

Figure 7: Evolution of earnings by German utilities RWE and E.On from renewable and conventional generation



- Enel Green Power (EPGW) in 2012 delivered €1.7bn, or 10% of the Enel group's EBITDA and 15% of its operating profits⁷. These percentages increased in the first nine months of 2013, year on year, while Spanish and Italian fossil generation EBITDA fell. Renewables in the group account for 3% of revenues, but 11% of earnings⁸. J.P. Morgan expects further increases in EPGW's EBITDA, e.g. over €2bn in 2015 and close to €2.2bn in 2016 while it forecasts that Generation and Energy Management business' EBITDA will weaken⁹. EPGW shares are outperforming those of parent company Enel (see the Bloomberg share price chart below).

Figure 8: Evolution of equity by Enel group and its subsidiary Enel Green Power



¹ IBERDROLA 2012-14 OUTLOOK, STRATEGIC PILLARS, CAPITAL MARKET DAY, 24 OCTOBER 2013: [HTTP://BIT.LY/19E8KID](http://bit.ly/19E8KID)

² IBERDROLA 2012-14 OUTLOOK, RENEWABLES BUSINESS, CAPITAL MARKET DAY, 24 OCTOBER 2013: [HTTP://BIT.LY/1CF6PXY](http://bit.ly/1CF6PXY)

³ J.P. MORGAN: IBERDROLA: 2014 SHOULD STILL BE A DIFFICULT YEAR, BUT A 6% DIVIDEND YIELD SHOULD PROVIDE SUPPORT, 28 OCTOBER 2013

⁴ E.ON: FULL YEAR 2012 RESULTS, MARCUS SCHENCK, 13 MARCH 2013: [HTTP://BIT.LY/1D60FQ2](http://bit.ly/1D60FQ2)

⁵ E.ON: FIRST NINE MONTHS 2013, 13 NOVEMBER 2013: [HTTP://BIT.LY/1BYZMF9](http://bit.ly/1BYZMF9)

⁶ J.P. MORGAN: GERMAN UTILITIES: RWE: BALANCE SHEET STORY CONTINUING TO UNFOLD, MAINTAIN PREFERENCE VS. E.ON, 19 NOVEMBER 2013

⁷ BLOOMBERG PROFESSIONAL, ENEL IM EQUITY, FA – FINANCIAL ANALYSIS, SEGMENTS, ACCESSED IN DECEMBER 2013

⁸ BANCA IMI: ENEL: 2013 GUIDANCE CONFIRMED, BUT UPSIDE ON NET DEBT TARGET. CREDIT COMPANY NOTE, 27 NOVEMBER 2013

⁹ J.P. MORGAN: SPANISH & ITALIAN GENERATIONS: TARIFF DEFICIT WEIGH ON NEAR-TERM SENTIMENT, 17 DECEMBER 2013

Case study: Iberdrola's controversial messages

Iberdrola started to invest in wind early on and became one of the world's biggest wind-asset owners. It also became the largest shareholder of Gamesa, a wind turbine producer. By the end of 2012, the company had 14 GW in non-hydro renewables or 30.5% of its total installed capacity worldwide. In Europe this was lower: 24% in Spain and 17% in the UK¹. Globally, Iberdrola's non-hydro renewable share of its net generation output was 24% in 2012²; again in Europe it was lower: 21% in Spain and 12% in the UK.

Iberdrola had used renewable language and symbols in its corporate communications for years, but radically changed its approach around 2009, when wholesale prices fell below €40/MWh and its gas power generation collapsed – falling from 20 GWh in 2008 to 3 GWh in 2012³. Since 2009/10 the company has been contradicting itself on renewables. It mostly maintained renewable-friendly communications abroad but started to criticise – and openly lobby against – renewable energy in Spain.

The change is spectacular. For instance, Iberdrola president Ignacio Sánchez-Galán in 2009 announced with pride a 50-MW solar thermal-gas hybrid power plant⁴, but three years later he said the

company was against the same technology⁵.

Recently, Iberdrola stopped new renewable investments in Spain and in the US and is only completing ongoing projects. While in 2009-2011 its total renewable capex averaged €1.9bn annually, the company nearly halved this to €1bn in 2012 and cut it further in 2013⁶. This may also explain why the world's largest onshore wind producer has moved so slowly into offshore wind. The company's renewable asset value peaked in 2011 at €23.6bn and started to fall in 2012⁷.

Potentially even more destructive is the impact of Iberdrola's anti-renewable campaign on solar energy in Spain. The Iberdrola-led lobby has successfully reduced solar investors' revenues by billions of Euros annually and killed interest in further Spanish renewable investments⁸. Ironically, Iberdrola has so successfully lobbied against renewables that it may become one of the biggest losers after the government's new draft rules aiming to limit return on existing renewable assets go into effect. The new rules mean that 37% of installed wind turbines will lose premium payments, and the rest will see their earnings reduced by 50%⁹.

¹ IBERDROLA: INFORMATION SUPPLEMENTARY TO THE SUSTAINABILITY REPORT: [HTTP://BIT.LY/1BDA9F5](http://bit.ly/1BDA9F5)

² IBERDROLA: SUSTAINABILITY REPORT 2012: [HTTP://BIT.LY/1HKQUZ7](http://bit.ly/1HKQUZ7)

³ GREENPEACE ESPAÑA: IBERDROLA, EMPRESA ENEMIGA DE LAS RENOVABLES, MAY 2013: [HTTP://BIT.LY/1KLBWCF](http://bit.ly/1KLBWCF)

⁴ IBERDROLA: JOSE MARIA BARREDA AND IGNACIO GALAN OPEN IBERDROLA RENOVABLES' FIRST SOLAR THERMAL POWER PLANT, 8 MAY 2009: [HTTP://BIT.LY/1CH2KWV](http://bit.ly/1CH2KWV)

⁵ GREENPEACE ESPAÑA, "IBERDROLA, THE COMPANY ENEMY OF RENEWABLE ENERGY", <[HTTP://BIT.LY/1DCUS5i](http://bit.ly/1DCUS5i)>, MAY 2013.

⁶ IBERDROLA: OUTLOOK 2012/14. RENEWABLE BUSINESS, 24 OCTOBER 2013: [HTTP://BIT.LY/1CF6PXY](http://bit.ly/1CF6PXY)

⁷ BLOOMBERG PROFESSIONAL. IBERDROLA (IBE SA). FA (FINANCIAL ANALYSIS), B/S (BALANCE SHEET), TOTAL ASSETS – PRODUCT/BRAND SEGMENTS – RENEWABLE ENERGIES, ACCESSED JANUARY 2014

⁸ M. GALANOVA: SPAIN'S SUNSHINE TOLL: ROW OVER PROPOSED SOLAR TAX, BBC, 6 OCTOBER 2013: [HTTP://WWW.BBC.CO.UK/NEWS/BUSINESS-24272061](http://www.bbc.co.uk/news/business-24272061)

⁹ T. WHITE & E. DUARTE: SPAIN PLANS TO CAP RETURN EARNED BY CLEAN ENERGY PLANTS AT 7.4%, BLOOMBERG, 3 FEBRUARY 2014

Small(er) is more beautiful?

It is not only specialist developers that have benefited¹ from the renewable revolution, but some smaller EU utilities also, such as Dong Energy and EdP.

Wind energy delivered 32% of Dong Energy's EBITDA for the first nine months of 2013², nearly doubling the amount year on year, thanks to the completion of two large offshore wind farms. During this period, Dong produced seven times more EBITDA on its wind business than on its thermal power business while wind sales (TWh) were less than half that of thermal power sales (TWh). Nearly half (46%) of all of Dong's gross investments were dedicated to the wind business. The company also played a key role in attracting new types of large investors to wind projects, such as large pension funds and Lego parent Kirkbi³.

¹ T. ANDERSEN: GERMAN UTILITIES HAMMERED IN MARKET FAVORING RENEWABLE, BLOOMBERG, 12 AUGUST 2013: [HTTP://BLOOM.BG/1YAXIT](http://bloom.bg/1YAXIT)

² DONG ENERGY: INTERIM FINANCIAL REPORT. FIRST NINE MONTHS 2013. 23 OCTOBER 2013: [HTTP://BIT.LY/19SDINE](http://bit.ly/19SDINE)

³ J. ACHER: LEGO OWNERS PLASH \$500MN ON GREEN POWER, REUTERS, 23 FEBRUARY 2012: [HTTP://WWW.REUTERS.COM/ARTICLE/2012/02/23/US-DONGENERGY-LEGO-IDUSTRE81MOM02120223](http://www.reuters.com/article/2012/02/23/us-dongenergy-lego-idUSTRE81MOM02120223)

EdP is the world's largest offshore wind developer and one of the largest onshore wind owners. It increased its renewable EBITDA from €231mn in 2009 to €938mn in 2012. In total EdP produced 25% of its EBITDA in its renewable division in the first nine months of 2013 despite being penalised by a new tax in Spain⁴. As for the company's total generation capacity, 34% is wind and another 34% hydro, producing 32% and 37% respectively of its total power in the same period. The share of wind production grew from 4% in 2006 to 15% in 2010 and 32% in 2013.

⁴ EDP: RESULTS PRESENTATION 9M2013: [HTTP://BIT.LY/1LL7MW](http://bit.ly/1LL7MW)

4.3. MISSING INITIAL ADVANTAGE IN SERVING PROSUMERS

European utilities seem to be losing their vantage-points in serving the fast-changing needs of their long-time customers, more and more of whom are becoming prosumers. As GdF Suez's CEO put it, "some consumers have become producers; it is a real revolution"¹. Still, instead of adapting to serve these new needs, utilities are lobbying actively against their own customers by attacking e.g. solar PV-related feed-in tariffs.

Missing out on customer knowledge

Utilities' new competitors often know the utilities' customers better and utilise customer intelligence more effectively than the utilities do themselves despite the their decade-long relationships to the same energy users. The utilities often have a one-way communication with their customers while e.g. some solar companies engage in dialogue, monitoring usage trends and adapting their systems to meet both solar PV owners' electricity needs and their own bottom lines.

In the US, SolarCity, SunPower and others collect billions of data points in smart home systems that consumers love and which baffle utilities². Some large utilities already have the infrastructure in place to leverage their access to detailed customer knowledge, e.g. Enel has installed 32 million smart meters since 2005 in Italy and plans to expand this to other markets³.

Ignoring consumer efficiency

Utilities often stick to what they know best, such as cutting their own costs, while there may be even greater potential to help their consumers improve their efficiency and optimise their energy or other costs. Implementing consumer-level, demand-side management and energy efficiency improvements may have significant potential to retain customers and generate larger overall value for both utilities and consumers. While utilities sometimes make an effort to deliver a few web-based tools about customer efficiency, such as Gas Natural's⁴, these mostly remain superficial.

¹ G. DE CLERCQ: RENEWABLES TURN UTILITIES INTO DINOSAURS OF THE ENERGY WORLD, REUTERS, 8 MARCH 2013: [HTTP://REUT.RS/1GBLNKY](http://reut.rs/1GBLNKY)

² C. MARTIN: SPYING SOLAR SYSTEMS HELP CUT ELECTRICITY USE, BLOOMBERG NEWS, 29 NOVEMBER 2013

³ ENEL: SMART METERING SYSTEM, ACCESSED JANUARY 2014: [HTTP://BIT.LY/1JD9T1Y](http://bit.ly/1JD9T1Y)

⁴ [HTTP://WWW.HOGAREFICIENTE.COM](http://www.hogareficiente.com)

Underestimating consumer technologies

Emerging technologies, like home solar PV-linked storage systems, will let customers get off the grid when utilities charge their highest rates, and provide a backup during outages⁵. Such solutions could significantly reduce the profitability of utilities.

Recently, SolarCity and Tesla started selling solar-linked storage systems in the US for both residential and commercial customers. As the ex-CEO of Duke Energy, the largest US utility, said: "If they combine solar with battery technology and a power management system, then we have someone just using [the grid] for backup."⁶

Utilities also cannot ignore the increasing scale and scope of existing distributed energy technologies. For example, connecting many solar PVs across larger areas into well-managed networks reduces the need for utilities' balancing and backup services.

Punishing their own customers

So far, utilities have often reacted to such consumer-level renewable innovations with legal challenges and lobbying. A prominent example of this lobbying against innovation and the utilities' own customers is the new Spanish "backup toll"⁷, originally proposed by Iberdrola in 2013, according to which people who produce their own power would pay a "backup toll" after using their own generating facilities – and pay full third-party access fees to "sell back" the excess to the grid. Registration would be compulsory and delays in payment harshly penalised. This means, for example, that simply to remain connected households with a few solar panels would have to pay the "backup toll" even if they do not use the grid.

⁵ A. VANCE: TESLA'S INDUSTRIAL-GRADE SOLAR POWER STORAGE SYSTEM, BLOOMBERG BUSINESSWEEK, 6 DECEMBER 2013

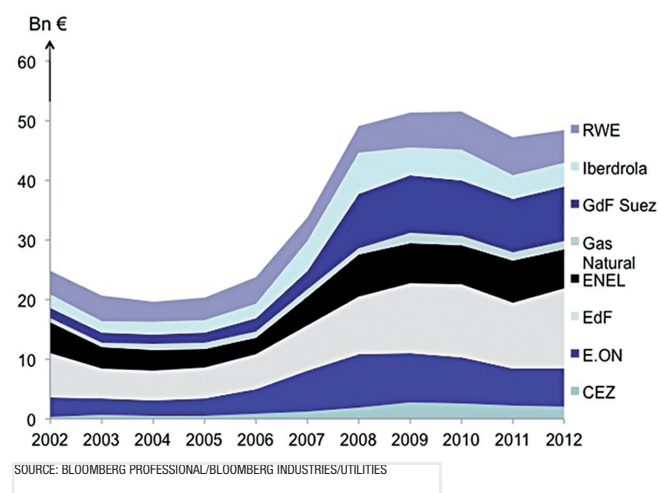
⁶ D. ROBERTS: THE RENEWABLE THREAT TO UTILITIES. CLIMATE ROCKS, 25 APRIL 2013: [HTTP://BIT.LY/1DRNMKU](http://bit.ly/1DRNMKU)

⁷ M. GALANOVA: SPAIN'S SUNSHINE TOLL: ROW OVER PROPOSED SOLAR TAX, BBC, 6 OCTOBER 2013: [HTTP://WWW.BBC.CO.UK/NEWS/BUSINESS-24272061](http://www.bbc.co.uk/news/business-24272061)

4.4. HUGE CAPEX GROWTH SINCE THE CRISIS

The large European utilities entered the current period of accelerated change weakened by their own mistakes including not only overinvestment in fossil generation capacity but also massive capital expenditures, especially during the 2008-2012¹ “crisis period”. Despite the financial crisis, EdF, E.ON, GdF Suez, RWE, Enel, Iberdrola, Gas Natural and CEZ have all increased their total annual capital expenditures to around €50bn since 2008, up from €20-25bn a decade ago, as the following chart shows.

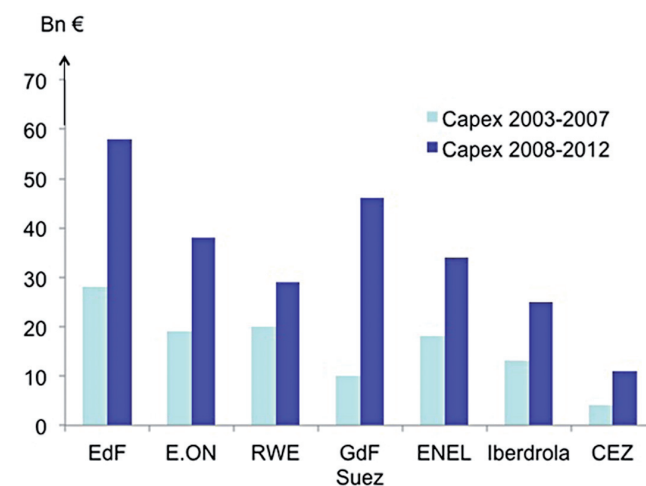
Figure 9: Capital expenditures of top European utilities 2002-2012



It is not entirely clear why large utilities increased their capex so much after the financial crisis. The momentum driven by strong EBITDA and dividend growth in 2002–2007 seems to have spurred them to make new investments and acquisitions also in 2008–2012, when cheap debt was abundant and most utilities still retained their “A” credit ratings.

As the following chart shows, most large utilities increased their capex massively. Where sufficient details on capex are disclosed, such as is the case for RWE, CEZ and GdF Suez, it is clear that a significant part of the 2008–2012 capex was going into fossil fuel power generation.

Figure 10: Capital expenditures of some of the largest European utilities in the last two 5-year periods



SOURCE: BLOOMBERG PROFESSIONAL – EDF FP EQUITY/FA

In making these investments, large utilities seem to have ignored changes in slowing/falling demand and large and growing over-capacity. Their business models still do not seem flexible enough to allow the utilities to steer away from investments fast enough when market conditions change. Also, instead of using these large capital expenditures to shift their business models in anticipation of the renewable revolution, the emergence of prosumers, the nuclear phase-out and other changes, they have been cementing in their old models.

Several large utilities cut back their capex in 2013 and have started divesting, including E.ON, RWE, Iberdrola, GdF Suez and CEZ. These steps are necessary as utilities’ balance sheets now have weakened, and most also expect their earnings to remain squeezed. These steps should have been taken much earlier: in coming years, these utilities’ expected reduced cash flows may be insufficient to reinforce their financial positions enough for an upcoming investment cycle (likely necessary for a business model shift related to renewables, storage or grid developments). Other investors may take advantage of opportunities arising from the utilities’ deteriorating credit quality.

¹ BLOOMBERG INDUSTRIES - UTILITIES – POWER GENERATION EUROPE (BI EGENE) – CASH FLOW, ACCESSED DECEMBER 2013

5. DIRE CONSEQUENCES

Changes to EU electricity markets have come much faster in the past few years, something the big energy companies failed to predict. The consequences are severe. Utilities' power generation businesses are getting trapped in a vicious circle and facing falling earnings. Their answer was to invest even more into the same assets that caused their problems in the first place. They continued with a combination of intensified lobbying for fossil subsidies, divesting, cost-cutting and employing other usual tools – which are insufficient to tackle the major strategic challenges they face. Also inadequate are their cautious, late steps towards renewable energy – from which some have already started to backtrack.

5.1. THE “VALLEY OF TEARS”

Changes to EU electricity markets have come much faster over the past few years, something the big energy companies failed to predict. Most developments should not have come as a surprise, as the situation had long been heading that direction.

The consequences are severe. RWE's CEO called the current period the “*The valley of tears*”, which could be “*deep and long*” as “*our traditional business model is collapsing under our feet*”^{1,2}. “*Management does not expect a recovery in wholesale prices over the medium term despite intense political lobbying in Germany and in Europe*”, he said³.

¹ DPA-AFX: AUSBLICK 2014: VERSORGER RUFEN AUS DEM ‘TAL DER TRANEN’ NACH DER POLITIK, 5 JANUARY 2014: [HTTP://YHOO.IT/1EHDA7G](http://yhoo.it/1EHDA7G)

² A. FRESE: RWE IM TAL DREN TRANEN: ENERGIEWENDE KOSTET 6750 STELLEN, 15 NOVEMBER 2013: [HTTP://BIT.LY/1LLT2QU](http://bit.ly/1LLT2QU)

³ NATIXIS: RWE: REVISION OF OUR 2014/15 ESTIMATES, EQUITY RESEARCH, 29 NOVEMBER 2013

Increased costs of fossil-nuclear power plants

There are several factors that weaken coal and gas producers' cost positions. Current and (at least near) future EU gas prices are high, and clean spark spreads (a profitability measure for gas plants) are negative in most EU markets. Several utilities are significantly affected by nuclear phase-out decisions through impairments, decommissioning and other costs. Dozens of coal plants that cannot meet requirements of the Large Combustion Plants Directive and Industrial Emissions Directive will be closed down, adding additional impairment and clean-up costs. Many coal and nuclear plants that do not close will need additional investments to meet new requirements relating to air pollution, nuclear safety and life extension. Deteriorating credit quality will also increase their financing costs.

Although most of these factors affect fixed costs, and so do not influence merit order positions¹ directly, they still affect earnings. Also, coal prices may not remain low, as an improved ETS or other carbon-pricing method would also deteriorate merit order position and weaken clean dark spreads.

Merit order effects of renewables

With zero marginal costs, wind and grid-connected solar push out more and more coal/gas plants from the merit order, reducing the fossil plant load factor. The increasing number of renewables on the grid, combined with low demand and over-capacity, reduces wholesale (spot) prices. The following Eurelectric chart shows how spot prices in Western Denmark (in blue) have fallen as wind production (in red) increased²:

Wind and solar usually replace lignite and coal plants in periods of low demand and gas-fired power during peak demand³. As an EWEA study has shown, wind energy can decrease spot price by €3 and 23/MWh⁴, which is a significant share of the current spot baseload price of around €35/MWh on the EEX market. By comparison, the pure support cost element of the German renewable levy was €23.9/MWh in 2013. Renewables can decrease prices so significantly that this price drop can even balance out the impact of renewable subsidy-related levies on the retail price.

A European Commission analysis found that during the past five years renewables contributed to lower wholesale prices – but so far these have not been translated into lower retail prices (see box below).

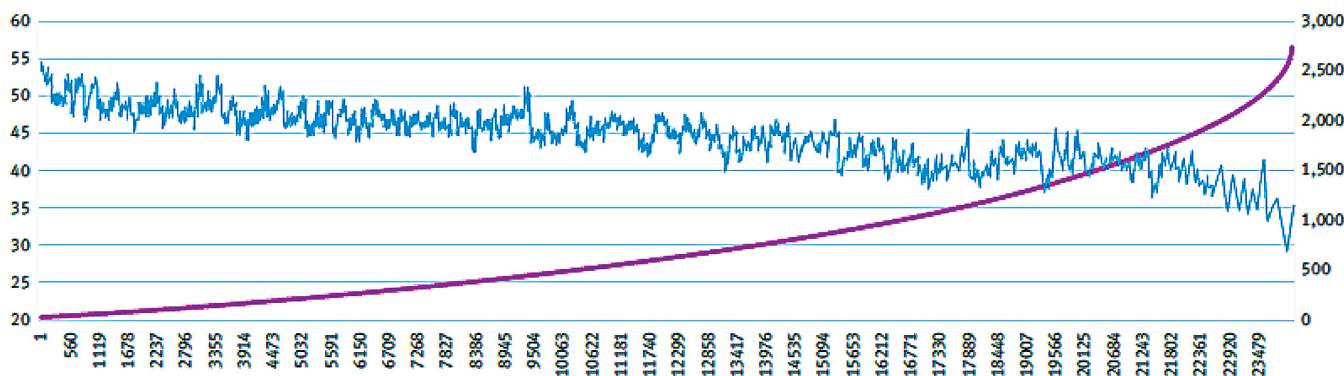
A fall in wholesale prices has “not translated” into a reduction in retail prices

The European Commission noted in a recent report that “in the period 2008–2012, wholesale electricity prices declined by between 35% and 45% on the major European wholesale electricity benchmarks⁵. “However, the fall in wholesale prices has not translated into a reduction in the energy element of retail prices”. According to the EC, reasons for this may include market concentrations, weak competition and universal retail price regulation.

The retail prices are also affected by substantial increase both in taxes/levies. Through taxes/levies, the “cost of renewable energy added to retail prices constitutes 6% of the average EU household electricity price and approx. 8% of industrial electricity price.” The network elements of the price also increased, and while some of this is related to the ongoing transformation, utilities that are losing on lower wholesale prices are also often the owner-operators of the networks.

¹ EUROPEAN COMMISSION: COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS: ENERGY PRICES AND COSTS IN EUROPE. 2014: [HTTP://EC.EUROPA.EU/ENERGY/DOC/2030/20140122_COMMUNICATION_ENERGY_PRICES.PDF](http://ec.europa.eu/energy/doc/2030/20140122_COMMUNICATION_ENERGY_PRICES.PDF) AND [HTTP://EC.EUROPA.EU/ENERGY/DOC/2030/20140122_SWD_PRICES.PDF](http://ec.europa.eu/energy/doc/2030/20140122_SWD_PRICES.PDF)

Figure 11: Correlation between wind generation and electricity spot prices in western Denmark between January 1st 2010 and September 27th 2012



¹ MARGINAL COST BASED SUPPLY CURVE RANKING OF POWER PLANTS USED TO ENSURE CHEAPEST PLANTS RUN MOST.
² EURELECTRIC: POWER STATISTICS & TRENDS 2012, FULL REPORT: [HTTP://WWW.EURELECTRIC.ORG/MEDIA/113657/POWER_STATISTICS_2012_HR-2012-180-0002-01-E.PDF](http://www.eurelectric.org/MEDIA/113657/POWER_STATISTICS_2012_HR-2012-180-0002-01-E.PDF)

³ ALTHOUGH LATELY THE COAL PLANTS ARE MORE OFTEN THE PRICE-SETTING MARGINAL PLANTS IN THE GERMAN MERIT ORDER DUE TO NATURAL GAS – COAL PRICES AND LOW CO2 PRICES.
⁴ PÖYRY: WIND ENERGY AND ELECTRICITY PRICES. EXPLORING THE “MERIT ORDER EFFECT”. THE EUROPEAN WIND ENERGY ASSOCIATION, APRIL 2010: [HTTP://BIT.LY/19PK54I](http://bit.ly/19PK54I)

Because of the merit order effect of renewables, traditional fossil producers face lower revenues and earnings. In cases when sunny and windy periods of the day coincide with peak-demand periods, utilities' earnings are hit especially hard as utilities tend to make a large part of their wholesale profits during peaks. And indeed, the premium of peak prices over baseload prices (in day-ahead trade) fell significantly in recent years – in Germany from €13.85/MWh in 2006 to €4.36/MWh in 2013, according to the Fraunhofer Institute for Solar Energy Systems⁵.

Renewable helped not only wholesale price levels, but also wholesale price volatility: the 30-day historical volatility in next-year German power fell from 60% in January 2010 to 11% now. Good news for customers, but not for traders⁶.

Utility generation businesses may trap themselves in a vicious circle

As fossil power generation becomes more expensive, the attractiveness of consumer efficiency improvements and distributed (renewable) energy solutions will also increase further. More and more consumers will at least decrease their dependence on centralised power (and ultimately may even leave the grid, as have mobile phone owners). In response, utilities will try to distribute their increasing costs over fewer and fewer kWh sold (and potentially over fewer and fewer customers) – which further increases the cost advantages of renewable solutions, at least in terms of long-term marginal costs. Ultimately, utilities will sell less and less electricity at lower and lower prices while their costs will increase.

The Wall Street Journal calls this the “‘mortal threat’ from solar”⁷. According to Moody's: “Large increases in renewables have had a

*profound negative impact on power prices and the competitiveness of thermal generation companies in Europe. What were once considered stable companies have seen their business models severely disrupted, and we expect steadily rising levels of renewable energy output to further affect European utilities' creditworthiness. Utilities must therefore adapt to this new paradigm or risk being squeezed out.*⁸

Collapsing earnings

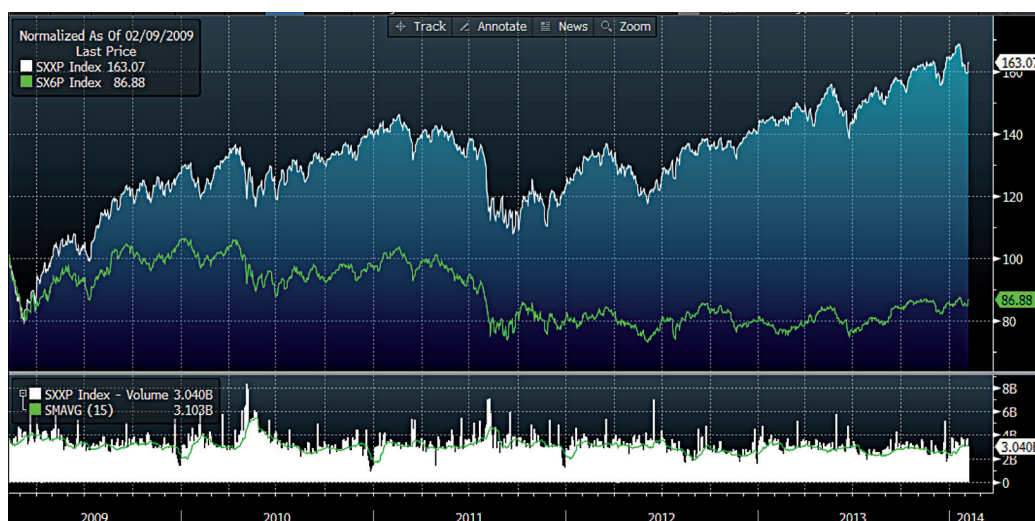
These changes have already resulted in a fall in power-generation-related earnings. For example, the EBITDA of E.ON's generation businesses fell from €1.7bn in January-September 2012 to €1.0bn in January-September 2013. Within the Generation division's EBITDA, the largest fall was in fossil generation; its EBITDA fell from €1.204bn to €448mn⁹.

Enel made more than €3bn EBITDA on its generation and trading business every year from 2005 to 2010; this fell in 2011 to €2.2bn and then dropped further in 2012 to €1.3bn¹⁰.

Weak share price performance

Despite a relatively more stable year in 2013, the longer-term share price performance of large European utilities is appalling: During the past five years, the Stoxx Eur 600 Utilities Index¹¹ fell by 13% while the overall Stoxx Eur 600¹² index was up by 63%, as of early February 2014. (See the Bloomberg chart below, where the utility price index is in green and the overall stock index is in white.)

Figure 12: Stoxx Eur 600 Utilities Index and overall Stoxx Eur 600 index during the past five years



⁵ J. MEYER: ELECTRICITY SPOT-PRICES AND PRODUCTION DATA IN GERMANY, 2013; FRAUNHOFER INSTITUTE FOR SOLAR SYSTEMS; 16 JANUARY 2014: [HTTP://WWW.ISE.FRAUNHOFER.DE/DE/DOWNLOADS/PDF-FILES/AKTUELLES/BOERSENSTOMPRIESE-UND-STROMPRODUKTION-2013.PDF](http://www.ise.fraunhofer.de/de/downloads/pdf-files/aktuelles/boersenstompriese-und-stromproduktion-2013.pdf)

⁶ A. SHIRYAEVSKAYA: RWE EXPANDS LNG TO US GAS TRADE AS BANKS EXIT COMMODITIES, BLOOMBERG, 31 JANUARY 2014

⁷ Y. CHERNOVA: UTILITIES FACING A ‘MORTAL THREAT’ FROM SOLAR, THE WALL STREET JOURNAL, 25 MARCH 2013: [HTTP://ON.WSJ.COM/1GBLCPO](http://on.wsj.com/1GBLCPO)

⁸ MOODY'S: WIND AND SOLAR POWER WILL CONTINUE TO ERODE THERMAL GENERATORS' CREDIT QUALITY. GLOBAL CREDIT RESEARCH, 6 NOVEMBER 2012: [HTTPS://WWW.MOODYS.COM/RESEARCH/MOODYS-WIND-AND-SOLAR-POWER-WILL-CONTINUE-TO-ERODE-THERMAL--PR_259122](https://www.moody.com/research/moodys-wind-and-solar-power-will-continue-to-erode-thermal--pr_259122)

⁹ E.ON: INTERIM REPORT III/2013: [HTTP://WWW.EON.COM/EN/ABOUT-US/PUBLICATIONS/INTERIM-REPORT.HTML](http://www.eon.com/en/about-us/publications/interim-report.html)

¹⁰ BLOOMBERG PROFESSIONAL. ENEL. FA (FINANCIAL ANALYSIS), ACCESSED JANUARY 2014

¹¹ STOXX EURO 600 UTILITIES INDEX: [HTTP://BIT.LY/19STUGI](http://bit.ly/19STUGI)

¹² STOXX EURO 600 INDEX: [HTTP://BIT.LY/1BUJ9I0](http://bit.ly/1BUJ9I0)

Major institutional investors started to punish fossil-focused utilities for their double unforced errors: Storebrand, the largest Nordic savings and pensions provider, announced in January 2014 that it would exclude from its entire portfolio 10 utilities with both high coal exposure and very low renewable investments in electricity production: “Given the global challenge that climate change represents, an average renewable share of 4% throughout the [utilities] sector is awfully low. It is especially important that the largest utility companies begin the change to a more sustainable model, to more power generation from renewable sources. One way in which Storebrand can contribute is by investing more in the best companies, and excluding the worst.”¹

Funding costs and ratings

The large utilities long enjoyed high ratings and low financing costs; they counted as nearly risk-free investments. Even today – according to Bloomberg’s WACC analysis – the cost of debt for the French and German giants is between 1.0% and 1.6%, for Italy’s Enel around 1.7%, and for the three large Spanish utilities in the 2.5-3.1% range².

However, this may change soon, as interest rates can only grow from current levels; also, nearly all the large EU utilities have been downgraded by between one to three notches since January 2008³. But Enel and Iberdrola are both already close to the bottom of the investment grade, as rated by Standard & Poor’s and Moody’s, and RWE is not far from it, either. Moody’s also has put most EU utilities on negative outlook.

Table 6: Ratings of the 10 largest EU utilities

Ratings	EdF	RWE	E.ON	GdF Suez	Enel	Vattenfall	Iberdrola	CEZ	EnBW	PGE
S&P Jan 2008	AA-	A+	A	AA-	A-	A-	A-	A-	A-	NR
S&P Jan 2014	A+	BBB+	A-	A	BBB	A-	BBB	A-	A-	BBB+
Moody’s Jan 2008	Aa1	NR	NR	Aa1	A1	A2	A3	A2	A2	NR
Moody’s Jan 2014	Aa3	Baa1	A3	A1	Baa2	A3	Baa1	A2	A3	A3

Further downgrading can make new debt substantially more difficult to access and more expensive. The spread in bond yields over sovereign debt has already grown for some of the large EU utilities.

Considering the large debt levels for these companies (especially EdF, Enel and RWE) and their significant refinancing needs, they cannot afford further deterioration in their credit quality. One reason behind utilities’ significant divestment programmes is to actually reduce their indebtedness to avoid further downgrading. Some of utilities are also trying to raise their capital to improve their balance sheets, a measure that often meets with resistance from shareholders, as in the case of RWE⁴.

¹ NYHET: STOREBRAND EXCLUDES ANOTHER 10 COAL COMPANIES, 24 JANUARY 2014: [HTTP://BIT.LY/KYCHMY](http://bit.ly/KYCHMY)

² BLOOMBERG PROFESSIONAL, WEIGHTED AVERAGE COST OF CAPITAL (WACC), ACCESSED DECEMBER 2013

³ STANDARD & POOR’S RATINGS SERVICES. UTILITY RATINGS, E.G. FOR EDF: [HTTP://BIT.LY/1EVPmN8](http://bit.ly/1EVPmN8)

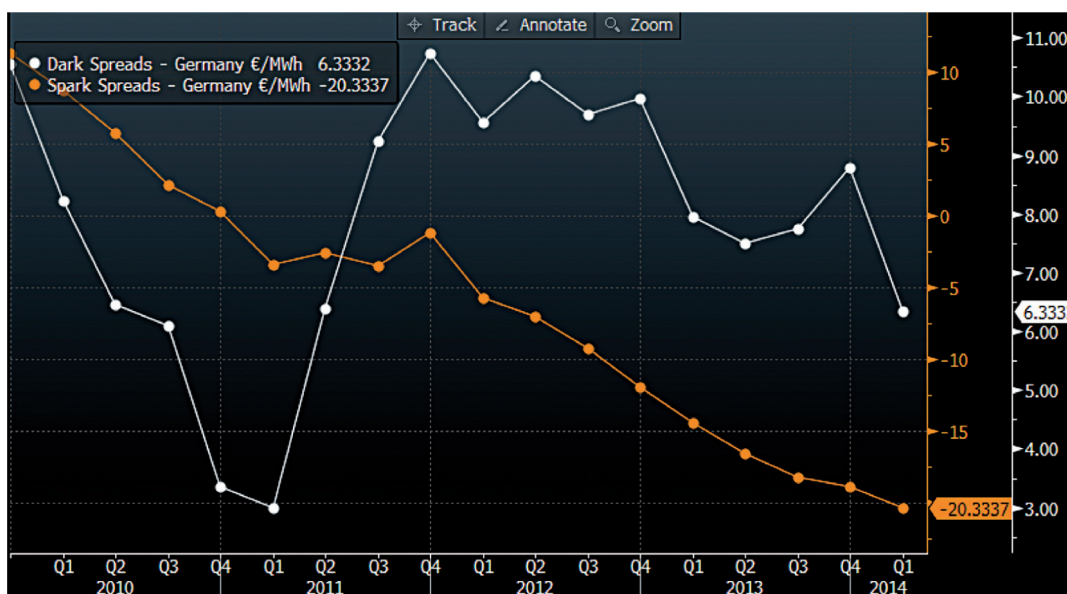
⁴ T. ANDRESEN: RWE SHAREHOLDER SAYS CAPITAL-INCREASE OPTION TO BE BLOCKED. BLOOMBERG, 11 FEBRUARY 2014

Unfavourable outlooks

The future outlook is also gloomy for the generation businesses of most large utilities due to continued weak demand, over-capacity, increased competition from renewables and therefore low wholesale prices, and reduced plant utilisation.

The clean spark spread (gas plant profitability) is negative in most EU markets, and even the currently high clean dark spark (coal plant profitability) is expected to lower with new developments related to carbon prices and import coal prices. The following Bloomberg chart on Germany shows highly negative and falling gas plant profitability (orange line) and still positive but lowering coal plant profitability (white line).

Figure 13: Profitability of gas and coal power plants in Germany since 2011



RWE's CEO acknowledged that "*earning capacity in conventional electricity generation will be markedly below what we've seen in recent years*"¹. The near-term financial outlook of the largest EU utilities also compares unfavourably with that of their US peers in terms of revenue and earnings growth potential².

Longer term, the situation may not be much better for fossil producers: according to the European Commission's reference scenario³, non-hydro renewables will reach 26% of generation by 2020 and 35% by 2030 while fossil generation will fall to 41% in 2020 and to 33% in 2030. Even according to Eurelectric, fossil-based production is expected to shrink further in the EU-27, dropping from 1,629 TWh in 2010 to 1,115 TWh in 2030. At the same time, total renewables are expected to grow up to 1,239 TWh in 2030, overtaking fossil production⁴. In Germany, distributed generation is forecast to result in a 20% decline in market share and a \$3.1bn loss in profit for utilities through 2020⁵.

¹ G. DE CLERCQ: ANALYSIS: RENEWABLES TURN UTILITIES INTO DINOSAURS OF THE ENERGY WORLD, 8 MARCH 2013: [HTTP://REUT.RS/19YKRBZ](http://reut.rs/19YKRBZ)

² BLOOMBERG INDUSTRY LEADERBOARD: UTILITIES, ACCESSED JANUARY 2014: [HTTP://WWW.BLOOMBERG.COM/VISUAL-DATA/INDUSTRIES/DETAIL/UTILITIES](http://www.bloomberg.com/visual-data/industries/detail/utilities)

³ EUROPEAN COMMISSION: EU ENERGY, TRANSPORT AND GHG EMISSIONS. TRENDS TO 2050. REFERENCE SCENARIO 2013: [HTTP://EC.EUROPA.EU/TRANSPORT/MEDIA/PUBLICATIONS/DOC/TRENDS-TO-2050-UPDATE-2013.PDF](http://ec.europa.eu/transport/media/publications/doc/trends-to-2050-update-2013.pdf)

⁴ EURELECTRIC: POWER STATISTICS & TRENDS 2012, FULL REPORT: [HTTP://WWW.EURELECTRIC.ORG/MEDIA/113657/POWER_STATISTICS_2012_HR-2012-180-0002-01-E.PDF](http://www.eurelectric.org/media/113657/power_statistics_2012_hr-2012-180-0002-01-e.pdf)

⁵ J FONTANA, G. FORER, C-E. CHOSSON: WHO'S GOT THE POWER? IN ERNST & YOUNG UTILITIES UNBUNDLED, ISSUE 15, DECEMBER 2013

5.2. UTILITIES WITH MORE VULNERABLE FOSSIL GENERATION BUSINESSES

Exposure to European fossil generation-related losses depends on factors such as:

- the share of EU generation-related earnings within utilities' total EBITDA;
- the share of coal, gas and fuel oil plants within utilities' power generation capacities;
- the magnitude of recent fossil power plant investments;
- the geographic distribution of power plants within Europe, given the still substantial wholesale market price differences despite ongoing market coupling and interconnector projects;
- the current own renewable capacities and off-grid distributed capacities in utilities' service areas;
- the level of sophistication of utilities' hedging strategies; and other factors.

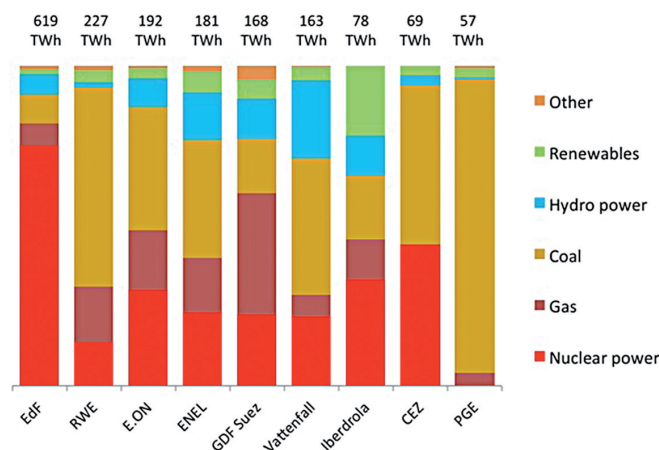
Market-based power generation-related earnings in Europe play an important role e.g. for RWE, Vattenfall and CEZ but are less significant for GdF Suez and Enel⁵ within their total EBITDA (see box).

Importance of European power generation earnings in total EBITDA

Around 70% of CEZ's 2012 EBITDA² was generated in its European power production and trading businesses while 74% of Vattenfall's "underlying operating profit" came from its generation business in 2012³ and 40% of RWE's total group 2012 EBITDA⁴ came from its German power generation business alone (the company has significant UK, Benelux, CEE businesses). The exposure is much lower e.g. for GdF Suez, given its significant diversification beyond electricity and outside of Europe. Similarly, Enel⁵ is more protected, given its diversification and the persistently high Italian wholesale prices.

Within power generation portfolios⁶, RWE, E.ON and GdF Suez had the largest share of coal-, gas- and fuel oil-based assets in 2012; in the case of RWE, it was close to 80%⁷. All of the large utilities had very low (2-7%) renewable shares in power generation, apart from Iberdrola, to counter-balance some fossil generation-related losses. The following chart shows the 2012 European production structure for selected utilities.

Figure 14: Structure of electricity production in Europe (2012)



¹ GDF SUEZ: CONSOLIDATED FINANCIAL STATEMENTS 2012: [HTTP://BIT.LY/1EEDSVN](http://bit.ly/1EEDSVN)

² CEZ GROUP: THE LEADER IN POWER MARKETS OF CENTRAL AND SOUTHEASTERN EUROPE. INVESTMENT STORY, 2013: [HTTP://BIT.LY/1GZBEGW](http://bit.ly/1GZBEGW)

³ VATTENFALL: A NEW ENERGY LANDSCAPE: ANNUAL REPORT 2012, INCLUDING SUSTAINABILITY REPORT. [HTTP://BIT.LY/1NLGPYK](http://bit.ly/1NLGPYK)

⁴ RWE: ANNUAL REPORT, 2012: [HTTP://BIT.LY/11BJ63R](http://bit.ly/11BJ63R)

⁵ ENEL: ANNUAL REPORT 2012: [HTTP://WWW.ENEL.COM/EN-GB/DOC/REPORT_2012/ANNUAL_REPORT_ENEL_2012.PDF](http://www.enel.com/en-gb/doc/report_2012/annual_report_enel_2012.pdf)

⁶ K. GROOT: EUROPEAN POWER UTILITIES UNDER PRESSURE, CIEP, 2013

⁷ RWE: FACT & FIGURES, NOVEMBER 2013: [HTTP://BIT.LY/1D7SRW3](http://bit.ly/1D7SRW3)

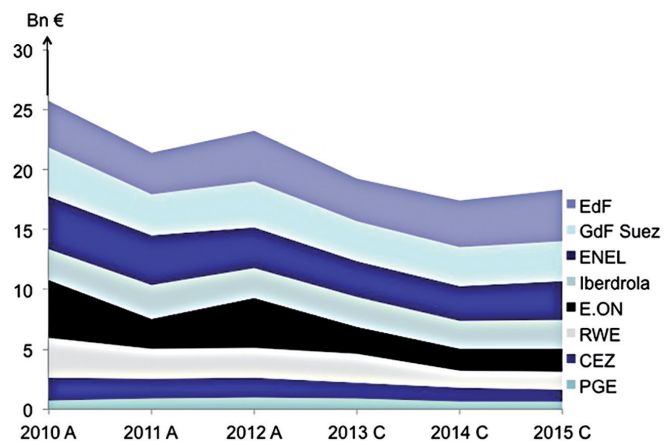
Currently, generators with more gas assets are more affected, but coal plant owners cannot relax, either: UBS predicts¹ that by 2020 the gross margin for coal-fired generation will be around zero and the capacity factor for brown coal plants will fall from 73% to 66% and for black coal plants from 47% to 37%.

The large utilities built significant new fossil capacities during the past five to 10 years, with RWE adding at least 9 GW and E.ON above 7 GW². Many of these now risk becoming stranded assets.

Considering wholesale market differences, utilities more exposed to the lower German and Nordic wholesale prices (such as E.ON, RWE, Vattenfall, EnBW and CEZ) are more under pressure than, for example, Enel (with higher Italian wholesale prices but being more exposed to macroeconomic risks due to its southern focus within Europe). The “Four Big” on the German market have also been hit by the “Atomausstieg” (withdrawal from nuclear power), as has GdF Suez in Belgium.

Based on these simple considerations, RWE, E.ON, Vattenfall and CEZ seem more exposed to fossil generation-related losses while EdF, GdF Suez, Enel and Iberdrola are less exposed. RWE is also among the most indebted in the group, along with EdF and Enel. Bloomberg’s analyst consensus forecasts decreasing incomes for most large EU utilities (see the following chart). They expect the largest percentage fall in earnings from 2012 to 2015 for E.ON, RWE, CEZ, PGE and EnBW.

Figure 15: Fall in utility income forecast



SOURCE: BLOOMBERG PROFESSIONAL/BLOOMBERG INDUSTRIES/UTILITIES

¹ G. PARKINSON: THE BEGINNING OF THE END FOR CENTRALISED GENERATION? RENEWECONOMY, 14 MARCH 2013: [HTTP://BIT.LY/197ABKS](http://bit.ly/197ABKS)

² PLATTS POWERVISION PLANT DATABASE

6. UTILITY RESPONSES

Utility responses to these challenges included the usual answers of more intensive lobbying for fossil and against renewable subsidies; cutting costs and laying off thousands; divestments; dividend cutbacks; and, more recently, capex reduction. Some utilities seem to go beyond these and are using, for example, divestment steps to start major strategic reorientations. While plans around diversifying away from EU markets geographically are quite typical, utilities differ as to how diversified to be along the energy value chains. Some utilities have also started looking into options going beyond the usual adaptation steps; these include improving the flexibility of power generation portfolios and offering new services to the millions of newly emerged prosumers.

6.1. TRADITIONAL RESPONSES: LOBBYING AND COST CUTTING

Utilities are responding to these challenges with a combination of intensified lobbying for fossil subsidies and against renewable support, cost-cutting, hedging and other usual tools. These are probably insufficient in comparison to the major strategic challenges they face. As an RWE spokesperson summarised, *“Whatever we do in terms of cost- and capex-cutting won’t fully compensate the profit loss we see in conventional power generation”*¹. The cautious and very late steps by utilities towards renewable energy and new customer service offers will also probably prove insufficient. And in some cases, utilities even have already stepped back from these by reselling their freshly acquired/built renewable assets.

¹ T. ANDERSEN: GERMAN UTILITIES HAMMERED IN MARKET FAVORING RENEWABLE, BLOOMBERG, 12 AUGUST 2013: [HTTP://BLOOM.BG/1YAXIT](http://bloom.bg/1YAXIT)

Lobbying for fossil subsidies

Today, utilities are lobbying for rules that would make it possible for them to shift the burden of their collective failed adaptation to changes and their mistaken investment strategies to consumers and renewable investors. As they put it, the utilities want reforms that help them “*adapt to the future*”². Such reforms mean ending support for renewables, especially solar PV³, and increasing subsidies for fossil power plants.

Utilities are arguing for different fixed-fee elements in electricity tariffs – as they expect their customers will remain connected to their respective grids, but will reduce their consumption from them. Increasing fixed elements, such as capacity fees, not only penalises poorer customers, it endangers EU energy efficiency objectives. And what if technological developments in storage enable masses of customers to disconnect from the grid fully (remember the mobile phone user “cutting the cord”)?

Hedging in sales and renegotiating gas contracts

Beyond lobbying, utilities are using sophisticated hedging strategies to dampen and delay the impacts of earnings losses of their thermal generation businesses. For example, they contractually fix their prices one to three years ahead – but most contracts expire in 2015 or 2016, at the latest. As an example in the Central European Region, RWE had sold 50% of its 2014 electricity volume by the end of 2012, Vattenfall 77%, EnBW 85% and E.ON 100%⁴. Some utilities, such as the UK ones, may now enjoy the fact that they have long-term price agreements with regulators.

Gas-focused utilities also renegotiated their take-or-pay oil-indexed gas contracts with such major suppliers as Gazprom, Statoil, Sonatrach and Eni. In some cases, they took the contracts to arbitration courts.

Punishing shareholders and employees

Utilities also react with job redundancies and other cost-cutting measures, and dividend cuts. Basically, utility managements are passing on the costs of their own mistakes to their employees and shareholders. Moody’s calls this approach “*defensive*”⁵.

In effect, shareholders continuously vote about these measures through the share price, but employees are much more vulnerable: RWE first announced 8,000 job cuts in 2011, then threatened to cut another 2,400⁶, and then to expand this second wave of layoffs to 10% of the workforce (around 7,000 jobs). Union leader Peter Hausmann says: “*It cannot happen that the employees have to pay*

for a failed corporate strategy”⁷. Vattenfall also announced in early 2013 a large layoff programme aimed at cutting 2,500 jobs by the end of 2014 and cutting costs by SEK4.5bn in 2013 and 2014⁸.

Portfolio reshuffles

Utilities have also started reshuffling their portfolios, and most of the larger ones also have announced substantial divestment programmes. By the end of 2013, RWE planned divestments of €7bn⁹ and E.ON of €15bn¹⁰. Iberdrola would like to free up €2bn sitting in assets, Enel €6bn and GdF Suez €11bn. They even started to cut back on their limited renewable assets¹¹ – which does not sound like a step to diversify their generation portfolios.

These divestments do not only improve cash positions and help lower indebtedness; they help reduce exposure to European markets¹². For example, GdF has already shed assets at least in Italy, France and Belgium; Vattenfall in Germany, the Netherlands, Belgium and Finland; and RWE and Iberdrola have divested from several EU positions – among others. Moving away from Europe also means strengthening positions in growth markets. GdF Suez and Enel plan to spend more than half of their capex outside Europe; E.ON is focussing on Turkey and Brazil, and in both markets wants to build 20 GW generation portfolios.

On the other hand, large utilities are quite different in terms of levels of vertical and horizontal integration. Some seem to be refocussing on their core businesses (such as Vattenfall on hydro, nuclear and renewables) while others (such as GdF Suez and EdF) have started diversifying into broader areas.

² G. DE CLERCQ AND B. LEWIS: EUROPEAN UTILITIES URGE POLICY REFORM TO AVERT BLACK-OUTS, REUTERS, 11 OCTOBER 2013, [HTTP://REUT.RS/1LC2QKA](http://reut.rs/1LC2QKA)

³ G. DE CLERCQ: EUROPEAN UTILITIES CEOs URGE END TO RENEWABLE SUBSIDIES, REUTERS, 11 OCTOBER, 2013: [HTTP://REUT.RS/KRTN6N](http://reut.rs/kRTN6N)

⁴ BLOOMBERG PROFESSIONAL – BLOOMBERG INDUSTRIES – UTILITIES – EMEA POWER GENERATION – POWER SALES HEDGING RATIOS

⁵ MOODY’S: RATING ACTION: MOODY’S DOWN-RATED RWE’S RATINGS TO BAA1. MOODY’S RATING SERVICES, 21 JUNE 2013: [HTTP://BIT.LY/1ICGETL](http://bit.ly/1ICGETL)

⁶ C. BRYANT: RWE COST CUTS THREATEN 2,400 JOBS, THE FINANCIAL TIMES, 14 AUGUST 2012: [HTTP://ON.FT.COM/1BFOP41](http://on.ft.com/1BFOP41)

⁷ IG BCE: STELLENABBAU BEI RWE: “WIR SIND NICHT IN DER BINGO-HALLE”, 14 NOVEMBER 2013: [HTTP://BIT.LY/LLUBCO](http://bit.ly/LLUBCO)

⁸ K. GUSTAFSSON: SWEDISH UTILITY VATTENFALL CUTS 2,500 JOBS, THE WALL STREET JOURNAL, 6 MARCH 2013: [HTTP://ON.WSJ.COM/1NMF0ZF](http://on.wsj.com/1NMF0ZF)

⁹ T. ANDRESEN: RWE WILL SELL OIL, GAS PRODUCTION UNIT TO CUT CAPITAL SPENDING, BLOOMBERG, 5 MARCH 2013: [HTTP://BLOOM.BG/1NZ5F2X](http://bloom.bg/1NZ5F2X)

¹⁰ E.ON: E.ON MAKING RAPID PROGRESS IMPLEMENTING NEW STRATEGY, 3 SEPTEMBER 2011: [HTTP://BIT.LY/1CEA067](http://bit.ly/1CEA067)

¹¹ L. DOWNING: UTILITIES IN PAIN SELLING RENEWABLE ASSETS AT RECORD RATE, BLOOMBERG, 6 NOVEMBER 2013: [HTTP://BLOOM.BG/1GRSLI6](http://bloom.bg/1GRSLI6)

¹² J.P. MORGAN: GDF SUEZ: CLARITY ON DIVIDEND SUSTAINABILITY AND EARNINGS TRAJECTORY SHOULD TRIGGER RE-RATING: UPGRADE TO OW, EUROPE EQUITY RESEARCH, 18 DECEMBER 2013

6.2. POTENTIAL ELEMENTS OF NEW UTILITY BUSINESS MODELS

Acknowledging the need for full business model shift

The large telecommunication players that survived old fixed-line telephones becoming nearly extinct did so by becoming leaders in wireless in the first place. They also showed capacity to become much more adaptable and flexible and to innovate, introducing new products to expand their customer offerings. They could also venture into areas less exposed to policy changes. Similar strengths would come in handy for European utilities now. For example, grabbing leading positions of distributed electricity solutions and storage may prove to be a precondition for their survival in the long run – when we look back in 10 years' time.

As a first step, some utility managements began acknowledging the seriousness of the situation; for example, EnBW expects its earnings from electricity generation to fall by 80% from 2012 to 2020 and hopes to make up for it with energy services and renewables^{13, 14}. GdF Suez's CEO also suggests that geographic diversification may not be sufficient, summarising the three key steps utilities need to take as: *"seeking growth in emerging markets, where the model of centralised production in thermal plants still works; helping institutional clients use energy more efficiently through the units operating heating and cooling systems; and building up their own renewables businesses."*¹⁵

Adaptability, flexibility, new services

Substantial expert analyses are available for utility managements to consider when planning their model shifts. For example, Boston Consulting Group experts suggest utilities will need to improve their general adaptability¹⁶, including their organisational flexibility, and move to more asset-light and flexible power-generation models with more balanced technological mixes. "Asset-light" here means that utilities keep operating their power plants and other assets, but give over the ownership to external financial investors – a useful direction considering the utilities' weakened balance sheets and high leverage in contrast to their deteriorating credit quality. In terms of future services, utilities could:

"build up a 'flexibility portfolio' to profit from the increasing volatility of supply;

- *sell energy generated by local wind and solar plants directly to the local community;*
- *become agents for decentralised energy 'prosumers' who balance power supply and demand; or*
- *sell service and maintenance contracts to residential and commercial customers who have installed rooftop solar-PV panels."*¹⁷

To improve the flexibility of current portfolios, several options are available. One area is the concept of "flexibilisation", which is focussing on reducing minimum load points and optimising start-up procedures for existing plants¹⁸. As an example, RWE is looking into technical options to improve the regulability of its coal plants.

Another important direction is building up additional storage capacities, as renewables increase share on the grid. These include expanding own or contracted pumping hydro capacities, and developing power-to-gas projects and other innovative electricity storage technologies. For example, E.ON invested in a 2 MW hydrogen electrolysis plant¹⁹ that captures wind power when the local grid is congested. In Italy, Terna - Rete Elettrica earmarked €1bn to invest in batteries, and Endesa (Enel) also has started operations in three electricity-storage plants on the Canary Islands²⁰.

In terms of more traditional infrastructure-focussed roles, utilities may strengthen their positions of being the "last resort", the backup providers. According to the head of IEA's Gas, Coal and Power Division, utilities could benefit greatly if they treated rooftop solar-PV panels not as competition for their thermal plants but as a gateway into that new market. *"In a future electricity system, the electricity network company could essentially be an insurance company, providing insurance against not having sunshine when you need power"*²¹. RWE and Siemens are expanding their concept of "virtual

¹³ S. SCHULTZ: ENBW-CHEF MASTIAUX: "SELBST WENN WIR WOLLTEN, DÜRFTEN WIR KRAFTWERKE NICHT ABSCHALTEN"; DIE SPIEGEL, 11 DECEMBER 2013: [HTTP://BIT.LY/J4GUHS](http://bit.ly/J4GUHS)

¹⁴ BRINGING VALUES TO LIFE, MAKING THEM VISIBLE AND MEASURABLE, INTERVIEW WITH DR. MASTIAUX, ENBW-REPORT 2012: [HTTP://BIT.LY/1IUQY4T](http://bit.ly/1IUQY4T)

¹⁵ G. DE CLERCQ: ANALYSIS: RENEWABLES TURN UTILITIES INTO DINOSAURS OF THE ENERGY WORLD, 8 MARCH 2013: [HTTP://REUT.RS/19YKRBZ](http://reut.rs/19YKRBZ)

¹⁶ I. MARTEN AND A. MACK: THE EUROPEAN POWER SECTOR: ONLY THE NIMBLE WILL THRIVE, BOSTON CONSULTING GROUP, 29 MARCH 2013: [HTTP://ON.BCG.COM/1J0AJDL](http://on.bcg.com/1J0AJDL)

¹⁷ F. KLOSE, H. RUBEL, H. G. HERING: TOWARD A ZERO-CARBON WORLD: CAN RENEWABLES DELIVER FOR GERMANY, THE BOSTON CONSULTING GROUP, JUNE 2012.: [HTTP://ON.BCG.COM/1DPCB00](http://on.bcg.com/1DPCB00)

¹⁸ F. KLOSE & J. PRUDLO: FLEXIBILIZATION: THE NEW PARADIGM IN POWER GENERATION. THE BOSTON CONSULTING GROUP, 17 JUNE 2013: [HTTP://ON.BCG.COM/1FYJZR](http://on.bcg.com/1FYJZR)

¹⁹ P. SMITH: E.ON LAUNCHES POWER-TO-GAS PLANT; WIND POWER MONTHLY, 29 AUGUST 2013; [HTTP://WWW.WINDPOWERMONTHLY.COM/ARTICLE/1209712/EON-LAUNCHES-POWER-TO-GAS-PLANT](http://www.windpowermonthly.com/article/1209712/eon-launches-power-to-gas-plant)

²⁰ T. WHITE: ENDESA STARTS OPERATIONS AT THREE ELECTRICITY-STORAGE PLANTS, BLOOMBERG, 3 FEBRUARY 2014

²¹ G. PARKINSON: THE BEGINNING OF THE END FOR CENTRALISED GENERATION? RENEWECONOMY, 14

power plant” to integrate distributed energy sources and enable trading by customers²².

Eurelectric’s head of Energy Policy and Generation summarises similar steps as business model innovation: *“I would rank business model innovation as the single most important challenge to utilities today. We need to get away from the old model, where utilities sell just megawatt hours, to one where they also sell a much more differentiated set of products — for example, energy services, e-mobility and generation capacities.”*²³

Still action toward to a genuine model change is limited

Utilities are searching for a way out; even RWE’s 2013 internal strategy document²⁴ acknowledged the unsustainability of the current business model, and proposed to position the company *“as a project enabler, operator and system integrator of renewables.”* However, Reuters²⁵ was not optimistic about such an RWE transformation: *“A latecomer to renewable energy, Germany’s RWE is trying to turn itself green at a time when it lacks the two resources it needs most: time and money.”*

And recent developments signal that Reuters may have been right: RWE is revising down significantly its short-lived renewable ambitions, by reducing its stakes in acquired renewable assets, stopping the Atlantic Array off-shore project and restructuring its RWE Innogy (originally set up to invest in renewables, and now being transformed to focus on project development)²⁶.

As RWE’s example shows, even if these business model changes are discussed in utility board rooms and used in communications, so far they do not seem to have been widely implemented – despite the many peaceful years utilities have had to develop these. Instead, several large utilities still seem to believe that lobbying – often at the expense of their own customers – and the usual set of cost-cutting and divestments are sufficient, even during the current paradigm shift. Airlines such as American, United and Delta, and corporate giants WorldCom and Kodak, may have thought the same in their time.

MARCH 2013: [HTTP://BIT.LY/197ABKS](http://bit.ly/197ABKS)

²² RWE: VIRTUELLES KRAFTWERK, [HTTP://WWW.RWE.COM/WEB/CMS/DE/237450/RWE/INNOVATION/PROJEKTE-TECHNOLOGIEN/ENERGIEANWENDUNG/DEZENTRALE-ERZEUGUNG/VIRTUELLES-KRAFTWERK/](http://www.rwe.com/web/cms/de/237450/rwe/innovation/projekte-technologien/energieanwendung/dezentrale-erzeugung/virtuelles-kraftwerk/) ACCESSED JANUARY, 2014

²³ S. NIES: SPARKING INNOVATION IN ERNST & YOUNG’S UNBUNDLED UTILITIES, ISSUE 15, DECEMBER 2013

²⁴ KAREL BECKMAN: EXCLUSIVE: RWE SHEDS OLD BUSINESS MODEL, EMBRACES TRANSITION, ENERGY POST, 21 OCTOBER 2013: [HTTP://BIT.LY/KKTM3J](http://bit.ly/kktm3j)

²⁵ REUTERS: GREEN MAKEOVER WILL BE STRUGGLE FOR GERMANY’S RWE, 31 OCTOBER 2013: [HTTP://REUT.RS/1IQJP7W](http://reut.rs/1IQJP7W)

²⁶ BLOOMBERG NEW ENERGY FINANCE: WEEK IN REVIEW, 21 JANUARY 2014.

7. GREENPEACE RECOMMENDATIONS TO GOVERNMENTS

Electricity supply is – to a large extent – policy driven. European governments have the responsibility to send utilities clear and unequivocal signals in order to direct them towards new business models that are both economically and environmentally sustainable and consistent with agreed policies on energy, climate change, air pollution, nuclear safety and other relevant areas.

- a. Building on the success of the EU's 2020 climate and energy policy package, governments should set unambiguous policy up to 2030, **including ambitious targets** with national implementation. Greenpeace advocates for a 45% share of renewable energy, a reduction of carbon emissions within the EU by at least 55% (compared to 1990) and a reduction of final energy consumption by 40% (compared to 2005).
- b. Governments should **refrain from unexpected, radical and retrospective policy changes**. Unfortunately, changes in renewable support systems in Spain, Italy and the Czech Republic have already significantly devalued earlier investments and created uncertainty for capital allocation decisions.
- c. Governments should **apply effective renewable energy support mechanisms** that help new technologies reach full competitiveness sooner and maximise benefits from large, early investments, while being flexible enough to adjust to changing market conditions and technology maturity.
- d. Decision-makers should also **remove barriers to a renewable and efficient energy system**, including the revision of price mechanisms, transmission and congestion management practices and technical requirements, to allow for an optimal integration of renewable energy technologies, including those of a variable and decentralised nature. A key element is the modernisation of the power grid system to ensure the development of grid connections for renewable energy, including offshore wind energy, as well as smart grid management, net metering and active demand-side management.

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- e. Governments should **resist the introduction of capacity markets and taxes and tolls that penalise renewables**. These are unfair for individuals, communities and businesses that have invested hundreds of billions in renewables. They also perpetuate the utilities' fossil over-capacities. While offering limited temporary relief for utilities, these measures can also discourage a switch to new sustainable business models.
 - f. Governments should **abolish subsidies and other support for thermal and nuclear energy technologies**. Spain, Germany, Poland and Romania still subsidise their coal sectors, while Italy, Ireland and others operate capacity payments for natural gas plants. Nuclear subsidies – even after 50 years of commercial operation – are also present in many countries, ranging from liability-related subsidies to public support for nuclear waste management and decommissioning.
 - g. Decision-makers should **strengthen the EU's Emissions Trading Scheme (ETS)** as it has a large influence on utility investments. A functioning ETS can deter coal-based power generation and stimulate the uptake of cost-competitive renewables, but it cannot (as utilities have claimed) alone drive the transformation of Europe's electricity supply.
 - h. Governments should **fully implement the EU's Third Energy Package** and **ensure full ownership unbundling** of transmission and distribution system operations from power production and supply. Discriminatory practices in implementing unbundling in EU member states give an unfair competitive advantage to some utilities over others and over the millions of prosumers on the market.
 - i. Governments need to **learn not to rely almost exclusively on a few utilities** that still produce power in centralised, polluting plants, while a cleaner electricity supply emerges thanks to a multitude of actors, such as small and medium enterprises, co-operatives and private citizens.
 - j. Governments should also **become more strategic utility owners**¹ in order to ensure consistency between the policies of utilities and national and EU energy and climate policies.

¹ VATTENFALL, ONE OF EUROPE'S LARGEST GENERATOR UTILITIES, IS FULLY STATE-OWNED; EDF, CEZ AND ENBW ARE MAJORITY OWNED BY THE STATE; ENEL, GDF-SUEZ AND RWE ARE MINORITY OWNED BY NATIONAL OR REGIONAL STATE HOLDERS.

8. APPENDIX

Table 7: Top 10 EU utilities production and renewable share 2012

	Power production 2012 within EU (TWh)	% of total power production within EU-27	Renewables			
			Wind power (%)	Other (non-wind and non-hydro, %)	Hydro (%)	Total (%)
EdF ¹	618.6	20.0%	0.8%	0.6%	6.5%	7.9%
RWE ²	227.1	7.4%	2.1%	1.8%	1.6%	5.5%
E.ON ³	192.1	6.2%	2.2%	1.0%	9.0%	12.2%
ENEL ⁴	180.6	5.9%	3.6%	3.1%	14.6%	21.3%
GDF Suez ⁵	167.5	5.4%	3.8%	2.2%	12.5%	18.5%
Vattenfall ⁶	163.4	5.3%	2.4%	1.6%	24.5%	28.5%
Iberdrola ⁷	78.4	2.5%	20.9%	0.9%	12.4%	34.2%
CEZ ⁸	68.8	2.2%	1.4%	1.6%	3.0%	6.0%
EnBW ⁹	59.1	1.9%	0.8%	0.6%	10.8%	12.2%
PGE ¹⁰	57.1	1.9%	0.2%	2.6%	0.8%	3.6%
Ten largest utilities within EU	1,812.7	58.7%	2.7%	1.4%	9.2%	13.3%

1 EDF'S TOTAL ELECTRICITY PRODUCTION COMPRISED 642.6 TWH IN 2012. PRODUCTION WITHIN THE EU IS ESTIMATED BY DEDUCTING THE PRODUCTION OF NUCLEAR WITHIN THE USA AND THE PRODUCTION OF WIND POWER OUTSIDE THE EU. EDF, "THE MAIN FINANCIAL AND NON-FINANCIAL DATA, ANALYST PACK 2012", <[HTTP://SHAREHOLDERS-AND-INVESTORS.EDF.COM/NEWS-AND-PUBLICATIONS/PUBLICATIONS/FINANCIAL-RESULTS/FULL-YEAR-RESULTS-283451.HTML](http://shareholders-and-investors.edf.com/news-and-publications/publications/financial-results/full-year-results-283451.html)>
THE TOTAL AMOUNT IS WIND POWER PRODUCED BY EDF COMPRISED 8.5 TWH. EDF, "ACTIVITY & SUSTAINABLE DEVELOPMENT 2012", <[HTTP://WWW.EDF.COM/HTML/RA2012/EN/PDF/EDF2012_RADD_FULL_VA.PDF](http://www.edf.com/html/ra2012/en/pdf/edf2012_radd_full_va.pdf)>, PAGE 49. OF THIS TOTAL AMOUNT IT IS ESTIMATED, BASED ON PRODUCTION CAPACITY FIGURES, THAT 40% WAS PRODUCED OUTSIDE THE EU. OF THE TOTAL OF HYDRO POWER PRODUCED (46.3 TWH), 6.7 TWH ORIGINATES FROM PUMPED STORAGE. THIS IS ACCOUNTED FOR AS "OTHER NON-RENEWABLES", INSTEAD OF AS "HYDRO". EDF, "FACTS & FIGURES 2012", <[HTTP://SHAREHOLDERS-AND-INVESTORS.EDF.COM/FICHIERS/FCKEDITOR/COMMUN/FINANCE/PUBLICATIONS/ANNEE/2013/2013-07-30_FACTS-AND-FIGURES_2012.PDF](http://shareholders-and-investors.edf.com/fichiers/fckeditor/commun/finance/publications/annee/2013/2013-07-30_facts-and-figures_2012.pdf)>, PAGE 98.

2 RWE, "KEY DATA TOOL", <[HTTP://RWE-DATATOOL.COM/?LANG=ENG](http://rwe-datatool.com/?lang=eng)>

3 E.ON, "ANNUAL REPORT 2012", <[HTTP://WWW.EON.COM/CONTENT/DAM/EON-COM/UEBER-UNS/GB_2012_US_EON.PDF](http://www.eon.com/content/dam/eon-com/ueber-uns/gb_2012_us_eon.pdf)>, PAGE 32. PRODUCTION IN THE EU COMPRISES TOTAL PRODUCTION (263.2 TWH), MINUS PRODUCTION IN RUSSIA (64.2 TWH) AND IN USA (WIND; 6.9 TWH). EU INCLUDES TURKEY. "OTHER" CATEGORY (3.0 TWH) TAKEN FOR HALVE RENEWABLES, HALVE NON-RENEWABLES.
E.ON, WEBSITE "ENERGY MIX AND DECARBONIZATION", <[HTTP://WWW.EON.COM/EN/SUSTAINABILITY/ENVIRONMENT/CLIMATE-PROTECTION/ENERGY-MIX-AND-CARBON-REDUCTION.HTML](http://www.eon.com/en/sustainability/environment/climate-protection/energy-mix-and-carbon-reduction.html)>, AS VIEWED ON 1-11-2013.

4 ENEL, "SUSTAINABILITY REPORT 2012", <[HTTP://WWW.ENEL.COM/EN-GB/DOC/REPORT_2012/ENEL_ENVIRONMENTAL_REPORT_2012.PDF](http://www.enel.com/en-gb/doc/report_2012/enel_environmental_report_2012.pdf)>

5 GDF SUEZ, "2012 ANNUAL RESULTS, PRESENTATION APPENDICES", <[HTTP://WWW.GDFSUEZ.COM/EN/INVESTORS/RESULTS/2012-RESULTS](http://www.gdfsuez.com/en/investors/results/2012-results)>, FEBRUARY 2013. AT 100% SHARE.

6 VATTENFALL, "ANNUAL REPORT 2012 INCLUDING SUSTAINABILITY REPORT" <[HTTP://WWW.VATTENFALL.COM/EN/FILE/ANNUAL_REPORT_2012_27432841.PDF](http://www.vattenfall.com/en/file/annual_report_2012_27432841.pdf)>, PAGE 122.

7 IBERDROLA, "INFORMATION SUPPLEMENTARY TO THE SUSTAINABILITY REPORT 2012", <[HTTPS://WWW.IBERDROLA.ES/WEBIBD/GC/PROD/EN/DOC/IA_ANEXO_INFORMOSOSTENIBILIDAD12.PDF](https://www.iberdrola.es/webibd/gc/prod/en/doc/ia_anexo_informosostenibilidad12.pdf)>, PAGE 9.

IBERDROLA, "SUSTAINABILITY REPORT 2012", <[HTTPS://WWW.IBERDROLA.ES/WEBIBD/GC/PROD/EN/DOC/IA_INFORMOSOSTENIBILIDAD12.PDF](https://www.iberdrola.es/webibd/gc/prod/en/doc/ia_informosostenibilidad12.pdf)>, PAGE 40.
IBERDROLA, "RESULTS PRESENTATION FULL YEAR 2012", <[HTTP://WWW.IBERDROLA.ES/WEBIBD/GC/PROD/EN/DOC/RESULTADOS12.PDF](http://www.iberdrola.es/webibd/gc/prod/en/doc/resultados12.pdf)>, PAGE 32.

8 CEZ, "ANNUAL REPORT 2012", <[WWW.CEZ.CZ/EDEEC/CONTENT/FILE/INVESTORS/2012-ANNUAL-REPORT/VZ2012AJ.PDF](http://www.cez.cz/edeec/content/file/investors/2012-annual-report/vz2012aj.pdf)>, PAGE 80.

9 ENBW, "ANNUAL REPORT 2012", <[HTTP://WWW.ENBW.COM/COMPANY/THE-GROUP/ABOUT-US/INTEGRATED-REPORTING/ENBW-REPORT-2012/INDEX.HTML](http://www.enbw.com/company/the-group/about-us/integrated-reporting/enbw-report-2012/index.html)>, PAGE 47.

10 PGE GROUP, "ANNUAL REPORT 2012", <[HTTP://WWW.GKPGE.PL/MEDIA/PDF/MNGMNT_BOARD_CONSOLIDATED_REPORT_PGE_CG_2012.PDF](http://www.gkpg.pl/media/pdf/mngmnt_board_consolidated_report_pge_cg_2012.pdf)>, PAGE 41, 52 AND 56. BIOMASS PRODUCTION AMOUNTED TO 1.5 TWH, OF WHICH 0.5 TWH STAND-ALONE AND 1.0 TWH CO-FIRING IN LIGNITE/COAL PLANTS.