



The Phase-out of GHG Emissions
to Reach the 1.5°C Target
and the Role of the Construction Sector

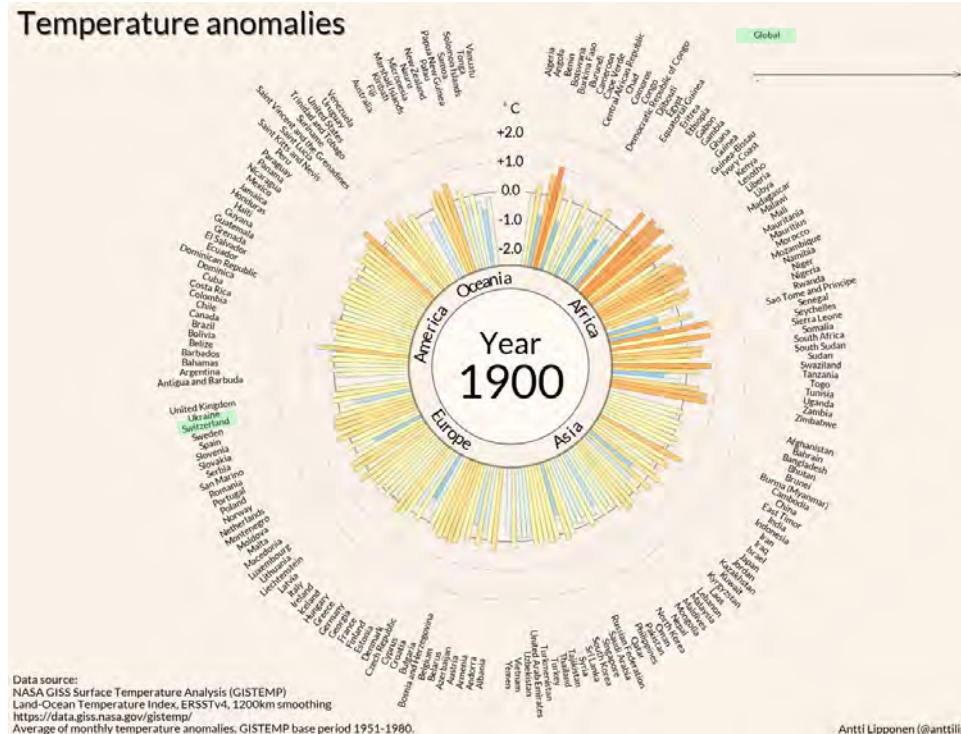


Agenda

1. What for?
2. How ambitious?
3. The construction sector?



Global Warming: Merely a few Outliers?





Where are we now?



Human activities are estimated to **have caused** approximately 1.0°C of global warming above pre-industrial levels.

Estimated anthropogenic global warming is currently increasing at **$\sim 0.2^{\circ}\text{C}$ per decade** due to past and ongoing emissions.

Global warming is likely to **reach 1.5°C** between 2030 and 2052 if it continues to increase at the current rate.

1.5° or 2°C – does it really matter?

EXTREME WEATHER

100% increase in flood risk. vs **170%** increase in flood risk.

SPECIES

6% of insects, **8%** of plants and **4%** of vertebrates will be affected. vs **18%** of insects, **16%** of plants and **8%** of vertebrates will be affected.

WATER AVAILABILITY

350 million urban residents exposed to severe drought by 2100. vs **410 million** urban residents exposed to severe drought by 2100.

ARCTIC SEA ICE

Ice-free summers in the Arctic at least once **every 100 years.** vs Ice-free summers in the Arctic at least once **every 10 years.**

PEOPLE

9% of the world's population (700 million people) will be exposed to extreme heat waves at least once every 20 years. vs **28%** of the world's population (2 billion people) will be exposed to extreme heat waves at least once every 20 years.

SEA-LEVEL RISE

46 million people impacted by sea-level rise of 48cm by 2100. vs **49 million people** impacted by sea-level rise of 56cm by 2100.

OCEANS

Lower risks to marine biodiversity, ecosystems and their ecological functions and services at 1.5°C compared to 2°C.

CORAL BLEACHING

70% of world's coral reefs are lost by 2100. vs Virtually **all coral reefs are lost** by 2100.

COSTS

Lower economic growth at 2°C than at 1.5°C for many countries, particularly low-income countries.

FOOD

Every half degree warming will consistently lead to lower yields and lower nutritional content in tropical regions.

and 4°C?

A vibrant landscape photograph showing a mountain valley. In the foreground, there are various wildflowers, including white daisies with yellow centers, blue flowers, and a yellow butterfly. The middle ground features a lush green valley with a small lake or pond. The background consists of steep, rocky mountains with patches of snow under a blue sky with scattered clouds.

What for?
For this!



The public expects solutions from us



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What are the Pathways for 1.5°C?

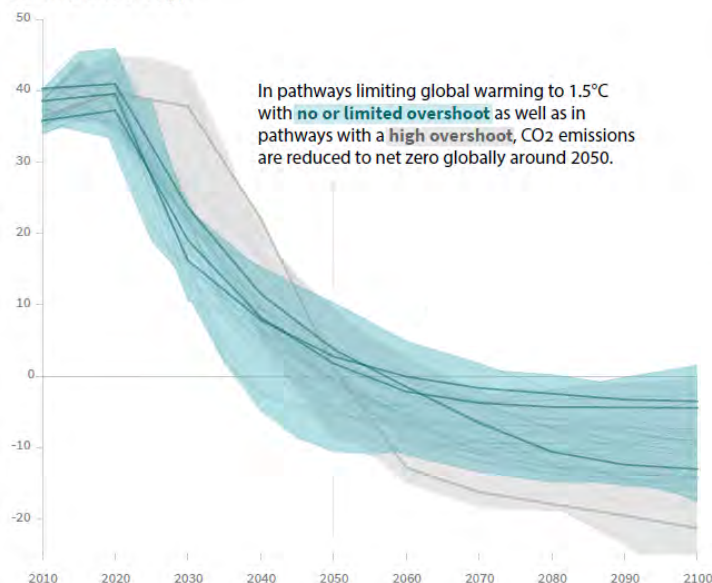
The **earlier** we start, the easier it is to remain below 1.5°C

The longer we stick to BAU, the heavier we rely on **net negative emissions**

Global CO₂ emissions must be reduced by 40-50% by 2030, **net zero** must be achieved by **~2050**

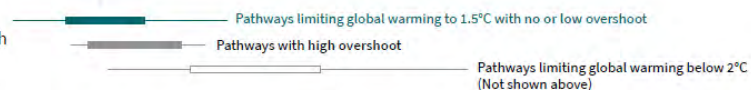
Global total net CO₂ emissions

Billion tonnes of CO₂/yr



Timing of net zero CO₂

Line widths depict the 5-95th percentile and the 25-75th percentile of scenarios



IPCC. SR15 Figure SPM.3a. 2018



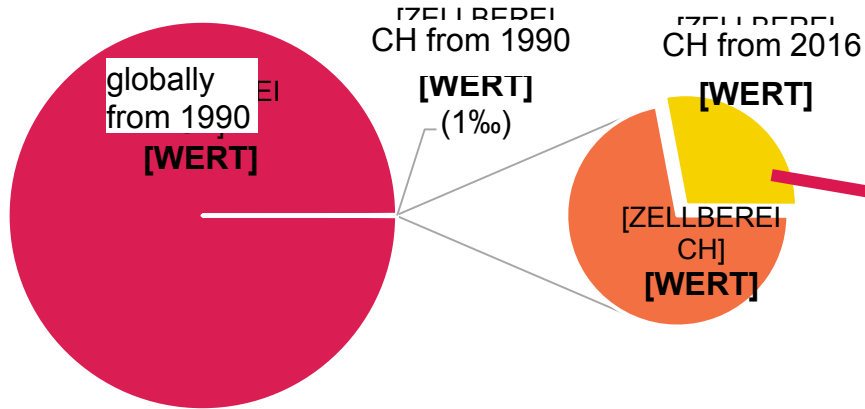
Common Misconceptions

wrong	right
net-zero not until 2nd half of this century	until 2050
net-zero until 2050 in every country	on average; countries with high GDP / responsibility much earlier
~1t CO ₂ per capita remains (from energy-related sources)	most sectors must reduce to 0t CO ₂ (fossil-free) <i>otherwise every sector claims the remaining tonne...</i>

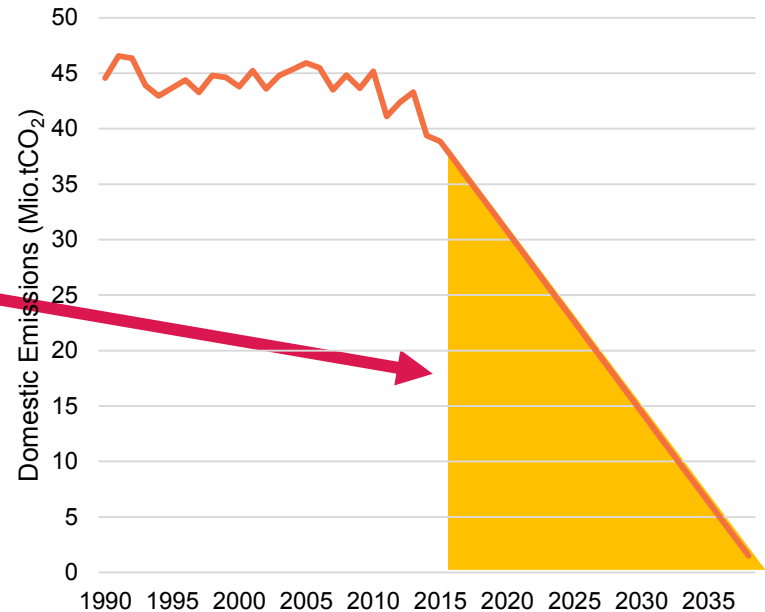


What is the Swiss Pathway to Paris?

Global Carbon Budget (billion t CO_{2eq})



Assuming linear reduction, net zero is to be reached in 2039



Vieli, B.; Fussen, D.; Müller M. CO₂-Budget der Schweiz. Zollikon, 2017.

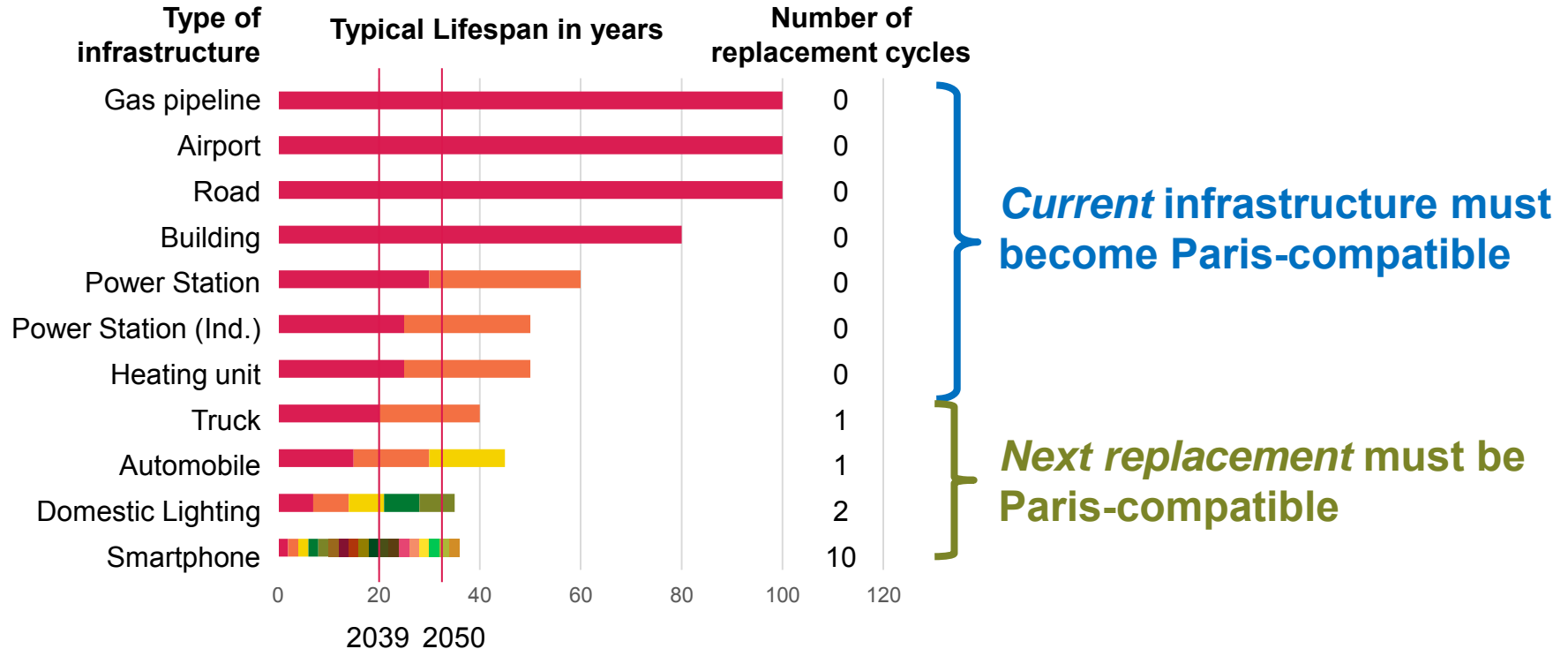


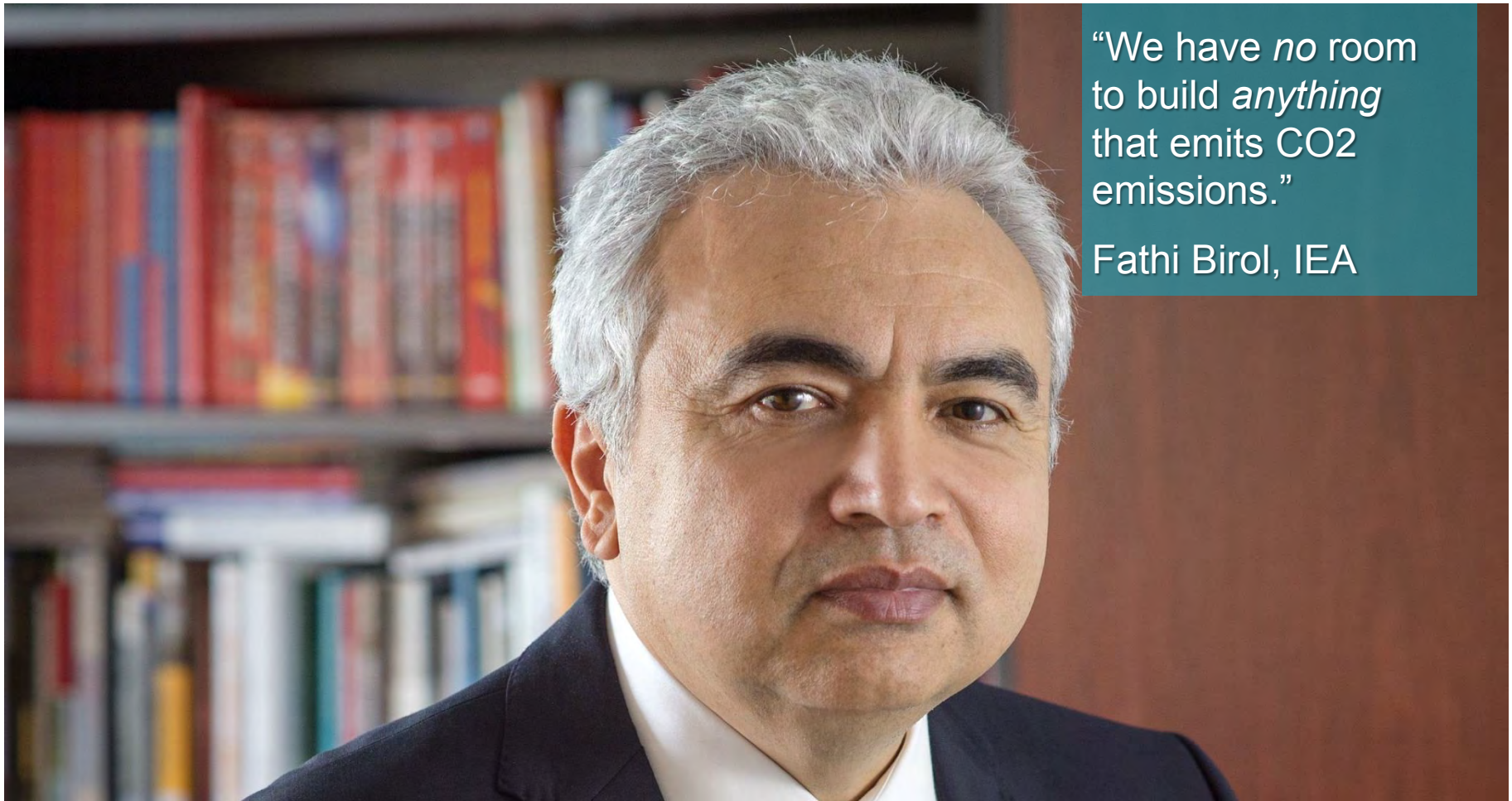
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Lifespan of Infrastructure is Crucial



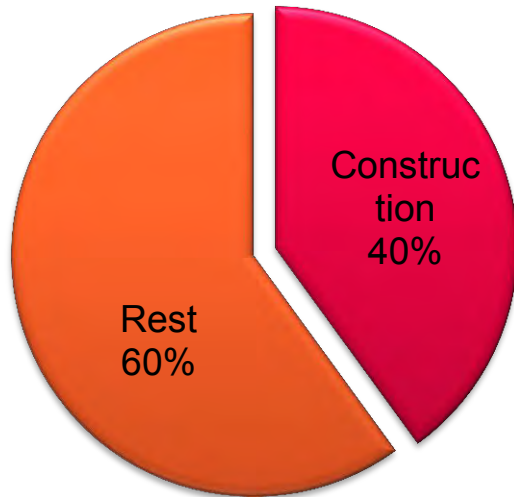


“We have *no* room
to build *anything*
that emits CO2
emissions.”

Fathi Birol, IEA

Why is the Construction Sector Relevant?

High share of global energy-related CO2 Emissions



(Most of the) construction sector is comparatively easy to decarbonate

- Buildings are immovable
→ subject to exclusive domestic regulation **without carbon leakage**
- Energy need for space heating can technically be reduced to **nearly zero**
- CO2-free technologies are **available and cost-competitive**, already today
- Decarbonisation of *construction phase* (**grey emissions from cement, steel** etc.) is still a **challenge**
- Emission reduction rate of **6% p.a.** – compared to 4% p.a. for most sectors



The Decarbonisation of Construction as a Special Challenge

IEA. Perspectives for the Clean Energy Transition. IEA. Paris. 2019
The Energy Transitions Commission. Mission Possible. 2018

- **Cement and steel** consumption for construction of buildings account for roughly 5% of global CO2 emissions
 - and the **floor area** is expected to nearly double by 2050 globally...
- Reduce steel and cement **demand** from buildings by
 - switching to low-carbon **building frames** such as wood or biosourced materials
 - material-oriented **optimisation** in building design
 - extending building's **lifetime** through modular design
 - **reusing / recycling** materials
- Decarbonise steel and cement **production**

Not for Paris.
But for her.





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WWF

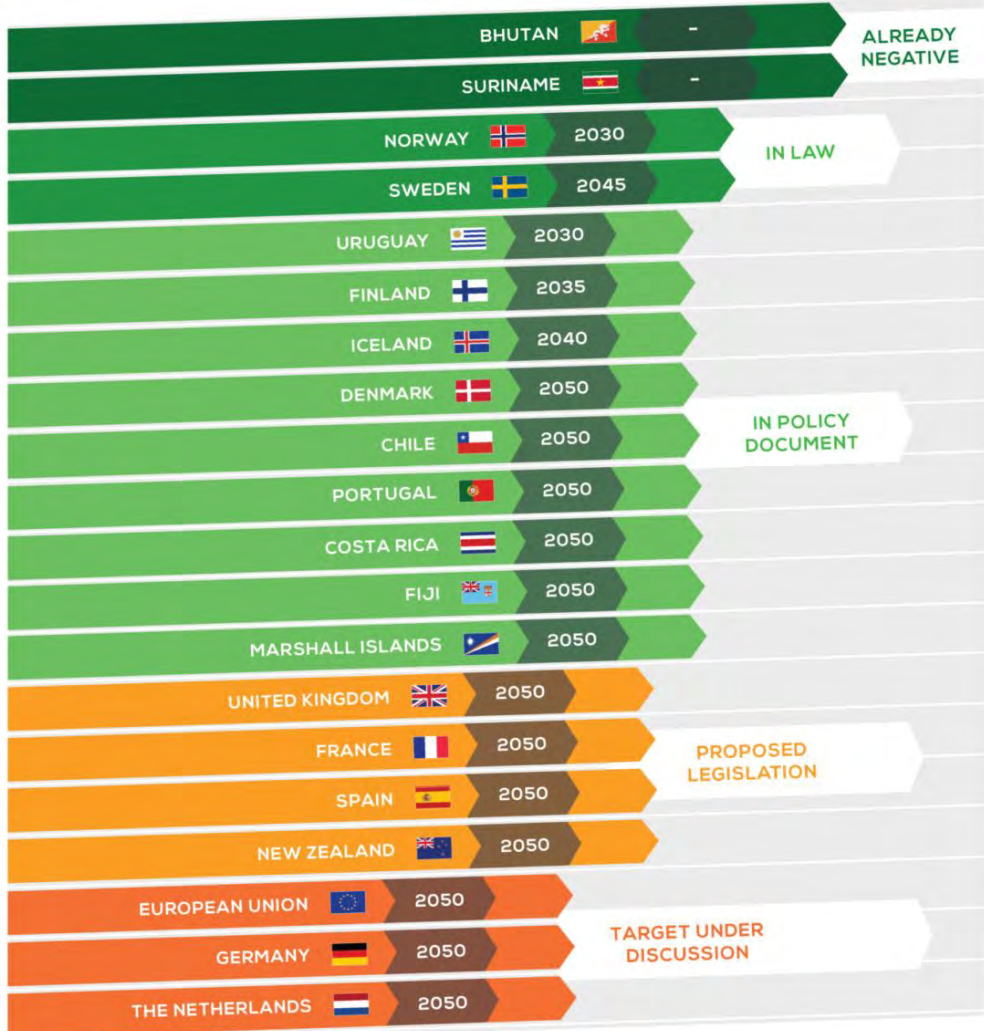


What is the *Swiss* pathway to Paris?

Basis and Assumptions

- **Paris-Agreement** as a legally binding instrument:
«... aims to ... holding the increase in the global average temperature to **well below 2°C** above pre-industrial levels and to pursue **efforts to limit the temperature increase to 1.5°C** above pre-industrial levels” (Art. 2)
- Global carbon budget for **33%** likelihood of remaining **below 1.5°C** (IPCC AR 5)
- **Historical emissions** are only accounted for since 1990 (publication of IPCC AR 1)
- Global carbon budget from 1990 onwards is divided up **equally per capita**
- Each country is assigned a carbon budget accordingly, taking into account only **CO₂** emissions within its **territory**

Vieli, B.; Fussen, D.; Müller M. CO₂-Budget der Schweiz. Zollikon, 2017.



Switzerland is hesitating, but other countries have moved forward: on the net-zero-emissions race...

CO₂ reduction rate per year

1%
p.a.

Swiss CO2-law
domestic 2020-2030
(draft)

4%
p.a.

According to **Paris**
Agreement

6%
p.a.

Derived for
construction sector

1.25%
p.a.

Switch **Oil** → **Gas**-
fired heating
(lifespan 20 years)

IEA. Perspectives for the Clean Energy Transition. IEA. Paris. 2019



Global Effects – but in Europe? In Switzerland?



The Glaciers are melting away (Gauli Glacier, CH)



And the Edelweiss
(*Leontopodium alpinum*)?