

13 November 2020 | ISAP 2020 – Thematic Track 13

Climate Neutrality for Germany as an Implementation of the European Green Deal

LCS-RNet: The Pathway Towards Decarbonisation—Message from Scientists
Towards Green Recovery

Stefan Lechtenböhmer



A European Green Deal

Striving to be the first climate-neutral continent

Reaching this target will require action by all sectors of our economy, including

- › investing in environmentally-friendly technologies
- › supporting industry to innovate
- › rolling out cleaner, cheaper and healthier forms of private and public transport
- › decarbonising the energy sector
- › ensuring buildings are more energy efficient

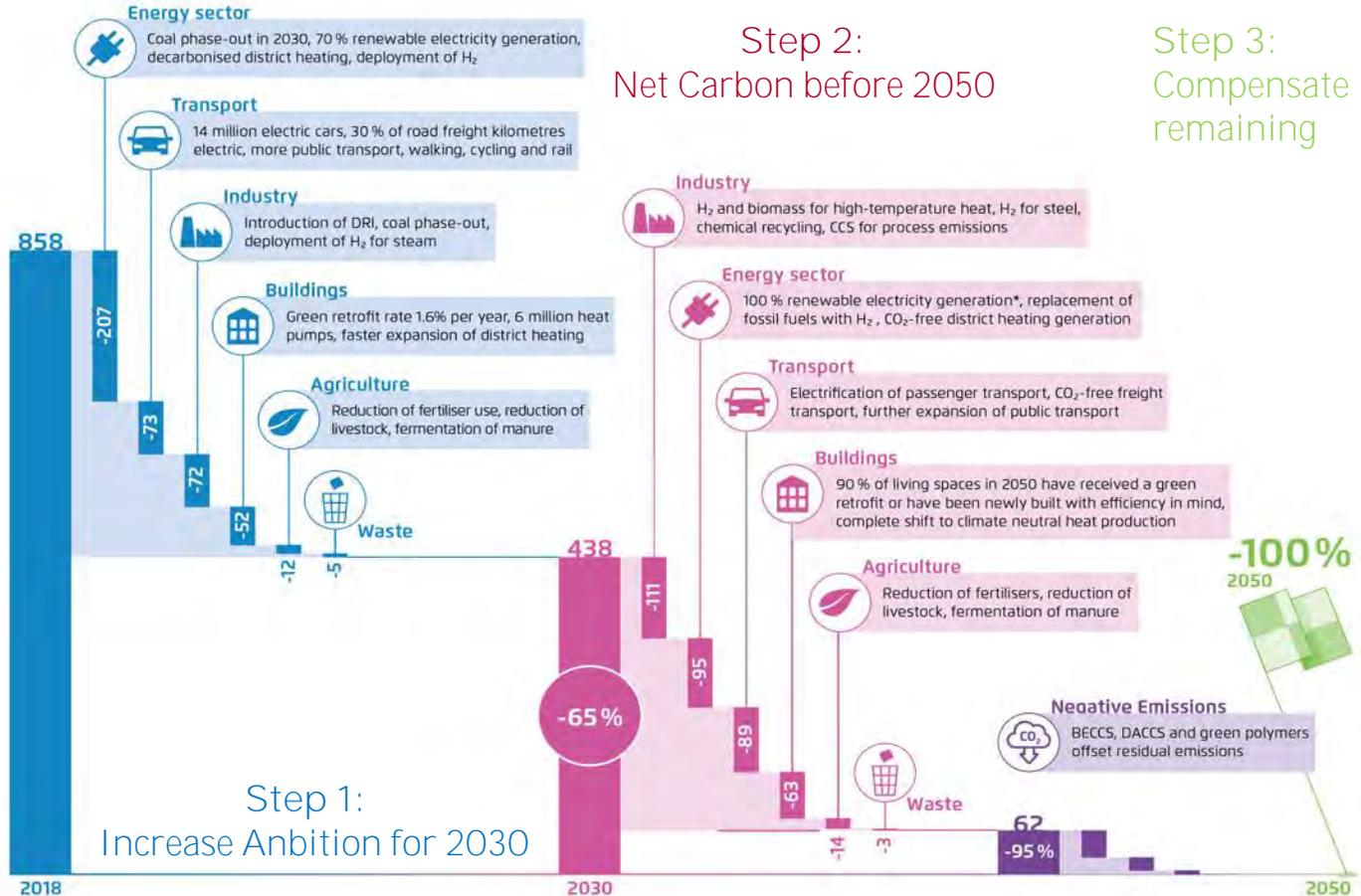
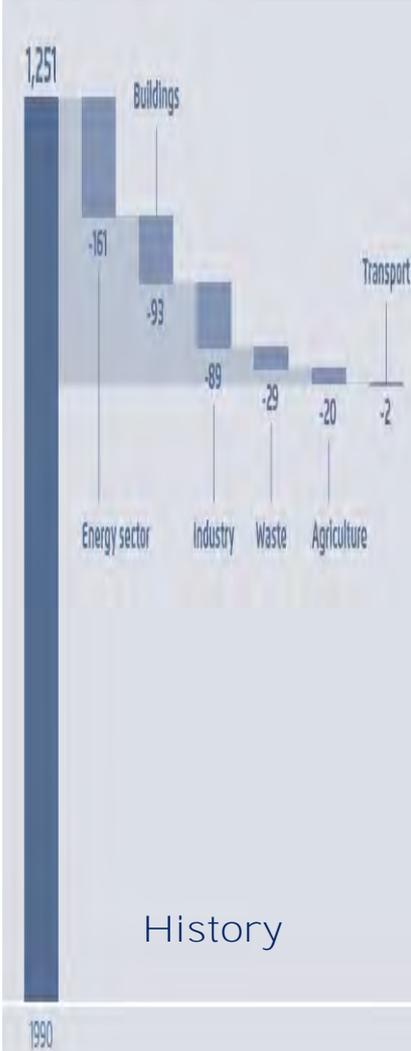
The Green Deal as an economic innovation strategy.



**A study how climate-neutrality
could work in Germany.**

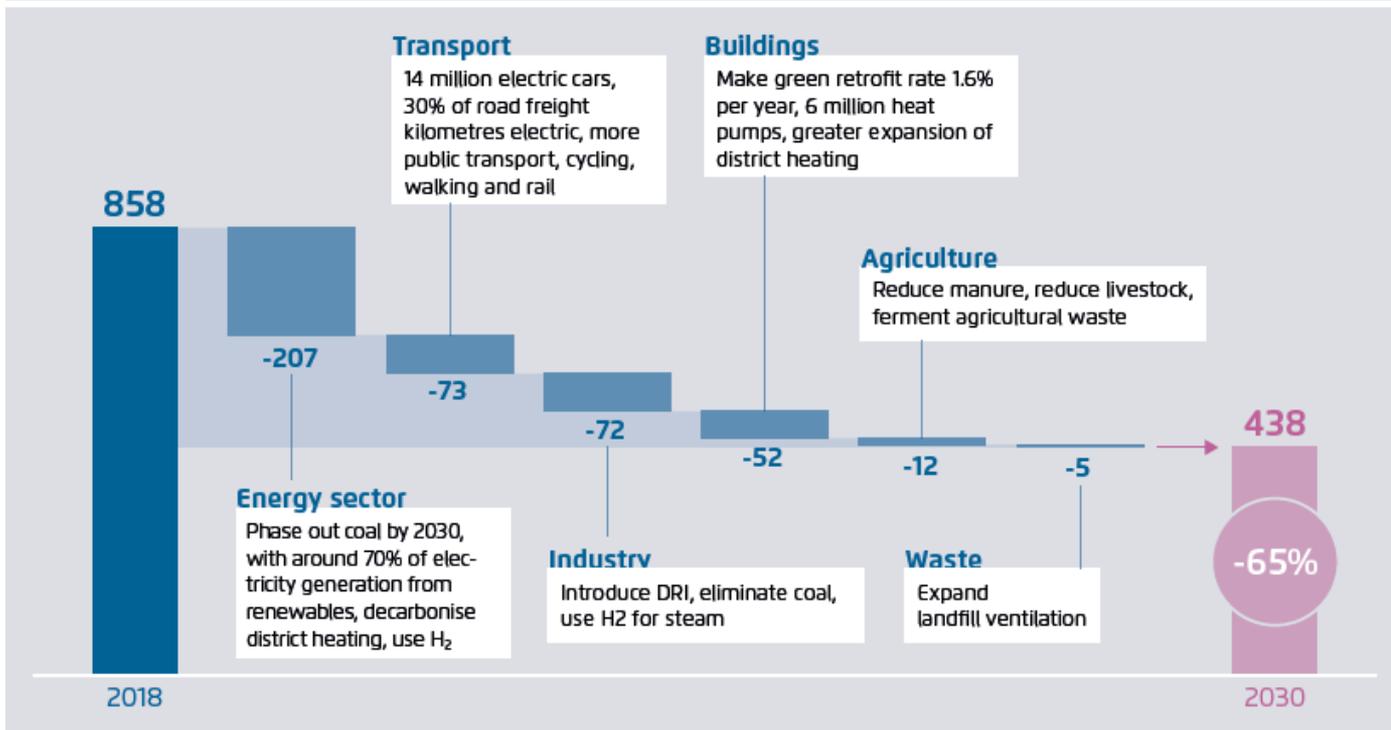


3 Steps to Climate Neutrality for Germany



STEP 1: Reduce emissions by 65% by 2030

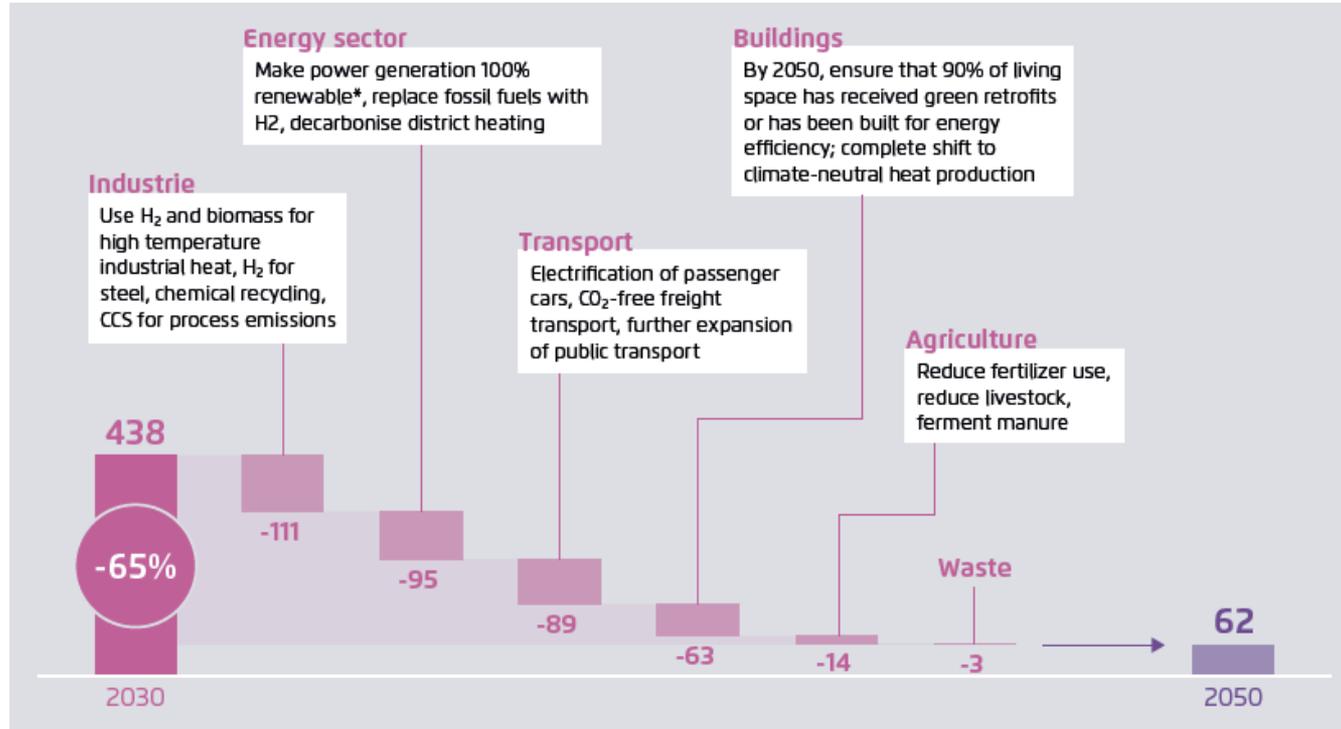
(Mt CO₂ equivalent)



- Increase ambition above current target of -55% GHG eq.
- Coal phase out in electricity by 2030
- 70% RES electricity
- 40% electric cars by 2030
- Convert 50% of steel making from coal to H₂ (and NG)
- Hydrogen infrastructure

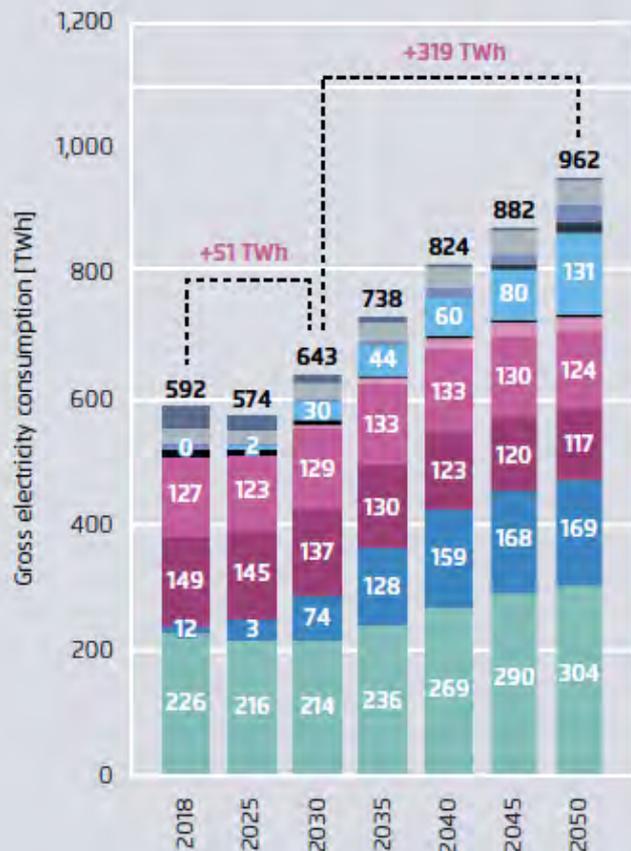
STEP 2: Carbon neutrality before 2050

(Mt CO₂ equivalent)



- Electrification of industry including hydrogen
- CCS for cement and waste incineration
- 100% renewable electricity generation + 63% electricity generation
- 90% of buildings energetically renovated

* Includes power generation from renewable hydrogen together with stored and imported renewable electricity.
Prognos, Öko-Institut, Wuppertal Institut (2020)



H₂/CO₂

2030

Production 19 TWh H₂

2050

84 TWh H₂,
19 Mt CO₂ DAC



5.6 million heat pumps, efficient electric appliances, efficient lighting, decline of direct electric heaters

13.8 million heat pumps, increasing for cooling and ventilation, efficiency with heat pumps, decline of direct electric heaters, efficiency with electric appliances



Heat pumps, efficient lighting

Heat pumps, efficient lighting



27% of road freight km via trucks powered by batteries and overhead lines, 14 M electric cars

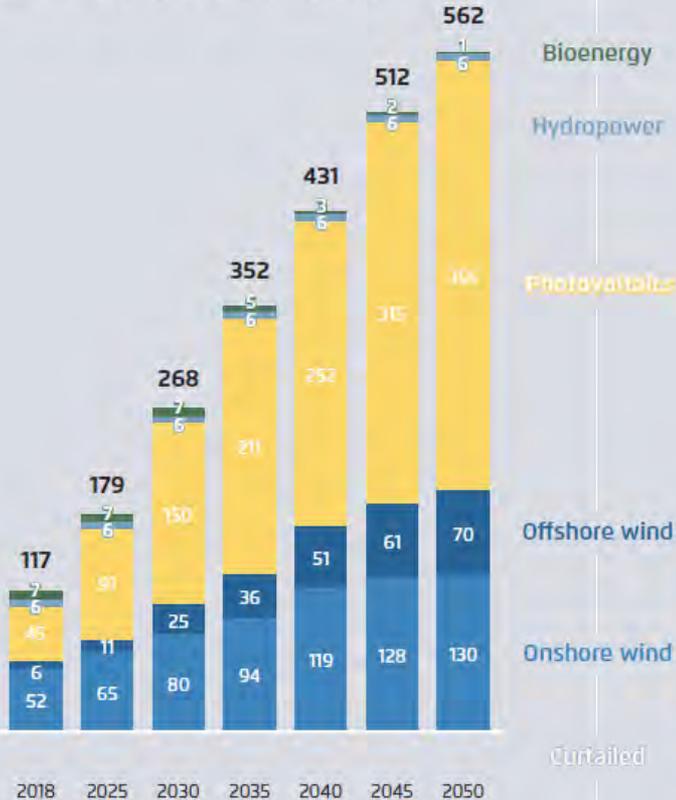
78% of road freight km via trucks powered by batteries and overhead lines, 30 M electric cars



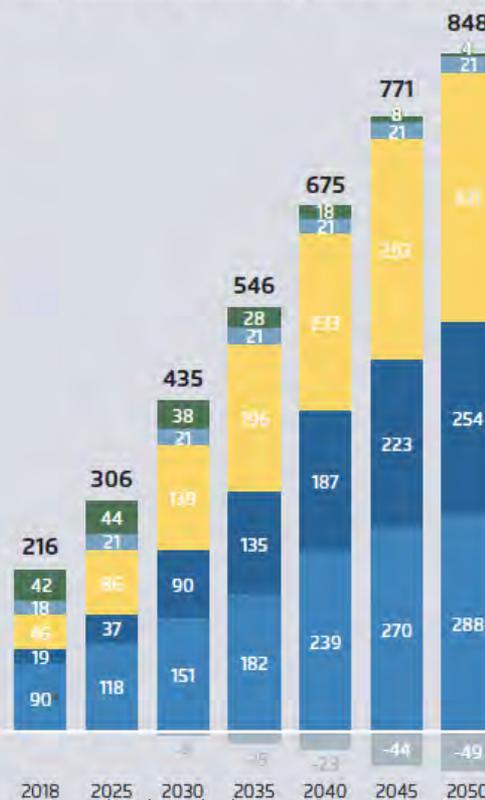
Electrification of process heat, electricity-based steam production, efficient cross-cutting technologies

Electrification of process heat, CO₂ capture, steam production in electric boilers and high-temperature heat pumps

Installed renewable capacity (GW)

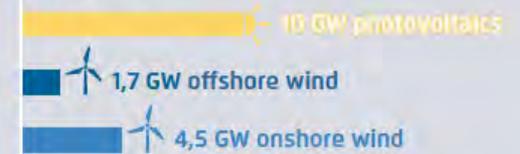


Renewable net electricity generation (TWh)



Needed average added capacity per year
Gross increase, for life spans of 25 years

2021–2030



Past years with greatest added capacity:
Photovoltaics: 8 GW (2010, 2012)
Offshore wind: 2 GW (2015)
Onshore wind: 5 GW (2014, 2017)

Cumulative gross increase from 2021 to 2030:
Photovoltaics: 98 GW
Offshore wind: 17 GW
Onshore wind: 44 GW

Share of renewable energy in gross electricity consumption



Climate neutrality as a powerful investment and innovation strategy for Germany and Europe

- Creation of a fully renewable energy system based on electricity and hydrogen
- Electrification of the transport sector including automobile industry
- Innovation of basic materials production with climate neutral low carbon processing technologies

- Additional investment of 50 to 100 Mln **€ per** year as a strong boost to the economy // 2 to 3% of GDP
- From 70% (fossil) energy imports to 80% domestic renewable electricity
- Strong co-benefits (climate mitigation, pollution, health, innovation)



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Thank you!

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www.wupperinst.org