

# Introduction



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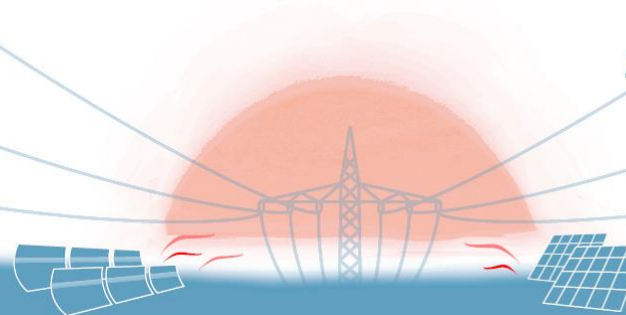
## 7<sup>th</sup> Solar Integration Workshop

International Workshop on Integration  
of Solar Power into Power Systems

with Special Topic **STORAGE**

24 - 25 October 2017

Berlin, Germany



**by Thomas Ackermann**

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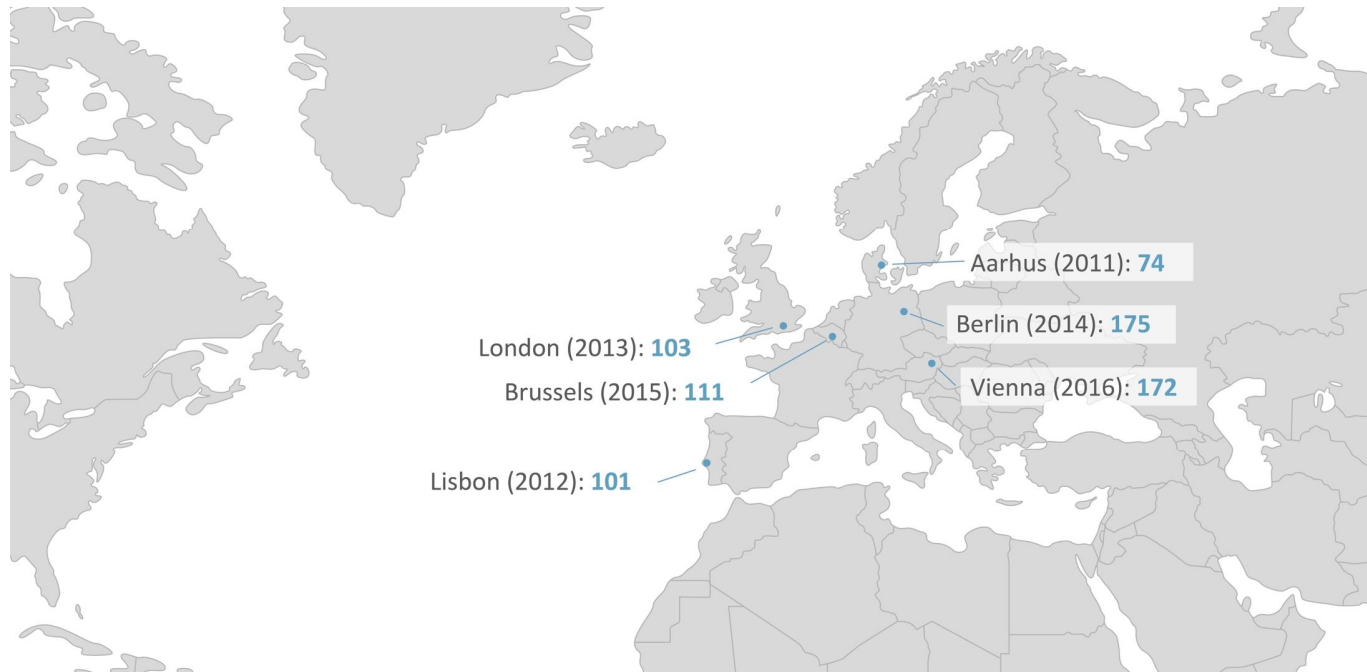
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# Short Workshop History

## Number of Participants of the previous Solar Integration Workshops

THIS YEAR 32 Countries →



COUNTRY	QTY.
Germany	54
Japan	19
USA	9
Sweden	7
Australia	6
France	6
Canada	5
Netherlands	5
Spain	5
Denmark	4
Ireland	4
South Africa	4
Namibia	3
Norway	3
Estonia	2
Portugal	2
Switzerland	2
Other *	12
<b>Total</b>	<b>155</b>

\* Algeria, Austria, Brazil, China, Cyprus, Finland, France, India, Israel, Korea, Poland, Serbia, Singapore, Sri Lanka, United Kingdom

# Impact of Parisian Climate Treaty



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To hit the Paris climate goals without geoengineering, the world has to do three broad (and incredibly ambitious) things:

1

**Global CO<sub>2</sub> emissions** from energy and industry have to fall in half each decade. That is, in the 2020s, the world cuts emissions in half. Then we do it again in the 2030s. Then we do it again in the 2040s. Some call this a “carbon law” analogy to Moore’s law.

2

**Net emissions from land use** — i.e., from agriculture and deforestation — have to fall steadily to zero by 2050. This would need to happen even as the world population grows and we’re feeding ever more people.

3

**Technologies to suck carbon dioxide** out of the atmosphere have to start scaling up massively, until we’re artificially pulling 5 gigatons of CO<sub>2</sub> per year out of the atmosphere by 2050 — nearly double what all the world’s trees and soils already do.

# Headline



2017-2020

All countries would prepare for the herculean task ahead by laying vital policy groundwork.

By 2020, all cities and major corporations in the industrialized world should have decarbonization strategies in place.

2020-2030

Now the hard stuff begins

Coal power is phased out in rich countries by the end of the decade and is declining sharply elsewhere.

In addition, spending on clean energy research increases by “an order of magnitude”.

➔ **IN 3 TO 13 YEARS**

2030-2040

Many countries should now have completely carbon-free grids and have electrified virtually all of their transport, heating, and industry. Cars with internal combustion engines “will have become rare on roads worldwide.” Aircraft will be almost entirely powered by carbon-neutral fuels, say, biofuels or hydrogen. New building construction will be largely carbon-neutral, by using emissions-free methods for steel and concrete or through other techniques. Meanwhile, we’d need to be sucking about 1 to 2 gigatons of CO2 from the air each year, with a heavy R&D effort on expanding that further.

➔ IN 13 TO 23 YEARS

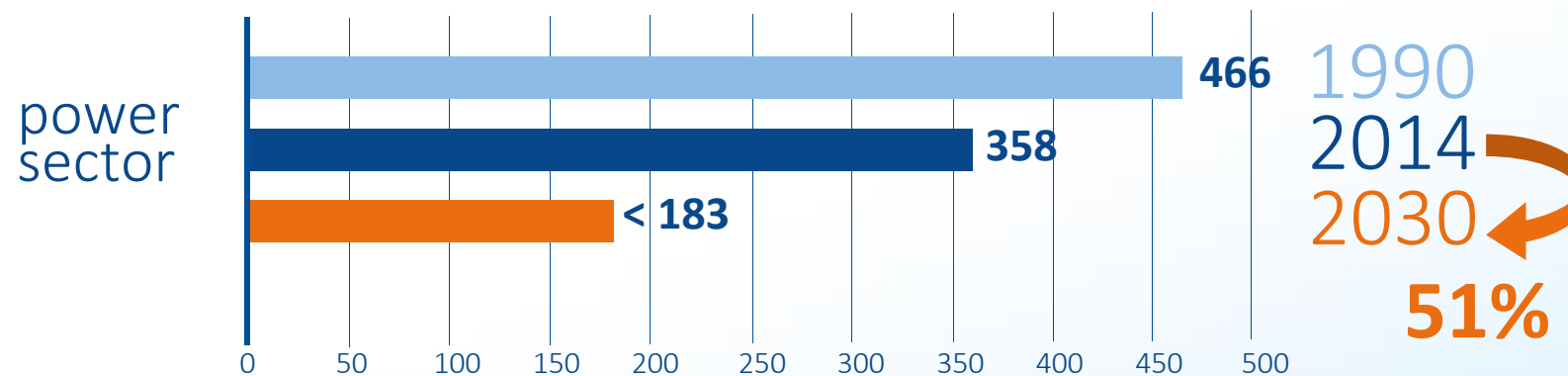
2040-2050

By the early 2040s, major European countries are close to carbon-neutral, and the rest of the world is moving toward that goal by the end of the decade. Electricity grids are nearly entirely carbon-free!

➔ IN 23 TO 33 YEARS

# The German Climate Protection Plan 2050

The goal for 2030:





# Goals for Germany (for 2030) – Expert Predictions



## PV Germany

end 2016 → **42,4 GW**

> 2030 → **34 to 40 GW Additional PV**



## Wind Germany

end 2016 → **53,81 GW**

> 2030 → **42 to 46 GW Additional PV**





**ENJOY THE WORKSHOP!**

**Take part in the discussions &  
read the proceedings.**



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