

Progress of Renewable Electricity Replacing Fossil Fuels

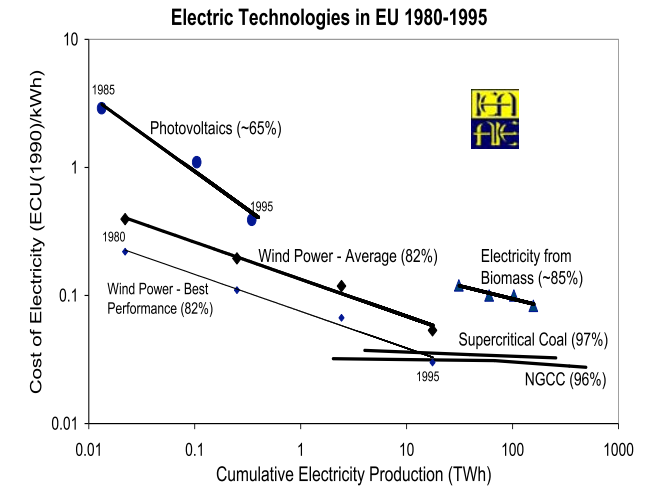
Tomas Kåberger

Professor Chalmers University of Technology, Göteborg
 Executive Board Chair of Renewable Energy Institute, Tokyo
 &
 Senior Advisor to GEIDCO, Beijing

Industrial learning by experience



Prof. Clas-Otto Wene, Chalmers Univ. of Technology, 2000



New low for wind energy costs: Morocco tender averages \$US30/MWh

By Giles Parkinson on 17 January 2016

The north African country of Morocco has achieved a new low for wind energy costs, securing average bids of just \$US30/MWh from its tender for 850MW tender of large-scale wind energy projects, with the lowest at around \$US25/MWh.

The pricing – revealed by its energy ministry at a ministerial round table at the International Renewable Energy summit in Abu Dhabi on Saturday – sets a new low for wind energy pricing in the world, and is boosted by the remarkable wind energy resource sourced from Atlantic trade winds, and some concessional finance.

Abderrahim El Hafidi, vice minister of energy and environment, described the result as “extraordinary” and “amazing” and said it pointed to a “real revolution” in the means of producing energy. Some bids in the US have been in and around \$US25/MWh, although these have been boosted by a 30 per cent production tax credit.



New low for Morocco

By Giles Parkinson on 22 Nov 2017

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Winning bids in Germany's third onshore wind auction average 3.8 cents/kWh

#Electricity market

Federal Grid Agency

The price for onshore wind power fell a further ten percent in Germany's third auction for the technology to an average of 3.8 cents per kilowatt-hour. The federal grid agency (BNetzA) said the winning bids came almost exclusively from projects proposed by citizen cooperatives. “The bidders now have four and a half years to implement their projects, and according to our judgement, they assume a positive technological development and falling prices in their offers,” said the agency's head Jochen Homann. The 61 winning bids with a total capacity of 1,000 megawatts ranged from 2.2 to 3.82 ct/kWh. “This auction round was dominated by projects without planning permission. In the first two onshore wind auction rounds in 2018 an existing planning permission will be compulsory for participation.”

New low for Morocco
By Giles Parkinson on 22 Nov 2017

The north African country is securing average bids for scale wind energy projects.

The pricing – revealed by an Energy summit in Abu Dhabi – is boosted by the remarkable concessional finance.

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Winning third average
#Electricity
Federal

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Abderrahim El Hafidi, vice president and "amazing" and said it points to the US have been in and around production tax credit.

Enel sets a new world wind record in Mexico, below \$18/MWh
November 29, 2017 Paul Dvorak : 0 Comments

This Flash Note from [Make Consulting](#) examines the results of Mexico's third long-term power auction held in November 2017. The note evaluates the event and its bidding within the context of previous auction rounds in Mexico as well as within the Latin American region. It analyses the dynamics that contributed to Enel's record low bidding and posits dynamics that favor low bidding in the Mexican market.

Key points:

- Mexico hosted a long-term power auction in November 2017 which awarded offtake agreements to wind power and PV projects totaling 5.5 TWh of annual production
- Enel submitted four successful bids for wind power sites with the lowest reaching **\$17.70/MWh**
- In total, the auction awarded PPAs to 2 GW of new project sites, including 689 MW of new wind power sites which are due online in 2020



said the agency of 1,000 megawatts ranged from 10 to 100 MW, dominated by projects without planning permission. Wind auction rounds in 2018 an existing planning permission for participation."

Clean Technica

Tremendously Low 4.8¢/kWh Solar Price In Peru, Unsubsidized

February 25th, 2016 by [Guest Contributor](#)

Peru recently awarded 185 megawatts (MW) of new solar photovoltaic (PV) contracts in a renewable energy solicitation, at record-low prices for a nation not offering any tax breaks for such development.

Of the 185 MW of new project capacity, 144 MW relates to a bid from [Enel Green Power](#) at \$47.98/MWh (megawatt-hours) and 40 MW relates to a bid from [Enersur](#) at \$48.50/MWh.

Notably, the projects aren't expected to be built until 2017 — when solar PV prices are expected to be notably lower, hence the lower bids and contracts.

According to the press release from Peru's Supervisory Agency for Energy and Mines (Osinergmin), the Enel Green Power contract is for the provision of 415 gigawatt-hours (GWh) of electricity a year from the company's planned Rubi solar PV project at the aforementioned price of \$47.98/MWh. The Enersur contract is for the provision of 108 GWh of electricity a year from the planned Intimpa solar PV project at \$48.50/MWh.

Delivery of electricity from the projects is currently set to begin by the end of 2018 — if the terms of the contracts are to be met.

Along with the above-mentioned solar energy projects, 3 wind energy projects were awarded contracts following the recent solicitation. Contract prices for these projects range from \$36.84–\$37.83/MWh. In addition, a number of hydroelectric and biomass projects were awarded contracts as well.

Clean Technica

Tremendously Low Solar Price Unsubsidized

February 25th, 2016

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gtm.

Solar Stuns in Mexico's First Clean Energy Auction: 1,860MW Won at \$50.7 per MWh

Solar in Mexico will now grow by 521 percent in 2016.

By Mohit Anand
April 05, 2016

Mexico just concluded its first Clean Energy Auction for energy, power and Clean Energy Certificates for purchase by CFE, Mexico's only utility. The results are stunning -- 11 PV projects have been awarded contracts worth 4 million megawatt-hours (MWh) per year. That translates to 1,860 megawatts of capacity (using an average capacity factor of 33.6 percent). Additionally, all 11 projects have won contracts for a combined 4 million Clean Energy Certificates (CECs).

Mexico defines clean energy quite broadly, so the auction was open to competition from wind, hydro, cogeneration, combined-cycle gas, and geothermal, as well as PV. Out of a total 5.38 million megawatt-hours of energy that was awarded, PV won 74 percent and wind won the remaining 26 percent, with no contracts won by any of the other technologies.

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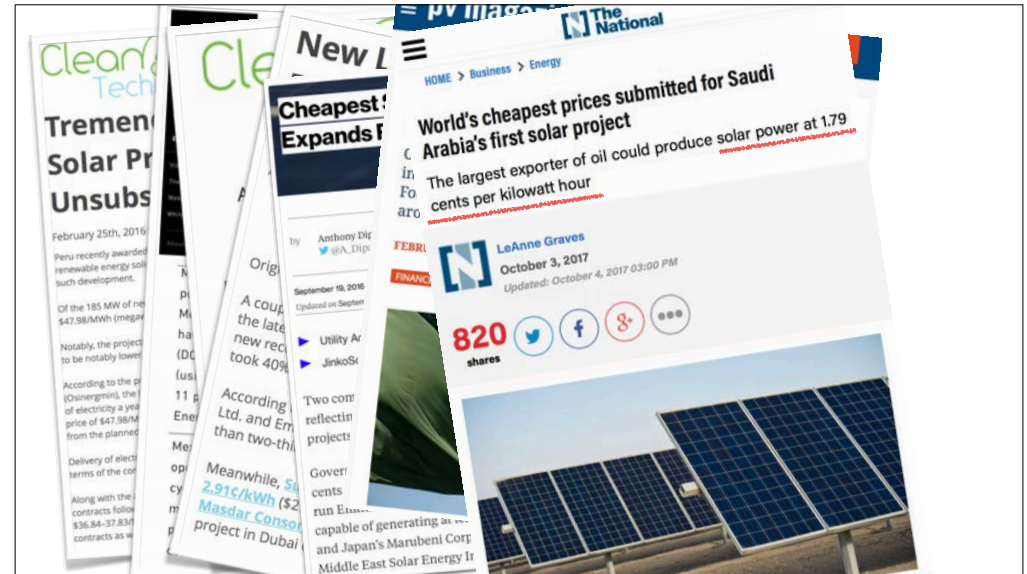
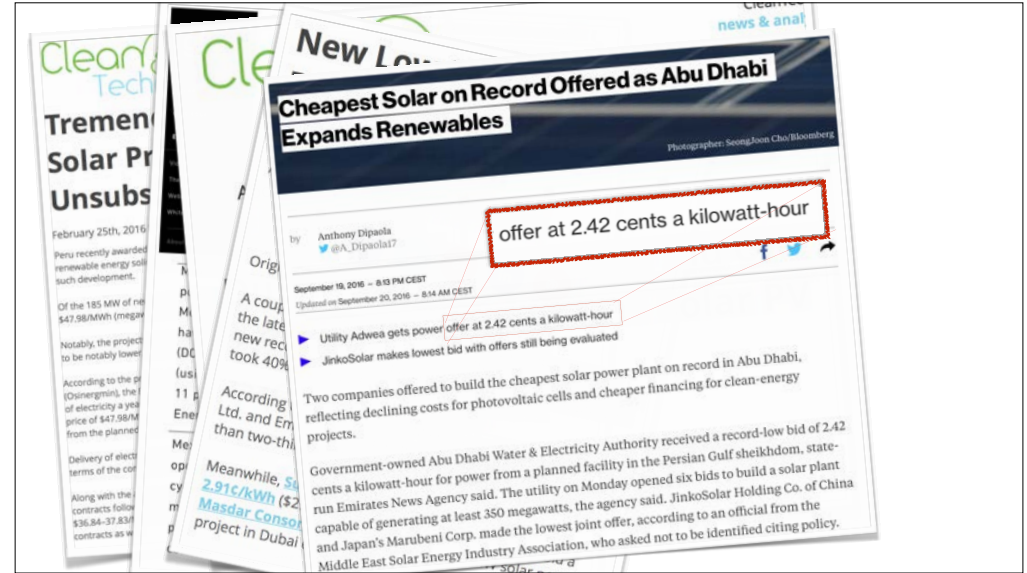
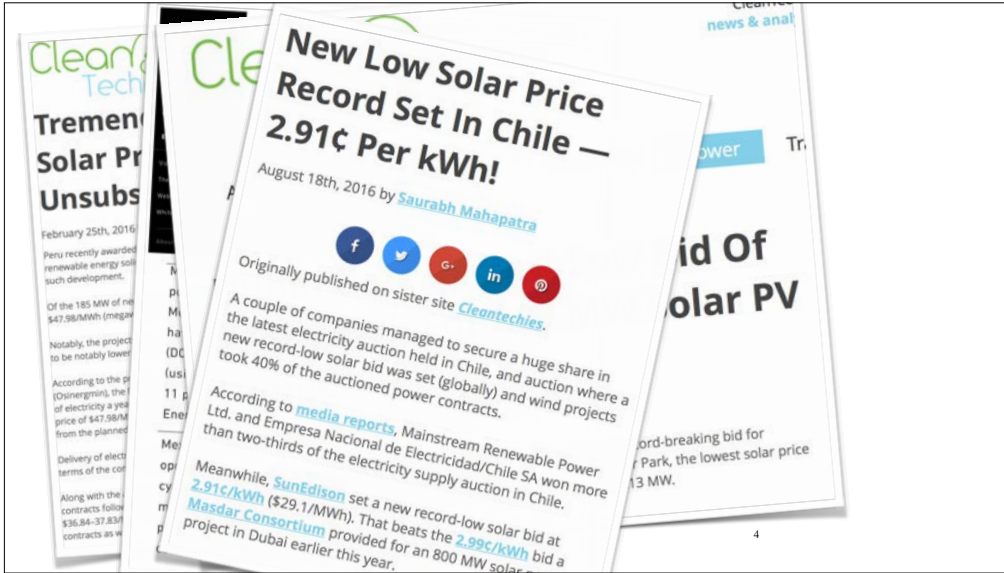
Clean Technica

About Electric Car Reviews Exclusives **Power** Tr

Dubai Gets Record-Low Bid Of 2.99¢/kWh For 800 MW Solar PV Project

May 2nd, 2016 by [Saurabh Mahapatra](#)

Dubai Electricity and Water Authority has received yet another record-breaking bid for expansion of the iconic Mohammed bin Rashid Al Maktoum Solar Park, the lowest solar price bid in history, for an 800 MW solar PV project that expands on 213 MW.





Overall, the F to ground-mo

ENER data intelligence consulting

Home / Publications / Daily Energy News

German PV auction reaches record low price of €4.91c/kWh (Germany)

18 Oct 2017

The German Federal network regulator (Bundesnetzagentur or BNetzA) published the results of the October 2017 solar PV auction round. In total, the BNetzA received 110 bids with a total volume of 754 MW and the average bid size was 6.9 MW. Only 20 bids won the round and a total capacity of 222 MW has been awarded. The maximum bidding price during this tender was previously set at €8.84c/kWh. The average bidding rate dropped further by €75c/kWh to €4.91c/kWh (€49.1/MWh). The highest bid achieved €5.06c/kWh and the lowest one €4.29c/kWh. Three out of the 20 successful bids obtained a volume higher than 20 MW.

Overall, the F to ground-mo

Renewables Now

France unveils winners in 2 solar tenders, prices go down

Feb 15, 2018 17:30 CEST

Author Ivan Shumkov

February 13 (Renewables Now) - France announced last week that it has selected 77 solar projects with a combined capacity of 508 MW in the country's third out of six tenders that should award 3 GW over a three-year period.

This latest auction brought down by 4% to EUR 61.6 (USD 76.2) per MWh the average price for all projects combined. The average price proposed by the winners with larger projects of between 5 Mwp and 17 Mwp was EUR 55.3/MWh, further down from the EUR-55.5/MWh "historically low" price achieved in the tender held last summer.

Rooftop solar project of Langa in Bressols (Midi-Pyrenees region in France)

Overall, the F to ground-mo

Renewables Now

France unveils winners in 2 solar tenders, prices go down

Avg solar bid at EUR 43.3/MWh in German solar tender

February 20 (Renewables Now) - The 200-MW German solar tender launched in December has been won by 24 projects, offering to sell their power at an average price of EUR 0.0433 (USD 0.054) per kWh, the Federal Network Agency said Tuesday.

The average rate in the solar tender completed in October 2017 was EUR 0.0491/kWh.

Large solar park. Source: IBC Solar. License: All Rights Reserved.

Overall, the F to ground-mo

Renewables Now

France unveils winners in 2 solar tenders, prices go down

Gebotstermin 1. Juni 2018

- Öffentliche Bekanntgabe der Zuschläge
- Bekanntmachung der Ausschreibung

Öffentliche Bekanntgabe der Zuschläge

Der niedrigste Gebotswert eines Gebotes, das einen Zuschlag erhielt, betrug 3,89 ct/kWh.

Das Gebot mit dem höchsten Zuschlagswert lag bei 4,96 ct/kWh.

Der durchschnittliche, mengengewichtete Zuschlagswert beträgt 4,59 ct/kWh.

Die Bundesnetzagentur gibt die Ergebnisse des Verfahrens nach § 35 Abs. 1 für den Gebotstermin 1. Juni 2018 bekannt:

The average rate in the solar tender completed in October 2017 was EUR 0.0491/kWh.

Offshore wind costs hit record low



Published on 06/07/2016, 10:57am

Two 350MW arrays in the Netherlands will supply power at €87/MWh, beating the next cheapest project by miles

By Megan Darby

Dong Energy has set a record low price for offshore wind power in a winning bid to build two arrays off the coast of the Netherlands.

The Danish company committed to supply electricity at €72.70/MWh (US\$80.40), not including transmission costs. The cables will add about €14/MWh, experts say.

That beats an industry goal of bringing costs below €100/MWh by 2020. The closest any rival had previously come was €103/MWh by Vattenfall in Denmark last year.

"It was a result that was well beyond anyone's expectations," said Oliver Joy, spokesperson for the European Wind Energy Association.

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New record for cheapest offshore wind farm



The costs of offshore wind have fallen significantly in recent years. CREDIT: BLOOMBERG

By Emily Gosden, ENERGY EDITOR

14 SEPTEMBER 2016 - 7:35AM

The cost of building offshore wind farms has fallen to a new low, with Sweden's Vattenfall winning contracts to build two projects in Danish waters for just over €60 (£51) per megawatt-hour (MWh).

Offshore wind record low



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VATTENFALL



7:33 AM CET / 9-Nov-2016 / Vattenfall (STO:ONOT)

Vattenfall wins tender to build the largest wind farm in the Nordics

Today, Vattenfall has won the tender to build Danish Kriegers Flak, a 600 MW offshore wind farm in the Baltic Sea. The winning bid was EUR 49.9 per MWh, which is among the lowest costs in the world for offshore wind power.

"The announcement is an essential milestone for our ambition to increase our production of renewable power. We are already the second largest offshore player globally. The winning bid of EUR 49.9 per MWh proves that Vattenfall is highly competitive and brings down the costs for renewable energy", says Magnus Hall, CEO Vattenfall.

Kriegers Flak will be Denmark's largest offshore wind farm and can supply 600,000 Danish households with renewable energy – corresponding to 23 percent of all households in Denmark. Vattenfall's investment in Kriegers Flak will be EUR 1.1 – 1.3 billion, pending a final investment decision.

"This is exciting news. I'm very proud of our people in the Wind organisation who once again delivered a winning bid. Vattenfall has won the three latest offshore wind tenders in Denmark; Horns Rev 3, Danish Near Shore and Kriegers Flak, equivalent to the energy consumption of 55 percent of the Danish households", says Gunnar Groebler, Head of Vattenfall Wind.

Clean Technica

CleanTech news & analysis

About Electric Car Reviews Exclusives Power

First Subsidy-Free Offshore Wind Deal In German Offshore Wind Auction, DONG Energy & EnBW Win Big

April 14th, 2017 by Joshua S Hill



Germany's first competitive auction for offshore wind projects has not only delivered an average bid price that was "far below expectations" according to the Bundesnetzagentur, but also included what is likely one of the world's first subsidy-free offshore wind projects.

Clean Technica

About Electric Car Reviews

First Subsidy-Free Wind Deal In Germany, DONG Energy Wins Big

April 14th, 2017 by Joshua S. Hill

Germany's first competitive auction for offshore wind projects has an average bid price that was "far below expectations" according to the auctioneer. The auction also included what is likely one of the world's first subsidy-free offshore wind projects.

NETHERLANDS
Vattenfall awarded Dutch zero-subsidy site

19 March 2018 by David Weston, [the first to comment](#)

NETHERLANDS: Developer Vattenfall has been granted the licence to build the 700MW Hollandse Kust Zuid offshore wind project in the latest Dutch offshore tender round, without subsidy.



Vattenfall, through its Dutch subsidiary Nuon, built Egmond aan Zee, the Netherlands' first offshore wind project.

The site, located 22.2km off the Dutch coast, will require €1.5 billion in investment from Vattenfall, the developer said. It comprises two 350MW projects and due online in 2022.

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Phelix-DE OTF Baseload Month Futures

Name	Best Bid	Best Ask	No. of Contracts	Last Price	Abs. Change	Last Time	Last Vol.	Settl. Price	Vol. Exchange	Vol. Trade Registration	Open Interest Prev. Day
Aug/18	-	-	-	-	-0.29	-	-	56.24	-	-	14
Sep/18	-	-	-	-	1.67	-	-	58.15	-	-	14
Oct/18	-	-	-	-	1.36	-	-	59.19	-	-	-
Nov/18	-	-	-	-	1.01	-	-	60.69	-	-	-
Dec/18	-	-	-	-	1.48	-	-	53.38	-	-	-
Jan/19	-	-	-	-	1.38	-	-	58.43	-	-	-
Feb/19	-	-	-	-	1.45	-	-	60.03	-	-	-
Mar/19	-	-	-	-	1.31	-	-	51.67	-	-	-
Apr/19	-	-	-	-	1.35	-	-	47.41	-	-	-
May/19	-	-	-	-	1.23	-	-	43.17	-	-	-

Themen Verbraucherservice Bundesnetzagentur Presse

Ergebnisse der dritten Ausschreibung für Wind an Land 2018

Ausschreibung leicht überzeichnet

Ausgabejahr 2018
Erscheinungsdatum 17.08.2018

Die Bundesnetzagentur hat heute die Zuschläge der dritten Ausschreibung für Wind an Land in diesem Jahr erteilt.

"Die Runde war leicht überzeichnet, trotzdem hat jedes zugelassene Gebot einen Zuschlag erhalten", sagt Jochen Homann, Präsident der Bundesnetzagentur.

Zuschlagswert steigt moderat

Die Gebotswerte reichten von 4,00 ct/kWh bis zum Höchstwert 6,30 ct/kWh. Der durchschnittliche Zuschlagswert liegt bei 6,16 ct/kWh. In den vorhergehenden Ausschreibungsrunden aus dem Mai 2018 lagen die Zuschläge im Durchschnitt bei 5,73 ct/kWh, im Februar 2018 bei 4,73 ct/kWh.

Der niedrigste Gebotswert eines Gebotes, das einen Zuschlag erhielt, betrug 3,89 ct/kWh.

Das Gebot mit dem höchsten Zuschlagswert lag bei 4,96 ct/kWh.

Der durchschnittliche, mengengewichtete Zuschlagswert beträgt 4,59 ct/kWh.

Die Bundesnetzagentur gibt die Ergebnisse des Verfahrens nach § 35 Abs. 1 für den Gebotstermin 1. Juni 2018 bekannt:

May/19	-	-	-	-	1.35	-	-	47.41	-	-	-
May/19	-	-	-	-	1.23	-	-	43.17	-	-	-

NASDAQ OMX Transactions Markets Nasdaq Commodities

MARKET PRICES

History | Market Transactions | Volume Summary

Market: Electricity Nordic | Type: Year

Export to Excel | Traded

Aggregated volume (GWh): 446.88

Updated: 2018-08-28 17:05:55

PRODUCT SERIES

	BID	ASK	LAST
EN0YR-19	42.46	42.73	42.72
EN0YR-20	34.85	35.05	35.50
EN0YR-21	33.36	33.58	33.51

NASDAQ OMX ► Transactions ► Markets ► Nasdaq Commodities

MARKET PRICES

History | Market Transactions | Volume Summary

Market: Electricity Nordic | Types: Year

Export to Excel | Traded

Aggregated volume (GWh): 446.88

Updated: 2018-08-28 17:05:55

SKM Elcertificate prices (SEK)

ELCERTIFICATE PRICES | HISTORICAL ELCERTIFICATE PRICES | TIME:17:01:08

Product	Bid	Ask	Date	CL
Spot				
March-19	231	250	28 Aug 15:41	24
March-20	239	252	28 Aug 15:41	24
March-21	175	196	28 Aug 12:53	18
March-22	14	36	22 Aug 10:31	29
March-23	14	36	23 Aug 10:20	27
March-23		34	3 Jul 11:59	27

Product Series

	BID	ASK	LAST
ENOYR-19	42.46	42.73	42.72
ENOYR-20	34.85	35.05	35.50
ENOYR-21	33.36	33.58	33.51

Sweden H2 2017:

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VASA VIND

Meny

NEWS

2017 | 2016 | 2015 | 2014 | 2013

Vasa Vind and APG to build one of Sweden's largest wind farms (30th June)

Vasa Vind and the Dutch pension fund manager APG are building one of Sweden's largest wind farms in Åskålen in Jämtland county. The project consists of 80 wind turbines with a total capacity of 288 MW and will generate almost 1 TWh of renewable electricity per year. The total construction investment is worth about 300 million EUR.

[Press release](#)

10

Sweden H2 2017:

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SVEVIND

NEWS

2017

REALIZATION OF MARKBYGDEN ETT - THE LARGEST SINGLE ONSHORE WIND FARM IN EUROPE

PUBLISHED 07/11/2017

Svevind is pleased to announce that the 650 MW Markbygden ETT wind farm in Northern Sweden, comprising 179 wind turbines, has reached financial close. The project has been acquired by GE Energy Financial Services and Green Investment Group Limited, part of Macquarie Group. As new equity partners, GE and Green Investment Group have raised approximately €800M in financing.

The construction of Markbygden ETT's infrastructure has already begun, with preparation of about 130km of wind farm roads, crane platforms, wind farm internal cabling and second level substations. GE Renewable Energy will supply 179 of its 3.6 MW wind turbines with 137 meter rotors. The wind farm is expected to begin commissioning in the second half of 2018 and be fully operational by the end of 2019. At that time, Markbygden ETT is expected to be the largest single onshore wind farm in Europe.

DECEMBER 2017

M T O T F L S

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DEN 18 DECEMBER 2017

Inga händelser den här dagen.

[Press release](#)

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Sweden H2 2017:

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SVEVIND

OX2

NEWS

2017

OX2 and Aquila Capital in major deal for 357 MW wind farm in Sweden

2017-12-18

OX2 announced today that the financing of Valhalla project comprising 85 wind turbines has been successfully completed. Aquila Capital will acquire the project which OX2 will deliver as an EPC contract. It will be one of the largest onshore wind farms in Europe.

The wind farm will be built in the municipalities of Bollnäs and Ockelbo, in central Sweden. The permits for the park have been developed in cooperation between OX2 and Bergvik Skog.

Roman Roslenbroich, CEO and Co-Founder of Aquila Capital says: "Wind energy investments in the Nordics region are highly attractive investments and this project is especially remarkable due to the technical dimension and its performance features. Our proposition in the region is enhanced even further by the broad network of partnership we have built with leading market participants such as OX2 and Vestas. We are very happy about this cooperation."

The construction work will begin immediately, with completion of the wind farm expected in the spring of 2020. OX2 will then have a contract for technical and commercial management of the wind farm. The expected average production is more than 1.1 TWh per year. The project will be featured with a long-term power purchase agreement with a yet undisclosed, high calibre-offtaker.

Managing Director OX2 Wind
Paul Sterman
+46 8 559 310 99

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Our projects

10

Sweden H2 2017:

Eolus säljer 232 MW vindkraft till Aquila Capital
Hässelholm, 2017-12-23 15:00 CET (GLOBE NEWSWIRE) --

Eolus har tecknat avtal med Aquila Capital avseende försäljning av vindparkerna Kråkröpet och Nylandsbergen bestående av 61 vindkraftverk med en total installerad effekt om 232 MW. Den preliminära köpeskillingen för vindparkerna uppgår till 264 MEUR.

Affären omfattar försäljning av samtliga aktier i de respektive projektbolag som äger rättigheterna till vindparkerna. Eolus kommer att uppföra båda vindparkerna och för vindpark Kråkröpet bestående av 43 vindkraftverk med en effekt om 163,4 MW kommer Aquila att bidra med finansiering under byggnationen. Den preliminära köpeskillingen för vindpark Kråkröpet uppgår till 182 MEUR. För Vindpark Nylandsbergen bestående av 18 vindkraftverk med en effekt om 68,4 MW kommer köpeskillingen för vindpark Nylandsbergen färdigställande och övertagande. Den preliminära köpeskillingen för vindpark Nylandsbergen uppgår till 82 MEUR. Båda vindparkerna kommer att driftsättas under 2019.

Som en del i affären har Eolus fått förtroendet att leverera tekniska och administrativa tjänster under sju år rörande båda vindparkerna för att maximera utfall och produktion från anläggningarna. Vindparkerna är belägna nära vindpark Jenåsen som Eolus för närvarande bygger i Sundsvalls kommun.

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Som en del i affären har Eolus fått förtroendet att leverera tekniska och administrativa tjänster under sju år rörande båda vindparkerna för att maximera utfall och produktion från anläggningarna. Vindparkerna är belägna nära vindpark Jenåsen som Eolus för närvarande bygger i Sundsvalls kommun.

Vasavind:	288 MW
Svevind:	650 MW
OX2:	357 MW
Eolus:	232 MW
Totalt:	1 574 MW

10

Sweden H1 + July 2018:

Fortsatt hög investeringstakt i vindkraft
2018-04-20
PRESSMEDDELANDEN

Under första kvartalet 2018 togs beslut om vindkraftsinvesteringar med en sammanlagd effekt på 220 MW, enligt ny statistik från Svensk Vindenergi. Om inte Sverige och Norge snabbt inför en volymbaserad stoppregel för elcertifikatsystemet finns en stor risk för att systemet havererar.

– Investeringsbesluten fortsätter att tas i rask takt. Det är nu mycket brådskande med en stoppregel som stänger elcertifikatsystemet på ett ansvarsfullt och rättssäkrat sätt, med hänsyn till alla investeringar, säger Charlotte Unger Larson, vd Svensk Vindenergi.

Under det första kvartalet 2018 fattades beslut om investeringar i vindkraft i Sverige avseende 220 MW. Det kan jämföras med toppnoteringen 1 429 MW under föregående kvartal och med endast 2 MW under första kvartalet 2017. Investeringstakten är fortfarande hög. Svensk Vindenergis prognos är att vindkraftsproduktionen kommer att öka från cirka 17 TWh år 2017 till nära 30 TWh år 2021.

11

Sweden H1 + July 2018:

Vattenfall påbörjar byggandet av en av Sveriges största vindkraftsparker
2018-04-20
PRESSMEDDELANDEN
16.05.2018

Nu börjar bygget av vindkraftsparken Blåkilden/Fåbodberget i Åsele och Lycksele kommuner. Totalt installeras 84 kraftverk och blir, när de tas i drift 2021/22, en av Sveriges största, och Vattenfalls hittills största, vindkraftsparker. Den totala investeringen uppgår till ca 3,5 miljarder SEK och 60 % av produktionen är redan såld genom ett 20-årigt avtal med Norsk Hydro.

Vattenfall har tecknat ett turbinkontrakt med Vestas och, efter att bankfinansiering är på plats, ett 20-årigt elleveransavtal med Norsk Hydro. För att åska projektet har ett partnerskap bildats mellan Vattenfall (30%), Vestas och PKA, ett danskt pensionsbolag. (tillsammans 70%).

Vindkraftsparken består av två områden: Blåkilden i Åsele kommun med 50 kraftverk och Fåbodberget i Åsele och Lycksele kommuner med 34 kraftverk. Den totala kapaciteten kommer att bli 353 MW vilket är tillräckligt mycket för att kunna försörja 220 000 svenska hem med hushållsenergi.

11

Sweden H1 + July 2018:

2018-04-20
PRESSMEDDELANDEN

Undersam Svel fin

Vattenfall på av Sveriges s

Nu börjar bygget av vindkra och Lycksele kommuner. To de tas i drift 2021/22, en av S största vindkraftsparker. Den miljarder SEK och 60 % av pro årigt avtal med Norsk Hydro.

Vattenfall har tecknat ett turbin kontrakt på plats, ett 20-årigt elföransvar avtal med Norsk partnerskap bildats mellan Vattenfall (30%), (tillsammans 70%)

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19 July 2018

Green Investment Group lands huge onshore wind farm in Sweden

Europe, Sustainable Energy

Financial close has been reached on a major new wind farm in Sweden.

The Green Investment Group (GIG) has put forward 270 million euros to develop the 235 megawatt project in the country's central belt.

The Överturingen wind farm will consist of 56 turbines reaching 220 metres into the sky, making them taller than any building in Scandinavia. Each machine will have a capacity of 4.2 megawatts, built by Siemens Gamesa, making them some of the most powerful onshore turbines currently available.

SCA Energy, which owns 2.6 million hectares of forest in Sweden, has also come on board to help finance the project, although GIG will own 100 percent of its equity.

The move is GIG's second foray into the Swedish renewables market after its successful financing of a 650 megawatt wind farm, set to become the largest in Europe. The group has identified Scandinavia as a "priority market", according to a statement.



2018-04-20
PRESSMEDDELANDEN

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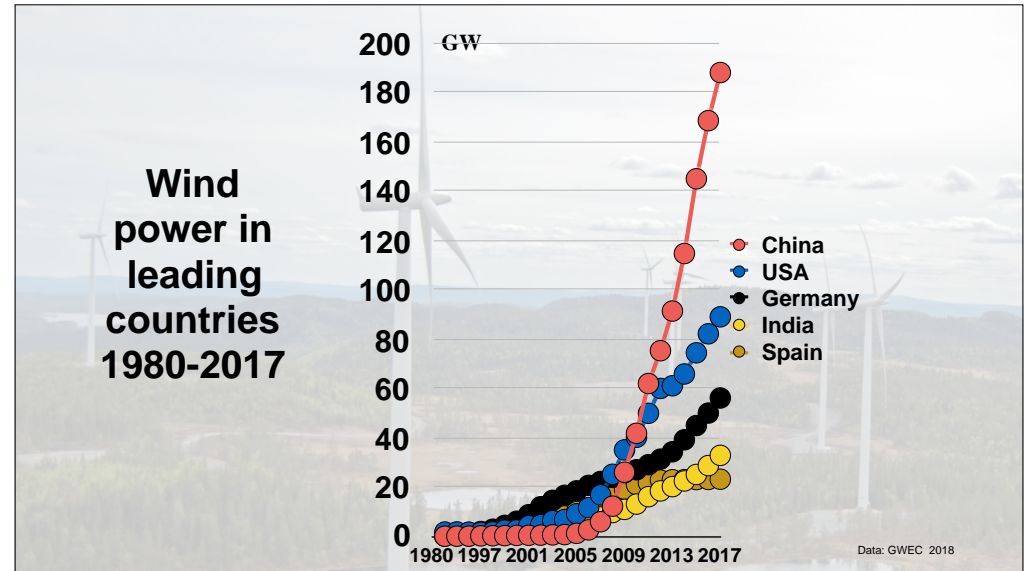
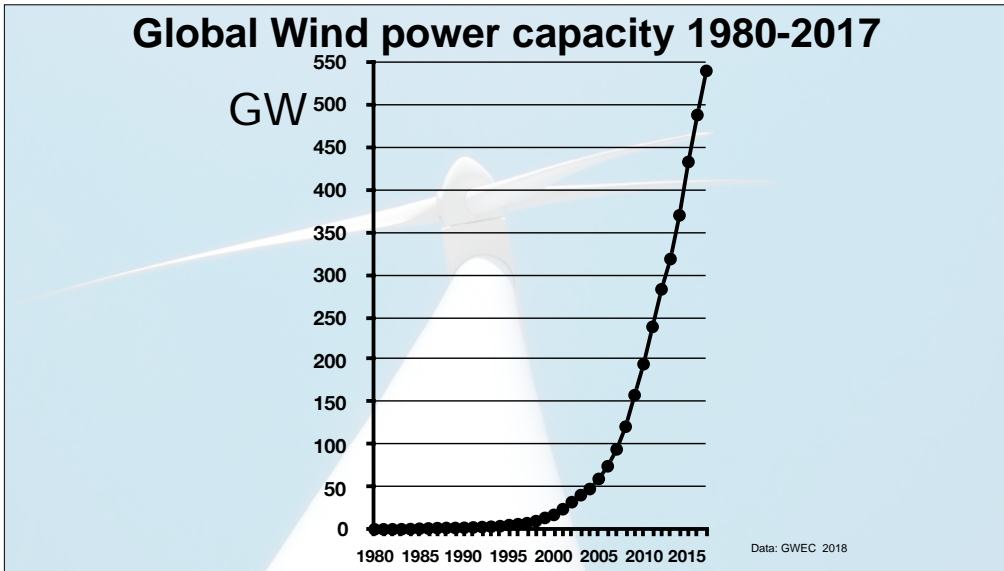
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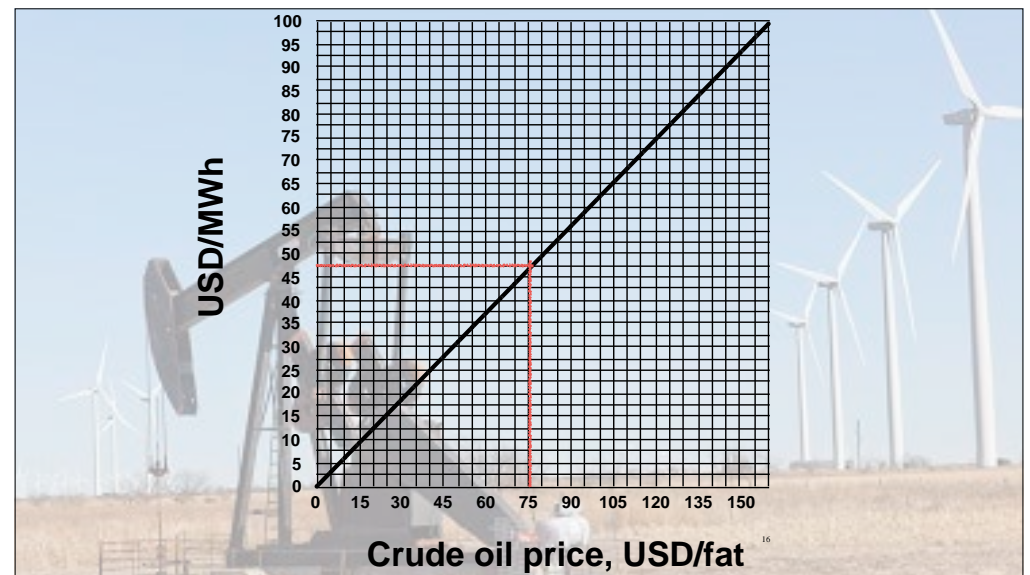
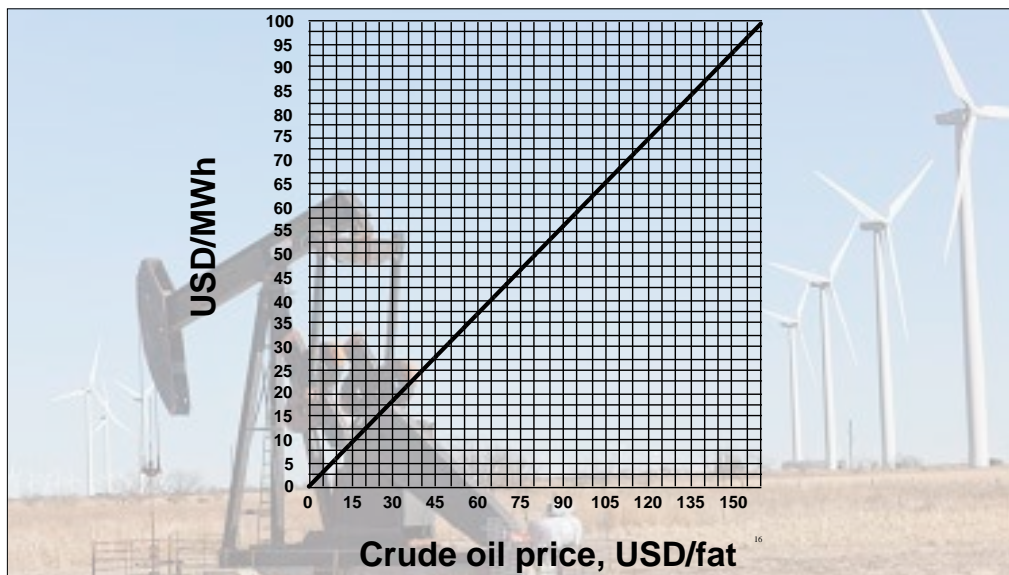
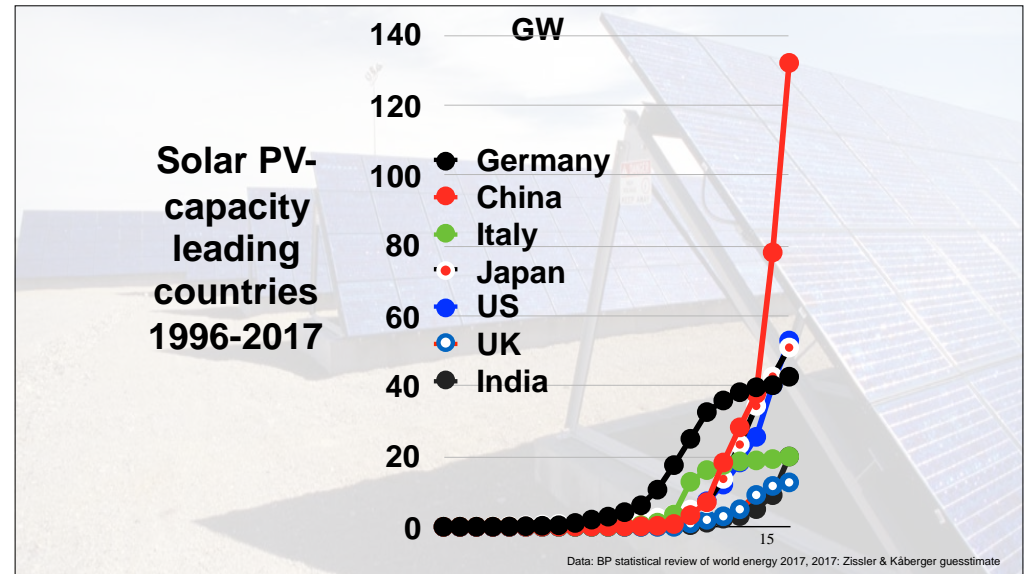
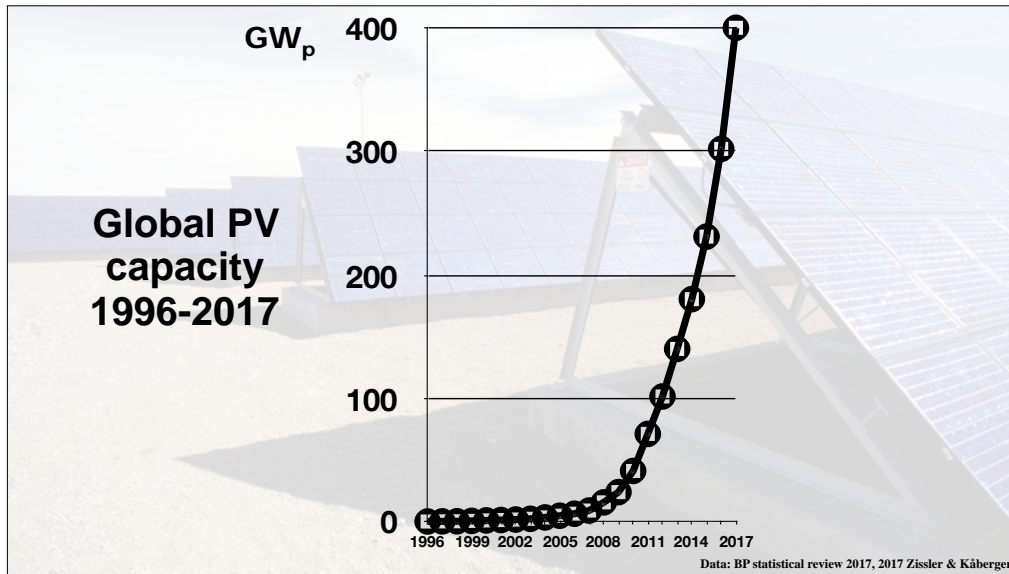
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2017-06–2018-01:	1 574 MW
2018 kv 1:	220 MW
Vattenfall Blakliden	353 MW
GIG	235 MW
Total since 2017-06:	2 382 MW
Expected production	7-10 TWh/a






THE WALL STREET JOURNAL. 2 of 12

TOP STORIES IN BUSINESS 1 of 12

- High Court Backs Airlines on Frequent-Flyer Program
- Asian Gas Demand Spawns Floating Super...

Business
Tesla Breaks Norway's All-Time Sales Record
 Company Sold 1,493 Electric Model S Sedans to Norwegians in March

By JOHN D. STOLL
 April 2, 2014 11:37 a.m. ET



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Aussies Introduce 1000 Kilometer Electric Bus

November 1st, 2015 by Steve Hanley



Australian company Brighsun, headquartered in Melbourne, has developed an electric bus with a certified range of 1,004 kilometers — enough to make the trip from Melbourne to Sydney without stopping to recharge and with more than 100 kilometers of range left over.

17

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Aus Elec

Proterra Catalyst E2 max electric bus achieves a new world record – travels 1772.2 km on a single charge

November 1st

In Cars, Hybrids, EVs and Alternative Fuel. International News. Videos / By Gerard Lye / 21 September 2017 3:40 pm / 8 comments

Like Share 87 people like this. Sign Up to see what your friends like.



ON SEPTEMBER 4, 2017 PROTERRA BEAT THE WORLD RECORD FOR MILES DRIVEN ON A SINGLE CHARGE

Australian company Brighsun, headquartered in Melbourne, has developed an electric bus with a certified range of 1,004 kilometers — enough to make the trip from Melbourne to Sydney without stopping to recharge and with more than 100 kilometers of range left over.

Proterra, a company that produces heavy-duty electric vehicles, has announced it has set a world record for driving the longest distance ever travelled by an electric vehicle on a single charge. Its 40-foot Catalyst E2 max managed to travel 1772.2 km on a single charge at the Navistar Proving Grounds in New Carlisle, Indiana.

17

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DAIMLER

The new Fuso eCanter. E-
Pioneer among light trucks

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17

new world record – travels 1772.2 km on a single charge

leaves a new

Nov 17, 2017

Tesla Semi electric truck with 800 km range



Tesla has unveiled the Semi and this electric truck appears the most ambitious EV from the Californians to date. A range of up to 800 kilometres supported by autonomous driving and a Megacharger are features designed to distinguish Tesla from any competitors even more clearly than expected.

Start with the range promise Tesla CEO Elon Musk made at the presentation just a few hours ago: 400 miles (640 kilometres) recharged in half an hour at said Megacharger is a bit more than what observers had predicted, who believed Tesla would tackle the medium range segment around 500 km. But there is a second battery option for the electric truck, that increases range from 480 to 800 kilometres, or 300 to 500 miles. The latter results in a massive power pack the truck will haul on top of the 40 tons of whatever goods it may deliver.

The Semi's drive sits at the rear axles. Four electric motors, the same as in the Model 3, operate independently and shall accelerate from 0 – 100 kph in under 5 seconds when the truck is empty, faster than a BMW i3. Under load, acceleration decreases to 20 seconds, still quicker than any diesel-powered lorry, and driving speed is capped at 100 kph.

Australian company Bright... certified range of 1,004 km... stopping to recharge and... max manage... Indiana.

new world record – travels 1772.2 km on a single charge

leaves a new

Nov 17, 2017

Setting a Course for Carbon-Free Shipping



Electric truck appears the most ambitious EV from the Californians to date. A range of up to 800 kilometres supported by autonomous driving and a Megacharger are features designed to distinguish Tesla from any competitors even more clearly than expected.

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leaves a new

Tue 21 Jun 2016 by Paul Fanning

ABB powers world's largest emission-free electric ferries



ABB powers world's largest emission-free electric ferries. Tycho Brahe – along with Aurora – will operate completely on battery power between Helsingør (Denmark) and Helsingborg.

Australian company Bright... certified range of 1,004 km... stopping to recharge and... max manage... Indiana.

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leaves a new

May 1, 2015

AIRBUS PUTS ELECTRIC E-FAN TRAINER INTO PRODUCTION IN PAU



Airbus is to put its two-seat E-Fan powered by electric motors into serial production in Pau, France. Construction on a new plant will start in 2016 and Airbus has set a target for entry-into-service for the E-Fan 2.0 of the end of 2017 or beginning of 2018.

Australian company Bright... certified range of 1,004 km... stopping to recharge and... max manage... Indiana.



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Exxon Seeks Wind, Solar Power Delivery in Texas

By Brian Eckhouse and Kevin Crowley
25 augusti 2018 00:03 CEST
Updated on 27 augusti 2018 20:53 CEST

- Document shows oil company in market for 12-20 year contracts
- Large request 'shows that renewables are cost competitive'

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In this article

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EXXON MOBIL CORP
80.40 USD
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CL1
WTI Crude
66.27

Exxon Mobil Corp. has been looking to buy renewable energy for delivery in Texas, according to people familiar with the matter.

The largest U.S. oil company sent out a request for proposals with a June 8 deadline, inviting solar or wind power suppliers to pitch contracts that would last 12, 15 or 20 years, according to a document obtained by Bloomberg and people with knowledge who asked not to be named discussing confidential matters. Exxon, based in Irving, Texas, is seeking at least 100 megawatts and would consider proposals for more than 250 megawatts.

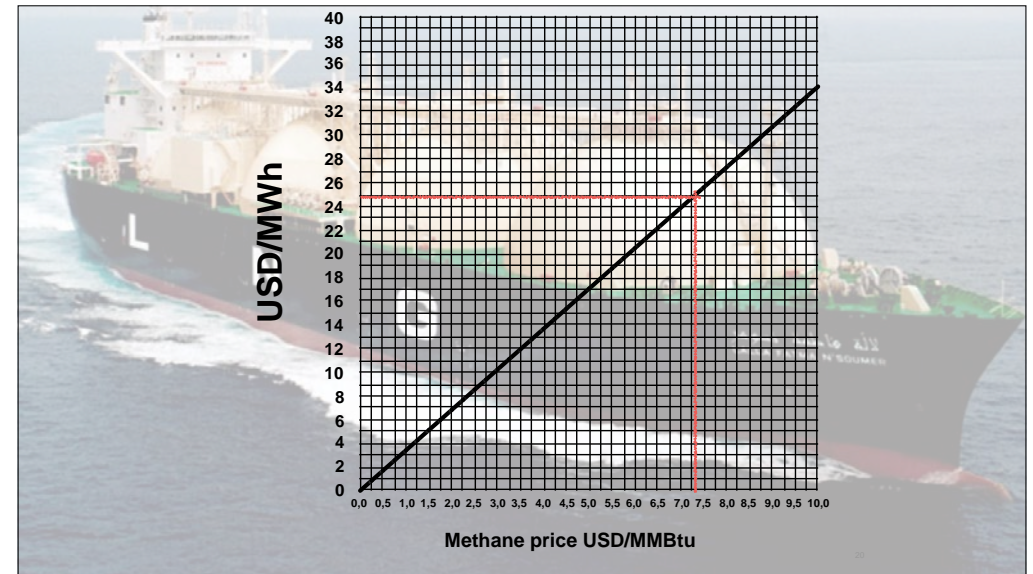
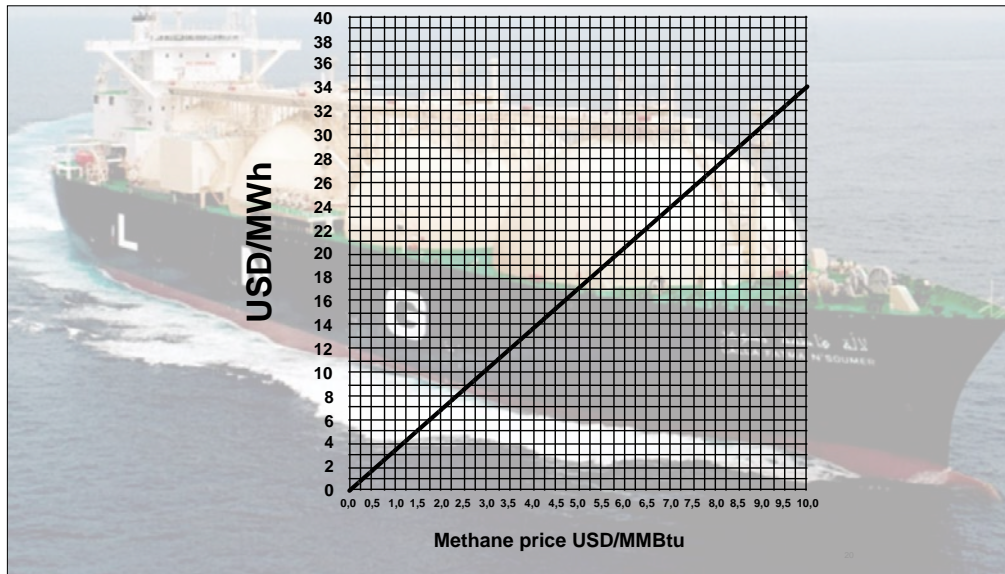
The stunning numbers behind success of Tesla big battery

By Sophie Vorrath & Giles Parkinson on 11 May 2018

Print


The Tesla big battery in South Australia has already taken a 55 per cent share in the state's frequency and ancillary services market, and lowered prices in that market by 90 per cent, new data has shown.

The stunning numbers on the economics of the country's first utility-scale battery were presented at the Australian Energy Week conference in Melbourne on Thursday by McKinsey and Co partner Godart van Gendt.



7 July 2017

Nuon, Statoil and Gasunie join forces using hydrogen in future CO₂-free energy plants



ISPT has previously brought together various parties, one of them being Nuon, to do a feasibility study into the storage of electricity in Ammonia (NH₃). Now Nuon, Gasunie and the Norwegian Statoil announce their collaboration in a joint venture that aims to use hydrogen as fuel for the Magnum-power plant in the Eemshaven in Groningen. They will start an innovative project that aims to have one of the three available units fully transferred to hydrogen starting 2023. This is a very important step on the way to a 100% CO₂-free energy supply. This also brings the 'super battery', that Nuon has been working on a step closer to reality.

21

7 July 2017

Nuon, Statoil and Gasunie join forces using hydrogen in future CO₂-free energy plants



ENERGY EVERYWHERE

SUNFIRE NEWSLETTER OCTOBER 2017

SUNFIRE ELECTROLYSER AT TOTAL FILLING STATION



Sunfire delivered its steam electrolyser called Sunfire-HyLink to a hydrogen filling station in Karlsruhe. This hydrogen filling station marks the first time that a steam electrolyser is used in flexible operation for the production of hydrogen from solar energy directly at the filling station.

The installation at the hydrogen filling station in Karlsruhe provides outstanding proof that Sunfire's electrolyser technology is very versatile.

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21

7 July 2017

Nuon, Statoil and Gasunie
for
CO₂

sunfire

SUNFIRE NEWSLETTER

SUNFIRE ELECTROLYSER AT TOTAL FILLING

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Power-to-Gas for Renewables Integration Is on the Rise

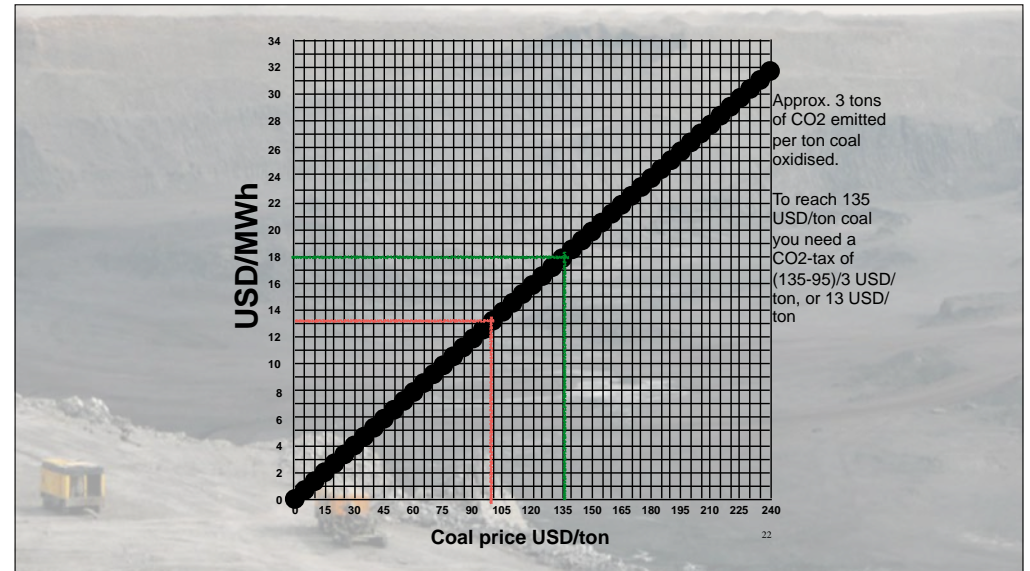
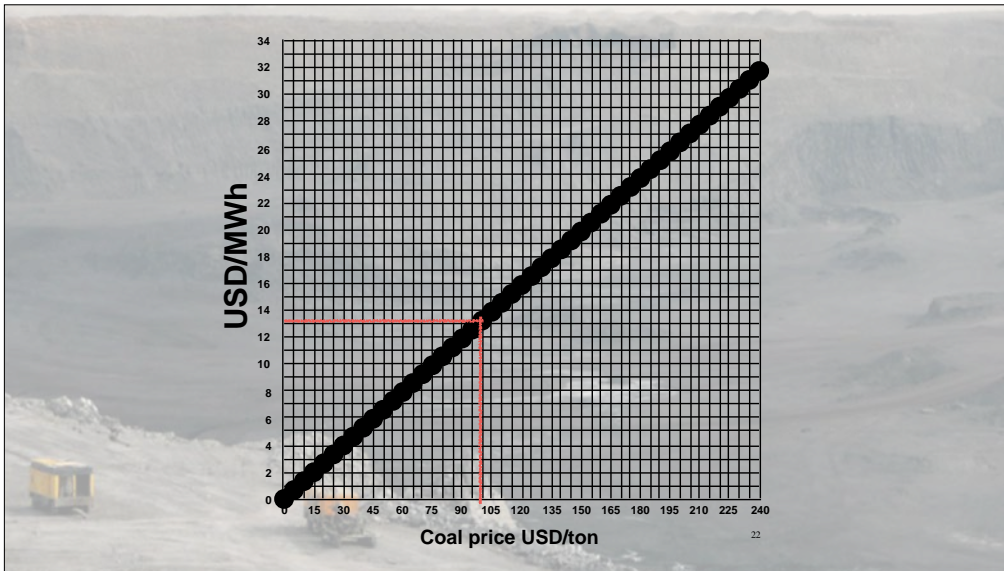
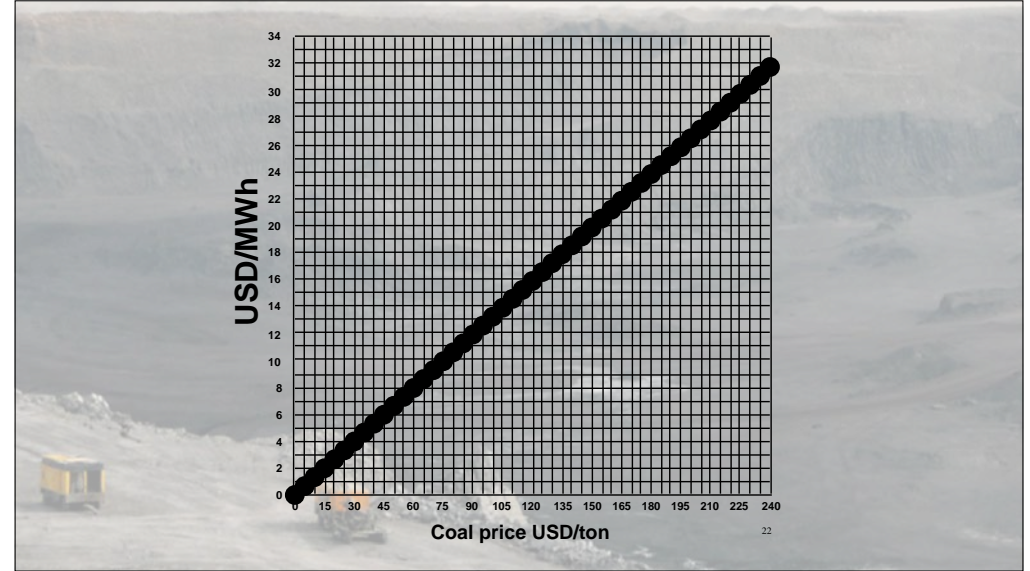
October 13, 2017

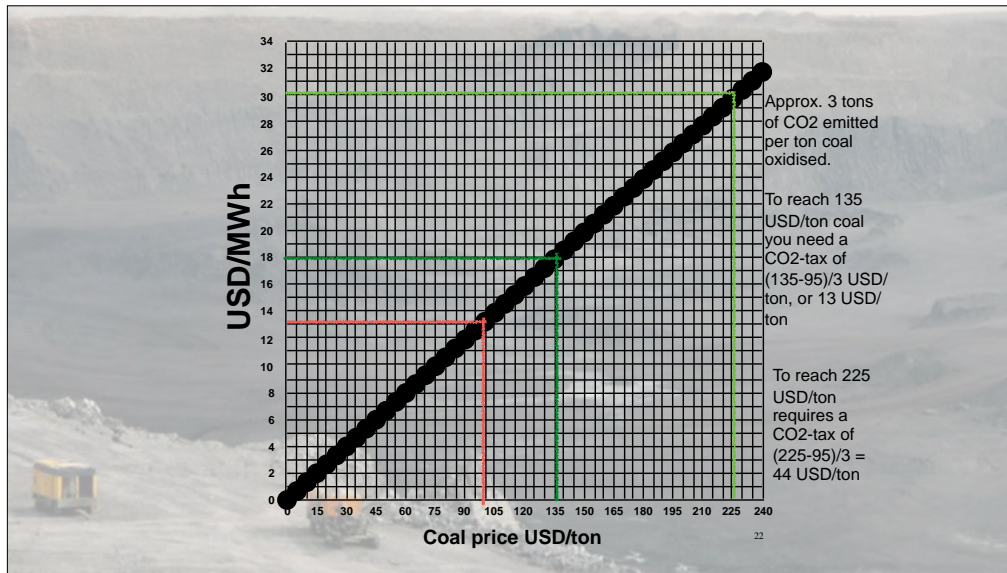
By Adam Forni



Power-to-gas (P2G)—the conversion of electrical power into gaseous energy carriers—is a quickly improving and potentially disruptive energy conversion technology. It offers many of the same services of other energy storage technologies and has the added ability to be stored for long periods in the form of a useful commodity fuel product, hydrogen. The hydrogen economy has had false starts before thanks in part to high costs and infrastructure challenges. P2G is primed for significant growth in coming years as demand for clean hydrogen grows, electrolyzer capital costs fall, and cheap renewable energy bathes the grid.

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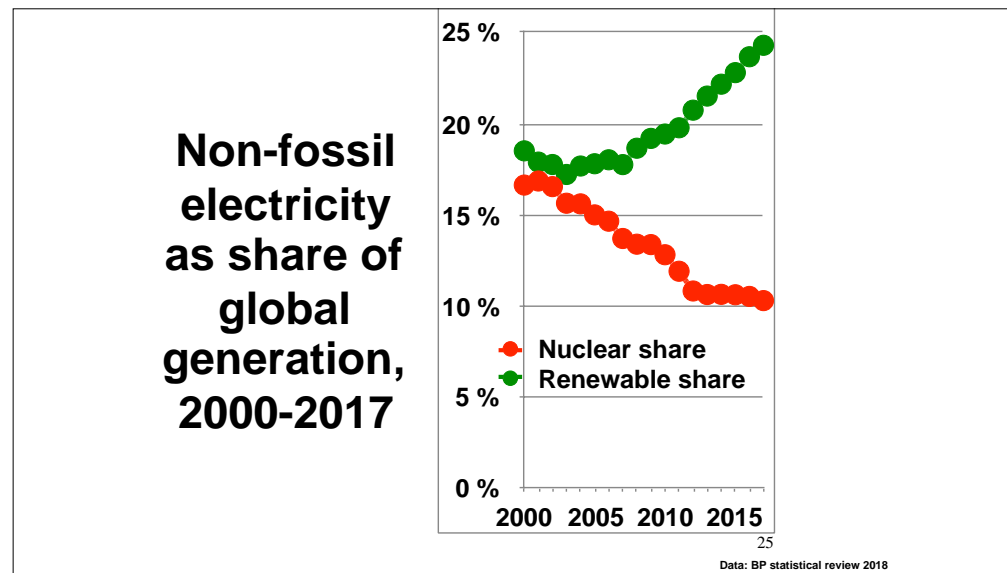
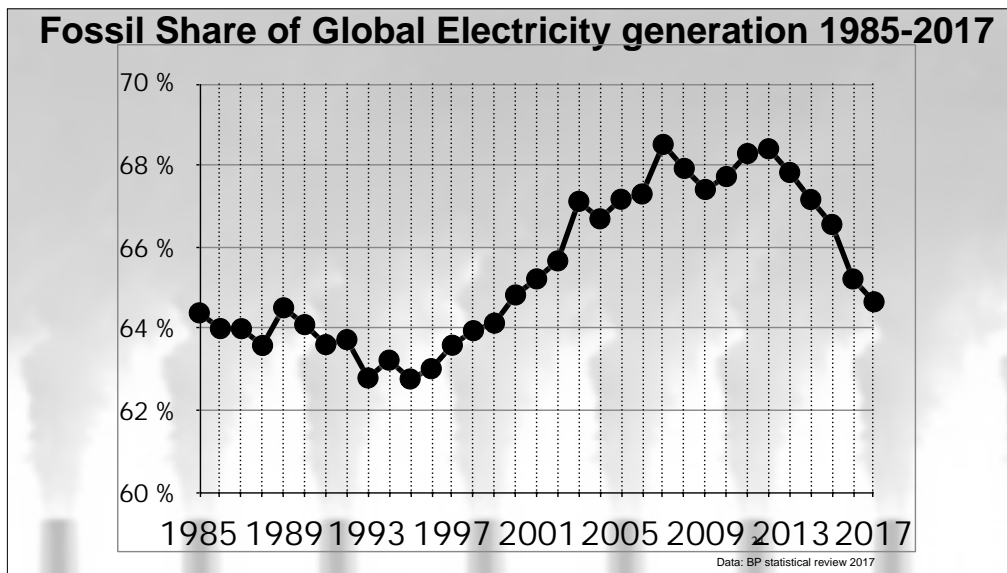


SSAB, LKAB and Vattenfall form joint venture company for fossil-free steel

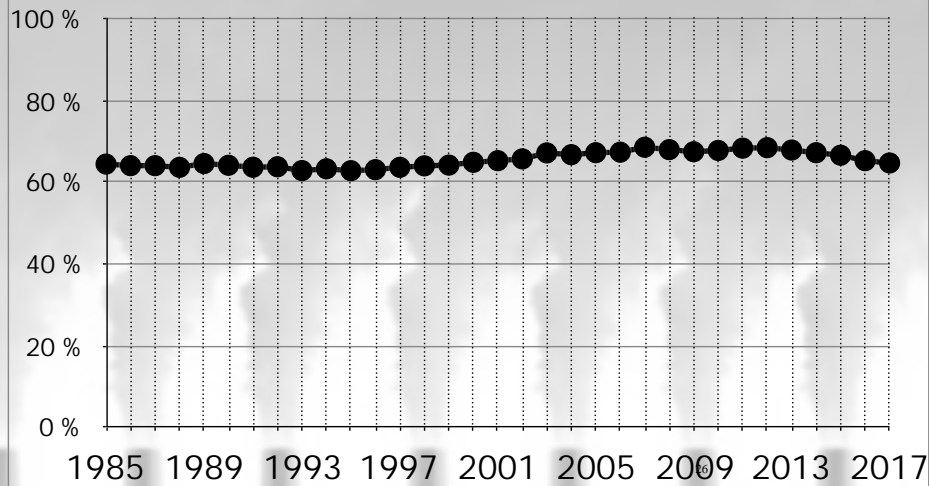
SSAB, LKAB and Vattenfall announced today that they have formed a joint venture company to continue to drive the HYBRIT initiative. The three companies will each own one third of the company, which will seek to develop a steelmaking process that emits water instead of carbon dioxide.

"HYBRIT is a very important initiative for SSAB and a fossil-free Sweden by 2045. A joint venture company will enable us to work together effectively to eliminate the root cause of carbon dioxide emissions in the steel industry," said Martin Lindqvist, President and CEO of SSAB.

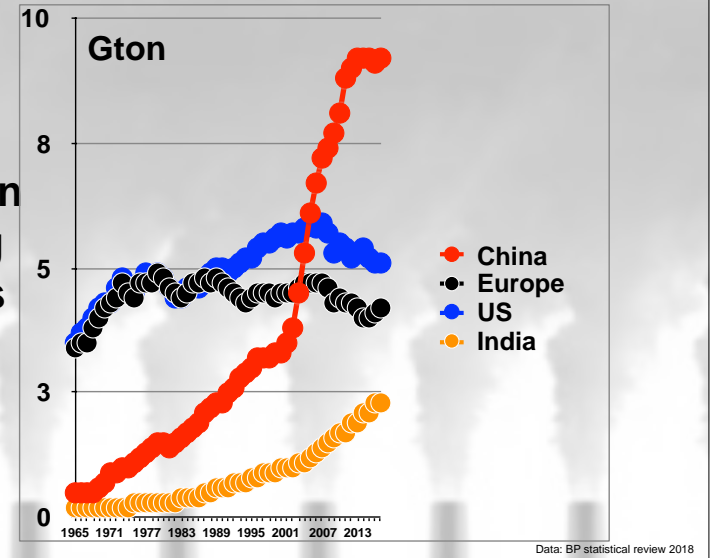
"Our establishment of a joint venture to develop HYBRIT indicates our conviction that it is possible to develop a fossil-free production chain all the way from the mine to the steelworks. If we're successful, this will be a technology breakthrough that can make a global contribution to significantly limiting climate change," said Jan Moström, President and CEO of LKAB.



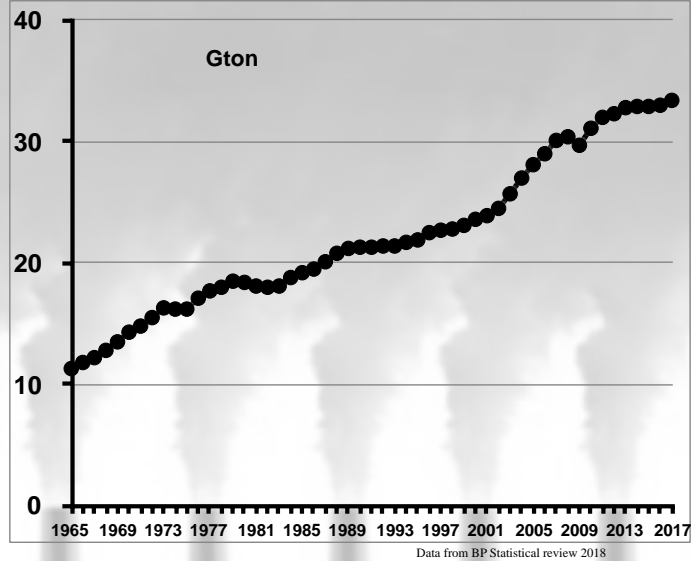
Fossil Share of Global Electricity generation 1985-2017



CO2-emission leading regions 1965-2017



Global Carbon dioxide emissions from fossil fuels 1965-2017



Fantastic development of renewables!

Fantastic development of renewables!

But still not fast enough!

Fantastic development of renewables!

But still not fast enough!

Progress of Renewable Electricity Replacing Fossil Fuels

Tomas Kåberger

*Professor Chalmers University of Technology, Göteborg
Executive Board Chair of Renewable Energy Institute, Tokyo*

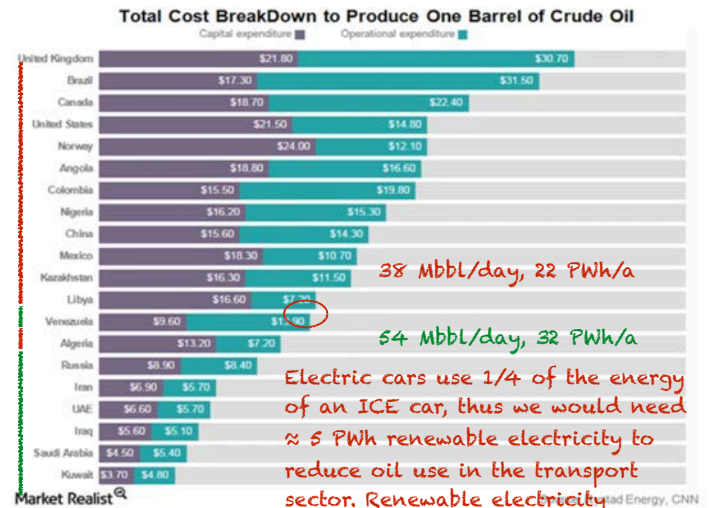
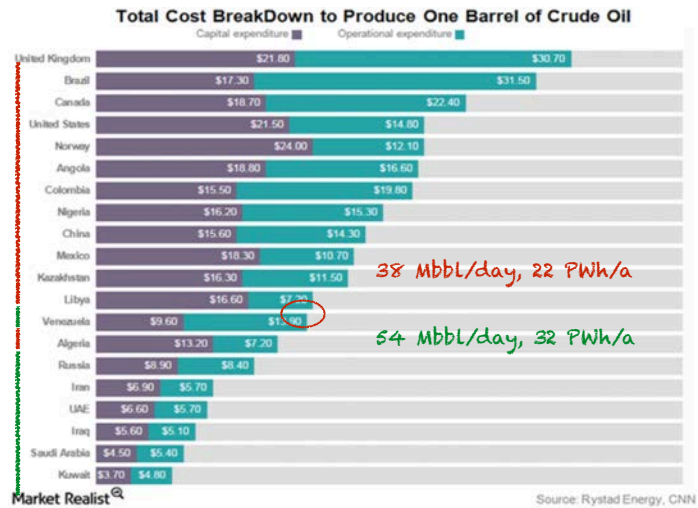
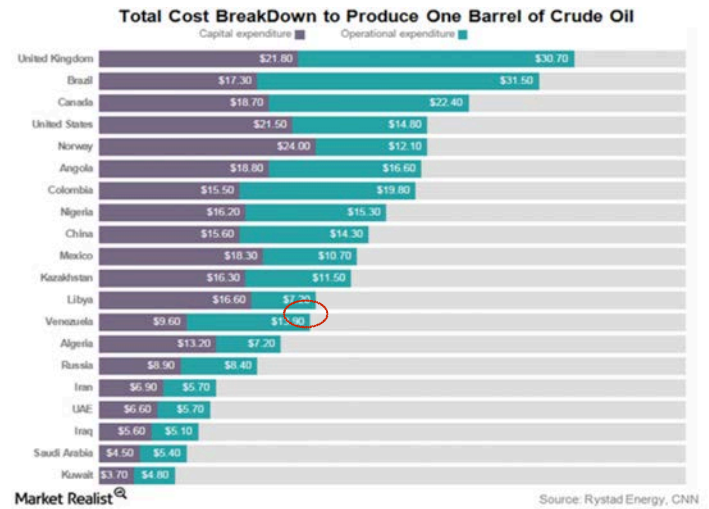
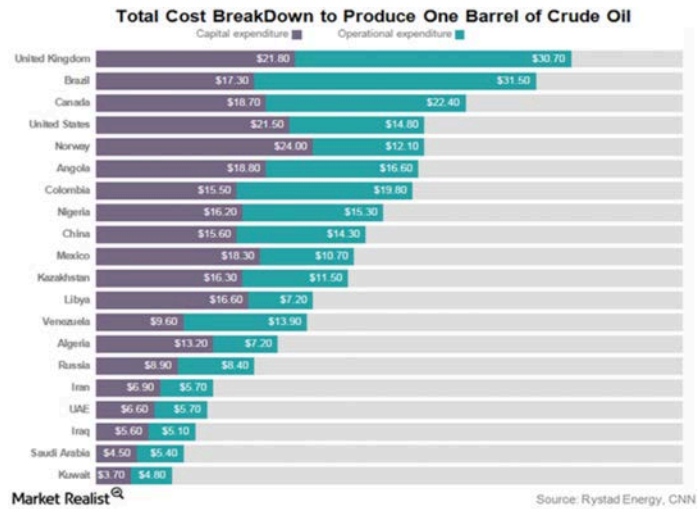
*&
Senior Advisor to GEIDCO, Beijing*

Free Energy, \$10 A Barrel Oil By 2025 Says French Utility Company

December 28th, 2016 by Steve Hanley

"The promise of quasi-infinite and free energy is here," says Thierry Lepercq, head of research, technology and innovation for Engie SA. He thinks the cost of solar power will drop below \$10 a megawatt-hour (\$0.01 per kWh) before 2025 in the world's sunniest places. Engie recently conducted a "very deep modeling" of the Provence-Alpes-Cote d'Azur region of France, which has about 5 million inhabitants. The study showed those regions could run entirely on renewable energy for about 20% less than the price of electricity today.

The Engie logo features a blue curved line above the word "ENGIE" in a bold, blue, sans-serif font.



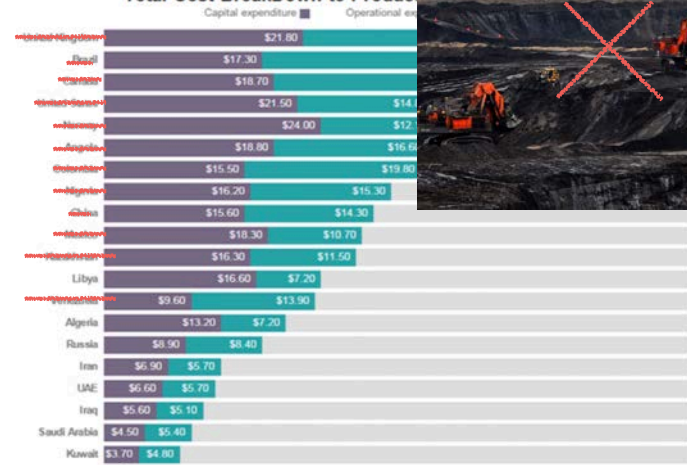
Total Cost BreakDown to Produce One Barrel of Crude Oil



Market Realist

Source: Ry33ad Energy, CNN

Total Cost BreakDown to Produce One Barrel of Crude Oil

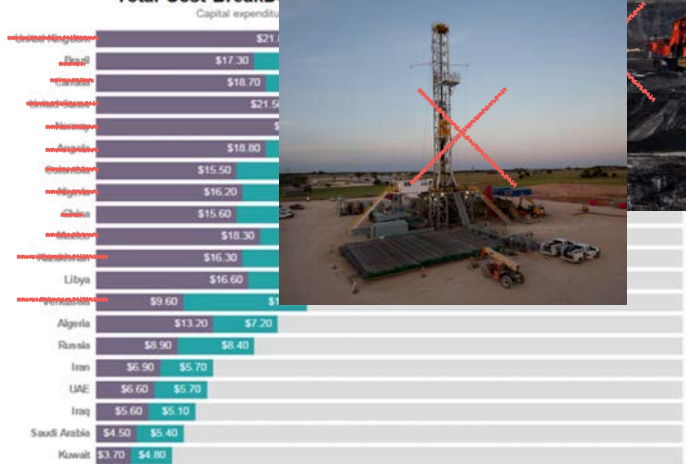


Market Realist

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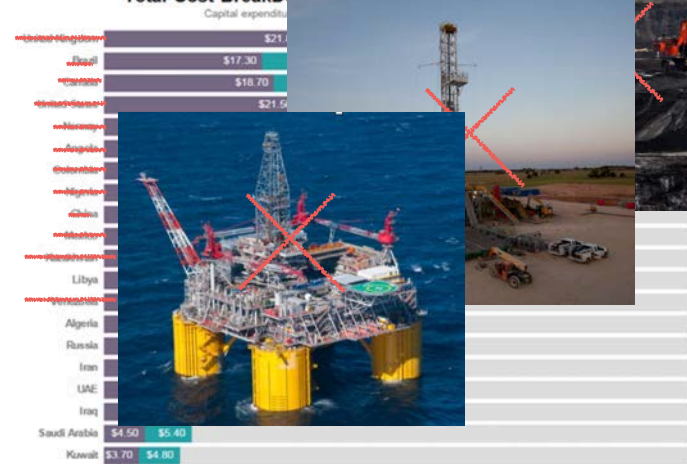


Market Realist

Source: Ry33ad Energy, CNN

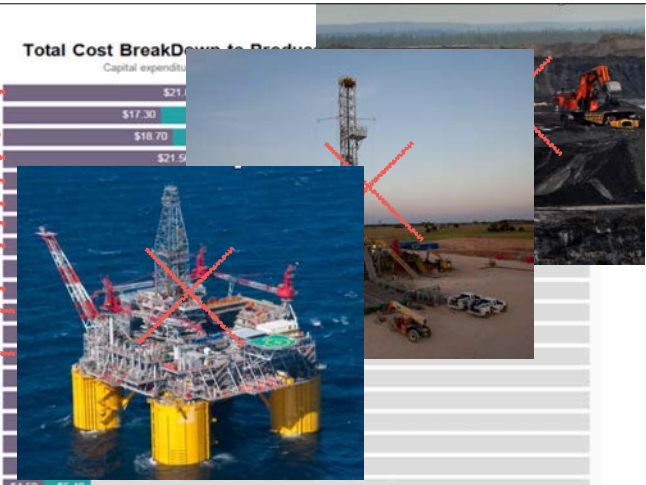


Total Cost BreakDown to Produce One Barrel of Crude Oil



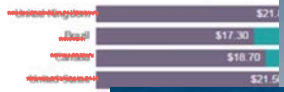
Market Realist

Source: Ry33ad Energy, CNN



Total Cost BreakDown to Product

Capital expenditure



Source: Ry33ad Energy, CNN