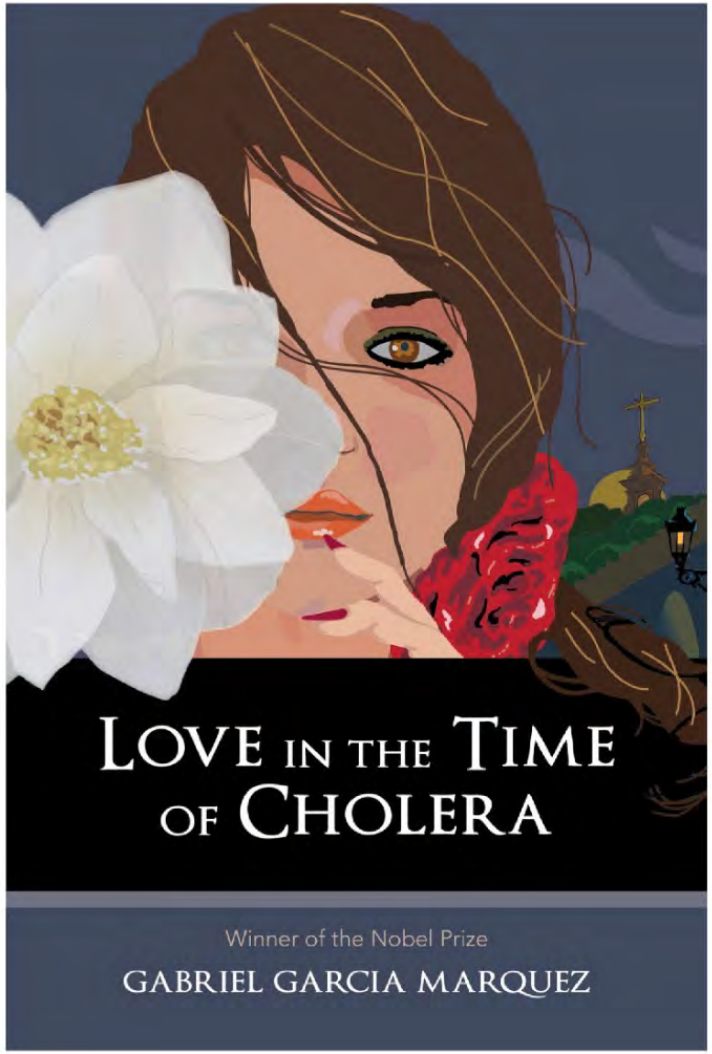
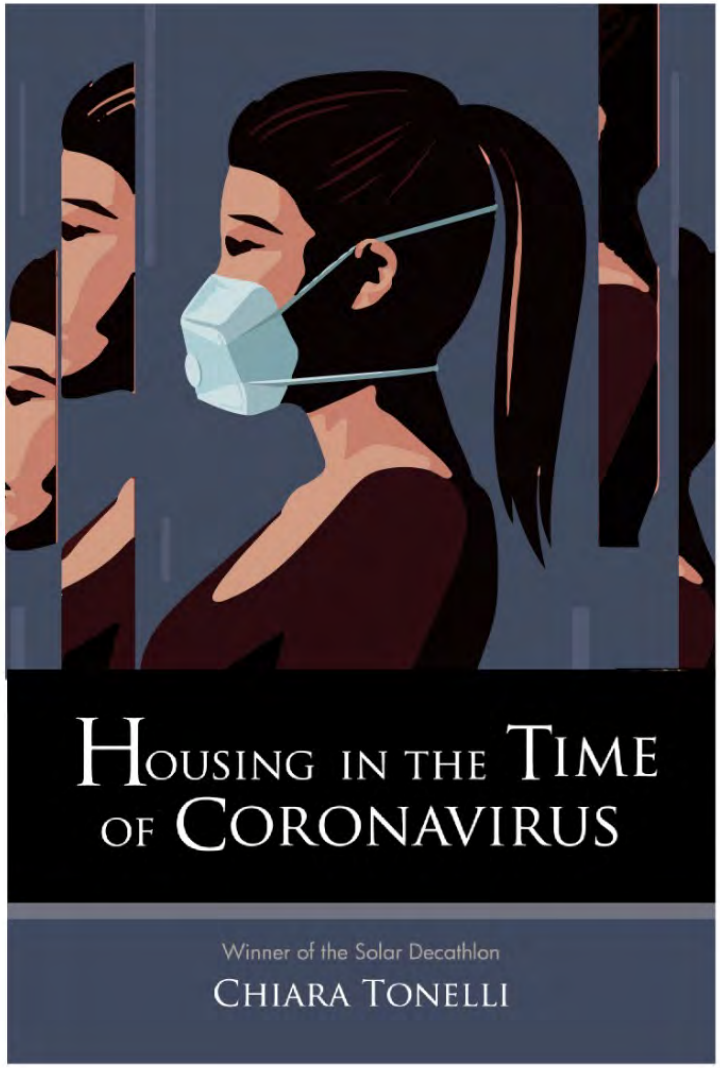
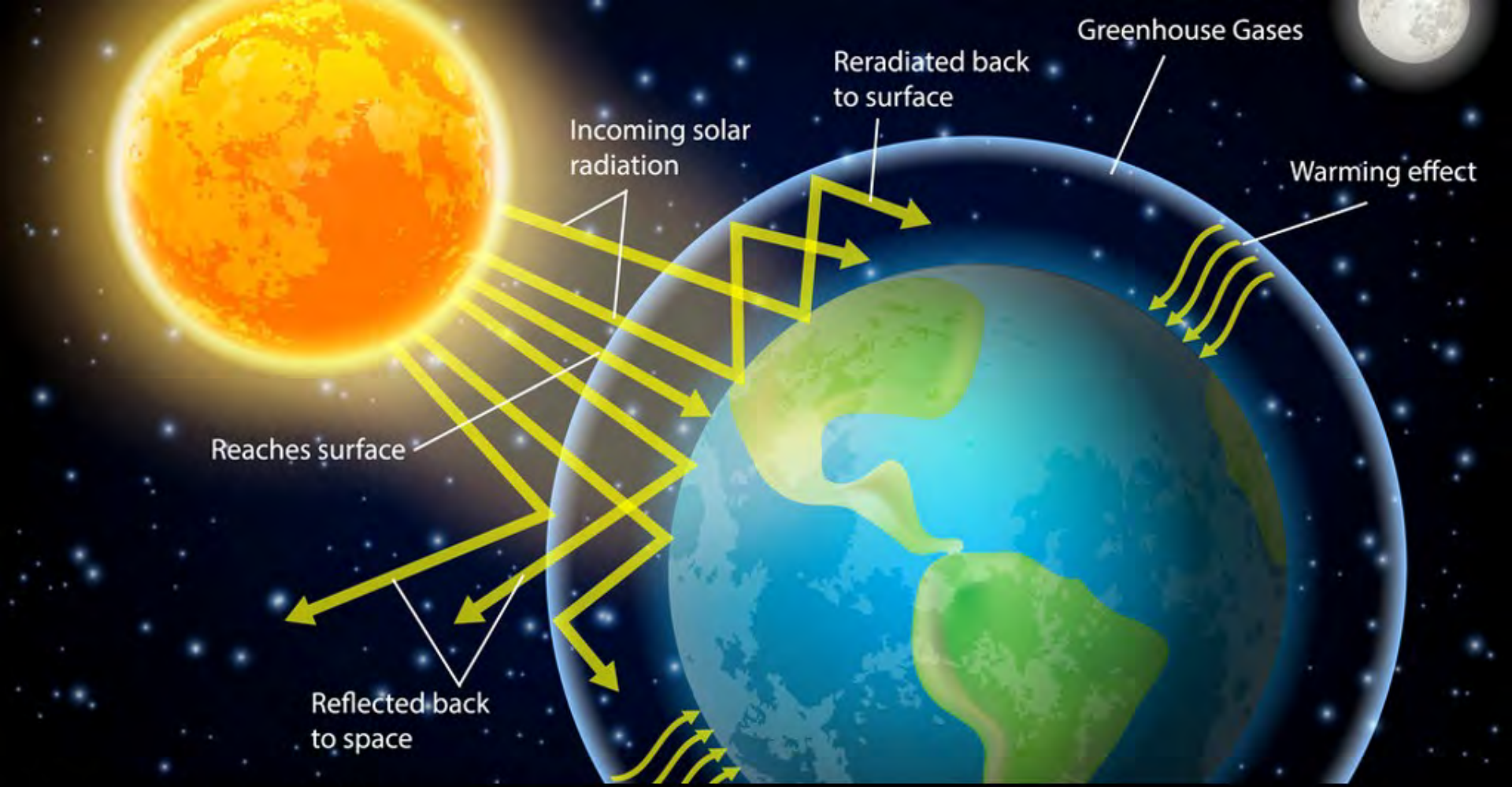

LOVE IN THE TIME OF CHOLERA
Winner of the Nobel Prize
GABRIEL GARCIA MARQUEZ

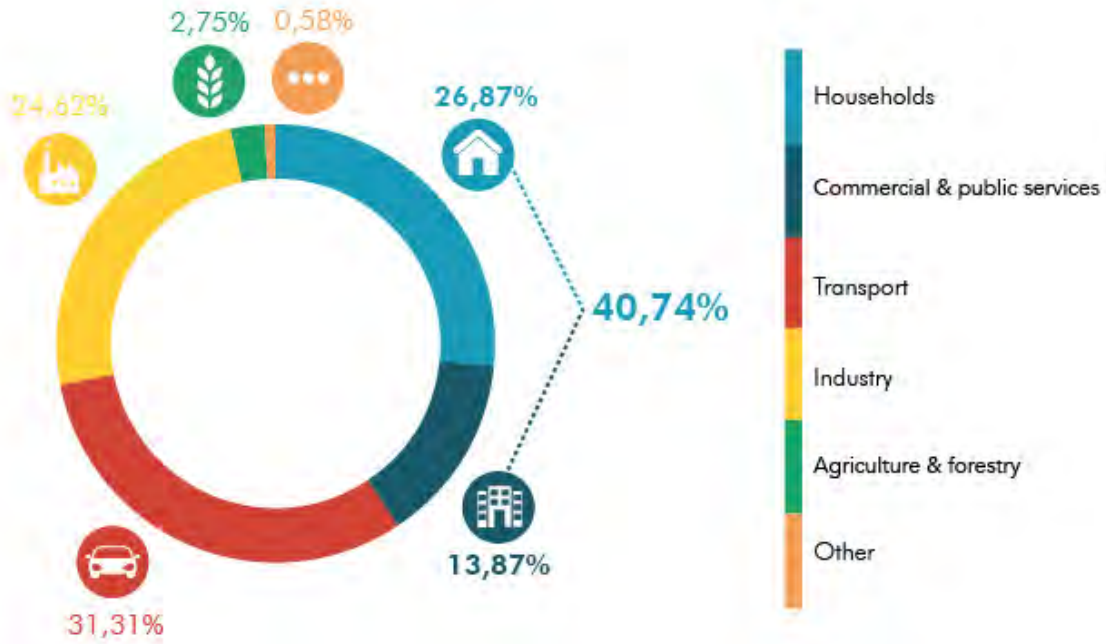

HOUSING IN THE TIME OF CORONAVIRUS
Winner of the Solar Decathlon
CHIARA TONELLI

energy transition



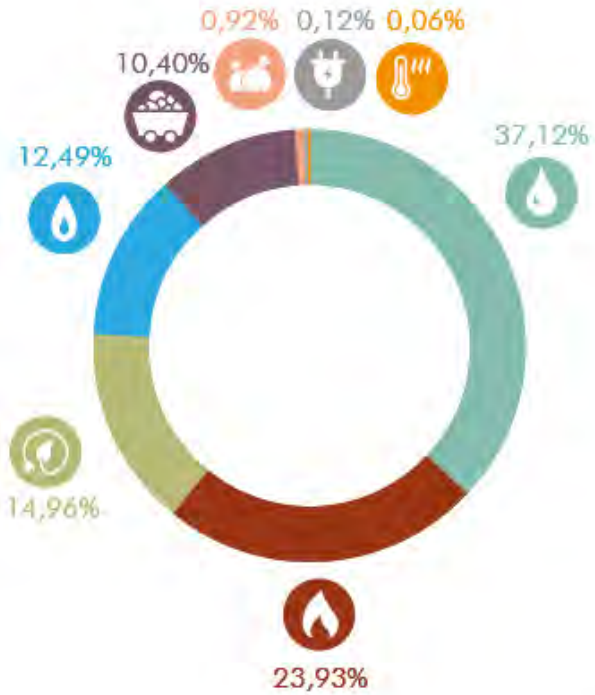
Greenhouse Effect

EUROPEAN UNION (28 COUNTRIES)



Final energy consumption, EU28, Eurostat 2021 (2019 data)

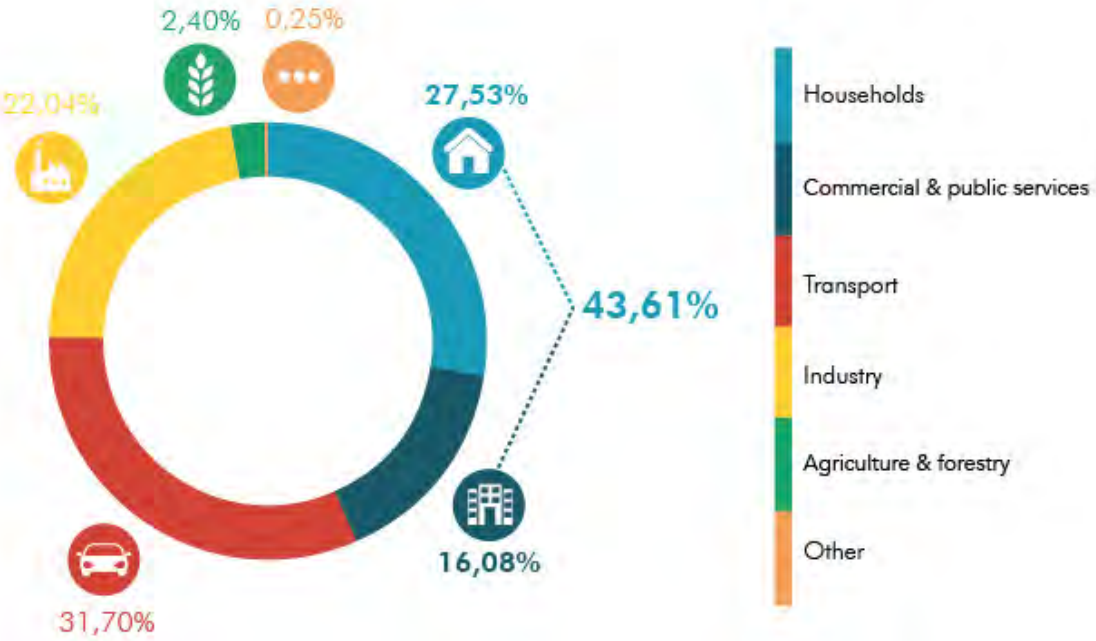
EUROPEAN UNION (28 COUNTRIES)



- Crude Oil and petroleum products
- Gas
- Renewable and biofuels
- Nuclear heat
- Solid fossil fuel
- Non-renewable waste
- Electricity
- Heat

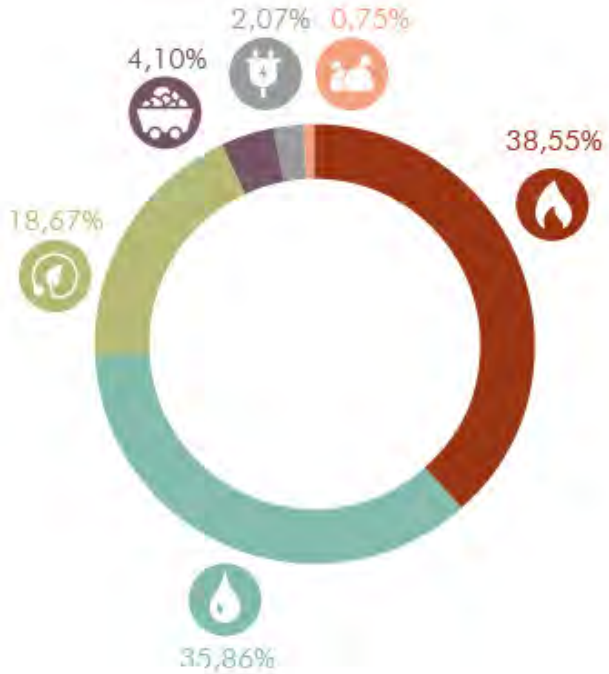
Gross available energy, EU28, Eurostat 2021 (2019 data)

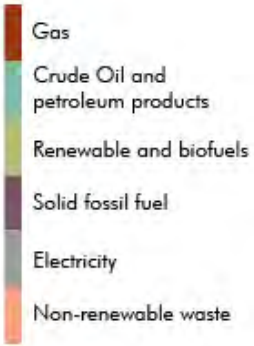
ITALY



Final energy consumption, ITA, Eurostat 2021 (2019 data)

ITALY

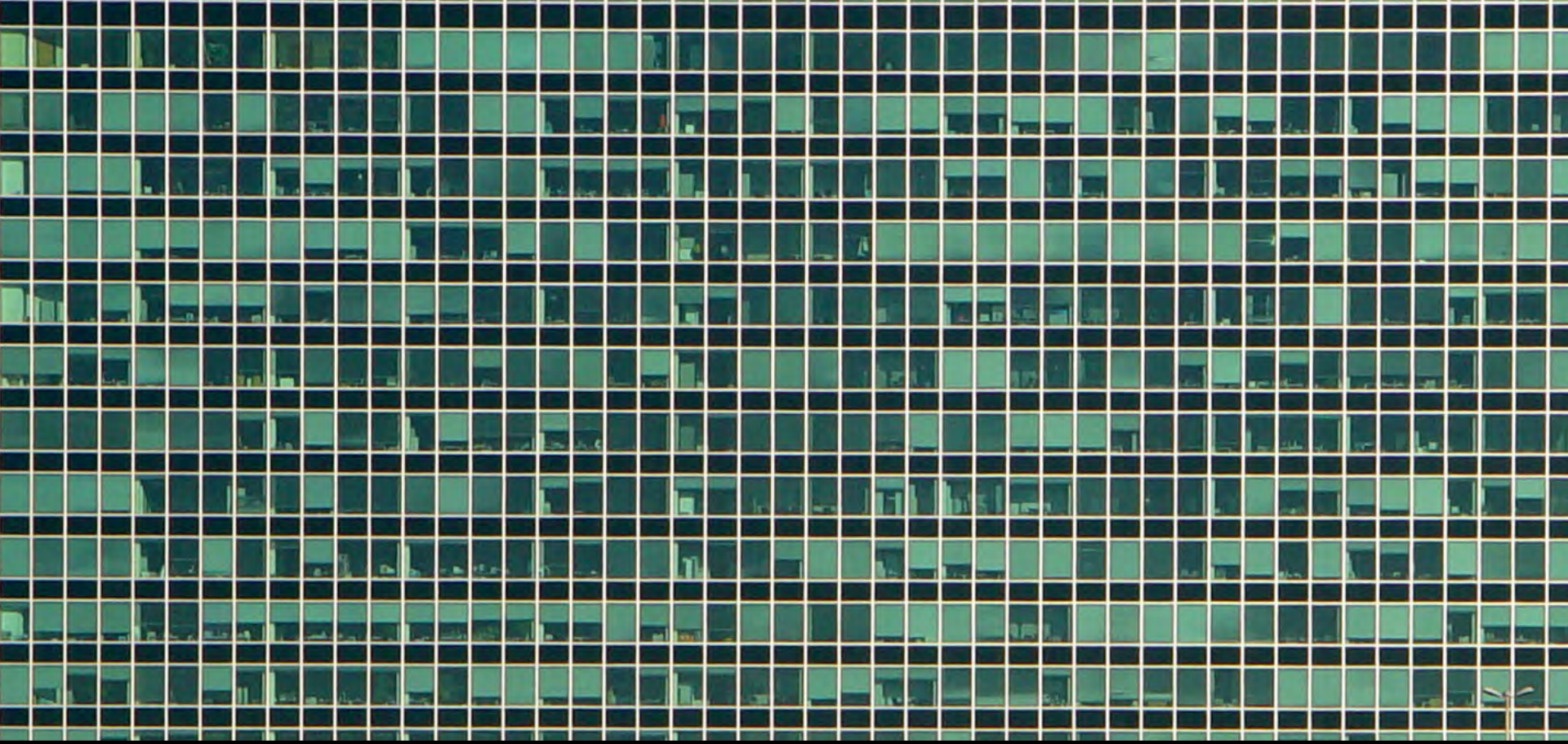




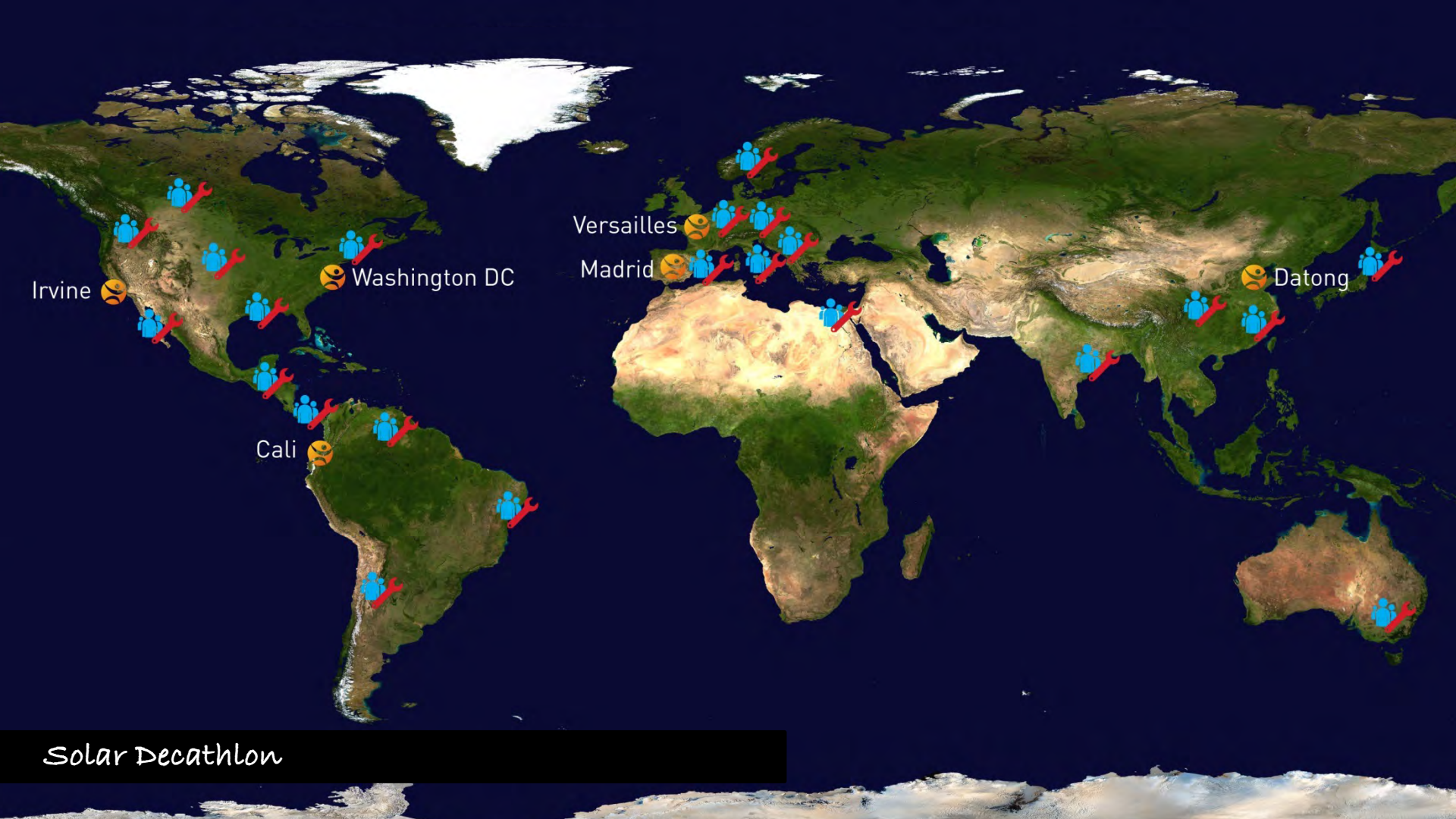
Gross available energy, ITA, Eurostat 2021 (2019 data)

Among the 265 million Europe' buildings, 240 million (90%) are HOUSING

180 million of the existing residential buildings have been built after 1945 (77%)



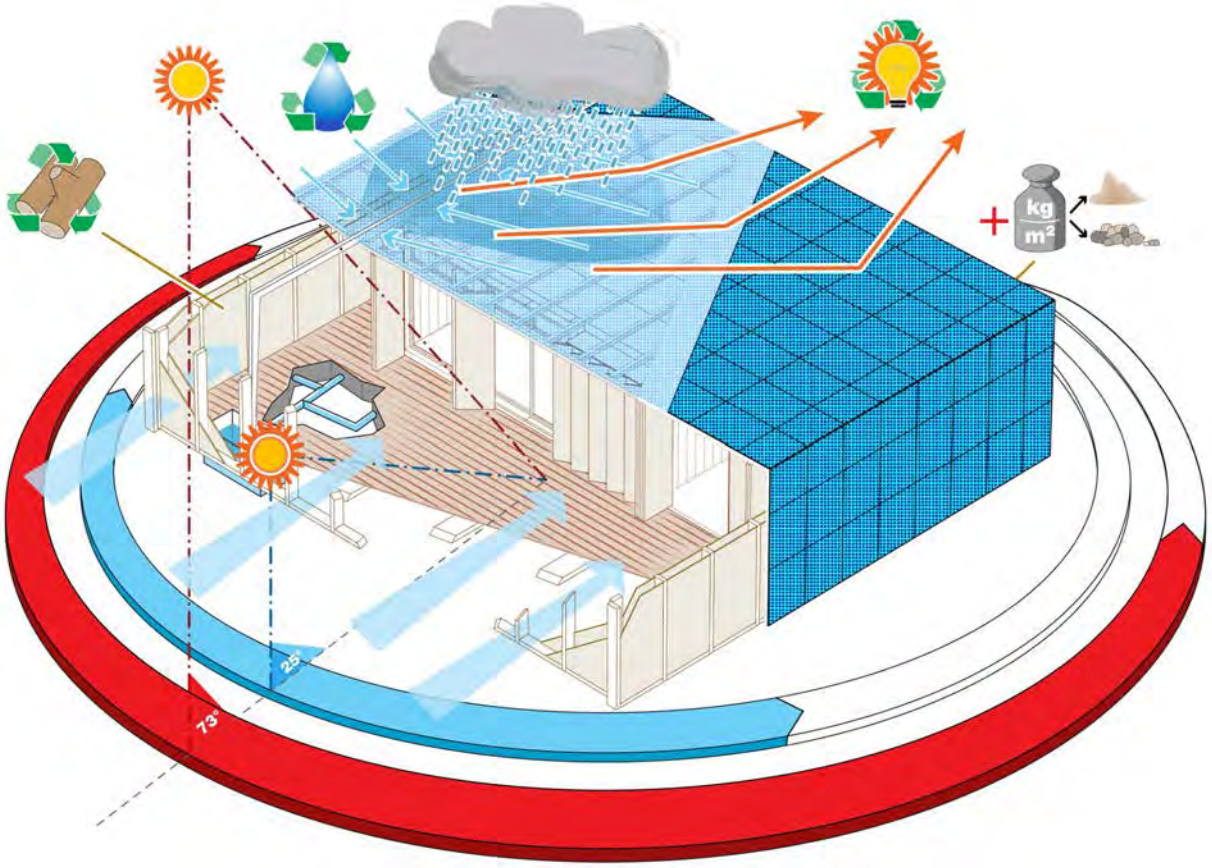
Replication of the same model all around the world: prevalence of glazed facades, widespread cementification, housing models far from local culture and energy consumption that with the rising costs of fossil fuels have become increasingly unsustainable and unaffordable.


Versailles
Madrid
Irvine
Washington DC
Cali
Datong
Solar Decathlon

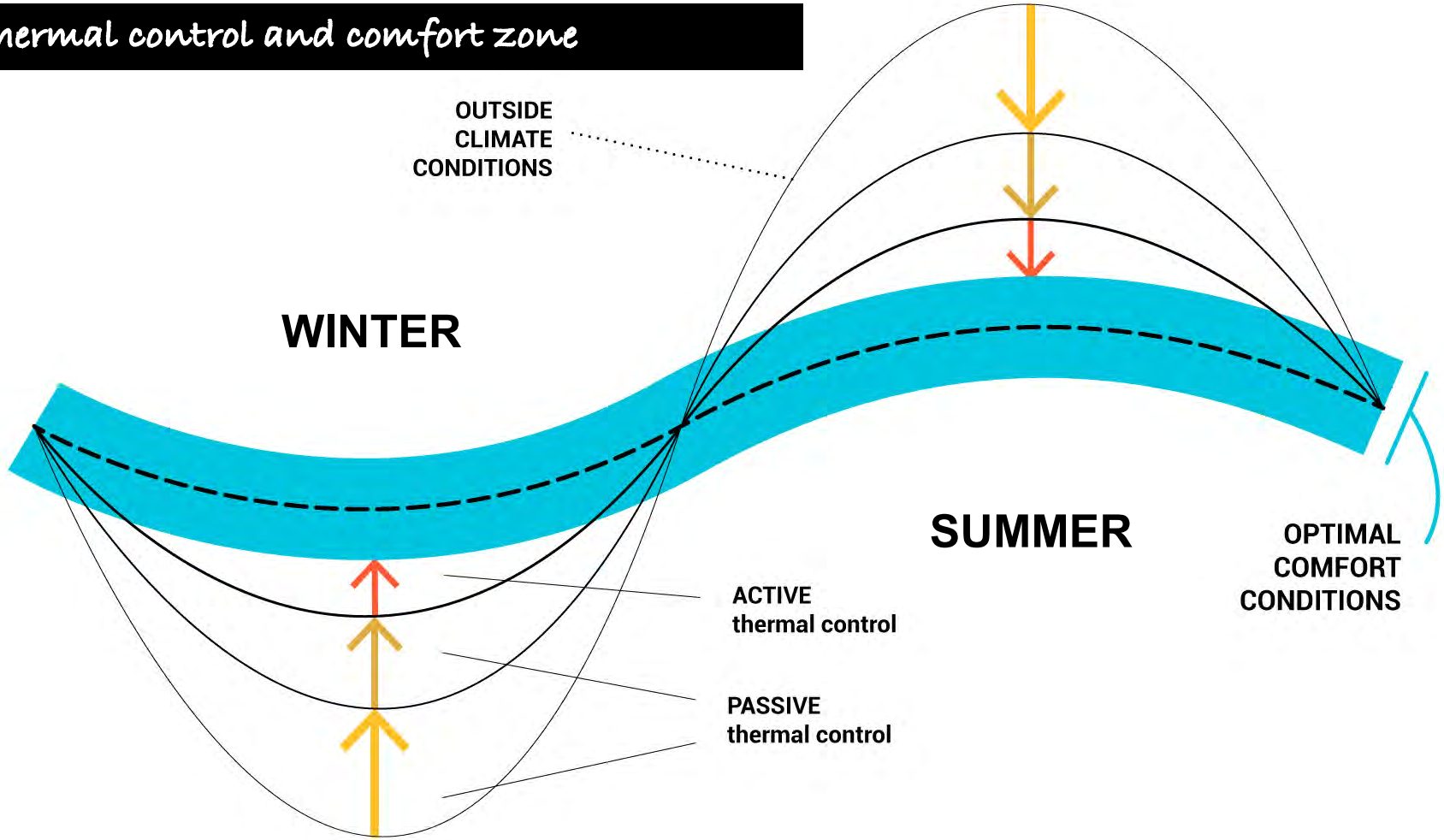
Solar Decathlon

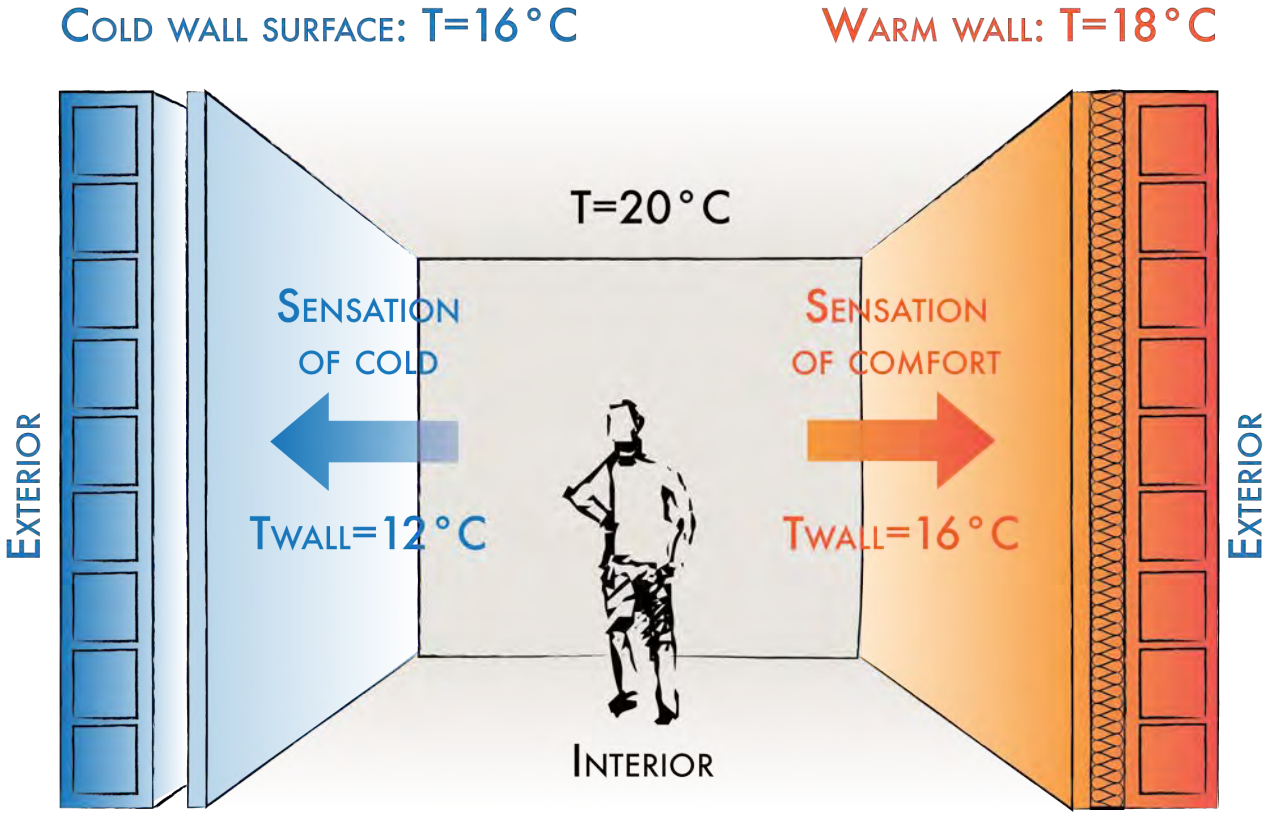
Solar Decathlon

RhOME for denCity | The winner housing prototype of Solar Decathlon 2014

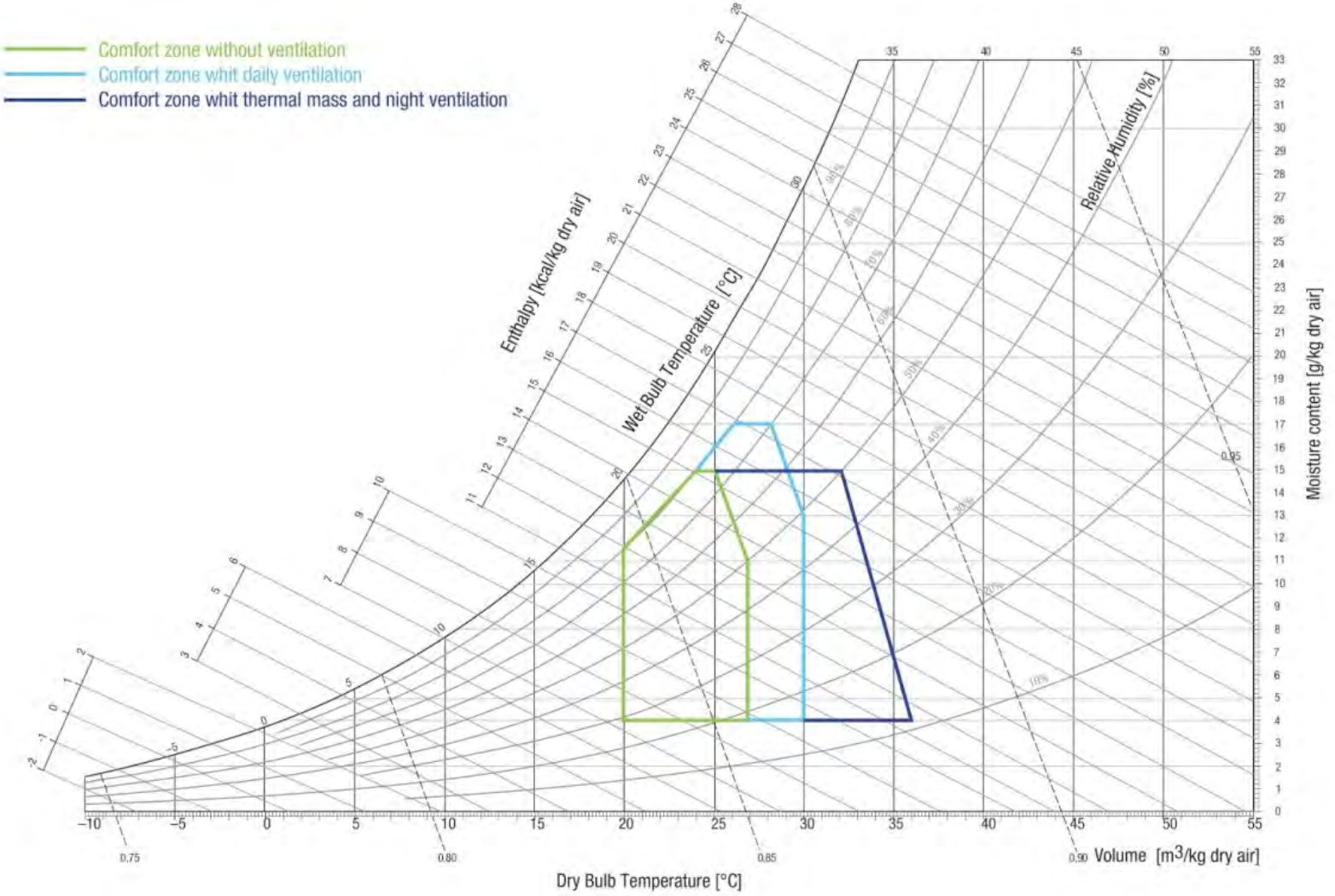

kg
m²
25°
73°

Thermal control and comfort zone





THE THERMAL COMFORT TEMPERATURE DEPENDS ON AIR TEMPERATURE AND WALL TEMPERATURES.

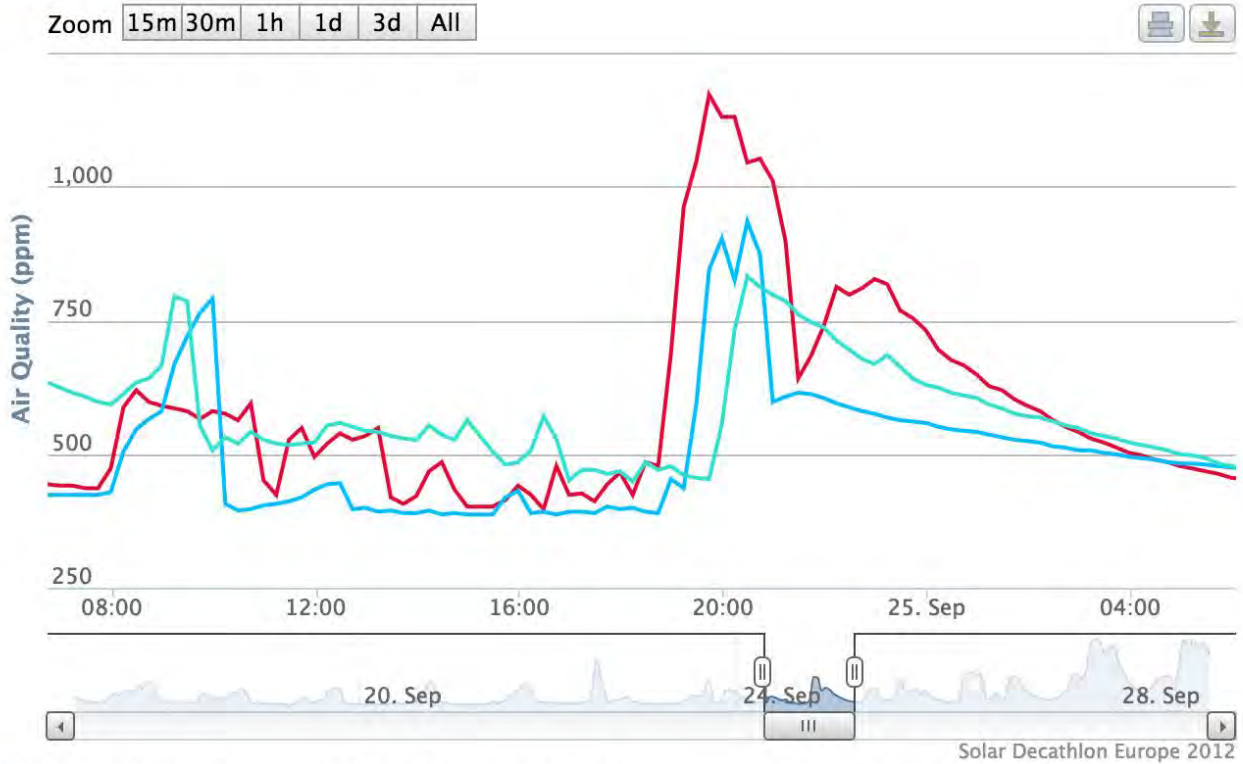

Comfort zone without ventilation
Comfort zone whit daily ventilation
Comfort zone whit thermal mass and night ventilation
Enthalpy [kcal/kg dry air]
Wet Bulb Temperature [°C]
Relative Humidity [%]
Moisture content [g/kg dry air]
Dry Bulb Temperature [°C]
Volume [m3/kg dry air]
0.75
0.80
0.85
0.90
0.95

Modellazione e rendering: Maurita Glorioso ed Emanuele Pangrazi - www.studiomater.com

digital transition

Solar Decathlon

Monitoring > Air Quality

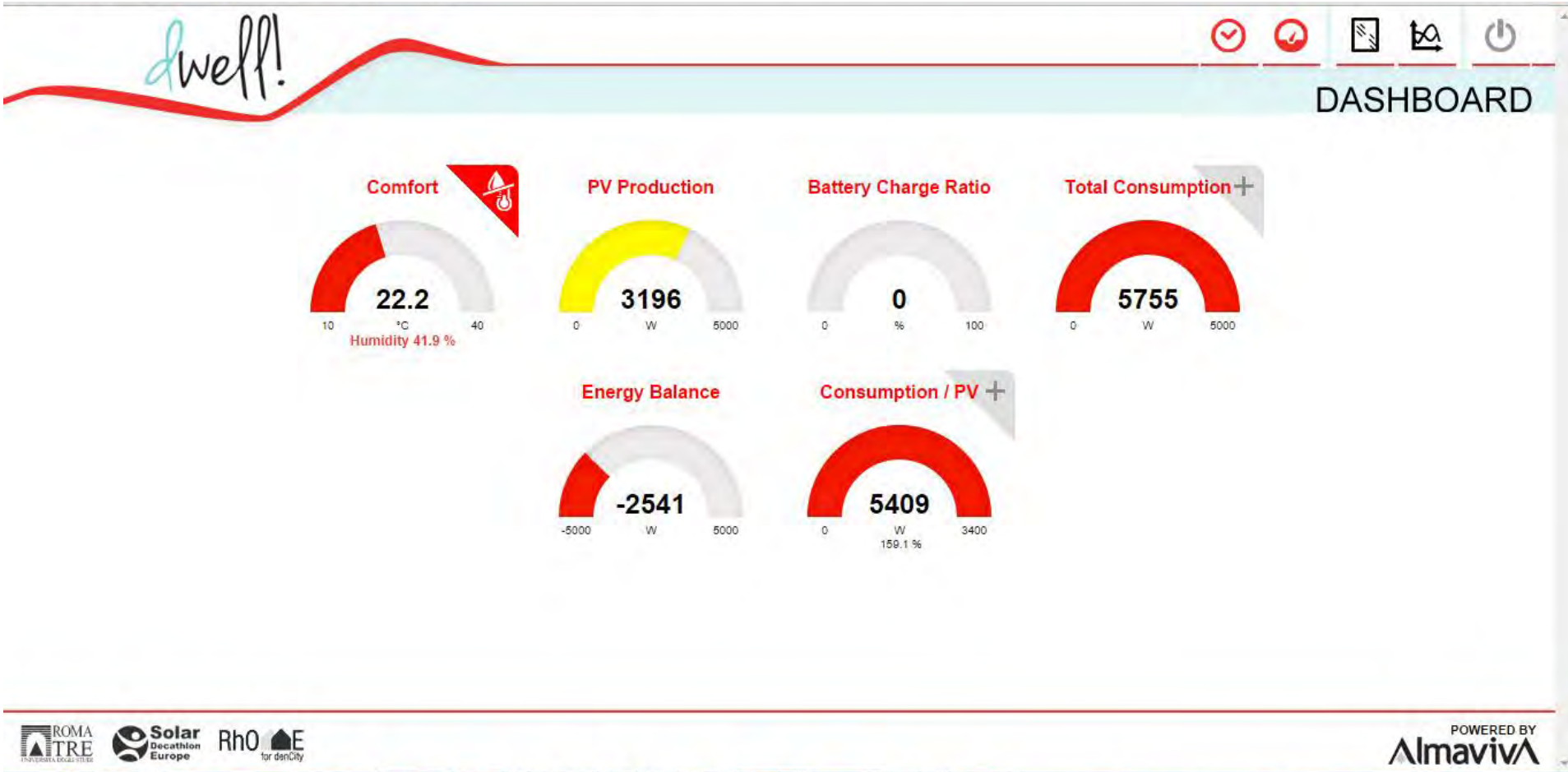


- [x] 01 ABC - Sumbiosi
- [ ] 02 AND - Patio 2.12
- [ ] 03 BME - Odoo
- [ ] 04 BRA - Ekó House
- [ ] 05 BUC - Prispa
- [ ] 06 CEU - SMLsystem
- [ ] 07 CUJ - Omotenashi House
- [ ] 08 DTU - Fold
- [ ] 09 EHU - Ekihouse
- [ ] 10 FAUP - cem' casas em movimento
- [ ] 11 HTWG - Ecolar Home
- [x] 12 ROME - Med in Italy
- [ ] 13 RWTH - Counter Entropy House
- [ ] 14 STSH - astonyshine
- [ ] 15 TJU - Para Eco-House
- [x] 16 TRA - Canopea
- [ ] 17 UDZ - Casa pi Unizar
- [ ] 18 UPC - (e)co

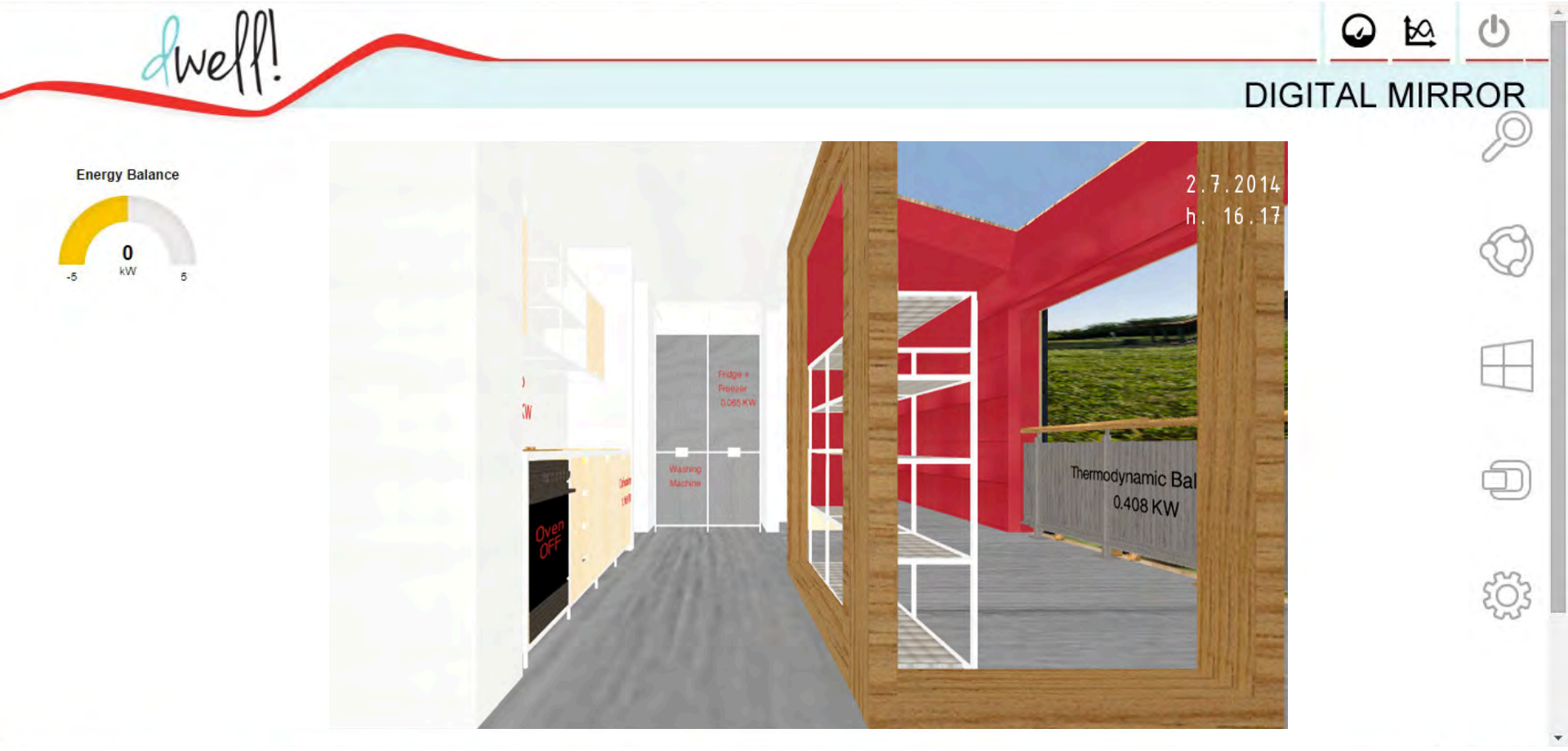
Compare/Refresh

less automation, more information

Dwell - dashboard



Dwell – digital mirror



Dwell – digital mirror

Dwell - discovery

dwell!

DISCOVERY

Measuring period
From 05/07/2014 00:00
To 12/07/2014 00:00
with sampling of 1 hour

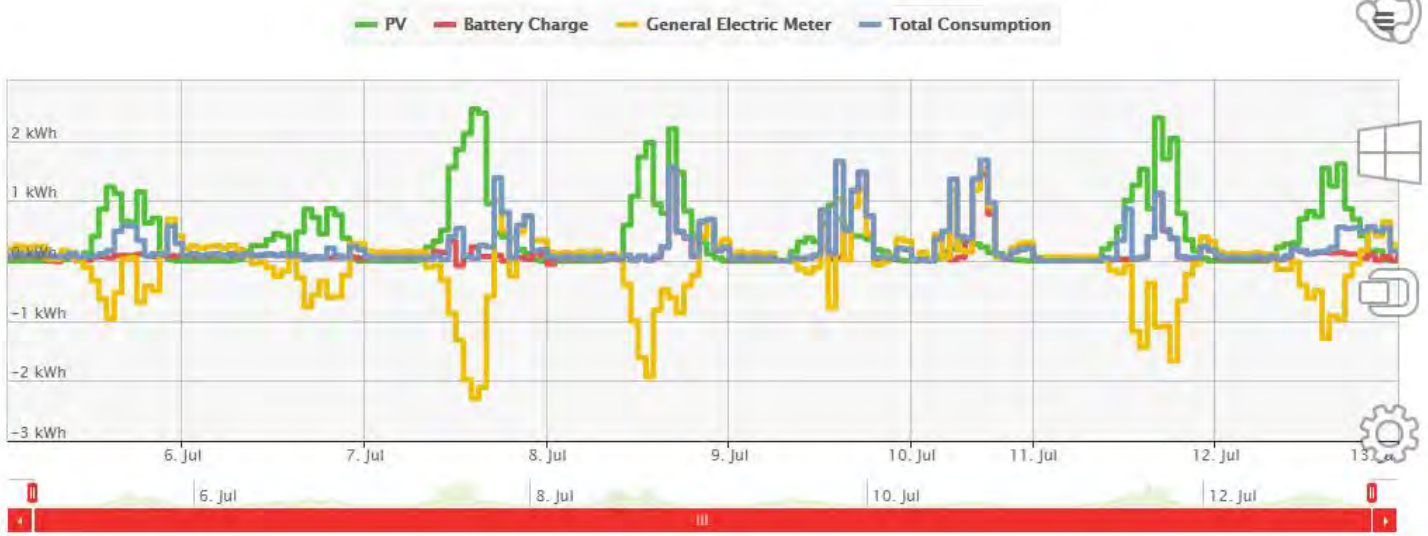
ENERGY BALANCE

PV	71.69 kWh
Total Consumption	70.79 kWh
Energy Balance	**12.41 kWh**

Energy Balance

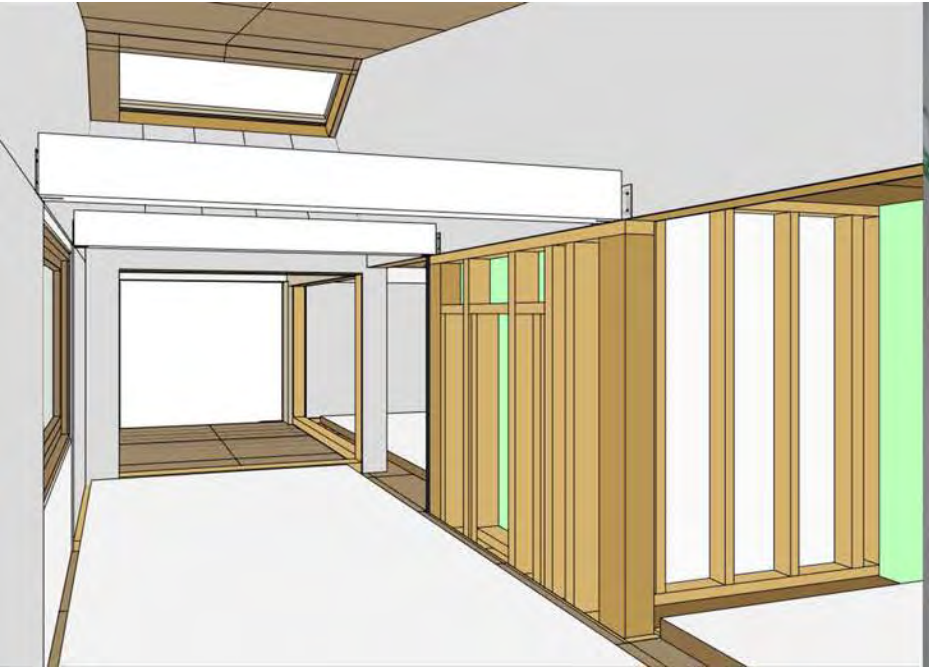
Period << 1D 1W 1M >> TODAY

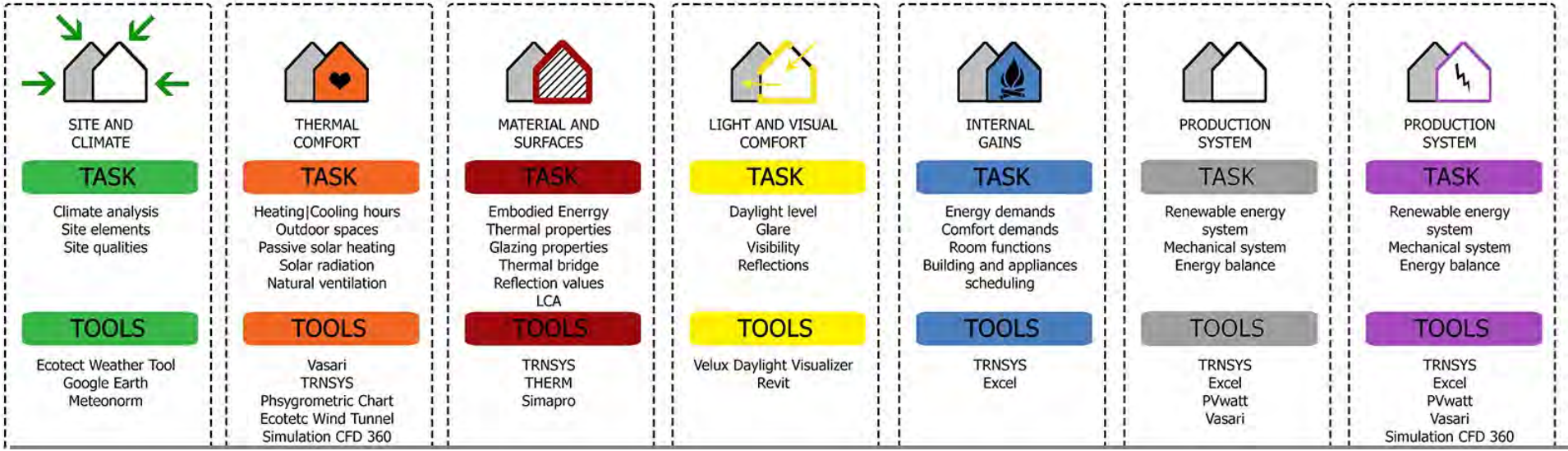
Consumption 1 MINUTE 1 HOUR 1 DAY



ROMA TRE · Solar Decathlon Europe · RhOME for denCity

POWERED BY Almaviva





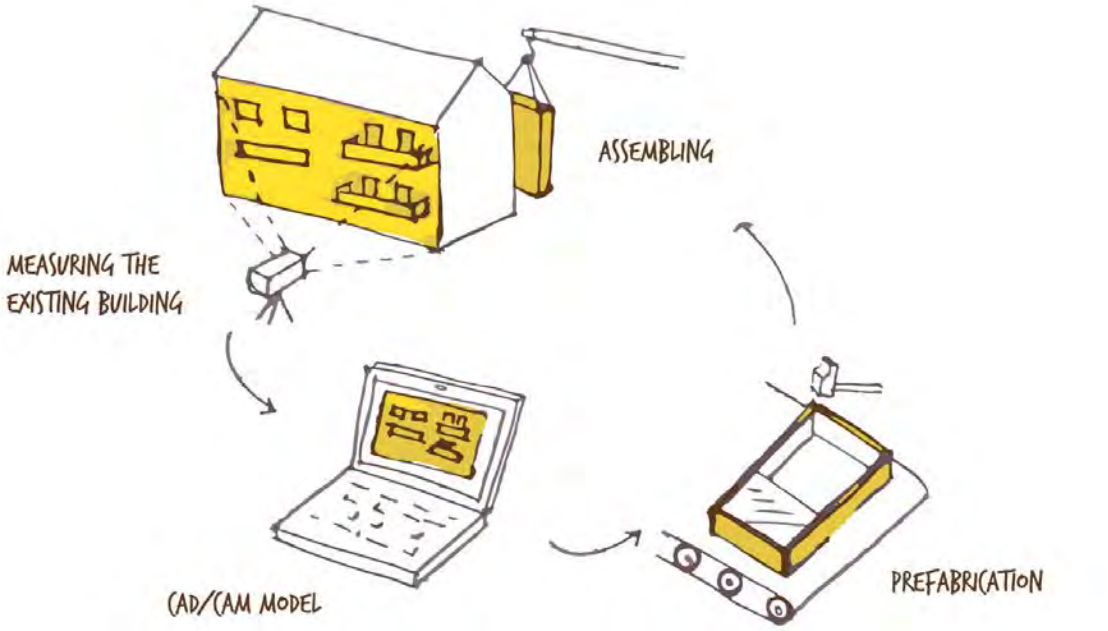
Attraverso una sinergia accorta tra software di simulazione dinamica e quelli di progettazione parametrica, le intuizioni energetiche hanno cercato forma, verifica e miglioramenti adattivi, attraverso l'utilizzo di tutti gli strumenti digitali a disposizione orientando le analisi verso entrambi i climi di riferimento, Roma (aggregato urbano) e Versailles (prototipo da competizione).

Energy efficiency of a renovated building

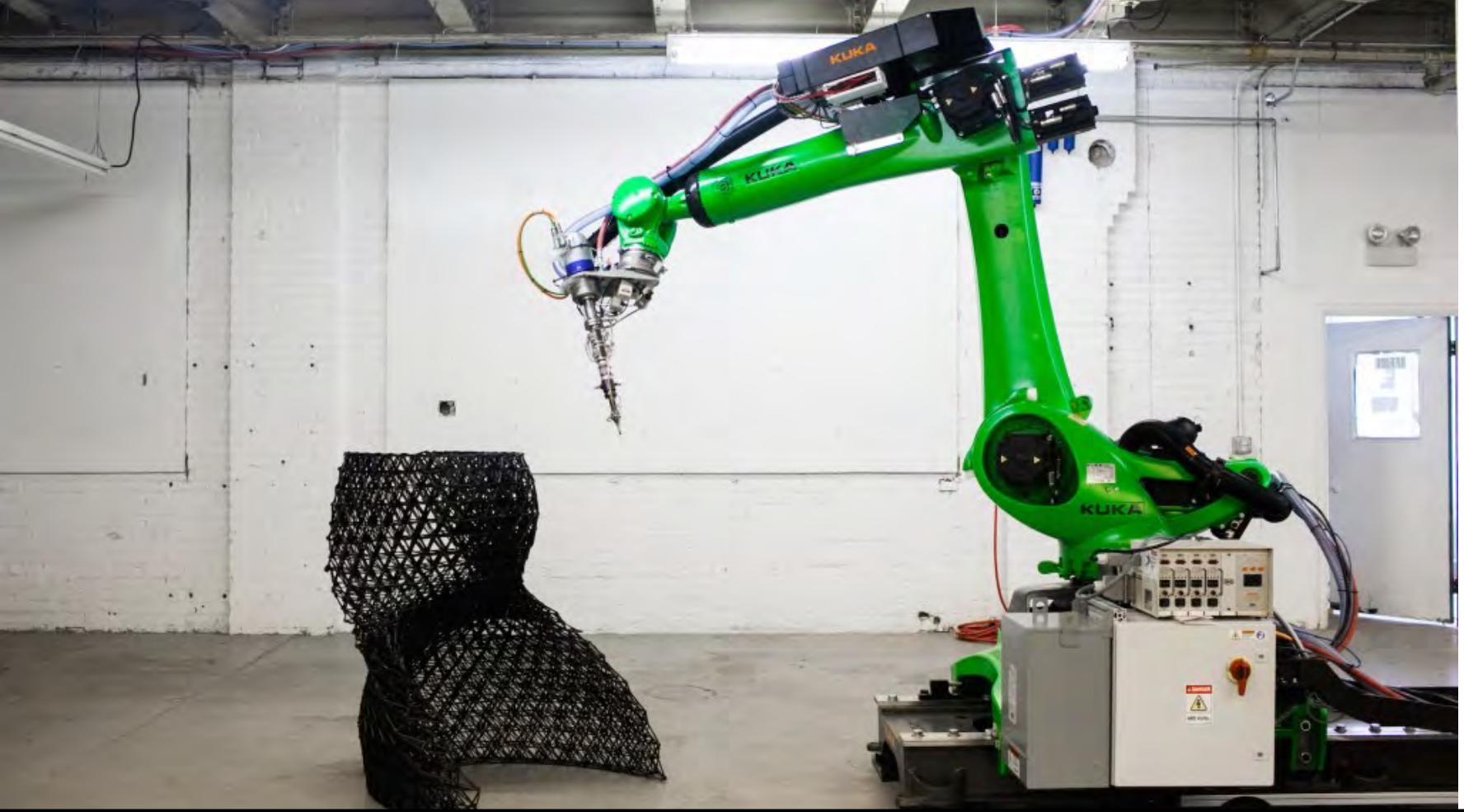
"Develop a façade renovation method (TES Method) based on large scale, timber based elements for substantial improvement of the energy efficiency of a renovated building, which would be applicable throughout Europe."

"Is a systemized modernization process from survey, planning, production off-site to assembly on-site as a consistent structure along a digital based workflow."

[source: TES_Manual]

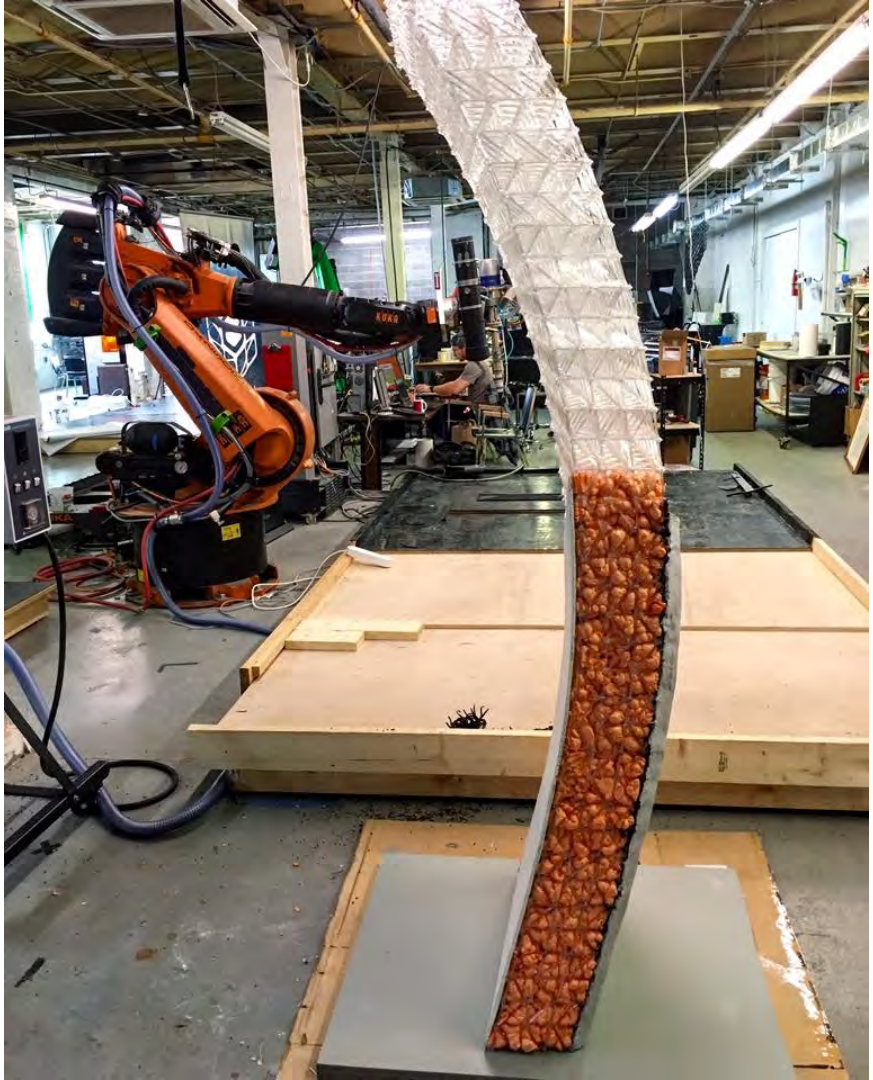


From research to practise



A new way to build: **3D printers**

SHINI
KUKA


KUKA

Shop Architects, Flotsam and Jetsama Pavilion, Miami, USA, 2016

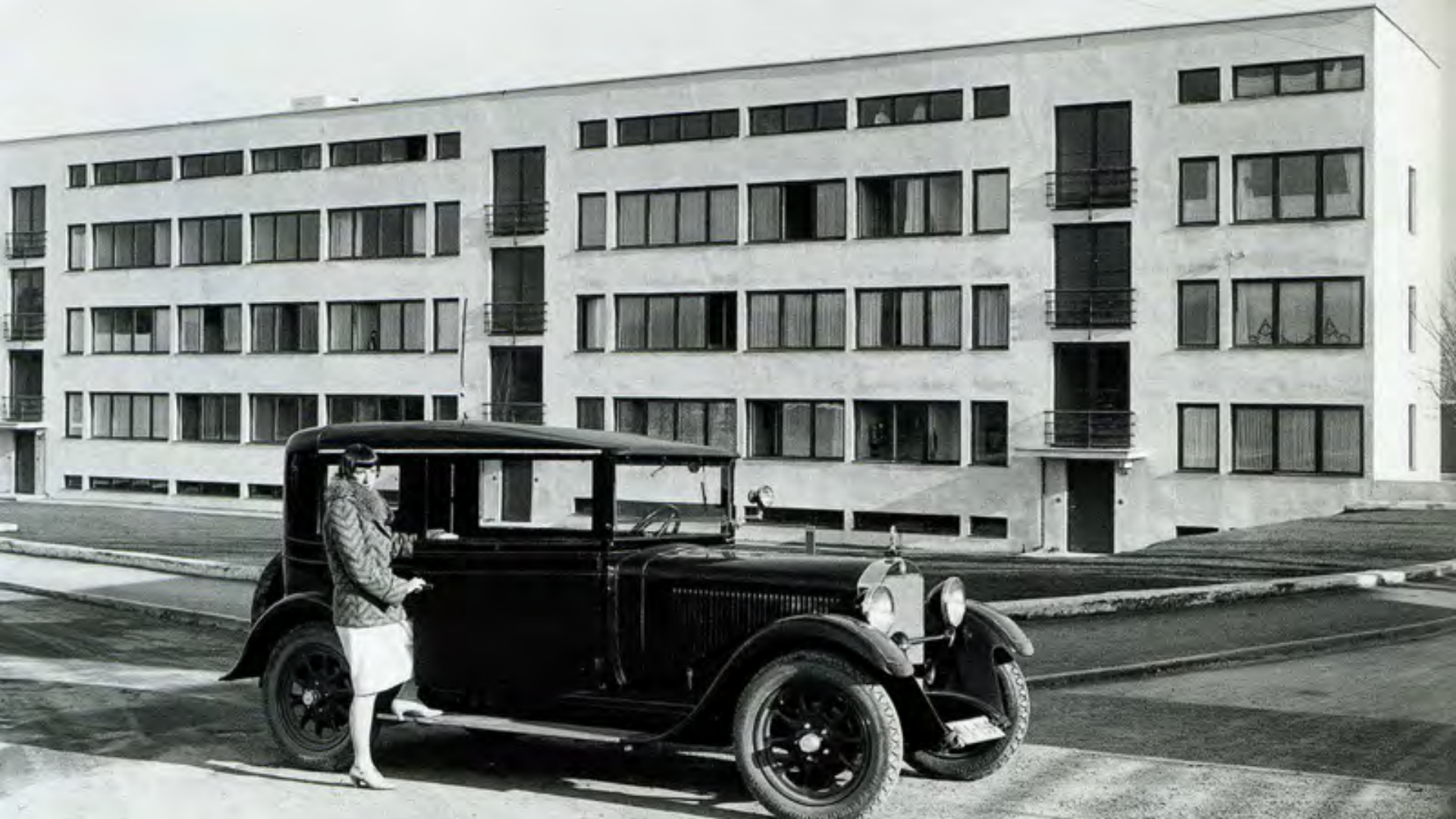
ACTLAB | **Trabeculae Pavilion** | Milan Polytechnic | 2018

CRANE with which WASP printed GAIA, a small 30sqm house with rammed earth walls.

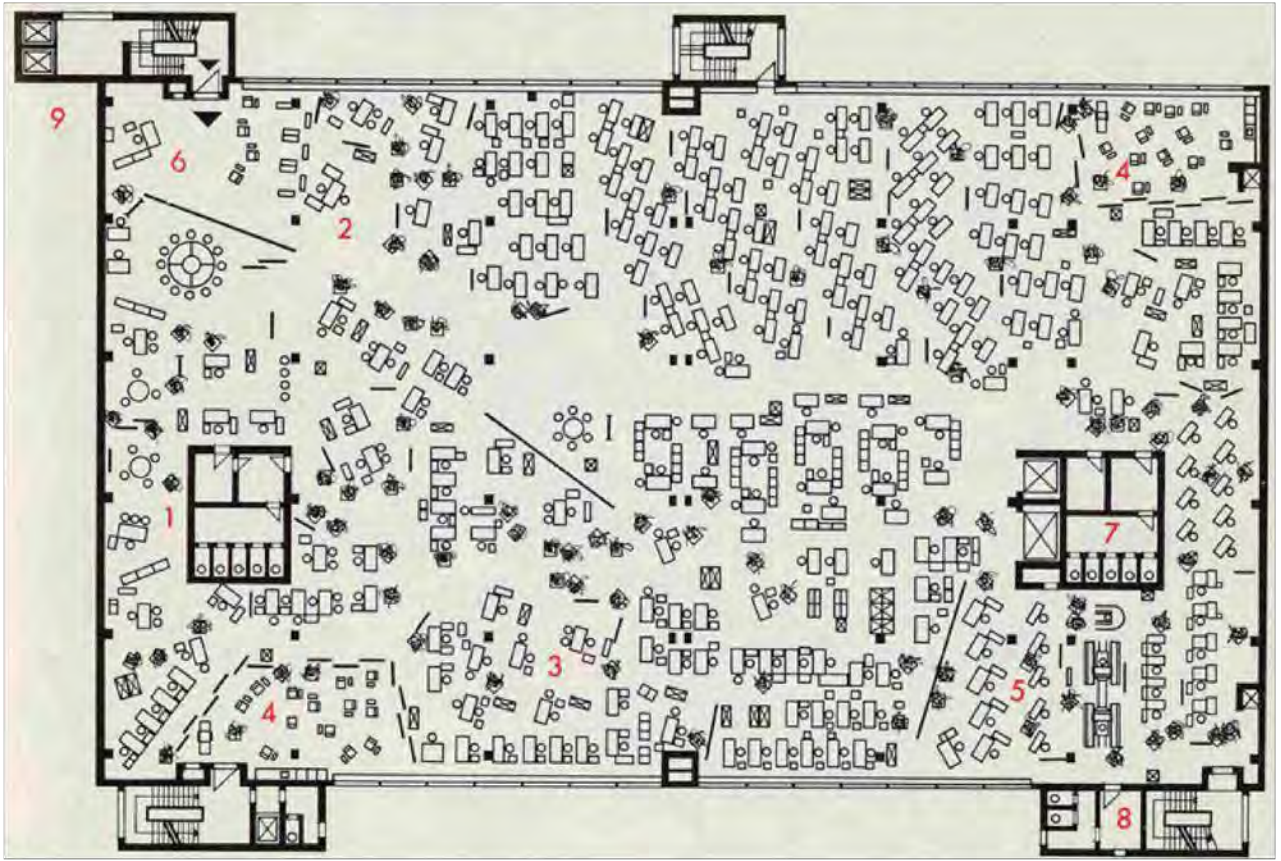
TECLA - Technology and Clay, da un progetto di Mario Cucinella e WASP-World's Advanced Saving Project

wasp

digital is affecting
our lifestyle



1900's TAYLORISM LARKIN BUILDING – Frank Lloyd Wright, Buffalo, New York, 1902



1961_Find your desk! Floor plan of the Bertelsmann Verlag in Gütersloh

The Facebook office in Menlo Park, California.

Virginia_Tech_1920s

Google office in Sidney

Redbull office meeting room

Kitten

housing after the Pandemia

Alcove Plus Ronan &
Erwan Bouroullec, 2021

© Vitra International AG

Night

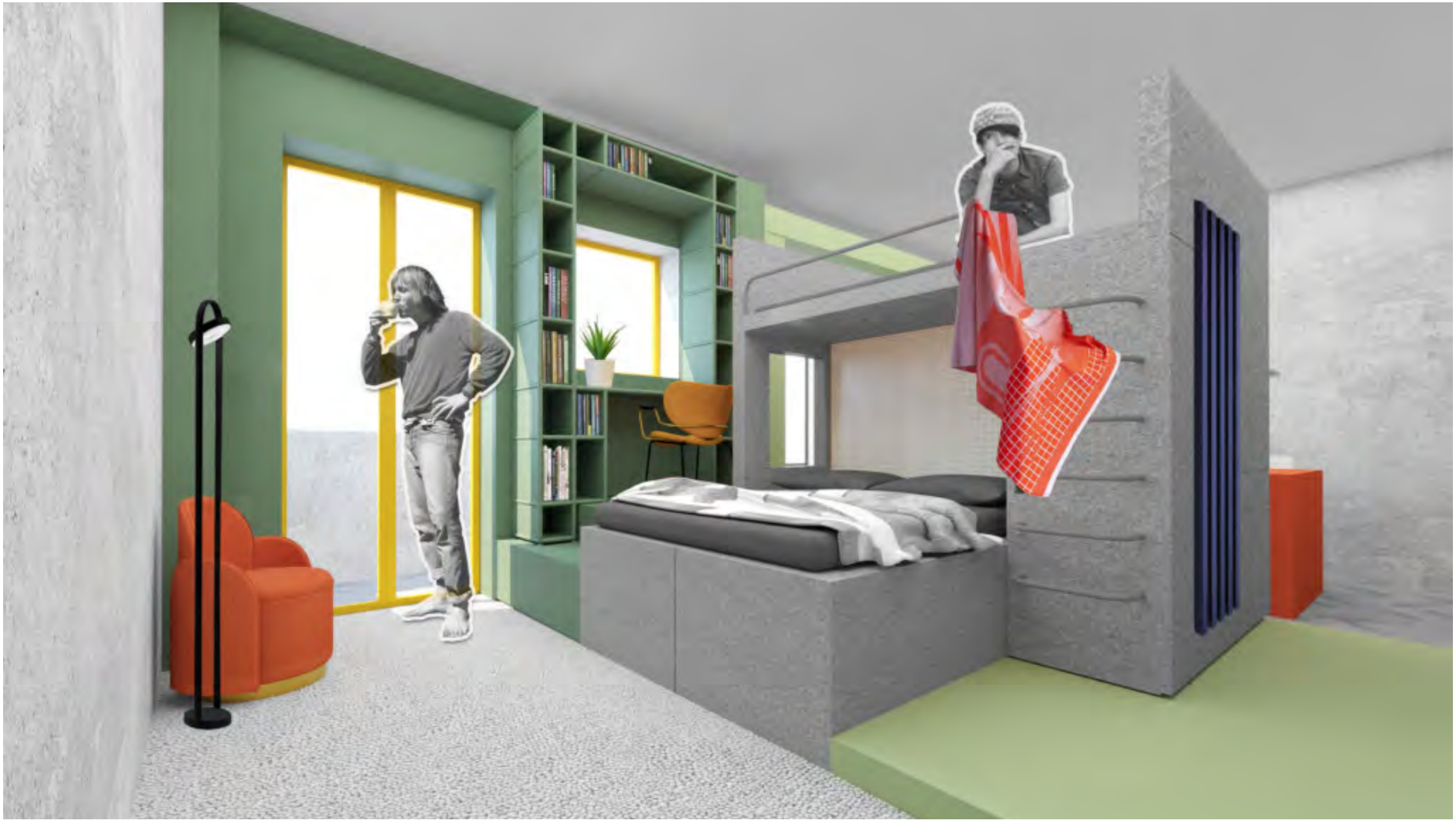
Day

MIA, Cleea, Claudio Lucchin e architetti associati, 2013

Dancing wall

energieintelligenz

POST-HOME La casa ideale da vivere dopo la pandemia, che indaga le esperienze abitative e lavorative contemporanee, nel segno dello smart living.
arch. Claudia Campone, ThirtyOne Design



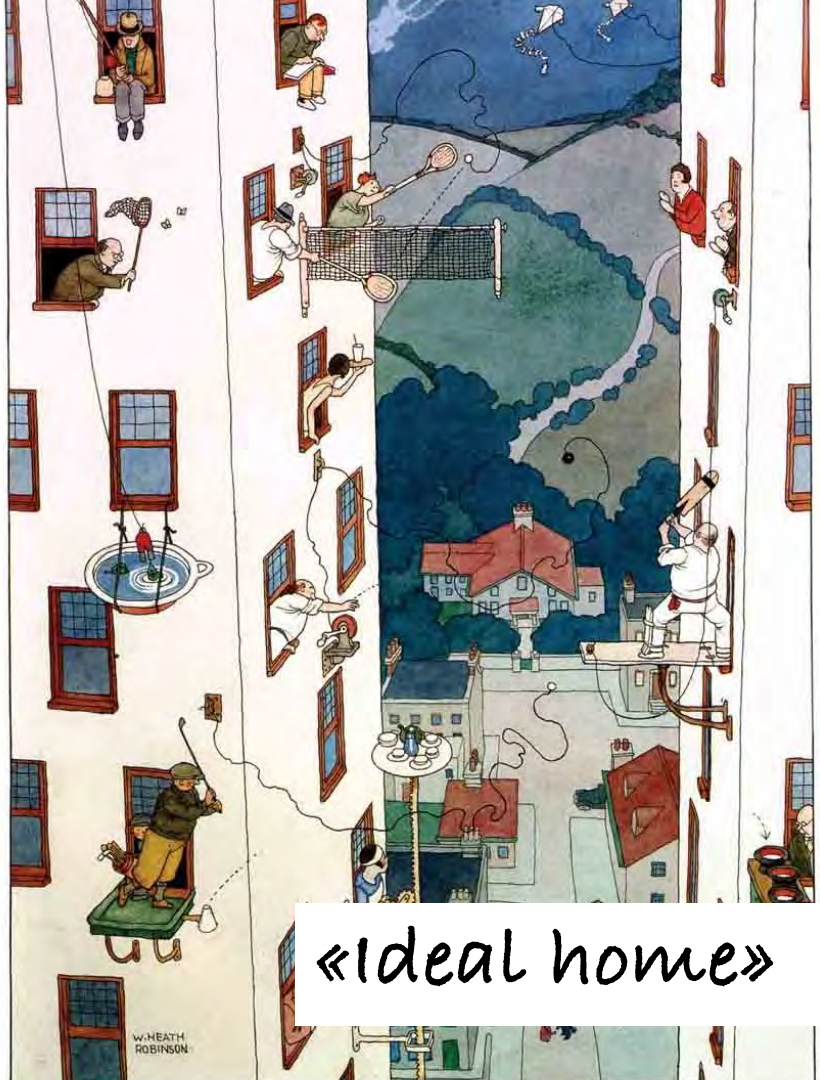
CoreDAR have designed a tiny LiDAR device called Glamos that can turn any screen into an interactive, but touchless, touchscreen.

Serena
Ministeriale
CODEGA

Serena
PIsana
CODEGA

«Folding garden»

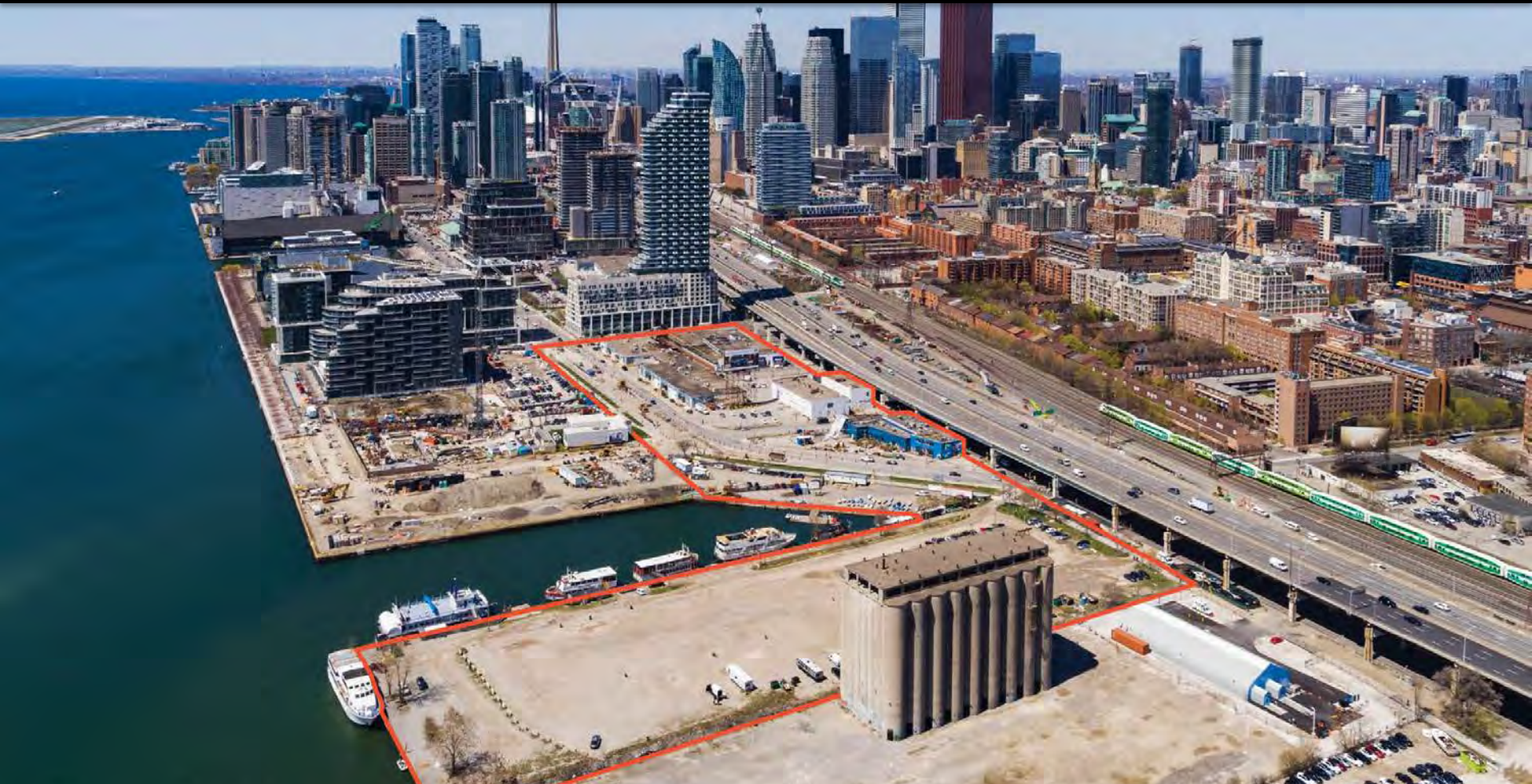
Heath Robinson (1872-1944)



«Ideal home»

GHI

Sidewalk Toronto



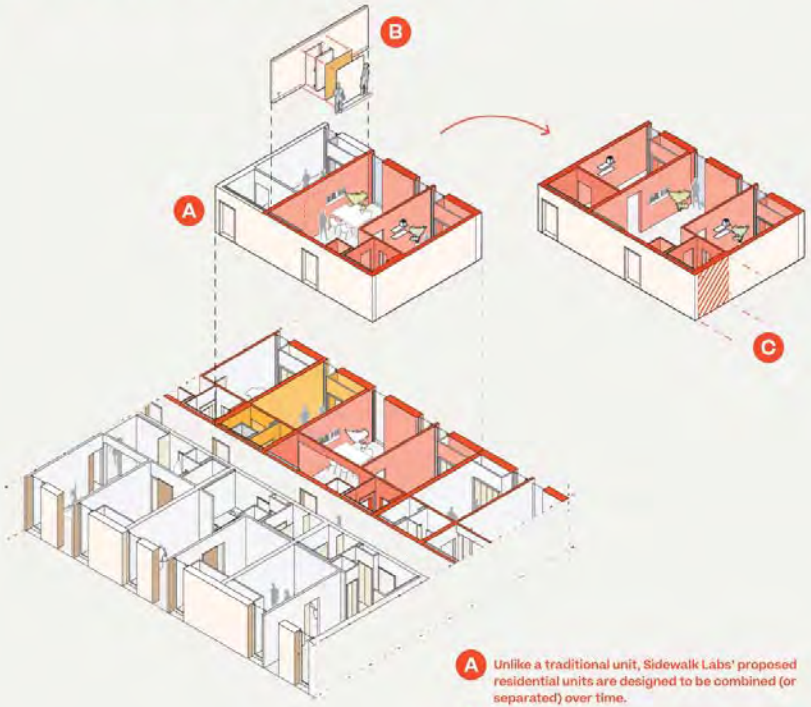
Sidewalk Toronto

www.sidewalktoronto.ca

Side Walk Toronto: Innovation Campus

Efficient units: Warm, flexible living

Designing residential units to support changing household needs



A Unlike a traditional unit, Sidewalk Labs' proposed residential units are designed to be combined (or separated) over time.

B Flexible walls (shown in light red) and floor plans enable smaller units to be combined into larger ones.

C Consistent floor plans with aligned wet-box (kitchen and bathroom) corridors could be designed to accommodate the future addition or subtraction of adjacent units.

While just as strong and sound-resistant as typical walls, flexible wall panels would be designed to accelerate renovation by hiding power and sprinkler systems instead of embedding them within walls.

Residential

Traditional wall

A Sprinkler pipes (2.5 to 5.1-centimetres) embedded in ceilings and walls require draining the pipes, opening the walls, and unscrewing the piping, re-plumbing the connections, refilling the system, and checking for leaks.

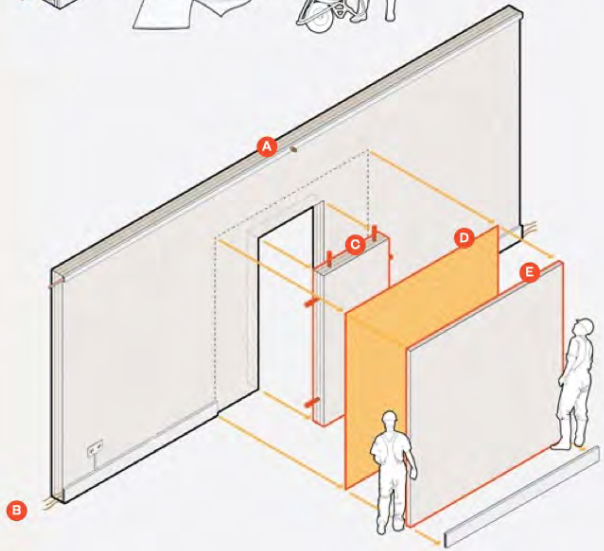
B Access to embedded utilities requires drywall to be removed.

C Plasterboard and wiring in partition walls creates waste during demolition.

D Two iterations of spackling and sanding are typically required to produce a smooth surface ready to paint.

Residential

Flexible wall



A Mist systems in one-centimetre tubing are hidden along a wall surface or ceiling and could be easily moved in less than an hour.

B Removable baseboards hide systems, including a low-voltage digital, electric power system.

C Removable panels close interconnecting spaces.

D Additional soundproofing is included.

E Architectural panels hide removable panel seams, and do not require spackling or sanding.

thank you

chiara.tonelli@uniroma3.it

Roma TRE University
Architecture Department

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