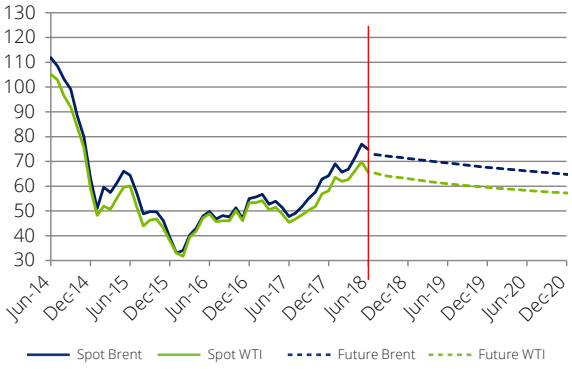
Deloitte.

Power & Utilities
July 2018

Newsletter
Power & Utilities in Europe

Commodities

Crude oil ($/bbl)



Source Capital IQ

Crude oil prices experienced mild volatility in Q2 2018. In May, Brent prices reached **$77 per barrel** while WTI prices reached **$70 per barrel**. However, oil prices fell slightly in June 2018 following OPEC announcements to increase production. Furthermore, the Brent-WTI spread widened to **$10**, a magnitude last seen in February 2015.

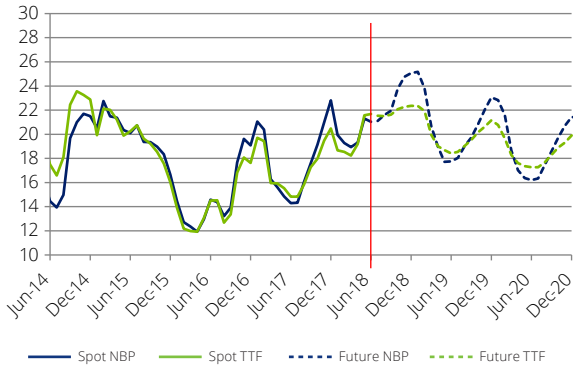
The continued rise in oil prices this quarter was driven by supply concerns following **US economic sanctions against Iran**. These sanctions led to the exit of prominent oil companies from Iran, most notably **Total and Maersk**, the former having committed a billion US dollars' worth of investments in 2017. In addition, the ongoing political and economic crisis in Venezuela contributed to further declines in oil output and hence an increase in prices.

In spite of this, the upward movement in oil prices cooled in June 2018 due to concerns over **plans by OPEC and Russia to increase oil production**. Following OPEC's meeting on 22 June 2018 in Vienna, member countries agreed to comply with output targets set in 2016, although no specific details were forthcoming. These 2016 targets aimed to reduce output by 1.7 million barrels per day (bpd). However, due to supply disruptions (in particular Venezuela, Angola and Libya), actual reductions exceeded the targets. Therefore, compliance with 2016 targets would imply an **increase in current output, estimated to be around 1 million bpd**.

Amid movements in headline oil prices, the **widening of the Brent-WTI spread** may be attributed to **pipeline capacity constraints** and higher **geopolitical risk** associated with Brent prices. In the USA, pipeline constraints trapped output inland and, as a result, oil producers are forced to accept larger discounts on WTI prices. This development led to a surge in US oil exports as they became price-competitive. In June 2018, the US Energy Information Administration estimated that **exports increased by 1.86 million bpd or 208% year on year**.

Looking ahead to the second half of 2018, the upward pressure on oil prices may taper off due to increased production from OPEC, Russia and shale oil in the US. On the demand side, the growth in oil demand may slightly soften due to the impact of high prices on developing countries and the escalating protectionist trade policies between the US, China and the EU.

Gas (€/MWh)



Source Capital IQ

Gas prices experienced an unseasonal upswing in Q2 2018. NBP and TTF prices reached **€21.50/MWh** in May, around a **50% increase year on year**. In June 2018, gas prices fell as warmer conditions set in, thereby reducing gas demand and prices.

Historical seasonal patterns suggest that warmer conditions in Q2 and Q3 lead to lower gas prices. However, this quarter's movements may be attributed to a few supply and demand factors. Unplanned outages in the **Norwegian and UK Continental Shelves** led to a tightening of gas inventories in the UK. In particular, gas flows into the Barrow North, St Fergus and Dimlington terminals were **reduced by around 18 million cubic meters per day**.

On the demand side, cold conditions in Q1 left **gas inventories below five-year averages** in the UK and on the Continent. These inventories need to be replenished ahead of the 2018/19 winter. In addition, a brief unseasonal cold spell in May in the UK led to a surge in gas demand and a reduction of exports from the UK. In turn, gas inventories tightened on the Continent, which led to an **increase in imports from Russia, Norway and LNG**.

In June 2018, a combination of warmer conditions and **disruptions to the Interconnector pipeline** led to a fall in NBP prices. The former reduced gas demand while the latter led to an increase in gas inventories in the UK which dampened prices. In addition, the depreciation of pound relative to euro contributed to lower euro-denominated NBP prices. At the end of Q2, **NBP prices were trading at a discount to TTF prices** and, as such, exports from the UK to the Continent are expected to grow and continue until the end of Q3 2018.

The forward curve indicates that markets expect prices to remain stable in July and August before increasing in September as cooler conditions set in. Due to the closure of the Rough storage facility, **this coming winter's NBP gas prices are expected to be higher and more volatile compared to previous winters**. Gas demand is likely to remain stable due to low electricity prices and clean spark spreads across Europe.

Coal ($/metric ton)

Source Capital IQ

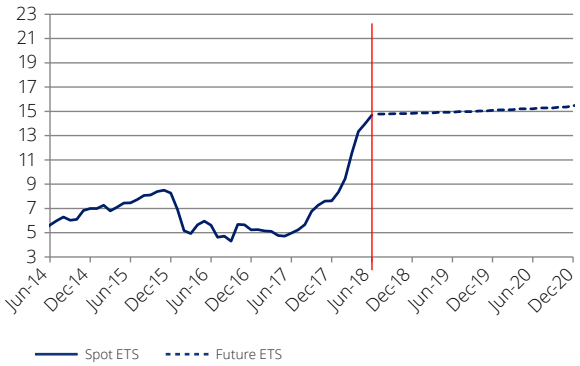
Coal prices rose steadily throughout Q2 2018, peaking at **$93/metric tonne in June 2018**, which is **19% higher year on year**. The movement in coal prices is typically attributed to events in Asia, where coal consumption and production are significant relative to the rest of the world. While the demand for coal-powered heating decreased this quarter, **unseasonably warm temperatures** in Asia increased demand for coal-generated electricity for air conditioning and industrial cooling.

China's ongoing gasification policy to encourage the use of natural gas has not yet displaced coal to meet energy demand and, as such, coal demand remains strong. In addition, China has **imposed restrictions on seaborne coal imports** by banning unloading at ports and tightening custom clearances. Furthermore, China has levied tariffs on US-originated coal in retaliation to the US government's trade policy. The resulting **tightening of Chinese coal supply** has led to higher prices, which in turn affects ancillary industries such as steel and construction.

In India, **attempts to reduce coal imports have not been successful**, mainly due to low productivity of the domestic coal industry. The government announced in February 2018 that it is **ending 45-year state monopoly** on the coal industry to encourage private sector investment. The tightening of global coal supplies is also driven by a **restriction on coal exports by Indonesia**, one of the world's largest producers of coal.

Looking ahead, markets expect coal prices to decline steadily over the next two years as environmental policies move towards a reduction and potential phase out of coal. Recent initiatives include **RBS's announcement to stop financing new coal projects**, as well as **Paris City Council's motion to insurance companies to end their support for the coal industry**.

Carbon CO_2 (€/ton)



Source Capital IQ

Carbon prices continued the upward trend which started last year, rising to just under **€15/ton** in Q2 2018. The price level in June 2018 is **76% higher compared to the start of 2018** and almost **three times the level a year ago**.

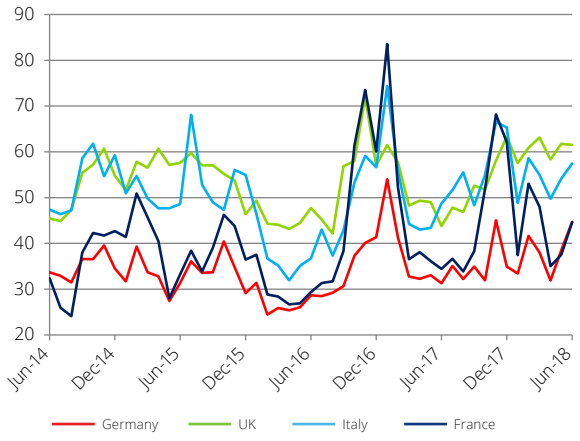
The rise in carbon prices reflects the EU's initiative in using the Emissions Trading System (ETS) to incentivise switching to low-emissions technologies. In particular, the **imminent implementation of the Market Stability Reserve (MSR)** in 2019 to reduce the excess supply of European Union Allowances (EUAs) has increased demand for EUAs and hence prices.

Carbon prices still need to rise further to meet obligations in the Paris Agreement to **reduce emissions by at least 40% compared to 1990 levels**. However, European governments have expressed concern that high carbon prices may have a negative feedback effect on economic growth, particularly in the industrial sectors.

On the demand side, the **economic recovery in Europe** has led to **increased economic activity and higher carbon emissions**. Data released by the European Commission in April showed that **emissions under the ETS rose in 2017 for the first time in seven years**.

The forward curve suggests that **market expectations are cautious** as the EU has targeted **32.5% energy savings** and set the **share of renewable energy at 32% by 2030**. These initiatives are expected to reduce carbon emissions and thus the demand for EUAs. This demand-side effect partially offsets the supply-reduction initiatives through the MSR, and hence forecasts of carbon prices in the long run are tapered.

Baseload Electricity
Baseload Spot Day Ahead (€/MWh)



Source Bloomberg

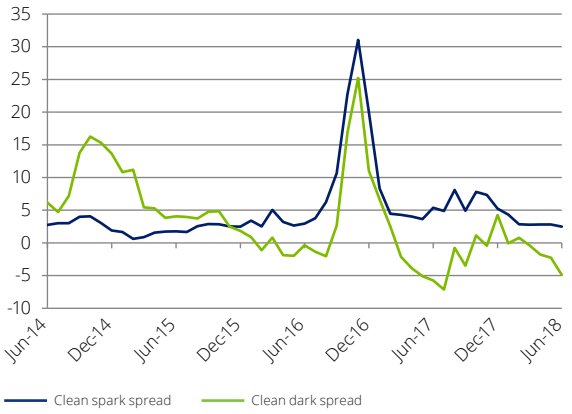
Baseload spot electricity prices **dipped in April but rose towards the end of Q2 2018** – this pattern was broadly similar across the UK and the Continent. Compared to the previous year, the biggest movement in prices is in the UK, where Q2 prices increased by 40% year on year.

Across all four countries, price movements can be broadly explained by weather conditions. Electricity prices dipped in April due to milder conditions in early spring. However, this was followed by **a spike in May 2018 due to a brief cold spell** which raised gas prices. The difference in magnitude of price movements across countries can be attributed to supply-side factors.

Electricity prices in the UK were slightly lower in June 2018 unlike the spikes seen on the Continent. This may be attributed to **low gas prices** and low electricity demand due to warmer conditions, both of which were partially offset by **a fall in wind power output**. In France, prices are significantly affected by nuclear power availability, which accounts for 75% of the country's electricity needs. Prices rose in June 2018 following an unplanned outage at EDF's Bugey 4 and Nogent 2 reactors. In addition, a **3-day strike at the Cruas reactor** further reduced output to the extent that **nuclear power availability was below 69%**.

In Germany, price fluctuations are typically attributed to renewable energy output. The fall in wind and solar power output in June 2018 lifted electricity prices. In addition, **Germany's reliance on coal** for power generation means that **rising coal and carbon prices** may lead to an increase in the underlying trend of spot electricity prices. In Italy, the fall in wind power output and the rise in TTF gas prices (unlike NBP prices) in June 2018 contributed to a rise in electricity prices.

UK Clean dark & spark spreads (£/MWh)



Source Bloomberg

UK clean spark spreads were stable in Q2 2018 as gas margins remained low after declining in Q1. However, **clean dark spreads fell into negative territory this quarter**, implying that coal power plants were unprofitable. As a result, the gap between gas and coal margins widened to **£7/MWh**.

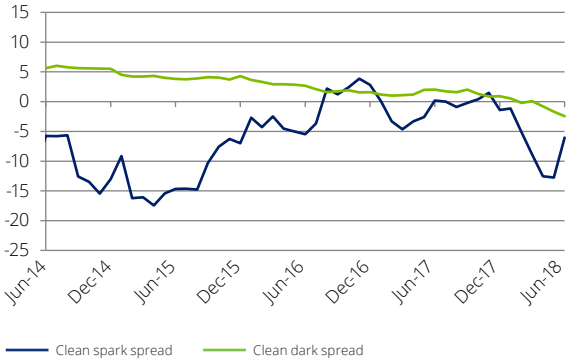
Since natural gas dominates the UK electricity supply stack, electricity prices are often determined by marginal costs of Combined Cycle Gas Turbines (CCGT). Hence, gas margins are typically less volatile compared to coal margins.

Clean spark spreads measure the gross margin of a 50% efficient gas power plant after accounting for the cost of gas and carbon emissions. Clean spark spreads **closed Q2 at £2.50/MWh** – a level last seen two years ago. In this quarter, movements in NBP gas prices and carbon prices were mirrored by movements in electricity prices.

Clean dark spreads measure the gross margin of a 35% efficient coal power plant after accounting for the cost of coal and carbon emissions. While coal plants broke even in Q1, they operated at a loss of **£5/MWh** by the end of Q2, similar to a year ago. Falling coal margins can be attributed to coal prices rising faster than electricity prices on the back of strong demand from Asia. This may be partly attributed to the appreciation of the dollar against the pound, making dollar-denominated coal more expensive in the UK. In addition, the profitability of emission-heavy coal power plants were affected by **rising carbon prices**.

With coal prices likely to continue rising on the back of strong demand from Asia, coal power plants may be expected to remain unprofitable. Furthermore, the continued rise of carbon prices is likely to exert pressure on gas and coal margins.

German Clean dark & spark spreads (€/MWh)



Source Bloomberg

German clean dark spreads declined into negative territory in Q2 2018, similar to movements in the UK. By the end of the quarter, coal power plants incurred a loss of **€2.40/MWh**. However, clean spark spreads experienced some volatility, falling in April and May before recovering to negative margins of **€6/MWh** in June. At the end of this quarter, both gas and coal power plants are unprofitable.

Coal still dominates (around a third) electricity generation in Germany despite progress in renewable energy generation. Therefore, coal is the electricity price setting plant. Coal margins have been on a gradual and steady decline for a number of years and in Q2. This may be attributed to a combination of rising coal and carbon prices. In addition, high levels of hydro power output from heavy snowfall in Q1 exerted some downward pressure on electricity prices which led to lower margins this quarter.

Clean spark spreads were negatively affected by rising TTF gas prices due to the replenishing of gas inventories, dropping to a loss of **€12.80/MWh** in May 2018. In addition, the steep rise of carbon prices has exerted pressure on gas power plants to increase efficiency. However, gas margins recovered in June as the rate of increase in gas prices was lower than that of electricity prices due to warmer conditions.

As it emerged that Germany is currently on track to reduce emissions by only 32% relative to 1990 levels by 2020 (below the 40% EU target), a coal phase-out commission was established. This initiative could affect the merit order, electricity prices and hence margins.

Spotlight on Power and Utilities market

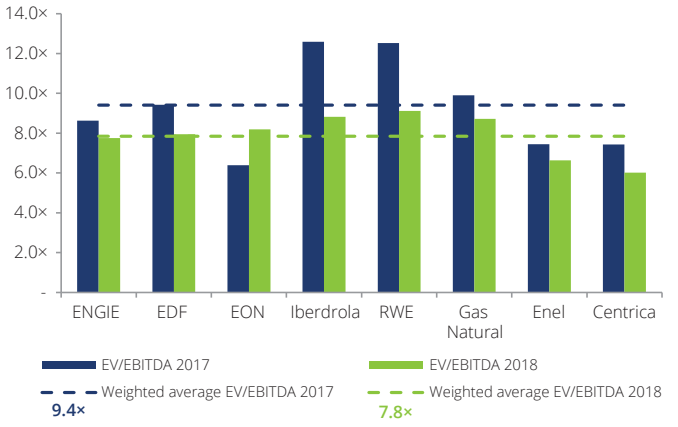
Capital market overview

	Deloitte Index (1)	Enel	Iberdrola	EDF	ENGIE	Gas Natural	E.ON	RWE	Centrica
Market cap. ratios									
Currency		EUR	EUR	EUR	EUR	EUR	EUR	EUR	GBP
Market cap. (June 18)		48 422	40 560	34 479	32 226	21 373	19 752	12 016	8 414
3m stock price performance	+2%	-5%	+8%	+2%	-5%	+11%	-1%	-4%	+13%
YoY stock price performance	+1%	-2%	-7%	+24%	-3%	+5%	+9%	+8%	-23%
Market multiples									
EV/EBITDA 2017	9.4x	7.5x	12.6x	9.4x	8.6x	9.9x	6.4x	12.5x	7.4x
EV/EBITDA 2018	7.9x	6.6x	8.8x	7.9x	7.8x	8.7x	8.2x	9.1x	6.0x
P/E 2017	13.1x	12.8x	14.5x	10.9x	22.6x	15.7x	5.0x	6.2x	25.3x (2)
P/E 2018	13.4x	11.7x	13.7x	17.1x	13.2x	16.9x	13.7x	13.1x	11.0x
Price/book value 2018	1.3x	1.5x	1.1x	0.8x	0.9x	1.3x	n.m.	1.3x	3.1x
Profitability ratios									
ROE forward 12m	12%	12%	8%	5%	7%	9%	36% (3)	12%	28% (2)
ROCE forward 12m	8%	10%	5%	4%	5%	6%	17%	10%	18%
EBITDA margin 2017	18%	20%	20%	18%	13%	17%	16%	9%	7%
EBITDA margin 2018	20%	21%	26%	21%	15%	19%	13%	11%	8%

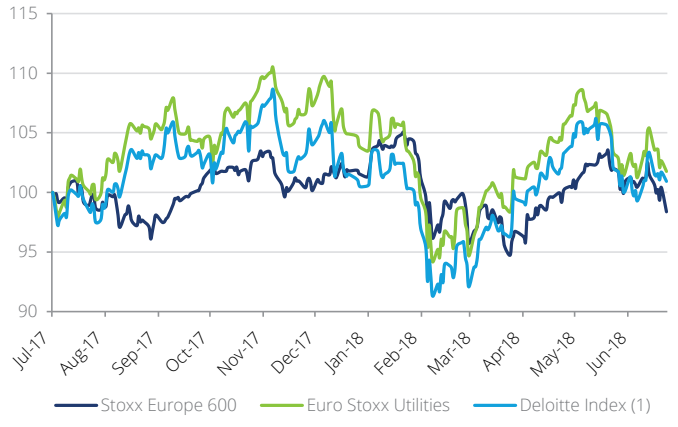
(1) Deloitte Index is composed of Engie, EDF, E.ON, Iberdrola, RWE, Gas Natural, Enel, SSE and Centrica

(2) Ratio linked to the expected level of non recurring income resulting from disposals program by Centrica

(3) Ratio linked to non-reccuring items (Nuclear tax refund and E.ON / RWE agreement)



Source Capital IQ



Source Capital IQ

Key messages from brokers and analysts

"UK to consider RAB approach for new nuclear"
(UBS – June 6, 2018)

"Hydro and tempertures look positive for utilities into 2Q-3Q: Looking at weather forecasts, above average temperatures are expected in Northern and Eastern Europe over the summer"
(Morgan Stanley – June 4, 2018)

"Carbon has rallied 70% YTD. But at current prices, coal-to-gas switching is economic and spreads are back in negative territory. This raises questions about the ongoing carbon rally."
(Morgan Stanley – April 16, 2018)

"Ofgem has released the first major consultation on the long awaited UK tariff cap : Overall, we see potential for cautious optimism on the UK retailers"
(Morgan Stanley – March 5, 2018

M&A Trends

Transactions involving Power & Utilities companies

EDF bought the **Neart na Gaoithe wind farm project in Scotland**, which will generate up to 450MW of renewable energy, from **Mainstream Renewable Power**, a renewable energy producer, in an investment plan of **£1.8bn**.

(*The President Post* - May 31, 2018*)*

Total SA entered into an agreement with **Direct Energy**, France's third-biggest power vendor with 1.35 GW of combined gas and renewable capacity, to **acquire 74.33%** interest for a **deal valued at €1.4bn**.

(*SNL Financial LC* – May 1, 2018)

Enel acquired a 73.4% stake in **Electropaulo**, Brazilian power distributor with 7 million customers in Brazil, for **BRL 5.55bn** (€1.3bn).

(*Agence France Press* – June 5, 2018)

ContourGlobal plc, US Energy firm with 4.4MW in operation in 18 countries, finalized acquisition of five solar thermal plants in Spain from **Acciona SA**, a Spanish provider of sustainable solutions for infrastructure and renewable energy projects, for a purchase consideration of **€1.1bn**.

(*Financial Deal Tracker* – May 15, 2018)

Algonquin Power & Utilities, Canadian renewable energy company that currently holds 25% equity interest in Atlantica, exercised the right to purchase 16.47% interest in **Atlantica Yield**, a UK yieldco, from **Abengoa SA**, a Spanish energy and engineering group, for **$345m**.

(*See News Deals* – April 18, 2018)

Public Power Corporation S.A., the biggest electric power company in Greece, agreed to sell 40% stake in **four coals-field power plants** in Greece including Meliti I (330MW) and Meliti II (450MW). The selling price is underway and the acquirer is not been identified.

(*Financial Deals Tracker* – May 25, 2018)

EDF and **Andes Mining & Energy S.A.**, a Chile company, jointly acquired **750MW of flexible generation capacity in Chile**, from **AES Gener**, a producer and distributor of electricity in Chile, for an undisclosed amount.

(*Dow Jones Institutional News* – May 10, 2018)

Transaction involving equity funds

Actis, a London private equity fund, acquired **Intergen's Mexican portfolio**, including 2200 MW in operation, for **$1.25bn**.

(*Leaders League* – May 9, 2018)

Antin Infrastructure Partners, a French independent private equity firm, entered into exclusive negotiations to acquire **Idex**, a French independent energy infrastructure and energy services company which posted revenues of approximately €860m in 2017, from **Cube Infrastructure Managers**, an independent Luxembourgian management company, **for around €1bn**.

(*Global Fund Media Ltd* – May 23, 2018)

Sembcorp, a developer, owner and operator of energy and water assets, agreed to acquire **UK Power Reserve Ltd**, an electrical services company with 533 MW in operation and 480MW in construction, from **Equistone Partners Europe Limited** and **Private Equity Partners**, private equity firms for a purchase consideration of **£216m**.

(*Financial Deal Tracker* - June 2, 2018)

Boralex, a Canadian power producer, entered into a purchase agreement to acquire **Kallista Energy Investment SAS**, a French wind power specialist with a portfolio of 163MW of operating and contracted wind projects, from **Ardian Infrastructure**, a French private equity company, for **€129.4m**.

(*SNL Financial* – May 1, 2018)

Greencoat Renewables Plc, an Irish renewable infrastructure investment company, completed the acquisition of **Dromadda More Wind Farm in Ireland**, including 36MW capacity, from **Impax Asset Management Group plc**, an asset management company, for **€88.4m**.

(*Financial Deal Tracker* – May 2, 2018)

European Power and Utilities companies wrap-up

Companies beat expectations despite wet and windy weather. First quarter earnings have benefitted from much improved hydro seasons across Europe. Higher carbon has supported power prices, but it has contributed to mounting pressure on spot thermal spreads - high renewable production adds to this impact

For Central Europe the deal between E.ON and RWE dominate much of the discussion and in in the UK the discussion are still focused **on the tariff cap**.

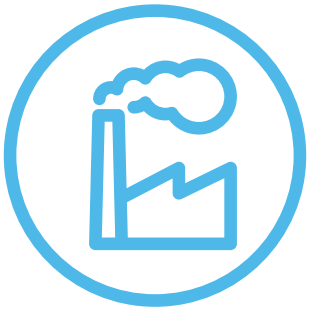
All utilities confirmed the guidance for FY18.

	EDF	ENGIE
Q1 2018 Highlights	• **First quarter 2018 sales at €20.4bn, an increase of 3% in organic terms** mainly driven by (i) France - Regulated activities segment in line with the tariff increase, and (ii) the performance of EDF Trading, which benefited from an improved volatility and price environment linked to weather conditions in Europe and North America. • Regarding France – Generation, the higher hydropower and nuclear output and the improvement in the price conditions were neutral on sales due to a net buying position (in euros) on the wholesale markets in the first quarter of 2018, as in the first quarter of 2017.	• **Revenue of Q1 2018 at €17.5bn** i.e. +3.0% in organic terms, namely due to - (i) the increase in renewable power generation in France and in Belgium, (ii) the increase of gas and electricity sales in the retail segment in France, (iii) the commissioning of assets in Latin America and (iv) the favorable temperature impact for gas distribution in France. - these effects being partially compensated by a negative foreign exchange impact (in particular Brazilian real and US dollar vs. Euro). • **EBITDA is up by 6% at €3.2bn, in organic terms**. This increase is mainly driven by the reasons mentioned above. In addition, the sharp increase in EBITDA is also due to (i) a 30 basis points increase in service activities margins and (ii) the outstanding performance of midstream gas activities in a favorable market environment in Europe.
Key events in the period	• Launch of the **Electricity Storage Plan** with the goal of commissioning an additional 10GW by 2035. • **Acquisition of the "Neart na Gaoithe"** offshore wind power project in Scotland (450MW). • **Inauguration** of 200MW of solar capacity in the Emirate of Dubai, **the first unit of the DEWA III (800MW) plant**, a joint project between EDF, Masdar and DEWA. • **Completion of the acquisition of Gas Natural Fenosa Vendita Italia** by Edison: increase in the customer base by circa +50%. • Jaitapur: **Industrial Way Forward Agreement signed for 6 EPRs** (almost 10GW) in India. EDF will participate as the supplier of the EPR technology. • **Taishan 1: start of fuel loading** on 10 April 2018. • **Flamanville 3: detection of quality deviations** on the welding of the pipes of the secondary coolant system. Additional controls on the welds and report currently underway.	• **Shutdown of the Tihange 3**: Electrabel, Belgian subsidiary of Engie, will extend the shutdown of the nuclear reactor until 30 September • **Acquisition of Infinity Renewables**, a leading developer of utility-scale wind and solar projects in the US. • **Launch of innovative partnership with Air Products** - Blockchain technology to certify the traceability of green electricity. • **Agreement signed for the control of Electro Power Systems**, pioneer in hybrid storage solutions. • **Acquisition of SoCore** in the United States a fully-integrated developer, owner, and operator of solar projects based in Chicago. • **Acquisition with Axium of a energy system** serving six Harvard-affiliated Medical Institutions in the United States. • **Acquisition of Unity International Group**, a premier electrical construction and maintenance provider based in New-York
FY 2018 Outlook	• **FY 2018 guidance confirmed**	• **FY 2018 guidance confirmed**

	e·on	RWE
Q1 2018 Highlights	• **Q1 2018 sales declined by 11% at €9.3bn** because of the initial application of IFRS 15 in 2018. This mainly affected (i) Energy Networks in Germany and the Czech Republic and (ii) Customer Solutions in the Czech Republic. • **Adjusted EBIT of €1,3bn shows an increase of 24%** compared to prior-year figure. The main reasons are (i) increasing gross margin in Customer Solutions in Germany, and (ii) prior year one-off effects related to unplanned outages and an extended overhaul at PreussenElectra's Brokdorf nuclear power station.	• **Sales in the first quarter went down by 7% at €11.6bn** because of (i) the application of IFRS 15 and (ii) a drop of volumes of Innogy due to competition, in particular in German households, corporate customers and industrial enterprises. • **Adjusted EBITDA of €1.9bn shows a 11% drop** compared to the same period last year. The main reasons are declining generation margins and a weak energy trading performance.
	• **On March 12, 2018, E.ON SE and RWE AG reached an agreement under wich E.ON will acquire RWE's 76.8% stake in Innogy SE as part of an extensive asset swap.** Following approval of the offer documents by the German Federal Financial Supervisory Authority, on April 27,2018, E.ON published its voluntary public takeover offer for Innogy SE stock. The transaction will take place in several steps and is subject to the usual antitrust approvals, which are not expected before mid-2019.	
Key events in the period	• **Approval of German Federal Financial Supervisory Authority of the PTO for Innogy SE** on April 27, 2018. • **Agreement to sell 74.9% stake in Hamburg Netz GmbH to the Free and Hanseatic City of Hamburg.**	• RWE power and the energy utility EnBW jointly **sold their stakes of 50.9% and 21.7% in Hungarian power producer Mátrai Erőmű Zrt.** (March 2018). • **Innogy placed a senior bond with a nominal volume of €1bn** and a tenor of eleven-and-a-half years. • **Merger** of the grid business of Innogy subsidiary with the grid business of Aachener Stadtwerke to form the **new company Regionetz GmbH.**
FY 2018 Outlook	• FY 2018 guidance confirmed	• Asset swap with E.ON requires adjustments to forecast. The parts of Innogy will be transferred in "discounted operation" until they are sold. It will no longer be considered in the Group's sales volume, revenue, adjusted EBITDA, ...

	enel	centrica
Q1 2018 Highlights	• **Q1 2018 sales totaled €18.9bn, i.e. -2.2%** compared to Q1 2017, namely due to - (i) adverse exchange rate developments and (ii) a reduction in revenue from the sale of electricity as a result of a contraction in volumes against a background of declining average prices; - this was partly offset by an increase in revenue from the distribution of fuel: consolidation of EnerNOX and the Volta Grande hydroelectric plant. • **The gross operating margin amounts to €4.0bn, i.e. +3.1%** compared to Q1 2017, due to - improving in the margin in the renewables and distribution sectors; - these were partly offset by (i) adverse exchange rate developments, especially in South America and (ii) the recognition in the 1st Quarter of 2017 of the gain on the disposal of Electrogas in Chile.	• **Good financial performance mainly because of colder than normal weather.** • Improvement of operational performance and customer outcomes in **UK Business.** • Good gas optimization performance in **North America Business** during periods of cold weather and higher Brand net promoter score. • Reduction in volumes in **Central Power Generation** due to higher planned and unplanned outages.
Key events in the period	• **Issue of new green bond in Europe for €1,3bn** (January 2018). • **Acquisition of 100% of Parques Eolicos Gestinver,** a company that owns five wind plants in Galicia and Catalonia. • **Investment of $170m in a photovoltaic project in Peru**. Rubi photovoltaic plant will be able to generate around 440 GWh per year. • **Launch of a voluntary tender offer for the acquisition** of the entire share capital of the Brazilian power distribution company **Eletropaulo Metropolitana Eletricidade de Sao Paulo SA**. (April 2018).	• **Investment in EtaGen**, a Californian based startup developing a Linear Generator that offers businesses affordable and flexible onsite power that's also reliable and clean. • **Launch of a distributed energy and power proposition in North America** under the new Centrica Business Solutions banner. • **Launch of British Gas Lite** – a new electricity service that supplies smart meters and is entirely online.
FY 2018 Outlook	• FY 2018 guidance confirmed	• FY 2018 guidance confirmed

	IBERDROLA	gasNatural
Q1 2018 Highlights	• **Q1 2018 sales totaled €9.3bn**, i.e. **+14%** compared to Q1 2017. • **EBITDA is increasing by 24% at €2.3bn** due to - i) the consolidation of Neoenergia, (ii) a rate plans in force in New York and Connecticut in the Networks business, (iii) the increase in renewable production and (iv) an increased commercial activity in Spain; - these positive effects were partly offset by a negative exchange rate impacts.	• **Q1 2018 sales totaled €6.4bn, i.e. +5.2%** compared to Q1 2017, due to higher volumes and prices in the gas business. • **EBITDA is increasing by 2.7% at €1.1bn**, due to better businesses performance, particularly in gas.
Key events in the period	• **Award of maintenance of 4,425 MW** wind capacity in the Iberian Peninsula for €110bn. • **Installation of 25,000 e-vehicle charging points in Spain by 2021.** • **Award of construction of two offshore wind farms in German waters Sea, totaling 486 MW.** • **Signing of a green loan for $400bn** with ten banks led by BBVA.	• **Issue of €850bn in 10-year bonds paying 1.5%** (January 2018). • **Investment of €95bn in two solar photovoltaic projects in Brazil.** They total 83MW of capacity and are expected to come into operation in the Q4 2018. • **Approval of the competition authorities concerning the sale of 20% stake in the company Holding de Negocios de Gas S.A.** (March 2018).
FY 2018 Outlook	• FY 2018 guidance confirmed	• FY 2018 guidance confirmed



Talking point

Profitability of a coal plant in the German power market

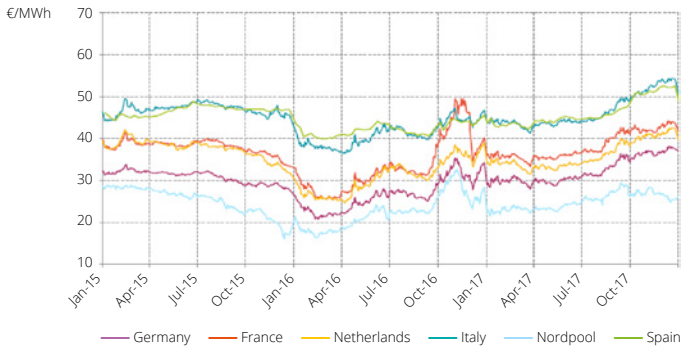
1 Introduction to thermal power plant economics

Electricity prices have significantly dropped in Europe after the 2008 financial crisis, mostly due to a decline in both industrial demand and coal prices and very low CO_2 prices. As a result, many operators of thermal power plants have been suffering from deteriorating economics of their power stations (see A. O. Abani, *Profitability of gas power plants in Europe: is the storm behind us?*[1]). Still, since the beginning of 2017, electricity prices in major European Power markets have followed a new upward trend. It is thus obvious to wonder if the increasing prices are positively impacting the income of thermal power plant operators. More specifically, this raises new questions about the influence of electricity prices on the profitability of their power plants.

Economic modelling is a strong tool to explain and precisely analyze the profitability of thermal power plants. Modelling can highlight, for example, the evolution of the cash-flows of the power station modelled over a period of time. It can also allow to identify the main profitability drivers of the power station. Finally, the role of the plant's flexibility on its profitability can be assessed by a detailed representation of its technical characteristics.

The Energy & Regulation team of Deloitte Economic Advisory has already been scrutinising thermal power plant economics and has used modelling tools to highlight the particular facts described above. This article therefore presents the results of the analysis of the profitability of a generic coal-fired power plant operating in the German power market. As shown in figure 1, there is a strong correlation between power prices in Europe. In addition, German power prices are structurally lower than prices elsewhere (with the exception of NordPool). Therefore, the analysis of the power plant operating in the German Power market could be naturally transposed to other electricity systems in Europe and can be interpreted as the lower bound for revenues of coal plants in other markets (operators relying on imported hard coal face similar procurement costs).

Figure 1. Electricity Futures prices (Y+1) in Europe



Source: CRE

Our modelling approach is based on a linear optimization of the revenues of a coal-fired power plant. Several assumptions are made and key technical characteristics are precisely represented and summarized in box 1.

Box 1. Modelling approach of the thermal power plant

For this analysis, the model is based on a 400MW coal-fired power station with a net efficiency of 38%.[1] The model takes into account the exact technical characteristics of the plant. Therefore, start-up costs, start-up and shut-down trajectories, part-load efficiency losses and minimum load level are modelled. The inputs of the model are (i) the hourly electricity prices (ii) the weekly coal prices and (iii) the daily CO2 prices, from 2006 until 2017. The operation of the power plant is represented for each hour of a year (hereafter, from 2006 to 2017). The main objective of the optimization is to determine the profit-maximal generation schedule of the plant subject to the economic and technical constraints described above.

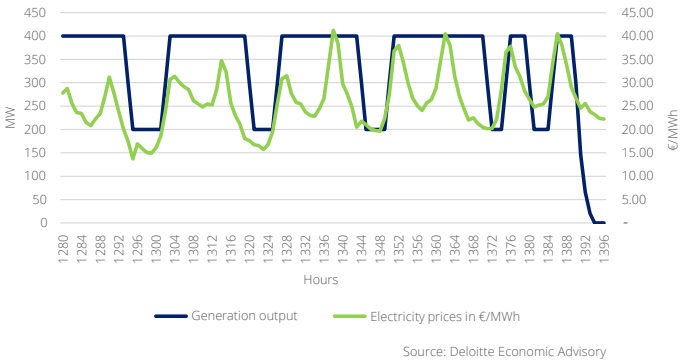
1 Which means that 62% of the thermal power capacity is lost during the transformation of coal into heat and electricity.

1 https://www2.deloitte.com/content/dam/Deloitte/fr/Documents/financial-advisory/economicadvisory/deloitte_profitabilite-centrales-au-gaz-en-Europe-vers-la-fin-de-la-tempête.pdf

To illustrate more precisely the functioning of the model, figure 2 presents extracted data for a typical week. The figure shows the evolution of power prices over the course of the week and the corresponding generation schedule of the plant.

The model deals with the trade-off of making losses at certain times (because the plant is operating while its variable costs are higher than electricity prices) to be able to capture high power prices at a later stage, while avoiding high start-up costs[2] (represented by the negative spike in the second graph).

Figure 2. Generation schedule of the modelled thermal power plant during a typical week (example: from Monday 22.2 to Friday 27.2 2016) and corresponding hourly profit



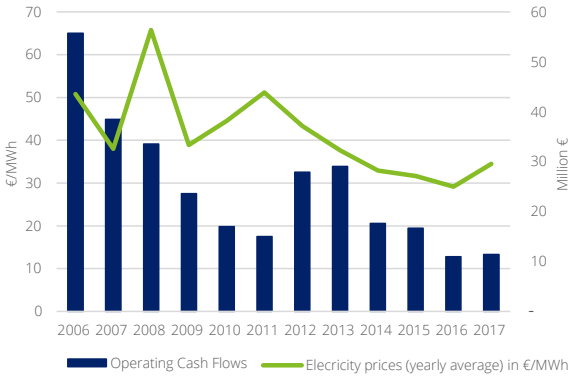
Source: Deloitte Economic Advisory

2 The evolution of cash-flows of a thermal plant between 2006 and 2017

Figure 3 presents the operating cash-flows of the modelled power plant from 2006 to 2017 alongside electricity spot prices on the German power market. In an energy-only market where power plant earnings are directly tied to electricity sales, it is not a surprise to observe a strong correlation between average electricity prices and the operating revenues of the coal-fired unit. As one can see, there is a strong decreasing trend in the profitability of the plant over the last twelve years.

The operating cash-flows of the thermal power plant must cover both the operational costs (OPEX) and the capital expenditures (CAPEX). In the results presented in this article, the coal-fired power plant was built during the mid-1980s and has therefore already amortized its main capital expenditures (not including maintenance needs and annual fixed costs).

Figure 3. Operating cash flows of the modelled power plant and average power prices (2006-2017)



Source: Deloitte Economic Advisory

3 What are the main drivers of the profitability?

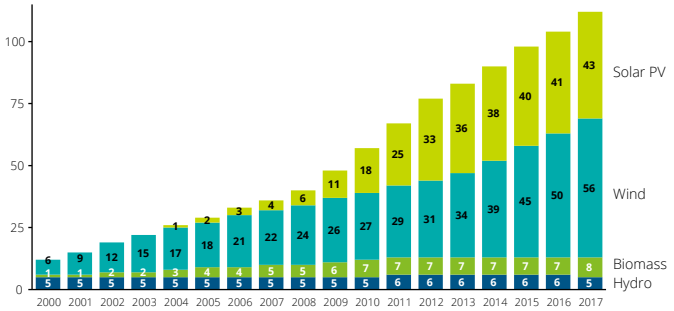
The economic modelling of the coal-fired unit allows to identify several profitability drivers. They are described in the next paragraphs.

Electricity prices and the merit-order effect

The large penetration on the energy market of Renewable Energy Sources (RES), most notably in German electricity market (figure 4)**, has a strong impact on electricity prices.**

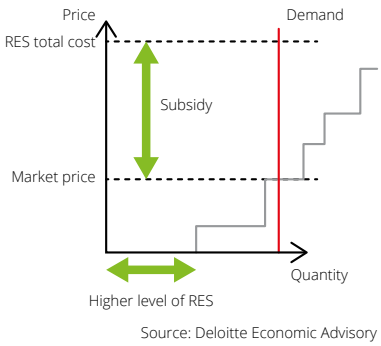
As the share of RES increases, electricity prices are dropping. It is mainly due to the so-called merit order effect, as illustrated in figure 5.

Figure 4. Installed capacity for power generation in Germany on the basis of renewables



Source: J. Trüby, H. W. Schiffer, 2018. La transition énergétique allemande : bilan et perspectives. *La revue de l'énergie* n°638, Mai - Juin 2018

Figure 5. Impact of the integration of RES on the marginal price



Source: Deloitte Economic Advisory

2 Beyond the start-up costs issue is the technical constraint of ramping-up: it takes some time (hours to days) for the plant to reach its maximum operation capacity. Therefore, if the plant is closed during the night, it could not fully benefit from peak prices, thus reducing the profit.

Over time gas power plants have gradually been displaced from mid-load operation towards serving peak load primarily. As such gas plants have been price setting at shorter time intervals, deteriorating also the margins of coal plants.

Due to its negative impact on wholesale electricity prices, large-scale deployment of renewables is decreasing the load factor of coal-fired power plants as shown in figure 6 and is thus negatively impacting the profitability of coal-fired power plants.

Coal and CO_2 prices

Figure 7 shows the relationship between the operating cash-flows of the coal-fired unit and coal and CO_2 prices. It is perhaps surprising that average coal and CO_2 prices do not have an obvious impact on the profitability of the plant, which is counter-intuitive. This stems from the fact that coal-fired power plants have increasingly become price-setting and as such, movements in coal and CO_2 prices have been directly feeding through to electricity prices. This is contrary to the situation in the mid-2000s when coal plants were mostly intramarginal and prices were, regularly, set by gas-fired power plants.

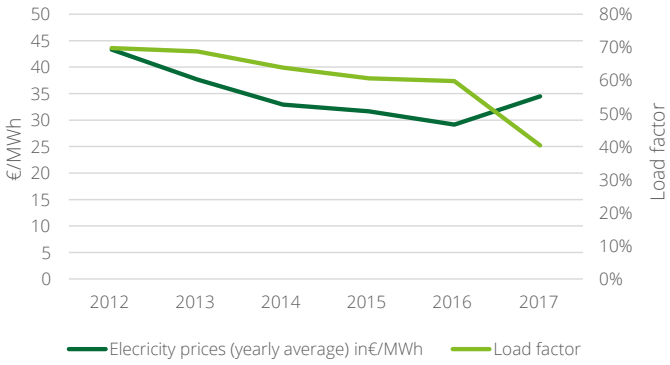
4 The benefits of detailed power plant modelling

4.1 What is the role of the plant's flexibility on its profitability?

One of the major benefits of realistic economic modelling of the thermal unit is to show the strong impact of the plant's inflexibility on its profitability. To illustrate this idea, figure 8 presents the comparison of the operating profit margin between one plant modelled with technical constraints (i.e. minimum load, start-up costs, part-load efficiency losses, etc.) and the same plant modelled without these technical constraints, i.e. a fully flexible plant.

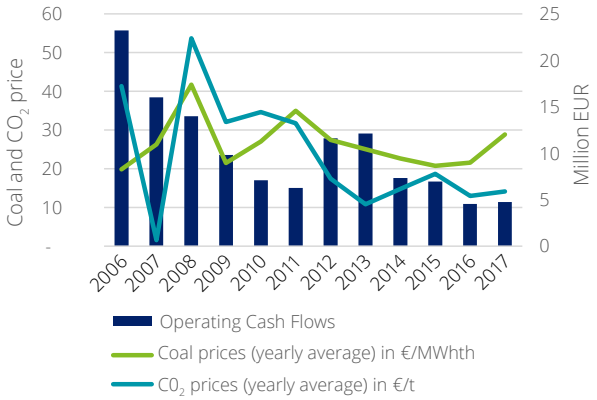
Reducing the number of mathematical constraints on an optimization problem leads automatically to decreasing costs and increasing profits. The increasing operating cash-flows shown by the figure 8 is therefore expectable. But the magnitude effect highlights here is remarkable. The plant's inflexibility reduces its cash-flows by nearly 25%. This is an indication for the potential to increase revenues through retrofit investments that improve flexibility.

Figure 6. Load-factor of the modelled power plant



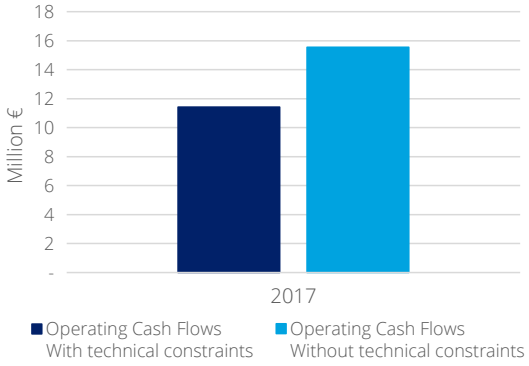
Source: Deloitte Economic Advisory

Figure 7.Comparison between coal prices, CO_2 prices and the operational cash-flows of the power plant modelled



Source: Deloitte Economic Advisory

Figure 8. Comparison of operating cash-flows with and without modelling of technical constraints

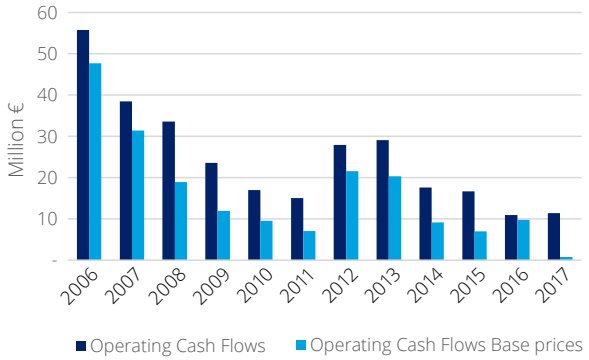


Source: Deloitte Economic Advisory

4.2 What is the role of price representation on the profitability of the plant?

"Baseload prices"[3] are usually used in industry to represent and anticipate the profitability of a thermal power plant. However, **such a simplified modelling assumption can lead to false conclusions and can thus lead to wrong decisions from power plant operators** (such as mothballing power plant or wrong investment decisions). To illustrate this idea, figure 9 shows the cash-flow evolution of the modelled coal-fired unit with hourly electricity prices and with "baseload prices".

Figure 9. Cash flows based on hourly prices vs. cash flows based on average annual prices



Source: Deloitte Economic Advisory

A simplified method can therefore have major impacts on the result. In this case, the simplification of the modelling assumptions (i.e. taking into account yearly average electricity prices vs. hourly electricity prices) leads to a significant underestimation of the value of the power plant. However, one has to be careful about these conclusions. **This result cannot be generalized as it could be the other way round for other types of plants or in other countries.**

5 Conclusion

The article also shows the interest of a realistic modelling approach for thermal power plant operators. As shown in section 4, simplified assumptions can lead to significant interpretation mistakes and therefore can lead to decisions (mostly investments or divestments) that negatively impact the profit of operators.

Finally, the technical parameters of the modelled power plant can be easily changed to assess different plant types, operational strategies or investment and divestment decisions. For example, the modelling could quickly be adapted in order to see the results on profitability of retrofit measures. **By retrofitting an old power plant, the operators can improve their flexibility** (for example, operators can rapidly change the valves in the boiler system or completely replacing the steam turbine in order to minimize the minimum load-level). **Therefore, retrofitting, by allowing more flexibility, can help operators to minimize their losses (for example, when the plant stays online to avoid costly start-up costs) and maximize their revenues.** This additional flexibility is also critical in the context of the European Union's targets in terms of integration of a large shares of renewables in order to decarbonize the energy system.

3 This consists of annual average electricity prices.

Policy and Regulation Radar

This section summarizes the key changes respectively in the EU or in the country regulation that may significantly affect the power and utilities companies.

What is changing in the EU regulation?

EU Budget 2021 - 2027: Renewal of the Connecting Europe Facility

Key features

In June, the Commission has proposed to **renew** the **"Connecting Europe Facility"** (CEF) (an EU funding instrument to support the development of trans-European networks in the fields of transport, energy and digital services), as part of the next long-term **EU budget 2021-2027**.

The budget proposed is **€42.3 billion** to support investments in the **European infrastructure networks for transport** (€30.6 billion), **energy** (€8.7 billion) and **digital** (€3 billion). In particular, 60% of the CEF budget will contribute to climate objectives in line with the EU's commitments under the Paris Agreement.

This represents an increase of 47% compared to 2014-2020, showing the EU's commitment to a **well connected and integrated Union** where citizens and businesses can fully benefit from free movement and the single market.

In addition, as part of the next long-term EU budget 2021-2027, the Commission has proposed to increase the **LIFE** (an EU programme for the **environment and climate action**) with a budget of **€5.45 billion**. One of the main objectives of the new LIFE programme is to stimulate investment and support activities focused on **energy efficiency**, especially in European regions lagging behind in the transition towards clean energy.

Insights

The Commission's proposal aims to better integrate these sectors:

- **Transport**: CEF will finance strategic transport projects in order to:
  - Advance the work on the **European transport network**, while helping the EU transition towards **connected, sustainable, inclusive, safe and secure mobility**.
  - **Decarbonise transport**, e.g. by creating a European network of charging infrastructure for alternative fuels and by prioritising of environmentally friendly transport modes.
  - Invest in **transport projects** offering **high-added value in cohesion countries**, with a dedicated budget of €11.3 billion.
  - Adapt sections of the transport network for **civilian-military** dual-use.
- **Energy**: CEF will help to complete the **Energy Union** and will support **Europe's clean energy transition**. CEF will finance energy projects in order to:
  - Make the EU's energy systems **better interconnected** and more resilient to possible supply disruptions, as well as **smarter** and more **digitalised**.
  - Foster Member State cooperation on **cross-border renewable** energy technology **projects** - ensuring a lower cost for renewables integration and enabling the strategic uptake of renewables technologies.
  - Back **key trans-European energy network infrastructures**, allowing for further integration of the internal energy market, boosting interoperability of networks across borders and sectors, and facilitating the overall decarbonisation of our economy.
- **Digital**: CEF will finance **digital connectivity infrastructure** in order to:
  - Set up **very high capacity broadband networks**, the **physical infrastructure** necessary to enable the digital services and more generally the **digital transformation** of society and economy.
  - Support **key projects aligned with the 2016 Gigabit Society Strategy** and essential for the success of the Digital Single Market, providing Gigabit connectivity for socio drivers, such as hospitals and schools or deploying 5G networks along major transport paths.
  - Provide **very high quality wireless connectivity** to local communities and provide an important contribution to connecting communities and all households throughout the EU with very high capacity networks.

Next steps

A swift agreement on the budget is essential to ensure that EU funds begin to deliver on the ground as soon as possible. An agreement on the next long-term budget in 2019 would provide a seamless transition between the current long-term budget (2014-2020) and the new one.

Link: *EU Budget 2021 – 2027: Renewal of the Connecting Europe Facility*

European Energy Council

Key features	Insights
On June 11th, the **European Energy Council** agreed its position (general approach) on a regulation to **update the role of ACER**, the EU Agency for the Cooperation of Energy Regulators. The **functioning** and the **role** of the agency, as well as the scope of its specific **tasks**, are defined in the regulation. The objective is to **improve collaboration** between national electricity and gas regulators by updating the tasks of the agency. New regulatory tasks and competences shall only be granted to the agency on condition that **adequate involvement of member states** is guaranteed.	Since its creation in 2011, ACER has improved coordination between energy regulators on cross-border issues. Increased market integration and the change towards more variable electricity production means that further efforts are needed to **coordinate national energy policies with neighboring countries** and to make greater use of the opportunities offered by **cross-border electricity trade**. This adaptation covers the tasks of its director and the board of regulators, which consists of senior representatives of the member states' national regulatory authorities. Special care has been taken to ensure appropriate governance mechanisms by providing a clearer definition of the respective roles.
	Next steps
	This general approach enables the Council to start negotiations with the European Parliament. Negotiations are expected to start under the Austrian presidency.

Link: *European Energy Council*

New agreements on: renewable energy, energy efficiency and the governance of the Energy Union

Key features

On 30 November 2016, the Commission presented, as part of the Clean Energy for All Europeans Package (see Q4 2016 Newsletter), its proposals for:

- A revised **Renewable Energy** Directive.
- A revised **Energy Efficiency** Directive.
- A regulation on the **Governance of the Energy Union**.

Now, in **June 2018, three ambitious political agreements** have been reached between the negotiators from the Commission, the European Parliament and the Council on these three issues.

With these rules agreed now, Europe will be equipped to complete the clean energy transition and meet the goals set by the Paris Agreement.

Insights

The main achievements of the agreements are as follows:

- **Renewable energy**:
  - Sets a new **binding renewable energy target** for the **EU** for **2030** of **32%**, including a **review clause** by **2023** for an upward revision.
  - **Improves the design and stability of support schemes** for renewables.
  - **Reduces administrative procedures**.
  - Establishes a stable regulatory framework on **self-consumption**.
  - Increases the level of ambition for the **transport** and **heating/cooling** sectors and improves the sustainability of the use of **bioenergy**.
- **Energy efficiency**:
  - Sets a new **energy efficiency target** for the **EU** for **2030** of **32.5%**, with an upwards **revision clause** by **2023**.
  - Extends the **annual energy saving obligation beyond 2020**, which will attract private investments and new market actors.
  - Strengthens **rules on individual metering and billing** of thermal energy.
  - Requires **Member States** to have in place transparent **national rules** on the **allocation of the cost** of heating, cooling and hot water consumption in multi-apartment and multi-purpose buildings with **collective systems**.
  - Tackles existing market, behavioural and regulatory barriers in order to **increase security of supply**, **competitiveness** of EU industries, **reduce energy bills** of consumers and health costs for society.
- **Governance of the Energy Union**:
  - Calls for each Member State to prepare a **national energy and climate plan** for the period **2021 to 2030**. These national plans would be **comparable throughout the EU**. Assessments of the draft plans, and recommendations by the Commission, will result in final plans that ensure that the 2030 climate and energy targets will be reached.
  - Aligns the **frequency and timing of reporting obligations** with the Paris Climate Agreement, significantly enhancing transparency and delivering a **reduction of the administrative burden**.
  - Ensures that **EU and Member States can work together** and strengthens **regional cooperation** across the Energy Union dimensions.
  - Introduces the necessary **flexibility for Member States** to reflect national specificities and fully respects their freedom to determine their energy mix.
  - Ensures the **follow-up of the progress** made at Member State level to the collective achievement of the EU targets.
  - Establishes a transparent **regulatory framework for the dialogue** with civil society in Energy Union matters and enhances regional cooperation.

Next steps

Following these political agreements, the texts will have to be formally approved by the European Parliament and the Council. Once endorsed by both co-legislators in the coming months, the texts will be published in the Official Journal of the Union and will enter into force 20 days after publication. Member States will have to transpose the new elements of the revised Directives into national law 18 months after its entry into force.

Link: *Agreement on further renewable energy development*

Link: *Agreement on energy efficiency*

Link: *Agreement on the governance of the Energy Union*

What is changing in country regulation?

United Kingdom			
Topic	**Key features**	**Insights**	**Next Steps**
Automatic compensation for switching problems	• Ofgem issued proposals to **extend the scope** of **Guaranteed Standards of Performance** (GS) to ensure **automatic compensation** when **switches** go wrong. • Compensation is intended to cover erroneous and delayed switches, late final bills and credit balance refunds. • **Suppliers** will be required to **pay at least £30** in compensation for each **switching problem** under Ofgem proposals.	• This proposal is intended to **reduce the direct costs experienced by customers** when switches go wrong, to help **improve confidence in the switching process**, and to create **incentives for suppliers** to **make sure their practices, processes, data and IT systems** ensure switches go smoothly. • The key benefit is that consumers are automatically compensated without requiring a formal investigation. • However, suppliers that may not be at fault may be paying compensation. Nonetheless, it is expected that compensation will be proportionate to the number of faulty switches caused.	Consultation is ongoing until 31 July 2018. In particular, Ofgem invites views from consumer bodies and suppliers. Ofgem aims for this regulation to take effect from 2019.
Discount off winter bills	• Smaller energy suppliers will be obliged to offer the **Warm Home Discount** (WHD). These suppliers will be required to give **vulnerable customers**, including pensioners, **£140 off** their winter bills. • The threshold for energy suppliers' participation in WHD will remain at 250,000 customer accounts this coming winter. This will be lowered in future years to 200,000 customer accounts in 2019/20 and 150,000 customer accounts in 2020/21. • Having more suppliers in WHD will **improve switching for vulnerable customers** as part of plans to eradicate fuel poverty.	• Lowering the threshold for suppliers to participate in WHD will likely cover 97% of consumers in 2019/20. • This will **increase the costs of supply to existing energy retailers** that have between 100,000 and 250,000 customer accounts. • Extending the eligibility of the discount also makes it easier for vulnerable customers to compare suppliers when considering switching. • The threshold for suppliers will be reviewed after 2021 where it could continue to fall, potentially to zero.	The extension of WHD will begin in winter 2019/20.

Italy			
Topic	**Key features**	**Insights**	**Next Steps**
Requirements for second generation (2G) intelligent metering systems	• The resolution 87/2016/R/EEL defined the functional requirements for **second generation** (2G) **intelligent metering systems** and the characteristics related to the **communication** between the meter and the user device (the so-called "Chain 2"). • It also established a **monitoring of communications** performance through "Chain 2" and a **process for assessing the availability of standardized technological solutions** that support incremental functionality (Version 2.1) of second-generation low-voltage smart metering systems. The **conclusion** of the process for the evaluation was planed for **31 May 2018**. • Now, this resolution of ARERA (Italian Regulatory Authority for Energy, Networks and the Environment) **extends the duration** of the monitoring of communications performance through "Chain 2" and, at the same time, the deadline for the conclusion of the procedure aimed at defining the incremental functions of the version 2.1 of the Smart Metering second generation systems.	• This resolution **enhances non-discriminatory access to data** and a further **evolution of measuring instruments**. Non-discriminatory information on energy consumption and the parallel development of smart meters become central hubs of **competitive retail markets**: - For **consumers**, access to detailed information is a prerequisite for both a more active and aware **participation in the market**, and to **adapt their consumption** behavior and investment choices towards a more rational and **efficient use of energy**. - For **third parties** (e.g. vendors and aggregators), non-discriminatory access to consumer information and collection data, along with the guarantee of privacy and data security, is an indispensable condition for the **competitive development** of the **market services for energy efficiency** and **active demand management**.	The duration of the monitoring of **communication performance** is extended to **31/12/2018**, while the deadline for the procedure aimed at **defining the incremental functions of Smart metering second generation systems** is **31/03/2019**

Germany			
Topic	**Key features**	**Insights**	**Next Steps**
Draft for an amendment of the Renewable Energy Sources Act 2017 (EEG 2017)	• The Federal Ministry of Economic Affairs and Energy (BMWi) is working on an **amendment to the EEG** (so called "100-Tage-Gesetz"). • The **tendering procedure** for **wind onshore**, which led to undesirable developments in 2017, will be modified. • In the field of combined heat and power, the changes are expected to affect the **concept of cogeneration**, which has been the subject of various discussions. • The **support for existing plants** according to § 13 of the Combined Heat and Power Act (KWKG) shall also be adjusted. In particular, it is planned to **reduce** the subsidy rate significantly. • In addition, the legislator intends to **exclude a cumulation of investment subsidies** completely, which are currently granted by the KWKG.	• Adjustments to the **tendering procedure** is a mere optimization with potentially **no great impact**. • The **support** scheme for **CHP-plants** is again adjusted to **avoid too much financial support**. This is due to the EU Commission interfering with the German support scheme. CHP-plant projects thus will face another downturn.	The legislative process came to a **standstill** in June 2018. The respective amendment to the EEG 2017 was originally intended to be implemented before the summer break of the Bundestag in 2018 (so-called "100-Tage-Gesetz"). However, this will now last **until autumn**.
Settlement between the German government (Bundesregierung) and the EU Commission on a new stipulation amending the EEG 2017	• According to § 61b no. 2 **EEG 2017** being applicable until 31 December 2017, the power produced by a highly efficient **CHP plant** and consumed in a **Self-Supply** situation was entitled to a **reduction of the EEG Levy to 40%**. • This reduction from the EEG Levy was only enforced until the end of 2017 and needed to be approved by the **European Commission**. The European Commission **refused such approval** so that as of 1 January 2018 this **provision does not apply anymore**. • The German government has reached a settlement with the European Commission on a **new stipulation amending the EEG 2017**. A **reduction** from the EEG Levy to 40% for CHP plants in a Self-Supply situation (taken into **permanent operation after 1 August 2014**) **can now be claimed** for the following three asset **categories**: - Systems **below 1 MW** and **more than 10 MW**. - Installations with **less than 3.500 full hours of use** per year. - Systems in the **power-intensive industry**. • For new CHP plants built between 1 August 2014 and the end of 2017, there will be a phased transitional arrangement until 2019 or 2020.	• If, after the implementation of the new law, any of the other power production and Self-Supply facilities benefit from the new stipulation, it shall **apply retroactively from 1 January 2018**. • This new stipulation **does not include all CHP plants**, so that many (industrial) CHP plants will have to be operated without relief from the EEG Levy. This imposes a **high cost burden** on many industries and thus will lead to further decommissioning of plants.	The legislative process came to a **standstill** in May 2018. The respective amendment to the EEG 2017 was originally intended to be implemented before the summer break of the Bundestag in 2018 (so-called "100-Tage-Gesetz"). However, this will now last **until autumn**.

Germany			
Topic	**Key features**	**Insights**	**Next Steps**
Results of the second tender for offshore wind farms	• The Federal Network Agency (Bundesnetzagentur) announced on 27 April 2018 the market premium in the **second tender for offshore wind farms**. • The available tender volume was **1,610 megawatts**. Taking into account this volume of tender and the free capacity of the connection lines, **six bids could be awarded**. • The lowest bid value was **0.00 ct / kWh**. The highest bid value was **9.83 ct / kWh**. • The names of the bidders who have been awarded the tender are as follows: Baltoc Egale GmbH, Gode Wind 04 GmbH, Iberdrola Renovables Offshore Deutschland GmbH, Innogy Kaskasi GmbH, KNK Wind GmbH and Orsted Borkum Riffgrund West I GmbH.	• By winning, bidders will receive the following benefits: - **EEG funding** (market premium). - **Right to operate** their offshore wind farms for over **25 years**. - **Connection to a grid** (financed by the electricity consumer via the network charges).	The commissioning of the supplemented wind farms will take place during the period from 2021 to 2025. The next tender for wind at sea will take place in September 2021 with commissioning from 2026.
Germany needs to recover illegal state aid from certain large electricity users exempted from network charges in Germany in 2012-2013	• The **European Commission** has concluded that the **exemption** for certain **large electricity users** in Germany from **network charges in 2012-2013** was **against EU State aid rules**. There were no grounds to fully relieve those users from paying network charges. Germany now has to **recover the illegal aid**. • In 2014, Germany abolished the exemption (§ 19 para. 2 of the German Network Charges Ordinance). Since then, users with a stable consumption can request their network charges to be calculated based on the costs that they individually cause to the network. This new regime was not part of the Commission's investigation. • Between 2011 and 2013, electricity users that had an annual consumption above 10 gigawatt hours and a particularly stable electricity consumption were fully exempted from paying network charges under German law (§ 19 para. 2 of the German Network Charges Ordinance). In 2012, thanks to this provision, these users avoided paying an **estimated €300** million in network charges. These costs were instead financed by a special levy imposed on final electricity consumers (the so-called § 19-surcharge), which Germany introduced in 2012.	• **Revenues** from the § 19-surcharge are **State resources** because electricity consumers are obliged to pay the surcharge under German law and the German State has control over the funds. • It is now for Germany to **determine** the amount of **network charges generated by each beneficiary** of the exemption in 2012 and 2013, in line with the methodology set out under the Commission decision. • Germany must then **recover the illegal state aid from each beneficiary**. This will be facilitated by the **network operators**, who granted these reliefs. A series of civil court cases, even against the German legislator, might start.	The Federal Network Agency will determine the amount of network charges generated by each beneficiary of the exemption in 2012 and 2013. The Federal Network Agency will oblige the network operators to recover the illegal state aid from each beneficiary.

Snapshot on surveys and publications

Deloitte

Energy management: Businesses drive and households strive – May 2018

This paper presents how businesses and consumers are producing a virtuous circle of sustainability, with each group appearing to drive the other toward cleaner, greener energy and sustainable practices.
Link to the survey

Supercharged: Challenges and opportunities in global battery storage markets – May 2018

This report for Deloitte Center for Energy Solutions takes a closer look at the growing global battery storage market and examines the key drivers and challenges that are transforming the global energy storage market.
Link to the survey

Agencies or research institutes

European Commission

Renewables in the EU : An overview of support schemes and measures - May 2018

This report provides a compilation of the different support schemes and measures implemented by the EU countries since the 2009 Renewable Energy Directive (RED) came into force. The focus of support for renewables has been strongly on electricity generation but has been broadening to the heating/cooling and transport sectors as well.
Link to the survey

Evaluation of the TEN-E Regulation and assessing the impacts of alternative policy scenarios – May 2018

This case study examines priority corridors and thematic areas of trans-European energy infrastructure and provides guidelines for the selection of Projects of Common Interest (PCIs). The main objective of the TEN-E Regulation is the development and interoperability of trans-European energy networks and connection to such networks.
Link to the survey

Energy as a tool of foreign policy of authoritarian states, in particular Russia – May 2018

Russia and other energy-rich authoritarian states use their energy exports for economic gains but also as a tool of foreign policy leverage. This study looks at the ways and methods these states have used to exert political pressure through their energy supplies, and what it means for the European Union.
Link to the survey

National strategies for renewables – April 2018

This report summarises the presentations and discussions of the workshop on "National Strategies for Renewables: Energy Efficiency, Building Renovation and Self-Consumption", which was held on 22nd February 2018. National strategies for the development of renewable energy were discussed in relation to energy efficiency targets and other policies, including building renovation and self-generation of electricity.
Link to the survey

Scenario analysis of accelerated coal phase-out by 2030 – April 2018

The present report is a hands-on exercise by the European Commission's Joint Research Centre (JRC) using the METIS model (Artelys, 2017). The model is used on two variations of the European Commission EUCO27 scenario built to simulate the impacts of an accelerated coal phase-out policy unfolding during the next decade.
Link to the survey

Global energy and climate outlook 2017 – March 2018

This document complements the Global Energy and Climate Outlook 2017 Report. It provides the detailed GHG and energy balances for the Reference, INDC and B2C scenarios described in the main report. The results displayed in this report have been produced with the global energy & GHG model POLES-JRC.
Link to the survey

Eurelectric

Blockchain in Electricity: a Critical Review of Progress to Date – May 2018

Early blockchain-based energy transactions were taking place by 2014. By March 2018, there were 122 energy sector organisations involved in blockchain technology and 40 publicly announced deployed projects. This paper discusses current blockchain-related activities and critically assesses the potential for growth of blockchain technologies in the electricity sector.
Link to the survey

Water Framework Directive: Experiences & Recommendations from the Hydropower Sector – May 2018

Hydropower provides more than 36% of the renewable electricity generated in the EU-28. This paper presents recommendation of Eurelectric in respect with the Water Framework Directive (WFD). A holistic approach of European environmental, energy and climate policies is necessary to balance ecological, human and economic aspects and promote a sustainable use of water.
Link to the survey

Decarbonization pathways – May 2018

This paper examines the potential of electrification in decarbonization of the economy. Deep decarbonization is by implication an electrification journey. Electrification is the most direct, effective and efficient way of reaching the decarbonization objectives.
Link to the survey

Oxford institute for Energy

Quarterly Gas Review – Analysis of Prices and Recent Events – March 2018

In this presentation, the author provides his insights and analysis on recent regional and global pricing issues while also commenting on relevant questions concerning policy and market-related matters.
Link to the survey

Natural gas demand in Europe in 2017 and short term expectations – April 2018

This short paper provides a brief overview of the main dynamics that have impacted gas demand in Europe in 2017 and identifies key drivers for future demand in the next five years.
Link to the survey

Decarbonisation of heat in Europe: implications for natural gas demand – May 2018

The objective of this paper is to set the scene and provide a framework to study the heating (and cooling) sector in Europe, with a special focus on the implications for the natural gas industry, and especially for natural gas demand.
Link to the survey

Oxford Energy Forum – Decarbonization and liberalization in the power sector: international perspectives – June 2018

Oxford Energy Forum 104 (February 2016) looked at the transformation under way in the electricity sector, driven by technological developments and policies on decarbonization. It focused mainly on OECD countries, and on Europe in particular. This issue of the Forum explores related issues, but on a wider canvas – countries across the world, with a diverse range of approaches, many outside the OECD.
Link to the survey

Newsletter contacts

Véronique Laurent
Partner
France - E&R leader
vlaurent@deloitte.fr

Thomas Gounel
Partner
tgounel@deloitte.fr

Emmanuel Rollin
Director
erollin@deloitte.fr

François Lévêque
Senior Advisor
fleveque@deloitte.fr

Nuria Fernandez
Senior Manager
nufernandez@deloitte.es

Sébastien Douguet
Manager Energy
Deloitte Economic Consulting
sdouguet@deloitte.fr

Global Power Leadership contacts

Global Power Leadership	Name	Contact Details
Global Power Leader	Felipe Requejo	frequejo@deloitte.es
European Power Leader	Veronique Laurent	Vlaurent@deloitte.fr
Global Renewable Energy Leader	Jane Allen	janallen@deloitte.ca

Global E&R Function Leadership	Name	Contact Details
Global E&R Consulting Leader	Anton Botes	abotes@deloitte.co.za
Global E&R Tax Leader	Brad Seltzer	bseltzer@deloitte.com
Global E&R Financial Advisory Services Leader	Rajeev Chopra	rchopra@deloitte.co.uk
Global E&R Enterprise Risk Services Leader	Paul Zonneveld	pzonneveld@deloitte.ca
Global E&R Audit & Accounting Leader	Véronique Laurent	vlaurent@deloitte.fr

Deloitte
6, place de la Pyramide – 92908 Paris-La Défense Cedex