

# **The Energy Crisis and the role of Renewable Energy**

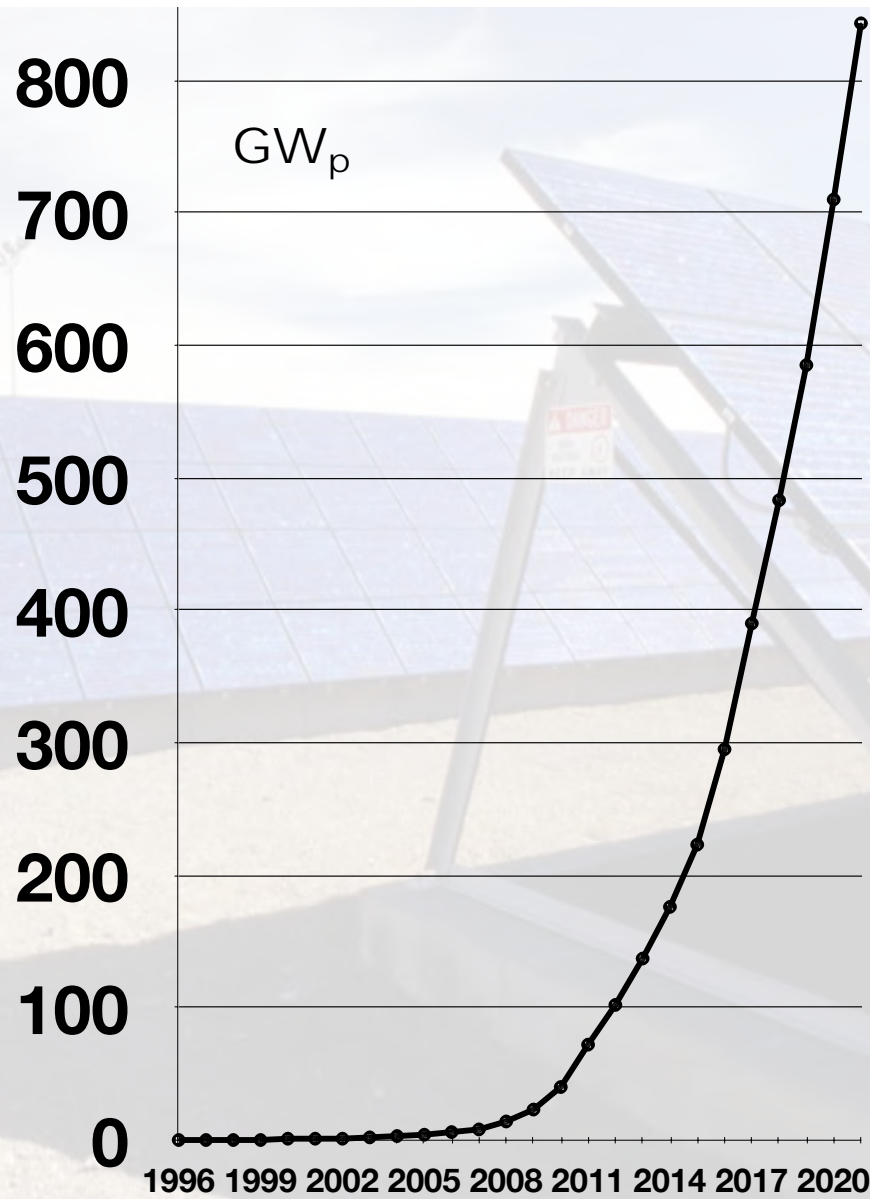
Renewable Energy Institute 2022-06-14

**Tomas Kåberger**

**Executive Board Chair of Renewable Energy Institute, Tokyo**

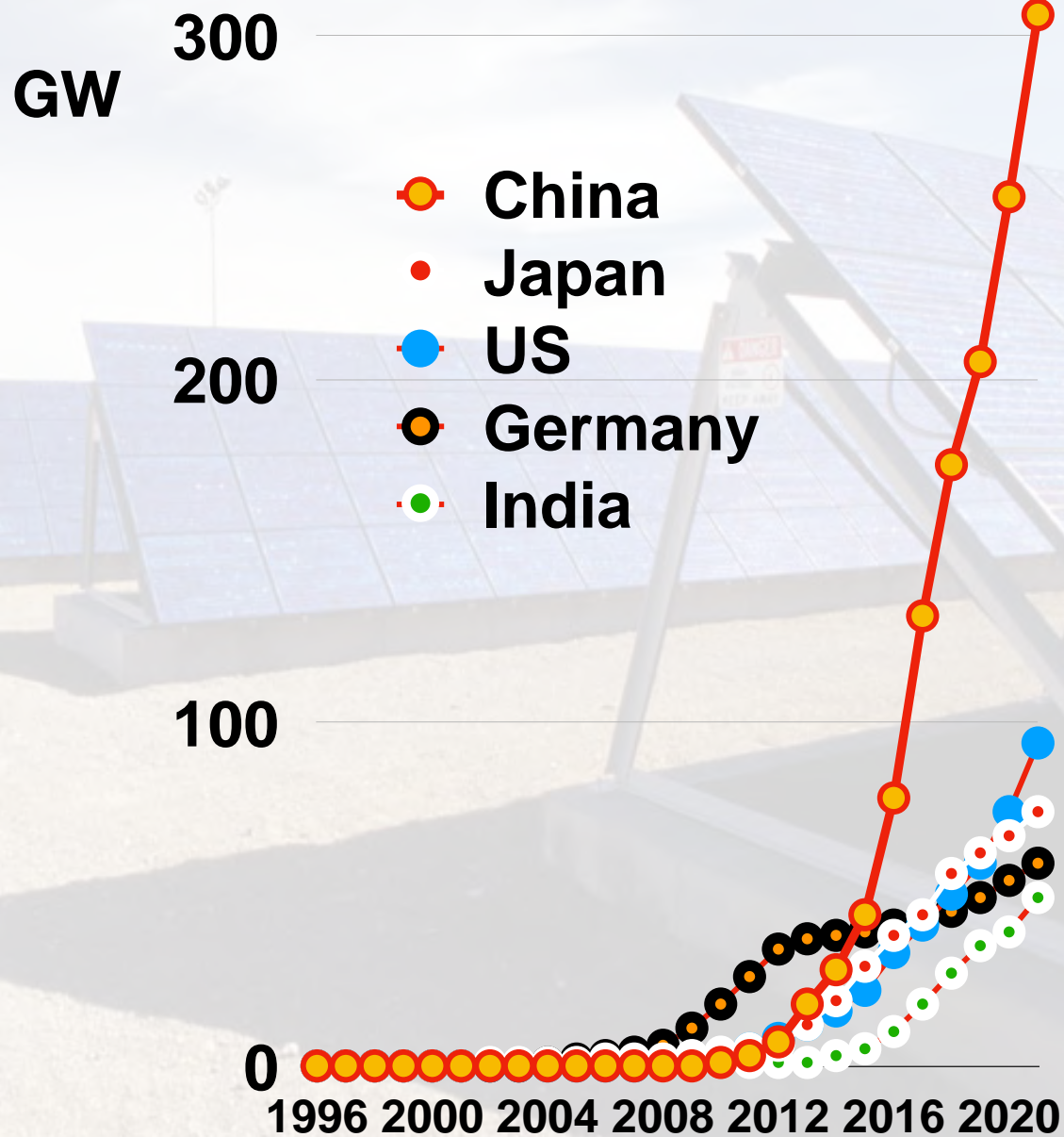
*Professor Chalmers University of Technology, Göteborg*

# Global solar PV capacity 1996-2021



Data: BP statistical review, IRENA

# Solar PV- capacity leading countries. 1996-2021



Data: BP statistical review of world energy, IRENA

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# 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.

# Cheapest Solar on Record Offered as Abu Dhabi Expands Renewables

Photographer: SeongJoon Cho/Bloomberg

by Anthony Dipaola  
@A\_Dipaola17

September 19, 2016 – 8:13 PM CEST  
Updated on September 20, 2016 – 8:14 AM CEST

offer at 2.42 cents a kilowatt-hour

- ▶ Utility Adwea gets power offer at 2.42 cents a kilowatt-hour
- ▶ JinkoSolar makes lowest bid with offers still being evaluated

Two companies offered to build the cheapest solar power plant on record in Abu Dhabi, reflecting declining costs for photovoltaic cells and cheaper financing for clean-energy projects.

Government-owned Abu Dhabi Water & Electricity Authority received a record-low bid of 2.42 cents a kilowatt-hour for power from a planned facility in the Persian Gulf sheikhdom, state-run Emirates News Agency said. The utility on Monday opened six bids to build a solar plant capable of generating at least 350 megawatts, the agency said. JinkoSolar Holding Co. of China and Japan's Marubeni Corp. made the lowest joint offer, according to an official from the Middle East Solar Energy Industry Association, who asked not to be identified citing policy.

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SOLAR PROJECTS

# Cheapest Solar Expands Renew

## Mexican Solar Sets a Record Low Price for Latin America

Mexico's latest energy auction didn't set a world record, but confirms a trend toward ultra low-cost PV worldwide.

JASON DEIGN | NOVEMBER 29, 2017

by Anthony Dipaola  
@A\_Dipaola17

September 10, 2016 -- 8:13 PM CEST  
Updated on September 20, 2016 --

- ▶ Utility Adwea gets
- ▶ JinkoSolar makes



Neeen just placed the lowest solar bid Mexico has seen to date.

Share icons for Facebook, Twitter, LinkedIn, and Email.

Two companies o Prices for solar in Mexico's latest auction may not have set a new world record, but have raised eyebrows among analysts nevertheless.

Average solar prices were in the \$20 per megawatt-hour range, said GTM Research Americas solar analyst Manan Parikh. "I was surprised the average cost of solar broke the thirties because I thought the prices would stabilize more, given that the commissioning date is still only two and a half years out," he said.

Global solar developer Neeen secured the lowest solar bid, at \$19.18 per megawatt-hour -- which represents the lowest solar price seen in Latin America to date.

GTm originally reported that Mitsui-Trina secured the lowest solar bid in Latin America to date. However, a review of the calculation

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# Cheapest Solar Expands Renew

SOLAR PROJECTS

Mexico's trend toward

JASON DEIGN

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Average solar prices were in the \$20 cents a kilowatt-hour, solar analyst Manan Parikh. "I was surprised to think the prices would stabilize more than half years out," he said.

Government-run Emirater capable of competing with Japan's and Middle Eastern solar developer Neeen secured the lowest solar price seen in Latin America.

GTM originally reported that Mitsui-Trina secured the lowest bid. However, a review of the calculations shows that Neeen's bid was the lowest.

# Winners, projects, prices of Portugal's record PV auction

The Portuguese government has published the final results and a list of all projects selected in the procurement exercise. French IPP Akvo is the developer behind the record bid of €0.0147/kWh, which was for one of three projects it won in the auction. The second- and third-lowest winning bids were €0.01637/kWh and €0.0171/kWh, while the highest was €0.03116/kWh. Overall, the authorities allocated 1.15 GW of solar in the oversubscribed auction, down from initial plans for around 1.4 GW.

AUGUST 9, 2019 EMILIANO BELLINI

MARKETS UTILITY-SCALE PV PORTUGAL



# Cheapest Solar c Expands Renew

by Anthony Dipaola  
@A\_Dipaola17

September 19, 2018 - 8:13 PM CEST  
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## SOLAR PROJECTS

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Neoen just placed the lowest solar price.

# Winners, projects, price Portugal's record PV a

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AUGUST 9, 2019 EMILIANO BELLINI

MARKETS UTILITY-SCALE PV PORTUGAL



# Saudi Arabia's second PV tender draws world record low bid of \$.0104/kW

The record low price was offered for the 600 MW Al-Faisaliah PV IPP project which competed in the second round of the country's procurement scheme for renewable energies.

APRIL 8, 2021 EMILIANO BELLINI

MARKETS MARKETS & POLICY UTILITY SCALE PV SAUDI ARABIA

"The output capacity of these projects, in addition to the projects of Sakaka and Dumat Al-Jandal, will amount to more than 3,600 MW," he said in a statement, adding that one of the projects - the 600 MW Al-Faisaliah PV IPP project - will sell power at a world record low price of \$0.0104/kWh. The project was selected by the Ministry of Energy in Round 2 of the procurement scheme that is being held under the umbrella of the country's National Renewable Energy Program (NREP).





# Global Wind power capacity 1980-2021

GW

800

700

600

500

400

300

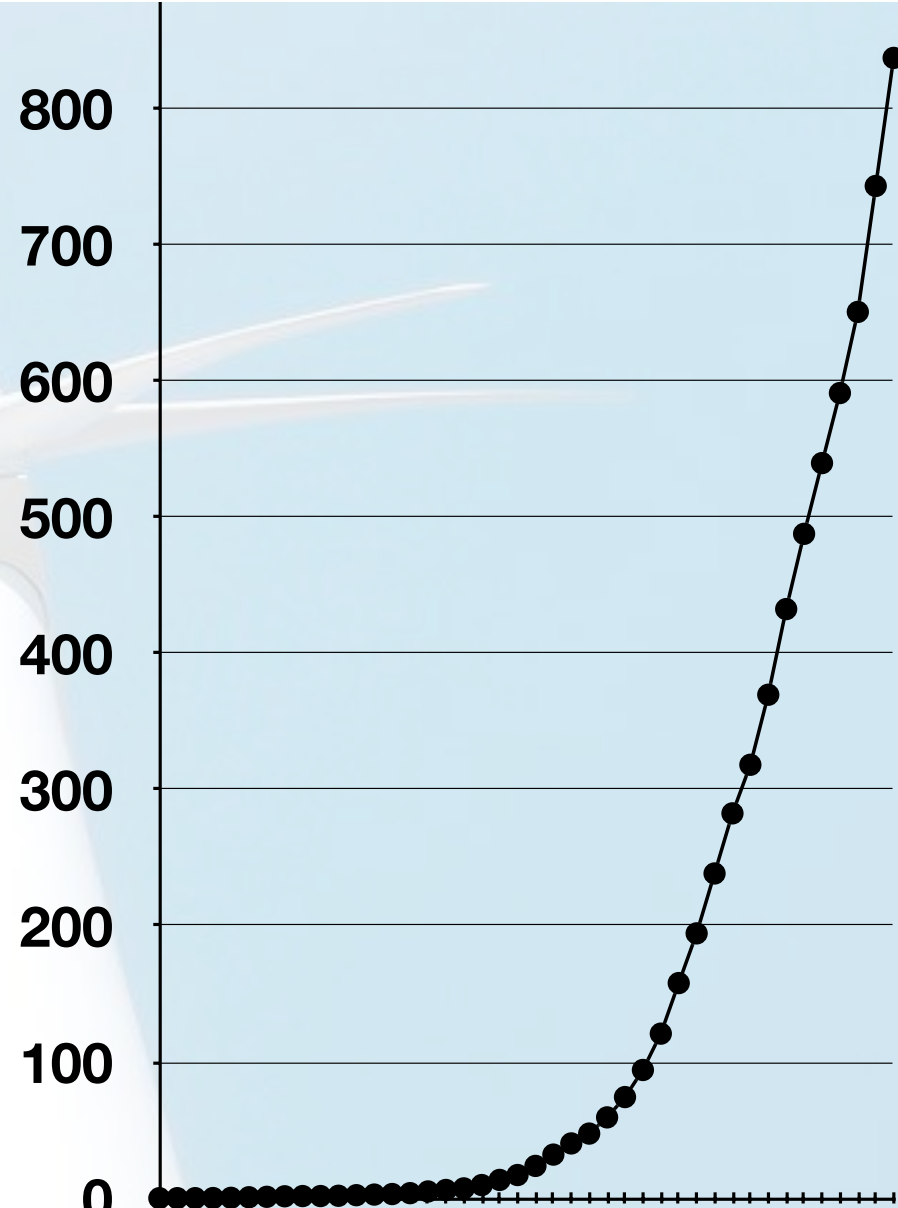
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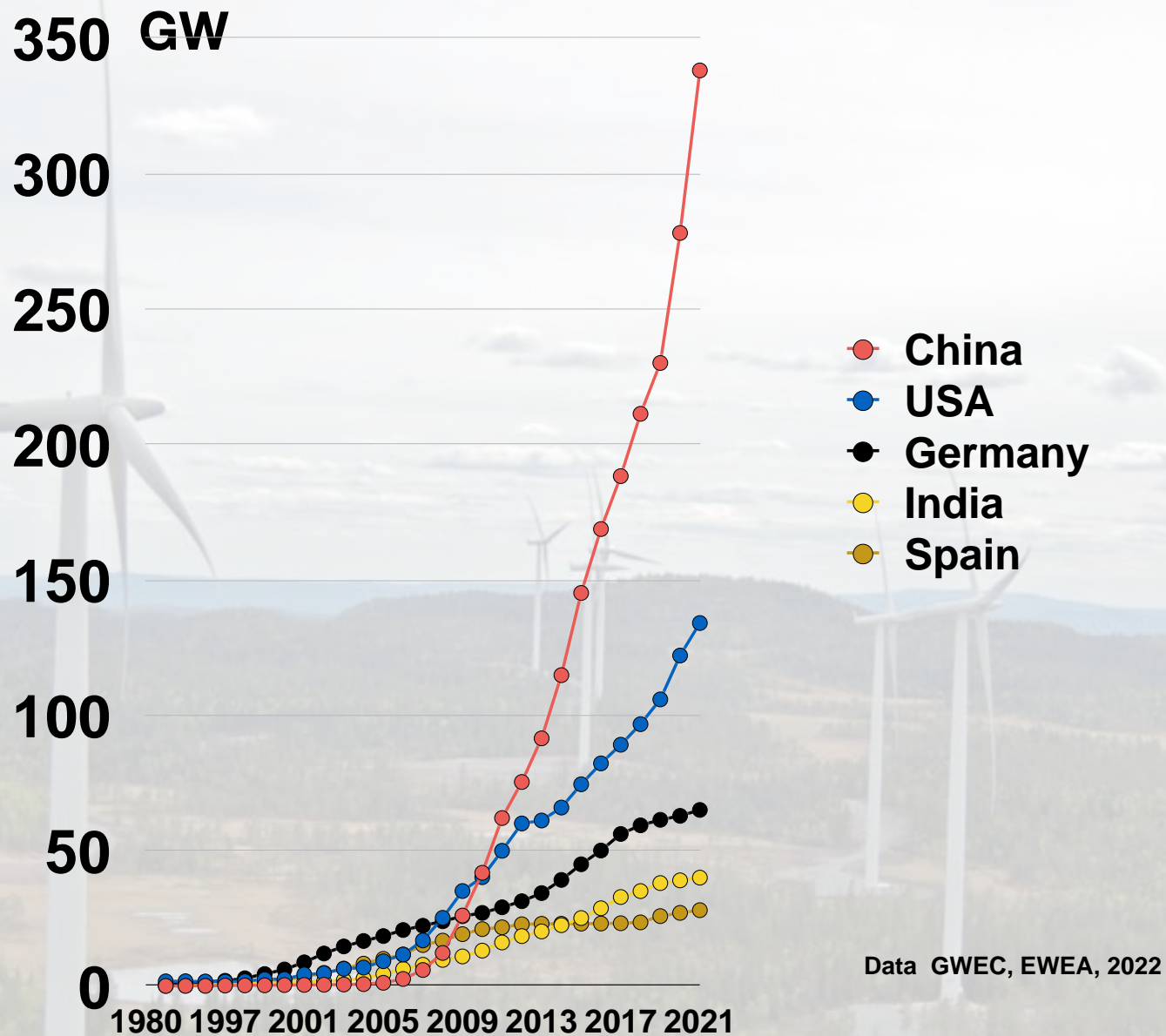
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1980 1985 1990 1995 2000 2005 2010 2015 2020

Data: GWEC, 2022



# Wind power capacity leading countries 1980-2021



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

14

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.

Print

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

By Giles Parkinson on 17 January 2016

The north African country of Morocco has secured average bids of just \$US30/MWh from scale wind energy projects, with the lowest at

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## 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



# Offshore wind costs hit record low

1k Shares



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.

# Offshore wind record low

# New record for cheapest offshore wind farm



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

Two 350MW arrays in the power at €87/MWh, beat by miles

By Megan Darby

Dong Energy has set a wind power in a winning bid on the coast of the Netherlands

The Danish company offered €72.70/MWh (US\$80.40) for the power. The cables will be laid in 2017.

That beats an industry target of €100/MWh by 2020. The current average cost was €103/MWh last year.

"It was a result that exceeded expectations," said a spokesman for European Wind Energy Association.



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

Two 350MW arrays in the power at €87/MWh, beat by miles

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That beats an industry target of €100/MWh by 2020. The previous record came was €103/MWh in 2015.

"It was a result that exceeded expectations," said a spokesman for European Wind Energy Association.

# New record for cheapest offshore wind farm



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

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



The costs of offshore wind power have fallen to a new low, w... contracts to build over €60 (£51) per MWh

By Emily Gosden  
14 SEPTEMBER 2016

The cost of building a new low, w... contracts to build over €60 (£51) per MWh

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.

# 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.



# First Subsidy Wind Deal In Wind Auction EnBW Win

April 14th, 2017 by Joshua S H

Germany's first competitive average bid price that was also included what is likely

NETHERLANDS



## Vattenfall awarded Dutch zero-subsidy site

19 March 2018 by David Weston, [Be 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.

# First Subsidy Wind Deal In Wind Auction EnBW Win

April 14th, 2017 by Joshua S H

Germany's first competitive average bid price that was also included what is likely

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## Vattenfall awarded subsidy site

19 March 2018 by David Weston, Be the first

NETHERLANDS: Developer Vattenfall awarded the Dutch Hollandse Kust Zuid offshore wind farm without subsidy.



Vattenfall, through its Dutch subsidiary

The site, located 22.2km off the Dutch coast, was awarded to Vattenfall, the developer said. It comprises two 350MW projects scheduled for completion in 2022.



## RWE Signs Thor Concession Agreement with Danish State

January 26, 2022, by Adrijana Buljan

After winning the tender for the construction and operation of the 1 GW Thor offshore wind farm last month, RWE has now signed a concession agreement with the Danish Energy Agency (DEA) and the Danish Government.

The concession grants RWE the right to build and operate the offshore wind farm for 30 years, during which time the project will also generate income for Denmark, instead of requiring subsidies itself - making this **the first offshore wind farm in the world to be built with payments to the state**, according to the DEA.

Namely, with the expected electricity prices from 2026 onwards, when Thor is scheduled to produce first power, RWE is anticipated to have paid the state DKK 2.8 billion (around EUR 376 million) within only a few years. After that, in practice, there will be no financial balance between the state and the bid winner, and the wind farm will be run on purely commercial terms, without support, for the rest of its 30-year lifespan.

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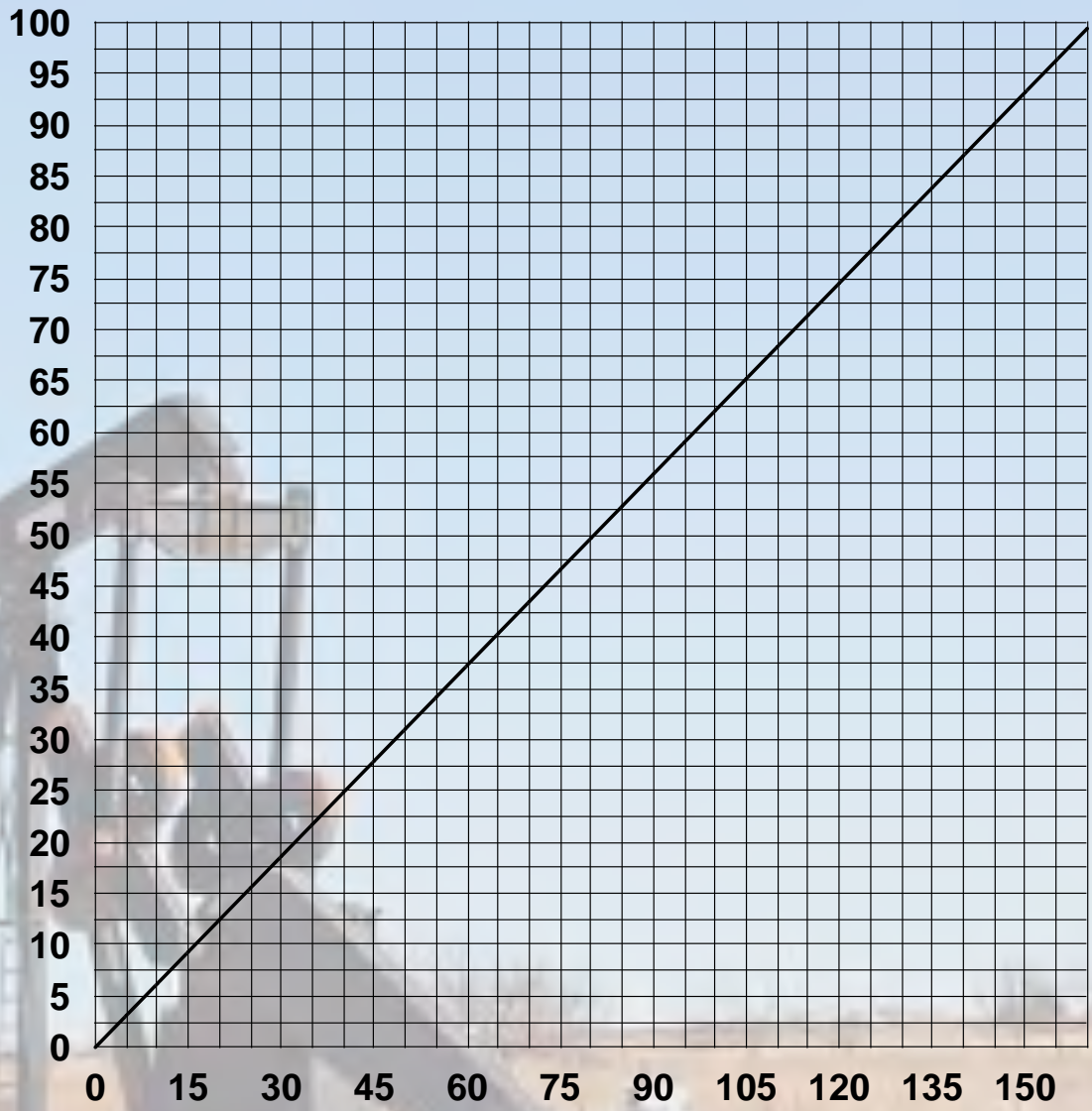


RWE, Energinet Sign Grid Connection Agreement for Thor 2 months ago

1 GW Thor to Be Operated and Partially Built from Port of Thorsminde about 1 month ago

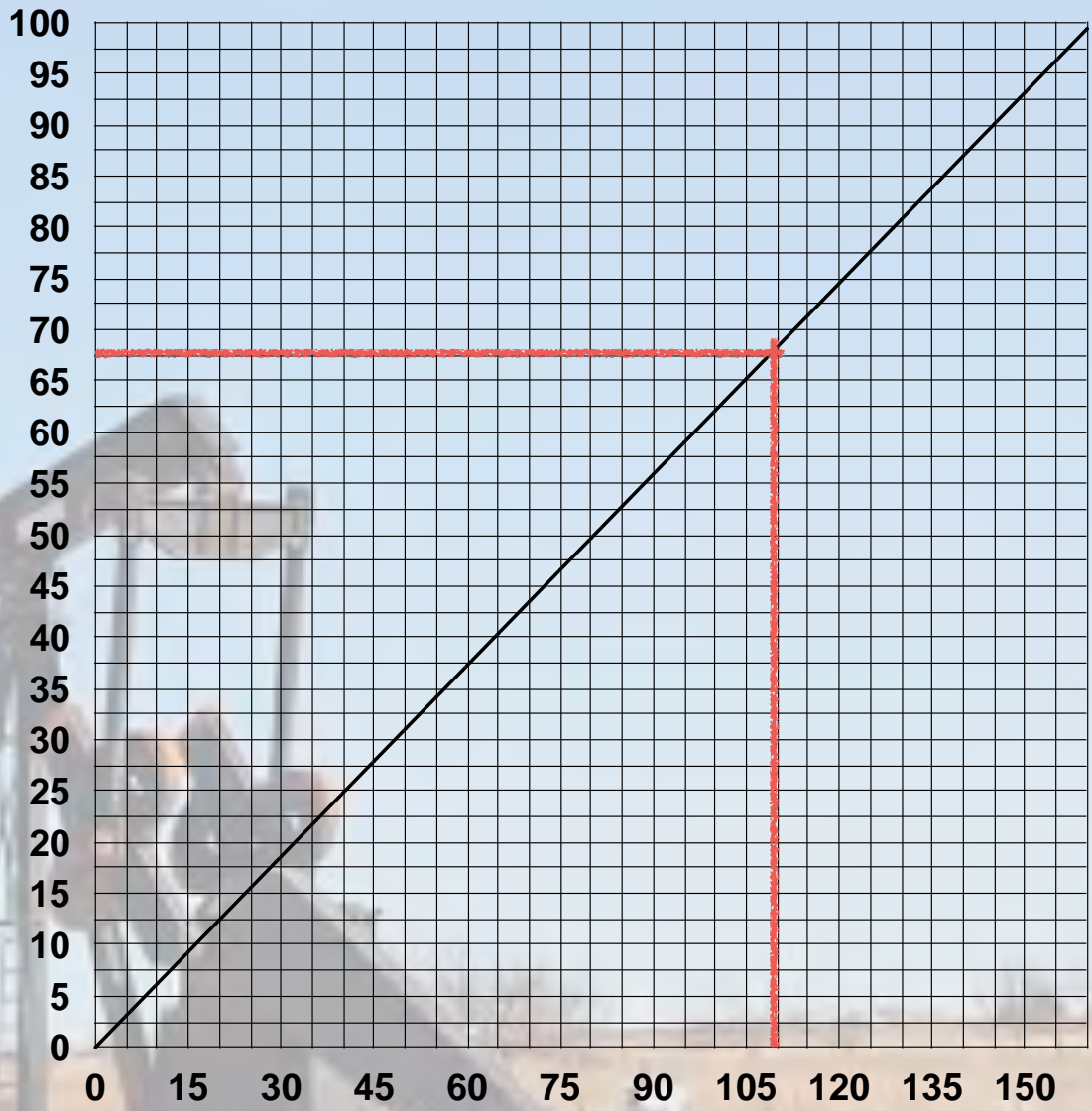
Denmark's Largest

**USD/MWh**



**Crude Oil, \$/bbl**

**USD/MWh**




**Crude Oil, \$/bbl**

**Norway: Plug-In Car Sales Nears 85% Share In June 2021**



Jul 05, 2021 at 12:56pm ET

# How Did Shenzhen, China Build World's Largest Electric Bus Fleet?

by  [Lu Lu, Lulu Xue](#) and Weimin Zhou - April 04, 2018

 Comments [Add Comment](#)  Print      More

Diesel buses—and the choking smog they spew—are a common sight in most cities. But not in Shenzhen, China.

The southeastern city, which connects Hong Kong to mainland China, **announced** at the end of last year that all of its **16,359** buses had gone electric. The city's buses are the world's first 100 percent electrified bus fleet, and its largest—bigger than New York's, Los Angeles's, New Jersey's, Chicago's and Toronto's electric bus fleets **combined**.



Electric buses have replaced diesel ones in Shenzhen, China. Photo by Lu Lu/WRI China

# World's Largest

Electromobility

## Setting a Course for Carbon-Free Shipping

<http://www.siemens.com/innovation/en/home/>



### How Did Shanghai Electric Buses

by  Lu Lu, Lulu

 Comments

Diesel buses—a they spew—are most cities. But China.

The southeast connects Hong China, announced year that all gone electric world's first bus fleet, a New York's Jersey's, Chicago



In conjunction with Fjellstrand, a Norwegian shipyard, Siemens has developed the technology for the world's first electrically-powered car ferry. The fact that the electric ship, which will enter service in 2015, causes no carbon dioxide emissions is in part due to the electricity mix in Norway.

As silently as a crocodile, the white giant approaches the shore. It opens its "mouth," which is several meters across. Suddenly the silence is broken by the roar of engines as a stream of trucks and people emerge from the opening. Odd Moen, an engineer who is responsible for ship solution sales at Siemens Norway, smiles. If everything goes as planned, this vision of an electrically-powered ferry sailing across Norway's fjords will become a reality at the beginning of 2015. Making hardly a sound and producing absolutely no emissions, it will be the first and only ferry of its kind in the world.

#### A Century of Battery-Powered Service

For more than 100 years, there have been battery-powered submarines that run solely on electricity.\*

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 1 October 2014

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# How Did Shanghai's Electric Buses...

by  Lu Lu, Lulu

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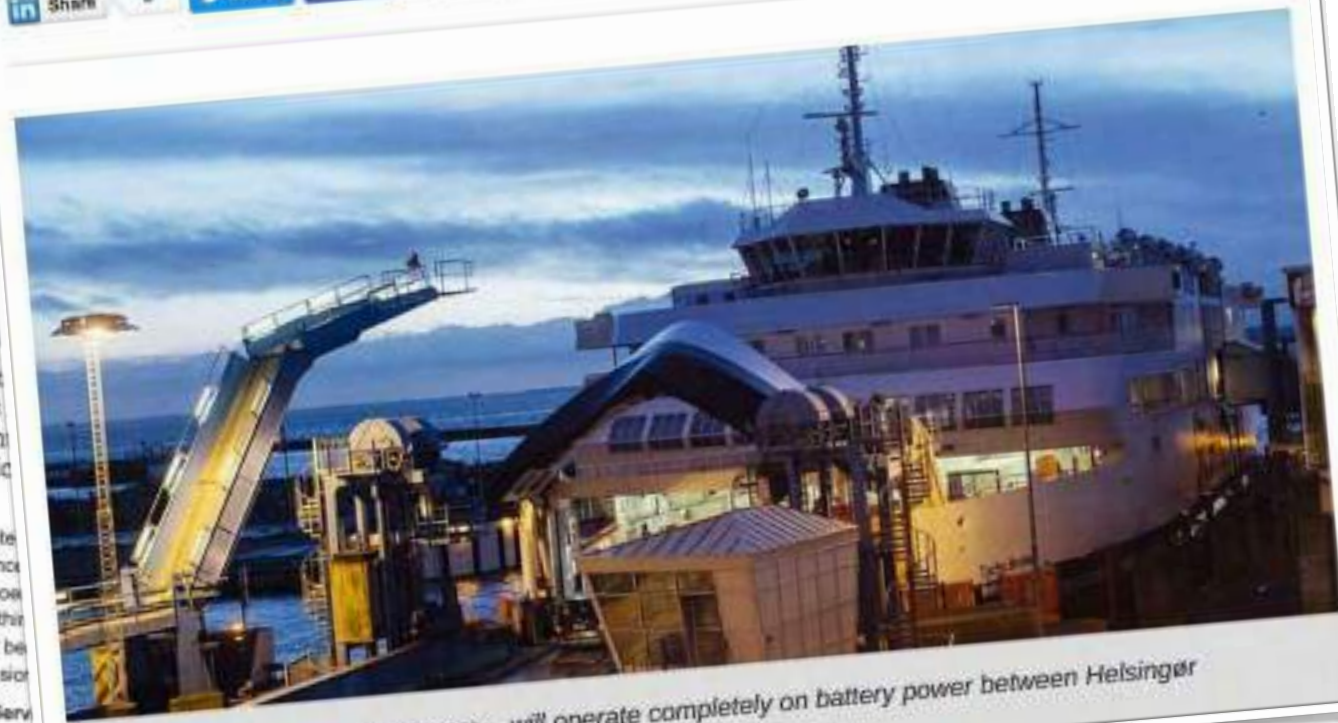
Jul 05, 2021

Electromobility  
Setting a Cou

# ABB powers world's largest emission-free electric ferries

Tue 21 Jun 2016 by Paul Fanning

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Tycho Brahe – along with Aurora – will operate completely on battery power between Helsingør (Denmark) and Helsingborg

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In conjunction with Fjellst technology for the world's electric ship, which will be in part due to the electric  
As silently as a crocodile, the white meters across. Suddenly the silence emerges from the opening. Odd Moe Siemens Norway, smiles. If everything sailing across Norway's fjords will be and producing absolutely no emissions  
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How Did Shanghai's Electric Buses

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A Century of Battery-Powered Service

For more than 100 years, there have been

World's Largest

the largest emission-



## AIRBUS PUTS ELECTRIC E-FAN TRAINER INTO PRODUCTION IN PAU

by Dave Calderwood May 1, 2015

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.

Norwa

# How Did Sh Electric Bu

by  Lu Lu, Lulu

Comments

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Sustainable Business

# United Airlines to buy 100, 19- seat electric planes from Heart Aerospace

2 minute read

Allison Lampert



# AIRBUS PUTS EL

by Dave Calderwood

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into-service for the E-



# South Australia's Tesla big battery saves \$40 million in grid stabilization costs

A new report analyzing the world's largest lithium-ion battery's performance in the first year of operation shows the Hornsdale Power Reserve has delivered on high expectations of its performance and market impact. It has helped stabilize the grid, avoid outages and reduce system costs, as well as triggered a surge in uptake of similar fast response systems across Australia.

DECEMBER 5, 2018 **MARIJA MAISCH**

ENERGY STORAGE HIGHLIGHTS UTILITY SCALE STORAGE AUSTRALIA



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DECEMBER 5, 2018 **MARIJA MAISCH**  
ENERGY STORAGE HIGHLIGHTS UTILITY SCALE STORAGE AUSTRALIA



BRIEF

# Storage will replace 3 California gas plants as PG&E nabs approval for world's largest batteries

By Gavin Bade  
Published Nov. 9, 2018

## Dive Brief:

- The California Public Utilities Commission on Thursday approved four energy storage projects for Pacific Gas & Electric (PG&E) to replace retiring gas generators, including two batteries that would be the largest in the world.

BiDirectional charging enables car-owners to become their own utility



ONE DAY, CHARGING WILL BE FOR FREE

VOLKSWAGEN  
AKTIENGESELLSCHAFT

BiDirectional charging enables car-owners to become their own utility



ONE DAY, CHARGING WIL

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## Duke may offer some EV customers 'all you can charge' for just \$19.99/month (restrictions apply)

Duke Energy wants to offer North Carolina residential customers a flat-fee EV charging subscription, in exchange for some control over when the charger is used.

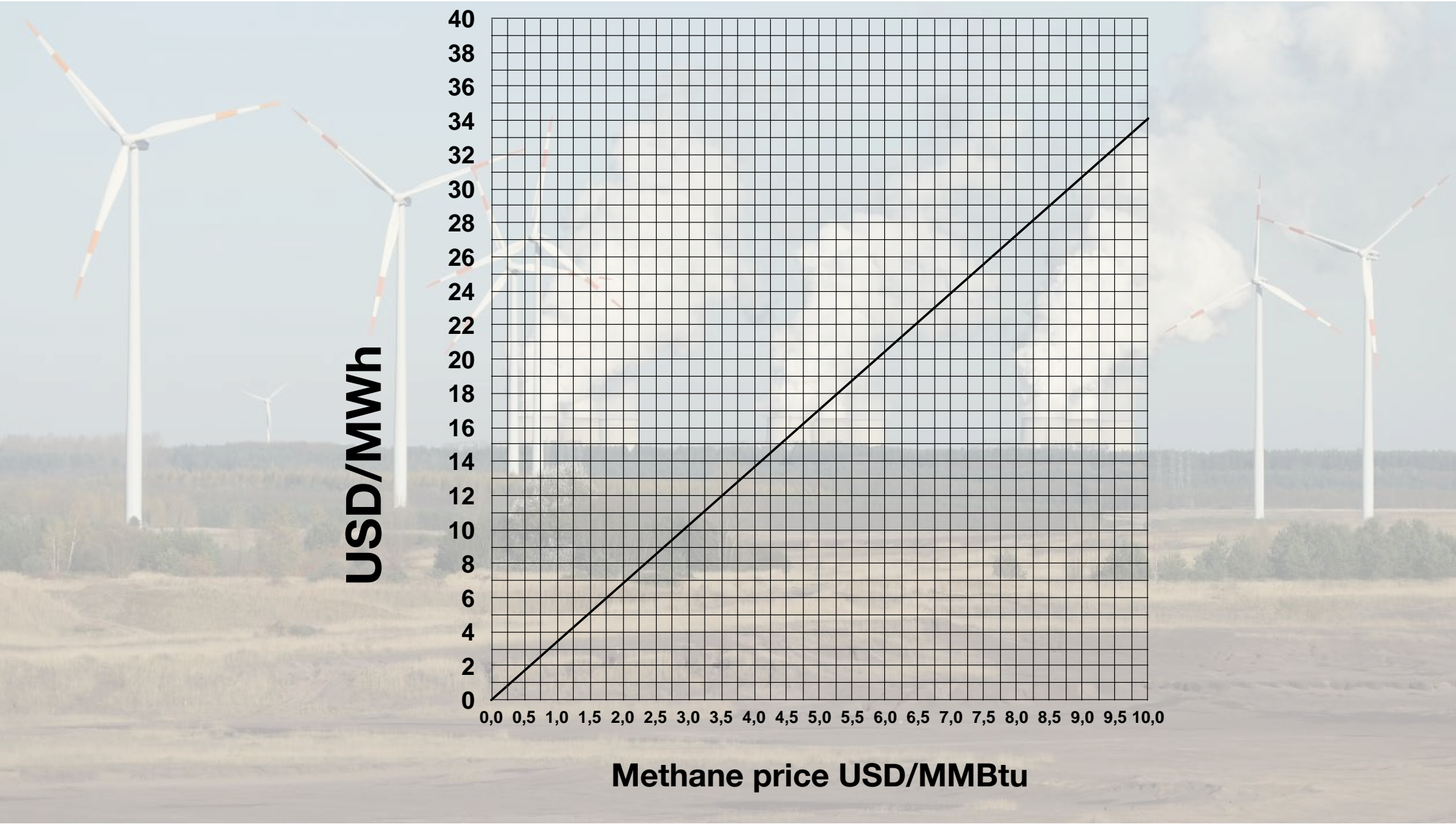
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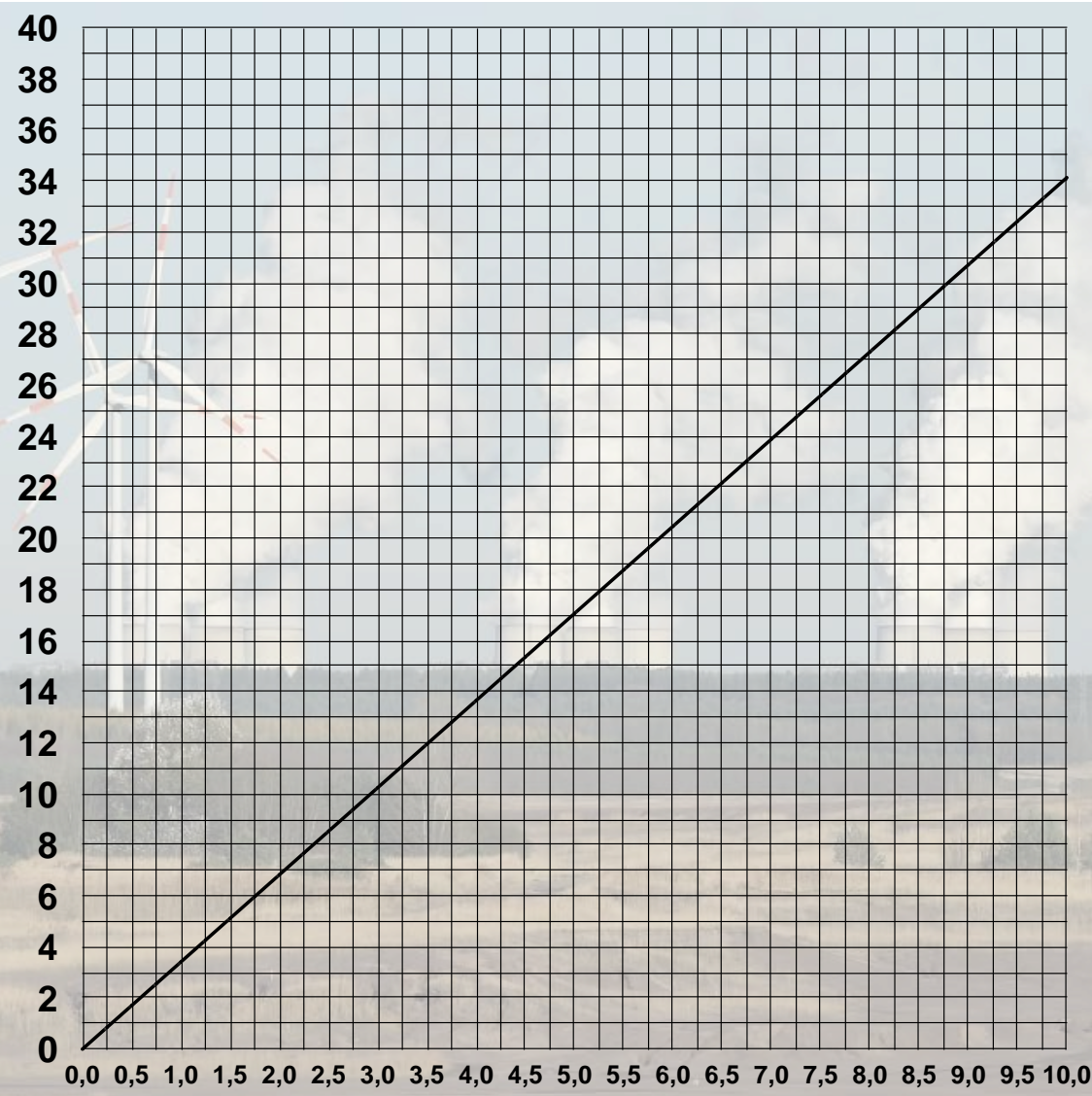
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Reporter

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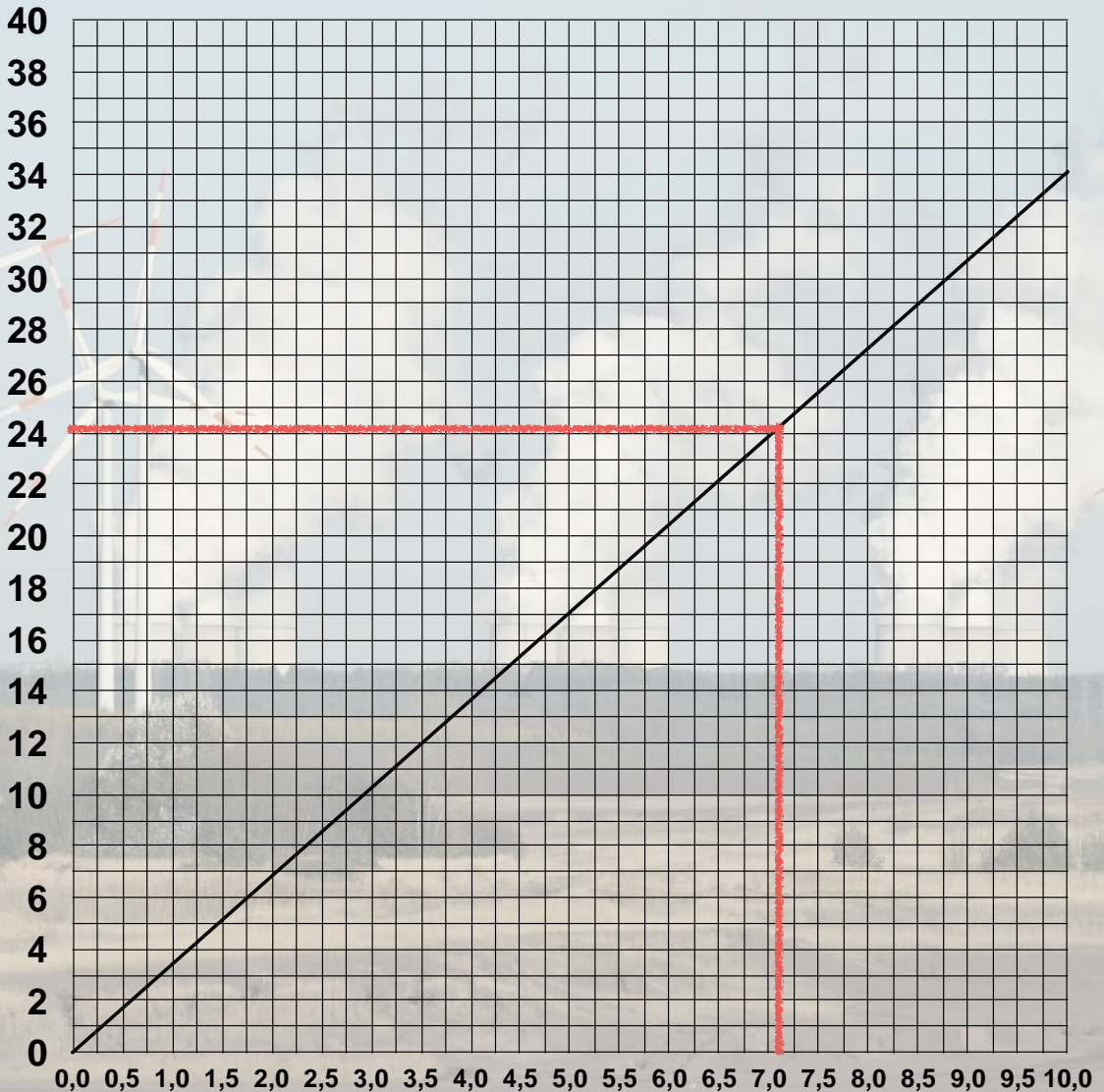


**USD/MWh**



**Methane price USD/MMBtu**

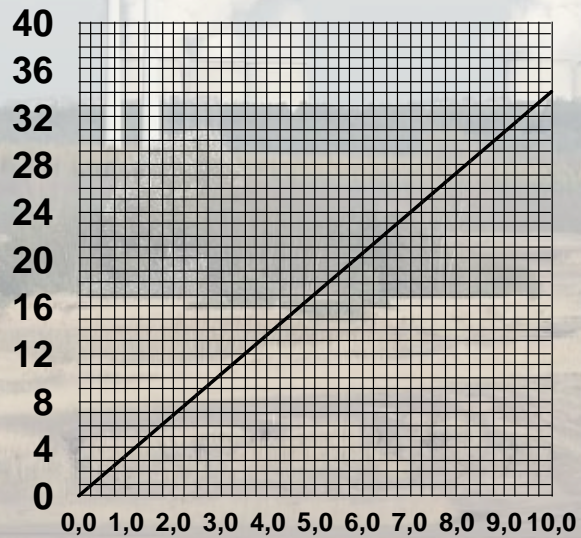
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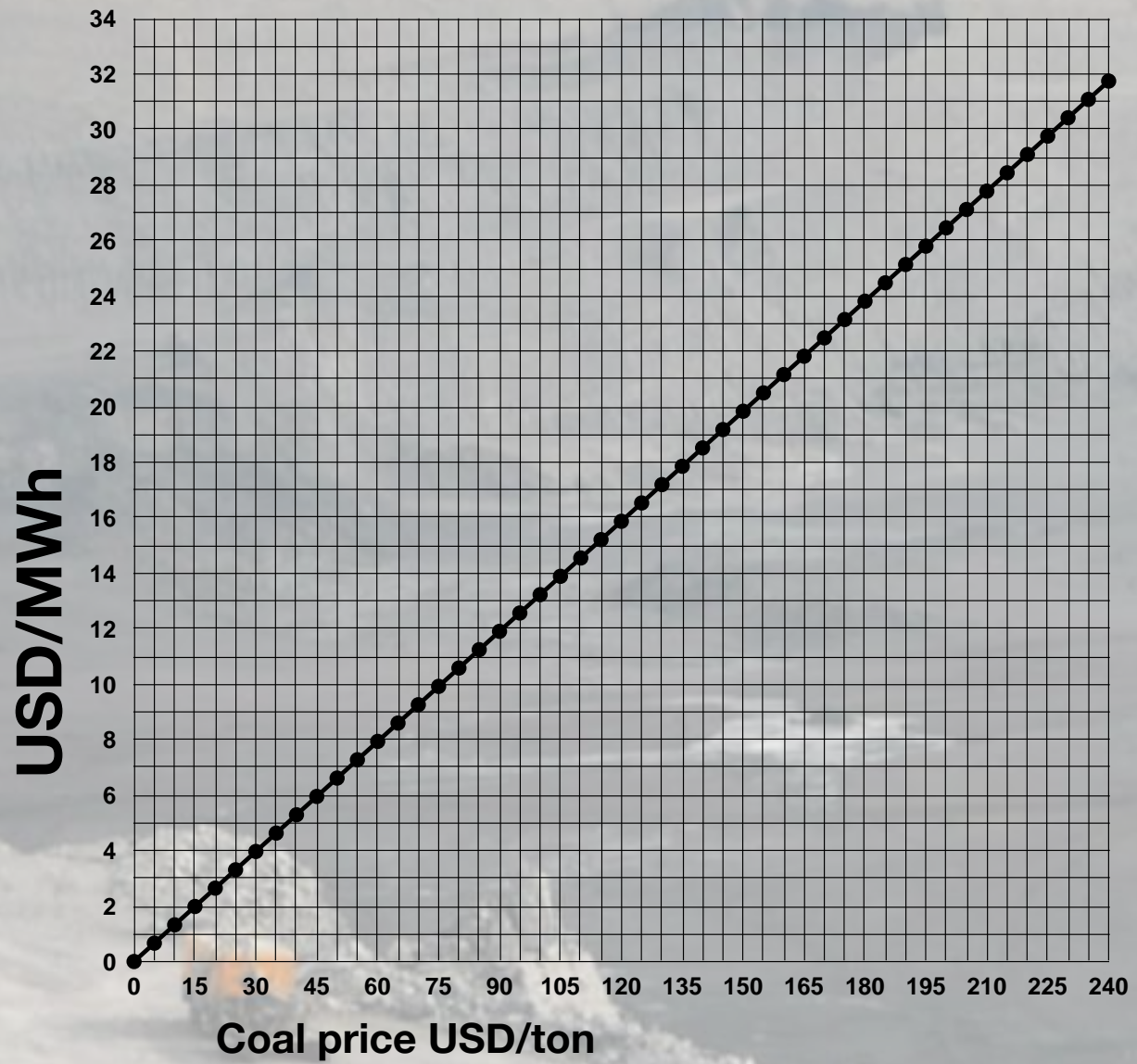
**Methane price USD/MMBtu**

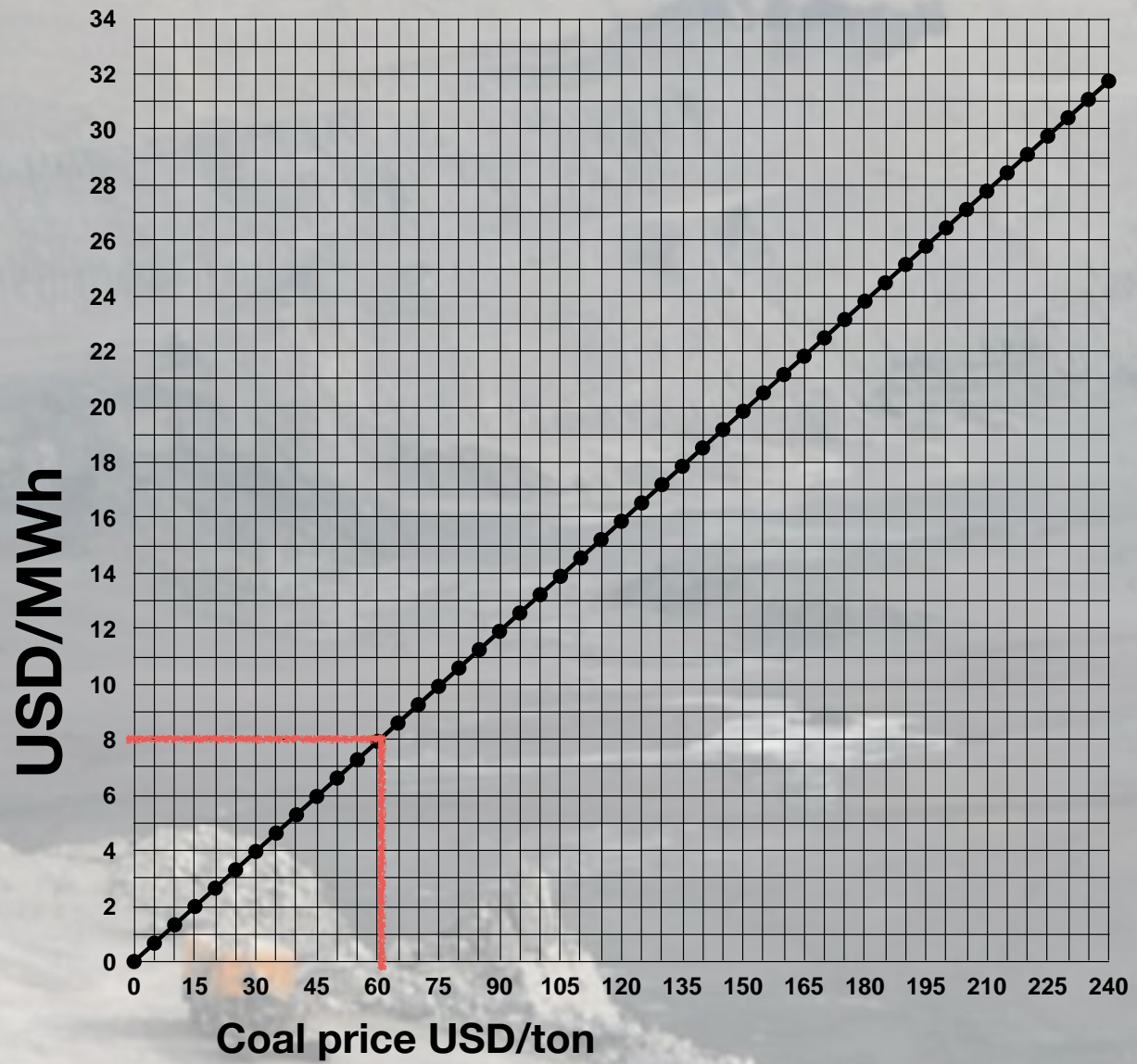


**USD/MWh**



**Methane price USD/MMBtu**









A joint venture between SSAB, LKAB and Vattenfall

2021-06-21

## **HYBRIT: SSAB, LKAB and Vattenfall first in the world with hydrogen-reduced sponge iron**

SSAB, LKAB and Vattenfall have now produced the world's first hydrogen-reduced sponge iron at a pilot scale. The technological breakthrough in the HYBRIT initiative captures around 90% of emissions in conjunction with steelmaking and is a decisive step on the road to fossil-free steel.

The HYBRIT pilot plant in Luleå, Sweden has completed test production of sponge iron and demonstrates that it is possible to use fossil-free hydrogen gas to reduce iron ore instead of using coal and coke to remove the oxygen. Production has been continuous and of good quality. Around 100 tonnes have been made so far. This is the first time ever that hydrogen made with fossil-free electricity has been used in the direct reduction of iron ore at a pilot scale. The goal in principle is to eliminate carbon dioxide emissions from the steelmaking process by using only fossil-free feedstock and fossil-free energy in all parts of the value chain.



2021-06-21

## HYBRIT: SSAB, LKAB hydrogen-reduced

SSAB, LKAB and Vattenfall have a pilot scale. The technological emissions in conjunction with

The HYBRIT pilot plant in Luleå demonstrates that it is possible to remove the carbon from coal and coke to produce hydrogen. 100 tonnes of hydrogen have been made and electricity has been used in the process to eliminate carbon dioxide emissions and fossil-free energy in all parts of the value chain.

Articles

SSAB and Vattenfall

# The world's first fossil-free steel ready for delivery

AUGUST 18, 2021 15:00 CEST

6 MIN READ

SSAB has now produced the world's first fossil-free steel and delivered it to a customer. The trial delivery is an important step on the way to a completely fossil-free value chain for iron- and steelmaking and a milestone in the HYBRIT partnership between SSAB, LKAB and Vattenfall.



In July, SSAB Oxelösund rolled the first steel produced using HYBRIT technology, i.e., reduced by 100% fossil-free hydrogen instead of coal and coke, with good results. The steel is now being delivered to the first customer, the Volvo Group.

"The first fossil-free steel in the world is not only a breakthrough for SSAB, it represents proof that it's possible to make the transition and significantly reduce the global carbon footprint of the steel industry. We hope that this will inspire others to also want to speed up the green transition," says Martin Lindqvist, President and CEO of SSAB.

**HYBRIT**  
▶▶▶ FOSSIL-FREE STEEL

2021-06-21

## HYBRIT: SSAB, LKAB hydrogen-reduced

SSAB, LKAB and Vattenfall have a pilot scale. The technological emissions in conjunction with

The HYBRIT pilot plant in Luleå demonstrates that it is possible to use hydrogen instead of coal and coke to remove the carbon from iron ore. 100 tonnes have been made. The steel is now being rolled. Electricity has been used in the process to eliminate carbon dioxide emissions and fossil-free energy in all parts of the process.



In July, SSAB Oxelösund rolled the first steel produced using hydrogen instead of coal and coke, with good results. The steel is now being rolled. "The first fossil-free steel in the world is not only a breakthrough, it will also significantly reduce the global carbon footprint of the steel industry," says Martin Lindqvist, President and CEO of SSAB.

Articles  
**The world's first fossil-free steel**  
AUGUST 18, 2021 15:00 CEST

SSAB has now produced the world's first fossil-free steel. An important step on the way to a complete decarbonization of the HYBRIT partnership between SSAB, LKAB and Vattenfall.

Press release  
**VOLVO LAUNCHES WORLD'S FIRST VEHICLE USING FOSSIL-FREE STEEL**

10/13/2021  
By Press Information

Volvo Group is proud to reveal the world's first vehicle made of fossil-free steel from SSAB – made in Volvo Construction Equipment's facility in Braås, Sweden. During today's green steel collaboration event, it was announced that more vehicles will follow in 2022 in what will be a series of concept vehicles and components using fossil-free steel from SSAB.



# Fossil-free steel a giant step in Scania's decarbonisation

© 6 July 2021 · 📍 Simon Vincent · 📰 News · 💬 Comments Off



"Now we are gearing up in our journey towards completely emission-free products," said Scania's Head of Purchasing Anders Williamsson following the company's decision to invest in and enter into a partnership with the company H2 Green Steel (H2GS).



# Epiroc to use fossil-free steel for mining equipment

Staff Writer | April 27, 2022 | 8:24 am Suppliers & Equipment



Epiroc's production facility in Örebro, Sweden, where the fossil-free steel from SSAB initially will be used. Credit: Epiroc

Epiroc is starting a partnership with steelmaker SSAB to secure fossil-free steel for use in the production of Epiroc's mining equipment.

## ...ant step in ...ation

Comments Off



...completely emission-free  
...ders Williamsson following the  
...partnership with the company H2

## Schaeffler to buy green steel from Swedish start-up company H2greensteel



Schaeffler will source 100,000 tons of the steel, which is produced virtually CO<sub>2</sub>-free and with the use of hydrogen, from 2025.

2025-11-06 | Herzogenaurach

- Schaeffler signs off-take agreement with H2greensteel for supply of green steel
- From 2025, Schaeffler to source 100,000 tons of the steel, which is produced virtually CO<sub>2</sub>-free, on an annual basis
- The ordered green steel reduces Schaeffler's CO<sub>2</sub> emissions c. p. by up to 200,000 tons per year
- The agreement is a first major step to make Schaeffler's supply chain carbon-neutral by 2040

## ...se fossil-free ...ning

Suppliers & Equipment



...ebro, Sweden, where the fossil-free ... will be used. Credit: Epiroc

...hip with steelmaker SSAB to ... e in the production of

## ...iant step in ...ation

Comments Off



...completely emission-free ... ders Williamsson following the partnership with the company H2

# Fuel price increase

- **Has the same effects as a global carbon tax**
- **Makes energy efficiency and renewable energy more profitable than before**
- **But dependence on Russian uranium challenge for global nuclear**

# Russia: An "old energy" superpower

- **Worlds largest exporter of fossil gas**
- **Worlds largest net-exporter of oil**
- **With other CIS-countries, more than 1/2 of global uranium mining**
- **All nuclear construction started outside China since 2019 are by Rosatom**

## **But:**

- **Unlike middle east countries and the US: No renewable energy development.**

ESG ENVIRONMENT JULY 8, 2018 7 8:54 PM | UPDATED 3 YEARS AGO

# Russia's Putin says wind power harmful to birds and worms

1 MIN READ



By Reuters Staff



# Putin Says Zero-Carbon Energy Will 'Send Us Back to Caves'

Nov. 20, 2019



Putin criticized green energy in a speech at an economic forum.

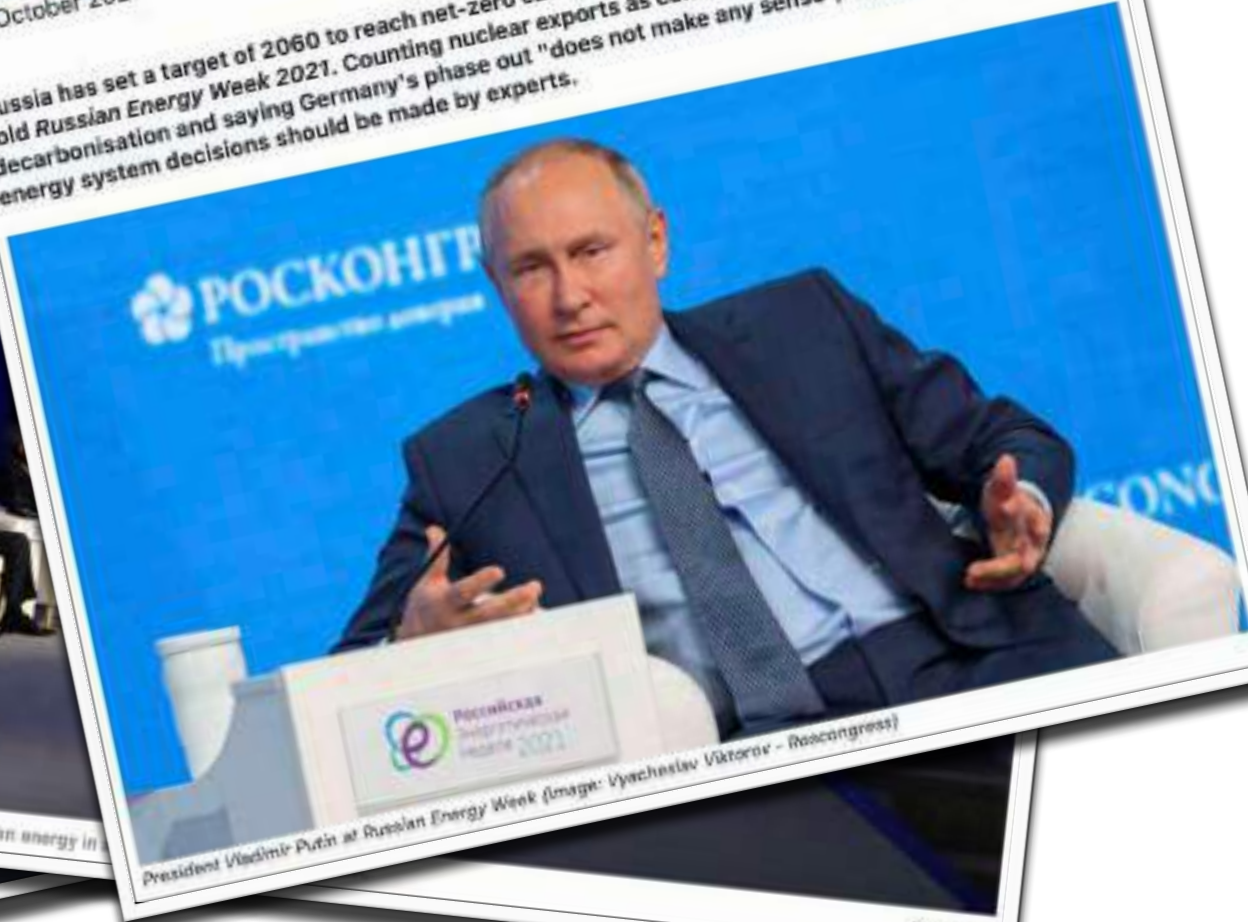
Kremlin.ru

# Putin: German nuclear phase out 'does not make any sense'

Share

19 October 2021

Russia has set a target of 2060 to reach net-zero carbon dioxide emissions, President Vladimir Putin told Russian Energy Week 2021. Counting nuclear exports as contributing towards global decarbonisation and saying Germany's phase out "does not make any sense", he said that he thinks energy system decisions should be made by experts.



President Vladimir Putin at Russian Energy Week (Image: Vyacheslav Viktorov - Roscongress)

Kremlin.ru

REUTERS

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Putin criticised green energy in

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REUTERS

# Putin

**Putin: German**  
19 October 2021

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Putin criticised green energy in

President Vladimir Putin at Russian

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## Putin blames EU green policies for energy price spike

By Georgi Gotev | EURACTIV.com

14 okt. 2021



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# Europe and the world need to draw the right lessons from today's natural gas crisis



Fatih Birol [in](#)

Executive Director at International Energy Agency (IEA)

Published on January 13, 2022

Unfortunately, we are once again seeing claims that volatility in gas and electricity markets is the result of the clean energy transition. These assertions are misleading to say the least. **This is not a renewables or a clean energy crisis; this is a natural gas market crisis.**

We see strong elements of 'artificial tightness' in European gas markets, which appears to be due to the behaviour of Russia's state-controlled gas supplier. Russia has reduced its exports to Europe by 25% in the fourth quarter of 2021 compared with the same period in 2020 – and by 22% compared with its 2019 levels.

# US strategy:

- Short term: release oil from the strategic reserves
- A year or two: Motivate concession holders to extract more oil and gas from federal lands
- Energy efficiency, renewable electricity and electrification of transport and heating
- *"I am going to use the Defense Production Act to secure supply chains for the critical materials that go into batteries for electric vehicles and the storage of renewable energy : lithium , graphite, nickel and so much more."*



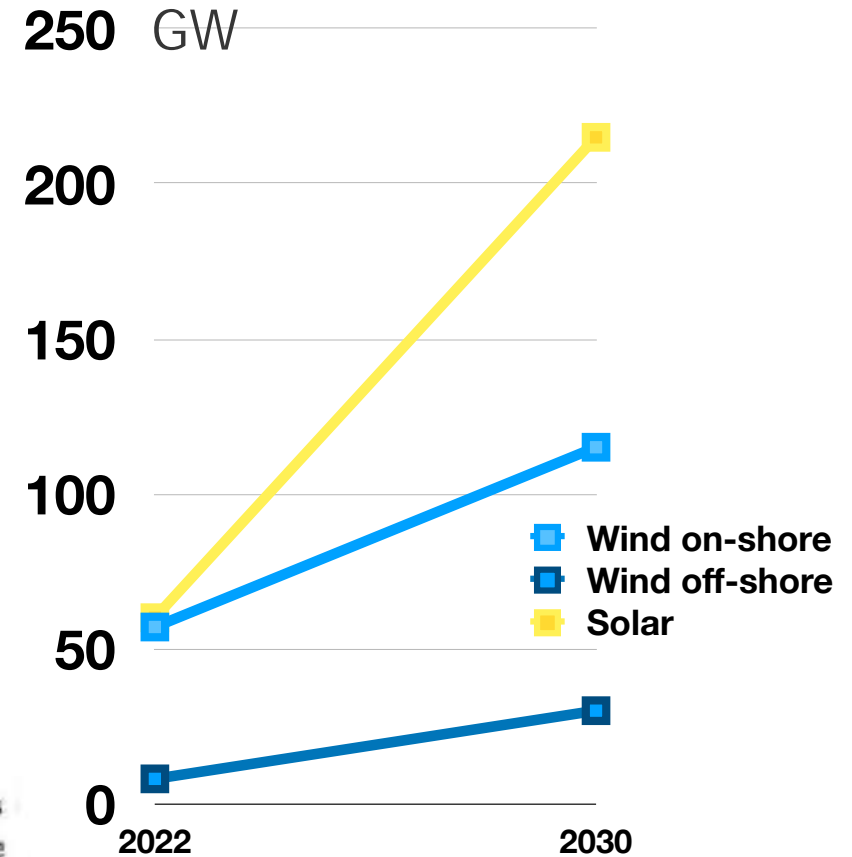
<https://www.whitehouse.gov/briefing-room/speeches-remarks/2022/03/31/remarks-by-president-biden-on-actions-to-lower-gas-prices-at-the-pump-for-american-families/>

# Federal Minister Robert Habeck says Easter package is accelerator for renewable energy as the Federal Cabinet adopts key amendment to accelerate the expansion of renewables



Minister Habeck said: "The Easter Package is an accelerator for the expansion of renewable energy. Within less than a decade, we will almost double the share of renewables in gross energy consumption. We are tripling the pace of the expansion of renewables - at sea, on land, and on rooftops. In the future, renewable energy will be vital to public interest and serve to protect public security. This is crucial to increase the pace of the expansion. Overall, the Easter Package is creating the conditions for boosting Germany's energy security and energy sovereignty. At the same time, it lays the foundations for Germany to become climate-neutral."

By 2030, at least 80 percent of the gross electricity consumed in Germany is to come from renewable sources. In 2030, the installed capacity of onshore wind farms is expected to reach 115 GW, offshore wind 30 GW, and the total capacity of photovoltaic panels 215 GW.



# Federal Minister Robert Habeck says Easter package is accelerator for renewable energy as the Federal Cabinet adopts key amendment to accelerate the expansion of renewables

By 2030, at least 80 percent of the gross electricity consumed in Germany is to come from renewable sources. In 2030, the installed capacity of onshore wind farms is expected to reach 115 GW, offshore wind 30 GW, and the total capacity of photovoltaic panels 215 GW.



- At the heart of the package is the principle that the use of renewable energy is in the overriding public interest and serves public security. The expansion of renewable energy on land and at sea will be raised to an entirely new level. By 2030, at least 80% of German gross electricity consumption is to be covered by renewables.

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the same time, it lays the foundations for Germany to become climate-neutral.

2022

2030

## REPOWER EU TO CUT OUR DEPENDENCE ON RUSSIAN GAS



**More rooftop solar panels, heat pumps and energy savings** to reduce our dependence on fossil fuels, making our homes and buildings more energy efficient.



**Decarbonising Industry** by accelerating the switch to electrification and renewable hydrogen and enhancing our low-carbon manufacturing capabilities.



**Speeding up renewables permitting** to minimise the time for roll-out of renewable projects and grid infrastructure improvements.



**Doubling the EU ambition for biomethane** to produce 35 bcm per year by 2030, in particular from agricultural waste and residues.



**Diversifying gas supplies** and working with international partners to move away from Russian gas, and investing in the necessary infrastructure.



**A Hydrogen Accelerator** to develop infrastructure, storage facilities and ports, and replace demand for Russian gas with additional 10 mt of imported renewable hydrogen from diverse sources and additional 5 mt of domestic renewable hydrogen.





## the energy mix

### **IEA assembles global energy and climate leaders to turbocharge energy efficiency action**

Governments around the world have responded to today's global energy crisis in a variety of ways, but one vital area has not been getting the attention and policy support it deserves. Energy efficiency doesn't make as many headlines as oil markets or renewable energy – but it is incredibly important for addressing the interlinked energy, economic and climate challenges the world faces today.

The situation may be changing now, though, after a historic gathering of energy and climate leaders at our [Global Conference on Energy Efficiency](#) in Sønderborg, Denmark, last week that resulted in 24 governments from around the world issuing a [joint statement](#) stressing the importance of energy efficiency for addressing several critical challenges, including the energy crisis, rising inflation and greenhouse gas emissions. It was the first event of its kind at which so many governments – including [France](#), [Germany](#), [Indonesia](#), [Japan](#), [Mexico](#), [Senegal](#) and the [United States](#) – have made a specific call for stronger action on energy efficiency.

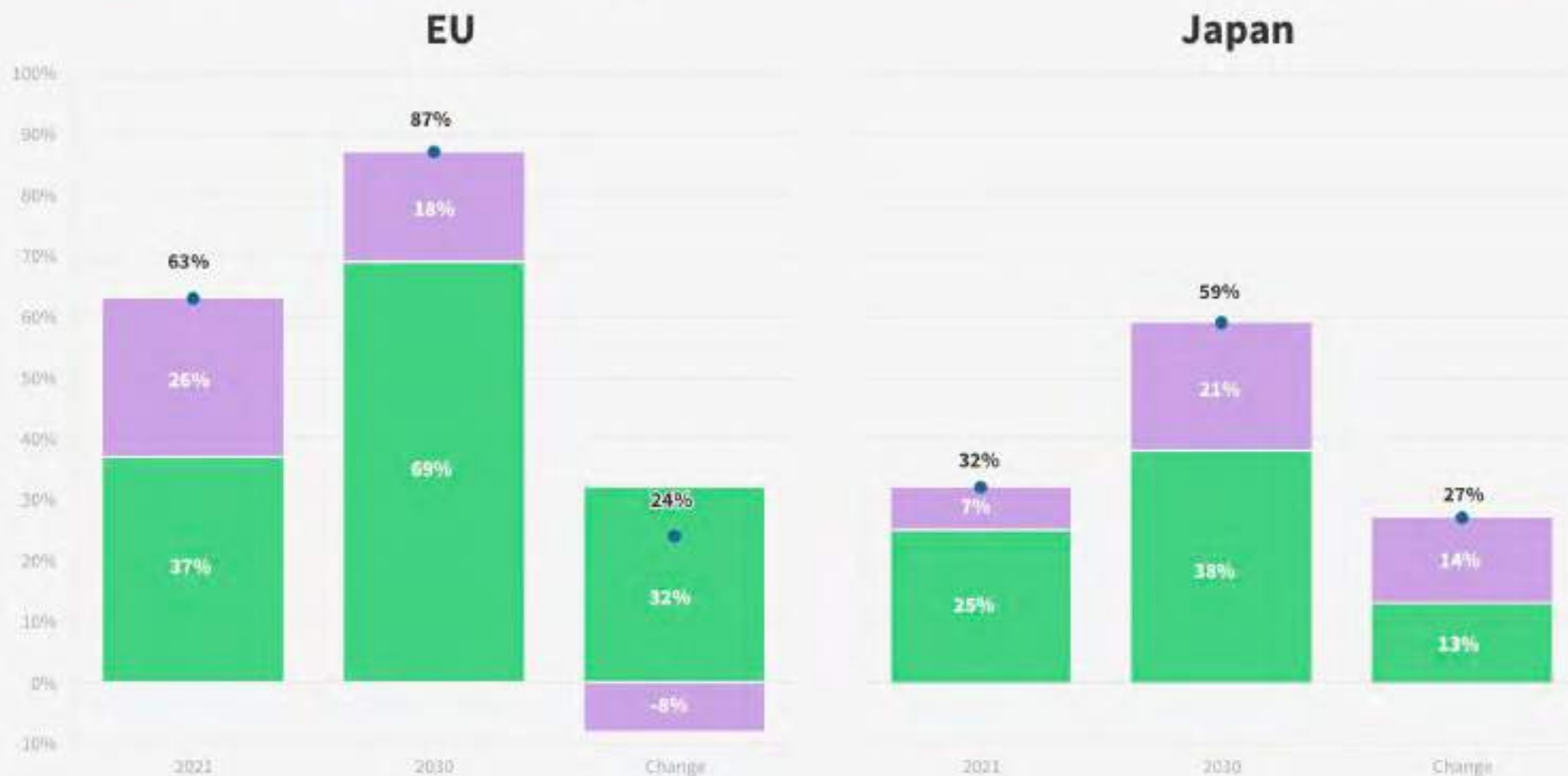
*"Energy efficiency and demand side action have a particularly important role to play now as global energy prices are high and volatile, hurting households, industries and entire economies," the joint statement said. The governments said they would seek opportunities for exchange and collaboration, welcoming the Sønderborg Action Plan that sets out key principles and best practice policies for stronger energy efficiency actions. They asked the IEA "to continue to facilitate and support these actions" and called on "all governments, industry, enterprises and stakeholders to strengthen their action on energy efficiency."*

# Common interests for EU and Japan:

- **High fuel prices calls for**
  - **Improved Energy Efficiency**
  - **Rapid deployment of renewable sources of energy**
- **Using these opportunities will avoid even higher fuel prices**

## Two journeys to clean power

Renewables and nuclear power in the EU and Japan



Sources: [Ember](#), [European Commission](#), [METI](#)

Ember internal data for 2021 actuals. For EU 2030, EU's REPowerEU plan from May 2022. For Japan 2030, METI's Strategic Energy Plan from October 2021.



## Two journeys to clean power

Renewables and nuclear power in the EU and Japan



EU

Japan

100%

“Solar and wind are currently playing cameo roles in Japan’s electricity system, but they are ready to step up to take the lead role. Record fossil fuel prices and the need to reduce imports from Russia should be a wake-up call. Japan needs more homegrown, clean energy; Japan needs more ambition on solar and wind.”



—  
Dave Jones

Global Programme Lead, Ember

10%

2021

2030

Change

2021

2030

Change

Sources: [Ember](#), [European Commission](#), [METI](#)

Ember internal data for 2021 actuals. For EU 2030, EU's REPowerEU plan from May 2022. For Japan 2030, METI's Strategic Energy Plan from October 2021.

# **The Energy Crisis and the role of Renewable Energy**

Renewable Energy Institute 2022-06-14

**Tomas Kåberger**

**Executive Board Chair of Renewable Energy Institute, Tokyo**

*Professor Chalmers University of Technology, Göteborg*