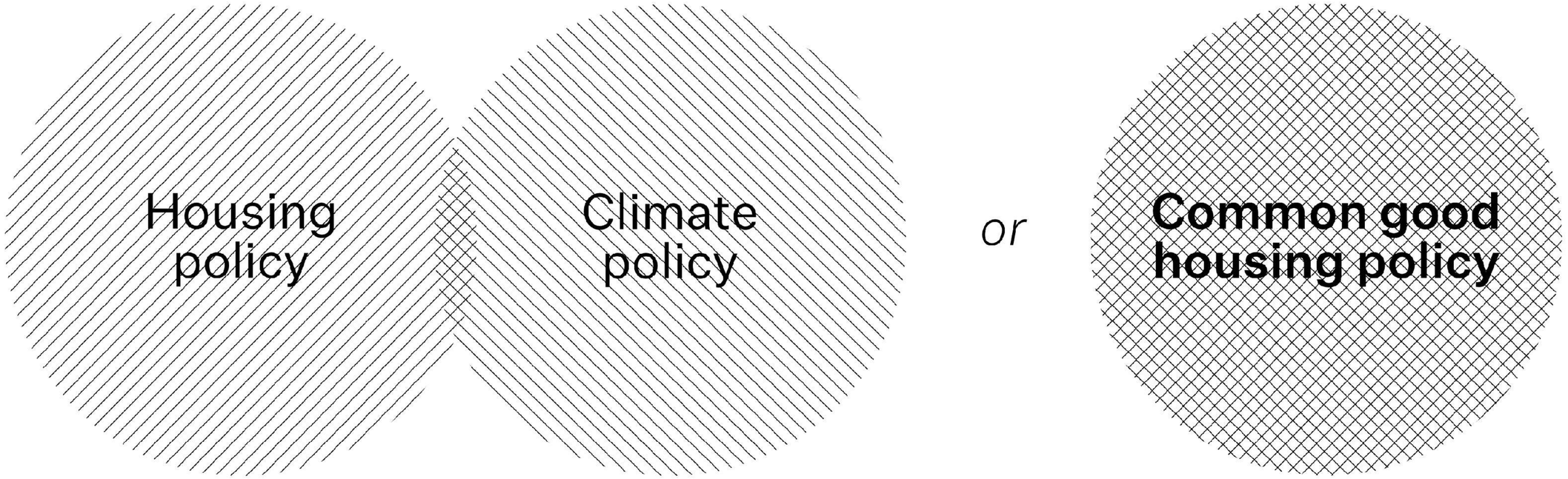

Professor Dan Hill
Director, Melbourne School of Design, University of Melbourne
Visiting Professor, UCL Institute for Innovation and Public Purpose

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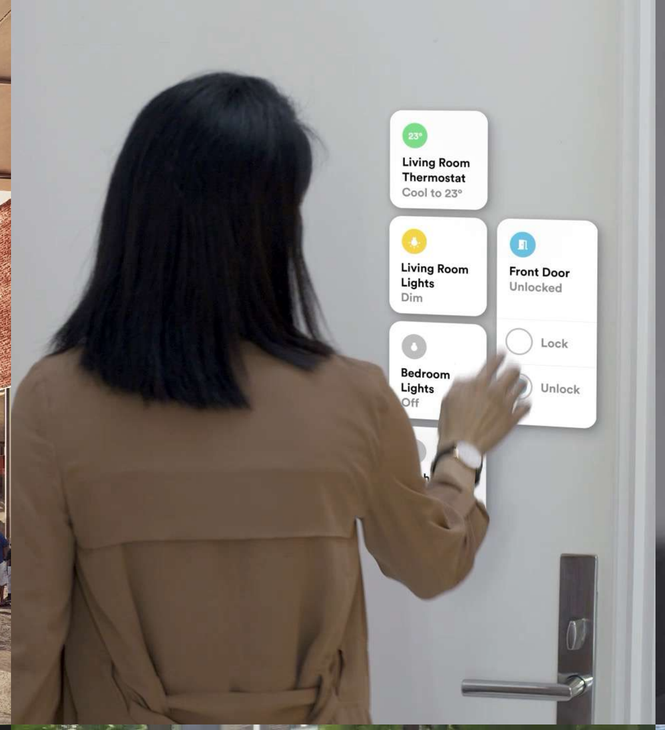
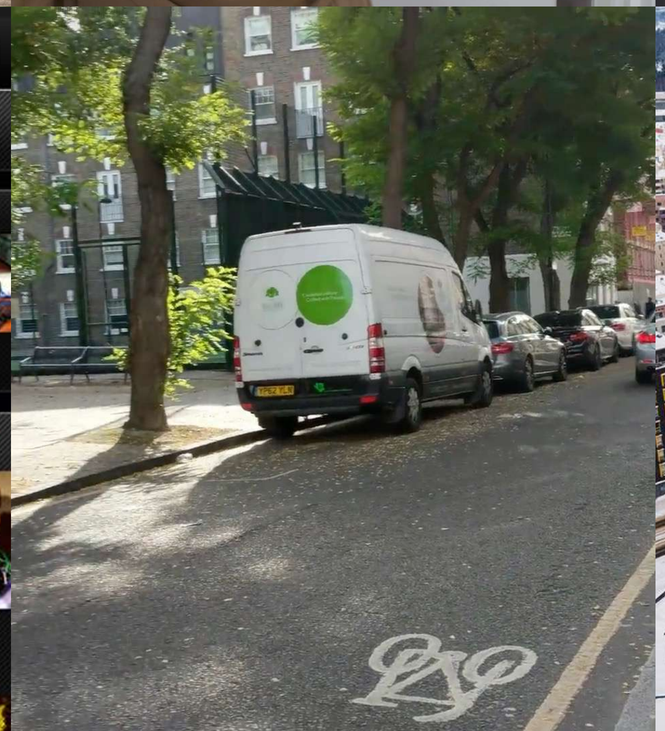
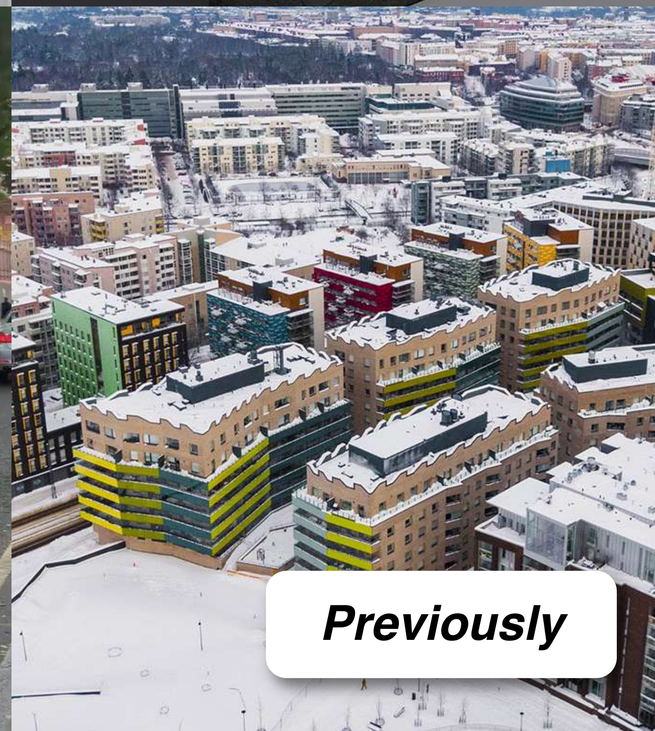
V&A
Sadler's Wells


Living Room Thermostat
Cool to 23°
Living Room Lights
Dim
Front Door
Unlocked
Lock
Unlock
Bedroom Lights
Off


12:15
Mon 17 Sep
Locked
Punkt.


BBC
Home
News
Sport
Weather
iPlayer
TV
Radio
Top Gear
LAST PLAYED
Waking the Dead
End Game
3 episodes
Gavin and Stacey
Episode 2
Featured
For You
EastEnders
31/05/2010




Previously

Vinnova, Swedish Government's Innovation Agency

Sweden

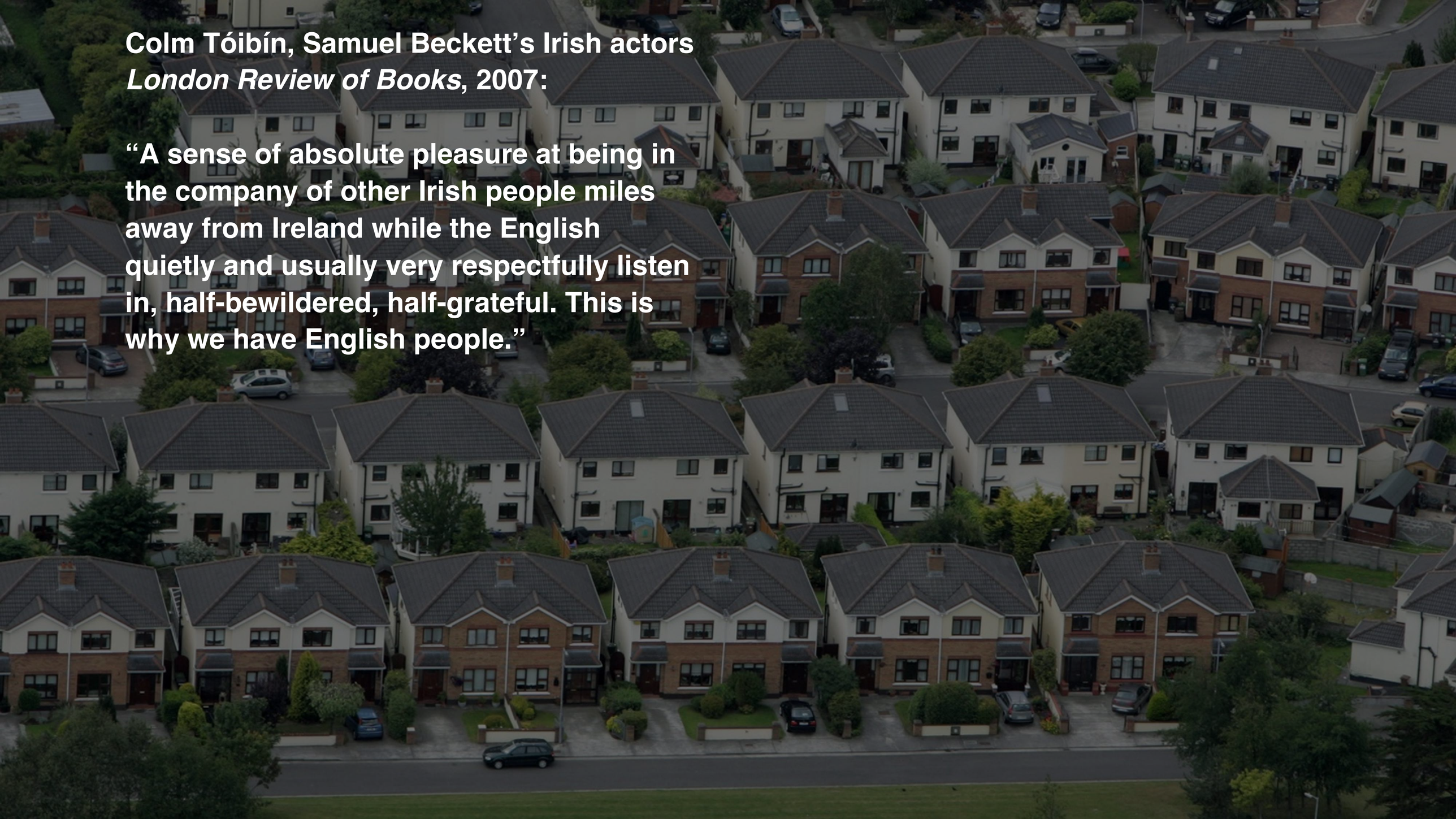

Paimio Sanatorium, Finland, October 2024
Finland

Karakusevic Carson new public housing, London

UK


Shepparton, 2023
Australia


Ireland?



Colm Tóibín, Samuel Beckett's Irish actors
London Review of Books, 2007:

"A sense of absolute pleasure at being in the company of other Irish people miles away from Ireland while the English quietly and usually very respectfully listen in, half-bewildered, half-grateful. This is why we have English people."

Inequality

Australia's housing market 'buckling' under widening gap between income and home values, report finds

Hou g pr s fe 0.1 Dec ut ke o b
'sha w ar rt-lived', ordi o CoreLogic

Fo w our Aus ne live b for la upd s
ur ws fr pp or
podcast

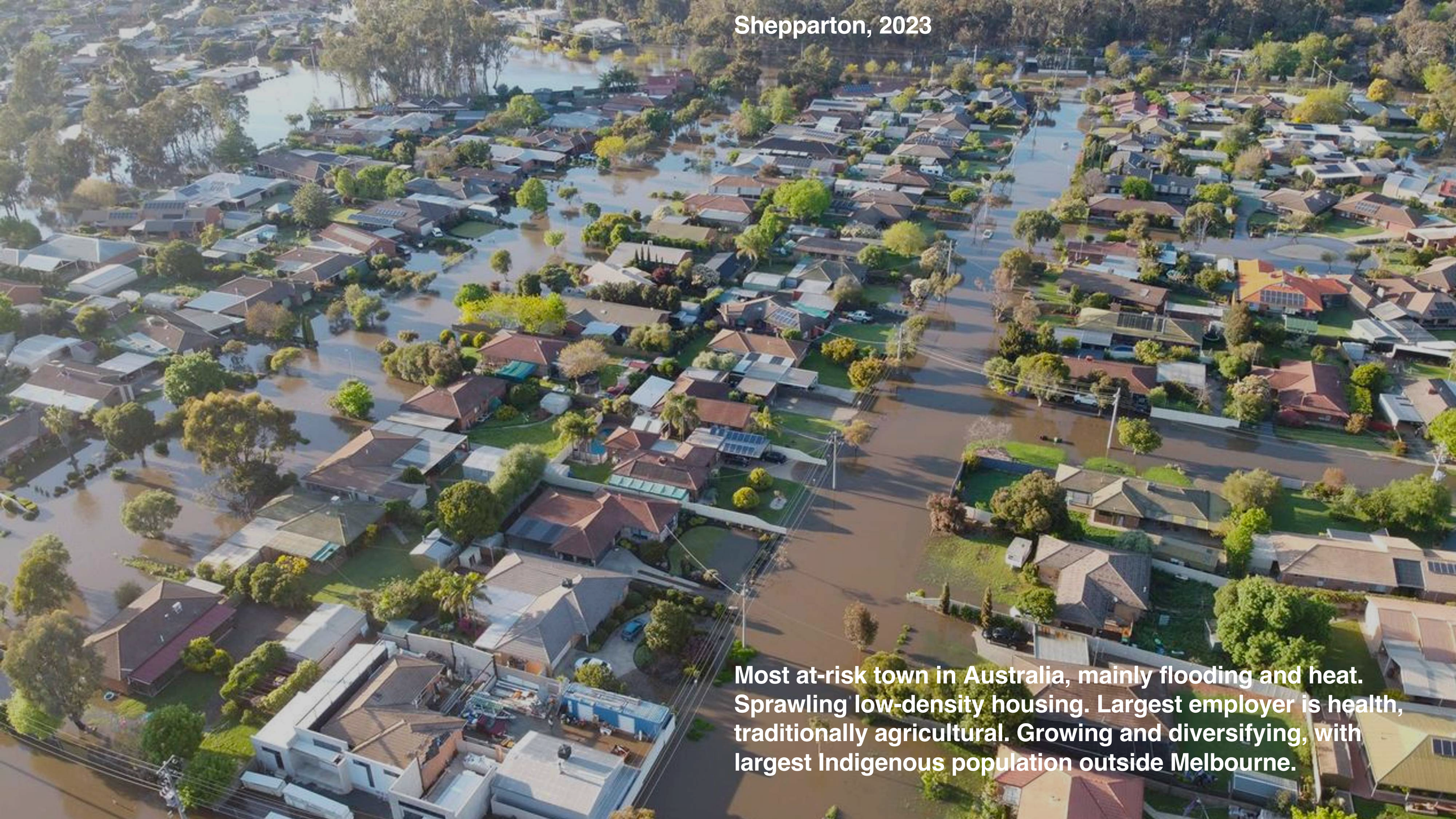
Cait Kelly *Inequality reporter*

Wed 8 Jan 2025 01.00 AEDT

Share

While the housing downturn was largely driven by Sydney and Melbourne, the slowdown trend was evident in most regions, according to CoreLogic. Photograph: Darren England/AAP

Australia's housing downturn is being driven by a widening gap between



Shepparton, 2023

Most at-risk town in Australia, mainly flooding and heat. Sprawling low-density housing. Largest employer is health, traditionally agricultural. Growing and diversifying, with largest Indigenous population outside Melbourne.

The Australian suburbs where more than half of properties will be uninsurable by 2030

'We're now seeing that the system is not able to cope with climate change,' insurance analyst says

- Victorian election 2022 live results: follow the latest news and updates
- Get our morning and afternoon news emails, free app or daily news podcast

Flooded houses in Forbes, NSW. Data shows rising costs associated with climate crisis hazards are making more and more homes uninsurable. Photograph: Lucy Cambourn/EPA

When Kim Sly moved to a lower-lying area of Forbes four years ago, she was asked to pay $12,000 a year for flood insurance.

The bill was a shock. Her new home was built 1.2 metres above the ground to

Top 30 Australian suburbs by number of High Risk Properties in 2030 from all climate change hazards under RCP8.5

Suburb	% High Risk Properties	High risk properties	Total properties
Doonan	95.59	1928	2017
Shepparton	89.17	16248	18221
Chinderah	86.47	1540	1781
Kialla	78.95	3162	4005
Coonamble	76.84	1533	1995
Newstead (Qld)	76.08	4964	6525
St George (Qld)	74.95	1903	2539
Rocklea (Qld)	73.4	1755	2391
Ballina	70.47	6174	8761
Tweed Heads West	67.32	2425	3602
West Lakes	66.43	2669	4018
Charleville	65.65	1724	2626
Wangaratta (Vic.)	63.79	7429	11646
Mulwala	63.51	1657	2609
Yarrabilba	57.8	2034	3519
West End (Brisbane - Qld)	55.86	5499	9844
Dalby	54.52	4167	7643

New housing, Shepparton, Victoria, 2023

Health, heat, flooding, social fabric, mobility, carbon, biodiversity, economic complexity, long-term value etc.

90% uninsurable by 2030
Climate Council

	1969	2019
People per household	**3.3**	**2.6**
Average size of new house	**120m^2**	**240m^2**
Floor area per person	**36m^2**	**92m^2**

Under housing targets of 200,000 homes pa

37,260,000 m^2
total new built floor area pa

CO_2e intensity per house

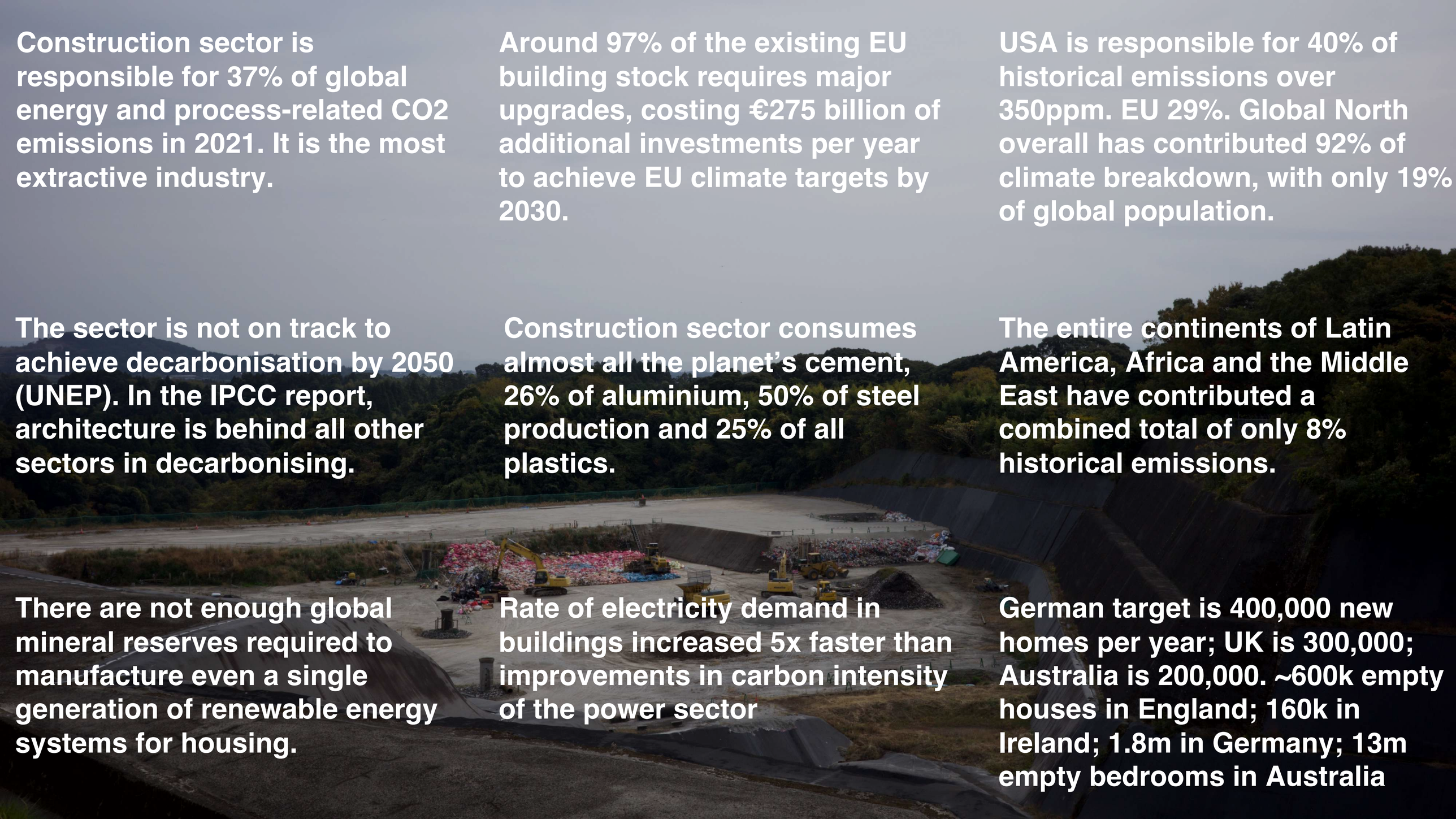
461.8
kgCO_2e/m2

Total CO_2e pa

17.21 million
tons of CO_2e pa

Versus planetary boundaries under Paris

200%
Australia's total carbon budget for everything



Construction sector is responsible for 37% of global energy and process-related CO2 emissions in 2021. It is the most extractive industry.

Around 97% of the existing EU building stock requires major upgrades, costing €275 billion of additional investments per year to achieve EU climate targets by 2030.

USA is responsible for 40% of historical emissions over 350ppm. EU 29%. Global North overall has contributed 92% of climate breakdown, with only 19% of global population.

The sector is not on track to achieve decarbonisation by 2050 (UNEP). In the IPCC report, architecture is behind all other sectors in decarbonising.

Construction sector consumes almost all the planet's cement, 26% of aluminium, 50% of steel production and 25% of all plastics.

The entire continents of Latin America, Africa and the Middle East have contributed a combined total of only 8% historical emissions.

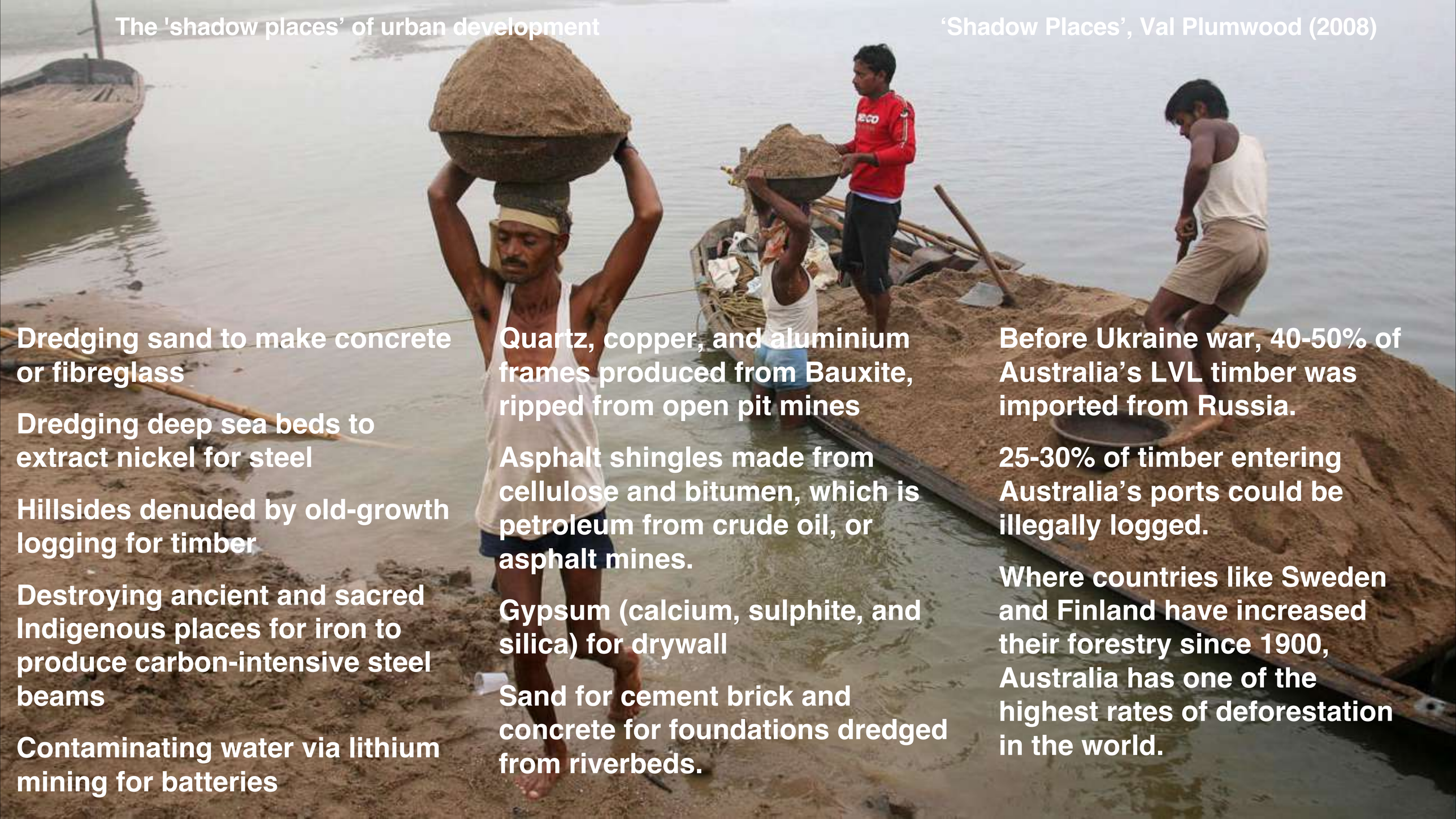
There are not enough global mineral reserves required to manufacture even a single generation of renewable energy systems for housing.

Rate of electricity demand in buildings increased 5x faster than improvements in carbon intensity of the power sector

German target is 400,000 new homes per year; UK is 300,000; Australia is 200,000. ~600k empty houses in England; 160k in Ireland; 1.8m in Germany; 13m empty bedrooms in Australia

The 'shadow places' of urban development

‘Shadow Places’, Val Plumwood (2008)



Dredging sand to make concrete or fibreglass

Dredging deep sea beds to extract nickel for steel

Hillsides denuded by old-growth logging for timber

Destroying ancient and sacred Indigenous places for iron to produce carbon-intensive steel beams

Contaminating water via lithium mining for batteries

Quartz, copper, and aluminium frames produced from Bauxite, ripped from open pit mines

Asphalt shingles made from cellulose and bitumen, which is petroleum from crude oil, or asphalt mines.

Gypsum (calcium, sulphite, and silica) for drywall

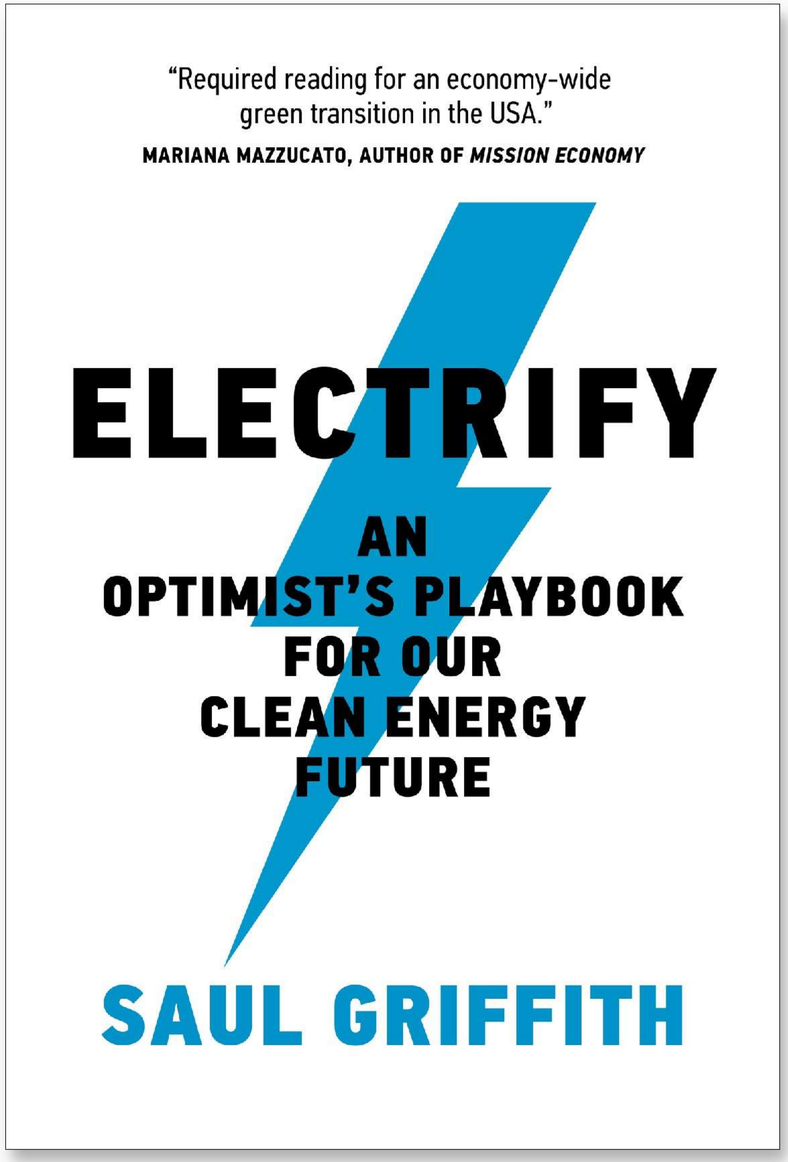
Sand for cement brick and concrete for foundations dredged from riverbeds.

Before Ukraine war, 40-50% of Australia’s LVL timber was imported from Russia.

25-30% of timber entering Australia’s ports could be illegally logged.

Where countries like Sweden and Finland have increased their forestry since 1900, Australia has one of the highest rates of deforestation in the world.

Yes please



And yet

To meet UK electric car targets for 2050 (all cars and vans electric by 2050 and all sales to be purely battery electric by 2035) we would need to produce just under two times the current total annual world cobalt production, nearly the entire world production of neodymium, three quarters the world's lithium production and 12% of one year's total annual production of mined copper. A 20% increase in UK-generated electricity would be required to charge the current 252.5 billion miles to be driven by UK cars.

Boyce et al (2019) SoS MinErals (an interdisciplinary programme of NERC-EPSRC-Newton-FAPESP funded research)

Australian Reduction Roadmap reductionroadmap.au

Melbourne School of Design, Terroir, QUT etc.
with EFFEKT et al in Denmark reductionroadmap.dk

461.8kg
CO2eq/m2

Housing
Emission

6.63kg
CO2eq/m2

Limit
pr. m2

England's housing strategy carries a high carbon cost – unless politicians are willing to change plans

Published: November 11, 2022 4.40am AEDT

Authors

Sophus zu Ermgassen
PhD Researcher, Durrell Institute for Conservation and Ecology, University of Kent

Christine Corlet Walker
Doctoral researcher, Centre for the Understanding of Sustainable Prosperity, University of Surrey

Josh Ryan-Collins
Head of Finance and Macroeconomics, Institute of Innovation and Public Purpose, UCL

Disclosure statement

The authors do not work for, consult, own shares in or receive funding from any company or organisation that would benefit from this article, and have disclosed no relevant affiliations beyond their academic appointment.

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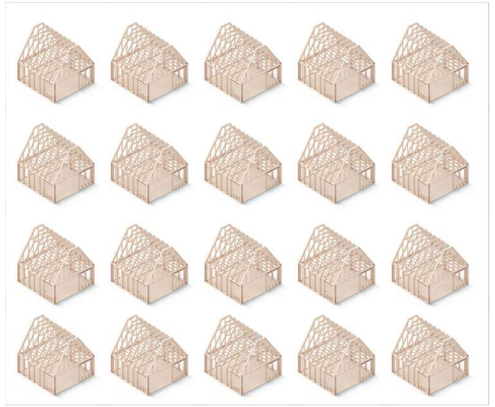
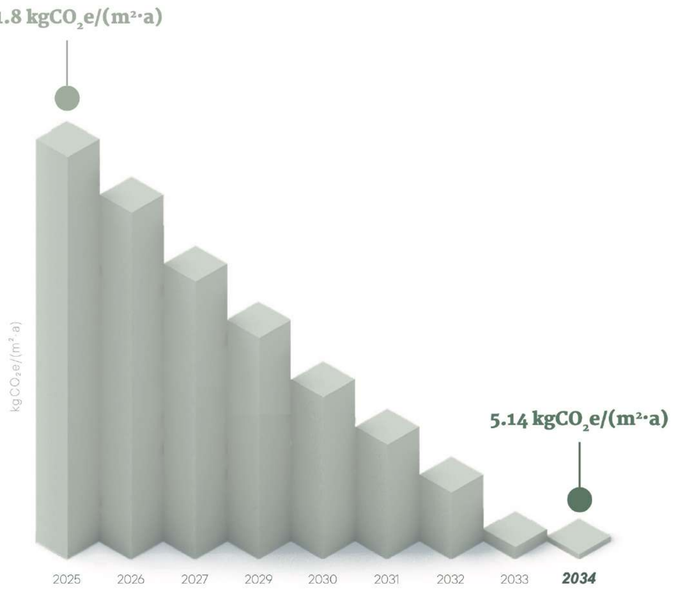
200%
Australia's total carbon budget for everything

Australian Reduction Roadmap reductionroadmap.au

Melbourne School of Design, Terroir, QUT etc.
with EFFEKT et al in Denmark reductionroadmap.dk



200,000 housing
units of 240 m²

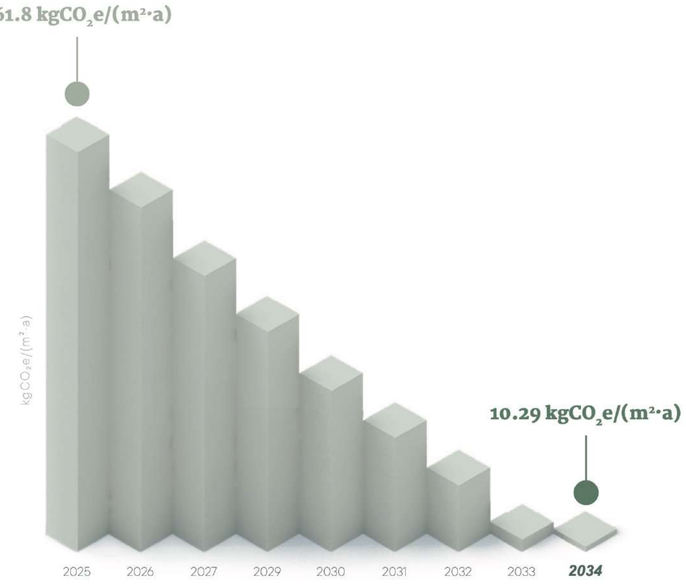


OR

200,000 housing
units of 120 m²

or

100,000 housing
units of 240 m²



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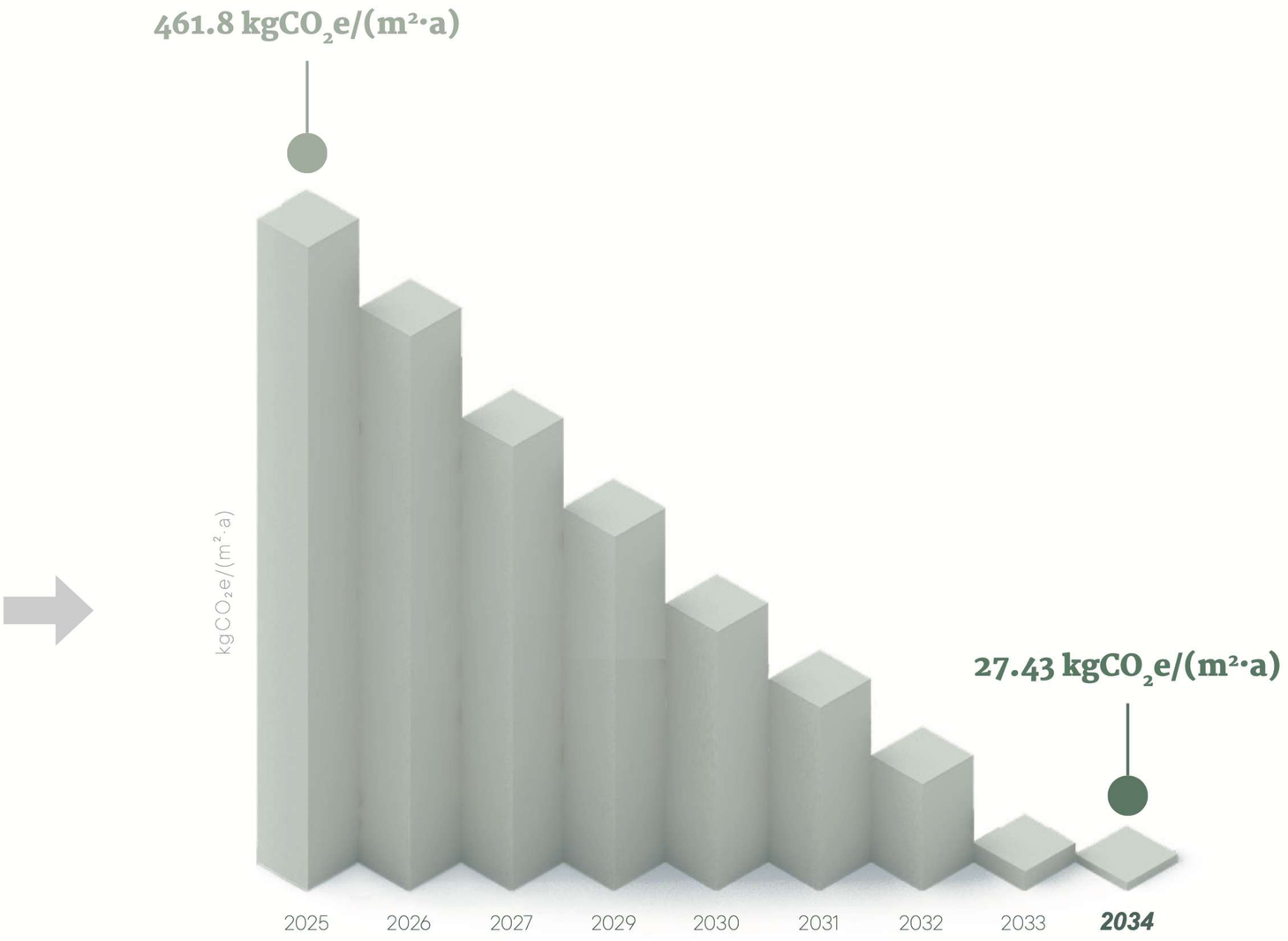
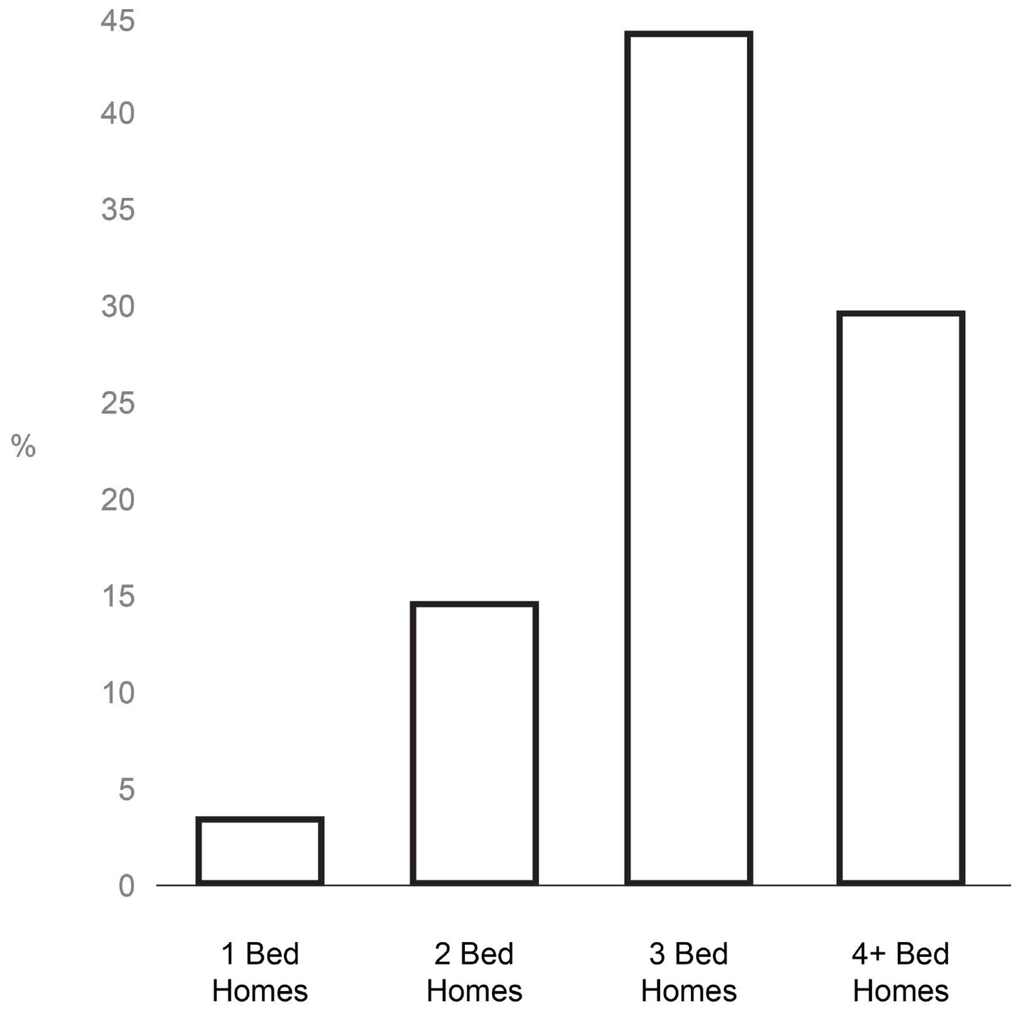
75,000 housing units of 120 m²



Shepparton’s housing does not match Shepparton’s diversity

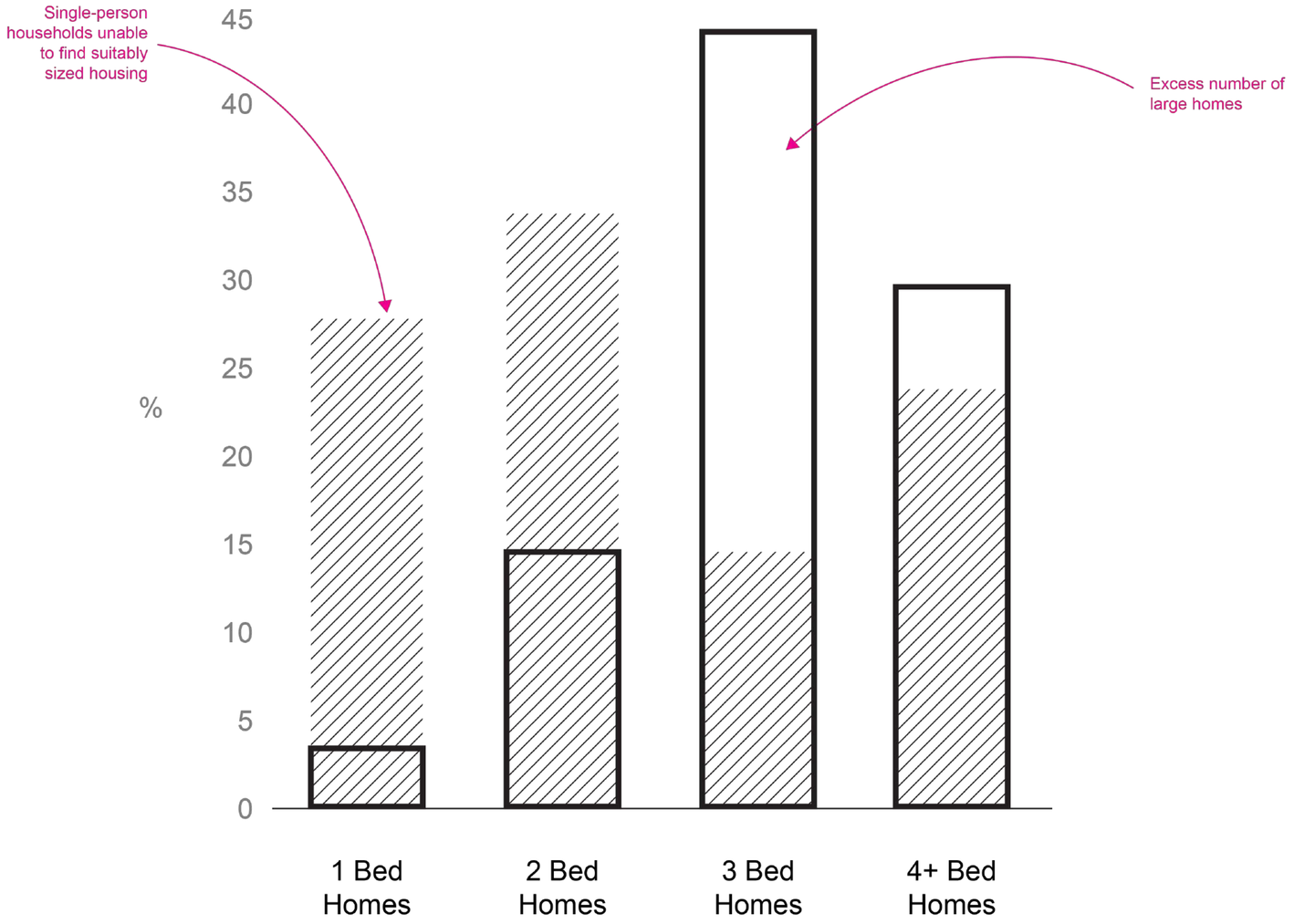
Research in Shepparton, Victoria, 2023—
Melbourne School of Design



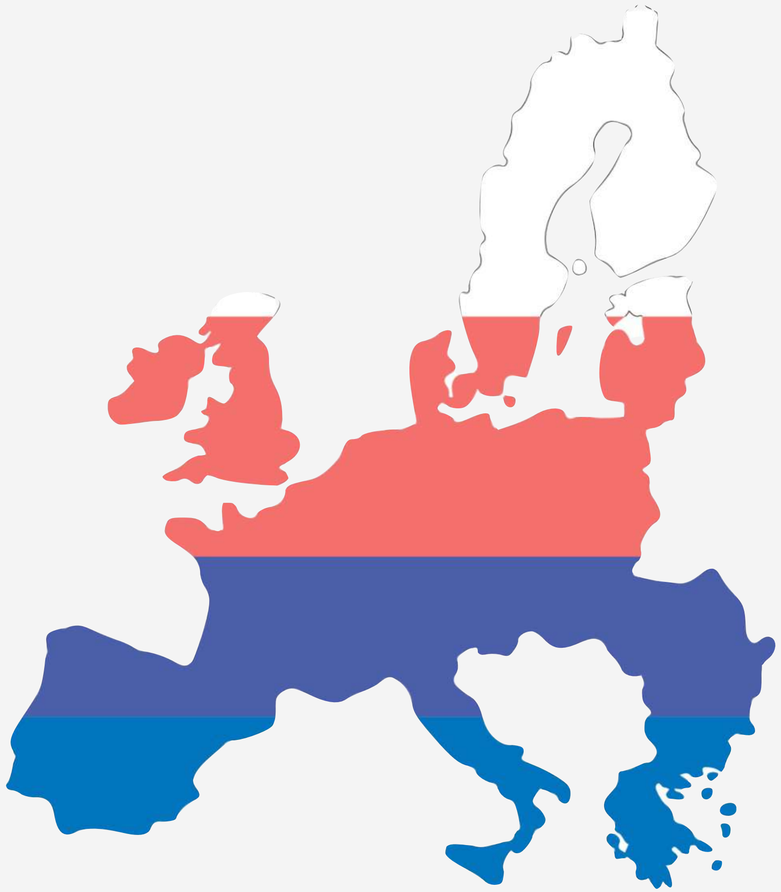
Greater Shepparton City Council - ‘Affordable Housing Strategy’, 2020

Shepparton's housing does not match Shepparton's diversity

Research in Shepparton, Victoria, 2023—
Melbourne School of Design



Greater Shepparton City Council - 'Affordable Housing Strategy', 2020



~18% vacant dwellings in Europe, more than 11 million empty houses

Currently there are ~700,000 homeless people in Europe

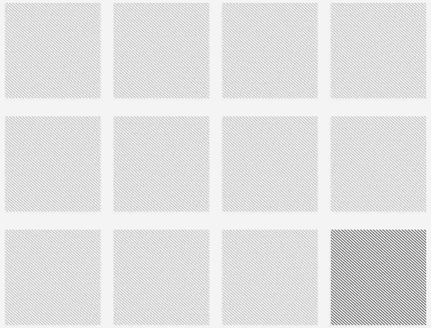
Do we need to make new homes at all?

33% under-occupied households in Europe

32% normally-occupied households in Europe

17% overcrowded households in Europe

Based on a diagram by Dark Matter Labs



Estimates vary, but Europe may have ~11m empty homes and ~1m homeless people

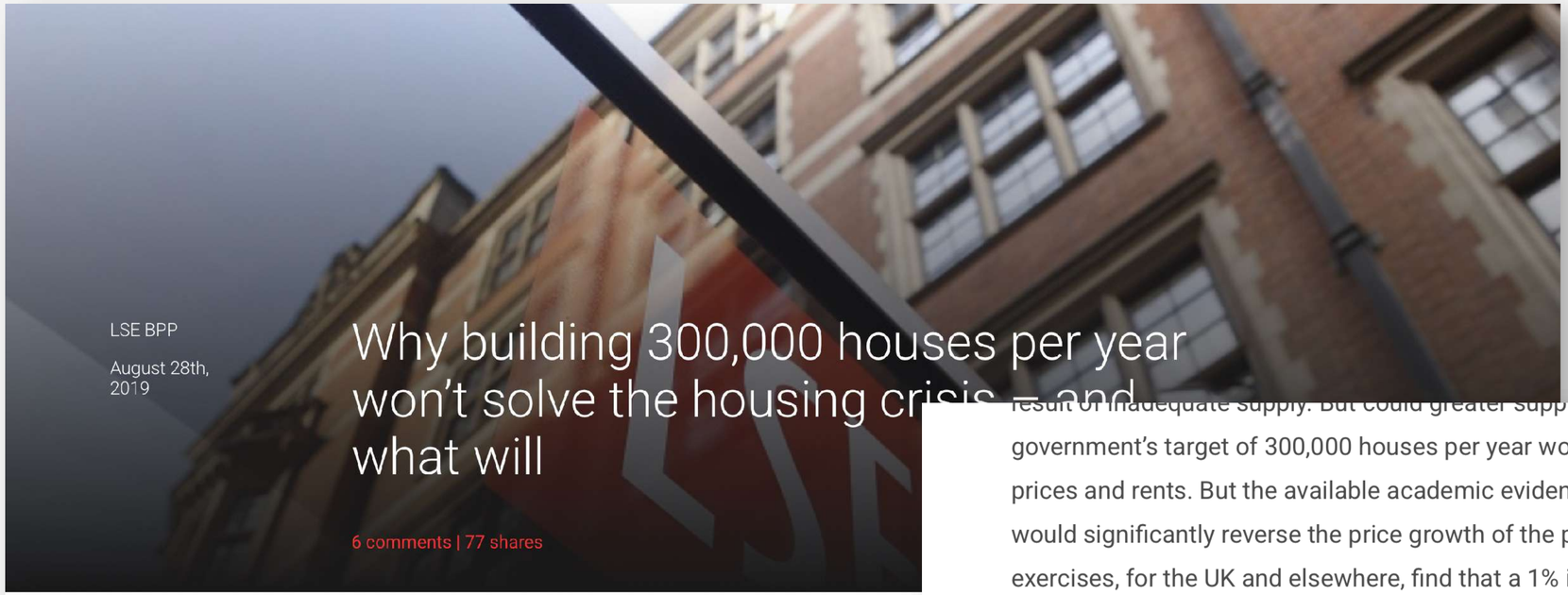
Approximately 300,000 homes are empty in England alone. Approximately 1.8m in Germany. In the UK, 50,000 homes are demolished each year

1m empty houses in Australia; current new build target is 1m houses.

13 million unused bedrooms in Australia. 33% of housing has 3+ spare bedrooms.

Most homelessness in Australia is to do with family violence: what if we (really) tried to reduce that?

Why building 300,000 houses per year won't solve the housing crisis – and what will. Ian Mulhearn, LSE



Ian Mulheirn explains why the current policy focus
not offer a solution to the housing crisis. Instead, ra
will require further fiscal intervention.

Average house prices in the UK have risen by over 1
point in the middle of 1996. Home ownership remains around its
Among political leaders, policymakers, and commentators there
problems are largely down to one failing: decades of undersuppl
shortage story is unconvincing and my new paper for the UK Col
Evidence makes the case that a fundamental policy rethink is ba

Housing supply has outstripped household formation for decad

It is commonly claimed that we have failed to build enough hous

result of inadequate supply. But could greater supply nonetheless be the solution? Hitting the government's target of 300,000 houses per year would certainly put more downward pressure on prices and rents. But the available academic evidence suggests that no plausible rate of supply would significantly reverse the price growth of the past two decades. Multiple modelling exercises, for the UK and elsewhere, find that a 1% increase in the stock of houses tends to lead to a decline in rents and prices of between 1.5% and 2%, all else equal.

This implies that even building 300,000 houses per year in England would only cut house prices by something in the order of 10% over the course of 20 years. This is an order of magnitude smaller than the price rises of recent decades. If we are to create more affordable houses to buy and rent, the solutions lie elsewhere.

The collapse of home ownership

High house prices are often seen as the cause of the collapse in home ownership across the UK. However a closer look at the data suggests that the mortgage market is a more important factor.

In England, home ownership peaked at 70.5% in 2003 but collapsed quickly from 69.1% in 2007 to 63.1% by 2016 – a period that saw quite sharp price falls across much of the country. The dominant cause of the collapse was the abrupt slowdown in mortgage lending to first-time

Materials

Circular biomaterials from regenerative sources
Linked to local material reserves, trades and craft skills
Participative design and build

Growing Places project, UK
Material Cultures, funded by re:arc

Architecture and agriculture

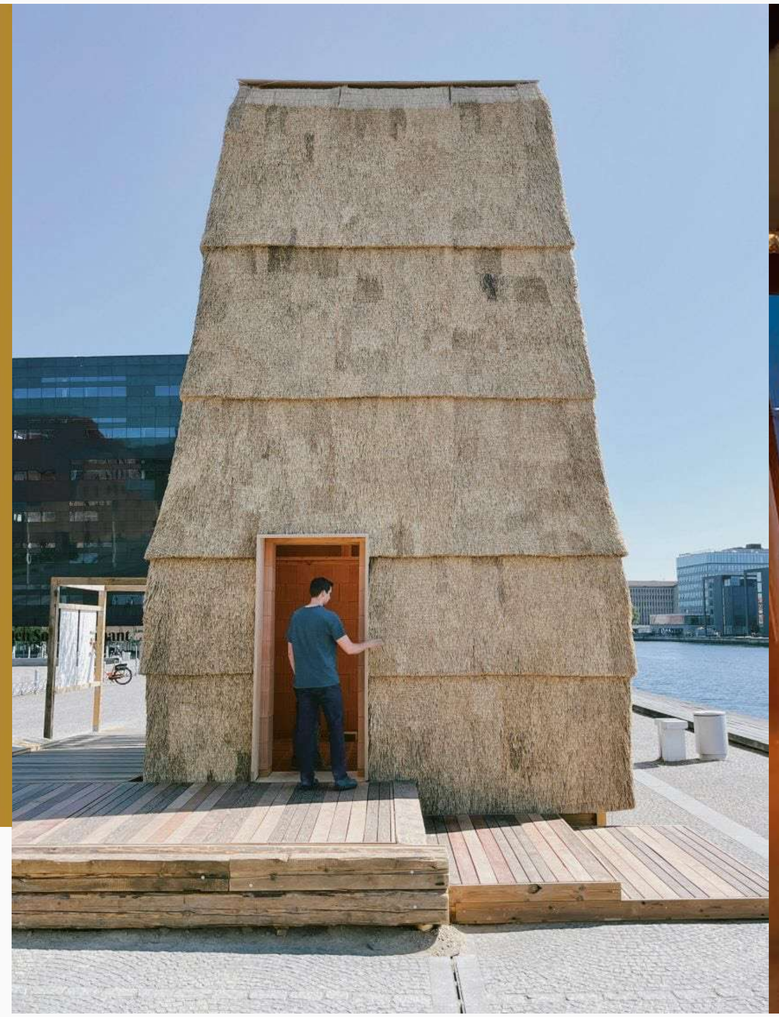
André Bonnice + students
Dookie Campus x Melbourne School of Design, University of Melbourne

CINARK, Royal Danish Academy

BIOGENIC CONSTRUCTION
MATERIALS
ARCHITECTURE
TECTONICS

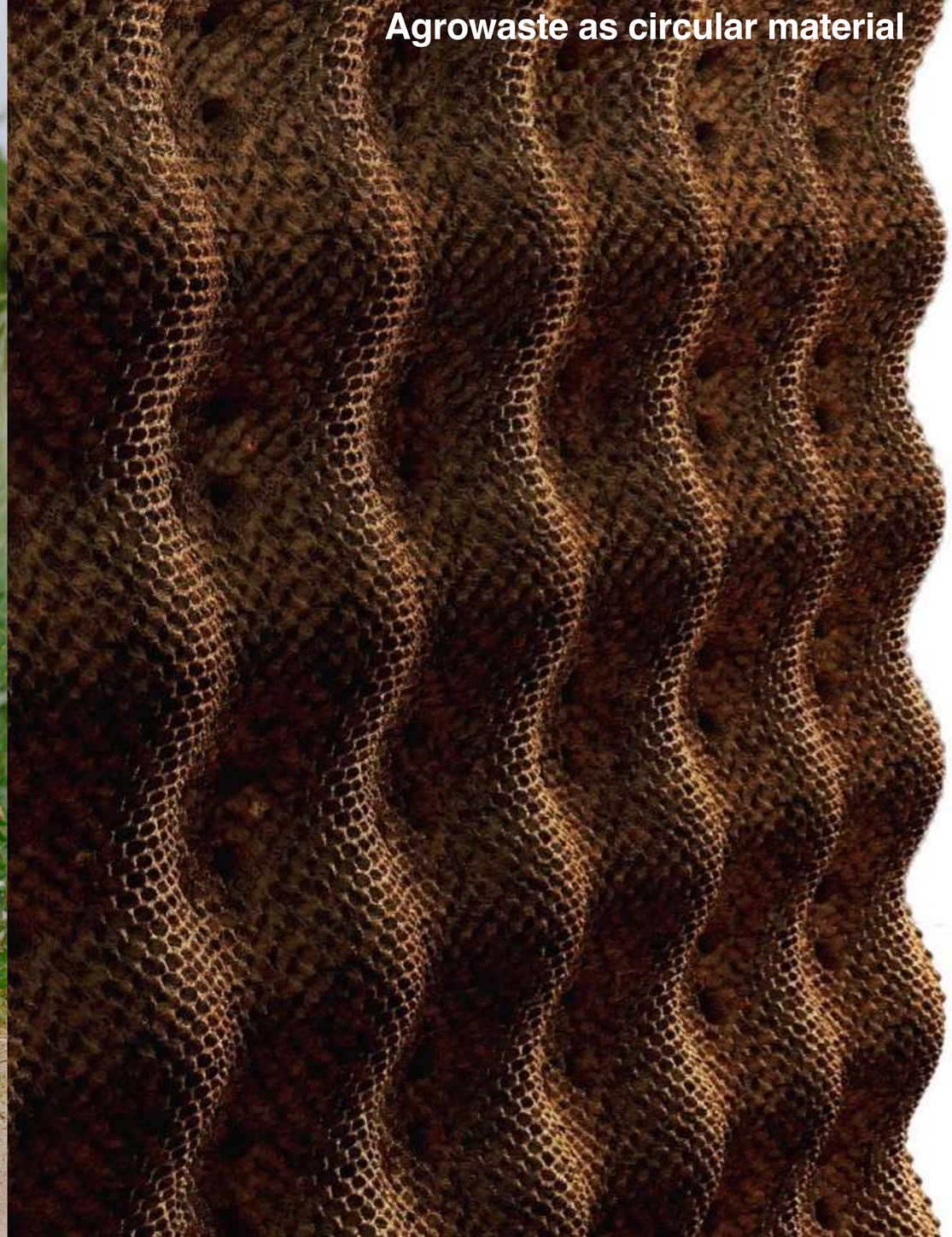
BIOGENT BYGGERI
MATERIALE
ARKITEKTUR
TEKTONIK

CINARK ROYAL DANISH ACADEMY
COPENHAGEN 2023



Mae-ling Lokko
Yale University
Willow Technologies, Ghana

Agrowaste as circular material



Columns and beams of mass timber, slabs of CLT and a wooden clad facade

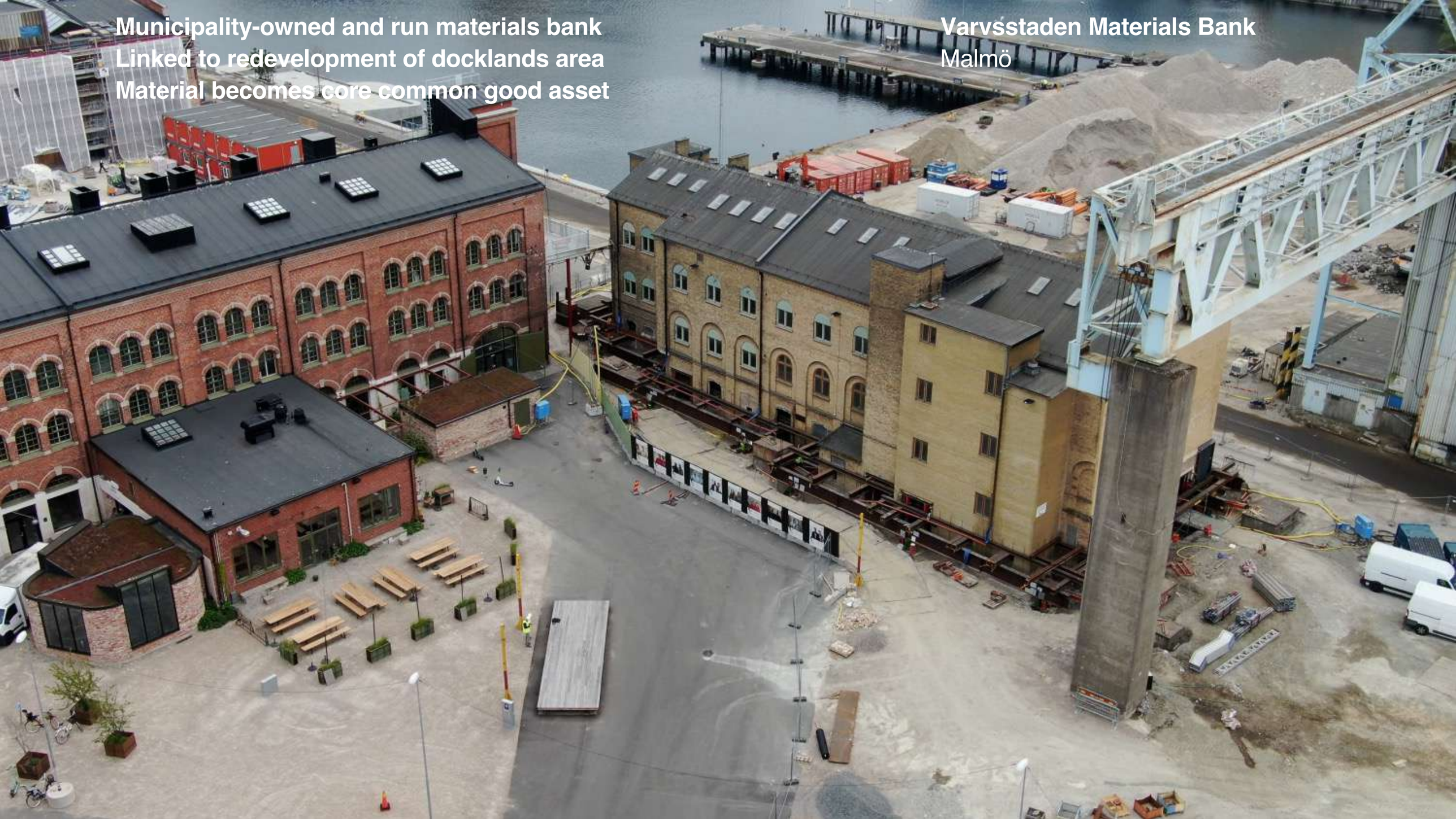
Espoo House, Finland
Cobe and Lundén

In the EU, less than 3% of all material is used in construction is renewable wood-based.

Hans Sohlström, CEO Stora Enso

351 rental units, linked to high-speed rail
Modular fabrication and salvaged hardwood for structure
Integrated food production

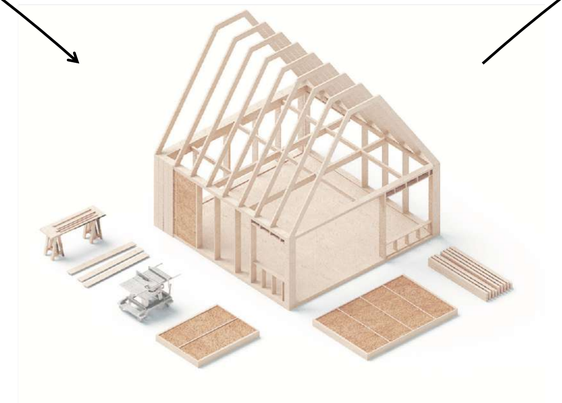
Taisugar Circular District
Taiwan (2022–)



Municipality-owned and run materials bank
Linked to redevelopment of docklands area
Material becomes core common good asset

Varvsstaden Materials Bank
Malmö

Materials existed
Before



Materials will exist
After

Retrofit

Retrofit

Sanders Place, NMBW/Finding Infinity
Melbourne (2024–)

Retrofit

Wilam Ngarrang Apartments Retrofit

Melbourne (2024–)

Wilam Ngarrang Apartments Retrofit

Melbourne (2024–)

Retrofit

Holes in the House, Tokyo
Mio Tsuneyama and Fuminori Nousaku

Retrofit

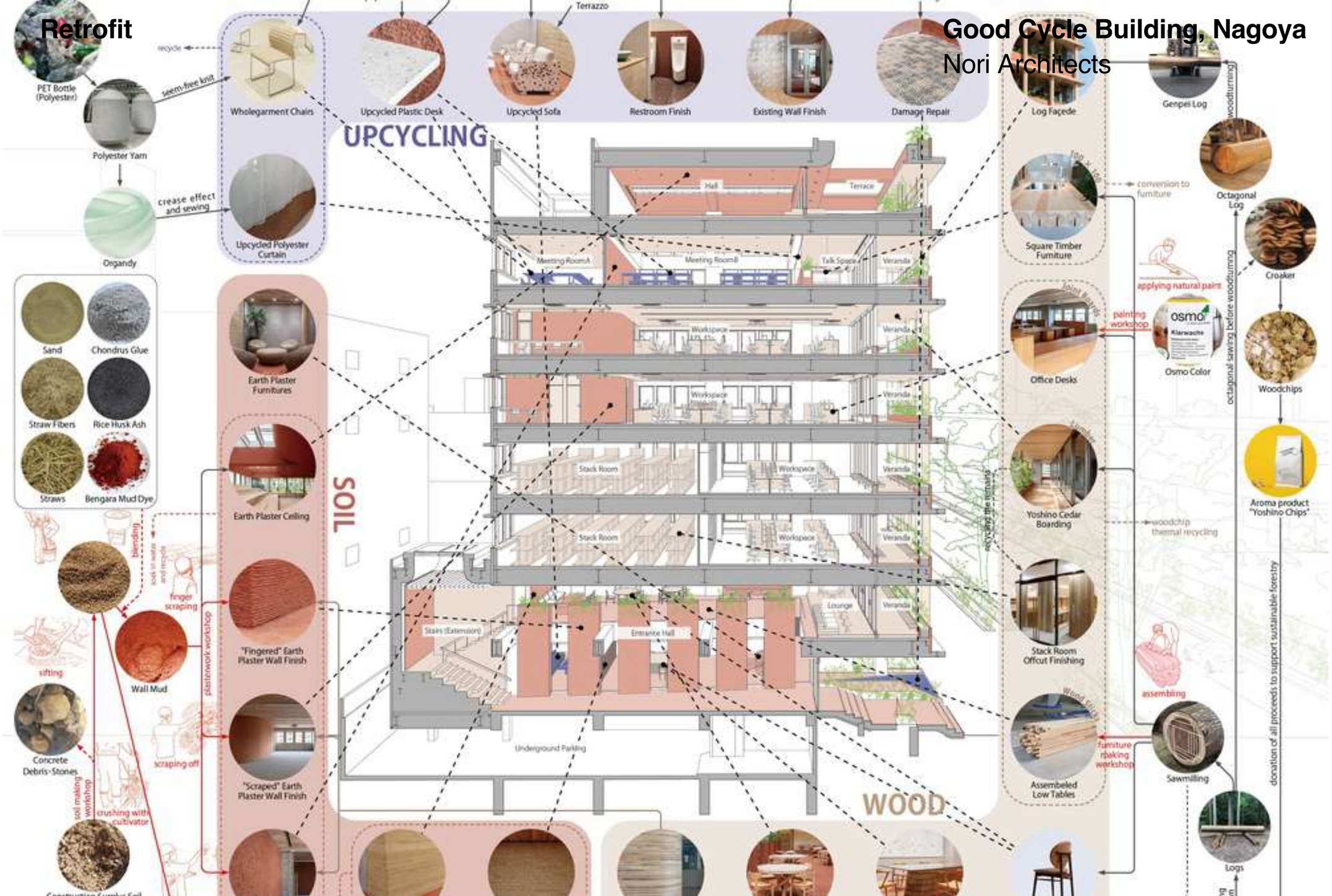
Good Cycle Building, Nagoya

Nori Architects

Retrofit

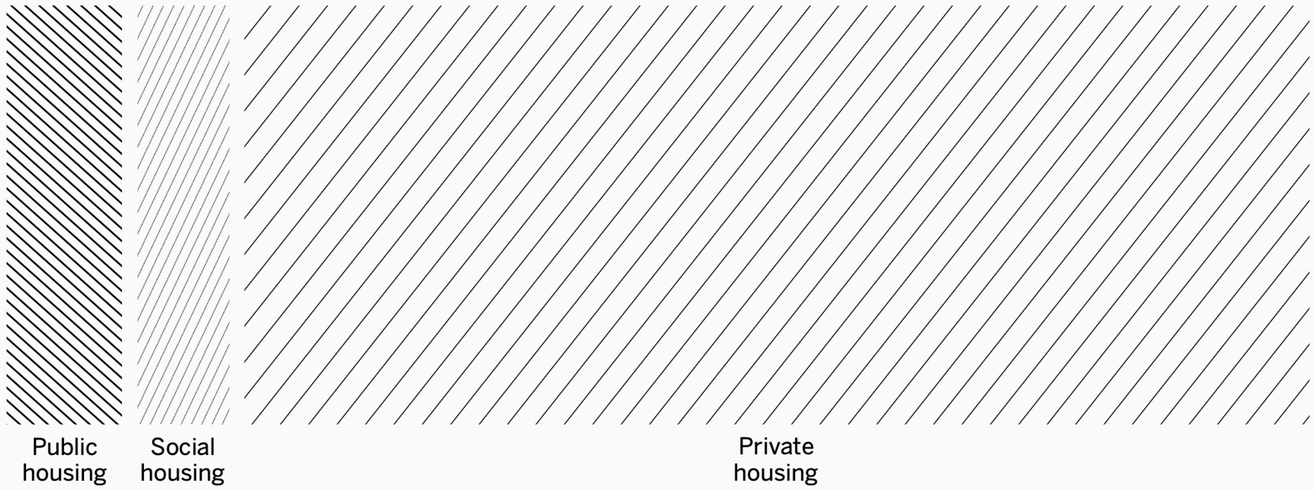
Good Cycle Building, Nagoya

Nori Architects



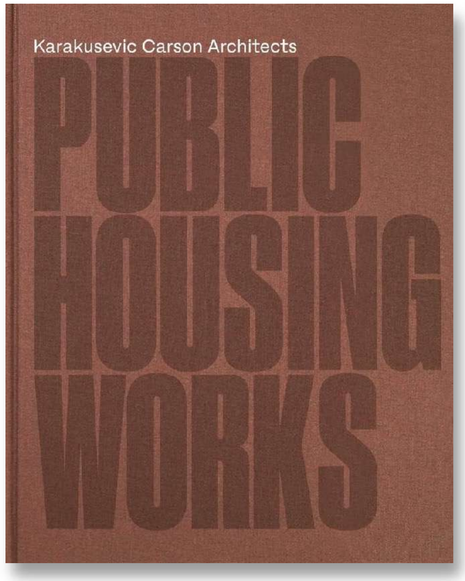
Shared

Modern housing: An environmental common good, Hill and Mazzucato
Council on Urban Initiatives (2024)



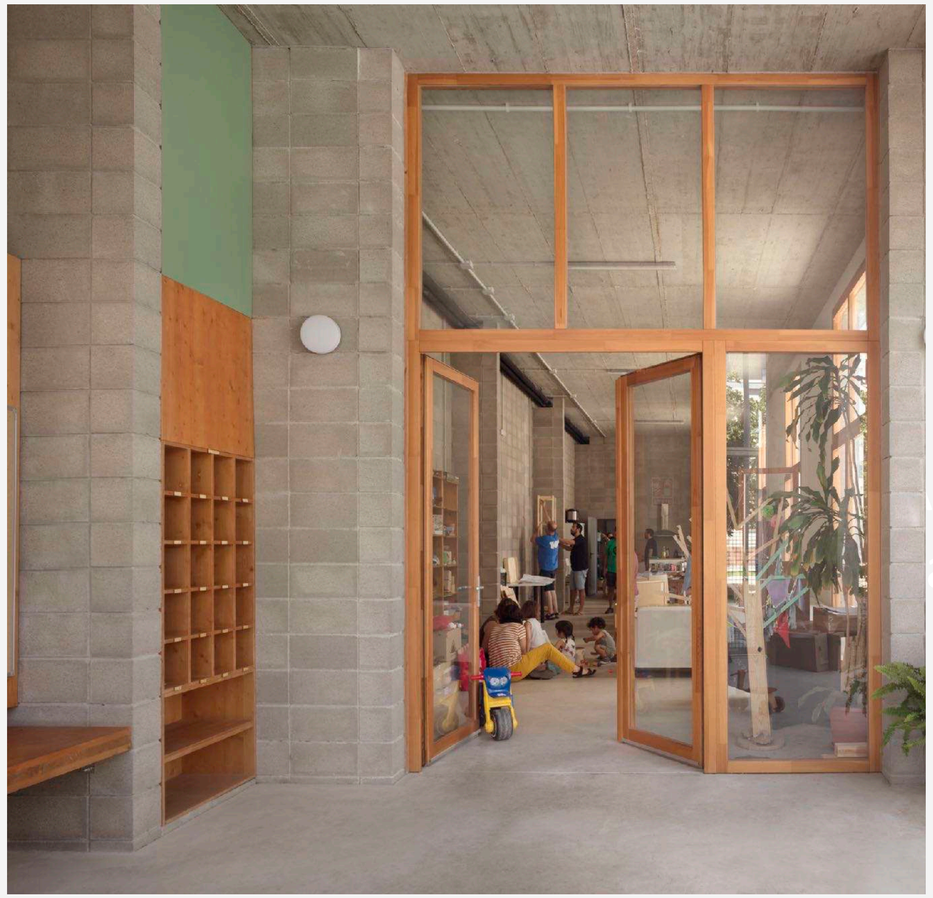
High quality public housing, 100% affordable
Designed to last 300 years

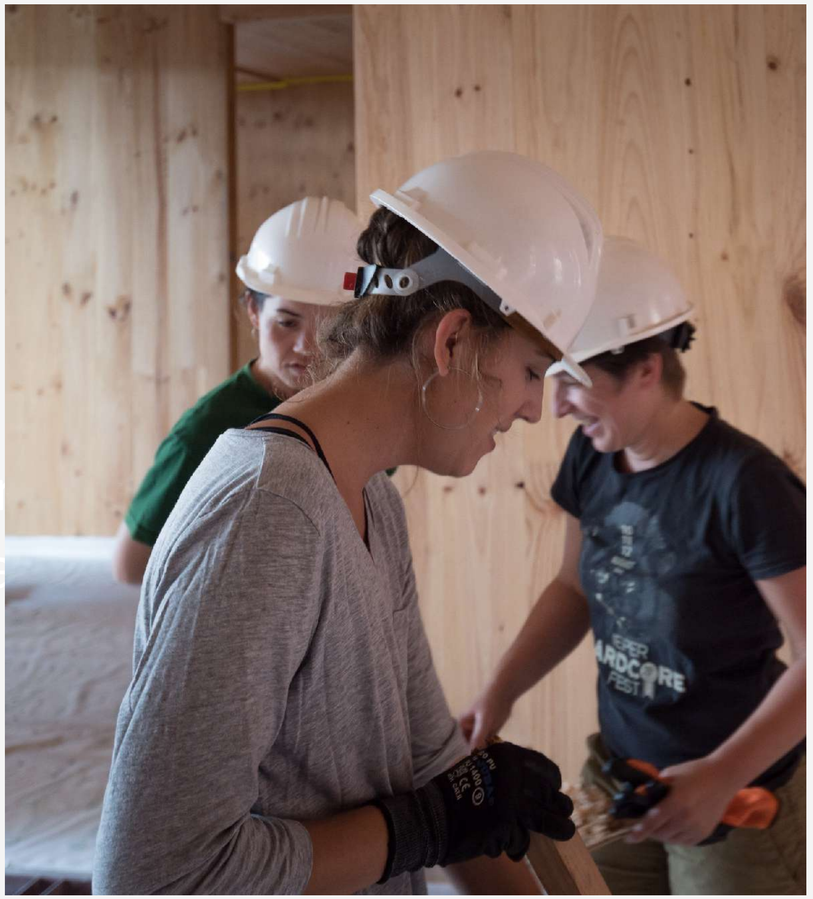
Kings Crescent, Hackney, London
Karakusevic Carson Architects



Cooperative housing

Lacol, Barcelona
Enabled by Mayor Ada Colau’s administration





Bonus Track, Shimokitazawa, Tokyo (2021–)

Tsubame Architects

Bonus Track, Shimokitazawa, Tokyo (2021–)

Tsubame Architects

Post-car living
Integrated co-working, retail and housing
Live-above-the-shop, carefully curated
Above Odakyū Railway train tracks
Community garden and public transport
Simple adaptable timber frame
Neighbourhood economy
Culturally-led participative design

Circular biomaterials from regenerative sources
Linked to local material reserves, trades and craft skills
Adaptable scale and materiality
6000 homes
Britain’s first carbon-regenerative hotel
Co-mobility hub (electric car and bike share)
No on-street parking
Co-working and makerspace
Events and music venue
On- and off-site renewable energy
Urban mining for construction materials

Phoenix Housing project, UK
Human Nature, with Mae, Material Cultures, Al-Jawad Pike, Ash Saula, Charles Holland

What is WikiHouse?

WikiHouse is a modular timber building system, like LEGO for real buildings.

Wikihouse
Open Systems Lab

Precision manufactured
WikiHouse blocks are digitally fabricated to 0.1mm precision, so they fit together easily and accurately.

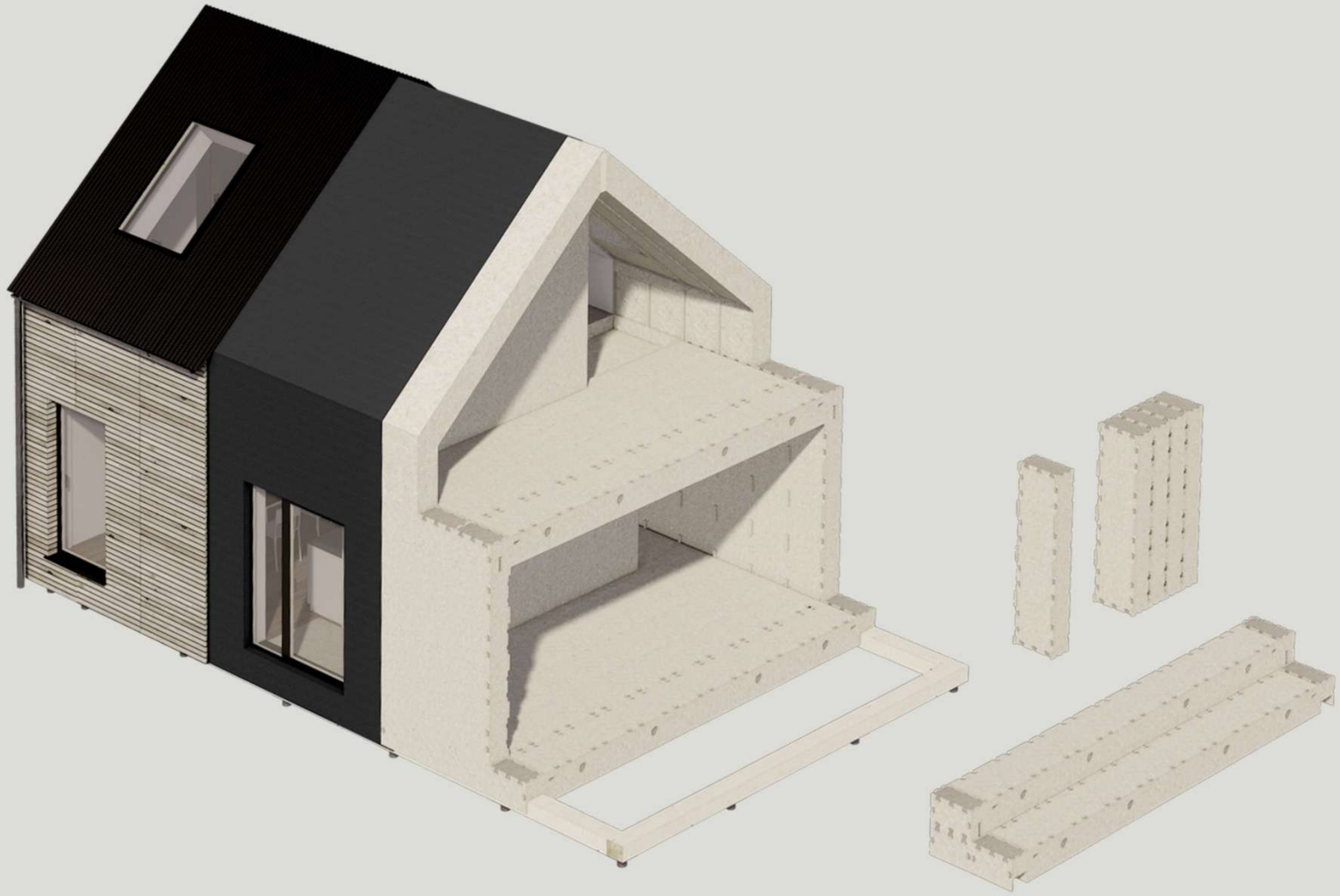
Simple, rapid assembly
A small team can assemble the structure of a house in 1-4 days, without conventional construction skills.

High performance
The insulated blocks have a U value of 0.15-0.18 W/m²K, so buildings are ultra-low energy by default.

Reusable
At the end of a building's life, the building can be easily disassembled, and blocks re–used or recycled.

Local, bio-based materials
Uses wood grown within the region. Lightweight structure consumes less material.

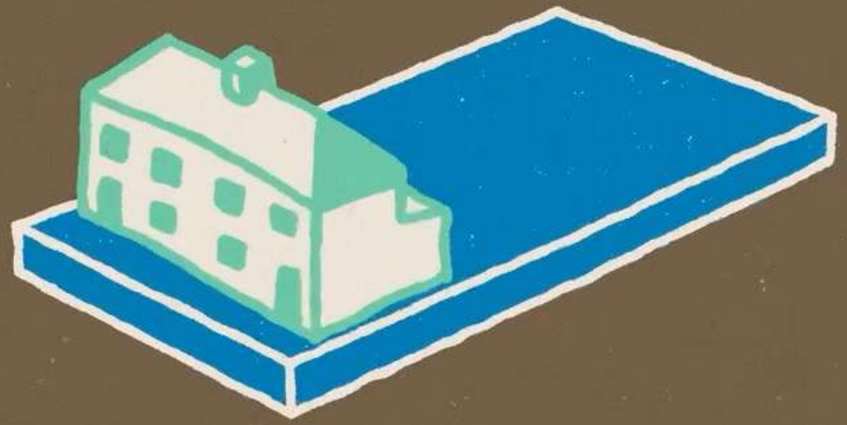
Open source
Thousands of hours of R&D stored as code, openly shared as a public good.



A studio and double garage in the Peak District built using the Skylark 250 system. The studio is clad in larch and has a slate roof covered in solar panels. It was built over 3.5 days.

Peaks Barn Workhouse
Derbyshire, UK

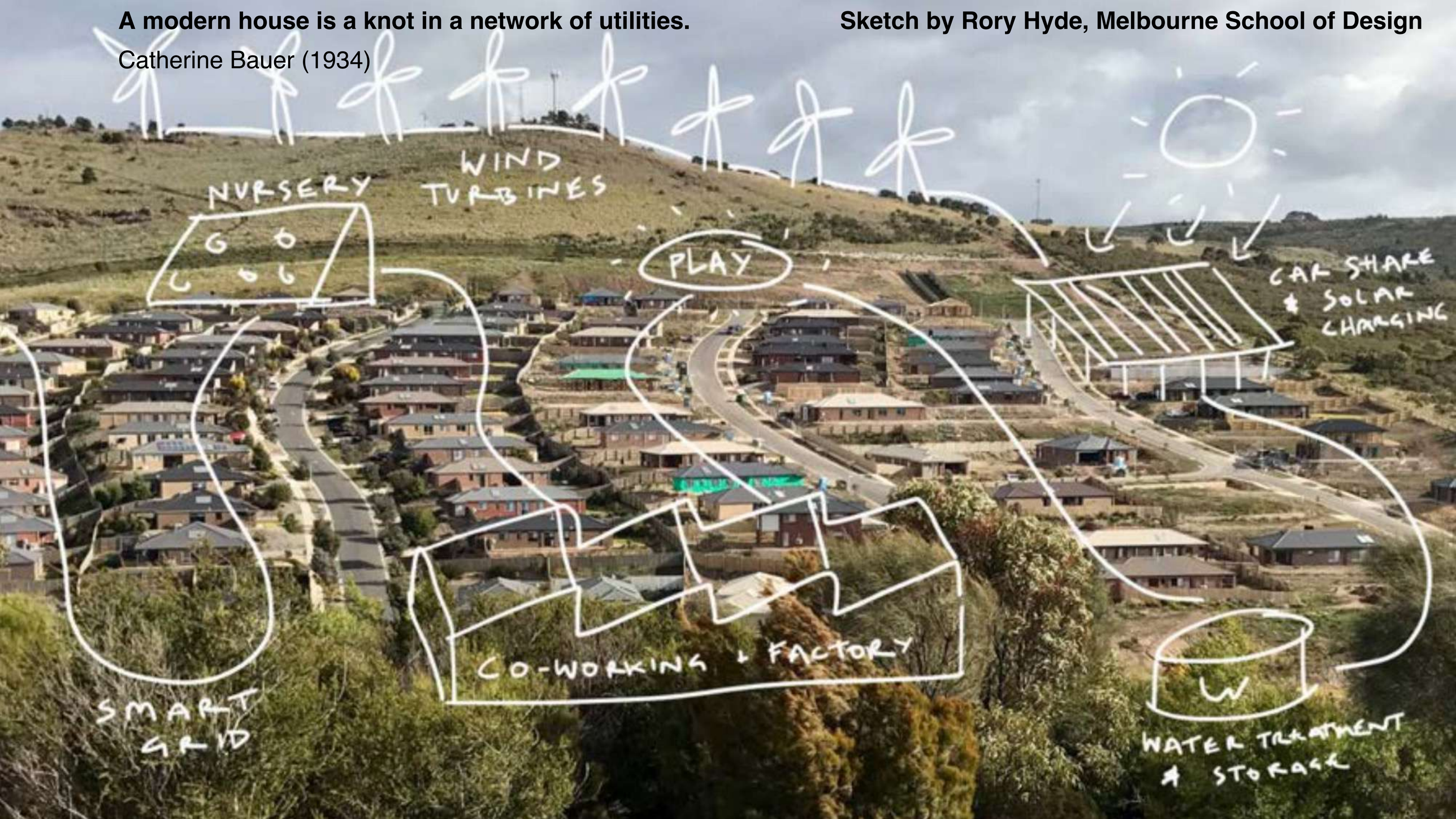
WeCanMake
Bristol, UK



A modern house is a knot in a network of utilities.

Catherine Bauer (1934)

Sketch by Rory Hyde, Melbourne School of Design



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Building more social and affordable housing could save UK government £1.5 billion a year

4 October 2023

Investing significantly more in social and affordable housing could save the UK government an estimated £1.5 billion a year overall by eliminating substantial costs related to homelessness, according to a new report led by UCL researchers.

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Mission

'All those in favour of a better future should read this book'
GUARDIAN

MARIANA MAZZUCATO

MISSION ECONOMY

A Moonshot Guide to Changing Capitalism

COUNCIL ON URBAN INITIATIVES | UN HABITAT FOR A BETTER URBAN FUTURE | UCL IIPP Institute for Innovation and Public Purpose | LSE Cities

Discussion paper 2024/02

Modern housing
An environmental common good

Dan Hill
Professor of the Built Environment | University of Melbourne
Director | Melbourne School of Design
Member | Council on Urban Initiatives

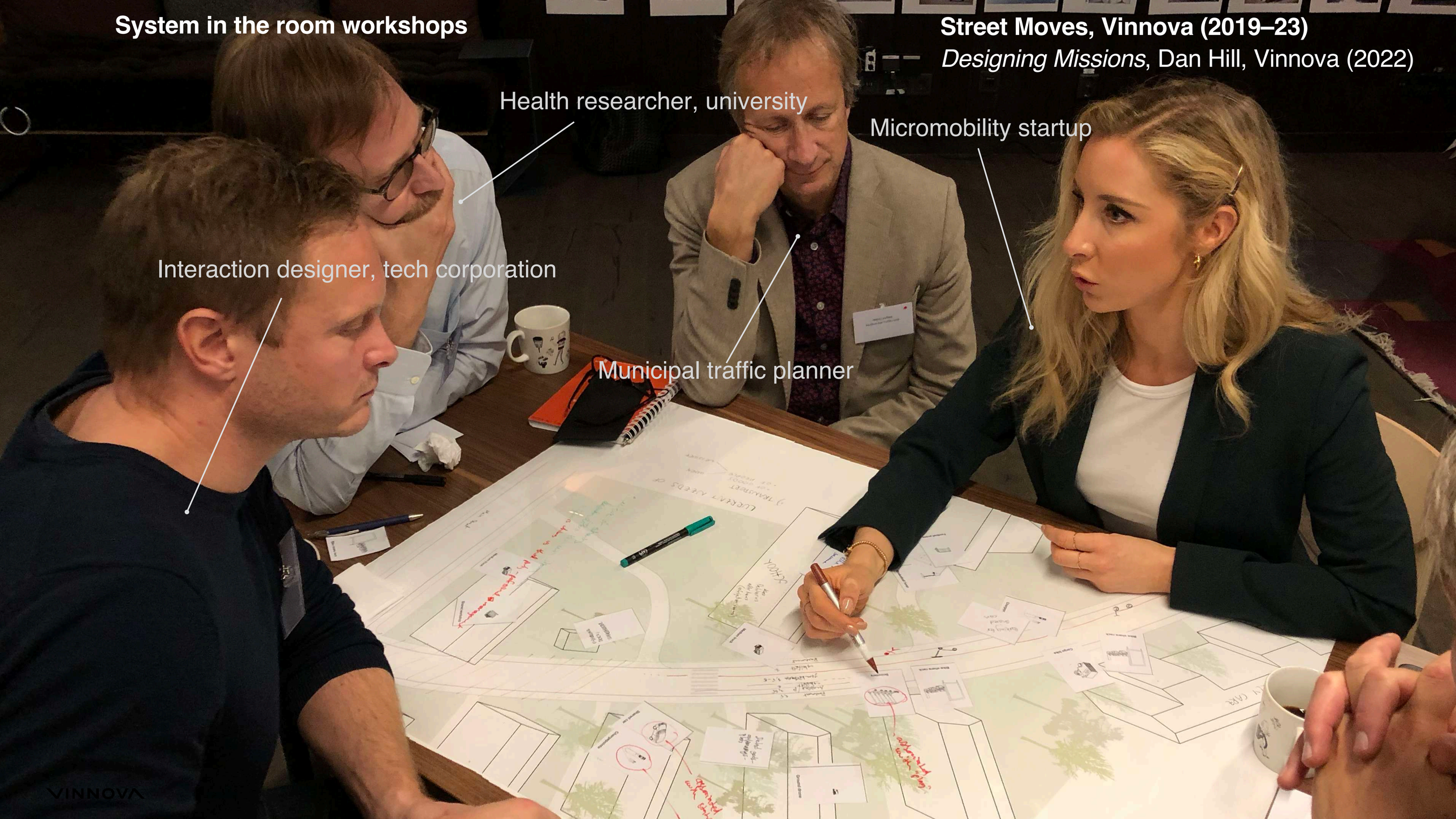
Mariana Mazzucato
Professor in the Economics of Innovation and Public Value
Founding Director | UCL Institute for Innovation and Public Purpose (IIPP)
Co-chair | Council on Urban Initiatives

Street

Ensure that every street in Sweden is healthy, sustainable and full of life by 2030.

System in the room workshops

Street Moves, Vinnova (2019–23)
Designing Missions, Dan Hill, Vinnova (2022)



Distributed and participative adaptive design

Street Moves, Vinnova (2019–23)

Designing Missions, Dan Hill, Vinnova (2022)

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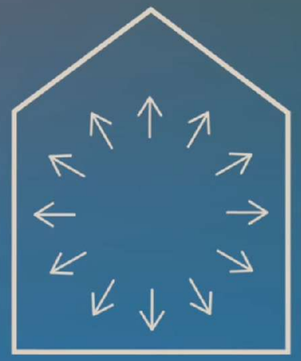
Street Moves' One-Minute City ended up engaging 25 municipalities across Sweden

Also, Normandy

Homes that Don’t Cost the Earth.
Arup, Dark Matter Labs, Rising Tide and UCL IIPP, supported by Laudes Foundation



Homes that Don’t Cost **the Earth**

Affordability within
planetary boundaries

Retrofitting first Retrofit first, via circular biomaterials, nature-based infrastructures and participative co-design with people, place and environment, recognising the rights of people to remain in place rather than be displaced by external forces, removing operational emissions while retaining embodied carbon and interconnected biodiversity, and reinforcing the social and cultural fabric.	**Moving second** Wherever the climate and biodiversity crisis makes existing settlements uninhabitable, ensure dignified, secure, inclusive, affordable and sustainable housing is made available for those displaced, carefully integrated into retrofit neighbourhoods and supporting social infrastructures, and with care taken in terms of governance and co-design, ensuring culturally diverse possibilities.	**Adapting third** Ensure the right to self-build, repair and adapt at both housing and neighbourhood scale, via open building systems, shared common good infrastructures, new skills and trades, engaged policy, and legible supply chains for materials and resources, allowing existing environments to refine in place and new housing to adapt.
Circular biomaterials Whether retrofit or new-build, prioritise biomaterials from regenerative sources, produced, installed and maintained, and reused to high standards. Source locally wherever possible and from locally managed sustainable environments, and produce, maintain and recycle under dignified and safe labour conditions, creating new forms of employment, trades and cultural activity.	**Definancialised markets** Create an even balance of housing across public, social and private sectors, with diverse types, tenure and land ownership, removing financialisation's imperative for over-building. Make existing under-utilised spaces more openly available. Direct sustainable building sectors via collaborative public leadership, procurement and operations.	**Legible systems** Ensure a new "right to the city" incorporates the rights of the environment itself, by developing open, interoperable, legible systems to track provenance, performance and permissions of habitats, materials, resource flows and building/land use. Develop new common good "balance sheets" based on smart contracts for shared assets and activities.
Convivial infrastructures Prioritise planning for harmonious density that unlocks sustainable common good outcomes, where housing design integrates diverse, high-quality and well-maintained social infrastructures, alongside shared systems for active mobility, public transport, renewable energy, on-site water storage and green/blue infrastructure, food production and local waste loops, facilitated by accessible public digital services.	**Open buildings** Deploy advanced biomaterial-oriented fabrication systems for construction and retrofit, from open digitally enabled community-scale self-build and repair systems operated, maintained and resourced locally, through to large-scale industrial modular and automated fabrication and construction systems for larger buildings and infrastructure, linked to legible, equitable and regenerative material supply chains in both instances.	**Systemic governance** Ensure systemic perspective to design, construction and governance of housing incorporates integration of these linked infrastructures and practices, working systemically across house, block, neighbourhood, city, region, nation and global scale, recognising that these are all the same system from a planetary boundaries perspective.

Modern housing: An environmental common good, Hill and Mazzucato

Council on Urban Initiatives (2024)

Shared

Mission

Material

Retrofit