

Going sustainable in buildings

TOOL 03

Construction

Introduction

This guidance tool supports users from different backgrounds in applying a sustainability approach during the construction stage of buildings. It helps users define their role, identify construction priorities, check materials and documentation, reduce waste, monitor site performance, support retrofit implementation, and select relevant EXEL4Housing tools and resources for more sustainable building delivery.

There are no right or wrong answers. Use the questions to reflect on your current situation and identify possible next steps.

User Journey

- 1 Identify user
- 2 Assess knowledge
- 3 Select methods
- 4 Document materials
- 5 Reduce waste
- 6 Check energy
- 7 Plan retrofit
- 8 Assess impacts
- 9 Check handover
- 10 Tools suggestions

WHO AM I?

User profile

Define yourself or your team

Reflect and define your role – Defining a simple user profile in the initial phase is an important step in driving meaningful self-reflection. Encouraging users to reflect on who they are and assess their current situation, helps to gain a clear understanding of users background, needs and context.

This self-awareness lays a foundation for the entire guidance journey. Understanding the current baseline makes it significantly easier to identify specific training needs and select the most relevant tools.

Note: This initial step aims to establish contact between the user and the guidance tool. Although it does not directly influence the selection of tools presented to the user, it prompts them to reflect on their purpose and goals. Defining a profile statement serves to characterize their profile and objectives, guiding their overall action

Select your profile

- ☐ Municipality / public authority
- ☐ Housing provider / developer
- ☐ Architect / designer / engineer
- ☐ Construction company
- ☐ Manufacturer / supplier
- ☐ Construction waste manager
- ☐ Facility or property manager
- ☐ Educator / trainer
- ☐ Student
- ☐ Researcher
- ☐ Other:

Main sustainability
needs

Profile statement

**I am _____ working on _____ and need
guidance to _____ .**

Construction knowledge and practice level

Define your level

Reflect and assess your current knowledge of sustainable and innovative construction practices before selecting actions. This step helps users understand what they already know, what is missing, and what support is needed to improve construction-stage sustainability.

Level	Maturity stage	Description
Level 1	Limited	Little knowledge of sustainable construction practices.
Level 2	Basic	Understands key concepts, but application is still limited.
Level 3	Developing	Some practices or tools are tested in selected activities
Level 4	Applied	Sustainable practices are regularly used on site.
Level 5	Advanced	Innovative practices are integrated, monitored and improved.

What support is needed to move one level forward?

☐	Training	☐	Examples and Case studies	☐	Tool access
☐	Management support	☐	Clear roles and responsibilities	☐	Better site data
☐	Sustainability indicators / KPIs	☐	Digital documentation	☐	Other

Select your level

Level 1 Limited	Level 2 Basic	Level 3 Developing	Level 4 Applied	Level 5 Advanced
☐	☐	☐	☐	☐

Justify your selection

Support needed

Sustainable Construction Methods

This topic helps users to reflect and identify construction and assembly methods that reduce environmental impacts, improve efficiency and support safer, higher-quality building delivery.

Construction method options

The options below are examples; other relevant construction methods may also be considered.

Method	Description
Efficient assembly	Plan installation to reduce time, errors and material use.
Prefabrication / modular construction	Produce components off-site and assemble them on-site.
Low-waste construction	Use materials carefully to minimise off-cuts and waste.
Careful material storage	Protect materials from damage, moisture and loss.
Reduced site impact	Limit noise, dust, traffic and disturbance around the site
Safer and cleaner site practices	Keep work areas organised, clean and safe
Other method relevant to your project:	

Practical exercise: Apply one construction method

All these methods are important for improving construction practice and sustainability. Selected one method to reflect on where it could be applied, why it is relevant to your work, and how it could contribute to a more sustainable construction process.

Selected Method

Where it can be applied

Sustainability benefit

First action on site

Material Passport and Documentation

Material passports record information about building materials and components throughout their life cycle. They help document what is used in the building, where it is located, and how it can be maintained, reused, recycled or recovered. Digital material and building passports support a more circular, traceable and connected construction sector by compiling information on materials, components and building characteristics throughout the life cycle. They can improve design, maintenance and decision-making, while supporting reuse, recycling and recovery at end-of-life. Integration with digital technologies such as BIM can further improve traceability, transparency and efficiency. Their wider use still depends on better standardisation, interoperability, stakeholder collaboration and awareness.

Example of information to include in a material passport?

Core product and material information	Circularity and end-of-life information
- Product name, function and type - Origin, manufacturer and certifications - Material type and specification - Material sourcing - Year of installation - Quantity, number, mass, area or length - Building layer or location	- Wear condition at end of initial life - Disassembly potential - Disassembly instructions - Lifespan - Expected end of life - Recycled material - Recyclable material - Data sources

Practical exercise: Create a simple material passport entry

Select one material or component from a building, such as window, insulation panel, facade element or structural component. For this exercise, you don't need to complete every criterion in the full passport. Fill in the selected field below using the information available to you.

Product/material name

Building layer/location

Material type/specification

Manufacturer/origin

Quantity

Year of installation

Reuse or recycling potential

Data source(s)

Construction Waste Reduction

Construction waste reduction helps users prevent unnecessary material losses, improve site organisation and support circular use of resources. This topic focuses on reducing, separating, reusing and recovering materials during the construction stage.

Practical exercise: Apply the waste reduction pathway to one example

This exercise uses one selected site activity or material flow as an example to practise identifying the most appropriate waste reduction action, reuse or recycling, and to reflect on how these actions can improve sustainability on site.

Waste reduction pathway

01	Prevent	Avoid waste before it happens: accurate quantities, early coordination, standard dimensions.
02	Reduce	Minimise losses: reduce over-ordering, packaging, cutting waste and damaged materials
03	Reuse	Keep useful materials in the project: protect leftovers, reuse pallets, formwork or off-cuts where possible.
04	Separate	Organise waste on site: provide labelled areas/bins for wood, metal, concrete, plastics and packaging
05	Recycle / Recover	Send sorted waste to an approved recycler or recovery route and document quantities/evidence.

Material/activity causing waste

How can I prevent the waste production?

How can I reduce the waste production?

How can I reuse it?

Can it be separated more efficiently? how?

How can I improve the recycling or recovery?

Which of the above actions have more benefit?

Energy Performance Checking

Energy performance checking confirms that energy-related elements and systems are installed, tested and documented according to design requirements before handover.

Energy performance items to check

Some examples of energy-related elements and systems that can be checked on site are:

- Building envelope insulation
- Windows and glazing
- Air leakage check
- Ventilation system
- Heating / cooling systems
- Lighting and controls
- Renewable energy systems
- Energy use monitoring.

Other relevant items may also be considered.

Elements to check - example

01	Design requirement	What was specified?
02	Installed work	What is installed on site?
03	Site check / test	What must be checked?
04	Evidence collected	What proof is available?
05	Status / action	OK, follow-up, or correction?

Practical exercise: Check one energy performance item

All the items are important. Select one as an example and check it step by step following the table above, considering its contribution to energy performance, quality and sustainability

Energy item selected

Design requirement

Installed work

Site check / test

Evidence collected

Status / action

Retrofit Implementation

Retrofit implementation focuses on delivering renovation or improvement works on site while managing constraints, quality, handover evidence, etc.

Example retrofit actions

Some examples of elements and systems that can be checked on site are:

- Insulation upgrade
- Window replacement
- Heating / cooling upgrade
- Ventilation improvement
- Lighting upgrade
- Airtightness improvement
- Renewable energy installation
- Accessibility improvement

Before / During / After implementation timeline

BEFORE WORKS

Existing condition

What is the current problem or need?

Planning and preparation

What must be prepared before work starts?

DURING WORKS

Site constraints

What may limit the work?

Implementation action

What work will be carried out on site?

AFTER WORKS

Quality check

How will the retrofit work be checked?

Handover evidence

What documents or proof should be collected?

Practical exercise: Plan one retrofit action

All the retrofit actions listed are important. Select one as an example and reflect on its implementation, site constraints, quality checks and handover evidence.

Retrofit action selected

Existing problem

Main site constraint

Implementation action

Quality check

Handover evidence

Measuring Impacts of Green and Digital Transition

This topic helps users understand how green and digital actions can improve construction performance. It focuses on expected benefits, possible challenges and evidence needed to measure the impact of these actions during construction.

Green and digital actions to assess

The actions below are examples; other relevant green or digital actions may also be considered.

Green transition actions	Digital transition actions
Low-carbon material use	Digital material passport
Waste reduction practice	BIM / digital coordination
Efficient construction method	Digital site checklist
Energy performance check	Energy monitoring / meters



Practical exercise: Assess one green or digital action

This exercise uses one selected action as an example to reflect on its expected benefit, required evidence, possible challenge and follow-up action.

Green/digital action selected

Main expected benefit

Evidence to collect

Possible challenge

Follow-up action

Impact scorecard

Select one green or digital action and write one expected benefit for each impact area.

Environmental impact

Does it reduce waste, emissions, energy use or material consumption?

Process impact

Does it improve efficiency, coordination, time or quality control?

Digital impact

Does it improve data collection, documentation or traceability?

User / site impact

Does it improve safety, communication or reduce disruption?

Quality Control and Handover

Quality control and handover ensure that sustainability decisions made during design are correctly implemented and communicated for building operation.

Documentation checklist

The items below are examples; other relevant handover documents may also be considered:

- As-built drawings
- Product documentation
- System test results
- Maintenance instructions
- Material passport information
- User/operator guidance

Practical exercise: Review one handover item

As an exercise, select one handover item from the checklist and define who needs it, the required format or evidence, and who is responsible for providing it.

Key handover item

Who needs it

Format/evidence

Responsible person

Recommended tools

Excel4housing toolbox

Review your answers from the previous pages and identify your main planning and design needs. Then use the tables below to find the tools that best match those needs.

If the user needs...	Recommended tools	Why it fits
To create and use material passports To record information about building materials and components to support traceability, maintenance, reuse, recycling and future circularity.	Material passport – (De)Construct project	Helps record material and component information to support future maintenance, reuse, recycling and circularity
To assess building energy performance during construction To check whether installed systems, materials and construction choices are consistent with the expected building energy performance.	DesignBuilder	Helps identify what needs to be checked on site, such as installed systems, test results and performance evidence
	Ubakus U-Wert-Rechner	Calculates U-values and evaluates heat and moisture behaviour in walls, roofs and floors, helping users verify whether proposed or installed envelope assemblies provide the expected thermal performance.
To assess the impacts of green and digital construction practices To understand the benefits, challenges and results of introducing greener or more digital approaches into construction activities.	Tool to be defined	Helps assess expected benefits, evidence, challenges and follow-up actions for green and digital construction practices

Recommended tools

Excel4housing toolbox

If the user needs...	Recommended tools	Why it fits
To identify suitable construction tools for your next steps	EXCEL4Housing 4.0 toolbox	Allows users to select tools by phase, need, difficulty, data requirement and sustainability goal