



Snøhetta   
*on*  
Carbon Neutral Buildings and the 2030 Agenda

10.09.2020 / Green Building Council Iceland / Snøhetta by Tine Hegli



# Climate footprint



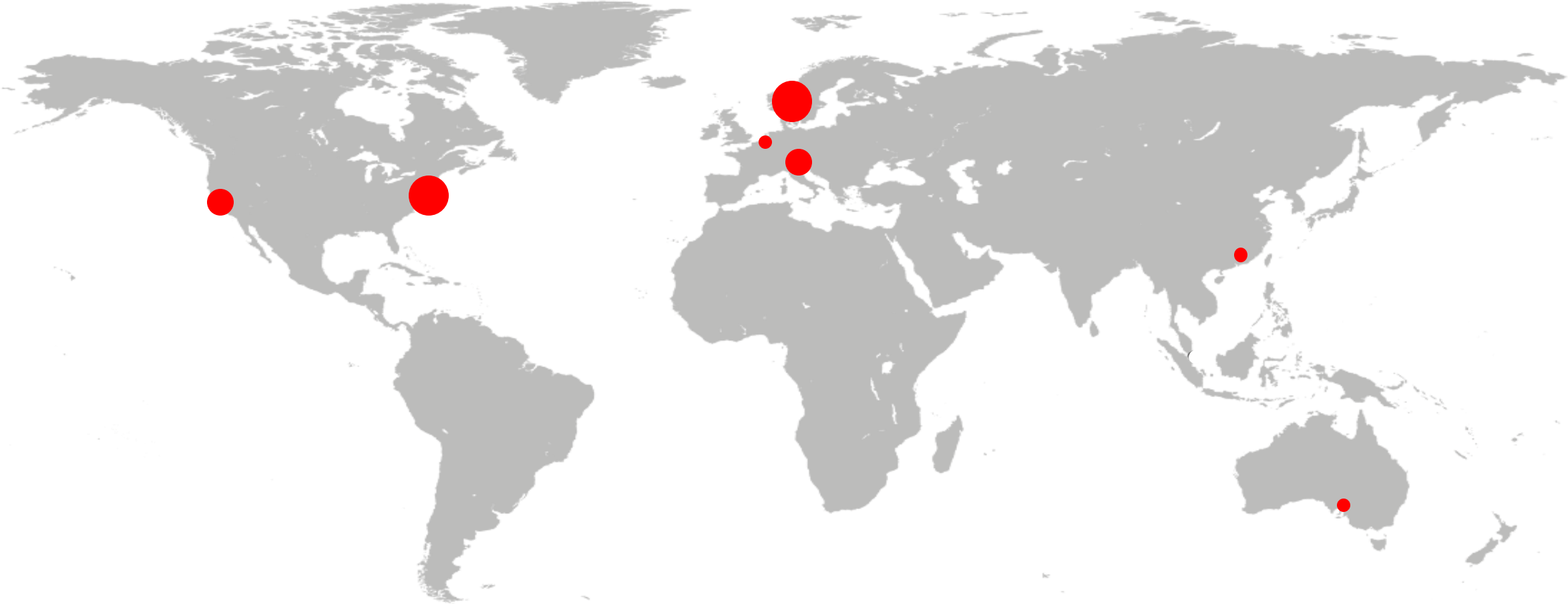






# Sustainable societies





San Fransisco

New York

Paris

**Oslo**

Innsbruck

Hong Kong

Adelaide



# The big (black) picture



1987 - 2017

# OUR COMMON FUTURE

THE WORLD COMMISSION  
ON ENVIRONMENT  
AND DEVELOPMENT







**1** NO  
POVERTY



**2** ZERO  
HUNGER



**3** GOOD HEALTH  
AND WELL-BEING



**4** QUALITY  
EDUCATION



**5** GENDER  
EQUALITY



**6** CLEAN WATER  
AND SANITATION



**7** AFFORDABLE AND  
CLEAN ENERGY



**8** DECENT WORK AND  
ECONOMIC GROWTH



**9** INDUSTRY, INNOVATION  
AND INFRASTRUCTURE



**10** REDUCED  
INEQUALITIES



**11** SUSTAINABLE CITIES  
AND COMMUNITIES



**12** RESPONSIBLE  
CONSUMPTION  
AND PRODUCTION



**13** CLIMATE  
ACTION



**14** LIFE  
BELOW WATER



**15** LIFE  
ON LAND



**16** PEACE, JUSTICE  
AND STRONG  
INSTITUTIONS



**17** PARTNERSHIPS  
FOR THE GOALS





**Take urgent action  
to combat  
climate change  
and its impacts**

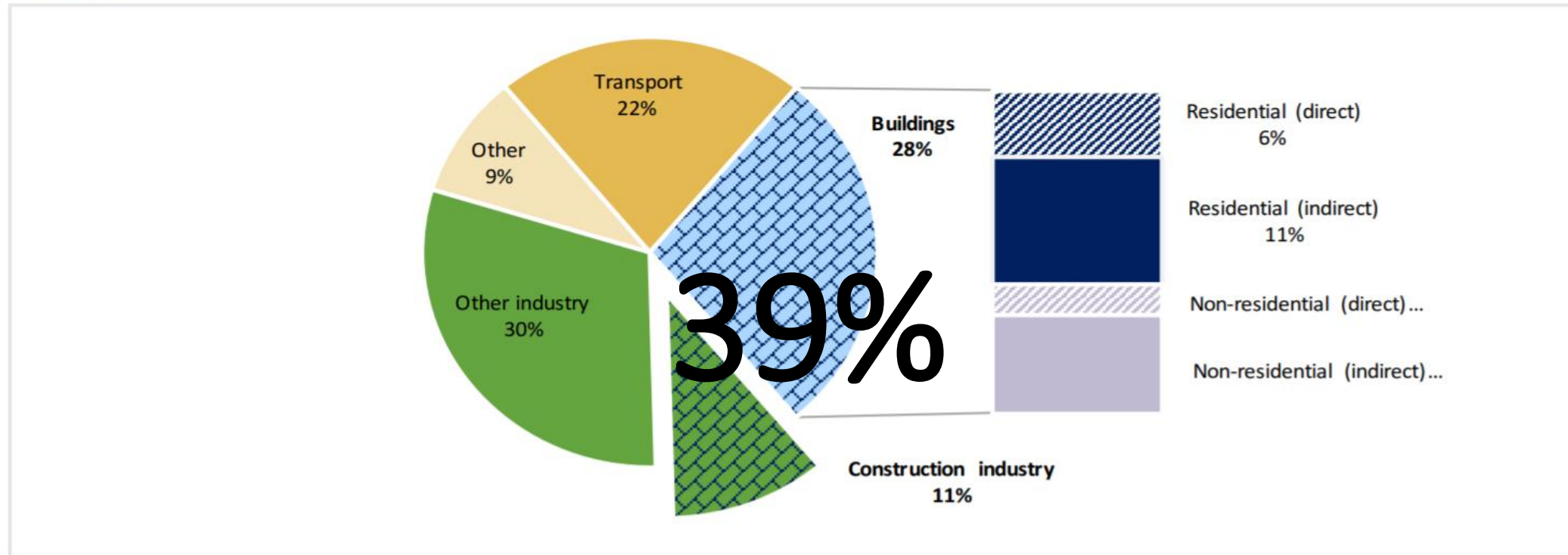
<https://sustainabledevelopment.un.org/sdg13>

<https://www.unenvironment.org/explore-topics/sustainable-development-goals/why-do-sustainable-development-goals-matter/goal-13>



2018

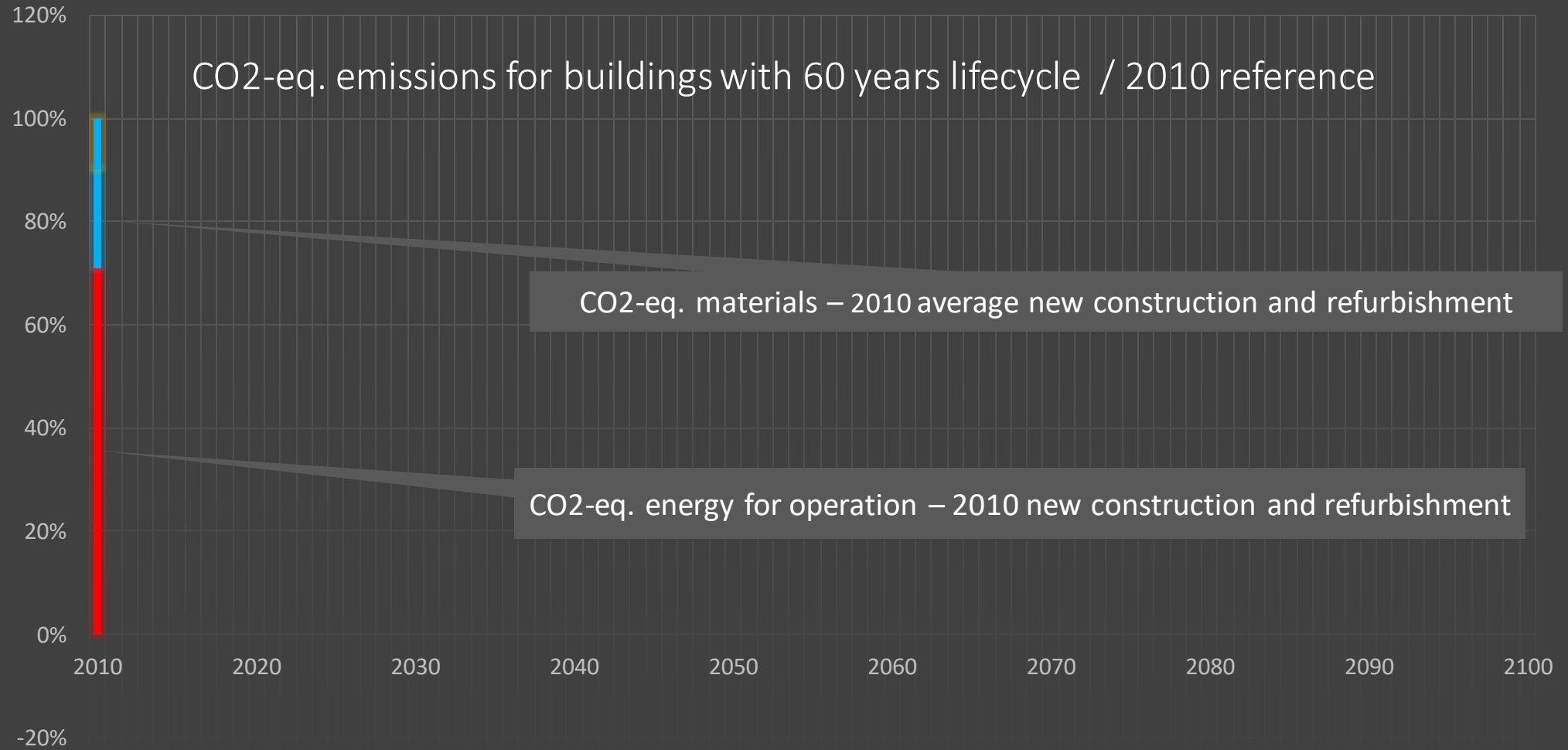


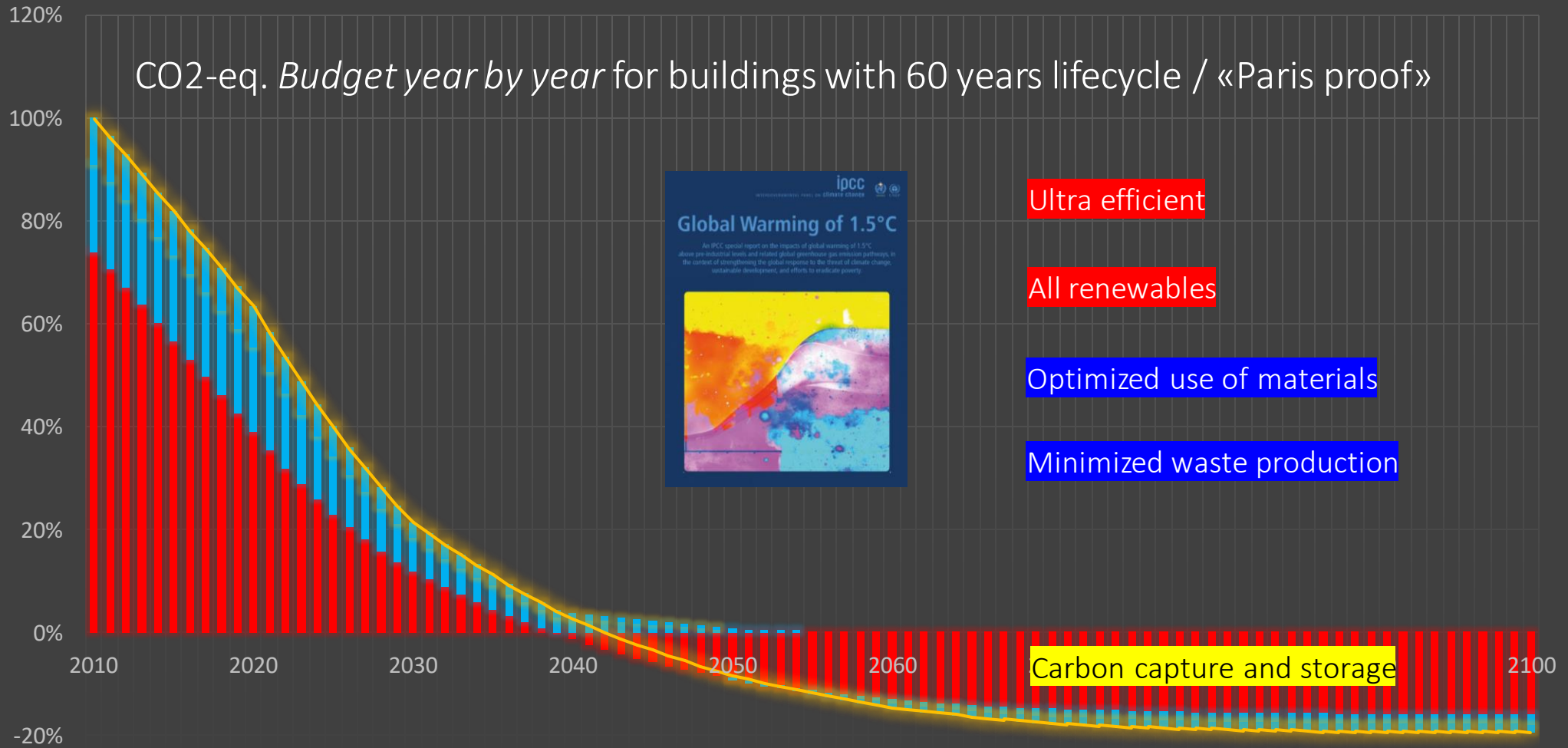
**FIGURE 7** Share of global energy-related CO2 emissions by sector, 2015

Note: The "construction industry" is an estimate of the portion of the overall industry sector that applies to the manufacturing of materials for building construction, such as steel, cement and glass.

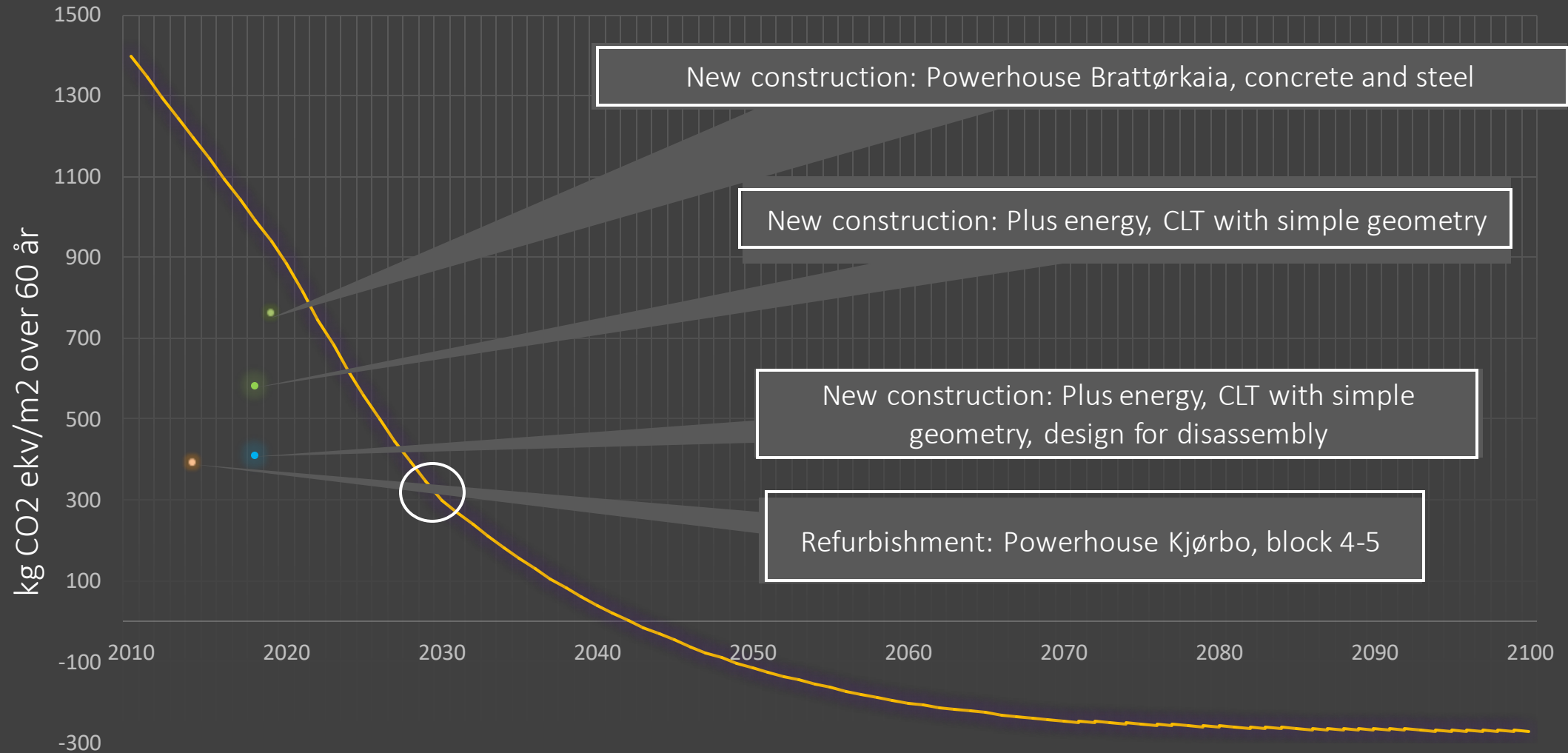
Source: derived with IEA (2017), World Energy Statistics and Balances, IEA/OECD, Paris, [www.iea.org/statistics](http://www.iea.org/statistics)











A1-3 PRODUCT STAGE			A4-5 CONSTRUCTION		B1-7 USE STAGE					C1-4 END OF LIFE				Supplementary information beyond the building life cycle
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	D
Raw material supply	Transport	Manufacturing	Transport	Construction ins process	Use	Maintenance	Repair	Replacement	Refurbishment	De -construction	Transport	Waste processin	Disposal	Reuse-Recovery-Recycling potentia
Benefits and loads beyond the system boundary														

# Lifecycle methodologies



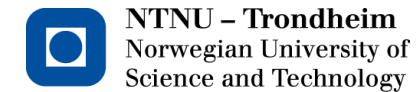


**Strengthen the means of implementation and revitalize the global partnership for sustainable development**

2009 - 2017



The Research Center on  
Zero Emission Buildings

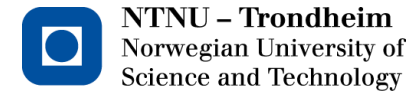


[https://no.wikipedia.org/wiki/Forskningssenteret\\_Zero\\_Emission\\_Buildings](https://no.wikipedia.org/wiki/Forskningssenteret_Zero_Emission_Buildings)  
<https://www.zeb.no/index.php/no/om-zeb/about-the-zeb-centre>

The ZEB center was established in 2009 as the building sectors FME center (Forskningssenter for Miljøvennlig Energi)



2018 - 2028



<https://fmezen.no>

The ZEB center was established in 2018 as the building sectors FME center (Forskningssenter for Miljøvennlig Energi). ZEN builds upon the definitions from ZEB, with added complexity

2011 -

# POWERHOUSE

Snøhetta 



entra

SKANSKA

 asplan viak

ZERO 

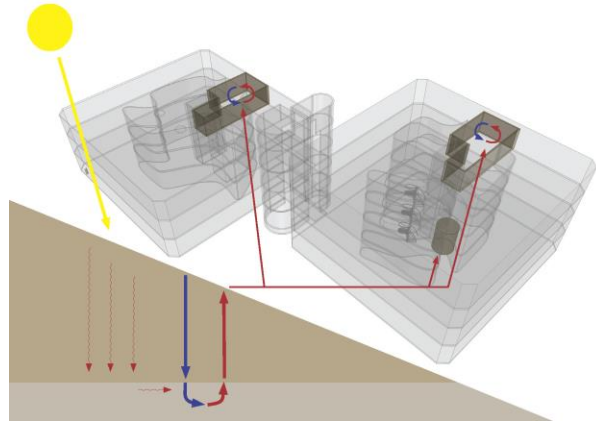


Research Centre on  
ZERO EMISSION  
NEIGHBOURHOODS  
IN SMART CITIES

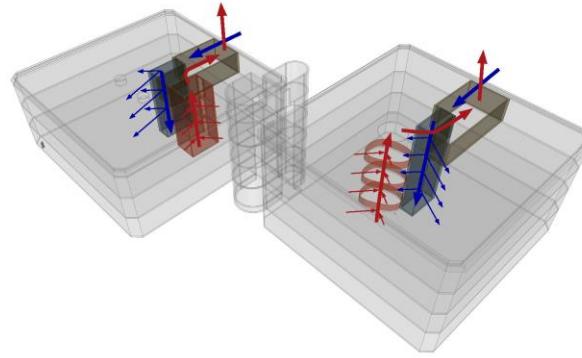


HARVARD  
CENTER FOR GREEN  
BUILDINGS AND CITIES  
at the Graduate School of Design

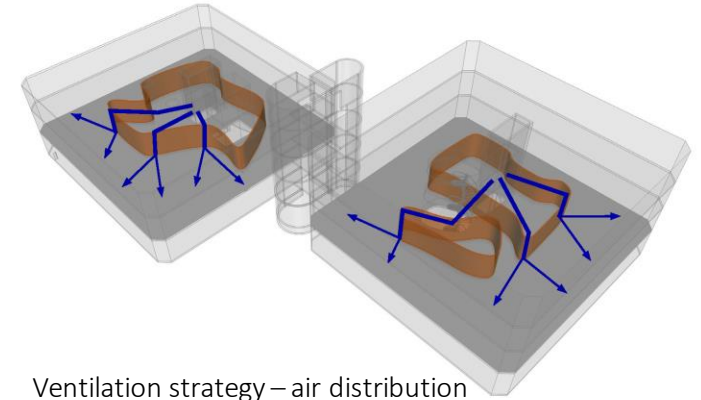




Thermal energy supply

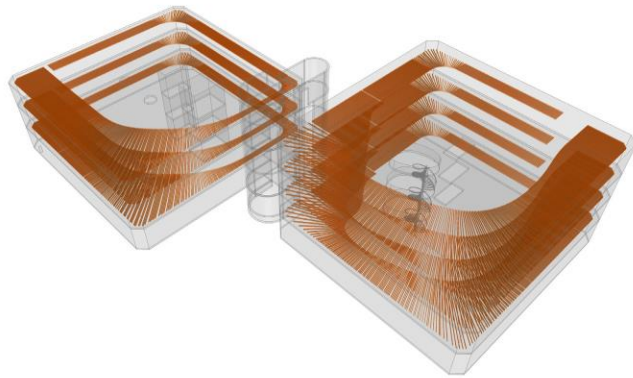


Ventilation strategy – air extract, exhaust and intake

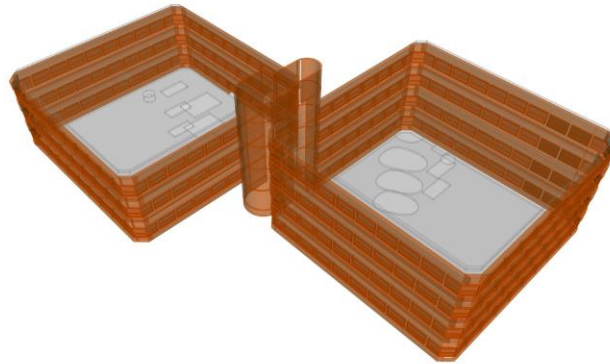


Ventilation strategy – air distribution

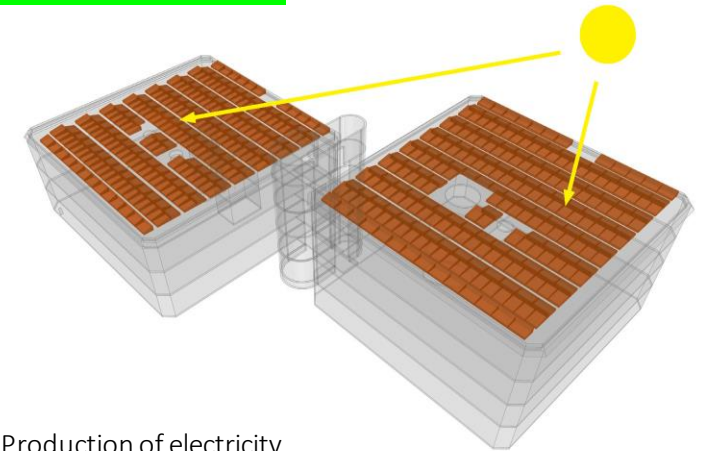
# Integrated design teams



Thermal and acoustic comfort



Energy efficient climate envelope



Production of electricity





Ultra efficient:





Powerhouse Kjørbo / refurbishment of 1980 office building

















Snøhetta

Powerhouse Kjørbo





All renewables:



 Trondheim Sentralstasjon

Powerhouse Brattørkaia – «form follows environment»

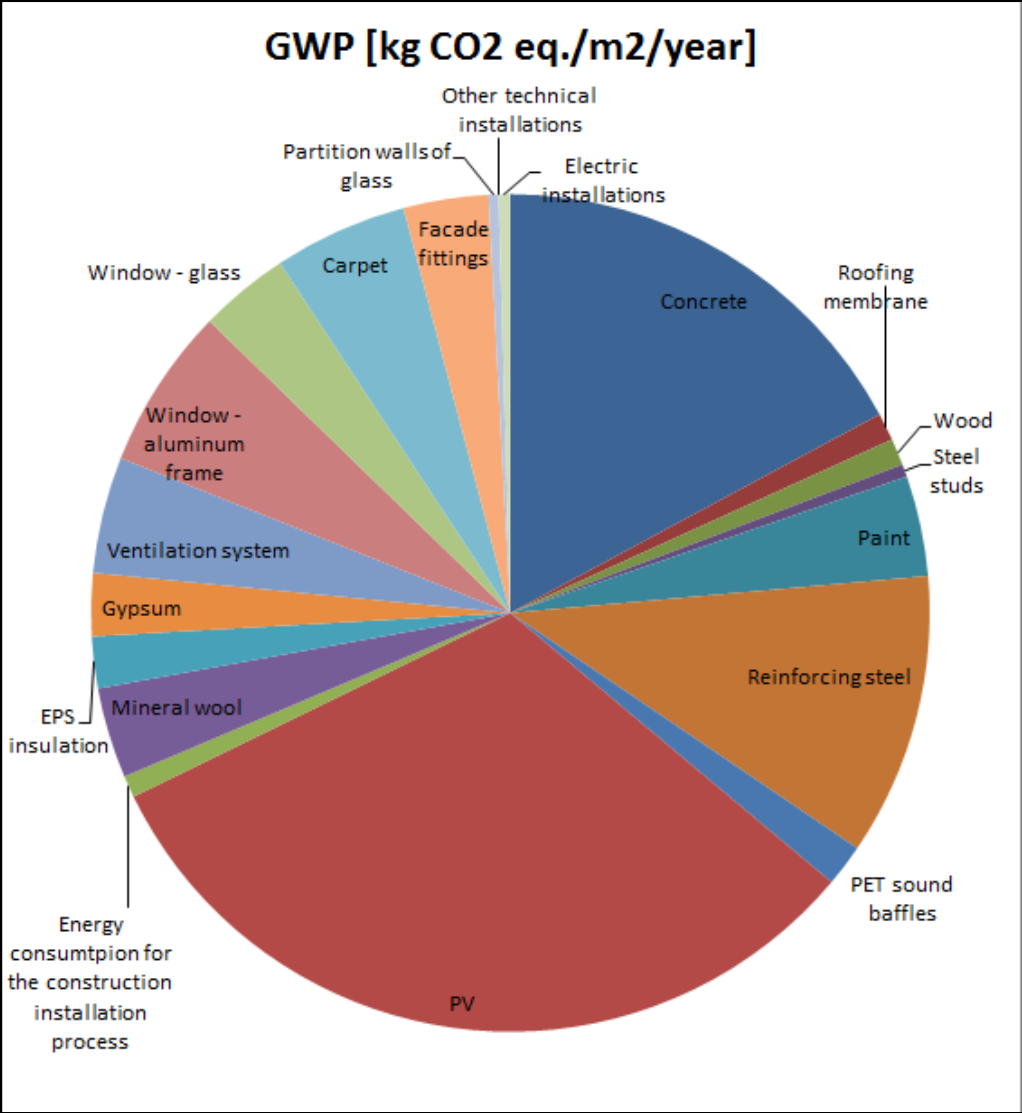




Powerhouse Brattørkaia – «form follows environment»







TU DIGI.NO INSIDE TELECOM DISKUSJON VEIER24 MARITIM ENERGI ELEKTRISK BYGG

**TU Bygg**  LEDIGE JOBBER KONFERANSER BLI EKSTRA-ABONNENT SØK  LOGG INN

© Vis bildetekst

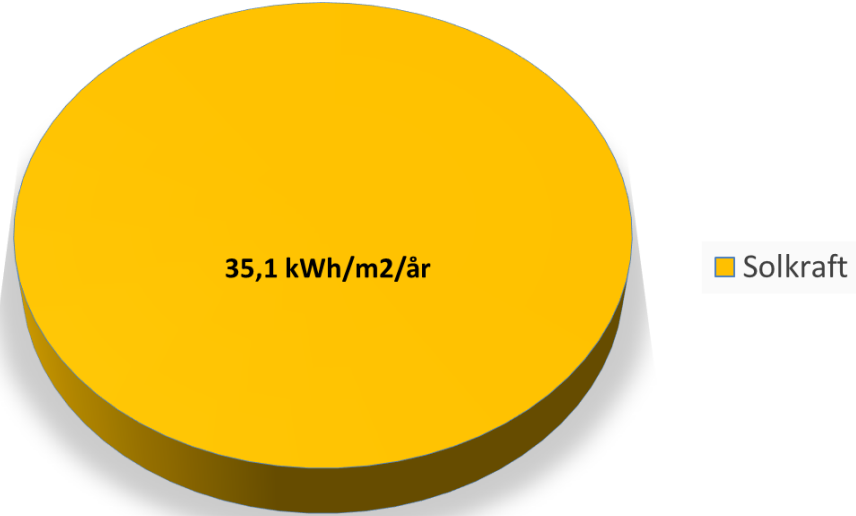
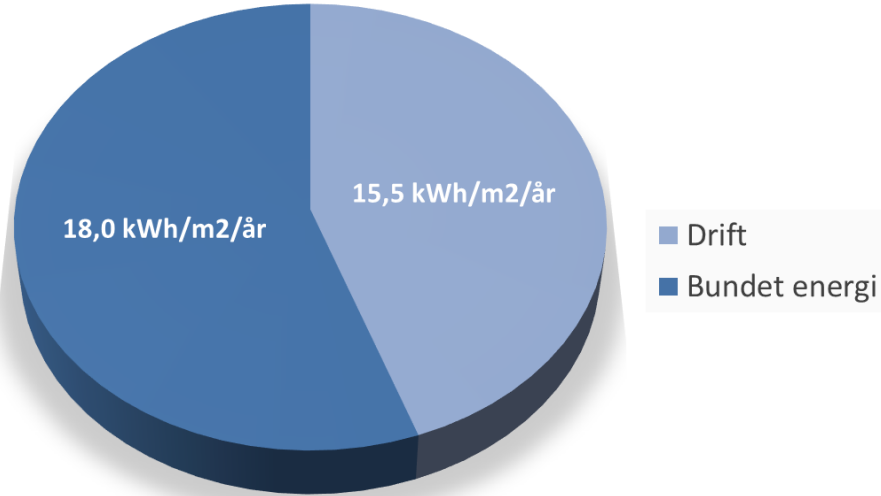
POWERHOUSE LEVERER ENERGI TIL MIKRONETT I TRONDHEIM

## Mikronett: Powerhouse skal forsyne hele Brattørkaia med strøm

Powerhouse Brattørkaia produserer mer strøm enn det bruker. Med batteri i kjelleren skal de forsyne hele nabolaget med overskuddsstrøm.

TUVÅ STRØM JOHANNESSEN **BYGG** 11. MARS 2019 - 05:15

Powerhouse Brattørkaia / PV panles in relation to embodied emissions / source: Skanska, Bjørn Jenssen



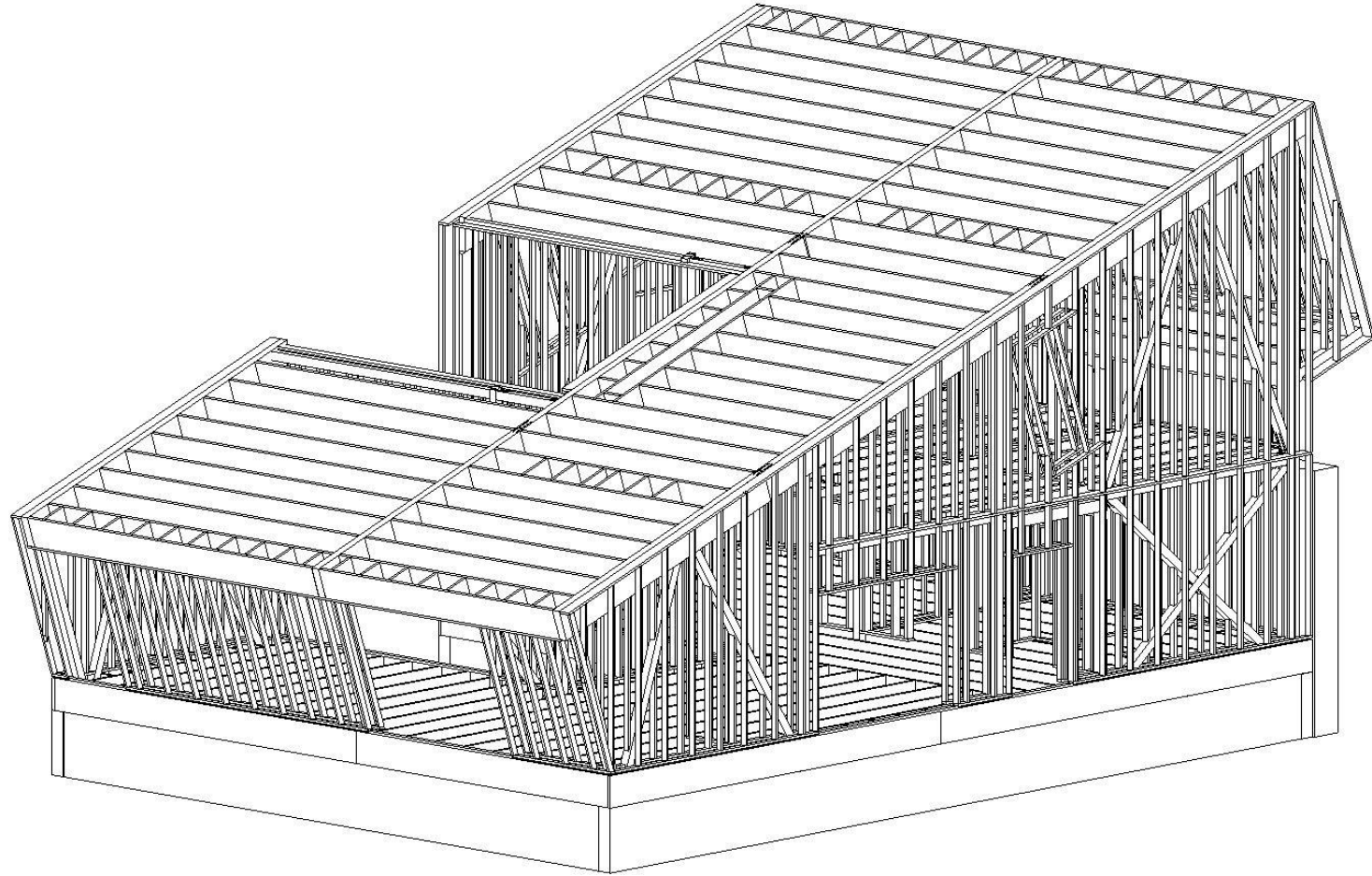
Solkraft	35,1
Bundet energi	-18,0
Drift	-15,5
SUM	1,6

Optimized use of materials:





ZEB Pilot House Larvik, single family demo house



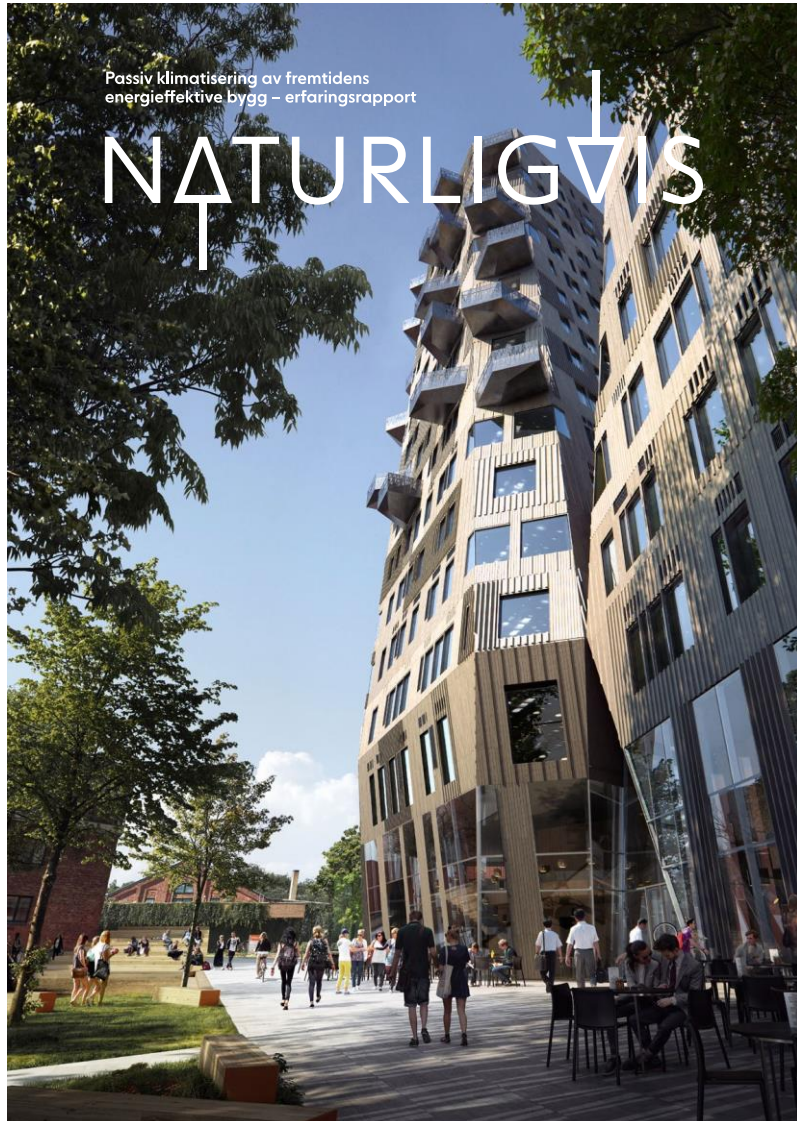




ZEB Pilot House Larvik, prefabricated superstructure from Moelven



Minimizing waste production:



Publication «Naturligvis» - / «Atmosphere without machines» / Gullhaug Torg





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Harvard HouseZero, Boston

# Carbon capture and storage:





<https://snohetta.com/projects/403-plast>

Ocean plastic as resource for furniture design / Chair S-1500

## A chair made of recycled plastic

We believe that it is necessary to switch the current conversation on plastic, from seeing it as a cheap and disposable material to treating it as the robust and reusable material that it really is. How can we trigger more awareness on the issue and educate younger generations through an object of design?

The solution came from the North of Norway. Its innovative and sustainable fish farming industries like Kvarøy Fiskeoppdrett are keystone businesses that provide wealth to and sustain human settlements in local communities. After visiting fish farming production sites, it became evident that the industry's main plastic waste, like fishing nets, ropes and pipes, are valuable resources that can be put to use in other arenas. Once these components are worn out they can be collected, processed and subsequently grinded into a granulate that can be injected in new shapes, generating endless of possibilities for developing new objects with.

From this insight, the idea of creating a chair made from recycled fish farming plastic waste came to life. A chair that communicates the journey of the plastic material, from its use in the fish farms, to chairs, and subsequently to other products when the chair has completed its life cycle.

The S-1500 chair references the textures, colors and crafts of its origin in the North of Norway. The chair-shell is made from 100% recycled Norwegian plastic, produced by NCP, and the chair's subframe is obtained by recycled Norwegian steel. The goal is both to inspire big industries to make changes in how they produce and reuse valuable surplus material and to engage younger generations through a product that they can relate to in their everyday lives.









# Iceland Carbon Capture Project Quickly Converts Carbon Dioxide Into Stone

More than 95 percent of gas injected into the ground precipitated out as harmless carbonate, scientists calculate



Thank you for the attention!  
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[www.snohetta.com](http://www.snohetta.com)