



The Role of Wood Construction in Ukraine's Recovery: Overview of Strategies and Initiatives

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Acronyms used in this report

Acronym	Full title	Definition
BREEAM	British Research Establishment Environmental Assessment Method	International green building certification standard
CEN- CENELEC	European Committee for Standardization-European Committee for Electrotechnical Standardization	European Union regulatory bodies
CLT	Cross laminated timber	A form of engineered timber
CO ₂	Carbon dioxide	
CPR	Construction Products Regulation	European Union regulation on building materials
DGNB	German Sustainable Building Council (Deutsche Gesellschaft für Nachhaltiges Bauen)	International “green” building certification standard
EBRD	European Bank of Reconstruction and Development	International financial institution
EIB	European Investment Bank	International financial institution affiliated with European Union
EPDB	Energy Performance of Building Directive	European Union regulation
EU	European Union	
FSC	Forest Stewardship Council	International 3 rd party forest certification standard that confirms that the forest is being managed in a way that preserves biological diversity and benefits the lives of local people and workers, while ensuring it sustains economic viability
GHG	Greenhouse gas	
IFI	International financial institution	International lenders that work with governments and private sector
KSE	Kyiv School of Economics	
LEED	Leadership in Energy and Environmental Design	International “green” building certification standard
LIFE	L'Instrument Financier pour l'Environnement	European Union funding mechanism for environment projects
NEB	New European Bauhaus	European Union initiative for sustainable architecture
NEFCO	Nordic Environmental Finance Corporation	International financial institution of Nordic countries
NGO	Non-governmental organization	
SME	Small or medium enterprise	
UNDP	United Nations Development Program	Implementer/funder of international development programs
UNIDO	United Nations Industrial Development Organization	Implementer/funder of international development programs
USAID	United States Agency for International Development	Funder of international development programs

1. Executive Summary

Ukraine has committed rhetorically to a Green Reconstruction in response to Russia's continuing destructive invasion, including decarbonization of the building sector. This will require not only reducing operational carbon emissions (those caused by powering and heating buildings) but also embodied carbon emissions (those associated with the manufacturing of materials, transportation, construction, maintenance and deconstruction of a building).

The consideration of embodied carbon creates opportunities for Ukrainian manufacturers of wood building materials, which are associated with much smaller CO₂ emissions than other materials like steel and cement, and can even sequester significant volumes of carbon for long periods within permanent structures. FSC certified producers will be at a particular advantage, given the additional assurances certification provides for donors and lenders with sustainability policies.

For the time being, neither the Ukrainian government nor its partners in the EU have imposed any "climate conditionality" on receipt of funding for reconstruction projects. At most, some incentives to adhere to the sustainability and circularity principles of the New European Bauhaus (NEB) have been incorporated into the selection process for projects, and international financial institutions (IFIs) also demonstrate preferences for projects with a demonstrably reduced carbon footprint. But as Ukraine and its partners move from emergency repairs into long-term, post-war reconstruction, and especially as Ukraine advances in accession to the EU, it is likely that climate conditionality will increase.

Current trends in the EU suggest that this conditionality will relate to calculation and minimization of the whole life cycle carbon footprint of both building materials (through the Construction Products Regulation) and the buildings made from them (through the Energy Performance of Building Directive). It is unlikely that the use of biomaterials like wood will be mandated, but this is unquestionably one of the most effective measures for decarbonization of construction.

To take advantage of the opportunities provided by a growing focus in Kyiv, Brussels and partner countries on a Green Reconstruction, FSC stakeholders and actors should take the following steps:

- 1) Develop partnership with Ukrainian architects engaged in NEB to raise their awareness of FSC and sustainable Ukrainian wood
- 2) Develop a coalition for popularization of wood-based construction in Ukraine, similar to such initiatives in the EU
- 3) Conduct a capacity and impact assessment of increased use of wood-based materials in urban construction in Ukraine
- 4) Initiate advocacy campaign with the Ukrainian government, EU mission and IFIs
- 5) Build capacity amongst FSC certified building material producers to calculate "carbon footprint"
- 6) Tightly connect the use of wood-based materials in Reconstruction with other priorities of the European Union, including Natura2000 and Rewilding.

2. The role of wood-based building materials in Ukrainian and EU visions for Reconstruction

Methodology

The author conducted a review of official strategy and policy documents of the Ukrainian government, the European Union, Ukrainian and international non-governmental organizations (NGOs) regarding the importance of principles of sustainability and decarbonization and the possible role of wood building products in the nation's reconstruction. This selection of documents is not exhaustive but should contain the main stakeholder positions. It was assembled from the author's archive, in consultation with experts in the field and by conducting multiple Google searches in Ukrainian and English. Only documents produced since the start of Russia's full-scale invasion of Ukraine (since February 24, 2022) were included in the review. A list of documents reviewed is included in Appendix I.

The author followed this review with key information interviews with Ukrainian and EU officials, experts and civil society representatives identified from the analyzed documents to obtain more detail and explore key themes. A list of contacted individuals is included in Appendix II.

Positions of Ukrainian and international NGOs

Ukrainian civil society plays an active role in the debate around Reconstruction, including several prominent climate action groups such as Ekodiya¹, the Dixi Group², Ro3kvit³, ReThink⁴ and broad-profile ecological NGOs such as WWF Ukraine⁵ and Environment-People-Law⁶.

The first conclusion that can be made after reviewing the public positions of these organizations is that they are still prioritizing operational carbon (emissions caused by the functioning of buildings) over embodied carbon (CO₂ emitted during production of building materials, but also carbon sequestered long-term in those materials). This is logical, since operational carbon is by far the largest source of lifetime emissions for existing, Soviet-era buildings. For more than 9 years the Ukrainian government, international donors and civil society have focused on improving the energy efficiency of old housing stock, and this is reflected in their current priorities.

But several organizations have begun to consider embodied carbon as huge needs emerge for reconstruction and new construction, particularly Ro3kvit and Ekodiya. After reviewing their public positions the author reached out to both organizations for a deeper conversation

Ro3kvit

Ro3kvit is "a coalition of over 80 professionals from Ukraine and beyond who united their efforts to develop knowledge and methodologies for rebuilding Ukraine's urban and rural environment and infrastructure." Two of its leading members produced a detailed training session on "Circular Housing in Ukraine" for the New European Bauhaus (NEB) meant to bring Ukrainian architects and builders in line with European trends. The presentation⁷ describes wood as a biomaterial with a low carbon footprint, and investigates two technologies: prefabricated structures with wooden framing, rye straw insulation and clay siding and cross-laminated timber (CLT, sometimes known as "mass timber"). This presentation and a follow-up interview with three Ro3kvit members identified the following important barriers to scaling up the use of wood in urban construction:

1 <https://ecoaction.org.ua/>

2 <https://dixigroup.org/>

3 <https://ro3kvit.com/>

4 <https://rethink.com.ua>

5 <https://wwf.ua/>

6 <https://epi.org.ua/en/>

7 https://new-european-bauhaus.europa.eu/system/files/2023-02/221207_NEB_circular_housing.pdf

- Current Ukrainian legislation does not allow for the use of wood for structural purposes in buildings higher than 3 stories.⁸ In some particularly sensitive objects such as schools, fire safety regulations do not allow the use of wood for structural purposes at all, only as siding. This has obstructed some efforts to renovate schools in the NEB style in Kyiv oblast. It is possible, but difficult, to receive an experimental status for building projects that allows for more structural use of wood.
- Although interest in CLT is high amongst Ukrainian architects, experience is limited to a small number of single family homes.
- Only one mill in Ukraine produces CLT (UHSC in Korosten) and the product is relatively expensive compared to concrete.
- Ukraine lacks national standards for construction with CLT.
- The three Ro3kvit architects are studying options for the use of wood in this structure but have not reached a final decision. Despite their great interest in CLT, the cost will potentially limit its use. Prefabricated modules from wood and straw or wood and “hempcrete” might be options, as well as sandwich panels.

Lesia Lysenko, Business Development Director at the UHSC CLT mill commented on price concerns by acknowledging that CLT is indeed more expensive on a per-unit basis than concrete, but if a number of its advantages in installation, integration with other building materials and maintenance are considered, it can lead to overall savings on the construction project. For example, CLT can be used for interior walls without further covering because of its attractive natural wood appearance.



Construction of wooden homes in Chernihiv for residents who lost their homes due to Russian aggression, 2023.

Source: Suspilne Chernihiv

Despite their great interest in wood as a low-carbon biomaterial, the Ro3kvit architects expressed reservations about using Ukrainian wood. They did not know about FSC certification and expressed doubt that the legality and sustainability of Ukrainian wood could be assured. They also noted that the vast majority of damaged buildings are in eastern Ukraine, while the forests are in the West, and that transport over this distance could be prohibitively expensive and result in emissions that undermine the carbon benefits of using wood.

Questions of sustainability and legality of Ukrainian wood products are certainly hotly debated, and it is clear that dialogue between organizations such as Ro3kvit, FSC Ukraine and the wood

⁸ State Building Normatives of Ukraine (Державні будівельні норми). <https://e-construction.gov.ua/laws/doc...type=2>

processing sector is needed to develop a common understanding. This is key because they form the most natural core of a coalition to promote the use of biomaterials in Ukraine's reconstruction, but first must develop trust amongst themselves.

The latter concern mentioned by the architects about the carbon footprint of transporting lumber across Ukraine is potentially misplaced. According to carbon accounting expert Lennard de Clerk "the carbon benefits of wood over concrete and steel are so strong that the wood could be transported from New Zealand and still result in less emissions."

Ecoaction (Ekodiya)

Center for Environmental Initiatives Ecoaction is "a civil society organization that unites efforts of experts and activists in a joint struggle to protect the environment. We advocate for energy efficiency, renewable energy, countering climate change, clean air for all and sustainable development of transport and agriculture in Ukraine." It is one of the most prominent Ukrainian organizations in discussions with Kyiv and Brussels about decarbonization of Ukraine's economy.

The organization's first public statement about green recovery was published in April, 2022 and is a case of "negative framing" about wood products. The only mention that it makes of them is to say that additional protection of natural ecosystems will be needed to counter increased timber harvesting for the reconstruction process. The potentially positive substitution effect of wood is not mentioned.

However, Ecoaction is one of the organizations that produced the December 2023 report "Climate Change Caused by Russia's War in Ukraine," which has a detailed chapter on how the carbon footprint of reconstruction can be reduced. Authored by the Dutch expert Lennard de Klerk, the report explicitly advocates for an "embodied carbon strategy" and not just one based around lowering operational carbon. The fact that Ecoaction endorses this approach means that the understanding of the potential role of wood is growing in Ukrainian discourse: The report and a follow-up interview with de Klerk revealed the following:

- "There is no embodied carbon regulation at the EU level yet. But as is often the case, novel regulation is first developed by member states and later harmonized at the EU level, and it is expected this will happen regarding embodied or whole life carbon as well. However, the EU taxonomy has already incorporated embodied carbon as a potential green project category." The Taxonomy is "a classification system that defines criteria for economic activities that are aligned with a net zero trajectory by 2050 and the broader environmental goals other than climate."⁹
- "...Regulators in the EU set upper emissions limits (usually in tCO₂e/m² over the lifetime) and leave it up to the market how to achieve this target. In Ukraine, we believe it would be too early to mandate an upper limit, given that the understanding of embodied carbon by regulators and the construction sector is at an early stage. Instead, we recommend to provide an incentive for investors and project developers to remain below a certain benchmark."
- There could be a three-pronged approach to decarbonizing reconstruction: Smart Design that calculates embodied carbon and optimizes material use, Low Carbon Cement and Steel, and Increased Use of Biomaterials (including wood).

Other NGO positions

The author only found two more documents from Ukrainian NGOs that mention wood in the Reconstruction. The climate expert organization Dixi Group lists wood (along with compacted earth) as a biomaterial that can help reduce construction-related CO₂ emissions by substituting

⁹ "The EU taxonomy allows financial and non-financial companies to share a common definition of economic activities that can be considered environmentally sustainable. In this way, it plays an important role in helping the EU scale up sustainable investment, by creating security for investors, protecting private investors from greenwashing, helping companies become more climate-friendly and mitigating market fragmentation. https://finance.ec.europa.eu/sustainable-finance/tools-and-standards/eu-taxonomy-sustainable-activities_en

for steel¹⁰, and the ReStart coalition (which labels itself “an alternative to Soviet-style rebuild of Ukraine”) recommended installing a wood panel production plant in Chernihiv to help maintain the city’s traditional wooden aesthetic during reconstruction.¹¹

The author contacted WWF Ukraine directly and determined that the organization has no public position on the use of timber in the reconstruction, though a representative expressed their preference for sourcing of wood from forests zoned for exploitation (especially forests of artificial origin), their strong opposition to sourcing of wood from any category of protected area and also from old-growth forests located in any zoning category.



Old-growth spruce forest in the Ukrainian Carpathians. Source: Brian Milakovsky

Other position papers on green reconstruction by Ukrainian NGOs lacked any mention of the use of wood products. These include the “Green Restoration of Ukraine: Public position” by Ukraine’s leading environmental NGOs, the “Green Reconstruction initiative” by Greenpeace and the “Recommendations for the Future Reconstruction of Ukraine” by the Ukrainian Confederation of Builders and European Construction Industry Federation.

The situation is similar amongst European NGOs commenting on the Ukrainian reconstruction. The following European NGO policy statements make no mention of biomaterials or embodied carbon:

- “Green reconstruction. Post-war green recovery of Ukraine,” a German-Polish-Ukrainian policy statement by WiseEuropa¹².
- “The Energy and Climate Roadmap: Ukraine towards the EU” by the German-Ukrainian organization Green Deal Ukraina.
- “Why Ukraine’s Reconstruction Must Be Green” in the Green Europe Journal¹³.

¹⁰ ЗЕЛЕНЕ ПОВОЄННЕ ВІДНОВЛЕННЯ УКРАЇНИ: ВІЗІЯ ТА МОДЕЛІ. Аналітична записка. Серпень 2022 р. https://dixigroup.org/wp-content/uploads/2022/08/green_recovery.pdf

¹¹ ReStart Ukraine: 5 months progress and how to use it. <https://docs.google.com/presentation/d/1E-85nHvxLvw5iksQOKt6BoRLBc8zcTFaaB8...lv8lks/edit#slide=id.p>

¹² https://wise-europa.eu/wp-content/uploads/2022/07/Zielona-odbudowa_ENG.pdf

¹³ <https://www.greeneuropeanjournal.eu/why-ukraines-reconstruction-must-be-green/>

- “How to implement a green reconstruction for Ukraine”¹⁴ by the German Economic Team.

However, the German NGO Bauhaus Earth, which promotes the New European Bauhaus (NEB) principles globally focuses on “decarbonizing the Ukrainian built environment.” At the Ukraine Green Reconstruction conference in Vilnius in November, 2023, the executive director of this NGO said that *“In Europe and Ukraine we need a new resource base. Continuing on concrete and steel will not get us to carbon neutrality. We need to broaden our material palette and talk about timber as part of a family of bio-based materials, if carefully, sustainably sourced... We need to channel long-lived building products into our cities... We can do it wrong though, very quickly wrecking the forests across Europe and in Ukraine. So we need to be careful. We need really solid safeguards in place...”*

It is also worth mentioning two analytical works led by Ukrainian scientists that shed light on the capacity of Ukrainian forest industry to supply materials for the reconstruction.

In the white paper “Activating and Strengthening Ukraine’s Reconstruction Capacity,”¹⁵ funded by the USAID Economic Resilience Activity, Ukrainian industrial experts calculated the volumes of the 30 most common construction materials needed to reconstruct buildings damaged as of November, 2022. Only one of these 30 is wood-based (doors), but its weight in the overall value of needed materials is relatively high at 6.3%. In all 10,381,000 doors will be needed at a value of \$3.91 billion.



Repairs to traditional village homes damaged during Russia’s first invasion of Ukraine, 2015. Nizhne, Luhansk Oblast.
Source: Brian Milakovsky

Importantly, the experts found that Ukrainian wooden door manufacturers can cover 114% of this need, suggesting that domestic sourcing should be entirely possible. The author was not able to determine what proportion of production is FSC certified, but a review of the FSC Search website did reveal the availability of certified doors of Ukrainian origin¹⁶. At least two other wood products are widely used in construction (wooden boards and plywood), but their value was not sufficient to fall into the top 30 material types.

¹⁴ <https://www.german-economic-team.com/en/newsletter/how-to-implement-a-green-reconstruction-for-ukraine/>

¹⁵ https://era-ukraine.org.ua/wp-content/uploads/2023/05/Ukraine-ERA-Reconstruction-Capacity-Report-BFO_web_en.pdf

¹⁶ <https://search.fsc.org/en/>



Restoration of destroyed homes in the Novobasanska Consolidated Community, Chernihiv Oblast, 2023.
Source: Suspilne Chernihiv

It should be noted that the analysis considered only “traditional” urban reconstruction, which is to say repair of existing housing models. It did not consider the use of wood if mass timber construction was to be implemented. This analysis will be updated in the first half of 2024 to reflect new damage levels from Russia’s continuing invasion.

Minimum, mean and maximum carbon emissions from rebuilding completely destroyed residential buildings by July 2022 with mass timber or steel or concrete in Ukraine. Source: Utkina, Otto and Churkina 2023.

	Unit	Mass Timber	Steel/Concrete	Difference
Minimum	tC	137,430.71	279,924.04	142,493.33
	tCO ₂	504,370.71	1,027,321.24	522,950.52
Mean	tC	293,890.29	480,713.84	186,823.55
	tCO ₂	1,078,577.37	1,764,219.78	685,642.41
Maximum	tC	476,426.47	851,747.39	375,320.93
	tCO ₂	1,748,485.14	3,125,912.94	1,377,427.80

Minimum, mean and maximum carbon emissions from rebuilding completely destroyed residential buildings by July 2022 with mass timber or steel or concrete in Ukraine. Source: Utkina, Otto and Churkina 2023

Three Ukrainian scholars in the European Union published an extremely pertinent analysis of possible mass timber construction during Ukraine’s recovery.¹⁷ It includes the following results:

- The manufacture of construction materials is responsible for about 15% of the GHG industry emissions in Ukraine, and buildings generate about 8% of the country’s GHG emissions.
- The substitution of steel/concrete with mass timber in urban reconstruction in Ukraine could reduce carbon emissions from the process by 522,950 to 1,377,427 tons of CO₂ (44-51%) (see table above). It should be noted that damage levels of July 2022 were used, so reconstruction needs will be much larger now.

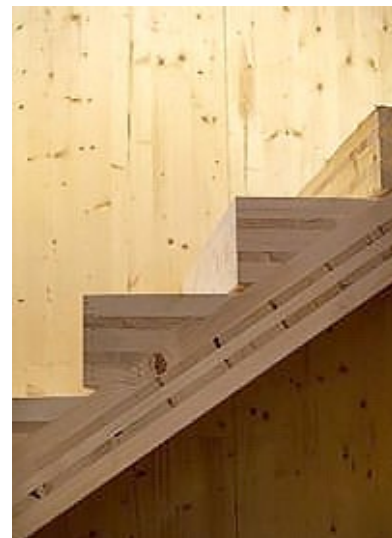
¹⁷ Utkina K, Otto IM, Churkina G (2023) Rebuild better for a sustainable future. PLOS Clim 2(3): e0000165. <https://doi.org/10.1371/journal.pclm.0000165>
<https://journals.plos.org/climate/article?id=10.1371/journal.pclm.0000165>

- “We estimate that rebuilding all completely destroyed buildings by using mass timber will require the use of 7,813,435 to 10,417,914 m³ of softwood over a period of three to five years. The future roundwood production at the 2020 level could meet approximately 50–70% of the new demand.”
- Ukrainian forests likely could not sustain harvest levels needed to supply high levels of wooden construction during the Recovery and also Ukraine’s current wood export volumes.

Official documents of the Ukrainian government and European Union

The government of Ukraine has produced a number of large-scale strategy documents for its dialogue with international donors, lenders and investors about the Reconstruction. The first was the Lugano Declaration, which includes a section on Sustainable Development (Сталий розвиток), which was followed by the Ukraine Recovery plan.¹⁸ The wording of these documents is vague and constitutes only a general commitment to sustainability and compliance with Ukraine’s existing climate commitments.¹⁹ There are no specific goals related to the use of wood or other biomaterials during reconstruction.

Deputy Minister of Infrastructure Oleksandra Azarkhina claims that there will be more direction about how to “green the reconstruction” in the Ukraine Plan, the document required by the European Union to unlock access to the €50 billion Ukraine Facility. However, she claims that *“at that moment it’s not so much obligatory, it’s more about the principles... It’s not just right now to ask people to pay a lot more and require some very environmentally correct solution when they don’t have a roof over their head.”* Deputy Minister Azarkhina claims that the government intends to motivate reconstruction with a smaller carbon footprint in two ways: by providing financing to businesses that will produce green construction materials and technology, and by including principles of the New European Bauhaus (NEB, see below in this report) and European Green Deal in the selection criteria for government funding of reconstruction projects.



Stairway designed with engineered wood.

Source: CLT Rezult company
(<https://clt-rezult.com/>)

The Ministry of Reconstruction plans to add a “NEB Compass” to its reconstruction database DREAM that will rate projects by sustainability and should improve the prospects of particularly “green” ones.

At the same time, Deputy Minister Azarkhina said that selection criteria related to NEB are “not the most decisive, since first of all we are trying to be human-centric in this process.” Thus, her statements make it clear that the government of Ukraine is not yet considering mandatory requirements to decarbonize the building sector, which might have favored wood building products over steel or cement.

This was confirmed in an interview with architects from Ro3kvit. They said that the Ministry of Infrastructure had asked them how easy it would be to evaluate construction projects in terms of sustainability, but it has not yet taken concrete actions on the basis of their advice. A representative of a Ukrainian ecological NGO said that discussion of near-term sustainability commitments has receded ever since the mood in Ukraine became more realistic/pessimistic about the prospects of a long war with difficult funding. The focus today will be on “practicable, doable things and not sustainability.”

¹⁸ <https://recovery.gov.ua/>

¹⁹ From the Lugano Declaration: Процес відновлення має забезпечити сталу перебудову України, яка узгоджується з Порядком денним сталого розвитку до 2030 року та Паризькою угодою, інтегруючи соціальні, економічні та екологічні аспекти, включаючи зелений перехід.

Representatives of the Ukrainian Agency for Recovery confirmed that none of his colleagues had encountered any “climate conditionality” in western-funded reconstruction projects that are already taking place in Ukraine.

Nonetheless, European Union officials positively assess Ukraine’s efforts to “green the reconstruction.” At the Ukraine Green Recovery conference in Vilnius, Iliana Ivanova, EU Commissioner for Innovation, Research, Culture, Education and Youth said *“We are very glad to see interest from the Ministry of Reconstruction for the integration of the New European Bauhaus principles from the very early stages of the reconstruction process.”* She noted that the reconstruction database DREAM already includes NEB principles in its criteria for funding, and that the Ministry of Reconstruction is considering setting up an expert roundtable to consult the Ukrainian government on integrating NEB values and principles in reconstruction.

For the time being, the European Union seems satisfied with Ukraine’s voluntary adoption of NEB principles and is not yet looking to impose any decarbonization requirements that might stimulate the use of wood as a condition for receiving reconstruction funding. Partially, this is because the EU’s Ukraine Facility is not funding large-scale reconstruction; its largest “pillar” (around 75% of the funds) is for macroeconomic stabilization, while the remainder is mostly for technical assistance and loan guarantees. The member of European Parliament Viola Von Cramon-Taubadel, who is one of the lead proponents of the Ukraine Facility, told the author that *“it is premature to ask about climate conditionality in EU reconstruction funding.”*

That does not mean that the idea of “climate conditionality” is totally absent from the debate. When asked if calculation of embodied carbon in reconstructed buildings should be made obligatory for Ukraine, Oliver Rapf, the executive director of Buildings Performance Institute Europe (an independent NGO very close to EU policy discussions) said *“...it is of course possible to say that we make this one of the criteria for accessing the funds for Green Reconstruction. Absolutely. Why not? I think we just need to find the right balance of the requirements that we put in.”*



Construction of homes with cross laminated timber in Chernihiv for residents who lost their homes due to Russian aggression. 2023.
Source: CLT Rezult (<https://clt-rezult.com/>)

According to Ukrainian climate and sustainability policy expert Oleksii Riabchyn (Kyiv School of Economics), the European Union differentiates between “Rapid” and “Long-term” reconstruction. The Ukraine Facility will only provide some limited support for rapid reconstruction, and so few conditions will be imposed besides transparency and accountability. When the EU provides later loans and grants for long-term reconstruction, it may impose many more conditions to bring the process more in line with the European Green Deal. The section of this report entitled “Important trends in European Union regulation and practice affecting the use of wood in construction” provides some predictions about what kind of conditions those may be.

At this point, we can look to the non-binding language of the Ukraine Facility to understand what future priorities the EU may have for the green reconstruction. The Facility preamble states that it should *“contribute to the adherence to the Paris Agreement and the United Nations Framework Convention on Climate Change... In particular, funding allocated in the context of the Facility should be coherent with the long-term goal of holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1,5°C.”*

The Facility also states the objectives of fostering *“climate resilience, biodiversity conservation, circular economy and zero-pollution and the transition towards the decarbonization of Ukraine's economy.”*

Given the “dirty” status of Ukraine's other major structural building materials (steel and cement) due to their high energy-intensity of production, wood-based materials have a natural advantage in supporting all the goals listed in the two paragraphs above.

Requirements of European and global international financial institutions

The Ukrainian climate policy experts Oleksii Riabchyn and Daryna Kulaga (Kyiv School of Economics) point out that much of the funding from the European Union for reconstruction will be channeled through the international financial institutions (IFIs) the European Investment Bank (EIB), European Bank of Reconstruction and Development (EBRD) and World Bank. In addition there will likely be national-level support from the northern European countries through the Nordic Environmental Finance Corporation (NEFCO).

Riabchyn and Kulaga reviewed the sustainability policies of all these IFIs and found common themes that will affect what kind of reconstruction projects could be supported. EIB and EBRD both require compliance with the principles of the European Green Deal and EU Climate Law. These two banks and NEFCO require compliance with the EU Taxonomy, which defines what kinds of projects can be deemed “sustainable.” All four IFIs require compliance with the climate commitments of the Paris Agreement and with the Nationally Determined Contribution of CO₂ emissions for the project country (Ukraine has made ambitious commitments to cut emissions).

Finally, all four IFIs require monitoring and assessment of greenhouse gas (GHG) emissions from the project and measures for their reduction, and all four require consideration of the “shadow carbon price” of the project, which is to say the monetary value of its climate externalities, even if they are not presently monetized on the market.

As can be seen, none of these conditions explicitly require or prioritize the use of biomaterials like wood, but they could all provide advantage to reconstruction projects that fit the European agenda of decarbonizing the building sector. And substitution of steel and cement with wood certainly fits that agenda. According to climate accounting expert Lennard de Klerk, IFIs will be “desperate for greenery” in a challenging environment like Ukraine.

Potential role of green building certification systems

The author did not find any information suggesting that the Ukrainian government or its western financing partners will use compliance with any international green building certification scheme as a condition for reconstruction funding. That being said, the widespread recognition of such systems as BREEAM, LEED, DGNB and Active House by EU agencies and

IFIs means that they could be a shortcut to achieving levels of sustainability and decarbonization that could make projects more attractive to these institutions.

For example, EIB's Climate Action and Environmental Sustainability Eligibility Criteria (2022)²⁰ cite the EU Taxonomy to suggest the following measures for Construction of New Buildings: "For outside the European Union, adoption of best energy standards is required as compared to a baseline which is defined on a case-by-case basis. For example, internationally recognized certification schemes with an energy baseline defined through a transparent, practical method (IFC Edge certification, LEED, BREEAM, etc.), and achievement of energy levels 20% below the baseline."

In turn, these systems consider the sustainability of origin of materials used in construction in their rating schemes. According to analysis by Svitlana Berzina of the Ukrainian NGO Living Planet, for both BREEAM and LEED material requirements make up 13% of the total rating scheme.²¹ Use of FSC certified wood products is one of the most commonly used methods to achieve a positive rating on these particular requirements, even more so if the wood is sourced locally. Thus, if green building certification will be used to improve the competitive funding position of reconstruction projects, this should create advantages for Ukraine's certified forest companies.

Experience with wood-based building in Ukraine reconstruction projects

The author attempted to use the DREAM database to assess how wood building products are being used during Ukrainian reconstruction projects, but unfortunately this level of detail is not available in the database. The author could find no other source of information that might indicate how widespread the use of wood has been. However, he did find three examples of projects with international funding that attempt to use wood for buildings that would more often be steel-and-cement based in traditional Ukrainian construction.



Design of foster homes that will be financed by the Estonian government in Ukraine.
Source: © 2024 DAGOpen architects

²⁰ https://www.eib.org/attachments/publications/climate_action_lending_eligibility_list_en.pdf

²¹ Green Initiatives: Challenges and Opportunities for Ukraine. 2023. Powerpoint. GIZ project "Support for Energy Efficiency and Implementation of the EU Directive of Energy Efficiency in Ukraine."



Design of foster homes that will be financed by the Estonian government in Ukraine. Source: © 2024 DAGOpen architects

The Lithuanian and Estonian governments both provided Ukraine with unified, easily replicable designs for social buildings. Lithuania provided the “New Ukrainian School” and Estonia a design for foster homes with support from the Olena Zelenska Foundation. In both cases the designs include wood for both structural and siding purposes.

The Lithuanian government encountered the issue that Ukrainian school construction standards are quite strict in regards to fire safety, and do not presently allow the use of wood structural material. This is presently being discussed with the Ministry of Infrastructure. The foster home design promoted by the Estonian government will not face this difficulty as it qualifies as a residential building. It was designed to be produced as a pre-fabricated modular building (“following the EU requirements for quality and sustainability”), initially by Estonian companies though a project representative notes that *“we have reached the stage when we are talking about building some factories within Ukraine for production... The know-how should move from Estonia to Ukraine.”*²²

Finally, an ambitious project incorporating cross-laminated (“mass”) timber has been announced by the Andrii Sadovyi, the mayor of Lviv. The international firm Shigeru Ban Architects will construct a new surgical ward at one of Lviv’s largest hospitals, which presently serves Ukrainian veterans wounded during Russia’s invasion. Construction should begin in the first half of 2024 and the building will likely be the largest exhibit of mass timber construction in Ukraine.

²² Veronika Valk-Siska, Head of Housing Policy at the Ministry of Climate of Estonia at the Ukraine Green Recovery conference in Vilnius, November 2023



Design for reconstruction of Lviv hospital with the use of cross laminated timber as the primary material.
Source: © Hiroyuki Hirai. <https://shigerubanarchitects.com>

Decarbonization of the Building Sector

Emergency Reconstruction

Modest Scale. Key public and residential buildings in safest de-occupied areas; limited new IDP housing

Funding sources are bilateral grants and loans, local municipal budgets, limited amount of Ukraine Facility

Non-mandatory sustainability requirements: Some incentives created for use of New European Bauhaus (NEB) principles by UA government, donors

Use of wood building materials is limited to structural uses for 1-3 story buildings and interiors. First experimental projects with mass timber appearing

Long-Term Reconstruction

Enormous scale encompassing reconstruction of thousands of public and residential buildings and infrastructure across post-conflict zone

Funding sources will include loans from international financial institutions, possible extension of EU Ukraine Facility, EU accession funds, limited proportion of grants

Conditionality of sustainability requirements will increase with size of funding and progress on EU accession. Minimization of whole life cycle carbon footprint for materials and buildings, adherence to EU Taxonomy

Potential dramatic increase in wood use IF ... regulatory barriers are eased, mass timber production increased and government + civil society convinced of advantages of biomaterials

Sustainability requirements of the EU acquis



3. Important trends in European Union regulation and practice affecting the use of wood in construction

As the above section demonstrates, the European Union has not yet committed to long-term reconstruction funding for Ukraine, and has not imposed any conditionality on its short-term funding that would force Ukraine to decarbonize its building sector. The Ukrainian government would like to demonstrate its commitment to the European Green Deal and the overall EU climate agenda, but is doing so more through encouragement of NEB principles than through regulatory requirements. Similarly, the IFIs that will manage much of the EU funding may incentivize greener reconstruction even if they do not set strict requirements.

Still, all the experts interviewed in this report think that conditionality will gradually increase as the scale of reconstruction grows and Ukraine advances in the EU accession process. To a great extent this will be driven by the EU acquis, the body of legislation that candidates must incorporate into their domestic regulatory systems. The EU is rapidly transforming its own laws to incorporate principles of the Green Deal, Fit for 55 and other sustainability commitments. Sooner or later Ukraine will need to as well, and FSC certified actors and stakeholders would do well to watch these trends.

This section draws on insight from EU regulators interviewed by the author and also by UNIDO for a series of seminars on Ukraine's green reconstruction.

Incorporation of “embodied carbon” into EU regulatory framework

The EU Energy Performance of Building Directive (EPDB) has been regulating energy efficiency of buildings since 2010. According to Alessia Gaetani of CEN-CENELEC, the EU's committee for standardization, there is a proposal to “recast the EPDB towards reaching zero-emission and fully decarbonized building stock by 2050.” This will mean not only addressing operational carbon (emissions caused by powering and heating buildings) but also embodied carbon (emissions from the manufacturing of materials, transportation, construction, maintenance and deconstruction of a building). The European Commission website says this about the change:

The EPBD will address carbon emissions over the full lifecycle of a building, through mandatory calculation and disclosure of this information for new construction, to inform citizens and business and raise awareness. This approach builds upon experiences from several Member States and will be gradually introduced (starting with large buildings of over 2000 square metres as of 2027, and applying to all buildings after 2030) to allow enough time for data to be available.

According to Philippe Moseley of the EU Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs (DG Grow), “Such a ‘whole life carbon’ approach would incentivise the use of construction products with low environmental impact, especially carbon footprint, and biobased products such as wood.” It is important to note here the use of terms such as “inform,” “raise awareness” and “incentivize” as opposed to “require.” Because building regulations are the jurisdiction of EU member states, it is not clear to what extent the EU will impose legal requirements on reducing the carbon footprint of housing, and thus to what extent this will enter the EU acquis that Ukraine must adopt. For the time being, member states such as France, the Netherlands and the Nordic states have been applying such requirements at the national level. Experts note that such national experiments sometimes inspire EU-wide legislation.

At the same time, Moseley says the EU is amending the Construction Products Regulation (CPR), to make it “mandatory for all construction products placed on the single market to declare their carbon footprint, based on a life cycle analysis using EN [European] standards as the basis.” This is important because the CPR is part of the EU acquis, and Ukraine is already deep into the challenging process of adapting its regulations to comply with it. (In Ukraine

the CPR is popularly known as “Normative 305.”) As such this “carbon footprint declaration” requirement is likely to be something that Ukraine will need to implement in the future.

Besides these regulatory changes, Moseley also points to strategic initiatives by the EU to encourage the use of biomaterials in construction:

- The New European Bauhaus initiative, which mainly takes effect through EU funding programmes such as Horizon Europe and LIFE.
- 2050 Roadmap to reduce whole life cycle greenhouse gas emissions of buildings. This is led by DG Environment and publication foreseen this year.
- Transition Pathway for Construction, a non-legislative document that maps a path to decarbonization of the industry.
- European Commission certification scheme for carbon removals. This is being developed by DG Climate Action, and long-lasting carbon removals in wood-based construction products is within its scope.
- Revised EU Bioeconomy Strategy.



Construction of wooden homes in Stariy Bykiv village (Chernihiv Oblast) for residents who lost their homes as a result of Russian aggression. 2023. Source: Suspilne Chernihiv

Active promotion of wood-based construction

All of the regulatory and strategic changes mentioned above increase the motivation to use wood and other biomaterials in EU construction. An interesting coalition of environmental funders, progressive architects and forest industry associations is actively pushing national governments and businesses to act on this motivation. They have a particular focus on the popularization of mass timber construction, since it facilitates a much greater use of wood in the urban environment.

There are three prominent organizations: Wood4Bauhaus: the Wood Sector Alliance for the NEB²³, Built by Nature, which aims to help policymakers and builders “decarbonise our built environment and protect nature”²⁴ and Home for the Future, which “stimulates the use of sustainable wood in social housing to decarbonise, protect biodiversity and support

²³ <https://wood4bauhaus.eu/>

²⁴ <https://builtbn.org/>

responsible forest management.” Below is a sampling of their initiatives, which provide a fascinating example for what wood-popularization might look like in Ukraine.

Built by Nature initiatives

The Timber Perception Lab, which studies the social/cultural, regulatory, technological, financial and environmental barriers to using more mass timber in the Italian building sector and proposes clear actions for overcoming them. These include establishing the country's first Timber Living Lab.²⁵

“Impact Scan for timber construction in Europe,”²⁶ which aimed to rigorously address concerns in EU civil society about whether the continent's forests and their biodiversity can sustain increased use for urban construction. At the same time, the report quantifies the potential climate benefits of large-scale replacement of steel and cement with mass timber across the EU²⁷ and the United Kingdom.

A step-by-step guidance aiming to simplify the process for gaining insurance for mass timber buildings.²⁷ A report identifying investment needs to scale up wood construction in the urban environment and the financial instruments necessary to fund them.²⁸ Models for building 6-story wooden buildings that are in compliance with European insurance regulations.²⁹

Wood4Bauhaus initiatives

Establishment of a NEB Academy Hub at the University of Primorska (Slovenia) for Sustainable Built Environments with Renewable Materials³⁰.

Reforest our Plant, Retimber our Cities conference to popularize NEB-inspired wooden construction. Policy recommendations to encourage nature-based materials like wood in construction and renovation of the built environment³¹.

Home for the Future initiatives

‘Sustainable Building with Timber’ online course from Delft University of Technology, already attended by 2000 learners from over 100 countries³².

The Wooden Dial, a guide to building with more wood in non-profit housing³³. Production of life cycle assessments (LCAs) and product cards (EPDs) that are added to the National Environmental Database of the Netherlands³⁴.

25 https://builtbn.org/knowledge/documents/1_674_pot-report-eng_final230316-002.pdf

26 <https://builtbn.org/knowledge/impact-scan-for-timber-construction-in-europe/414>

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28 <https://builtbn.org/knowledge/investing-in-the-modern-forest-and-timber-construction-industry/366>

29 <https://builtbn.org/solutions/new-model-building/54>

30 <https://wood4bauhaus.eu/news/neb-academy-launched/>

31 <https://wood4bauhaus.eu/news/policy-recommendations-researchneeds-neb/>

32 <https://www.homeforthefuture.org/free-online-course>

33 <https://www.kab-bolig.dk/traebvgeri>

34 <https://www.homeforthefuture.org/about>

4. Recommended actions for FSC stakeholders and actors

1. Develop partnership with Ukrainian architects engaged in NEB to raise their awareness of FSC and sustainable Ukrainian wood

Architects, designers and builders who take part in the Ukraine support programs of the New European Bauhaus³⁵ are the most natural partners to FSC Ukraine to promote wood-based construction during the Ukrainian recovery. However, interviews for this report indicate that they have low awareness of FSC and deep concerns about the sustainability of Ukrainian timber.

The actors and stakeholders involved in FSC should build bridges to the progressive design community to explain how the FSC principles help to help address such concerns, including through an independent audit process that gives civil society a much greater role in forest management.

Architects interviewed for this report expressed their interest to get acquainted with FSC and learn more about how to identify certified wood building materials in Ukraine. The author strongly recommends organizing a hybrid FSC seminar for Ro3kvit and other NEB partners in Ukraine, as a starting point towards finding common ground with them about the desirability of wood-based construction.

It would be helpful to provide brief profiles of some of the main certified producers of building materials, and a “tour” of the FSC Search function that allows for sorting by product type.

2. Develop a coalition for popularization of wood-based construction in Ukraine, similar to the EU initiatives Wood4Bauhaus and Built by Nature

Experience in the EU shows that many barriers exist to increasing the use of wood-based construction, including outdated regulations, negative public perception or outright ignorance of the topic, concerns about insurance, production capacity and presence of attractive design.

Coalitions of progressive architects, wood processing and forestry companies and environmental donors have formed to address all of these barriers, already with some success. Ukraine needs to both emulate this experience, and potentially collaborate with these coalitions to transfer their experience and capacity to Ukraine.

FSC Ukraine would be one of the logical founding members of such a coalition. Progressive architects and designers such as those in Ro3kvit and ReThink would as well, but a prerequisite for this cooperation is Recommendation #1 above. Other coalition members might include wood products industry associations, forestry and construction faculties at universities, and climate-focused NGOs such as Ecoaction or Dixi Group.

Funding for such a coalition might be pursued through the New European Bauhaus, which works through such EU funding mechanisms as Horizon Europe and LIFE. The EU advocacy group Built by Nature has an open call for grant proposals that also may be pertinent.³⁶ Other funding sources might include business support grant programs from USAID, the European Union, UNDP or other international donors. UNIDO, for instance, has been supporting research into a green recovery.

3. Conduct a capacity and impact assessment of increased use of wood-based materials in urban construction in Ukraine

As a very first action point, FSC Ukraine actors should invest in research into Ukraine’s present capacity to implement wood-based construction. This capacity could be influenced by multiple factors, all of which need to be carefully assessed:

³⁵ https://new-european-bauhaus.europa.eu/get-inspired/inspiring-projects-and-ideas/actions-ukraine_en

³⁶ <https://builtbn.org/bbn-fund>

- Legislative and Regulatory framework.
- Production capacity of various wooden building materials, including both “traditional” and “innovative” (i.e. cross-laminated timber) and priority investment needs.
- Long-term sustainability of wood supply, specifically the product classes needed for building material production.
- Sustainability of supply if increased wood construction in Ukraine is additional to traditional export flows.
- Professional capacity of architects and builders to work with “traditional” and “innovative” wooden building materials (it should be noted that mass timber construction in the EU is usually implemented with Building Information Modeling (BIM) software, which in Ukraine is more associated with industrial objects).

This assessment should build on the work begun by other experts such as Lennard de Klerk and Kateryna Utkina to quantify the benefits of substituting steel and concrete with wood-based materials. Such a document could be a powerful starting point for advocacy discussions with the government of Ukraine, EU Mission in Ukraine and IFIs.

4. Initiate advocacy campaign

With the right analytical materials and an appropriate coalition, FSC Ukraine and its partners could shape the discussion of the Ukrainian Reconstruction and Ukraine’s decarbonization commitments during the EU Accession process. At present, all of these discussions are severely short on technical detail and concrete proposals. Ukraine’s forest sector should capitalize on its “climate-friendly” status and its relatively strong economic performance compared to more war-affected sectors like metallurgy to take a leadership role.

Different advocacy approaches are needed for different actors. Ukrainian policymakers need a bottom-up introduction to “wood-based materials as a climate-friendly reconstruction option.” At present the forest industry is viewed as an export success story but the author has not heard any policymakers connect it to the Reconstruction.

In the case of advocacy with EU officials, the New European Bauhaus provides a superb framework for the discussion. The goal of advocacy with EU officials is that they reinforce the message with their Ukrainian counterparts, and look for ways to incentivize biomaterial use in their funding programs.

Finally, advocacy with IFIs should demonstrate how Ukrainian wood-based construction “ticks the boxes” of their own sustainability criteria, which are described above in the section “Requirements of European and global international financial institutions.” The Ukrainian experts Oleksii Riabchyn and Daryna Kulaga of KSE can speak to this in more detail.

5. Build capacity amongst FSC certified building material producers to calculate “carbon footprint”

As demonstrated in this report, even without an advocacy campaign in Ukraine the EU is likely to gradually increase incentives for reconstruction projects that have a reduced carbon footprint. Ukrainian producers of wood building materials should immediately increase their capacity to conduct Life Cycle Carbon Accounting of their products (ideally, a “cradle to grave” assessment that includes emissions from deinstallation and disposal). Having such an accounting would allow these companies to speak in the language of decarbonizing the building sector, which is a priority for the EU and its affiliated IFIs.

The author would encourage such companies (especially those which are FSC certified) to view this as an investment in market access and not wait for donor support. According to Ukrainian carbon accounting expert Mykola Shlapak, Life Cycle Carbon Accounting is not a skill that is yet offered domestically, but there are experts such as himself who could rapidly be trained. There would also be EU-based experts available to conduct the necessary accounting.

6. Tightly connect the use of wood-based materials in Reconstruction with other priorities of the European Union, including Natura2000 and Rewilding

The author would like to caution against developing a narrow strategy of promoting sequestration of carbon in long-lasting wood products as the primary contribution that Ukraine's forests can make to the country's decarbonization. While the EU would like to see more wood construction, it also has high expectations of Ukraine to embrace the Natura2000, Restoration Law and Rewilding agendas.

Some countries with strong forest industry lobbies have leaned hard into the “we can sequester more carbon in boards than in old trees” argument to lobby for higher logging volumes (i.e. Sweden) and even for conversion of old forests into more “efficient” planted forests (i.e. Latvia). These efforts have inspired strong pushback from the EU environmental authorities and have not had the effect that forest industry was hoping for.

Ukraine should learn from this experience, as it will be under particularly close scrutiny in the EU accession process. A successful strategy to obtain EU support for increased use of wood building materials in the reconstruction would be to also promote reduced CO₂ emissions through protection of high conservation value forests or increased use of continuous canopy forestry.



Old-growth oak forest in Kyiv Oblast. Conservation of such forests is critically important for reducing emissions of CO₂.
Source: Brian Milakovsky

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Individuals interviewed for this report (some are anonymous)

Name	Position and affiliation
Representative	Ukrainian climate NGO
Lennard de Klerk	Initiative on GHG Accounting of War
Natalia Kozub	Ro3kvit
Philippe Moseley	European Commission Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs
Representative	Ukrainian Agency for Recovery
Oleksii Riabchyn	Kyiv School of Economics

