ARCHITECTS' COUNCIL OF EUROPE
CONSEIL DES ARCHITECTES D'EUROPE

SUSTAINABLE ENERGY WEEK
An initiative of the European Commission

Morning Session / Part 2

Raising the Bar for Level(s) – Architects Feedback from the Pilots

Co-funded by the
Creative Europe Programme
of the European Union

PROGRAMME

- **Introduction** by Josefina LINDBLOM, EU Commission – DG Environment

- **Presentation of the ACE report** by Dr. Judit KIMPIAN, Chair of the ACE Sustainability Work Group

- **Panel discussion moderated by Judit Kimpian, with**:
  - **Josefina LINDBLOM**, EU Commission – DG Environment
  - **Brian Højbjerre SØRENSEN**, Architect at Årstiderne Arkitekter
  - **Markus MÜLLER**, Chairman of the Sustainable Architecture Work Group of the Federal Chamber of German Architects and President of the Chamber of Architects of Baden Würtemberg
  - **Dr Esfand BURMAN**, Researcher at the University College London - Institute for Environmental Design and Engineering Home
  - **Dr. Anna BRAUNE**, Director Research and Development at the German Sustainable Building Council (DGNB)

- **Conclusions**

Co-funded by the Creative Europe Programme of the European Union

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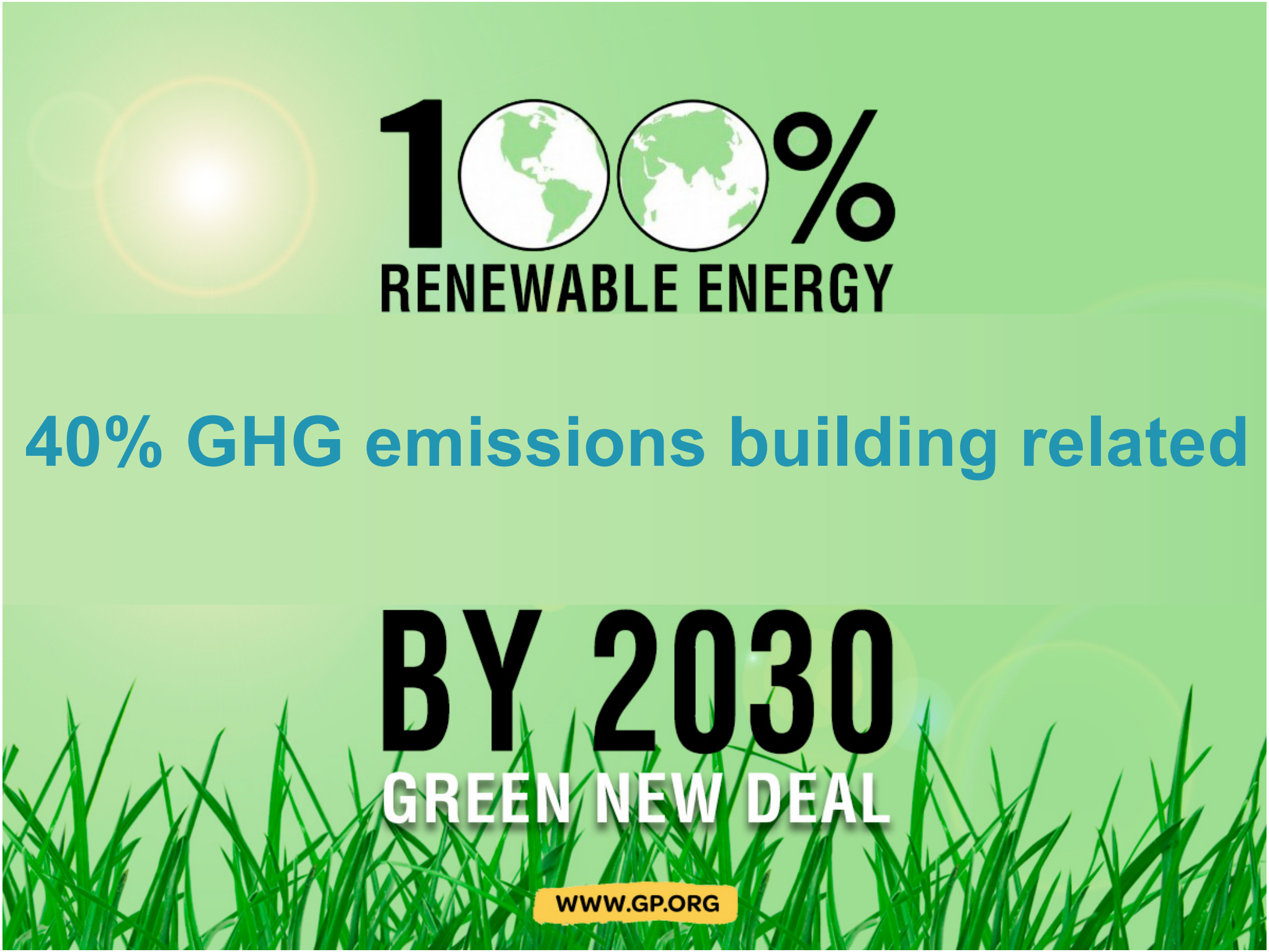
Raising the bar for Level(s) - Architects' feedback from the Pilots

Dr Judit Kimpian


extinction
rebellio
FROM THIS MOMENT
DESPAIR ENDS
AND TACTICS BEGIN
© picture-alliance/dpa/NurPhoto/R. Pope
SKOLSTREJK
FÖR
KLIMATET
ACT NOW
extinction rebellion
TELL THE TRUTH
make a step change
CLIMATE
EMERGENCY


100%
RENEWABLE ENERGY
40% GHG emissions building related
BY 2030
GREEN NEW DEAL
WWW.GP.ORG

Norway targets climate neutrality by 2030

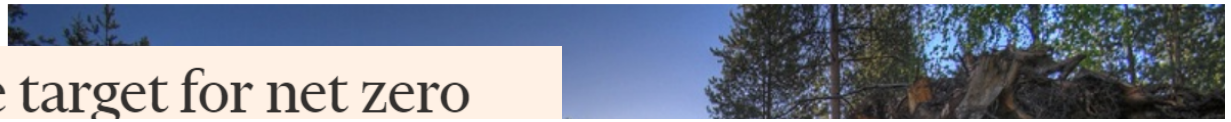
Published on 08/06/2016, 10:09am

Lawmakers recommend government adopts zer 2012 – in wake of Paris climate agreement

Finland to be carbon neutral by 2035. One of the fastest targets ever set

Published on 03/06/2019, 2:10pm

Incoming prime minister Antti Rinne presented the climate goal as part of a package with increased welfare spending on Monday



Germany to back EU-wide target for net zero emissions

Support for going carbon-neutral by 2050 st credentials

EU member states swing behind 2050 carbon neutral target

Germany has joined other countries after gr

Jon Stone Brussels | @joncstone | 14 hours ago |

Sweden passes climate law to carbon neutral by 2045

Published on 15/06/2017, 4:56pm

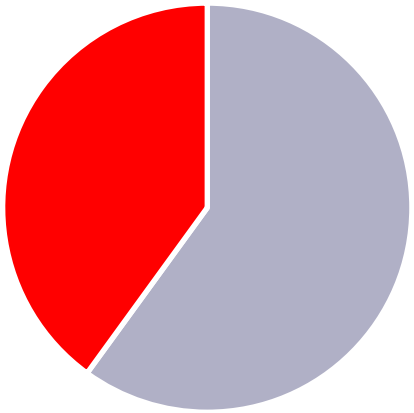
Legislation makes Sweden the first country to significantly since the world agreed a climate deal in Paris, in ing

UK to set legally binding target for net zero emissions by 2050

By Press Association 2019

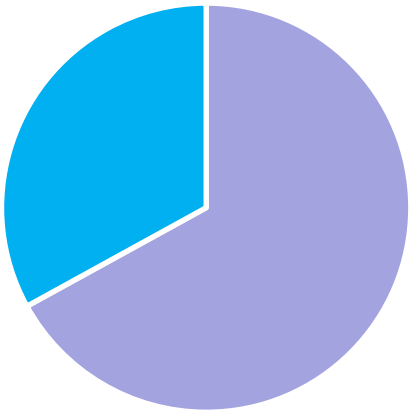
Status quo environmental

GHG



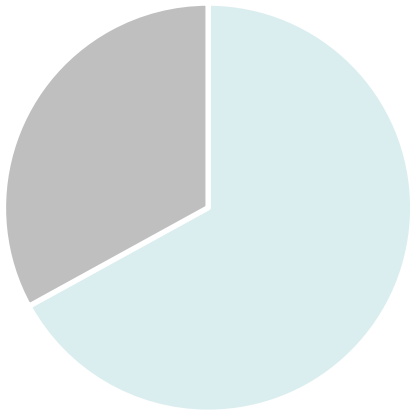
~40% of energy is used in buildings in EU

Water



12% of water used in buildings

Waste



25-30% of EU waste

Status quo economic

Construction accounts for **9%** of all economic activity in EU

40-90% all EU lending is in residential property

Over **90%** of the 2050 building stock is already built

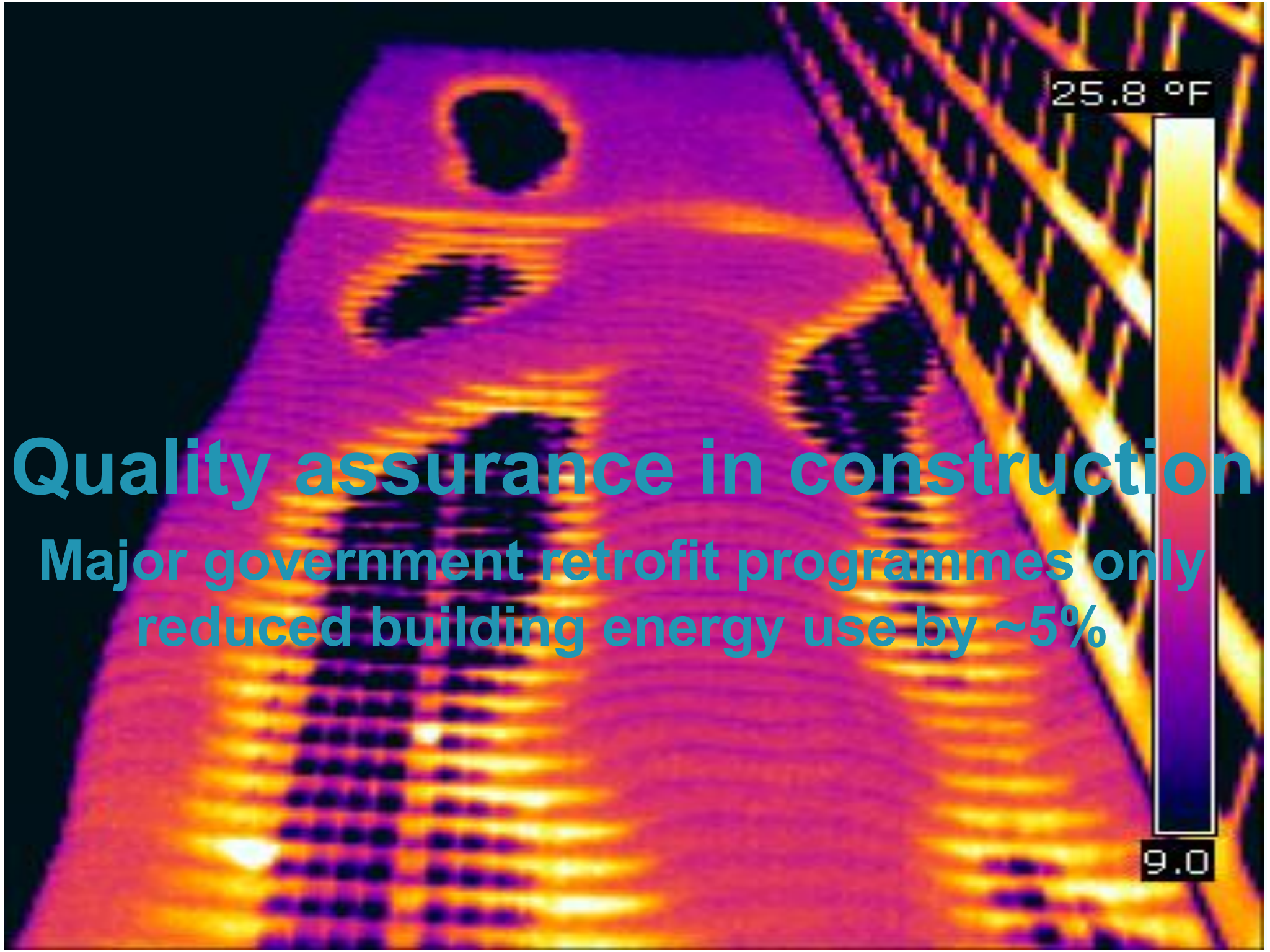
Government investment in UK residential retrofits on average improve GHG emissions between **5-15%**

Status quo social

We spend in around 90% of our time in buildings

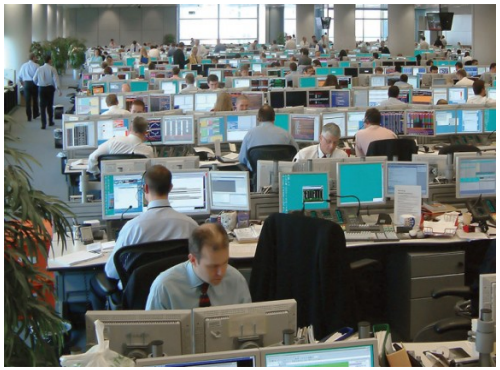
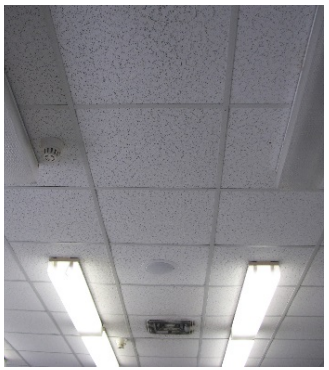
100% in the built environment

Architecture expresses & forms culture and has an impact on life span, health, education, communication, human activity



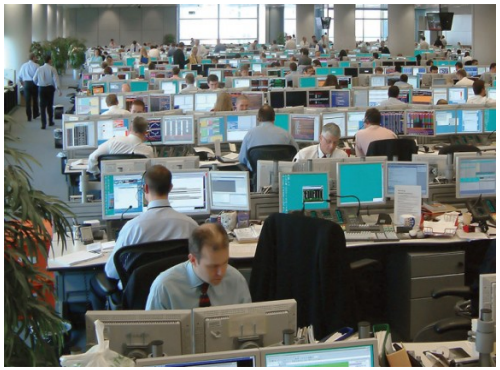
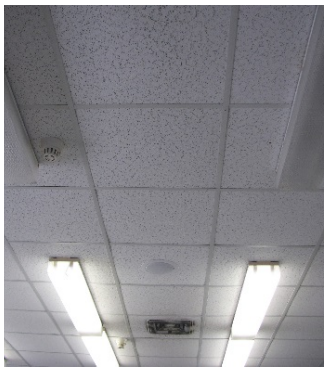
Quality assurance in construction

Major government retrofit programmes only reduced building energy use by ~5%


Reliance on energy consuming systems

For greater flexibility and profit


Smart Readiness Indicator

First attempt at ‘regulating’ control systems

https://www.ace-cae.eu/uploads/tx_jidocumentsview/10_2_GA19_1_SRI.pdf

#Performancegap

On average buildings consume 1.5-3 times more than intended

Energy Performance Certificate
Non-Domestic Building
HM Government

More energy efficient

A+

Net zero CO_2 emissions

A 0-25

B 26-50

C 51-75

D 76-100

E 101-125

F 126-150

G Over 150

Less energy efficient

31 This is how energy efficient the building is.

Technical information

Main heating fuel:	Grid Supplied Electricity
Building environment:	Heating and Natural Ventilation
Total useful floor area (m^2):	15560.369
Building complexity (NOS level):	5
Building emission rate ($kgCO_2/m^2$):	13.08

Benchmarks

Buildings similar to this one could have ratings as follows:

46 If newly built

89 If typical of the existing stock

Display Energy Certificate
How efficiently is this building being used?
HM Government

A 0-25

B 26-50

C 51-75

D 76-100

E 101-125

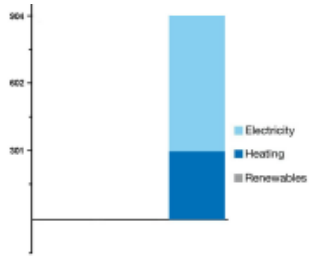
F 126-150

G Over 150

Less energy efficient

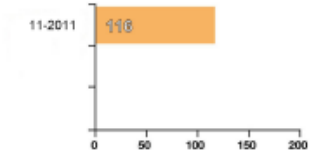
100 would be typical

116



Previous Operational Ratings

This tells you how efficiently energy has been used in this building over the last three accounting periods



Technical information

This tells you technical information about how energy is used in this building. Consumption data based on actual meter readings.

Main heating fuel: Natural Gas
Building Environment: Mixed-mode with Natural Ventilation
Total useful floor area (m^2): 14610
Asset Rating: 31

	Heating	Electricity
Annual Energy Use (kWh/m^2/year)	105	75
Typical Energy Use (kWh/m^2/year)	155	42
Energy from renewables	0%	0%

Administrative information

This is a Display Energy Certificate as defined in SI 2007/991 as amended.

Assessment Software:	DCLG, ORCalc, v3.6.1
Property Reference:	539640800000
Assessor Name:	Esfandiar Burman
Assessor Number:	LCEA900050
Accreditation Scheme:	CIBSE Certification Limited
Employer/Trading Name:	Aedas Architects Ltd
Employer/Trading Address:	5-8 Hardwick Street,London,EC1R 4RG
Issue Date:	28-11-2011
Nominated Date:	28-11-2011
Valid Until:	27-11-2012
Related Party Disclosure:	Not related to the occupier

Recommendations for improving the energy efficiency of the building are contained in the accompanying Advisory Report.

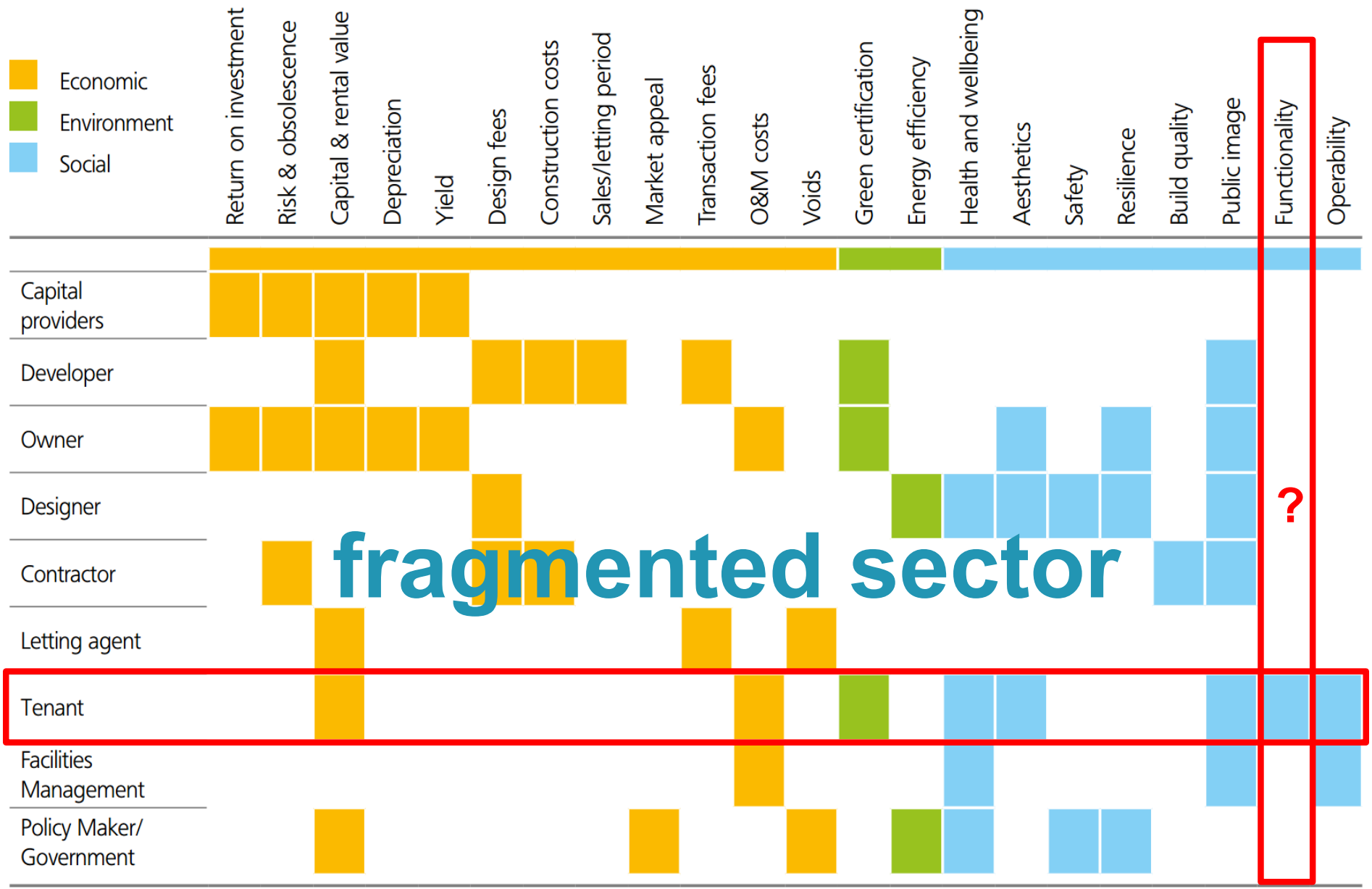


Figure 1: Building performance for different stakeholders (based on Task Group research)


#constructiongate
#credibilitygap
#measuretomanage

Transferring impacts to less reported areas

Source: Artist Maria Arceo

technical systems to achieve regulatory compliance vs higher maintenance costs

cost of materials vs local sourcing, recycled content, recyclability

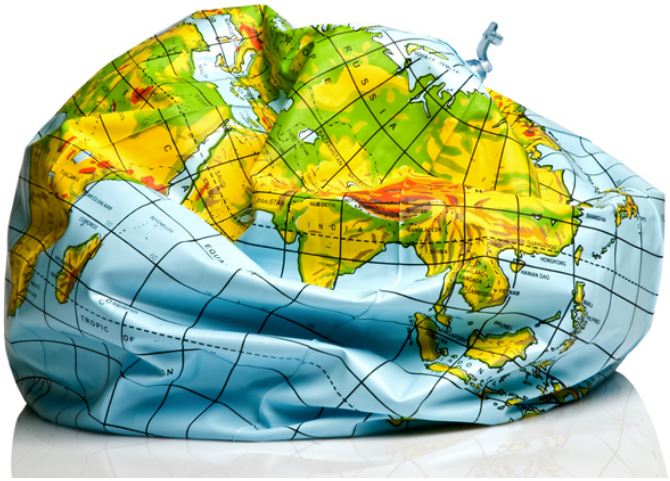
loss of floor area vs environmental impact of insulation products

speed of erection vs end of life disassembly

More usable area vs less stratification and comfort


Compact & lightweight or
High ceilings with thermal mass

Comfort & wellbeing



Climate change resilience

Life cycle cost & value

Holistic approach

Lifecycle approach
#MeasureToManage

List of indicators

1. GHG Emissions
Along the building lifecycle

- **Primary & Delivered Energy consumption in use:** kWh/m²/yr
- **Global Warming Potential** embodied CO_2 eq./m²

2. Material Impacts
Low impact material life cycles

- **Bill of Materials:** Abiotic fossil fuels, minerals and metals, Biotic materials
- **Waste Flows:** Kg/m² disposed of; reused; recycled; E recovery

3. Water Use
Circular use of water resources

- **Use Phase Consumption:** m³/occupant/yr

Service Life
Adaptability
Deconstruction/Reuse/recyclability

Other LCA Criteria: ozone depletion, acidification, eutrophication, Photochemical ozone creation

4. IEQ
Healthy & comfortable envs

- **Indoor Air Quality:** ventilation rate l/s/m2; CO2 ppm; RH %
- **Pollutants:** TVOC, CVOC, RI VOC, formaldehyde, benzene, PM2.5/10; µg/m³
- **Thermal Comfort:** % time out of range degree days or hours

Lighting
Visual
Acoustic

5. Climate Change
Adaptation, resilience & impact

- **Extreme weather events under future climate scenarios:**
- **Thermal Comfort:** % time out of range degree days or hours 2030/2050
- **Food Risk:** surface water runoff; flood risk area

Sun Rain
Wind Snow
Sea level

6. Cost & Value
Optimised over whole life

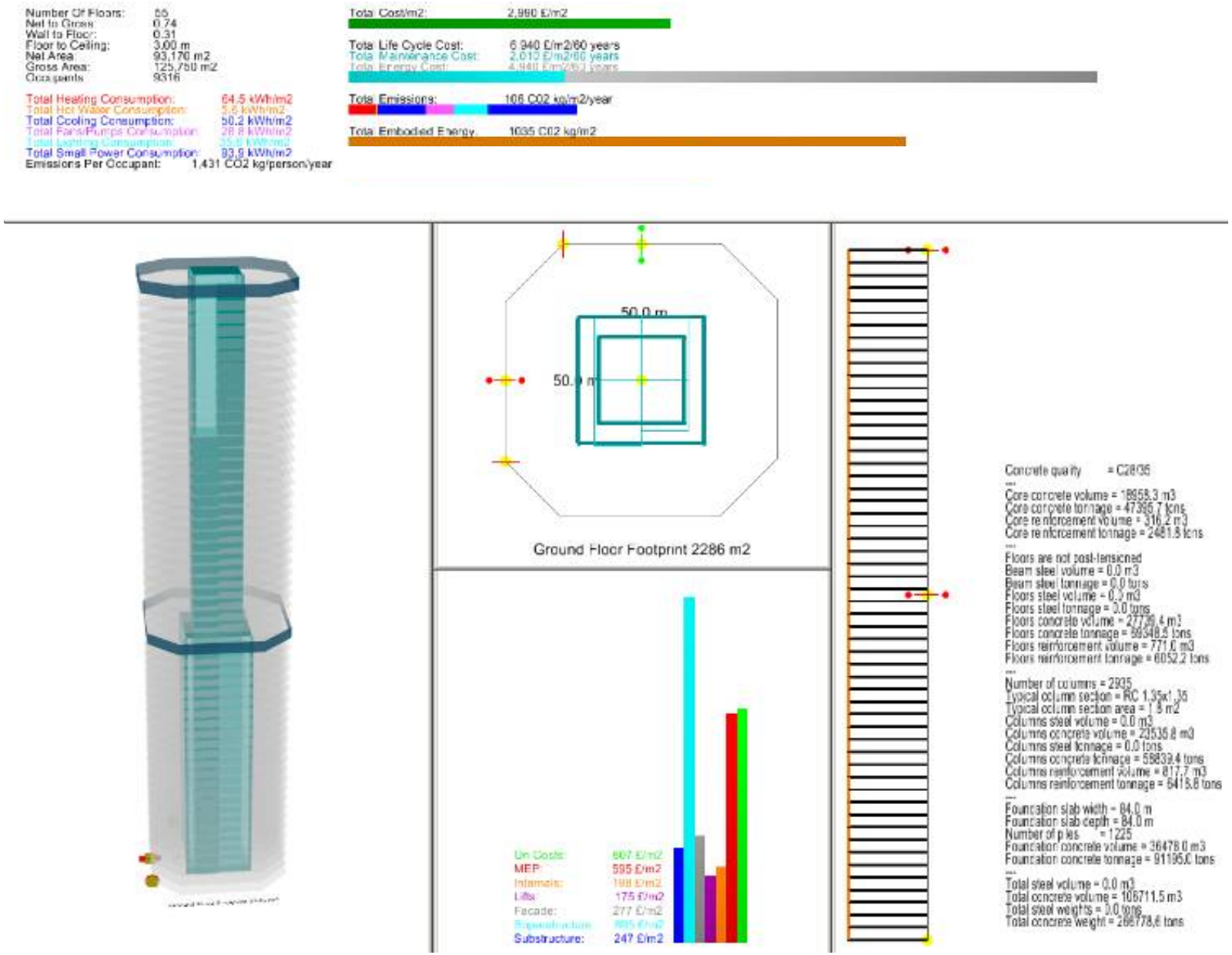
- **Life cycle costs** £/m2/yr
- **Value Creation & Risk Factors:** Data quality of Indicators

Feedback:

more accountability in construction

#audit what matters

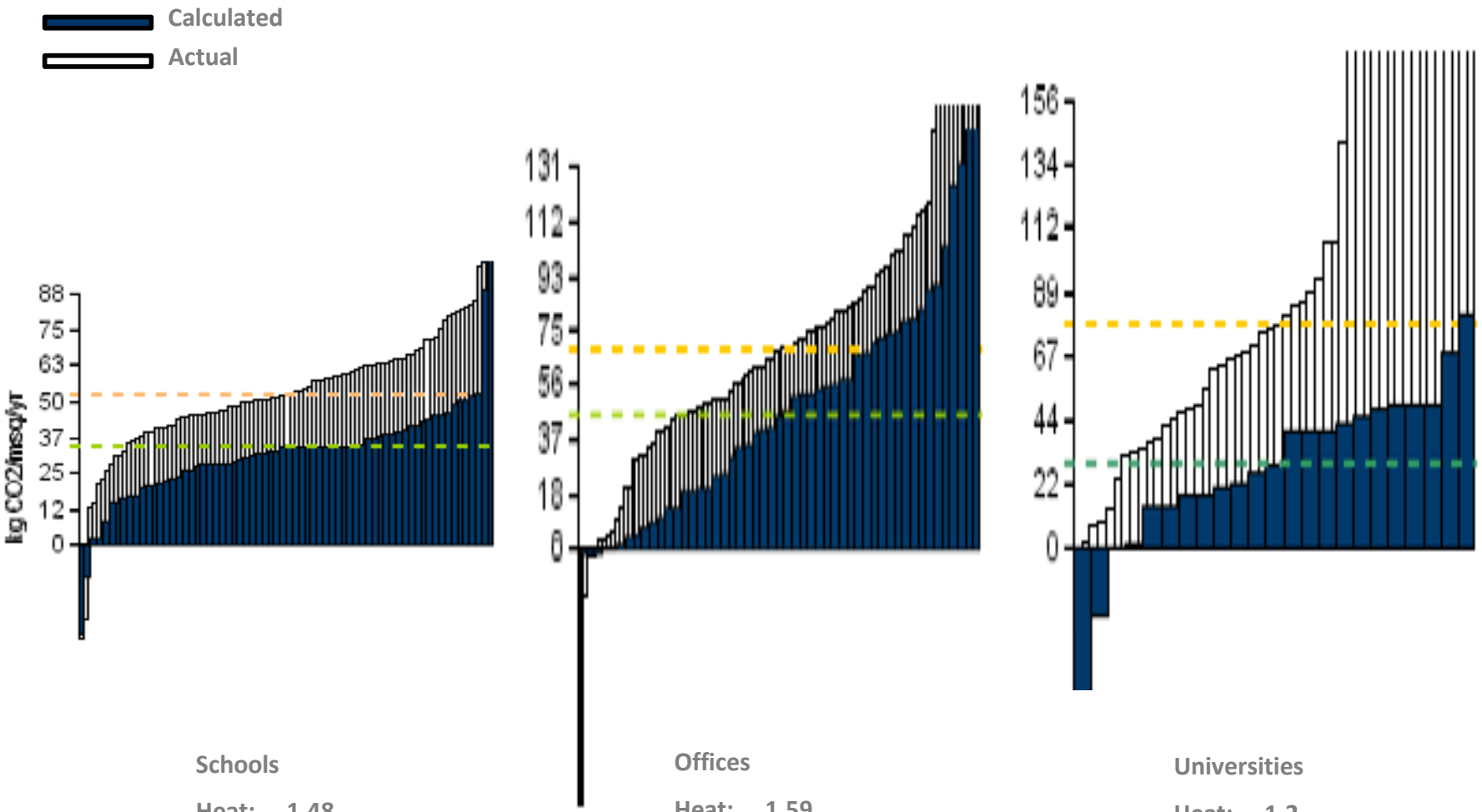
#loveschedules



Aedas ARUP HILSON MORAN Davis Langdon

#benchmarks

CarbonBuzz
an RIBA CIBSE platform



Schools

Heat: 1.48

Electricity: 1.9

Offices

Heat: 1.59

Electricity: 1.71

Universities

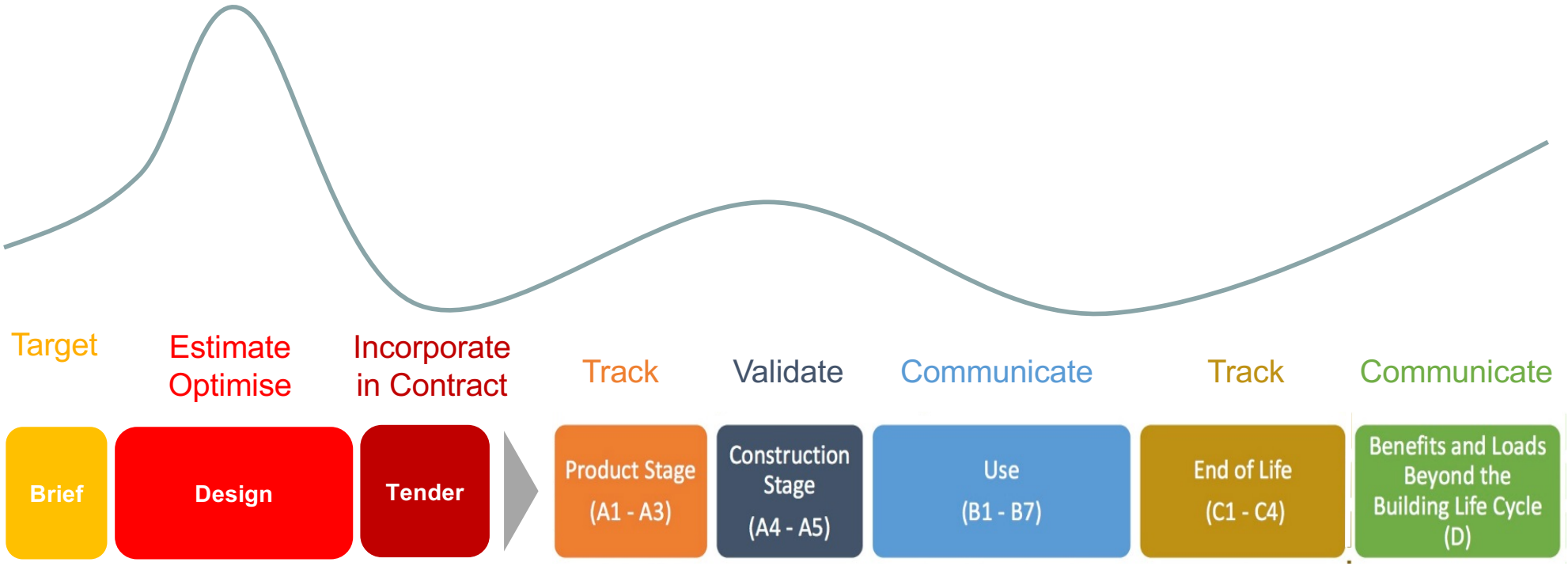
Heat: 1.2

Electricity: 2.3

embodied vs operational carbon
complexity vs quality risks
technological solutions vs life span
capital vs whole life cost
heat loss vs summertime overheating
lower embodied carbon vs overheating
low cost materials vs VOCs

#Design

#BalancingPriorities



Calculate : Measure : Report

Match reporting to workflow

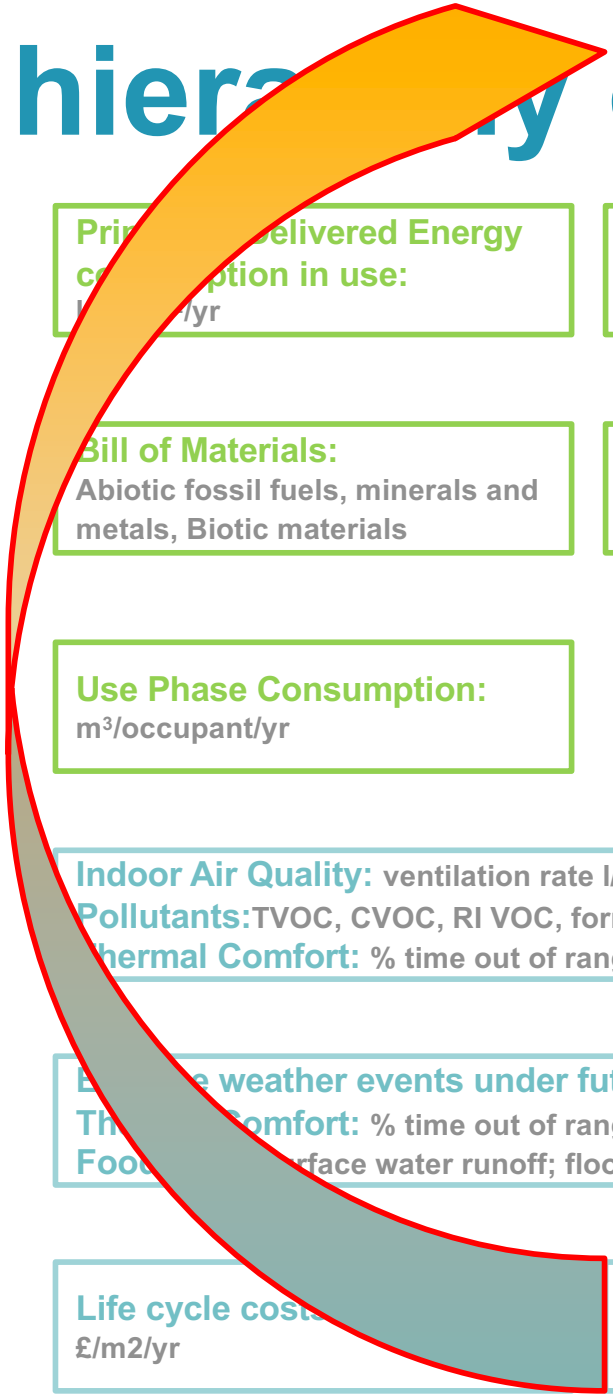
#EasyAccess

Smart Readiness Indicator
EPBD
Building Passports / Digital Log Books
Construction Products Directive
Eco-labels
Indoor air quality initiative

#RegulatoryAlignment


IGNORE
ME
Architecture : Culture : People

Reverse hierarchy of indicators



1. GHG Emissions
Along the building lifecycle

Pri… …elivered Energy co… …ption in use:
…/yr

Global Warming Potential
embodied CO_2 eq./m^2

2. Material Impacts
Low impact material life cycles

Bill of Materials:
Abiotic fossil fuels, minerals and metals, Biotic materials

Waste Flows: Kg/m^2
disposed of; reused; recycled; E recovery

3. Water Use
Circular use of water resources

Use Phase Consumption:
m^3/occupant/yr

Service Life
Adaptability
Deconstruction/Reuse/recyclability

Other LCA Criteria:
ozone depletion, acidification, eutrophication, Photochemical ozone creation

4. IEQ
Healthy & comfortable envs

Indoor Air Quality: ventilation rate l/s/m2; CO2 ppm; RH %
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…hermal Comfort: % time out of range degree days or hours

Lighting
Visual
Acoustic

5. Climate Change
Adaptation, resilience & impact

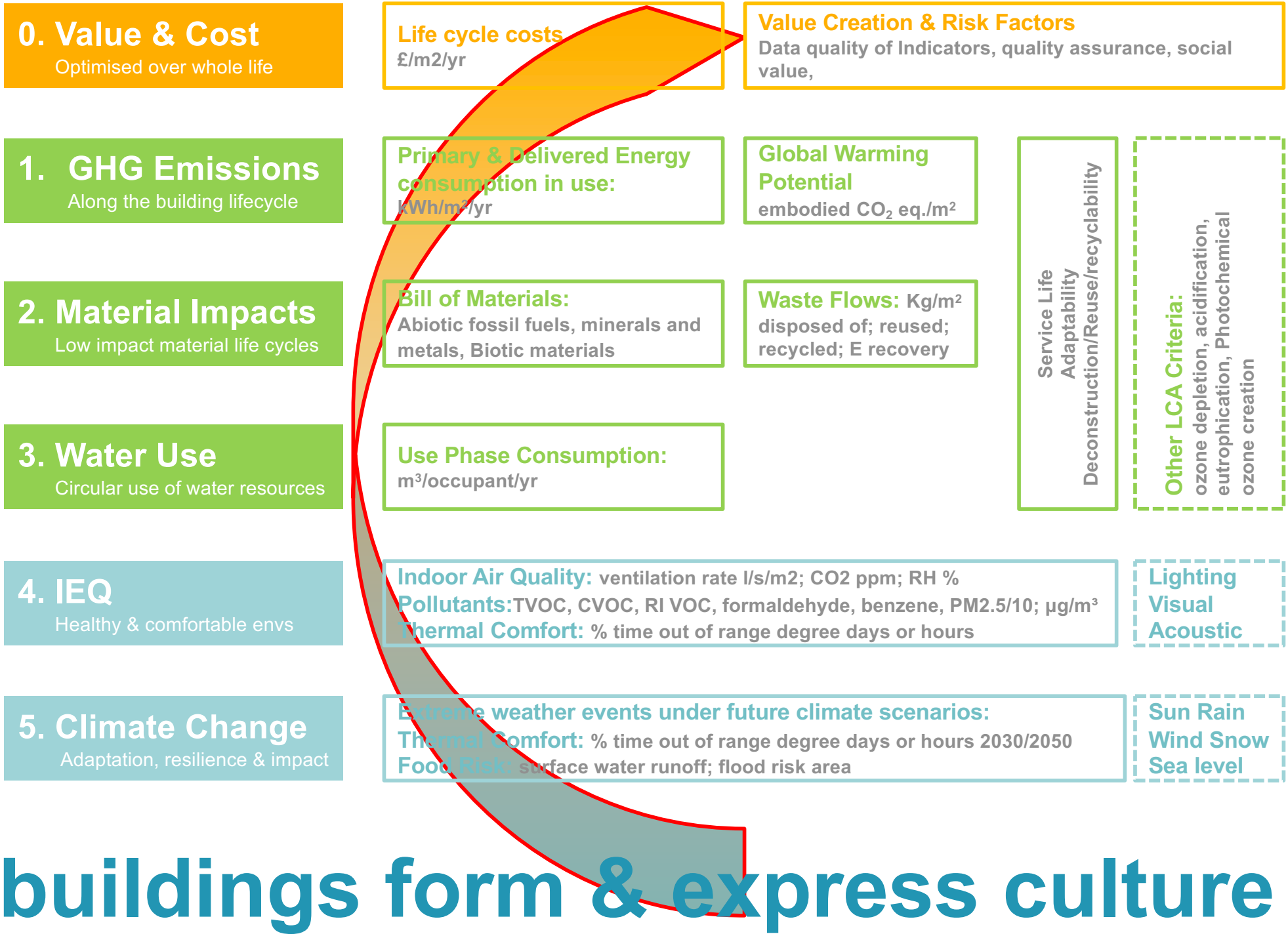
E… …e weather events under future climate scenarios:
Th… …Comfort: % time out of range degree days or hours 2030/2050
Food… …rface water runoff; flood risk area

Sun Rain
Wind Snow
Sea level

6. Cost & Value
Optimised over whole life

Life cycle cost…
£/m2/yr

Value Creation & Risk Factors:
Data quality of Indicators


0. Value & Cost
Optimised over whole life
Life cycle costs
£/m2/yr
Value Creation & Risk Factors
Data quality of Indicators, quality assurance, social value,
1. GHG Emissions
Along the building lifecycle
Primary & Delivered Energy consumption in use:
kWh/m²/yr
Global Warming Potential
embodied CO2 eq./m²
Service Life
Adaptability
Deconstruction/Reuse/recyclability
Other LCA Criteria:
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Flood Risk: surface water runoff; flood risk area
Sun Rain
Wind Snow
Sea level
buildings form & express culture


Forced fixation down 70%
Medication down 60%

25% more students

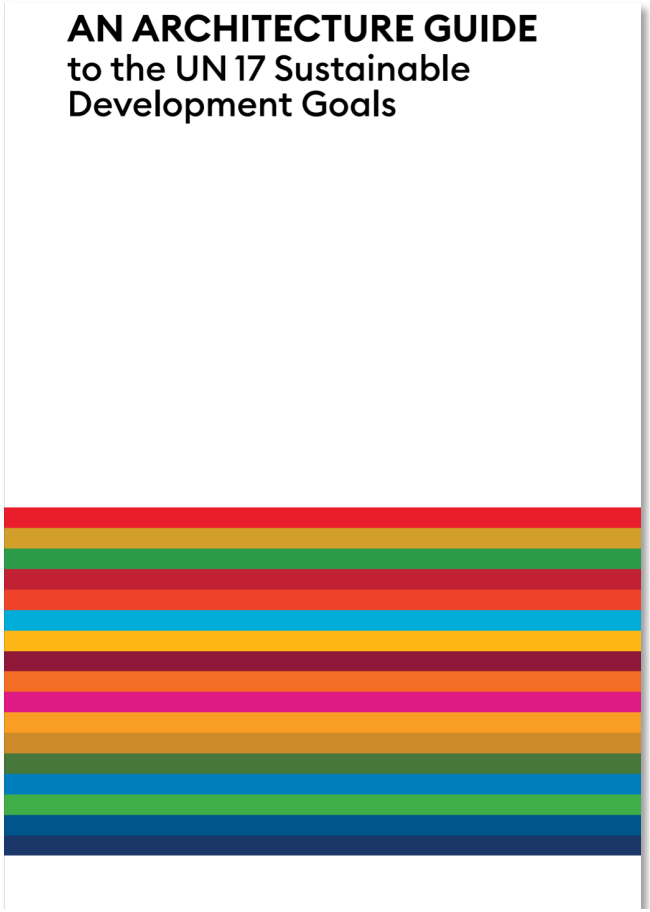
40% rise in exam completion

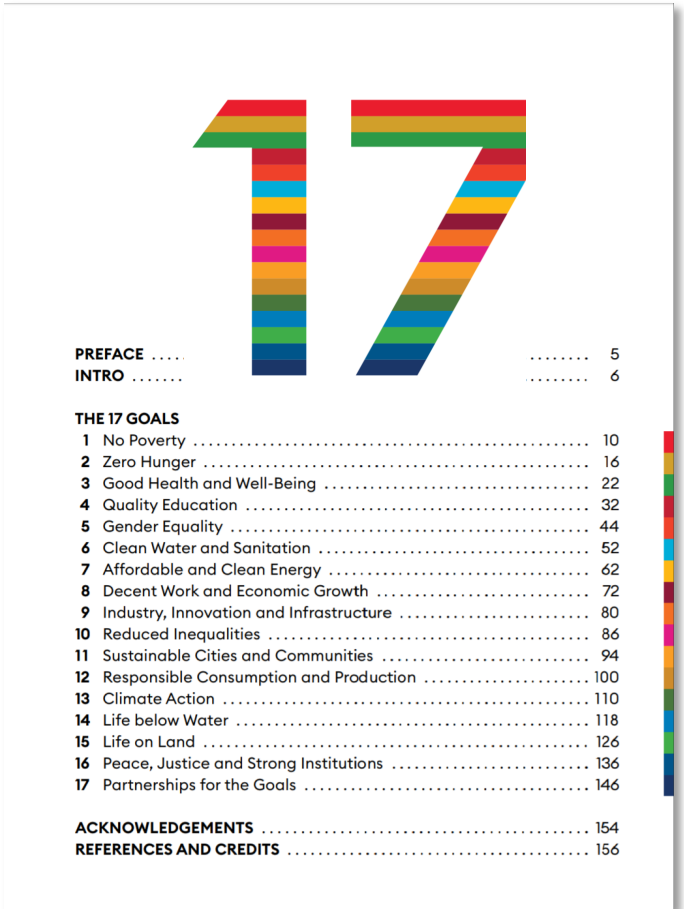

Life cycle costs down 80%
STEN ARCHITECTS | SKATERS PARK & GYM

#BigPicture

#UNSDG

#Education





ARCHITECT

DOCUMENT YOUR VALUE CREATION

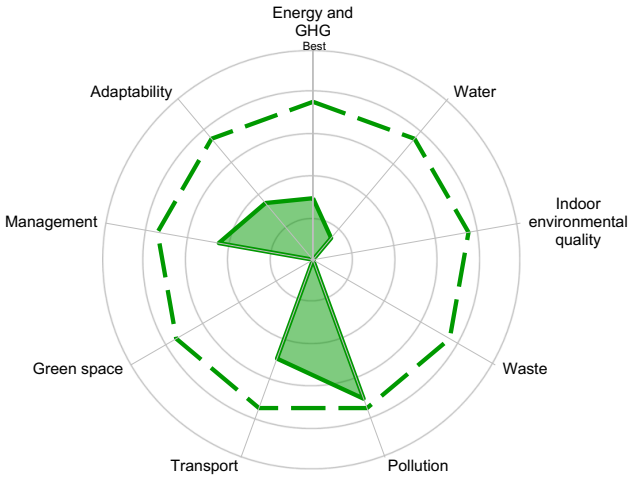
How to get started!

Lene Espersen
Chief Executive Officer
Danish Association of Architectural Firms

Peter Andreas Sattrup
Chief Consultant, Architect MAA PhD
Danish Association of Architectural Firms

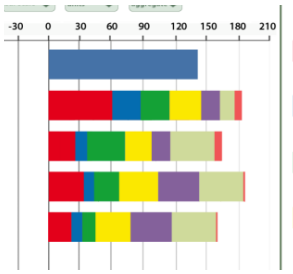
DANISH ASSOCIATION OF ARCHITECTURAL FIRMS

#ClosetheFeedbackloop



Investment KPIs

Prediction



Validation


Static dominance


Animated symbiosis
© Andre Baertschi | wildtropix.com

MENU ☰

ENERGY PEOPLE BUILDINGS

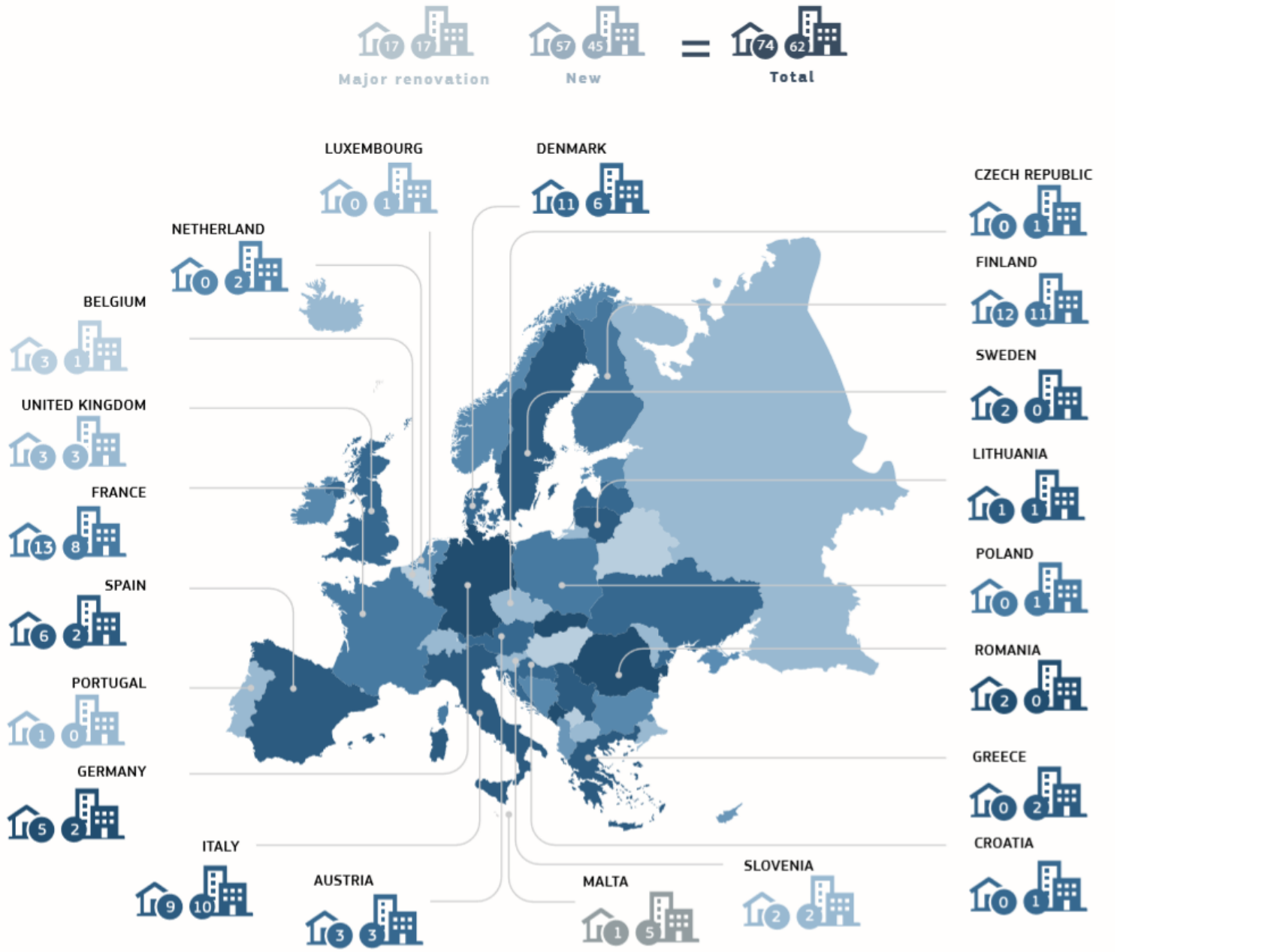
THANK YOU

WITH HATTIE HARTMANN AND SOFIE PELSMAKERS

ARCHITECTS' COUNCIL OF EUROPE
CONSEIL DES ARCHITECTES D'EUROPE

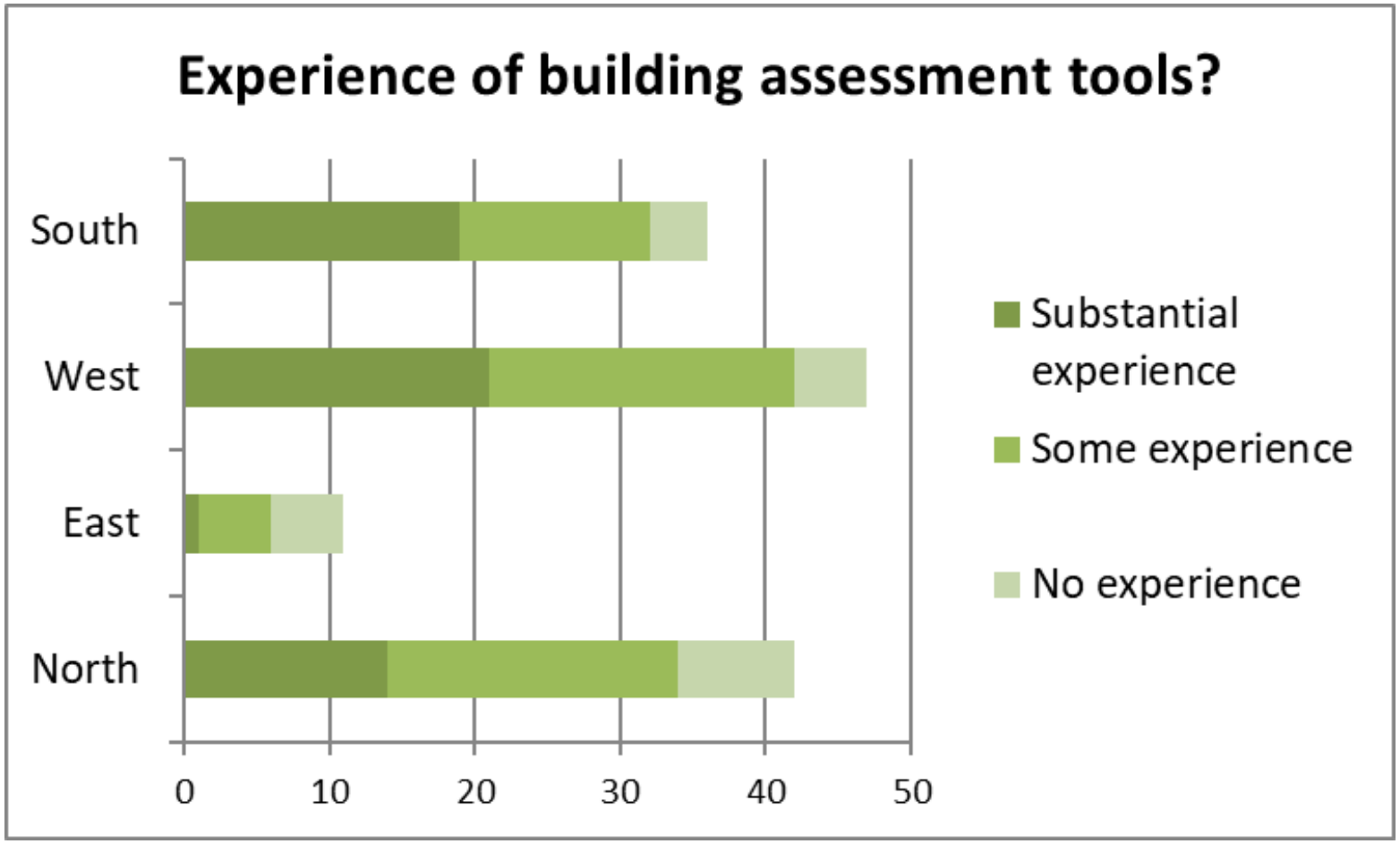

European
Commission
Level(s)
Building sustainability
performance
#BuildCircular

Testers and their tests



European Commission

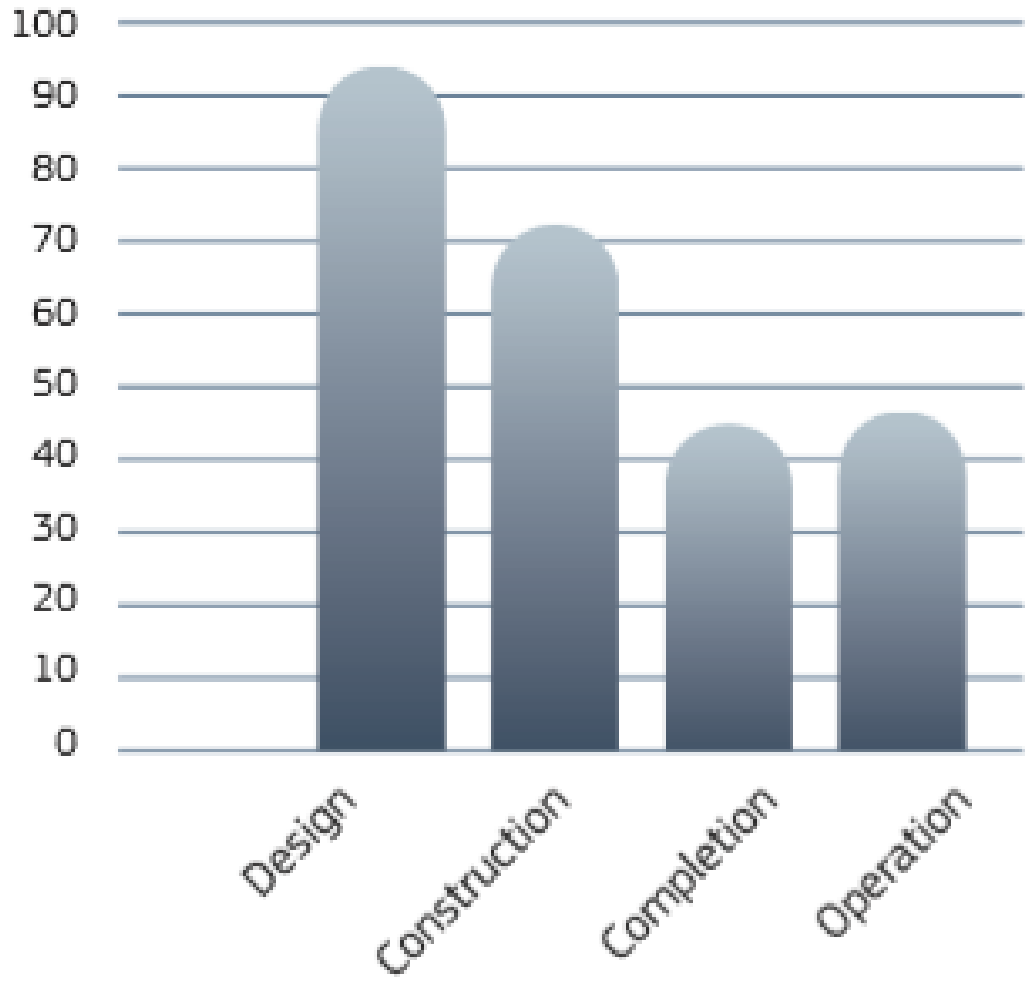
What is the level of experience?



Who is testing Level(s)?

European Commission

At what stages is Level(s) tested?



European Commission

Do chosen indicators depend on experience?

- No, all experience categories test different kinds of indicators at same high numbers.
- Life Cycle GWP is tested by around 90% of testers.

Does testing depend on stakeholder type?

- Same pattern for:
  - residential/offices
  - new/renovation
  - building life cycle stage

- Some differences in chosen indicators:
  - “optional indicators” – range between public authorities and construction companies at less than 50% and design teams at 76%

What is next?

30 June	End of test phase, reporting of indicator results
30 September	Horizontal feedback
2019	Verification and analysis
2020 – Q1 Q2	Modification and consultation
2020 Q2	Launch of final version
2020-2021	Green Public Procurement criteria development
2021 Q4	GPP criteria to feed into the Sustainable Finance initiative


European
Commission
Level(s)
Building sustainability
performance
#BuildCircular