



POLICY BRIEFING

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# RECOMMENDATIONS FOR INDUSTRIALISED RENOVATION

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# CONTENTS

RECOMMENDATIONS  
FOR INDUSTRIALISED  
RENOVATION

01

POLICY GAPS  
AND SOLUTIONS  
FOR INDUSTRIAL  
PREFABRICATION

03

RECOMMENDATIONS  
TO ACCELERATE  
THE UPTAKE OF INDUSTRIAL  
PREFABRICATION  
OF RENOVATIONS

05

- Strengthening regulatory requirements
- Supply stability
- Digitalisation
- Performance guarantees and remuneration
- Tailored finance





**Action and innovation are needed to achieve the EU climate goal of full, society-wide decarbonisation by 2050. The EU is committed to a 55% reduction of greenhouse-gas emissions by 2030.<sup>1</sup> The 2022 REPowerEU plan puts increased emphasis on decarbonisation, notably through reducing energy demand and futureproofing European infrastructure. There is significant potential for decarbonisation and energy reductions in the existing European building stock to contribute to all these pressing goals, but new techniques are needed. Using prefabricated building components produced at an industrial scale (a process known as industrial prefabrication) is one promising solution.**

To enable innovation in the renovation sector, policymakers at EU, national and local level must collaborate and implement complementary measures. Innovation is particularly required to increase the rate and depth of renovations, as progress on the ground has been slow despite a flurry of policy initiatives.

Beyond delivering carbon emission savings, industrial prefabrication has the potential to drive innovation in the construction sector. It prepares actors across the value chain to integrate digital solutions and optimise the renovation process in ways that are also useful for traditional renovation and construction solutions.

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<sup>1</sup> 55% compared to 1990 greenhouse gas emission levels.

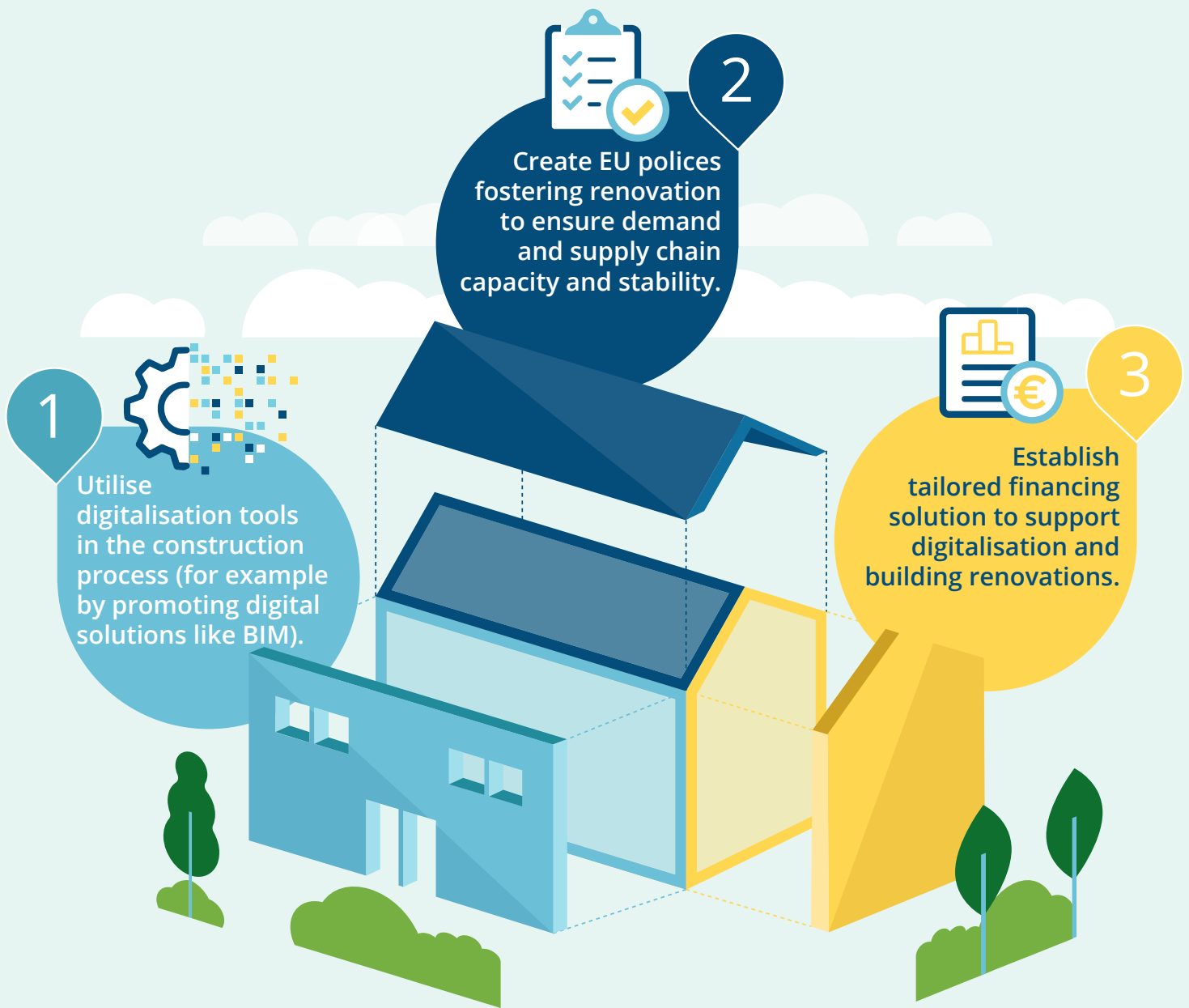
Nevertheless, the regulatory and incentive framework does not yet enable successful industrialised renovation at scale, and existing policy gaps must be addressed to realise its potential.



## Direct action is required to:

- **Address regulatory barriers and include guidance in national and regional planning to encourage industrial prefabrication solutions.**
- **Create conditions to stimulate supply stability by fostering project aggregation.**
- **Increase digitalisation of the construction sector (e.g., through building information modelling and digital building logbooks).**
- **Foster trust in industrially prefabricated renovation through energy performance remuneration legislation, energy performance guarantees and quality labels.**
- **Design tailored financial tools to establish research and development, pilots, and investment support.**

European, national and local policy action is needed, as well as involvement from private investors, banks, housing associations and industry. This policy brief presents concrete policy levers for four key themes, and details how EU, national and local policymakers can accelerate the uptake of industrially prefabricated renovation solutions.

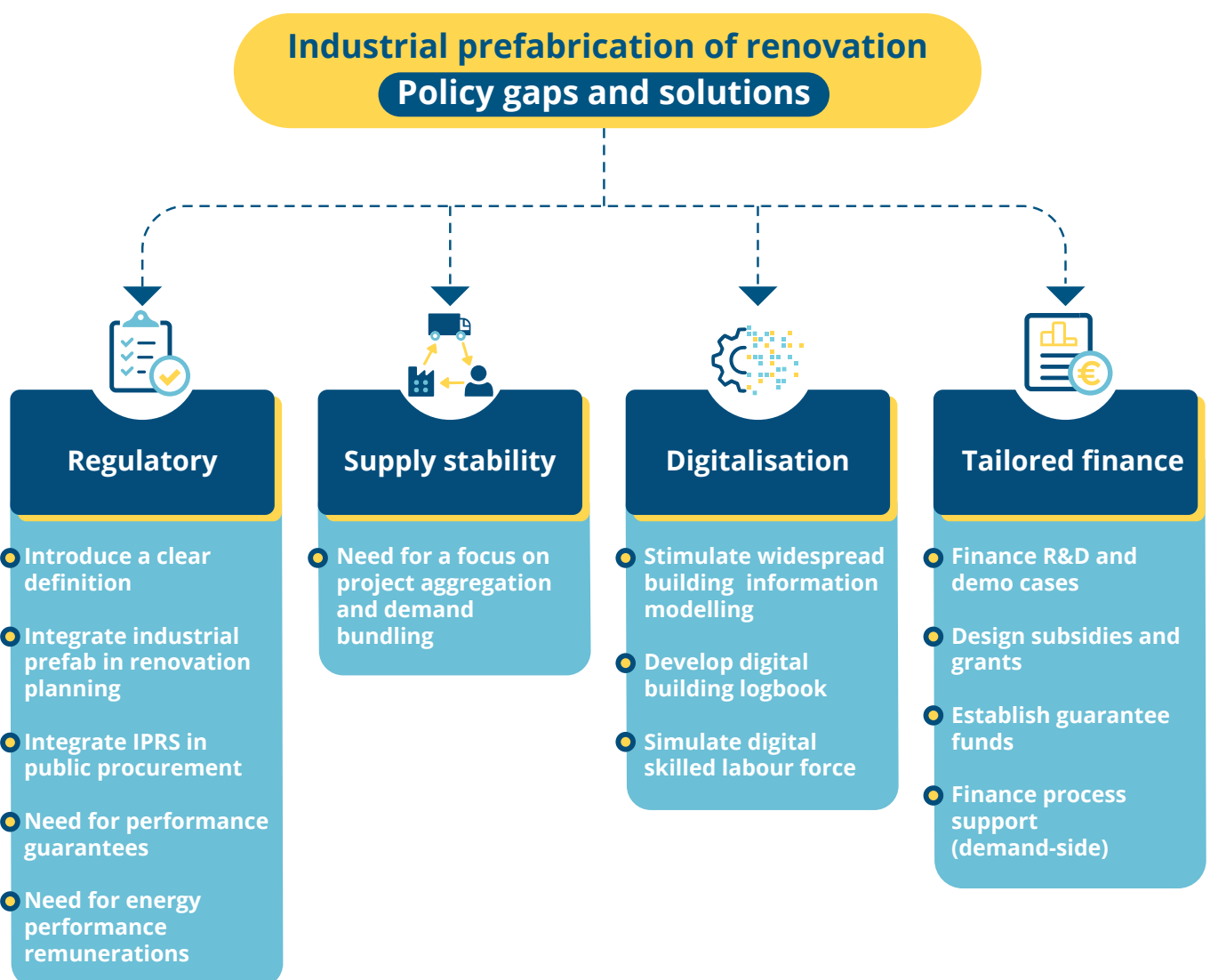


**Figure 1** - Essential preconditions for industrial prefabrication solutions [1].

## POLICY GAPS AND SOLUTIONS FOR INDUSTRIAL PREFABRICATION

To realise the potential of industrial prefabrication for renovation, several market and policy preconditions must be met. Upscaling industrial prefabrication requires (1) digital tools in the construction process (such as building information modelling), (2) EU policies fostering renovation to ensure demand and supply chain capacity and stability, and (3) tailored financing solutions to support digitalisation and building renovations [1]. Central to these preconditions is to foster trust and remove barriers for industrial prefabrication of renovation solutions.

Industrial prefabrication renovations involve different design, implementation and financing processes compared to conventional renovation, resulting in different benefits and limitations. There are significant benefits to off-site construction, including higher precision, improved quality control, resource efficiency and the potential to reduce costs if sufficient scale is achieved [1]. Despite these advantages, industrial prefabrication for renovation has not yet achieved market maturity. It is therefore important to fill policy gaps (see figure 2) and create a supportive regulatory environment, promoting digitalisation, supply stability and tailored financing, and removing regulatory barriers.



**Figure 2** - Policy gaps and solutions for industrial prefabrication.



## RECOMMENDATIONS TO ACCELERATE THE UPTAKE OF INDUSTRIAL PREFABRICATION OF RENOVATIONS



### STRENGTHENING REGULATORY REQUIREMENTS

Strong regulatory support is needed to incentivise and provide stability through long-term policy signals, given that the market for industrial prefabrication for renovation is still relatively young across the EU and primarily remains in the pilot phase. There are several opportunities to create supportive policy in current legislation at EU, national and local levels in the near term and long term.

#### **Industrial prefabrication integration into renovation planning**

##### **The Energy Performance of Buildings Directive**

The Energy Performance of Buildings Directive (EPBD) is the main policy tool that could embed industrial prefabrication within the broader EU building policy context. Currently, the EPBD is being revised, after the European Commission made a proposal at the end of 2021. Proposed changes include requirements for Member States to include more ambitious objectives, as well as establish five-year targets to reduce the overall energy, carbon, and environmental footprint of buildings. The proposal also aims to make buildings and their components easier to dismantle and recycle [2] – something that industrial prefabrication can support.

The EPBD recast proposal suggests replacing national long-term renovation strategies with national building renovation plans (NBRP). NBRPs are a good opportunity to integrate industrial prefabrication as one avenue for achieving emission reductions through building renovations, since they include data on the building stock, planned measures, skills and training needs, for example. NBRPs should include several updates and amendments including more ambition for 2050 targets, clear links to other planning tools and a mandatory template for Member States. Member States would be required to submit their plans by the end of 2024, and the European Commission would have six months to analyse them, respond and create recommendations.



 <b>EU</b>	 <b>NATIONAL</b>	 <b>LOCAL</b>
<ul style="list-style-type: none"> <li>✔ Formulate a definition of industrial prefabrication of renovation solutions.</li> <li>✔ In the mandatory reporting templates for NBRPs, include a provision for Member States to conduct an analysis of the building stock and report what percentage is suitable for industrial prefabrication solutions.</li> <li>✔ Require Member States to periodically publish best practices and tools illustrating how actors in the building sector can support industrial prefabrication of renovation. This would signal long-term policy support for such solutions.</li> <li>✔ In the near term, prepare resources and tools to guide Member States to pursue industrial prefabrication solutions in NBRPs. Additional tools and guidance include a roadmap to plan and understand industrial prefabrication projects and including industrial prefabrication as a potential solution in advisory services like one-stop-shops and technical assistance.</li> </ul>	<ul style="list-style-type: none"> <li>✔ When crafting NBRPs, analyse the national building stock for industrial prefabrication potential, and include benchmarks for renovating the building stock, highlighting the potential for industrial prefabrication. <a href="#">The France branch of the Energiesprong</a> project conducted an overview of its eligible building stock, which serves as a good example, highlighting the potential for industrial prefabrication.</li> <li>✔ Conduct the analysis with local authorities (via public consultations) and include methods for data collection, in line with European level reporting templates, and digital building logbooks (discussed below).</li> </ul>	<ul style="list-style-type: none"> <li>✔ Establish local renovation strategies based on the NBRP, especially if there is a portion of the building stock within the region that is viable for industrial prefabrication. Local strategies should encourage a programmatic/area-based approach to renovations, rather than an individual building approach.</li> </ul>



## SUPPLY STABILITY

Producing renovation solutions through industrial prefabrication requires a different way of working on both the market supply and demand side. To achieve stable and predictable pipelines of projects for manufacturers, a shift in planning and investing in renovation on the building owner side is required.

Project aggregation and demand bundling are ways to generate sufficiently large quantities of renovation projects that make investments in industrial facilities to produce prefabricated renovation solutions profitable. Member States and local governments can support and stimulate demand bundling in several ways, e.g., by linking buildings from different (large) building owners and street or district approaches.

 <b>EU</b>	 <b>NATIONAL</b>	 <b>LOCAL</b>
<ul style="list-style-type: none"> <li>✔ Provide clarity to Member States on which building typologies are most suitable for industrial prefabrication (e.g., post-war inefficient buildings). Minimum energy performance standards help to provide clarity regarding which building classes (e.g., F and G rated buildings) should be addressed first. It implicitly encourages project aggregation, provides clarity on long-term policy ambition, and provides some predictability on the demand for building renovation.</li> </ul> 	<ul style="list-style-type: none"> <li>✔ Facilitate knowledge exchange between actors at the national level, e.g., contract templates, best practices, hurdles, and complications.</li> <li>✔ Increase the pace of permitting procedures for industrial renovation to prevent long waiting times (in line with green public procurement policies).</li> </ul> 	<ul style="list-style-type: none"> <li>✔ Create one-stop shops for industrial prefabrication for (larger) building owners and construction companies active in the industrial prefabrication sector.</li> <li>✔ Assess feasibility of public buildings on the local scale for industrial prefabrication of renovation solutions (also considering the requirement in the Energy Efficiency Directive to renovate 3% of the building stock).</li> <li>✔ Assess potential collaboration with other local governments to bundle demand.</li> </ul> 



## DIGITALISATION

Data collection and storage is essential not only for tracking emissions and energy reductions, but to facilitate digital solutions and automation – all components essential to low-emission industrial prefabrication solutions. Specific policy geared toward data tracking (including energy savings, cost, construction time, etc.) would further prove the benefits and show investors the status quo and potential of industrial prefabrication for renovation.

 <b>EU</b>	 <b>NATIONAL</b>	 <b>LOCAL</b>
<ul style="list-style-type: none"><li>✔ Use the current work surrounding a European-wide digital building logbook<sup>2</sup> to spur not only the data collection and storage needed for the industrial prefabrication design process, but also to track the positive energy and emissions reduction impacts.</li><li>✔ Issue guidelines for the specific data and formats that need to be collected for industrial prefabrication, in conjunction with the NBRP template. This will ensure that the data reported and collected is in line with the digital building logbook standards, so that uniform collection can happen across the EU.</li></ul> 	<ul style="list-style-type: none"><li>✔ Develop national digital building logbooks and encourage use of building information modelling in line with European recommendations to ensure collection at local level follows a standard format. (For example, see the <a href="#">Flemish Woningpas</a> logbook).</li><li>✔ Support the widespread use of BIM, e.g. by running an information campaign and developing training programmes for planners.</li></ul> 	<ul style="list-style-type: none"><li>✔ Foster the uptake of digital building logbooks, e.g., through requiring/encouraging them as part of permitting procedures or through public procurement.</li><li>✔ Additionally, work with national authorities to develop a local methodology that feeds into national guidelines for a digital.</li></ul> 

<sup>2</sup> Digital building logbooks are digital data repositories that allow the storage of different types of building data over all phases of a building's life [3].



## PERFORMANCE GUARANTEES AND REMUNERATION

Regulatory hurdles must be resolved to improve trust in the quality of industrially prefabricated renovation solutions and improve their business case. Combined, performance guarantees and performance remuneration can incentivise large buildings owners (e.g., portfolio owners, public buildings, or multifamily apartment buildings) to invest in industrial prefabricated renovations for a higher number of buildings. Quality assurance is essential for broader market penetration and can be achieved through performance guarantees given by manufacturers or through dedicated government funds.

Public authorities can also improve the business case for prefab renovation solutions by crafting legislation that allows energy performance remuneration. Such legislation would allow building owners that invest in deep renovations to charge tenants for reasonable payments reflecting the achieved monthly energy savings, to strengthen the business case and circumvent the owner-tenant dilemma.

 <b>EU</b>	 <b>NATIONAL</b>	 <b>LOCAL</b>
<p> Issue guidance on how EU funds can be utilised for industrial prefabrication performance guarantees and remuneration (see finance section below).</p> 	<p> To overcome the owner-tenant dilemma, offer owners the possibility to charge reasonable costs where energy savings are achieved.</p> <p> Define performance standards that must be achieved if building owners want to charge an energy performance remuneration from tenants. This can be done through national standards or quality labels.</p> <p> Define monitoring requirements to ensure the guarantee is met, through standards or as part of quality labels that increase the quality of and trust in industrially prefabricated renovation solutions.</p> 	<p> Lead by example by requiring the application of performance guarantees, compliance with performance requirements or use of quality labels, when local funding is invested in renovations during public procurement.</p> 



## TAILORED FINANCE

The EPBD recast proposal calls for finance to promote energy-efficient mortgages with safeguards, as well as to foster public investment in an energy-efficient building stock, for example through public-private partnerships, energy performance contracts or reducing the perceived risk of the investments. This means the EU can ensure that existing funds for national authorities can be used and prioritised for research and implementation of deep renovations (especially of the worst-performing buildings) using industrial prefabrication.



EU

- ✓ Establish a web portal and organise conferences to clarify to key stakeholders what EU-level funding is available (1) for research and development of innovative solutions at the national and local levels, and (2) to implement solutions for deep renovations (in particular by using industrial prefabrication solutions).
- ✓ In addition, ensure technical assistance is available to help Member States access such funds in a timely manner, especially if NBRPs include such provisions.



NATIONAL

- ✓ Use European funding to conduct a national analysis of the building stock to identify suitable areas for industrial prefabrication e.g., through the Regional and Cohesion Funds.
- ✓ Use European funds, notably Horizon Europe, to develop industrial prefabrication solutions tailored to local geographic, climate and technical conditions.
- ✓ Provide guarantees for industrial prefabrication projects, as well as established financial products, grants and subsidies, for enhanced energy performance of buildings for people in energy poverty, vulnerable and low-income households, and other groups having difficulty to access finance or get traditional mortgages. Assess funding availability from the Social Climate Fund, European Investment Bank, the Recovery and Resilience Fund, and Emission Trading System revenues.
- ✓ Create dedicated funding to stimulate project aggregation, for example through investment subsidies to improve the business case of industrial prefabrication (e.g., through grants dedicated to industrially prefabricated renovation solutions and low-interest loans) or subsidies for process costs for managing interactions between building owners, local authorities and construction companies that are essential to establish longer-term project pipelines and project aggregation.



LOCAL

- ✓ Identify the feasibility of industrial prefabrication of renovation solutions and feed this back into the NBRP – e.g., using the Regional and Cohesion Funds.
- ✓ Work with local authorities once regional opportunities are identified for industrial prefab to implement solutions and pilots.
- ✓ Earmark funding specifically when industrially prefabricated renovation solutions comply with performance guarantees or quality labels.

## REFERENCES

- [1] Glicker, J. and Broer, R. 2022. Industrial prefabrication solutions for building renovation - innovations and key drivers to accelerate serial renovation solutions in Europe. BPIE, Brussels.
- [2] ITRE, "Draft Report on the proposal for a directive of the European Parliament and of the Council on the energy performance of buildings (recast) (COM(2021)0802 – C9-0469/2021 – 2021/0426(COD))."
- [3] European Commission, P. Ursula, C. Johannes, and G. N. Income, "Europe 's moment : Repair and prepare for the next generation," no. May 2020. 2021.



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