Federal Act on Climate Protection Goals, Innovation and Enhanced Energy Security

Science background and perspectives

Augustin Fragnière

Deputy-director, Competence Centre in Sustainability

UNIL | Université de Lausanne
Centre de Compétences en Durabilité

Key points

Overarching goal: compliance with the Paris Agreement (art. 1)

Mitigation: Net zero GHG emissions by 2050, net negative after 2050 (art. 3)

- Sets emissions reduction goals for : buildings, transportation, industry
- Subsidy for the replacement of fossil fuel and electric heating systems (200M/year for 10 years)
- Subsidy for new technologies and innovation (200M/year for 6 years)
- Development of negative emission technologies

Adaptation: protection against the impacts of climate change (art. 8)

Finance: make financial flows compatible with mitigation and adaptation (art. 9)

General mitigation goal (article 3)

Goal

- Net zero GHG emissions in 2050 (§1)
- Net negative GHG emissions after 2050 (§2)

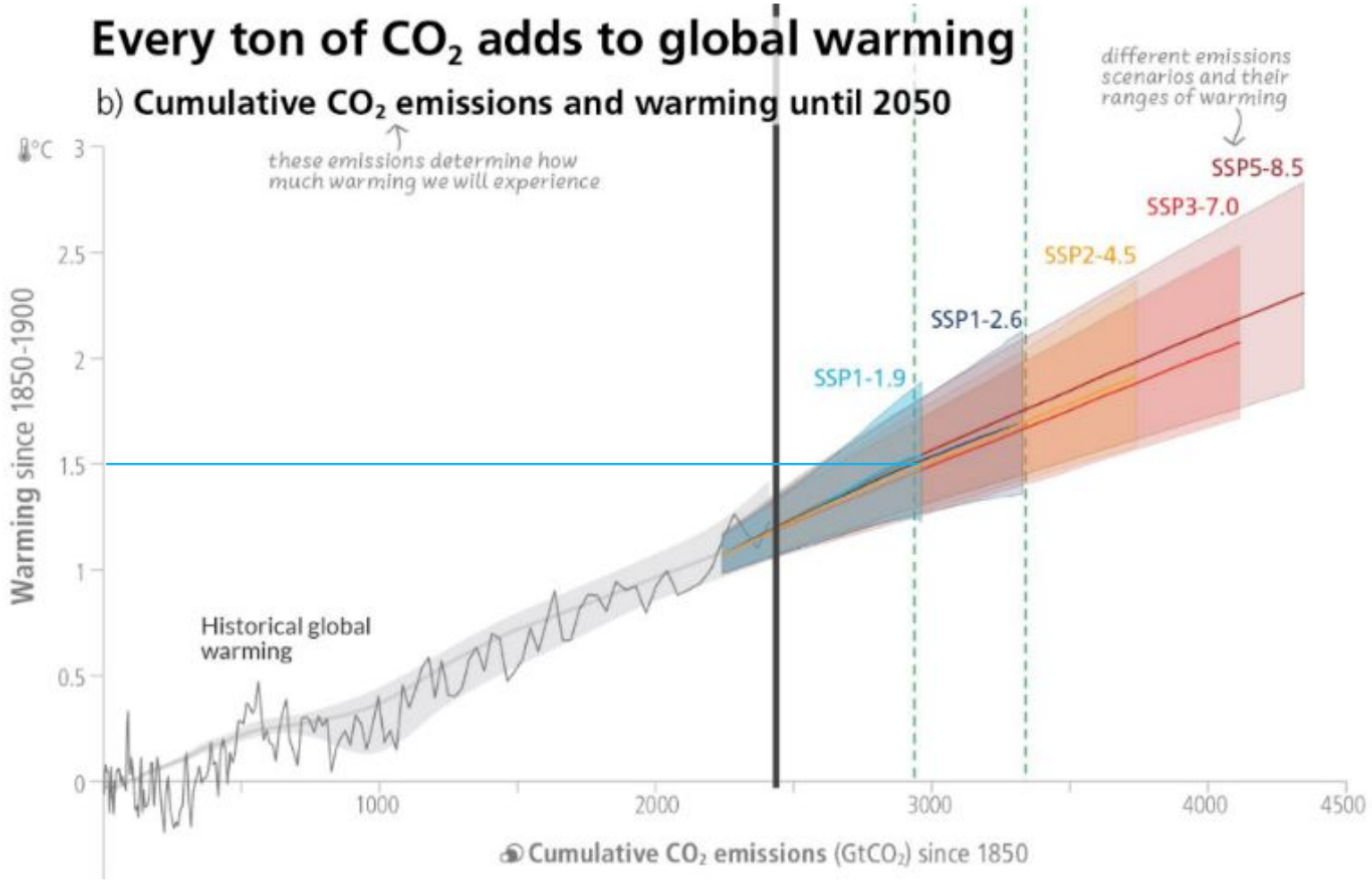
} Direct emissions + air and sea travel from CH

Strategy

1. Reducing GHG emissions as much as possible
2. Balancing **remaining emissions** with negative emissions technologies, <u>in CH and abroad</u>
   - The Confederation and the cantons are responsible for ensuring that we have enough of them (art.3, §5)

Net zero 2050 Why and how?

Warming is proportional to cumulative CO_2 emissions



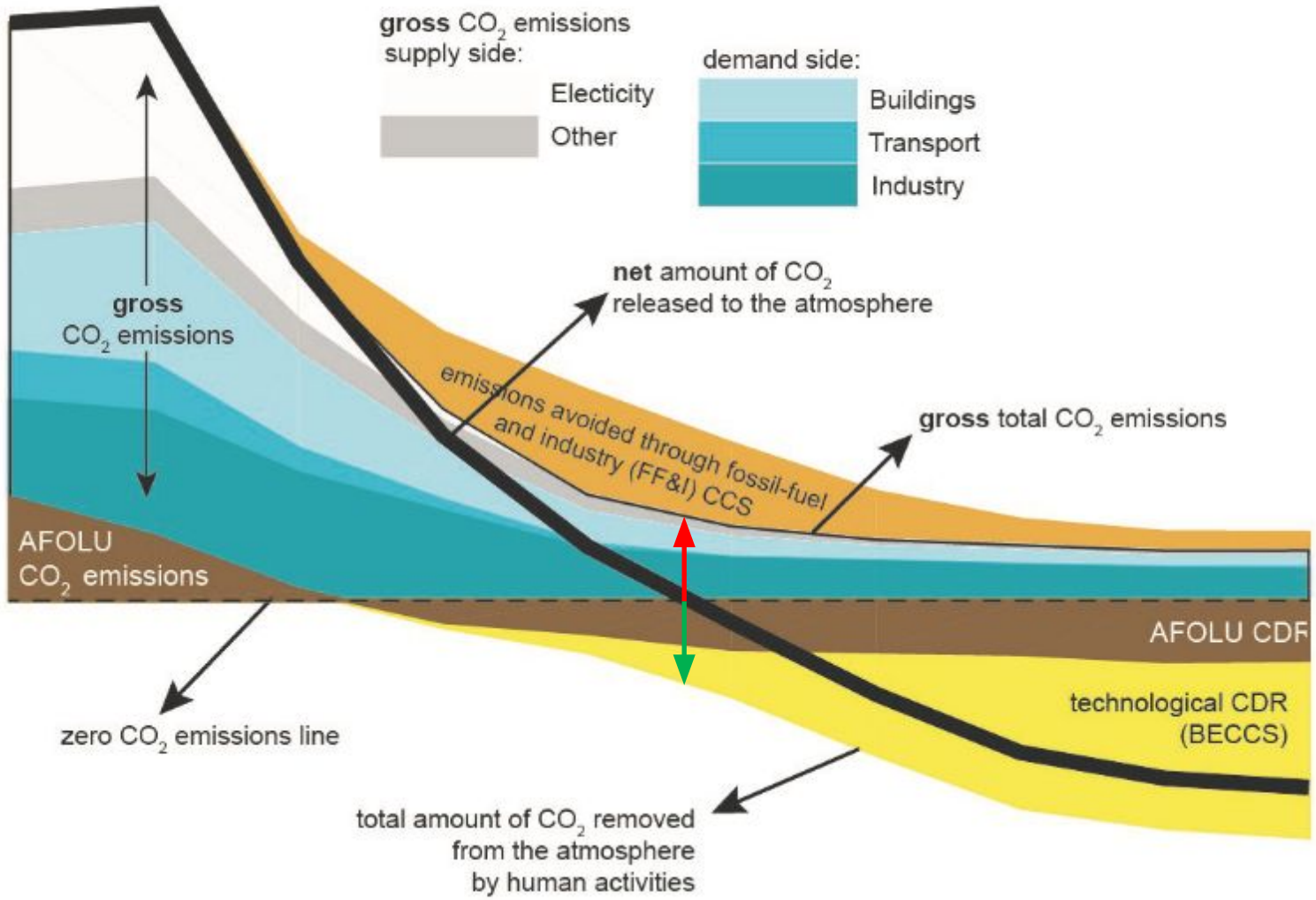
IPCC AR6 - Synthesis report

Net zero 2050 Why and how?

Net zero carbon dioxide emissions are achieved when anthropogenic CO_2 emissions are balanced globally by anthropogenic CO_2 removals over a specified period. Net zero CO_2 emissions are also referred to as carbon neutrality.

IPCC SR1.5

PARIS COMPATIBLE MITIGATION PATHWAY



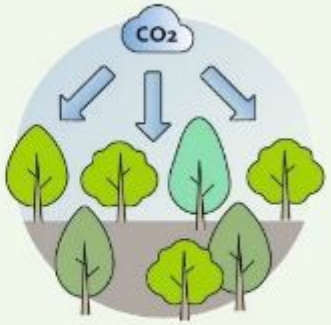
IPCC SR1.5

Net zero 2050 Why and how?

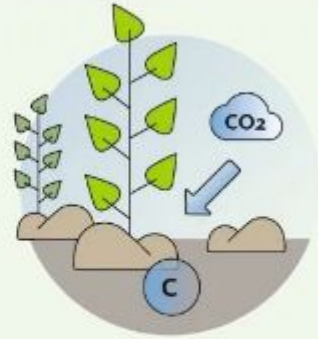
Different types of negative emission technologies

Possible approaches for negative emissions

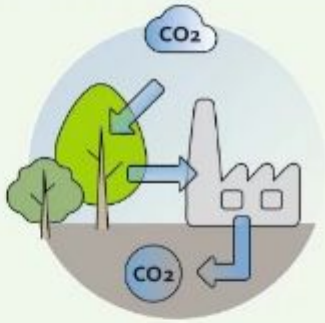
Afforestation, reforestation, forest management and wood utilisation
Trees remove CO_2 from the air as they grow. The CO_2 can be stored in trees, soil and wood products.



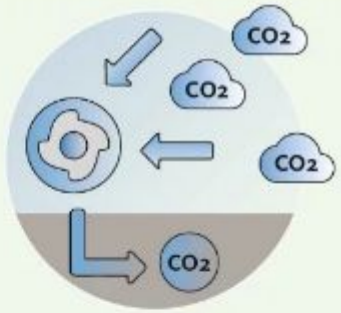
Soil management (incl. biochar)
The introduction of carbon (C) into soils, e.g. through crop residues or vegetable carbon, can accumulate C in the soil.



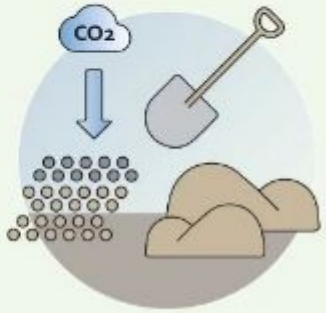
Bioenergy with carbon capture and storage (BECCS)
Plants convert CO_2 into biomass, which provides energy. CO_2 is captured and stored underground.



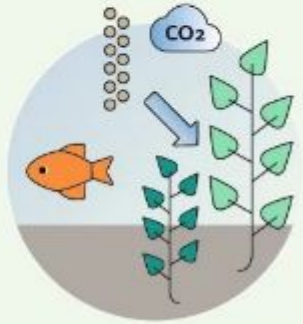
Direct air capture carbon capture and storage (DACCS)
CO_2 is extracted from the ambient air by chemical processes and stored underground.



Enhanced weathering
Crushed minerals bind CO_2 chemically and can then be stored in products, in the soil or in the sea.



Ocean fertilisation
Iron or other nutrients are added to the ocean to increase the absorption of CO_2 by algae.



Source: FOEN

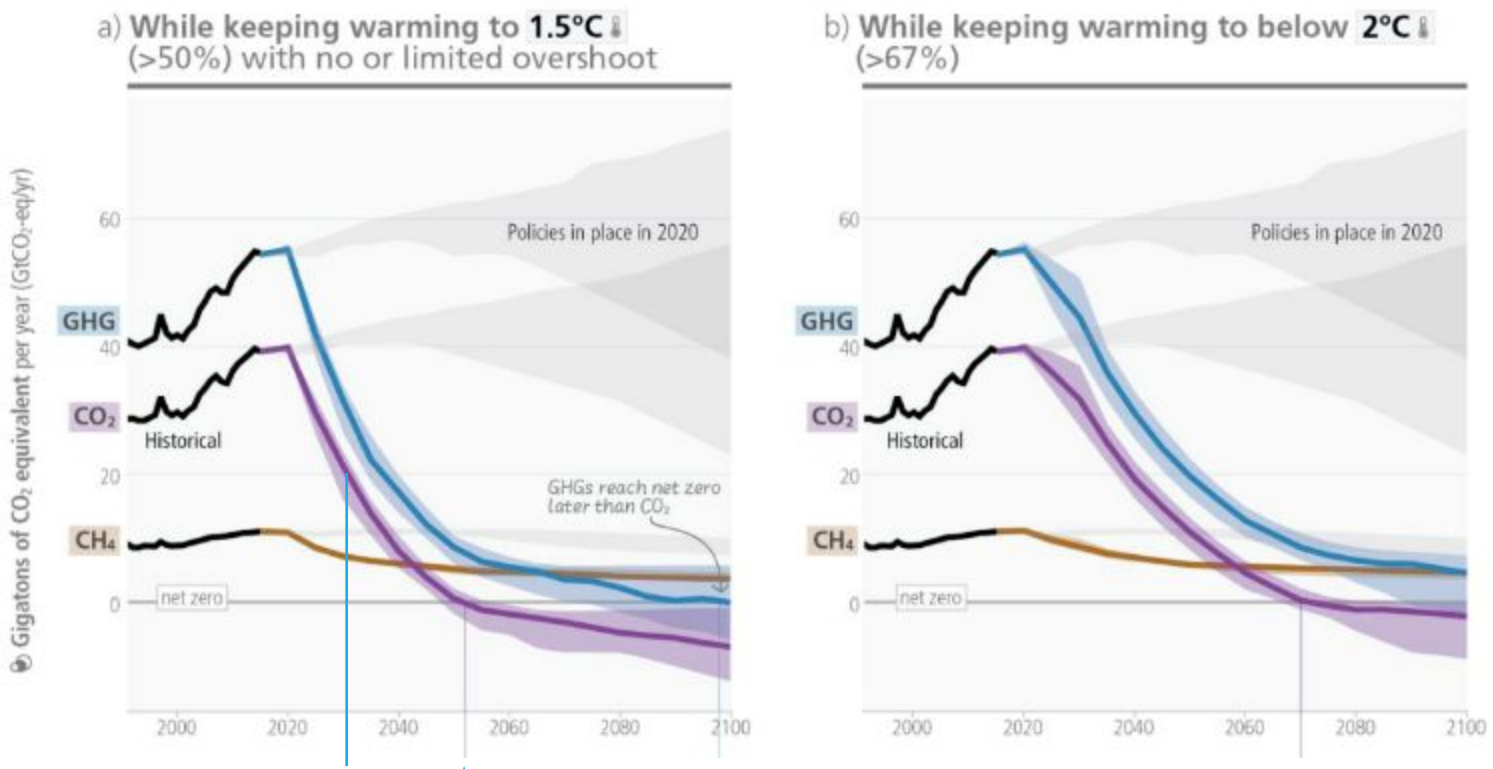
Net zero 2050 Why and how?

Reaching net zero CO_2
 stabilization of global mean temperature

Reaching net zero GHG
 slow decrease of global mean temperature (after overshoot)

Global modelled pathways that limit warming to 1.5°C (>50%) with no or limited overshoot reach net zero CO_2 emissions around 2050

Total **greenhouse gases (GHG)** reach net zero later



-50% CO_2

Zero net CO_2 → Climate law asks for zero net GHG !

IPCC AR6 - Synthesis report

Intermediate mitigation goals

Intermediate mitigation goals (article 3, §3)

a. At least - 64% between 2031 and 2040 (mean)

b. At least - 75% in 2040

c. At least - 89% between 2041 et 2050 (mean)

} Direct emissions only, relative to 1990

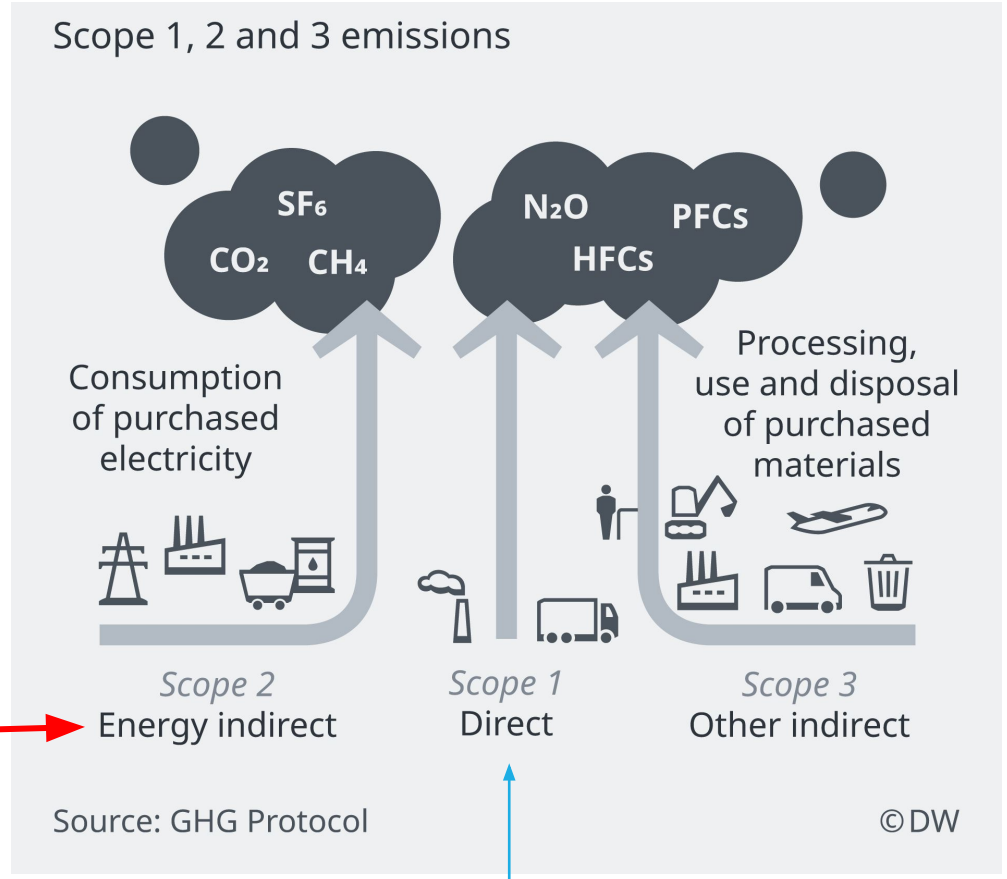
Restrictive conditions (article 3, §4). Emissions reductions must be:

- Technically feasible → The technology must be available
- Economically feasible → For the average company or economy-wide?
- As far as possible, implemented in Switzerland → No carbon offsetting?

What types of emission are included in the reduction goals?

Warning:
In climate law “indirect”
= energy indirect only !!
(art. 2, §c)

+ air and sea travel from CH for net zero goal (art. 3, §6)

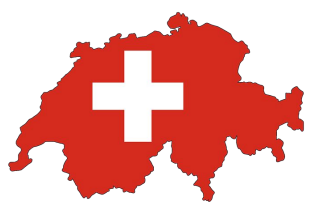


Country and sectors (art. 3 and 4)

Companies (art. 5, §1)

Federal administration (art. 10, §2)

Part of scope 2 and 3 emissions



69%

24 %

16 %

8 %

Data : 2019, Global carbon project

Sector specific mitigation goals

Sectors specific mitigation goals (art. 4)

a. Buildings: - 82% by 2040 / - 100% by 2050
b. Transportation: - 57% by 2040 / - 100% by 2050
c. Industry: - 50% by 2040 / - 90% by 2050

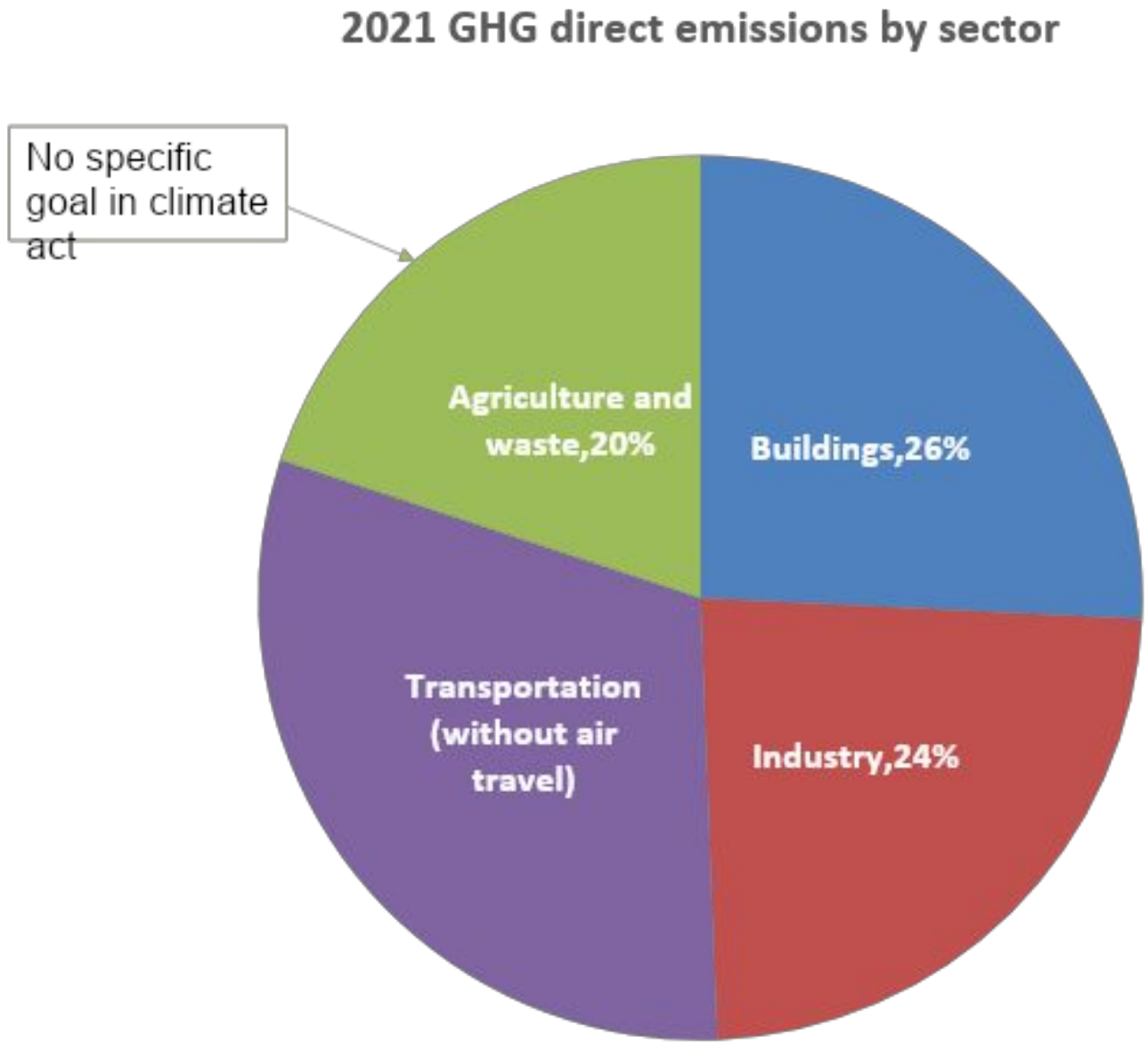
} Direct emissions, relative to 1990

Other entities

- Companies: net zero by 2050 (art. 5) → Direct and indirect emissions
- Federal administration: net zero by 2040 (art. 10, §2) → Direct, indirect and imported emissions
- Cantonal administrations: net zero by 2040 (art. 10, §4)
- Companies linked to the Confederation: net zero by 2040 (art. 10, §4)

} Direct emission (?)

What sectors contribute the most to climate change in CH ?



Data : 2021, FOEN

Adaptation goals (article 8)

Avoid an increase in damage to people and property caused by climate change, in particular as a result of:

a. rising average temperatures and changes in precipitation patterns;
b. intensive, frequent and long-lasting extreme events;
c. changes in natural environments and species composition.

Finance goals (article 9)

Make financial flows compatible with climate goals

The Confederation ensures that the Swiss financial center makes an effective contribution to:

a. low-emission development → mitigation

b. that is resilient to climate change. → adaptation

This includes measures to reduce the climate impact of domestic and international financial flows.

Finance as a lever to fight climate change

GHG emissions	Mt CO_2eq	Multiple of scope 1	% of global emissions
Direct emissions in CH	46	1	0.08
Abroad through imported goods and services	69	1.5x	0.12
Abroad controlled by CH companies	300-400	6-9x	0.5 – 0.7
Abroad linked to swiss finance flows (shares, bonds and loans to companies)	700-900	14-18x	1.3 – 1.6
Abroad linked to investment in government bonds	150-1100	3-22x	0.3 - 2
TOTAL	1265 - 2515		2.3 – 4.5

McKinsey & Company. (2022). *Klimastandort Schweiz : Schweizer Unternehmen als global Treiber für Netto-Null*.

Economic incentives

1. CHF 200 millions / year, over 6 years (art. 6 and 7). For:
   a. Companies: financial help for investing in innovation and new technologies
   b. Covering the risks of investments in public infrastructure (leverage effect)

2. CHF 200 millions / year, over ten years (modification of the Federal energy act). For:
   a. The replacement of fossil fuel and electric heating systems
   b. Energy efficiency measures

Implementation

The Federal Council proposes concrete measures of implementation of the goals to the Federal Assembly for each decade until 2050 (art. 11)

“The prescriptions of other federal acts and cantonal acts, […] shall be designed and implemented in a way that contributes to achieving the objectives of this Act” (art. 12)

“In particular in the areas of CO_2, the environment, energy, land planning, finance, agriculture, forestry and the timber industry, road and air transport, and the taxation of mineral oil”.

→ The principles of direct democracy apply

Attention points

- The climate law defines goals it has to be implemented in other legal documents
- Direct vs indirect emissions be aware of the difference
- Economically feasible reductions how exactly will that be defined?
- Negative emissions technologies multiple unknowns about their real potential
- Carbon offsetting Switzerland has a history of using carbon markets