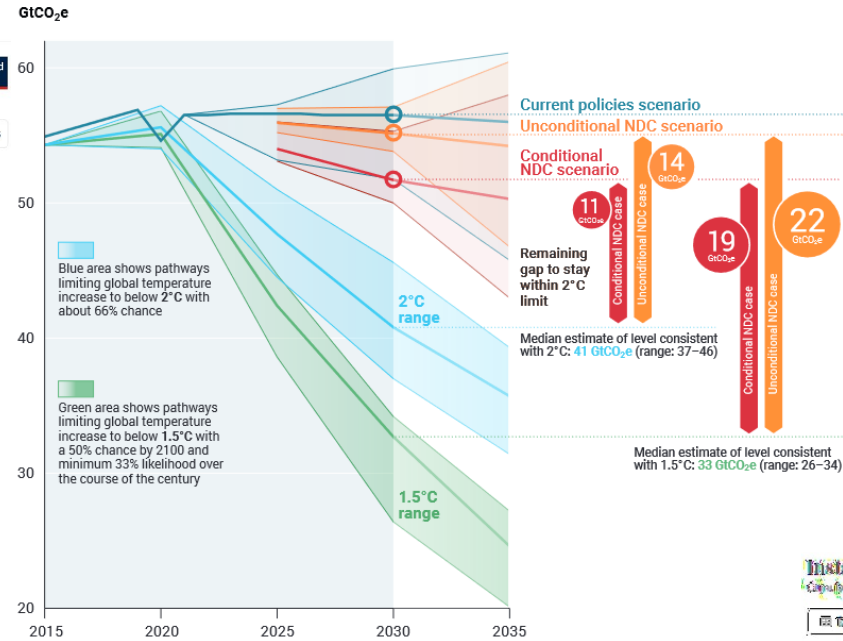
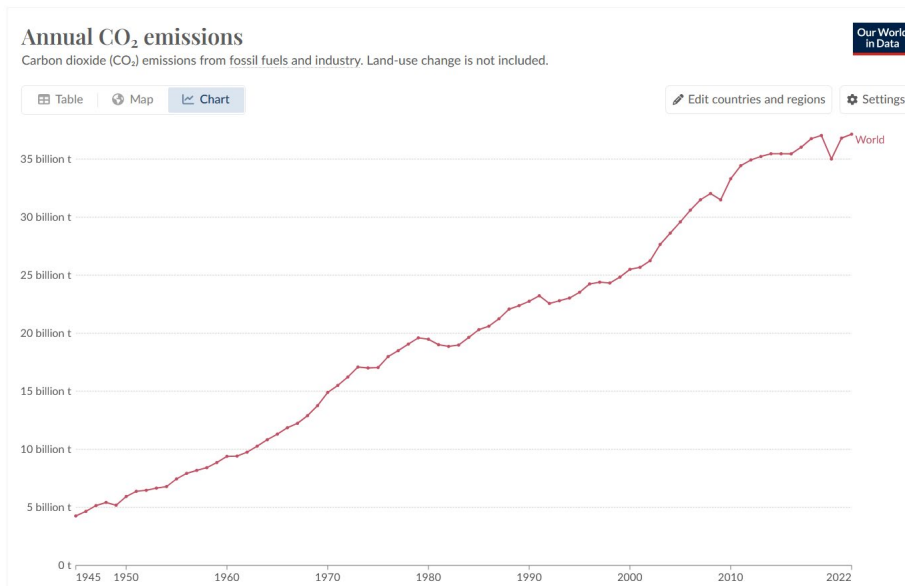


Finanzierbarkeit von
Energieprojekten und
Anpassungsbedarf der
Rahmenbedingungen

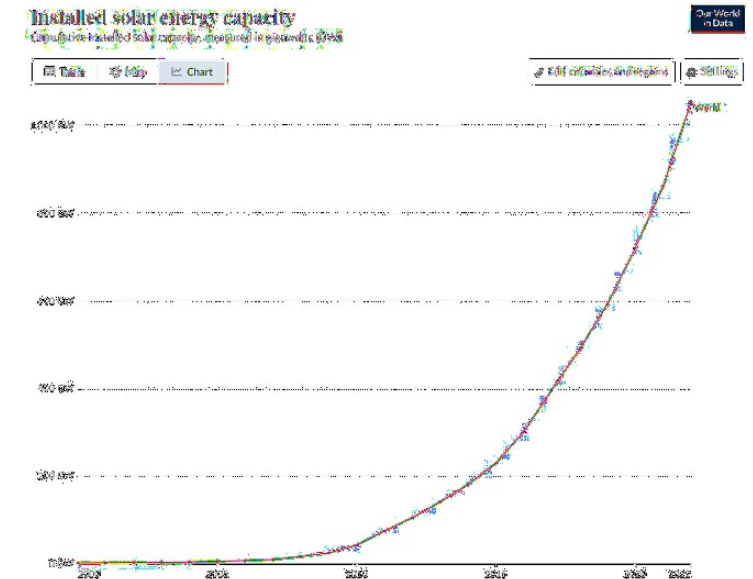
Prof. Dr. Tobias Schmidt, ETH Zürich
Forum Energie, 09.04.2024

Wo stehen wir bei der Energiewende?



- Photovoltaik und Batterien sind die am schnellsten Wachsenden CO₂-armen Technologien

- Nach jahrzehntelanger Zunahme von CO₂ Emissionen, Abflachen der Kurve in den letzten Jahren
- Hauptgründe: Erneuerbare, Elektromobilität, Gas
- Aber: wir müssen so rasch wie möglich eine massive Absenkung der Emissionen erreichen



Wo steht die Schweiz?

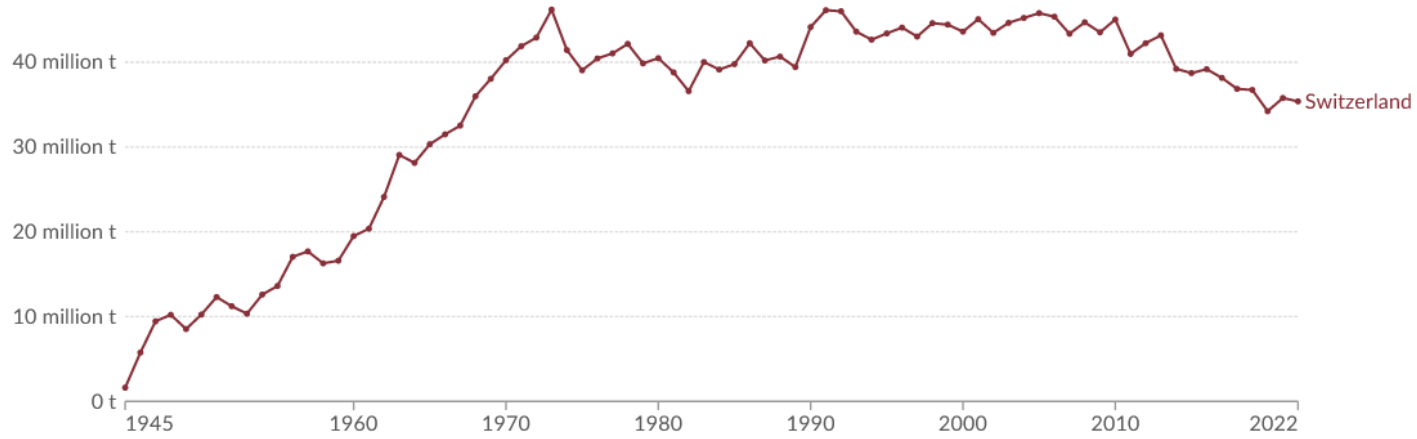
Annual CO₂ emissions

Carbon dioxide (CO₂) emissions from fossil fuels and industry. Land-use change is not included.

Our World in Data

[Table](#) |
 [Map](#) |
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[Edit countries and regions](#) |
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Share of CO₂ emissions embedded in trade

Exported or imported emissions as a percentage of domestic production emissions. Positive values (red) represent net importers of CO₂. Negative values (blue) represent net exporters of CO₂.

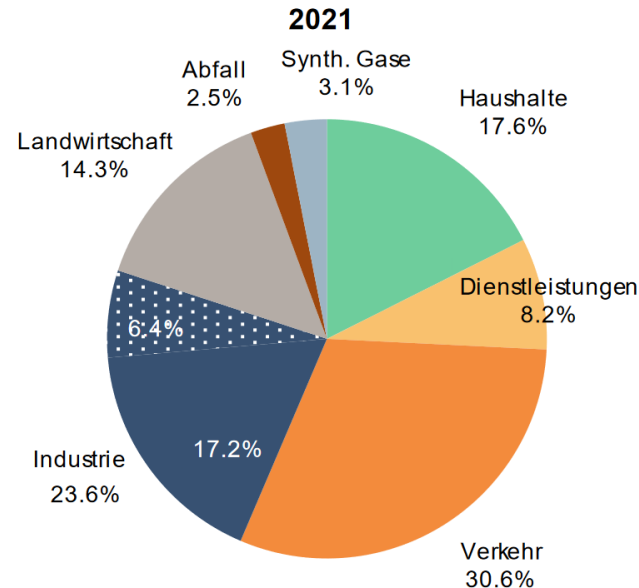
Our World in Data

[Table](#) |
 [Map](#) |
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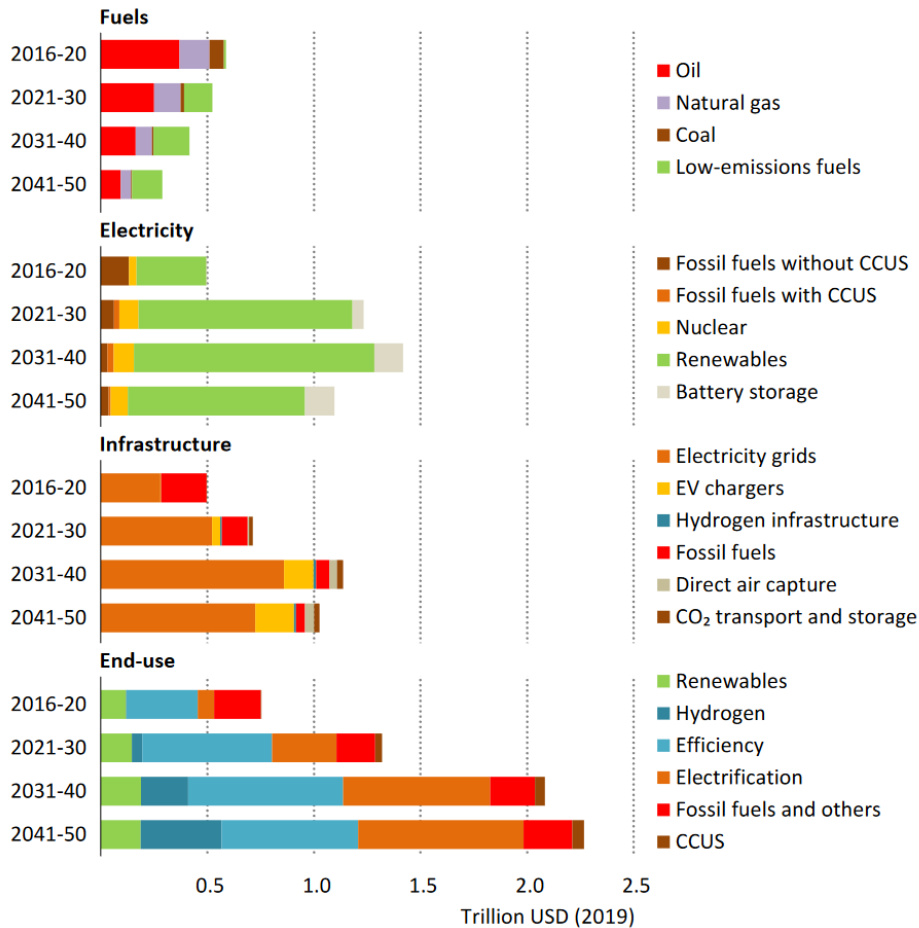
Anteile der Sektoren an den totalen Treibhausgasemissionen



Wie viel Kapital wird benötigt?

Globaler Investitionsbedarf

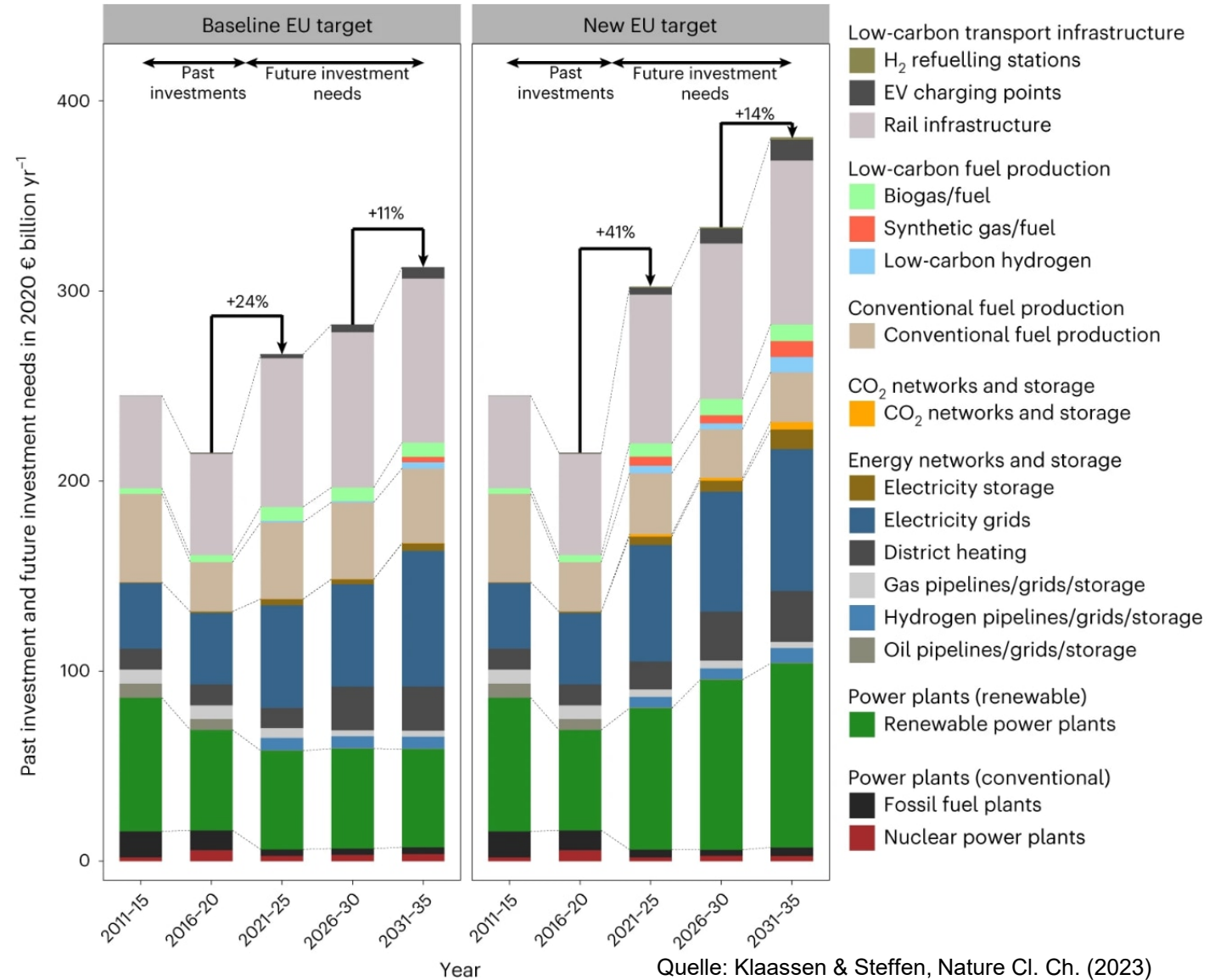
IEA: $4.5 \cdot 10^{12}$ USD bis 2030 und steigend



Quelle: IEA (2021)

<https://www.iea.org/reports/net-zero-by-2050>

Investitionsbedarf in Europa



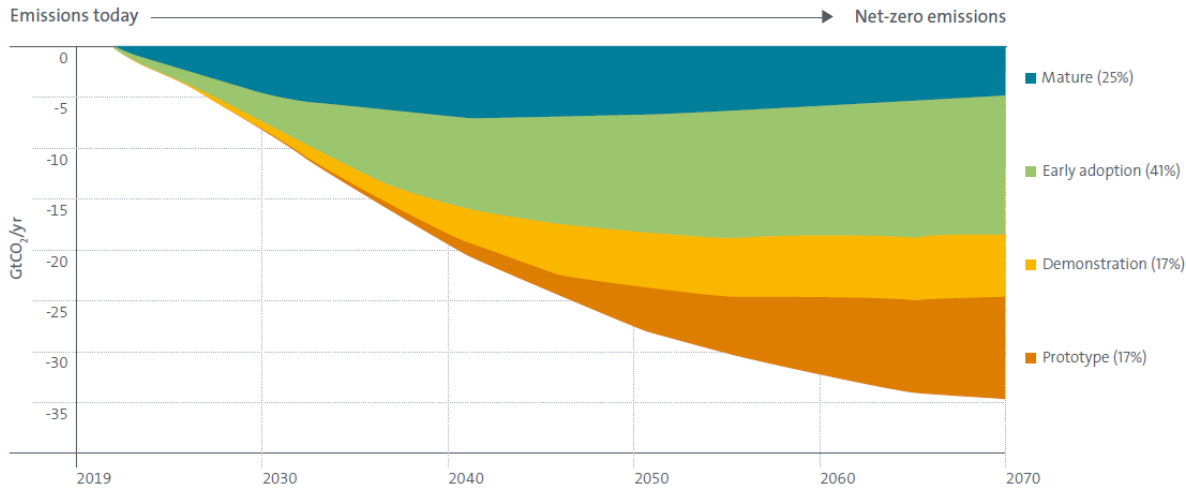
Quelle: Klaassen & Steffen, Nature Cl. Ch. (2023)

<https://rdcu.be/dDLZ4>

Welche Art von Kapital wird benötigt?

Figure 1.1

Global energy sector CO₂ emissions reductions by current technology readiness category in the IEA Sustainable Development Scenario relative to the Stated Policies Scenario

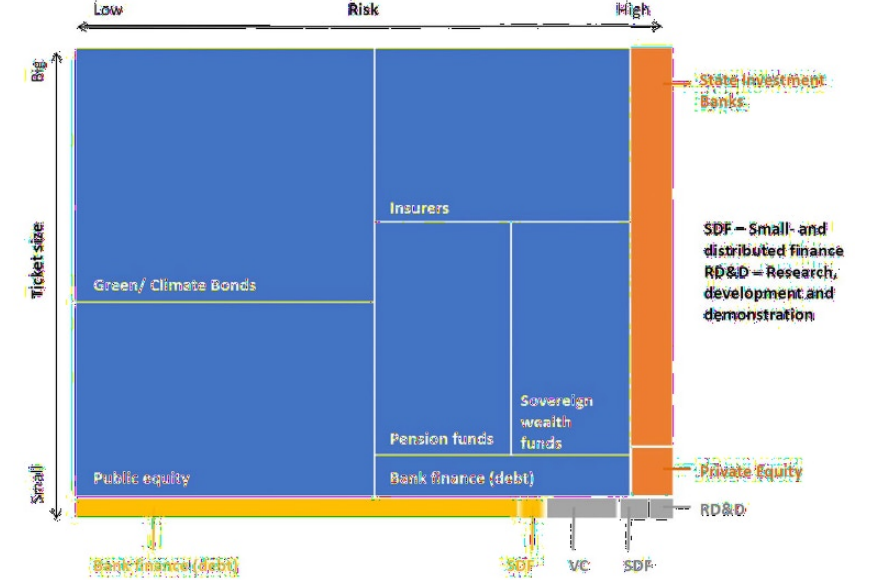


Notes: the IEA Sustainable Development Scenario maps out a way to meet the key energy-related goals of the United Nations Sustainable Development Agenda, including by mitigating climate change in line with the Paris Agreement. The trajectory for emissions in the Sustainable Development Scenario is consistent with reaching global "net-zero" CO₂ emissions by around 2070. The Stated Policies Scenario assesses the evolution of the global energy system on the assumption that government policies that have already been adopted or announced with respect to energy and the environment, including commitments made in the nationally determined contributions under the Paris Agreement, are implemented. Percentages refer to cumulative emissions reductions by 2070 between the Sustainable Development Scenario and the Stated Policies Scenario enabled by technologies at a given level of maturity.
Source: IEA 2020a: ETP Special Report on Clean Energy Innovation

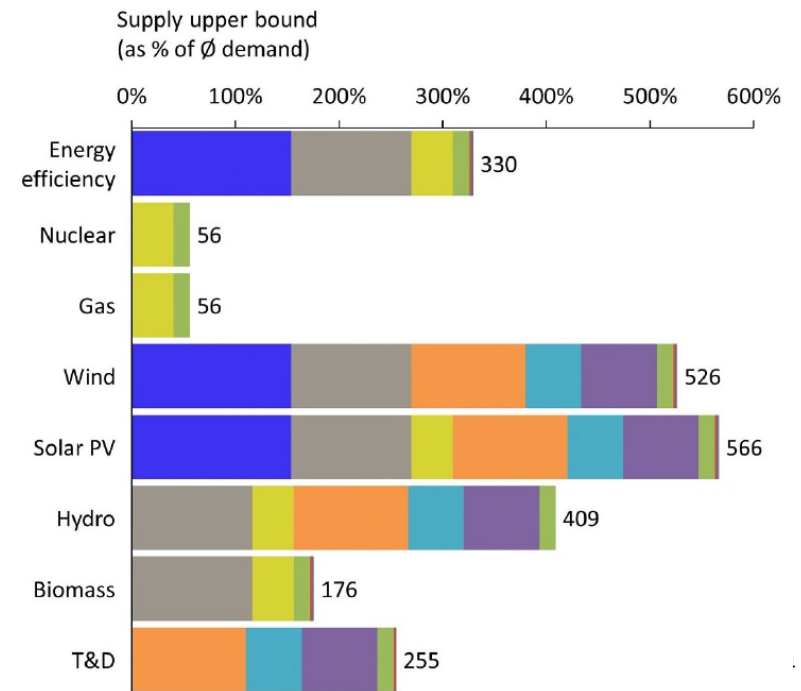
Absolute amount available	Upper bound
Public equity	221.54
Green/ climate bonds	191.22
State investment banks	60.35
Insurers	158.16
Pension funds	77.06
Sovereign wealth funds	104.7
Bank finance (debt)	38.33
VC and private equity	4.61
Small- and distributed finance	2.03

Quellen: IEA; Polzin & Sanders, En. Pol. (2020), <https://doi.org/10.1016/j.enpol.2020.111863>

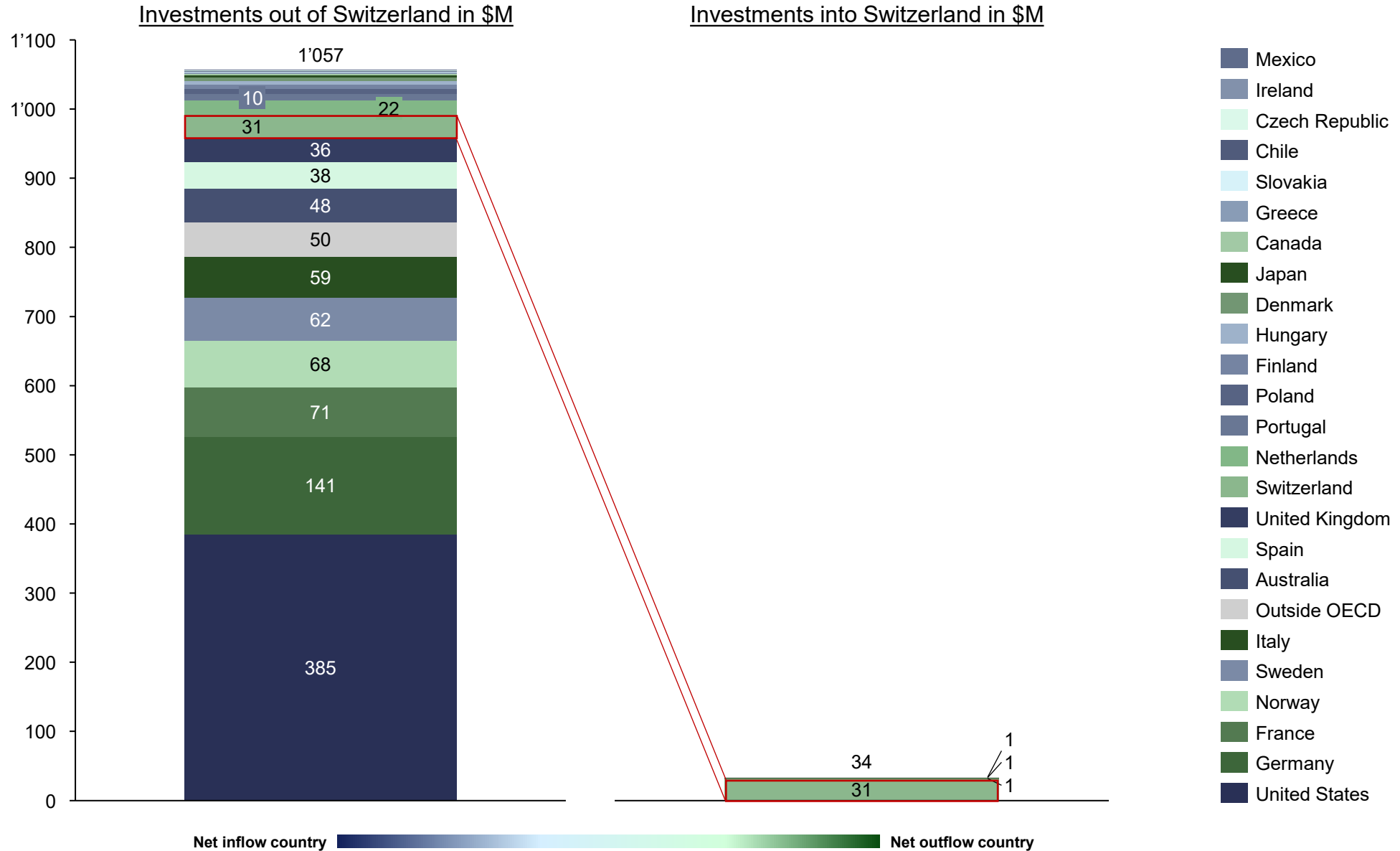
Availability of sources for the energy transition in Europe



Upper bound financing supply per source and technology in Europe



Schweizer Investoren investieren grösstenteils im Ausland



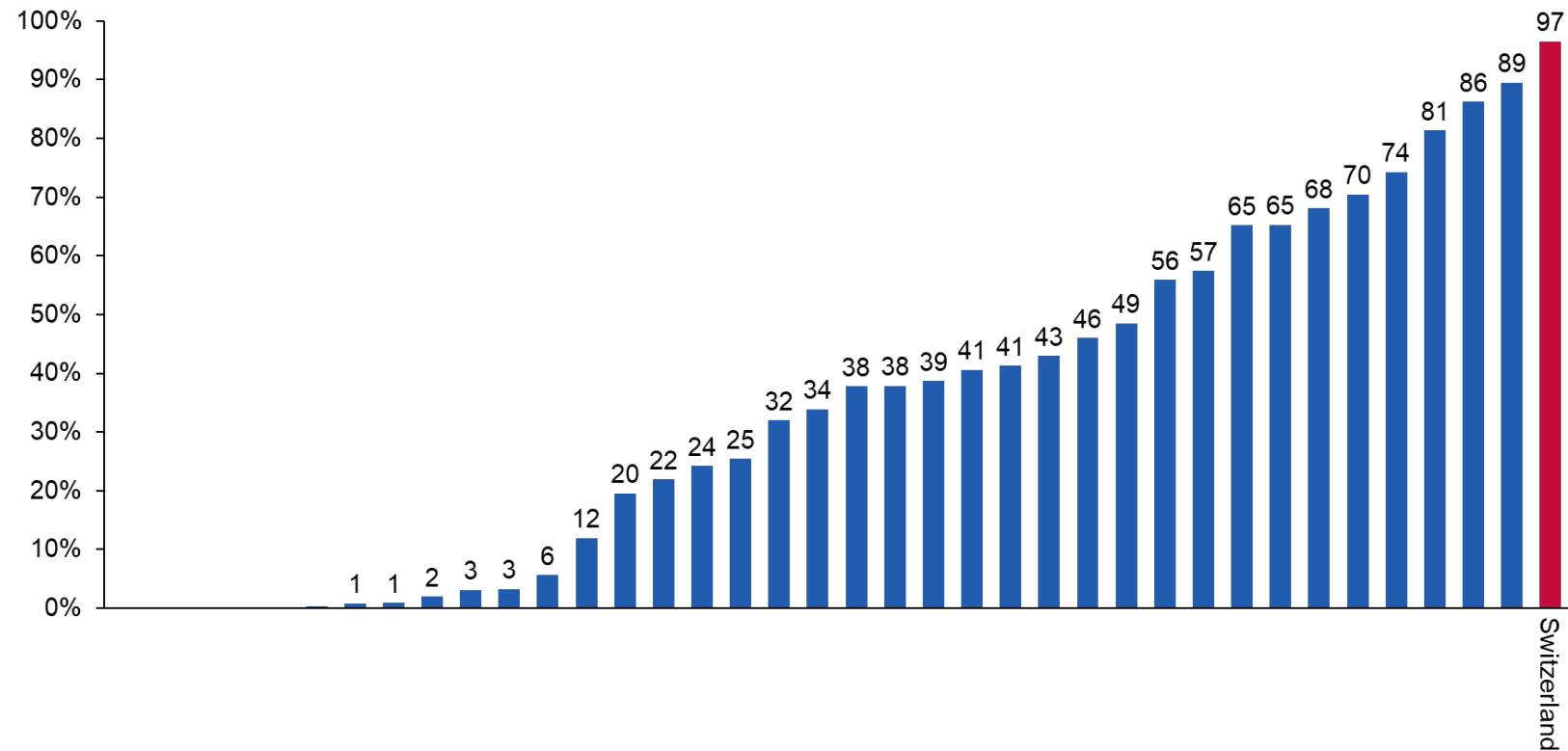
- Mexico
- Ireland
- Czech Republic
- Chile
- Slovakia
- Greece
- Canada
- Japan
- Denmark
- Hungary
- Finland
- Poland
- Portugal
- Netherlands
- Switzerland
- United Kingdom
- Spain
- Australia
- Outside OECD
- Italy
- Sweden
- Norway
- France
- Germany
- United States

Quelle: ETH Zurich (EPG):
Eberhart et al. (mimeo)

Anteil der Auslandsinvestitionen aller Investitionen in Erneuerbare Energie Projekte

Energieversorger

Investment outflow shares of utilities by country (2004-2022)



Warum ist die Schweiz ein so grosser Netto-Kapitalexporteur bei den Erneuerbaren?

- Schweiz ist ein grosser und international aktiver Finanzplatz
- Kaum inländische erneuerbare Grossprojekte (ausser Wasser)
 - Landschaftsschutz, NIMBYism, ...

=> Energieversorger investieren im Ausland
- Kaum Zuflüsse von aussen, weil:
 - Kapital vorhanden
 - unattraktiver Energiesektor (Fragmentierung!)
- Andere Märkte wesentlich attraktiver! (Rendite, Risiko, Grösse)
- Fazit: Am Kapital wird es nicht scheitern, eher am Willen (in Bern und in jeder einzelnen Gemeinde)

Vielen Dank für Ihre Aufmerksamkeit!

Mehr zu unserer Forschung: www.epg.ethz.ch

Beteiligte ForscherInnen:



Sara Eberhart



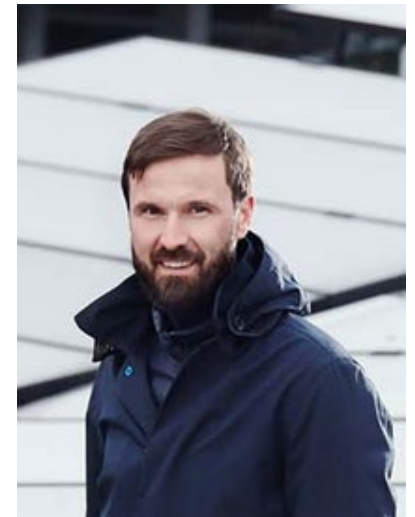
Lena Klaassen



Prof. Dr. Bjarne Steffen



Prof. Dr. Florian Egli



Prof. Dr. Tobias Schmidt