



Navitas – September '16

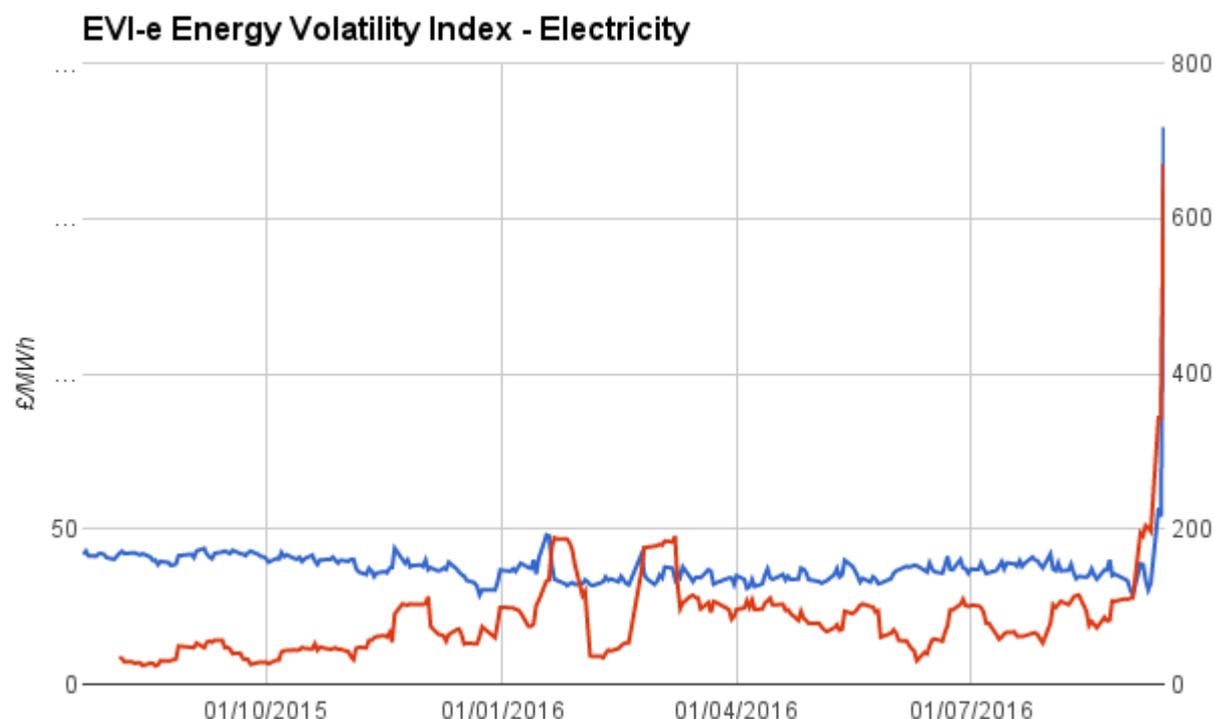
Energy Solutions Newsletter

Wholesale Prices Soar – EVI-e hits 670%

Day ahead prices are high and rising fast. Today's opening price is £179 MWh.

The price increase has been caused by a combination of weather – not as windy as expected – reducing generation and much hotter than expected in the South – increasing load for cooling, reduced nuclear generation in France and issues with the interconnector from UK to France means less power available from Europe. We are currently very close running out of power, and any unexpected failure in the system would lead to blackouts or diesel generation being started up.

EVI-e – 669%





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UK Power Prices (£/MWh)			
Price Period	Previous Open	Current Open	Change
Day Ahead	54.00	179.41	125.41
Oct-16	40.90	46.88	5.98
Nov-16	45.30	49.44	4.14
Dec-16	47.24	46.42	-0.82
Q4 2016	43.96	46.35	2.39
Q1 2017	46.49	48.06	1.57
Winter '16	44.97	46.66	1.69
Summer '17	38.20	38.77	0.57
Winter '17	42.62	42.89	0.27
Summer '18	36.92	37.29	0.37
Winter '18	40.85	41.26	0.41



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Siemens Uses Old Technology to Power New Electric Trucks



German engineering company Siemens has persuaded the Swedish government to trial a 1.25-mile stretch of 'eHighway' north of Stockholm, using overhead cables to power trucks with electricity.

So-called catenary systems, which have been powering trams and trains (and dodgem cars) around the world for almost 150 years, transfer energy through overhanging wires directly to vehicles on the road[1].

Teaching old tech new tricks

If the idea of something akin to a lightning conductor sprouting from a truck's roof sounds a bit archaic, well, perhaps it is – but then so are electric vehicles! The electric car was actually invented in the 1830s by a Scotsman, Robert Anderson (or arguably by American Thomas Davenport)[2], but it wasn't until French physicist Gaston Planté built the first rechargeable lead-acid storage battery that they really took off[3].

By 1900, 28 per cent of the 4,192 cars produced in America were electric. However, within two decades electric vehicles had ceased to be commercially viable and had been superseded by petrol-powered cars (Henry Ford's revolutionary Model T had begun production in 1908).



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Battery? Parked...

Today, electric trams and locomotives still trundle through the streets of cities as far apart as Berlin, San Francisco and Manchester, following their tracks below and their power lines above. In fact, it was Siemens that created the world's first electric railway with an external power source – so the new trial in Sweden is truly its own technology repurposed for the modern age[4].

Siemens believes that its eHighways will solve a problem that has flummoxed the transport and haulage industry for a while now – how to run heavy freight vehicles, upwards of 40 tonnes, on electricity[5]. The power required to propel such a weight is enormous, and there does not yet exist a commercially viable battery able to take on the job.

In fact, according to the trend-watchers at [Quartz](#), “With today’s technology, driving a semi-truck 500 miles (804 kilometres) would require a 23-ton lithium-ion battery.”[6] Whereas with an eHighway, of course, lorries would not need to account for any such extra weight, nor the space inside that one would take up. In bypassing the battery and instead looking up, Siemens is showing blue-sky thinking.

Breath of fresh air

The other ecologically friendly alternative for freight lorries is hydrogen fuel cell technology. The reason Siemens is testing its catenary system instead is cost; according to market researcher IDTechEx, eHighways could save as much as €200 billion over the next 30 years if the test proves successful[7]. But what about roads without power lines? Well, Siemens and truck manufacturer Scania have developed hybrid trucks that will run on diesel, or even a charged battery, when not hooked up overhead.

“The eHighway is twice as efficient as internal combustion engines. This means that not only is energy consumption cut in half, but also local air pollution is reduced,” says Roland Edel, Chief Technology Officer of Siemens Mobility. “The electric hybrid is the first step on the road to electrically powered vehicles that will come to play an increasingly important role in the development of sustainable freight transport.”[8]

Obviously, the technology is still at its early stages, but should the pollution-busting hybrid electric vehicles be a success, Siemens could hit Sweden’s ambitious target of having a successful alternative fuel transport sector by 2030.



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New ENGIE successes in Mexico: the Group wins 209 MW in contracts for solar and wind energy projects

ENGIE has won contracts of 209 MW at very competitive prices for solar and wind energy projects in connection with a new national call for tenders organized by CENACE, Mexico's National Center for Energy Control. These projects form part of a national policy of the Mexican government, which aims to increase the share of renewables in its energy mix to 25% in 2018 and 60% by 2050.

The future Trompezon solar farm (157 MW) will be built in central Mexico in the State of Aguas Calientes. Project work is scheduled to begin in early 2018 with commissioning in 2019. The future Tres Mesas wind farm (51.8 MW) will be built in the northeast of Mexico where ENGIE is already present as an actor in gas distribution. These contracts are signed for a period of 15 years.

These new successes follow ENGIE's contract award in April this year for a 28 MW solar energy project in Mexico's Baja California peninsula. These contracts perfectly reflect ENGIE's strategy to develop low or not emitting CO₂ activities and confirm the Group's renewable energy drive in Latin America. Since November 2015, ENGIE has won a total of 501.2 MW contracts on the continent. The Group also operates four solar farms in Chile representing a total of 63 MW.

ENGIE in Mexico

ENGIE in Mexico manages a range of energy businesses including electricity generation and cogeneration, natural gas distribution, natural gas transmission and energy services to commercial, industrial and residential customers. The company's natural gas assets include six natural gas distribution companies that serve more than 430,000 customers and two natural gas transmission companies, which operate over 1,000 km of pipelines serving the Mexican Electricity National Utility (CFE). In power, ENGIE operates two power plants with



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a total of 311 MW capacity. ENGIE, in a joint venture with PEMEX, is developing the Ramones II South project, a pipeline of 308 km that will strengthen gas infrastructure and gas availability in Mexico.

Through the “Rassembleurs d’Energies” initiative, ENGIE also supports the development of a social enterprise, “Eres Energia Renovable” whose mission is to bring electricity to 600,000 Mexican households that have no access to energy. Operating in 11 States of Mexico, this company offers individual solar systems to communities, schools and dispensaries that are not connected to the electricity grid and has installed over 3,000 systems providing 15,000 beneficiaries with green electricity. Local biogas systems and organic fertilizers are also being developed with another social entrepreneur, Biobolsa, since 2010.



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‘E.ON Marketplace’ launched to help people quickly find the most energy efficient household goods and to see how much these will cost to run in their own home

E.ON has today unveiled ‘[E.ON Marketplace](#)’ – a revolutionary online comparison and shopping service which will help people find the most energy efficient household goods in just minutes.

The only tool of its kind in the UK, E.ON Marketplace is being trialled to help people make better informed purchasing decisions when buying fridge freezers and freezers, washing machines, tumble dryers, dishwashers, lighting and TVs.

Working with US-based company, Enervee1, E.ON Marketplace allows shoppers to immediately review, compare and rank a range of appliances and electronic goods based on their energy efficiency, price and popularity.

E.ON Marketplace is free and available to anyone, regardless of their energy supplier.

Energy Score

As part of E.ON Marketplace, people can use the ‘Energy Score’ to find the most energy efficient products by translating products’ performance and energy use into a universal score (with 0 being worst and 100 being best).

This score is updated daily for all available products and instantly reveals products’ energy and cost saving benefits. It’s shown in the product listing to enable users to sort and filter based on energy efficiency, cost, and other features while shopping.

Tailored information about lifetime costs with ‘Clear Cost’

As part of E.ON Marketplace, customers can also compare and shop for appliances and electronic goods based on a product’s purchase price and its energy consumption over the lifetime of the product.

Through the ‘Clear Cost’ function, shoppers can enter details about their own usage patterns, for example the number of hours they watch TV or the number of times they use the washing



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machine per week, and their current electricity tariff price to get the most accurate predication.

David Bird, Managing Director of E.ON's Residential business, said: “When shopping around for new white goods, TVs or lighting, it’s useful to look beyond the initial outlay to work out the true cost.

“E.ON Marketplace is the first and only service of its kind in the UK and it enables people to get a personalised, transparent prediction of how much energy a product will be using in their own home before they make their final purchasing decision.

“We’ve been working with Enervee to launch E.ON Marketplace and believe this service could be transformational in helping people understand the energy costs of everyday household items and encourage them to think about this before they buy new items for their homes.”

Over 80% of all UK appliance and electrical product shoppers go online to research their next appliance purchase² and almost two-thirds (65%) of UK appliance shoppers feel that energy efficiency information is important for their buying decision³.

E.ON Marketplace compares selected goods from Amazon, AO.com, Argos, Currys, Hughes and John Lewis and can be found at marketplace.eonenergy.com



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Collection: Hinkley Point C

Background

Hinkley Point C will provide reliable energy at an affordable cost, powering nearly six million homes for around 60 years and creating more than 25,000 jobs.

The project marks a significant step forward in our transition to a low-carbon energy system, and will help us meet our climate change commitments in a cost-effective way.

Bilateral negotiations with EDF on the support for Hinkley Point C began in February 2013 as part of DECC's Final Investment Decision (FID) enabling process. The Strike Price for the Contract for Difference (CfD) and other key terms were agreed in October 2013 and these received State aid approval from the European Commission in October 2014. Following a comprehensive review of the project, and a revised agreement with EDF, the Government made a decision in September 2016 to proceed with the first new nuclear power station in a generation. The Secretary of State then directed the Low Carbon Contracts Company to offer a Contract for Difference with respect to Hinkley Point C and enter into the associated documents.

Contract for Difference

Under the umbrella of Electricity Market Reform, there has been an initiative to facilitate investment in low carbon generation in the UK, in particular by implementing Contracts for Difference (CfDs). This mechanism allows for payments to generators to provide increased certainty around revenue levels, in order to bring forward investment, while retaining the need for the generator to sell its electricity in the commercial market.

The Hinkley Point C CfD provides a Strike Price for the developer of £92.50/MWh (2012 prices), reducing to £89.50/MWh (2012 prices) if EDF take a FID on their proposed Sizewell C project, for a 35 year term from the date of commissioning. This means that for each MWh of electricity generated at Hinkley, the developer is paid the difference between the Strike



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Price and the market reference price (a composite of wholesale price indices) for electricity sold into the market for the duration of the contract. The generator will pay back the difference should the market reference price rise above the strike price.

Secretary of State Investor Agreement

A Secretary of State Investor Agreement (SOSIA) provides protection for the term of the CfD for investors in relation to qualifying changes in law which permanently prevent the construction or operation of the facility or a reactor or where there is a political shut down of Hinkley Point C by a UK, EU or international Competent Authority. The SOSIA also includes provision where project outperformance or equity sales that increase investors' realised equity returns above the base case would be shared with the consumer.

Exchange of Letters

The Government will be able to prevent the sale of EDF's controlling stake prior to the completion of construction, without the prior notification and agreement of ministers. This agreement has been confirmed in an exchange of letters between the Government and EDF.

Value for Money

The Value for Money assessment provides analysis that Hinkley Point C project provides a good deal for both customers and investors.

The Value for Money assessment supports the Secretary of State's decision on Hinkley Point C.

Funded Decommissioning Programme

The Secretary of State has approved the Funded Decommissioning Programme (FDP) for Hinkley Point C. Approval is conditional upon the CfD being executed and coming into legal effect. The FDP sets out how the generator will provide for the funding of the treatment,



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storage, transportation and disposal of nuclear waste, the decommissioning of the facility and the clean-up of the site to so that the taxpayer does not have to bear the burden of these costs in future.



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ENGIE invests in Heliatek, a pioneer in organic photovoltaic technology

Through its venture capital fund ENGIE New Ventures, ENGIE has taken a 6.6% equity stake in Heliatek, the German industrial startup specialized in the manufacture of organic photovoltaic film in order to develop innovative decentralized energy production solutions.

In conjunction with the startup's €80 million fundraising exercise, ENGIE chose to invest in Heliatek to support the development of organic photovoltaics (OPV). It decided upon the investment based on an in-depth analysis of Heliatek products by ENGIE Research Center and a pilot project undertaken by ENGIE Research Laboratory.

ENGIE is particularly interested in Heliatek's integration of photovoltaic solar film for buildings. This technology matches ENGIE's ambition to become an "energy architect" for buildings and to contribute to growing clients demand for buildings with zero CO₂ emissions and zero energy consumption.

"Technologies developed by Heliatek hold tremendous promise; they open up a broad range of solar solutions that may be utilized at different levels and via various applications, from buildings to automobiles to textiles, for example. Totally committed as we are to solar energy development, we are most pleased to support this innovative startup and thus contribute to great strides being made in the world through photovoltaics," emphasized Isabelle Kocher, CEO of ENGIE.

As French solar industry leader, with a gross installed capacity of 600 MW, ENGIE has recently strengthened its position in the sector abroad by winning tenders in India, Chile and Mexico. The Group has a 2 GW portfolio of solar projects today and is looking to expand its positions, particularly through innovative, decentralized production solutions.



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Solar solutions developed by Heliatek (PV applications for buildings, automobiles, textiles, etc.) are based on a production process that is among the most rapidly viable, economically efficient, and adaptable to industrial application, thanks to:

- ten years of semi-conductor research,
- manufacturing know-how (laser operations, vacuum deposition of organic matter ensuring film impermeability and uniformity),
- clean production processing without solvent, toxic emissions or chemical waste production,
- new organic solar cells that set a world record 13.2% energy efficiency yield.



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Local pupils get creative at media camp organised by E.ON

Eleven pupils from schools across the West Midlands have had the opportunity to take part in a week long creative media camp organised by E.ON, where they learned how to create and produce an engaging media campaign, supported by experts from the creative industry.

The pupils, aged 14-19, spent a week of their summer holidays at the Thinktank in Birmingham, where they were tasked with creating an innovative energy solutions idea for the home of the future, working in groups with the other pupils.

The groups also had to produce a supporting media campaign to promote their idea and use this to engage and inspire young people to take an interest in STEM (Science, Technology, Engineering and Maths) subjects and to demonstrate the exciting opportunities studying these subjects can offer.

On the final day of the workshop, the pupils were invited to E.ON's Head Office in Coventry, where they had the chance to present their ideas to a Dragon's Den style judging panel made up of senior managers from across E.ON and experts from the creative industry.

The winning team created the idea of 'E.Power', a wristband made from solar panels which uses the physical energy generated whilst moving to charge a mobile phone. To use the energy from the band, users would need to download an app and complete regular quizzes and tasks aimed at increasing their STEM knowledge.

The winning team will now be invited to spend a day in London with leading creative communications agency, The Engine Group, to experience first-hand what a career in the creative industry involves. They will also gain membership onto 'The Ladder', an exclusive scheme for young people aspiring to work in the creative industries, run by The Ideas Foundation.

Jules Greenwood, Head of Corporate Communications at E.ON and one of the judges on the panel, said: "It has been really encouraging to see the students engaging in STEM so passionately and demonstrating their enthusiasm for encouraging other young people to study these subjects.



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“Through programmes like the media camp we believe that businesses can really help pupils develop an enthusiasm for STEM subjects by making them fun and engaging and ensure students understand how careers in these areas can be so diverse and exciting.”

Kevin Bryant, Marketing Communications Manager at E.ON and another one of the judges on the panel, said: “The students have been so enthusiastic throughout the week and hearing them present their ideas to us has been really inspirational.

“A key part of our business strategy is about providing innovative energy solutions for our customers. By running creative workshops such as the media camp we can involve the next generation in creating these solutions for our homes of the future and today we’ve seen just how creative they can be.”

The media camp was developed in conjunction with The Ideas Foundation, a charity which identifies and nurtures creatively gifted young people.

Helen Poole, Creative Programme Manager at The Ideas Foundation, said: “The media camp has been a huge success and it’s been inspirational to meet such creative individuals. The ideas the students have developed as part of the workshops in just a week are really innovative and fantastic and it’s clear to see how passionately they feel about their future.”

The workshop forms part of E.ON’s broader community and educational activities aimed at inspiring young people to get involved in STEM and to consider STEM subjects as possible career options.

To find out more about E.ON’s educational activities visit eonenergy.com/community