



Newsletter

Power & Utilities in Europe

May, 2017

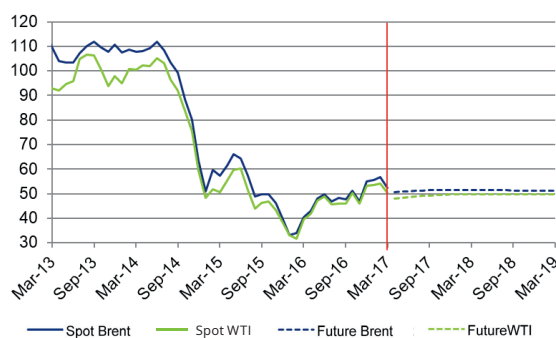
Newsletter

Power & Utilities in Europe

Commodities



Crude oil (\$/bbl)



Source Capital IQ

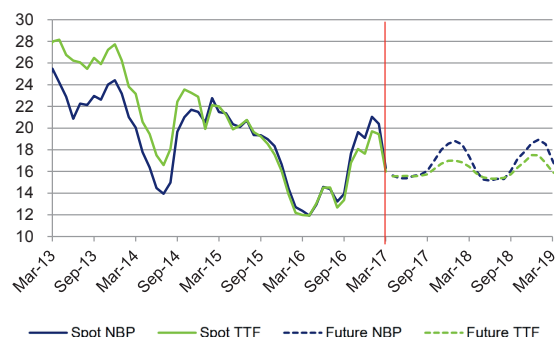
Global Oil demand continued to grow throughout the second half of 2016 with demand reaching 97.1mb/d in Q3 2016 and 97.9mb/d for Q4 2016.

Prices fluctuated throughout the second half of 2016 but strengthened following agreements by OPEC (in November) and non-OPEC countries (in December) to reduce output.

OPEC targeted production cuts of 1,164 kb/d, whilst 11 non-OPEC countries jointly targeted cuts of 558kb/d. Following this, oil prices traded tightly around the \$55/bbl for much of the start of 2017 as OPEC compliance with the cuts was meaningful but fell back towards the \$50 level following the release of data in March, which showed the build-up of US oil stocks.



Gas (€/MWh)



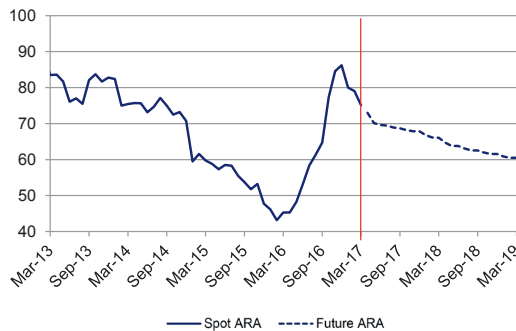
Source Capital IQ

Gas demand in the UK and in continental Europe exhibited strong growth in Q4 2016 and Q1 2017 as demand for both heating and power drove consumption levels.

During 2016 French gas demand for power generation doubled as parts of the French nuclear fleet were taken offline for safety checks. January in North-western Europe was the coldest for the last seven 7 years driving large withdrawals from storage. Combined with extended problems at the UK's largest gas storage facility, this lead EU gas storage levels to fall to their lowest level in Q1 since 2012-13. Following a cold January, Europe experienced a warmer than average February that saw prices fall away from their January peaks.



Coal (\$/metric tonne)



Source Capital IQ

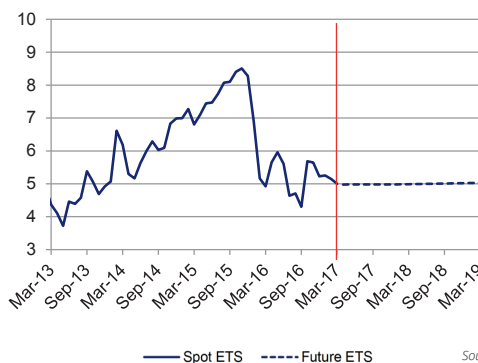
Coal prices continued their surge in Q4, peaking in December before falling away throughout Q1.

Restrictions on the number of days that Chinese coal mines could operate for (set in March 2016) drove the increase in prices during the year. In November these restrictions were relaxed to meet heating season demand in China. Furthermore, Chinese New Year holidays in late January and early February reduced industrial consumption in China in Q1. Together, these factors reduced the level of Chinese imports and had knock on effects on both world and European markets. Storage levels in February reached the highest levels in a year at four major European coal terminals as warmer weather reduced coal demand for electricity in Europe reduced coal demand for electricity in Europe.



Carbon

CO₂ (€/tonne)



Source Capital IQ

Nuclear plant outages in France and cold weather in January contributed to additional fossil fuel burning in Q4 2016 and Q1 2017. However, responses in the carbon markets are limited with allowances trading in the 6-4 euro range since February 2016.

On February 15, the European parliament voted in favour of proposed revisions to the ETS directive. The key reform being that the number of emission allowances will decline at a faster pace than before.

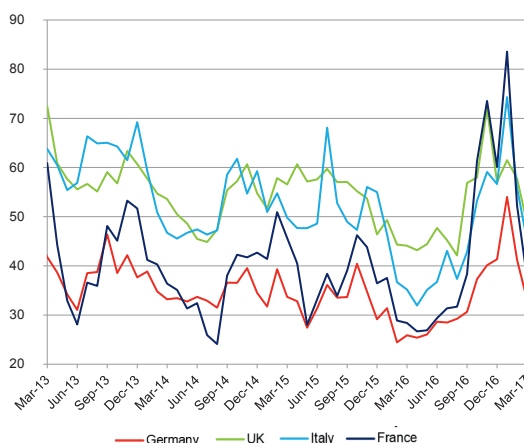
From 2021 onwards, the number of allowances will decline by 2.2% annually instead of 1.74% annually, which was previously planned.

Eventually, this can be expected to lead to rising carbon prices. However, the current set of reforms is unlikely to have material impacts on carbon prices in the short to medium-term. The overhang of structural oversupply is likely to keep allowances prices below levels that encourage coal to gas switching across Europe, which is instead being driven by other factors such as coal closures in the UK and the UK's Carbon Price Floor.



Baseload Electricity

Baseload Spot Day Ahead (€/MWh)



Source Bloomberg

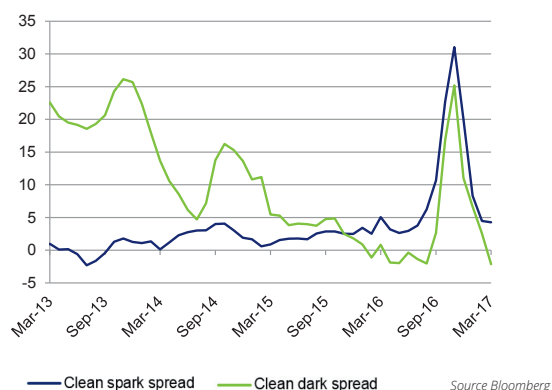
Rough weather in November caused damage to the electricity interconnector between Great Britain and France. This meant that the interconnector was limited to 50% of its normal capacity from late November until the end of March.

A number of French nuclear plants faced delays in returning to service after being taken offline to undergo safety checks at the request of the regulator. This resulted in EDF downgrading its nuclear output target for 2016 from 408-412TWh to 378-385TWh and at points in November, nuclear availability was as low as 70%. Supply fears eased after the French nuclear regulator allowed some reactors to restart in early December.

Overall, it was tight margins due to coal closures in the UK and nuclear outages in France, combined with bouts of cold weather that drove prices throughout the winter.



UK Clean dark & spark spread (£/MWh)



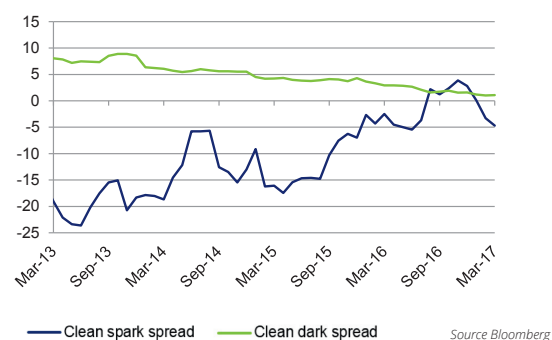
The UK entered winter with the tightest system reserve margin since market liberalisation in the 1990s.

On average, Britain typically imports electricity from France through the interconnector. The supply issues in France, combined with damage to the interconnector, made the tight margin situation more acute.

Low levels of spare capacity and cold weather drove clean spark spreads and clean dark spreads to new highs in November. As temperatures increased and electricity demand reduced after the winter peak, margins have fallen back to their pre-peak levels and clean dark spreads have returned to negative territory. Throughout the last two quarters, even when clean dark spreads reached record levels, gas had firmly been ahead in the merit order in GB. This is principally a result of the UK's carbon price floor (lifting generator carbon costs 18 £/t above the EU ETS price).



German Clean dark & spark spread (€/MWh)



In contrast to the UK, where the CPS puts gas ahead of coal in the merit order, the EU ETS price alone typically still does not suffice to lead to gas being held ahead of coal in the German merit order.

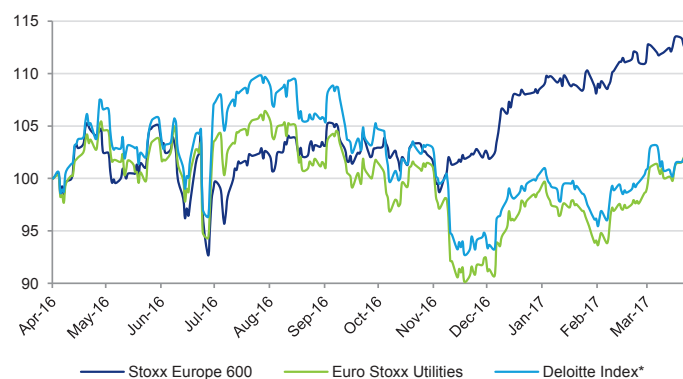
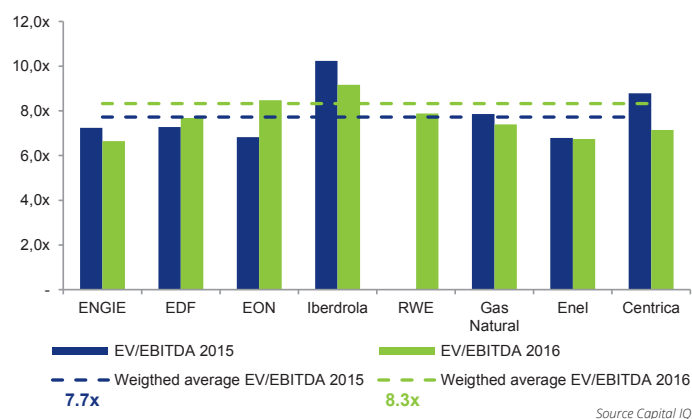
The exception to this was the six month period in which coal prices peaked and the rise in German electricity prices was enough for clean spark spreads to trade in positive territory before returning to negative margins from February.

Coal stations are still the marginal price setting plant on the German electricity system, implying modest but positive clean dark spreads. However, these margins are increasingly being squeezed by the impact of increased deployment of low marginal cost wind and solar energy, which can lead to periods of very low or negative electricity prices as penetration increases.

Spotlight on Power and Utilities market

Capital market overview

	Deloitte Index ⁽¹⁾	Enel	Iberdrola	ENGIE	EDF	Gas Natural	E.ON	Centrica	RWE
Market cap. ratios									
Currency		EUR	EUR	EUR	EUR	EUR	EUR	GBP	EUR
Market cap. March 31, 2017		42,981	40,498	30,256	21,659	19,240	15,076	12,051	8 949
3m stock price performance	6%	6%	9%	9%	-19%	16%	10%	-7%	31%
YoY stock price performance	5%	14%	15%	-1%	-19%	18%	-11%	-4%	37%
Market multiples									
EV/EBITDA 2016	8.5x	6.8x	10.2x	7.2x	7.3x	7.9x	6.8x	8.8x	n.m.
EV/EBITDA 2017	8.5x	6.7x	9.2x	6.6x	7.7x	7.4x	8.5x	7.2x	7.9x
P/E 2016	11.3x	16.7x	14.8x	n.m.	7.6x	14.3x	n.m.	7.2x	n.m.
P/E 2017	13.3x	12.1x	14.6x	12.7x	12.2x	14.5x	11.4x	13.3x	7.8x
Price/book value 2016	0.6x	1.2x	1.1x	0.8x	0.6x	1.3x	-14.3x	n.m.	2.4x
Profitability ratios									
ROE forward 12m	5%	10%	7%	6%	5%	9%	n.m. (3)	34% (2)	31%
ROCE forward 12m	9%	9%	5%	5%	4%	7%	n.m. (3)	17%	19%
EBITDA margin 2016	21%	22%	25%	14%	21%	20%	16%	8%	5%
EBITDA margin 2017	21%	21%	25%	16%	21%	21%	13%	9%	12%
EBIT margin 2016	13%	14%	15%	8%	10%	12%	6%	5%	0%
EBIT margin 2017	13%	13%	15%	9%	8%	12%	8%	6%	7%



Key messages from brokers and analysts

"Guidance for 2017 was mostly maintained and 2016 numbers met expectation but the few that changed guidance saw strong stock reactions"
(Morgan Stanley – March 21, 2017)

"Clean technologies: Declining costs and increasing adoption"
(HSBC – March 8, 2017)

"Inflationary expectations ... impact concentrated in the UK, France and Italy due to inflation linked regulation"
(Morgan Stanley – February 13, 2017)

"Still a fast-growing market for the utility offshore developers but pioneers-level profitability is over for the new projects"
(HSBC – February 7, 2017)

"Falling yields and improving outlook in December drove the sector to make up much of its previous underperformance"
(Morgan Stanley – January 9, 2017)

(1) Deloitte Index is composed of Engie, EDF, EON, Iberdrola, RWE, Gas Natural, Enel, SSE and Centrica
(2) Ratio linked to the level of non-recurring income resulting from disposals program by Centrica

Source Capital IQ

M&A Trends

Transactions involving Power & Utilities companies

ENGIE closed the sale of **8.7 GW of thermal assets** (8.0 GW gas-fired and 0.7 GW coal-fired), **to a joint venture formed by Dynegy**, a US power generation and distribution Company, and **ECP**, a US private equity firm, for an enterprise value of **\$3.3bn**.
(GlobalData - February 8, 2017).

Portuguese energy company **EDP** sold the gas distribution network of its Spanish subsidiary **Naturgas for €2.6bn** to **Nature Investment**, a private equity fund.
(Reuters - March 27, 2017).

Mitsubishi Heavy Industries and **Japan Nuclear Fuels**, a Japanese nuclear business, **acquired 10%** (5% each) **of Areva's** nuclear fuel business for **€500m**.
(The Deal - February 3, 2017).

Drax Group, a UK electrical power generation company, completed the **acquisition by Engie** of **Opus Energy**, a provider of energy and gas distribution services to corporate for **£340m**.
(GlobalData - February 13, 2017).

Public Power Corporation (PPC), Greek electricity utility, **sold** a 24% stake in **ADMIE**, the Greek Independent Power Transmission Operator, to **China's State Grid International Development** for **€320m**. In addition, PPC set up a special vehicle to transfer a cost-free 51% stake to the state and existing shareholders.
(Kathimerini - January 18, 2017).

Enea, a state-owned Polish utility company, **acquired** the **Engie** polish coal power plant with a **generation capacity of 1.9 GW (Engie Energie Polska)** for **€300m**.
(PAP Market Insider - March 14, 2017).

EDP Renovaveis S.A., a subsidiary of Portuguese utility EDP specialized in renewables, entered into an **agreement with China Three Gorges Corporation**, a Chinese state-owned power company, **to sell 49% in a portfolio of wind assets** for €242m and representing a total capacity of **422 MW**.
(SeeNews - February 28, 2017).

Amundi Energy Transition (AET), a joint venture between Amundi and EDF, **acquired** a majority interest in one of **Dalkia's** gas-fired cogeneration plants portfolio in France (132 facilities with a total capacity of 330MW), representing **a total capacity of 330 MW** for **€150m**.
(Project Finance Magazine - January 10, 2017).

SSE and **Statoil** have increased their shares in the Dogger Bank offshore wind development (**4.8 GW under construction**) by **acquiring 12.5% each** from **Statkraft**, the state-owned Norway hydropower company, for an undisclosed amount.
(Reuters - March 23, 2017).

Transaction involving equity funds

Institutional investors have agreed to acquire **onshore wind assets in the UK representing a 409MW capacity**, from **Infinis Energy plc**, a UK utility company, for an enterprise value close to €763m.
(MarketLine - February 9, 2017).

UK Green Investment Bank, a renewable energy investment company, agreed to acquire **75% of Lincs Wind Farm Limited**, a company which owns Lincs offshore wind farm with a **270MW** capacity, **from Centrica plc and Siemens Project Ventures GmbH for £731m**.
(GlobalData - January 17, 2017).

Vortex, the Egyptian Investment Bank renewable energy platform, agreed with **TerraForm**, a US energy company, to **acquire** a solar energy portfolio in the UK worth **365 MW for £470m**.
(Utilities-me.com - January 10, 2017).

J.P. Morgan Asset Management Inc., on behalf of institutional investors, has agreed to acquire **Varmevarden AB**, a company engaged in producing and distributing district heating, electricity and steam, from **Macquarie European Infrastructure Fund and Capstone Infrastructure Corporation** for **\$321m**.
(GlobalData - February 23, 2017).

European Power and Utilities companies wrap-up

Most of European Power Utilities achieved their 2016 guidance.

In France, Q4 electricity wholesale prices have been boosted by the **nuclear power plant outages** and **colder weather** but it was insufficient in offsetting the **impact of low commodity prices** and **challenging markets conditions**. In addition, the Brexit had some consequence on Utilities operating in the UK with adverse foreign exchange impact.

On a year-on-year basis, **recurring net incomes of Utilities in 2016 are close to 2015 levels**.

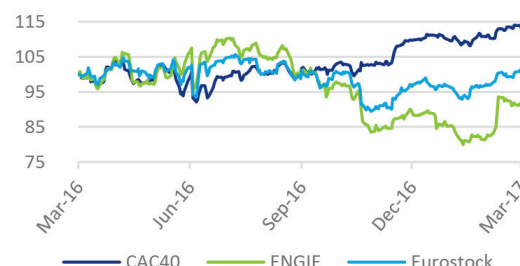
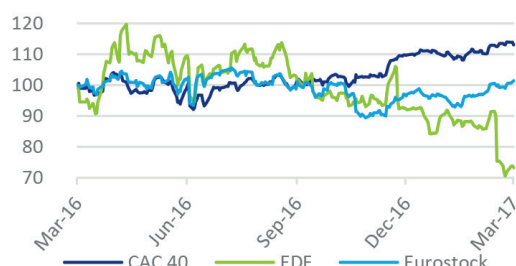
On aggregate, **impairment recorded by Utilities** is still significant (approx. **€12bn**) but represents **half of the amount in 2015**.

Guidance announced for 2017 is almost aligned with 2016 actuals, given the current uncertain economic context.





Share Price Perf. 2016 - 2017



Key Reported Financials

In billion of €	2016	2015	Var.
Sales	71.2	75.0	-5%
EBITDA	16.4	17.6	-7%
Impairment	-0.6	-3.5	nm
Operating Income	7.5	4.3	74%
Recurring net income Gr	4.1	4.8	-15%
Net Income Gr Share	2.9	1.2	142%
Operating CF	13.1	13.5	-3%
Net Capex	-11.7	-12.7	-8%
Net debt	-37.4	-37.4	0%

In billion of €	2016	2015	Var.
Sales	66.6	69.9	-5%
EBITDA	10.7	11.3	-5%
Impairment	-4.2	-8.7	nm
Operating Income	2.5	-3.2	nm
Recurring net income Gr	2.5	2.6	-4%
Net Income Gr Share	-0.4	-4.6	-91%
Operating CF	9.7	9.8	-1%
Net Capex	-6.2	-6.5	-5%
Net debt	-24.8	-27.7	-10%

2016 Highlights

- **2016 guidance achieved**
- **Sales are down by 5% at €71.2bn** namely in connection with the drop in French nuclear output (-37 TWh) due to additional controls on steam generators. In the UK EDF records a record level of 65TWh nuclear output.
- **EBITDA amounts to €16.4bn**, -7% vs 2015 including a -5% organic variation, due to:
 - adverse effect of the **drop in nuclear generation in France** and the **challenging downstream markets** conditions both in France and in the UK,
 - partially offset by the **positive impact of the 2014 tariff adjustment (+€1.0bn)** and of the continued opex reductions (+€0.3m).
- Operating income is positively impacted by the **lower impairment charge in 2016** vs 2015.
- **Continuation of Opex reductions (€-0.3bn vs 2015) and rapid progress of the disposal plan (€6.7bn signed or released i.e. 67% of the objective)** including a binding agreement to sell 49.9% of RTE (French electricity TSO) to CDC and CNP Assurance (Equity value of €8.4bn).
- **Approval of the compensation terms for the closure of the Fessenheim nuclear plant** including a **fix compensation of €490m** to be paid in 2019 and 2021.
- **Issuance of a Senior bond in Japan of €1.1bn.**
- **Share capital increase of €4bn.**
- **Launch of Flamanville EPR performance test** prior to reactor start-up in 2018.

For 2017 EDF outlooks are:

- Nuclear output between 390 and 400 TWh.
- **EBITDA of €13.7bn to €14.3bn.**
- **Net financial debt/EBITDA < 2.5x.**
- Pay-out ratio of Net Income excluding non-recurring items: 55% to 65%.

For 2018:

- **EBITDA > €15.2bn.**
- **Net debt/EBITDA ratio < 2.5x.**
- Opex saving of €0.7bn vs 2015.
- Net invest. of €10.5bn excl. linky, new development and assets disposals.
- Cash flow positive.
- Pay-out ratio of Rec. Net income: 50%.

FY 2017 Outlook

• 2016 guidance achieved

- **Sales fell by 5% at €66.6bn** due to unfavourable impact of exchange rate and lower commodity prices, partially offset by a positive effect of slightly colder temperatures in France vs 2015.
- **EBITDA amounts to €10.7bn**, -5% vs 2015 including a -3% organic variation, due to:
 - continued **negative prices and unfavourable foreign exchange impact**,
 - partially offset by the **positive impact of the restart of the Doel 3, Tihange 2 and Doel 1 nuclear power plants in Belgium** and the first effects of the "Lean 2018" performance program, **colder temperature in France and the commissioning of assets.**
- **Impairments mainly relate to Benelux (€1.4bn), European thermal power plants (€0.7bn) and renewable energy in France (€0.4bn).**
- **Transformation plan on track:**
 - €8bn of disposals today representing more than 50% of the 2018 objective.
 - Performance program "Lean 2018" is ahead of its 2016 roadmap and decision to accelerate its implementation by raising the target by 20% (€1.2bn).
- Decision of the **competition authority to sentence Engie to pay a €100m penalty for abuse of dominant position in gas.**
- **Successful issue of a second green bond of €1.5bn.**

For 2017, Engie outlooks are:

- **A net recurring income, Group share between €2.4bn and €2.6bn**, assuming an organic growth compared to 2016. This guidance is based on an estimated range of EBITDA of €10.7bn to €11.3bn.

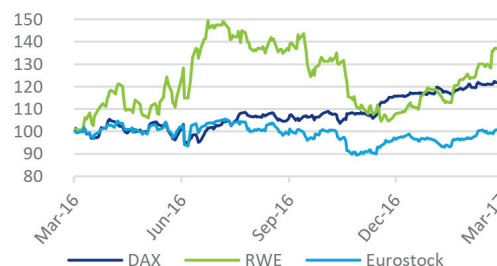
For the 2017-2018 period, the Group anticipates:

- **A net debt/EBITDA ratio < 2.5x.**
- An "A" category rating.

e-on

RWE

Share
Price Perf.
2016 - 2017



Key
Reported
Financials

In billion of €	2016	2015 (1)	Var.
Sales	38.2	42.7	-11%
EBITDA	4.9	5.8	-16%
Impairment	-0.4	-3.4	nm
Operating Income	-0.4	0.0	
Recurring net income Gr	-0.9	-1.1	-18%
Net Income Gr Share	-8.5	-7.0	21%
Operating CF	3.0	4.2	-29%
Net Capex	-3.2	-3.2	0%
Net debt	-26.3	-27.7	-5%

(1) Prior year figures are adjusted of Uniper deconsolidation

In billion of €	2016	2015	Var.
Sales	45.8	48.1	-5%
EBITDA	5.4	7.0	-23%
Impairment	-4.4	-3.1	nm
Operating Income	3.1	3.8	-18%
Recurring net income Gr	0.8	1.1	-27%
Net Income Gr Share	-5.7	-0.2	2,750%
Operating CF	2.4	3.3	-27%
Net Capex	-2.0	-2.9	-31%
Net debt	-22.7	-25.5	-189%

2016
Highlights

- 2016 results at top end of full year guidance
- The **spin-off of Uniper** took place on **September 9, 2016**, with E.ON still holding a **46.65% interest**. By virtue of a so-called control termination agreement concluded by E.ON with Uniper, **E.ON ceded the de facto control of Uniper**, solely keeping a significant influence. Accordingly, **Uniper is recorded with equity method in 2016 and 2015 financial statements have been restated**.
- **Sales are below 2015 by 11%** due to several adverse effects: **transfer of wholesale customers portfolio to Uniper**, lower sales prices, decommissioning of **Grefenrheinfeld nuclear power plant** and an expiration of supply contract by **PreussenElektra**.
- **EBITDA amounts to €4.9bn**, a **16% drop vs 2015**. The drop is mainly explained by the items driving the decrease in sales and especially the **absence of earnings from divested operations**.
- The **net loss amounts to €16bn** (€8.5bn Group share) and is exclusively **attributable to**:
 - financial impacts of Uniper spin-off with a €14bn loss, with (i) €3.8bn due to impairment recorded before classification of Uniper as held for sale, (ii) €3.6bn due to deconsolidation of Uniper and (iii) €7.0bn due to the record of Uniper investment at fair value based on Stock Exchange share price
 - the impact of KfK law on nuclear decommissioning (€4bn) with (i) €1,6bn of decommissioning assets impairment and (ii) €2.4bn of decommissioning provision increase.
- **KfK: the German legislative process is completed and the next step is EU approval regarding State Aids** and legal claim resolution. **Payment from operators to the fund is planned around July 1st, 2017**. E.ON would finance its contribution via cash on the balance sheet, bonds issue (up to €3bn), and commercial paper. In connection with KfK financing, E.ON performed **a capital increase by 10% of existing share capital** (approx. €1.4bn)

- **Operating earnings for 2016 at upper-end of forecast range**
- The IPO of innogy took place on October 7, 2016 and RWE sold 13% of Innogy share capital. As of December 31, 2016, **RWE holds 77% of Innogy and records it as a fully owned subsidiary**.
- **Sales are down by 5%, excluding negative impact of foreign exchange**, which lowered revenues in the UK, and **sales dropped by 3%**:
 - **electricity sales fell by 4%** due to the decline in residential, commercial and industrial, partially offset by increased sales in Germany and the full-year contribution of VSE acquired in 2015,
 - **gas sales fell by 11%** due to lower volumes and prices.
- **EBITDA declines to €5.4bn, -23% vs 2015, due to**:
 - **declining margins in conventional electricity generation, negative performance of trading business and the absence of one-off earnings in 2015 at innogy**,
 - these impacts are partially compensated by **improved efficiency in conventional power generation**.
- RWE and innogy implement **Europe's largest guarantor and creditor exchange for €11 billion** in corporate bonds.
- RWE exercised its right to call a subordinated hybrid bond that the Group issued in November 2011 on its first call date.
- **Impairment namely relates to German conventional generation (€3.7bn)** due to a drop in electricity price forecasts and lower utilisation rate.

FY 2017
Outlook

For 2017, E.ON outlooks are:

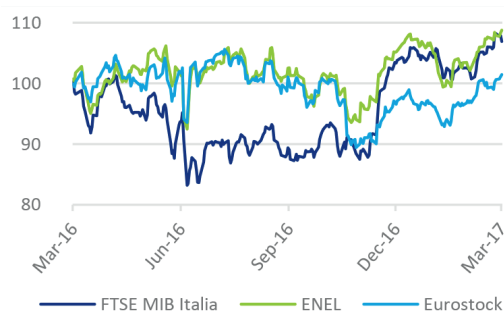
- Adjusted EBIT of €2.8bn to €3.1bn.
- Adjusted net-income of €1.20bn to €1.45bn.

For 2017, RWE outlooks are:

- Adjusted EBITDA of €5.4bn to €5.7bn.
- Adjusted net-income of €1.0bn to €1.3bn.



Share Price Perf. 2016 - 2017



Key Reported Financials

In billion of €	2016	2015	Var.
Sales	70.6	75.7	-7%
EBITDA	15.3	15.3	0%
Impairment	1.4	2.7	nm
Operating Income	8.9	7.7	16%
Recurring net income Gr	3.2	2.9	10%
Net Income Gr Share	2.6	2.2	18%
Operating CF	9.8	9.6	2%
Net Capex	-8.8	-7.8	13%
Net debt	-37.6	-37.5	0%

In billion of €*	2016	2015	Var.
Sales	33.9	35.0	-3%
EBITDA			
Impairment	0.0	-2.8	nm
Operating Income	3.1	-1.1	-382%
Recurring net income Gr	1.1	1.1	0%
Net Income Gr Share	2.1	-0.9	-333%
Operating CF	3.0	2.7	11%
Net Capex	1.3	1.1	18%
Net debt	-4.3	-5.9	-27%

* assuming a fixed exchange rate of 1.25 into euros

2016 Highlights

- Ordinary EBITDA above target announced in November.
- Sales are down by 6.7% vs 2015 due to unfavourable exchange rates, notably in Latin America, the deconsolidation of the Slovakian company Slovenské elektrárne in July 2016, lower electricity sale prices and production in mature markets and a decline in electricity trading operations.
- EBITDA amounted to €15.2bn, up by 1.3%, reflecting:
 - the improved margins in most of geographical areas, especially Latin America (both in electricity generation and in the distribution and sale of electricity) and mature retail markets in Italy and Spain.
 - partially offset by adverse variation in exchange rates, lower margins from conventional generation and deconsolidation of the Slovakian assets.
- Acquisition of the Brazilian electricity distribution company CELG.
- Merger between Endesa Americas and Chilectra Americas into Inersis Americas.
- Agreement with GE Energy Financial Services to sell a 1% stake in EGPNA US-based renewables subsidiary Enel Green Power North America ("EGPNA REP"). After the transaction, EGPNA REP would be 50% owned by Enel and 50% by GE Energy Financial Services into an equally owned joint venture. Upon completion of the transaction, the Enel Group will deconsolidate EGPNA REP's debt (approximately 500 million US dollars) and installed capacity.
- First green bond totalling €1.3bn on European market
- Sales fell by 3% vs 2015 primarily reflecting the impact of lower commodity prices in UK and North America for energy supply and E&P, and lower consumption due to warmer weather in North America.
- In 2016, the operating income is positively impacted by fair value remeasurement of energy contracts (€1.3bn) and negatively impacted by impairment in 2015 (€2.8). Excluding these exceptional items, the operating income increases by 4% with:
 - positive impact of strong Energy Marketing & Trading performance, a return to profitability in UK business in a competitive backdrop, favourable foreign exchange impact and cost efficiencies.
 - partially offset by lower profitability in E&P, power generation and storage business.
- Exit from wind power generation completed with the sale of Lincs windfarm; Trinidad & Tobago E&P divestment announced; Canada E&P sale targeted for 2017.
- Acquisition of ENER-G-Cogen, a supplier and operator of a combined heat and power business, and Neas Energy, a leading company of energy management and revenue optimisation services for third party owned assets.
- Agreement by British Gas to pay £9.5 million in compensation to customers in respect to issues following the implementation of a new customer billing system.

FY 2017 Outlook

For 2017, Enel outlooks are namely:

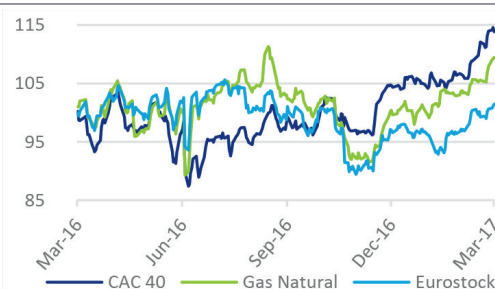
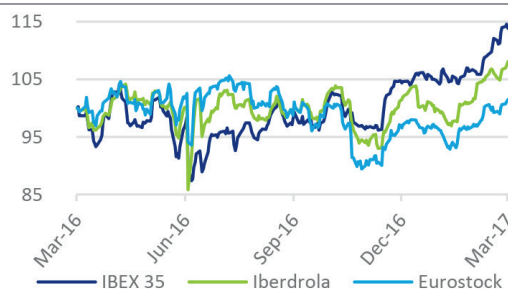
- Recurring EBITDA approx. €15.5bn.
- Net ordinary income approx. €3.6bn.
- FFO/net financial debt: 26%.

For 2017, Centrica outlooks are namely:

- adjusted operating cash flow to exceed £2bn.
- 3-5% per annum adjusted cash flow growth.
- Having built base capacities delivering €100m incremental revenue in growth.



Share
Price Perf.
2016 - 2017



Key
Reported
Financials

In billion of €	2016	2015	Var.
Sales	29.2	31.4	-7%
EBITDA	7.8	7.4	5%
Impairment	-0.5	-0.3	nm
Operating Income	4.5	3.8	18%
Recurring net income Gr	2.5	2.3	9%
Net Income Gr Share	2.7	2.4	13%
Operating CF	6.3	5.9	7%
Net Capex	-4.3	-3.2	33%
Net debt	-29.4	-28.1	5%

In billion of €	2016	2015	Var.
Sales	23.2	26.0	-11%
EBITDA	5.0	5.3	-6%
Impairment	-0.1	0.0	nm
Operating Income	3.0	3.3	-9%
Recurring net income Gr	na	na	
Net Income Gr Share	1.3	1.5	-13%
Operating CF	3.4	3.5	-3%
Net Capex	-2.2	-1.4	57%
Net debt	-15.4	-15.6	-1%

2016
Highlights

- 2016 guidance achieved
- Sales are down by 7% at €29.2bn, namely in connection with an adverse foreign exchange impact with the depreciation of Sterling Pound (13%) and Brazilian Real (5%).
- In Spain, the period is characterized by a high portion of renewables production (41%) due to strong increases in hydroelectric production (+25%). Consumption remains at a level similar to that of 2015.
- EBITDA amounts to €7.84bn, +5% vs 2015, and by 8% excluding foreign exchange impact, thanks to:
 - full contribution of US power and gas utility UIL, acquired in 2015, Tariff increase for Spanish networks, high renewable output in Spain and strong retail activity, and a 5% decrease in operating expenses,
 - partially offset by lower output in the UK and lower tariffs in regulated generation.
- Net debt totals €29.4bn due to €1.0bn of non-recurring payments (anticipation of renewable investments (€0.3bn) and one-off tax payment in Spain (€0.7bn), partially compensated by the positive impact of foreign exchange on debt (€0.5bn).
- Issue of a Green bond worth €0.7bn in November 2016 and €1.0bn in February 2017. In addition, Iberdrola signed the first green loan for an energy company for €0.5bn with BBVA.
- Agreement with Neoenergia to purchase 50% of the companies Força Eólica do Brasil (FEB) 1 and 2 in Brazil (wind-based power plants).

- 2016 guidance achieved
- Sales are down by 11%, broadly due to the decline in commodity prices year-on-year.
- EBITDA reached €5.0bn, -6% vs 2015, with:
 - the negative impact of discontinuation of liquefied petroleum gas business in Chile, and the negative foreign exchange impact due to depreciation of the Colombian peso and the Mexican peso,
 - partially compensated by performance in European and LatAm networks while underpinned by stable regulatory frameworks.
- Intensified capex in core network business with:
 - €0.4bn for acquisition of LPG connection points with EBITDA contribution expected starting 2017.
 - network expansions and installation of smart meters.
- Issue of bonds (€1.0bn in November 2016 and €1.0bn in January 2017).
- Electricaribe (ECA): Gas Natural lost the control of ECA due to recurring difficulties with the Colombian government and the appointment of a special agent by the government. The company was deconsolidated commencing December 31, 2016 and EBITDA contribution for FY16 amounts to €0.3bn. In addition, Gas Natural decided to pursue international arbitration before the United Nations Commission on International Trade Law.

FY 2017
Outlook

For 2017, Iberdrola outlooks are namely:

- Mid-single-digit growth at EBITDA and Net Profit level.

For 2017, Gas Natural outlooks are namely:

- EBITDA approx. €4.7bn.
- Net income between €1.3bn-€1.4bn.

Talking points

1 - Hydropower regulatory regimes in Europe: a whole spectrum of rules waiting for consideration

Sources: ENTSO-E, Statistical factsheet 2015 – Florence School of Regulation & Microeconomix, Regimes for granting rights to use hydropower in Europe, 2016 – Eurelectric, Hydro in Europe: powering renewables, 2011

Hydropower as an energy source is **a key piece for the achievement of efficient liberalised energy markets in Europe**. It can substitute for all other generation technologies and it is strategic for system balancing thanks to its high flexibility and its storage characteristics, thus contributing greatly to the integration of other (intermittent and volatile) renewable energy sources. Moreover, while hydropower is already at a strategic place in the European power system (20% of total installed capacity and 17% of electricity generation – ENTSO E, 2016), there is still a huge potential for further development (50% of hydropower technically feasible potential is untapped – Eurelectric, 2011).

Meanwhile, **hydropower is also a peculiar generation technology, which seriously affects its local environment**. It can impact other water or land uses (tourism, agriculture, aquaculture, etc.) or even remote aquatic life. Its risks for the environment due to infrastructure aging are also major.

Therefore, the benefits of hydropower for the entire power system should be weighed against its potentially negative environmental impact. **This arbitrage accounts for the in-depth public controls observed in Europe for granting the rights to use hydropower, install a power turbine, and possibly build a water reservoir for the purpose of energy storage**. The arbitrage between hydropower capacity and its environmental impact account for an indepth public control. As these public controls are realized at national, regional or even local levels, through regulators or local authorities, a full landscape of different rules, contractual conditions and safeguards can be observed from one European jurisdiction to another with regards to the rights for water use.

A whole spectrum of hydropower regulatory regimes in Europe

Since 2014, The Florence School of Regulation and the Economic Consulting team of Deloitte France have looked more closely at these differences in the European regulatory regimes

for hydropower. A benchmarking now targeting fourteen European countries¹ (Austria, Bulgaria, Finland, France, Germany, Great Britain, Greece, Italy, Norway, Poland, Portugal, Spain, Sweden and Switzerland) is realised annually and analyses the various regimes along four main dimensions:

1. the institutional framework of hydropower regimes (e.g., the types of rights for hydropower usage, the authorities granting the rights to use hydropower, etc.);
2. the framework for granting the right to use hydropower (duration of the rights and procedure, competitive process and the existence of a possible EC infringement procedure);
3. the obligations of the hydropower operator (environmental and investment obligations and royalties);
4. and the specific treatment of small hydropower (thresholds for environmental impact assessment, differentiation of support schemes...)

The benchmarking has enabled the **documentation of the complexity of the institutional framework concerning hydropower, with a stacking of interests and decision-making powers** from the European Commission (or EFTA, for non EU members) to local authorities and national authorities. One can for example oppose the situation in Great Britain, where the Environment Agency is the sole authority, to that of France, where department prefectures must cede their authority to the Ministry of Energy over the 100-MW threshold. Coordination between these interests is then needed to reach efficient decisions regarding the right of hydropower usage.

Analyzing more specifically the framework for granting the right to use hydropower, it is noteworthy that **the implementation of competitive processes remains incomplete in studied countries, with some of them still presenting fully uncompetitive regimes (see figure hereafter)**. On the one hand, thus, a number of countries implement authorisations

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1. The State and regional regulations in countries like Switzerland or Germany were also considered in the review.

(e.g. Austria), grant concessions for unlimited time (e.g. Finland and Sweden), or directly negotiate concessions without a transparent competitive process. On the other hand, different levels of opening are observed for the initial granting process or for renewals. For example, Great Britain is in a hybrid situation: licenses granted before 2003 were given for an unlimited period of time, but new licenses are granted for 12 or 24 years. Moreover, Portugal grants new concessions in a competitive process, but such a process is not implemented for renewals. In France, the framework has finally evolved in the direction of competition after years of stop-and-starts, following the formal notice sent by the European Commission on the dominant position of EDF and the *Loi pour la Transition Énergétique et la Croissance Verte*. It is now characterized by the possibility to create a semi-private entity for all new concessions or renewals, ensuring that the State would retain some control over its hydropower mix.

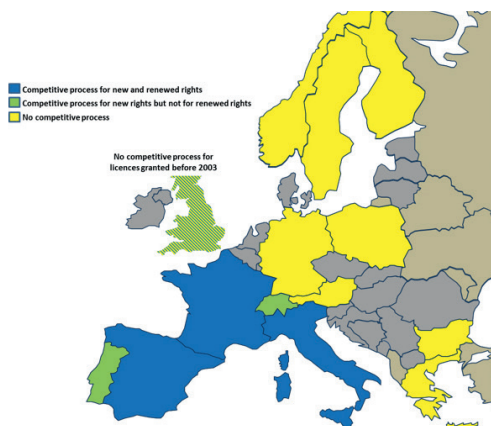


Figure 1 - Competitive processes to grant hydropower rights in Europe

This level of **non-harmonization among European hydropower regimes is yet further exacerbated when looking at the other characteristics of those mechanisms.**

This concerns for example the differences in the level of support for hydropower: while countries have begun to adapt to the new rules specified in the EEAG 2014 Guidelines (feed-in premium, progressive passage to auctions in France, Germany, Greece, Italy...), standardization of the support schemes is still a long reach, with green certificates still in place in Norway and Sweden, new support all but stopped in countries such as Bulgaria and Switzerland, and investment-based grants in Finland or Spain. Another example of non-harmonization lies in the levels and scopes for royalties to be paid by hydropower operators.

For instance, in Norway 10% of hydropower generation must be sold at a low rate, whilst in Great Britain, standard unit charges are set regionally, between 15 and 40 €/1000m³/year. In Spain, taxes for water use, production tax, and regulation tax can be cumulated, while in Switzerland the maximal charge per gross capacity is capped at 103 €/kW at federal level.

At yet another level, the environmental obligations imposed on hydropower operators also differ in terms of constraint and scope. Environmental impact assessments (EIA) are mandatory for all projects only in Bulgaria, Poland, Portugal and Sweden, whereas in other countries they are either reduced to sensitive areas only (Finland, France, Greece, Spain, UK) or to larger installations (generation over 40 GWh in Norway, capacity over 1 MW in Germany ...).

A lack of harmonization leading to market distortions in Europe

This lack of harmonization leads to continuing market distortions in the European power sector, with competitive advantages for operators established in countries with less constraining frameworks. Ongoing difficulties may thus be expected for the achievement of the internal energy market and European energy objectives. In particular, different conditions for hydropower development and operation from one country to another may prevent the achievement of RES and decarbonization objectives at the lowest cost. It also leads to more difficult conditions for hydropower development and operation in the energy markets. For hydropower operators and investors, **the absence of clear and predictable rules and the lack of both a level playing field at a European level and of a response to new challenges** (lower wholesale prices and falling profitability) increase the non-diversifiable risk and could put a damper on new investments. In Sweden, for example, one of the main Nordic electricity generator Fortum² indicated that new investments in the hydropower sector were “virtually impossible”, in particular due to the high level of taxation, which sometimes overcomes the (decreasing) energy price and makes the technology highly uncompetitive: in 2013, the industrial property tax for hydropower plants thus increased from 2.2% to 2.8% of the property's value, which incidentally increased by 70% for hydropower real estate: cumulated, these increases amounted to a 200-million-euro envelope.

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2. Fortum (2015), Annual report 2015

Incoherencies in the European approach

The issues in terms of non-harmonization and competition distortions are further hampered by **the contradictory approach adopted by the European Commission with regard to hydropower regimes.**

- On the one hand, several procedures were indeed launched by the European Commission over the past decade, concerning the compatibility of national hydropower rights granting with European laws and regulations in numerous countries (e.g., France, Spain, Italy, Portugal). France is particularly concerned, as the formal notice sent in 2015 on the abuse of dominant position by EDF followed a first infringement procedure from 2004 to 2008 on the preference shown to outgoing concession holders. Also quite recently, in Portugal, a recent in-depth inquiry on potential State aid was opened in 2013 about the price paid by the electricity incumbent for the extension of its hydropower rights.
- On the other hand, some hydropower regimes (e.g., in Finland, Germany or Sweden) have never been subject to such investigations, despite not being founded through a competitive process.

In addition, the involvement of the European institutions has shown **a lack of coordination of the Commission's DGs regarding the treatment of opened infringement procedures.** Each DG acts independently on its own infringement cases, with its own objectives, using uncoordinated tools, and while no country has yet been simultaneously targeted for its hydropower regime by various DGs, several strong contradictions in DGs' approaches are nevertheless observed.

For example, DG Competition has targeted Portugal for State aid, but DG Internal Market and Services has raised no question about the absence of a competitive process for the renewal of rights to use hydropower. Similarly, DG Environment has opened an infringement procedure against Austria for non-compliance with the water directive while DG Internal Market and Services has opened none, whereas no competitive process has been implemented.

A need for better harmonisation: which role for the European institutions?

As a response to these findings, the efforts at national and European levels should be reoriented toward a better and more consistent harmonization of hydropower regulatory regimes. **New and harmonised rules regarding the implementation of rights and joint obligations are an urgent matter that the EC should treat alongside its efforts to develop and regularize the competitive processes for hydropower rights.** With regard to that latter issue, the action and policy of the various DGs acting on the EU hydropower regime should be coordinated and their tools and approaches harmonized. This goes along with the will to exit from "silo mentalities, clusters and portfolio frontiers" that European Commission President Jean-Claude Juncker announced in 2014³.

A strong opportunity now appears to come with the Energy Union Package, first established in 2015 and further pushed by the Winter Package on clean energy for all Europeans, published in November 2016. Indeed, the Energy Union is designed to bring a coherent and economic response to the current limitations of European energy system and to achieve ambitious goals in terms of system security, efficiency, market integration and decarbonisation. Therefore, **it is both relevant and appropriate that hydropower be integrated in the framework and the targets of the Energy Union.** Such an inclusion would enable to tackle hydropower issues and would ultimately secure the achievement of the Energy Union's goals. A virtuous circle could thus be implemented: **by addressing the barriers of hydropower regimes and harmonising the rules, the Energy Union would be able to build on the existing and potential value that hydropower brings to the European energy system.**

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3. Jean-Claude Juncker (22 October 2014, Setting Europe in Motion: President-elect Juncker's Main Messages from his speech before the European Parliament): "That is why my Commission will not only look different but will also work differently. Not as the sum of its parts, but as a team. Not through silo mentalities, clusters and portfolio frontiers, but as a collegiate, political body. I want a political, executive Commission at the service of the common good and of Europe's citizens."

2 - Two recent examples of the importance of digital transformation for energy transition: blockchain technologies and multi-energy open data solutions

Energy transition and digital transformation are heavily interconnected.

ENGIE, for instance, considers that digital is one of the 4 structural trends of the energy revolution. The development of smart meters, smart grids and big data are widely presented as potential game changers in the energy business; many other examples exist, among which the irruption of blockchain in the energy world and a new initiative on data management by the French Electricity and Gas network operators. Both examples are briefly described below.

Promising opportunities for the blockchain in the energy sector

While the most famous use of blockchain system is the Bitcoin, a decentralised virtual currency with a never-failing security system, new usages are being considered. Blockchain first emerged in response to the financial crisis, which resulted in a generalised distrust of the traditional banking system. This development highlights a general trend of diverting societal influence from large established organizations to individual citizens, creating a system of peer-to-peer transactions that are decentralised and fully secure, fast and reliable.

Basically, blockchain is a shared digital decentralised ledger that records transactions across a peer-to-peer network⁴, allowing secure storage of data and execution of peer-to-peer transactions⁵. The benefits of the technology are diverse in different sectors. **The main advantage to all is that blockchain eliminates the inefficient, error prone and costly back office processes of a transaction**⁵. Its use is particularly relevant when there is a need to reduce transaction costs or improve transaction speed, or a wish to realise decentralised and secure peer-to-peer transactions without intermediary. **Europe is perhaps the most active region for blockchain pilots in the energy sector, as large utilities work on electric vehicle charging, connected home appliances, wholesale settlements**, as shows the Indigo Global Interactive Blockchain in Energy and Utilities Interactiv Map⁶.

More and more applications of blockchain are emerging in the energy sector, such as those presented in the following examples.

- **Electric car recharge in Germany**⁷
In Germany, Innogy partnered with blockchain startup Slock.it to issue a "BlockCharge", the physical "Smart plug" that can be used as a charger for electric vehicles, but with an identification code. The application uses blockchain transactions to record all energy consumption data and manage the billing process, without any intermediary. The application is linked to the demand – supply data and negotiates the best market prices automatically and processes the payments. The advantage of the startup is that it is the main provider of the charging stations in the European market, which gives them full access to charging terminals.
- **Electricity network management in Austria**
In Austria, the startup Grid Singularity relies on blockchain technology to develop a decentralised energy exchange platform to cover several grid services such as validating electricity trades or monitoring grid equipment. The system also aims at trading Green Certificates and even online due diligences⁸.
- **Peer-to-peer solar micro-grid**
In Brooklyn, NY, a local market of energy "prosumers" are supported by blockchain technology. The network is a distributed system relying on smart meters connected to the local grid and providing production and consumption data combined in a transactions platform. The platform links 5 buildings producing and auto-consuming solar electricity. These transactions are entirely based on real-time exchange between these houses' energy needs and electricity production. The transactions are made of electrical quantities, paid with local currency (US\$). The historical data is kept for all the electricity getting into and out of the micro grid. This system relieves the users from transportation costs, and any related intermediary fees.

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The main advantage to all is that blockchain eliminates the inefficient, error prone and costly back office processes of a transaction.

4. <https://microgridknowledge.com/blockchain-energy-trading/>

5. <https://www.greenbiz.com/article/blockchains-emerging-role-sustainability>

6. <https://indigoadvisorygroup.com/blockchain>

7. James Basden and Michael Cottrel « How Utilities Are Using Blockchain to Modernize the Grid », Harvard Business Review, updated March 27, 2017 (<https://hbr.org/2017/03/how-utilities-are-using-blockchain-to-modernize-the-grid>)

8. <http://losangeleshightech.com/2017/03/blockchain-for-the-energy-sector/>

Blockchain is well suited to facilitate the development of such a peer-to-peer energy trading system without excessive administrative burden or transaction costs.

- Trading energy: digitalised petroleum and gas commerce

The trading of raw materials can also benefit from blockchain. This technology could automatise energy goods trading with robotic trader at gas desks. The robot's algorithms can scan available market interest and optimise the research of the best deal to meet customer's requirements. Once both parties have approved the terms, the trade is executed and recorded in blockchain. This information remains available to the pipeline, shipping the merchandise to equally optimise the shipping process. Another similar application was launched by IBM⁹: a private blockchain is used to secure the financing process of crude oil in the USA. This system helps secure the transactions and communicates the available transaction data to the seller, buyer, pipeline and bank. The entire deal life cycle can be transformed by Blockchain technology, thus minimising human intervention from trade execution to payment.

- Smart energy contracts^{10, 11}

Smart contracts are another application of blockchain technology that should shortly impact all energy market participants. Smart contracts are similar to a digital confirmation of embedded conditional statements. For example, the terms of an agreement between two parties are executed automatically. If a certain price and/or volume conditions is met to characterise a transaction as compliant or not with the contract. Blockchain enables such self-executing contracts to improve efficiency and security. The existing contracting habits are worth being replaced only when frequent transactions occur among a stable network of parties and manual and duplicative tasks are performed by counterparties at each transaction. In the energy sector, smart contracts can facilitate power trade with the advantage of avoiding the need of data mining that is the main source of energy consumption. Smart contracts are applied on the recorded transaction data on the

blockchain. They self-initiate and self-verify the compliance of a transaction with determined conditions. Therefore the mining steps, such as cryptocurrency creation and exchange, become unnecessary.

One of the main drawbacks of blockchain system is its relatively high direct energy consumption, which is mainly due to the mining process needed to secure each transaction (each time a block of transactions is created, miners take the information in the block, and apply a mathematical formula to it, converting it into a seemingly random sequence of letters and numbers known as a hash. This hash is stored along with the block, at the end of the blockchain at that point in time). The mining costs are mostly electricity costs, at about 90%¹², as noted by co-founder of NorthBridge Energy Partners.

The mining centres are big warehouses dispersed globally, in particular where electricity price is low. The largest number of data center mines is in China, but also in Iceland, Malaysia, Venezuela, Republic of Georgia and other countries¹³. The storage needs of the growing bitcoin system reached a size of 74 000 MB, which is stored on each participating computer between January 2012 and January 2016¹⁴. Long-term estimates expect that blockchain size will reach 508 TB by 2030¹⁵.

The energy consumption of a bitcoin transaction has been calculated with a BECI (Bitcoin Energy Consumption Index) which estimated that the amount of electricity embodied in each bitcoin transaction (from 26 and 100 kWh) is enough to power 0.9 to 3.6 US households for a day¹⁶, as of March 2017.

The technical feasibility of the blockchain system relies on the assumption that more users means more transactions needed to be validated by miners. **The complexity of the system that needs to validate each additional block of the chain is growing and the algorithms are getting more sophisticated, thus needing more performant chips to resolve the calculations.**

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9. <http://www.the-blockchain.com/2017/03/28/ibm-natixis-trafigura-introduce-first-ever-blockchain-solution-u-s-crude-oil-market/>

10. Deloitte: Blockchain applications in energy trading

11. <https://dupress.deloitte.com/dup-us-en/focus/signals-for-strategists/using-blockchain-for-smart-contracts.html>

12. <https://www.cryptocoinsnews.com/as-mining-expands-will-electricity-consumption-constrain-bitcoin/>

13. <http://www.altcointoday.com/power-supply-limit-bitcoins-growth/>

14. <https://www.iwkoeln.de/en/studies/beitrag/markus-demary-vera-demary-the-promise-of-blockchain-317239>

15. Blockchain.info, 2016, <https://blockchain.info/de/charts/blocks-size?timespan=all> [28-11-2016]

16. <http://www.bitcoinisle.com/2017/03/07/bitcoin-is-still-unsustainable/>

Given that this energy expenditure is required to provide a level of protection against attacks, the only viable improvement in this respect as of today is to increase the number of transactions secured with a given quantity of electricity. As a matter of fact, **the energy efficiency of transactions on the network improves with the new bitcoin protocols and mining machinery.**

Numerous opportunities lie in the introduction of blockchain into the energy sector. Utilities are expected to play an active role in this evolution, in particular by assessing the impacts, both positive and negative, this system would have, inter alia, on energy pricing, selling terms and energy efficiency.

Linking data from gas and power networks

Another big challenge for energy transition is to use most efficiently all the data that is gathered by energy producers and consumers. More and more data is collected (through smart meters for instance) and **can be of great value to optimise energy production and consumption. Such optimisation requires the design of new ways to make available and to process this data.** In France, the electricity and gas network operators decided to make some of their data publicly available to enable others to make the best use of it.

Using consumption and production data in open source is a trend that is impacting many sectors, including the energy sector. **In France, the Electricity transmission network operator (RTE) and the Gas transmission network operator (GRT gas) have just launched a multi-energy open data platform through a special purpose entity.** They consider that this platform raises new opportunities to value digital revolution for a more efficient energy network, able to handle the territorial challenges related to climate change and energy transition¹⁷.

This open data platform provides energy production and consumption information at national and local levels. **It is intended to**

help local authorities to better adapt their energy policies to enhance innovation.

The data, feeding this platform, comes from several existing sources implemented by both partners: Open Data RTE, Open Data GRTgaz and the applications GRTgaz+ and éCO2mix. The geographical scale of the presented data is national and regional, with an annual coverage monitoring since 2010. The data is divided into the following datasets: consumption (datasets including gas hourly consumption and electricity half-hourly consumption – also presented in a daily amplitude dataset); territories & regions (3 datasets) and production (1 dataset). The platform is not yet consolidated in real-time: for the time being, only data from 2008 to 2015 is definitive; final data for 2016 is still being consolidated and should be validated and made available by mid-2017¹⁸.

The collected data through smart meters on consumers' side and industrial energy demand, with smart grids and meters, offer opportunities to optimise the energy mix between conventional and renewable sources¹⁹. The analytics of such open source data projects can provide the possibility to realise more accurate analyses based on real-time data, better planning and diagnostics for equipment management. Open data can allow for predictive maintenance and healthier equipment assets. The optimisation of the network that is possible by using such an open data tool could increase overall energy efficiency and help the management of winter.

However there is a need to settle two key issues. These are the protection of the collected data and the access control to the data base. The question is how to prevent misappropriation of data and in the meantime still allow a fair competition among energy companies?

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The collected data through smart meters on consumers' side and industrial energy demand, with smart grids and meters, offer opportunities to optimize the energy mix between conventional and renewables sources

17. <http://www.grtgaz.com/fileadmin/medias/communiqués/2017/FR/CP-GRTgaz-RTE-cooperation-03042017.pdf>

18. <https://opendata.reseaux-energies.fr/pages/accueil/>

19. <http://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/the-digital-utility-new-opportunities-and-challenges>

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?

Second State of the Energy Union Report

Key features	Insights
<p>On 1st February, the European Commission published the second State of the Energy Union Report which evaluates the progress made towards building the Energy Union since the publication of the first State of the Energy Union in November 2015.</p> <p>According to the report, the EU is on track to reach its 2020 targets on energy efficiency, renewables and greenhouse gas emissions.</p> <p>The Report published is accompanied by an upgraded set of specific indicators to observe and assess the progress that has been made in meeting the Energy Union objectives, as well as setting out a new monitoring approach and methodology. The document serves as a starting point and practical tool for Member States in the preparation of integrated national energy and climate plans.</p>	<p>The Report outlines several trends:</p> <ul style="list-style-type: none"> • Energy efficiency: Europe is on track to reach its 20% target for 2020. The EU has already significantly lowered its energy consumption, and has reduced its final energy consumption below the 2020 target. • Renewable energy: The EU as a whole is well on track to reach its 20% target by 2020, however, Member States will have to keep up their efforts in order to reach their national goals. The EU achieved a share of 16% renewables in its final energy consumption in 2014. • Greenhouse gas emissions: in 2015, EU greenhouse gas emissions were 22% below the 1990 level. Despite a temporary limited increase in 2015, emissions remain on a decreasing trend. Another important trend is that the EU continues to successfully decouple its economic growth from its greenhouse gas emissions. During the 1990-2015 period, the EU's combined Gross Domestic Product (GDP) grew by 50%, while total emissions decreased by 22%.
	Next steps
	<p>The Energy Union related legislative proposals presented by the Commission, such as those included in the Clean Energy for All Europeans package, should be addressed this year as a priority by the European Parliament and Council.</p> <p>The Commission will carry out further in-depth analysis of Member States' policies using the new Energy Union Tour throughout 2017.</p>
<p>Link: Second State of the Energy Union Report</p>	

European Commission's proposal: 444 million euros in energy infrastructure

Key features	Insights
<p>On 17th February, EU Member States agreed on the European Commission's proposal to invest €444 million in priority European energy infrastructure projects.</p> <p>In total, 18 projects were selected following a call for proposals under the Connecting Europe Facility (CEF), an EU funding programme for infrastructure:</p> <ul style="list-style-type: none"> • 7 in the electricity sector (€176 million), • 10 in the gas sector (€228 million) • 1 for smart grid (€40 million). <p>The selected projects will contribute to achieve the Energy Union's goals by connecting European energy networks, increasing security of energy supply, and contributing to sustainable development by integrating renewable energy sources across the EU.</p>	<p>In the electricity sector, the allocated grants will cover, amongst other things :</p> <ul style="list-style-type: none"> • the implementation of Germany's largest energy infrastructure project (EU support €40.25 million). The SuedLink project consist of 700 kilometres of high voltage cables being laid fully underground. The power line: <ul style="list-style-type: none"> - will create a link between the wind power generated in the north and the consumer centres in the south; - will ensure better integration of renewable energies; - will further enhance the cross-border exchange of energy with other EU Member States. • the implementation of an innovative energy storage project. It is a compressed air energy storage project in Northern Ireland (EU support €90 million). The project: <ul style="list-style-type: none"> - will contribute to system flexibility and stability; - will facilitate the large-scale penetration of renewables. <p>In the gas sector, CEF will support, amongst other things:</p> <ul style="list-style-type: none"> • the construction of an off-shore LNG terminal on the Croatian island of Krk (EU support €102 million); • the interconnection between Poland and Slovakia (EU support €108 million); <p>These projects will bring diversification to regions mostly dominated by one single supply source of supply. They will thus improve energy security and price competitiveness in these regions.</p> <p>Furthermore, a smart grid project (SINCROGRID project) that will lead to more efficient use of the existing electricity transmission grid in both Slovenia and Croatia will receive financial support (of €40 million). This will enable current infrastructure to cope with the uptake of additional renewable energy and result in greater energy security without the need to build new overhead cables.</p>
Next steps	<p>In order to be eligible for a grant, a proposal has to be 'a project of common interest' (PCI). There are currently 195 European energy infrastructure projects identified as PCI. The list is updated every two years. The next PCI list is expected at the end of 2017.</p>

European Energy Council

Key features	Insights
<p>On February 27th, the European Energy Council debated the Commission's "Clean Energy package" (released on 30 November 2016) and the "Second State of the Energy Union report" (published on 1 February 2017).</p> <p>The Clean Energy package includes legislative proposals on electricity market design, energy efficiency, security of supply, renewables and governance rules aimed at implementing the Energy Union strategy. It is important for the Commission, Council and European Parliament to work together and agree on the text of the proposed legislation by the end of 2017. At this Energy Council, these legislative proposals have been debated by ministers.</p> <p>In addition, the Commission presented its recent report on the State of the Energy Union. The European Union has already achieved considerable reductions in energy consumption and it is on track to reach its 2020 energy efficiency target. The ministers recognized that member states' efforts must continue.</p>	<p>The main aspects commented about each legislative proposal are as follows:</p> <ul style="list-style-type: none"> • Electricity market design. Ministers stressed: <ul style="list-style-type: none"> - urgency of further action to develop an efficient infrastructure and develop interconnections. - need to establish fair conditions for the choice of low-carbon energy resources and technologies. - importance of free price formation by removing price caps. - the value of regional cooperation, but it was also underlined that no national powers should be transferred to the regional operational centres, as proposed by the Commission. • Energy efficiency. The Commission's package suggests a 30% binding energy efficiency target for 2030 at EU level, but ministers expressed preference for maintain the indicative target of 27% on energy efficiency. • Energy performance of buildings. Member states underlined that obligations on long-term renovation strategies are too demanding and unclear. They stressed the need for flexibility on financial incentives and the need to take into account member states' specific circumstances. • Renewable energy. Several ministers supported the move towards a more market-based approach for renewables. Many ministers stressed that flexibility to choose the most cost-efficient option is a key element. • Energy Union governance. Member states stressed that governance rules must ensure that the EU reaches its 2030 energy and climate goals, but must leave member states the necessary flexibility to cater for specific national circumstances and technological changes. They also commented that the deadlines proposed for presenting the integrated national energy and climate plans should be more realistic.
<p>Next steps</p> <p>Next Energy Council is planned for June 2017. The agreements on proposed legislation on clean energy are expected by the end of 2017.</p>	
<p>Link: European Energy Council</p>	

Intergovernmental Agreements in energy

Key features	Insights
<p>In February 2016, the European Commission proposed changing the rules for Intergovernmental Agreements (IGAs) (see April 2016 Newsletter). Now, on March 21st 2017, the European Parliament and the Council have adopted these new rules for increasing the transparency and compliance with EU law of IGAs in the field of energy that EU countries sign with non-EU countries.</p>	<p>With previous rules, EU countries have to submit the energy IGAs concluded with non-EU countries to the Commission after signing them. The Commission then checks whether they are compliant with EU law. If an IGA is found to be not compliant with EU law, it may not be possible to renegotiate the IGA, for both legal and political reasons.</p> <p>To avoid this, the Parliament and the Council have now decided that IGAs with non-EU countries in the gas and oil sectors must be submitted to the Commission before they are signed, so that they can be checked for compliance with EU law. IGAs concerning electricity will also have to be submitted to the Commission, but only after signing, as is the case now.</p> <p>The new rules are in accordance with the EU's Energy Union strategy.</p>
<p>Next steps</p> <p>The revised rules will be implemented during 2017.</p>	
<p>Link: Intergovernmental Agreements</p>	

Energy efficiency labelling rules

Key features	Insights
<p>In July 2015, the European Commission proposed returning to the original A to G energy label scale, simpler and well understood by consumer (see October 2015 Newsletter). Now, on March 22nd 2017, the European Parliament and the Council have agreed on the revised energy efficiency label and the relevant regulatory framework.</p> <p>The current A+++ to G labels for products will be replaced by a clear and easier to use A to G label scale. This will make energy labels more understandable for consumers and help them make better informed purchasing choices.</p>	<p>Consumer surveys show that about 85% of European citizens look at energy efficiency labels when they purchase products. Giving consumers more accessible information about the energy consumption of products and appliances will make it easier to identify the most efficient appliances.</p> <p>The measure will be accompanied by the introduction of a public database making it easier for citizens to compare the energy efficiency of household appliances.</p> <p>The new legislation introduces provisions on software updates and smart appliances, and explicitly bans the use of defeat devices.</p>
Next steps	
<p>The text will have to be formally approved by the European Parliament and the Council. Once endorsed by both co-legislators, the revised Energy Efficiency Labelling Regulation will be published in the Official Journal of the Union.</p>	
<p>Link: Clearer energy efficiency labelling rules</p>	

Key consultations from EU

What is discussed?	Insights	Link
"Consultation on the list of proposed Projects of Common Interest"	<p>EU seeks to collect views on the need for gas or electricity projects (on the third list of projects that have been submitted as potential Projects of Common Interest) from an EU energy policy perspective bringing together security of supply, market integration, competition and sustainability.</p> <p>Closing date: June 19th.</p>	Link to the consultation
"Consultation on the list of proposed Projects of Common Interest - Additional projects in oil and smart grids"	<p>EU seeks to collect views on the need for a gas or electricity project (on the list of additional projects in oil and smart grids projects that have been submitted as potential Projects of Common Interest) from an EU energy policy perspective bringing together security of supply, market integration, competition and sustainability.</p> <p>Closing date: June 26th.</p>	Link to the consultation

Country reporting on changes in the Policy and Regulation framework

United Kingdom			
Topic	Key features	Insights	Next Steps
Capacity Market Rules CP190, CP215 CP195, CP162, CP184.	<ul style="list-style-type: none"> The Capacity Market is administered by National Grid. Capacity Agreements are agreements under which a provider (typically a generator but also demand side response providers) is paid a fixed amount per kW of capacity they provide to the system. Providers are required to provide their capacity at times of system stress. The fixed amount to be paid is determined by an auction process. There are a number of rules surrounding the qualification, performance of obligation and auction activity that Ofgem is considering changing. Ofgem has launched a statutory consultation on amendments to the Capacity Market Rules. The consultation considers 79 Rule changes that have been proposed by industry participants of which Ofgem are minded to accept 20. Key changes that Ofgem are minded to accept are: <ul style="list-style-type: none"> - CP190, which would require planning consents for new build projects to be held before pre-qualification for the scheme. Currently some planning consents can be obtained after a capacity agreement has been awarded. - CP215, which would allow a Dispatch Controller to act as the Applicant on behalf of Prospective Capacity Market Units (CMUs), which consist of one or more Units that may have one or more legal owners. This brings the rules for Prospective CMU's more closely into line with the rules for Existing CMUs. - CP195, which would allow New Build and Refurbishing Interconnector CMUs to bid into the auction above a price of £25/kW. Previously they were constrained to bid prices of £25/kW or below or not enter the auction. - CP162 and CP184 which would define Enhanced Frequency Response as a Relevant Balancing Service. This will allow those CMUs (typically battery units) that have Enhanced Frequency Response contracts to also hold capacity agreements without being at risk of defaulting on their capacity due to fulfilling requirements of their EFR contract. 	<ul style="list-style-type: none"> CP190, very few of the CMUs that did not have planning consents at the time of pre-qualification actually went on to provide the planning consents and therefore failed to pre-qualify for the auction. The change is likely to have minimal impacts. CP215, allowing small Prospective CMUs to club together and have a single external party undertake some of the administration functions and bidding for them may encourage more third party aggregators to be involved in the capacity market. CP195, allowing interconnectors to bid as price makers may see more interconnector projects reaching the pre-qualification and auction stages in the capacity markets. The business case for certain interconnectors at a price of £25/kW and £50/kW can be significant. This would allow business cases for the development of interconnectors to be progressed to the point of entering the auction. However, it is not clear that this proposal would affect the clearing price of the auction and so, whether more projects are developed as a result will depend on the auction clearing price. CP162 and CP184, defining EFR as a relevant balancing service will enable developers (typically large scale batteries) to earn revenues from two different sources (EFR contracts and the capacity market). The immediate impact will be felt by those developers that already hold EFR contracts. These were bid for on the assumption that this change will go through and the developments may not have been commercially viable without access to capacity market revenues. It may also engender greater battery investment in future due to the confidence in revenue stacking. 	<p>The closing date for the consultation is the 5th of May.</p> <p>Following the closure of the consultation, Ofgem will produce a response. It is expected if the changes are accepted, the majority will be implemented in the summer of 2017.</p>

Country reporting on changes in the Policy and Regulation framework

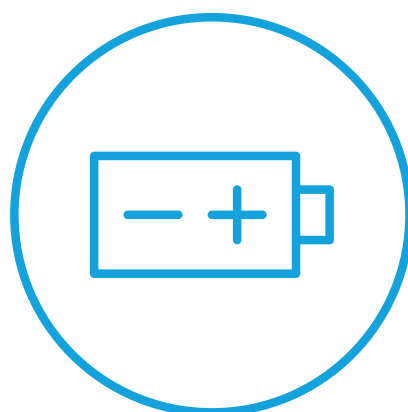
United Kingdom			
Topic	Key features	Insights	Next Steps
Embedded Generation: Modification of TNUoS charging	<ul style="list-style-type: none"> Embedded benefits are transmission cost advantages that small scale distribution connected generation has been able to capture in the GB electricity market. Ofgem (the regulator) considers Transmission Network Utilisation Use of System (TNUoS) demand residual payments to Embedded Generation to be a "major concern" and distortion in the capacity and wholesale market, driving up consumer costs. Hence, Ofgem has sought to make changes. Ofgem has published an impact assessment of its minded to position. The minded to position would reduce the value of this benefit for all new and existing generators from circa £45/kW to Circa £2/kW with a three year transition period. This new value is considered to better represent the economic benefits that embedded generators provide in terms of avoided transmission investment. 	<ul style="list-style-type: none"> The new regulation is likely to reduce the competitiveness of smaller distribution system connected generators and improve the competitiveness of large transmission system connected generators This rebalancing of competitive positions will affect both existing generators and prospective new build developments. Ofgem estimates that this will lead to customer benefits of £7.2bn over 28 years. The reduction of this embedded benefit may also increase the prices in the capacity market as smaller distribution connected generators can now be expected to bid higher in that auction. 	<p>The impact assessment accompanies a consultation. The consultation closes on 18 April after which Ofgem will form its final policy decision.</p> <p>Ofgem is expected to make a final decision in the first half of 2017.</p> <p>Ofgem expects to enact changes to TNUoS demand residual payments to Embedded Benefits in 2018/19.</p> <p>A phased approach will introduce the change over 3 years.</p>
Contracts for Difference (CFD) (contract and regulations change)	<ul style="list-style-type: none"> CFDs ensure generators to receive the difference between a fixed price and a market reference price for the low carbon electricity they produce for the duration of the contract. The Department for Business, Energy and Industrial Strategy (BEIS) has published its response to the consultation on changes to the contracts and rules: <ul style="list-style-type: none"> clarify the definition of foreseeability within the contracts. clarify how storage should be treated on CfD sites. Clarifying how storage is treated will require that the energy storage, co-located with facilities that are in receipt of a CfD are separately metered units. This prevents the metered output of the CfD eligible project being influenced by the activity of the storage unit. The government will implement these changes together with other minor amendments before the next CfDs are allocated. 	<ul style="list-style-type: none"> The clarification of foreseeability is widening the interpretation. This will prevent a project being able to claim a CfD if they are aware of relevant ongoing legal proceedings that would prevent them from fulfilling the necessary milestones. This is in response to a recent legal for a project that had their CfD terminated due to missing project milestones. The project successfully claimed they were prevented from meeting milestones due to legal action against the planning authority. The change will make it more expensive and potentially less attractive to co-locate storage with renewable sites. 	<p>The revised CFD T&Cs, incorporating these changes, have been published in draft form. These documents are drafts of the intended contracts to be signed by successful generators in the second allocation round, and final contracts will be published closer to the opening of the round.</p>

Italy			
Topic	Key features	Insights	Next Steps
Obligation to cover Italy's energy needs with renewable energy.	<ul style="list-style-type: none"> The Italian Senate and the Chamber of Deputies finally have approved the Draft Law regarding Obligation to cover Italy's energy needs with renewable energy for conversion into an effective law. Regarding the energy sector, the new regulation establishes the deferment of one year (from 1 January 2017 to 1 January 2018) on the obligation to cover 50% of Italy's energy needs for heating, cooling and production of hot domestic water with renewable energy. 	<ul style="list-style-type: none"> The obligation is applicable to consumers and building contractors for new constructions and big reconstructions. Gestore dei Servizi Energetici GSE S.p.A will guarantee this obligation. GSE is the state-owned company, which promotes and supports renewable energy sources in Italy. The State will revoke the granted incentives for the ones (consumers and building contractors) that will not achieve the target, also imposing a sanction (from 500 to 30,000 €) Following the regulation in charge, these needs will be 35% covered by renewable energy until 31 December 2017. 	<p>The draft got into law on February 27th.</p> <p>The changes will become effective from 1 January 2018.</p>

France			
Topic	Key features	Insights	Next Steps
Strategic plan toward multi-year energy plan	<ul style="list-style-type: none"> The French energy transition law asks to prepare a multi-year energy plan (PPE) to set out priority courses of actions of public authorities for namely (i) security of supply, (ii) improving energy efficiency, (iii) developing renewables and (iii) the balance of networks. The French energy transition law targets a contribution of 50% for nuclear production in the electricity production in 2025. The first PPE for the period 2016-2018 has been passed in October 2016 and targets a decrease in nuclear power output by 10 to 65 TWH in 2023 vs 2015, representing the shutdown of minimum 2 nuclear power plants. In addition, the PPE asks EDF to prepare a corporate strategy plan presenting its actions to comply with the above objectives of the PPE. 	<ul style="list-style-type: none"> EDF Board of Directors examined strategic plan, set out in the PPE law In its plan, EDF explains the main actions to be deployed in France over the 2016-2018 period. These actions concern: <ul style="list-style-type: none"> - Nuclear: during this period, the French nuclear fleet will evolve with the commissioning of Flamanville 3 and the concomitant closure of Fessenheim; the investment program of the Grand Carénage will continue to be deployed progressively on the existing fleet and EDF will prepare the necessary actions for future nuclear competitiveness; - Fossil-fired plants, which play an essential role in security of supply: the period is marked by the shutdown of plants operating on fuel oil; - Renewable energies: some of the existing hydro assets will be modernised and the development of new assets would be accelerated. EDF precised that closure of Fessenheim is subject to the following conditions: <ul style="list-style-type: none"> - the repeal of the authorisation to operate the Fessenheim power plant only takes effect on the date of commissioning Flamanville 3 EPR; - the closure of the Fessenheim power plant is necessary in order to comply with the legal ceiling of 63.2 GW both on the date of the request for repeal and on the date of commissioning Flamanville EPR 3. 	<p>The Government formally releases the decree regarding the closure of Fessenheim nuclear power plant but discussions are still ongoing with respect to the outcome of presidential election.</p> <p>Discussions about the second closure have not yet started.</p>

Country reporting on changes in the Policy and Regulation framework

Spain			
Topic	Key features	Insights	Next Steps
Energy efficiency targets	<ul style="list-style-type: none"> In July 2014, the Spanish government implemented: <ul style="list-style-type: none"> a national system of obligations in energy efficiency assigning an annual quota of energy savings to all gas or electricity retailers and oil and LNG wholesalers. a national fund to finance initiatives in energy efficiency. This fund will help to achieve the established savings objective for Spain in 2020. Now, an aggregate target of energy savings of 3,046.51 GWh has been passed for 2017. The finance equivalence of this energy savings for 2017 is 67,916.58 € per GWh. 	<ul style="list-style-type: none"> The annual quota of energy savings for 2017 is assigned proportionally among companies (gas or electricity retailers and oil and LNG wholesalers) on the basis of their respective volume of energy sales in 2015. The enforced companies have to pay to the national fund the amount equivalent to the annual obligation assigned. This contribution would be paid in four instalments in 2017. 	This national system of energy efficiency will be active until 2020.
Electricity production from renewable sources, cogeneration and waste	<ul style="list-style-type: none"> As a reminder, the remuneration system for renewable generation facilities is now based on the calculation of the fixed costs (investment, fixed operation and maintenance) and variable costs (fuel, variable operation and maintenance) - ref. Newsletter of June 2014. In 2014, the specific retributive parameters for each type of installation (used in the calculation of the fixed and variable costs) were passed for the period 2014 to 2016 - ref. Newsletter of October 2014. Now, these parameters have been updated for the period 2017 to 2019. 	<ul style="list-style-type: none"> The remuneration for renewable generation facilities includes: <ul style="list-style-type: none"> a payment for the energy sold in the market (market price). a regulated remuneration (based on fixed and variable costs) in order to cover the costs that can't be recovered by the sale of energy. The Spanish government has explained that the updated parameters (used in the calculation of the remuneration) will guarantee a return of 7.4% to the facilities. However, renewable companies argue that the estimated future market price calculated by the government is very high and distant to the reality. Hence, the government has estimated higher payments for the energy sold in the market and a lower regulated remuneration. Therefore, renewable companies argue that updated parameters will reduce their revenues for the 2017 - 2019 period. 	In 2020 the parameters will be reviewed.



Snapshot on surveys and publications – December 2016

Deloitte

Innovative Finance for Energy Innovation – February 2017

This paper explores current utilisation of risk sharing tools for clean energy innovation, as well as opportunities to apply innovative financing mechanisms – such as those commonly associated with international development – to drive investment in clean energy research, development and demonstration.

[Link to the survey](#)

Wireless Connectivity Fuels Industry Growth and Innovation in Energy and other businesses – January 2017

This paper, co-authored by Deloitte and CTIA (a telecom industry association), explores four major industries, highlighting case studies that demonstrate how wireless connectivity has enabled these industries to grow and evolve.

[Link to the survey](#)

Agencies or research institutes

International Energy Agency

Technology Roadmap: How2Guide for Bioenergy – January 2017

This document has been developed jointly by the International Energy Agency (IEA) and the Food and Agriculture Organisation of the United Nations (FAO) as a toolbox that can be used for both planning and implementing new bio-energy strategies, or to improve existing ones.

[Link to the survey](#)

Next Generation Wind and Solar Power – 2016

Renewable power has seen a dramatic expansion in recent years thanks to sharply falling costs. But this growth has raised a new challenge for power-system operators and regulators. Power systems must be adapted and upgraded to take variable renewables into account.

[Link to the survey](#)

Coal market Analysis and Forecasts to 2021 – 2016

To truly understand the important role that coal plays, for better or worse, in the global energy system, it is critical that we examine both sides of the coin. This means understanding the implications of climate agreements on the future for coal while at the same time coming to terms with what coal is doing – and will continue to do – for energy security and energy access in developing and emerging economies

[Link to the survey](#)

European Commission

Mapping and analyses of the current and future (2020 - 2030) heating/cooling fuel deployment (fossil/renewables) – March 2017

These are the final results of a study of fuel consumption and technologies used in the heating/cooling sector in EU28+3. Analysis of scenarios up to 2020 and 2030 and a related economic analysis were also carried out together with the identification of obstacles, best practices and policy recommendations.

[Link to the survey](#)

Study on the 2016 Report on Renewable Energy, in preparation of the Renewable Energy Package for the Period 2020-2030 in the European Union – March 2017

This study includes, inter alia, data collection and assessment of the progress in deployment of renewable energy sources at national and EU level, and an analysis of non-economic barriers and incentives for the deployment of renewables.

[Link to the survey](#)

The Macroeconomic and Other Benefits of Energy Efficiency – February 2017

This report sets out the impacts of improvements in energy efficiency in buildings that could come about through the revision of the Energy Performance Buildings Directive (EPBD). For the EU, the benefits largely outweigh the costs. These benefits cover all three of the economic, social and environmental spheres

[Link to the survey](#)

Member State Notifications on Investment Projects in Energy Infrastructure – February 2017

The purpose of the study was to assess the notifications received from Member States about investment projects in energy infrastructure for accuracy and completeness by comparing them with independent sources. It covers the 2015 notifications exercise, but input from the three previous exercises was used as background.

[Link to the survey](#)

Framework for cross-border participation in capacity mechanisms – January 2017

The study describes and assesses different options for cross-border participation in capacity mechanisms, in particular with regards to the quantification of costs and benefits of each of the options. This study provided input to the Impact Assessment supporting the legislative proposal for a new market design which is part of the Commission's "Clean Energy for All Europeans" package.

[Link to the survey](#)

The impact assessment for a new Directive mainstreaming deployment of renewable energy and ensuring that the EU meets its 2030 renewable energy target – January 2017

This study provided input to the Impact Assessment supporting the legislative proposal for a recast of the Renewable Energy Directive, which is part of the Commission's "Clean Energy for All Europeans" package.

[Link to the survey](#)

Supporting investments into renewable electricity in context of deep market integration of RES-e after 2020 – January 2017

This study asks what the likely paths of EU electricity market developments through to 2050 will be, and how RES-e shares are likely to evolve under those scenarios. Assuming an energy-only market (EOM) as the only source of revenue, what are the likely market revenues for each type of RES-e (in the case of no financial support from public funds)?

[Link to the survey](#)

Guidance for sub-metering of thermal energy in multi-unit buildings – January 2017

The detailed guidance on good practice in cost-effective cost allocation and billing of individual consumption of heating, cooling and domestic hot water in multi-apartment and multi-purpose buildings has been revised to take account of further stakeholder comments and suggestions received at a number of workshops held in the second half of 2016.

[Link to the survey](#)

Evaluation of the Project Development Assistance implemented under the Intelligent Energy Europe – January 2017

The study analyses the outputs, results and outcomes of Project Development Activities co-funded under the Intelligent Energy Europe Programme (IEE II) that aim to mobilise investments in sustainable energy at a local level. The analysis was performed via a deep data collection carried out in collaboration with the Managing entities and 54 project beneficiaries across the EU.

[Link to the survey](#)

Eurelectric

Gas Markets Events faced during winter 2016/2017 – March 2017

This paper intends to share EURELECTRIC's main takeaways from the events observed in European gas markets during the winter of 2016/2017. This return of experience also highlights the growing interdependence between gas & electricity markets.

[Link to the survey](#)

Oxford institute for Energy

Towards a Balkan Gas Hub: the interplay between pipeline gas, LNG and renewable energy in South East Europe – February 2017

This paper sets out a realistic roadmap that is able to overcome existing barriers and provide the desired level of supply security. The gas consumption that does not yield positive economic returns is to be phased out by energy efficiency, use of renewable energy and opening to international markets.

[Link to the survey](#)

Financing renewable electricity in the resource-rich countries of the Middle East and North Africa – February 2017

This paper seeks to remedy this deficiency of academic inquiry. At the root of our inquiry lies a simple pair of questions: what makes a project financeable, and what can the resource-rich nations of the region do to create vibrant and clean electricity financing markets for renewables?

[Link to the survey](#)

The Future of Gas in Decarbonising European Energy Markets – January 2017

The European gas industry has argued that gas can be a bridging fuel in the transition to decarbonised energy markets because of the advantages of switching from coal to gas, and the role of gas in backing up intermittent renewable power generation. While this remains a logical approach for some countries, in others it has proved either not relevant, or generally unsuccessful in gaining acceptance with either policymakers or the environmental community.

[Link to the survey](#)

The OPAL Exemption Decision – January 2017

Since the OPAL pipeline started operating more than five years ago, Gazprom has been unable to use more than 50 per cent of its capacity due to a regulatory cap imposed by the European Commission (EC) in June 2009. In any event, the decision could serve as a guidance for future regulatory treatment of onshore extensions of any new Russian transit-diversification pipelines.

[Link to the survey](#)

Brexit's impact on gas markets – January 2017

This study is launching a new research theme on the impact of Brexit on gas markets. This publication, dealing with supply security, is the first of a series that will focus on Brexit as negotiations continue between the UK and the EU.

[Link to the survey](#)

EU energy policy – 4th time lucky? – December 2016

The European Commission has tabled a mega-package of legislative proposals to complete its blueprint for Europe's Energy Union. Billed as "the biggest transformation of Europe's energy system since the building of its centralised energy system a century ago", the draft legislation aims to accelerate decarbonisation by adapting the electricity market to decentralised and intermittent renewables.

[Link to the survey](#)

The role of coal in Southeast Asia's power sector – December 2016

Driven by rapidly increasing electricity demand, Southeast Asia coal demand has surged since 2010. The availability of coal in the region and its lower cost than competing fuels, has made coal the preferred option to fuel rising power demand.

[Link to the survey](#)

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