



# Zurich's pathway to Net Zero & the role of carbon storage

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80<sup>th</sup> LCA Discussion Forum, Zürich, 9. June 2022

# Who are we?



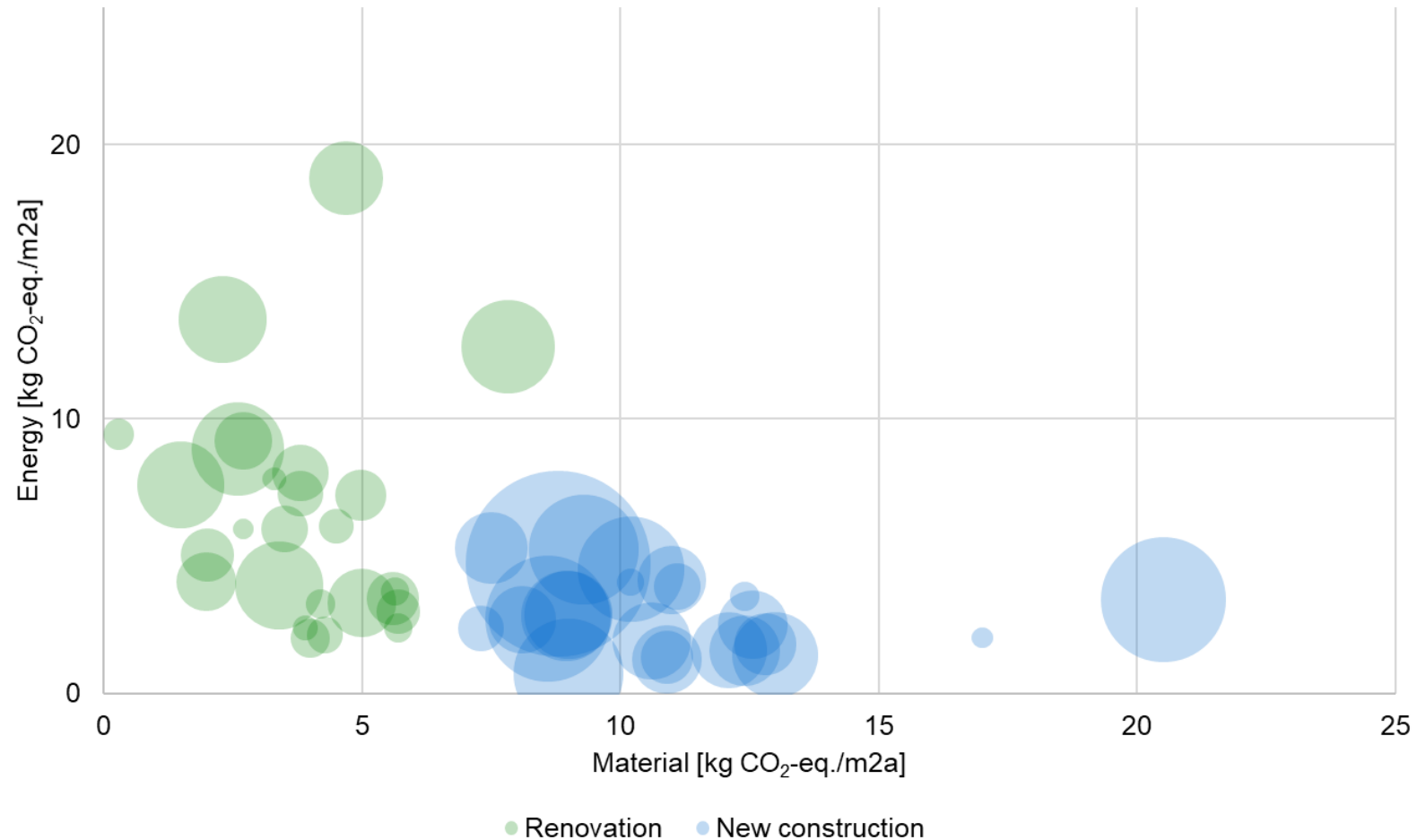
Public construction office

Sustainable Construction  
office

Developing, defining, and  
controlling the city's  
sustainable construction  
standard

Building owner perspective

# What do we do?



Pioneered recycling concrete

Involved in KBOB platform and standardisation processes

Developing and controlling strict and actionable standards (7-Meilenschritte)

Piloting component ReUse in Zurich

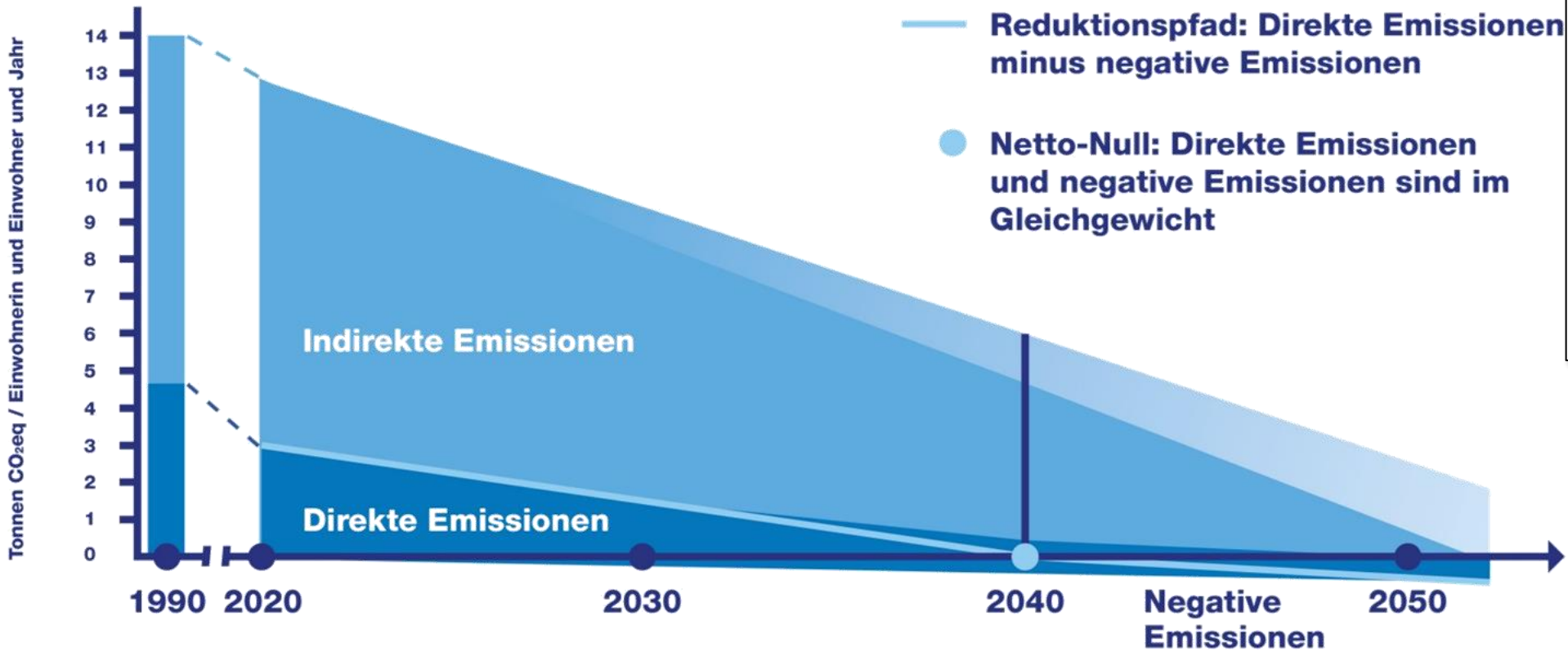
# The city's net zero strategy

Stadt Zürich, vertreten durch UGZ/EB

Netto-Null  
Treibhausgasemissionen Stadt  
Zürich (Phase 1)



Interner Grundlagenbericht zuhanden UGZ/EB  
Zürich, 13. Juli 2020

Donald Sigrist, Rolf Iten, Stefan Kessler, Markus Maibach, Martin Peter, Damaris Bertschmann, Felix Weber, Stephan Hammer, Lena Windler (INFRAS)  
Mireille Faist, Simon Gmünder, Corinne Schlierenzauer, Barbara Spiegel (Quantis)

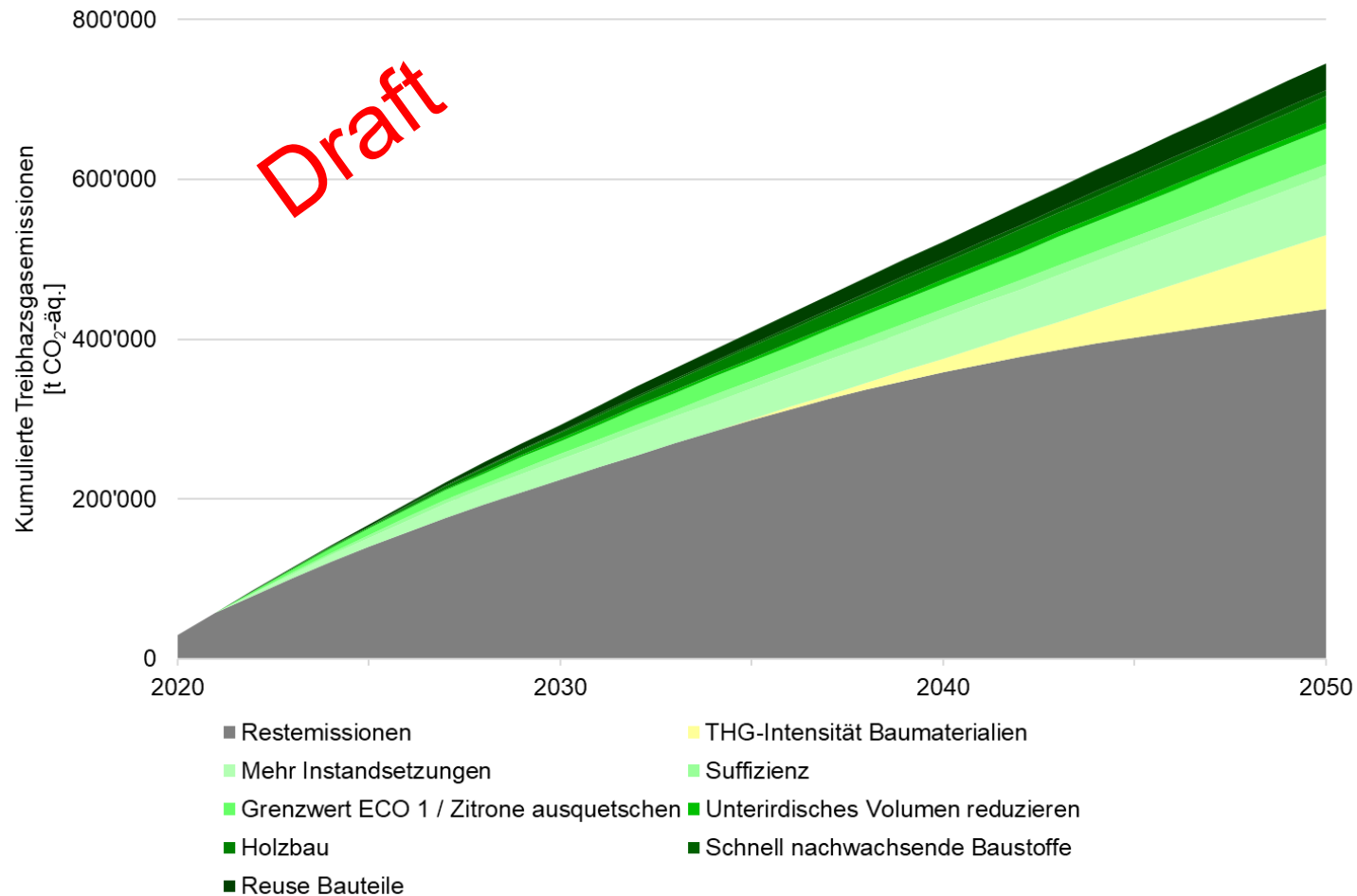


[www.stadt-zuerich.ch/netto-null](http://www.stadt-zuerich.ch/netto-null)

# Zurich's net zero target

	<b>Zurich</b>	<b>City administration</b>
<b>Direct GHG emissions <u>minus</u> negative emissions</b>	<b>Net Zero until 2040</b> (-50% until 2030)	<b>Net zero until 2035</b>
<b>Indirect GHG emissions</b>	-30% per inhabitant until 2040 (compared to 1990)	-30% until 2035 (compared to 1990)
No certificates allowed		
	<b>Referendum</b> <b>15.5.22</b>	<b>City council</b> <b>21.4.21</b>

# The road to net zero



Scenarios for reducing emissions from construction

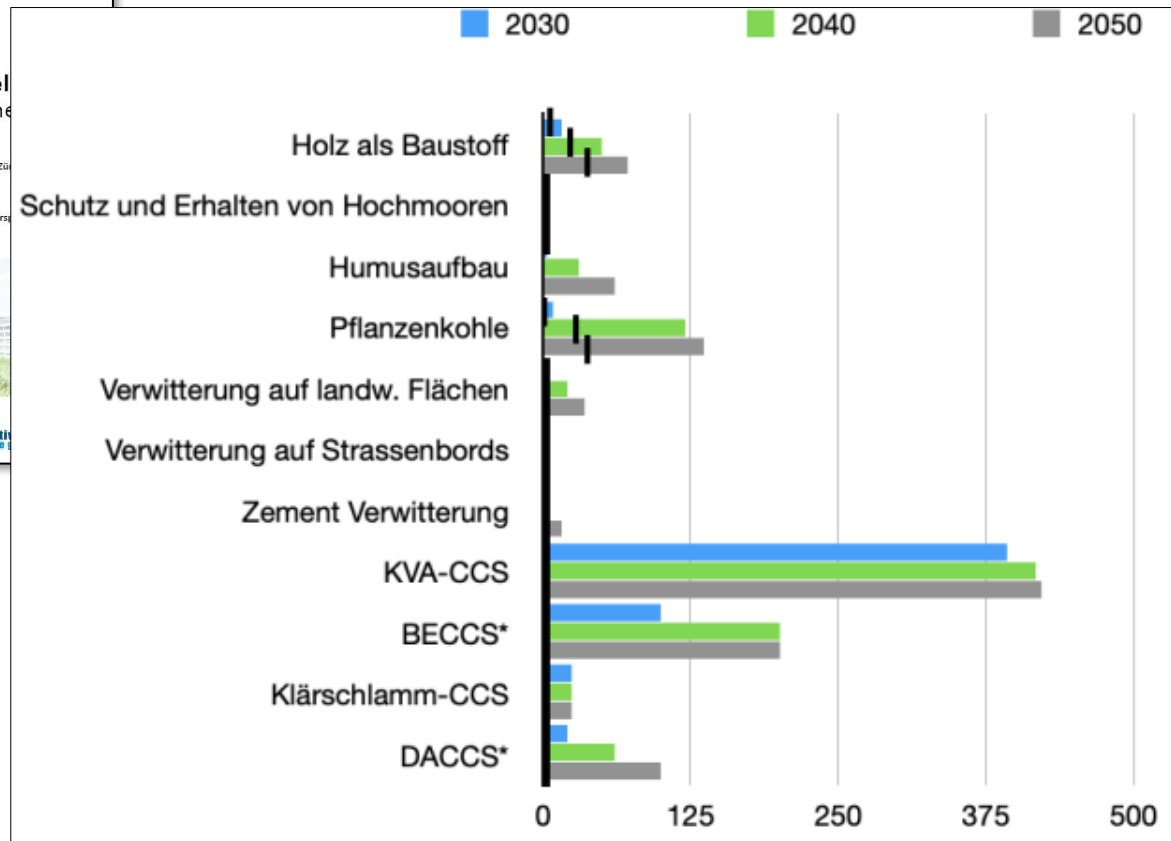
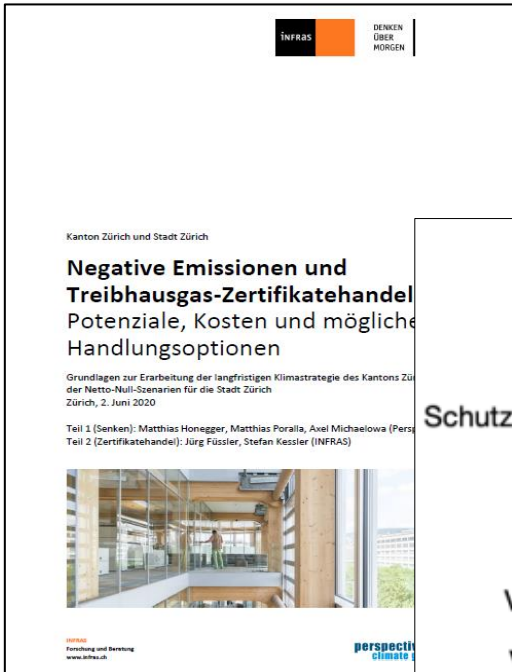
Wood and biogenic construction as an important option

Benefits of wood construction often surprisingly low

Stadt Zürich, unpublished



# Negative emissions

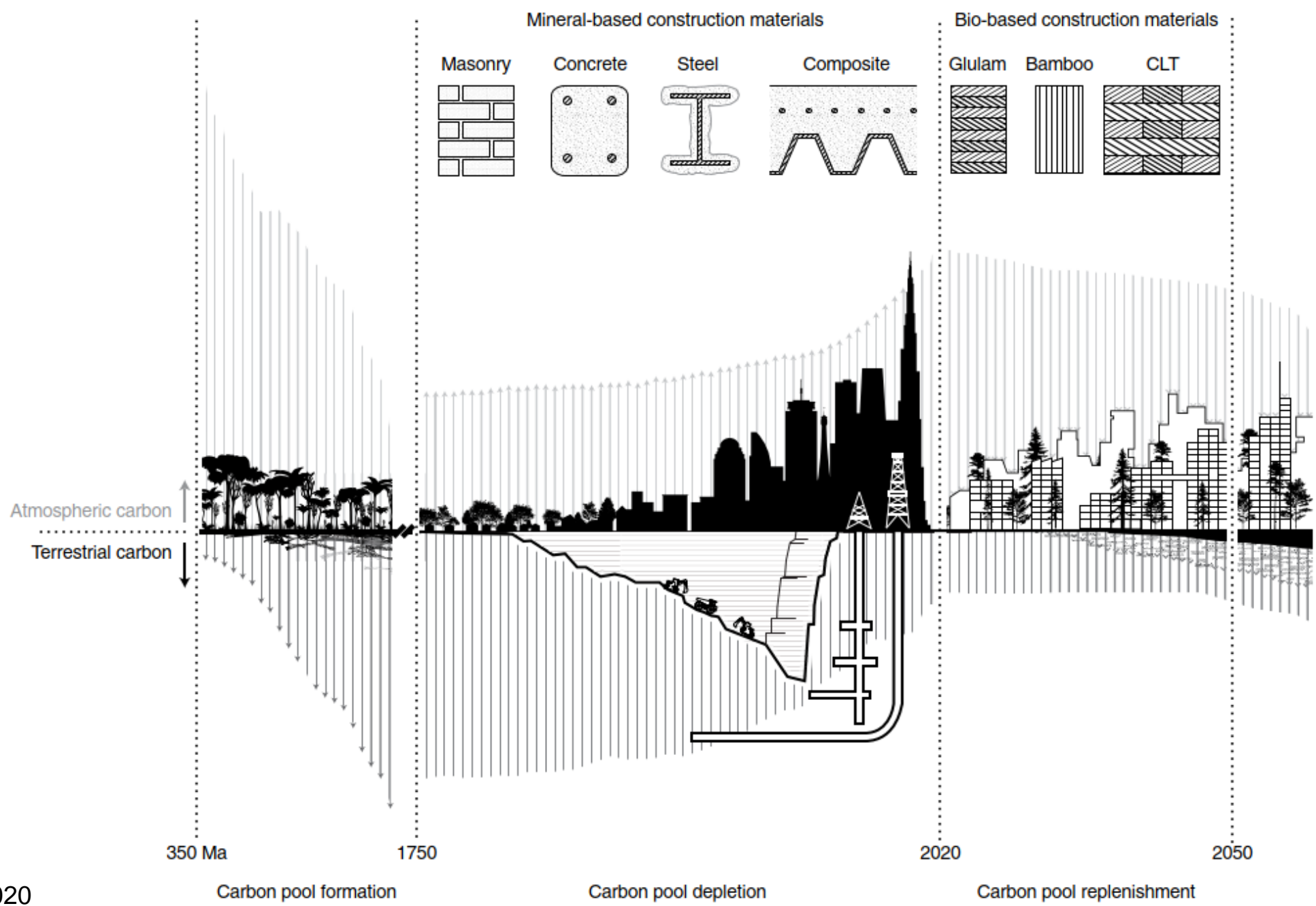


## Activities

Biochar in agriculture (black goes green trial)

Biochar power plant  
Frauenfeld (30 GWh<sub>el</sub>, 45 GWh<sub>th</sub>, 3.5 kt biochar coal)

[www.stadt-zuerich.ch/netto-null](http://www.stadt-zuerich.ch/netto-null)

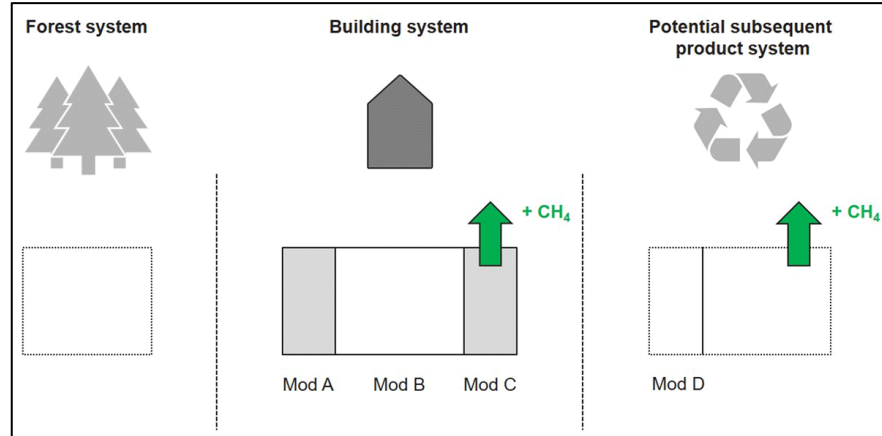


Churkina et al. 2020

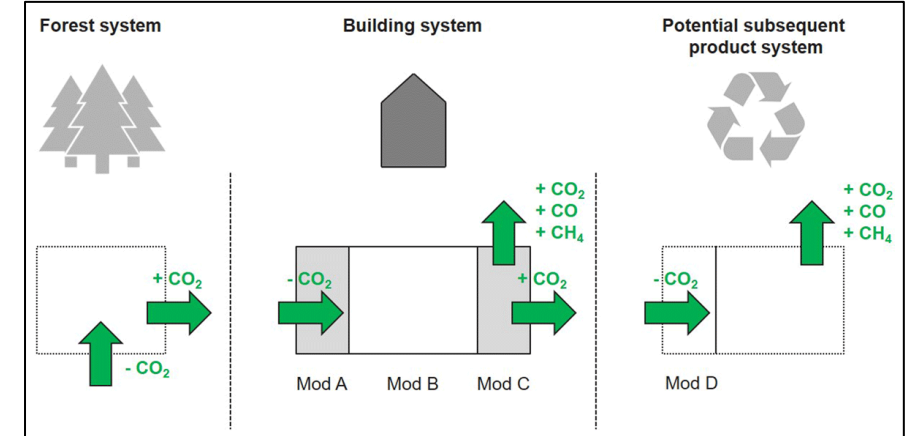


# Accounting of biogenic C is non-trivial

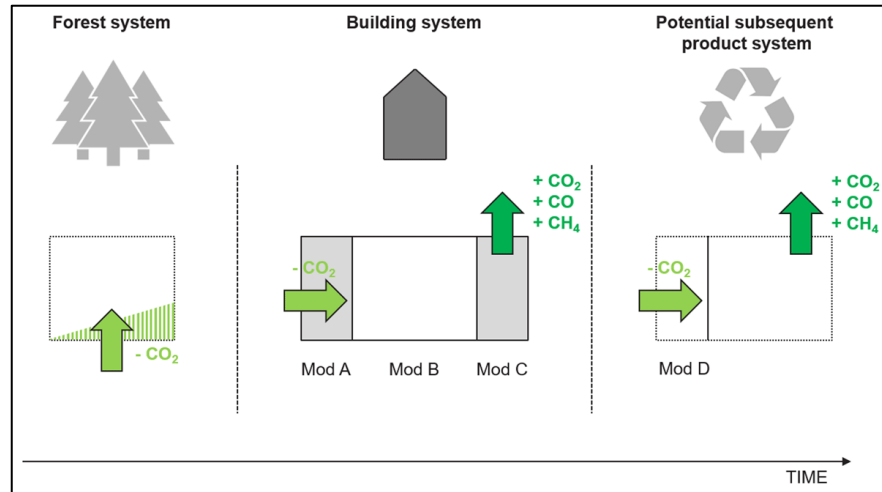
0/0



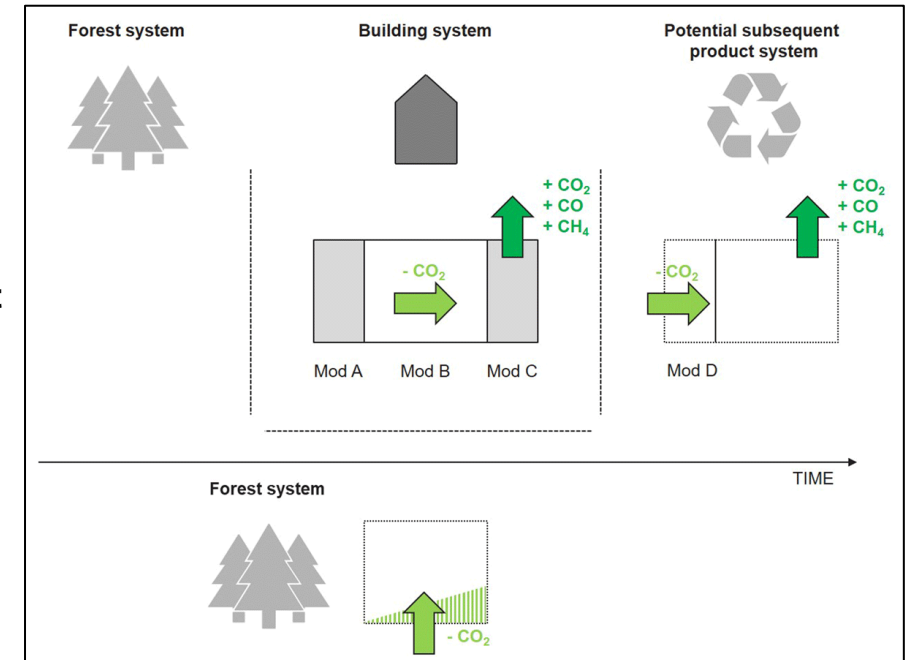
-1/+1



Dynamic,  
regrowth  
before use

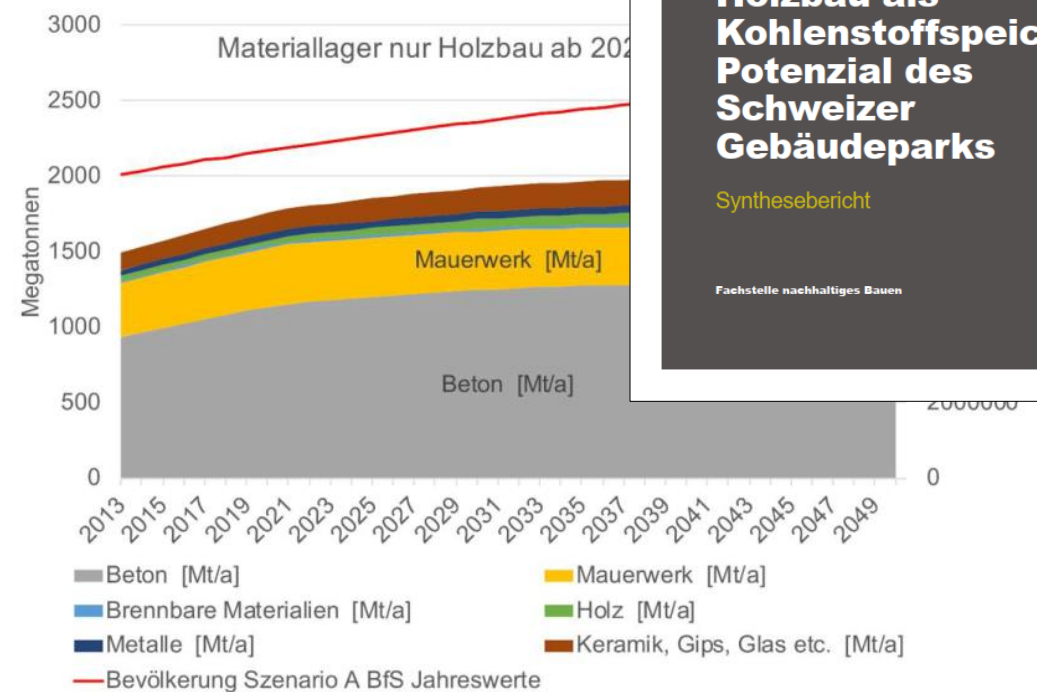
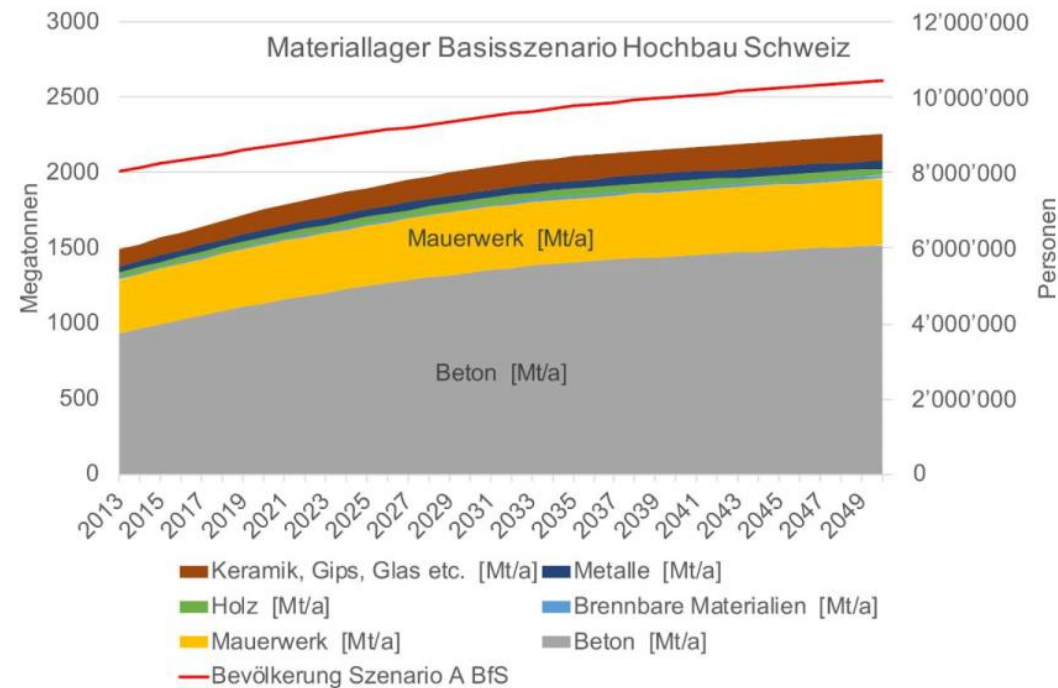


Dynamic,  
regrowth  
after harvest



Hoxha et al. 2020

# Study by Büro für Umweltchemie & ETH Zurich



Stadt Zürich  
Amt für Hochbauten

## Holzbau als Kohlenstoffspeicher – Potenzial des Schweizer Gebäudeparks

Synthesebericht

Fachstelle nachhaltiges Bauen

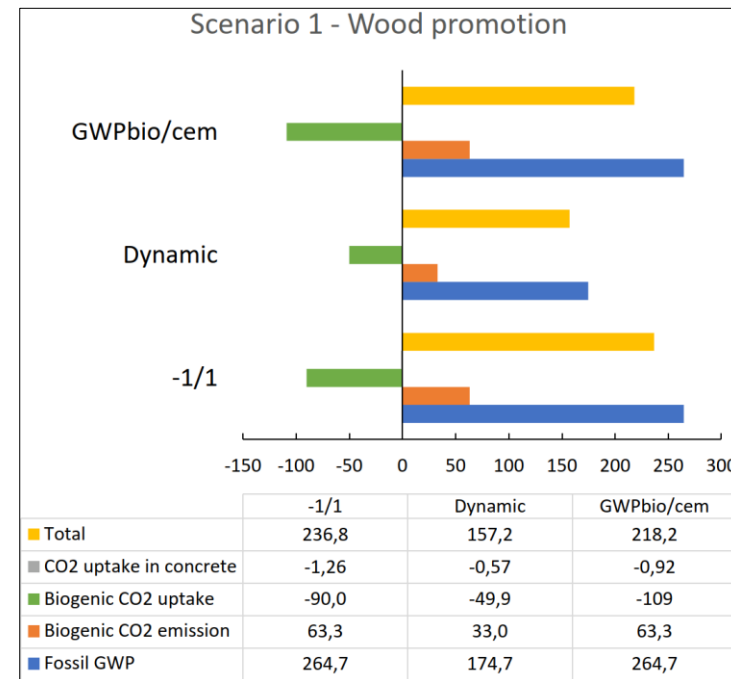
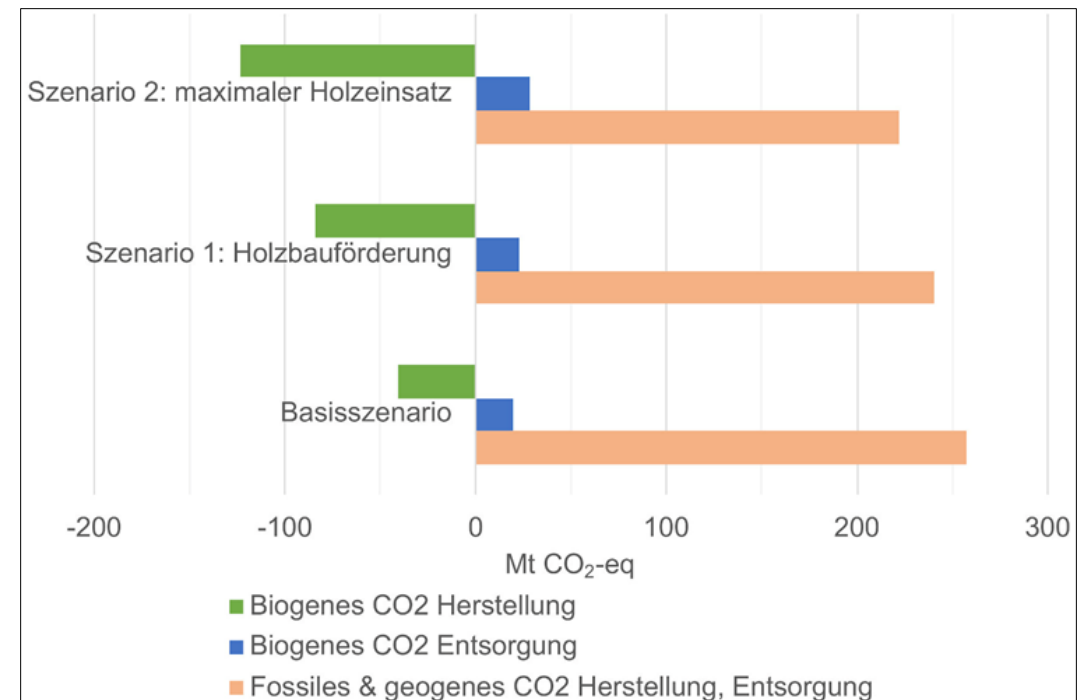
# Results

Swiss wood availability is given, if hardwood is included

Highlight differences between -1/+1, dynamic LCA, semi-static approach for concrete carbonation and biogenic carbon

Looking only at wood construction is not enough

Could be an important contribution towards net zero, considering moderate population growth

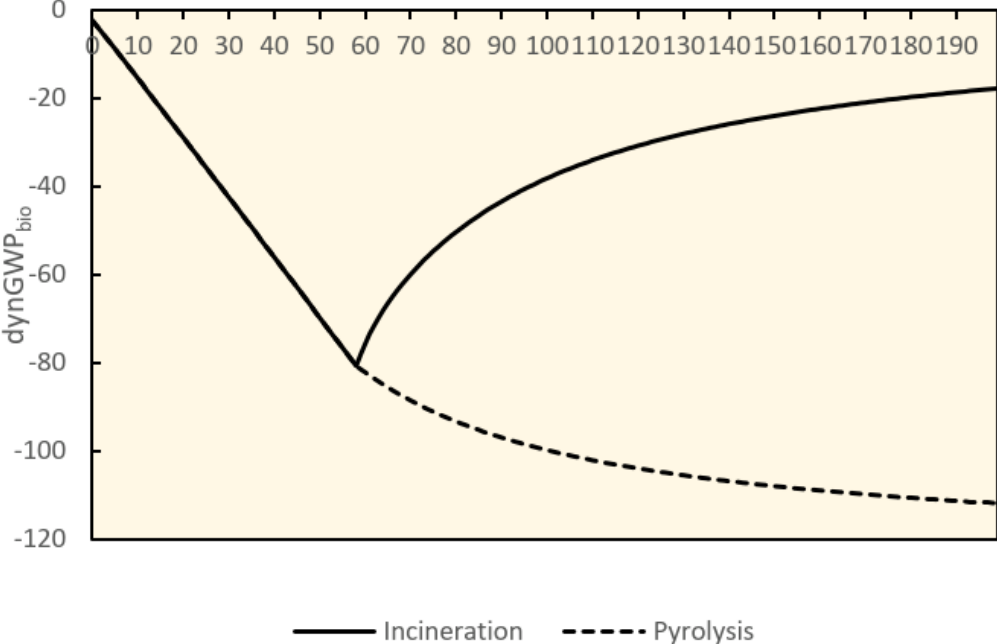
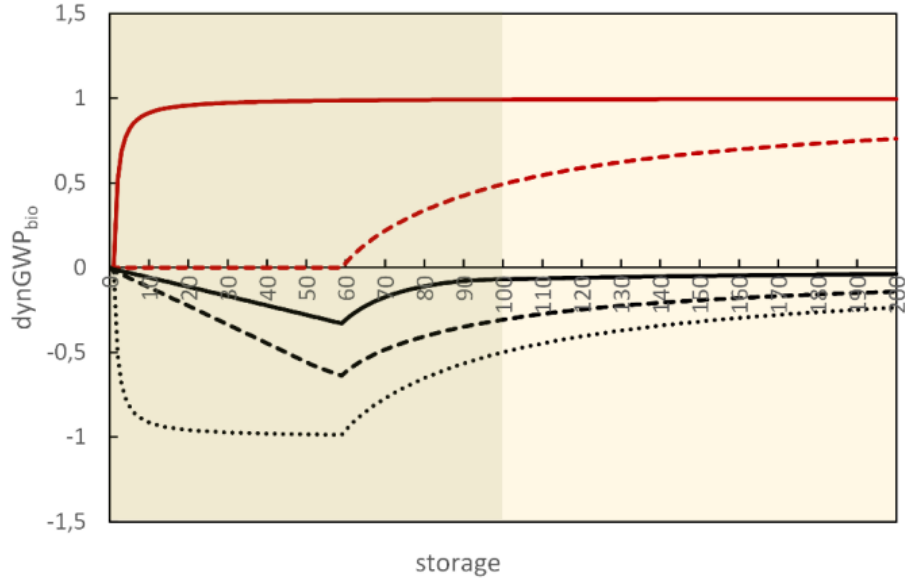


Büro für Umweltchemie,  
ETH Zurich

# End-of-life

In the long run the contribution to global warming is neutral

What if we were able to fixate the biogenic carbon after its use?



# Summary

Wood construction benefits

- Mass effect

- Substitution effect

- Storage effect

Structural problems in the wood industry

No construction = no storage

Consider biogenic material in retrofits (insulation, fillings, etc.)

# Outlook

Propose accounting guidelines in line with existing standards

Consensus building and stakeholder engagement in Swiss construction sector

Propose benchmarks for C storage

Adopt C storage thresholds

Pilot projects

Gain experience with alternative materials, local wood

Maximised C storage



# Discussion

Science and legislation (submission) for using bio-based materials must be fixed asap

Biogenic carbon is *temporary* storage

Guarantee a growing stock!

Do we need a minimum amount of biogenic C in buildings?

Leverage end-of-life (e.g. certificates, create markets)

Can (forced) carbonation of concrete be considered storage?

# Thank you.