iBRoad2EPC

TRAINING MODULE FOR CONSTRUCTION PROFESSIONALS

3 –Step By Step Recommendations

This project has received funding from the European Union's HORIZON 2020 research and innovation programme under grant agreement No 101033781

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ULO No	Autonomy and responsibility	Skills	Knowledge
3	Read and interpret step-by-step recommendations with focus on achieving MEPs at the first step of the staged renovation project	Develop a step-by-step renovation plan Avoid lock-in effect in step-by-step planning and implementation of energy efficiency measures	Detailed know-how on step-by-step renovation plans (including know-how of gaps in the practical implementation) Good and bad practices related to lock-in effects Building Renovation Passports (BRPs) for renovation in order to increase awareness about the costs, benefits, and the process of renovation

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Step-by-step recommendations

If You Do It, Do It Right From The Start!

- It is important to avoid missed opportunities by carrying out every renovation measure with an eye on quality and energy efficiency. It is also essential to remember that when we renovate, we are not just improving aesthetics and reducing energy losses – we are also directly affecting a building's moisture balance, air-flow, surface temperatures and much more.

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Step-by-step recommendations

When you are assessing how your energy efficiency renovation might affect your finances, do not just consider payback. Sure, energy efficiency pays for itself — and puts more money in your pocket — but taking a more holistic approach can get you bigger bang for your renovation buck.

As part of your holistic approach, you should consider the non-energy financial benefits of a renovation, as well. For instance, creating a more comfortable living environment will attract more tenants, who will stay longer, leading to lower vacancy rates. You will also have lower maintenance costs and be able to increase the overall value of your property. In fact, for apartments and commercial buildings, every $1 you save from your annual energy costs is equivalent to approximately $10-15 in additional building value.

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Step-by-step Renovation – Why?

1. building components have long life cycles – today, each renovation must contribute to the climate target

2. most renovations are performed stepwise and not in one step. But also stepwise renovations should be deep and avoid lock-ins.

3. it takes an overarching plan to combine single renovation steps to a deep renovation

4. a long-term plan can consider the trigger points

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Guiding questions to define Renovation Steps

Can the owner implement measures that are **independent** from the age of a building component (e.g. insulation of the cellar ceiling)?

Are there measures that provide considerable energy **savings at low investment cost**?

Do the owners complain about specific **comfort aspects**, e.g., draught or summer heat?

Are there components that need to be renovated or exchanged **anyway** in the near future?

When will components need maintenance in the future according to their specific **life span**?

Are there technical needs that require a specific **order** of renovations? Some renovations are much easier if they are combined.

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Building data collected and stored

EPC

- Administrative information
- Physical description of the building
- Building performance data

Other databases and logbooks

- Digital Building Logbooks
- Building cadastres
- One-stop shops
- EPC databases etc.

Detailed audit

- Comprenhensive on-site visit
- Possibility to tailore to the needs and demand of the occupant

Process

EPC

iBRoad2EPC concept

iBRoad2EPC

Basic module

- On-site visit required; the (additional) effort needed is quite limited.
- The energy auditor only has to enter a few (additional) details, mainly WHAT should be renovated and WHEN.
- Using this input, renovation recommendations are selected from predefined lists and can be further edited.
- Recommendations are given in a specific sequence to avoid lock-in effects when applied step-wise.
- Recommendations address the long-term perspective and are target-oriented.

Advanced version: Basic module + modular expansion

- Builds on and likely extends the scope of the on-site visit.
- Builds on the basic iBRoad2EPC module and extends it with additional functions (modules), e.g., information on energy consumption, IEQ, SRI, investment costs.
- Each country can choose which modules to apply at which stage.
- The more modules are chosen, the more iBRoad2EPC comes closer to a comprehensive BRP.
- Possibility to link to EPC database, BRP, DBL and other databases.

Building Renovation Passport

iBRoad

- Based on a thorough building audit and data quality assurance.
- Customised and stepwise roadmap to carbon neutrality of the individual building.
- Detailed overview of renovation measures including energy and cost-savings after each renovation step.
- Flexibility for the auditor to include other aspects such as non-energy interventions.
- Tailored to the needs, possibilities and demands of the building owner.
- Direct link to iBRoad logbook.

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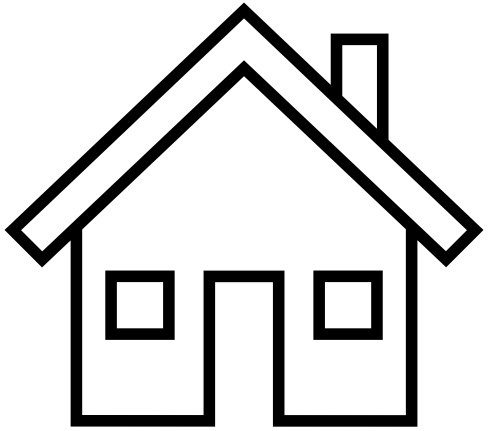
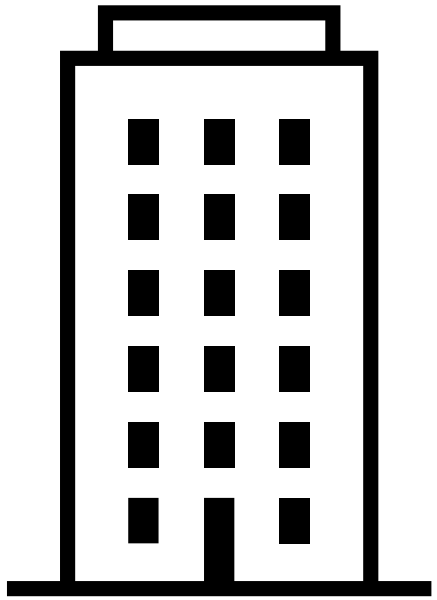
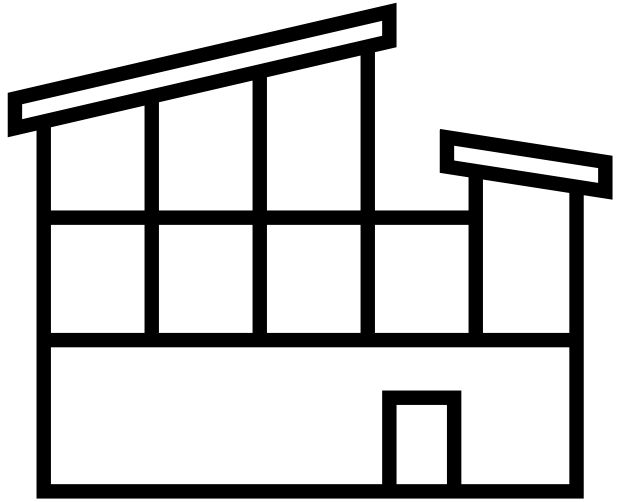
iBRoad2EPC addresses all types of buildings







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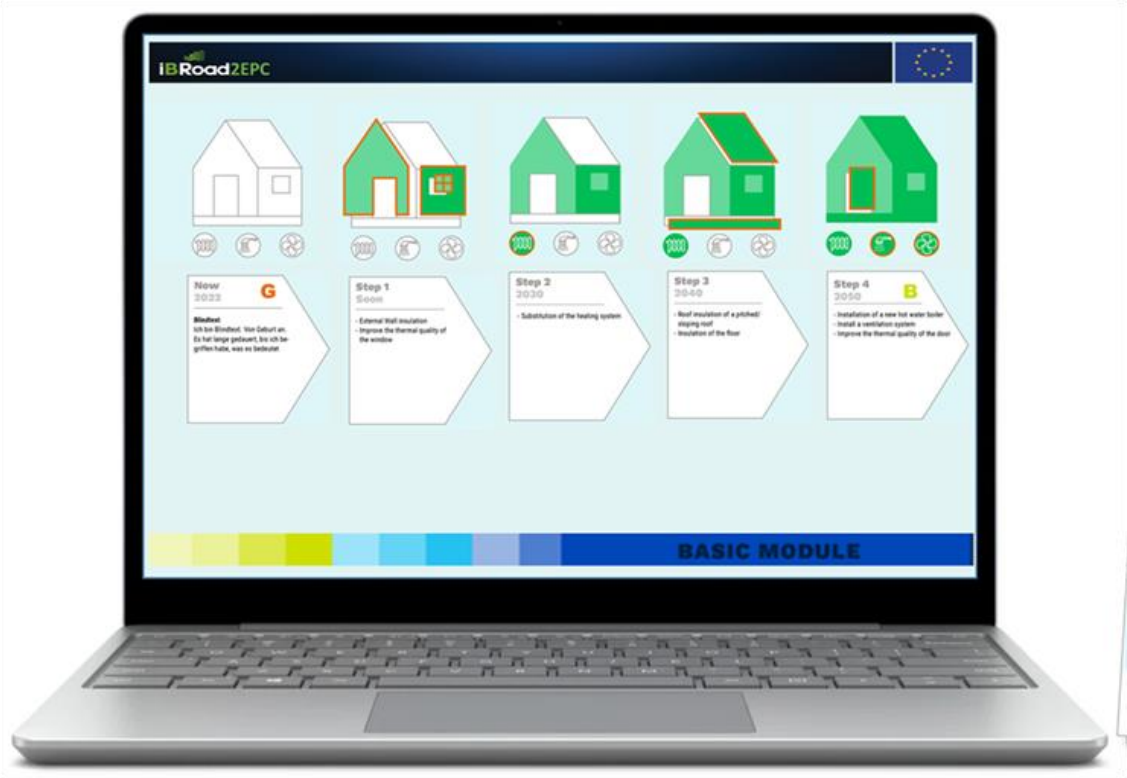

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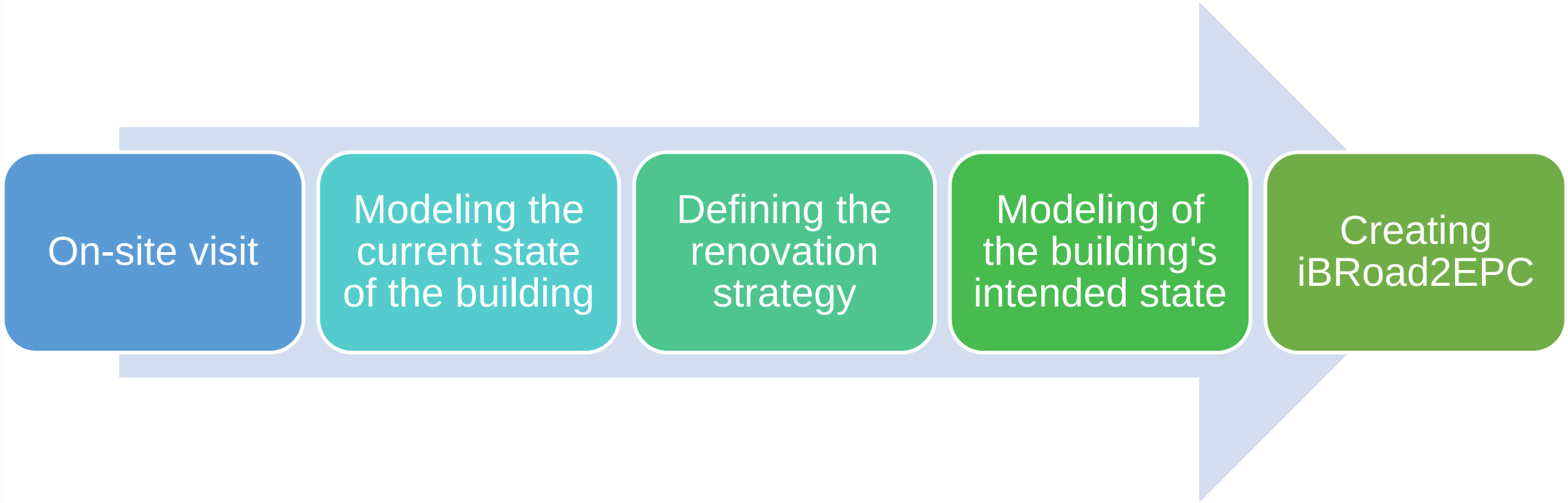
iBRoad2EPC main steps



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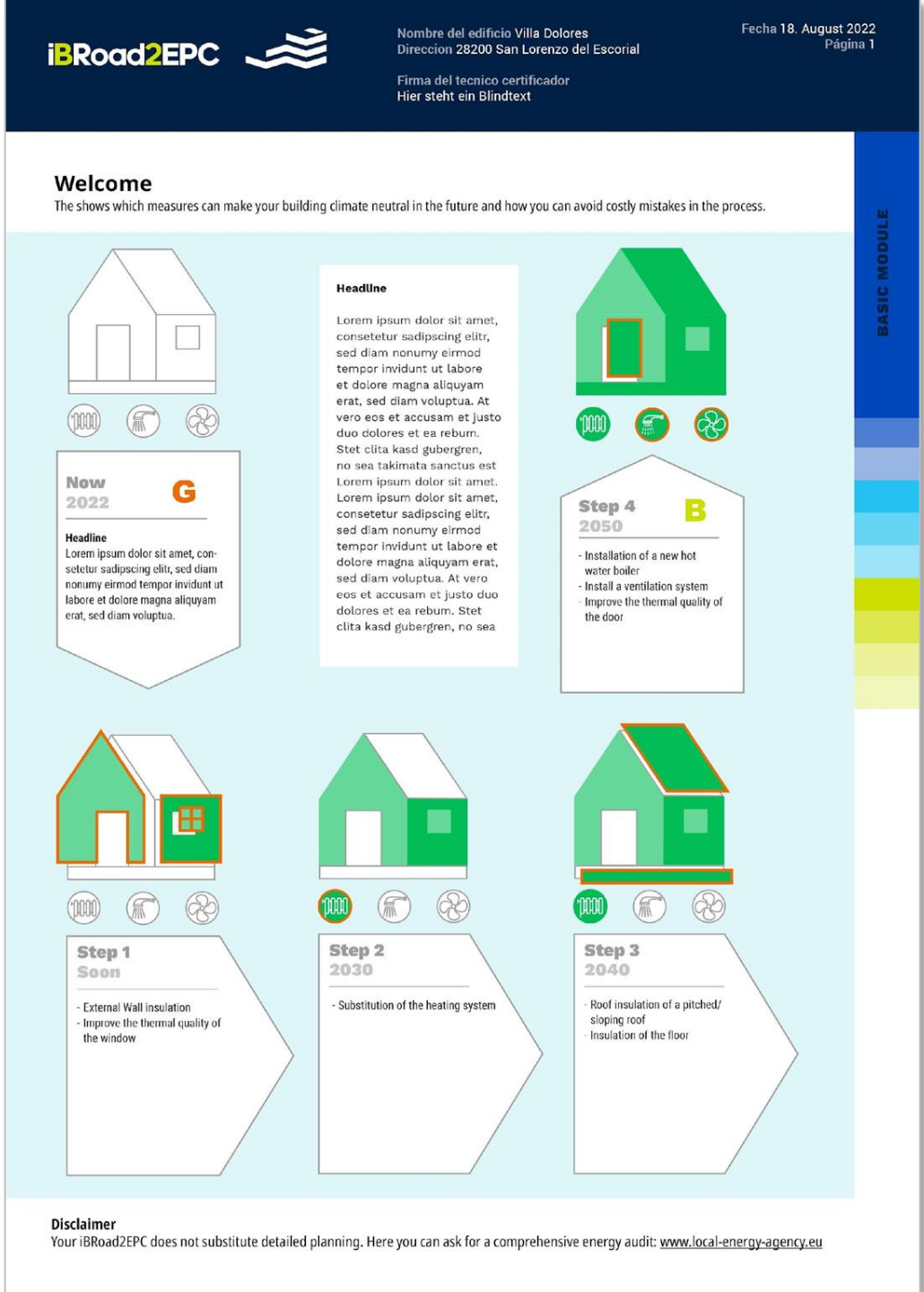
iBRoad2EPC

Basic Module

Key features:

- On-site visit required, but the (additional) effort and cost is quite limited
- Basic expert training required
- Developed relying mainly on collected EPC data; the energy auditor only has to enter a few (additional) details, e.g., what specific renovation measures should be applied when
- Renovation recommendations are selected from predefined lists and can be further edited
- Recommendations consist of improvement measures planned over a time range of decades in a specific sequence to avoid lock-in effects when applied step-wise; no provision for indicating individual cost items or performance levels achieved



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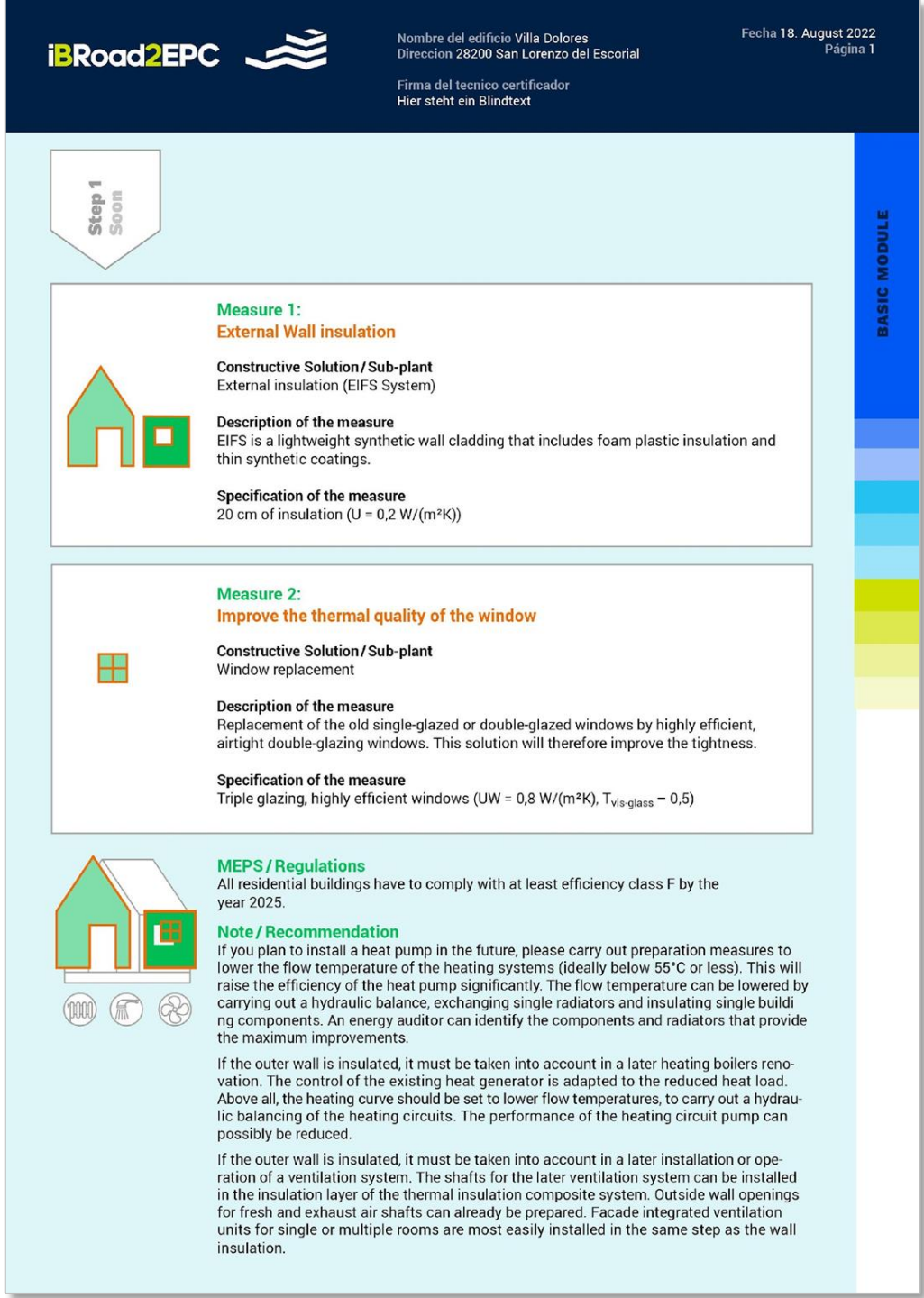
Basic Module

- Recommendations address the long-term perspective and are target-oriented with an end goal of achieving a zero-emissions building standard.
- Flags requirements to comply with MEPS.
- Does not consider lifestyle aspects.
- Provides opportunity for future extension with additional modules according to Member State needs and market maturity.
- Trigger point for further engagement and action.



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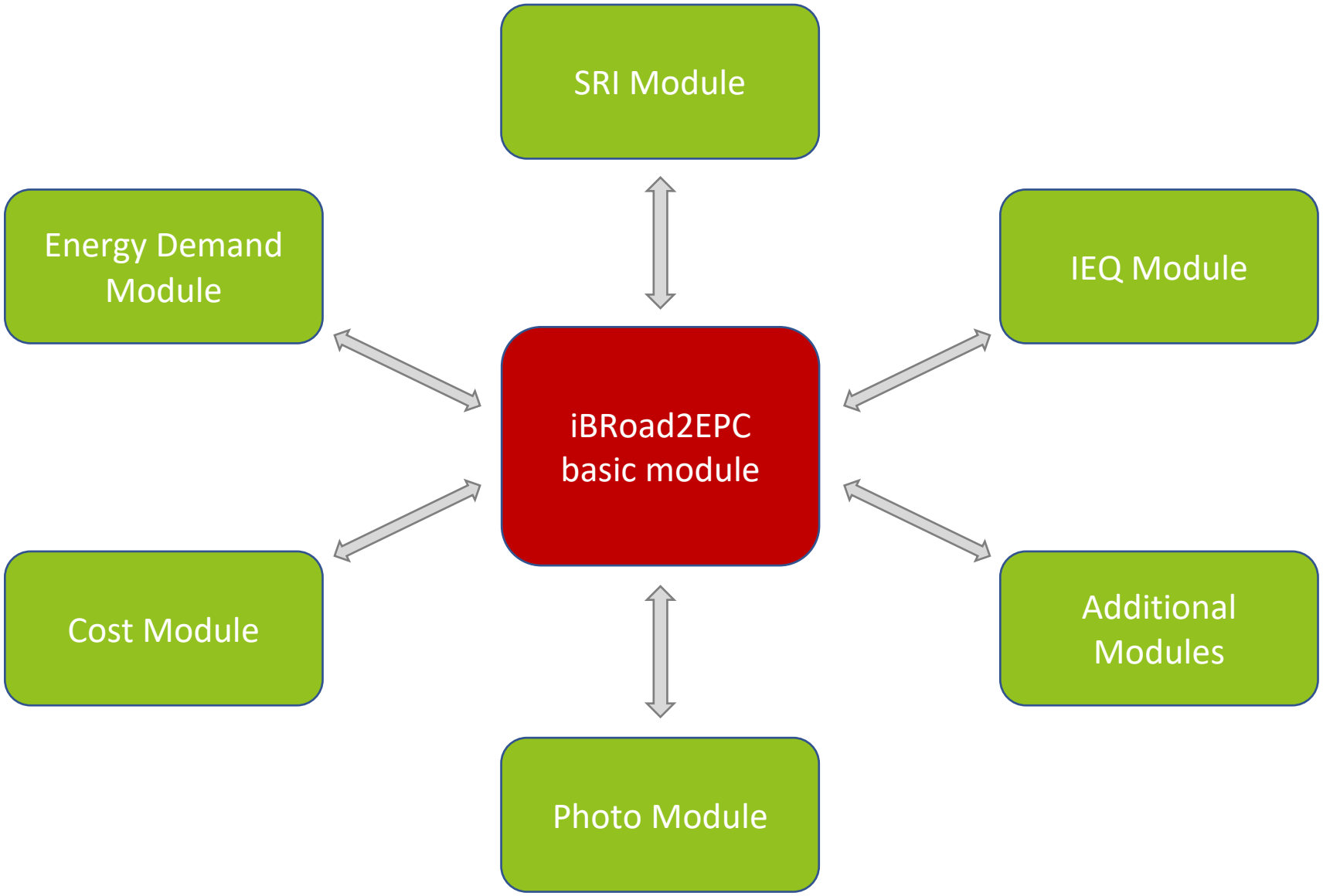

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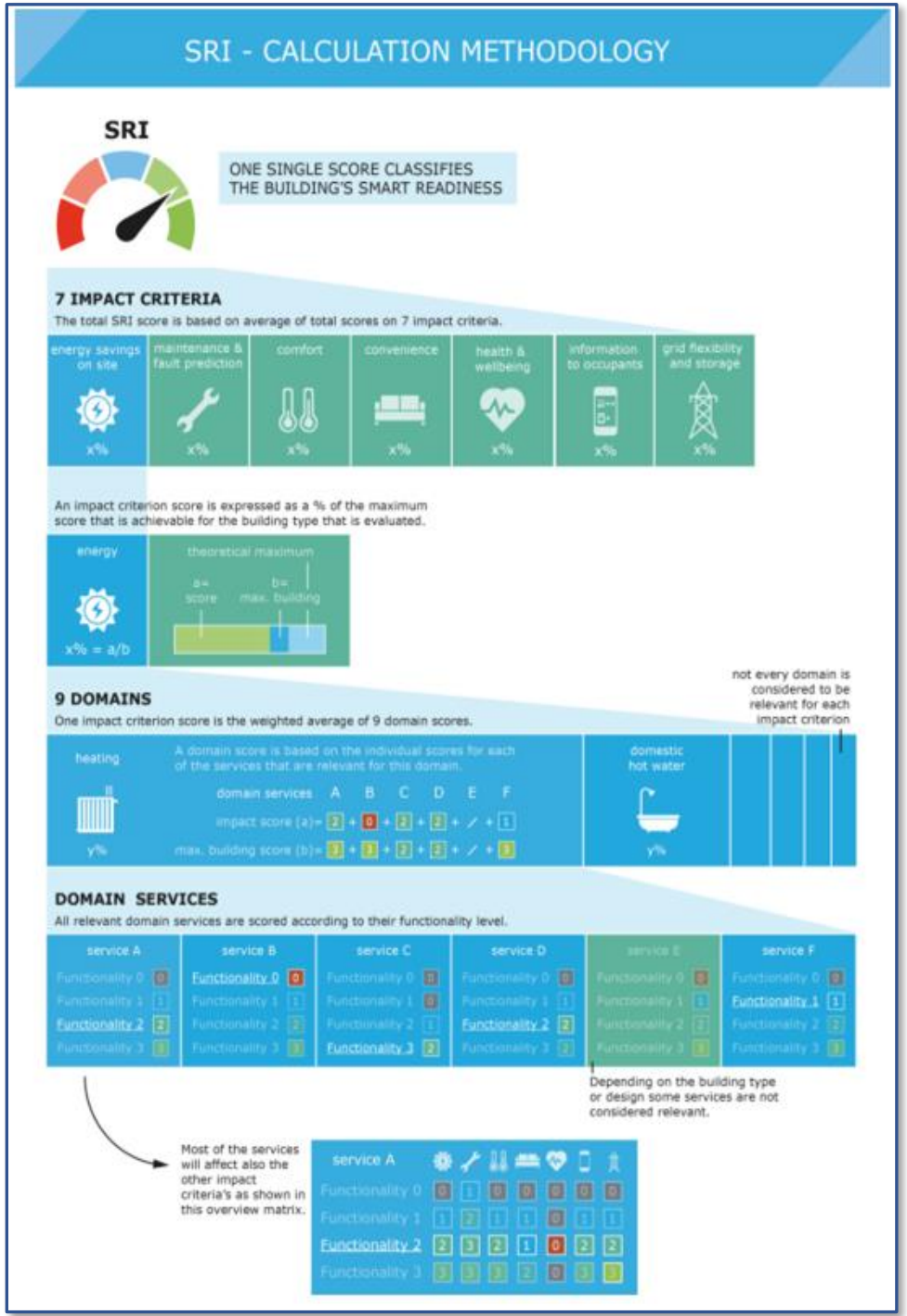
Advanced version

- Additional tools are developed to make the tool more useful such as:
  - Cost Module
  - Energy Demand Module
  - Photo Module
  - IEQ Module
  - SRI Module
  - Other modules



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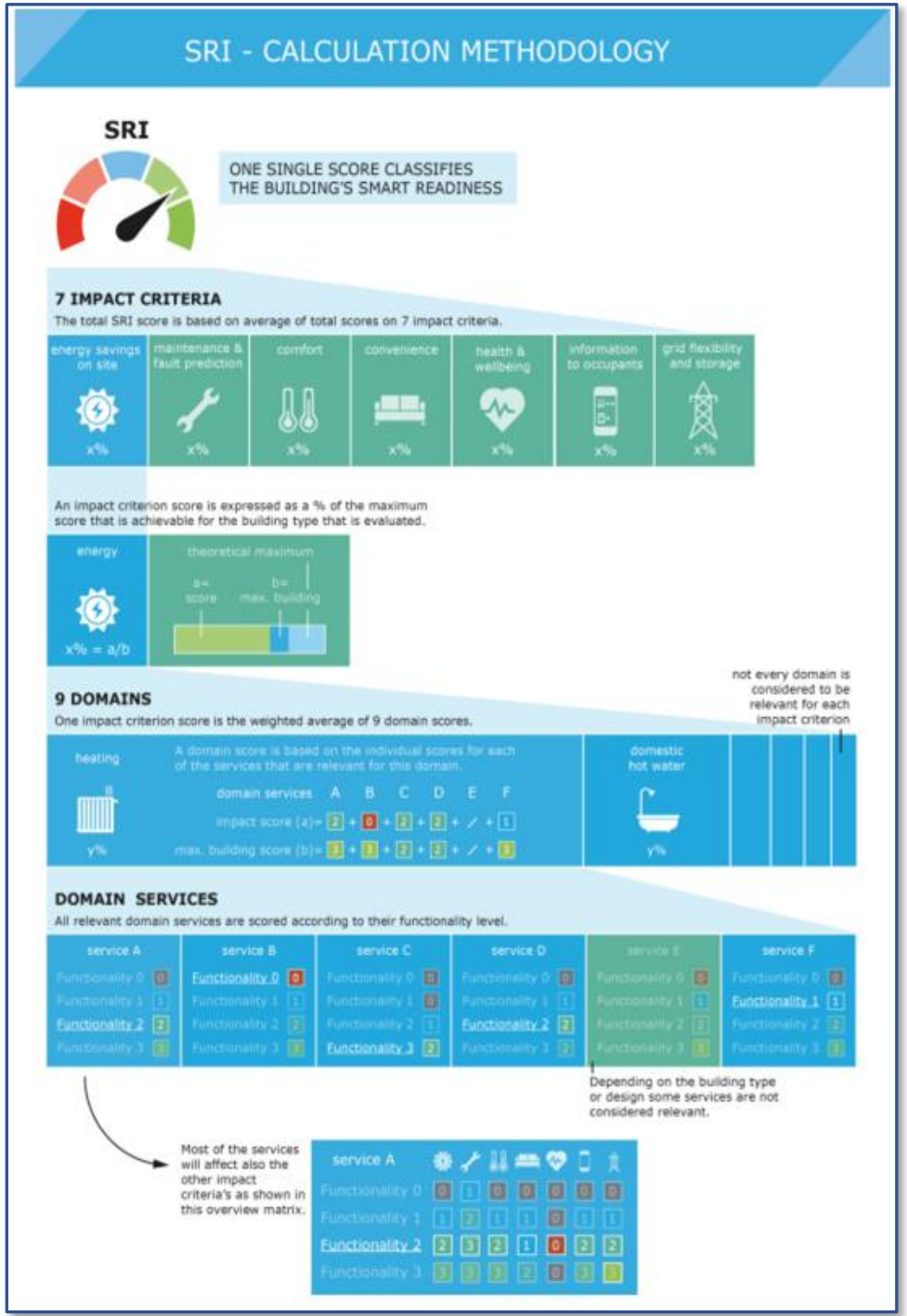
Advanced version

- Some of the additional modules can be required by different countries
- Additional modules will give owners the possibility to understand additional benefits of renovation and smart readiness indicator



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How the iBRoad2EPC measures/steps are defined following an on site visit by the energy expert and why?

The year of implementation and the final objective of the measures are pre-set, taking into account the local context of each country, but also the European goals in the field of energy efficiency and climate.

The selection of correct measures in the specific steps is set by the EPC issuer

The depth of renovation is defined by national and EU legislation and MEPS as reflected in the iBRoad2EPC recommendations.

For example, the steps/measures are tied to the goal by which year the building should be zero-emission, depending on whether it is residential, public or another type.

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iBRoad2EPC

Related principles, objectives and benefits

The main principles of determining the measures and steps in iBRoad2EPC is to prepare measures that are most suitable for implementation in the building and arrange them in steps that are economically and practically the most expedient while avoiding lock-in effects.

The objectives of the steps are to arrange them in such a way as to achieve specific results, so that the building meets the minimum requirements in the respective country in the given period regarding the climate and energy targets.

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iBRoad2EPC

Related principles, objectives and benefits

The benefits for end users, be they owners, tenants or building managers, are to know how they can improve the building, to know what obligations they have and what steps they need to take to reach the next building renovation obligations.

The builders and designers of the buildings, on the other hand, have a renovation strategy in which attention is paid to the possible risks of lock-in during renovation and what needs to be considered during the implementation of the measures.

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iBRoad2EPC

How related notes to avoid lock-in effects must be interpreted including know-how of gaps in the practical implementation?

Depending on the selected measures for each of the steps, a list of recommendations to avoid lock-in effects is set.

They are determined on the basis of practical experience and good practices in building renovation.

The goal is to inform the owner at the earliest possible stage what the risks of incorrect renovation are and to avoid them at the planning stage.

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Step 1 Soon

Measure 1
External wall insulation

Description of the measure
The external wall is insulated with a "Exterior Insulation Finishing System (EIFS)". EIFS is a lightweight synthetic wall cladding that includes foam plastic insulation and thin synthetic coatings.

Specification of the measure
15 cm of insulation (U = 0,2 W/(m²K))

Measure 2
Replacement of the windows

Description of the measure
Replacement of all windows that are older than 10 years.

Specification of the measure
Triple glazing, highly efficient windows (UW = 0,8 W/(m²K).

MEPS/Regulations
By 1 January 2024, every newly installed heating system is to be based on 65 percent renewable energies

Note/Recommendation
When the outer wall is being insulated, please prepare a low thermal bridge connection to a later pitched roof insulation. Existing panels at the eaves should be opened so that the insulation can be laid up to the upper edge of the rafters. At the verge, the insulation should be laid up to the upper edge of the gable wall. For this, the roof overhang must usually be extended.
When the outer wall is being insulated the control settings of the existing heat generator should be adapted to the reduced heat load. Your installer should check whether the flow temperatures and the flow rate of the heating circuit pump can be reduced.

When the outer walls are being insulated, please prepare for a later installation of a ventilation system by installing the outside wall openings for fresh and exhaust air shafts for the ventilation system in the wall insulation layer. Facade integrated ventilation units for single or multiple rooms are most easily installed in the same step as the wall insulation.

If you plan to install a heat pump in the future, please carry out preparation measures to lower the flow temperature of the heating systems (ideally below 55°C or less). This will raise the efficiency of the heat pump significantly. The flow temperature can be lowered by carrying out a hydraulic balance, exchanging single radiators and insulating single building components. An energy auditor can identify the components and radiators that provide the maximum improvements.

Back

iBRoad2EPC

Bad examples

A bad example would be installing insufficient insulation on all elements of the envelope and replacing windows with ones of insufficient quality because the budget was not sufficient to implement all the measures. This renovation of the building envelope will remain for the next 30 to 50 years without the possibility to improve further and achieve the desired renovation classes.

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Bad examples

If a step-by-step renovation is done with sufficiently thick thermal insulation, but the steps are arranged incorrectly or the future measures are not considered, it is possible that the next measures can be performed with poor quality details or that it is necessary to destroy part of the measures already made.

**Specific examples with details are presented in following modules.*

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Good examples

Implementation of properly generated steps from a phased renovation plan issued by a professional (EPC issuer) considering the automatic recommendations presented by iBRoad2EPC.
Final results will be best when going through a full step-by-step design stage and using a builder with knowledge of step-by-step renovation.

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Test Questions

1. Which statement is true?
   a) When renovating Step by Step it is important not to allow lock-in effects
   b) When we apply the Step by Step principle, we can only achieve the regulatory requirements for energy efficiency
   c) The Step by Step principle can only be implemented with thermal insulation on walls

2. Which one is not among the Guiding Principles for Establishing iBRoad2EPC?
   a) Short-term perspective
   b) Individual Renovation Context
   c) Attracting and motivating

3. Which statement is true?
   a) Step by Step approach is appropriate only for multi-family buildings
   b) Building components have long life cycles

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Test Questions

4. Which one of the statements listed below is not among the Step-by-step recommendations?
    a) If You Do It, Do It Right From The Start!
    b) Set Goals
    c) Go ahead with the measures without baseline

5. In the context of the step-by-step renovation each step can:
    a) include 1, 2 or more measures
    b) include just 1 measure
    c) include minimum 3 steps at a time

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Thank you for your time and collaboration

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