Level(s)

European framework for sustainable buildings
Why Level(s)?

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

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.

1/2 of all extracted materials
1/2 of the total energy consumption
1/3 of water consumption
1/3 of waste generation
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?

- Resources
  - Resource use and environmental performance during a building’s lifecycle
    - Energy
    - Materials
    - Water

- Whole Lifecycle Value
- Health & Comfort
  - Life cycle cost, value, and risk
  - Health and comfort, resilience to climate change
<table>
<thead>
<tr>
<th>Thematic areas</th>
<th>Macro Objectives</th>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resource use and environmental performance</td>
<td>1. Greenhouse gas emissions throughout building life cycle</td>
<td>1.1 Use stage energy performance (kWh/m²/yr)</td>
</tr>
<tr>
<td></td>
<td>2. Resource efficient and circular material life cycles</td>
<td>1.2 Life cycle Global Warming Potential (CO2 eq./m²/yr)</td>
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<td>3. Efficient use of water resources</td>
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<tr>
<td>Health and comfort</td>
<td>4. Healthy and comfortable spaces</td>
<td>2.1 Bill of quantities, materials and lifespan</td>
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<td></td>
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<td>2.2 Construction and Demolition waste</td>
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<td></td>
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<td>2.3 Design for adaptability and renovation</td>
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<td></td>
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<td>2.4 Design for deconstruction</td>
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<tr>
<td>Cost, value and risk</td>
<td>5. Adaption and resilience to climate change</td>
<td>3.1 Use stage water consumption (m³/occupant/yr)</td>
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<td>6. Optimised life cycle cost and value</td>
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<td></td>
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<td>4.1 Indoor air quality</td>
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<td></td>
<td></td>
<td>4.2 Time out of thermal comfort range</td>
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<tr>
<td></td>
<td></td>
<td>4.3 Lighting</td>
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<tr>
<td></td>
<td></td>
<td>4.4 Acoustics</td>
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</table>
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)?

- **Sustainable Finance** – tackling climate change, Delegated Act implementation: 2021
- **Web-based support tool** to work with Level(s) and web-based training material: 2021
- **Directives on energy performance - revisions** 2021
- **Roadmap for Whole Life Carbon reduction in the building sector** 2023
- **Public Private Partnership** under Horizon Europe 2021
- **Recovery and Resilience Plans** 2021
- **Green Public Procurement Criteria** 2023
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)
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
Education & Demonstration Experience
Case study of sustainable construction?
Need for a scheme, a kind of system to navigate through sustainability requirements.
Sustainable Building
DGNB Platinum Certificate

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.
Why not to apply & compare with Level(s) reporting tool?
**DGNB & Level(s) mapping**

- Comparison in requirements/criterias
- Highlighting similarities & differences

### Core sustainability indicators

<table>
<thead>
<tr>
<th>Level(s)</th>
<th>Unit</th>
<th>Level 1</th>
<th>DGNB</th>
<th>Level 2</th>
<th>DGNB</th>
</tr>
</thead>
<tbody>
<tr>
<td>MO 1: GHG Emissions along a buildings life cycle</td>
<td>kg CO2e/yr</td>
<td>DGNB: Full life cycle for minimum building scope (incl. MEP, water); Results (tabular) plus LCA summary report - s. p. 50</td>
<td>Sub-result of ENV 1.1 LCA calculation</td>
<td>Applicable if detailed LCA method is chosen (parking to be included) - BUT: GWP differentiation issue (see below cell E33)</td>
<td>DGNB: Full life cycle for minimum building scope (incl. MEP, water) but no external works; Results (tabular) plus LCA summary report - s. p. 50</td>
</tr>
</tbody>
</table>

- **Simplified LCA method:** Incomplete result from DGNB compliant LCA; Problems: No MEP, no differentiation into different GWP’s, not calculated for 60yrs, no GWP of water consumption.
- **Simplified reporting option 2: Incomplete LC (A1-A3, B6, C3-4, D):** Incomplete result from DGNB compliant LCA; Problems: No MEP, no differentiation into different GWP’s, not calculated for 60yrs, no GWP of water consumption.

- **Results for GWP differentiated into:** GWP (fossil), GWP (biogenic); GWP (land use and land transformation); Totals - calculated for 60 yrs

- **Sub-result of ENV 1.1 LCA calculation:** Applicable if detailed LCA method is chosen (parking to be included) - BUT: GWP differentiation issue.
Filled for “Completion and handover stage”

<table>
<thead>
<tr>
<th>1.1 Use stage energy consumption</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.3 Construction and demolition waste and materials</td>
<td>○</td>
<td>○</td>
<td>○</td>
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<tr>
<td>3.1 Use stage water consumption</td>
<td>○</td>
<td>○</td>
<td>○</td>
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<tr>
<td>4.1 Indoor air quality</td>
<td>○</td>
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<td>4.2 Time out of thermal comfort range</td>
<td>○</td>
<td>○</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1.2 Life cycle Global Warming Potential (GWP)</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 Life cycle tool: Building Bill of Materials (BoM)</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>5.1 Scenarios for projected future climatic conditions</td>
<td>○</td>
<td>○</td>
<td>○</td>
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</tbody>
</table>

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

Post air measurements

DGNB TEC 1.4. tool

DGNB TEC 1.6. tool

DGNB LCC tool
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

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

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

43 member organisations, 31 Countries, over 600,000 architects
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%
Bottom up net zero campaigns
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

Material impacts

Source: Artist Maria Arceo
...to achieve:

- Comfort & wellbeing
- Climate change resilience
- Capital and whole life cost / value
...over a building’s life span
Holistic reporting framework to underpin EU initiatives
Climate literacy helps balance conflicting drivers through design

- CO$_2$e
- 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

Whole life carbon at 100 years

Implement UX design principles in architecture
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, Aaarhus, 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
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?
...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
The European Green Deal

POLICIES

ACTIONS

EU
NATIONAL
REGIONAL
LOCAL
LEVEL

SUSTAINABLE DEVELOPMENT GOALS

#EUGreenDeal

PARIS 2015

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

ALLOWS TO ASSIGN A SUSTAINABILITY 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
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
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 BUILDING’S VOLUME
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

Governemental Levels

Global

European Union

State

Region

City

ACT LOCAL

COMMON INDICATORS
• 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
• 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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