



Level(s)

European framework for sustainable buildings

Why Level(s)?

Based on a building's full life cycle, the building sector is responsible for:



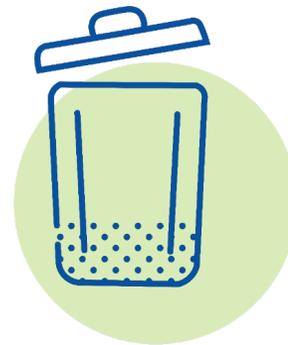
1/2 of all extracted materials



1/2 of the total energy consumption



1/3 of water consumption



1/3 of waste generation

Level(s) provides a holistic framework to increase the performance of buildings and bring them into the circular economy.

- Level(s) enables building professionals and their clients to use fewer resources, and therefore improve the environmental performance of their buildings.
- Level(s) can be used as an entry-level tool and at each stage of building projects, to give a complete picture throughout the full lifecycle.
- It offers a framework to measure performance in key areas at each stage

What is Level(s)?

- EU wide assessment and reporting framework for sustainable performance of buildings
- Applicable to individual buildings or pan-European portfolios
- Whole Lifecycle approach - provides a robust approach to measurement and improvement from design to end-of-life
- For residential buildings and offices, new construction/ renovation
- Core indicators already tested by the building sector
- Open source and freely available

2015 – Initial development of the Level(s) framework

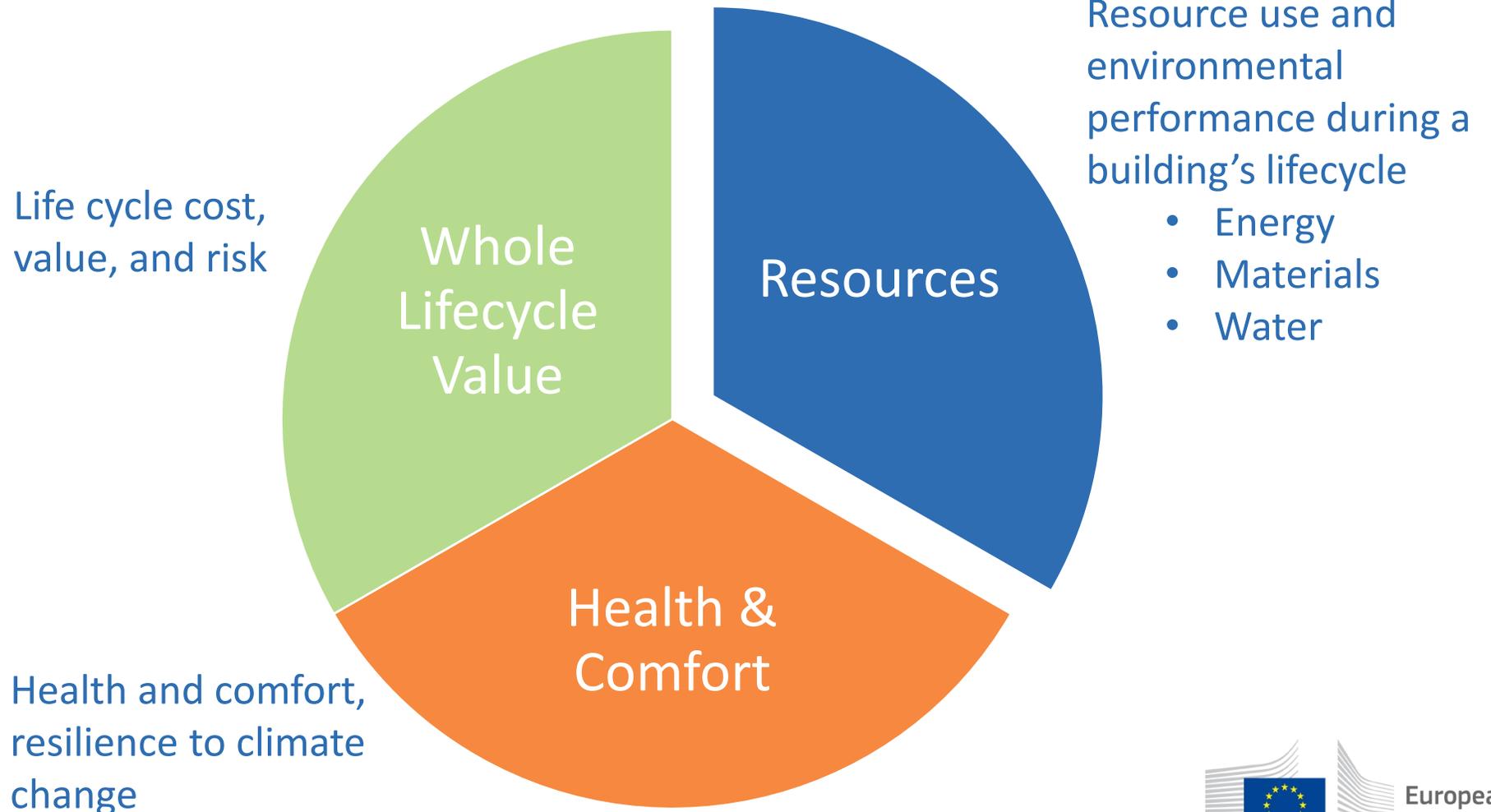
2017-2019 – Level(s) testing phase involving over 130 projects in 21 EU member states

2019 – Level(s) test survey

2020 – Official Level(s) launch

2021 – Web based material

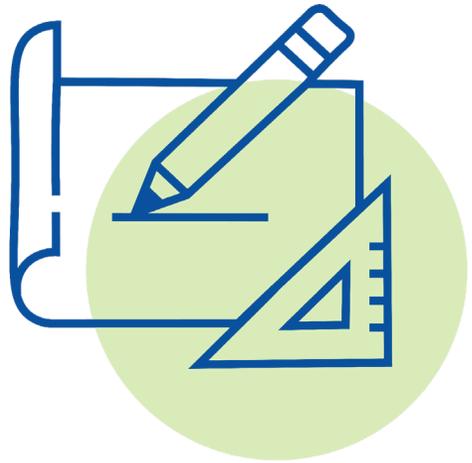
What areas does Level(s) cover?



Level(s): 3 themes, 6 macro indicators

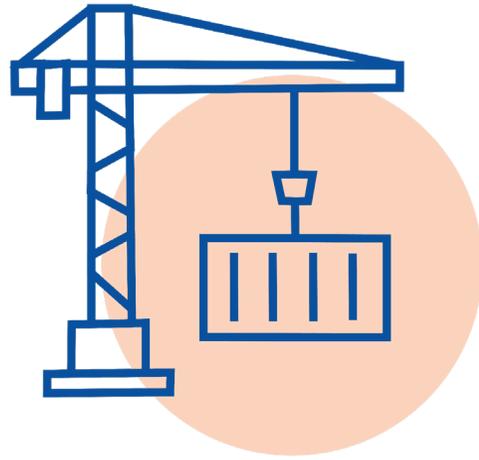
Thematic areas	Macro Objectives	Indicators			
Resource use and environmental performance	1. Greenhouse gas emissions throughout building life cycle	1.1 Use stage energy performance (kWh/m ² /yr)	1.2 Life cycle Global Warming Potential (CO ₂ eq./m ² /yr)		
	2. Resource efficient and circular material life cycles	2.1 Bill of quantities, materials and lifespan	2.2 Construction and Demolition waste	2.3 Design for adaptability and renovation	2.4 Design for deconstruction
	3. Efficient use of water resources	3.1 Use stage water consumption (m ³ /occupant/yr)			
Health and comfort	4. Healthy and comfortable spaces	4.1 Indoor air quality	4.2 Time out of thermal comfort range	4.3 Lighting	4.4 Acoustics
Cost, value and risk	5. Adaption and resilience to climate change	5.1 Life cycle tools: scenarios for projected future climatic conditions	5.2 Increased risk of extreme weather	5.3 Increased risk of flooding	
	6. Optimised life cycle cost and value	6.1 Life cycle costs (€/m ² /yr)	6.2 Value creation and risk factors		

The 3 stages of Level(s)



Level 1

**Concept
stage/qualitative**



Level 2

**Design and
construction/
quantitative**

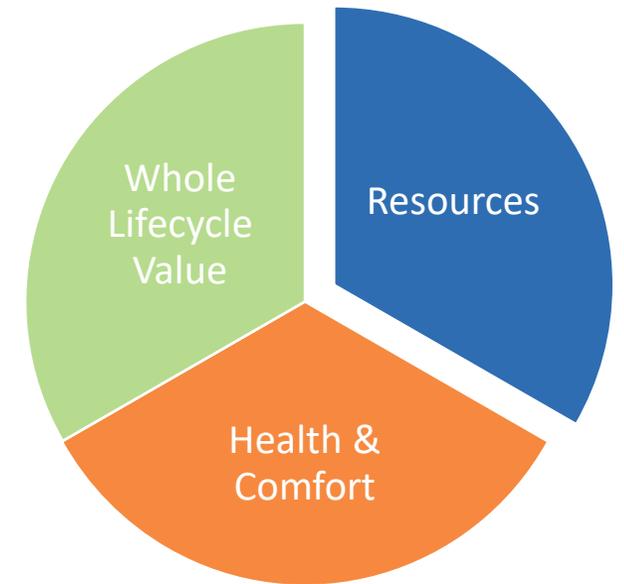


Level 3

**Reality/monitoring,
including the handover
to the client**

Level(s) in the policy context

- Paris Agreement – decarbonisation of building and construction sector by 2050
- Sustainable Development Goals
- EU Green Deal, including:
 - The EU Circular Economy Action Plan
 - The EU Renovation Wave
 - Recovery Plan
 - Bauhaus



Key benefits of Level(s)

- Holistic, common language using existing best practice industry standards
- Methodology can be used across major asset types and geographies
- Future-proofing buildings for carbon neutrality
- Underpins future EU and national policies
- Alignment with certification schemes
- Enhances dialogue between design, technical and financial stakeholders
- Supports sustainability skills in organisations
- Brings minimum numbers of indicators, with maximum leverage to deliver sustainability.
- Tracks performance throughout the life cycle
- Brings accountability and investor confidence
- Supports communication of value based on ESG factors

Level(s) is for you!



Planning

Public authorities,
policy makers and
procurers



Design

Architects, designers,
engineers, and quality
surveyors



Financing

Clients and
investors, including
property owners,
and developers

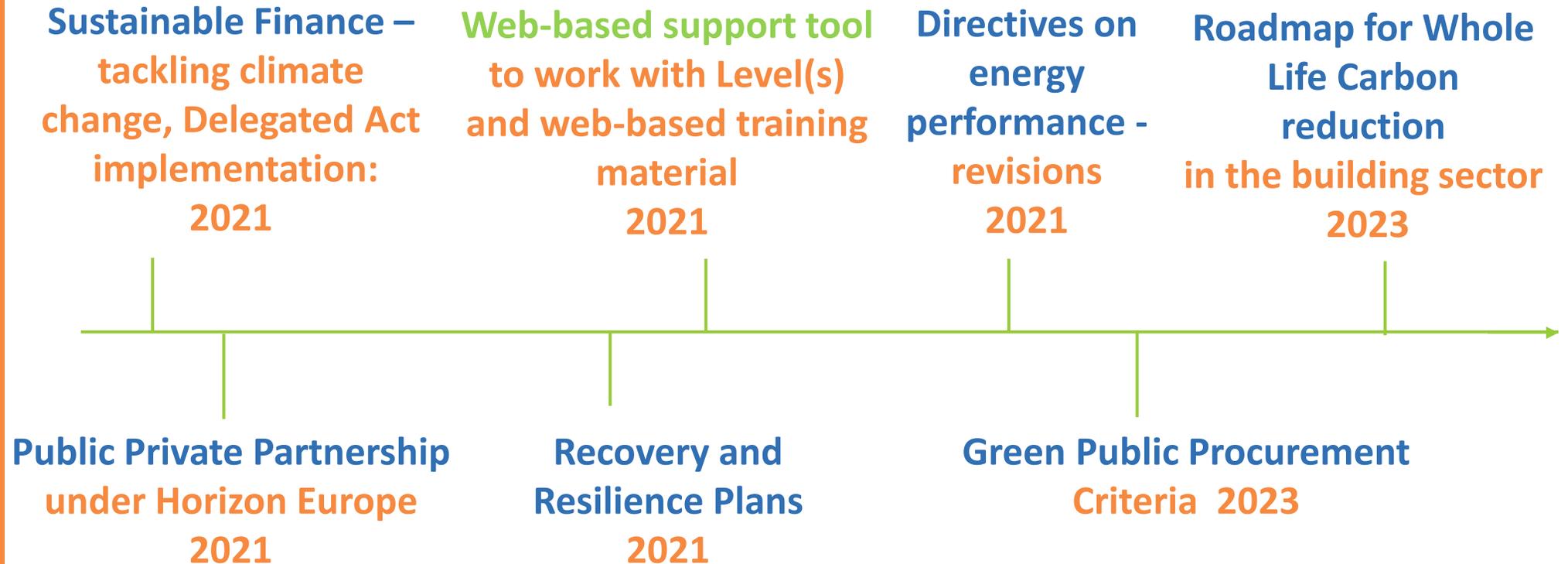


Execution

Construction and
contractors, asset and
facilities managers,
and occupants



What's next for Level(s)?



Roadmap for whole life carbon reduction

- Importance of whole life emissions
- Vision and milestones
- An accelerator
- Green and digital transition create opportunities
- Be inspired by front runners

Thank you

Visit https://ec.europa.eu/environment/topics/circular-economy/levels_en

To join the new Level(s) group on LinkedIn, visit
<https://www.linkedin.com/groups/12501037/>

Follow and share developments under #BuildCircular on social media
(Twitter, Facebook)



Webinar Level(s)

9.03.2021



Level(s) testing phase - pilot project Knauf Insulation Experience Center Building

Jean-Pierre Pigeolet, Products and Buildings Sustainability Manager



Rock Mineral Wool Plant, Skofja Loka in Slovenia

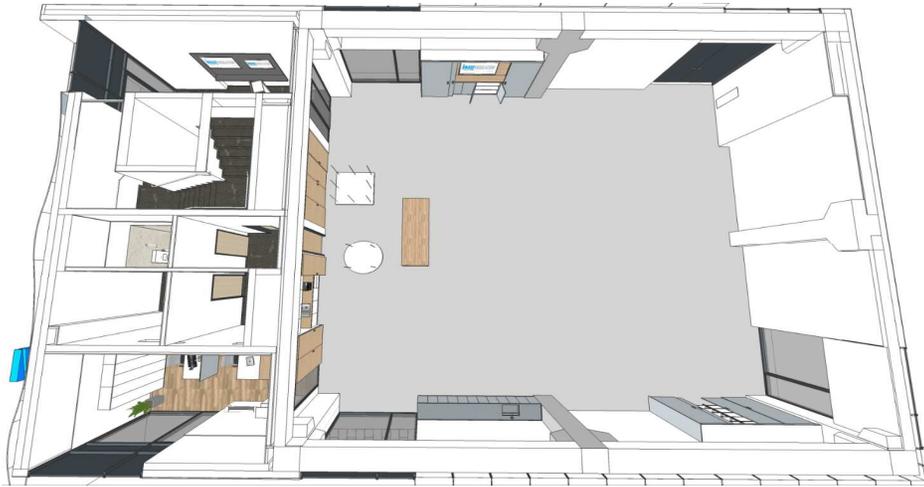
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EXPERIENCE CENTER

Education & Demonstration Experience

KNAUFINSULATION



KNAUF INSULATION
EXPERIENCE CENTER 3

Case study of sustainable construction ?

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Need for a scheme, a kind of system to navigate through sustainability requirements.



DGNB

Sustainable Building DGNB Platinum Certificate

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Year of completion: 2018

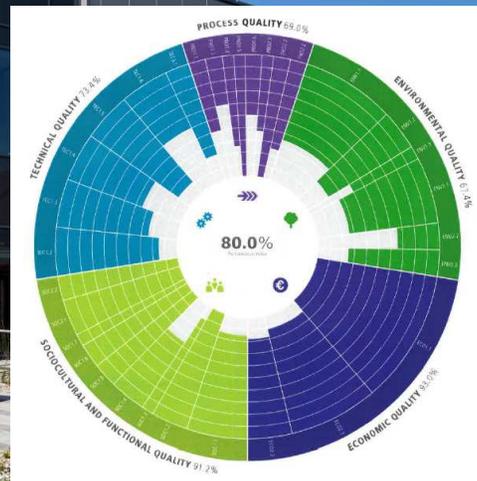
Gross floor Area: 832 m²

Floors: P+2

Energy class (SLO): A2

Nearly zero-energy building

Architect: Protim Ržišnik Perc d.o.o.



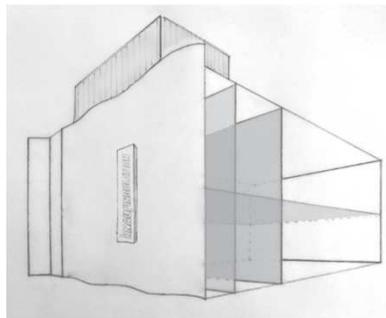
**KNAUF INSULATION
EXPERIENCE CENTER** 6

Why not to apply & compare with Level(s) reporting tool?



DGNB[®]

Deutsche Gesellschaft für Nachhaltiges Bauen e.V.
German Sustainable Building Council



DGNB & Level(s) mapping

- Comparison in requirements/criterias
- Highlighting similarities & differences



Core sustainability indicators					
Level(s)	Unit	Level 1	DGNB	Level 2	DGNB
MO 1: GHG Emissions along a buildings life cycle					
1.1 Use stage energy performance					
1.1.2 Delivered energy demand (supporting indicator)					
	kg CO2e/m²/yr	<i>Fuels, District energy, Electricity</i> Full life cycle for minimum building scope (incl. MEP, water); Results (tabular) plus LCA summary report - s. p. 50)	Sub-result of ENV1.1 LCA calculation Applicable if detailed LCA method is chosen (parking to be included) - BUT: GWP differentiation issue (see below cell E33)	see Level 1 Full life cycle for minimum building scope (incl. MEP, water) but no external works; Results (tabular) plus LCA summary report - s. p. 50)	Sub-result of ENV1.1 LCA Applicable if detailed LCA method is chosen for all life cycle stages (all modules?)- BUT: GWP differentiation issue
		Simplified reporting option 1: Incomplete LC (A1-A3, B4,5,6)	Simplified LCA method: incomplete result from DGNB compliant LCA; Problems: No MEP, no differentiation into different GWPs, not calculated for 60yrs, no GWP of water consumption		
		Simplified reporting option 2: Incomplete LC (A1-A3, B6, C3-4), D)	Simplified LCA method: incomplete result from DGNB compliant LCA; Problems: No MEP, no differentiation into different GWPs, not calculated for 60yrs, no GWP of water consumption		
1.2.1 Life cycle GWP		Results for GWP differentiated into: GWP (fossil); GWP (biogenic); GWP (land use and land transformation); Totals - calculated for 60 yrs	n.a. due to use of data sets and EPDs!	Results for GWP differentiated into: GWP (fossil); GWP (biogenic); GWP (land use and land transformation); Totals - calculated for 60 yrs	n.a. due to use of data sets and EPDs!

KI Experience Center : Level(s) indicators



■ Filled for “Completion and handover stage”



	Level 1	Level 2	Level 3
1.1 Use stage energy consumption	●	○	○
2.3 Construction and demolition waste and materials	●	○	○
3.1 Use stage water consumption	●	○	○
4.1 Indoor air quality	○	○	●
4.2 Time out of thermal comfort range	●	○	○

Post air measurements

DGNB TEC 1.4. tool

	Level 1	Level 2	Level 3
1.2 Life cycle Global Warming Potential (GWP)	●	○	○
2.1 Life cycle tool: Building Bill of Materials (BoM)	●	○	○

	Level 1	Level 2	Level 3
2.2 Life cycle tool: scenario 1 - Building and elemental service life planning	●	○	○
2.2 Life cycle tool: scenario 2 - Design for adaptability and refurbishment	○	●	○
2.2 Life cycle tool: scenario 3 - Design for deconstruction, reuse and recycling	○	●	○
2.4 Life cycle tool: Cradle to cradle Life Cycle Assessment (LCA)	●	○	○
5.1 Scenarios for projected future climatic conditions	○	○	○
6.1 Life Cycle Cost (LCC)	○	●	○
6.2 Value creation and risk factors	○	○	○

DGNB TEC 1.6. tool

DGNB LCC tool

Those are the old Level(s) scale and stages from the Pilot phase in 2019!

Lessons and challenges

- **DGNB ≈ high similarities or same requirements as Level(s)**
- **DGNB tools can really help:**
 - LCC
 - Deconstruction
 - Building Flexibility



LEVELS - KI Experience Center

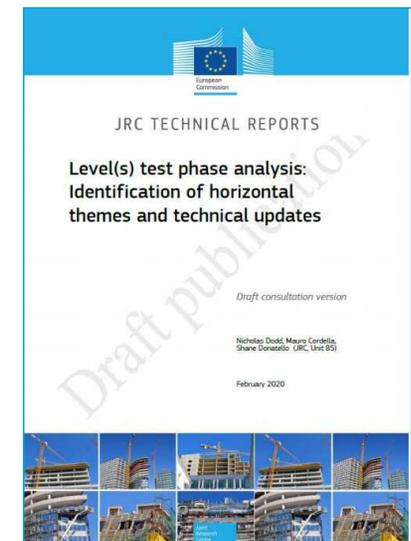


- Excel reporting tool submitted June 2019 to EU JRC
- Level(s)/GPP/GBC Conference September 2019 in Slovenia
- JRC survey questions filled in September 2019



136 registrations, 82 testers finalised

According to *Saša Galonja (Head of Construction Division, Spatial Planning, Construction and Housing Directorate at the Slovenian Ministry of the Environment and Spatial Planning)*, “the opening of KIEXC is a demonstration of Knauf Insulation’s pioneering approach to sustainable construction. The project gave us the opportunity to learn how an established certification scheme as DGNB works in our legal and built environment, and how the Level(s) framework is compatible with DGNB but also with our national sustainability criteria. *This project represents a reality check for the application of new sustainability requirements in our country.*”



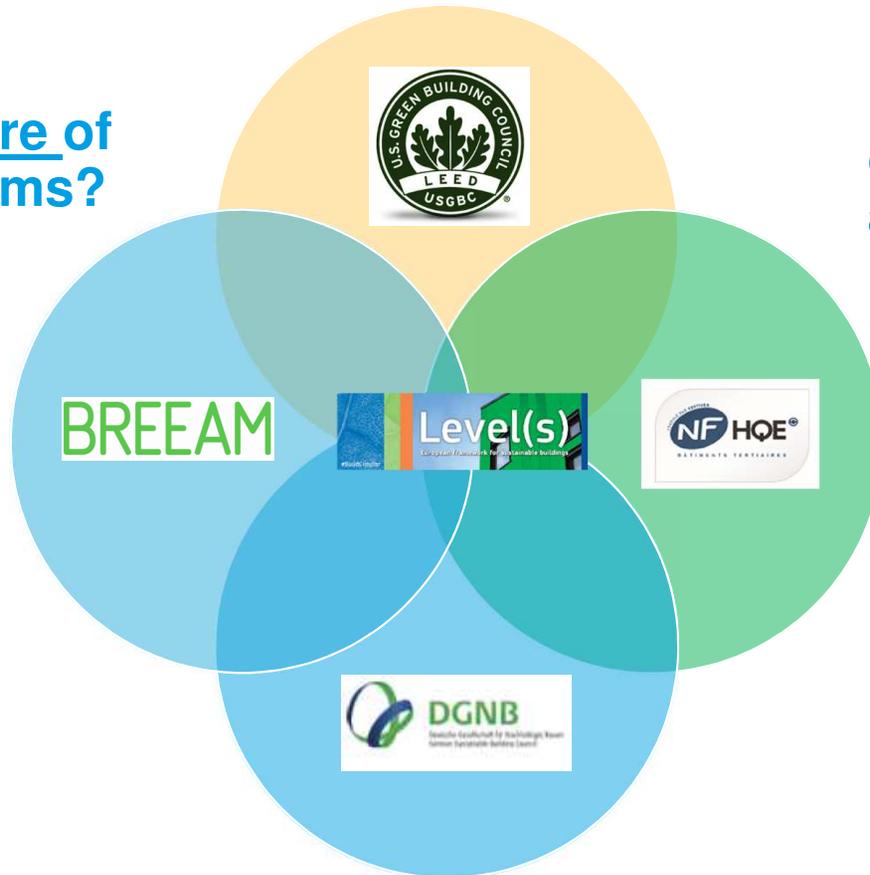
Lessons and challenges

- If you experienced a rating system like LEED, DGNB...this tool should not be a problem!
- Importance to spread knowledge and awareness across stakeholders
- Relevant Holistic approach through Life Cycle Assessment
- Will increase knowledge of European Norms: EN 15978 (Bldg LCA), EN 15804 (Products LCA)...
- Importance of the Bill of Materials : LCA, LCC, Deconstruction...
- Values/risks factors criteria (value creation) was a challenge in pilot phase, but simplified in 2021.
- Resilience to climate change (risk extreme weather & sustainable drainage) also challenging but ISO 14091 norm is coming.
- Acoustic & Fire safety criteria not yet part of LEVEL(s) in 2019, gap!
Acoustic criteria published in 2021.



Lessons and challenges

Level(s) = common core of rating systems?



Level(s) = tool for construction permits authorization?

Level(s) = support to Green Public Procurement?

Level(s) = tool for financial incentives (insulation, Photovoltaic panels...)?

Etc...

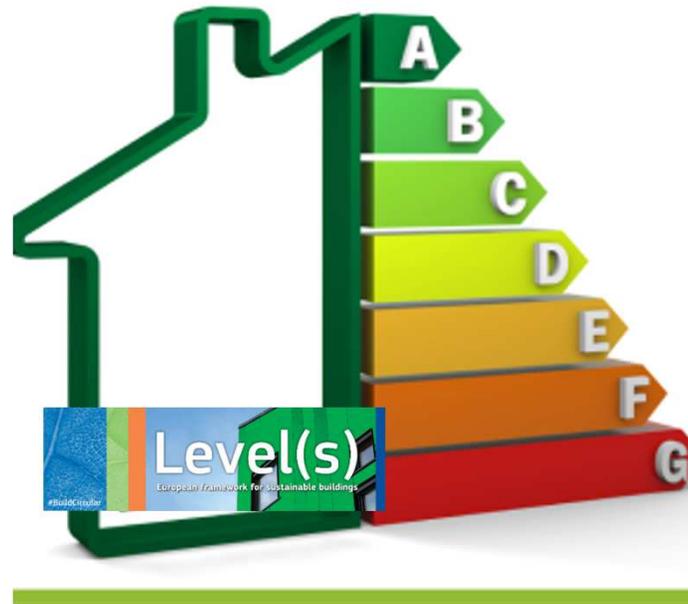
Level(s) = common core of rating systems?

- The **LIFE Level(s)** is directed towards **mainstreaming sustainable buildings in Europe** through greater awareness and use of the specified indicators within the framework of Level(s).
- Funding from the **LIFE Programme** of the European Union. The project will last for three years, from 2019 until 2022.
- The partners engaged in the execution of the project are **8 European Green Building Councils**
- The key indicators within Level(s) are **Life cycle assessment (LCA)**, **Life cycle costing (LCC)** and **Indoor air quality (IAQ)**.



LEVEL(S) as a new Building Assessment Holistic approach

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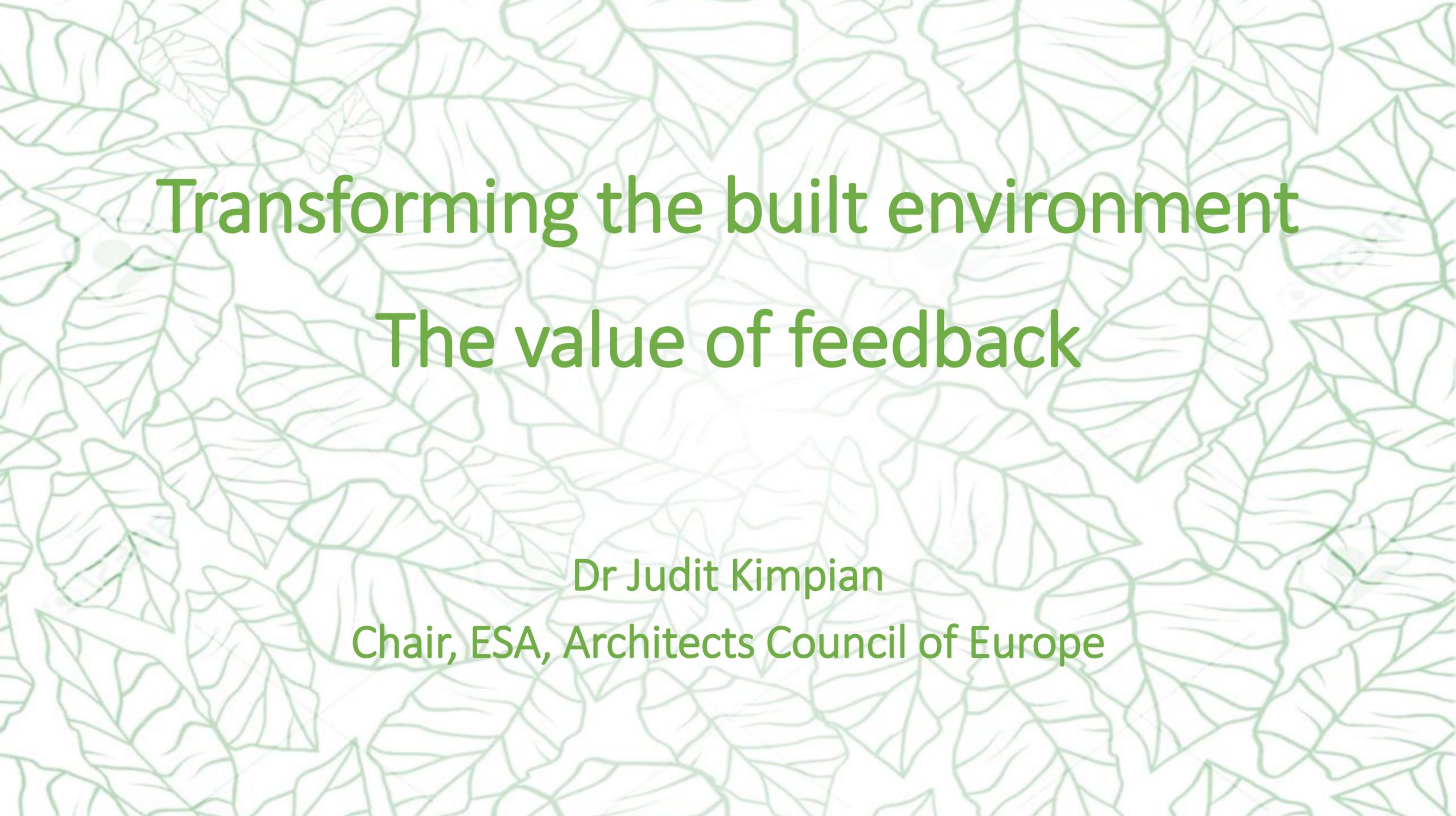


**From Energy Performance Building Directive
to Sustainable Performance Building Directive!**

Thank you

Jean-Pierre.Pigeolet@knaufinsulation.com





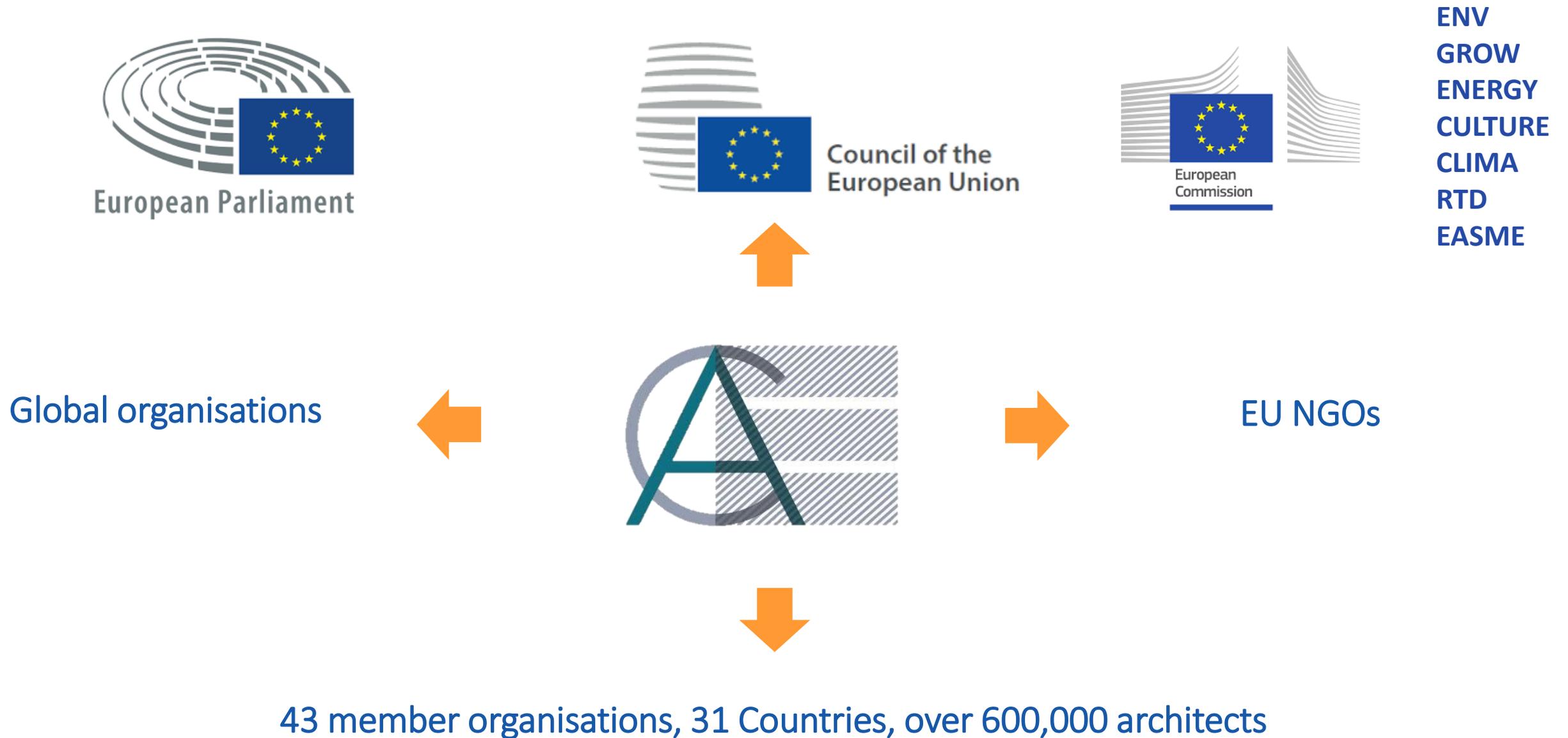
Transforming the built environment

The value of feedback

Dr Judit Kimpian

Chair, ESA, Architects Council of Europe

Architects Council of Europe



EU policies

- EU Climate Action
- EU Green Deal
- Circular Economy Action Plan
- Construction Products Regulation
- Renovation Wave
- EPBD / EED / RED review
- Just transition mechanism (Euro100bn)



EU climate Emergency Declarations

- UK >500 local authorities
- EU >350 local authorities
- 12 EU countries
- EU net zero target
- AU local government toolkit
- www.lgcet.com

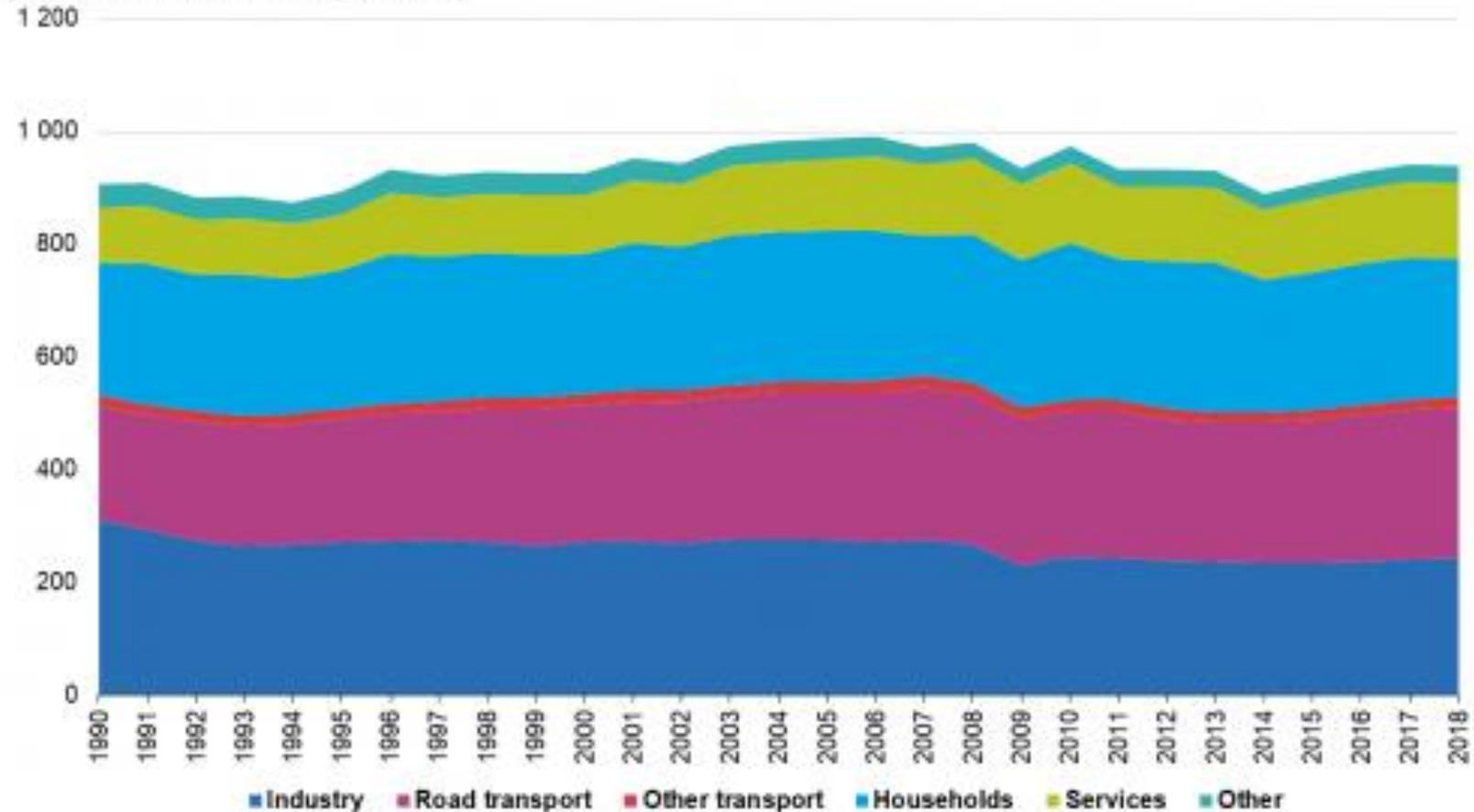


Energy use reduction since 1990

Reduction for
Households and
Services

0%

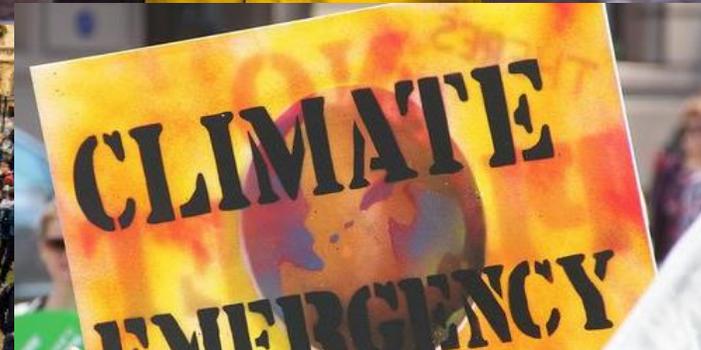
Final energy consumption by sector, EU-27, 1990-2018
(million tonnes of oil equivalent)



Source: Eurostat (online data code: nrg_bal_c)

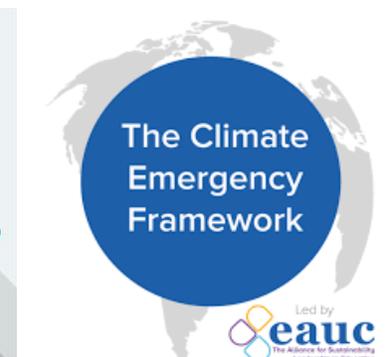
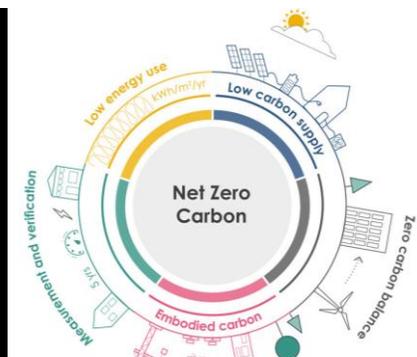
Bottom up net zero campaigns

**extinction
rebellion**



Net zero – professional organisations raising the bar, creating consensus

- Architects Climate Action Network (ACAN) – campaign
- Architects (Engineers, etc) Declare (AD) – campaign
- London Energy Transformation Network (LETI) - guides
- RIBA Climate Challenge – benchmarks, guides, and awards
- CIBSE Climate Action Plan – benchmarks, guides and awards
- DGNB
- GABC
- WKGBC

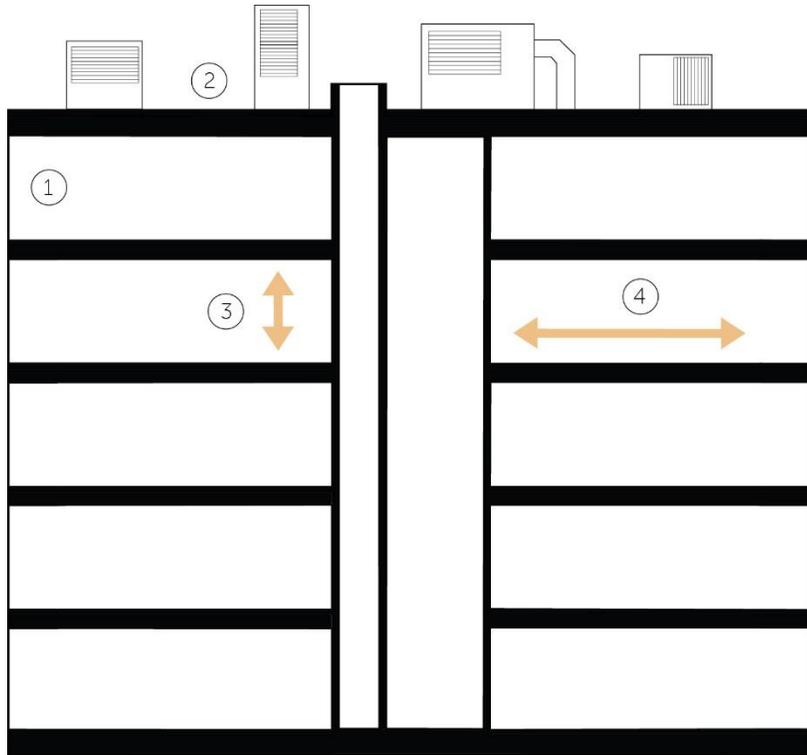


COVID 19 IMPACTS

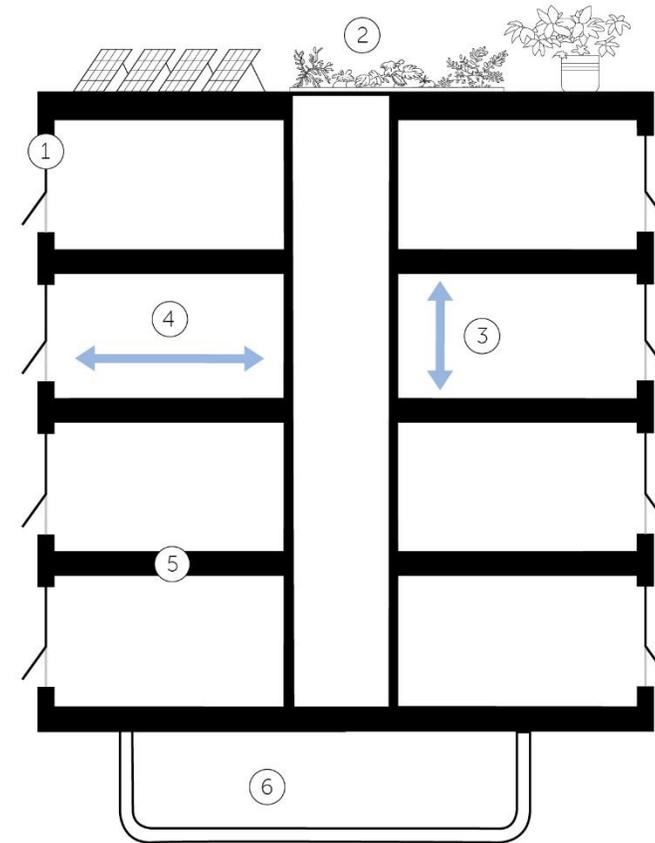
- Emphasis on green public realm / Transformation of city centres
- Remote working / spatial and architectural quality of homes
- Green transport / cycling / local facilities and urban renewal



Greater emphasis on resilience = buildings that stand the test of time



- 1. Sealed facade
- 2. Plant rooms and risers on roof
- 3. Lower ceilings
- 4. Deeper floor plans



- 1. Operable facade
- 2. Room for solar panels and greenery on roof
- 3. Higher ceilings
- 4. Shallower floor plans
- 5. Underfloor heating/cooling
- 6. Earth tubes

Baukultur: High quality architecture = convergence of performative and cultural

Life cycle costs down 80%



Redefining 'Building Performance'?

Resources used...



Energy



Water



Source: Artist Maria Arceo

Material impacts

...to achieve:



Comfort & wellbeing



Climate change resilience



Capital and whole life cost / value

...over a building's life span

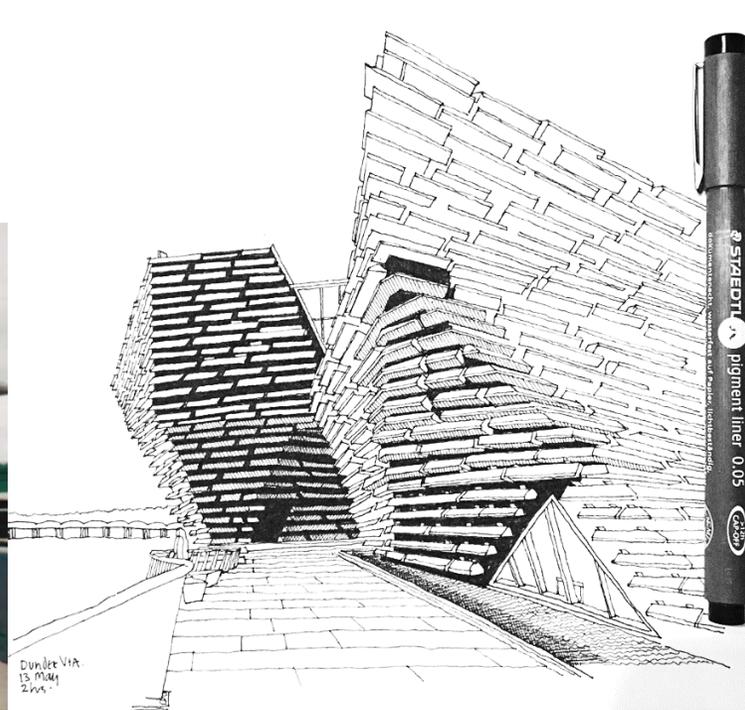


Product



Source: V&A Dundee

Construction



Source: Siddall Drawing

Use



End of Life



Source: Ai Wei Wei

Beyond Life

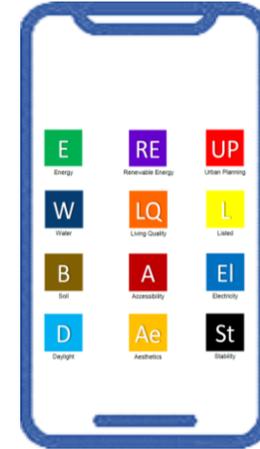
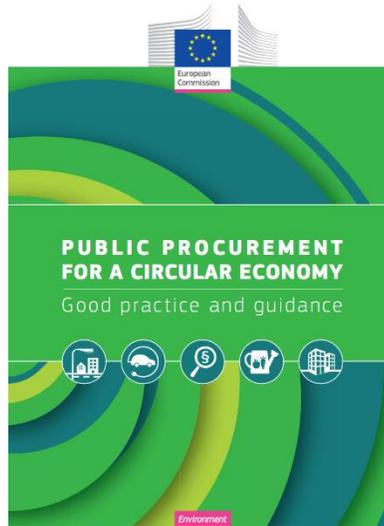
Holistic reporting framework to underpin EU initiatives



Green ND



EPBD



Climate literacy helps balance conflicting drivers through design

CO_{2e}

Functional flexibility

Complexity

Life span

CapEx

Overheating

Embodied carbon

Plastic insulation

CO_{2op}

Mechanised environment

Quality risk

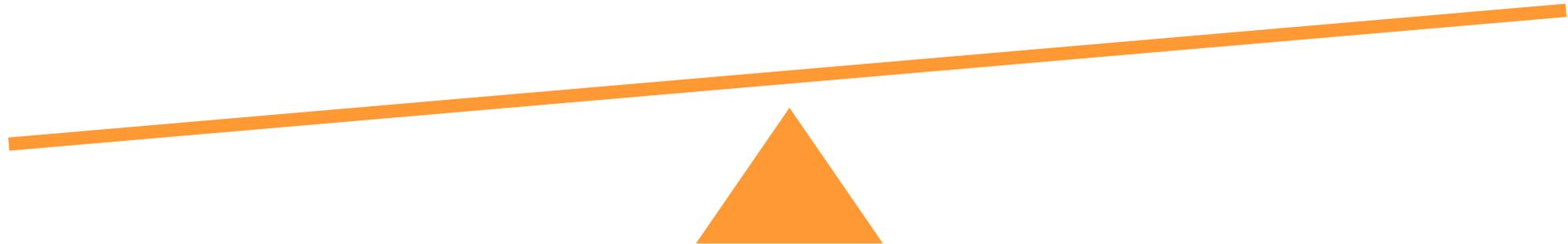
Technology

OpEx

Compact form

Speed of erection

Higher net area



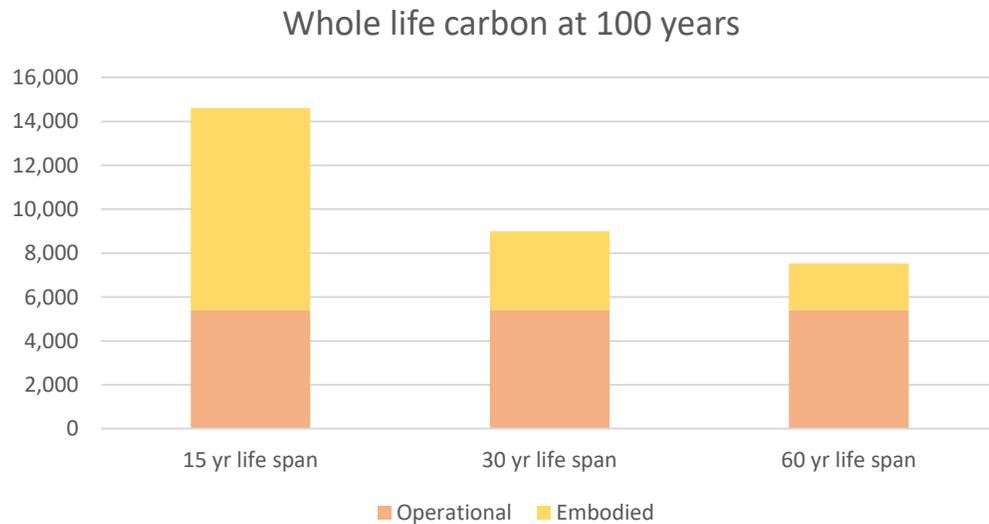
Start measuring 'real life' and not just 'in-the-lab' performance?

Emission standard vs real emissions - Efficacy vs effectiveness

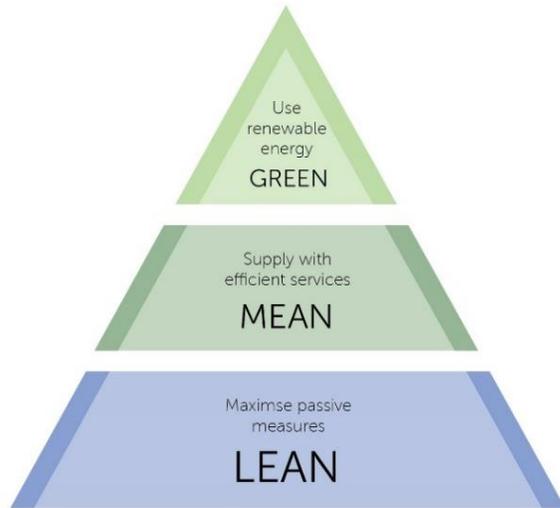


The role of life-span in net zero calculations

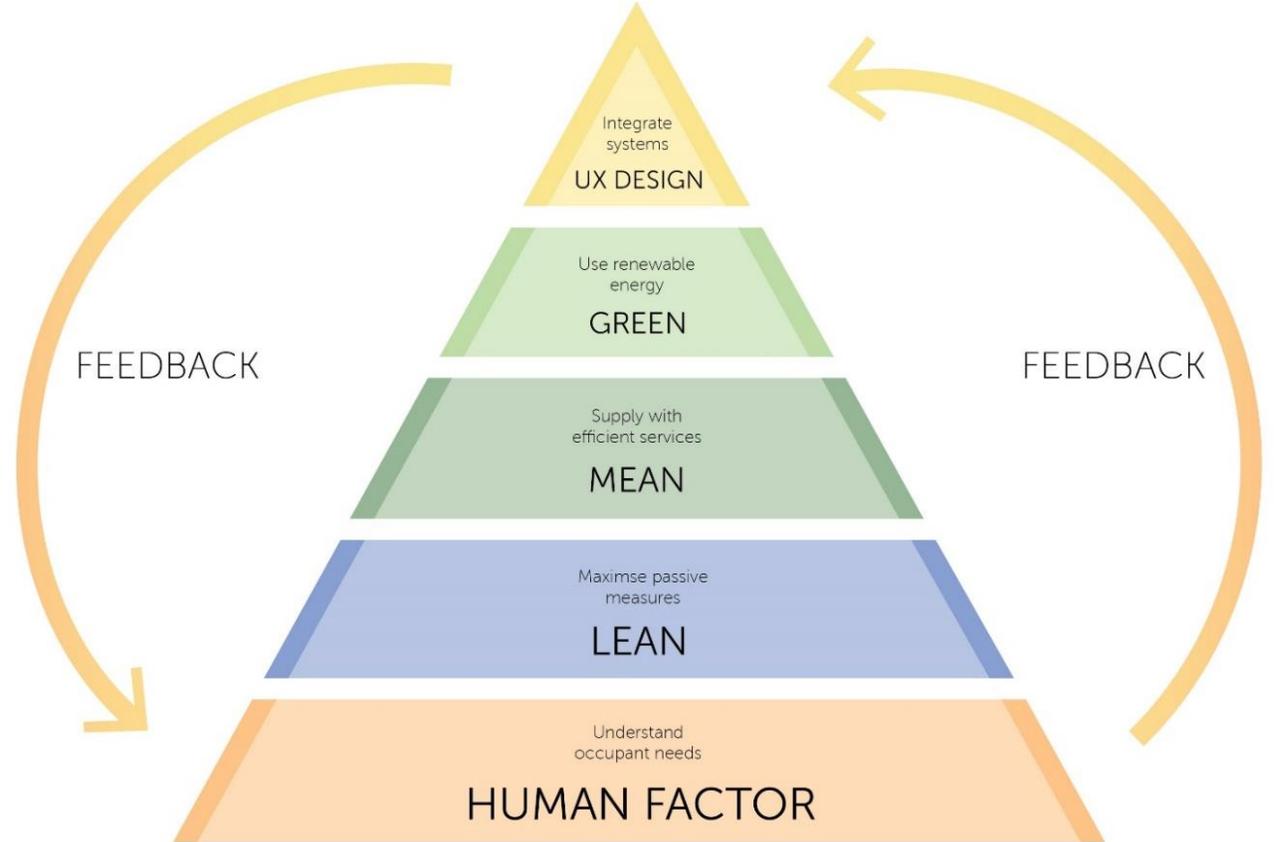
- Design for long-term occupant needs
- Design FOR lifespan
- Design BY lifespan



Implement UX design principles in architecture



Old Hierarchy



New Hierarchy

How can reporting wider metrics help architectural quality?

1. Everyman Theatre, Liverpool by Haworth Tompkins Architects
2. Morelands Rooftop, London by AHMM
3. Carrowbreck Meadow, Hellesdon, Norfolk by Hamson Barron Smith
4. Rocky Mountain Institute, Basalt, Colorado by ZGF with Graybeal Architects
5. Frederiksbjerg School by Henning Larsen and GPP Arkitekter, Aarhus, Denmark
6. Keynsham Civic Centre, Keynsham, Somerset by AHR
7. Enterprise Centre, University of East Anglia, Norwich, Norfolk by Architype



Changing the policy approach to net zero

CO₂



To architects architecture is the elephant in the room

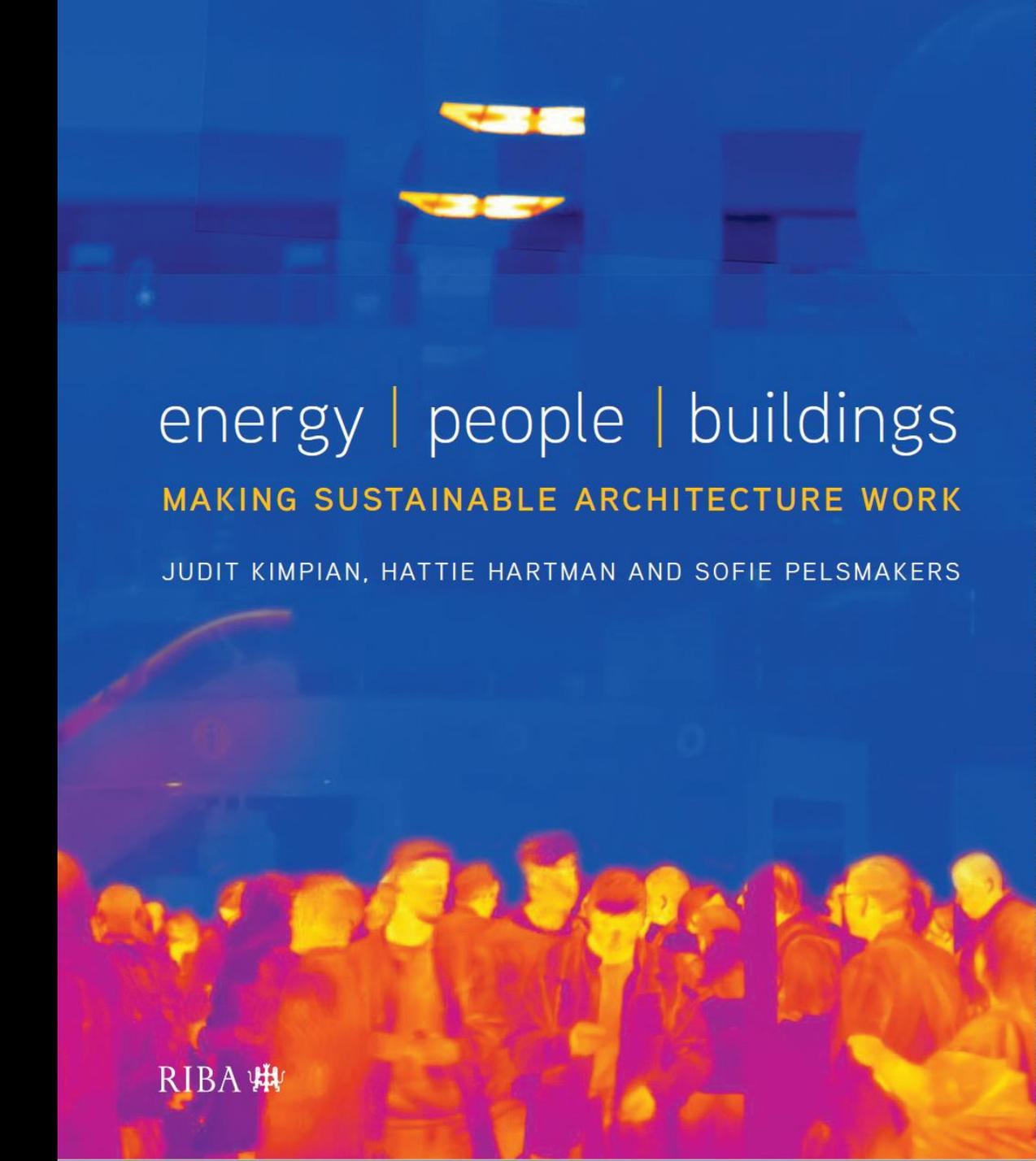


To the wider sector architectural education is the elephant in the room



Is FEEDBACK the actual elephant in the room?





energy | people | buildings

MAKING SUSTAINABLE ARCHITECTURE WORK

JUDIT KIMPIAN, HATTIE HARTMAN AND SOFIE PELSMAKERS

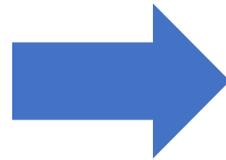
RIBA 

...net zero does not deliver
architectural quality but
architectural design could
mainstream net zero...

Policies and assessment systems: what role for Level(s) ?

Andrea Moro





**POLICIES
ACTIONS**

**EU
NATIONAL
REGIONAL
LOCAL
LEVEL**



POLICIES



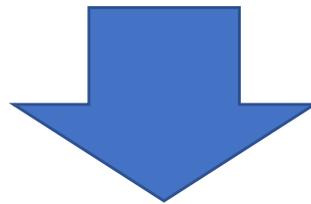
SUSTAINABLE DEVELOPMENT STRATEGIES
CLIMATE CHANGE ADAPTATION STRATEGIES
SUSTAINABILITY ACTION PLANS
LAWS AND REGULATIONS
GREEN PUBLIC PROCUREMENT
FUNDING PROGRAMS FOR RENOVATION
SPATIAL PLANNING
BUILDING CODES

NEED TO SET

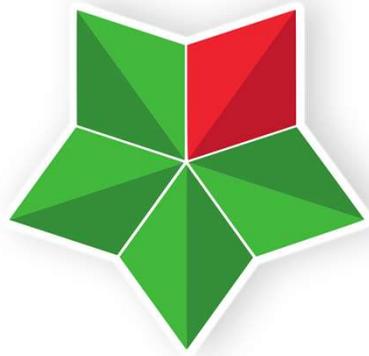
**MEASURABLE
RELIABLE
VERIFIABLE**



TARGETS



ASSESSMENT SYSTEMS



PROTOCOLLO
ITACA
EDILIZIA SOSTENIBILE ITALIA

ASSESSMENT SYSTEM DEVELOPED BY THE ITALIAN REGIONS (PUBLIC) IN 2004
NATIONAL STANDARD (UNI PdR13)

ALLOWS TO ASSIGN A SUSTIANBILITY SCORE TO A BUILDING

35 CRITERIA WITH QUANTITATIVE INDICATORS

ENERGY, WATER, MATERIALS, IEQ, ENVIRONMENTAL LOADINGS, SERVICE

SCORING SCALE: -1 TO 5

0= MINIMUM ACCEPTABLE PERFORMANCE, 5= EXCELLENT PERFORMANCE

2000 + BUILDINGS CERTIFIED

REGIONE PIEMONTE



Population: 4.300.000 inhabitants

Density: 170 inhabitants / Km²

Area: 25.387 Km²

Capital: Torino (Turin)



FUNDING PROGRAMS FOR SOCIAL HOUSING



«10.000 apartments by 2012» - 700 million euro

MINIMUM SUSTAINABILITY SCORE REQUESTED

- 2 for new buildings
- 1 for existing buildings retrofitted

INCENTIVE: EXTRA FUNDING, + 10.000 euro per apartment

Certified 250 buildings

Higher quality and sustainability

Improvement of standard practice



URBAN REGENERATION AND SOIL CONSUMPTION



Regional Law nr. 16 - 2018

Incentives for:

- Renovation of the building stock (demolition and reconstruction)
- Use of recycled materials
- Improvement of land permeability
- Adoption of selective deconstruction processes

MINIMUM SUSTAINABILITY SCORE REQUESTED: 2,5

INCENTIVE: INCREASE OF BULDING'S VOLUME



SHOPPING CENTERS



Regional Decree in 2013

Mandatory sustainability certification for new and renovated buildings to receive the commercial authorisation from the Region.

**MINIMUM SUSTAINABILITY SCORE REQUESTED:
3,0 for new constructions**

NO INCENTIVATION: MANDATORY



FUNDING PROGRAMS FOR THE RENOVATION OF PUBLIC BUILDINGS



Structural Funds (ERDF) 2014 – 2020 (Regione Piemonte and Calabria)

- Estimation of the potential sustainability score after retrofit in the application phase.
- Bonus score in the ranking list: greater chance of being selected.
- Mandatory certification to prove the sustainability level achieved.
- Public tenders: the achievement of the declared sustainability score is mandatory for the general contractor

ADDITIONAL SCORE IN THE RANKING LIST

300 buildings under certification
600 professionals trained



GREEN PUBLIC PROCUREMENT



Energy Center Torino : design and construction

Pre-evaluation of the building: document part of the tendering process.

Improvements proposed by participants evaluated in terms of score increase.

Mandatory certification of the building.

Score not achieved: 5% penalty on the value of the contract.

EXTRA SCORE IN THE TENDERING PROCESS



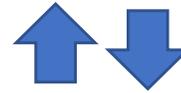
MULTI LEVEL GOVERNANCE

THINK GLOBAL

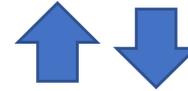
Governmental Levels

ACT LOCAL

Global



European Union



State



Region



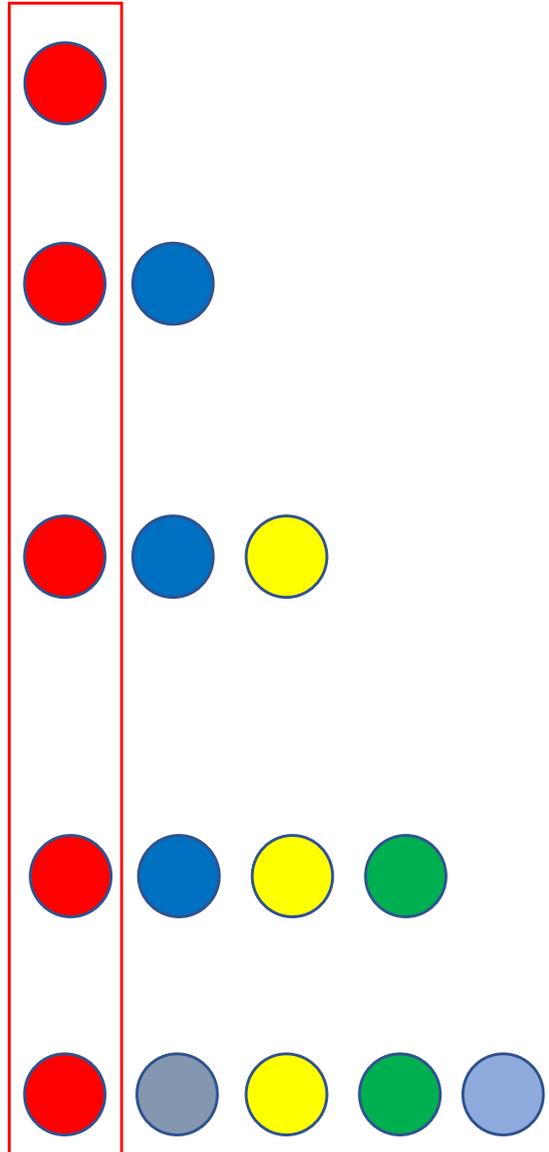
City



Level(s)

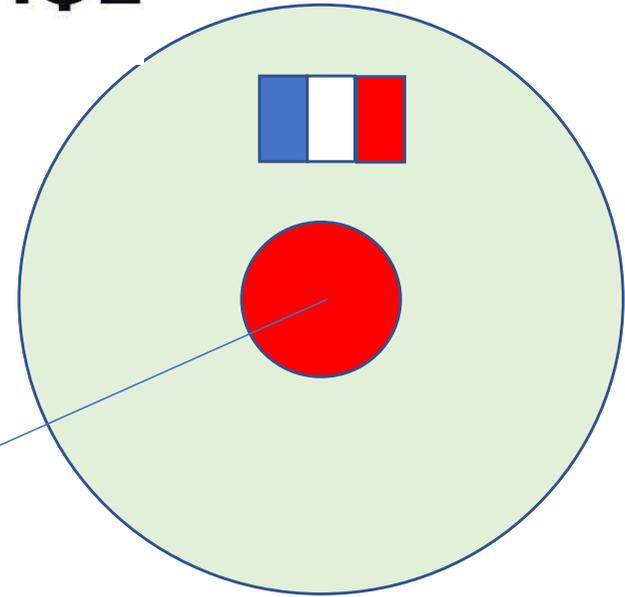
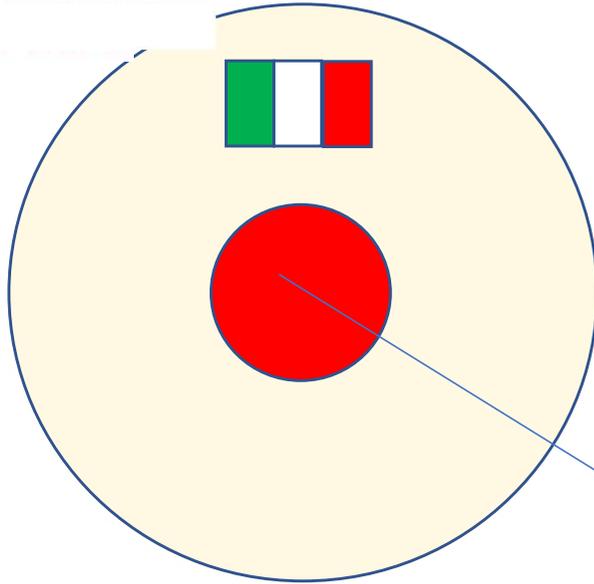


COMMON INDICATORS

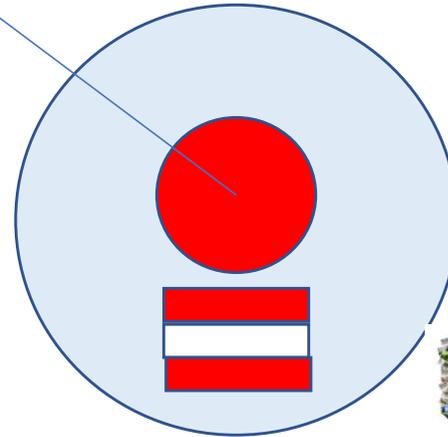
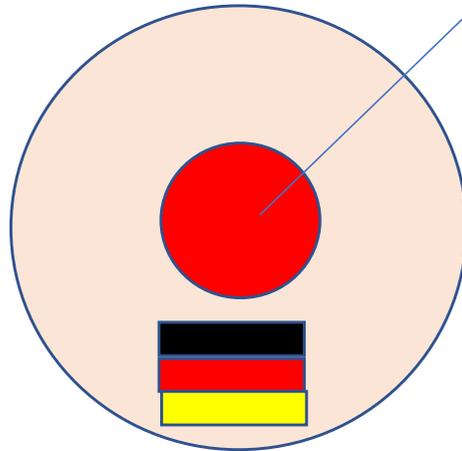
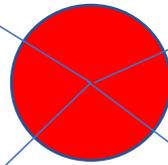




PROTOCOLLO
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Level(s)



KCA

Level(s)

- Establishes a common language
- Provides a common understanding on sustainable building reference macro areas
- Supports the Multi Level Governance approach
- Facilitates international cooperation and best practices exchange
- Allows to compare and aggregate results from local to global

Level(s)

- Connects national systems improving their acceptance by the market
- Helps to fill gaps providing indicators and metrics where not available
- Promotes the adoption of new approaches (e.g. circular economy, life cycle approach)

THANK YOU

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