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MESTRI-CE

D.2.2.3 MESTRI-CE Evaluation toolbox with technical assessment methods and simulation tools for the (re)construction of buildings

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A. INTRODUCTION

The MESTRI-CE Sustainable Building Methodology (MESTRI-CE SBM) has been developed to enhance existing building standards and sustainability frameworks in the pilot countries, while remaining flexible and adaptable to regional specificities. To achieve this, the methodology employs a comprehensive set of criteria, indicators, and metrics focused on energy efficiency and sustainability. These are framed in alignment with key EU frameworks, including Level(s), the latest Energy Performance of Buildings Directive (EPBD), and the EU Taxonomy. Where appropriate, metrics from national or regional standards in the pilot countries have been integrated to ensure contextual relevance.

To facilitate the adoption of the MESTRI-CE SBM methodology at national or regional level and enable a gradual upgrade of the building standards currently in use in the different MESTRI-CE pilot countries, the MESTRI-CE SBM can be adapted to the national or regional context in which it will be used. This "adapted" version of the methodology may include both national or regional metrics and metrics as defined by the MESTRI-CE SBM.

The MESTRI-CE Evaluation Toolbox (ET) is an open-source, Excel-based tool that complements the MESTRI-CE SBM. It is designed to assess the compliance of buildings or projects with the targets set for each MESTRI-CE SBM indicator or its national/regional adapted version. The ET also provides the technical assessment methods to be used for calculating relevant metrics and indicators, links them to existing standards and identifies suitable evaluation or calculation tools.

The ET supports a multi-dimensional evaluation approach, enabling the assessment of building performance across various levels of compliance with the targets established for each metric. This structured and scalable framework ensures that stakeholders can effectively measure, compare, and improve building sustainability in alignment with current and future EU directives and regulations.

B. THE MESTRI-CE EVALUATION TOOLBOX

The **MESTRI-CE Evaluation Toolbox (ET)**, provided as an open-source Excel-based tool, enables stakeholders to assess the sustainability performance of buildings or projects, resulting in varying levels of compliance with the targets defined for each MESTRI-CE SBM metric.

In addition to the information contained in the transnational or national/regional versions of the MESTRI-CE SBM, the ET provides detailed guidance for each indicator, including:

- The relevant stage of the building's life cycle at which the metric should be calculated or evaluated.
- The specific requirement and target to be met, whether quantitative or qualitative.
- The recommended tools and methods for calculating or evaluating the metric, along with the necessary documentation or evidence to demonstrate compliance, and any measurements that must be taken in the different stage of the building´s life cycle.

The minimum requirements and targets already defined in the transnational version of the ET—applicable to both new and existing buildings—are fully aligned with EU directives, regulations, and EU framework for sustainable buildings. For some targets, however, it is necessary to enter the actual national target, and the ET will calculate the transnational threshold in background.

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TRANSNATIONAL EVALUATION TOOLBOX - EXISTING BUILDING

THEMATIC AREA		Use stage energy performance Assessing the energy performance of the building during its operational or 'in use' phase allows an evaluation of how efficiently the building uses energy resources for heating, cooling, lighting and other operational needs. Factors such as energy demand and consumption, the use of renewable energy sources and the overall efficiency of the technical building systems are considered. The aim is to promote and measure sustainable practices that minimise the environmental impact associated with the building's ongoing energy use, while maintaining appropriate indoor comfort conditions for occupants.								
A ENERGY & ENVELOPE PERFORMANCE										
			METRIC	UNIT MEASURE	ASSESSMENT STAGE	REQUIREMENT	TARGET	PROJECT VALUE	PROJECT ASSESSMENT	TOOLS; DOCUMENTATION; MEASUREMENT OR ASSESSMENT MODE	COMMENTS
	ENERGY USE	A1.1	Primary energy use	kWh/m² per year	Detailed design x Construction x As Built x In use	60% lower than the national/regional threshold for total primary energy use	PLEASE INSERT NATIONAL/REGIONAL TARGET VALUE		PLEASE INSERT PROJECT VALUE	Option A: Software based on Annex A of the key European standards on energy performance of buildings , namely EN ISO 52000-1, EN ISO 52003-1, EN ISO 52010-1, EN ISO 52016-1, EN ISO 52018-1, EN 16798-1, EN 52120-1 and EN 17423 or superseding documents Option B: Software based on the national or regional calculation method for energy performance laid down in the Member State where the building is located	
		A1.2	Final energy use	kWh/m² per year	Detailed design x Construction x As Built x In use	60% lower than the national/regional threshold for total primary energy use	PLEASE INSERT NATIONAL/REGIONAL TARGET VALUE		PLEASE INSERT PROJECT VALUE	Option A: Software based on Annex A of the key European standards on energy performance of buildings , namely EN ISO 52000-1, EN ISO 52003-1, EN ISO 52010-1, EN ISO 52016-1, EN ISO 52018-1, EN 16798-1, EN 52120-1 and EN 17423 or superseding documents Option B: Software based on the national or regional calculation method for energy performance laid down in the Member State where the building is located	

The national or regional adapted versions of the Evaluation Toolbox (ET) can be customized to reflect the specific targets and requirements of each country or region. These localized benchmarks may align with, or differ from, the transnational and EU-level targets, allowing for flexibility in addressing local priorities.

C. THE PROJECT/BUILDING ASSESSMENT PROCESS

By using the MESTRI-CE Evaluation Toolbox —whether in its transnational version or in a national/regional adapted version—stakeholders can automatically assess the level of compliance of a building or renovation project, or of an existing building, with the requirements and targets defined by the MESTRI-CE SBM for each indicator.

The project/building evaluation process foresees the following steps for each selected metric:

- **Determine evaluability**: Check whether the metric can be assessed in consideration of the specific nature of the intervention, the current stage of the building process (design, construction, building in use, etc.) and the availability of the necessary documentation;
- **Conduct the assessment**: Evaluate the metric using the calculation/assessment method and tools defined in the MESTRI-CE SBM and in the ET;
- **Record the result**: Enter the value/result obtained in the ET under the "Project Value" field;
- **Verify compliance**: the level of compliance of the project metric with the targets/requirements set by the MESTRI-CE SBM is automatically displayed in the ET under the "Project Assessment" field.

The levels of compliance with the targets/requirements that will result from the ET are differently defined for quantitative metrics and qualitative ones.

With regard to **quantitative metrics**, i.e. metrics that have a numerical value as target, the following conditions of compliance are available in the ET:

- The project value does not reach the target value: NOT COMPLIANT
- The project value is equal to the target value: COMPLIANT
- The project value is better than the target value: BEYOND COMPLIANCE STEP 1 or STEP 2 or STEP 3 according to the fixed percentages of improvement.
- The project value reaches or exceeds the transnational MESTRI-CE SBM target value: EU FUTURE PROOF

If no values are available for the metric the following settings can be selected in the ET:

- METRIC IN THE USE PHASE (-): This indicates that the metric cannot be calculated at the present moment, as its evaluation can only be conducted during a subsequent stage (use stage).
- METRIC NOT APPLICABLE (X): This indicates that the metric is not applicable for the scope of the specific project. In this case, some notes on the reasons must be entered in the "Comments" field.
- METRIC NOT AVAILABLE (XX): This indicates that the metric has not been evaluated for the specific project/building.

For **qualitative metrics**, i.e. metrics that do not have a numerical target value but for which qualitative requirements to be proven through specific documentation (technical report, certificate of proof, technical data sheets, …) are defined, the following conditions of compliance are available in the ET:

- The requirement is fulfilled "YES": COMPLIANT or EU FUTURE PROOF

If no inputs are available for the metric the following setting can be selected in the Evaluation Tool:

- METRIC IN THE USE PHASE (-): This indicates that the metric cannot be calculated at the present moment, as its evaluation can only be conducted during a subsequent stage (use stage).
- METRIC NOT APPLICABLE (X): This indicates that the metric is not applicable for the scope of the specific project. In this case, some notes on the reasons must be entered in the "Comments" field.
- METRIC NOT AVAILABLE (XX): This indicates that the metric has not been evaluated for the specific project/building.

Both for quantitative and qualitative metrics, the EU Future Proof condition can only be reached if the metric evaluated for the specific project is consistent with the transnational MESTRI-CE SBM also in terms of calculation method used and stage of the project at which the metric is assessed. If these additional conditions are not met for a specific national/regional adapted metric, they must be displayed display in italic.

In the following screenshots of the Evaluation Toolbox (ET), the different steps of the project assessment process and outcomes are illustrated using as example the metric "A1.1 Primary Energy Use." These visuals demonstrate how the ET guides users through the evaluation workflow, from metric selection to compliance verification.

Step 0: Calculate the selected metric for your project

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TRANSNATIONAL EVALUATION TOOLBOX - NEW BUILDING

A ENERGY & ENVELOPE PERFORMANCE		Use stage energy performance Assessing the energy performance of the building during its operational or 'in use' phase allows an evaluation of how efficiently the building needs. Factors such as energy demand and consumption, the use of renewable energy sources and the overall efficiency of the technical sustainable practices that minimise the environmental impact associated with the building's ongoing energy use, while maint					
		METRIC	UNIT MEASURE	REQUIREMENT	TARGET	PROJECT VALUE	PROJECT ASSESSMENT
	A1.1	Primary energy use	kWh/m² per year	30% lower than the national/regional threshold for total primary energy use	PLEASE INSERT NATIONAL/REGIONAL TARGET VALUE		PLEASE INSERT PROJECT VALUE

Step 1: Enter the actual national/regional target in the field "TARGET" (for example 100 kWh/m²a)

		METRIC	UNIT MEASURE	REQUIREMENT	TARGET	PROJECT VALUE	PROJECT ASSESSMENT
A1.1	Primary energy use	kWh/m² per year	30% lower than the national/regional threshold for total primary energy use	100,00		PLEASE INSERT PROJECT VALUE	

Step 2: Enter the metric value calculated for your project (for example 100 kWh/m^{2}a)

	METRIC	UNIT MEASURE	REQUIREMENT	TARGET	PROJECT VALUE	PROJECT ASSESSMENT
A1.1	Primary energy use	kWh/m^2 per year	30% lower than the national/regional threshold for total primary energy use	100,00	100,00	COMPLIANT

In this example, the level of compliance displayed in the "Project Assessment" field of ET is marked as COMPLIANT, indicating that the project meets the national or regional target value defined for the metric "A1.1 Primary Energy Use."

The EU FUTURE PROOF level of compliance is only given if the metric value calculated for the project is at least 30% lower than the national/regional target as specified in the MESTRI-CE SBM requirement (for example if a value of 50 kWh/m^{2}a is entered).

	METRIC	UNIT MEASURE	REQUIREMENT	TARGET	PROJECT VALUE	PROJECT ASSESSMENT
A1.1	Primary energy use	kWh/m^2 per year	30% lower than the national/regional threshold for total primary energy use	100,00	50,00	FUTURE PROOF

Metric values that fall between the national/regional target and the SBM requirement (defined as -30% below the national target, for example 80 kWh/m^{2}a) are assessed as BEYOND COMPLIANCE into three progressive levels (STEP 1, STEP 2 and STEP 3). These levels reflect increasing degrees of performance improvement beyond the baseline national target, encouraging continuous advancement toward higher sustainability standards.

	METRIC	UNIT MEASURE	REQUIREMENT	TARGET	PROJECT VALUE	PROJECT ASSESSMENT
A1.1	Primary energy use	kWh/m^2 per year	30% lower than the national/regional threshold for total primary energy use	100,00	85,00	BEYOND COMPLIANCE - STEP 2

D. CONCLUSIONS

The testing of the Evaluation Toolbox (ET) on pilot projects in Austria, Croatia, Germany, Poland, and Italy demonstrated that its structure and usability are clear and intuitive for users. The compliance levels were well received as they help users maintain a strong focus on EU standards while providing a clear overview of deviations from both the EU framework and national/regional targets.

The flexibility of the ET in considering national and regional specificities—particularly in terms of assessment methods and target values—was perceived as a key strength. Its adaptability for integrating future updates further enhances its relevance and long-term usability across diverse regulatory and technical contexts.

As reported in D2.6.1 and D2.6.2, the implementation of the MESTRI-CE Sustainable Building Methodology (SBM) across European Union countries will inevitably vary in scope and depth. These differences are influenced by several factors, including the status of national and regional regulations on energy efficiency and sustainability, the age and condition of the existing building stock, the level of awareness and prioritization of sustainability issues among end users, the construction sector, and financial stakeholders. In some countries, certain sustainability aspects may be considered of primary importance, while in others they may be viewed as secondary. Therefore, adapting the MESTRI-CE SBM to the specific context of each country is essential to ensure its relevance and effectiveness for the intended target groups.

This contextual adaptation also forms the basis for developing and customizing the ET, making it a practical and effective tool for assessing building sustainability across diverse national and regional settings—without losing sight of the overarching European framework and long-term targets. This balance between flexibility and standardization fosters a gradual convergence of practices, helping to raise the overall standards of energy efficiency and sustainability in buildings throughout Europe. Through its structured approach and intuitive design, the ET serves not only as a technical assessment tool but also as a strategic instrument for advancing EU-wide sustainability goals.

E. ANNEXES

As Annexes to this deliverable 4 Excel files have been provided:

- D.2.2.3 Annex C - transnational ET new building
- D.2.2.3 Annex C - transnational ET existing building

These Annexes provide the transnational version of the Evaluation Toolbox.

- D.2.2.3 Annex D - national-regional ET new building – IT
- D.2.2.3 Annex D - national-regional ET existing building – IT

These Annexes provide a regional adapted version of the Evaluation Toolbox based on the Italian CasaClima certification schemes.