Zurich Carbon Market Association 25.06.2025

Mühlebachstrasse 11, Zurich

Forests and Climate Change

- Florian Goppel Moderator
- Asger Oleson: The Eurpoean Perspective
- Clemence Dirac: The national perspective
- Hubertus Schmidtke: Forest carbon projects
- Raphael Häner: Association WKSS, Market

Forests and Climate Change

Zurich Carbon Market Association ZCMA
25.06.2025

Hubertus Schmidtke
SILVACONSULT AG

Forests and Climate Change

- History
- Specifics of Forest Carbon Projects
- Methododology

Forests and Climate Change

- History Forest and UNFCC

1992 – UNFCCC Established

- Forests generally acknowledged for their role in the global carbon cycle.

1997 – Kyoto Protocol

- Introduced **LULUCF (Land Use, Land-Use Change and Forestry)** as part of national emissions accounting.
- Afforestation, reforestation, and deforestation included in national commitments.

2001 – Marrakesh Accords

- Detailed rules for LULUCF under Kyoto. **Only A/R. Focus on developing countries. CDM**
- Set limits on how much forest-based carbon could count toward national targets.

2007 – COP13 (Bali Action Plan)

- **RED -> REDD** -> **REDD+**, still focus on developing countries

2015 – COP21 (Paris Agreement)

- Article 5 of the **Paris Agreement**:
- Task for all countries to conserve and enhance forests.

Forests and Climate Change

History of the Voluntary Carbon Market

1. Origins and Early Development (1990s – early 2000s)

- companies and individuals began voluntarily offsetting emissions.
- Lack of Standards

---

2. Standardization and Maturation (2005 – 2015)

- **Drivers: Corporate social responsibility (CSR), Marketing and branding (carbon neutrality);** Pre-compliance purchases ahead of expected regulation
- **Emergence of Standards:** VCS (now Verra, 2006), Gold Standard (by WWF, 2003), ACR etc.
- Toppics: environmental integrity, additionality, and permanence of projects.
  Forest Standards not applicable to temperate zones

- ISO 14064-2

---

3. Market Expansion and Innovation (2015 – 2020)

- Paris Agreement (2015): Boosted interest in voluntary action
- Private Sector Momentum: Leading global companies committed to net-zero targets using VCMs.

Forests and Climate Change

- History

---

4. Surge in Demand and Scrutiny (2020 – Present)

- Net-Zero Commitments: **The volume of credits issued and retired (used) increased sharply.**
- **Criticism and Concerns**: Questions about greenwashing, concerns over quality, additionality, and double counting
- **Integrity initiatives**: Integrity Council for the Voluntary Carbon Market (ICVCM), ICROA, Voluntary Carbon Markets Integrity Initiative (VCMI)
  Push for high-integrity standards, transparent registries, and science-based targets

---

5. Future Trends and Outlook

- Digital MRV (Monitoring, Reporting, and Verification): Using AI, remote sensing, and blockchain to improve transparency and reduce costs.
- Article 6 (Paris Agreement): Will impact how voluntary credits interact with national carbon accounts.
- **Buyers Seeking Quality Over Quantity: There's a growing preference for high-integrity, durable, and socially and environmentally co-beneficial credits.**
- The VCM is increasingly relevant for sustainability reporting (investor pressure).

Forests and Climate Change

- History

Forest carbon projects, Switzerland, voluntary market

2007/2015 Forest Nature Reserve FNR, (Soulce Undervellier), 30 ha, stand alone, generic

2010 Improved Forest Management IFM, (OAK Schwyz), 7’000 ha, stand alone, generic+CCBA

2018/2019 Methodology ISO 14064-2
- IFM Improved Forest Management
- FNR Forest Nature Reserve

2019 Pilot project
2025 14% of Swiss Forests

Forests and Climate Change

Methodologies are under Revision, applicable to temperate zones

- IFM Improved Forest Management
- FNR Forest Nature Reserve
- Adaptation
- Additional Benefits: Biodiversity Module

Akkreditation
- ISO 14064-2
- ICROA
- ICR
- (CRCF)

The ISO 14060 Family

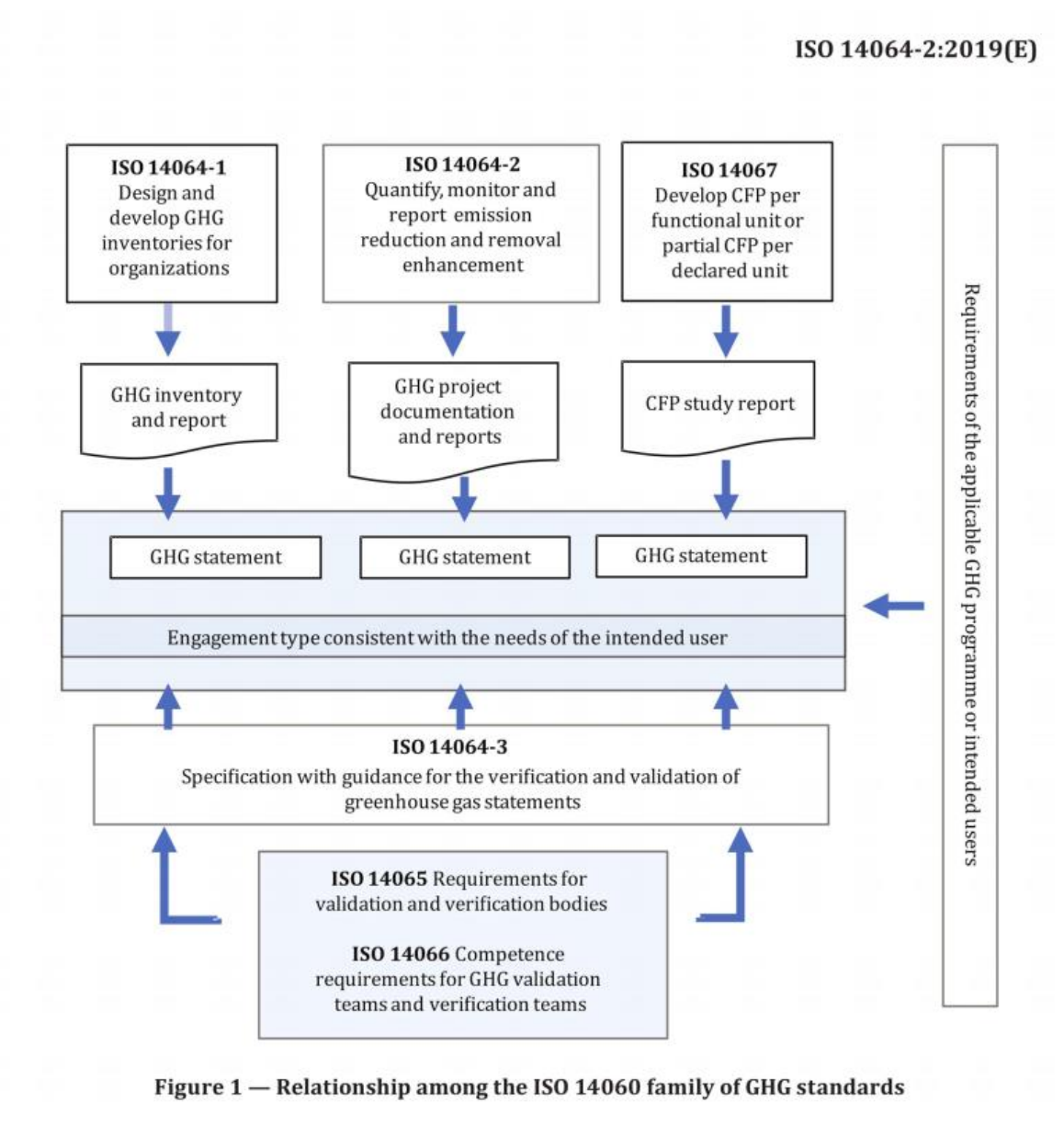


Figure 1 — Relationship among the ISO 14060 family of GHG standards

The ISO 14060 Family

ISO 14064-2

Provides standard requirements for carbon projects

Principles

- Relevance
- Completeness
- Consistency
- Accuracy
- Transparency
- Conservativeness

Rules for

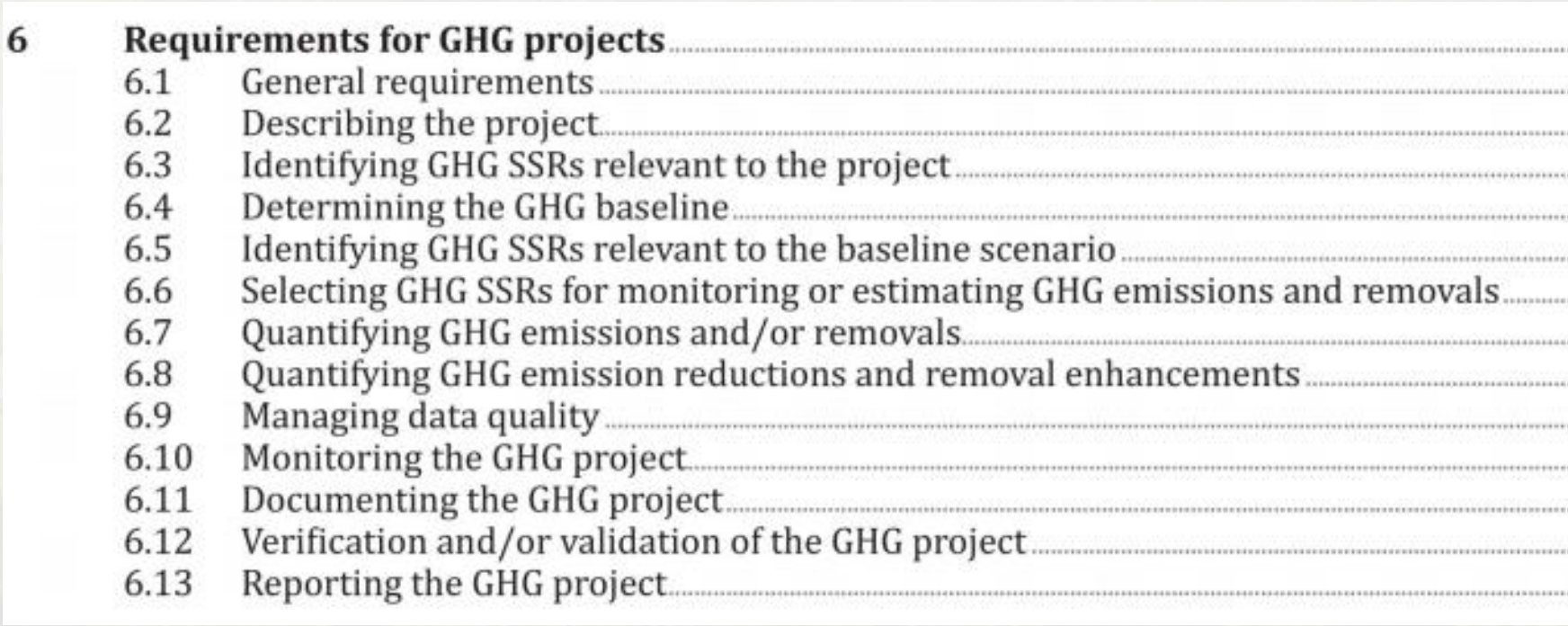
- Baseline
- Project case
- Monitoring
- Reporting

Certification

- Validation/Verification Process
- Certification body qualification

Validation of methodology

Validation and verification of each project



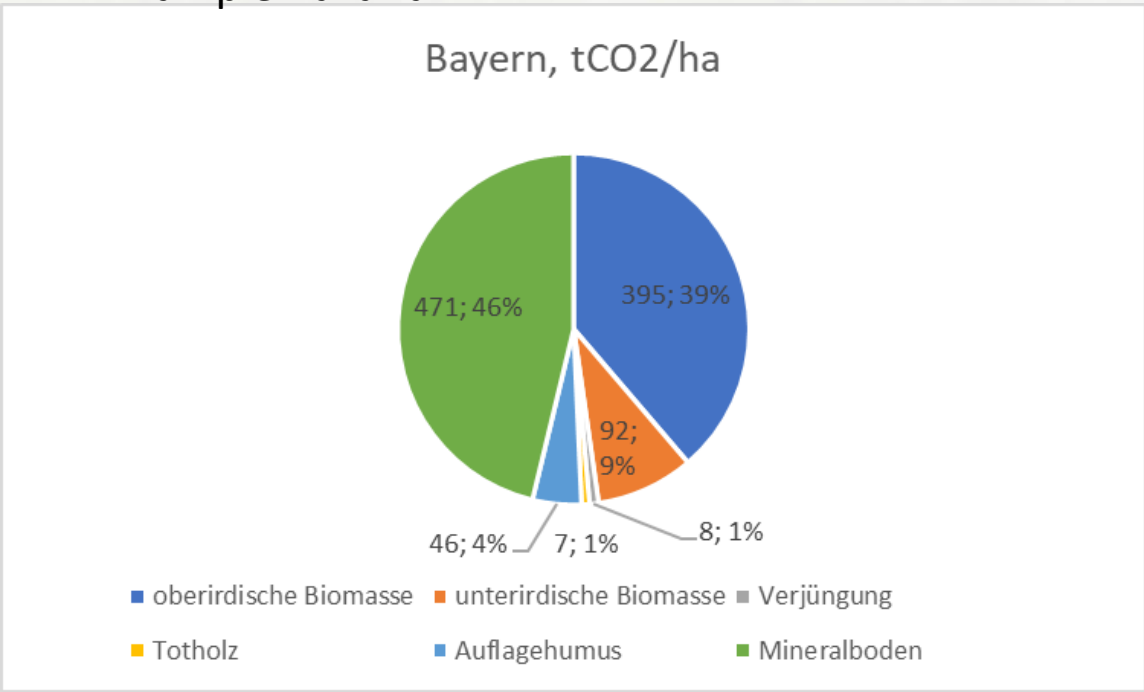
Forests and Climate Change

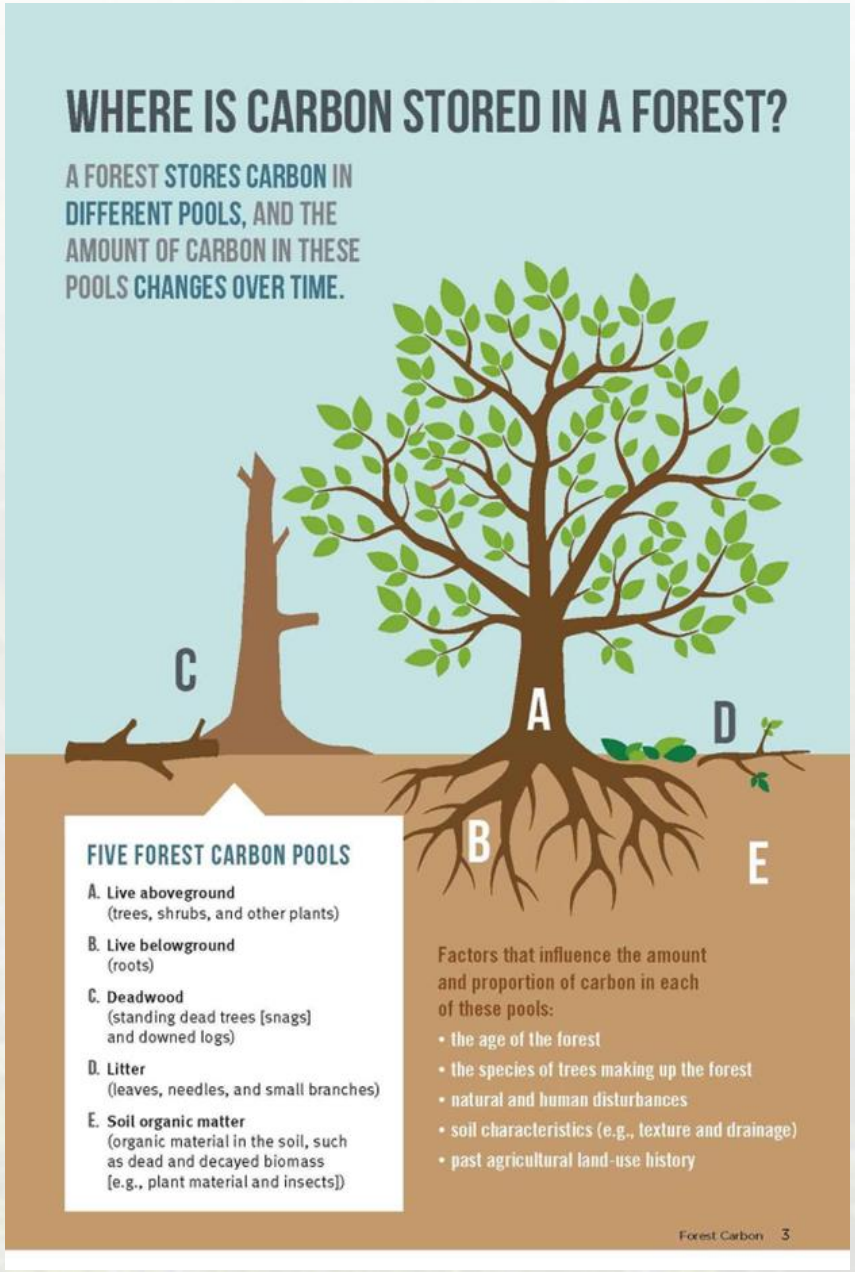
Specifics of Forest Carbon Projects

- Focus is not the single tree but the whole forest
- ecosystem with permanent growth and harvest/mortality

Forest Carbon Pools

Example Bavaria





Half of the forest biomass is in living trees
Half of the forest Biomass is in the soil

https://www.waldwissen.net/de/lebensraum-wald/klima-und-umwelt/klimawandel-und-co2/kohlenstoffspeicher-wald

Conservativeness

Only living tree biomass is accounted for, not soil carbon
Hugh contribution to conservativeness

Soil carbon

- Same amount as living biomass,
- Is alinged with tree biomass
- Delayed reaction on harvest activities
- Not economically measurable on project level

By accounting for living biomass only (tree biomass) only half of the projects carbon pool is accounted for

https://www.waldwissen.net/de/lebensraum-wald/klima-und-umwelt/klimawandel-und-co2/kohlenstoffspeicher-wald

Accuracy in forestry projects

Annual update V2 = V1 + Y – H – M

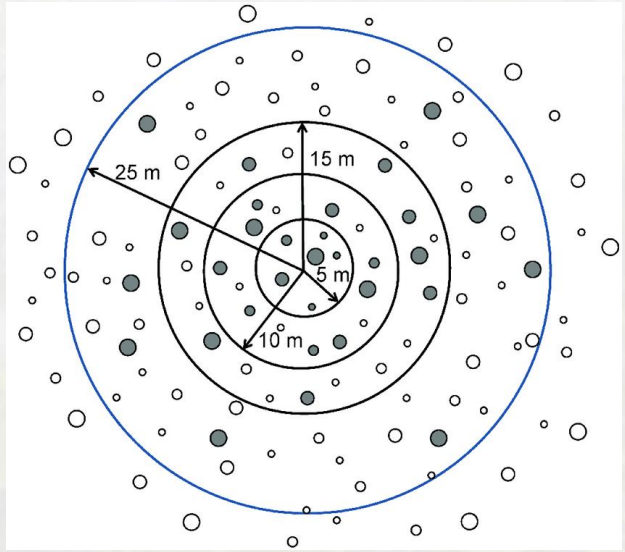
V1 = Volume at the begin of the year
V2 = Volume at the end of the year
Y = Yield
H = Harvest
M = Mortality

Inventories every 10 years to calibrate the project

Tree: standing timber volume

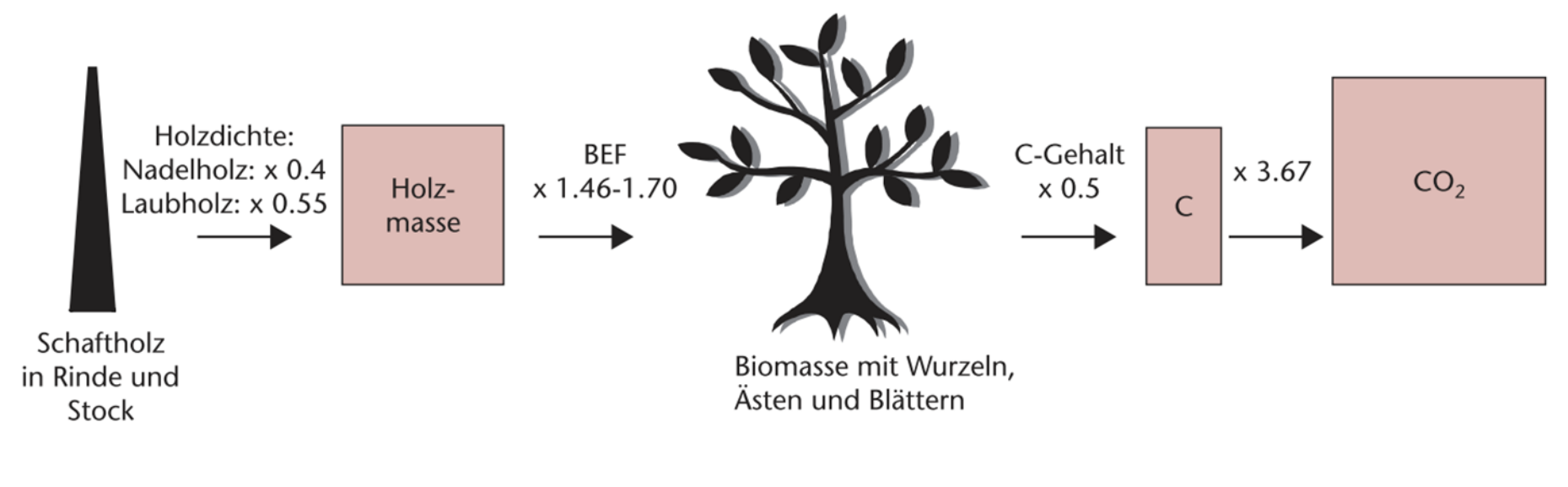
- Sample plot inventory (terrestrial)
- Two phase Inventory (terrestrial & remote sensing)
- Other methods?

Accuracy requirement
Standard error 5%,
Confidence 95%



A typical sample plot used in the fourth National Forest Inventory (NFI-4). Grey circles represent trees selected on the basis of tree diameter and the distance to the plot centre. https://doi.org/10.1371/journal.pone.0176114.g002

From m3 to tCO2e



Conifers	1 m3	=	1.1 – 1.2 tCO2e
Leaf Trees	1 m3	=	1.40 – 1.55 tCO2e

Article 5

1. Parties should take action to conserve and enhance, as appropriate, sinks and reservoirs of greenhouse gases as referred to in Article 4, paragraph 1 (d), of the Convention, including forests.

- Conserve: Protection of the carbon reservoir, Avoidance of emissions
- Enhance: Enhancement of carbon reservoir, Removals of CO2 sequestration/direct capture

Forests and Climate Change

Additionality/Baseline in forest carbon projects

Duration of the projects 30/50 years

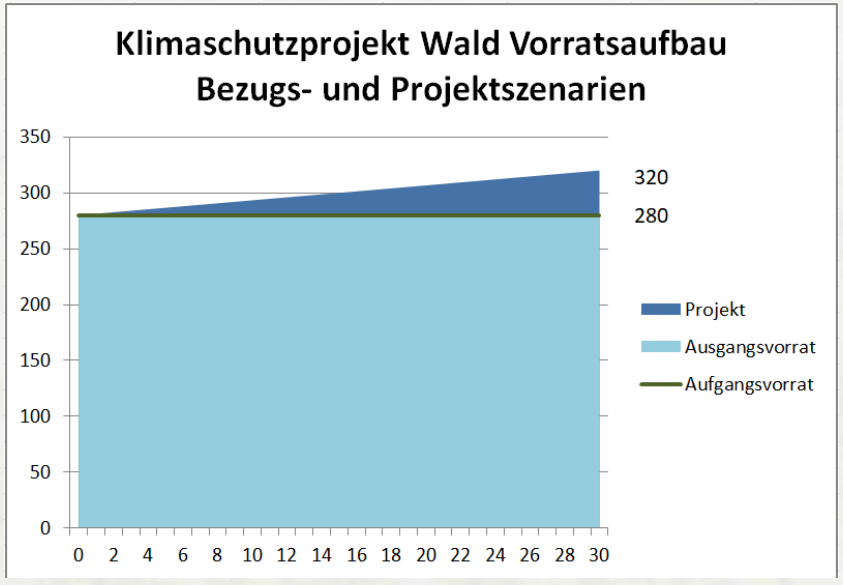
Assumptions on timber prizes, harvest costs, carbon credit prizes over 30 years are very uncertain.

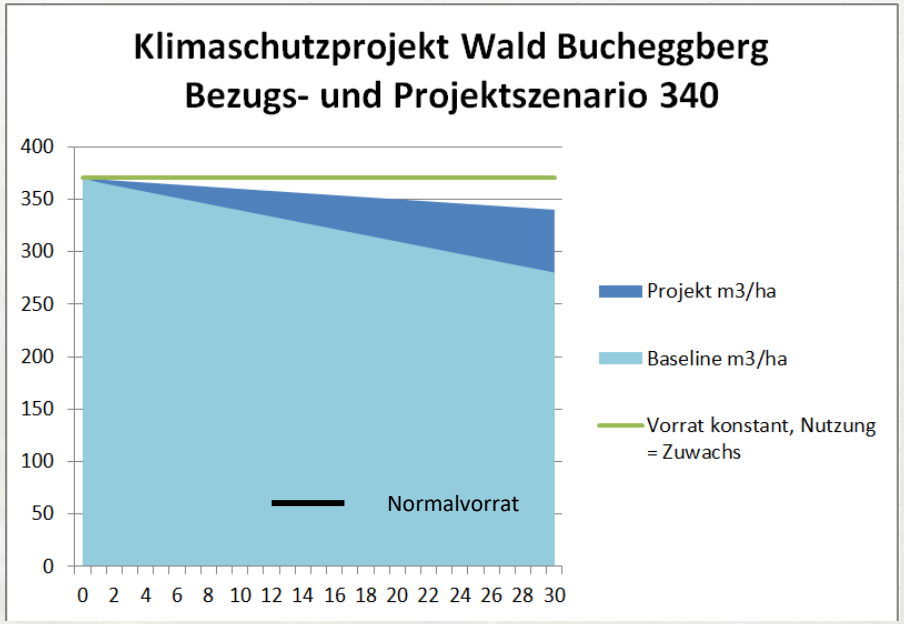
Common practise analysis (barrier analysis) is applied.

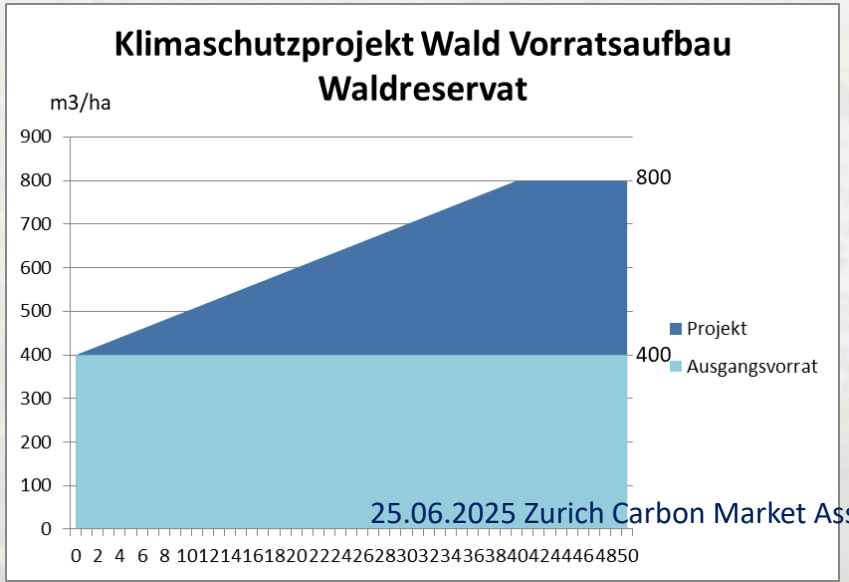
Scientific models of forest management are applied (e.g. yield table models)

Forest Carbon Projects

nach Methodik ISO 14064-2 «Klimaschutzprojekte im Wald für die Schweiz»







Carbon pools

- Living tree biomass
- (dead wood
- (shrub)
- (litter)
- (soil carbon)

Use of carbon money

The revenues from carbon credits are mainly reinvested in the forests, demand from the market

- Measures for adaptation (planting, thinning, protection against hug and deer browsing)
- Additional measures to improve biodiversity

Risks of Forest Carbon Projects

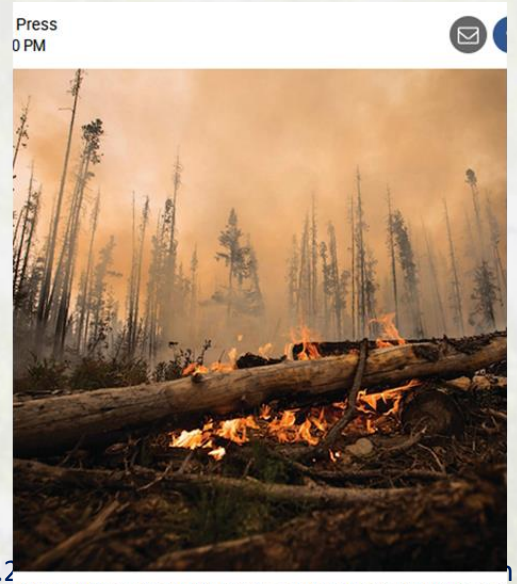
- Drought
- Bark beetles
- Storm
- Fire

Risks of forest fire in temperate zones

California

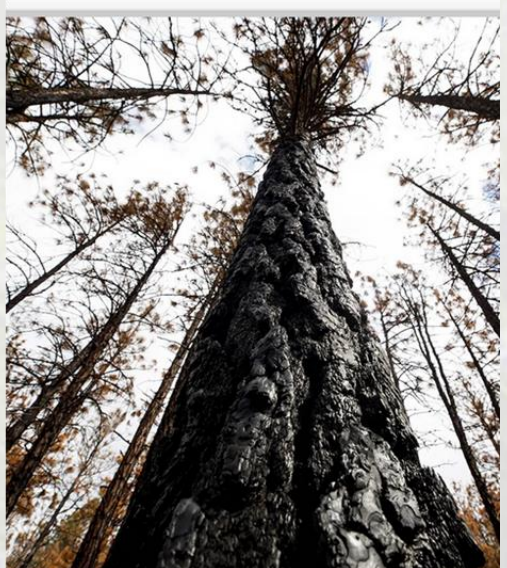
Canada

is May 2016 file photo. Experts warn the fire season is C
dictable. (Ontario Northwest Region Forest Fire Manage



from a wildfire can be equal to smoking a couple of packs of cigarettes a da
a researcher studying wildfires in Western Canada. A wildfire burns on a log
st of Fort St. James, B.C., on Wednesday, Aug. 15, 2018. THE CANADIAN PR

f Kenny Skerritt



Risks of forest fire in temperate zones

Park manager in the midst of giant sequoias killed by the Castle Fire in the Board Camp Grove, Sequoia National Park. NPS / Anthony Caprio

Giant sequoia seedlings establishing in Garfield Grove after the Castle Fire, summer 2021.

NPS / Christy Brigham

https://www.nps.gov/articles/000/wildfires-kill-unprecedented-numbers-of-large-sequoia-trees.htm

Risks of forest fire in Switzerland

Madlene Brigger (left) und Werksfeuerwehr Lonza (right)

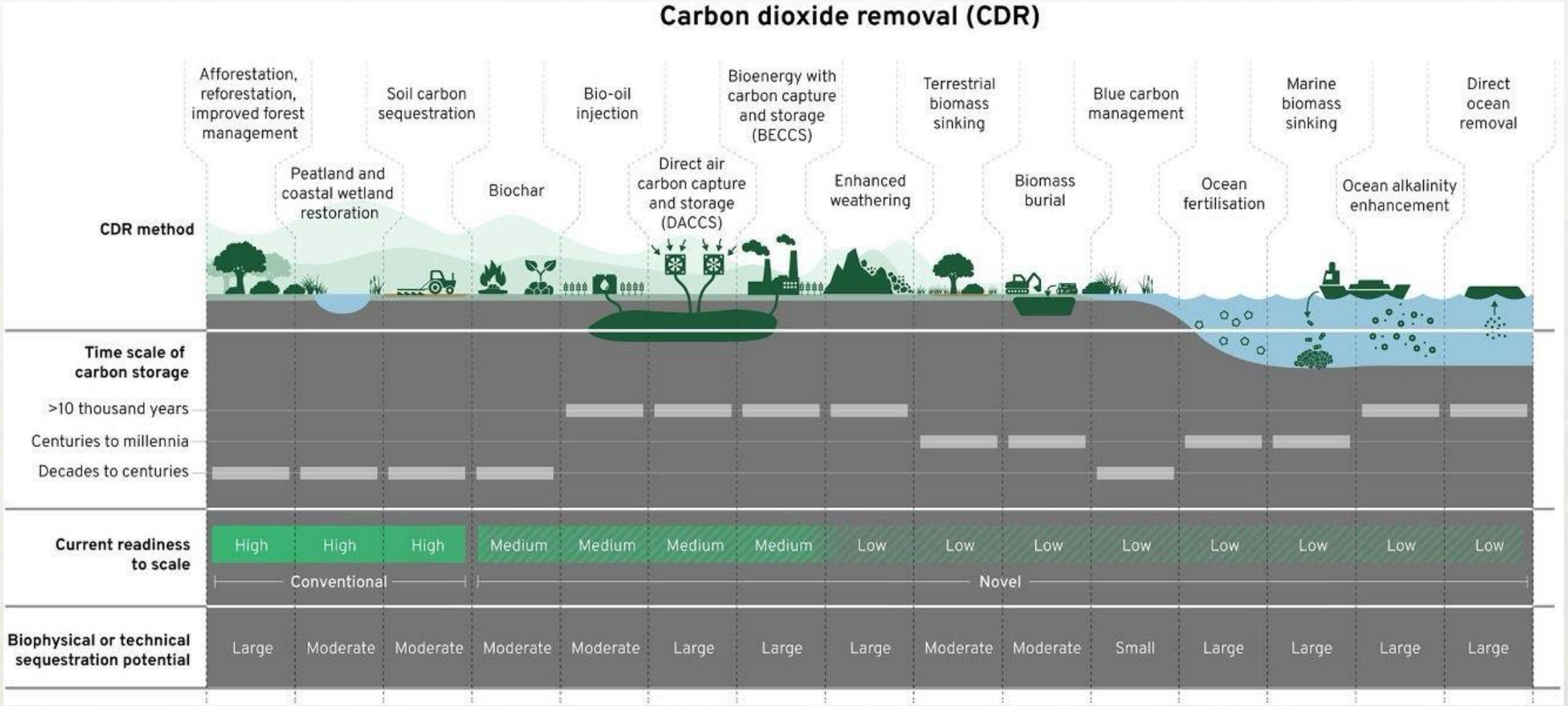
René Fuchs

2011 forest fire in Visp, Switzerland

2021 Regeneration of the forest, stems of burnt trees are still there

Most carbon remains on site after forest fire, large dead trees can last for decades
Ca. 80% of the tree biomass is not burnt

Forest Carbon Projects



Additional benefits: biodiversity, costs

Source: NOAA Ocean Acidification Program; Grafic: Sarah Battle, NOAA; Website: Approaches to Carbon Dioxide Removal Graphics Gallery (Land & Sea)

Forest Carbon Projects

SILVA CONSULT AG

- Avoidance of emissions
- Removals of CO2
- Permanence problem is overestimated in temperate zones
- Additional Benefits to carbon credits
    - . Biodiversity
    - . Resilient forest
    - . Ensure multifunctionality of forests for the society
    - . Tangible
- High readyness to scale
- Large potential
- Time scale of storage: projects decades,
  potential thousands of years
- Cost effective

COP30 in Belem, Brazil

Forestry COP