

# Positive Kipppunkte für den Klimaschutz

---

## K3 Klimakongress 2024

---

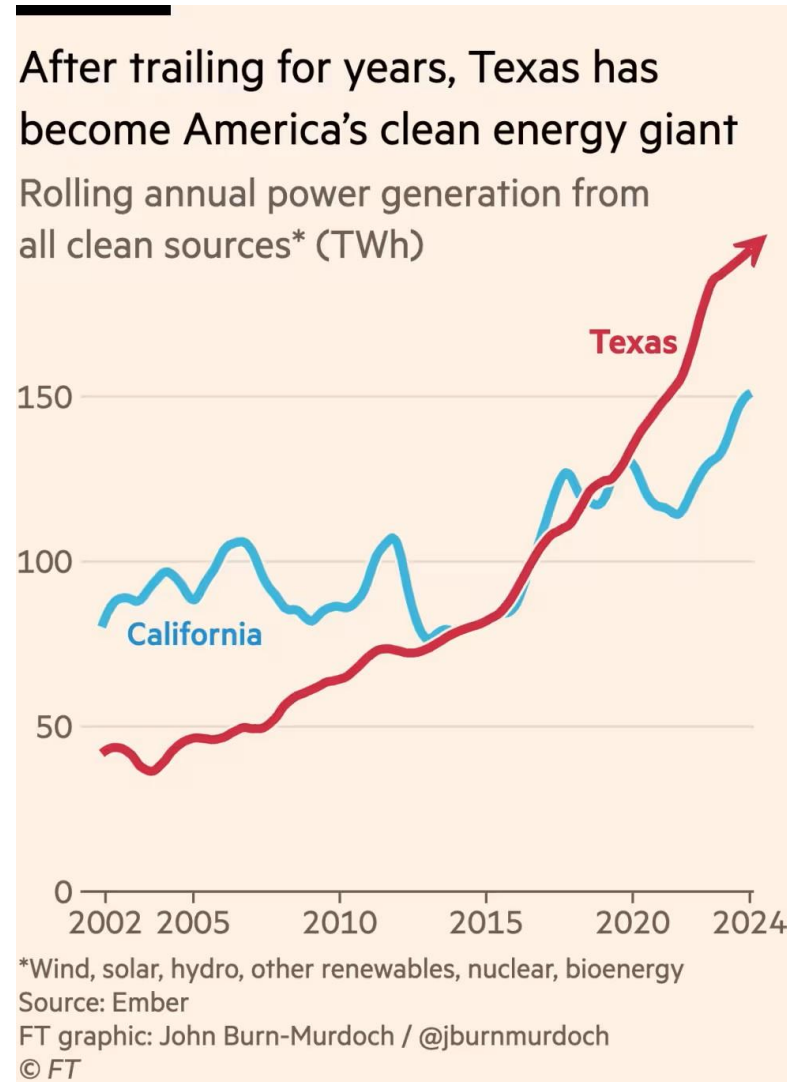
Dr. Lukas Fesenfeld, ETH Zürich & Universität Bern

# Eine Realität...



(Washington Post illustration/ Chip Somodevilla/Getty Images; iStock)

# Und eine andere Realität...

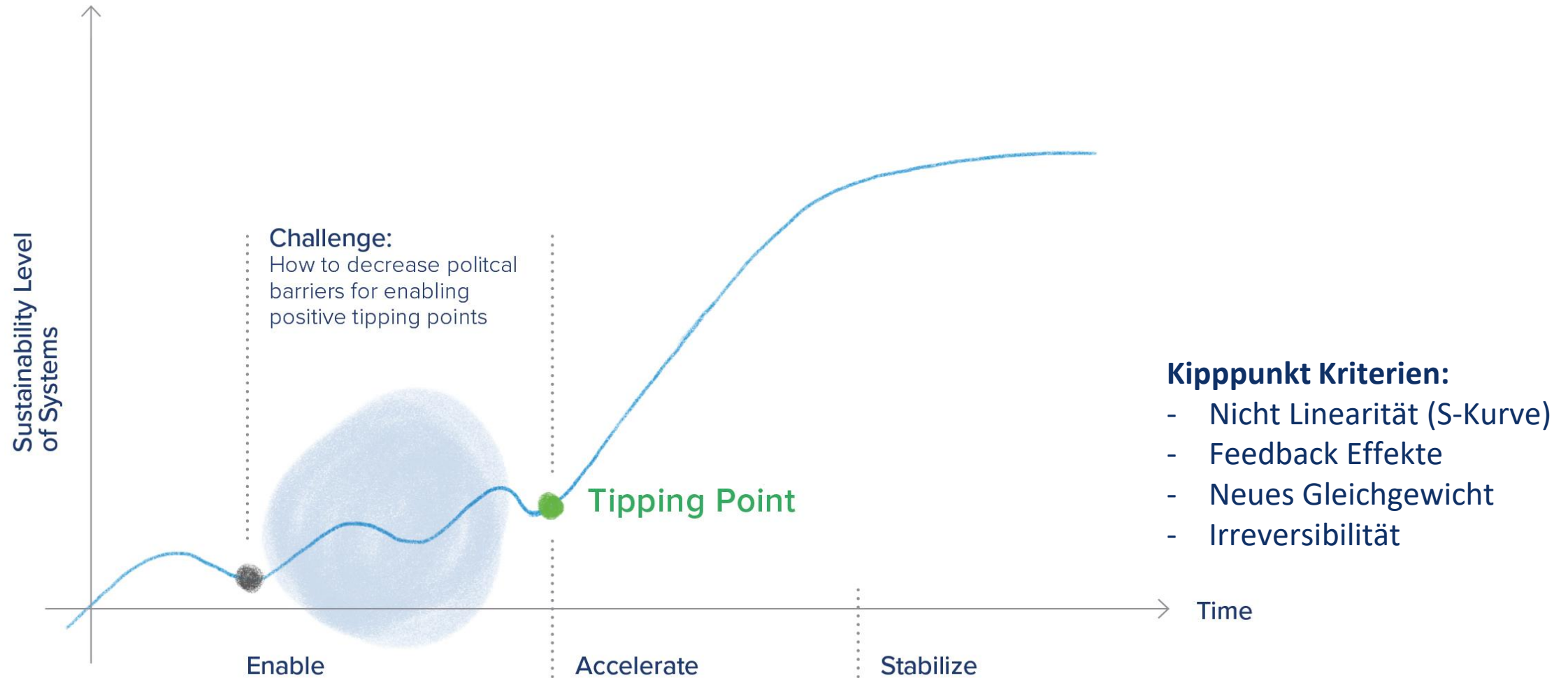


# 5 Thesen

1. Positive Kipppunkte für den Klimaschutz sind möglich, aber nicht ohne a-ha
2. Verhaltens- und Technologiewandel zusammendenken und Feedbacks nutzen
3. Kommunikation und Design von Klimaschutzpolitik eng verzahnen
4. Handeln strategisch ausrichten und überraschende Koalitionen bilden
5. Institutionen nicht vergessen und weiterentwickeln

1. Positive Kipppunkte für den Klimaschutz sind möglich, aber nicht ohne a-ha

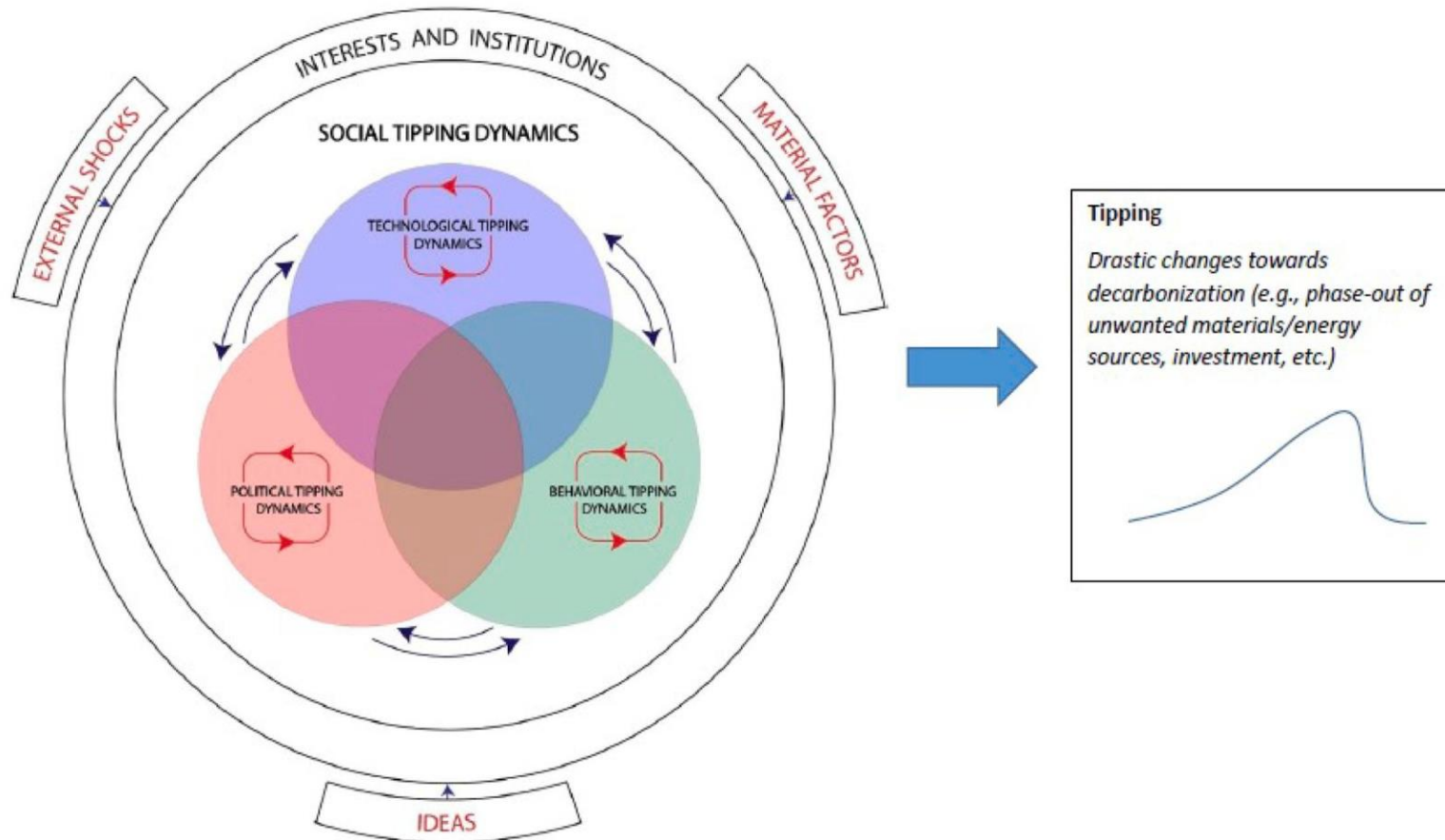
# Positive Kipppunkte ermöglichen



Fesenfeld, L.P., Schmid, N., Mathys, A., Finger, R., and Schmidt, T. (2022). The politics of enabling tipping points for sustainable development. *One Earth*, 1-26

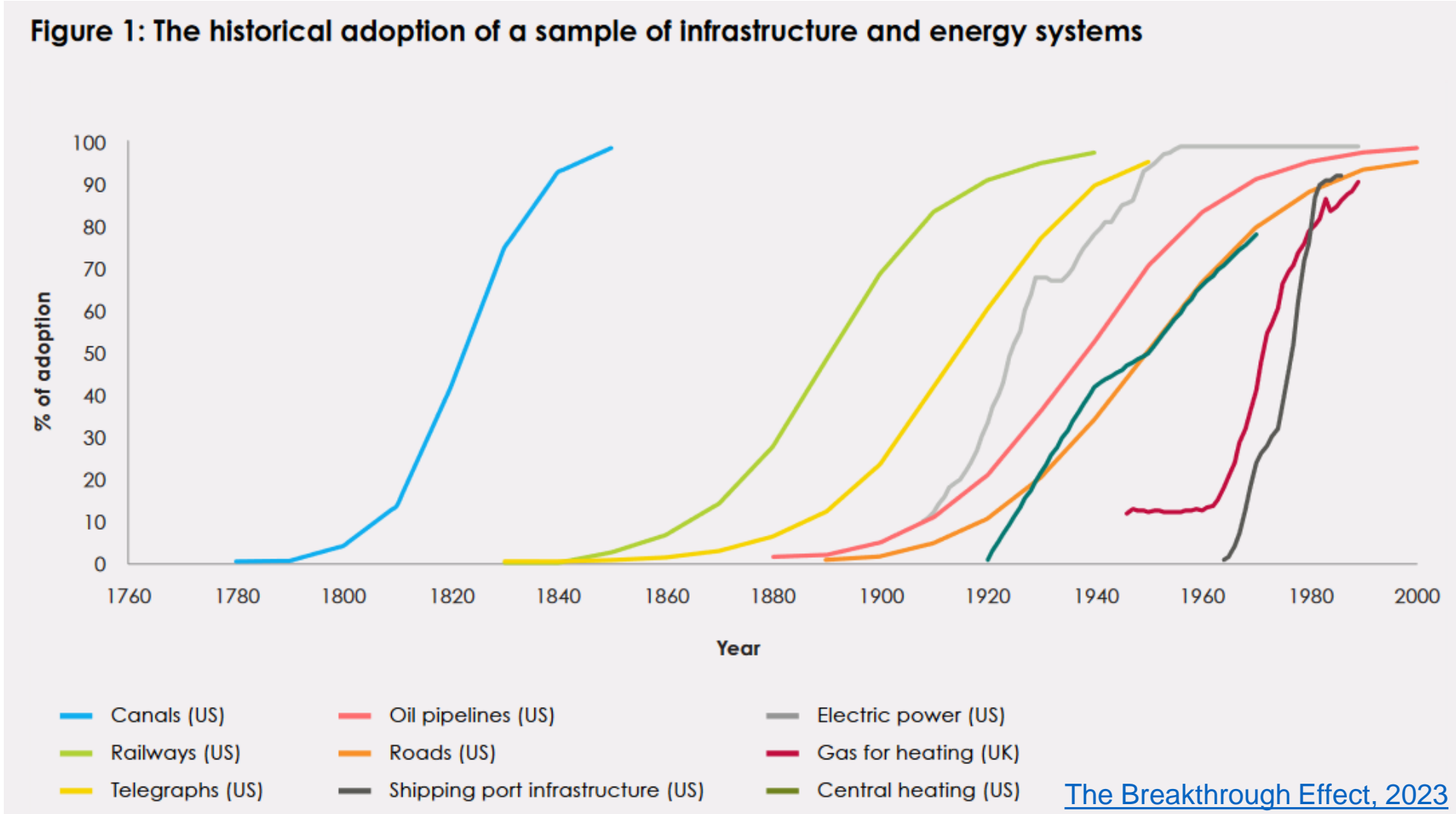
# Kipppunkt-Dynamiken in Technologie, Verhalten & Politik

## The Social Tipping Dynamics and Their Interlinkages



[Stadelmann-Steffen et al., 2021](#)

# S-Kurven sind historisch keine Ausnahme...

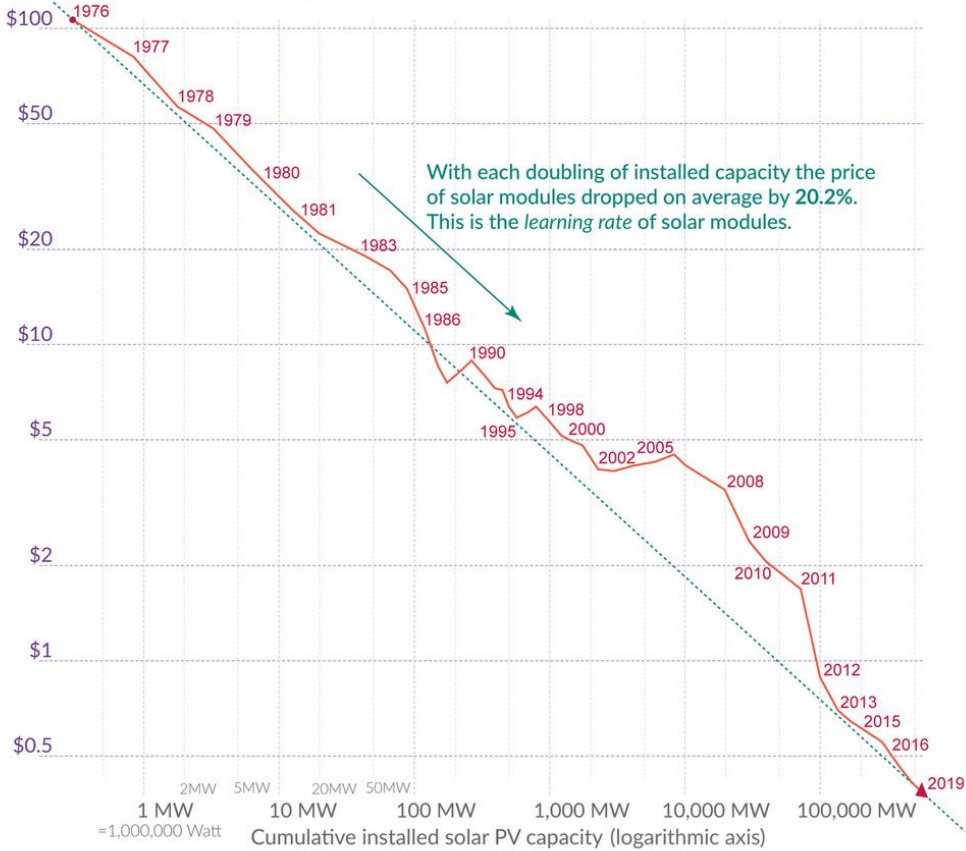




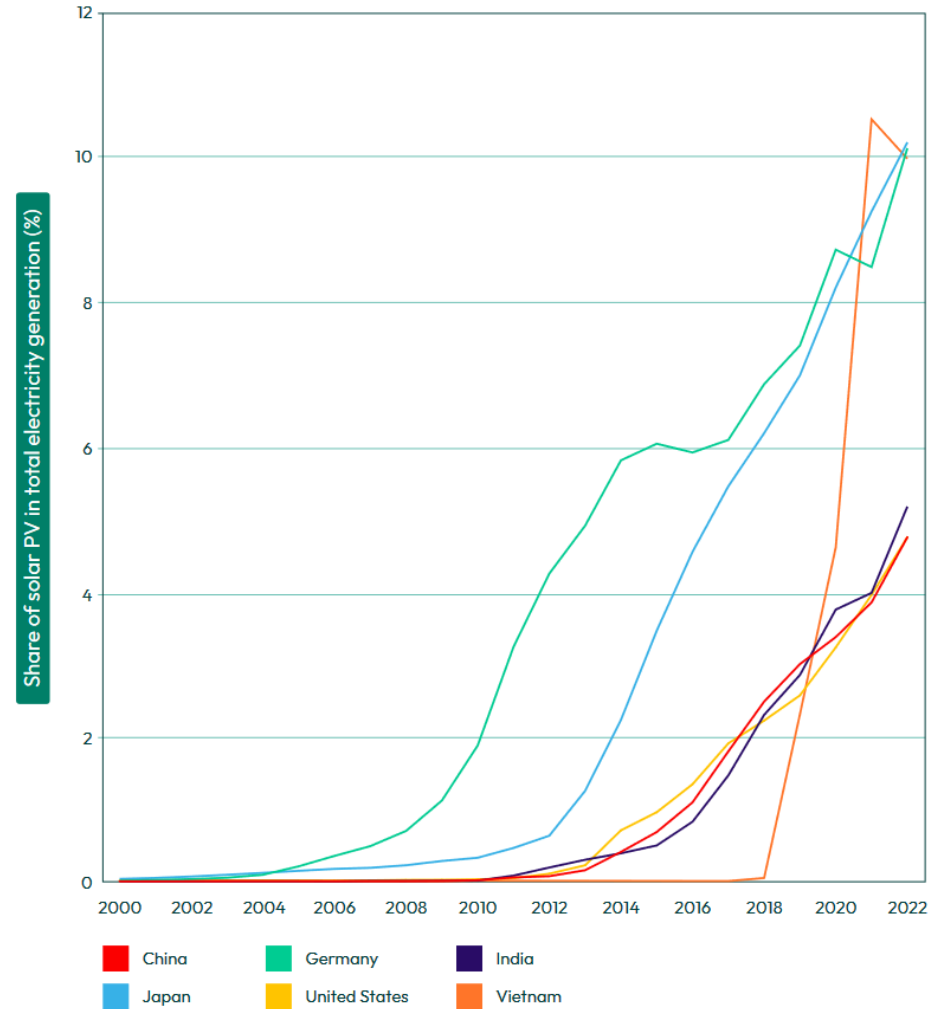
# ...und es gibt sie auch heute bei den Erneuerbaren.

## The price of solar modules declined by 99.6% since 1976 Our World in Data

Price per Watt of solar photovoltaics (PV) modules (logarithmic axis)  
The prices are adjusted for inflation and presented in 2019 US-\$.



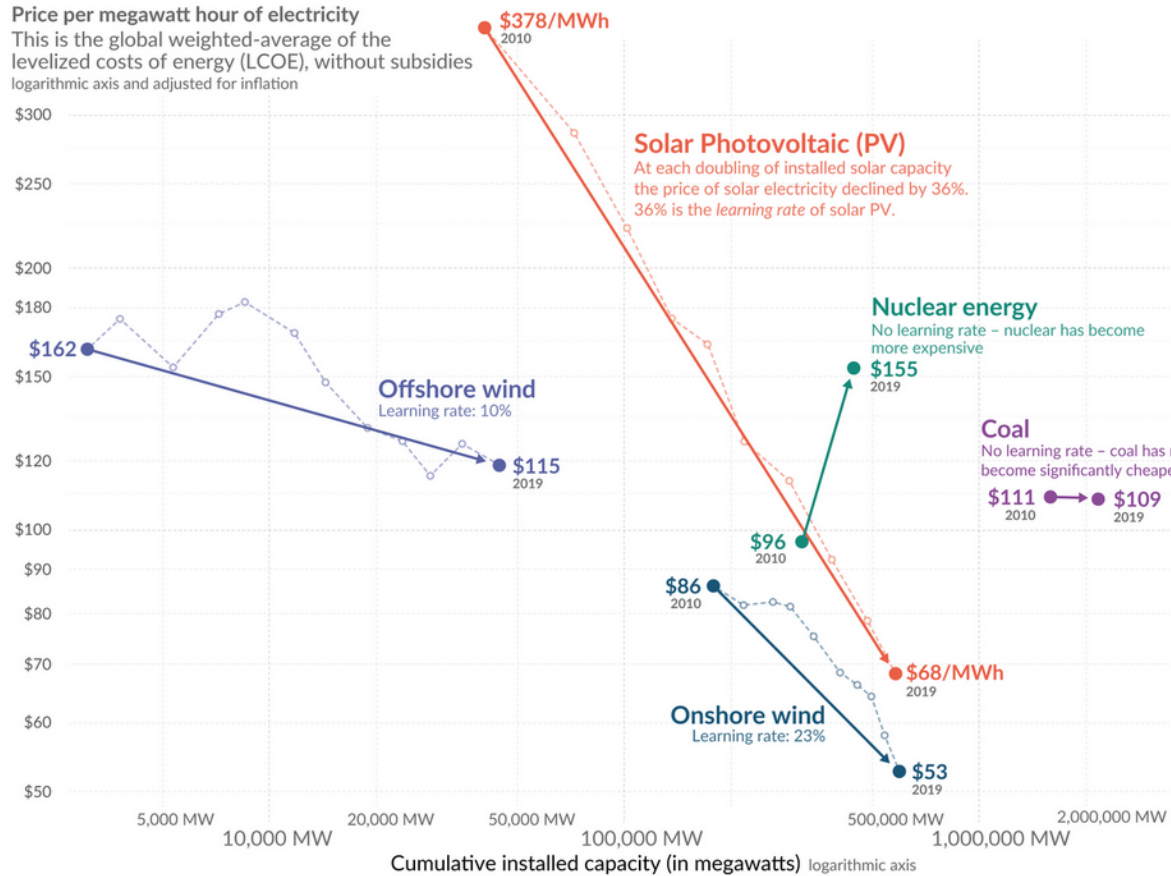
Data: Lafond et al. (2017) and IRENA Database; the reported learning rate is an average over several studies reported by de La Tour et al (2013) in Energy. The rate has remained very similar since then.  
OurWorldinData.org - Research and data to make progress against the world's largest problems. Licensed under CC-BY by the author Max Roser



Source: Our World In Data (2022)

# Technologische Lernkurven führen zu Preisreduktionen...

Electricity from renewables became cheaper as we increased capacity – electricity from nuclear and coal did not



Source: IRENA 2020 for all data on renewable sources; Lazard for the price of electricity from nuclear and coal – IAEA for nuclear capacity and Global Energy Monitor for coal capacity. Gas is not shown because the price between gas peaker and combined cycles differs significantly, and global data on the capacity of each of these sources is not available. The price of electricity from gas has fallen over this decade, but over the longer run it is not following a learning curve.

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

Licensed under CC-BY by the author Max Roser

Technologies that become cheaper with increasing production enter a virtuous cycle



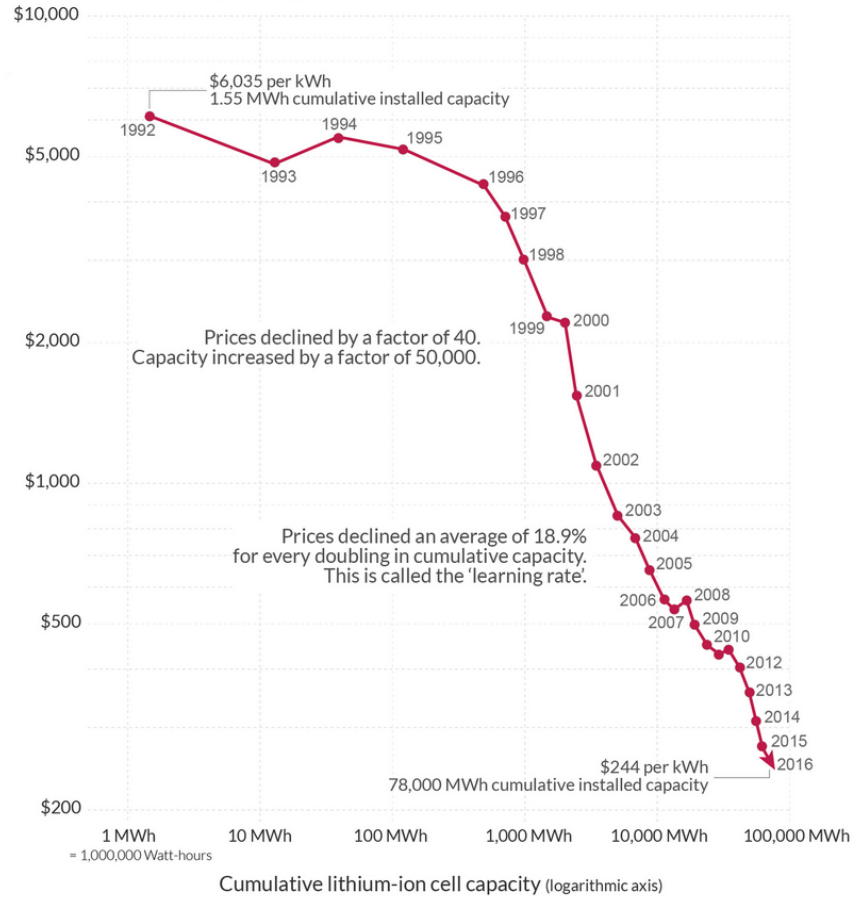
Learning curves = each doubling of the cumulative installed capacity price declines by % factor

# ...auch bei Batterien und Elektroautos...

Price and market size of lithium-ion batteries since 1992



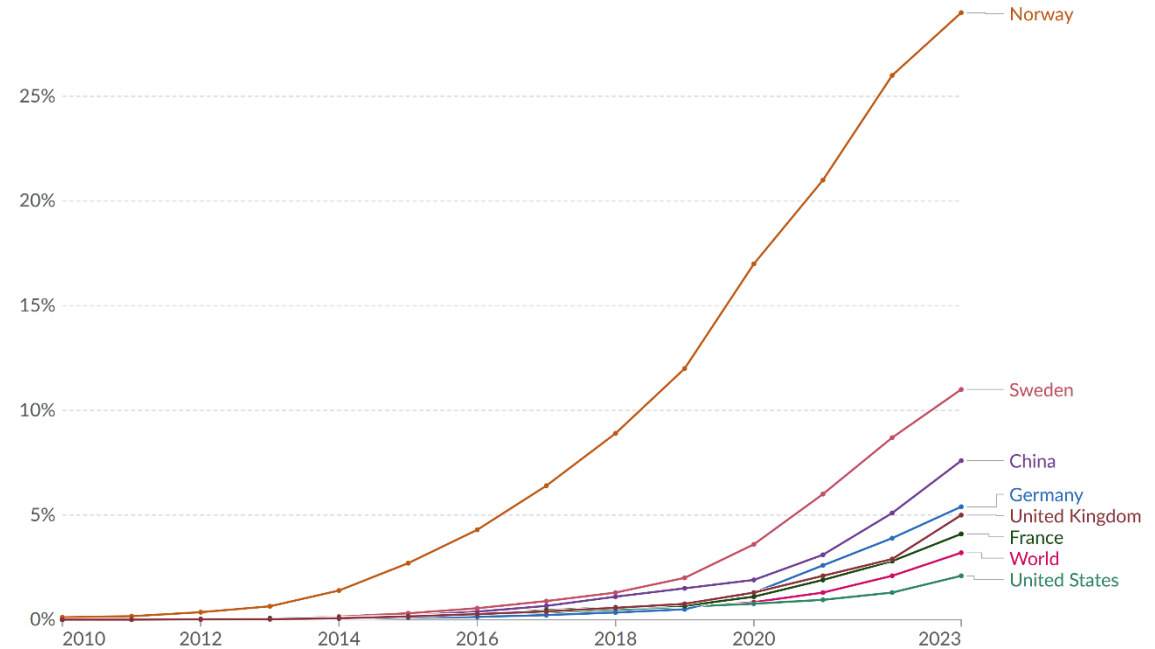
Price per kilowatt-hour; kWh (logarithmic axis)



Share of cars currently in use that are electric, 2010 to 2023



Electric cars include fully battery-electric<sup>1</sup> and plug-in hybrids<sup>2</sup>.

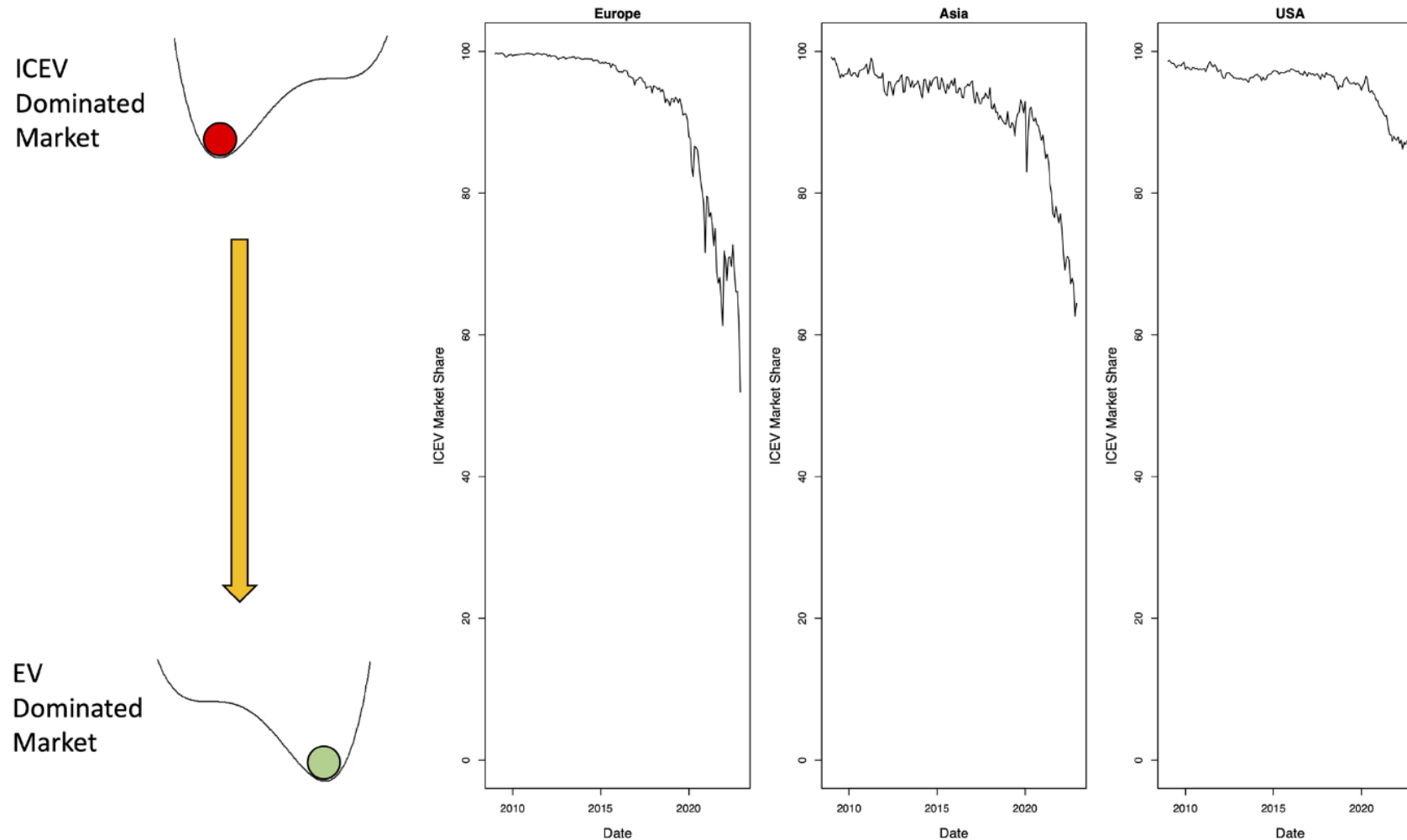


Data source: International Energy Agency. Global EV Outlook 2024.

OurWorldinData.org/energy | CC BY

- 1. Fully battery-electric:** Cars or other vehicles that are powered entirely by an electric motor and battery, instead of an internal combustion engine.
- 2. Plug-in hybrid:** Cars or other vehicles that have a rechargeable battery and electric motor, and an internal combustion engine. The battery in plug-in hybrids is smaller and has a shorter range than battery-electric cars, so over longer distances, the car starts running on gasoline once the battery has run out.

# ...und dies kann systemische Effekte haben...

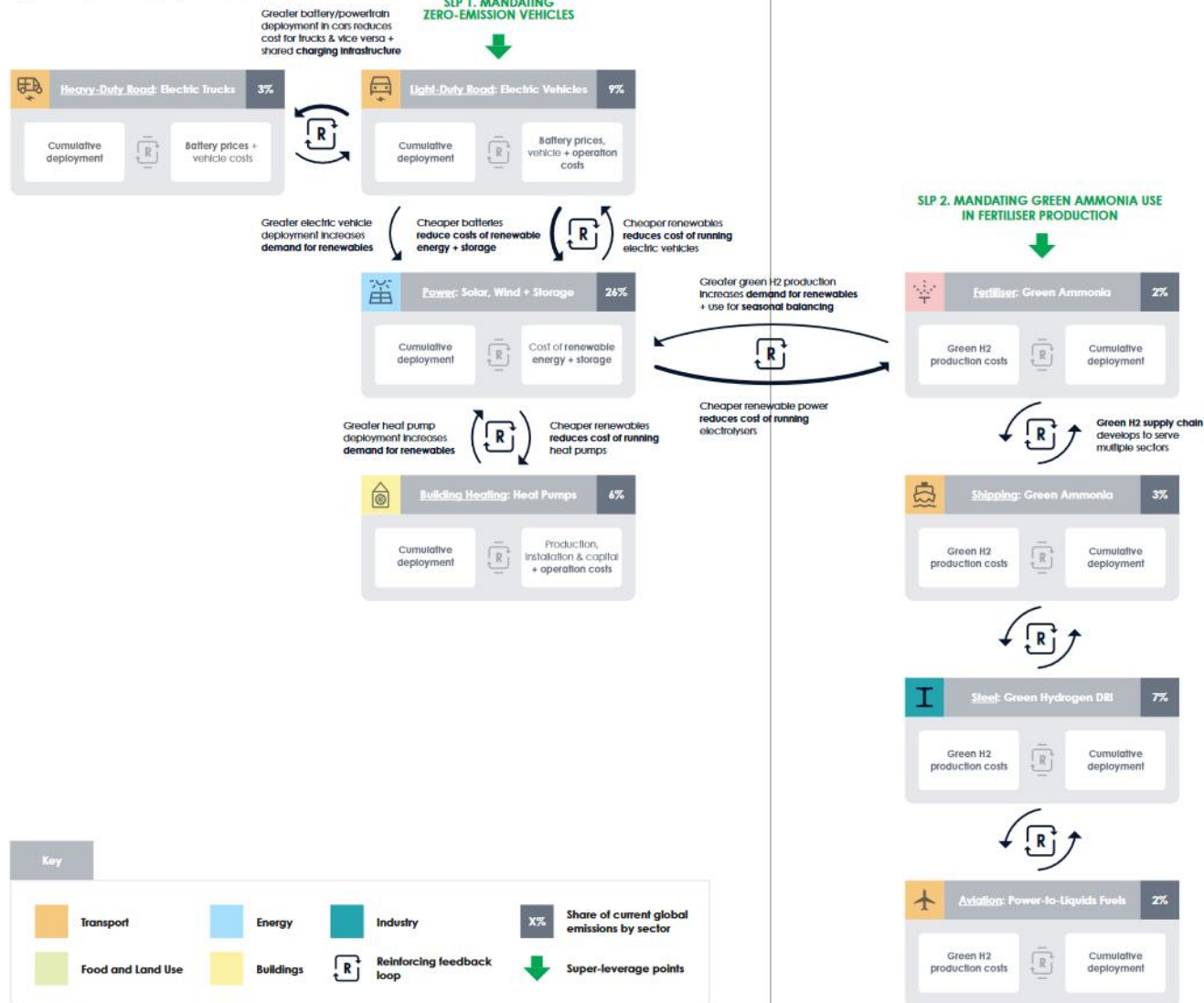


**Figure 4.3.4:** ICEV Market Share in the Europe, Asia and the USA, alongside a cartoon representing the alternate ICV dominated and EV dominated stable regimes which may exist.

[Buxton & Boulton in Lenton et al \(2023\) Global Tipping Point Report, Section 4: Positive tipping points](#)

# ...und Kippunkt Kaskaden auslösen?

Figure 5: Super-leverage points and tipping cascades



[The Breakthrough Effect, 2023](#)



Aber nicht ohne a-ha!



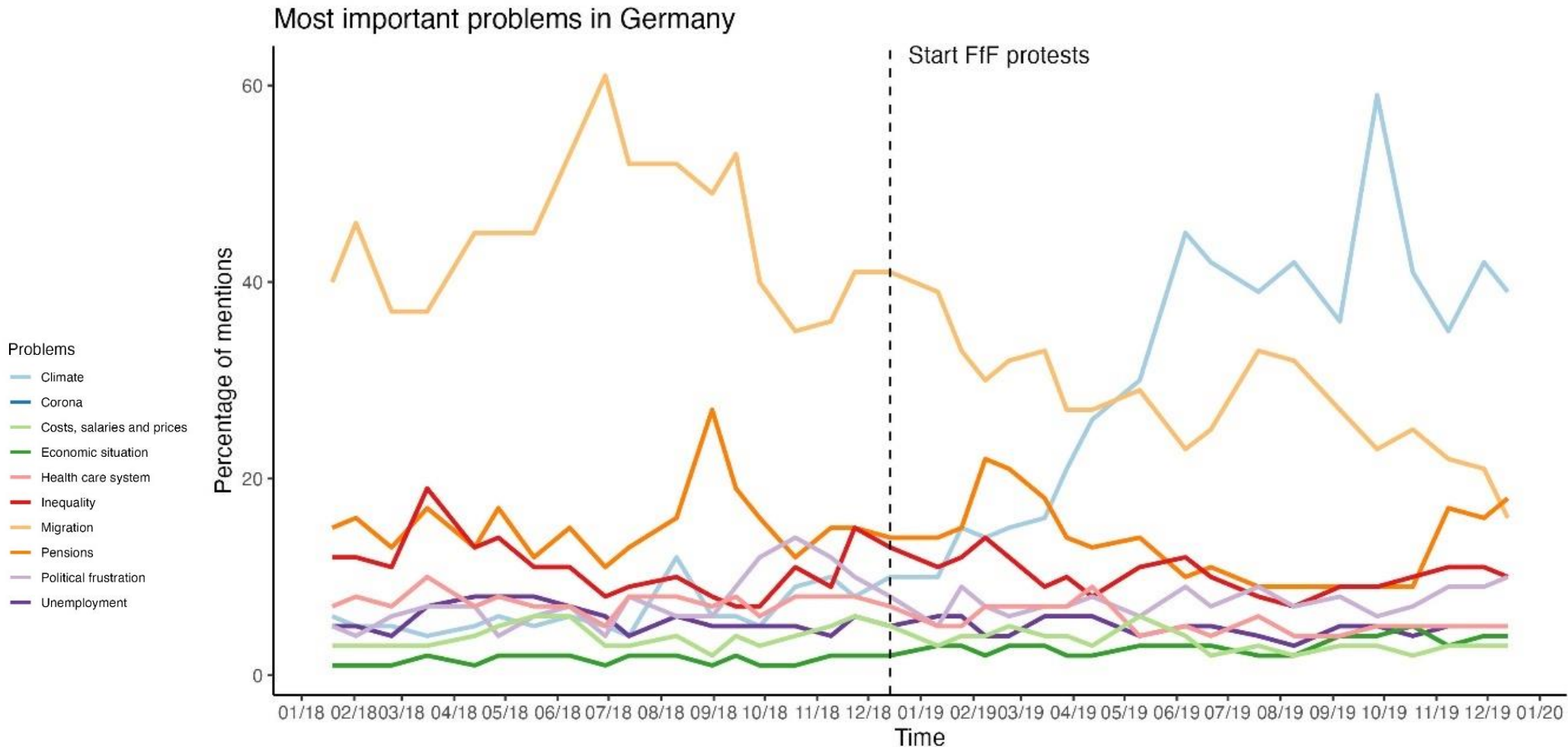
Early adopters: a-ha in 1985.



# Gibt es Kipppunkte in unseren sozialen Systemen...



# ...und in unseren politischen Systemen?



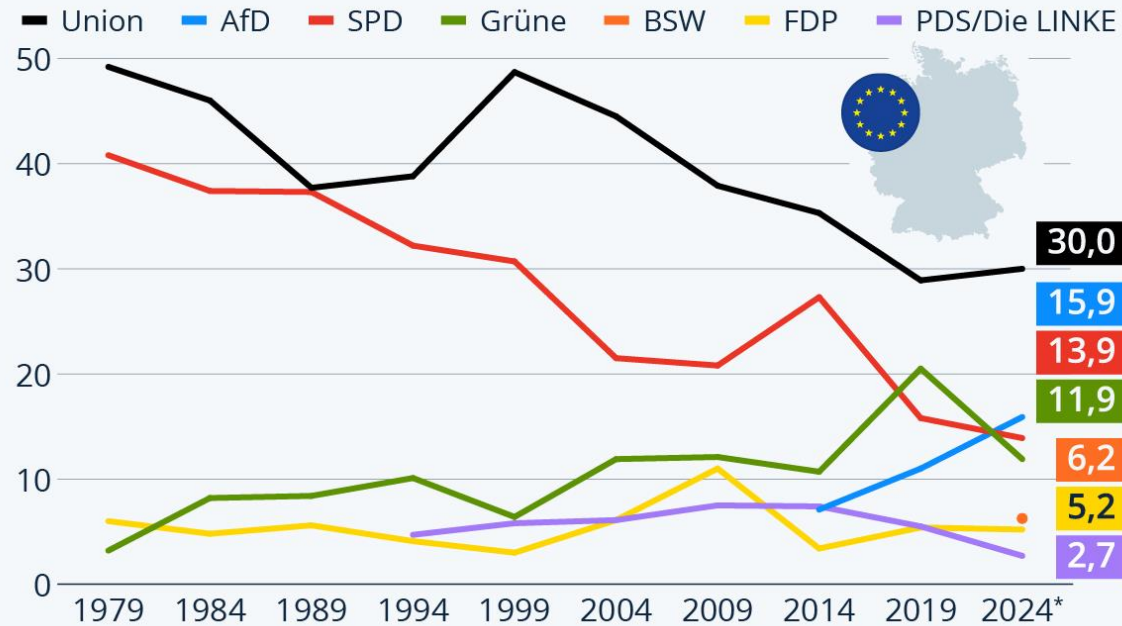
*Fesenfeld et al, 2024; Own illustration: The figure illustrates the results of the monthly surveys conducted by the Forschungsgruppe Wahlen with a representative sample of 1500 German citizens, who are eligible to vote (18+).*



# Mit dauerhaften Effekten?

## So hat Deutschland bislang bei Europawahlen gewählt

Stimmenanteile der Parteien bei den Europawahlen in Deutschland (in %)



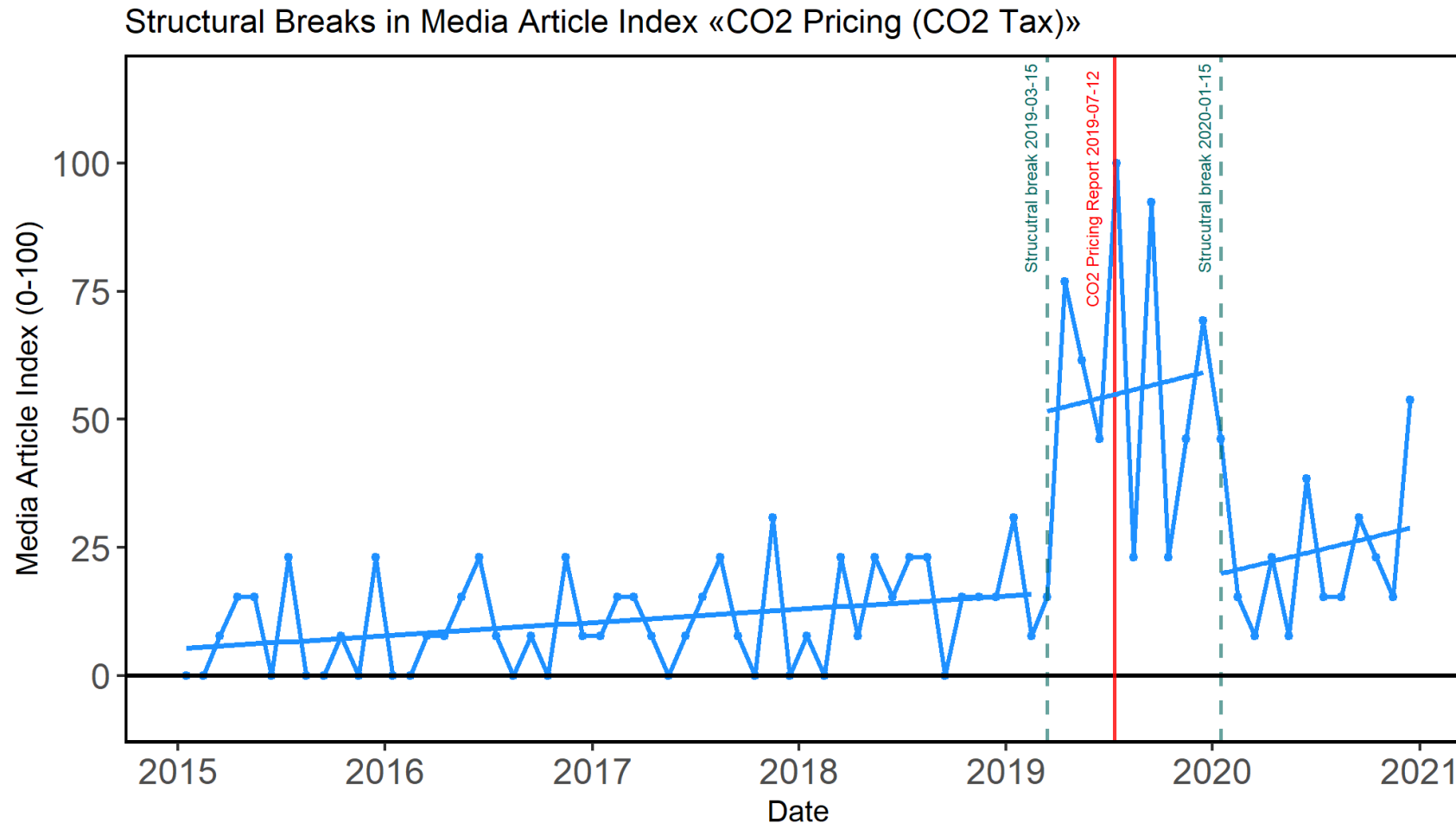
\* Stand: 10.06.2024 06:10 Uhr

Quelle: Bundeswahlleitung



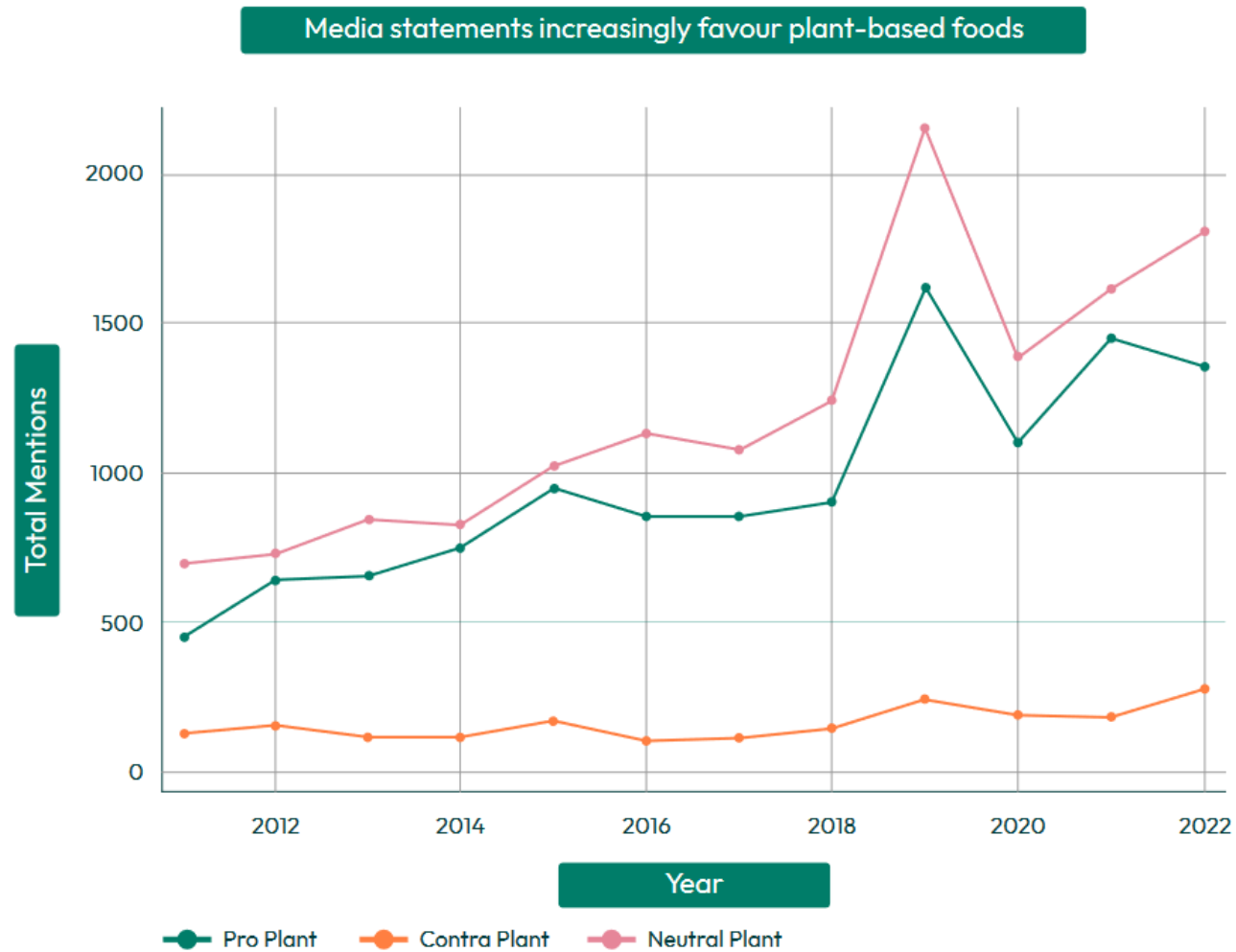
statista

# Kurzfristige Machbarkeitsfenster, langfristige Pfadabhängigkeiten



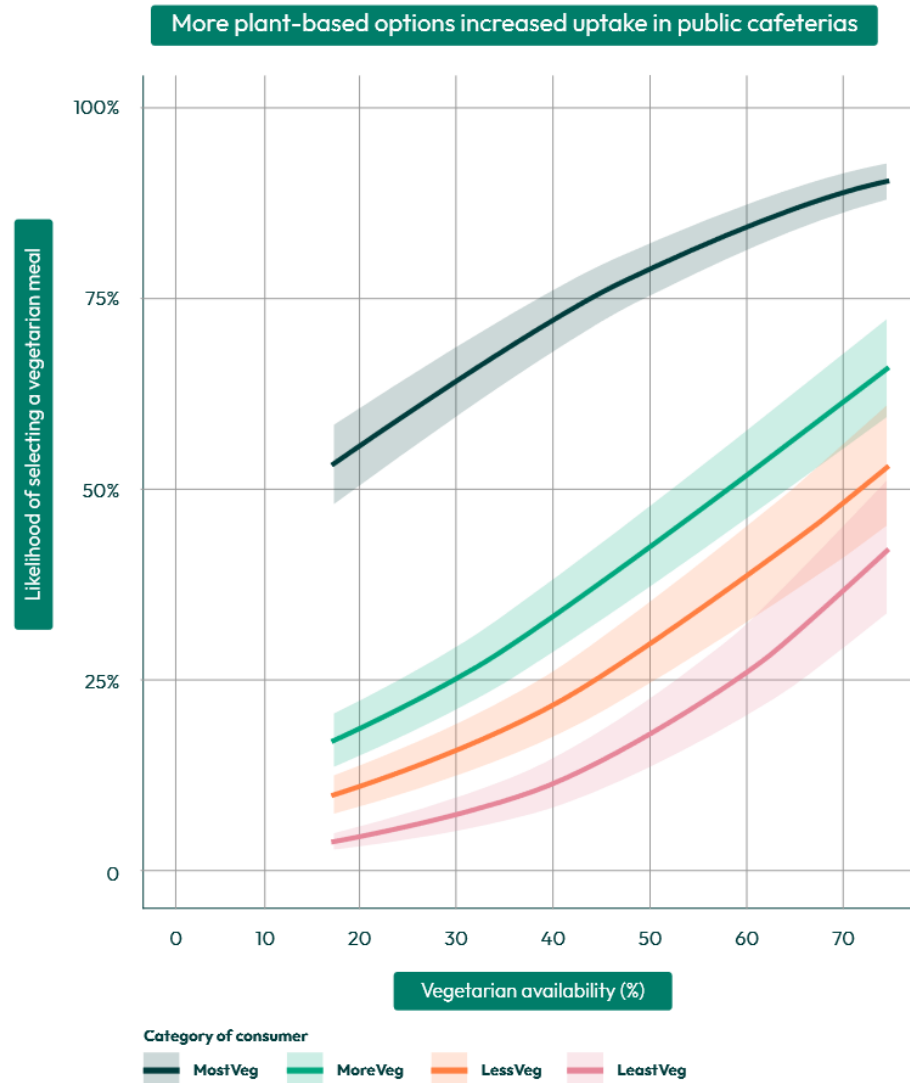
Fesenfeld, L.P., Levi, S., Montfort, S., Maier, M., Flachslund, C., Ingold, K. (2024). The political economy of German climate policymaking: An NLP-based discourse and process-tracing analysis of carbon price adoption in Germany.

# Und unser Verhalten und die sozialen Normen...



Based on a natural language processing analysis of over 500'000 media reports from the two most populated countries per continent, the graph shows the share of media statements in favour (pro), neutral, and against (con) plant-based food.

# ...lassen sich rascher als vermutet ändern, aber nachhaltig?



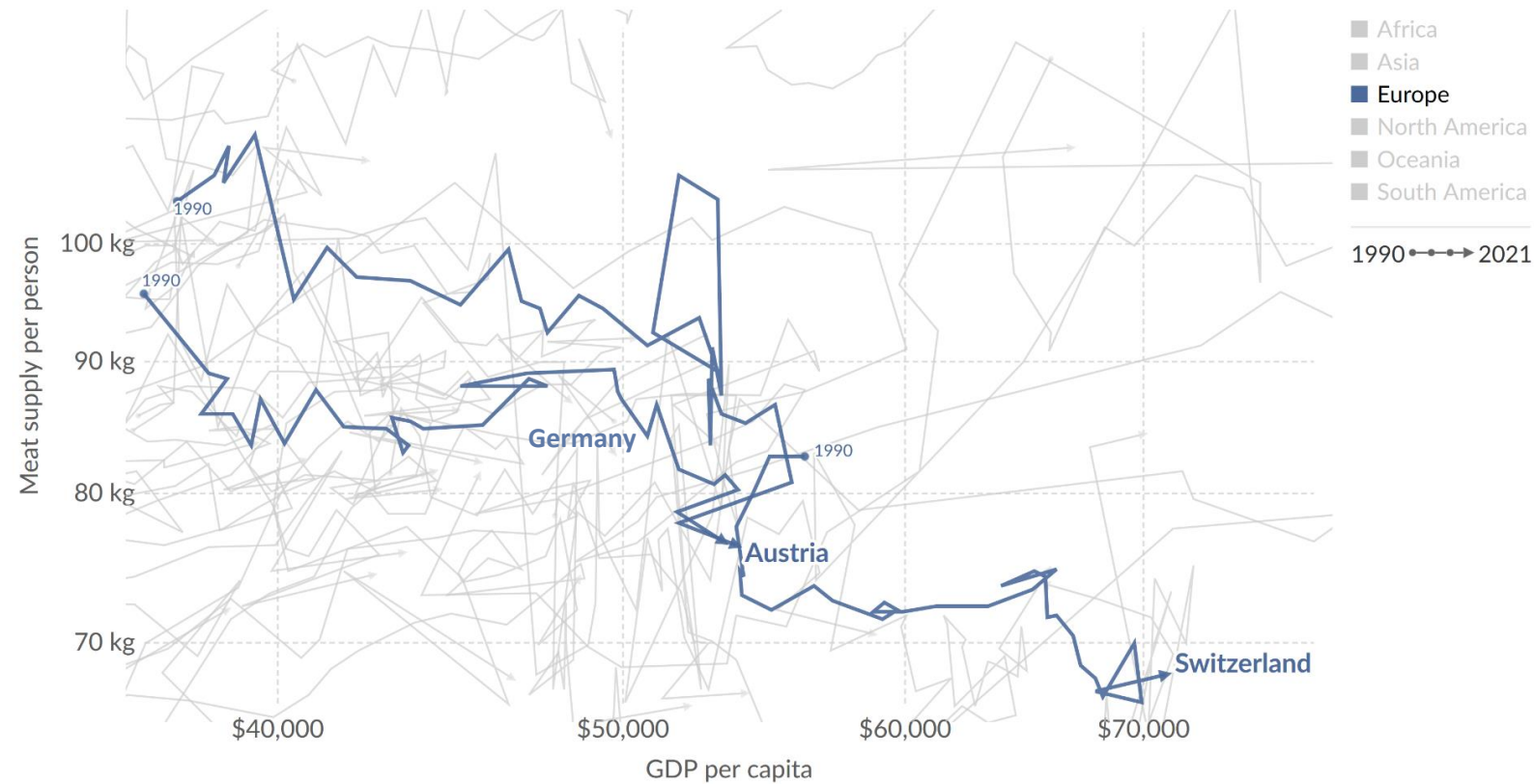
[Garnett et al., \(2019\)](#)

# Es kommt stets drauf an!

## Meat supply vs. GDP per capita, 1990 to 2021

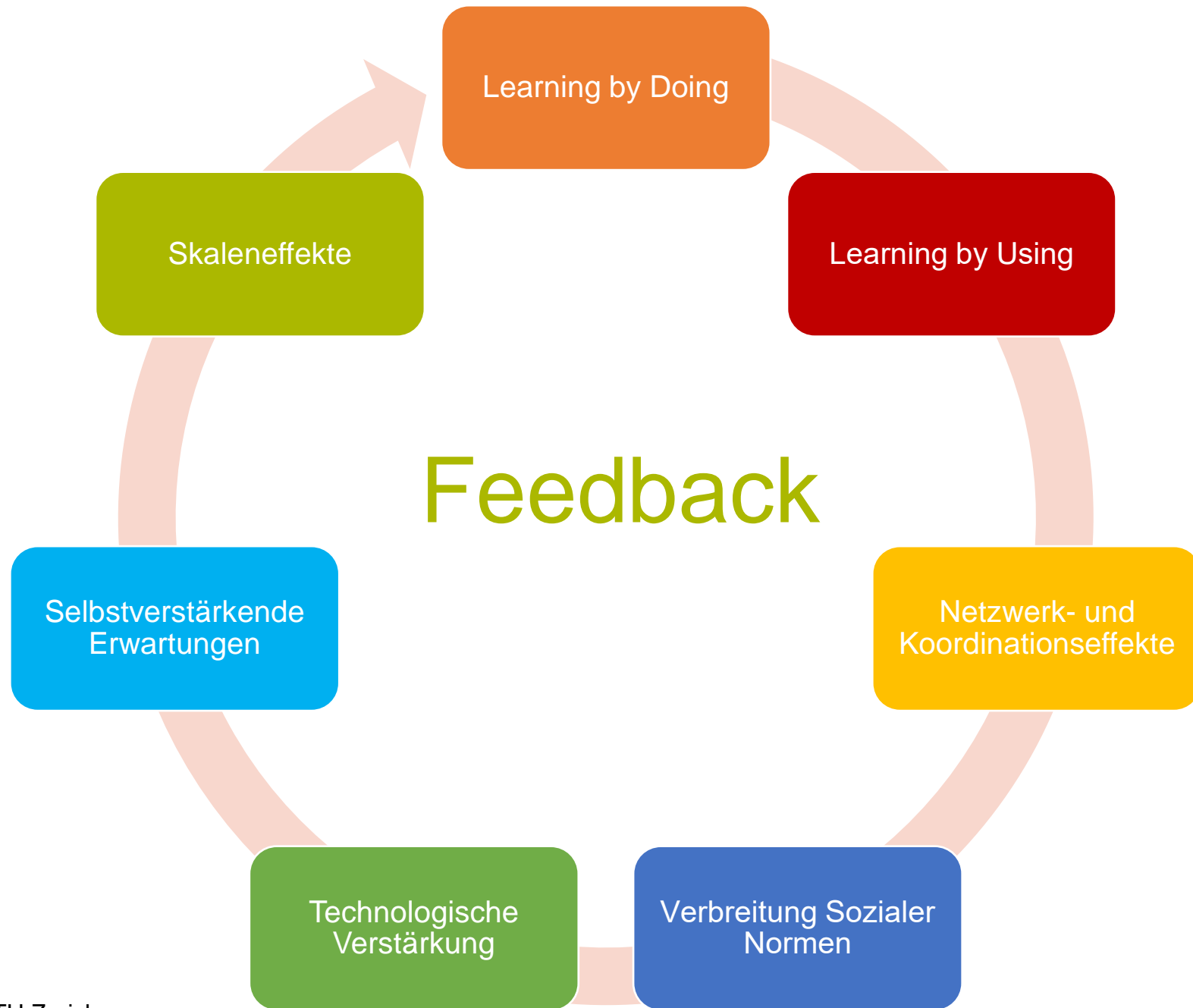
Our World  
in Data

Average meat supply per capita, measured in kilograms per year versus gross domestic product (GDP) per capita measured in constant international-\$. International-\$ corrects for price differences across countries. Figures do not include fish or seafood.

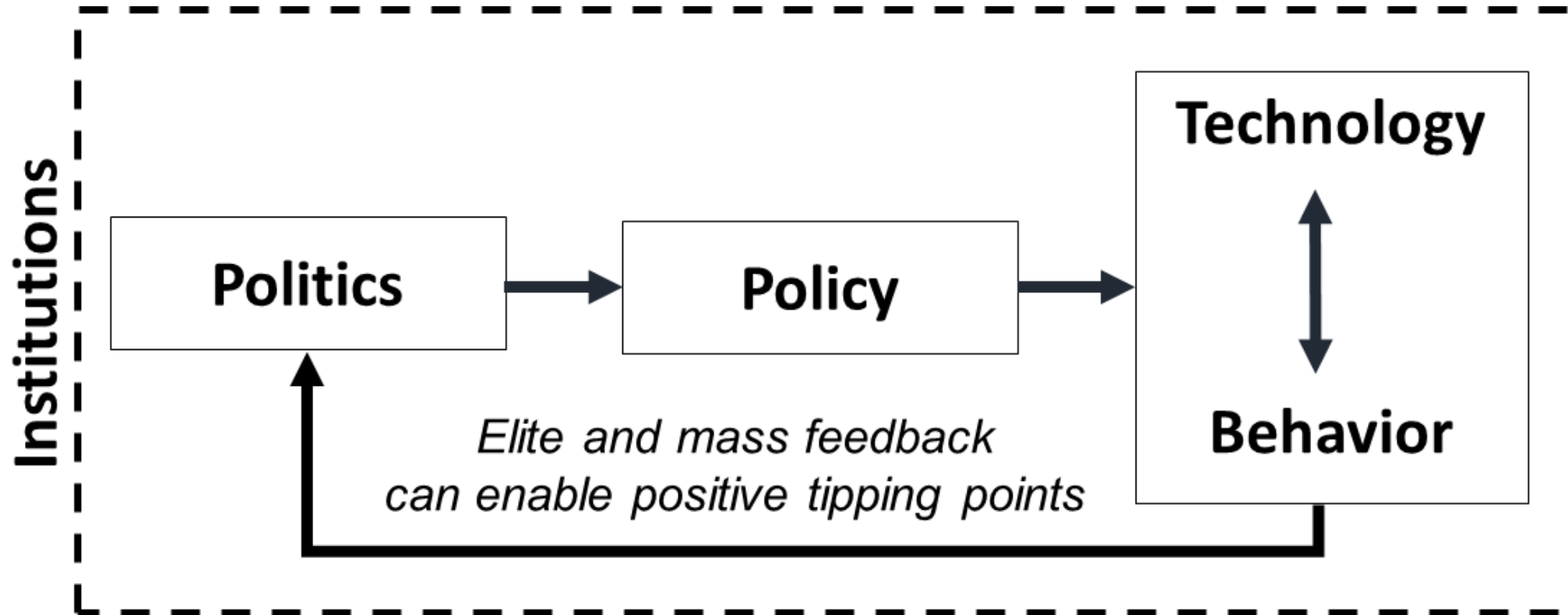


Data source: Food and Agriculture Organization of the United Nations (2023); World Bank (2023)  
OurWorldinData.org/meat-production | CC BY

## 2. Verhaltens- und Technologiewandel zusammendenken und Feedback nutzen



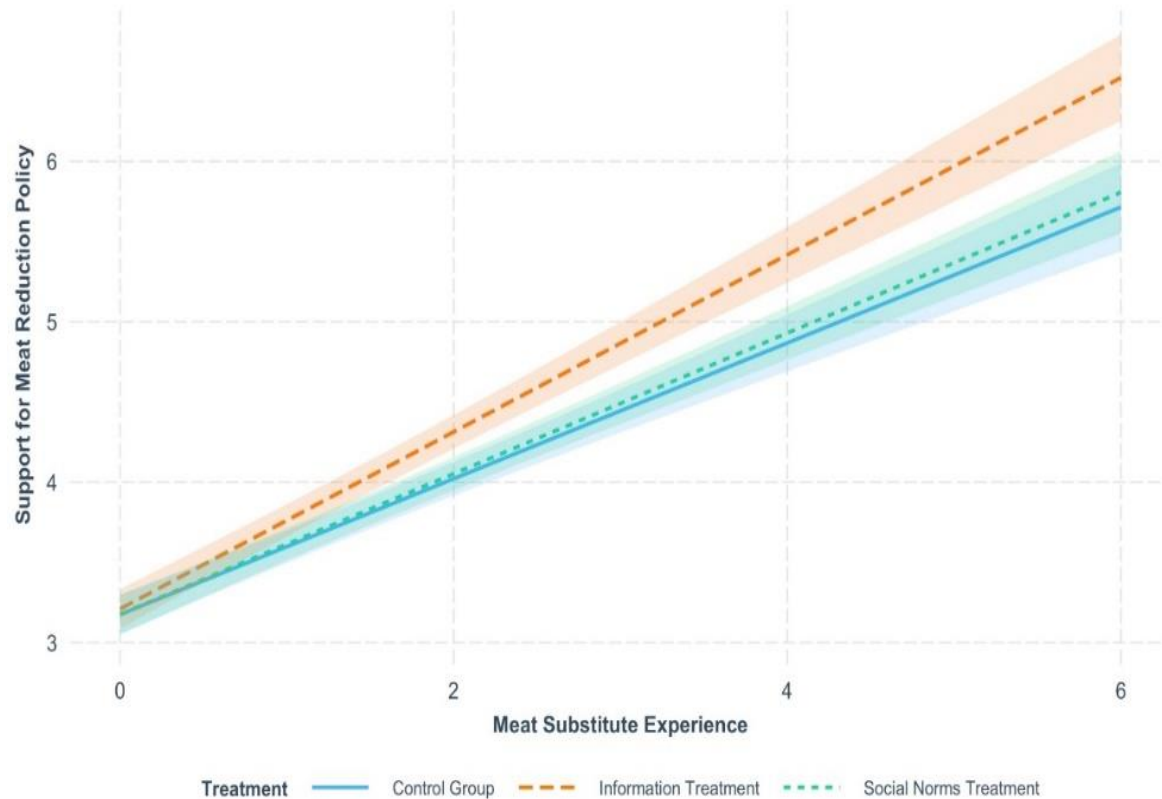
# Positive Kipppunkte durch Feedback ermöglichen



Fesenfeld, L.P., Schmid, N., Mathys, A., Finger, R., and Schmidt, T. (2022). The politics of enabling tipping points for sustainable development. *One Earth*, 1-26, <https://doi.org/10.1017/bpp.2022.3>



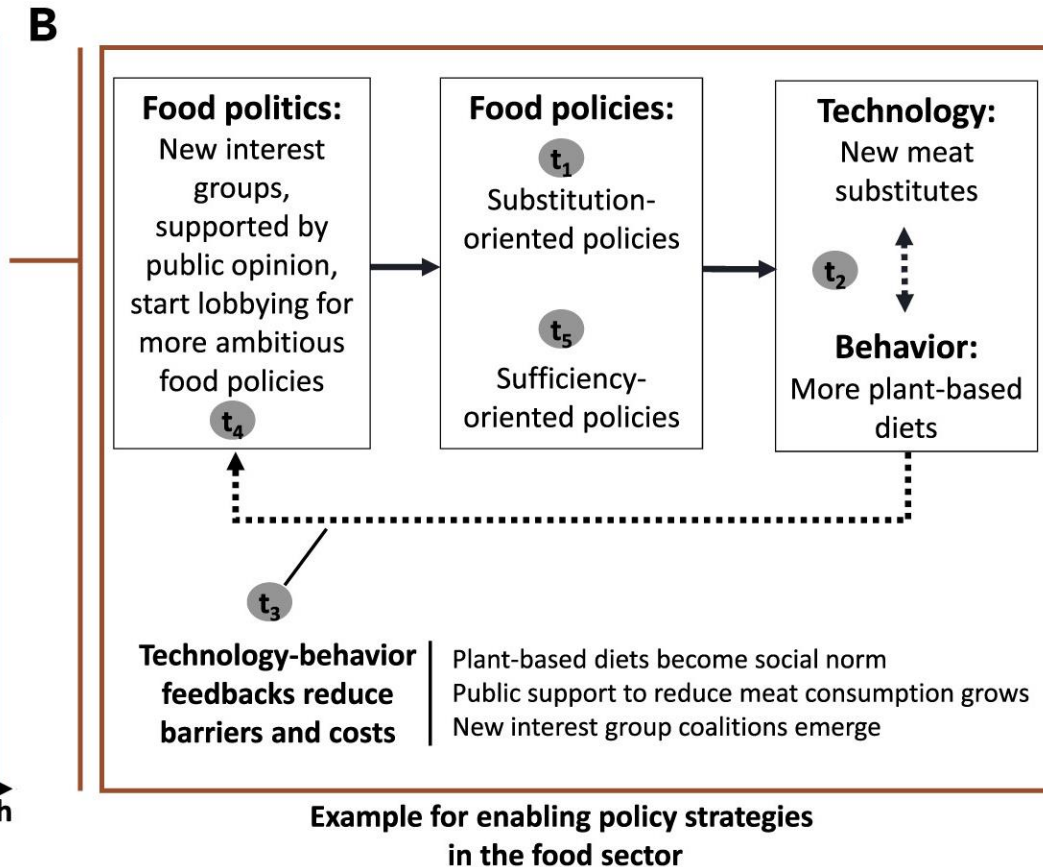
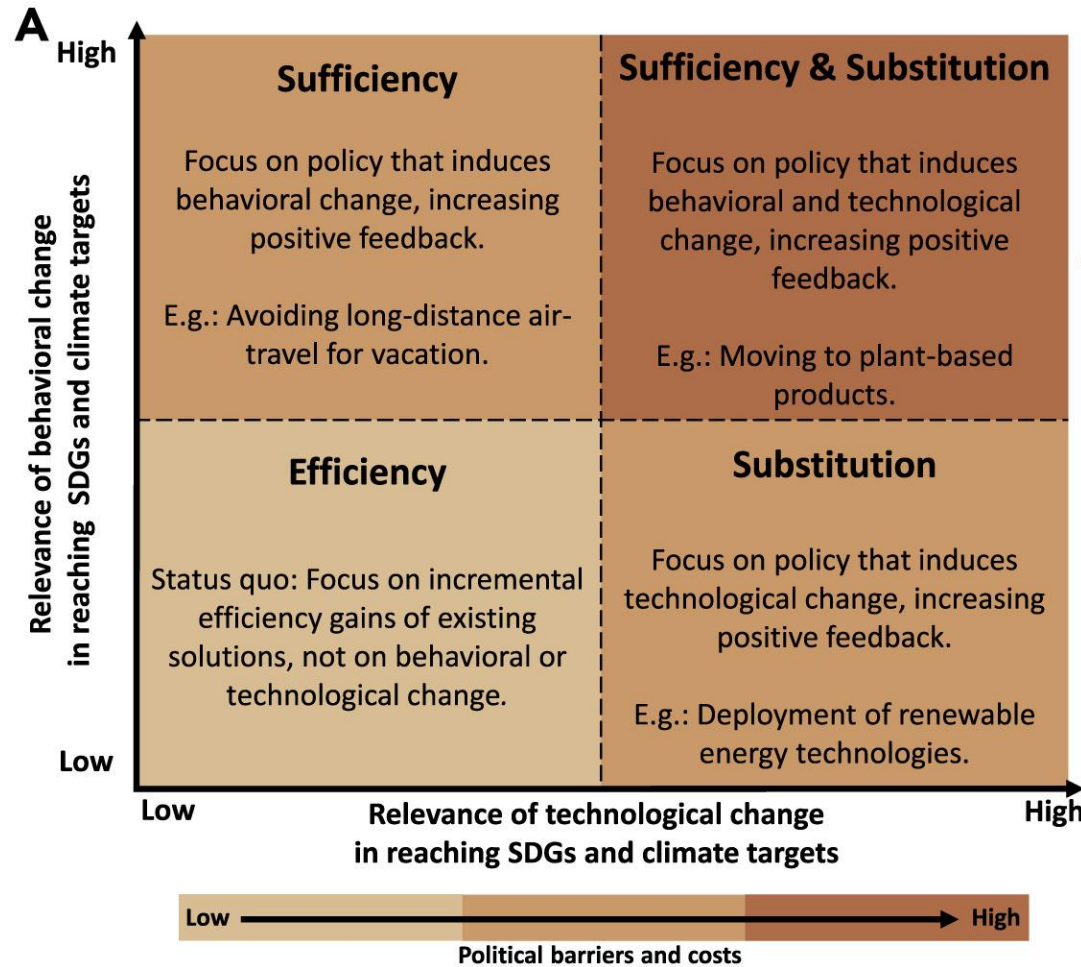
# Beispiel: Fleischersatzprodukte



Fesenfeld, L. P., Maier, M., Brazzola, N., Stolz, N., Sun, Y., & Kachi, A. (2023). How information, social norms, and experience with novel meat substitutes can create positive political feedback and demand-side policy change. *Food Policy*, 117, 102445.


See more details in AEA RCT Registry, preregistration <https://www.socialsciregistry.org/trials/13528>

# Positive Kipppunkte durch Feedback ermöglichen



Fesenfeld, L.P., Schmid, N., Mathys, A., Finger, R., and Schmidt, T. (2022). The politics of enabling tipping points for sustainable development. *One Earth*, 1-26, <https://doi.org/10.1017/bpp.2022.3>

# Beispiel: Dänemark Plant Fund



**MINISTRY OF FOREIGN AFFAIRS OF DENMARK**  
*Invest in Denmark*

SET UP A BUSINESS   OUR SERVICES   CASES   CONTACT

FACT SHEET

## A PLANT-BASED FOOD NATION

Denmark is known as the State of Green - and now the Danish food industry is joining the green transition with a solid response. Download our fact sheet to get a taste of the Danish food ingredients sector and investment insights.

[Fesenfeld \(2024\)](#)

CO<sub>2</sub>-Ausstoss kostet

## Eine Fleischsteuer soll in Dänemark den Konsum bremsen

Mit der Lenkungsabgabe soll in Dänemark der Treibhausgas-Ausstoss verringert werden. Das Vorhaben hat gute Chancen.

Donnerstag, 27.06.2024, 09:09 Uhr

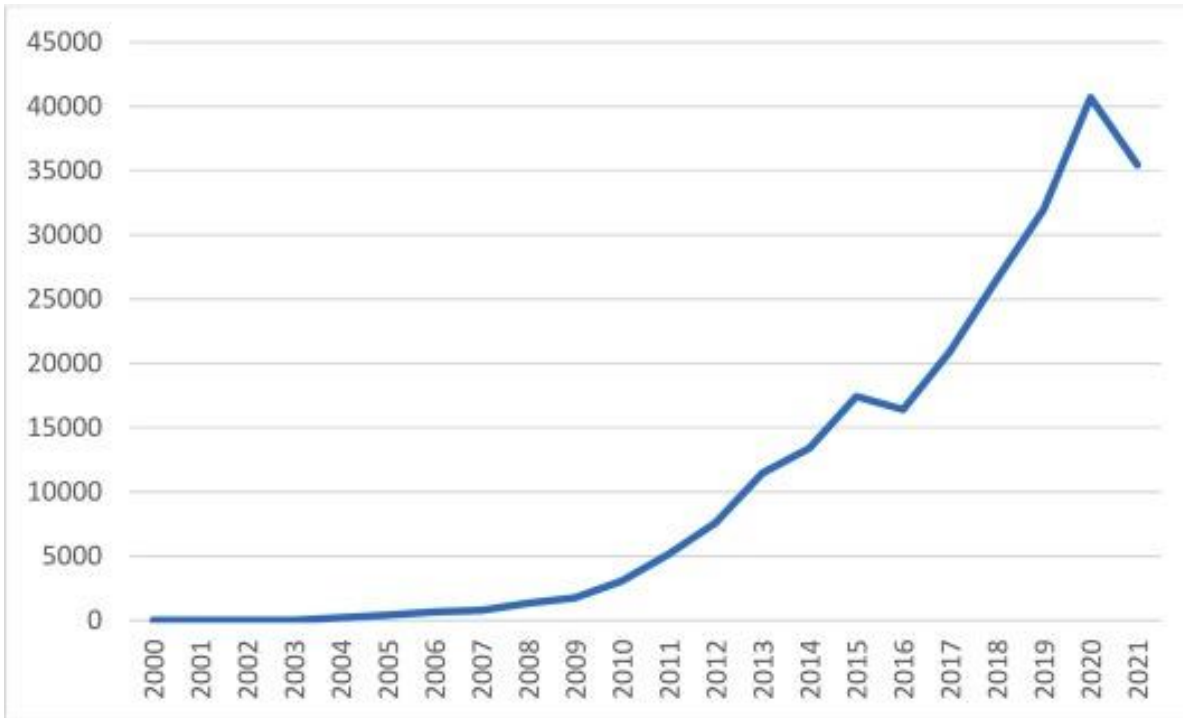


[SRF, 2024](#)



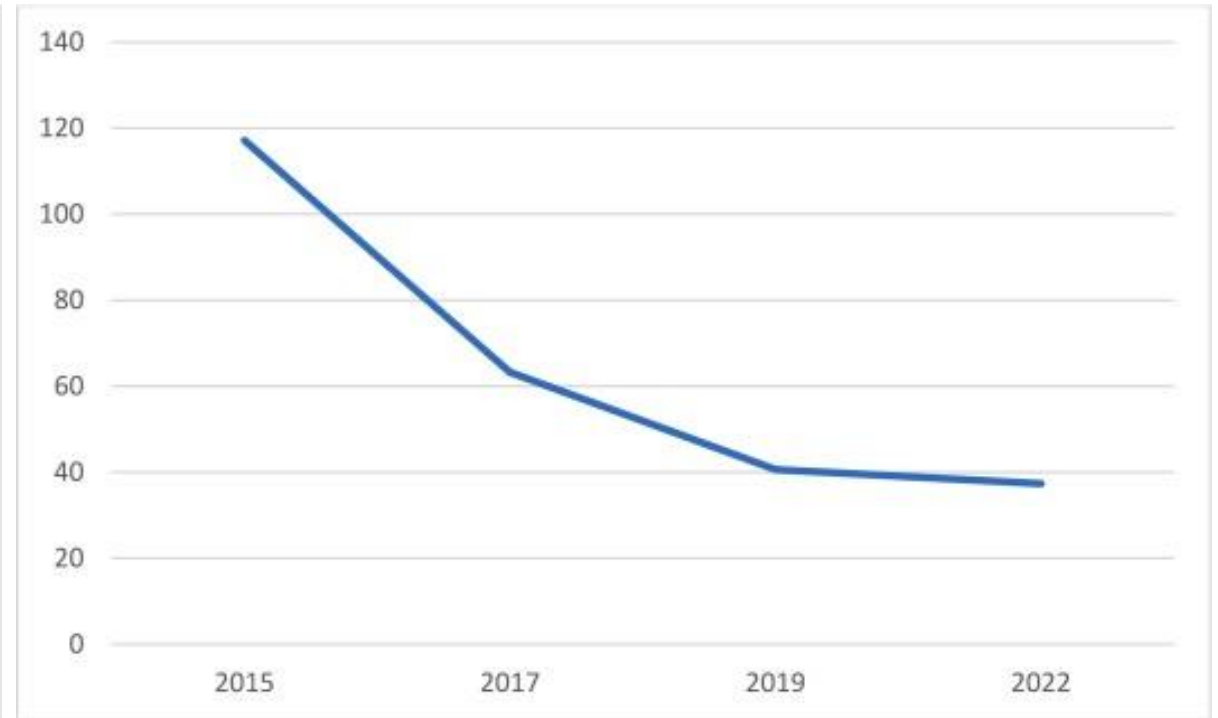
# Beispiel: Offshore Wind in der UK

## Rascher Ausbau von Offshore Wind ab 2009



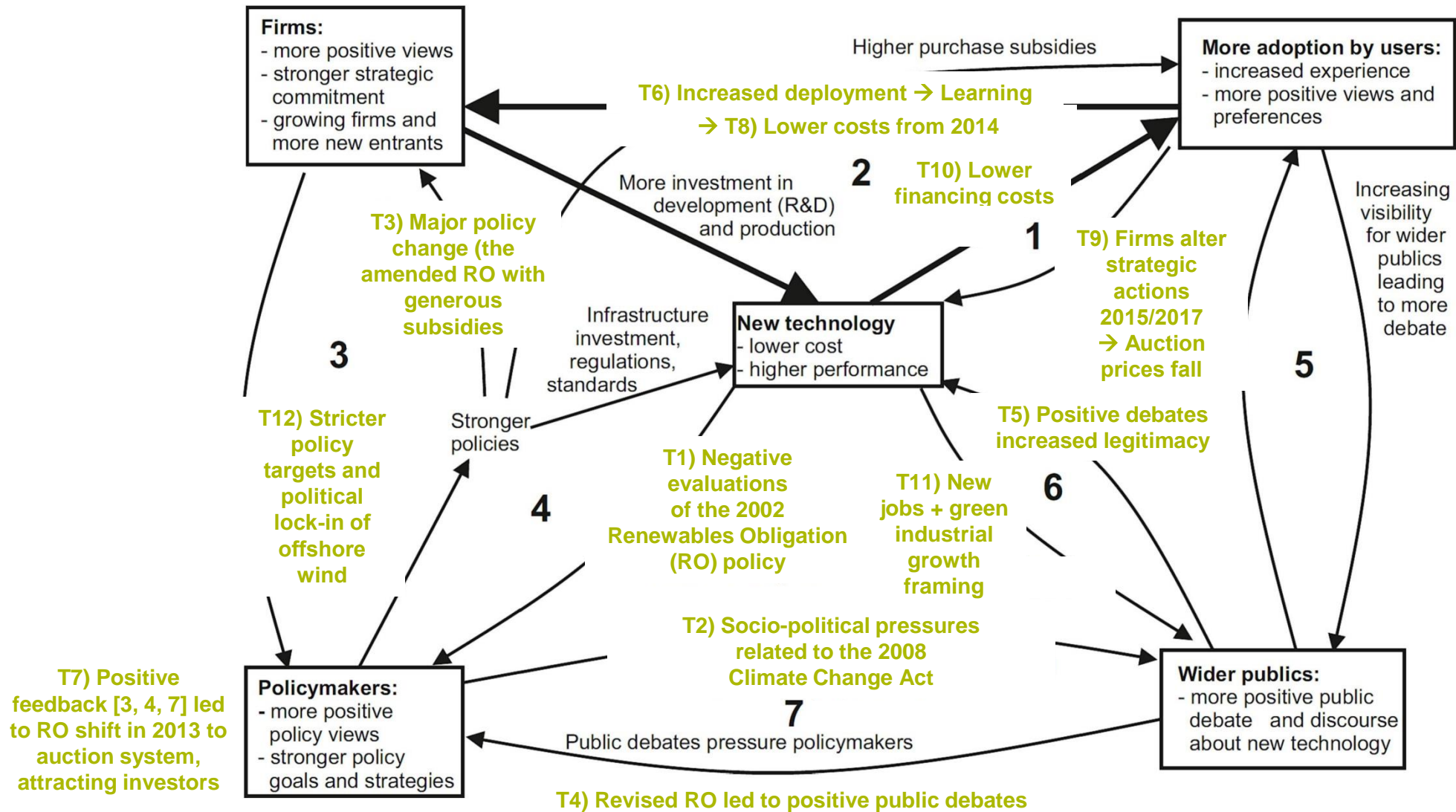
Electricity generated by offshore wind turbines in GWh, 1990–2021  
Note: Declining electricity generation in 2016 and 2021 were due to less than average wind conditions in the North Sea.

## Rasche Preisreduktionen für Offshore Wind Elektrizität



UK strike price results (in £/MWh) for offshore wind electricity in four successive auction rounds (for capacity coming online 4–5 years later).

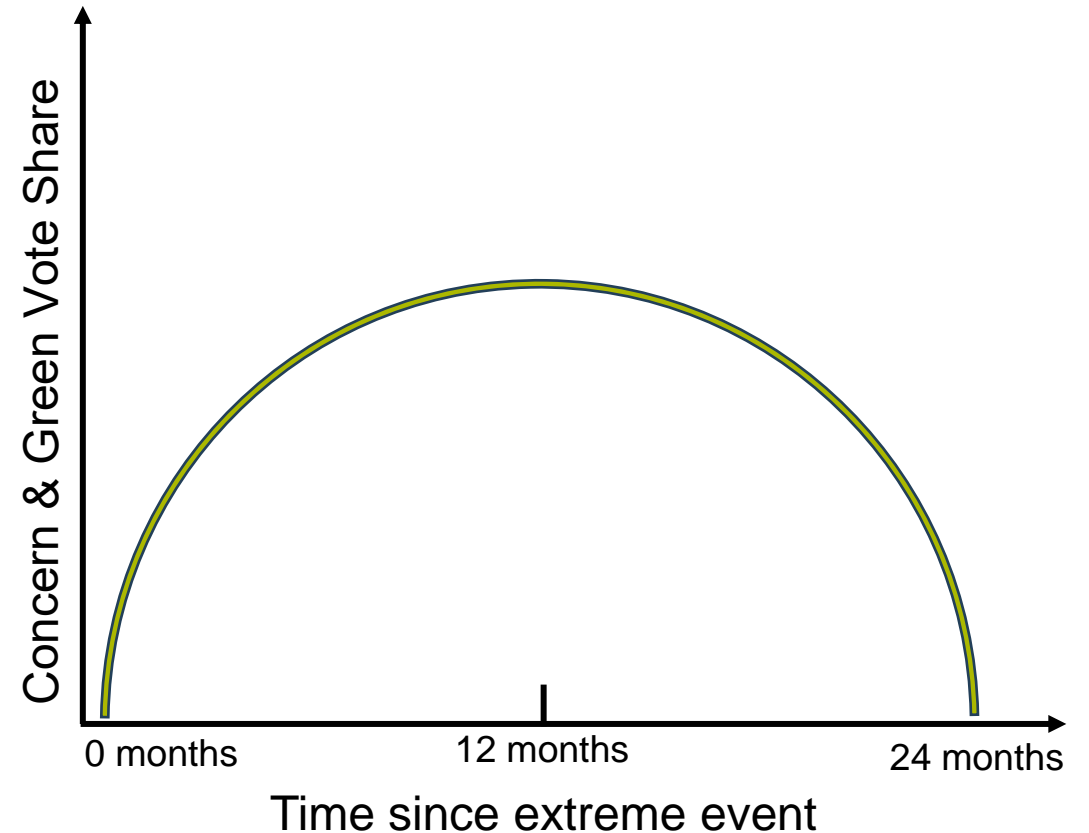
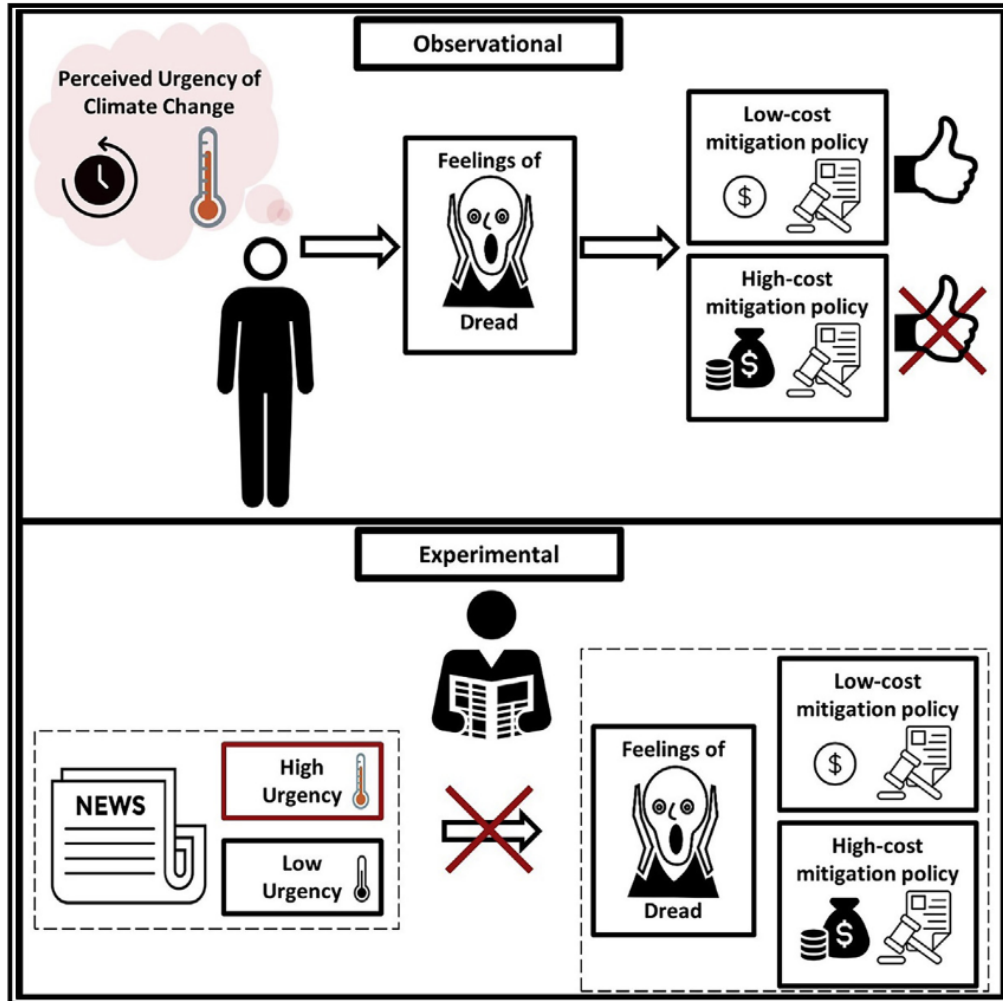
# Komplexes Feedback: Technologie, Verhalten & Politik



[Geels & Ayoub, 2023](#)

# 3. Kommunikation und Design von Klimaschutzpolitik eng verzahnen

# Kommunikation, Klimaextreme und öffentliche Meinung

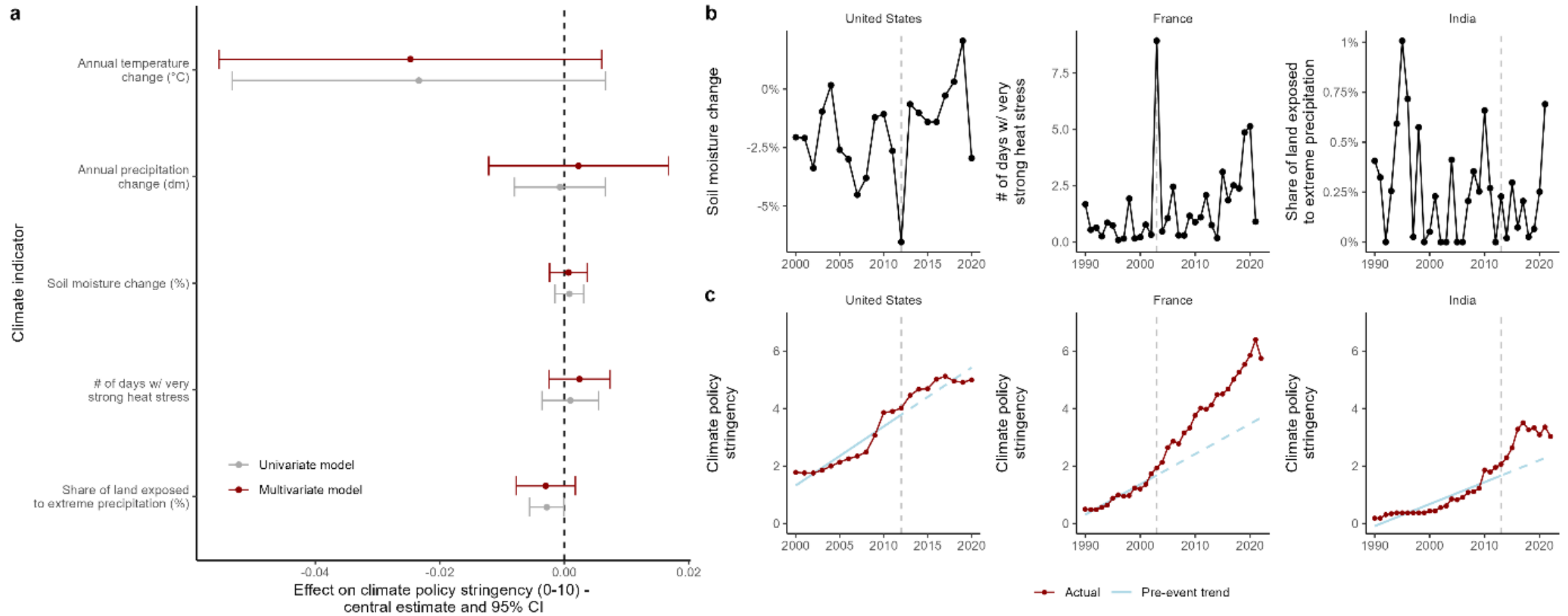


[Hoffmann et al., 2022](#)

Fesenfeld, L.P., & Rinscheid, A. (2021) *Emphasizing Urgency of Climate Change Is Insufficient to Increase Policy Support*. *One Earth* 4(3), 411-424

Fesenfeld, L.P., Sun, Y., Wicki, M., Beiser-McGrath, L. & Bernauer, T. (2024). *Systematic Mapping of Climate and Environmental Framing Experiments and Re-Analysis with Computational Methods Points to Omitted Interaction Bias*. *Plos Climate*, 3 (2)

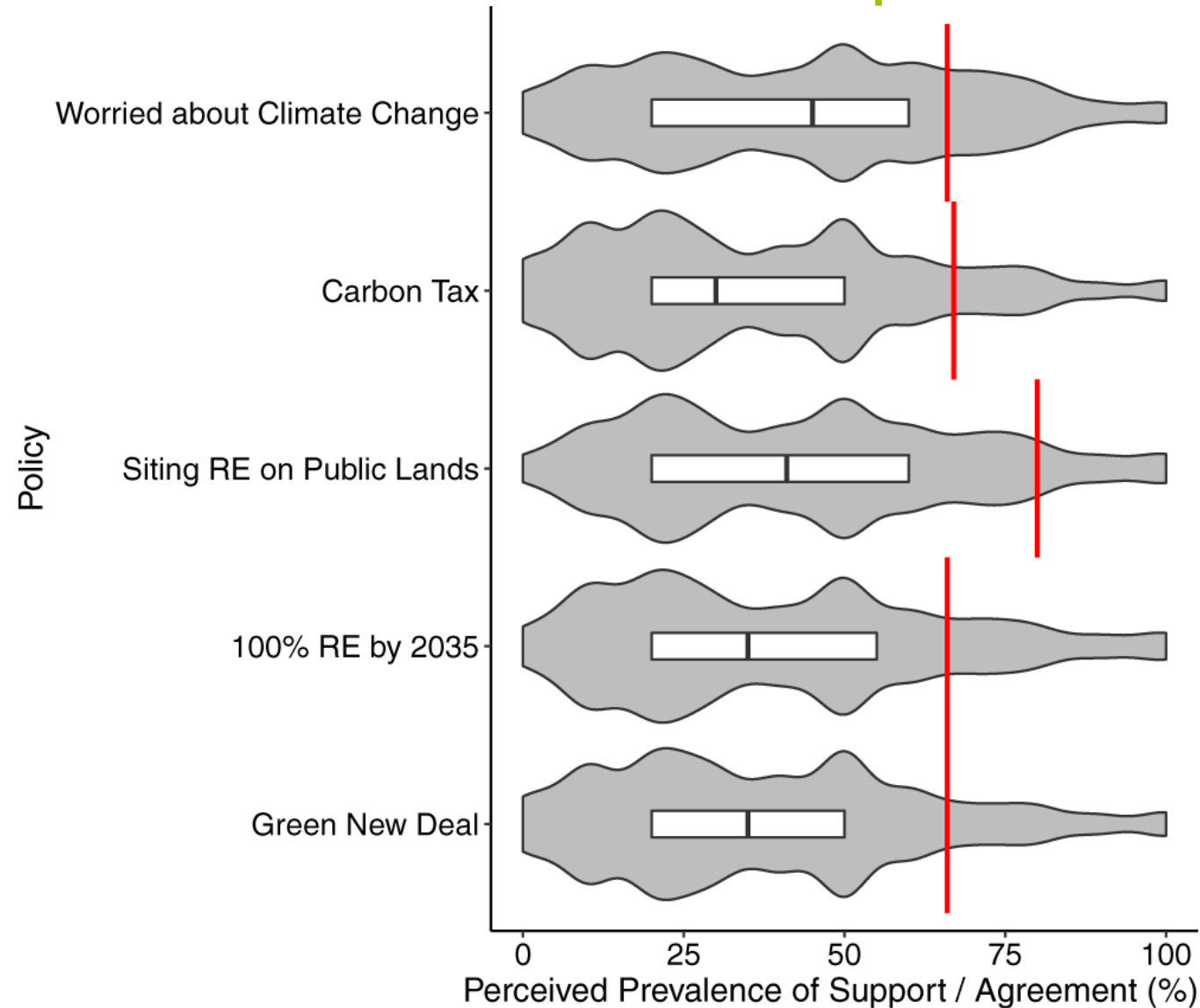
# Klimaextreme als „politische Machbarkeitsfenster“?



Fesenfeld et al. (2024). Climate Extremes and Policy. Working Paper. ETH-OECD



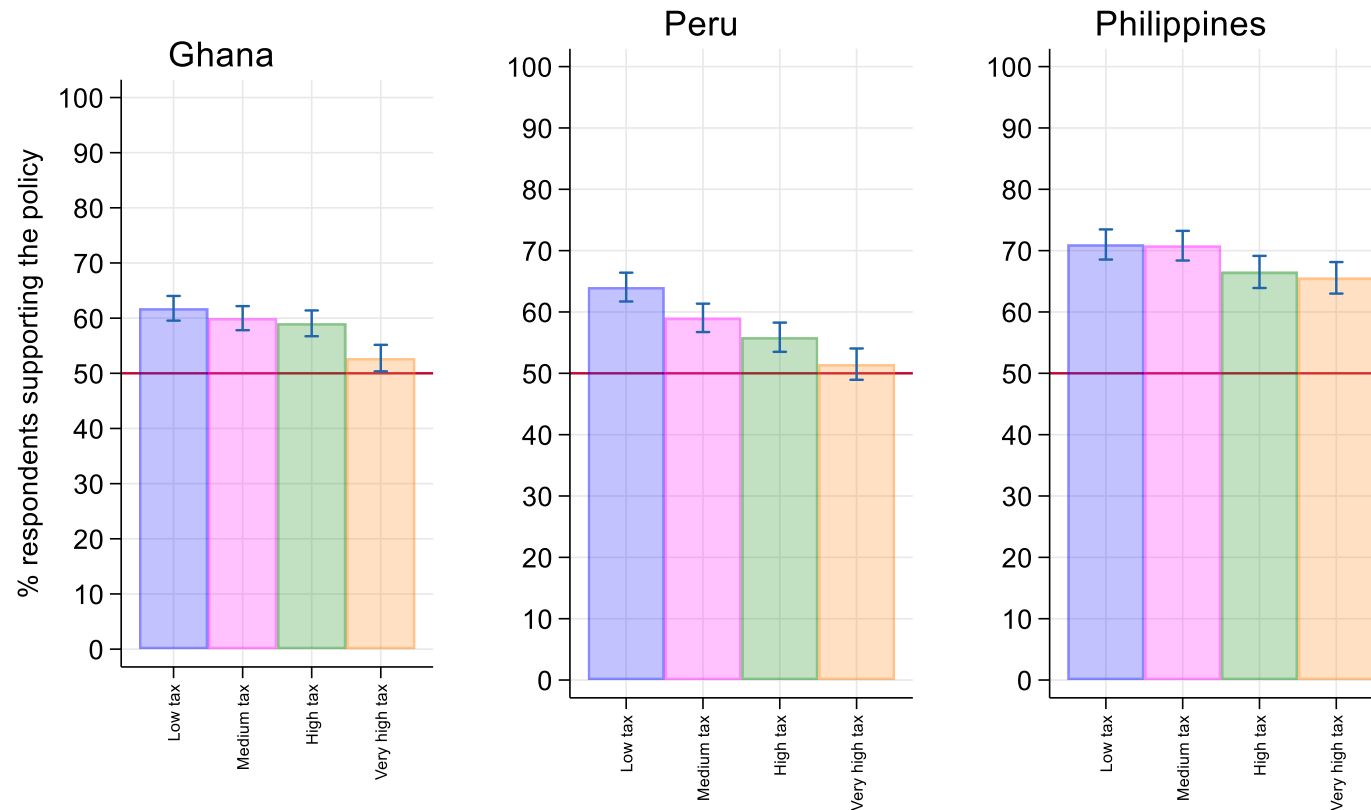
# Akzeptanz für ambitionierte Klimapolitik höher als gedacht



Sparkman, G., Geiger, N. & Weber, E.U. Americans experience a false social reality by underestimating popular climate policy support by nearly half. *Nat Commun* 13, 4779 (2022).  
<https://doi.org/10.1038/s41467-022-32412-y>

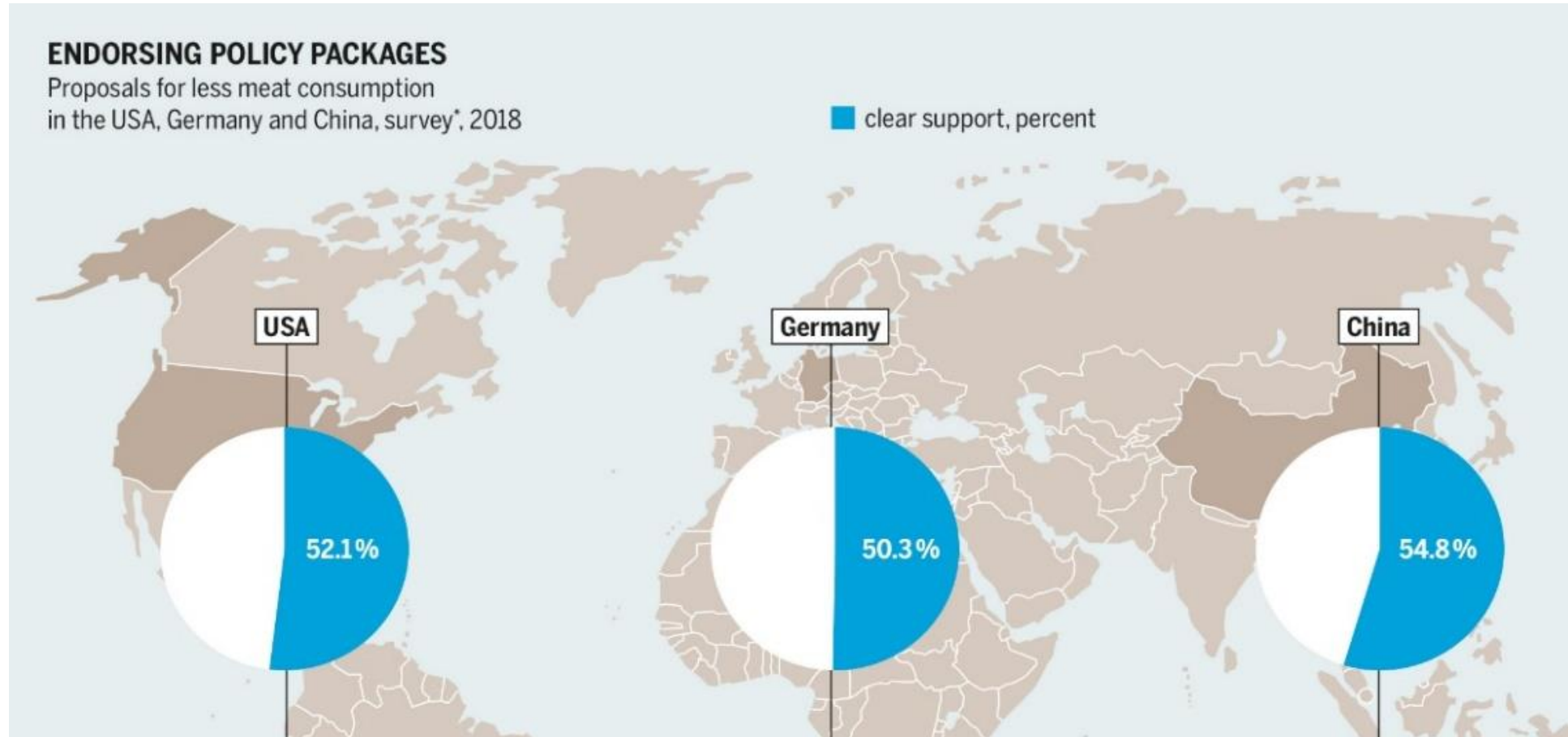
# Akzeptanz für ambitionierte Klimapolitik höher als gedacht

% respondents supporting the policy



Malerba, D., Never, B., Fesenfeld, L. P., Fuhrmann-Riebel, H, Kuhn, S. (2024). On the acceptance of high carbon taxes in low- and middle-income countries: a conjoint survey experiment. *Environ. Res. Lett.* 19 094014

# Politikpakete können Zustimmung erhöhen...



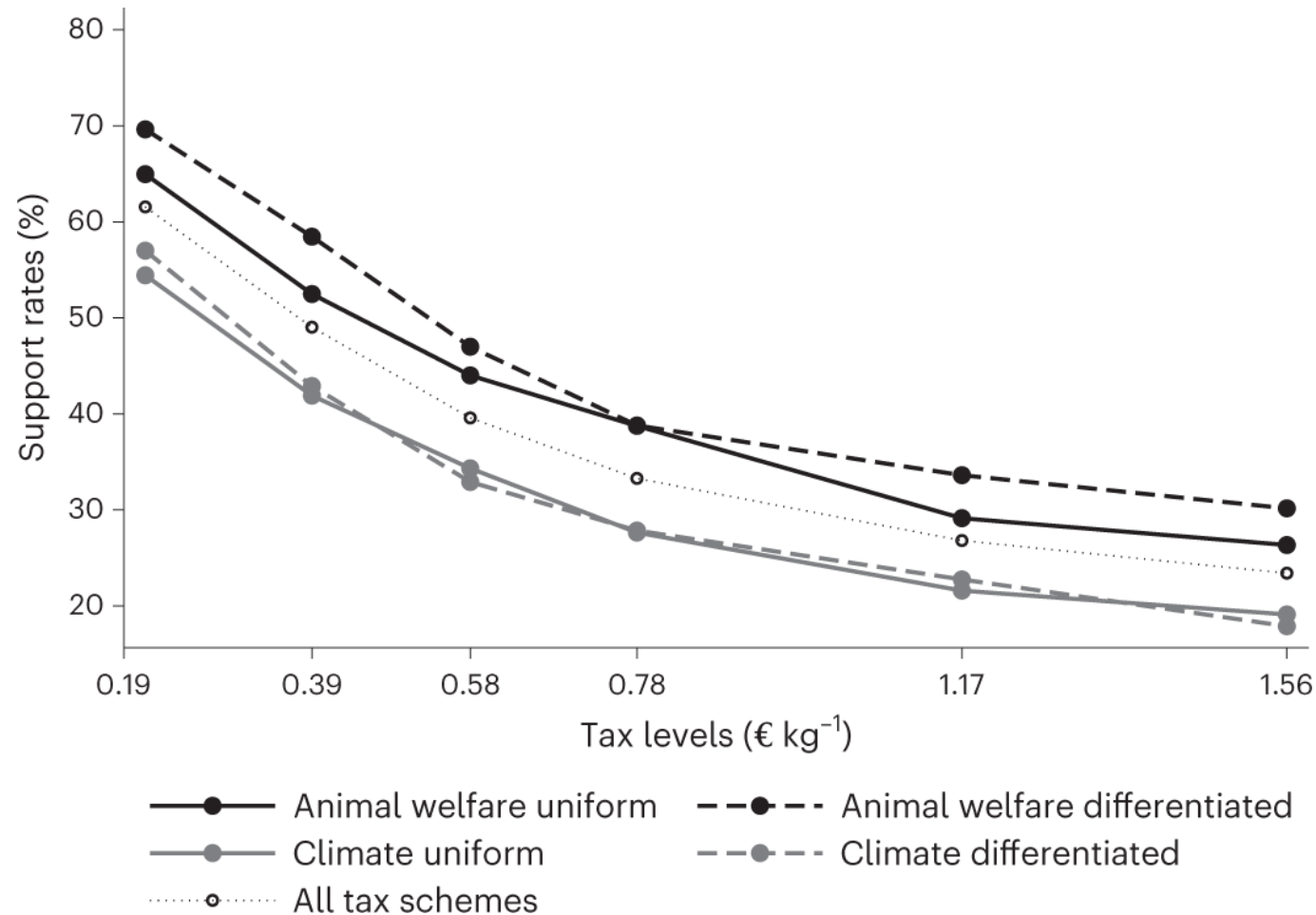
Fesenfeld, L.P., Wicki, M., Y. Sun, Y., & Bernauer, T. (2020). Policy Packaging Can Make Food System Transformation Feasible. *Nature Food*, 1(3), 173–182.

...komplexe Pakete erfordern strategische Kommunikation!



Fesenfeld, L.P. (2022). The Effects of Policy Design Complexity on Public Support for Climate Policy. *Behavioral Public Policy*, 1-26;

# Politisches Framing und Design zusammendenken!



Perino, G., Schwickert, H. Animal welfare is a stronger determinant of public support for meat taxation than climate change mitigation in Germany. *Nat Food* 4, 160–169 (2023). <https://doi.org/10.1038/s43016-023-00696-y>

Fesenfeld, L.P. et al.. The Role and Limits of Strategic Framing for Promoting Sustainable Consumption and Policy. (2021) **Global Environmental Change**, 68

Fesenfeld, L.P. & Sun, Y. (2023). Enabling Positive Tipping Points in Public Support for Food System Transformation: **Oxford University Press**.

# Tierwohlabgabe durch Bauernprotest mehrheitsfähig

STAND: 15.1.2024, 18:18 UHR

VON PETRA THIELE



# 4. Handeln strategisch ausrichten und überraschende Koalitionen bilden



# Strategische Abfolge von politischen Massnahmen



[Meckling et al, 2017](#)

**→ Wichtiger Hinweis: Grüne Industriepolitik besonders vielversprechend für Technologien wie Windenergie oder E-Autos ([Malhotra & Schmidt, 2020](#))**



# Bi-Partisan Support für Inflation Reduction Act + Investitionen

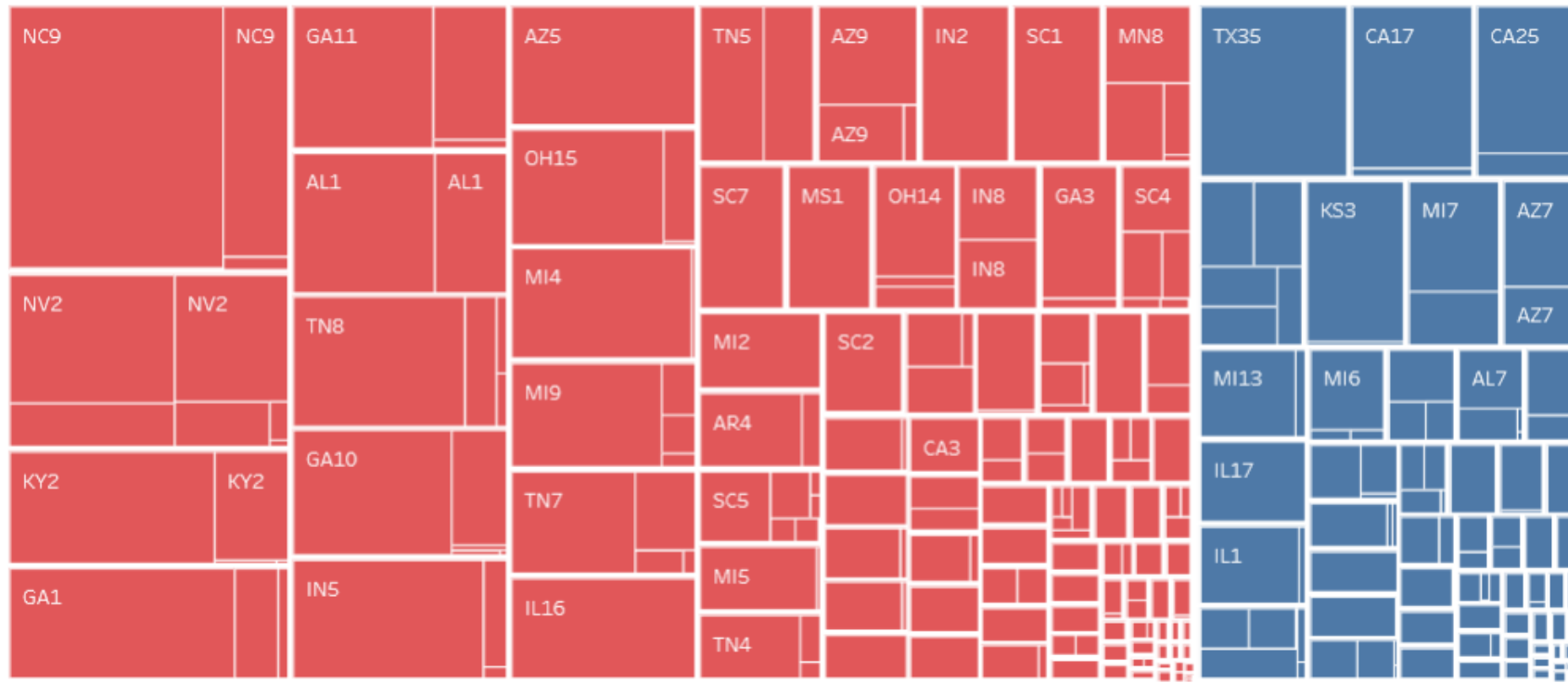
Republican-led districts:

**\$162.2 billion**

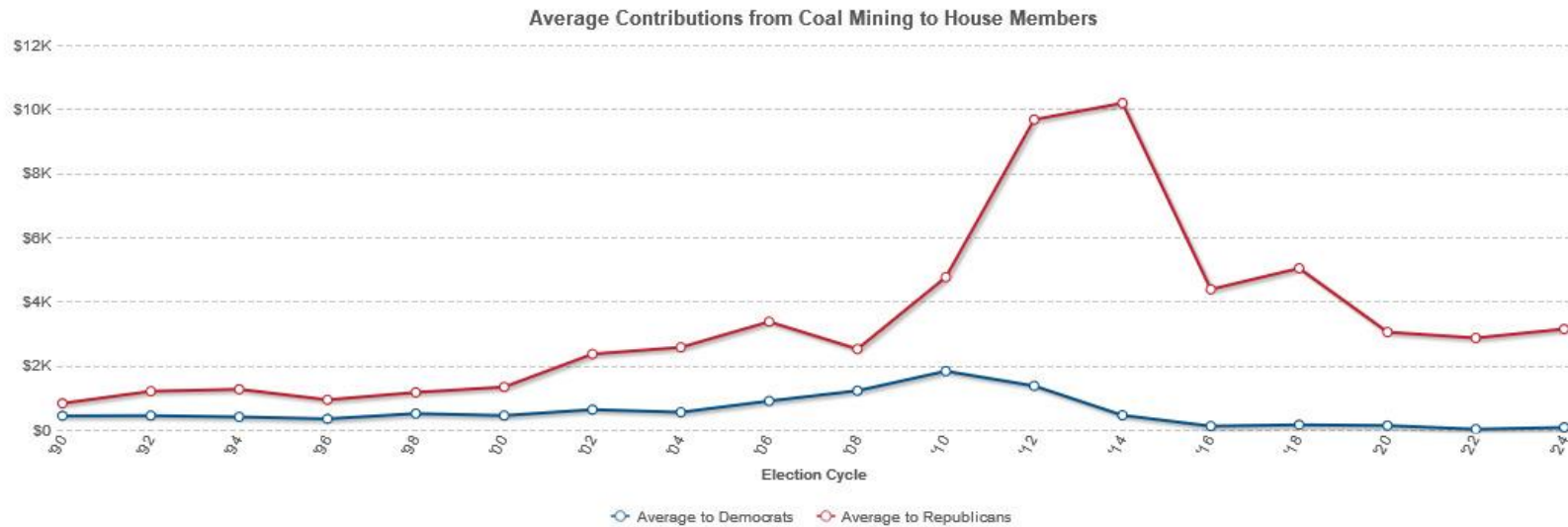
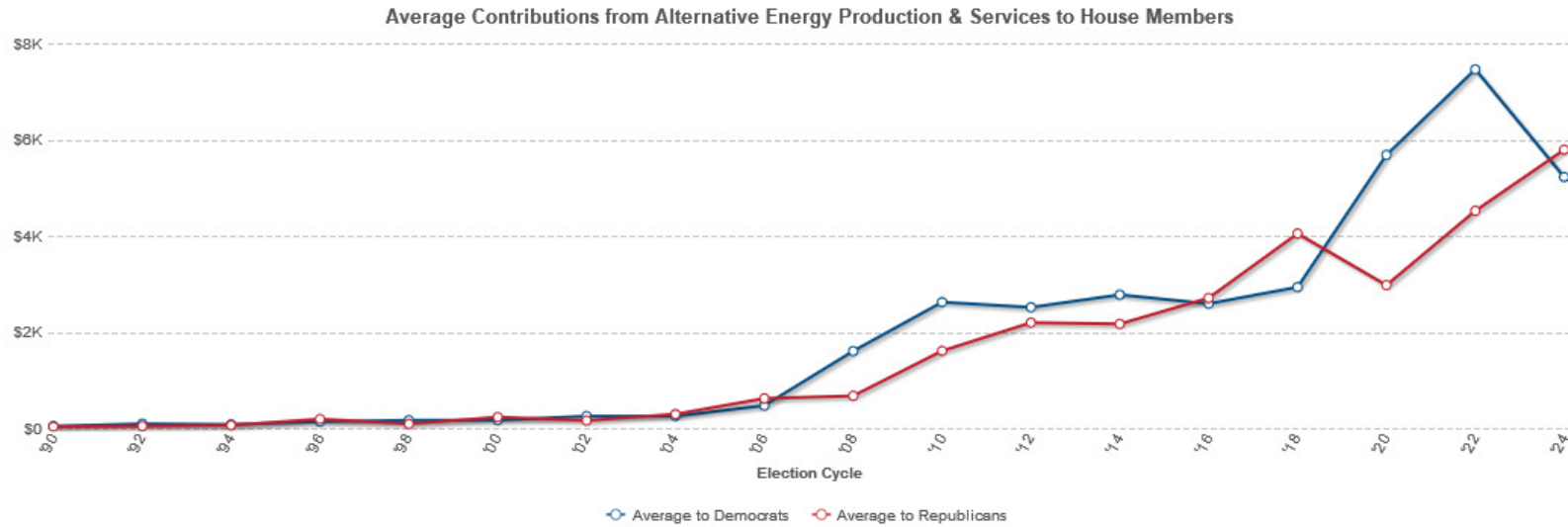
Democrat-led districts:

**\$61.1 billion**

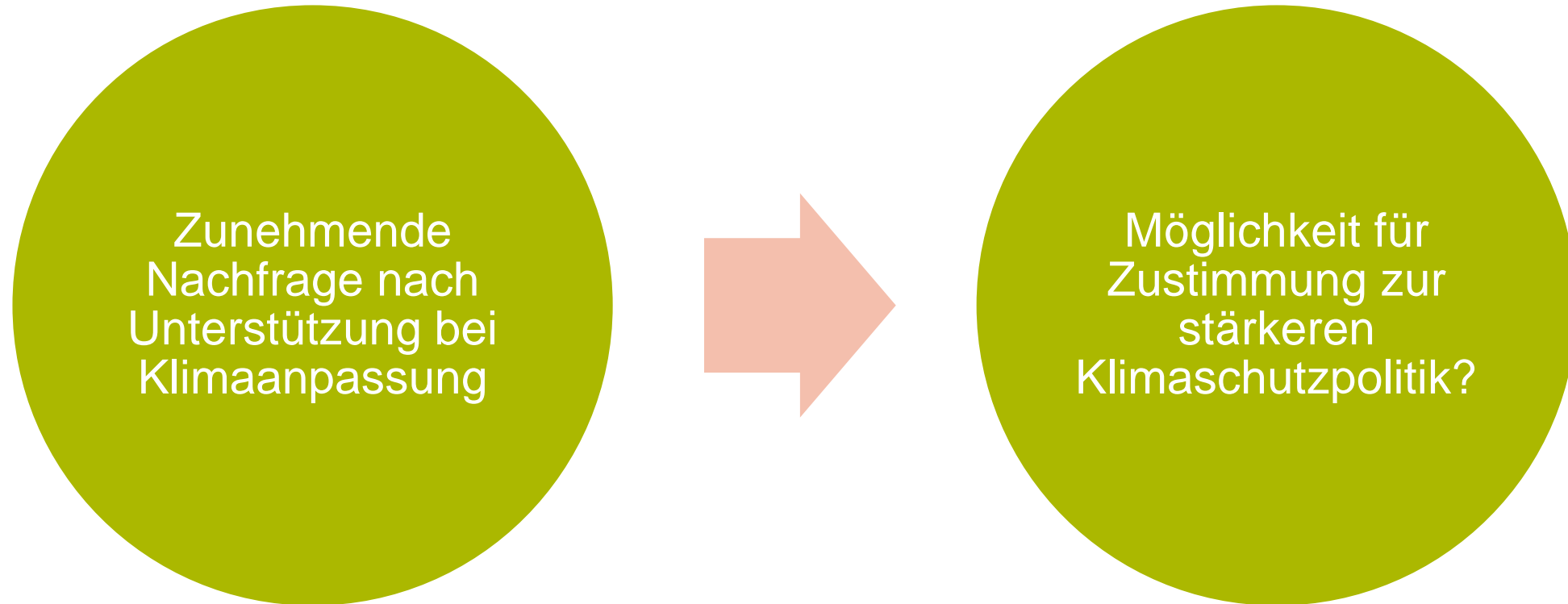
US clean energy supply chain investments by US congressional district:



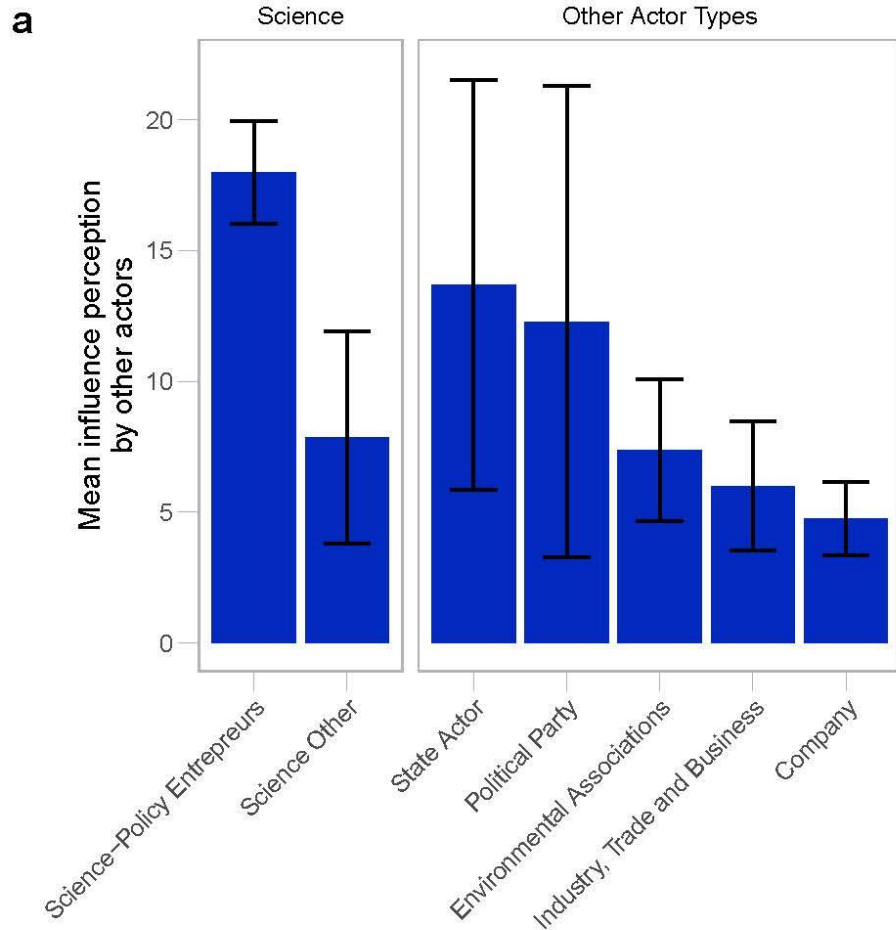
# Lobbying Effekte: Beispiel USA



# Politische Opportunität für neue, überraschende Koalitionen?



# Policy Broker, Entrepreneure und die Wissenschaft



„We recognize interesting new studies such as the one by Prof. Schmidt (SVR) and Prof. Edenhofer (PIK), suggesting carbon pricing in non-ETS sectors. We will look at these options before adopting further regulations, and will take this expertise into account when taking our decision...“

Angela Merkel, 10.4.2019, Bundestag

**SPIEGEL ONLINE**

**CO<sub>2</sub>-Ausstoß**  
**Deutsche Forscher fordern Steuer auf Kohlendioxid**

Wie lassen sich Klimaschutz und Ökonomie vereinbaren? Zwei renommierte Forscher sprechen sich im SPIEGEL für eine Steuer auf CO<sub>2</sub> aus, mit der sich das Einsparen des Klimagases für Industrie und Verbraucher rechnet.

Freitag, 30.11.2018 12:26 Uhr

**Ottmar Edenhofer**,  
 Direktor und  
 Chefökonom  
 des Potsdam  
 Instituts für  
 Klimafolgen-  
 forschung



**Christoph M. Schmidt**,  
 Präsident des  
 RWI – Leibniz-  
 Institut für  
 Wirtschafts-  
 forschung



Quelle: <http://www.spiegel.de/wirtschaft/soziales/co2-forscher-fordern-steuer-auf-kohlendioxid-a-1241270.html>

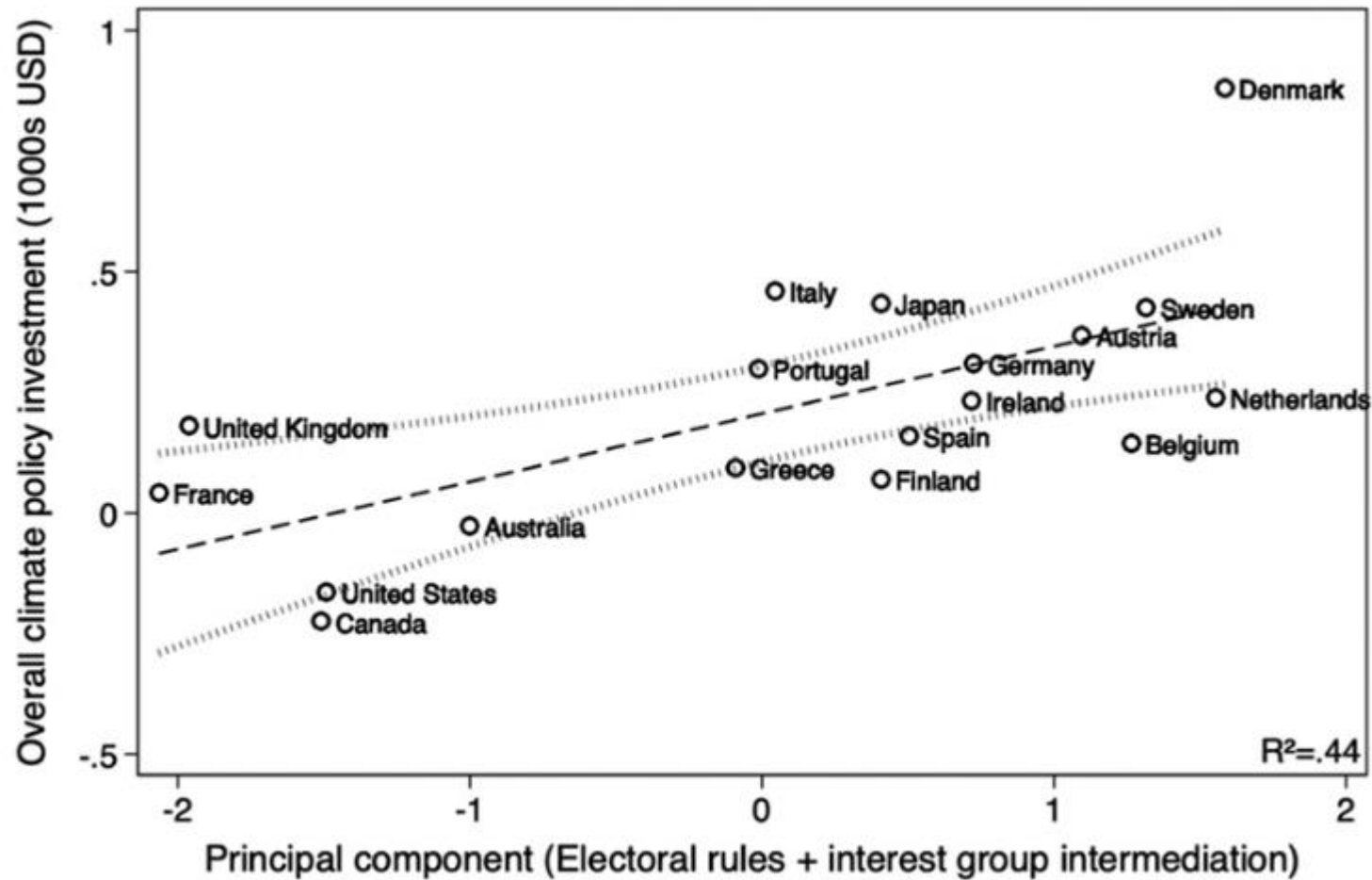
Own illustration: The figure illustrates the aggregated results from our policy network survey including responses from 50 organized actors about the perception of the influence and information provision of 76 pre-selected key policy actors during the German climate policy process

Fesenfeld, L.P., Levi, S., Montfort, S., Maier, M., Flachsland, C., Ingold, K. (2024). The political economy of German climate policymaking: An NLP-based discourse and process-tracing analysis of carbon price adoption in Germany.

# 5. Institutionen nicht vergessen und weiterentwickeln



# Vergessen wir nicht die Institutionen!



# Zukunftskommissionen als Weg aus der Polarisierung?



# Klimabürger- und Expertenräte als Mittel gegen Polarisierung?



[Fesenfeld, L. P. & Kuntze, L. \(2022\). Polarization and climate policy: Citizen assemblies are no silver bullet to reduce political backlash.](#)

# 5 Thesen

1. Positive Kipppunkte für den Klimaschutz sind möglich, aber nicht ohne a-ha
2. Verhaltens- und Technologiewandel zusammendenken und Feedbacks nutzen
3. Kommunikation und Design von Klimaschutzpolitik eng verzahnen
4. Handeln strategisch ausrichten und überraschende Koalitionen bilden
5. Institutionen nicht vergessen und weiterentwickeln



**Falls Sie bereits teilgenommen haben: Vielen Dank! Nehmen Sie bitte nur einmal teil.**

## Testen Sie Ihr Klimawissen!

Das “Center for Research on Environmental Decisions in Berlin” (CREDiBl) hat ein 5-minütiges Quiz vorbereitet, in welchem die Wirksamkeit von 5 politischen Maßnahmen im Hinblick auf deren CO2-Einsparpotenzial getestet wird.\*

**Scannen Sie einfach den QR Code auf der rechten Seite, um teilzunehmen.**



CREDiBl

Center for Research on  
Environmental Decisions in Berlin

**EINSTEIN**  
Foundation.de



\* Die Ergebnisse, welche Maßnahmen am effektivsten sind, werden nach dem K3-Kongress auf <https://credibl.de/> veröffentlicht!

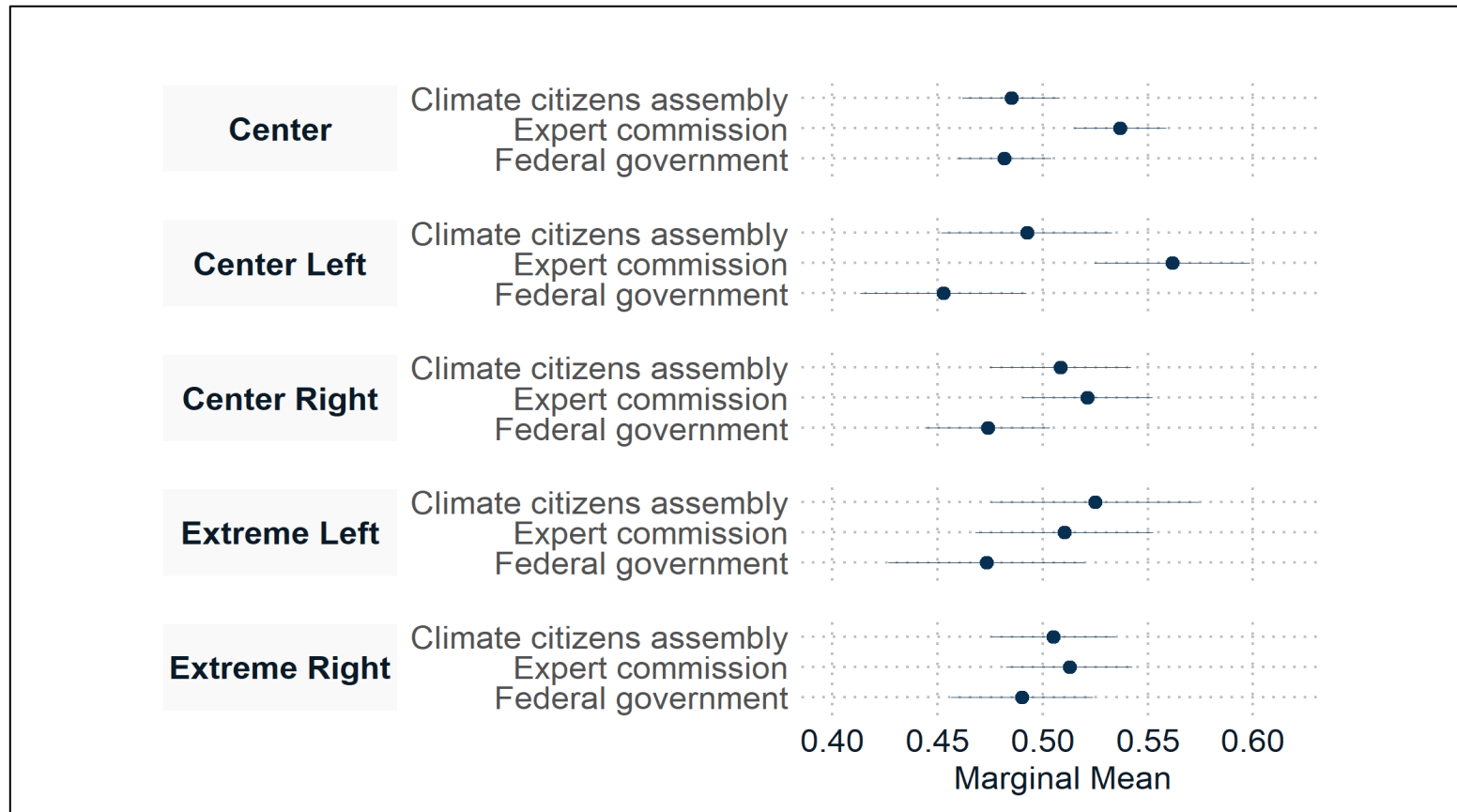


Herzlichen Dank

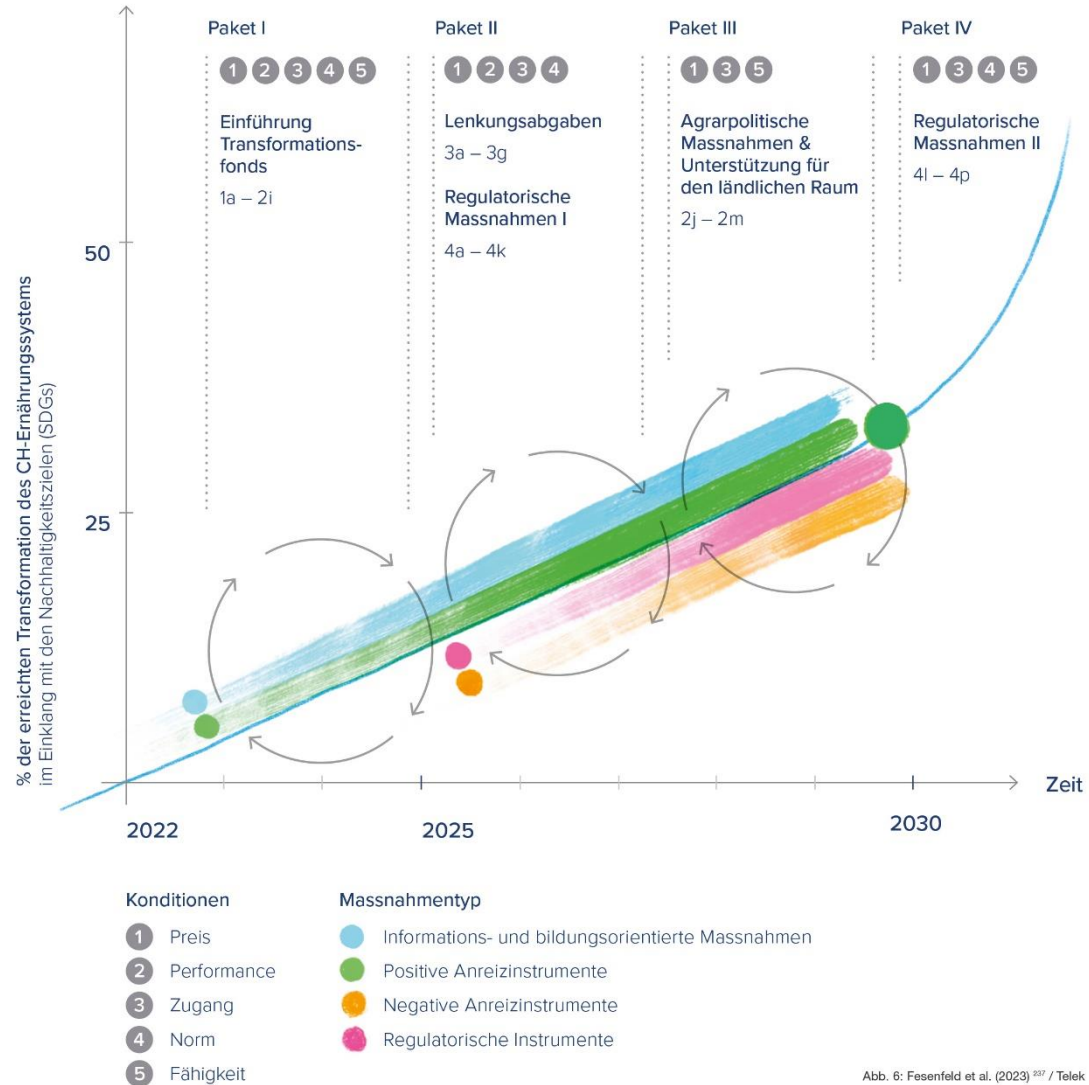


# Wirken Klima- und Expertenräte der Polarisierung entgegen?

## USA: Legitimation ambitionierter Klimapolitik



# Wege in die Ernährungszukunft der Schweiz



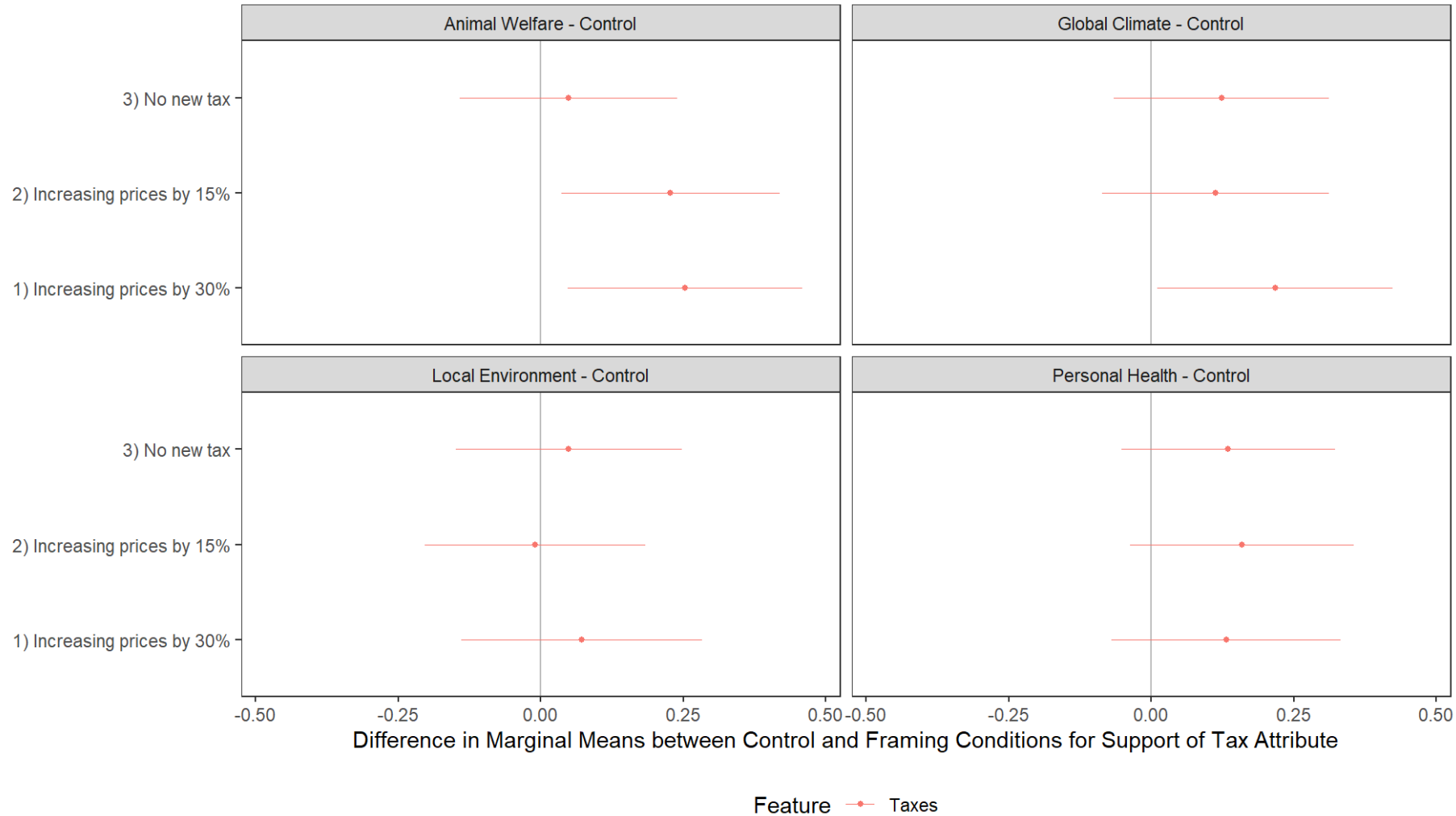
**Results of an interdisciplinary SDSN expert commission on accelerated food system transformation**  
(report currently only in German/French)

Fesenfeld, L. et al. (2023).  
<https://doi.org/10.5281/zenodo.7543576>



Abb. 6: Fesenfeld et al. (2023) <sup>227</sup> / Telek

# Politische Kommunikation und Design



Fesenfeld, L.P., Wicki, M., Y. Sun, Y., & Bernauer, T. (2020). Policy Packaging Can Make Food System Transformation Feasible. *Nature Food*, 1(3), 173–182.

Fesenfeld, L.P. et al.. The Role and Limits of Strategic Framing for Promoting Sustainable Consumption and Policy. (2021) *Global Environmental Change*, 68

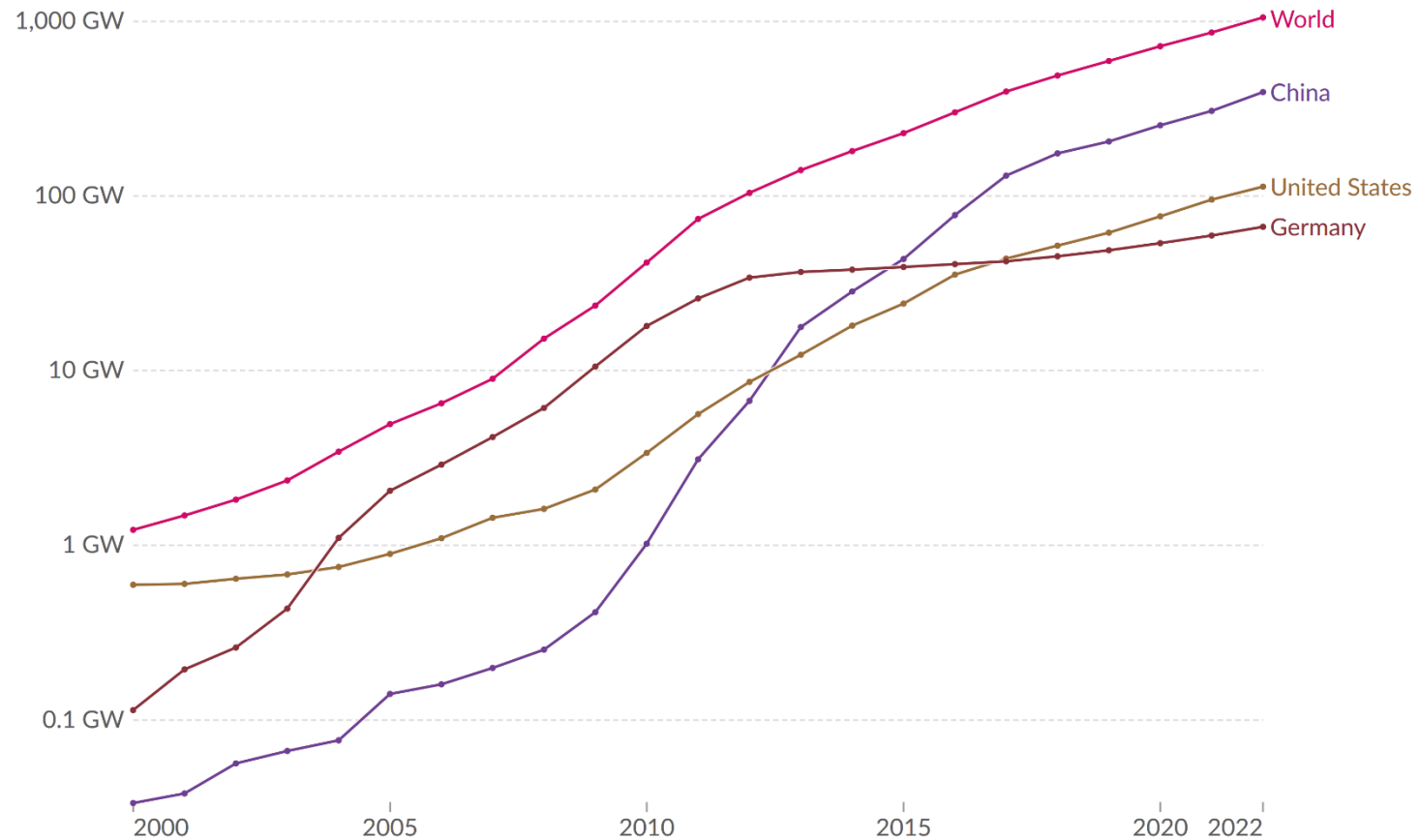
Dr. Lukas Fesenfeld, ETH Zurich Enabling Positive Tipping Points in Public Support for Food System Transformation: **Oxford University Press.**

# Beispiel: Globaler Solarenergie Boom

## Installed solar energy capacity

Cumulative installed solar capacity, measured in gigawatts (GW).

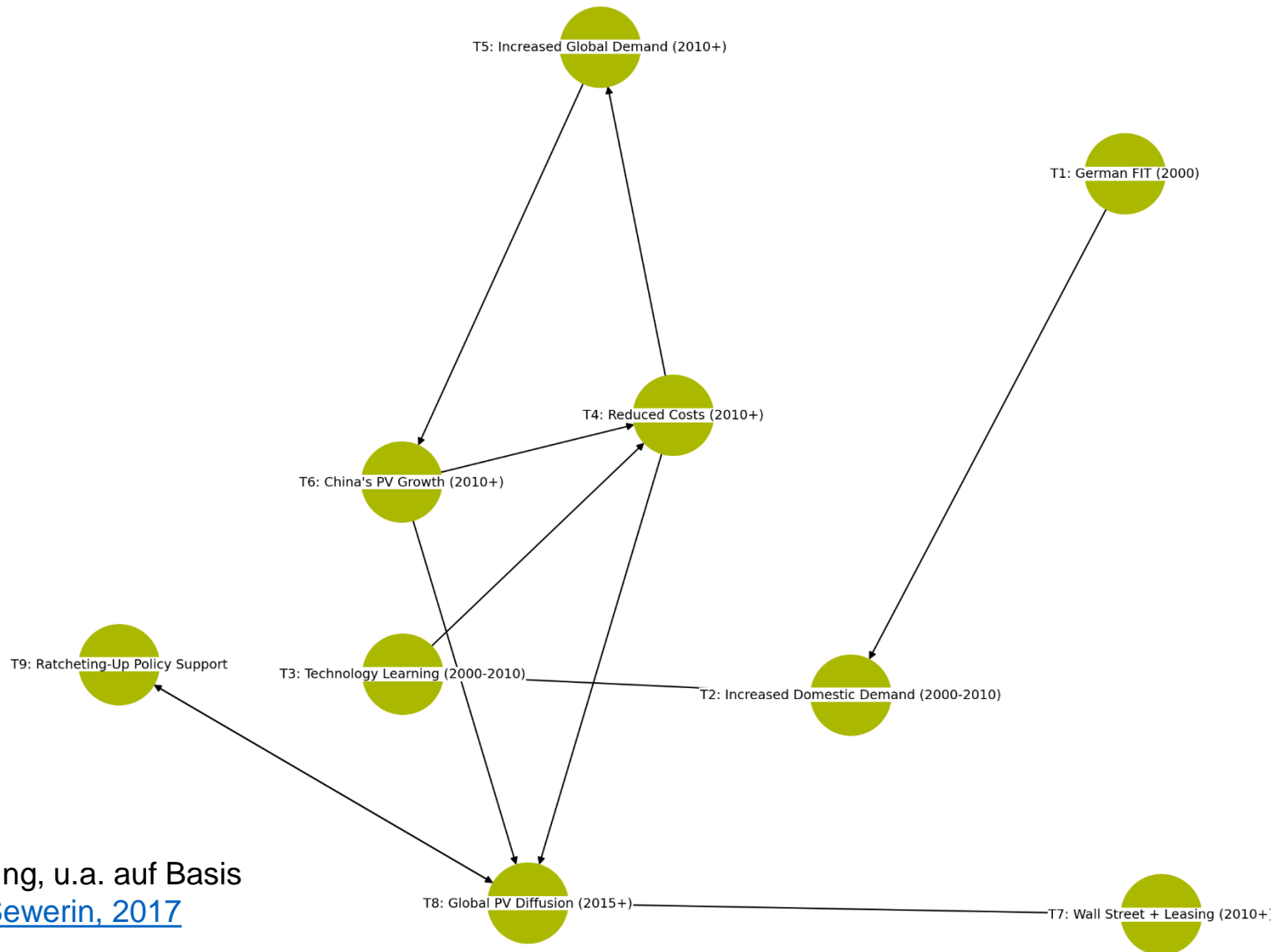
Our World  
in Data



Data source: International Renewable Energy Agency (2023)

OurWorldinData.org/renewable-energy | CC BY

# Die globale Diffusion von Solar PV



Eigene Darstellung, u.a. auf Basis  
von [Schmidt & Sewerin, 2017](#)