



A Reporter's Guide to the Energiewende*

Context.
Contacts.
Access.

3rd edition 2016



- #climate change
- #a new power market design
- #renewable energy / citizens' energy
- #phasing out nuclear
- #industry competitiveness
- #utilities fighting for survival
- #grid expansion

CLEAN
ENERGY
WIRE

Our team of journalists and media professionals in Berlin is available to support journalists in their work.



A note from CLEW

The energy transition is turning many parts of German society upside down. The landmark agreement at the global climate summit in Paris has further increased interest in this generational project, which provides a wealth of exciting and important stories.

Yet researching this massive undertaking in a foreign country with a tricky language is a difficult job, even for the most seasoned reporter. This is compounded by the immense complexity of the technology and economics behind energy policy.

At the same time, strong fact-based and critical journalism is essential to inform the international political debate about how to decarbonise the global economy.

Which is why Clean Energy Wire CLEW has set out to support journalists in their work. Fully funded by two non-profit foundations – Stiftung Mercator and the European Climate Foundation – we enjoy full independence from any business or political interests. We share our funders' commitment to work towards the decarbonisation of the economy in order to limit man-made climate change.

The CLEW "Reporter's Guide to the Energiewende", now in its third edition, gives journalists a

starting point for their work by highlighting the main storylines of the energy transition, providing lists of experts and links to key readings. Our website cleanenergywire.org offers plenty more in-depth information and contacts. Our daily news digest and our Twitter feed @cleanenergywire keep readers in the loop about Energiewende debates and events. We also organise workshops for journalists, providing a first-hand view of the transformation. But most importantly, we offer support with specific questions and put you in touch with experts – so don't hesitate to ask CLEW.

Sven Egenter and the Clean Energy Wire team



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Editor in Chief



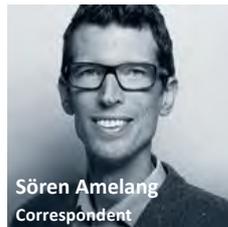
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1973-1975	1979/1980	1986	1991	1997/2005
<p>"Nuclear power? No thanks!" Birth of Germany's anti-nuclear movement as protests force plans for a nuclear power plant in Wyhl to be aborted</p>	<p>Enter the Greens Germany's Green Party is founded, with an exit from nuclear energy and a renewable future as key demands</p> <p>Activists first use the term "Energiewende"</p>	<p>Chernobyl disaster solidifies Germans' resistance to nuclear energy</p> <p>Climate change enters the discourse - a magazine story leads parliament to establish an advisory council</p>	<p>Kick-starting renewables New legislation introduces feed-in tariffs for renewable power</p>	<p>Kyoto Protocol Germany, the world's sixth largest emitter at the time, has to reduce CO₂ emissions under the agreement</p>

What is the Energiewende? And where did it come from?

The energy transformation, in Germany widely known as the “Energiewende” is the country’s planned transition to a low-carbon, nuclear-free economy. So far there have been two key elements to the process:

- The phase-out of nuclear power (by 2022)
- The development of renewable energies in the power sector

However, since the first introduction of feed-in tariffs for renewable energies in the 1990s, the project has started to radically reshape the energy system as a whole. As the traditional model of centralised power generation is being replaced by diverse sources of energy that fluctuate with the weather, not only the grid and the power market are effected. While so far mainly focused on electricity, the Energiewende is now also expected to transform other sectors like industry, housing, construction, heating and transport. *For specific energy transition targets see pages 4 - 5.*

Already, there are winners and losers: Big utilities’ traditional business models have been hit hard while consumers and some businesses are concerned about higher electricity costs. The coal industry first benefitted from the nuclear phase-out, but its future is now uncertain as the government steps up its efforts to cut CO₂ emissions. At the same time, entirely new industries have sprung up.

2000	2001	2007	2010	2011	2014	2015	2016
Renewable Energy Act The EEG stipulates fixed feed-in tariffs and grid priority for renewables	Nuclear phase-out #1 Red-Green government reaches “nuclear consensus” with utilities to phase out nuclear by 2022	EU targets EU sets 2020 climate targets: 20% renewables share, 20% GHG reduction, 20% more efficiency	Extending nuclear The nuclear consensus is reversed by a conservative government Energy concept Govt. sets out renewables and climate targets for 2020 and 2050	Nuclear phase-out #2 Merkel government formulates new nuclear-phase out by 2022 with large parliamentary majority after Fukushima disaster	New EEG & climate action Govt. lowers feed-in tariffs, starts PV auctions and introduces plan to achieve 2020 climate targets	Slow progress The Energiewende monitoring report shows climate targets are “in serious danger”	EEG reform Switch from feed-in tariffs to auctions for renewables Spin-offs Utilities E.ON and RWE are set to split to separate renewables from fossil operations

#Energiewende – Targets

The overall objective of the Energiewende is to reduce Germany's greenhouse gas emissions and phase out nuclear power, making the economy more environmentally sustainable.

On a national level, Germany aims to cut greenhouse gas emissions by 40 percent by 2020, and by up to 95 percent by 2050. The share of renewables in final energy consumption is to rise to 60 percent (from 12.6 percent in 2015) by 2050. Renewables are to cover at least 80 percent of the country's gross power consumption by the middle of the century.

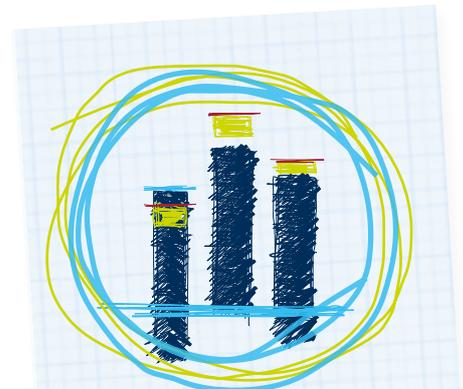
Germany's climate targets were put on paper in 2007 and 2010 and have been upheld by all governments since. They were reaffirmed in the 2014 energy transition progress report and are subject

to an annual monitoring process. The latest monitoring report was published in November 2015.

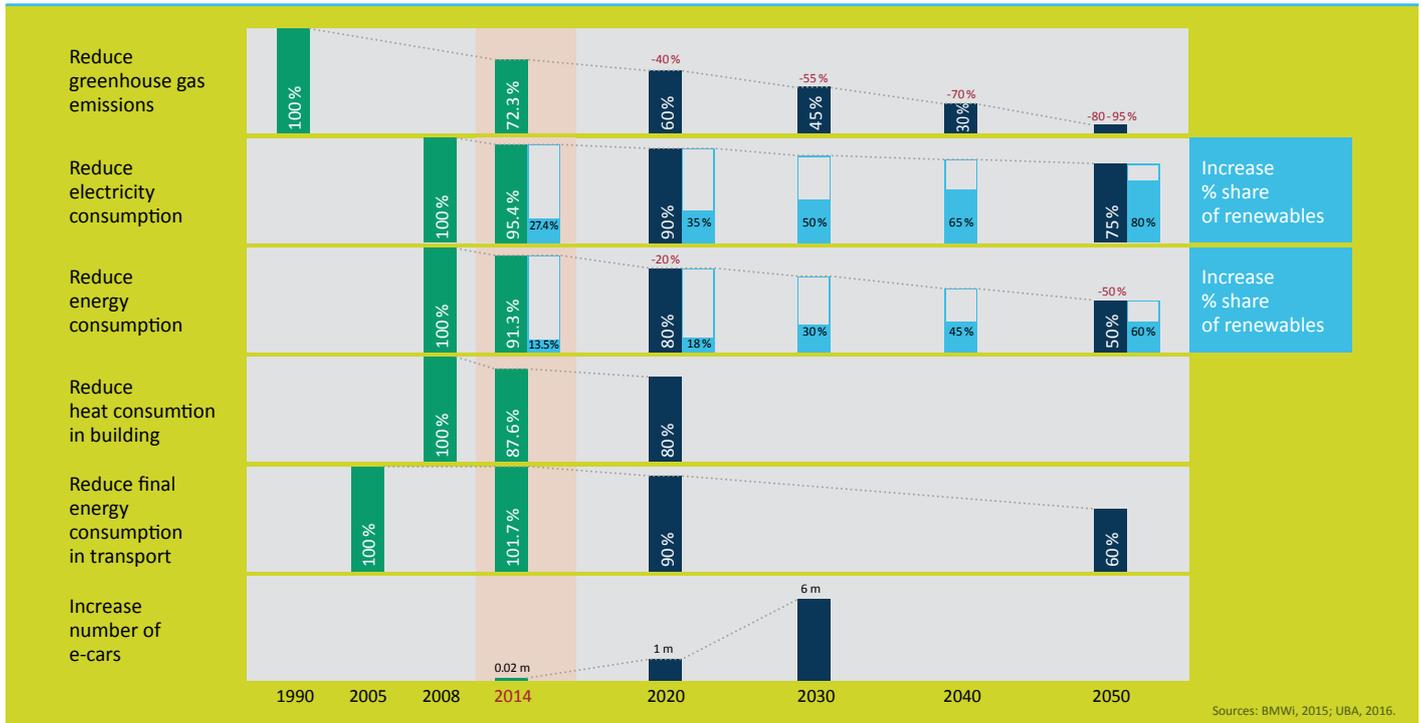
When it became clear in 2013/2014 that the CO₂ reduction goal for 2020 would likely be missed, the government opted to increase its efforts rather than adjust the targets. In 2016, the government aims to adopt a Climate Action Plan 2050 that describes the path the German economy must take to achieve the energy transition's long-term targets.

Germany's greenhouse gas reduction goal is more ambitious than that of the European Union, which aims to achieve a 20 percent cut by 2020 and a 40 percent cut by 2030, compared to 1990 levels. While some industry representatives say Germany should lower its objectives to European levels, others

argue that the Paris Climate Agreement should see the EU enhance its targets so that they are in line with a 1.5° to 2°C warming limit.



Quantitative targets of the energy transition



#Energiewende – Key Figures

45.1 m Passenger cars registered in Germany (01/2016)

25,502 Pure electric cars registered = 0.05% (01/2016)

46.6 % Renewable power capacity owned by citizens (2012)

80 % Fall in share price of the two biggest utilities E.ON and RWE over past eight years

3.6 % Renewables' share in gross German power generation in 1990

30 % Renewables' share in gross German power generation in 2015

12 minutes and 28 seconds: Average power outage in 2014 Compare (2013)

Denmark: 11 mins
France: 68 mins
UK: 54 mins
Poland: 254 mins

93 % of Germans believe use and roll-out of renewables is important (2015)

€ 22 bn Renewable surcharge paid by power consumers in 2015.

355,400 People employed in the renewables sector (2014)

20,767 People employed in the brown coal industry (07/2015)

20.6 → 28.7 ct/kWh
Average household power price 2007 and 2016 – thereof 6.35 ct/kWh renewable surcharge in 2016

38.6 % of natural gas imports to Germany came from Russia (2014)

57 % of natural gas imports to Germany came from Norway (33%) and the Netherlands (24%) (2014)

12.6 % Renewables' share in primary energy consumption in 2015 (up from 1.3% in 1990)

32.5 % Renewables' share in gross power consumption in 2015 (up from 3.2% in 1991)

6.6 → 3.2 ct/kWh
Average wholesale power price (base-load) in 2008 and 2015

902 m tonnes Greenhouse gas emissions in 2014

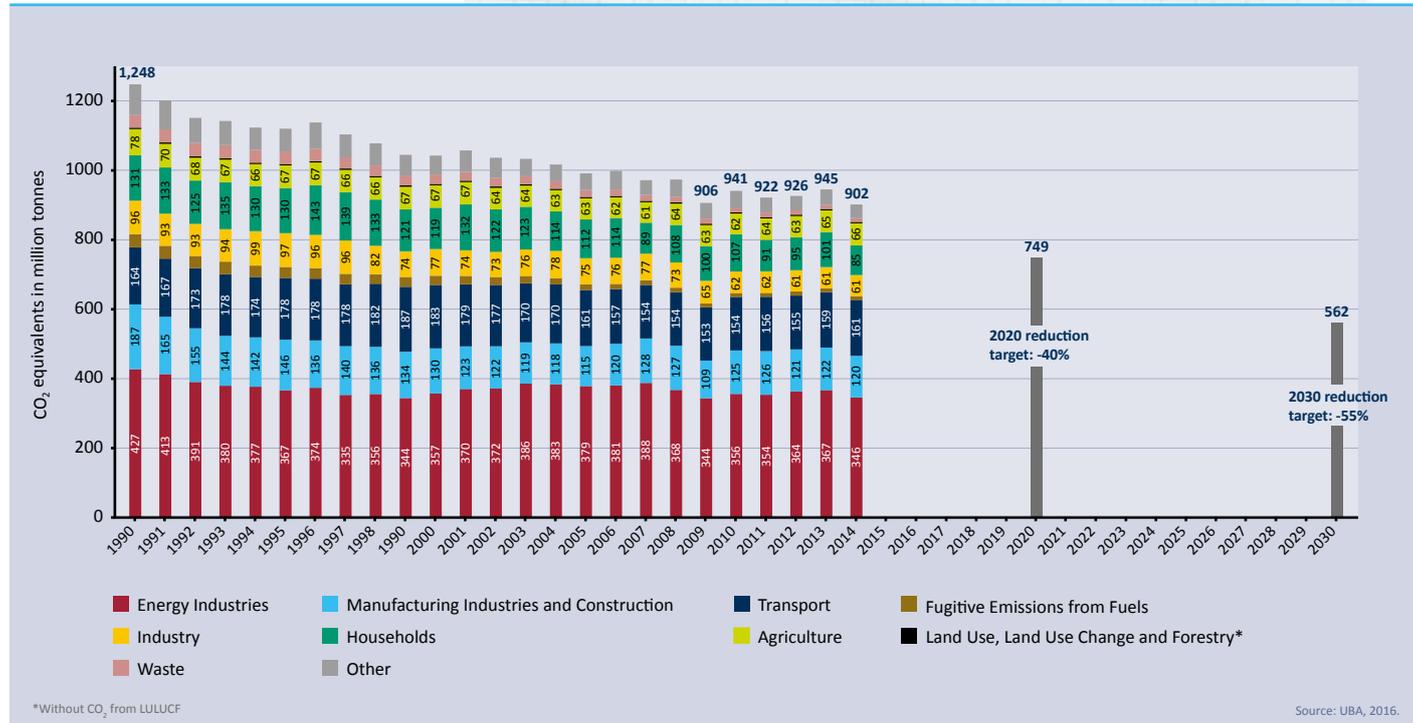
27.7 % Fall in greenhouse gas emissions 1990 - 2014

€52.3 bn Energy-related investment in existing buildings in 2014

12.4 % Drop in energy demand for heating 2008 - 2014

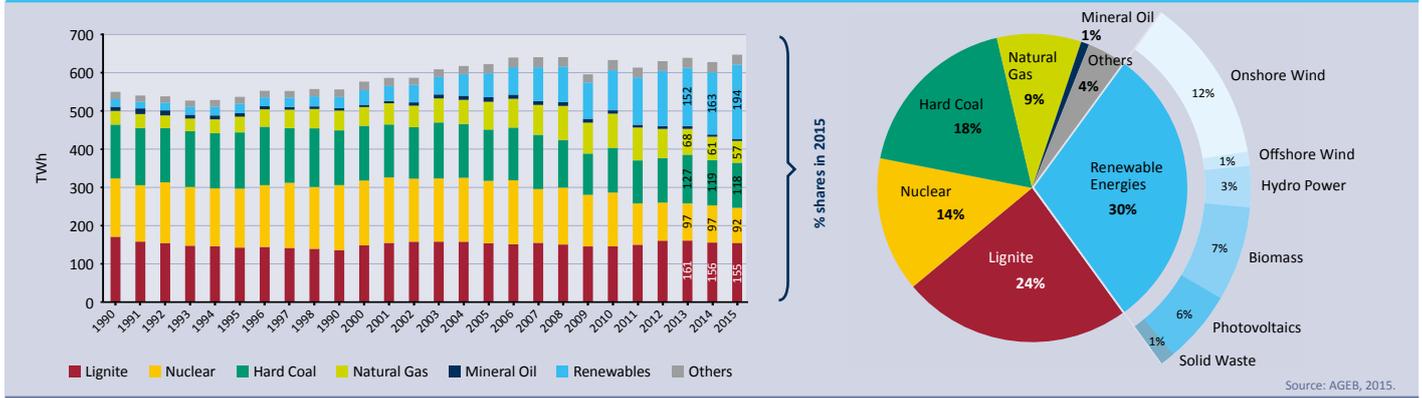
27.7% greenhouse gas reduction since 1990

Emission trends for Germany since 1990

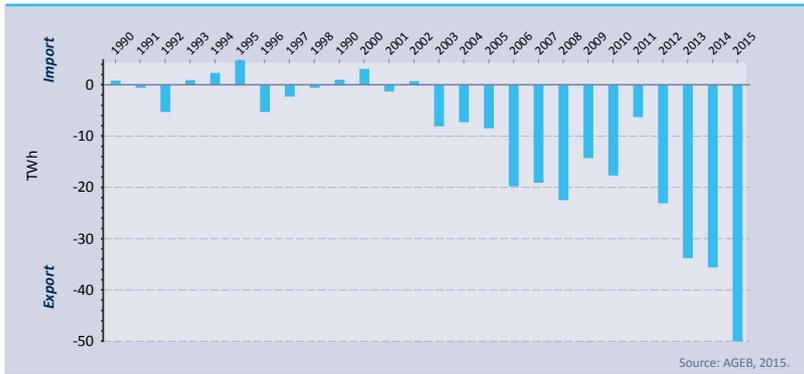


gross power production

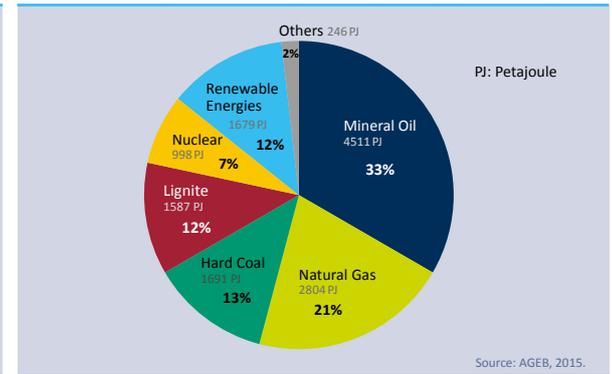
Development of gross electricity production 1990-2015 in terawatt-hours (TWh)



Germany's power export balance 1990-2015 in terawatt-hours



Share of energy sources in primary energy consumption



power export balance

#Energiewende – Dates 2016

11 March: Fifth anniversary of the Fukushima nuclear disaster.

17 - 18 March: The foreign ministry's annual Berlin Energy Transition Dialogue 2016 – Towards a global Energiewende. Speakers include foreign minister Frank-Walter Steinmeier, economy minister Sigmar Gabriel, and IRENA head Adnan Z. Amin, in BERLIN.

21 March: EnBW presents full year report 2015.

Spring 2016: Energy ministry expects legislative process for new power market law to be completed.

11 - 13 April: Berlin Energy Days conference, in BERLIN.

20 April: RWE annual shareholders' meeting.

25 - 29 April: International Energy Trade Fair with partner country USA, in HANNOVER.

26 April: 30th anniversary of the Chernobyl nuclear disaster.

12 - 13 May: RWE and EnBW report first quarter results.

Summer 2016: German parliament and Federal Assembly to approve reform of Renewable Energy Act. Climate Action Plan 2050 to be passed by cabinet. The plan may include details of a coal exit strategy.

2 June: Frankfurter Allgemeine Zeitung Energy Security Summit, in BERLIN.

7 - 9 June: German Association of Energy and Water Industries Congress 2016 – conference on energy markets and energy policy, in BERLIN.

12 - 13 September: Handelsblatt Renewable Energy Conference, in BERLIN.

27 - 30 September: WindEnergy Hamburg, global on- and offshore wind trade fair, in HAMBURG.



Calendar

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... for official statements

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... for latest data and research

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German Institute for Economic Research (DIW) DIW's energy, transportation and environment, and climate policy departments study the economics and politics of climate change and energy. +49 30 89789 249, rbogdanovic@diw.de, www.diw.de

Fraunhofer ISE, Solar energy research institute and publisher of electricity production data. Also see their data and graphs at www.energy-charts.de, +49 761 4588-5147, www.ise.fraunhofer.de

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... for industry comment

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the experts

... for a list of over 200 experts and institutions with insights into the Energiewende see:

www.cleanenergywire.org/experts

#Energiewende – Reading in English



cleanenergywire.org Our website provides in-depth analysis, factsheets, news articles, a daily press digest, an expert database, and more.

Agora Energiewende (2015) Understanding the Energiewende; (2013) 12 Insights on Germany's Energiewende. Good introductory readings on the energy transition in the power sector.

The Federal Ministry for Economic Affairs and Energy (BMWi) website offers a wide range of publications in English, including the newsletter "Energiewende direkt".

BMWi (2015) Fourth "Energy Transition" monitoring report. Overview of the progress and challenges of reforms in the fields of energy efficiency, renewable energy, power plants, electricity grids, greenhouse gas emissions and energy prices.

German Institute for Economic Research (2015) Deep Decarbonisation in Germany. Macro analysis of the Economic and Political Challenges of the Energiewende.

Schmid et al. (2016) Putting an energy system transformation into practice: The case of the German Energiewende.

Federal Ministry for the Environment (BMUB) (2015) Climate Action in Figures Facts, trends and incentives for German climate policy.

Federal Environment Agency (UBA) (2015) Data on the Environment.

AG Energiebilanzen (2015) Evaluation tables on the energy balance 1990 to 2014.

German Foreign Office (2015) Who is Who of the Energiewende in Germany. Brochure of contacts in politics, industry and society.

National Geographic (2015) Germany Could Be a Model for How We'll Get Power in the Future.

UBA (2015) National Trend Tables for the German Atmospheric Emissions Reporting.

PwC (2015) Energiewende outlook: Transportation sector.

Centre on Regulation in Europe (2015) The energy transition in Europe: initial lessons from Germany, the UK and France.

energytransition.de – A website/blog, funded by the Heinrich Böll Foundation, explaining what the energy transition is, how it works, and what challenges lie ahead.

#Climate and CO₂ #Fossil fuels

Climate targets force Germany to tackle coal



Renewable energy sources have expanded rapidly since the introduction of the Renewable Energy Act in 2000, but German carbon emissions have not always fallen in step. After 2009, emissions even rose as power generation from coal-fired power sta-

tions soared to levels above 1990. But power usage and CO₂ emissions eased in 2014, leading some analysts to predict better years ahead— while others pointed out that much of the reduction was due to warm weather. However, estimates for 2015 predict a slight rise

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📖 Reading

Agora Energiewende (2016) Eleven Principles for a Consensus on Coal

Agora Energiewende (2016) The energy transition in the power sector: State of affairs 2015

Agora Energiewende (2014) The German Energiewende and its climate paradox

Fraunhofer ISE (2015) Energy charts

DIW (2014) Coal power endangers climate targets: Calls for urgent action

AG Energiebilanzen (2015) Energy Consumption Increases Slightly in 2015

📄 CLEW Factsheets [on cleanenergywire.org]

Germany's greenhouse gas emissions and climate targets

Details of new Climate Action Programme

Coal in Germany

Understanding the European Union's Emissions Trading System

in emissions again and a monitoring report on the energy transition showed that Germany is still lagging behind many of its targets. Environmentalists warn that coal-fired power plants still threaten Germany's emissions targets. With the Paris Agreement backing

the cause, the call for a planned coal exit in the next 25 years is getting louder. This year, the environment ministry will present a Climate Action Plan 2050 and the economy and energy minister has backed plans for a round-table on coal.

#Energiewende #Society

Energiewende – the first four decades



For many observers, the energy transition in Germany began with Chancellor Angela Merkel's decision to phase out nuclear power, following the accident at the nuclear plant in Fukushima, Japan. But the societal project started decades before the Merkel government

re-instated plans to exit nuclear power. A long process deeply rooted in German history and society led to policies that triggered a strong increase in renewable energy sources and are now at the heart of a move to a low-carbon economy. The Energiewende – a

"The renewable energy act sparked a real grassroots citizens' movement. Germans turned the Energiewende into their own project."

Nina Scheer, Social Democrats MP

full-scale transformation of society and the economy – arose out of enduring grassroots movements, evidence-based discourse, concern about climate change, and key technological advances, as well as hands-on experience garnered along the way in Germany and elsewhere.

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📖 Reading

energytransition.de: Timeline Energiewende

Paul Hockenos (2008) *Joschka Fischer and the Making of the Berlin Republic: An Alternative History of Postwar Germany*

📄 CLEW Factsheets [on cleanenergywire.org]

Milestones of the German Energiewende

The history behind Germany's nuclear phase-out



#Electricity market

The country of the Energiewende strengthens competition and flexibility



The Energiewende involves tough choices for politicians: How will Germany organise the market around the ever-increasing share of renewable energy? What happens to energy security when the sun doesn't shine

and the wind doesn't blow? Fluctuating energy production challenges the entire power grid. The German government is trying to solve these problems with a complete overhaul of the power market and has opted to put its trust

©[mhp] Fotolia.

"We don't believe that there will be incentives for investors to build new, flexible power plants that will be needed in Germany to accompany the expansion of renewable energy."

Frank Brachvogel, BDEW

in the free market. These plans will have long-lasting implications. Most experts agree there will be little or no investment in fossil power plants in the future, but opinions diverge over whether this really matters.

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📖 Reading

European Commission (2016) The economic impact of enforcement of competition policies on the functioning of EU energy markets

BMWi (2015) An electricity market for Germany's energy transition - white paper of the Federal Ministry for Economic Affairs and Energy

BDEW (2013) Position paper: Design of a decentralised capacity market

Öko-Institut/WWF (2012) Focused capacity markets

Agora Energiewende (2015) Report on the German power system

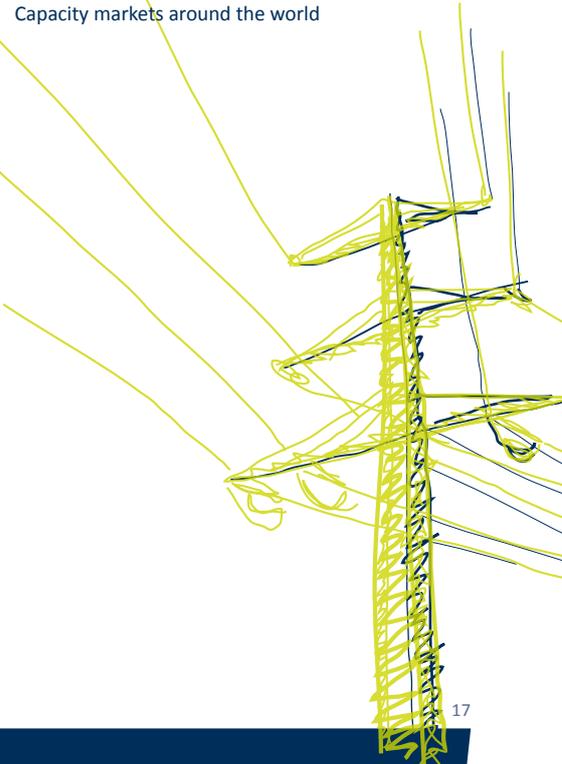
📖 CLEW Article / Factsheets [on cleanenergywire.org]

Germany's new power market design

Europe's largest electricity market set to split

German draft power market law sticks to lignite reserve

Capacity markets around the world



#COP21

Paris Climate Agreement – what it means for the German energy transition



Hope for the Paris Climate Summit (COP21) from 30 November to 11 December 2015 were high. Most observers – including the German government – agree that the conference exceeded all reasonable expectations. It reached an agreement that obliges all nations to participate in climate

protection, keep global warming below 2°C, and pursue “efforts to limit the temperature increase to 1.5°C”.

Some industry leaders criticise the absence of a binding mechanism and say Germany shouldn’t push ahead with climate protection and an energy transition while other countries

“World expects Germany to lead way with Energiewende”

*Jennifer Morgan, Executive Director
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📖 Reading

Climate Action Plan 2050 (2016) Website with latest documents and process updates

European Council (2015) EU position for the UN climate change conference in Paris: Council conclusions

United Nations Global Compact (2015) Special Edition: A Call to Climate Action

Greenpeace (2015) Effects of a partial coal exit (in German)

📄 CLEW Article / Factsheets [on cleanenergywire.org]

Paris deal fuels German coal exit debate, stirs industry concerns

Germans celebrate climate deal, turn to task ahead

Paris climate deal – does Germany get what it hoped for?

The making of “Climate Chancellor” Angela Merkel

Controversial climate summit issues – positions in Germany

aren't pursuing such ambitious targets. Yet there is huge pressure on “climate chancellor” Angela Merkel to make the most of the backing her policies received in Paris.

Just days after the conference concluded, commentators and climate activists argued the Paris Agreement vindicated

demands that Germany urgently phase out coal. The environment ministry has been tasked with writing a Climate Action Plan 2050 that describes a pathway to decarbonise the different sectors of the economy by the middle of the century. The plan is due to be agreed by government in summer 2016.

#Nuclear phase-out

Managing the nuclear legacy – a project into the next century



The question is no longer whether Germany's future will be nuclear-free – or even when, since the government is committed to completing the phase-out by 2022. But the logistics of pulling the plug on what was until

recently one of the country's primary sources of power are proving an immense challenge. Legal hurdles, decommissioning technicalities, and above all, the questions of where to store the radioactive waste and who will pay for it

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„In 2050, when the final repository is ready I will be 98 years old, so I am not sure I will live to see it happen, but I certainly feel that it is my responsibility to organise this now.“

*Barbara Hendricks,
Environment Minister*

all, are the main issues at hand. In 2016, Germany's nuclear phase-out marks two important anniversaries – it will be 30 years since the fatal nuclear meltdown in Chernobyl and five years since the catastrophe in Fukushima.

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📖 Reading

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German nuclear phase-out enters the next stage: electricity supply remains secure

Helmholtz Centre for Environmental Research (2015)
Germany's decision to phase out nuclear

power is fundamentally sensible from an economic perspective

Federal Office for Radiation Protection (Bfs)

Brunnengräber et. al. (2015) Nuclear waste governance - an international comparison

BBH (2014) Financial provisions in the nuclear sector – Possible risks of the status quo und options for reform (in German)

BMWi / Warth & Klein Grant Thornton (2015) Nuclear clean-up provisions evaluation (in German)

Wuppertal Institute for Climate, Environment and Energy (2007) Comparison of Different Decommissioning Fund Methodologies for Nuclear Installations

📄 CLEW Factsheets [on cleanenergywire.org]

The history behind Germany's nuclear phase-out

What to do with the nuclear waste – the storage question

Nuclear clean-up costs

Securing utility payments for the nuclear clean-up

Legal disputes over the nuclear phase-out

#Cost&Prices

German industry and its competitive edge in times of the Energiewende



Industrial competitiveness in times of an energy transition – few issues have been watched as closely. So far, German manufacturers have kept their competitive edge, backed by strong exports, despite concerns about rising electricity costs. Some of the most energy-thirsty

companies are actually benefitting from the lowest wholesale power prices in Europe, as they are exempt from levies that fund the Energiewende. But the topic of competitiveness is likely to persist as the Energiewende progresses. Many business leaders warn the

*“Perceptions
[of the Energiewende]
varied widely depending
on the size of the
business, their location
or industrial sector.”*

DHK Energy Transition Barometer, 2015

costs of the nuclear phase-out and the move into renewables could drive some manufacturing abroad. They say this could take a toll on the car industry and other pillars of the economy. But other sectors hope Energiewende technologies will secure future export success.

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Reading

Ecofys/Fraunhofer ISI (2015) Electricity Costs of Energy Intensive Industries – An International Comparison

Destatis (2015) Long-term energy price trends

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Industrial power prices and the Energiewende

What business thinks of the energy transition

What German households pay for power

#Technology

Technology to transform the energy system – made in Germany



Germany's energy transition anticipates a vastly more efficient and interconnected energy system in the future. It also poses huge technological challenges – and challenges for legislation and business models keep pace.

German scientists say their work has already made important contributions to the global goal of decarbonisation.

Batteries that can store power and help to regulate the grid within seconds with high accuracy, smart grids

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and other solutions for flexibility and integration of different power sources are key to adapting the power system to a high level of renewables. Germany has doubled research and development funds in under a decade.

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Technologies of Energiewende

Combined heat and power – an Energiewende cornerstone?

“What we will have is an electricity system that is very cheap in terms of getting fuel for free.”

Hans Schäfers, Hamburg University of Applied Sciences

#Business&Jobs

Jobs won, jobs lost – how the Energiewende is transforming the labour market



Germany's transition to a low-carbon, nuclear-free economy shakes up the country's labour market. The Energiewende has created hundreds of thousands of jobs – from solar-panel cleaners to housing-insulation specialists and wind turbine engineers. Countless new

business models have emerged, many beyond the renewables industry. Meanwhile, the conventional energy sector has been bleeding jobs, and many business leaders warn the Energiewende will cost many more jobs in other traditional pillars of Germany's economic success,

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such as steel or the car industry. Changes are so rapid that researchers have trouble keeping track. How many jobs the drive to renewables and the energy transition as a whole will eventually create remains hard to gauge and hinges on many political and individual decisions in coming decades.

“Installation is extremely labour-intensive, so carpenters and craftsmen are needed for every building that’s retrofitted.”

Christian Noll, German Industry Initiative for Energy Efficiency

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Where the Energiewende creates jobs



#Utilities

Fighting for survival: Germany's big utilities look for a future in the new energy world



Germany's ambitious transition to renewable energy has left the major utilities that have dominated the market for decades out in the cold. Their business models, based on the "old" energy world of centralised generation and large-scale investment, have been eroded.

Top dogs E.ON and RWE want to master the challenges by splitting off their conventional power businesses, Vattenfall has opted to sell its brown coal operations, and state-owned EnBW is redoubling efforts to become greener. Despite these drastic steps, their future

©[Bengt Lange] Moorburg Power Plant 11, Vattenfall.

“We have seen a kind of worst case scenario materialise for the big energy companies.”

Thorsten Lenck, Energy Brainpool

role in Germany’s fast-changing energy markets is far from clear. The upheaval is not yet over, as new business models and mighty competitors like Google could soon enter the fray. Experts say it remains to be seen if they can innovate their way out of the crisis.

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Small, but powerful – Germany’s municipal utilities

German utilities and the Energiewende

Securing utility payments for the nuclear clean-up

Vattenfall’s German brown coal: What’s being sold and who wants to buy

The history behind Germany’s nuclear phase-out

Can Germany’s energy giants change their DNA?

#Transport

Car giant Germany struggles to ignite Energiewende in transport



When it comes to the automobile, Germany flaunts unique gravitas. The German engineer Karl Benz invented the first automobile powered by an internal combustion engine 130 years ago. Today, sales by its carmakers Daimler-Benz, Volkswagen, BMW, Porsche, and Audi top Denmark's annual GDP. But so far, Germany has

made little headway in linking up its transport prowess to another prominent industry showcase – the transition to renewable energy. It's clear that extending the Energiewende to transport will be crucial in the country's quest for a low-carbon economy, but there is no consensus on how this should be done. Carmakers have lob-

“Decarbonisation isn't happening anywhere in the sector. Measures are expensive and intervene with our daily life. Thus, it just hasn't been pushed by either politicians or industry.”

*Peter Kasten,
Institute for Applied Ecology*

bied hard – and with some success – against stricter emissions limits, and they risk falling behind the global competition on battery technologies. Consumers are also slow on the uptake of electric vehicles, making it unlikely the government will reach its target of putting 1 million electric vehicles on German roads by 2020.

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CLEW Factsheets [on cleanenergywire.org]

Energiewende in transportation: Vague goals, modest strides

The role of biofuel and hydrogen in Germany's transport Energiewende

#Grid

Connecting up the Energiewende



Germany has to update its network to cope with decentralised, fluctuating supply as the country shifts to renewables.

Rapidly growing wind power capacity in the north means a bountiful supply of low-cost electricity. But too much

power can be as big a problem for the stability of the grid as too little. And not everyone is in favour of building new power lines to carry electricity to the country's industrial south. The debate raises key challenges, not only of public acceptance but of how central

"As long as the new power lines between north and south Germany are not completed, the problem of a lopsided system will only worsen."

*Andreas Jahn,
Regulatory Assistance Project (RAP)*

government works with regional states to make the Energiewende a success. Meanwhile, other possible solutions are floated, such as a decentralised power supply, demand-side management, power storage, or splitting the German power market.

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Setting the power price: The merit order effect

Re-dispatch costs in the German power grid

Loop flows: Why is wind power from northern Germany putting east European grids under pressure?

Germany's electricity grid stable amid energy transition

#Finance

Finance



Financing the Energiewende: Germany has mobilised over 200 billion euros for renewable energy projects over the last 10 years, most of it from local and national investors. Relatively high yields, a stable cash flow and a reliable public framework have made the

Energiewende a very attractive green investment opportunity. Now, institutional financiers are replacing some small-scale investors. Larger projects such as offshore wind play a more important role as banks, insurance firms and investment funds increasingly look

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*Relatively high yields,
a stable cash flow
and a reliable public
framework have made
the Energiewende a
very attractive green
investment opportunity.*

for carbon-free investment. Funding by the public banking system is also playing an increasingly important role. The Energiewende will continue to be financed by a broad mix of investors, but is part of global finance rather than a German singularity.

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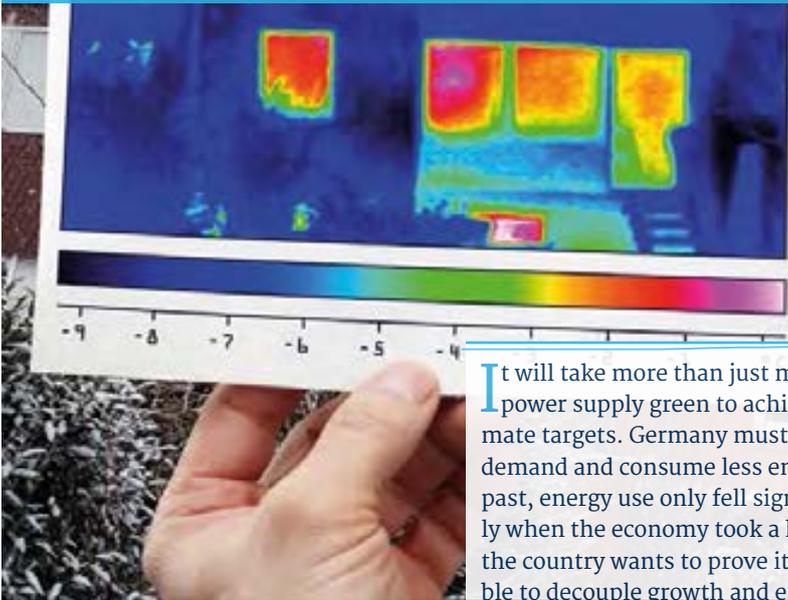
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#Efficiency

Taming the appetite for energy



It will take more than just making the power supply green to achieve climate targets. Germany must also tackle demand and consume less energy. In the past, energy use only fell significantly when the economy took a hit. Now the country wants to prove it is possible to decouple growth and emissions

by dramatically increasing efficiency. The potential is huge and so far largely untapped, which is why efficiency has been dubbed the “sleeping giant” of the Energiewende. The government’s Climate Action Programme, designed to get Germany back on track for its 2020 climate goals, suggests that increasing energy

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Details of new Climate Action Programme

Homes for the Energiewende

Germany's greenhouse gas emissions and climate targets

Combined heat and power - an Energiewende cornerstone?

"Germany can achieve its emission targets much faster if energy is used more efficiently."

Robert Pörschmann, BUND

efficiency can bring more emissions cuts – 25 to 30 million tonnes per year – than any other measure. But saving energy on a large scale – by insulating buildings, changing behaviour and introducing many new and often expensive technologies – requires everyone's participation and has proven a hard sell so far.

#Citizens' Energy

Germany between citizens' energy & nimbyism



Since the energy transition took off in 2000, millions of Germans have become energy producers, investing in solar panels on their houses and buying shares in wind parks. Citizens' engagement has been key

to maintaining high public support for the energy transition despite rising power prices. But plans for new regulations including the transition to a more auction-based system have stoked concerns that more com-

"If people participate with their own money, for example in a wind or solar power plant in their area, they will also support it."

Manfred Fischeidick, Wuppertal Institute

plex rules will put citizens off. At the same time, important Energiewende projects – such as grid extension and wind parks – have run into resistance, requiring new ways to keep the public on board.

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Citizens' participation in the Energiewende

Polls reveal citizens' support for Energiewende

Facts and figures on the social impact of the Energiewende

What German households pay for power

#Energiewende #Society

How the Energiewende is transforming Germany as we know it



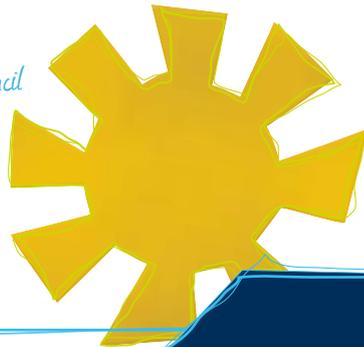
Germany's energy revolution is having a far-reaching impact on everything from the landscape to education. As some farmers earn more from their "energy harvest" than traditional crops and citizens rethink

lifestyle choices to go green, the transformation doesn't stop at architecture, tourism or urban planning. The changes and their knock-on effects don't please everybody: there are winners and losers when a society and economy

©[Sunny studio] Fotolia.

"Technology and renewable energy production are changing faster than society does."

*Günther Bachmann,
Sustainability Council*



undergo such sweeping reconstruction. While some jump aboard, transforming their homes into small solar power stations, others gripe about the "ugliness" of wind turbines and photovoltaic panels.

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Facts and figures on the social impact of the Energiewende

#EEG2016/Law

Germany revamps renewables law as it adapts to future with green power



Germany's renewable energy market is facing the most far-reaching legislative changes since green power incentives were introduced a quarter of a century ago. The controversial revamp of the renewable energy law (EEG) in 2014 aimed to cut costs related to the Energiewende, exert greater control over the expansion of renewables, and maintain exemptions that help large energy users deal with the transition. 2016 will see the next reform of the law. A shift from feed-in tariffs to a system of auctions to define renewable support is the most striking change. Some of the measures have a short track record

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EEG reform 2016 – switching to auctions for renewables

Defining features of the Renewable Energy Act (EEG)

Comparing old and new: Changes to Germany's Renewable Energy Act

Position of key stakeholders on the EEG 2.0

*“Economic logic and all experiences from other countries show:
In tenders the largest bidders have an advantage.”*

Lars Holstenkamp, Leuphana University

and strike at the very heart of the 1990 law. A target corridor for renewable development will be upheld, according to the Ministry for Economic Affairs and Energy, which is writing the reformed legislation.

Energy experts stress that the changes are necessary to expose the sector

to more market forces and cut costs, as well as adjust renewable growth to the slow grid expansion. But renewables developers, particularly in the solar and wind sector, have reservations, saying the reforms – and the “growth corridor” in particular – make investment in renewables less secure.

#International #Energy Union

Germany's energy transition in Europe: The solo draws to a close



Germany's energy transition began as a lonely expedition. Rapidly expanding green energy and switching off its nuclear power stations antagonised some neighbours, and the European Commission. Germany's energy markets are at the geographic heart of Europe. What happens here signifi-

cantly impacts markets in neighbouring countries. Germany has learned that it cannot reach its goals independently and needs to cooperate in areas such as grid extension, trade and research. And the EU's plan for an "Energy Union" will further deepen the German energy market's ties to its neighbours.

“People in this country and also outside of Germany who believe this must be some kind of act of renationalisation of energy policy [...] could not be more wrong.”

Rainer Baake, State Secretary

But while many European countries are following in Germany’s footsteps to push renewables, a European consensus does not appear within easy reach.

The Energiewende still poses major challenges in Europe, both for Germany and its neighbours.

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Energiewende – Germany is not alone

Germany’s energy consumption and power mix in charts

Capacity markets around the world

Loop flows: Why is wind power from northern Germany putting east European grids under pressure?

#Security

Energy transition shapes foreign policy in Germany and beyond



Energy supply is inseparable from German foreign policy, as the country relies on imports to feed its energy appetite. The Ukraine crisis has brought the risks of Germany's dependence on oil, gas and coal from

Russia into focus. While some experts warn against cutting these energy ties, others argue for an accelerated shift to renewables in order to boost international security. At the same time, the implications of a low-carbon future

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for foreign and security policy are hardly limited to energy supply security. If Germany is to make its energy transition a success, it could have profound geopolitical repercussions, and its impact might be felt across the globe.

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📖 Reading

The Economist (2014) European energy - Conscious uncoupling

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Heinrich Böll Stiftung (2014) Germany's energy transition: A blueprint for European energy security?

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📄 CLEW Factsheets [on cleanenergywire.org]

Germany's dependence on imported fossil fuels

"Experts from Russia clearly see the changeover to renewable energy as a threat. A threat to their economy."

Christian Hübner, Konrad Adenauer Stiftung

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Imprint

A Reporter's Guide to the Energiewende
(3rd edition March 2016)
A publication of the Clean Energy Wire, Smart Energy for Europe Platform (SEFEP) gGmbH, Rosenstr. 2, 10178 Berlin
Responsible Sven Egenter (Editor in Chief)
Editing Sören Amelang, Kerstine Appunn
Contributor Ruby Russell
Design Annika Langer
Pictures Detlef Eden (Team)
Print Laserline, Berlin – printed on Blauer Engel and FSC-certified recycling paper

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