

NEST – Machbare Beispiele und Hinweise zur Beschaffung

Reto Largo, Empa
Geschäftsführer NEST

Tagung nachhaltige
öffentliche Beschaffung
12.03.2024





Innovations Beschleuniger

Reto Largo

Empa, Managing Director NEST

Erfahrener Entre- und Intrapreneur mit 28 Jahren Erfahrung in den Bereichen Bauwesen, erneuerbare Energien, Fertigung, Logistik und ICT-Industrie. Meine Spezialgebiete sind Verkauf & Marketing, Innovations-management, vernetztes und unkonventionelles Denken, Startup-Coaching, neue Geschäftsmodelle und Moderation zwischen Forschung und Industrie. Und speziell im Starten und Bewirtschaften von Innovations-Ökosystemen.

Meine Passion ist das Vernetzen, Zusammenbringen und Begleiten von Menschen, um Neues entstehen zu lassen.



<https://www.linkedin.com/in/retolargo/>

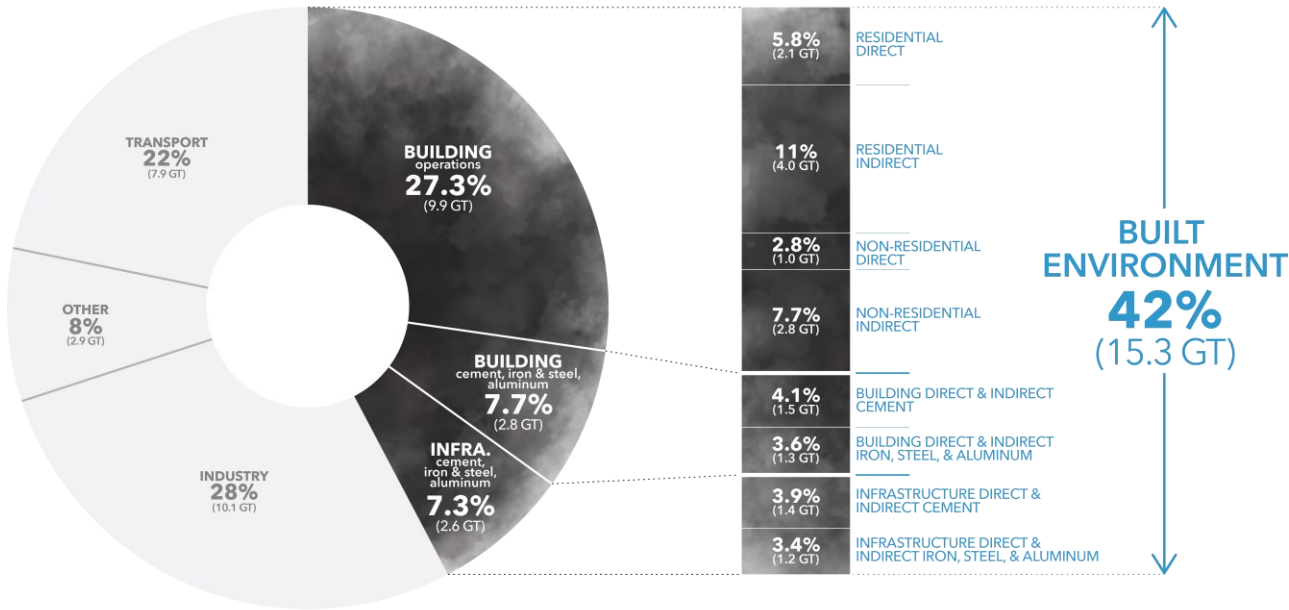


nest.empa.ch 150 Partner aus Forschung, Wirtschaft, öffentliche Hand

NEST
virtuell
erkunden

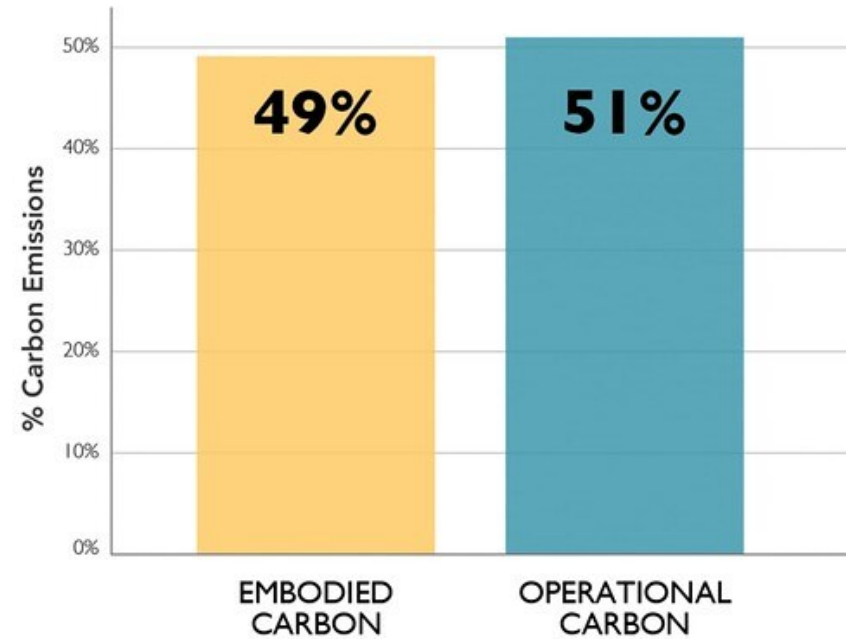
Ausgangslage

TOTAL ANNUAL GLOBAL CO₂ EMISSIONS
Direct & Indirect Energy & Process Emissions (36.3 GT)



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Analysis & Aggregation by Architecture 2030 using data sources from IEA & Statista.

Total Carbon Emissions of Global New Construction from 2020-2050
Business as Usual Projection



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Self-learning predictive control through physics-informed Machine Learning



20-40% less energy
and improved
thermal comfort

compared to state of industry controllers.

1-2 weeks of
training time

compared to multiple months with pure
Machine Learning methods.

Ready for demand
response

due to computationally efficient predictive
control algorithms.

viboo



31% Heating Cost Reduction in Dübendorf.

At the Empa Campus in Dübendorf, viboo's technology was integrated with 140 Smart Thermostats. After operation for two heating periods, the project achieved a 31% reduction in heating energy consumption utilizing viboo's Self-Learning Predictive Control. The reduction was accomplished without compromising predetermined comfort conditions. The result translates to annual savings of 29,000 kWh in heating energy, and significant CO₂-equivalent emissions reduction.

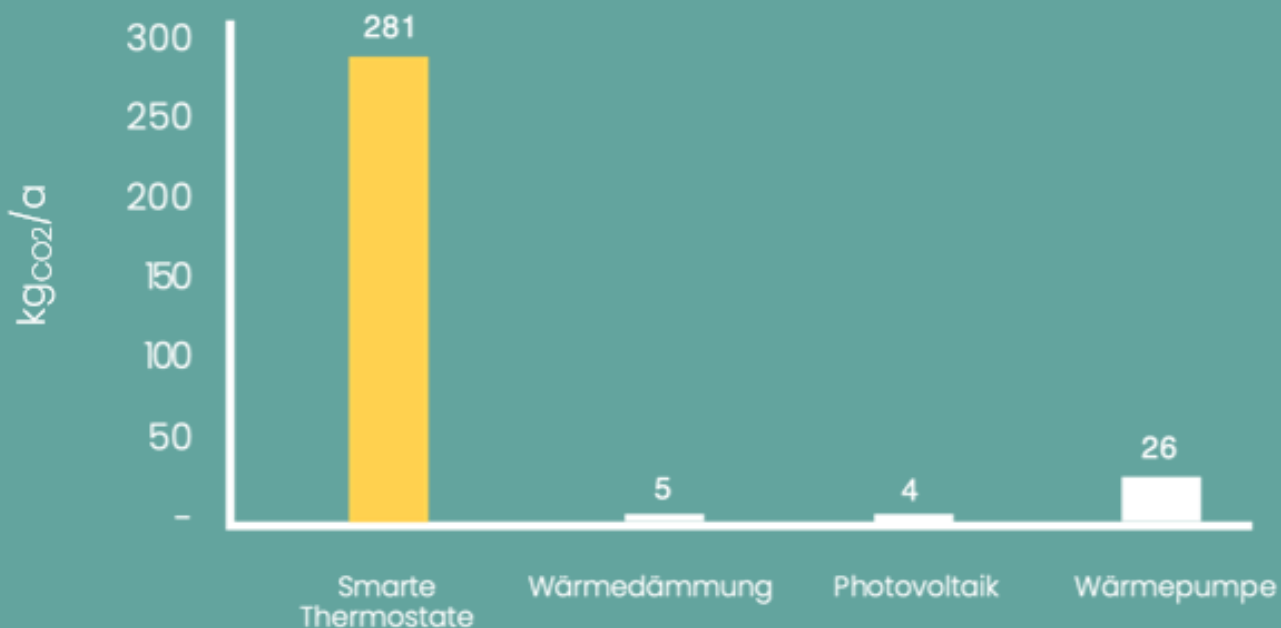
[Read Case Study](#)

Männedorf Municipality's Step Towards Energy Efficiency

In collaboration with the municipality of Männedorf, viboo conducted a project within the local school. Focused on both sustainability and practicality, the existing thermostats were updated with smart ones in a few hours. viboo's algorithms reduced the heat consumption by 27%. This real-world application demonstrates how thoughtful integration of technology can lead to meaningful energy conservation without altering daily comfort. For a detailed insight into this project, feel free to explore the full case study.

[Read Case Study](#)

Jährlich Eingespartes CO₂ pro eingesetzten 100€



*Studie von [Gemserly](#) in EU und UK, Begutachtet von Dr. Tim Forman, Senior Associate für Nachhaltigkeit, Universität Cambridge

**Smarte
Thermostate
sind der
günstigste*
Weg Energie
zu sparen.**

**Alles ist
trennbar**

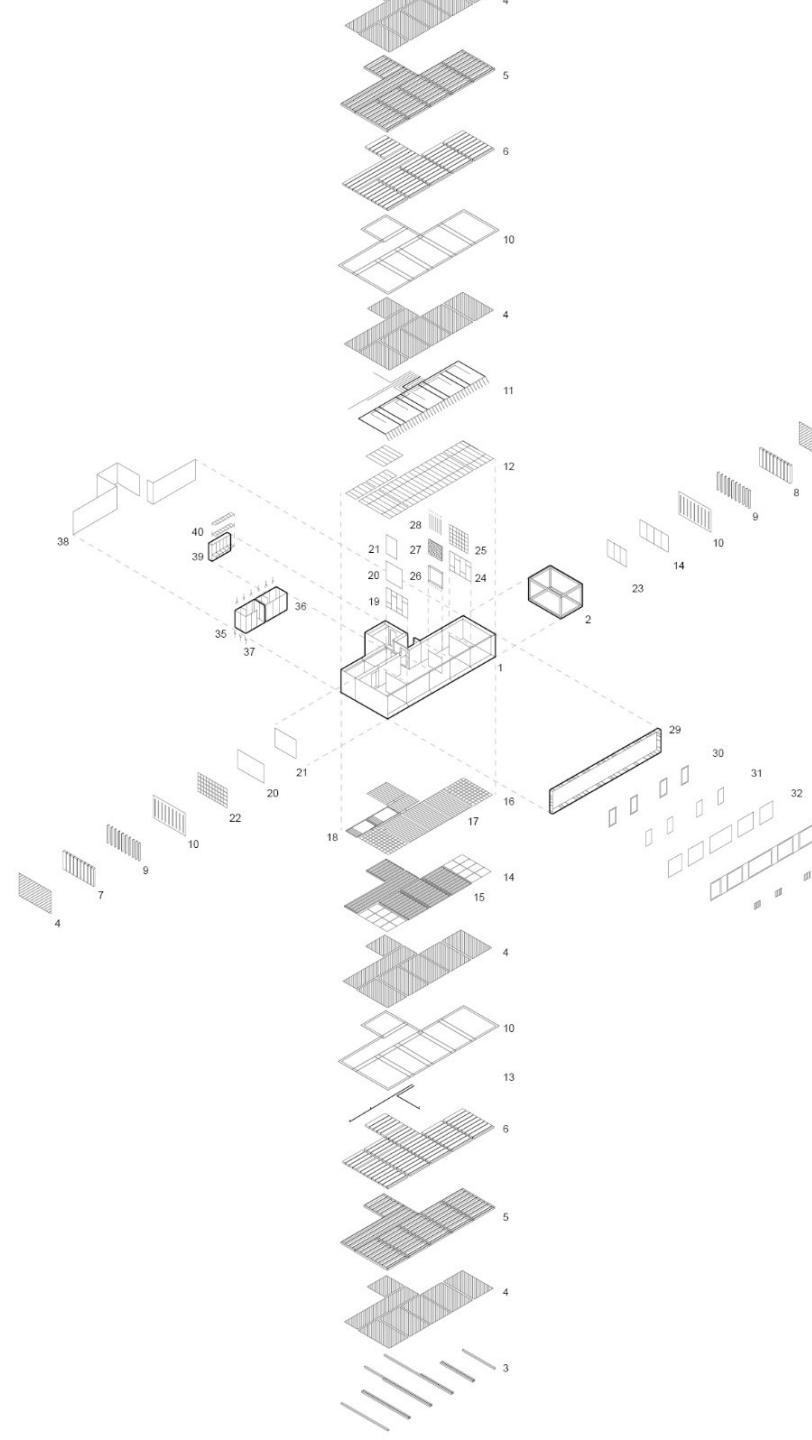
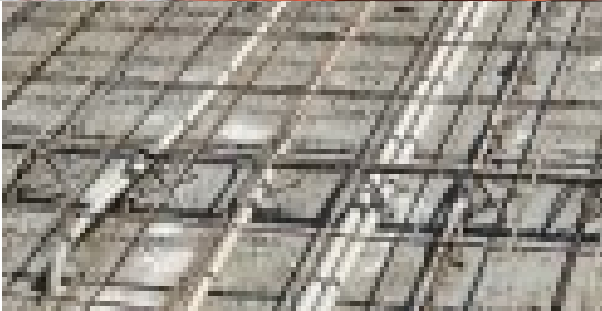


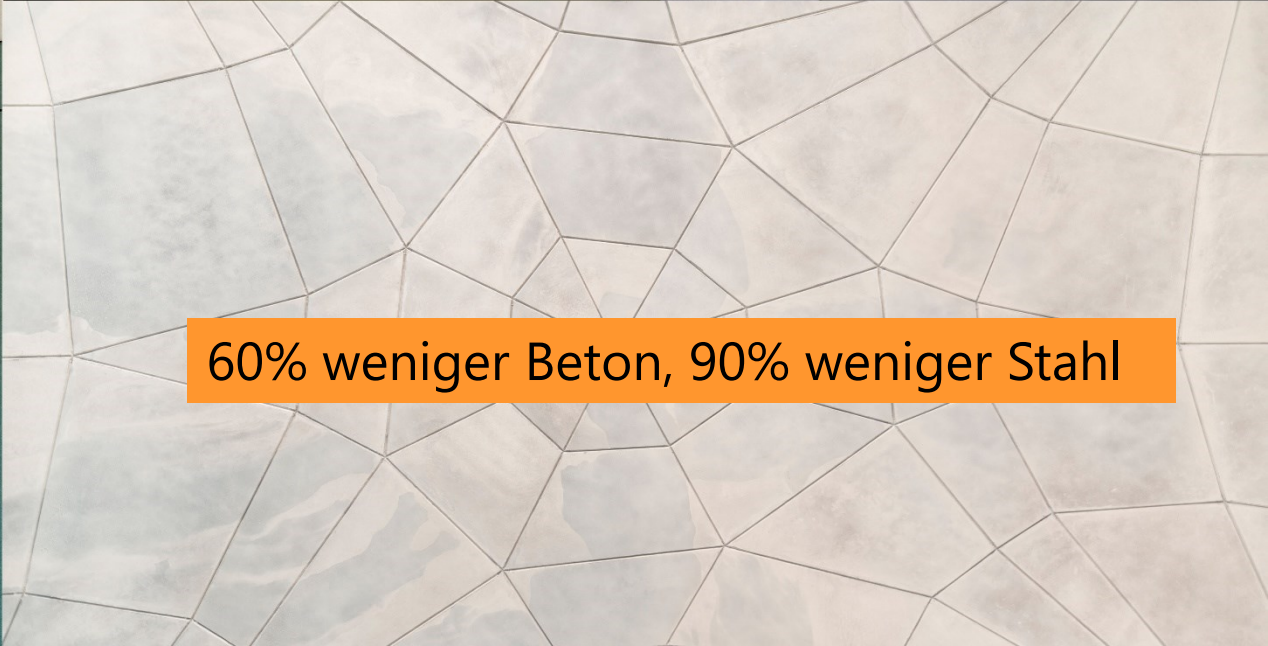
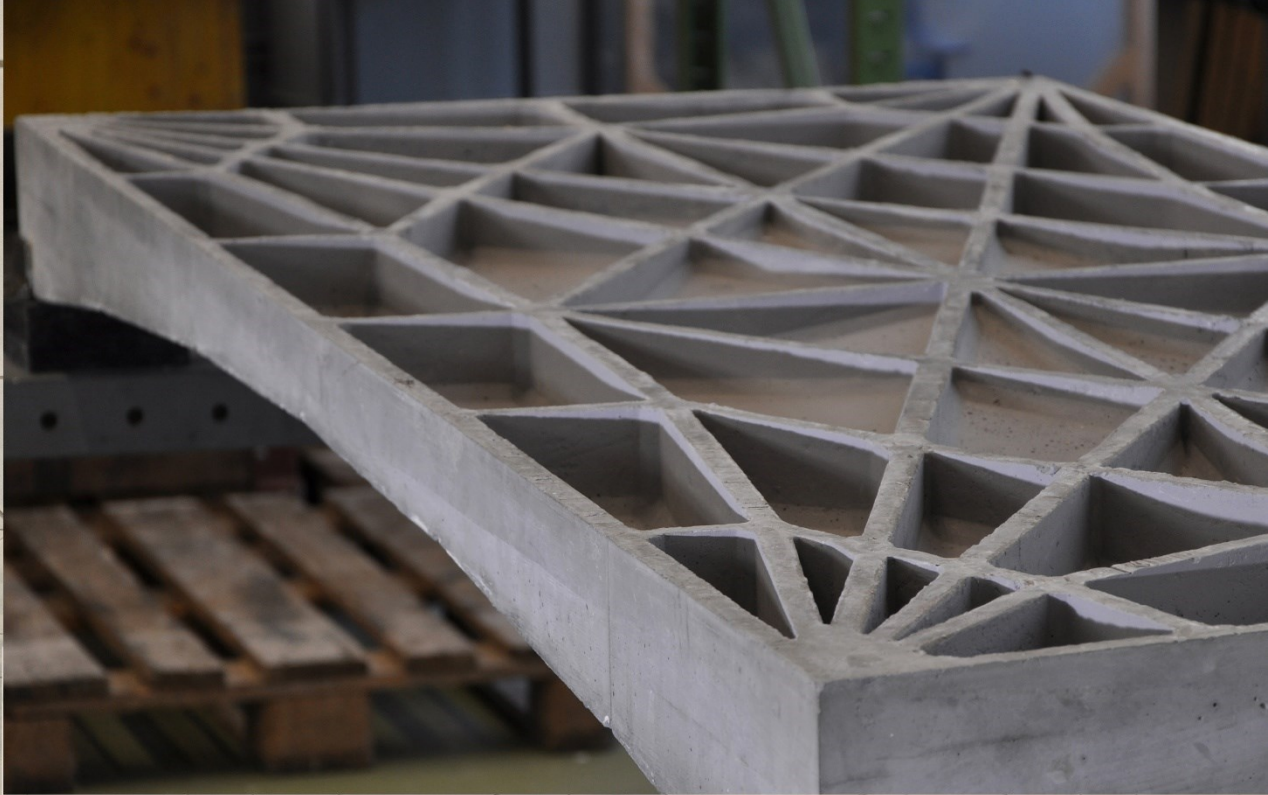
Photo: Zoey Braun, Stuttgart





**Weniger
Material
brauchen**





60% weniger Beton, 90% weniger Stahl



**>50% weniger
Emissionen**

**Bereits
benutztes
Material
brauchen**



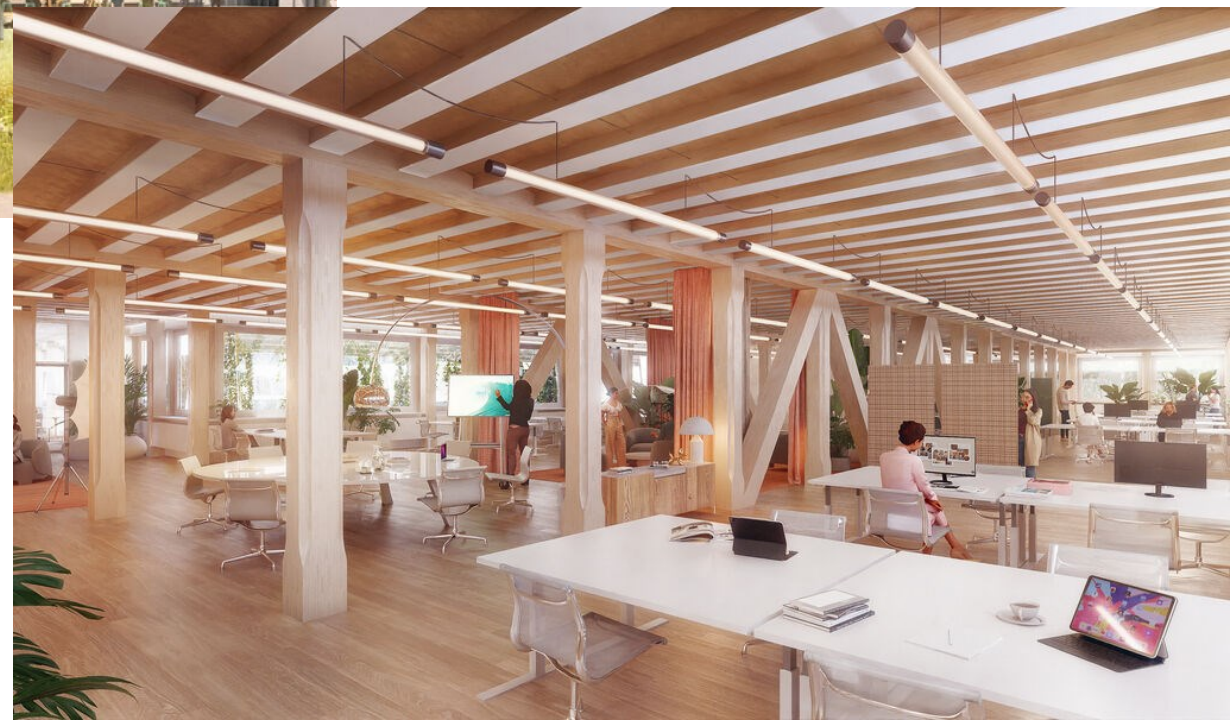






abo +

HORTUS



Earth-Timber Floor Slab

Patented, Certified, Ready to Build in Switzerland

Price Competitive

...to the industry standard reinforced concrete.

- use of less of the expensive timber as earth shields the timber from fire (50% earth, 50% timber)
- earth is 10x cheaper than concrete and 30x cheaper than timber
- efficient compressing of earth with robotics

Highly Sustainable

More sustainable than current timber solutions as we use less timber (CO₂, embodied energy).

- fully circular
- 75% less embodied carbon and 60% less embodied energy than standard reinforced concrete
- reduction of the total energy and CO₂ mortgage of buildings by up to 50%

3-layer panel solid timber beam rammed earth



High Performance

Same or better performance than concrete and optimized for the largest market which is residential.



payload

engineered to meet high payloads of up to 5kN/m²



fire protection

REI 60, REI 90 possible



sound protection

airborne sound: R'_w ≥ 53dB
impact sound: L_{n,w} ≤ 53 dB
depending on flooring



room climate

humidity regulating | 40% < σ < 60%
activatable thermal mass | 235 kJ/m²K
antiseptic and odor neutralizing

Verzicht auf:

- Beton (wo nicht zwingend)
- Estrich & Rigips
- Kunststoffe inkl. Fermacell
- Klebstoffe
- Metalle als Oberflächen
- Nicht heimische Produkte

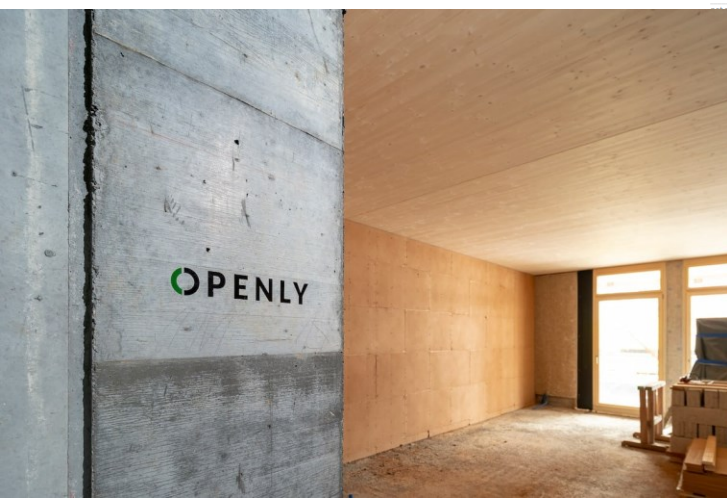
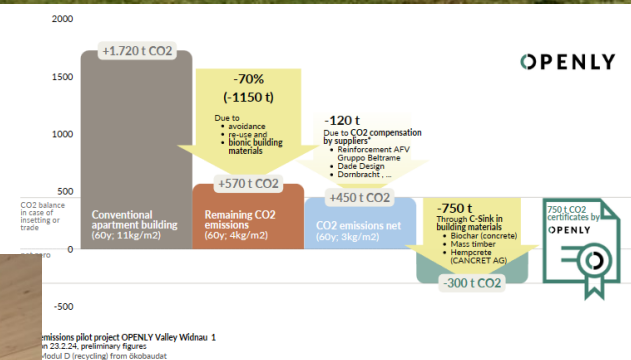
Fokus auf:

1. Plane an gut erschlossenen Lagen & erhalte die Substanz
2. Plane Plusenergie
3. Baue so wenig Haus wie möglich, insb. verzichte auf Untergeschosse & Installationen
4. Baue kompakt (<30% Fensterfläche)
5. Baue für 100 Jahre, Fokus auf Regelmass und langlebige Details
6. Spare Holz



OPENLY Valley Widnau breaks records

- Largest "hemp house" in Europe
- Savings of approx. 1000t CO2 (-70%) compared to a conventional building according to [SIA 2040](#)
- First apartment building in Europe to be built completely CO2 neutral. CO2 capturing with certificates of 750t.
- Largest [biochar concreting stage](#) (300m3 on 21.8.2023)
- Largest project in Switzerland with re-use of steel beams
- First project in Switzerland with 100% recycled and [100% neutralized reinforcing steel](#)
- 400,000 kg clay fill in the ceilings & 48,000 kg clay building boards
- First CO2 neutral kitchens
- 20 bathrooms with heat recovery and CO2-neutralized appliances from the manufacturers



Von einer Energie-Betrachtung zu einer Emissions-Betrachtung

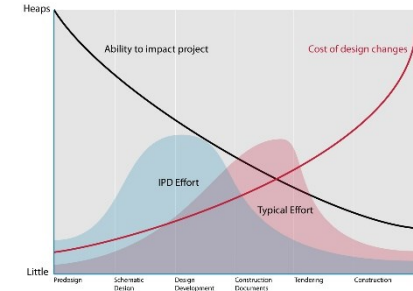
**Lebenszyklus
Lebenszyklen - Betrachtung**

Rahmenbedingungen schaffen

CO₂-Preis / Wert für CO₂ Reduktion

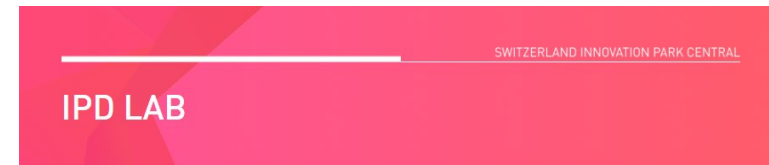
Wert für kreislauf-fähiges Bauen

Neue Herausforderungen brauchen neue Prozesse



MacLeamy Curve, 2004

**Leitfaden
Öffentliche Beschaffungen
mit Dialog für Planungs-
und Werkleistungen im
Baubereich**



Allianz-Verträge

**Tragwerk zuerst
ausschreiben**

Rahmenverträge, für mehrere Gebäude ausschreiben

um neue Technologien zu ermöglichen

um zu optimieren

um Kosten und Ressourcen zu sparen

Nicht alleine machen



KREISLAUFORIENTIERTES BAUEN CHARTA

@

<https://cbcharta.ch/>

Viel Mut, «just do it»

Leidenschaft macht Spass



nest.empa.ch

