Forging links within different country contexts

iBRoad2EPC´s modular approach and adaptable database of renovation advice

Peter Mellwig

ifeu – Institut for energy and environmental research

SUSTAINABLE PLACES 2024

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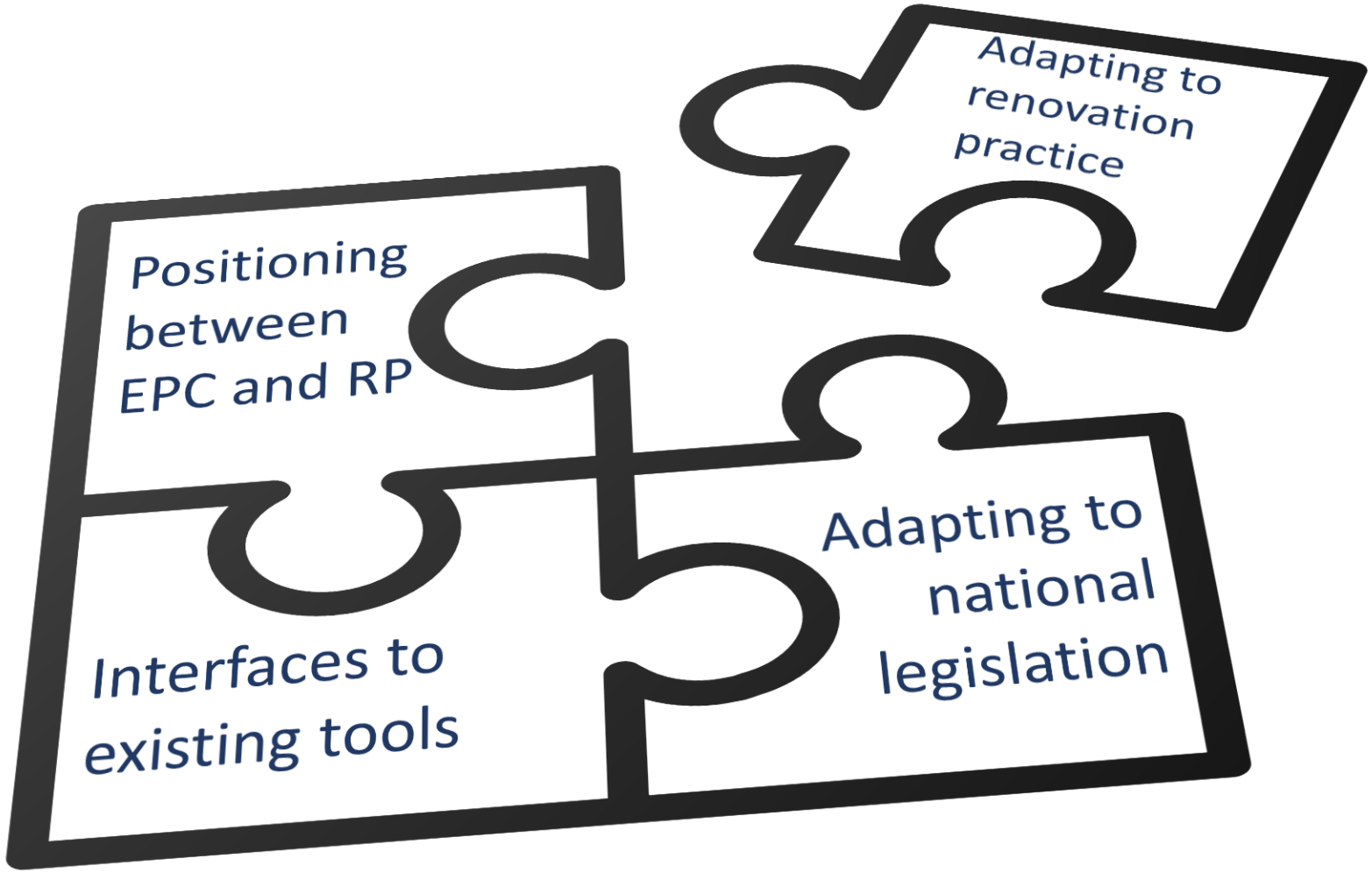
Levels of Adaptation



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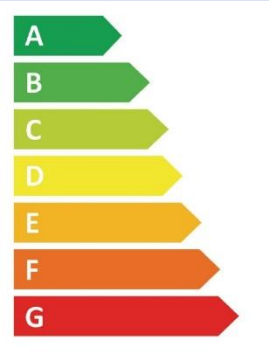
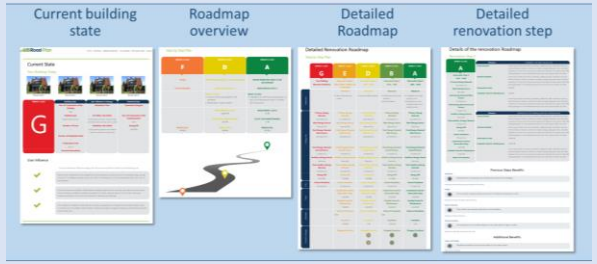
Positioning between EPC and RP

EPC



Energy Performance Certificate

RP



Renovation Passport

Effort:

2 - 4 hours → **1,5 – 2 days**

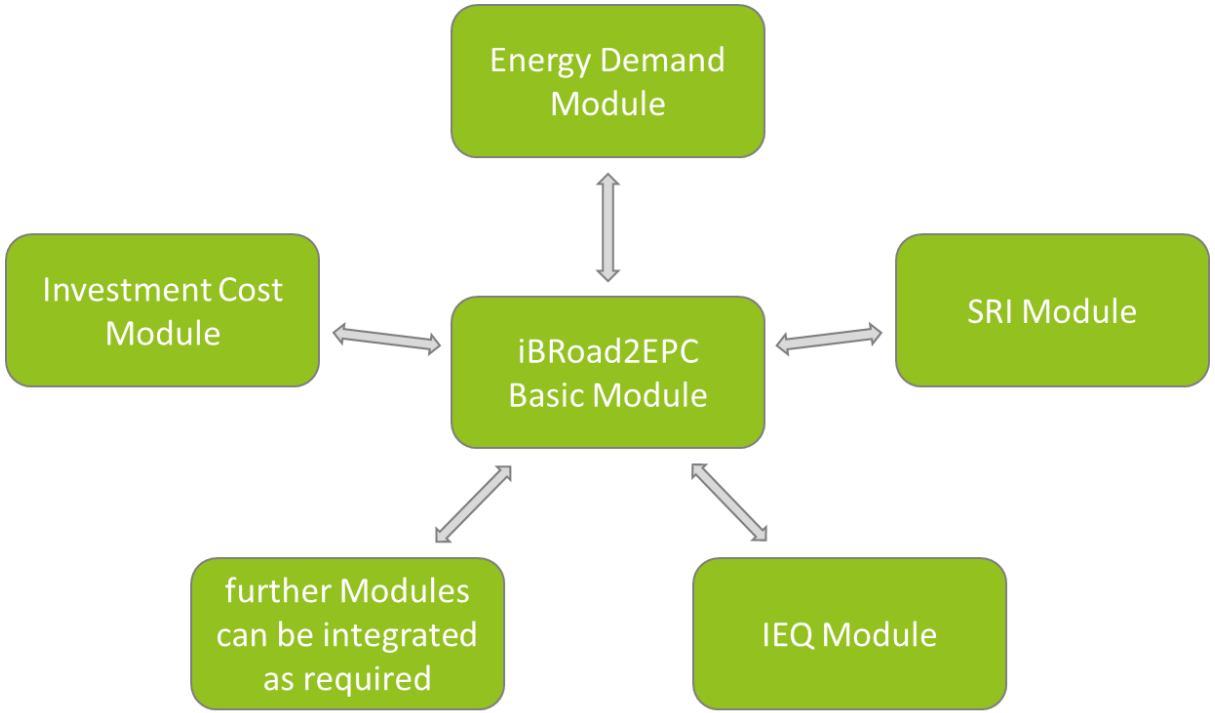
Price:

50 – 250 Euro → **1000 – 3000 Euro**

Coverage:

5 – 15% of the building stock — **obligatory** — **voluntary** — **several thousand buildings**

Positioning between EPC and RP



- iBRoad2EPC consists of a Basic Module which provides all core features
- The scope can be enlarged with additional modules that provide specific features
- The Basic Module requires low effort to issue and is designed to cover large parts of the market.
- The more modules are being added the more complex the processing gets up to the full scope of a Renovation Passport

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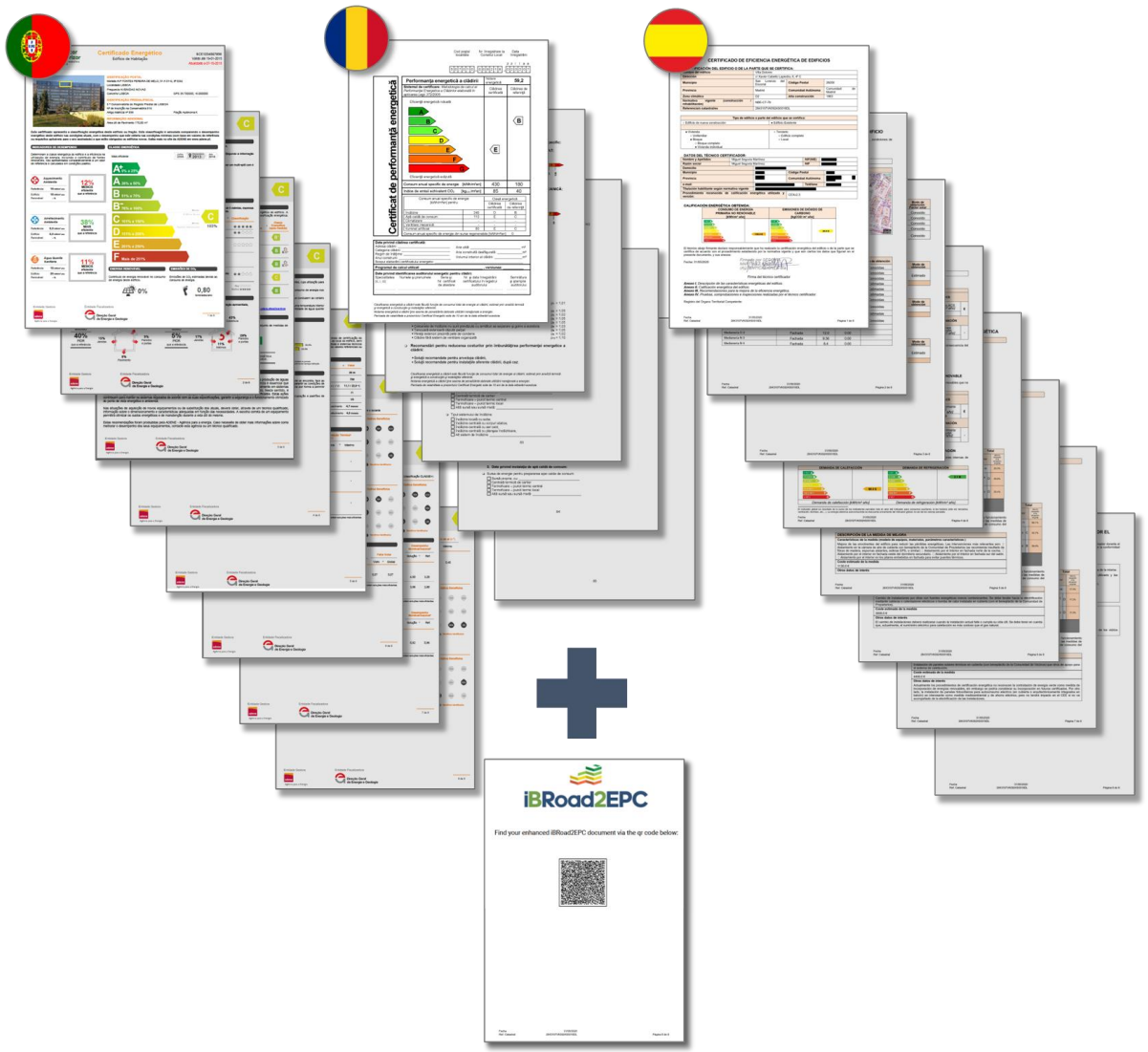
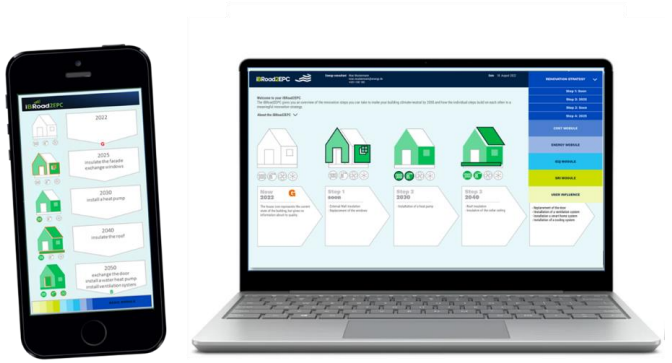
Positioning between EPC and RP



- iBRoad2EPC comes as an extra page to the regular EPC with an individual URL and QR-code leading to the online document.
- It can be a voluntary extension to the EPC
- or become a mandatory part of every EPC issued.
- iBRoad2EPC can also be combined with other existing consulting tools if individually required in one country.



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Adapting to national legislation

Roof tiles 50 years old

Heating system 20 years old

Facade 40 years old

2025 2030 2035 2040 2045 2050

National legislation: Minimum Energy Performance Standards (MEPS)

National legislation: Fossil fuel boiler ban

National legislation: Target: Zero Emission Building (ZEB)

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Adapting to national legislation

Target state
Climate neutral building according to national legislation

Present building state
according to EPC

Efficiency classes
According to national system (database)

Timing of renovation steps
According to national climate targets and legislation (database)

iBRoad2EPC

Energy consultant Max Mustermann
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Date 18. August 2022

RENOVATION STRATEGY

Welcome to your iBRoad2EPC
The iBRoad2EPC gives you an overview of the renovation steps you can take to make your building climate-neutral by 2050 and how the individual steps build on each other in a meaningful renovation strategy.

About the iBRoad2EPC

Now 2022 G
The house icon represents the current state of the building, but gives no information about its quality.

Step 1 soon
- External Wall insulation
- Replacement of th... ...ows

Step 2 2030
- Installation of a heat pump

Step 3 2040
- Roof insulation
- Insulation of the cellar ceiling

Step 4 2050 B
- Replacement of the door
- IInstallation of a ventilation system
- Installation a smart home system
- Installation of a cooling system

Imprint

Disclaimer
Your iBRoad2EPC does not substitute detailed planning.
Here you can ask for a comprehensive energy audit: www.local-energy-agency.eu

FUNDING NOTICE
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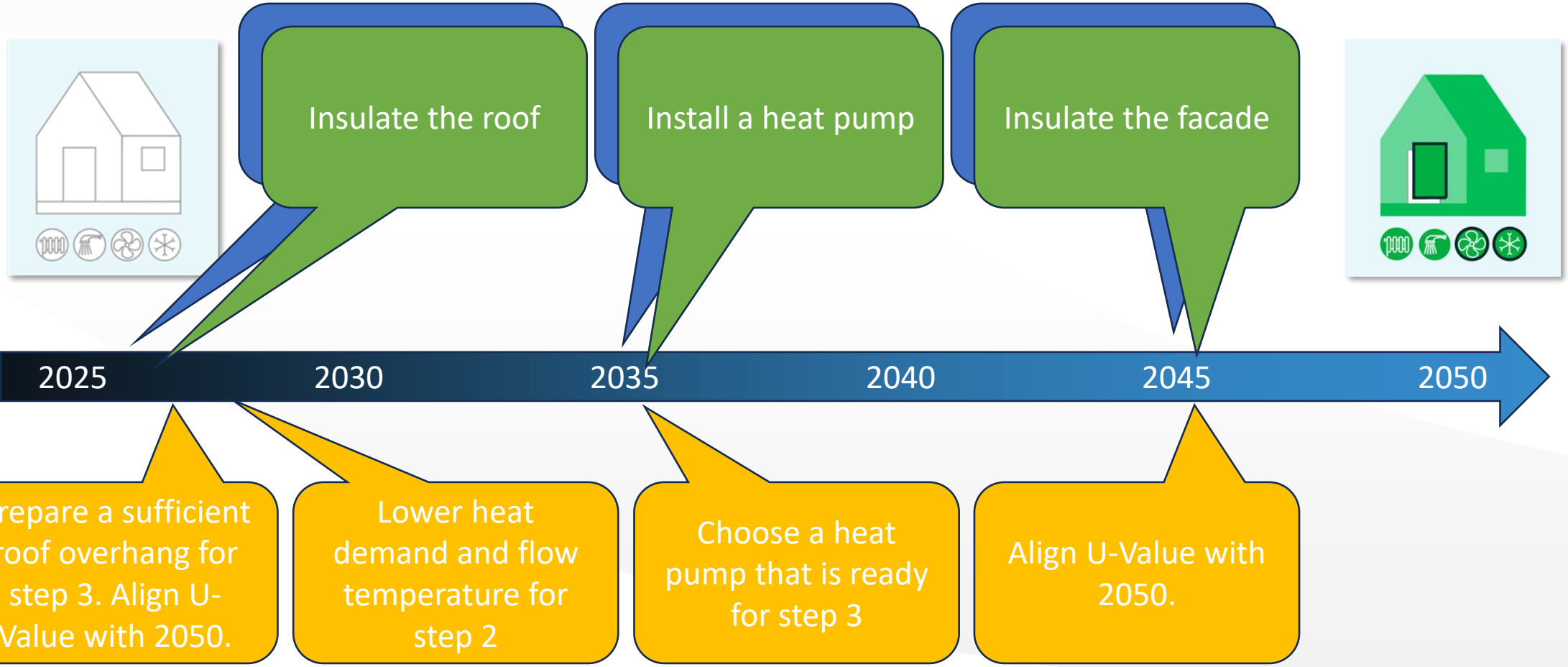
Adapting to national renovation practice

What do we know about the future of the building? Prepare for later steps



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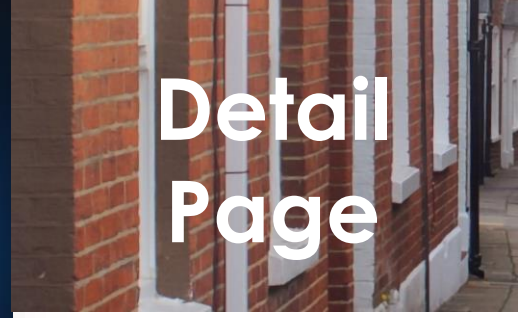

Adapting to national renovation practice

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Description of the measures
What should be renovated? (database)

Specification of the measures
Renovation depth according to NBRP (database)

Future Requirements
Information about content and timing (database)

Preparation for later renovation steps
reach deep renovation and avoid lock-in (database)

iBRoad2EPC

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Date 18. August 2022

Basic Module > Step 1

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

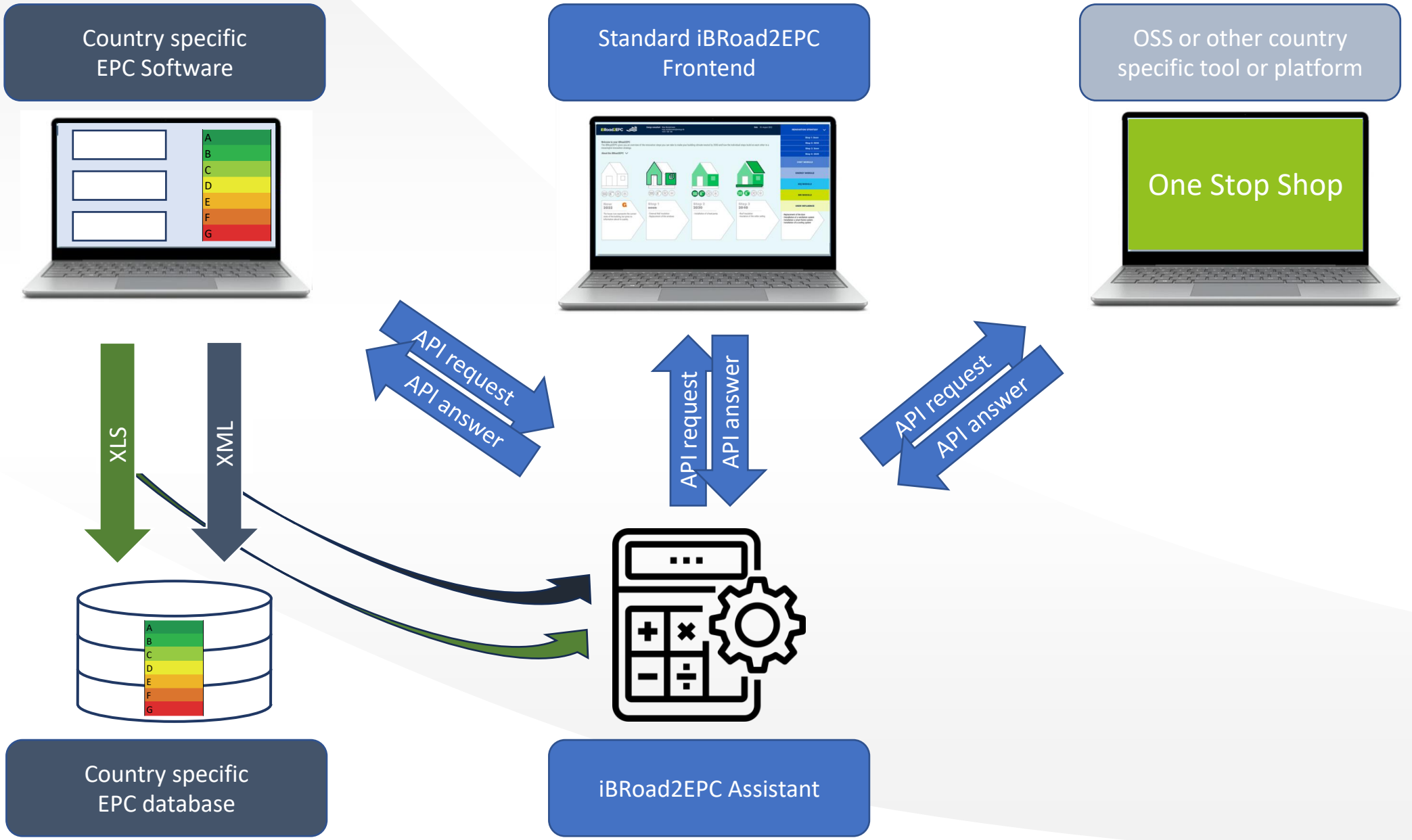
Note/Recommendation
When the outer wall is being insulated, please prepare a low thermal bridge connection to a later pitched roof insulation. Existing panels at the eaves should be opened so that the insulation can be laid up to the upper edge of the rafters. At the verge, the insulation should be laid 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.

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

Adaptability to countries' requirements
Connectivity to existing tools



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Thank you for your attention

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For more information, please visit **www.ibroad2epc.eu**

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Implementing iBRoad2EPC

Examples from Bulgaria

Dragomir Tzanev

EnEffect

SUSTAINABLE PLACES 2024

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The easy case

- **No energy saving measures implemented in the past.**
- Great orientation
- Very low energy consumption of the appliances
- Compact shape
- Promising cost-effective measures

Starting form **class C**

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iBRoad2EPC overview

	Current state	Step 1	Step 2
Year of implementation:		ASAP	2040
Trigger for renovation:		Poor façade of the building and replacement of the unefficient and expensive heating system	Roof renovation needed, improving ventilation together with planned internal reconstruction
Energy class:	C	A	A
Energy sources:	Diesel fuel for heating, electricity for cooling and appliances	Electricity	Electricity
Final energy demand:	208 kWh/(m²year)	34 kWh/(m²year)	10 kWh/(m²year)
GHG emissions:	71 kg/m²	28 kg/m²	8 kg/m²
Energy costs:	65.33 BGN/(m²year)	23.5 BGN/(m²year)	9.42 BGN/(m²year)
SRI rate*:	4.1	33.4	41.4
IEQ rate:**	5.2	6.5	7.5

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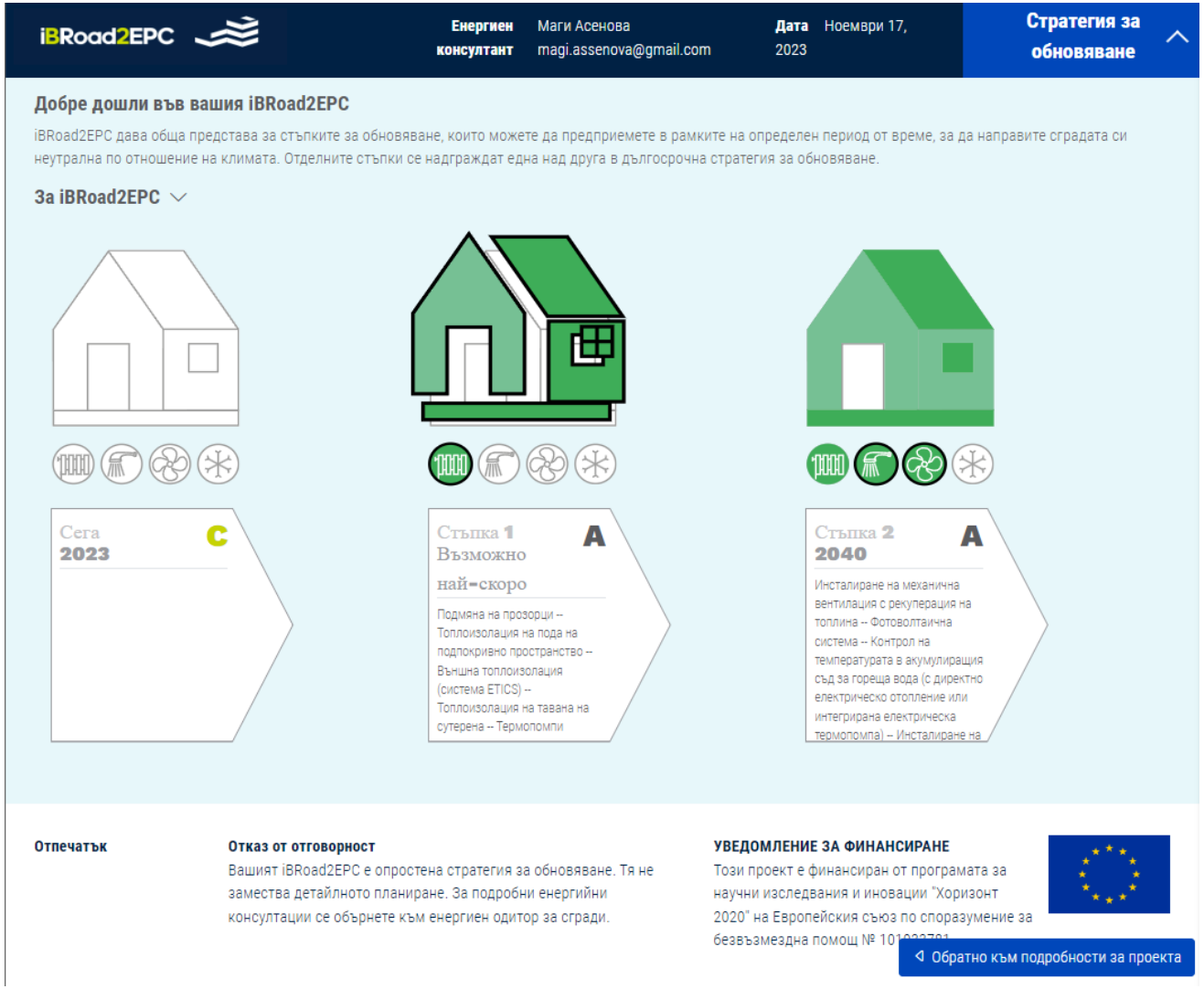
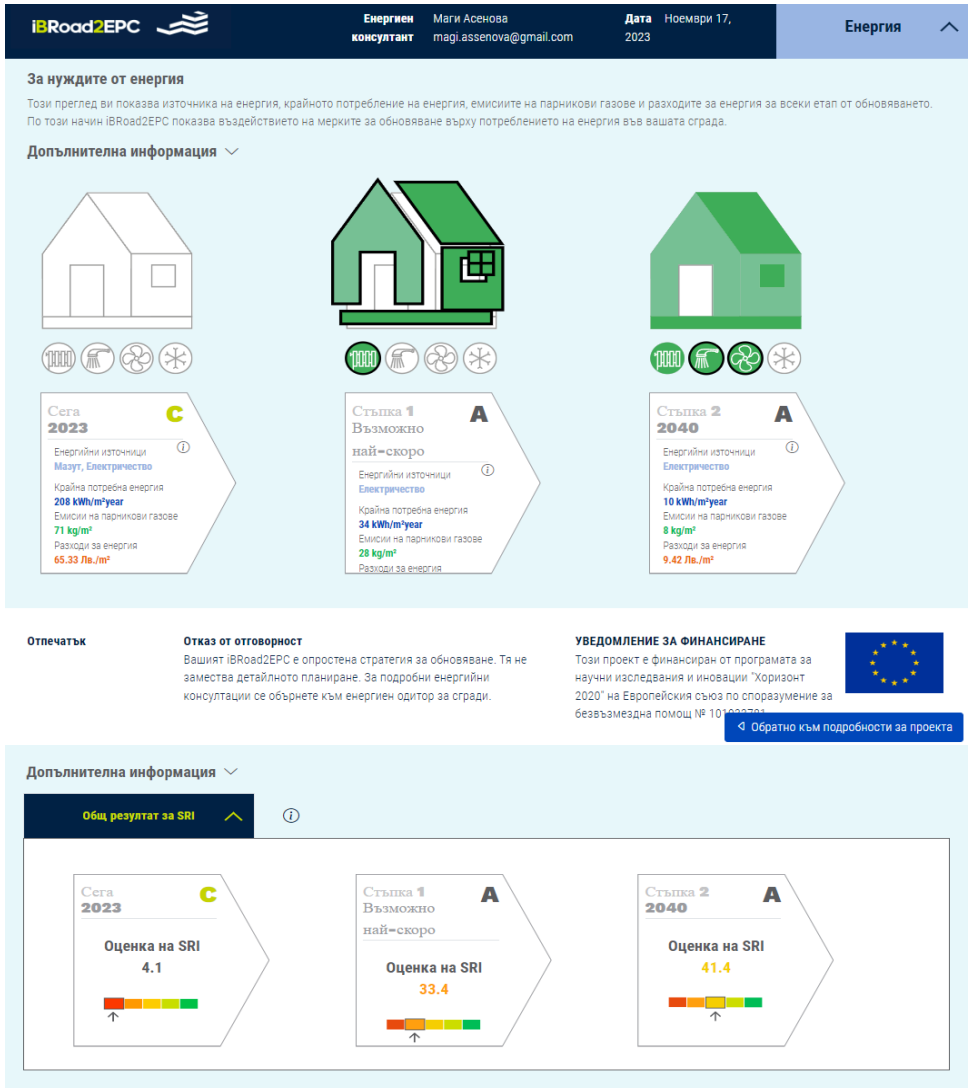
iBRoad2EPC overview





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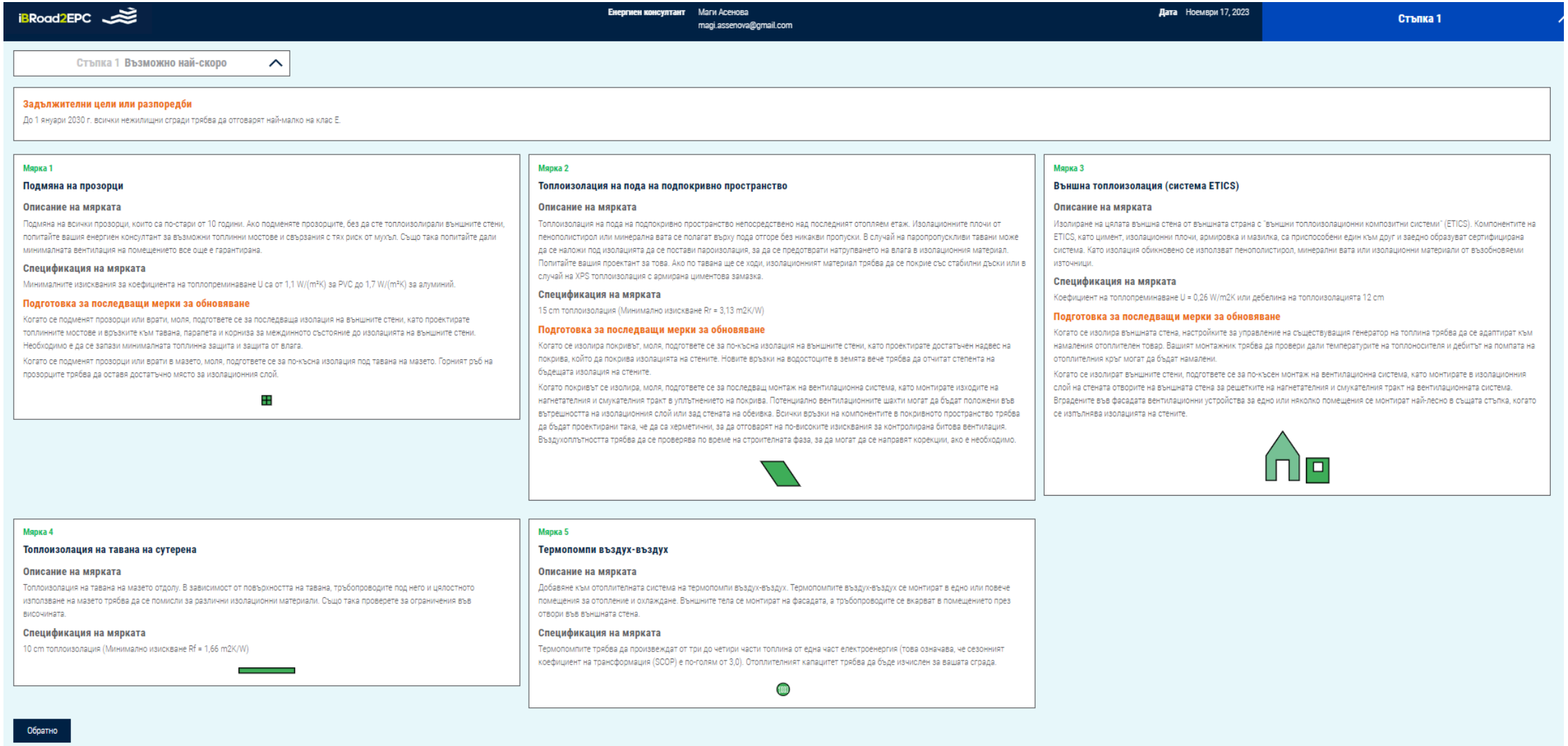
iBRoad2EPC overview



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But typically, it's complicated...

Administrative building

- Constructed in 1935
- Total floor area: 1191 m2
- Used by 3 administrative bodies
- Energy use: gas + electric boiler + heat pump
- Partly replaced windows
- Not certified

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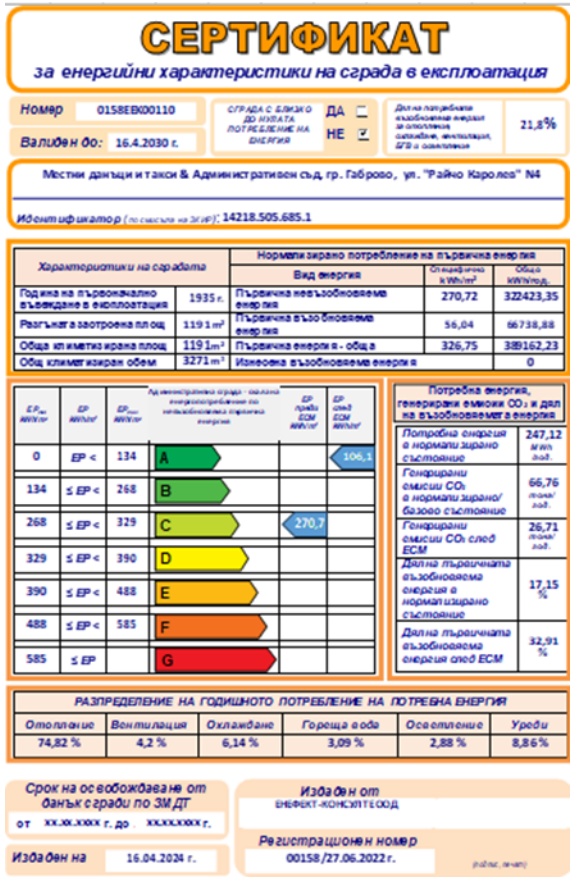
Summary of the BRP

Cost reduction by factor 5.5



СЕРТИФИКАТ

за енергийни характеристики на сграда в експлоатация

Номер 0158EBX00110

Валиден до: 16.4.2030 г.

СГРАДА С БЛИЗКО ДО НУЛАТА ПОТРЕБЛЕНИЕ НА ЕНЕРГИЯ ДА ☐ НЕ ☑

21,8%

Местни данъци и такси & Административен съд гр. Габрово, ул. "Райко Каролев" N4

Идентификатор (по смисъла на ЗМДТ): 14218.505.685.1

Характеристики на сградата		Нормализирано потребление на първична енергия		
		Вид енергия	Специфична kWh/m²	Обща kWh/год.
Година на първоначално въвеждане в експлоатация	1935 г.	Първична невъзобновяема енергия	270,72	322423,35
Разгъната застроена площ	1191 m²	Първична възобновяема енергия	56,04	66738,88
Обща климатизирана площ	1191 m²	Първична енергия - обща	326,75	389162,23
Общ климатизиран обем	3271 m³	Изнесена възобновяема енергия		0

0	EP <	134	A			106,1
134	≤ EP <	268	B			
268	≤ EP <	329	C		270,7	
329	≤ EP <	390	D			
390	≤ EP <	488	E			
488	≤ EP <	585	F			
585	≤ EP		G			

Потребна енергия, генерирани емисии CO_2 и дял на възобновяемата енергия	
Потребна енергия в нормализирано състояние	247,12 kWh/m² год.
Генерирани емисии CO_2 в нормализирано/базово състояние	66,76 тона/год.
Генерирани емисии CO_2 след ЕСМ	26,71 тона/год.
Дяла първичната възобновяема енергия в нормализирано състояние	17,15 %
Дяла първичната възобновяема енергия след ЕСМ	32,91 %

РАЗПРЕДЕЛЕНИЕ НА ГОДИШНОТО ПОТРЕБЛЕНИЕ НА ПОТРЕБНА ЕНЕРГИЯ

Отопление	Вентилация	Охлаждане	Гореща вода	Осветление	Уреди
74,82 %	4,2 %	6,14 %	3,09 %	2,88 %	8,86 %

Срок на освобождаване от данък сгради по ЗМДТ: от xx.xx.xxxx г. до xx.xx.xxxx г.

Издаден на: 16.04.2024 г.

Издаден от: ЕНЕФКТ-КОНСУЛТ ЕООД

Регистрационен номер: 00158/27.06.2022 г.

ENERGY CLASS C	ENERGY CLASS A	ENERGY CLASS A
YOUR BUILDING TODAY	RENOVATION STEP 1 2025 - 2030 ASAP	RENOVATION STEP 2 2035 - 2040 WHEN WINDOWS NEED TO BE EXCHANGED
	WHAT TO DO? • External Wall insulation • Change glazing with energy saving glazing • Roof insulation • Insulation of the cellar ceiling • Substitution of the heating system by a heating pump	WHAT TO DO? • Substitution of the old windows • Improve the air permeability of the envelope • Installation of a heat recovery unit • Installation of a photovoltaic system
ENERGY BILL 44396 лв/а	INVESTMENT COSTS 409392 лв COSTS FOR MAINTENANCE 0 лв ENERGY BILL 18963 лв/а	INVESTMENT COSTS 219440 лв COSTS FOR MAINTENANCE 0 лв ENERGY BILL 8875 лв/а

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Description of the step-wise renovation

The devil is in details

ENERGY CLASS	Measure	External Wall insulation
A	Improvement	External walls insulation with contact facade.
Renovation Step 1	Technical Details	Thermal insulation of all the walls of the building, including the vertical enclosing elements of the roof with 15 cm thick EPS and thermal conductivity coefficient λ=0.034 W/mK is planned. The heat transfer coefficient of the walls after laying the thermal insulation will be 0.194 W/m2K. The plinth of the building is also thermally insulated with XPS with a thickness of 10 cm and a coefficient of thermal conductivity λ=0.035 W/mK.
2025 - 2030	Renovation Costs	143457 лв
ASAP	Included Costs for Maintenance	0 лв
Primary Energy Demand	Note	Check that the window stops / door stops are removed so that windows / doors can be set against the front edge of the masonry in the future. The existing roller shutter boxes can be removed and new roller shutters integrated into the ETICS. Instead of the old shutters insulating parts are used. If the windows / doors are to be installed at a later date in the same installation level, then the reveal insulation must be connected to the existing windows in a weather-proof and impact-proof manner with a diffusion-open joint.
106 kWh/m²a	Incentives Information only relating to this Measure	"SUPPORT FOR SUSTAINABLE ENERGY RENOVATION OF PUBLIC BUILDING FUND FOR ADMINISTRATIVE SERVICE, CULTURE AND SPORTS",
Main Energy Source	Specific Incentive Bonus	143457 лв
Electricity		
Final Energy Demand Main Source		
14 kWh/m²a		
Auxiliary Energy Source		
Electricity		
Final auxiliary Energy Demand		
32 kWh/m²a		
Energy Bill		
18963 лв/a		
Carbon Emissions		
22 kg/(m²a)		
Investment Costs for Renovation Step		

ENERGY CLASS	Measure	Substitution of the old windows
A	Improvement	New very high efficient windows Uw equal or less to 1.1 W/m2K
Renovation Step 2	Renovation Costs	73440 лв
2035 - 2040	Included Costs for Maintenance	0 лв
When Windows need to be exchanged		
Primary Energy Demand		
50 kWh/m²a		
Main Energy Source		
Electricity		
Final Energy Demand Main Source		
7 kWh/m²a		
Auxiliary Energy Source		
Electricity		
Final auxiliary Energy Demand		
15 kWh/m²a		
Energy Bill		
8875 лв/a		
Carbon Emissions		
11 kg/(m²a)		
Investment Costs for Renovation Step		
219440 лв		
Name of Incentives		

Measure	Improve the air permeability of the envelope
Improvement	To carry out internal refurbishment of the premises and to complete the air tightness works on the inside (taping around windows, sealing of electrical wiring on external walls - incl. replacement of electrical boxes etc.).
Renovation Costs	10000 лв
Included Costs for Maintenance	0 лв

Measure	Installation of a heat recovery unit
Improvement	New heat recovery ventilation for the whole building, where nessesery installing a new ventilation ducks and registers. The minimal requerment for the efficiency of the heat recovery unit is 80%.
Renovation Costs	38000 лв
Included Costs for Maintenance	0 лв

Measure	Installation of a photovoltaic system
Improvement	Roof PV installation 40 kWp facing south and 20 kWp facing east
Renovation Costs	98000 лв
Included Costs for Maintenance	0 лв

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...and it can get even more complicated

Already implemented:

Several dwellings are insulated from outside

Replaced windows (not unified systems)

A lot of terraces are glazed

No centralised heating

Funding program:

Only external insulation and window replacement will be covered

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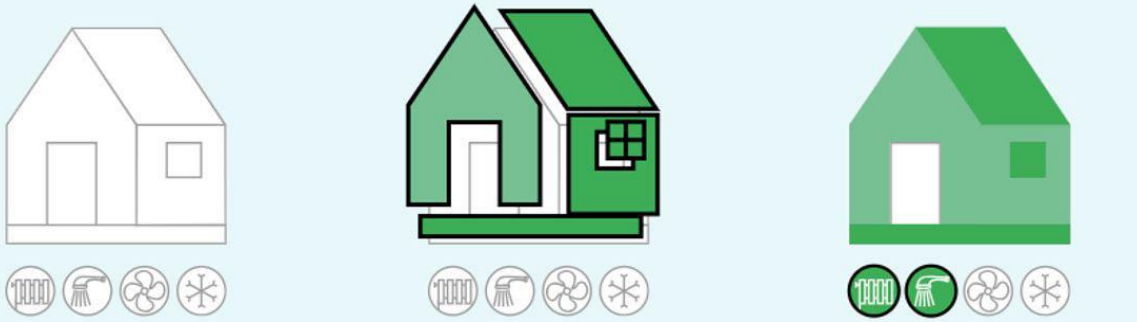
За iBRoad2EPC



Сега 2023 — E

Стъпка 1 2025 — B

Външна топлоизолация (система ETICS) – Подмяна на прозорци – Топлоизолация на покрива – Топлоизолация на тавана на сутерена – Инсталиране на LED лампи

Стъпка 2 2050 — A

Външна термопомпа въздух-вода – Свързване на нов резервоар за гореща вода с отоплителната система

Задължителни цели или разпоредби

До 1 януари 2030 г. всички жилищни сгради трябва да отговарят поне на клас E.

До 1 януари 2033 г. всички жилищни сгради трябва да отговарят най-малко на клас D.

Мярка 1

Външна топлоизолация (система ETICS)

Описание на мярката

Мярката включва топлинно изолиране на: - външни стени тип 1, 3, 4 и 5 с топлоизолация от EPS с дебелина 10 cm, коефициент на топлопроводност λ≤0,032 W/mK вкл. всички съпътстващи материали и елементи за системата, лепене и дюбелиране, стъклофибърна мрежа, шпакловка и финишно покритие силикатна мазилка, вкл. грундиране.

Спецификация на мярката

Обобщен коефициент на топлопреминаване на стените -U = 0,26 W/m2K

Подготовка за последващи мерки за обновяване

Когато се изолират външните стени, моля, осигурете се по-нисък топлинен мост при връзката с прозорците и вратите, за които е предвидена подмяна на по-късен етап. Ограниченията на прозорците или вратите трябва да се отстранят, за да могат в бъдеще прозорците или вратите да се поставят до предния ръб на вдадината. Съществуващите кутии за ролетни щори могат да се демонтират и новите ролетни щори да се интегрират в изолацията на стената. Ако новите прозорци или врати трябва да останат на същото монтажно ниво, изолацията на тавана трябва да се свърже със съществуващите прозорци по устойчив на атмосферни влияния начин с дифузионно отворена фуга.

Когато се изолира външната стена, настройките за управление на съществуващия генератор на топлина трябва да се адаптират към намалената отоплителен товар. Вашият монтажник трябва да провери дали температурите на топлоносителя и дебитът на помпата на отоплителния кръг могат да бъдат намалени.

Мярка 2

Подмяна на прозорци

Описание на мярката

подмяна на дървени прозорци, метални еделкини и стари PVC и AL прозорци подменени преди повече от 10-15 години със системи от PVC профили и троен стъклопакет от селективни стъкла с обобщен коефициент на топлопреминаване за системата U = 1,10 W/m²K. Подменят се и входните врати с нови алуминиеви с коефициент на топлопреминаване U = 1,70 W/m²K.

Спецификация на мярката

Обобщен коефициент на топлопреминаване през външната дограма - 1,24 W/m2K

Подготовка за последващи мерки за обновяване

Когато се подменят прозорци или врати в мазето, моля, подгответе се за по-късна изолация под тавана на мазето. Горният ръб на прозорците трябва да остави достатъчно място за изолационен слой.

Когато се сменят прозорци или врати в мазето, моля, подгответе се за по-късна изолация под тавана на мазето. Горният край на прозорците трябва да остави достатъчно място за изолационен слой.

Мярка 3

Топлоизолация на покрива

Описание на мярката

Мярката включва: покрив ТИП 1 - Полагане на топлоизолация минерална вата с дебелина 15 cm и коефициент на топлопреминаване λ ≤ 0,035 W/mK, по пода на подпокривното пространство на покрива. - покрив ТИП 2 - Полагане на вътрешна топлоизолация от XPS с дебелина 12 cm, λ ≤ 0,033 W/mK и шпакловане на тавана на остъклените тераси, граничещи с външен въздух.

Спецификация на мярката

Обобщен коефициент на топлопреминаване на покрива - 0,20 W/m2K

Мярка 4

Топлоизолация на тавана на сутерена

Описание на мярката

Под ТИП 1 - Полагане на топлоизолация от минерална вата с дебелина 8 cm и коефициент на топлопроводност λ ≤ 0,037 W/mK по тавана на партера. Подмяна на съществуващите стара дограма на партера със системи от PVC профили и стъклопакет с общ коефициент на топлопреминаване U = 1,10 W/m²K. Полагане на фасадна топлоизолация от XPS с дебелина 12 cm и коефициент на топлопроводност λ ≤ 0,033 W/mK по стените на неотопляемия сутерен, граничещи с външен въздух и финишно покритие силикатна мазилка. - Под ТИП 2 (вариар) - Полагане на топлинна изолация от XPS с дебелина 12 cm и коефициент на топлопроводност λ≤0,033 W/mK на арките.

Спецификация на мярката

Обобщен коефициент на топлопреминаване на пода - 0,27 W/m2K

Мярка 5

Инсталиране на LED лампи

Описание на мярката

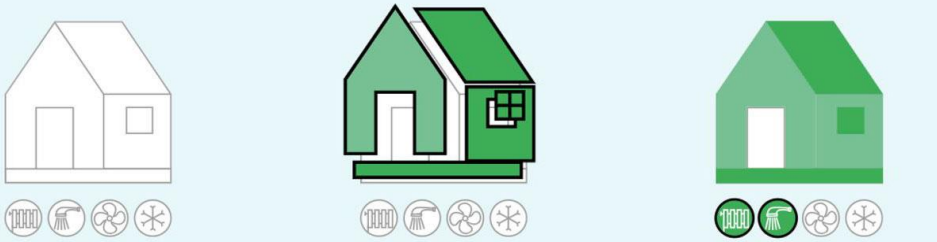
Предвижда се подмяна на лампите с нажежаема спирала в общите части – сутерени и частично в стълбищните клетки, с нови LED 10 W и монтиране на датчици за движение и присъствие.

Спецификация на мярката

Нови LED 10 W в сутерен и частично в стълбищните клетки и монтиране на датчици за движение и присъствие.

Обратно

Допълнителна информация



Сега 2023 — E

Енергийни източници: Централно отопление, Елек...

Крайна потребена енергия: 205 kWh/m²year

Емисии на парникови газове: 63.37 kg/m²year

Разходи за енергия: 33.39 лв./m²year

Стъпка 1 2025 — B

Енергийни източници: Централно отопление, Елек...

Крайна потребена енергия: 75 kWh/m²year

Емисии на парникови газове: 25.67 kg/m²year

Разходи за енергия: 13.37 лв./m²year

Стъпка 2 2050 — A

Енергийни източници: Електричество

Крайна потребена енергия: 40 kWh/m²year

Емисии на парникови газове: 19.44 kg/m²year

Разходи за енергия: 9.8 лв./m²year

Общ резултат за SRI

Сега 2023 — E

Оценка на SRI: 10.0

Стъпка 1 2030 — B

Оценка на SRI: 13.0

Стъпка 2 2050 — A

Оценка на SRI: 48.9

Влияние на потребителя

Дори поведението ви оказва влияние върху потреблението на енергия. Ето няколко насоки за намаляване на общото потребление на енергия.

Разходи за топла вода

Приблизително 12 % от потреблението на енергия се изразходва само за затопляне на вода. Това ясно се забелязва в сметките ви от топлофикация. Миенето на ръцете със студена вода, взимането на душ вместо вана и използването на икономични душ-глави и перлатори помага за пестенето на гореща вода. Също така, спирайте водата по време на сапунисване.

Дръжте щорите и завесите затворени

През нощта дръжте щорите и завесите затворени, за да предотвратите загубите на топлина през студените нощи.

Кратко и интензивно проветряване

Откръхнатите прозорци почти не осигуряват свеж въздух, но пък охлаждат стените и помещенията. Правилното интензивно проветряване трябва да се извършва 2 до 3 пъти дневно за около 4 до 5 минути, като прозорците и вратите във всички стаи са отворени. Това осигурява необходимия въздухообмен.

Уплътнете прозорците

Ако уплътните старите прозорци, през които става течение, ще избегнете загубата на енергия. Инвестицията в уплътнителна лента си заслужава: спестявате много разходи за отопление/охлаждане.

Намаляване на стайната температура

Всеки градус по-ниска температура в помещението спестява около 6 % от енергията за отопление. Обикновено в дневните помещения са достатъчни 20-22°C, в кухнята - 18-20°C, в банята - 23°C, а в спалнята - 16-18°C.

Обезвъздушавайте радиаторите

Ако радиаторите шумят и не се затоплят равномерно, въпреки че термостатния вентил е отворен докрай, в радиатора има въздух, който води до загуби на енергия. Като обезвъздушавате редовно радиаторите си, спестявате разходи за отопление и намалявате нивото на CO2.

Conclusions

- Implementing BRPs can help renovate buildings in a way that allows them to meet their long-term decarbonization goals.
- Achieving the highest energy performance when the building has already been renovated to a lower level without future renovations considered will be more difficult and more expensive.
- BRPs provide increased flexibility, as renovation steps can be selected in accordance with:
  - the intermediate goals in municipal long-term plans for deep building renovation;
  - the condition of the buildings and their installations and future renovation needs;
  - plans to implement other energy policies in the municipality, such as developing energy communities and cooperatives;
  - the availability of financial resources.

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

Thank you for your attention!

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For more information, please visit **www.ibroad2epc.eu**

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

Implementing iBRoad2EPC

Example from Portugal

João Cleto

ADENE

SUSTAINABLE PLACES 2024

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Portugal - Legal Framework

Legislative framework on EPCs and BRPS - EPC framework

- EPCs are mandatory for: new buildings, major renovations, renting or selling most types of building.
- Since 2013 the EPC class of a building must be explicitly mentioned in all real estate adds and at the entrance of non-residential buildings (A ≥ 250m²).

17 YEARS
>2.000.000
ENERGY CERTIFICATES
3 GENERATIONS

25% OF BUILDING STOCK CERTIFIED

+4.000.000 IMPROVEMENT MEASURES IDENTIFIED

≈ 2500 EPC EXPERTS

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Portuguese EPC (eco)system

One coherent system integrating (almost) all building related provisions and cross sectoral approaches: mobility, digitalization, water…

Portuguese Energy Certification System. More info at [ww.sce.pt](ww.sce.pt)

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Portugal - Legal Framework

Policy priorities set and ADENE's roles:

EPBD Transposition

Update the EPC scheme (v. 3.0: BRP, comfort, simplification, SRI) - on hold for EPBD transposition

Building renovation: Implementation and LTRS monitoring + NBRP update

Comfort improvement and Energy poverty reduction → NEW

National strategy to combat energy poverty
- **Energy Poverty Observatory**
- **50 Citizens Spaces until 2025**

Operationalize funding schemes to support buildings rehabilitation

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Portugal - Legal Framework

LTRS measure:

"Creation of the building renovation passport, as an optional instrument, which complements the energy certificate (in line with the one developed under the European iBRoad project); "

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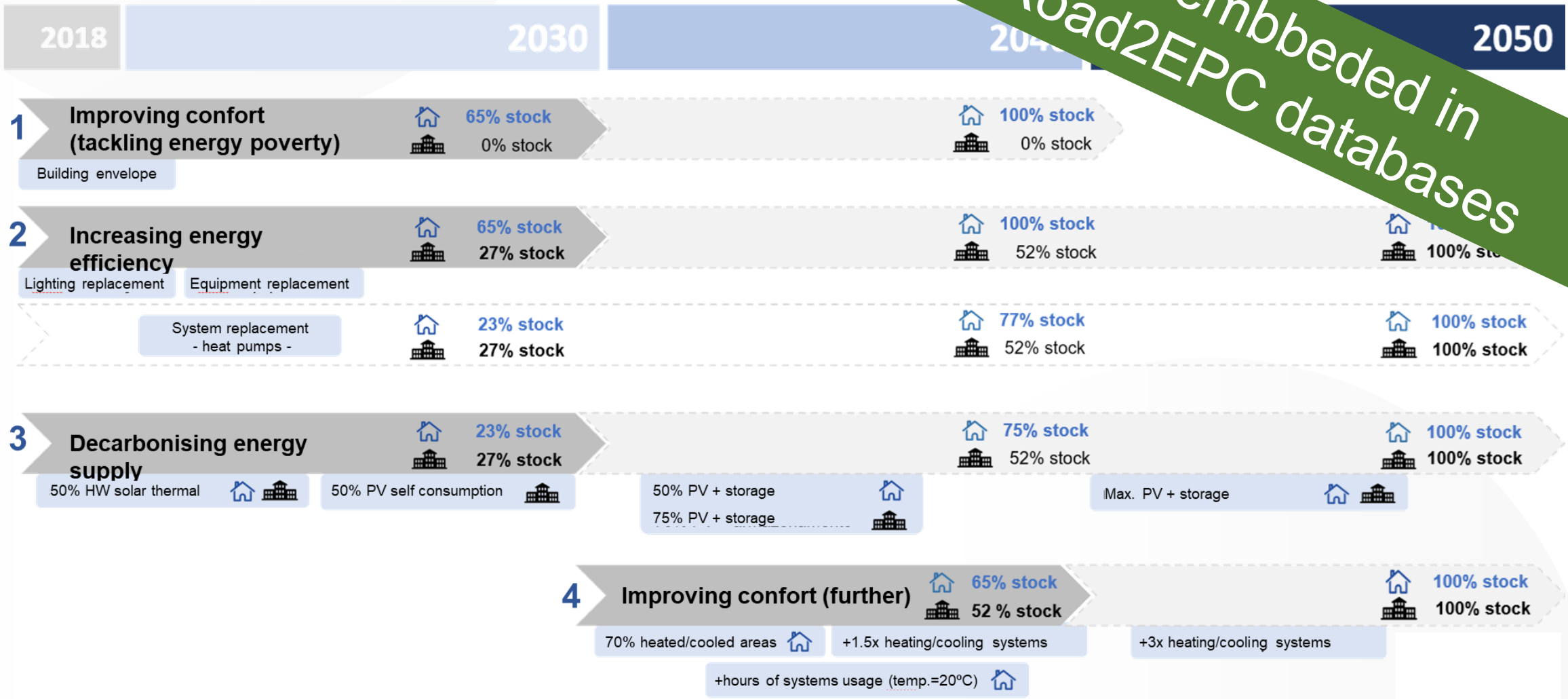
LTRS - Four packages across the decade - targets



Fully embbeded in iBRoad2EPC databases

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Portugal - iBRoad2EPC case studies

10 buildings (Offices, school, single-family, multifamily, social housing)

3 entities (SCML, GEBALIS, Construção Pública E.P.E.)

iBRoad2EPC

iBRoad2EPC Field Tests in Portugal

Completed Field Tests

North Region, Porto Metropolitan Area, Porto

- Single family house, 28,96 m²

Central Region, Leiria Region, Pombal

- Secondary school in Pombal (central Portugal) – managed by Construção Publica E.P.E. Public Company, 10.638,17 m²

Greater Lisbon, Lisbon

- Large non-residential building – Offices - headquarters' of Construção Publica E.P.E. Public Company, 31.578,40 m²
- Multifamily building owned by SCML – social services institution and privately rented to residents, 479,75 m²
- Multifamily building (social housing building managed by GEBALIS – Lisbon Social Housing company), 2.160,00 m²
- Multifamily building (social housing building managed by GEBALIS – Lisbon Social Housing company), 1.026,00 m²
- Single family house building (owned by SCML – social services institution and privately rented to residents), 291,91 m²
- Single family house (social housing building managed by GEBALIS – Lisbon Social Housing company), 17,31 m²
- Single family house (social housing building managed by GEBALIS – Lisbon Social Housing company), 51,67 m²
- Bi-family house (owned by SCML – social services institution and privately rented to residents), 66,60 m²

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Portugal - iBRoad2EPC case study: multifamily building

Residential building from 1932
6 dwellings, rented units

Owned by Santa Casa da Misericórdia de Lisboa (SCML), a private non-profit institution, deemed of administrative public utility, active in Lisbon and in Portugal for over 500 years with a focus on social action.

<u>Characteristics</u>

- three-story building, 6 one-bedroom apartments/50 m2,
- orientation between NW and SE,
- low quality envelope and windows,
- no heating or cooling systems installed,
- DHW is prepared via small gas heaters.

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Portugal - iBRoad2EPC case study: multifamily building

Residential building from 1932

<u>Current status</u>

Poor state of conservation, façade and roof maintenance and/or lifetime periods are long overdue

Visible signs of building pathologies affecting indoor environmental quality such as mold.

Low energy performance and a very likely situation of energy poverty of residents.

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Portugal - iBRoad2EPC case study: multifamily building

Residential building from 1932

Benefits of renovation:

The investment needed and financial capacity of the institution is limited, hence a step-by-step approach was very much welcomed.

The intervention also considered the balance between possible financial resources available and the highest energy efficiency ambition possible.

During the iBRoad2EPC issuing process several ancillary benefits were identified:

- reduction of energy needs,
- improvement of acoustic, thermal comfort and indoor air quality conditions,
- prevention or reduction of pathologies,
- promotion of energy production from renewable sources and
- improvement of aesthetics and visual quality.

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Portugal - iBRoad2EPC case study: multifamily building

Residential building from 1932

The renovation proposal

- Total refurbish of the building envelope,
- Solar thermal and efficient backup for DHW,
- Highly efficient windows (CLASSE+ labelling),
- biomass system for space heating.

Some of these systems are prepared with monitoring and control systems which also significantly increases the SRI value and impacts positively the IEQ values.

Opportunity to include additional investment that ensure a future-proof building, upgrade the real state value of the asset owned, improve the quality of life of current and future inhabitants and address urgent needs such as building pathologies and likely energy poverty situations.

From F to A+ in 4 steps by 2050

↗ 38% in the Indoor Environment Quality indicator

↗ 14x on the Smart Readiness Indicator

↘ CO_2 by 98%, energy by 58% and energy costs by 95%

~3700 € average investment in each stage

~1000 € average annual reduction of energy bill

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Portugal - iBRoad2EPC case study: multifamily building

Etapa 4 2050

Objectivos ou regulamentos obrigatórios

Até 1 de Janeiro de 2050, 100% dos edifícios residenciais que não atinjam a categoria III de conforto após a introdução de medidas passivas deverão ter instalados sistemas eficientes de aquecimento e arrefecimento, tais como bombas de calor elétricas.

Até 1 de Janeiro de 2050, 100% do stock de edifícios residenciais terá painéis solares térmicos e/ou produção fotovoltaica e/ou armazenamento elétrico.

Medida 1

Sistema solar térmico AQS

Descrição da ação

Instalação de um sistema solar térmico individual em termossifão, para preparação de águas quentes sanitárias, composto por 1 coletor solar, com uma área de 2,09 m2, e um depósito horizontal com capacidade de armazenamento de 145 litros. O coletor solar térmico será instalado na cobertura inclinada com azimute de -74º e inclinação de 20º, contribuindo para um Eren de 676 kWh/ano. Não existem obstruções assinaláveis no horizonte. O sistema solar térmico deverá ser devidamente certificado e cumprir todos os requisitos mínimos aplicáveis. Esta medida permite reduzir os gastos na produção de AQS. O custo de investimento desta medida de melhoria é de aproximadamente 2500€.

Especificação da medida

Eren = 676 kWh e Área da superfície do coletor = 2,09 m²

Medida 2

Efetuar manutenção do equipamento de climatização

Descrição da ação

Manutenção do sistema de climatização constituído por salamandra a pellets, por pessoal acreditado para o efeito, cujo objetivo será assegurar o seu perfeito funcionamento e repor os valores de rendimento do fabricante. O custo de investimento estimado para implementação desta medida de melhoria é de 100€.

Especificação da medida

P nominal = 8,0 kW e Eficiência = 87,7%

Medida 3

Efetuar manutenção do equipamento de produção de águas quentes sanitárias

Descrição da ação

Manutenção da bomba de calor por pessoal acreditado para o efeito, cujo objetivo será assegurar o seu perfeito funcionamento e repor os valores de rendimento do fabricante. O custo de investimento estimado para implementação desta medida de melhoria é de 100€.

Especificação da medida

P útil = 1,5 kW e SCOP = 3,4

STEP 1, from F to F /ASAP

- Efficient shower head
- Improve ventilation system

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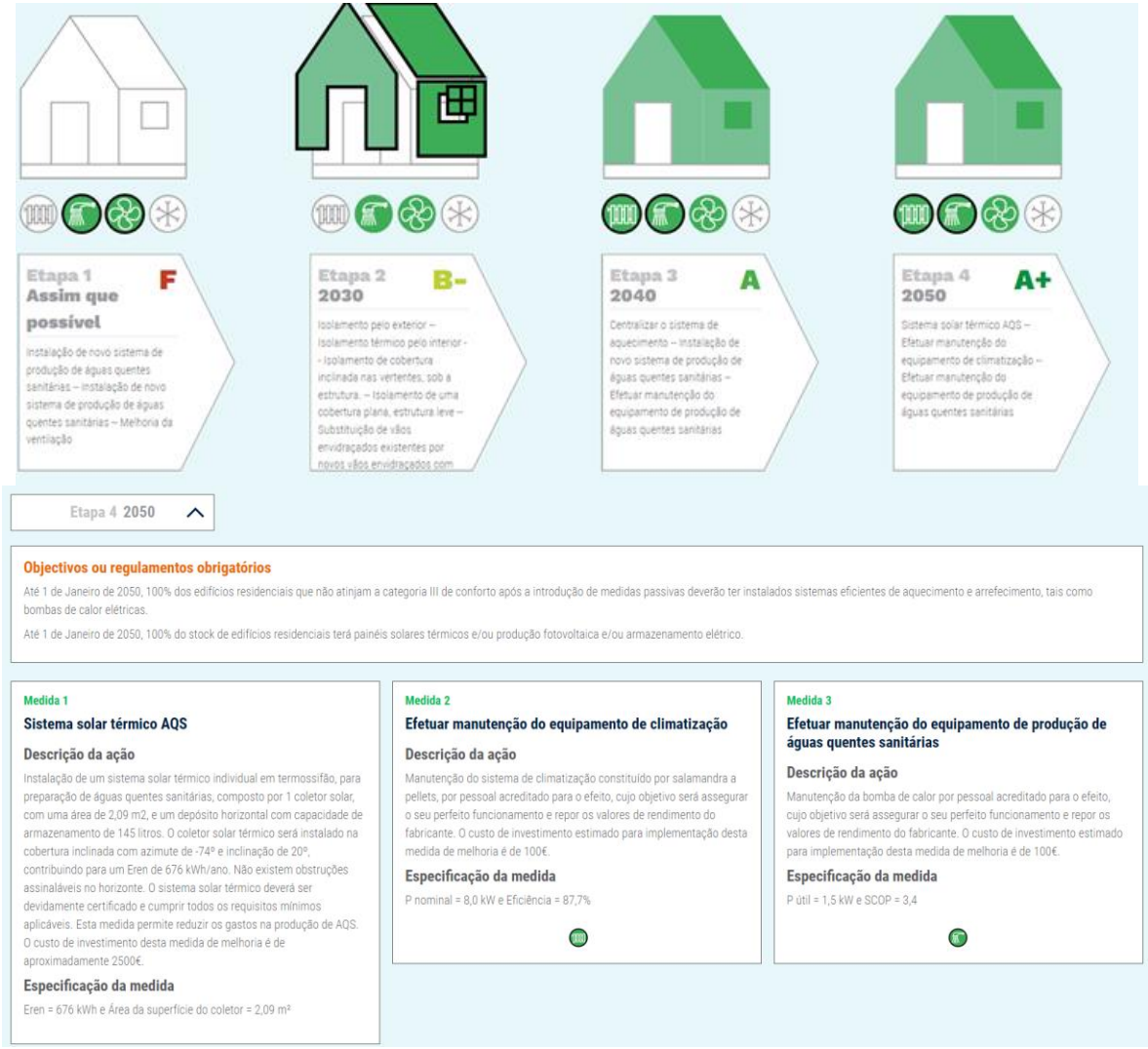
Portugal - iBRoad2EPC case study: multifamily building



STEP 1, from F to F / ASAP

- Efficient shower head
- Improve ventilation system

STEP 2, from F to B- / 2030

- Thermal insulation: roof and external walls
- High efficient windows

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Portugal - iBRoad2EPC case study: multifamily building

Etapa 4 2050

Objectivos ou regulamentos obrigatórios

Até 1 de Janeiro de 2050, 100% dos edifícios residenciais que não atinjam a categoria III de conforto após a introdução de medidas passivas deverão ter instalados sistemas eficientes de aquecimento e arrefecimento, tais como bombas de calor elétricas.

Até 1 de Janeiro de 2050, 100% do stock de edifícios residenciais terá painéis solares térmicos e/ou produção fotovoltaica e/ou armazenamento elétrico.

Medida 1

Sistema solar térmico AQS

Descrição da ação

Instalação de um sistema solar térmico individual em termossifão, para preparação de águas quentes sanitárias, composto por 1 coletor solar, com uma área de 2,09 m2, e um depósito horizontal com capacidade de armazenamento de 145 litros. O coletor solar térmico será instalado na cobertura inclinada com azimute de -74º e inclinação de 20º, contribuindo para um Eren de 676 kWh/ano. Não existem obstruções assinaláveis no horizonte. O sistema solar térmico deverá ser devidamente certificado e cumprir todos os requisitos mínimos aplicáveis. Esta medida permite reduzir os gastos na produção de AQS. O custo de investimento desta medida de melhoria é de aproximadamente 2500€.

Especificação da medida

Eren = 676 kWh e Área da superfície do coletor = 2,09 m²

Medida 2

Efetuar manutenção do equipamento de climatização

Descrição da ação

Manutenção do sistema de climatização constituído por salamandra a pellets, por pessoal acreditado para o efeito, cujo objetivo será assegurar o seu perfeito funcionamento e repor os valores de rendimento do fabricante. O custo de investimento estimado para implementação desta medida de melhoria é de 100€.

Especificação da medida

P nominal = 8,0 kW e Eficiência = 87,7%

Medida 3

Efetuar manutenção do equipamento de produção de águas quentes sanitárias

Descrição da ação

Manutenção da bomba de calor por pessoal acreditado para o efeito, cujo objetivo será assegurar o seu perfeito funcionamento e repor os valores de rendimento do fabricante. O custo de investimento estimado para implementação desta medida de melhoria é de 100€.

Especificação da medida

P útil = 1,5 kW e SCOP = 3,4

STEP 1, from F to F / ASAP

- Efficient shower head
- Apply thermostatic valve

STEP 2, from F to B- / 2030

- Thermal insulation: roof and external walls
- High efficient windows

STEP 3, from B- to A / 2040

- Centralized space heating system with biomass boiler
- Installation of a heat pump DHW production

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Portugal - iBRoad2EPC case study: multifamily building

Etapa 4 2050

Objectivos ou regulamentos obrigatórios

Até 1 de Janeiro de 2050, 100% dos edifícios residenciais que não atinjam a categoria III de conforto após a introdução de medidas passivas deverão ter instalados sistemas eficientes de aquecimento e arrefecimento, tais como bombas de calor elétricas.

Até 1 de Janeiro de 2050, 100% do stock de edifícios residenciais terá painéis solares térmicos e/ou produção fotovoltaica e/ou armazenamento elétrico.

Medida 1

Sistema solar térmico AQS

Descrição da ação

Instalação de um sistema solar térmico individual em termossifão, para preparação de águas quentes sanitárias, composto por 1 coletor solar, com uma área de 2,09 m2, e um depósito horizontal com capacidade de armazenamento de 145 litros. O coletor solar térmico será instalado na cobertura inclinada com azimute de -74º e inclinação de 20º, contribuindo para um Eren de 676 kWh/ano. Não existem obstruções assinaláveis no horizonte. O sistema solar térmico deverá ser devidamente certificado e cumprir todos os requisitos mínimos aplicáveis. Esta medida permite reduzir os gastos na produção de AQS. O custo de investimento desta medida de melhoria é de aproximadamente 2500€.

Especificação da medida

Eren = 676 kWh e Área da superfície do coletor = 2,09 m²

Medida 2

Efetuar manutenção do equipamento de climatização

Descrição da ação

Manutenção do sistema de climatização constituído por salamandra a pellets, por pessoal acreditado para o efeito, cujo objetivo será assegurar o seu perfeito funcionamento e repor os valores de rendimento do fabricante. O custo de investimento estimado para implementação desta medida de melhoria é de 100€.

Especificação da medida

P nominal = 8,0 kW e Eficiência = 87,7%

Medida 3

Efetuar manutenção do equipamento de produção de águas quentes sanitárias

Descrição da ação

Manutenção da bomba de calor por pessoal acreditado para o efeito, cujo objetivo será assegurar o seu perfeito funcionamento e repor os valores de rendimento do fabricante. O custo de investimento estimado para implementação desta medida de melhoria é de 100€.

Especificação da medida

P útil = 1,5 kW e SCOP = 3,4

STEP 1, from F to F / ASAP

- Efficient shower head
- Apply water saving kit

STEP 2, from F to B- / 2030

- Thermal insulation: roof and external walls
- High efficient windows
- Centralized space heating system with biomass boiler
- Installation of a heat pump DHW production

STEP 3, from B- to A / 2040

STEP 4, from A to A+ / 2050

- Solar thermal system for DHW
- Maintenance of the space heating system

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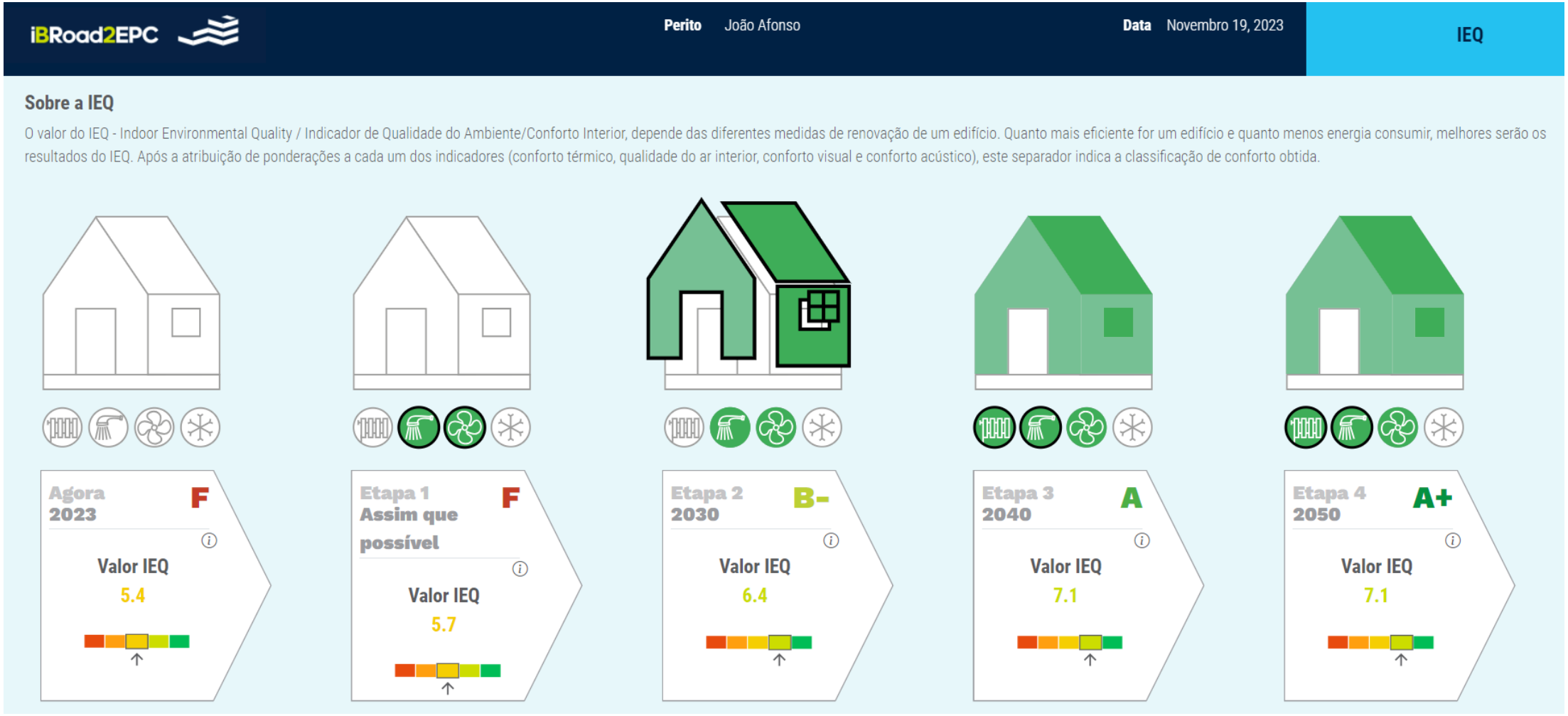
Portugal - iBRoad2EPC case study: multifamily building



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Portugal - iBRoad2EPC case study: multifamily building

The renovation results step by step:

	Current state	Step 1	Step 2	Step 3	Step 4
Year of implementation:		ASAP	2030	2040	2050
Energy class:	F	F	B-	A	A+
Energy sources:	Natural Gas (and electricity*)	Natural Gas, Electricity	Natural Gas, Electricity	Electricity, Biomass	Electricity, Biomass, Solar
Final energy demand:	164 kWh/(m²year)	162 kWh/(m²year)	73 kWh/(m²year)	68 kWh/(m²year)	68 kWh/(m²year)
GHG emissions:	53 kg CO_2/m²	52 kg CO_2/m²	19 kg CO_2/m²	3 kg CO_2/m²	1 kg CO_2/m²
Energy costs:	21,68 €/(m²year)	21.53 €/(m²year)	7.50 €/(m²year)	1.75 €/(m²year)	0.93 €/(m²year)
SRI rate*:	0.8	3.4	3.4	10.6	14.7
IEQ rate**:	5.4	5.7	6.4	7.1	7.1

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Thank you for your time and collaboration

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For more information, please visit **www.ibroad2epc.eu**

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Implementing iBRoad2EPC

Example from Spain

Ander Bilbao
CICLICA

SUSTAINABLE PLACES 2024

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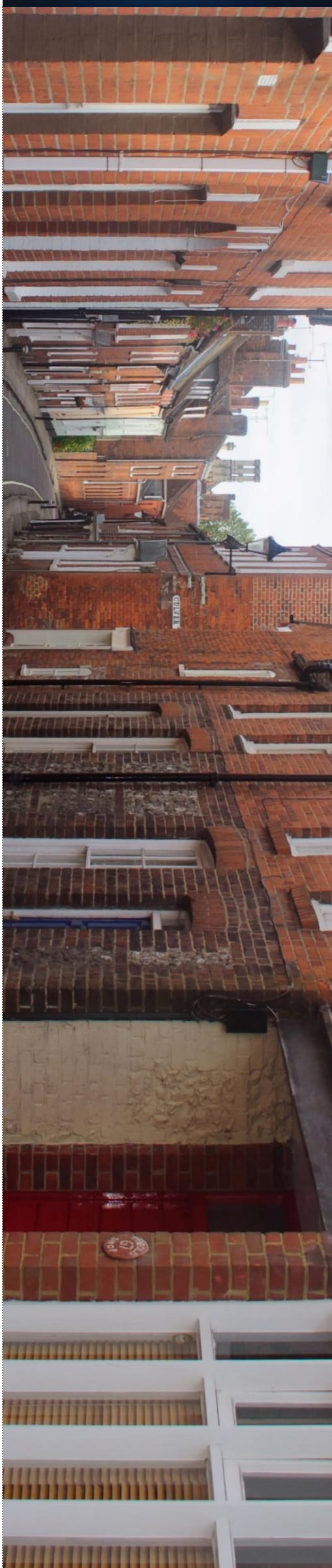
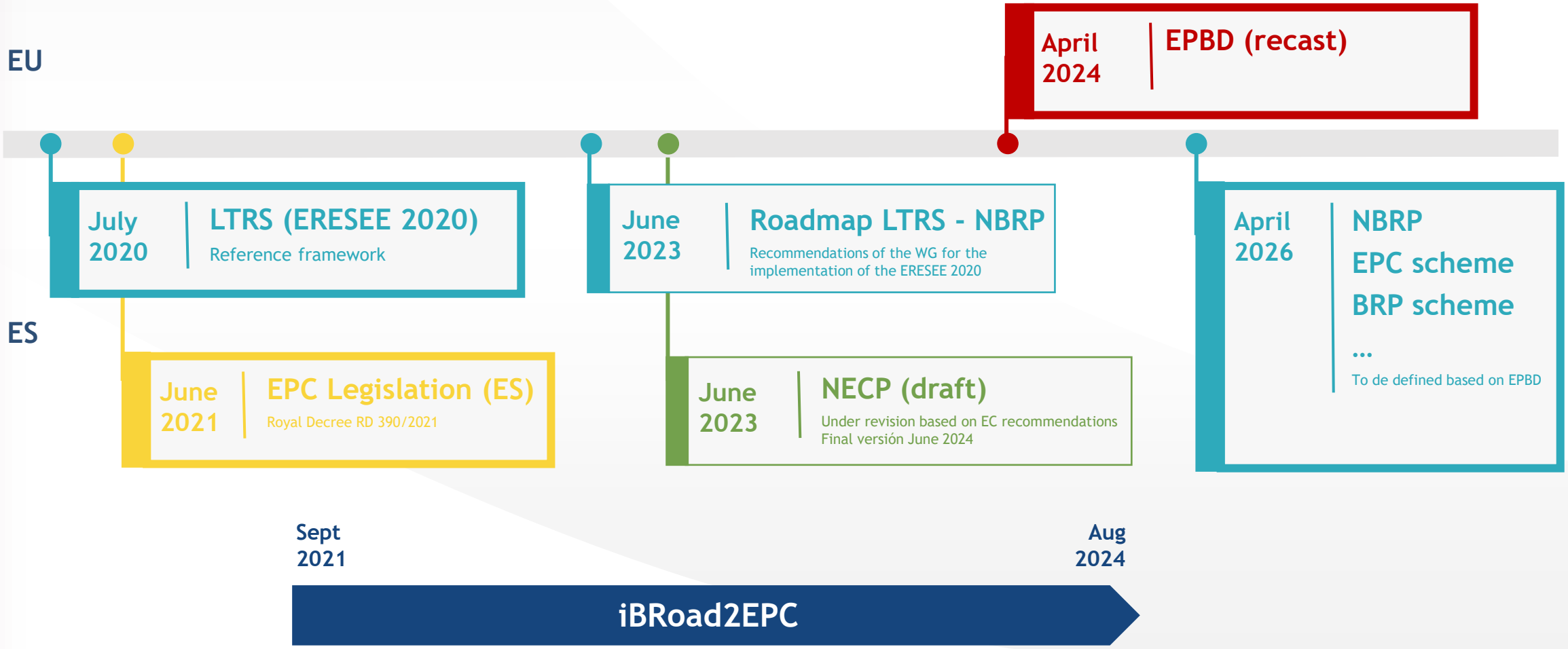
iBRoad2EPC

National context



National context [ES]



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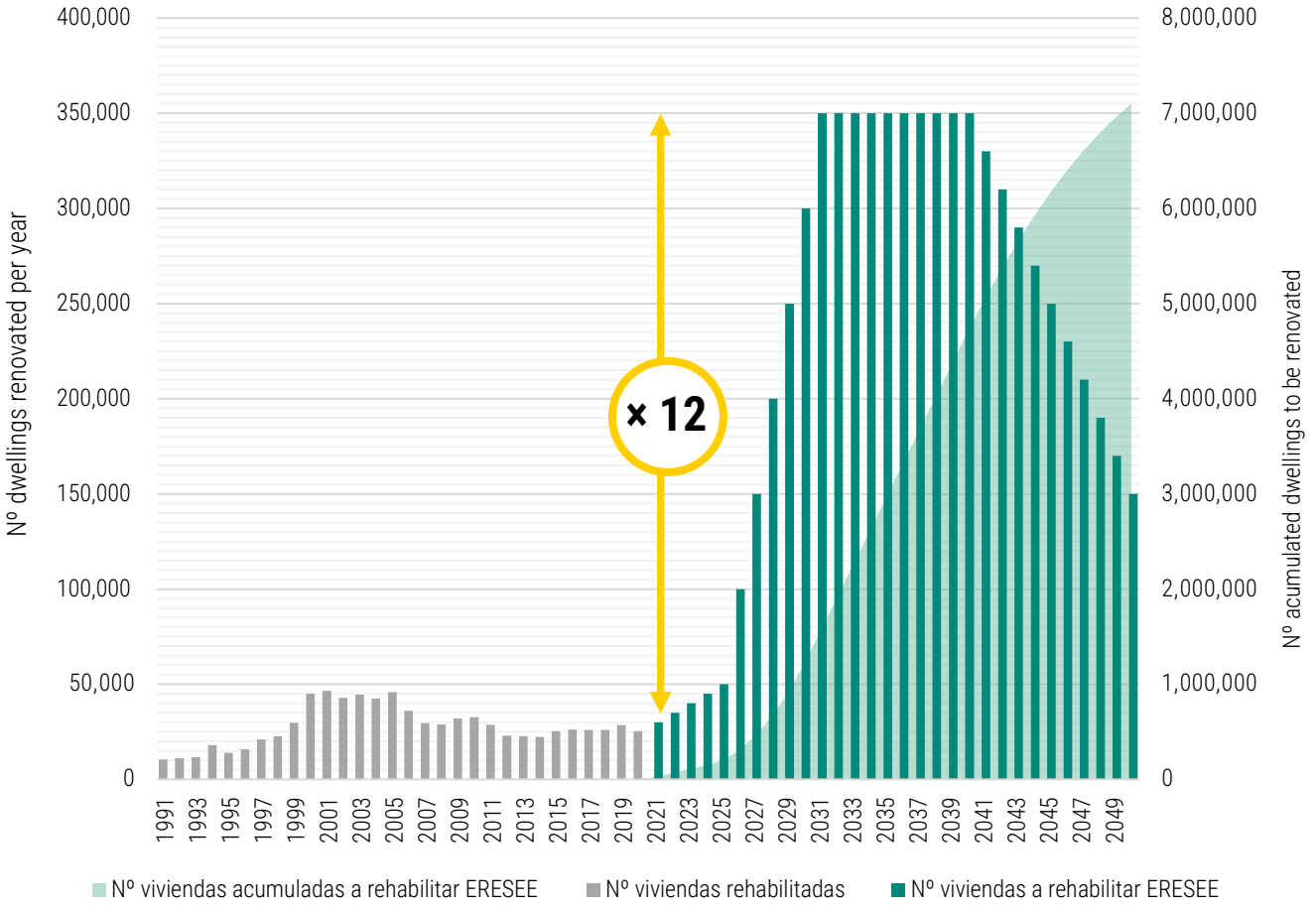
National targets and building stock [ES]

Challenges from LTRS

- Multiply by 12 renovation rate
- Multi-family buildings (71%)

Opportunities in EPBD

- New instruments: NBRP, DDBB, BRP, DBL
- New certification system
- Updated frameworks (legislative, financial)



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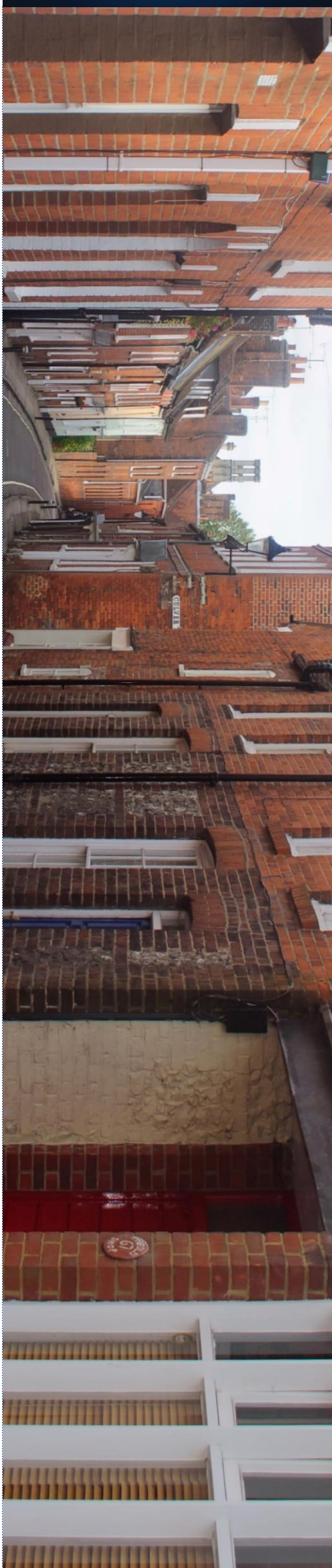
iBRoad2EPC

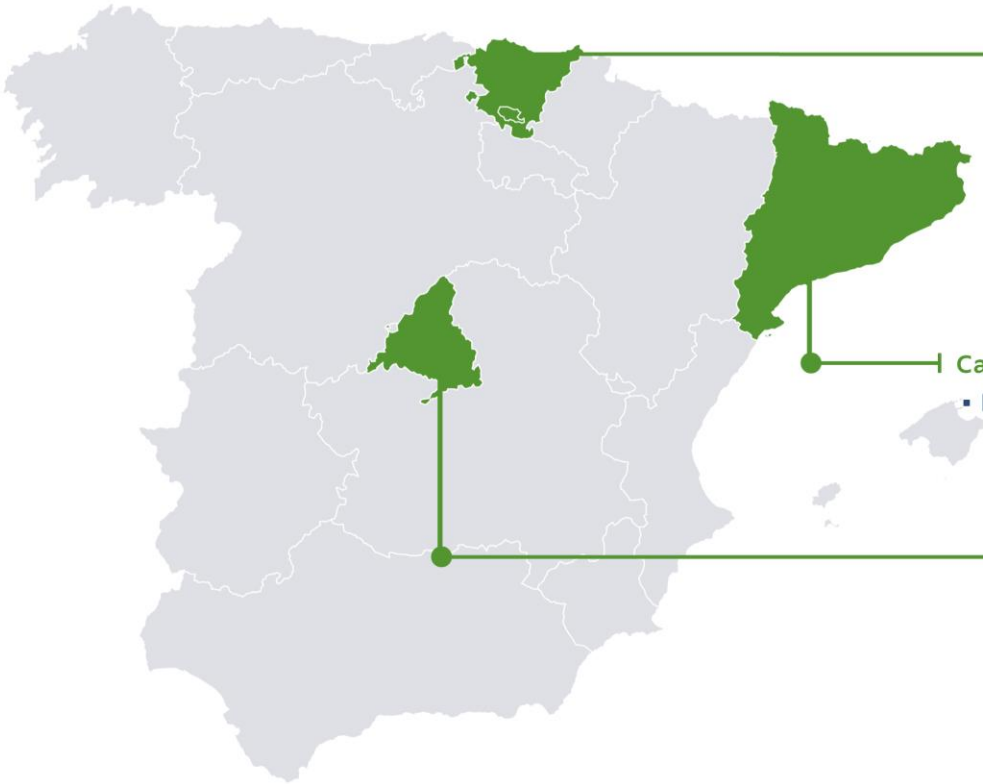
Field test



iBRoad2EPC

iBRoad2EPC Field Tests in Spain

Completed Field Tests



Basque Country

- Multi-family private building in Vitoria, 742,77 m²
- Multi-family private building in Vitoria, 639,6 m²
- Multi-family private building in Vitoria, 527,75 m²
- Multi-family private building in Vitoria, 2.000,41 m²
- Multi-family private building in Vitoria, 506,05 m²
- Multi-family private building in Vitoria, 1.131,00 m²
- Multi-family private building in Vitoria, 996,00 m²

Catalonia

- Public-owned, sports building in Barcelona, 4.333 m²

Community of Madrid

- Madrid: Public-owned, private-use office building, 28.280,41 m²
- Madrid: Public-owned government office building, 116.223 m²

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Testing in 2 phases

Phase 1. Pilot testing of the tool on 10 buildings

- General certification process based on official EPC software
- Collection and input of data into the official EPC software
- EPC calculation: current status + step-by-step intervention: 2030, 2040, 2050
- Manual entry of data in the Assistant

Phase 2. Improvement of the Assistant and interoperability

- Improvement of the Assistant based on feedback from Experts and Neighbours
- Integration of the Assistant with the official EPC software via XML

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Automatized & integrated approach: iBRoad2EPC [ES]

Proposed interlinkages

- Manual integration (Phase 1)
- Automated integration via XML (Phase 2)

Benefits

- Integration with EPC schemes
- Integration with EPC softwares
- Interaction with EPC Databases

A. Esquema de datos XSD del informe XML (v2.1)

A.1. Esquema de datos XSD

Esquema de datos (.xsd) que describe la información contenida en el elemento raíz `DatosEnergeticosDelEdificio` y sus subelementos.

DatosEnergeticosDelEdificioSchema21.xsd

```
<?xml version="1.0" encoding="UTF-8" ?>
<xs:schema attributeFormDefault="unqualified" elementFormDefault="qualified" xmlns:xs="http://www.w3.org/2001/XMLSchema">

<!-- Esquema de datos del edificio para certificación energética y verificación del DB-HE -->
```

Model from the Assistant iBRoad2EPC							Available	Mandatory	XML TEST	Not filled
Category	Field	Level	Label	if	Tipus	Description	17	14	7	0
Project details	PROJECT DETAILS									
	Project name	2	<IdentificacionEdificio><NombreDelEdificio>		Free Text		1	1	1	-
	Client number	-	-		Free Number		1	-	-	-
	Building type	2	<IdentificacionEdificio><TipoDeEdificio>		Dropdown	Residential Building; Public buildings	1	1	1	-
	Building sub type	2	<IdentificacionEdificio><TipoDeEdificio>	Residential buildings	Dropdown	Single family house; Two family house; Multi-family building; Apartment	1	1	1	-
	Building sub type	2	<IdentificacionEdificio><TipoDeEdificio>	Public buildings	Dropdown	Office buildings; Buildings for research and university; Health and care buildings; School buildings; Buildings for culture; Sports buildings; Technical buildings; Transport	1	1	-	-
	Country	-	-		Dropdown	Bulgaria, Greece, Poland, Portugal, Romania, Spain	1	1	1	-
	Climate Zone	2	<IdentificacionEdificio><ZonaClimatica>		Dropdown	A4; A3; B4; B3; C4; C3; C2; C1; D3; D2; D1; E1	1	1	1	-
	Environment	-	-		Dropdown	urban; suburban; rural	1	1	-	1
	Current energy class (Non-renewable primary energy; heating, DHW, cooling)	3	<Calificacion><EnergiaPrimariaNoRenovable><Global>		Dropdown	A; B; C; D; E; F; G;	1	1	1	-
	Tenure status	-	-		Dropdown	owner occupied; rented; mixed owner occupied and rented	1	1	-	1
	Building constructed in	2	<IdentificacionEdificio><AnoConstruccion>		Free Number	year	1	1	1	-
	Heating system installed in	-	-		Free Number	year	1	-	-	-
	Cooling system installed in	-	-		Free Number	year	1	-	-	-
	Project trigger	-	-	Multi-family building	Dropdown	Purchase whole building; Proof for MEPS; Expiration; Proof for obligations; Major renovation, extension; No legal trigger, voluntary iBRoad2EPC, interest; Access to	1	1	-	1
	Project receiver	-	-	Multi-family building	Dropdown	Old owner; property manager; owner;	1	1	-	1
	Recommendations addressed to	-	-	Multi-family building	Dropdown	Building owner; apartment owner; property management; tenant;	1	1	-	1
	EPC Certificate	-	-		File	PDF of the EPC	1	1	-	1

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Multi-family buildings [Basque Country]

- Number of buildings certified: 7
- Year of construction 1960-1980, context without regulations on the building's thermal characteristics (NBE-CT-79)
- Construction system: double-brick cavity wall with air chamber, aluminum or wood windows
- 7 auditors selected: 1 VERDE certified, 1 technician from the OPENGELA One-Stop-Shop
- Pilot: July - October

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Office building [Madrid]

- Number of buildings certified: 1
- Singularities: public property, private use
- Year of construction: 2012
- Surface: 28.300 m2
- 1 auditor selected (1 VERDE certified)
- Pilot: October

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Public building [Madrid]

- Number of buildings certified: 1
- Singularities: public property
- Year of construction: 1942
- Surface: 116.200 m2
- 1 auditor selected (1 VERDE certified)
- Pilot: October

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Sport building [Barcelona]

- Number of buildings certified: 1
- Singularities: public property
- Year of construction: 2010
- Surface: 4.300 m2
- 1 auditor selected (1 VERDE certified)
- Pilot: October

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Assessment and general conclusions

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Assessment stakeholders' groups [ES]

NAC [co-design]

Auditors and experts

Neighbours and receivers

+ Final National roundtable with around 70 attendees

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Final assessment of iBRoad2EPC [ES]

GENERAL VISION

- Facilitates integration of 2 EPBD instruments [NAC]
- Simple, intuitive and fast/dynamic tool [EXP]

PLANNING

- Facilitates long-term + step-by-step renovation planning [NAC]
- Improves considerably EPCs [EXP]

COMMUNICATION

- Intuitive and dynamic communication tool [NAC]
- Useful tool for explanation and transfer ideas to neighbors [EXP]
- Facilitates understanding and decision-making [NEI]

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Final assessment of iBRoad2EPC [ES]

MARKET

- Voluntary tool, same triggers than EPCs (sell or rent) [NAC]
- New name related to the building renovation strategy [EXP]

MODULES

- Difficulties with certain modules (i.e. IEQ, SRI) [EXP]
- Include new modules (i.e. accessibility, comfort) [EXP]

FEATURES

- Adjust specific features [EXP]
- Download results as pdf [EXP]

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Thank you for your attention

Ander Bilbao
CICLICA

For more information, please visit **www.ibroad2epc.eu**

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Introduction to the iBRoad2EPC renovation passport

Alexander Deliyannis

Sympraxis

SUSTAINABLE PLACES 2024

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

@SP24 Agenda

- **Introduction to the iBRoad2EPC renovation passport** – *Alexander Deliyannis*, Sympraxis
- **iBRoad2EPC's modular approach and adaptable database of renovation advice** – *Peter Mellwig*, ifeu
- **Q&A**
- **iBRoad2EPC in practice**
  - *Dragomir Tzanev*, Center for Energy Efficiency EnEffect (**Bulgaria**)
  - *Eleftheria Touloupaki*, INZEB (**Greece**)
  - *João Cleto*, ADENE (**Portugal**)
  - *Ander Bilbao*, Cíclica (**Spain**)
- **Q&A**

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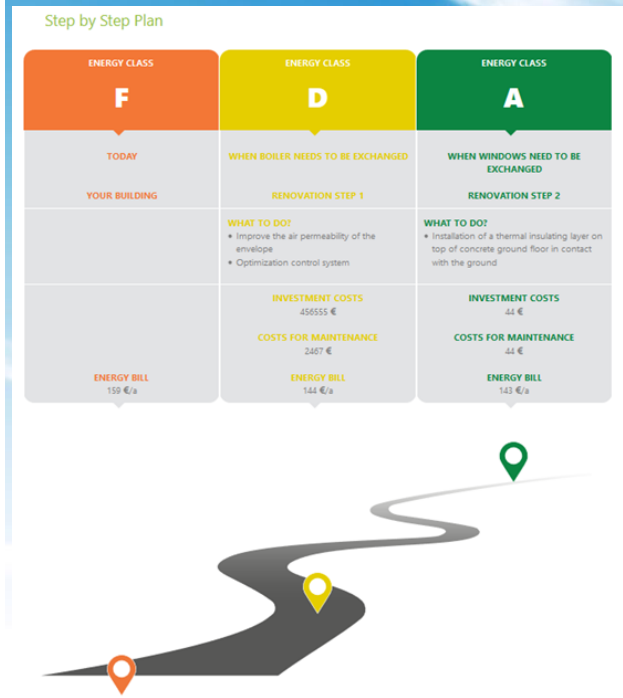
Why a Building Renovation Passport (BRP)?

- Renovation can be a challenge, especially when done step by step over a certain timespan.
- When carefully planned, so as to build on one another and to avoid lock-in effects, renovation steps can enable deep renovation to be achieved over a long-term horizon. Accordingly, each renovation contributes to reaching the overall climate target.
- An overarching plan provides guidance about which components to renovate when and how, at which cost and savings
- A long-term plan can take foreseeable occasions (“trigger points”) for renovation into account.



Source: ifeu

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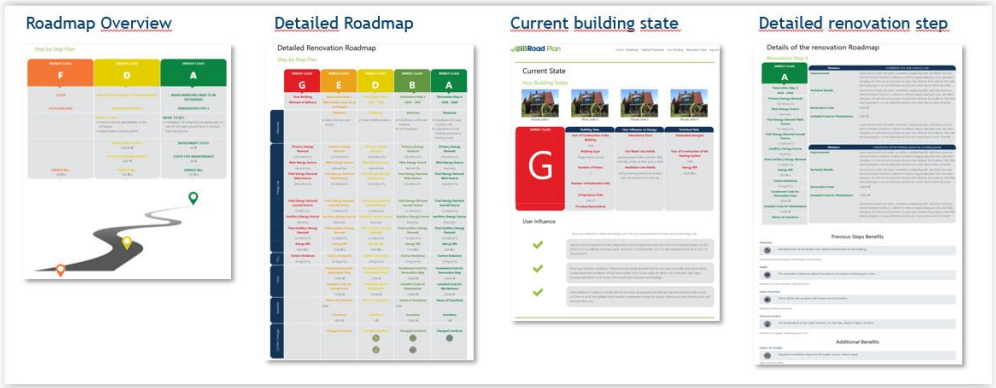
Looking back at the iBRoad products

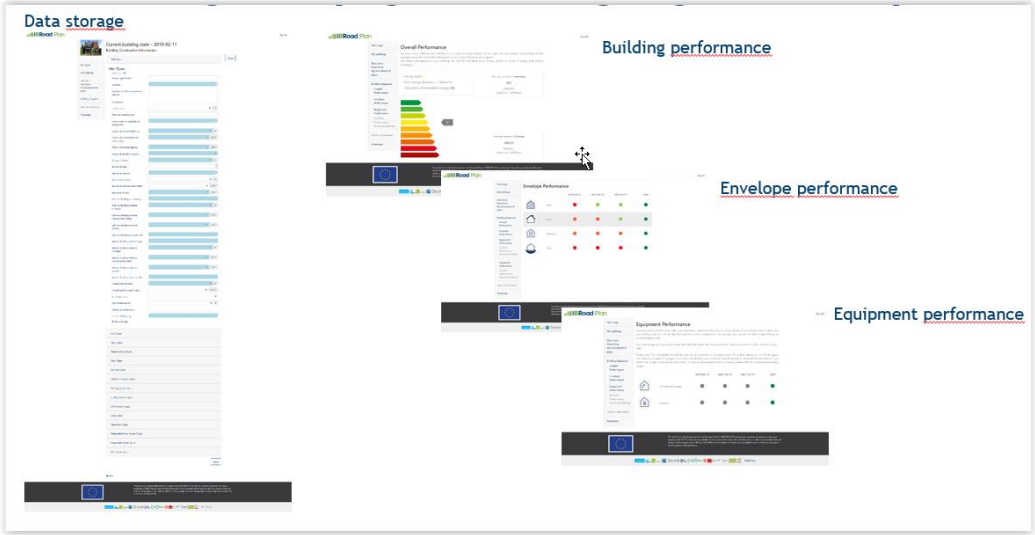
iBRoad Roadmap (BRP)

- Information for building owners about **what to do**, where to start and **in which order** to implement renovation measures;
- Outline of **a customised** renovation plan with a **long-term horizon** for **deep** staged renovation;
- Overview over the full range of renovations **adapted to the individual preferences** of the building occupants;
- Facilitating the owners' decision to invest in deeper renovation.



iBRoad Logbook

- Building repository for the building owner where all building-related information can be stored digitally (e. g., energy bills, incentives, loan and tax documents);
- Simplified assessment of envelope components and building equipment and their temporal development.



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iBRoad pilot testing results

Pilot country	No.	Year of con-struc-tion	Number of reno-vation steps	Current energy level	Final / future energy level	Current primary energy demand [kWh/m²]	Future primary energy demand [kWh/m²]	Estimated date for final renovation step	Complete-ness
BULGARIA	1	1970	3	G	B	600	362	When plaster needs renovation	complete
	2	-	4	D	B	269	36	2035-2040	complete
	3	1950	3	G	B	600	119	New heating system	complete
	4	1994	3	G	B	504	176	2019	parts missing
	5	1970	4	G	B	479	126	When boiler is exchanged	complete
	6	1980	4	F	A	390	73	2030-2035	complete
	7	1950	3	F	B	600	112	New heating system	-
	8	1968	5	E	A+	411	27	2035-2040	complete
	9	1982	4	G	B	500	111	2030-2035	complete
	10	1947	4	G	A	600	95	2025-2030	complete
	11	1911	2	D	B	362	142	2025-2030	parts missing
	12	2008	2	C	B	203	158	2025-2030	complete
	13	1929	5	G	A	505	109	2035 - 2040	complete
	14	1962	4	D	B	262	108	2035-2040	complete
	15	-	3	D	B	280	136	When windows are exchanged	parts missing

60%
average improvement

Pilot country	No.	Year of con-struc-tion	Number of reno-vation steps	Current energy level	Final / future energy level	Current primary energy demand [kWh/m²]	Future primary energy demand [kWh/m²]	Estimated date for final renovation step	Complete-ness
PORTUGAL	1	1986	5	C	A+	183	74	2035-2040	complete
	2	1500	5	D	A+	155	48	2035-2040	complete
	3	1971	4	E	A+	183	0	When plaster needs renovation	complete
	4	1937	3	F	A+	600	27	2030-2035	complete
	5	2001	3	A	A+	30	0	When boiler is exchanged	complete
	6	1937	4	F	A+	600	19	2030-2035	complete
	7	1919	5	D	A+	356	120	2025-2030	complete
	8	1998	4	C	A+	116	0	When plaster needs renovation	complete
	9	1994	2	A+	A	145	112	2025-2030	parts missing
	10	2002	3	C	A	278	104	2030-2035	complete
	11	1575	4	D	A	319	42	2025-2030	complete
	12	1988	4	F	A+	423	117	When windows are exchanged	complete
	13	1998	5	E	B-	203	0	2025-2030	complete
	14	1972	4	D	B-	387	250	2025-2030	complete
	15	1995	3	C	A	176	19	2030-2035	parts missing
	16	1966	2	E	A	326	27	2025-2030	complete
	17	1946	4	F	A	350	92	2030-2035	-
	18	1989	5	D	A+	116	20	When plaster needs renovation	complete
	19	2001	5	E	A	192	19	When plaster needs renovation	complete
	20	1981	4	C	A	211	34	2025-2030	complete

Pilot country	No.	Year of con-struc-tion	Number of reno-vation steps	Current energy level	Final / future energy level	Current primary energy demand [kWh/m²]	Future primary energy demand [kWh/m²]	Estimated date for final renovation step	Complete-ness
POLAND	1	1975	3	medium orange	light green	474	134	Substitution of the old windows	complete
	2	1978	3	dark orang			123	2030-2035	complete
	3	1987	4	dar ora					complete
	4	1950	3	d					
	5	1978	1						
	6	1975	3						
	7	1981	3						
	8	2000	3						
	9	1978							
	10	1990							
	11	1991							
	12	1936							
	13	1978							
	14	198							
	15	1							
	16								
	17								
	18								te
	19	1							lete
	20	1982	2	yellow					plete

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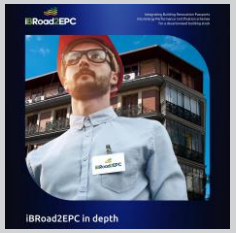
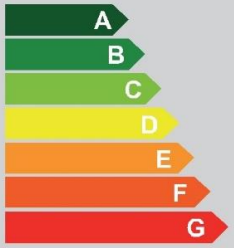
Market positioning of iBRoad2EPC / Database structure



EPC



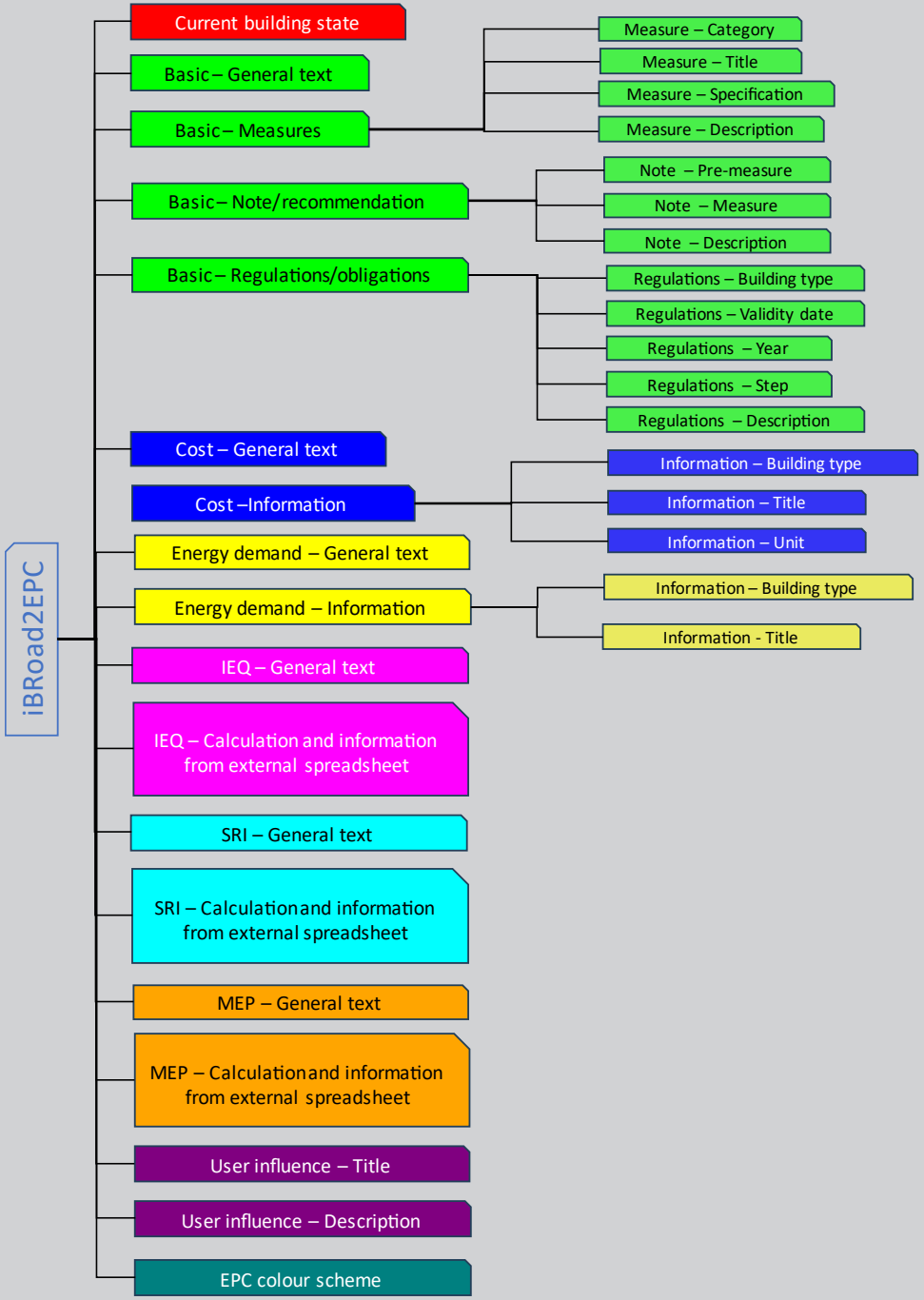
iBRoad2EPC

Building Renovation Passport

Effort:
2 - 4 hours — 1,5 - 2 days

Price:
50 - 250 Euro — 1000 - 3000 Euro

Coverage:
5 - 15% of the building stock — obligatory — voluntary — several thousand buildings



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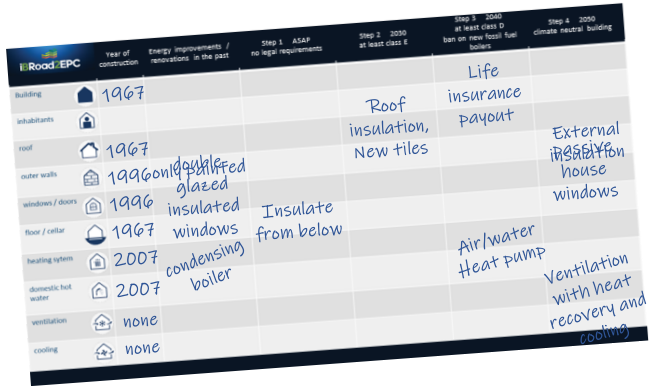
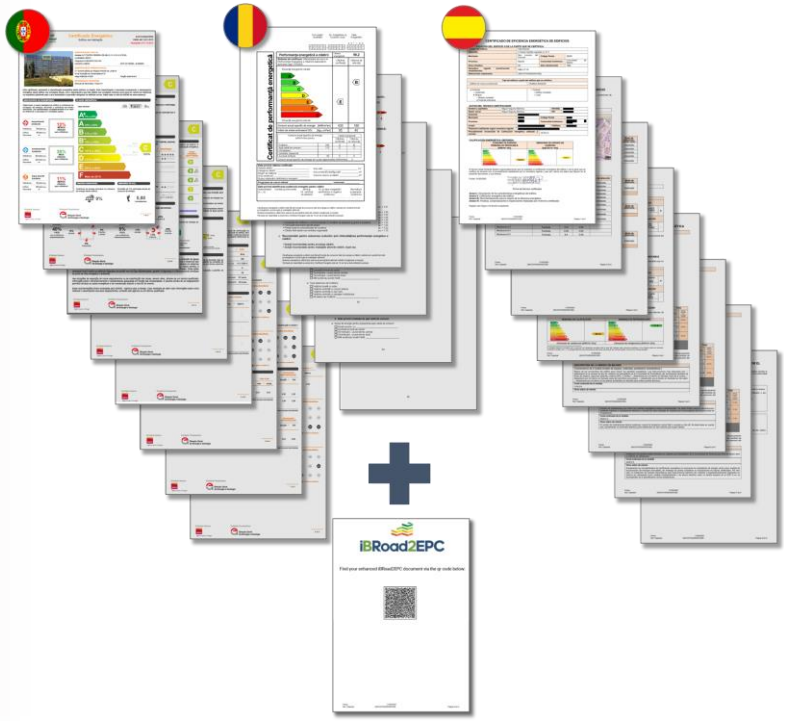
Issuing the iBRoad2EPC

- STEP 1: On-site Visit
- STEP 2: Calculation of the current Buildings State
- STEP 3: Definition of the Renovation Strategy
- STEP 4: Calculation of planned Building States
- STEP 5: Creation of iBRoad2EPC





Present building state according to EPC

Step 1 Which renovation measures are pending?

Renovation steps Support to meet all future requirements

Target state Climate neutral building

House icons Represent the quality of the envelop

Technology icons Represent the quality of the technical equipment

Timing of renovation steps According to climate targets

Brief description of the renovation measures contained in the step

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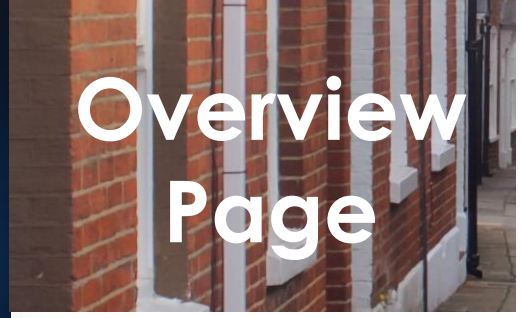
Overview Page



Present building state
according to EPC

Step 1
Which renovation measures are pending?

Renovation steps
Support to meet all future requirements

Target state
Climate neutral building

House icons
Represent the quality of the envelop

Technology icons
Represent the quality of the technical equipment

Timing of renovation steps
According to climate targets

Brief description
of the renovation measures contained in the step

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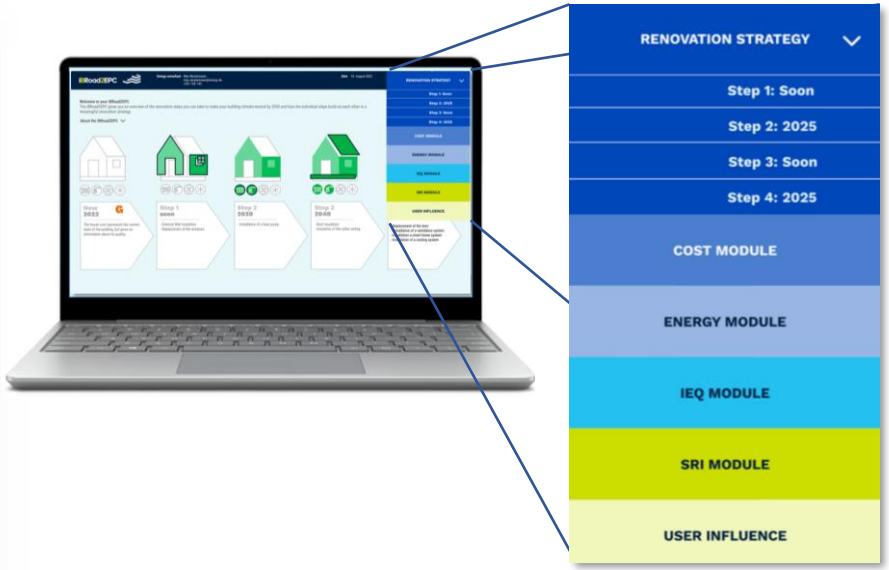
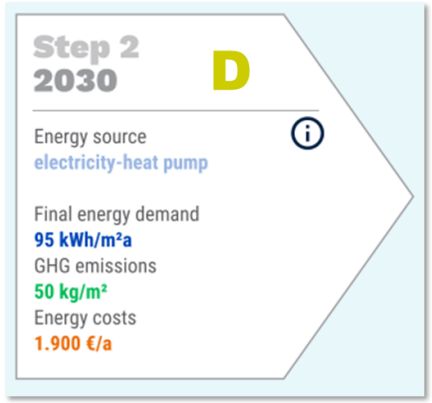
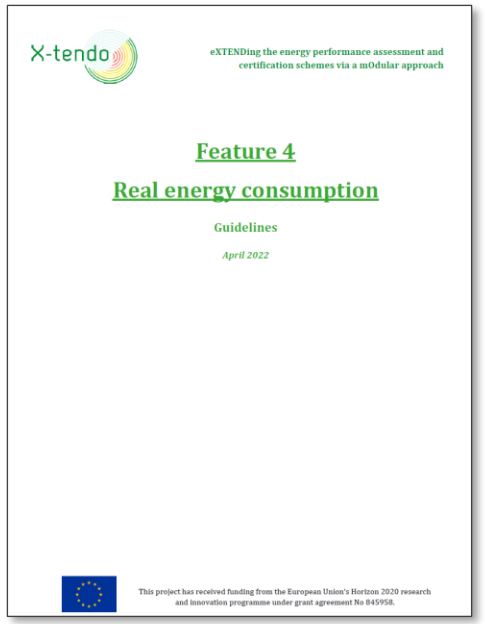
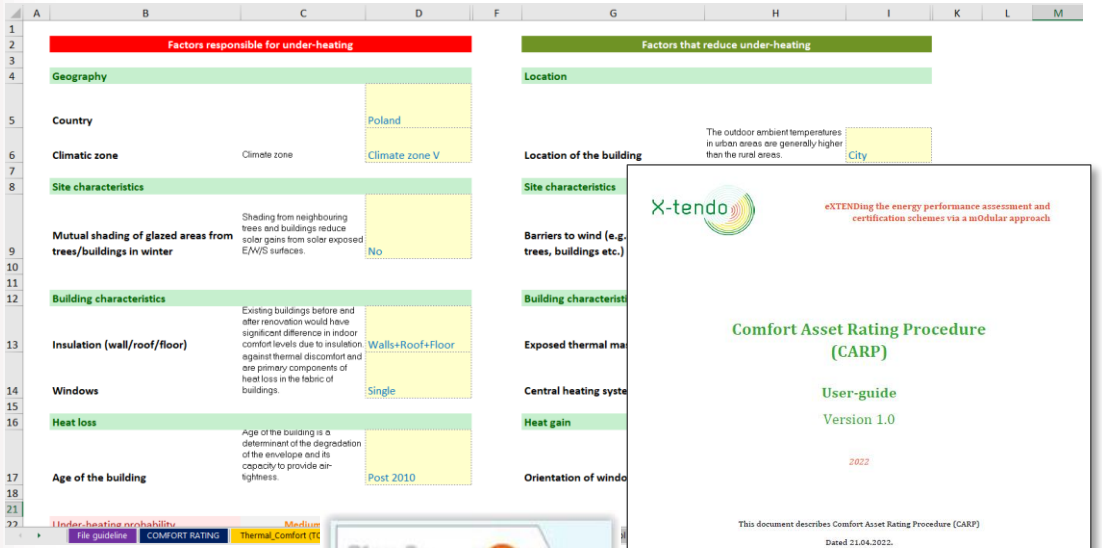
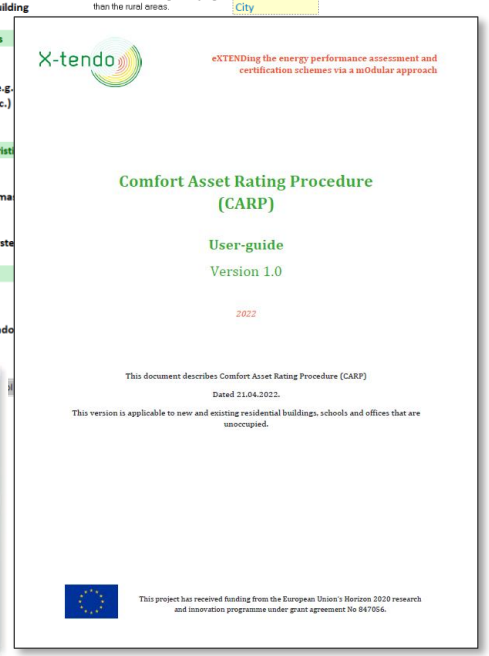
iBRoad2EPC modular/open approach

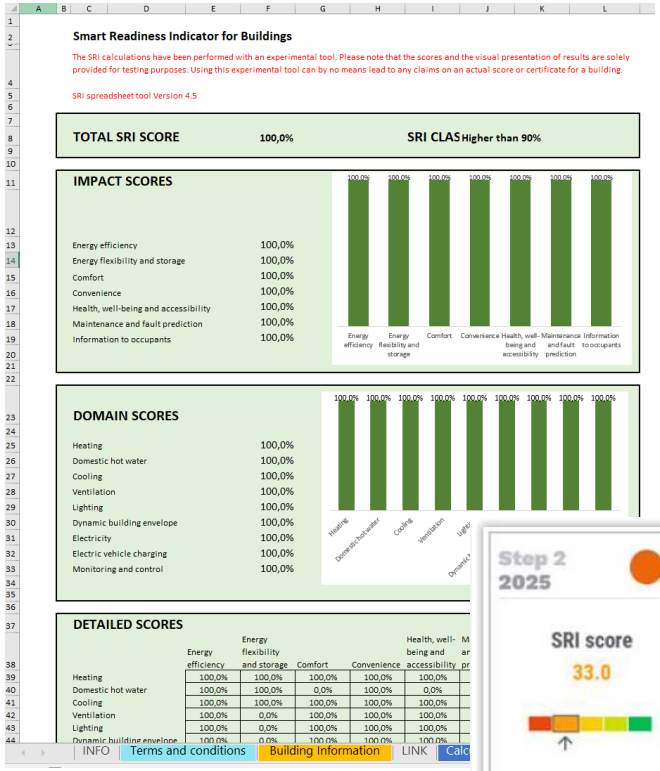


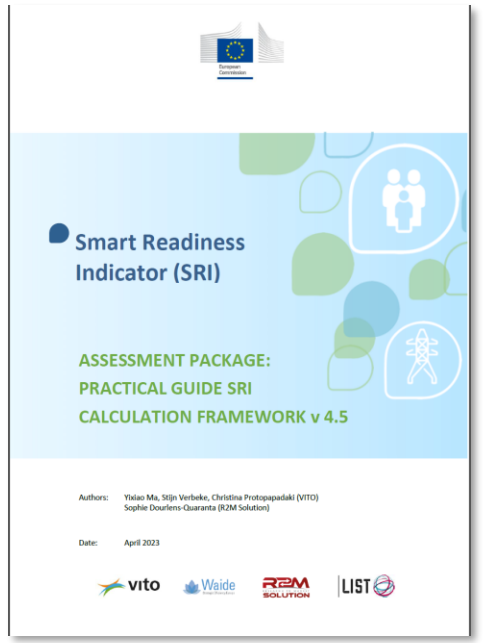












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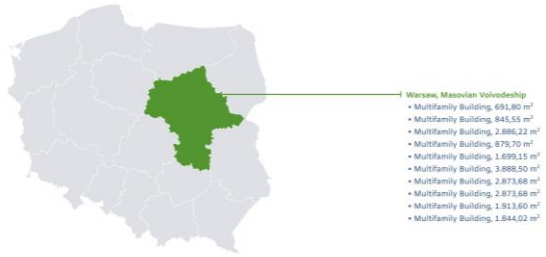
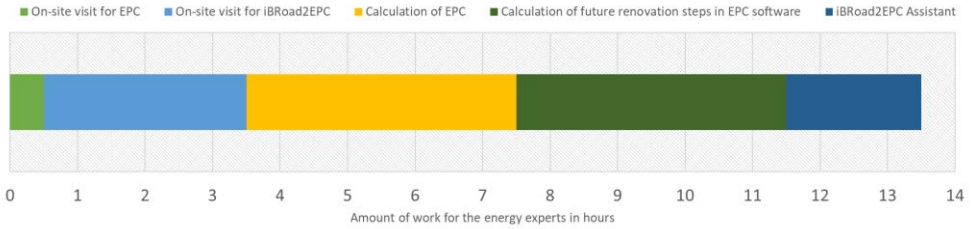
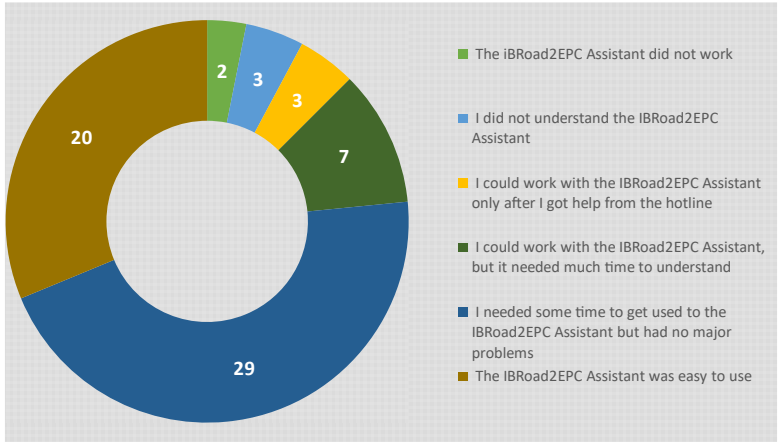
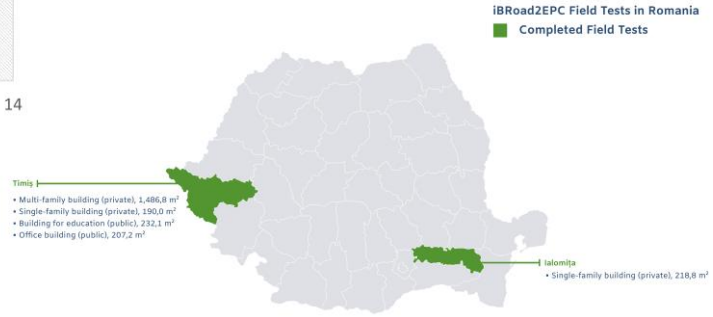
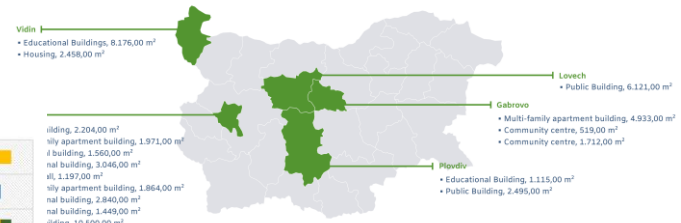
Pilot testing

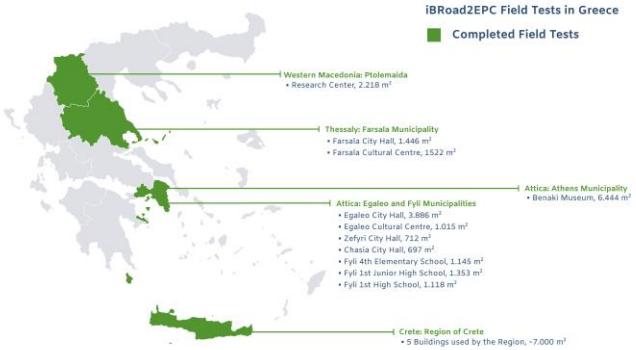












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In numbers

- **6 Pilot Countries**
- **Training:**
  - **202 energy experts**
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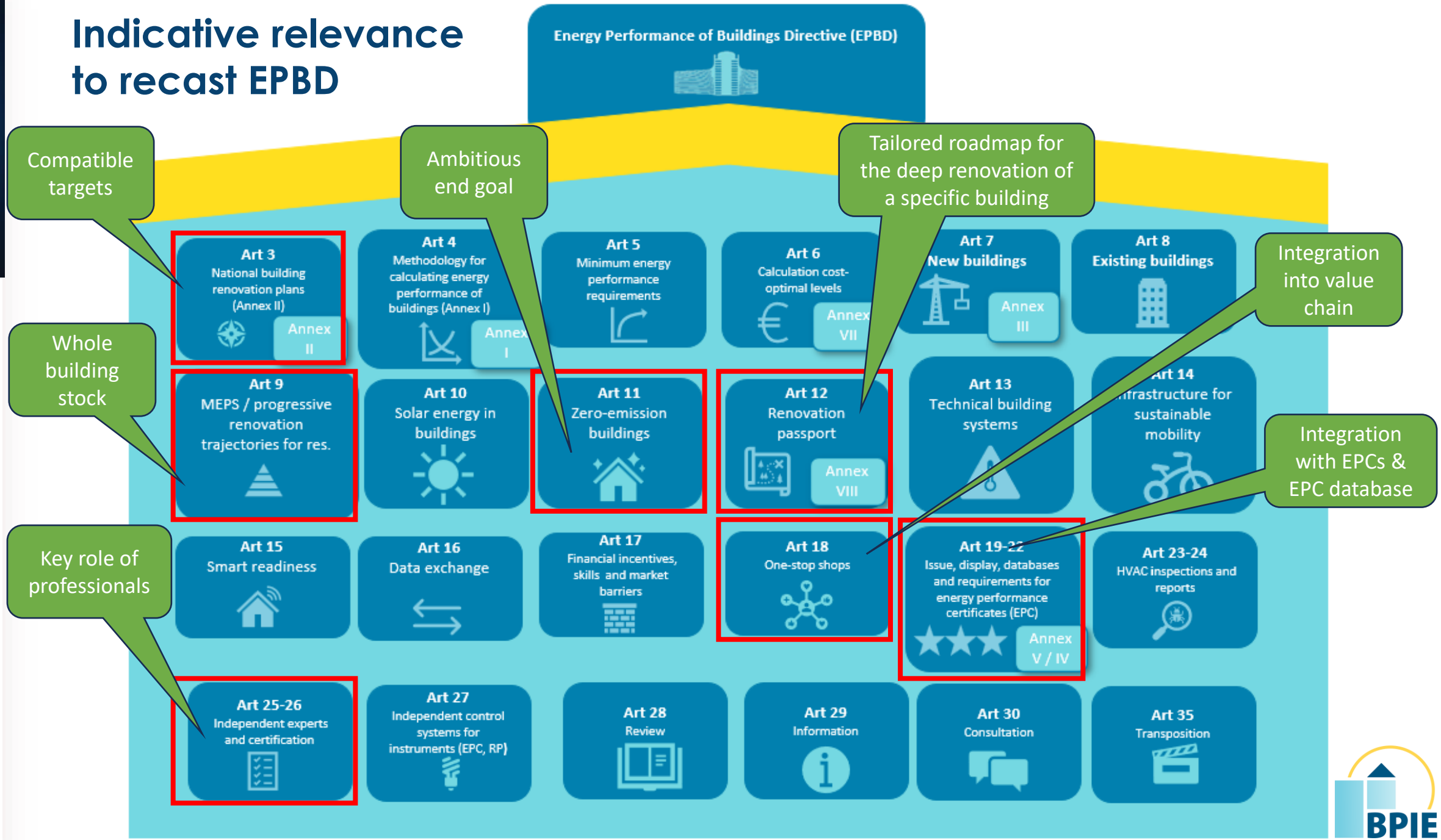

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Stay in touch with iBRoad2EPC at **www.ibroad2epc.eu**

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The iBRoad2EPC project in brief

Alexander Deliyannis

Sympraxis

SUSTAINABLE PLACES 2024

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@SP24 Agenda

- **Introduction to the iBRoad2EPC renovation passport** – *Alexander Deliyannis*, Sympraxis
- **iBRoad2EPC's modular approach and adaptable database of renovation advice** – *Peter Mellwig*, ifeu
- **Q&A**
- **iBRoad2EPC in practice**
  - *Dragomir Tzanev*, Center for Energy Efficiency EnEffect (**Bulgaria**)
  - *Eleftheria Touloupaki*, INZEB (**Greece**)
  - *João Cleto*, ADENE (**Portugal**)
  - *Ander Bilbao*, Cíclica (**Spain**)
- **Q&A**

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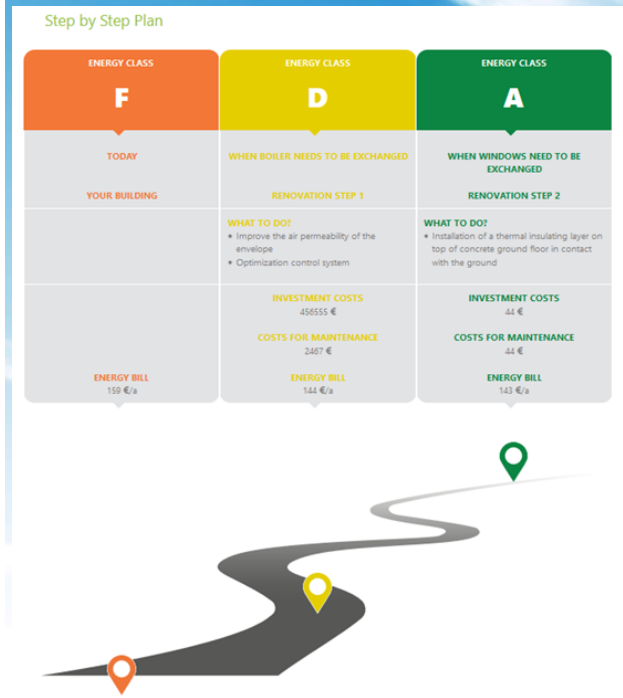
Why a Building Renovation Passport (BRP)?

- Renovation can be a challenge, especially when done step by step over a certain timespan.
- When carefully planned, so as to build on one another and to avoid lock-in effects, renovation steps can enable deep renovation to be achieved over a long-term horizon. Accordingly, each renovation contributes to reaching the overall climate target.
- An overarching plan provides guidance about which components to renovate when and how, at which cost and savings
- A long-term plan can take foreseeable occasions (“trigger points”) for renovation into account.



Source: ifeu

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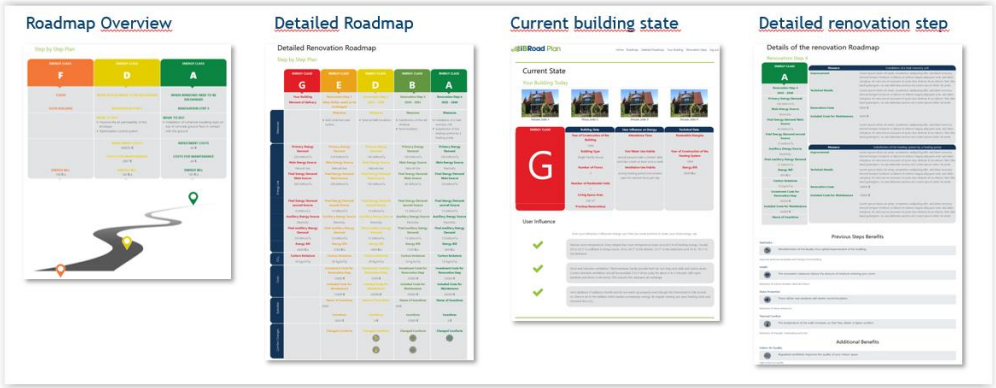
Looking back at the iBRoad products

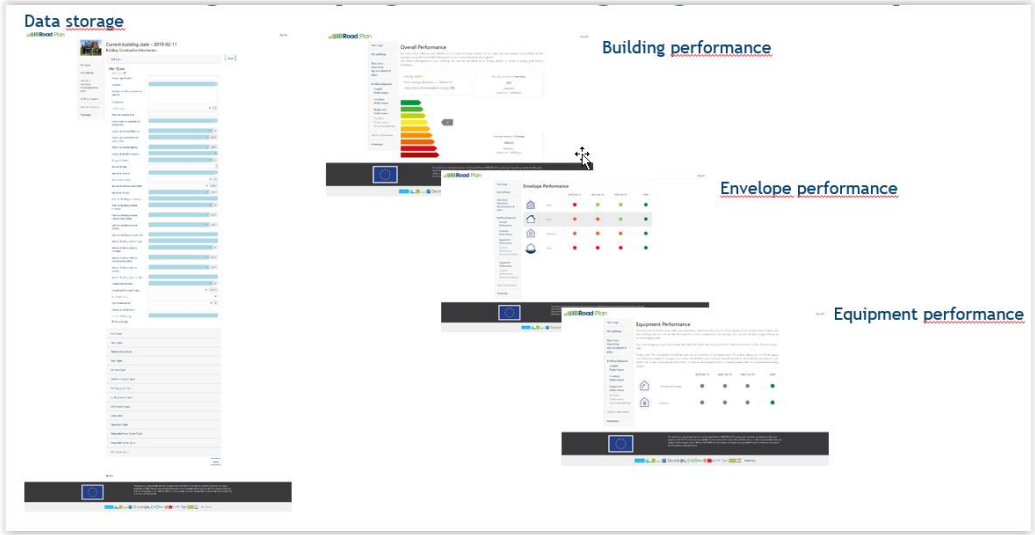
iBRoad Roadmap (BRP)

- Information for building owners about **what to do**, where to start and **in which order** to implement renovation measures;
- Outline of **a customised** renovation plan with a **long-term horizon** for **deep** staged renovation;
- Overview over the full range of renovations **adapted to the individual preferences** of the building occupants;
- Facilitating the owners' decision to invest in deeper renovation.



iBRoad Logbook

- Building repository for the building owner where all building-related information can be stored digitally (e. g., energy bills, incentives, loan and tax documents);
- Simplified assessment of envelope components and building equipment and their temporal development.



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iBRoad pilot testing results

Pilot country	No.	Year of con-struc-tion	Number of reno-vation steps	Current energy level	Final / future energy level	Current primary energy demand [kWh/m²]	Future primary energy demand [kWh/m²]	Estimated date for final renovation step	Complete-ness
BULGARIA	1	1970	3	G	B	600	362	When plaster needs renovation	complete
	2	-	4	D	B	269	36	2035-2040	complete
	3	1950	3	G	B	600	119	New heating system	complete
	4	1994	3	G	B	504	176	2019	parts missing
	5	1970	4	G	B	479	126	When boiler is exchanged	complete
	6	1980	4	F	A	390	73	2030-2035	complete
	7	1950	3	F	B	600	112	New heating system	-
	8	1968	5	E	A+	411	27	2035-2040	complete
	9	1982	4	G	B	500	111	2030-2035	complete
	10	1947	4	G	A	600	95	2025-2030	complete
	11	1911	2	D	B	362	142	2025-2030	parts missing
	12	2008	2	C	B	203	158	2025-2030	complete
	13	1929	5	G	A	505	109	2035 - 2040	complete
	14	1962	4	D	B	262	108	2035-2040	complete
	15	-	3	D	B	280	136	When windows are exchanged	parts missing

60%
average improvement

Pilot country	No.	Year of con-struc-tion	Number of reno-vation steps	Current energy level	Final / future energy level	Current primary energy demand [kWh/m²]	Future primary energy demand [kWh/m²]	Estimated date for final renovation step	Complete-ness
PORTUGAL	1	1986	5	C	A+	183	74	2035-2040	complete
	2	1500	5	D	A+	155	48	2035-2040	complete
	3	1971	4	E	A+	183	0	When plaster needs renovation	complete
	4	1937	3	F	A+	600	27	2030-2035	complete
	5	2001	3	A	A+	30	0	When boiler is exchanged	complete
	6	1937	4	F	A+	600	19	2030-2035	complete
	7	1919	5	D	A+	356	120	2025-2030	complete
	8	1998	4	C	A+	116	0	When plaster needs renovation	complete
	9	1994	2	A+	A	145	112	2025-2030	parts missing
	10	2002	3	C	A	278	104	2030-2035	complete
	11	1575	4	D	A	319	42	2025-2030	complete
	12	1988	4	F	A+	423	117	When windows are exchanged	complete
	13	1998	5	E	B-	203	0	2025-2030	complete
	14	1972	4	D	B-	387	250	2025-2030	complete
	15	1995	3	C	A	176	19	2030-2035	parts missing
	16	1966	2	E	A	326	27	2025-2030	complete
	17	1946	4	F	A	350	92	2030-2035	-
	18	1989	5	D	A+	116	20	When plaster needs renovation	complete
	19	2001	5	E	A	192	19	When plaster needs renovation	complete
	20	1981	4	C	A	211	34	2025-2030	complete

Pilot country	No.	Year of con-struc-tion	Number of reno-vation steps	Current energy level	Final / future energy level	Current primary energy demand [kWh/m²]	Future primary energy demand [kWh/m²]	Estimated date for final renovation step	Complete-ness
POLAND	1	1975	3	medium orange	light green	474	134	Substitution of the old windows	complete
	2	1978	3	dark orang			123	2030-2035	complete
	3	1987	4	dar ora					complete
	4	1950	3	d					
	5	1978	1						
	6	1975	3						
	7	1981	3						
	8	2000	3						
	9	1978							
	10	1990							
	11	1991							
	12	1936							
	13	1978							
	14	198							
	15	1							
	16								
	17								
	18								te
	19	1							lete
	20	1982	2	yellow					plete

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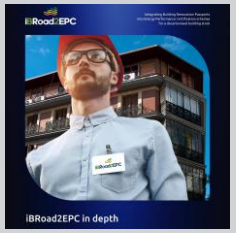
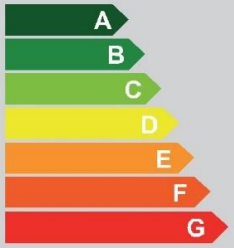
Market positioning of iBRoad2EPC / Database structure



EPC



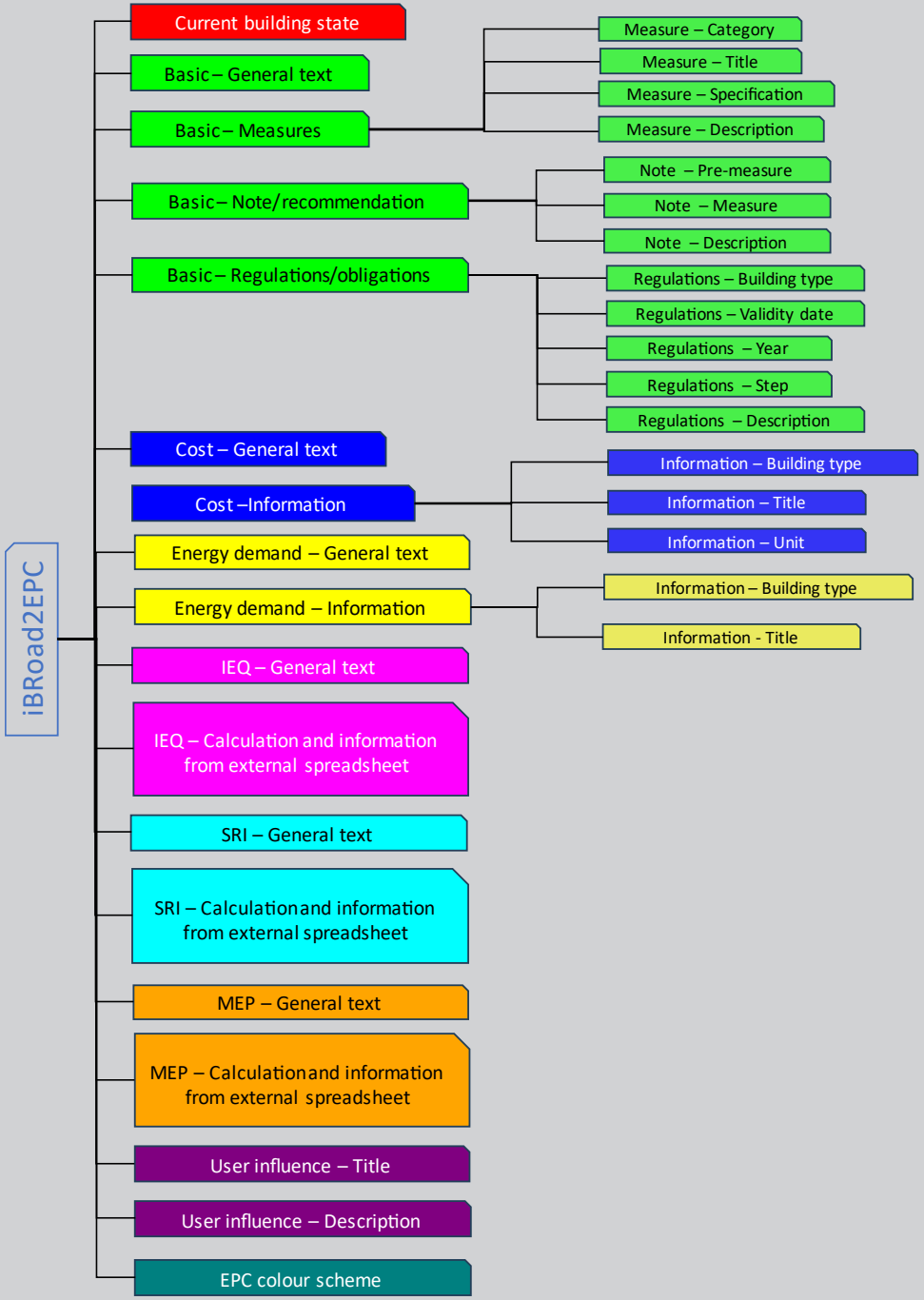
iBRoad2EPC

Building Renovation Passport

Effort:
2 - 4 hours — 1,5 - 2 days

Price:
50 - 250 Euro — 1000 - 3000 Euro

Coverage:
5 - 15% of the building stock — obligatory — voluntary — several thousand buildings



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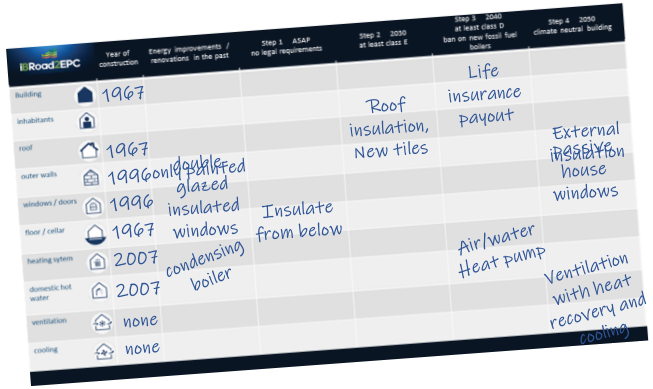
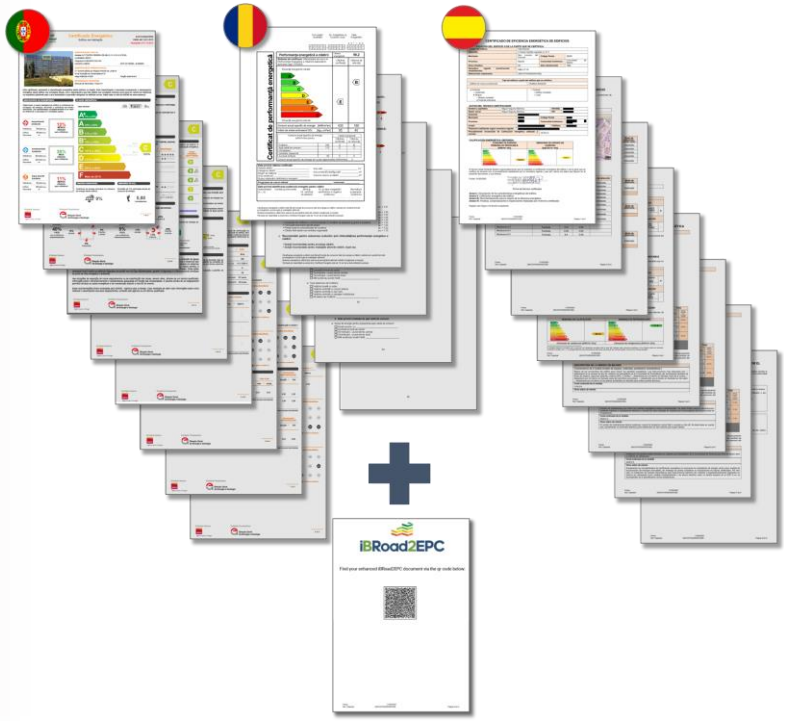
Issuing the iBRoad2EPC

- STEP 1: On-site Visit
- STEP 2: Calculation of the current Buildings State
- STEP 3: Definition of the Renovation Strategy
- STEP 4: Calculation of planned Building States
- STEP 5: Creation of iBRoad2EPC





Present building state according to EPC

Step 1 Which renovation measures are pending?

Renovation steps Support to meet all future requirements

Target state Climate neutral building

House icons Represent the quality of the envelop

Technology icons Represent the quality of the technical equipment

Timing of renovation steps According to climate targets

Brief description of the renovation measures contained in the step

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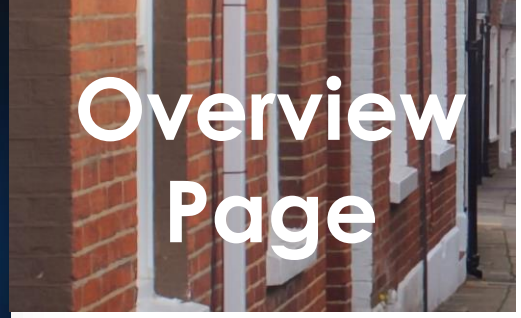
Overview Page



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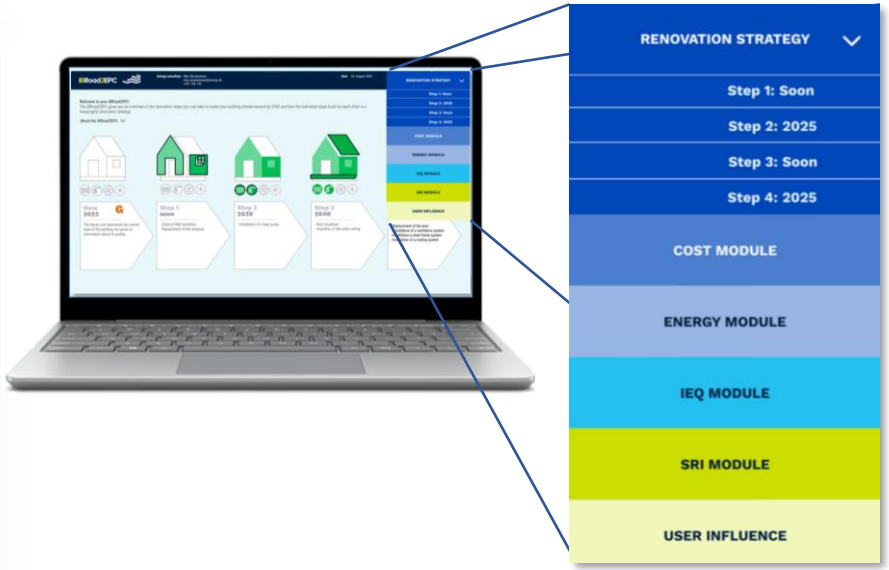
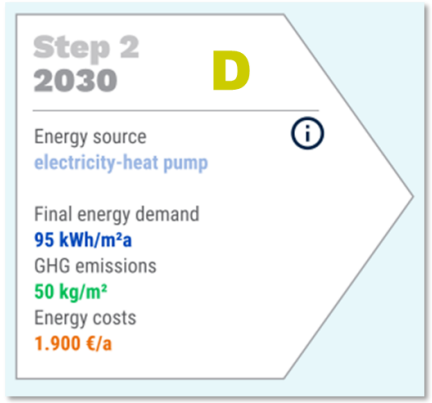
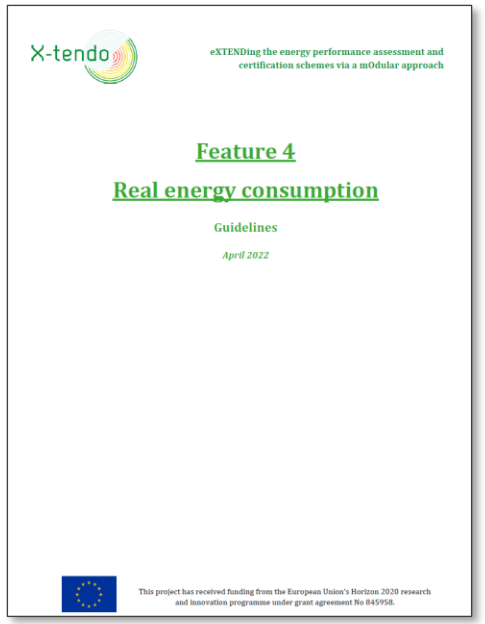
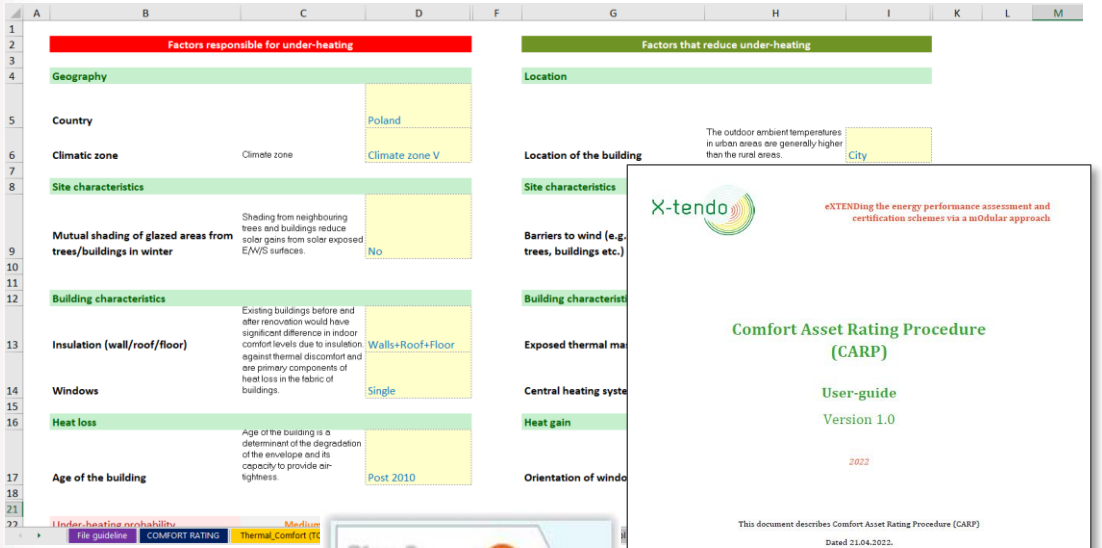
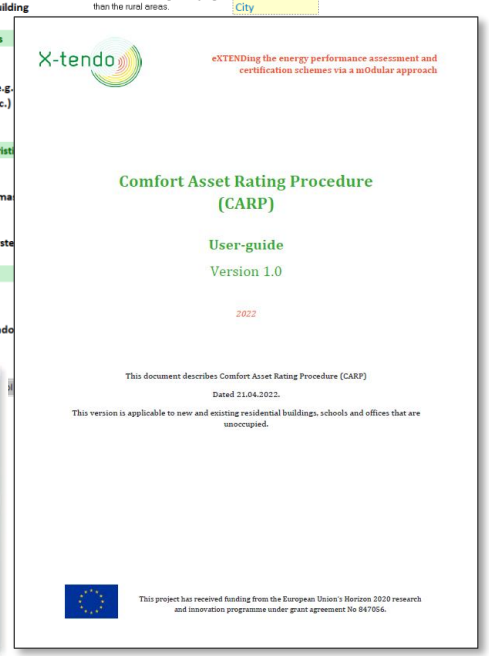
iBRoad2EPC modular/open approach

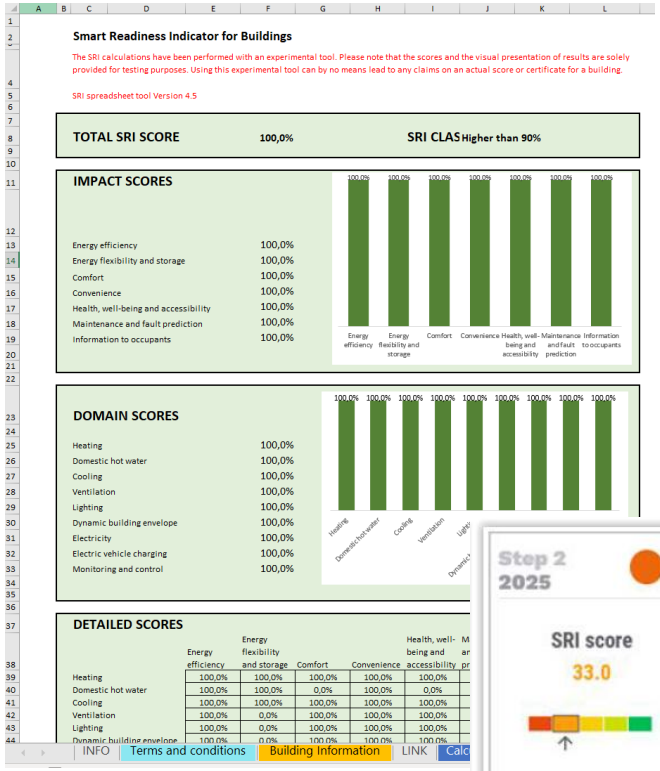


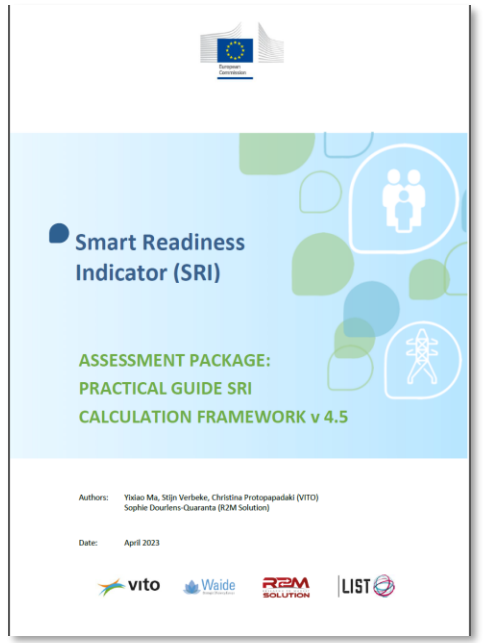












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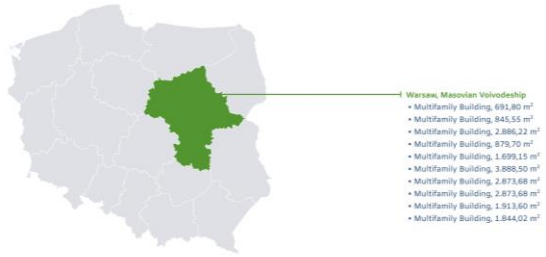
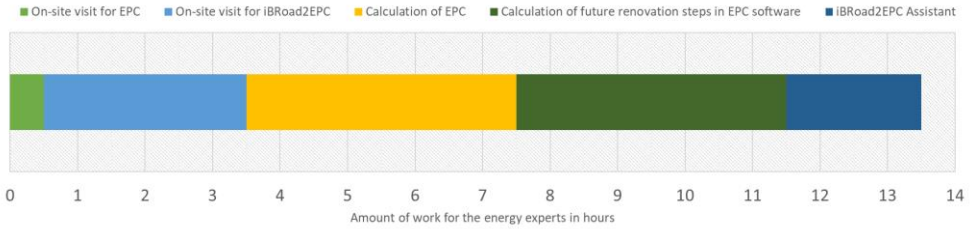
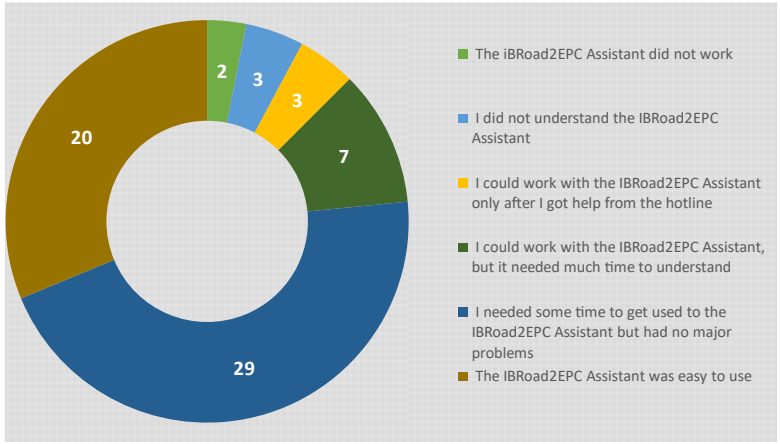
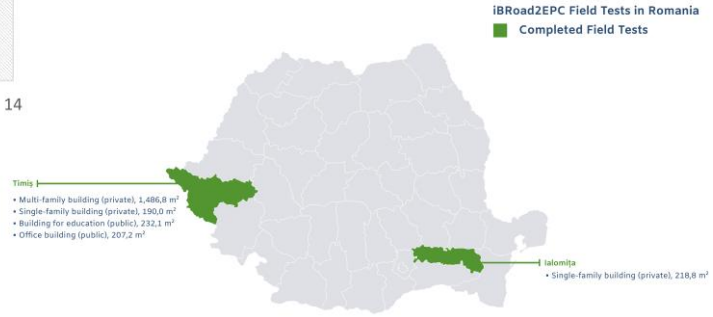
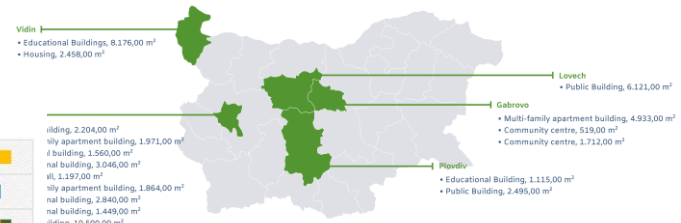
Pilot testing

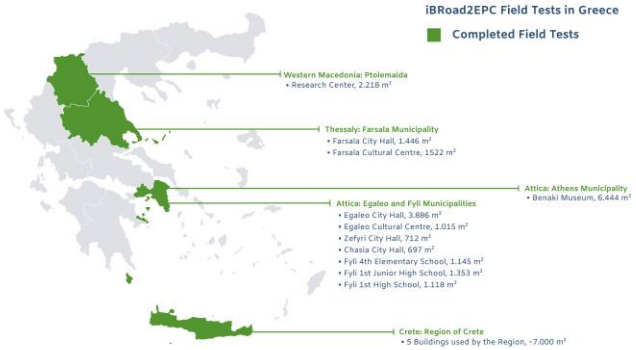












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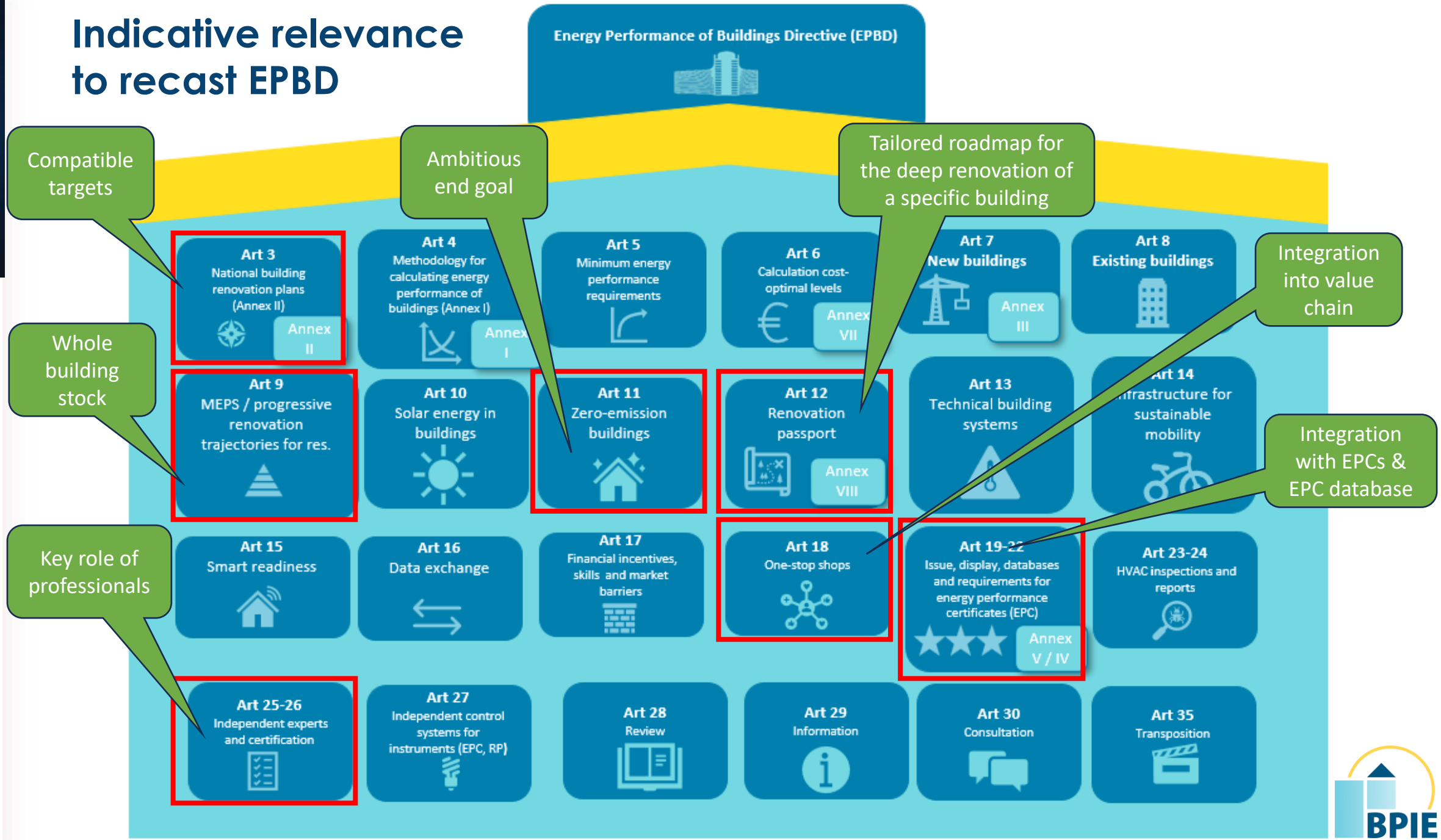

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Stay in touch with iBRoad2EPC at **www.ibroad2epc.eu**

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