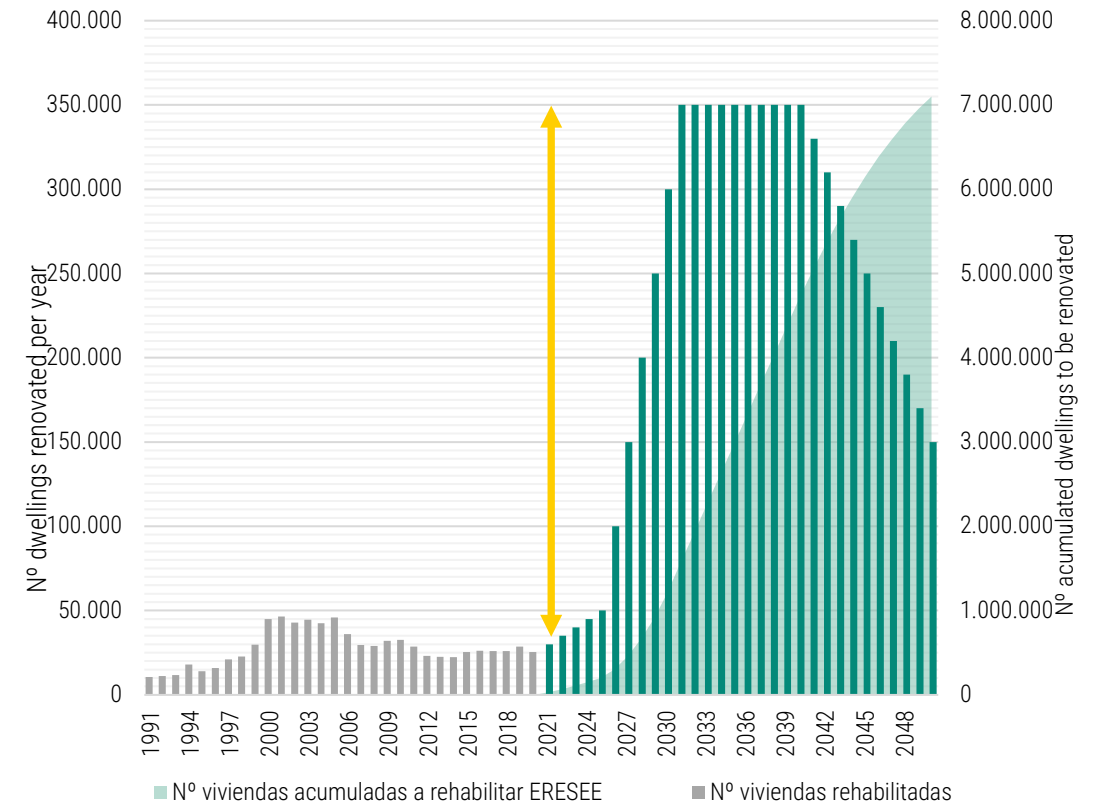


iBRoad2EPC: simplified renovation passport

Alicia de la Fuente, Eulàlia Figuerola
Green Building Council España (GBCE)

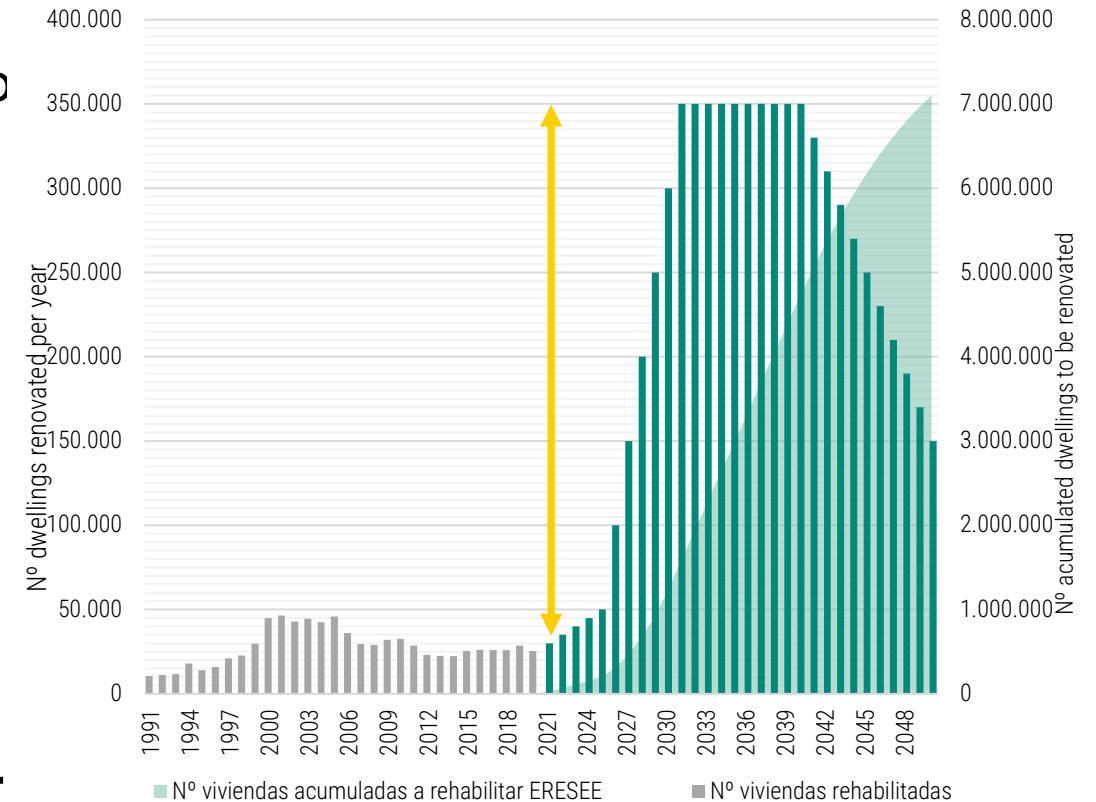
Background

- **Decarbonization by 2050:** In 25 years, our society must have stopped depending on carbon.
- **Buildings:** Responsible for around 40% of energy consumption and 36% of greenhouse gas emissions in the EU.
- **By 2050, 87% of the buildings that will exist are already built. We have to renovate.**
- The goal is to renovate 300,000 homes per year; the reality is that we are currently at 30,000, which means we would need to multiply renovations in Spain by 10.



Background

- Defining a path toward a "highly efficient and decarbonized building stock by 2050" is a **fundamental pillar of the new EPBD**
- Deep renovation of buildings has the potential to significantly reduce CO2 emissions, however, **building owners face multiple barriers when planning a renovation that must be overcome to achieve this goal**
- Deep renovation of a building is a very complex issue that requires long-term commitment and organization, as well as uncertainty about costs and the value of the proposed measures. Therefore, **this project aims to be an assistant to facilitate the process, coexisting with other tools.**



Background

- Energy performance certificates (EPCS), are tools that provide a snapshot of the energy state of a building and the potential for improvement, but **homeowners generally cannot undertake a complete renovation of their building in one step**, as it involves a large, one-time investment
- Conducting certifications and renovations over time without a plan does not seem to make much sense, **as it is not approached from a comprehensive perspective.**
- It is necessary **to understand renovation from a complete and phased perspective**, with a clear goal of achieving a decarbonized building.

CERTIFICADO DE EFICIENCIA ENERGÉTICA DE EDIFICIOS

IDENTIFICACIÓN DEL EDIFICIO O DE LA PARTE QUE SE CERTIFICA:

Nombre del edificio	Vivienda unifamiliar en Pobla Valibona		
Dirección	Calle Luis Pérez 5	Código Postal	46058
Municipio	La Pobla de Valibona	Comunidad Autónoma	Valenciana
Provincia	Valencia	Año construcción	2008
Zona climática	C3		
Normativa vigente (construcción / rehabilitación)	C.T.E.		
Referencia catastral	EG78900234YJ0045G		

Tipo de edificio o parte del edificio que se certifica:

Edificio de nueva construcción Edificio Existente

Vivienda

- Unifamiliar
- Bloque
- Bloque completo
- Vivienda individual

Tercario

- Edificio completo
- Local

DATOS DEL TÉCNICO CERTIFICADOR:

Nombre y Apellidos	Certificador	NIF(NIE)	2
Razón social	Certificador	NIF	2
Domicilio	Plaza Nueva 3	Código Postal	46001
Municipio	Valencia	Comunidad Autónoma	Valenciana
Provincia	Valencia	Teléfono	0
e-mail:	certificador@certificador.es		
Titulación habilitante según normativa vigente Arquitecto			
Procedimiento reconocido de calificación energética utilizado y versión: CEXv2.3			

CALIFICACIÓN ENERGÉTICA OBTENIDA:

CONSUMO DE ENERGÍA PRIMARIA NO RENOVABLE [kWh/m² año]	EMISIONES DE DIÓXIDO DE CARBONO [kgCO ₂ /m² año]
 G	 G

El técnico abajo firmante declara responsablemente que ha realizado la certificación energética del edificio o de la parte que se certifica de acuerdo con el procedimiento establecido por la normativa vigente y que son ciertos los datos que figuran en el presente documento, y sus anexos:

Fecha: 30/09/2016

Firma del técnico certificador

Anexo I. Descripción de las características energéticas del edificio.
Anexo II. Calificación energética del edificio.
Anexo III. Recomendaciones para la mejora de la eficiencia energética.
Anexo IV. Pruebas, comprobaciones e inspecciones realizadas por el técnico certificador.

Registro del Órgano Territorial Competente:

Fecha: 30/09/2016
Ref. Catastral: EG78900234YJ0045G

Página 1 de 8

Background

- This is why other tools arise, such as **the renovation passport, a proposal for a document that can diagnose the current state and set objectives over time**, plan coordinated transformation actions, and evaluate the results obtained for each building.
- What happens with these documents is that **they are technical and complex reports that provide very precise results** regarding energy renovation but are difficult to understand for someone who is not technical.
- **And this is where iBRoad2EPC comes in.**

CERTIFICADO DE EFICIENCIA ENERGÉTICA DE EDIFICIOS

IDENTIFICACIÓN DEL EDIFICIO O DE LA PARTE QUE SE CERTIFICA:

Nombre del edificio	Vivienda unifamiliar en Pobla Valibona		
Dirección	Calle Luis Pérez 5	Código Postal	46058
Municipio	La Pobla de Valibona	Comunidad Autónoma	Valenciana
Provincia	Valencia	Año construcción	2008
Zona climática	C3		
Normativa vigente (construcción / rehabilitación)	C.T.E.		
Referencia catastral	EG78900234YJ0045G		

Tipo de edificio o parte del edificio que se certifica:

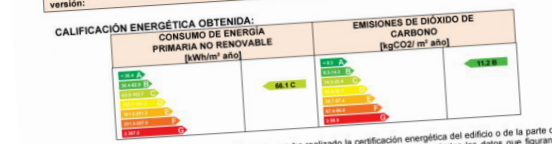
Edificio de nueva construcción Edificio Existente

Vivienda
• Unifamiliar
◦ Bloque
◦ Bloque completo
◦ Vivienda individual

Tercario
 Edificio completo
 Local

DATOS DEL TÉCNICO CERTIFICADOR:

Nombre y Apellidos	Certificador	NIF(NIE)	2
Razón social	Certificador	NIF	2
Domicilio	Plaza Nueva 3	Código Postal	46001
Municipio	Valencia	Comunidad Autónoma	Comunidad Valenciana
Provincia	Valencia	Teléfono	0
e-mail:	certificador@certificador.es		
Titulación habilitante según normativa vigente Arquitecto			
Procedimiento reconocido de calificación energética utilizado y versión: CEXV2.3			



El técnico abajo firmante declara responsablemente que ha realizado la certificación energética del edificio o de la parte que se certifica de acuerdo con el procedimiento establecido por la normativa vigente y que son ciertos los datos que figuran en el presente documento, y sus anexos:

Fecha: 30/09/2016

Firma del técnico certificador

Anexo I. Descripción de las características energéticas del edificio.
Anexo II. Calificación energética del edificio.
Anexo III. Recomendaciones para la mejora de la eficiencia energética.
Anexo IV. Pruebas, comprobaciones e inspecciones realizadas por el técnico certificador.

Registro del Órgano Territorial Competente:



iBRoad2EPC

iBRoad2EPC project

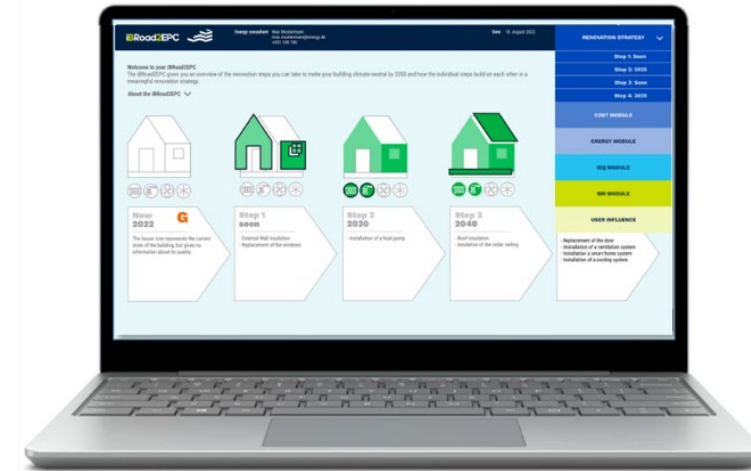
- iBRoad2EPC is a European project started in 2021, funded by the Horizon 2020 program, **aimed integrating the Building Renovation Passport with the Energy Performance Certificate**
- The project designed an assistant that allows users to **visualize the improvements that can be achieved through different phases of intervention in the building**
- To enhance this tool and ensure its utility, **a testing phase has been carried out in six countries, with 48 energy experts involved** (Bulgaria, Greece, Poland, Portugal, Romania, and Spain) through its application in real buildings.



Figure 1. Conceptual scheme. Source: iBRoad Project

iBRoad2EPC assistant

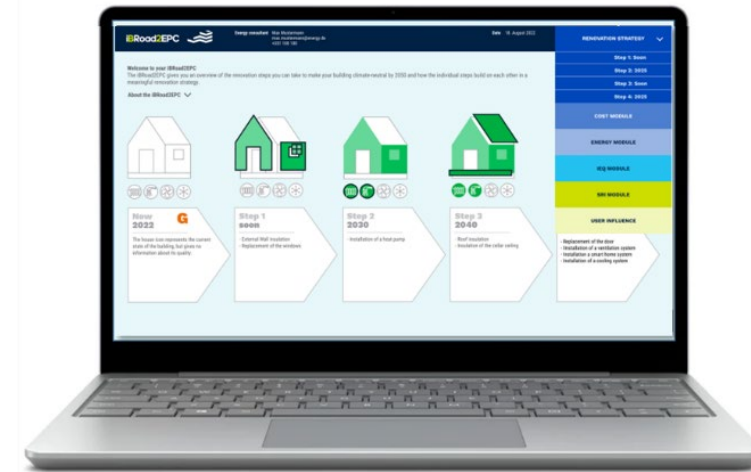
- The result of the project is an **energy consulting tool for building owners, issued by construction professionals.**
- This tool, outlines an initial renovation strategy on how a building can become climate-neutral.
- The strategy can include a complete renovation in a single step, but it can also involve multiple steps.
- The long-term perspective means that the individual renovation steps build upon one another



iBRoad2EPC assistant

The aim of iBRoad2EPC is to bring existing EPCs closer to a decarbonization roadmap and to introduce a long-term decarbonization goal through:

- Including improvement measures in a specific sequence that lead directly to the goal and avoid costly detours and poor investments (lock-in effects)
- Ensuring that each implemented measure is part of a comprehensive renovation strategy
- Complying with future regulatory and financial requirements that may be introduced
- Presenting recommendations in a way that can be easily understood by the end user and considering user needs



iBRoad2EPC assistant

The screenshot displays the iBRoad2EPC assistant interface, which is divided into several sections:

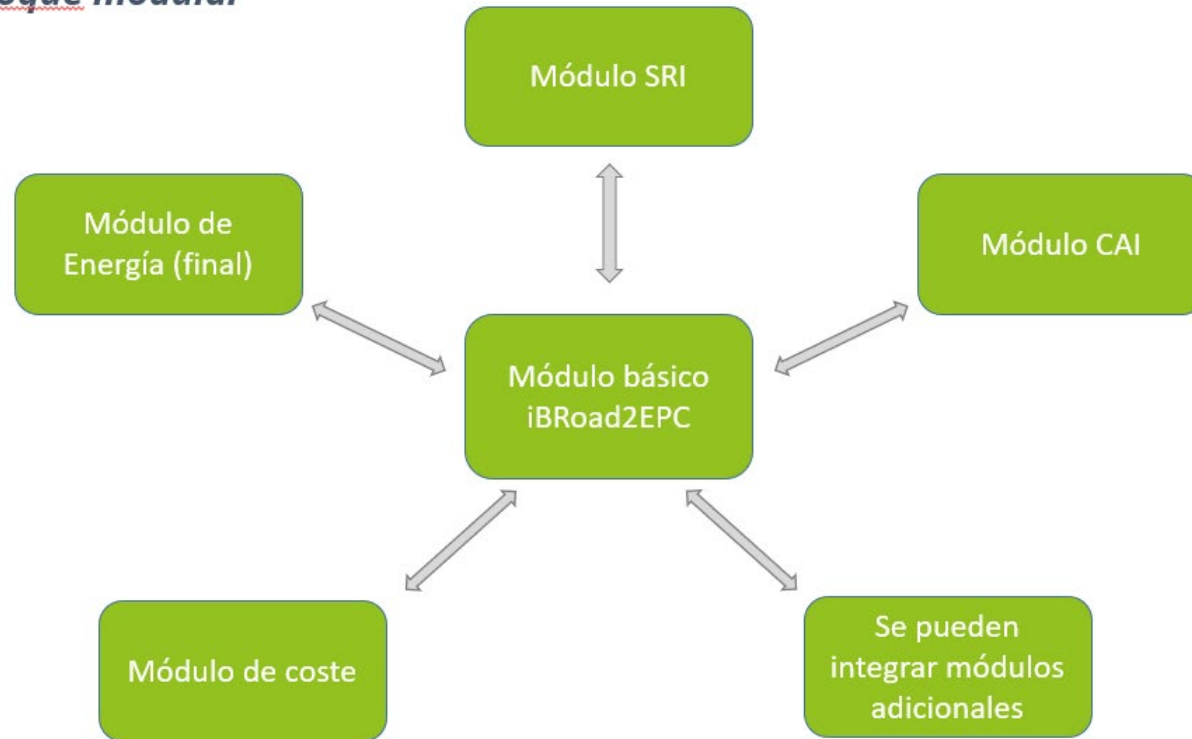
- Header:** Includes the iBRoad2EPC logo, user information (Asus Delacruz, asus.delacruz@ipr.es), and the date (June 20, 2022).
- Navigation:** A top bar with 'ESTRATEGIA DE RENOV' and 'INFLUENCIA DEL USUARIO' tabs.
- Renovation Strategy (Estrategia de Renovación):** A central area with four house icons representing different renovation stages:
 - Actual:** 2023
 - Phase 1:** 2024
 - Phase 2:** 2030
 - Phase 3:** 2040
- Renovation Details (Renovación):** A section with a green background providing detailed information about the renovation process, including energy source, GHG emissions, and energy costs.
- Energy Performance (Influencia del Usuario):** A section with a green background showing energy performance metrics, including energy demand, GHG emissions, and energy costs.
- Renovation Steps (Paso 2 2030):** A detailed view of the renovation strategy for 2030, showing:
 - Energy source:** electricity-heat pump
 - Final energy demand:** 95 kWh/m²a
 - GHG emissions:** 50 kg/m²
 - Energy costs:** 1,900 €/a
 - Costs:** 13,000 € Maintenance Costs + 2,000 € Energy-related Costs + 5,000 € Investment Costs
 - Funding:** 5,000 € Funding
 - Funding Source:** "Subsidies-EU" (www.subsidies-in-your-country.eu)
- Renovation Steps (Paso 2 2025):** A section showing a bar chart with a value of 6.2.
- Renovation Steps (Paso 4 2050):** A section showing a pie chart with a value of 61% and the label 'SRI Class D'.

iBRoad2EPC is an **online document** consisting of the following parts:

- Visualization of the renovation strategy
- Details of the renovation steps
- Tips for energy savings

iBRoad2EPC assistant

Enfoque modular



iBRoad2EPC is an **online document** consisting of the following parts:

- Visualization of the renovation strategy
- Details of the renovation steps
- Tips for energy savings

It has a modular approach:

- Basic module
- Energy, costs, Smart Readiness Indicator
- Other modules can be integrated, including one for accessibility

iBRoad2EPC assistant

- As an online assistant, there are some **preliminary steps** that must be taken before using it: It is not a calculation tool, but rather a planning, organization, and visualization tool.
- **Defining the renovation strategy once visited the building** is the first step of iBRoad2EPC, considering:
 - Complete or step by step renovation
 - Age of systems and components
 - Sequence of measures
 - Systems that should be combined
 - Obligations that must be met



iBRoad2EPC assistant

- Once this is done, the document is created through the iBRoad2EPC assistant. **Data is entered into the assistant, either manually or by linking with the EPC file.**
- The strategy for each building is created by determining the necessary steps and assigning renovation measures to each step.
- When all entries are ready and confirmed, the iBRoad2EPC document visualization will be generated, downloading the initial energy certificate, **resulting in an addition at the end of this document with a QR code that will direct anyone using it to the online document.**

**ANEXO II
CALIFICACIÓN ENERGÉTICA DEL EDIFICIO**

Zona climática	D2	Uso	Residencial
----------------	----	-----	-------------

1. CALIFICACIÓN ENERGÉTICA DEL EDIFICIO EN EMISIONES

INDICADOR GLOBAL	INDICADORES PARCIALES																			
	CALEFACCIÓN	ACS																		
<table border="1"> <tr><td>174</td><td>A</td></tr> <tr><td>7454</td><td>B</td></tr> <tr><td>11243</td><td>C</td></tr> <tr><td>12343</td><td>D</td></tr> <tr><td>14743</td><td>E</td></tr> <tr><td>15243</td><td>F</td></tr> <tr><td>1747</td><td>G</td></tr> </table>	174	A	7454	B	11243	C	12343	D	14743	E	15243	F	1747	G	<table border="1"> <tr><td>32.11</td><td>E</td></tr> </table>	32.11	E	<table border="1"> <tr><td>13.90</td><td>G</td></tr> </table>	13.90	G
174	A																			
7454	B																			
11243	C																			
12343	D																			
14743	E																			
15243	F																			
1747	G																			
32.11	E																			
13.90	G																			
Emisiones globales [kgCO ₂ /m ² año]	Emisiones calefacción [kgCO ₂ /m ² año]	Emisiones ACS [kgCO ₂ /m ² año]																		
	48.6 E																			
	Emisiones refrigeración [kgCO ₂ /m ² año]	Emisiones iluminación [kgCO ₂ /m ² año]																		
	2.62	-																		

La calificación global del edificio se expresa en términos de dióxido de carbono liberado a la atmósfera como consecuencia del consumo energético del mismo.

	kgCO ₂ /m ² año	kgCO ₂ /año
Emisiones CO ₂ por consumo eléctrico	2.02	787.50
Emisiones CO ₂ por otros combustibles	46.01	13804.04

2. CALIFICACIÓN ENERGÉTICA DEL EDIFICIO EN CONSUMO DE ENERGÍA PRIMARIA NO RENOVABLE

Por energía primaria no renovable se entiende la energía que ha sufrido ningún proceso de conversión o transformación.

INDICADOR GLOBAL														
<table border="1"> <tr><td>174</td><td>A</td></tr> <tr><td>7454</td><td>B</td></tr> <tr><td>11243</td><td>C</td></tr> <tr><td>12343</td><td>D</td></tr> <tr><td>14743</td><td>E</td></tr> <tr><td>15243</td><td>F</td></tr> <tr><td>1747</td><td>G</td></tr> </table>	174	A	7454	B	11243	C	12343	D	14743	E	15243	F	1747	G
174	A													
7454	B													
11243	C													
12343	D													
14743	E													
15243	F													
1747	G													
Consumo global de energía primaria no renovable [kWh/m ² año]														


3. CALIFICACIÓN PARCIAL DE LA DEMANDA

La demanda energética de calefacción y refrigeración del edificio.

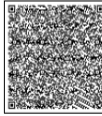
DEMANDA DE CALEFACCIÓN														
<table border="1"> <tr><td>174</td><td>A</td></tr> <tr><td>7454</td><td>B</td></tr> <tr><td>11243</td><td>C</td></tr> <tr><td>12343</td><td>D</td></tr> <tr><td>14743</td><td>E</td></tr> <tr><td>15243</td><td>F</td></tr> <tr><td>1747</td><td>G</td></tr> </table>	174	A	7454	B	11243	C	12343	D	14743	E	15243	F	1747	G
174	A													
7454	B													
11243	C													
12343	D													
14743	E													
15243	F													
1747	G													
Demanda de calefacción [kWh/m ² año]														

El indicador global es resultado de la suma de los indicadores de calefacción y refrigeración.

Fecha: Ref. Catastral:



Encuentre su documento iBRoad2EPC mejorado mediante el código qr que aparece a continuación:



https://staging.ibroad2epc.blue-planet.be/es/overview/projects/493089087095d0/renovation_strategy

iBRoad2EPC assistant

This is the general visualization of the iBRoad2EPC



iBRoad2EPC assistant

This is detail page of each renovation step, with the measurements included

The screenshot displays the 'iBRoad2EPC' interface. At the top, it shows 'Energy consultant Max Mustermann max.mustermann@energy.de +351 100 100' and 'Date 18. August 2022'. A dropdown menu is set to 'Step 1 Soon'. The main content area is divided into three columns:

- 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 ($U = 0,2 \text{ W}/(\text{m}^2\text{K})$)
 - Icon:** A green house icon with a square window.
- 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 ($UW = 0,8 \text{ W}/(\text{m}^2\text{K})$).
 - Icon:** A green window icon.
- MEPS/Regulations:** By 1 January 2024, every new installed heating system is to be based on 65 percent renewable energy sources.
- 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.

Callouts from the left side of the image point to specific elements in the screenshot:

- Step that is described in this page:** Points to the 'Step 1 Soon' dropdown.
- One box per measure A renovation step can comprise several measures:** Points to the 'Measure 1' and 'Measure 2' boxes.
- Future Requirements Information about content and timing:** Points to the 'MEPS/Regulations' section.
- Preparation for later renovation steps reach deep renovation and avoid lock-in:** Points to the 'Note/Recommendation' section.
- Name of the measure same as in the overview for easy orientation:** Points to the 'Measure 1' title.
- Description of the measures What should be renovated?:** Points to the 'Description of the measure' text.
- Specification of the measures How should it be renovated?:** Points to the 'Specification of the measure' text.
- Icon same as in the overview for easy orientation:** Points to the house and window icons.

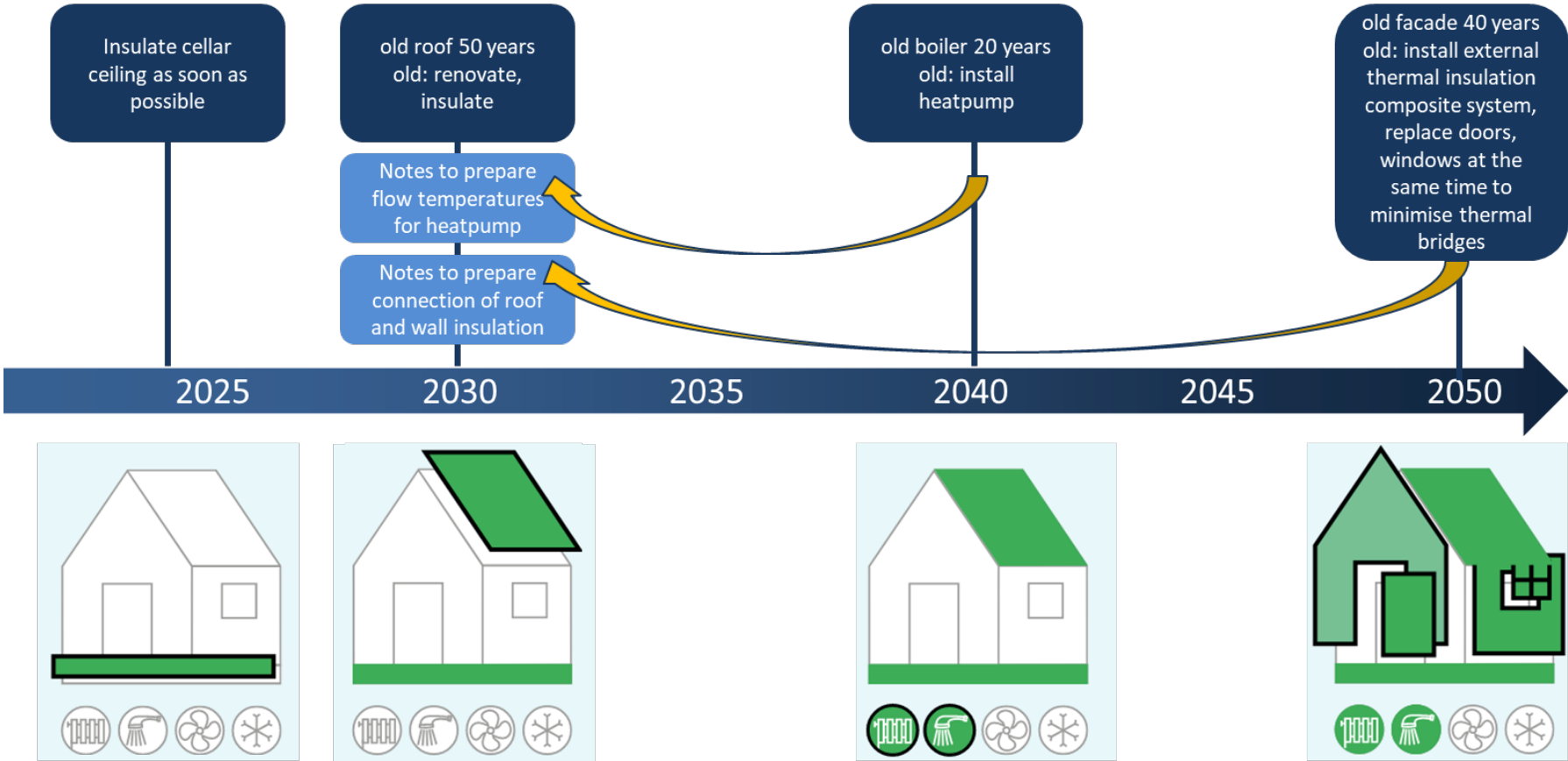
The added value

- One of the great added values of the iBRoad2EPC assistant is its ability **to communicate complex technical aspects in a simplified way**, thus creating the opportunity to involve non-professional stakeholders in the process.
- Another advantage is that better renovation recommendations are achieved compared to Energy Performance Certificates (EPC), thanks to the integrated elements of the Building Renovation Passport (BRP).
- iBRoad2EPC informs building owners about when they must meet future requirements. **This allows them to define their renovation strategy with legal guarantees.** iBRoad2EPC automatically displays future obligations in the timeline.



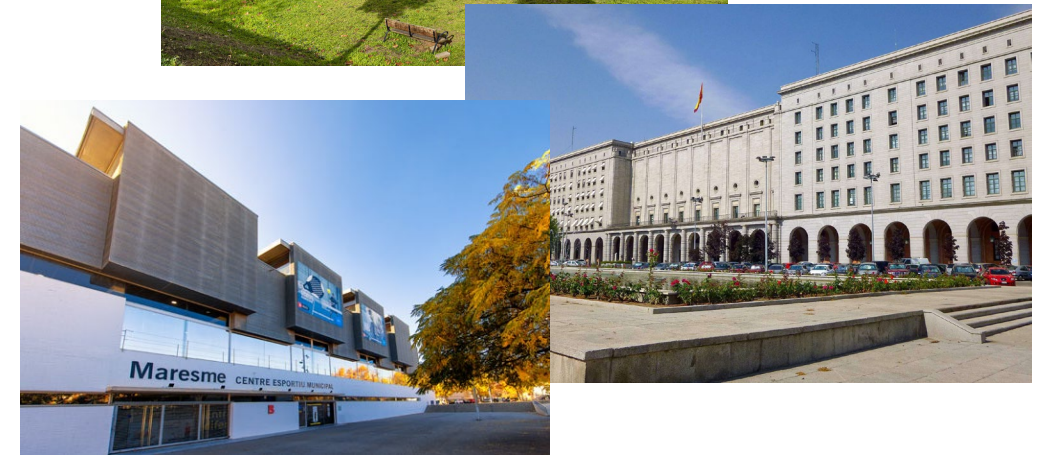
The added value

iBRoad2EPC creates a renovation strategy that allows planning ahead and thus preparing for later renovations



Field test: Spain

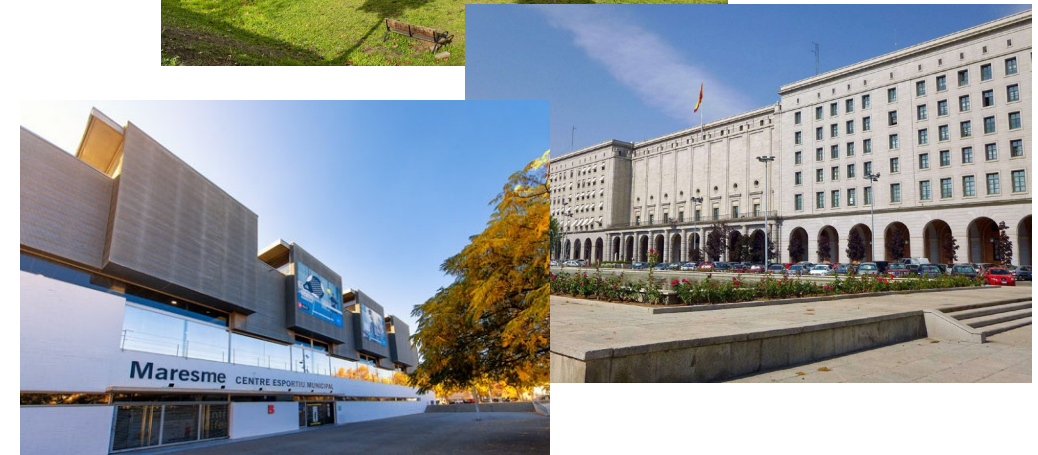
- A fundamental part of the project was the field test, in which 10 technical experts in energy audits and certifications put the tool to the test to evaluate it.
- To this end, 17 technicians were trained, and 10 of them conducted the field test on 10 buildings:
 - 7 residential buildings in the Zaramaga neighborhood of Vitoria
 - 1 office building of Sepides in Madrid
 - 1 public office building (Nuevos Ministerios) in Madrid
 - 1 public sports building in Barcelona



Field Test: Spain

Conclusions after the field test:

- iBRoad2EPC in general: A simple tool with great potential as an intermediate point between Energy Performance Certificates (EPC) and the renovation passport.
- It took them between 2-4 hours to complete, and they believed it could be a mandatory addition to the EPC, as it would improve communication with building owners.
- A proposal for improving the cost module and adding an accessibility module and a comfort module



Descargar Firefox para Android | lbroad2epc | (anonymous) - enhanced_epc_4930

https://staging.lbroad2epc.blue-planet.be/es/user_projects/83/flow/renovation_measures?project_id=83

Estado actual

Energía Fuentes de energía : 1. Gas natural Consumo de energía final : 232 kWh/m²-año Emisiones de GEI : 48 kgCO₂/m²-año Costes energéticos : 0.0 €/m²-año

Renovaciones a realizar en: 2024

Calificación energética D

Costes Gastos de mantenimiento : €15,000 Costes relacionados con la energía : €10,000 Financiación : €7,500

Energía Fuentes de energía : 1. Gas natural Consumo de energía final : 144 kWh/m²-año Emisiones de GEI : 30 kgCO₂/m²-año Costes energéticos : 1900.0 €/m²-año

- #### 1. Suelo - Aislamiento de la solera

Retirada de las capas existentes sobre la losa de hormigón. Instalación del aislamiento térmico y, sobre el aislamiento, una solera de hormigón, una barrera de vapor y, por último, la capa o capas de acabado (baldosas cerámicas, madera, etc.). Para esta solución es necesario disponer de suficiente altura de techo, y podría ser necesario adaptar la altura de todas las puertas y elevar las barandillas y las tomas eléctricas.
- #### 2. Pared exterior - Aislamiento interior

Aislamiento de la fachada por el interior. El aislamiento interior debe colocarse con el objetivo de evitar condensaciones; esto debe discutirse con un técnico de la construcción. Los puentes térmicos y la prevención del moho son mucho más importantes con el aislamiento interior que con el exterior.

⚠ Preparativos para renovaciones posteriores
- #### 3. Pared exterior - Relleno de la cámara de aire con aislamiento térmico

Aislamiento de la fachada mediante la aplicación de un material aislante inyectable en la cámara de la pared exterior. El material aislante es inyectado en la cámara desde el exterior por una empresa especializada.
- #### 4. Techo - Aislamiento de cubierta

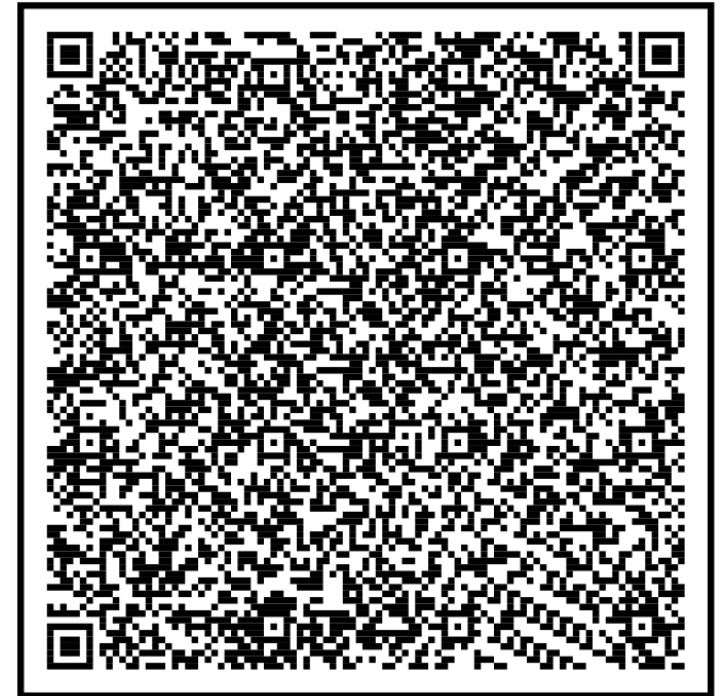
Aislamiento de la superficie de la cubierta junto con la sustitución de tejas. El nuevo aislamiento se instalará sobre la losa/el empuje.

If you would like further information,
please contact us at

alicia.delafuente@gbce.es

eulalia.figueroles@gbce.es

Thank you!



QR code to access an iBRoad2EPC document