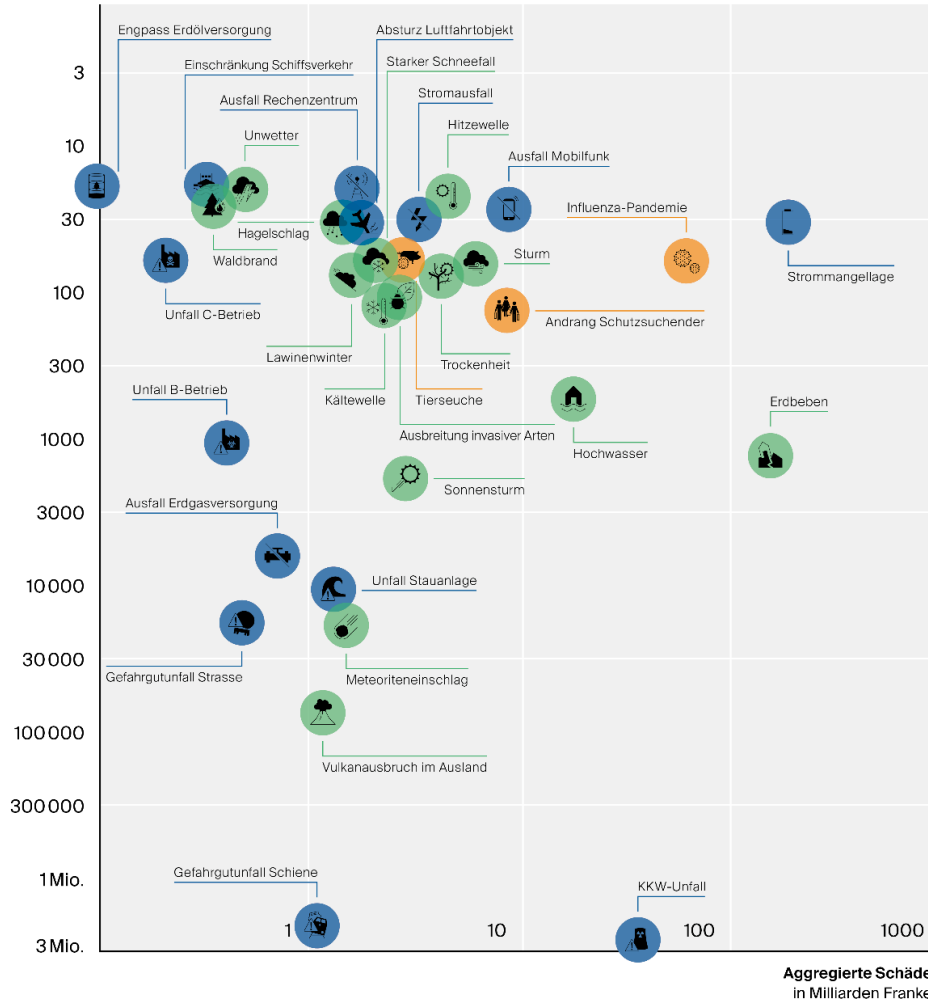


Kritische Gedanken zur Energiewende

Senioren Uni Schaffhausen, 20. Januar 2025

Hans Wanner

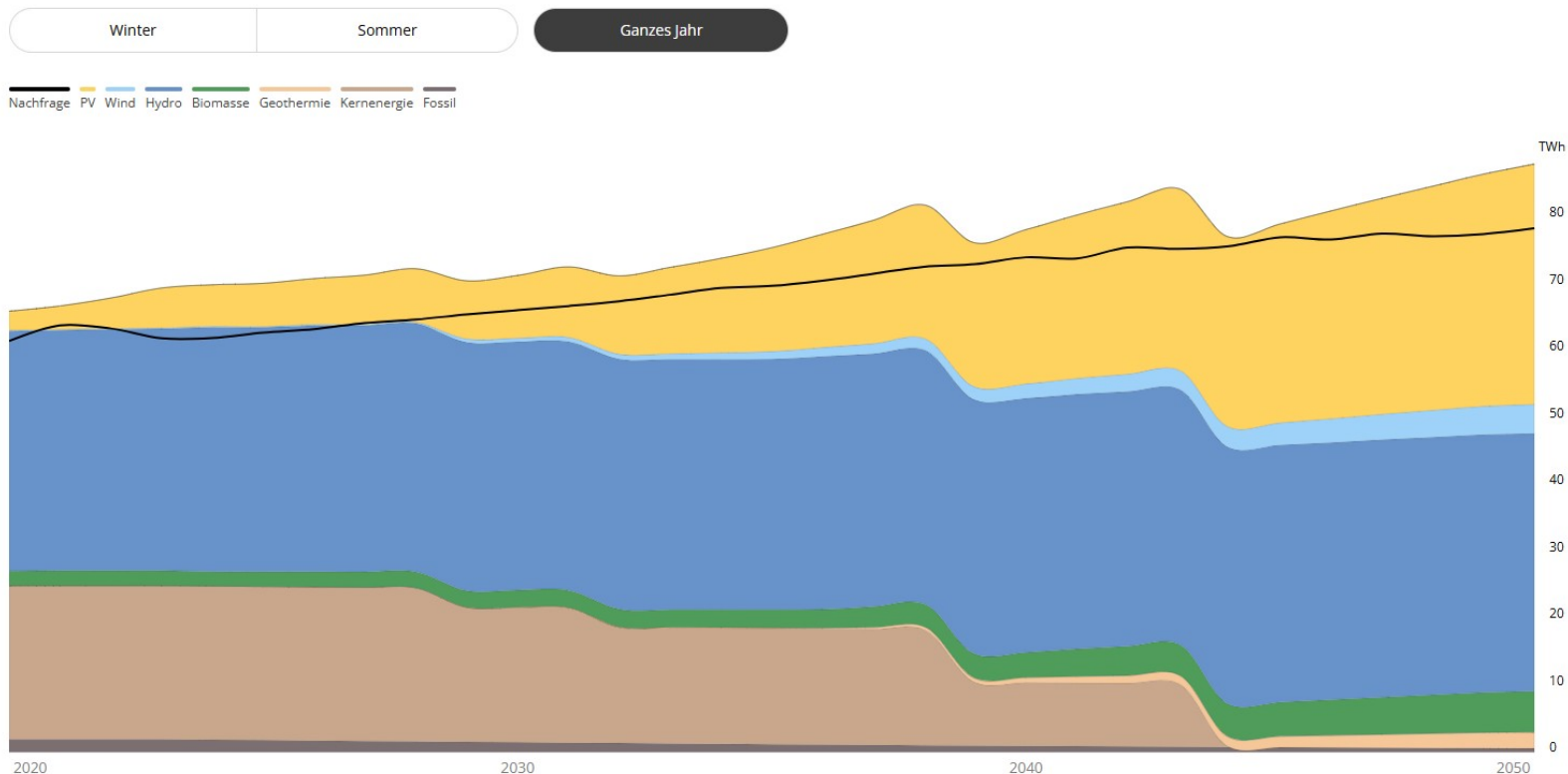
Häufigkeit
einmal in x Jahren



Risikodiagramm BABS 2020

Aggregierte Schäden
in Milliarden Franken

Energieperspektiven 2050+, Summe über ganzes Jahr

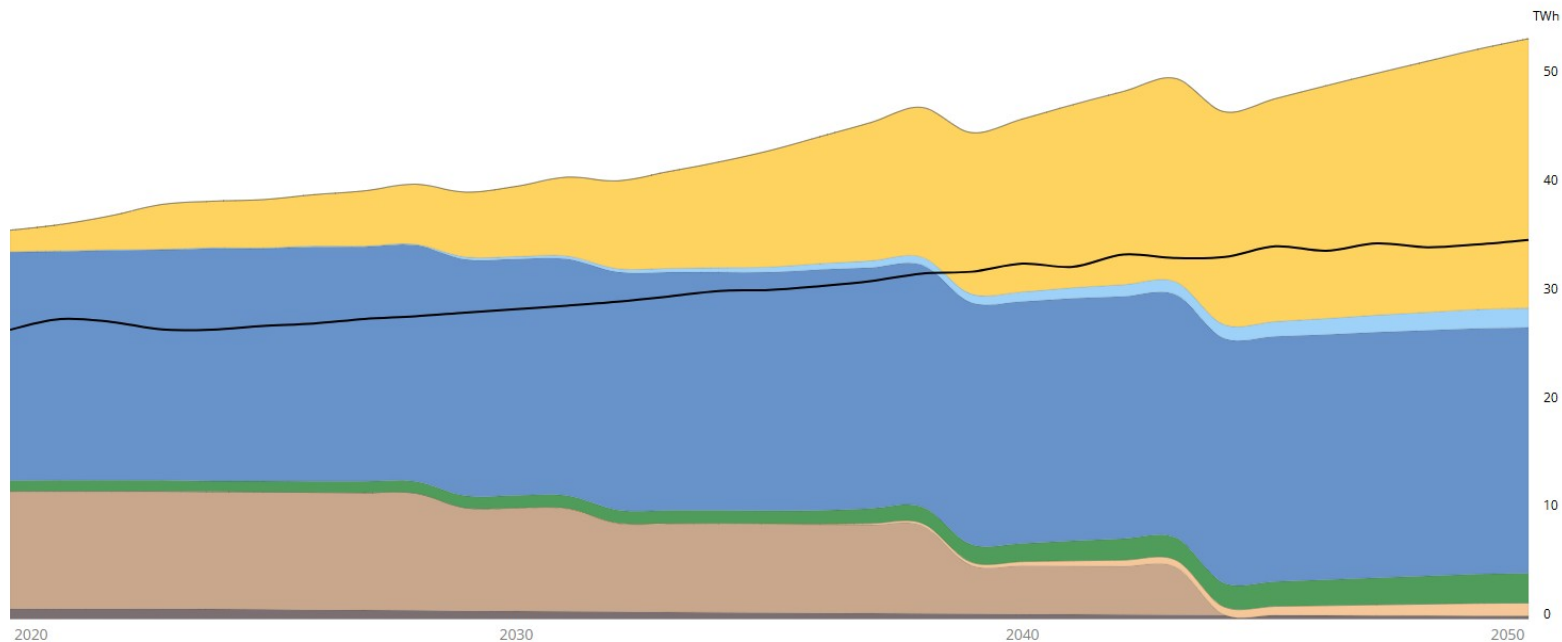


Quelle: <https://powerswitcher.axpo.com/de/scenarios/bfe-energy-perspectives-2050>

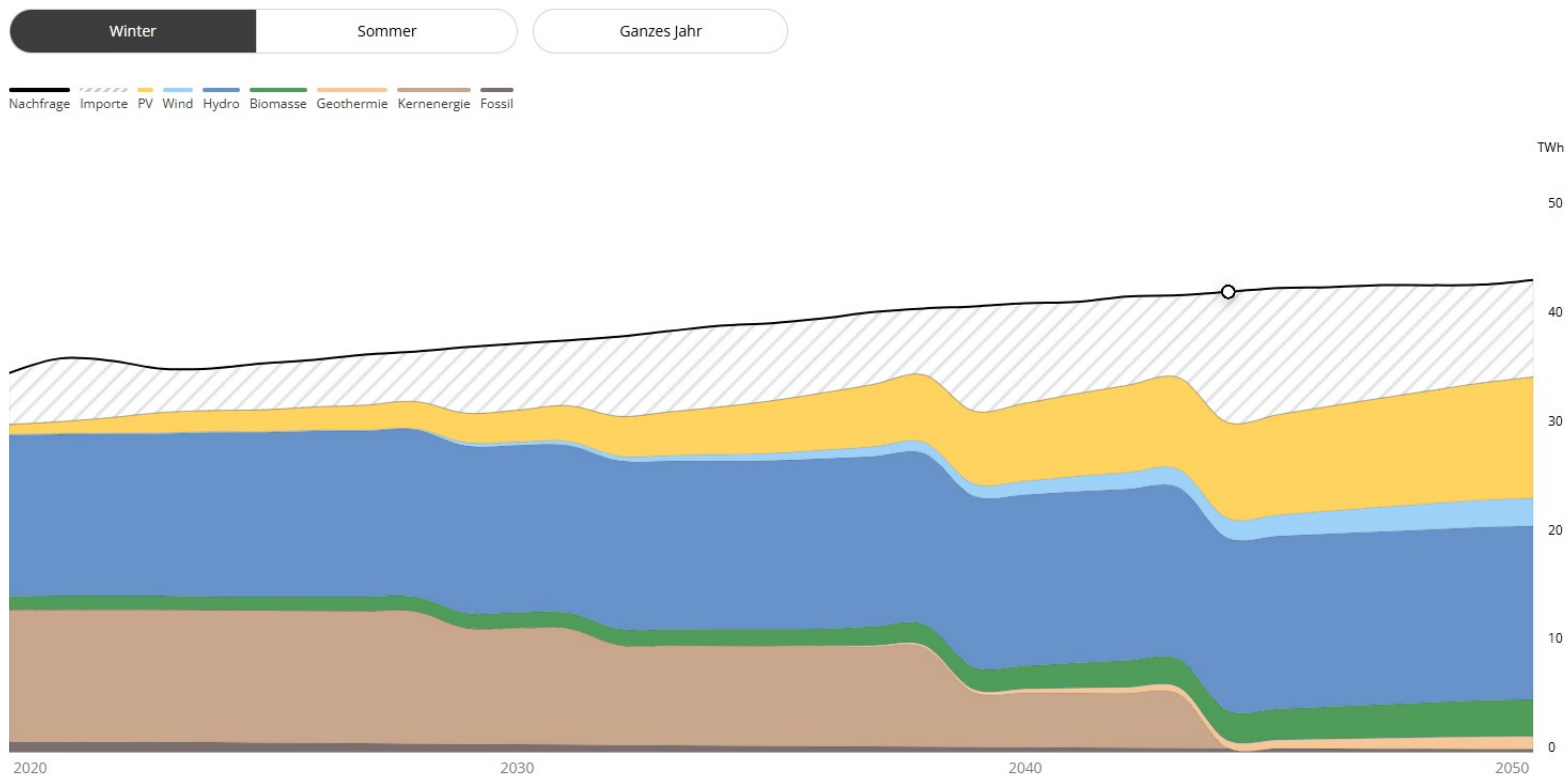
Energieperspektiven 2050+, Sommerhalbjjahr

Winter Sommer Ganzes Jahr

Nachfrage PV Wind Hydro Biomasse Geothermie Kernenergie Fossil



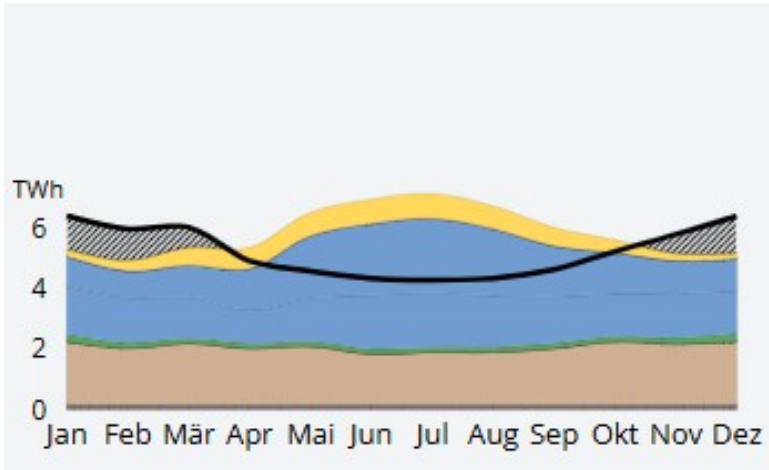
Energieperspektiven 2050+, Winterhalbjahr



Quelle: <https://powerswitcher.axpo.com/de/scenarios/bfe-energy-perspectives-2050>

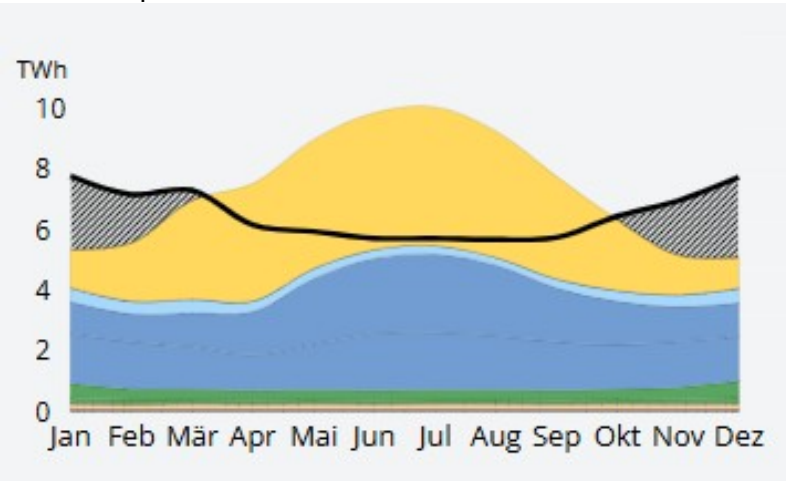
Jahresverlauf Szenario Bund

2025



Prognose 2050:

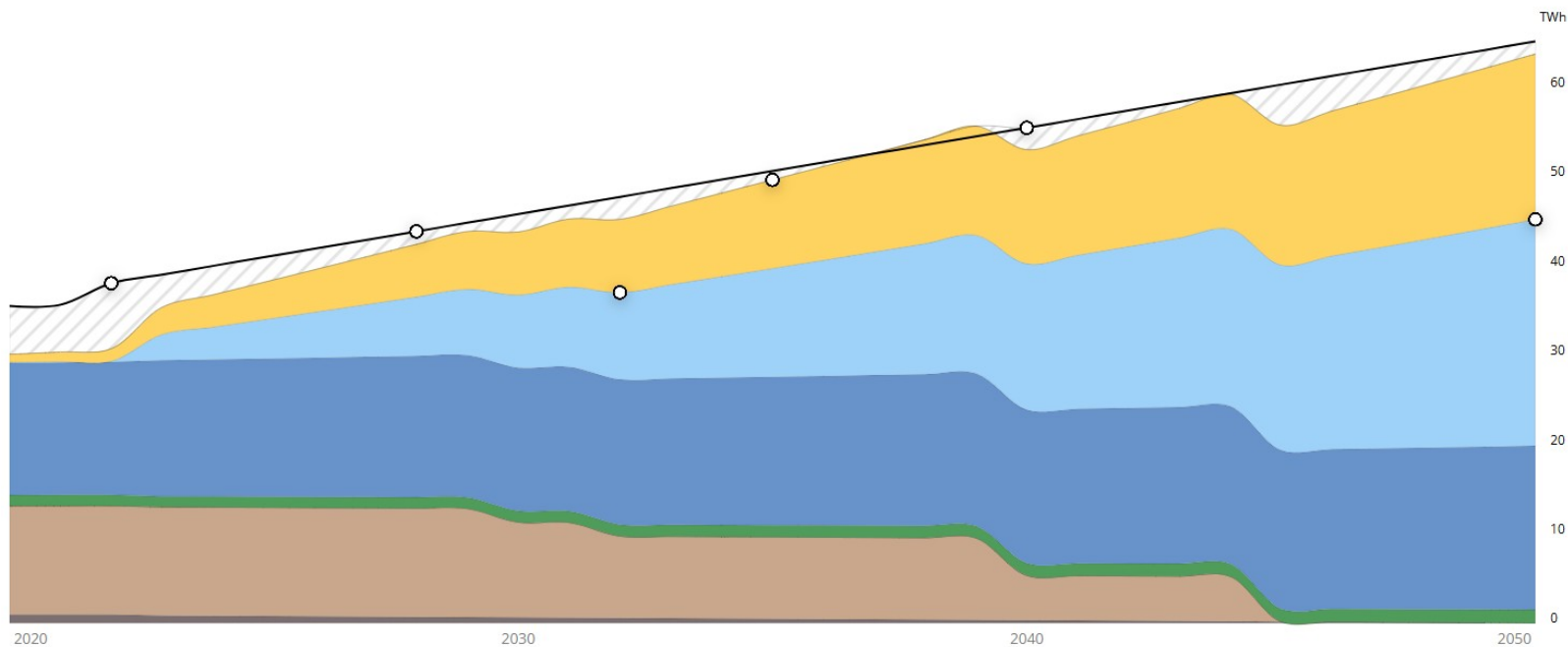
Nachfrage	78 TWh
Produktion	88 TWh
Sommerüberschuss	19 TWh
Winterimporte	9 TWh



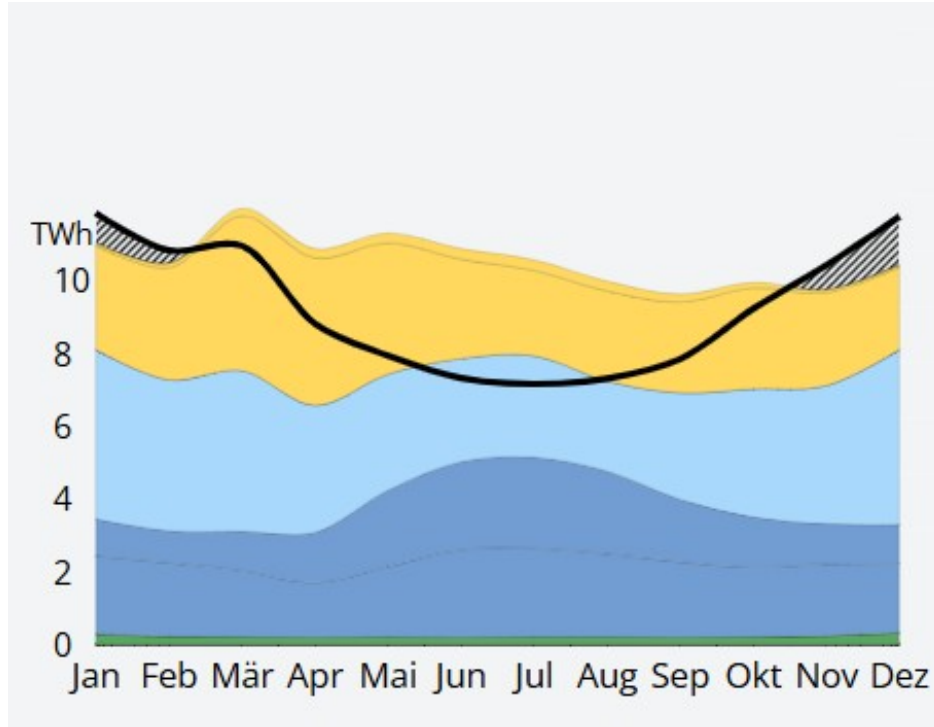
Winterhalbjahr: Ausbau Wind und PV in den Alpen



Nachfrage Importe PV Wind Hydro Biomasse Kernenergie Fossil



Jahresverlauf Szenario Wind und Alpensolar



Prognose 2050:

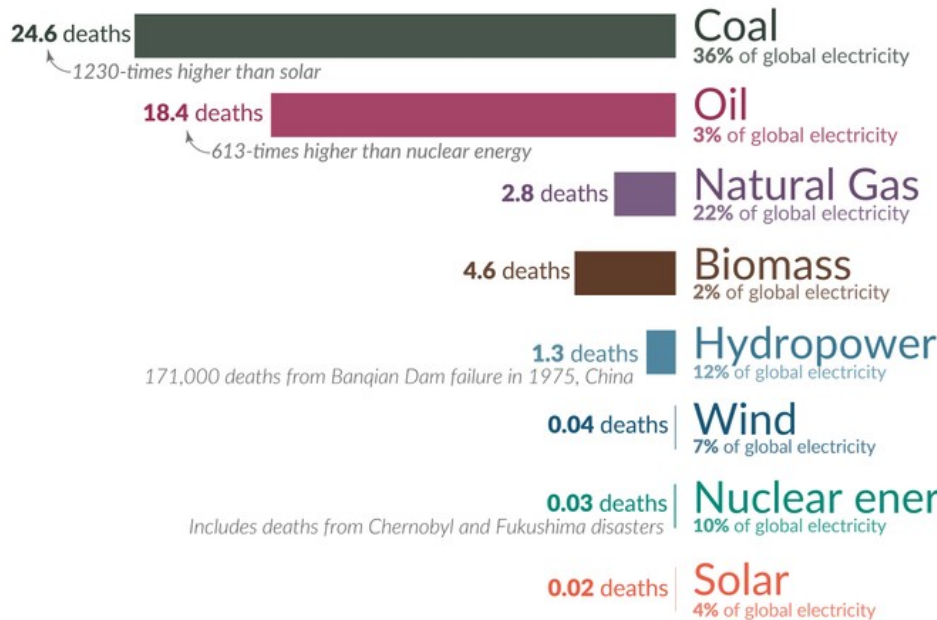
Nachfrage	112 TWh
Produktion	127 TWh
Sommerüberschuss	19 TWh
Winterimporte	3 TWh

What are the **safest** and **cleanest** sources of energy?

Death rate from accidents and air pollution

Measured as deaths per terawatt-hour of electricity production.

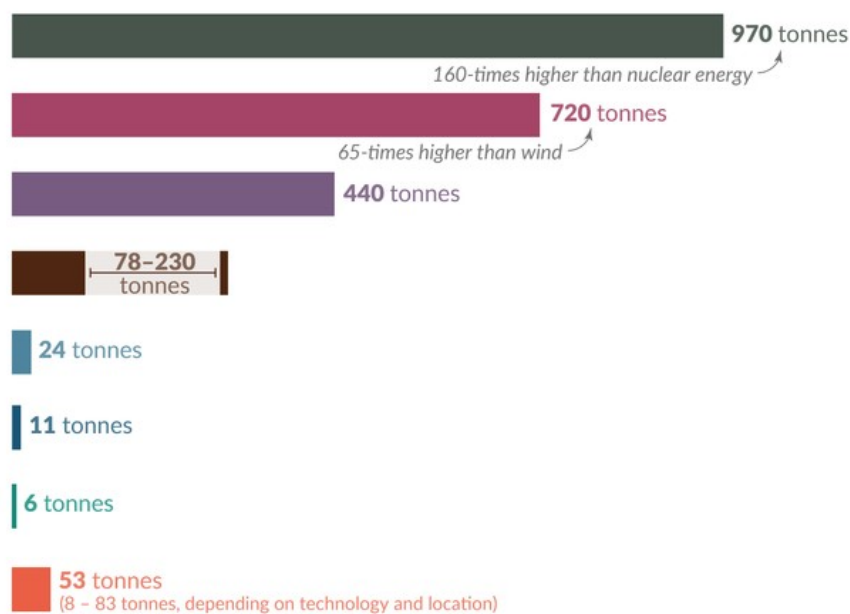
1 terawatt-hour is the annual electricity consumption of 150,000 people in the EU.



Greenhouse gas emissions

Measured in emissions of CO₂-equivalents per gigawatt-hour of electricity over the lifecycle of the power plant.

1 gigawatt-hour is the annual electricity consumption of 150 people in the EU.



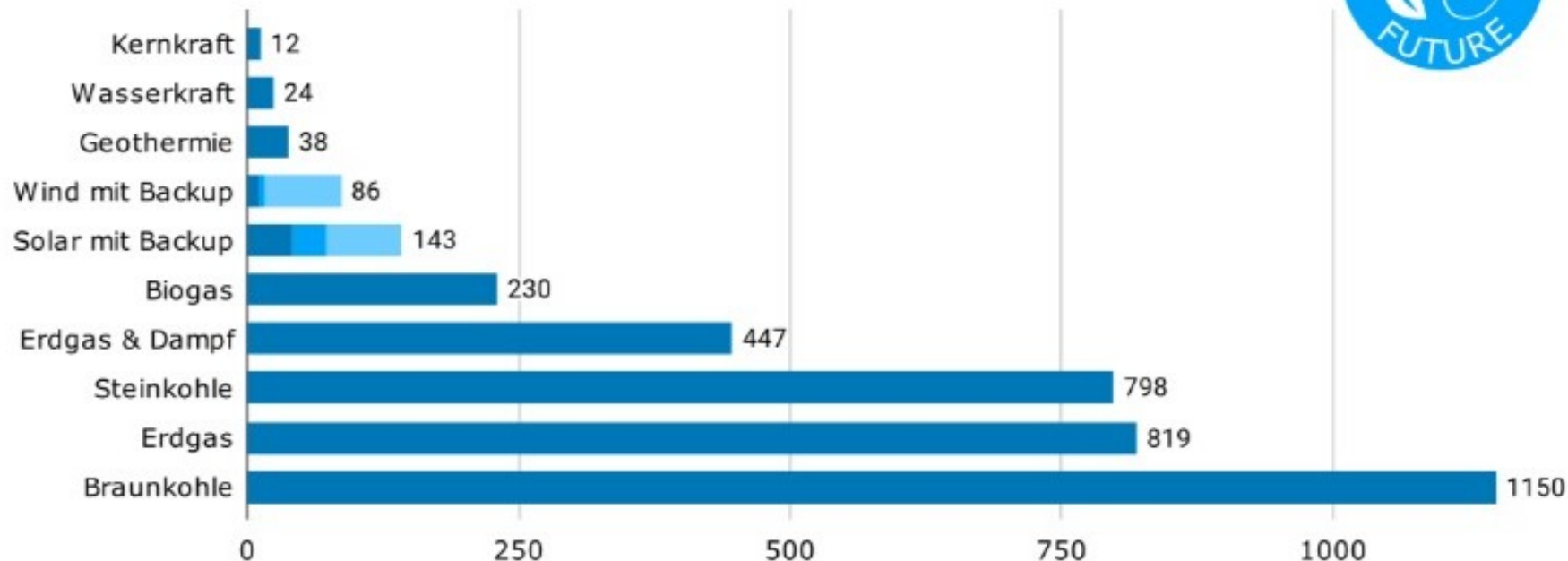
Death rates from fossil fuels and biomass are based on state-of-the art plants with pollution controls in Europe, and are based on older models of the impacts of air pollution on health. This means these death rates are likely to be very conservative. For further discussion, see our article: OurWorldinData.org/safest-sources-of-energy. Electricity shares are given for 2021. Data sources: Markandya & Wilkinson (2007); UNSCEAR (2008; 2018); Sovacool et al. (2016); IPCC AR5 (2014); UNECE (2022); Ember Energy (2021).

OurWorldinData.org – Research and data to make progress against the world's largest problems.

Licensed under CC-BY by the authors Hannah Ritchie and Max Roser.

Treibhausgase nach Energiequelle

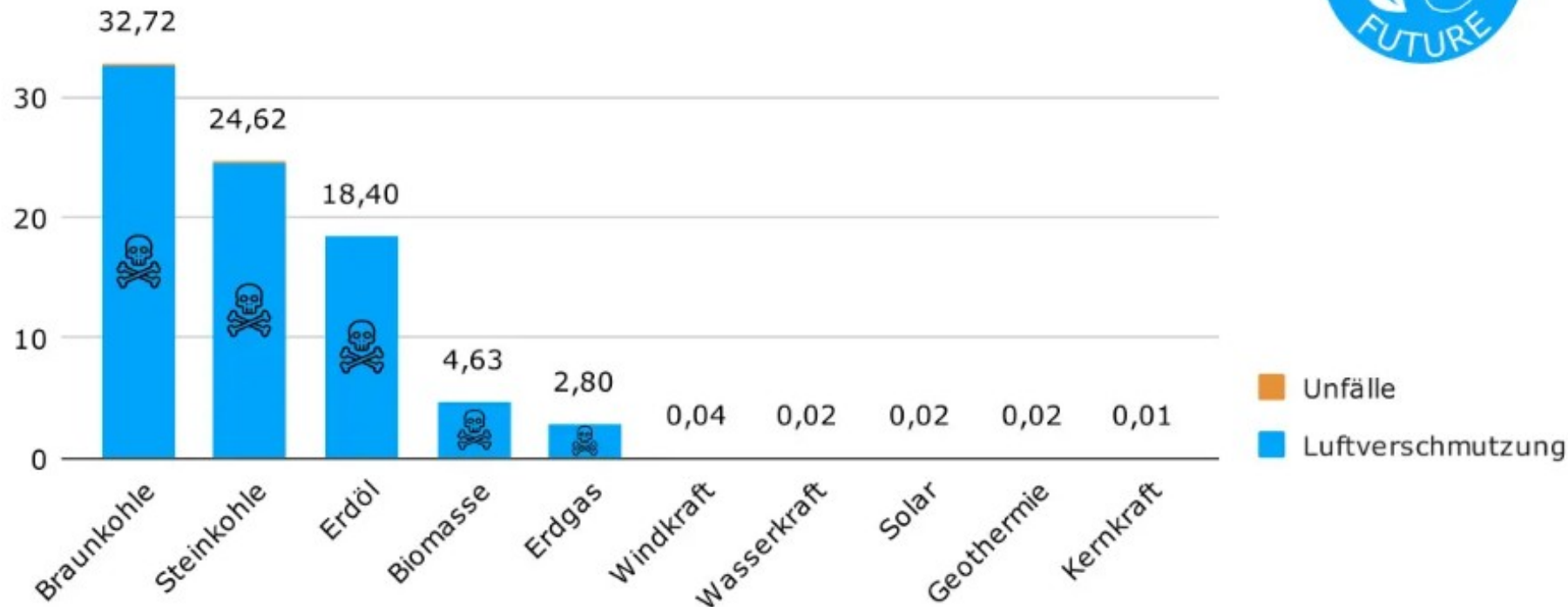
in CO₂-Äquivalenten (GTP100) g/kWh



Quellen: IPCC AR5 (2018), AG Energiebilanzen (2019), Umweltbundesamt (2020),
Hsu et al (2012), Pehnt et al (2008), Energy Charts (2018)

Sicherste Energiequellen nach Todesopfern

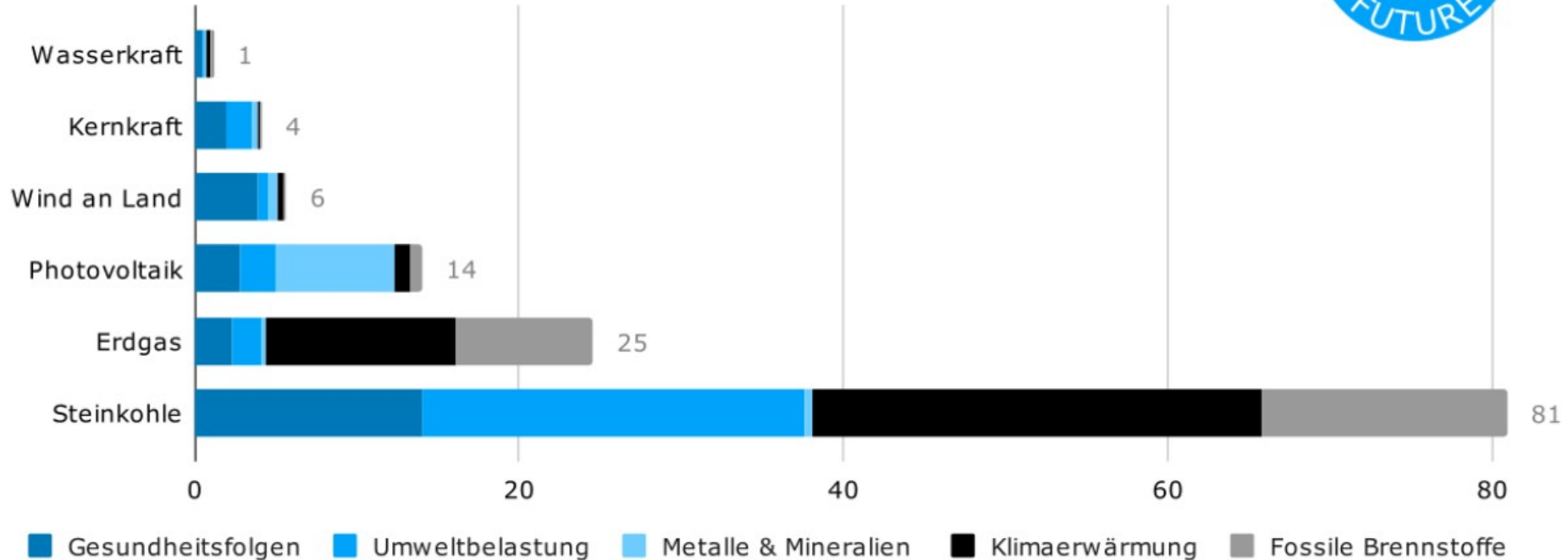
Mortalität durch Luftverschmutzung & Unfälle pro TWh Strom - ohne Klimafolgen



Quellen: Markandya & Wilkinson (2007), Sovacool et al (2015)

Umweltauswirkungen von Energiequellen

externe Umweltkosten pro TWh_{el} in Europa - normalisierte & gewichtete Punkte

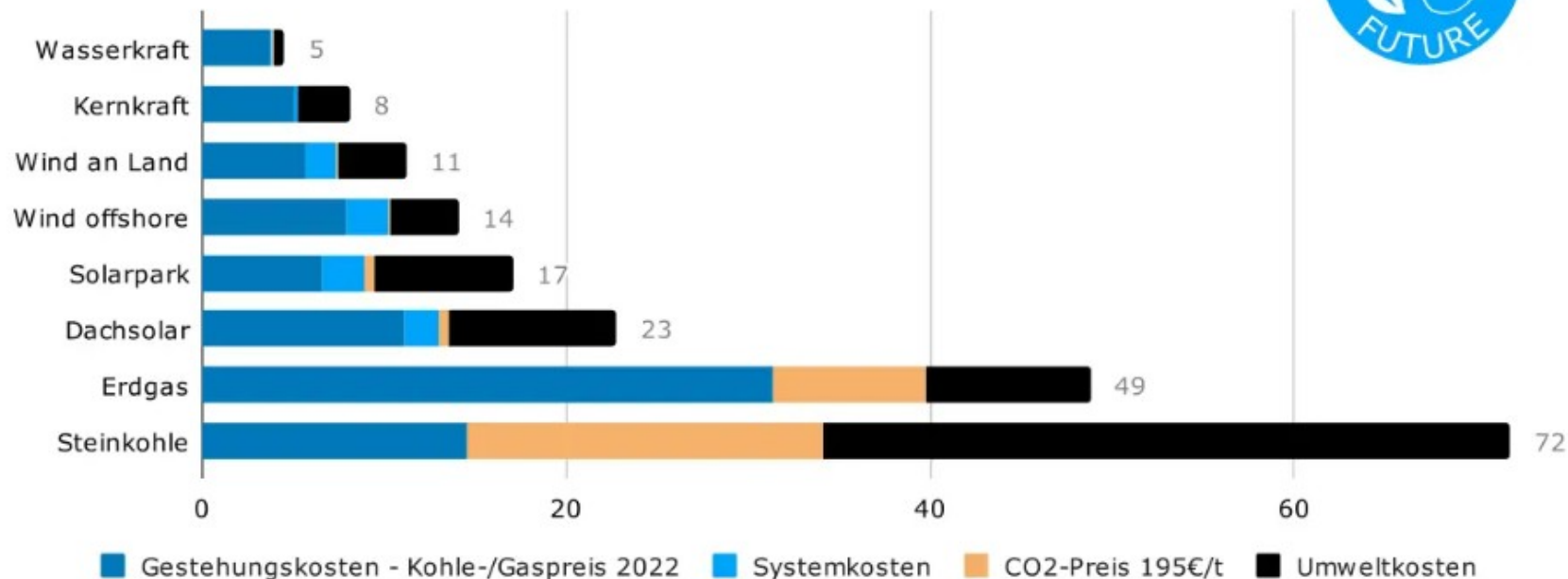


Quelle: UNECE (2021)

Vollkosten bei kompletter Berücksichtigung externer Kosten

Vollkosten nach Energiequelle inklusive externe Kosten

in €Cent pro kWhel für mitteleuropäische Erzeuger



Quellen: UNECE (2021), IEA (2020), OECD (2018)

Produktionskosten klimaneutraler Produktionstechnologien

