Swiss Carbon Removal Platform

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CDR Swiss Policy White Paper Launch

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Swiss
Carbon Removal
Platform

carbon-removal.ch

Scaling up CDR – sustainably – together

→ towards Net-Zero and beyond

We are a **broker** for contacts, opportunities, reflection and knowledge

We foster **collaboration** and synergies between members – enabling exchange and **networking**

We involve society and societal actors for a science-based **public debate** and **decision-making** under uncertainty

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Focus Areas

Swiss Carbon Removal Platform

Innovation, Funding, Pilots

- AG Innovation
- Empowerment through networking & cooperation

Stakeholder policy dialogue

- AG Policy
- White paper
- Ethics workshop

Information, activation, public debate

- Q&A about CDR in CH
- NETto-Zero Roadshow
- Newsletter, Website & Blog, Webinars

Join our 60+ members!

Swiss Carbon Removal Platform

carbon-removal.ch/membership

Agenda

Swiss Carbon Removal Platform

- Intro / Motivation
- Policy Needs (short- and medium-term)
- Policy Mixes / Case Studies
- Policy Visions (long-term)
- Conclusion
- Discussion and Q&A

Carbon Dioxide Removal

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Carbon Dioxide Removal (CDR) includes all solutions that remove CO_2 from the short carbon cycle and store it permanently outside the atmosphere. (R. Höglund)

Intro / Motivation

Authors

Swiss Carbon Removal Platform

- Main co-authors: Brazzola, N., Eberenz, S., Honegger, M.

- Further co-authors: Becattini, V., Betz, R., Bischof, S., Brunner, C., Florin, M-V., Hüppi, R., Koch, K., Reymond, A., von Rothkirch, J., Schübel, H., Sievert, K.

Acknowledgments

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- The Swiss CDR Platform and its Policy Working Group

- The contents of this paper exclusively represents the views of its authors and does not represent a shared position of the Swiss Carbon Removal Platform or its members.

Motivation

Swiss Carbon Removal Platform

- Take a step back
- See needs, haves and wants for comprehensive Removals Policy in Switzerland
- Are we thinking about this correctly – policy paradigms
- Dream big – beyond net-zero?
- Imagine – how did we get to net-negative in 2065?
- Evolving policy landscape: the Swiss Climate and Innovation Law

Climate & Innovation Law (KIG)

Swiss Carbon Removal Platform

Key Framing Decisions (Art. 3)

- First time: net-negative target – “after 2050”
- Defines downward emissions slope both overall and sector-specific
- Federation and Cantons ensure enough storage by 2050 (within mandates)

- Federal Council to set guiding values for CDR (Art. 4)
- Financial support to companies by 2030 through existing instruments; no duplication of funding or regulatory requirements (Art. 6)
- Federal Risk-Capital for necessary public infrastructure investments (Art. 7)

Policy Needs

FOEN's CDR Roadmap

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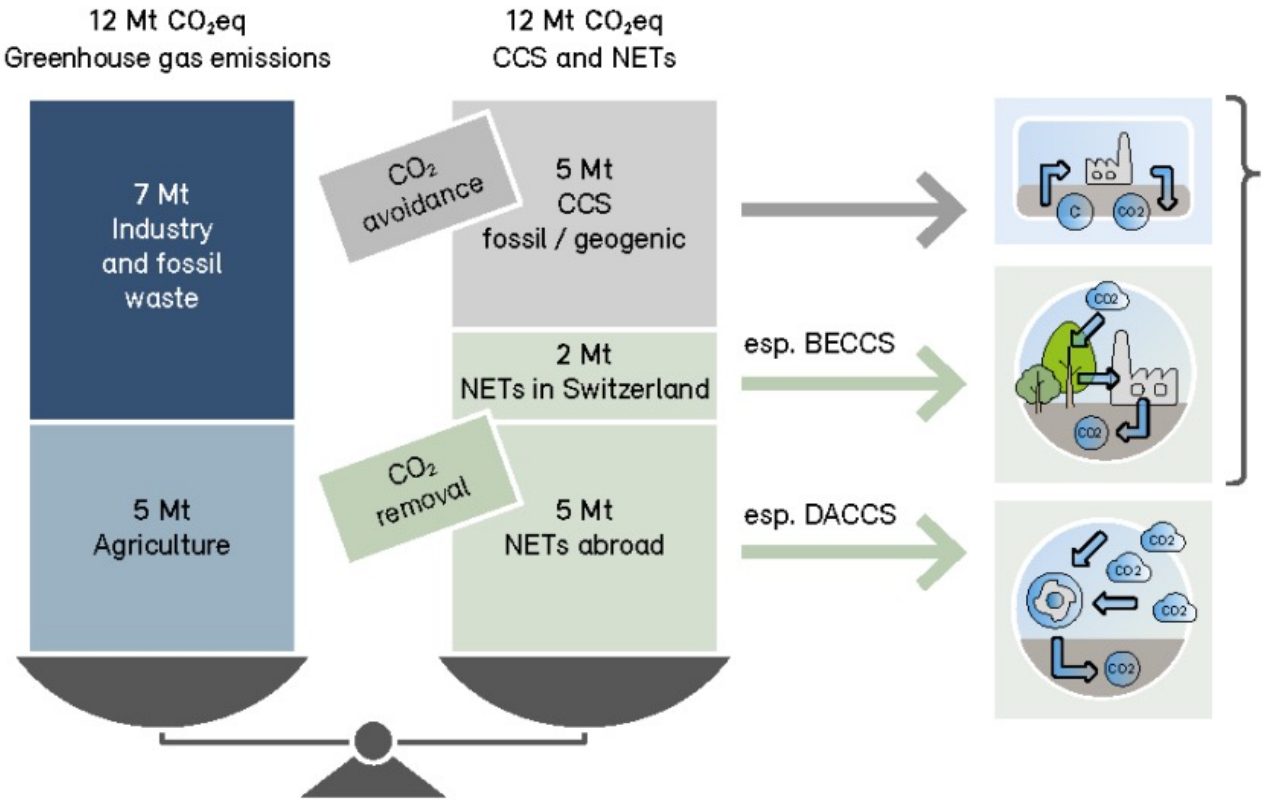
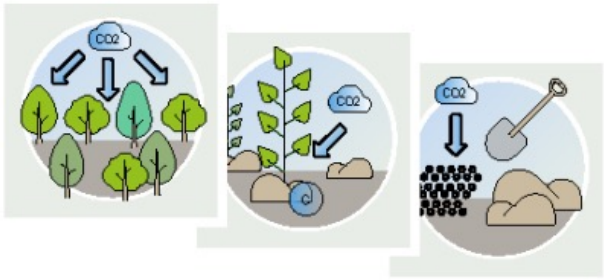


(BE)CCS at facilities in Switzerland

CO_2 transport and storage necessary (in Switzerland or abroad)



Other NETs could also help.

Identified policy needs

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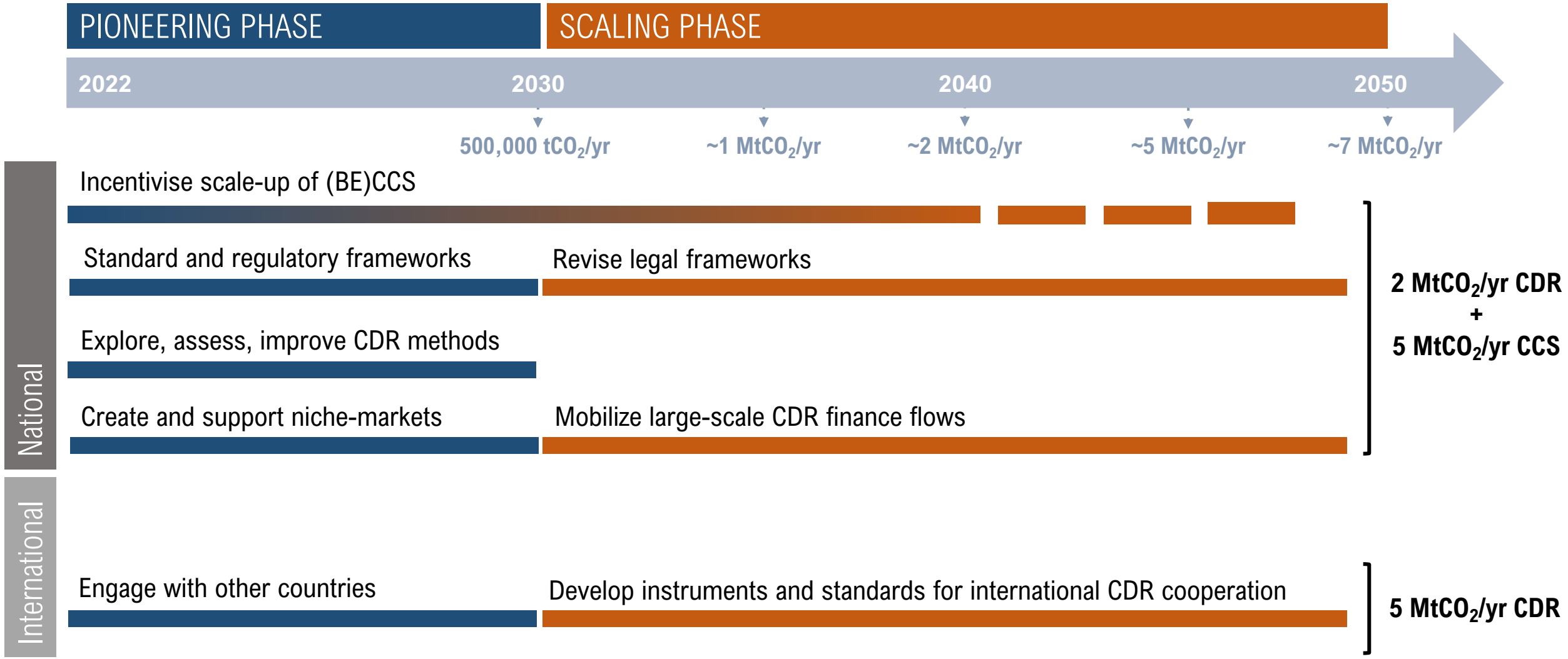
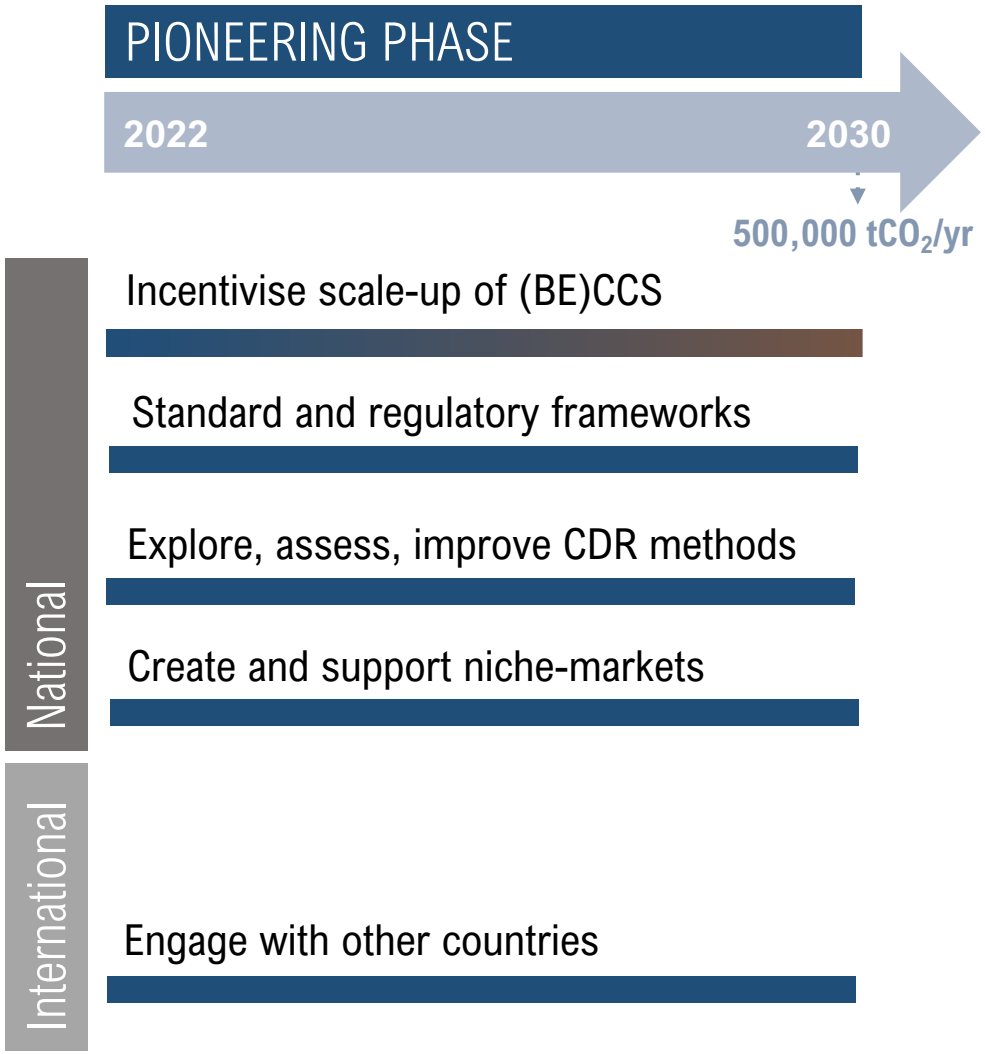


Short-term policy needs

Swiss Carbon Removal Platform



Key actions

1. Facilitate interconnected stakeholders
2. Establish clear legal frameworks
3. Promote CDR RDD&D
4. De-risk first CDR movers and investment in CO_2 infrastructure
5. Engage in bilateral and multilateral agreements

Mid-term policy needs

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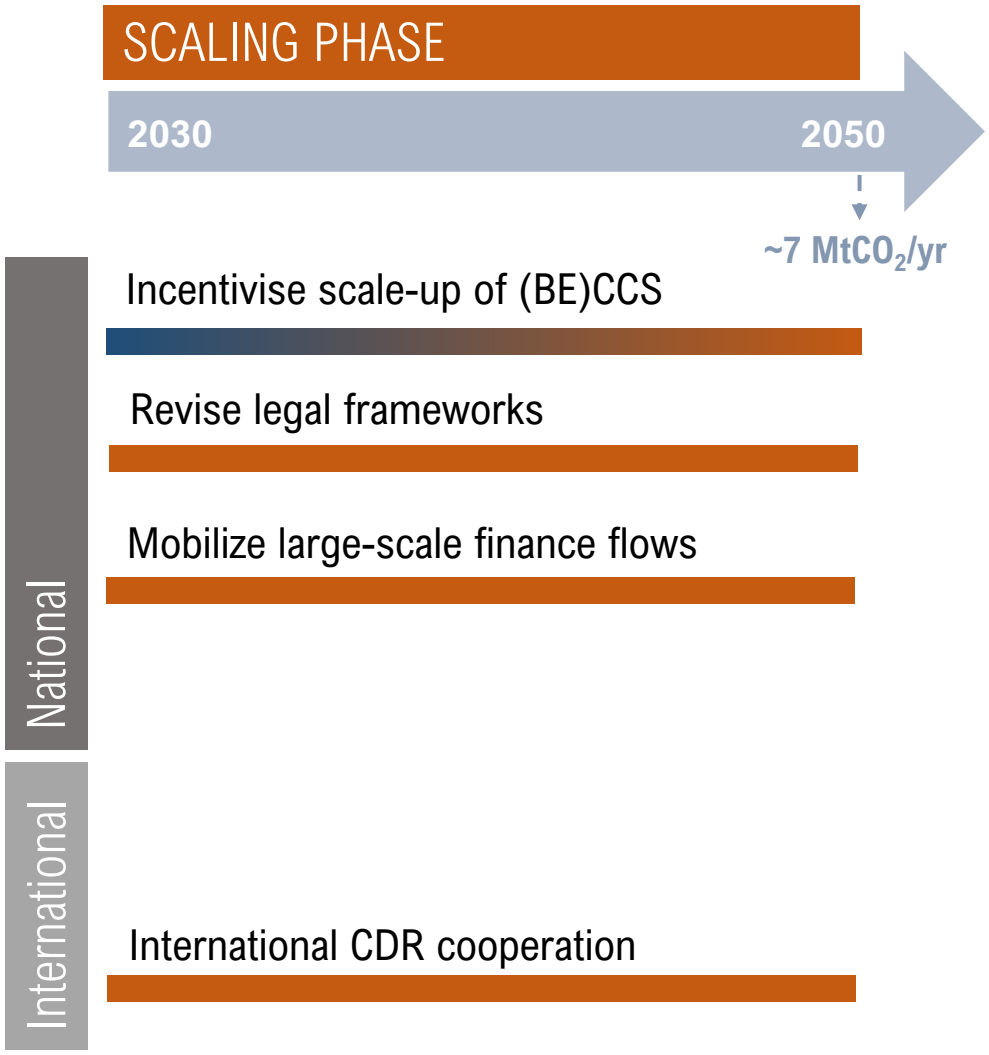

Key actions

1. Permitting processes & participatory elements
2. De-risk investment environment by ensuring robust business cases
3. Create sustainable streams of revenue
4. Minimize risks for host countries, clarify liabilities, avoid double-counting

Mid-term policy needs

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SCALING PHASE

2030 → 2050

~7 $MtCO_2$/yr

National

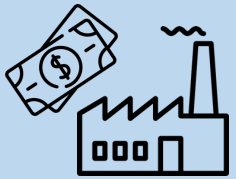
- Incentivise scale-up of (BE)CCS
- Revise legal frameworks
- Mobilize large-scale finance flows

International

- International CDR cooperation

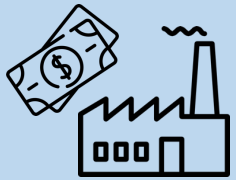
Three policy pathways

Only carrots & no sticks



Polluter pays

Command & control

	 **Only carrots & no sticks**	 **Polluter pays**	 **Command & control**
Mechanism	Financial support and incentives to enable CDR deployment	Pricing emissions and crediting CDR via CO_2 levy or ETS	Stringent sector-specific emission targets and CDR mandates
Advantages	1. Addresses near-term barriers for developers and investors 2. Promotes innovation and fair competition 3. Broad public and political support	1. Utilizes established governance models 2. Signals long-term CDR policy 3. Fosters competition and cost reduction	1. Direct control over carbon budget 2. Simple governance, speed, and cost control 3. De-risk investments
Risks	1. No long-term CDR revenue 2. Insufficient demand 3. Strain national budget	1. Price volatility and revenue uncertainty 2. Mitigation deterrence	1. Untested policy, low political and public acceptance 2. Economic burden on hard-to-abate sectors
Ex.	Negative Emissions Tariff (Luxemburg)	Integration of CDR in European ETS	EU Net Zero Industry Act

Policy Mixes / Case Studies

Policy mixes: 3 examples

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- There are many different CDR methods but not one single silver bullet.
- Large variety in stage of development and implementation, investment and operational costs, potential capacity, co-benefits, trade-offs and sectors affected.
- Differentiated policy needs to leverage development and optimize output (realization of long-term CDR capacities) vs. fair competitive conditions.

Policy mixes: 3 examples

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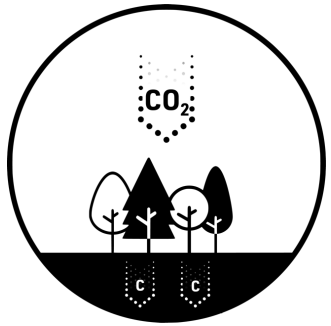
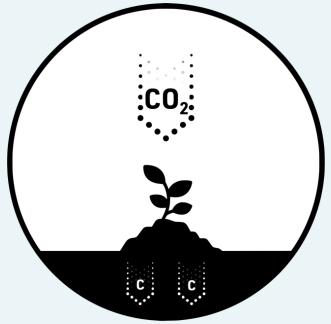
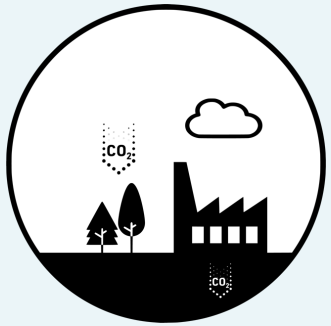


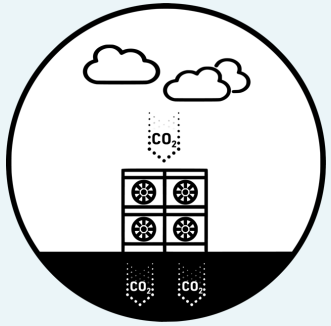
Afforestation +
Reforestation +
Forest management +
Wood utilization



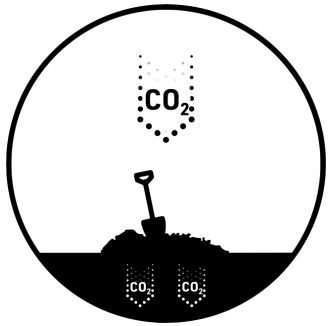
Biochar +
Soil management



Bioenergy with
Carbon Capture
+ Storage
(BECCS / BiCRS)

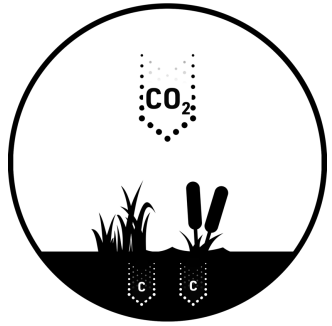


Direct Air Capture +
Storage (DACS)



Enhanced weathering +
mineralization
(e.g., in demolished
concrete)

...etc.



Wetland + coast
renaturation

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Policy mixes: 3 examples

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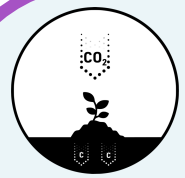
Premises:

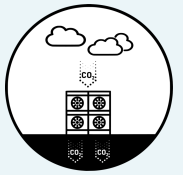


Biochar

- Mature technology
- Large theoretical potential
- Largest share on voluntary carbon markets (CDR)
- Prices do not cover costs
- Many disputed co-benefits and long-term side-effects
- Biomass use target conflicts
- Regulative restrictions for compliance market

BECCS / BiCRS

- Demonstrated pathways
- infrastructure-intensive
- Foreseeable potential from point sources (waste-to-energy, biogas, etc.)
- Energy penalty
- High CAPEX and OPEX
- Chicken-or-egg problem: Capture vs. Transport vs. Storage
- Lack of viable revenue model
- Synergies with CCS



DACS

- Low commercial maturity
- Role for CH: abroad + prepare technology for long-term upscaling to climate relevant levels
- High costs and energy demand
- Lack of business model
- No co-benefits
- Synergies with (BE)CCS

Policy mixes: 3 examples

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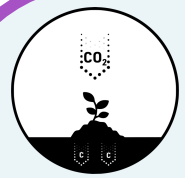
Policy & regulatory needs:

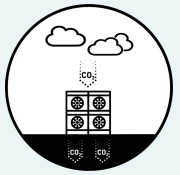


Biochar

- Less regulatory restrictions
- Valorization of co-benefits
- Integration in Swiss agriculture + other sectors
- Incentivize sustainable sourcing of biomass, e.g., cascade use of wood / avoid subsidiary distortions

BECCS / BiCRS

- Coordinated infrastructure planning + investments
- Demand-side: obligation schemes for hard-to-abate emissions, fees for waste producers
- Supply-side: de-risking (revenue guarantees), incentives: see NL (SDE++), SE (reverse auctioning), DK (CCS fund), EU (innovation fund).



DACS

- R&D support to lower costs and energy demand of DAC
- Long-term policy support to level out competitive disadvantages and realize potential (careful!), e.g., take-back-obligations
- Secure long-term abundance of renewable energy supply
- Regulation for geological storage

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Policy Visions

Long-Term CDR Policy Visions for a Net Negative Switzerland

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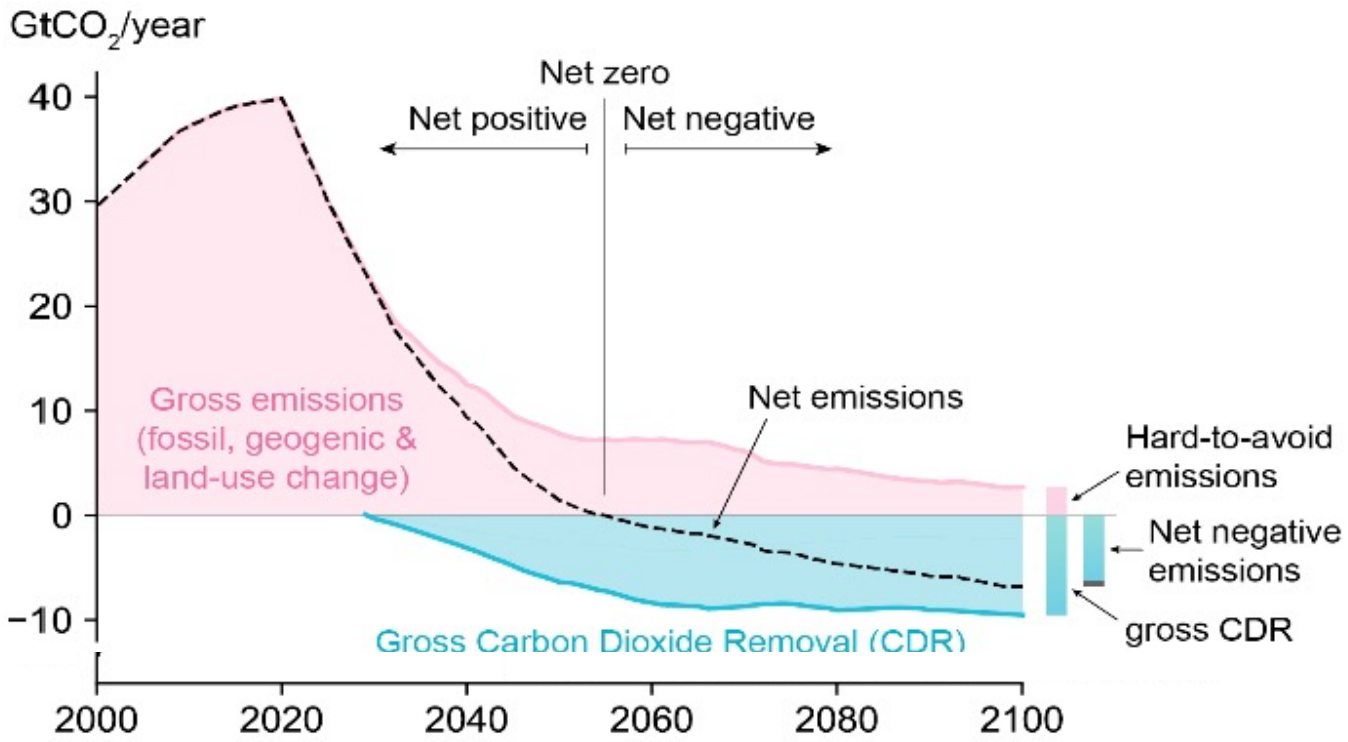
Why think about Net Negative?

- Net Zero is a point target
- Excess removals to lower temperatures
- CDR as tool to counteract accelerated climate system breakdown (tipping points)



Data source: IPCC AR6
Scenario Database hosted by IIASA (Byers et al., 2022), historical emissions from Minx et al. (2021).

Long-Term CDR Policy Visions for a Net Negative Switzerland

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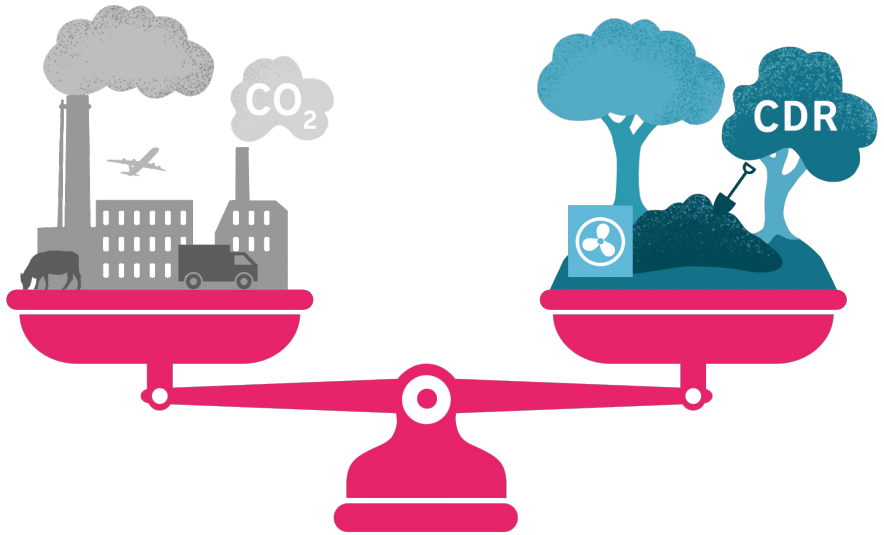
Four Paradigm shifts for sustained CDR post “net zero”:



- Toxic Waste Removal
- Carbon Debt
- Non-CO_2 Pricing
- Hybrid Governance

Welcome to 2065!

A Speculative Excursion to a “Net Negative” Future

Swiss Carbon Removal Platform

- “Do Our Best, Remove the Rest!”
- The Laws that Saved the Carbon Markets
- Infrastructure on the Move
- No Silver Bullet, But a Broad and Innovative Removal Portfolio Across Sectors
- Switzerland’s Success Is Also a European Story
- Paris Agreement Article 6 as a Vehicle for Increased International Cooperation
- Net Negative Emissions: Reparation and Recovery

Conclusion

Parallel Developments

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In **Switzerland** – operationalization ongoing:

- Revision of the CO_2-law (relevant for 2025–2030)
- Ordinances to come for 2nd period (2031–2040) and 3rd (2041–2050)
- Operationalization of financial support provisions
- Purchases of ITMOs from CDR abroad

In the **EU**:

- Carbon removal crediting (question marks around agriculture, buildings, CCU)
- Reform of the ETS – to be mirrored in Swiss ETS (incl. regarding biomass-CO_2)

And in the **UNFCCC**:

- Requirements for removals under Article 6.4
- Refinements of IPCC guidance for GHG inventory accounting

Political Battles

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- Defining: Hard-to-abate emissions
- Preventing battle between sectors
- Avoiding deterrence of emissions reductions efforts
- Need for Swiss leadership on international level
- Navigating public perception and ensuring support for meaningful action

Work only beginning with KIG

Swiss Carbon Removal Platform

- Aligning financial flows (Art. 9): many opportunities for far-reaching interpretations!

Operationalization ongoing:

- Revision of the CO_2-law (relevant for 2025–2030)
- Law(s) to come for 2nd period (2031–2040) and 3rd (2041–2050)

The Swiss Climate & Innovation Act (KIG)

Swiss Carbon Removal Platform

Policy framework for "domestic" net zero THG by 2050

- Reduction targets must be "technically possible and economically bearable" and as domestic "as possible"
- Residual domestic hard-to-abate emissions to be fully neutralized by 2050 with CDR projects in Switzerland and abroad.
- 2040 target for administration and cantons
- Companies to achieve net zero for scopes 1 & 2 (& 3?) by 2050
- Subsidies for new technologies and processes incl. CDR for "pioneer phase" 2025-2030

Read more: https://www.carbon-removal.ch/the-swiss-climate-act-vote-2023-policy-at-a-crossroads/

What's next?

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- CO_2 ordinance and revised CO_2 law to specify implementation of KIG, but also CDR method specific regulation (e.g., construction norms, biochar, etc.)
- Coordinated efforts and pioneer projects for CO_2 management infrastructure: capture, transport, storage
- International negotiations and bids for storage capacities
- Increased public visibility and debate, also on fairness and distribution of costs and benefits
- Join the conversations between policy makers, administration, industry, research, civil society and the public

Join the Swiss Carbon Removal Platform!

info@carbon-removal.ch

Discussion and Q&A

Discussion and Q&A

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Carbon Dioxide Removal Policies for a Net Zero Switzerland and Beyond.

Policy Pathways and Visions.

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Webinar CDR Swiss – Sept. 28, 2023

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Thank you for your attention!