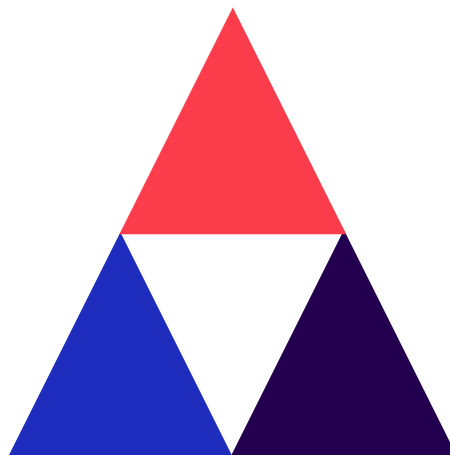




► Promotion of decent work and a just transition in the building materials industry, including cement

Report for the Technical Meeting on the Promotion of Decent Work and a Just Transition in the Building Materials Industry, including Cement
(Geneva, 23–27 September 2024)



► Contents

	Page
Abbreviations	5
Background	7
1. Introduction	7
2. Trends in the building materials industry	9
Global employment	13
Industry trends and structure	15
3. The future of work and just transition in the building materials industry	16
3.1. Demographic changes and urbanization	16
3.2. Climate change and multiple crises	19
Climate change	19
Multiple crises	23
3.3. Technological advances	24
4. Opportunities and challenges for the promotion of decent work and a just transition in the building materials industry	26
4.1. Sectoral policies and initiatives	26
4.2. Green jobs creation, skills and enterprise development	29
Green jobs creation	29
Skills development	30
Enabling environment for sustainable enterprises	32
Transition to formality	34
4.3. Occupational safety and health, and working conditions	34
Occupational safety and health	34
Working conditions and labour protection	37
4.4. Other fundamental principles and rights at work and international labour standards	38
4.5. Social protection	40
4.6. Social dialogue and tripartism	42



List of figures

1. Construction sector supply chain	9	
2. Historical trends in global building materials use, by type of material (billion tonnes), 2000–2017	10	
3. Global distribution of cement production facilities (grinding and integrated)	11	
4. Major countries in global cement production, 2022 (millions of tonnes)	12	
5a. Employment in the building industry (thousands) and share of total employment by income group (percentage)	13	
5b. Employment in the building industry (thousands) and share of total employment by region (percentage)	14	
6. Employment in the building materials industry (non-metallic mineral products) (thousands), selected countries, 2015–2023	14	
7. CO ₂ emissions in the building materials and construction sector	20	

List of boxes

1. EU Renovation Wave initiative and changes in the building materials industry	22	
2. Building materials and construction in G7 and G20 decarbonization efforts	27	
3. Examples of industry-led initiatives to transform the building materials industry	32	
4. Promoting green jobs in the construction sector in Zambia	33	
5. Occupational exposure to silica in the buildings materials industry	35	
6. Decent work challenges in traditional brickmaking	39	
7. International framework agreements	44	

► Abbreviations

AI	artificial intelligence
BIM	building information modelling
BWI	Building and Wood Workers' International
CCUS	carbon capture, utilization and storage
EBMOs	employer and business membership organizations
EU	European Union
GCCA	Global Cement and Concrete Association
GDP	gross domestic product
GHGs	greenhouse gases
GlobalABC	Global Alliance for Buildings and Construction
IEA	International Energy Agency
IFA	international framework agreements
IFC	International Finance Corporation
IOE	International Organisation of Employers
IndustriALL	IndustriALL Global Union
ITUC	International Trade Union Confederation
LRBT	local resource-based technology
MNEs	multinational enterprises
MSMEs	micro, small and medium-sized enterprises
OECD	Organisation for Economic Co-operation and Development
OSH	occupational safety and health
SMEs	small and medium-sized enterprises
TVET	technical and vocational education and training
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organization
WorldGBC	World Green Building Council



► Background

1. At its 347th Session, in March 2023, the Governing Body of the International Labour Organization endorsed the convening of a technical meeting on the promotion of decent work and a just transition in the building materials industry, including cement.¹
2. The purpose of the technical meeting is to discuss opportunities and challenges for the promotion of decent work and a just transition in the building materials industry, including cement, with the aim of adopting conclusions, including recommendations, for future action.
3. This report has been prepared by the International Labour Office as a basis for discussions at the meeting. The report explores recent trends and developments in the building materials industry, with a specific emphasis on how megatrends related to demographics, globalization and climate change are impacting the world of work. It highlights the opportunities and challenges associated with promoting decent work and facilitating a just transition in the building materials industry, including the cement segment.

► 1. Introduction

4. Building materials are the products, by-products and raw materials used in construction sector activities, including the construction, renovation, maintenance and demolition of buildings (residential and non-residential), as well as work conducted in civil engineering projects such as roads and utility systems.² There are numerous types of building materials.³ Their characteristics and properties are determinant in defining the physical qualities of the construction itself, as well as the construction method, equipment and skills required to develop it. General classifications are based on their chemical components and functions. There are natural/organic building materials, such as stone and wood; inorganic building materials, including cement, ceramics, lime, gypsum and steel; and composite materials, such as engineered wood and bricks. According to their functions, building materials can be classified as functional materials and structural materials. The selection of building materials holds significant implications, including with respect to occupational safety and health (OSH), environmental concerns and cost considerations. The continuous advancement of new building materials, often fuelled by innovations in construction techniques, presents significant implications in terms of job creation, business opportunities, skill requirements and OSH hazards.
5. For this report, the building materials industry is defined in accordance with the International Standard Industrial Classification of All Economic Activities, Revision 4 (ISIC, Rev. 4).⁴ The manufacturing of building materials encompasses different ISIC, Rev. 4, groups. Division 23 of ISIC, Rev. 4, "Manufacture of other non-metallic mineral products",⁵ refers to manufacturing

¹ ILO, *Sectoral Meetings held in 2022, Proposals for Meetings in 2023, and Recommendations of the Sectoral Advisory Bodies for Work in 2024–25*, GB.347/POL/2, 2023.

² ILO, "Impact of COVID-19 on the Construction Sector", ILO Sectoral Brief, 2021.

³ S.K. Duggal, *Building Materials*, third revised edition (New Age International, 2008).

⁴ United Nations, *International Standard Industrial Classification of All Economic Activities (ISIC), Revision 4*, 2008.

⁵ United Nations, *International Standard Industrial Classification of All Economic Activities*, 118.



activities related to a single substance of mineral origin. Division 23 includes the manufacture – from raw materials to finished articles – of glass and glass products (flat glass, hollow glass, fibres, technical glassware and so on); ceramic products; tiles and baked clay products; and cement and plaster. The manufacture of shaped and finished stone and other mineral products is also included in division 23. The manufacturing of other key building materials, such as iron and steel, is covered under division 24, while the manufacturing of structures is covered under division 25. Division 16 covers the manufacture of products of wood, cork, straw and plaiting materials (group 162), which are also relevant building materials.

6. There is increasing awareness of the environmental impacts of the choice of building materials throughout the life cycle of a construction project, from design to demolition and disposal.⁶ In particular, cement and concrete are hard-to-abate industries for decarbonization due to the growing demands driven by rapid urbanization, population growth and the need for the rehabilitation of ageing infrastructure.⁷
7. Given the substantial carbon footprint associated with sourcing, producing and transporting building materials,⁸ discussions around the industry are gaining prominence in the advance towards a just transition. The use of green building materials in construction is rising in importance thanks to technological advancements.
8. The transition towards environmentally sustainable economies – coupled with the global inflation-driven surge in raw material prices that began in 2020, the reliance on global supply chains, and the increasing adoption of automation and artificial intelligence (AI) – together have significant implications for enterprise development, the creation of green jobs and working conditions in the industry. While these trends are observed globally, there are regional variations, based on the climatic conditions, the level of urbanization and the availability of renewable energy and green building solutions.
9. While the building materials industry has experienced significant changes in recent years due to advancements in technology, sustainability requirements and shifts in consumer preferences, it is set to undergo further transformations in the coming decades. The impact of megatrends and the transformations in the construction sector towards greener building practices will significantly affect the building materials industry, including as a result of changes related to demand and technical specifications and standards, with implications for both businesses and workers in the industry.
10. The evolution of the building materials industry is inherently intertwined with the overall development of the construction sector, as well as the availability of raw materials. The construction sector is extremely sensitive to fluctuations in the price and supply of building materials.
11. The extraction of raw materials and the processing and manufacturing of building materials, as well as their use in the construction of buildings and infrastructure, constitute key subsectors in the construction supply chain (see figure 1). Recognizing the intricate connections among them helps comprehend the broader economic impact of the built environment sector,⁹ particularly in



⁶ Beijia Huang et al., “A Life Cycle Thinking Framework to Mitigate the Environmental Impact of Building Materials”, *One Earth* 3, No. 5 (2020): 564–573.

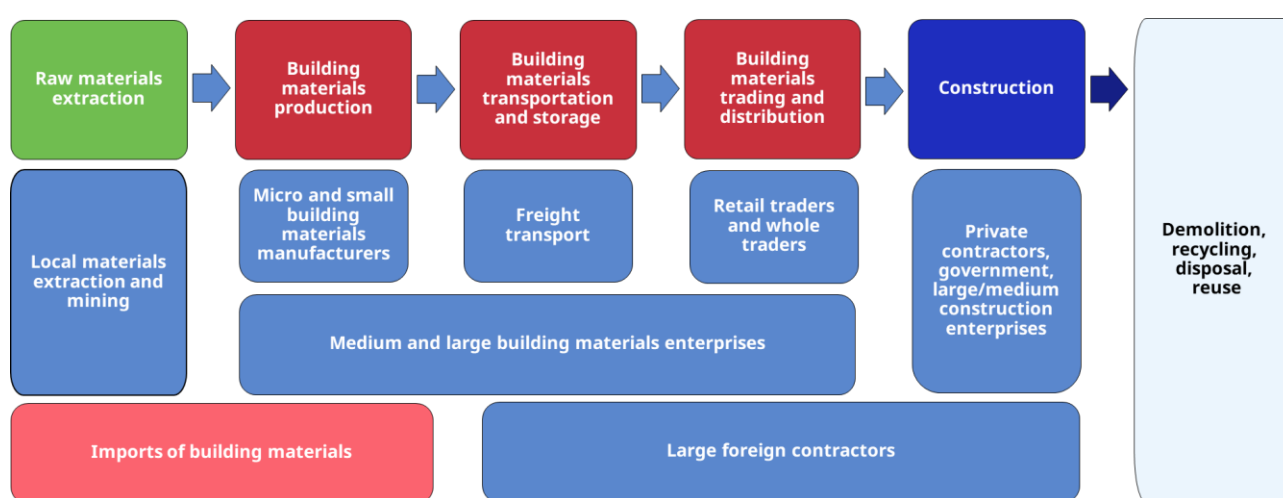
⁷ Moncef L. Nehdi, Afshin Marani and Lei Zhang, “Is Net-Zero Feasible: Systematic Review of Cement and Concrete Decarbonization Technologies”, *Renewable and Sustainable Energy Reviews* 191 (March 2024).

⁸ United Nations Environment Programme (UNEP), *Building Materials and the Climate: Constructing a New Future*, 2023.

⁹ See UNEP, *Building Materials and the Climate*, “Key terms”, for a definition.

the context of promoting decent work and advancing towards a just transition in the sector. Construction projects rely on the coordination of labour, equipment and materials throughout a complex set of upstream and downstream flows of products, services, finances, technology and information. The construction supply chain includes workers and enterprises engaged or involved in the extraction of raw materials (such as limestone and clay); the processing and manufacturing of building materials; and the retail, distribution, logistics, design and construction phases. The safe reuse, demolition and disposal of construction materials may be included for environmental considerations. Hence, the building materials industry is firmly embedded in the construction supply chain.¹⁰

► **Figure 1. Construction sector supply chain**



► 2. Trends in the building materials industry

12. The construction and building materials industry has evolved towards using more long-lasting materials over time. The transition from perishable building materials to more durable natural materials and finally non-organic materials has allowed for significant advancements in the construction industry. Changes in the design and features of construction were possible thanks to the development of stronger materials and the knowledge of the technical requirements and performance of diverse types of building materials.
13. The building materials industry contributes significantly to the world economy. While reliable estimates for the industry's contribution to global gross domestic product (GDP) are difficult to ascertain, estimates for the cement industry provide some indication, as the latter contributes to 5.4 per cent of global GDP.¹¹ Overall, the building materials industry is capital-intensive and energy-intensive. Given its close linkages with the construction sector, the industry is susceptible

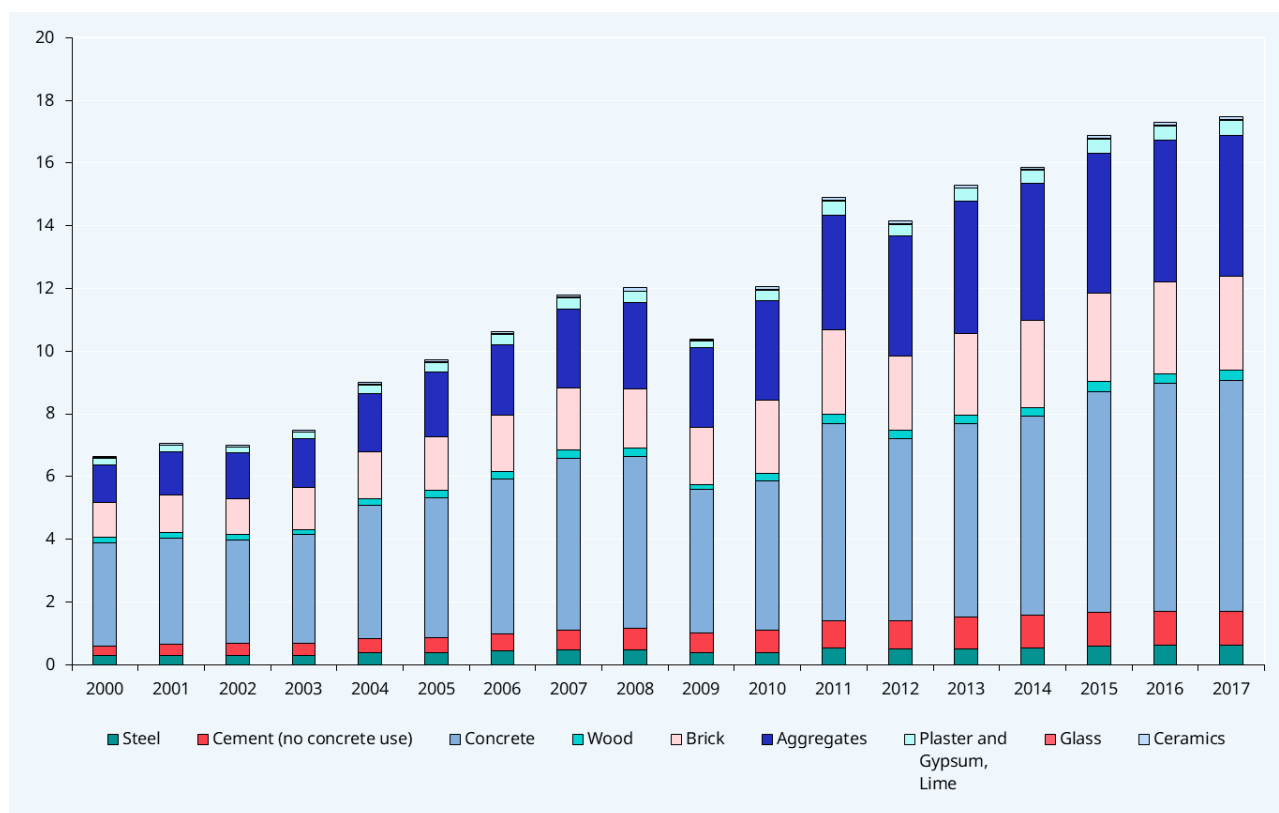
¹⁰ Stephen Pryke, ed., *Construction Supply Chain Management: Concepts and Case Studies* (Blackwell, 2009); Sulafa Badi and Niamh Murtagh, "Green Supply Chain Management in Construction: A Systematic Literature Review and Future Research Agenda", *Journal of Cleaner Production* 223 (June 2019): 312–322; Raffaele Carpi et al., "Value Creation in European Building Materials: Where Do The Opportunities Lie?", McKinsey, 15 May 2019; John Taylor and Hans Bjornsson, "Construction Supply Chain Improvements through Internet Pooled Procurement", Proceedings of the 7th Annual Conference of the International Group for Lean Construction, 1999, 207–218.

¹¹ International Finance Corporation (IFC), "The Impact of COVID-19 on the Cement Industry", August 2020.

to fluctuations in construction activity. Volatility in commodity and energy markets can also impact the performance of the building materials industry.

14. Billions of tonnes of materials are used annually in the construction sector, while the building materials industry has substantially expanded over the past two decades (figure 2).¹² Construction materials use per year is projected to grow from the 2010 level of 40 billion tonnes to reach as high as 90 billion tonnes by 2050.¹³ However, there are environmental concerns associated with the industry's growth, such as those related to air pollution and deforestation.
15. Cement and its derivatives such as concrete and mortar, together with steel, are the most commonly used building materials worldwide. Buildings and infrastructure consume more than half of the world's steel production.¹⁴ Overall trends for building materials closely follow those of cement and steel, including glass, aluminium and wood.

► **Figure 2. Historical trends in global building materials use, by type of material (billion tonnes), 2000–2017**



Source: Beijia Huang et al., "A Life Cycle Thinking Framework to Mitigate the Environmental Impact of Building Materials", *One Earth* 3, No. 5 (2020): 564–573.

Note: Comparable data for all materials disaggregated after 2017 are not available.

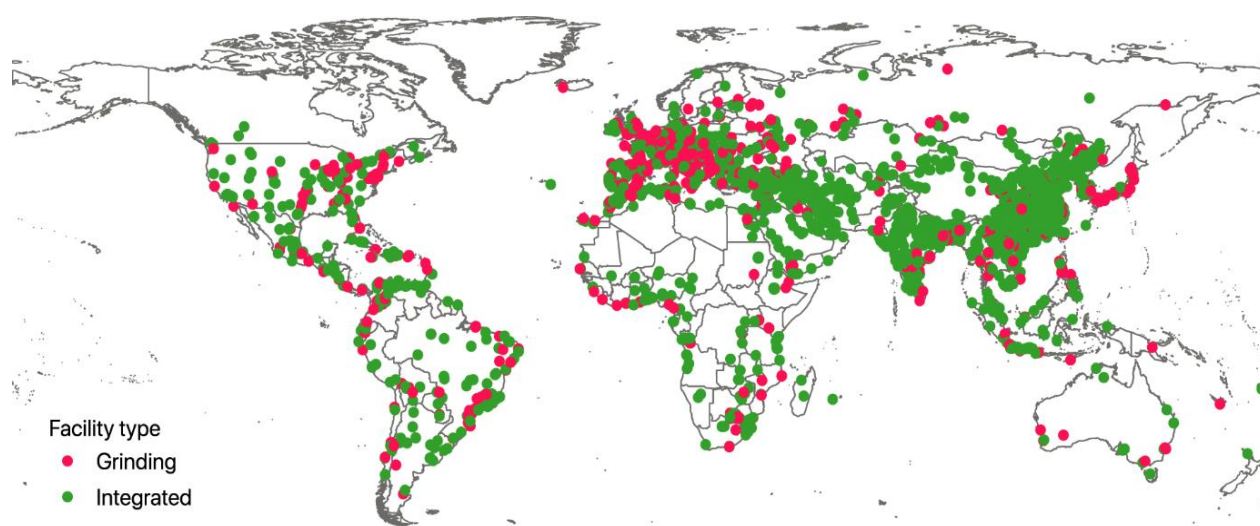
¹² Huang et al.

¹³ Tomer Fishman et al., "RASMI: Global Ranges of Building Material Intensities Differentiated by Region, Structure, and Function", *Scientific Data* 11, 418 (2024).

¹⁴ UNEP, *Building Materials and the Climate*, 49.

16. Cement is widely used in construction because of its abundance, easy operation, durability and versatility. Cement production takes place all around the world, although it is concentrated in certain regions (see figure 3). Total cement production was estimated at 4.1 billion tonnes in 2023 ¹⁵ and could reach 8.2 billion tonnes by 2030. ¹⁶
17. In Europe, the cement industry is well established and major multinational enterprises (MNEs) have invested in cement production facilities. The industry currently faces significant challenges due to stricter environmental regulations and sluggish economic growth in the region. In North America, while the cement industry has grown in recent years, it also faces the rising costs of imported essential raw materials due to recent changes in trade policies and tariffs. In South America, a few major MNEs dominate the industry and its growth has been driven by increases in the demand for infrastructure and construction projects, particularly in Brazil and Argentina. The cement industry is expanding in Africa thanks to the region's growing population and emerging middle class. Since the early 2000s, major Asian countries have been at the forefront of global demand for this material due to the upsurge in the infrastructure needs of an expanding middle class, particularly in China, India and countries in South-East Asia. ¹⁷

► **Figure 3. Global distribution of cement production facilities (grinding and integrated)**



Source: Nataliya Tkachenko et al., “Global Database of Cement Production Assets and Upstream Suppliers”, *Scientific Data* 10, 696 (2023).

18. As of 2022, about 68 per cent of global cement production was concentrated in five countries (China, India, Viet Nam, the United States of America and Türkiye), while China alone accounts for more than 50 per cent of the total (figure 4). ¹⁸

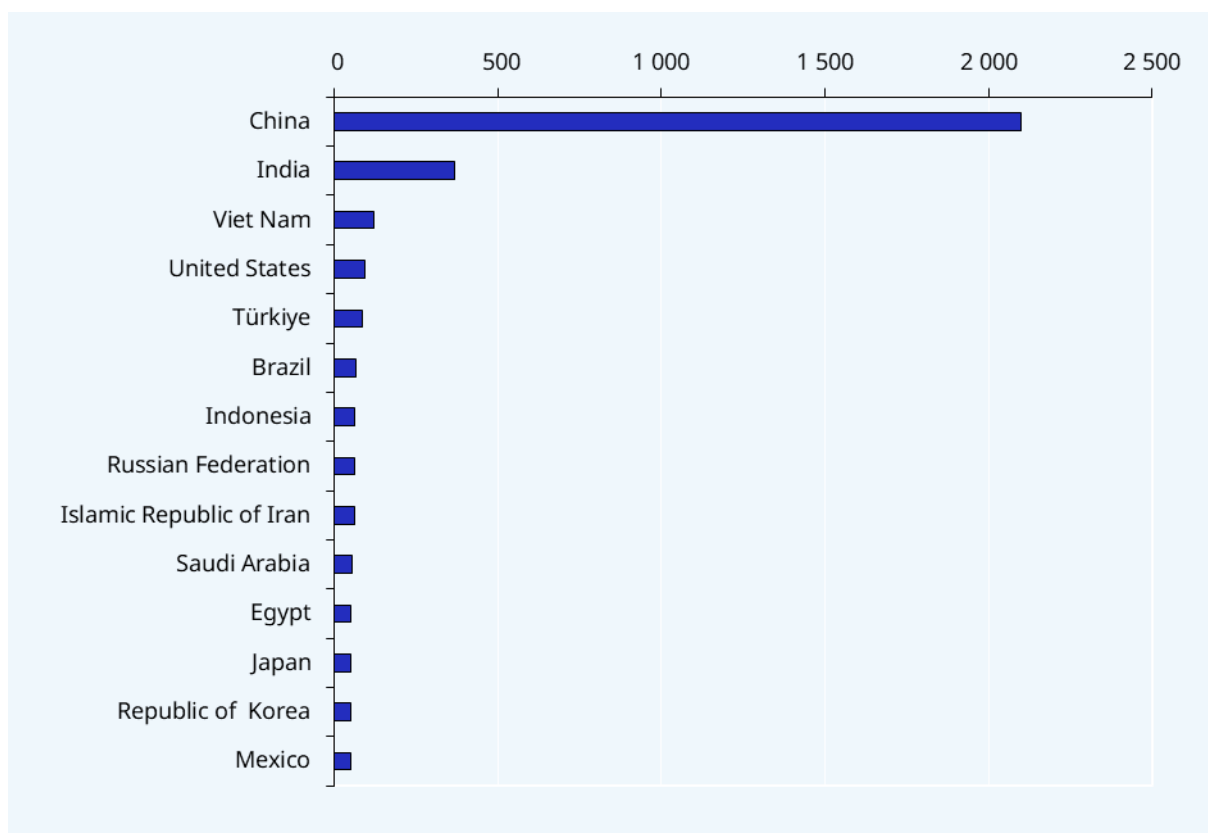
¹⁵ Statista, “Global Cement Production 1995–2023”, April 2024.

¹⁶ Nataliya Tkachenko et al., “Global Database of Cement Production Assets and Upstream Suppliers”, *Scientific Data* 10, 696 (2023).

¹⁷ Jeffrey Rissman et al., “Technologies and Policies to Decarbonize Global Industry: Review and Assessment of Mitigation Drivers through 2070”, *Applied Energy* 266 (2020), 114848; Tkachenko et al.; UNEP, *Building Materials and the Climate*, 43–44.

¹⁸ Tkachenko et al.



► **Figure 4. Major countries in global cement production, 2022** (millions of tonnes)

Source: ILO, based on Statista, "Construction Materials Industry Worldwide: Statistics and Facts", 2024.

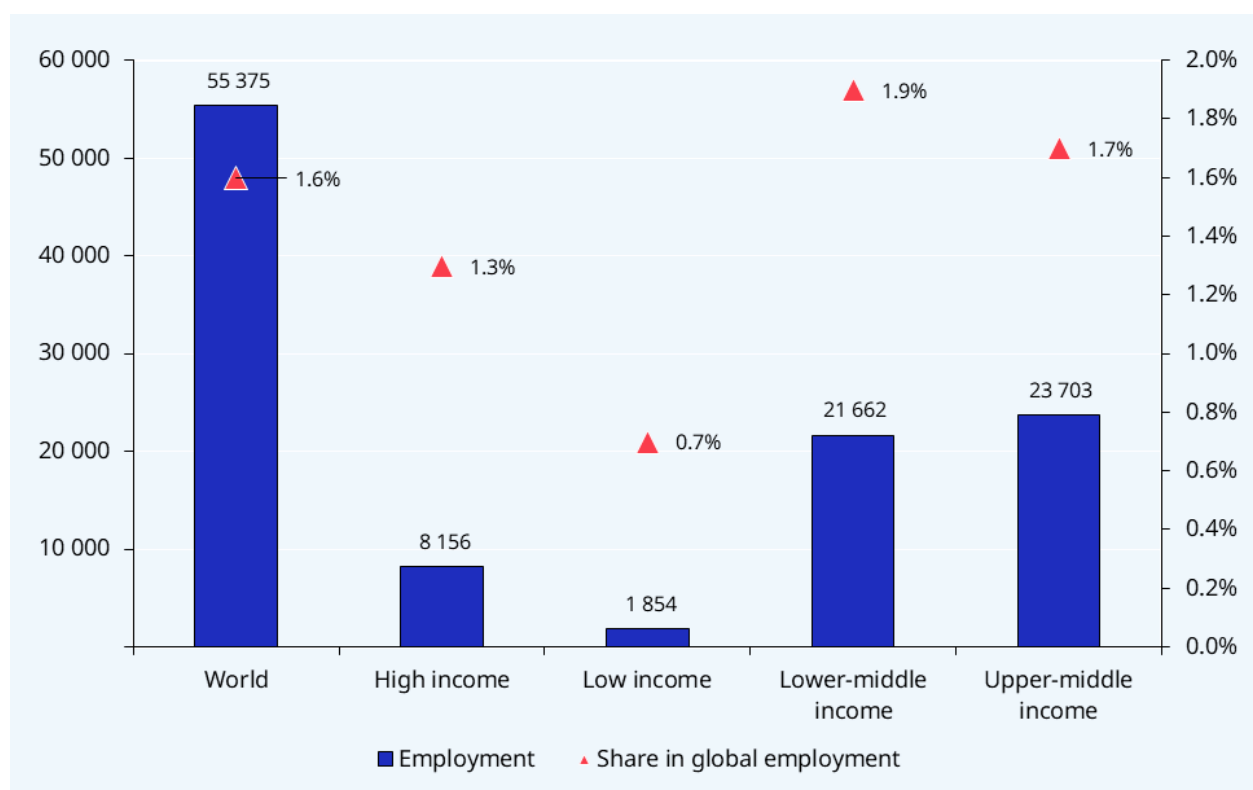
19. The key factors driving China's dominance in building materials include large economies of scale and prominent domestic enterprises, which are leveraged to expand globally. About one third of China's total annual cement output in 2022 was produced by the top five national cement manufacturers. In recent years, carbon-intensive heavy industries in China, including in the cement segment, have adapted to new environmental regulations in order to transition towards lower emissions in the industry. Policy goals set in 2022 are aimed at peaking carbon emissions before 2030 and achieving carbon neutrality by 2060, which will imply changes in industrial practices, including the adoption of sustainable technologies and alternative forms of cement. Nonetheless, the demand for materials will remain large in view of China's ongoing infrastructure and construction growth trajectory, including through the China-led One Belt and One Road Initiative.¹⁹
20. The market size for green building materials is set to expand steadily as more building projects opt for more sustainable materials and technologies, either for new construction or upgrades (see section 3 below).

¹⁹ Boying Ji, "China's Dominance and Challenges in Construction Material Market", *EqualOcean*, 31 August 2023; Cui Yuansheng, "The Chinese Cement Industry", *ZKG Cement Lyme Gypsum* 11 (2016); Joachim Harder, "China's Cement Industry under the Belt and Road Initiative", *ZKG Cement Lyme Gypsum* 5–6 (2020).

Global employment

21. According to ILO calculations based on data from the ILO Harmonized Microdata Repository, approximately 1.6 per cent of those in global employment (about 55,375,000 people) work in the building materials industry.²⁰ Unsurprisingly, variations exist across different regions and income levels globally, highlighting the diverse economic and occupational structures (figures 5a and 5b). Based on available ILOSTAT microdata, some employment indicators in this sector can be also discerned for several countries (see figure 6).

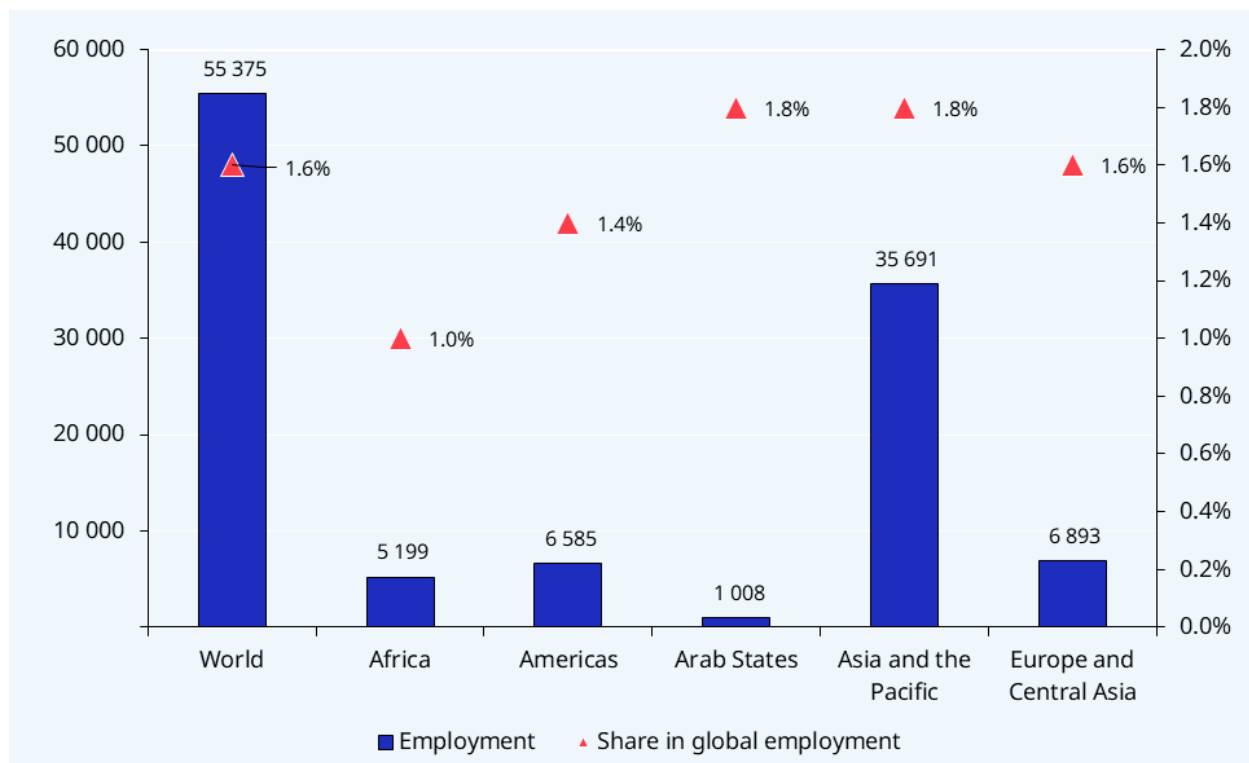
► **Figure 5a. Employment in the building industry (thousands) and share of total employment by income group (percentage)**



Source: ILO estimates based on the latest microdata available, ISIC, Rev. 4, 2-digit level.

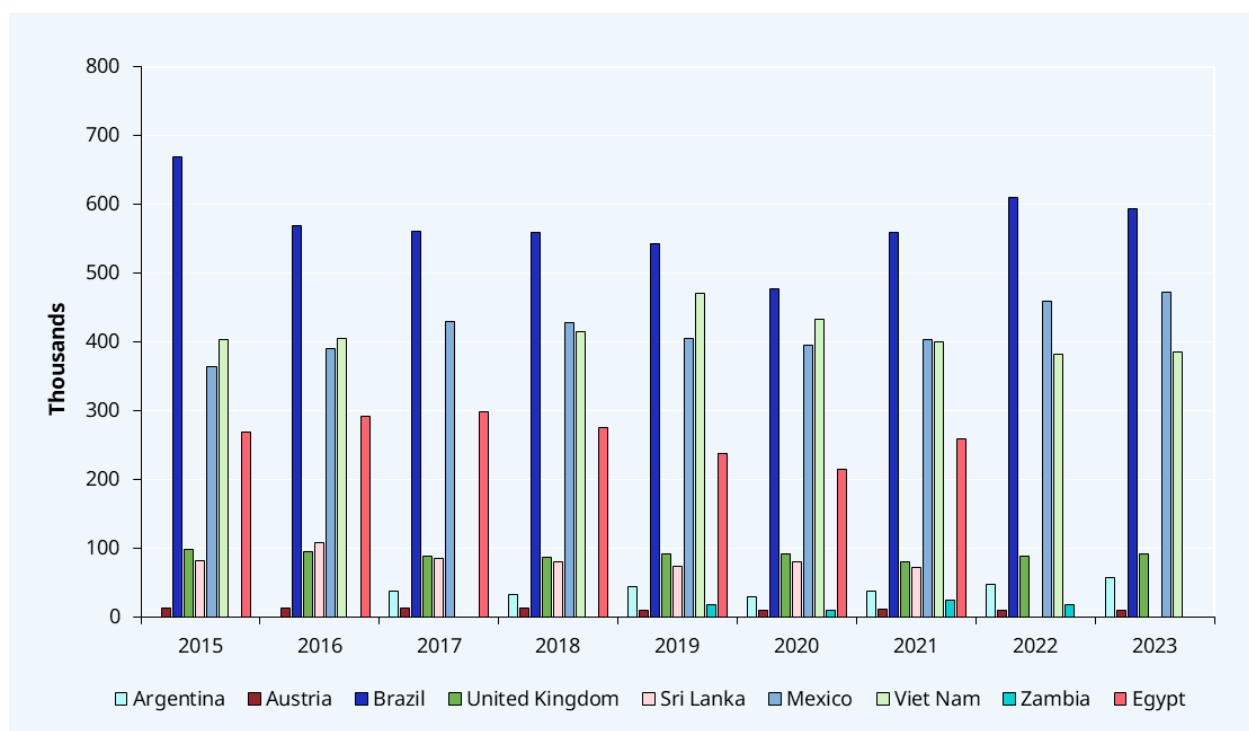
²⁰ These estimates are based on ILO microdata at the ISIC 2-digit level obtained from 111 of 189 countries, which represents 49.4 per cent of global employment. It is worth noting that obtaining global and regional estimates for employment in the building materials industry is limited by a number of caveats, including the lack of coverage in ILO microdata of countries with a sizeable building industry (such as China), as well as the limited availability of employment data beyond the 2-digit level of ISIC.

► **Figure 5b. Employment in the building industry (thousands) and share of total employment by region (percentage)**



Source: ILO estimates based on the latest microdata available, ISIC, Rev. 4, 2-digit level.

► **Figure 6. Employment in the building materials industry (non-metallic mineral products) (thousands), selected countries, 2015–2023**



Source: ILO microdata; data for selected countries with available data for several years at the ISIC 2-digit level for non-metallic mineral products.

22. Looking into national statistics, some countries provide employment data disaggregated for this sector. In the United States in 2022, there were about 13,000 workers employed in cement production, a figure that had remained relatively stable for several years prior to that year.²¹ In the European Union (EU), more than 11,000 employees work in the lime sector. European Commission estimates indicate that cement production provided about 61,000 jobs and up to a further 365,000 indirect jobs in related activities, while the production of concrete employed more than 305,000 people.²²
23. The building materials industry struggles to attract a more diverse workforce. The growing demand for building materials, together with the sector's labour shortages, indicate the need for efforts to improve the attractiveness of the industry, as well as to promote equal opportunities and treatment for women and men.²³
24. The building materials industry is highly male-dominated. Based on available ILO data published in 2023, the global share of women's employment in the manufacture of glass and glass products is about 17 per cent, while the corresponding share in the manufacture of cement, lime and plaster is 8 per cent.²⁴
25. Despite progress achieved over time, gender inequality and gender bias remain prevalent in the building materials industry and the construction sector in both formal and informal economies.²⁵ In the formal segments of the building materials sector, key gender challenges include addressing gender pay disparities and advancing gender balance at the senior management and administrative levels. In the informal segments, women's economic contribution is largely underestimated. In such settings, women are often relegated to labour-intensive and hazardous jobs, with significant gender pay gaps, and they also face barriers in accessing training, financial services, marketing information and new technologies.²⁶

Industry trends and structure

26. As the building materials industry includes a wide range of materials and activities, it is challenging to obtain reliable data on the number and types of building materials enterprises across the world. In recent decades, there has been a trend towards consolidation among materials manufacturing enterprises, with companies at the global scale acquiring smaller ones.²⁷ For example, while available worldwide estimates indicate that more than 1,000 cement producers manage 2,300 integrated cement plants and 600 grinding stations, some large enterprises are responsible for the lion's share of global cement production.²⁸ Similarly, the glass industry is highly concentrated.²⁹ The location of enterprises in the building materials industry is largely determined by the need to place the manufacturing plant close to the mine where the

²¹ Statista, "Employment in Cement Production in the United States", 2022 and 2024.

²² European Commission, "Cement and Lime".

²³ For example, see the cement industry case in Africa, as discussed in Africa Ahead, "Gender Inclusivity, a Catalyst for Decarbonization in the Cement Industry", October 2023.

²⁴ ILO, "Where Women Work: Female-Dominated Occupations and Sectors", ILOSTAT database, 7 November 2023.

²⁵ ILO, *Good Practices and Challenges in Promoting Decent Work in Construction and Infrastructure Projects*, GDFPDWC/2015, 21.

²⁶ UNEP, *Building Materials and the Climate*.

²⁷ Building and Wood Workers' International (BWI), "Cement and Sustainability: Industrial Structure, Technical Innovations and Challenges to International Trade Union Action", 2021; IFC, *Strengthening Sustainability in the Cement Industry*, 2020.

²⁸ IFC, The Impact of COVID-19 on the Cement Industry, 2; World Cement Association, "Cement Facts".

²⁹ Nora Wintour, *The Glass Industry: Recent Trends and Changes in Working Conditions and Employment Relations*, ILO Sectoral Policies Department Working Paper No. 310, 2015; IFC, *Strengthening Sustainability in the Glass Industry*, 2020.



main raw material is extracted (for example, for cement this would be a limestone mine) and also to a consumer market (for materials such as concrete). Building materials companies may subcontract routine and one-off tasks, but in some contexts subcontracting may involve core operational activities such as quarrying, maintenance, logistics or production. This provides opportunities for local small and medium-sized enterprises (SMEs) to be integrated into supply chains and generate employment opportunities.

27. The advance of business models in the area of offsite construction has implications for the provision of building materials. The use of prefabricated concrete and steel sections in building structures has increased in recent decades. The adoption of offsite construction may result in the introduction of more advanced industrial techniques, while offering a controlled, indoor factory setting that is safer and more attractive to workers. It can enhance OSH by reducing the impact of adverse weather conditions and minimizing the traditional on-site risks associated with working at great heights or in challenging environments.³⁰ Offsite construction enhances productivity, cost control, quality and energy efficiency, while facilitating expansion into export markets. While opportunities for skilled jobs in manufacturing plants can be generated through increased off-site construction, it leads to fewer opportunities on construction sites.³¹
28. In developing countries, where the demand for housing and infrastructure development is increasing due to rapid urbanization, there is significant market potential for local building materials companies. Despite the opportunities for local economic development, however, high levels of informality and decent work deficits prevail in the sector, hampering productivity, business development and growth. Furthermore, in the absence of local skills and capacity to produce the required quantity of good quality materials, large and medium contractors often rely on imports or manufacture the construction materials themselves.³²

► 3. The future of work and just transition in the building materials industry

3.1. Demographic changes and urbanization

29. Demographic shifts and evolving urbanization dynamics affect the demand for built environments and infrastructure. These trends largely determine the future demand for building materials.
30. According to UN projections, the global population is expected to grow to approximately 8.5 billion by 2030 and 9.7 billion by 2050, eventually peaking at about 10.4 billion by 2100. The sub-Saharan Africa region will feature the largest population growth rates and will likely yield a demographic dividend through an expanded working-age population.³³
31. The demographic dynamics will lead to an ageing workforce in certain regions, while low-income countries will experience rapid population growth and urbanization. Skills and workforce shortages are becoming pressing concerns in many countries, with an increasing share of

³⁰ Romain de Laubier et al., *"The Offsite Revolution in Construction"*, Boston Consulting Group (BCG), 8 May 2019.

³¹ ILO, *Good Practices and Challenges in Promoting Decent Work in Construction and Infrastructure Projects*.

³² ILO, *"Building Decent Work for All: A Market System Analysis of the Construction Materials Sector in Mozambique"*, May 2018.

³³ United Nations, *World Population Prospects 2022: Summary of Results*, 2022.



workers aged 55 to 64.³⁴ Some countries are addressing labour needs through labour migration, especially in sectors such as the construction and building materials sectors.³⁵

32. Meanwhile, sectors such as the building materials and construction sectors have emerged as catalysts for economic growth and employment creation in many emerging and developing countries, especially for the benefit of young people. Taking construction as an example, youth employment in this sector in Africa is increasing at a faster rate than employment for older population groups.³⁶ In Latin America and the Caribbean, the rapid growth of the construction sector has resulted in a significant increase in youth employment, especially in countries such as Colombia and Brazil.³⁷
33. Urbanization has major implications for the construction sector, thereby significantly shaping the demand for building materials. Based on UN projections, more than half of the global population live in urban areas and the population living in cities and towns will reach 5 billion people by 2030.³⁸ Most of the urbanization is occurring in Asia and Africa. Notably, about 35 per cent of the world's urban population growth between 2018 and 2050 is expected to take place in India, China and Nigeria.³⁹ Moreover, a large share of future urban growth will occur in small, intermediate and secondary cities, even though megacities will continue to play a prominent economic role.⁴⁰ Such diverse patterns of urbanization can generate business and job opportunities in the building materials industry at the local level, including in rural areas.
34. The construction sector and the building materials industry are pivotal in responding to urban priorities, such as providing adequate infrastructure, as well as affordable and adequate housing. They also play a role in addressing the challenge of slums and investing in intermediary cities.⁴¹ The upsurge in the global urban population will boost the demand for construction by an estimated 300 million additional houses by 2030. This surge holds paramount significance for the building materials sector.⁴²
35. In addition to urbanization, economic growth contributes to expanding the construction sector and increasing the demand for building materials.⁴³ According to the Organisation for Economic Co-operation and Development (OECD), the construction sector is projected to more than double its size between 2017 and 2060. For instance, in sub-Saharan Africa, the sector's size will expand



³⁴ Claire Harasty and Martin Ostermeier, *Population Ageing: Alternative Measures of Dependency and Implications for the Future of Work* (ILO, 2020).

³⁵ Belinda Brucker Juricic, Mario Galic and Sasa Marenjak, "Review of the Construction Labour Demand and Shortages in the EU", *Buildings* 11, No. 1 (2021):17.

³⁶ ILO, "Getting Africa's Youth Working: Taking a Systems Approach to Create More & Better Jobs for Young People in Sub-Saharan Africa", Research Brief, June 2020; Steve Hartrich, "Can We Create Better Jobs in Africa's Booming Construction Sector? Looking to Market Systems Analyses to Point Us in the Right Direction", ILO, November 2018.

³⁷ ILO, *World Employment and Social Outlook: Trends 2023*, 2023; Yury Villagrán-Zaccardi et al., "Overview of Cement and Concrete Production in Latin America and the Caribbean with a Focus on the Goals of Reaching Carbon Neutrality", *RILEM Technical Letters* 7 (2022): 30–46.

³⁸ United Nations, *World Urbanization Prospects: The 2018 Revision*, 2019; United Nations, *World Population Prospects 2022*.

³⁹ United Nations, *World Urbanization Prospects*.

⁴⁰ UN-Habitat, *World Cities Report 2022: Envisaging the Future of Cities*, 2022.

⁴¹ Intermediary cities would be urban areas with a population of 50,000 to 1 million inhabitants; see OECD/UN-Habitat, *Intermediary Cities and Climate Change: An Opportunity for Sustainable Development*, 2022; UN-Habitat, *World Cities Report 2022*.

⁴² Gloria M. Grandolini and Ede Ijjasz-Vasquez, "3 Reasons Why 'Housing for All' Can Happen by 2030", *World Bank Blogs* (blog), May 2016.

⁴³ Georg Schiller and Julia Roscher, "Impact of Urbanization on Construction Material Consumption: A Global Analysis", *Journal of Industrial Ecology* 27, No. 3 (2023): 1021–1036.

twelfefold by 2060.⁴⁴ Countries such as Brazil, China, India, Indonesia and Mexico are emerging economies with large markets and dynamic construction activity.⁴⁵ As a result, developing and emerging economies may provide opportunities in the building materials sector. In that regard, creating an enabling business environment is key to supporting local businesses, especially SMEs.

36. Non-metallic mineral construction materials, mainly cement, constitute the bulk of construction resources and face escalating demand globally. As fast-growing countries advance and mature economically, the utilization of non-metallic minerals and metals has experienced a significant increase, as exemplified by China over the past two decades.⁴⁶ China's cement consumption in the three years from 2011 to 2013 exceeded that of the United States in the entire twentieth century.⁴⁷ In the coming decades, the demand for construction materials may feature a shift from China to other parts of Asia and to Africa.⁴⁸
37. The cement market in sub-Saharan Africa is rapidly expanding.⁴⁹ For instance, the interplay between the construction sector's expansion and the thriving cement industry in West Africa underscores the potential of local cement production in terms of growth, enhancing productivity, fostering innovation and generating employment opportunities, while contributing to meeting major housing needs. In parallel, the intensive consumption of cement poses concerns in terms of environmental sustainability and the need to use green building materials that are affordable.⁵⁰
38. The environmental impacts of the material intensity in the construction sector indicate a need to transition from resource-intensive urbanization to alternatives that manage resources more sustainably. This raises the crucial question of how to ensure a just transition in the building materials sector. The patterns of global material flow scenarios differ across regions: developed countries tend to focus on renovating existing and ageing building stocks, while developing countries that are experiencing rapid urbanization need to focus on new construction. According to the United Nations Environment Programme (UNEP), addressing these different needs is pivotal for effective and inclusive global progress towards sustainable building practices.⁵¹ Balancing the needs across national contexts and circumstances becomes essential in order to foster a harmonized approach to sustainable construction, ensuring not only resource efficiency but also access to equitable economic opportunities in the building materials sector on a global scale.



⁴⁴ OECD, *Global Material Resources Outlook to 2060: Economic Drivers and Environmental Consequences*, 2019, 92.

⁴⁵ PwC, *The Long View: How Will the Global Economic Order Change by 2050?*, 2017.

⁴⁶ Alessio Miatto et al., "Global Patterns and Trends for Non-Metallic Minerals Used for Construction", *Journal of Industrial Ecology* 21, No. 4 (2016).

⁴⁷ International Resource Panel, *The Weight of Cities: Resource Requirements of Future Urbanization* (UNEP, 2018).

⁴⁸ OECD; International Resource Panel.

⁴⁹ African Union for Housing Finance, "Cement: Constructing Africa", *Financing Housing in Africa* 43 (May 2015).

⁵⁰ Armelle Choplin, "Produire la ville en Afrique de l'Ouest: le corridor urbain de Accra à Lagos", *L'information géographique* 83, No. 2 (2019); Giulia Celentano and Guillaume Habert, "Beyond Materials: The Construction Process in Space, Time and Culture in the Informal Settlement of Mathare, Nairobi", *Development Engineering* 6 (2021).

⁵¹ UNEP, *Building Materials and the Climate*.

3.2. Climate change and multiple crises

Climate change

39. Climate and environmental change are rapidly evolving into the foremost threat to the world of work, sustainable development and social justice.⁵² While the imperative to decarbonize the sector is essential for mitigating its adverse impact on the climate, the adoption of more environmentally sustainable practices carries profound implications for enterprises and workers in the building materials sector. It underscores the necessity for well-designed sectoral, industrial and skills development policies in order to mitigate potential challenges and ensure a just transition.
40. Climate and environmental change pose significant challenges to economic growth and employment, and these challenges will be greater in the medium-to-long-term future. These changes will alter how people live, work, consume and produce, thus hampering efforts to end poverty and achieve decent work, sustainable development and social justice.⁵³ There is strong evidence about the negative impacts of climate change and environmental degradation in terms of deteriorating working conditions and increasing risks of occupational injury, disease and death.⁵⁴ For instance, because of heat stress, productivity losses equivalent to 80 million jobs may be incurred by 2030.⁵⁵ Based on ILO estimates, the projected increase in global temperatures will render 2 per cent of all work hours too hot to enable safe employment by 2030.⁵⁶
41. The building materials industry and the construction sector remain among the most carbon-intensive sectors worldwide. In particular, the production and use of materials such as cement, steel and aluminium leave a significant carbon footprint. The energy and process-related emissions for the buildings and construction sector accounted for about 37 per cent of total global CO₂ emissions, at about 13.6 gigatonnes (Gt), in 2022. Emissions from buildings related to energy demand represented about 27 per cent of total global CO₂ emissions, while 7 to 9 per cent of the total was estimated to be due to the manufacturing of concrete, steel, aluminium, glass and bricks. When the additional materials used in construction such as plastics, foams, fabrics and other soft and hard materials are also taken into account, the share in total global CO₂ emissions of the building materials industry and the construction sector is even higher.⁵⁷
42. The production of cement is an energy-intensive process that involves chemical processes, releasing additional greenhouse gases (GHGs) and leading to the depletion of natural resources such as sand and the erosion of ecosystems (see figure 7).⁵⁸ The consumption of water in concrete production is also pervasive, at about 9 per cent of global industrial water withdrawals in 2012. By 2050, approximately 75 per cent of the water required for concrete production is projected to be used in regions facing water stress.⁵⁹ Despite its detrimental environmental impact, the



⁵² ILO, *Achieving a Just Transition towards Environmentally Sustainable Economies and Societies for All*, ILC.111/VI, 2023.

⁵³ ILO, *Achieving a Just Transition towards Environmentally Sustainable Economies and Societies for All*.

⁵⁴ ILO, *Ensuring Safety and Health at Work in a Changing Climate: Global Report*, 2024.

⁵⁵ ILO, *Working on a Warmer Planet: The Impact of Heat Stress on Labour Productivity and Decent Work*, 2019, 26.

⁵⁶ ILO, *World Employment and Social Outlook 2018: Greening with Jobs*, 2018.

⁵⁷ UNEP/Global Alliance for Buildings and Construction (GlobalABC), *Beyond Foundations: Mainstreaming Sustainable Solutions to Cut Emissions from the Buildings Sector – Global Status Report for Buildings and Construction*, 2024, x and 29.

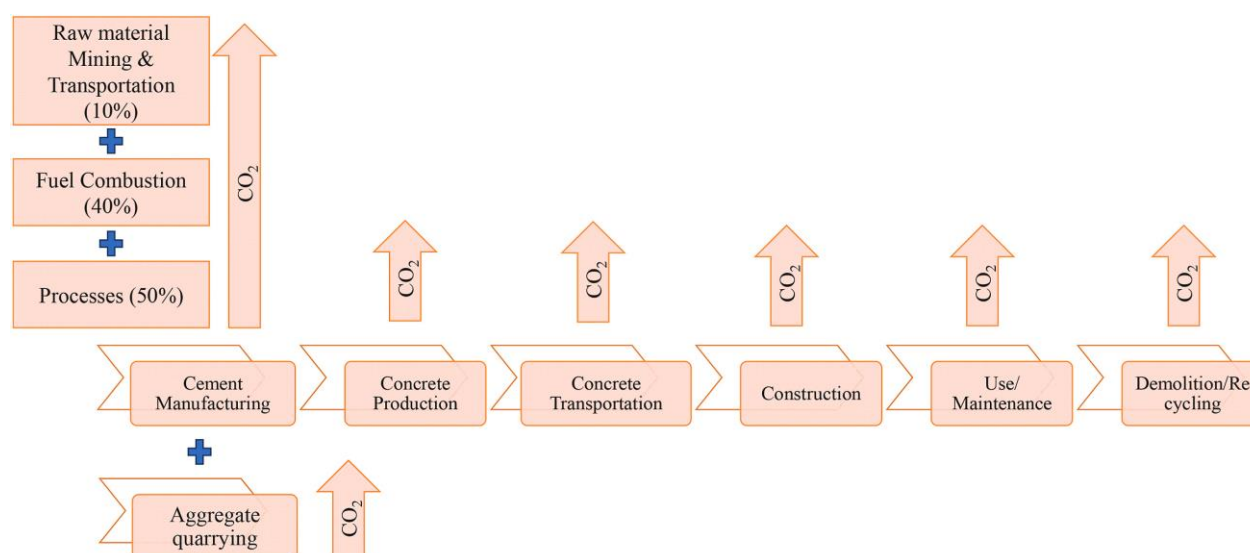
⁵⁸ Anna Zinecker and Jérémy Bourgault, "Building Materials: A Hidden Heavyweight for Climate Action", *International Institute for Sustainable Development*, 2022.

⁵⁹ Sabbie A. Miller, Arpad Horvath and Paulo J.M. Monteiro, "Impacts of Booming Concrete Production on Water Resources Worldwide", *Nature Sustainability* 1 (2018): 69–76.

cement industry keeps growing, propelled by the increasing demand for infrastructure development and the process of urbanization. ⁶⁰ It is projected that global cement production may reach 8.2 billion tonnes by 2030. ⁶¹

43. A broad transformation towards greener building practices is now under way. There is increased attention to reducing carbon emissions from the design, production and deployment of building materials. ⁶² This transformation is influencing not only the demand and volume of building materials but also the technical specifications and standards, with implications for the world of work. Given this unprecedented global construction boom, emerging economies find themselves at a critical juncture to revolutionize building materials and methods. Global raw material usage is expected to double by 2060, underscoring the importance of a just transition to green building materials practices. ⁶³

► Figure 7. CO₂ emissions in the building materials and construction sector



Source: Fadi Althoey et al., "Advancements in Low-Carbon Concrete as a Construction Material for the Sustainable Built Environment", *Developments in the Built Environment* 16 (2023).

44. According to the UNEP,⁶⁴ achieving decarbonization in the building materials industry would involve the implementation of three environmental policy priorities:
- (a) **avoid** – by minimizing the extraction and manufacturing of raw materials, including by promoting a circular economy;
 - (b) **shift** – by embracing regenerative material practices and prioritizing the use of green building materials; and

⁶⁰ Fateh Belaïd, "How Does Concrete and Cement Industry Transformation Contribute to Mitigating Climate Change Challenges?", *Recycling Advances* 15 (November 2022).

⁶¹ Tkachenko et al.

⁶² Fadi Althoey et al., "Advancements in Low-Carbon Concrete as a Construction Material for the Sustainable Built Environment", *Developments in the Built Environment* 16 (2023); IFC, *Strengthening Sustainability in the Cement Industry*.

⁶³ OECD.

⁶⁴ UNEP, *Building Materials and the Climate*.

- (c) **improve** – by revolutionizing methods to significantly reduce the carbon footprint of traditional materials such as concrete, steel, and aluminium.

Implementing sustainable and efficient practices in the use of building materials – such as minimizing material usage, relying on sustainably sourced timber and improving construction material recycling – could reduce greenhouse gas emissions by up to 36 per cent in the G7 countries by 2050.⁶⁵

45. Examples of green practices in the industry include designing structures to maximize efficiency and reuse, utilizing structural steel more efficiently, reusing elements and concrete components, incorporating industry by-products in cement production, exploring cement substitutes, prioritizing renovations over new construction, optimizing building space usage and recycling building materials, among others.⁶⁶ For instance, in cement manufacturing, reusing by-products can reduce the demand for clinker, which is a priority in order to reduce emissions in this industry. This transformation presents an opportunity for job creation. It is estimated that US\$1 million invested in this practice could generate, on average, 4.7 direct and indirect jobs in Latin American and Caribbean countries.⁶⁷
46. Efforts are being directed to advance towards the use of minimal to low-carbon concrete, especially by cutting emissions during clinker production in cement plants, including by shifting to renewable energy, as well as by introducing innovations in the binder composition and manufacturing process.⁶⁸ As carbon capture, utilization and storage (CCUS)⁶⁹ can be applied to cement or steel plants, it is being promoted in some advanced countries to tackle emissions in these hard-to-abate sectors. CCUS could in turn support the decarbonization of other parts of the energy system that are relevant to the functioning of the building materials industry, such as transportation. Given the major relevance of CCUS to a more sustainable building materials industry, it will be important to assess the labour implications of CCUS specific to this industry.⁷⁰
47. Alternative green building materials, including compressed earth blocks, green steel and sustainable timber, offer solutions that do not rely on cement and can be more accessible in developing countries and provide significant employment and industry growth prospects. For instance, compressed earth blocks have higher thermal insulation factors with equal strength when produced according to high standards.⁷¹
48. Some construction companies rely on locally sourced materials through local suppliers in order to shorten transportation distances between the production site and the construction site, which results in lower transportation costs, decreased fuel consumption and reduced carbon emissions.⁷² Revaluing local materials and building practices can create job opportunities



⁶⁵ UNEP, *Guide for Conducting Sustainable Buildings and Construction Country Assessments*, 2020.

⁶⁶ Martin Christiansen, "The Decarbonisation Benefits of Sectoral Circular Economy Actions", Ramboll Group, 9 June 2020.

⁶⁷ Fernando Esteves et al., "Job Creation and Decarbonization Synergies in Latin America: A Simulation-Based Exploratory Modelling Analysis", *Frontiers in Climate* 6 (May 2024): 01–11.

⁶⁸ Althoey et al.

⁶⁹ For a definition of CCUS, see International Energy Agency (IEA), "Carbon Capture, Utilisation and Storage".

⁷⁰ Incipient research is looking at labour implications in specific country contexts; see for example Julian McCoy et al., "Labour Implications of the Net-Zero Transition and Clean Energy Exports in Australia", *Energy Research & Social Science* 112 (2024).

⁷¹ For instance, see: Paul W. Griffin and Geoffrey P. Hammond, "The Prospects for 'Green Steel' Making in a Net-Zero Economy: A UK Perspective", *Global Transitions* 3 (2021): 72–86; Walaa Hussein Hussein Hanafi, "Compressed Stabilized Earth Block: Environmentally Sustainable Alternative for Villages Housing", *Journal of Engineering and Applied Science* 68 (2021).

⁷² UNEP, *Building Materials and the Climate*, 47; UNEP, *2022 Global Status Report for Buildings and Construction*, 2022.

through labour-intensive methods, which is important for regions such as Africa, in which there will be high future demand for building materials.⁷³

49. As the construction industry is in search of greener materials, low-carbon earth- and bio-based building materials are gaining relevance, including sustainably sourced bricks, timber and bamboo.⁷⁴ For instance, timber's advantages include renewability, low fossil energy use and superior environmental performance. A number of countries have developed national road maps to increase its use in construction.⁷⁵ Other alternative materials that aim to reduce the environmental impact of buildings include ferrock, polyester fibres, bitumen, agricultural residues and forest detritus.⁷⁶
50. The implementation of stronger energy efficiency standards can lead to a surge in job opportunities in the built environment, including the building materials industry. There is increased attention to retrofitting existing buildings and constructing new structures that adhere to higher energy-efficiency benchmarks.⁷⁷ In particular, retrofitting existing residential buildings contributes significantly to overall energy efficiency and in turn generates opportunities. Based on International Energy Agency (IEA) estimates, achieving efficiency improvements in the industry and buildings sectors will necessitate an additional 8 million workers for tasks such as retrofitting buildings, installing more efficient heating and cooling systems and enhancing industrial process efficiency (see box 1).⁷⁸ Concurrently, the rapid evolution of these standards, coupled with technological advancements in the building materials sector, pose challenges for workers in terms of training needs and OSH.⁷⁹

► Box 1. EU Renovation Wave initiative and changes in the building materials industry

The European Green Deal emphasizes the significance of renovating both public and private buildings to enhance energy efficiency. In 2020, the EU launched the strategy "[A Renovation Wave for Europe – Greening our buildings, creating jobs, improving lives](#)" to introduce a stimulus for the construction ecosystem and the broader economy in the context of the recovery from the coronavirus disease (COVID-19) crisis and concerns about the impact of the conflict in Ukraine. The Renovation Wave aimed to at least double the annual energy renovation rate by 2030, while also reducing emissions and generating green jobs in the construction sector. By prioritizing renovation projects, the measure targeted labour-intensive construction activities, while supporting local SMEs and job creation. Investments in local supply chains involved upskilling workers and attracting new talents to the sector. They also fostered demand for energy-efficient equipment, adding long-term value to properties. The Renovation Wave projected that by 2030, an additional 160,000 green jobs could be created in the EU construction sector.

⁷³ UNEP, *Unlocking the Potential of Local Circular Materials in Urbanising Africa*, 2023; World Bank, *Stocktaking of the Housing Sector in Sub-Saharan Africa: Challenges and Opportunities*, 2015.

⁷⁴ United Nations Economic Commission for Europe (UNECE) and Food and Agriculture Organization (FAO), *Circularity Concepts in Wood Construction*, Geneva Timber and Forest Study Paper 95, 2023; Inter-American Development Bank (IDB), "[Wood as a Housing Construction Material: What Are Its Benefits?](#)", June 2022.

⁷⁵ For instance, see IDB, "[How Does Uruguay Promote Wood as a Housing Construction Material?](#)", 11 August 2022; Uruguay, Ministerio de Vivienda y Ordenamiento Territorial and IDB, *Hoja de Ruta para la Construcción de Vivienda Social en Madera en Uruguay*, 2022.

⁷⁶ UNEP, *Building Materials and the Climate*; UNEP, 2022 *Global Status Report for Buildings and Construction*.

⁷⁷ Anne-Marie Badache et al., "[Seizing the Net Zero Opportunity for Buildings](#)", BCG, June 2023.

⁷⁸ IEA, *World Energy Outlook 2022*, 2022, 3

⁷⁹ "[Skills and Quality Jobs In Construction in the Era of the EGD and Post COVID Recovery](#)", *EFBWW News*, 12 June 2023; ILO, *Skills for a Greener Future: A Global View*, 2019.



51. The recycling of construction and demolition waste materials is being pursued as well.⁸⁰ Discarded material may be recovered to be used for road-building materials, gravel, erosion control or fertilizer additives, among others.⁸¹ However, the overall share of recycled non-metallic minerals remains limited to date, especially in regions with fast-growing demand for building materials.⁸²
52. Adopting a circular economy as a guiding principle holds the potential for responding to many challenges in the building materials industry. Advancing towards a circular economy would not only be more labour-intensive but also generate significant economic opportunities for enterprises, workers and communities.⁸³
53. A circular built environment conceives buildings as building stocks or material banks, and as such the aim is to preserve the added value of existing assets, facilitate material cycling and promote the deconstruction of buildings at the end of their life, with subsequent upcycling of building materials.⁸⁴ Moving towards circularity in construction can both encourage existing enterprises to adapt and stimulate the emergence of new enterprises dedicated to meeting the growing demand for circular building projects.⁸⁵ Policies that promote skills development for workers to acquire the necessary circular building skills can play a significant role in pursuing circularity in this sector.
54. Nevertheless, the employment implications of many of the efforts towards a more sustainable building materials industry have been insufficiently explored to date. The restructuring of the sector necessitates a substantial shift in employment allocation and business practices, while also seizing the potential for generating new green jobs. The ILO estimates that the transition to a green economy could create approximately 18 million jobs worldwide by 2030.⁸⁶ Many of these transformative shifts towards a more sustainable built environment signify a holistic approach to green building materials and construction practices that not only prioritizes energy efficiency but also considers the economic, social and environmental impacts throughout the entire building life cycle and value chain, with significant potential for generating new green jobs in the sector.

Multiple crises

55. The outlook ahead of the building materials industry is affected by the uncertainty associated with the global context of multiple and interrelated crises. The sector tends to be significantly affected by rising energy costs and disruptions in supply chains. Given its sensitivity to economic cycles, both enterprises and workers in the sector face heightened vulnerability during economic downturns. Recent global events, such as the COVID-19 pandemic, armed conflicts and heightened geopolitical tensions, have brought about unprecedented uncertainty worldwide, including in the building materials and construction sectors. Despite these challenges,



⁸⁰ For example, see European Commission, *Development and Implementation of Initiatives Fostering Investment and Innovation in Construction and Demolition Waste Recycling Infrastructure*, 2018.

⁸¹ World Economic Forum (WEF), *Shaping the Future of Construction: A Breakthrough in Mindset and Technology*, 2016, 34.

⁸² Miatto et al., "Global Patterns and Trends for Non-Metallic Minerals Used for Construction".

⁸³ Oliver Rapf, "The Zero Carbon and Circular Economy Challenge in the Built Environment: Policy Options for the European Union and its Member States", Buildings Performance Institute Europe (BPIE), 2019; Circularity Gap Reporting Initiative (CGRI), *The Circularity Gap Report 2024*, 2024; ILO, *World Employment and Social Outlook 2018*.

⁸⁴ Circle Economy, "Jobs and Skills to Drive a Circular Built Environment" (November 2022), 3.

⁸⁵ Circle Economy.

⁸⁶ ILO, *World Employment and Social Outlook 2018*, 37.

construction holds significant potential for economic recovery due to its capacity to create jobs and its linkages to other economic sectors.⁸⁷

56. During the COVID-19 pandemic, the demand for building materials was heavily affected by construction site closures. The building materials industry was also affected by lockdown measures, shortages in both labour and raw materials, and ongoing challenges in energy affordability that persist to this day.⁸⁸
57. Although construction activities rebounded to pre-pandemic levels in most major economies in 2021, the building materials sector faces economic and financial uncertainty. Stagnating building activity in some countries may lead to a decline in the demand for building materials.⁸⁹ In other contexts, there are supply chain disruptions, contributing to elevated inflation in the construction market.⁹⁰ Labour shortages can affect diverse levels of the supply chain, from collecting and processing raw materials to production, manufacturing and transportation.
58. Numerous factors can disrupt the supply of building materials. Transportation costs have increased, primarily due to rising fuel and energy prices and trade disruptions. For energy-intensive industries such as steel and cement, volatility in energy prices can significantly impact operating costs and profitability. Investing in energy-efficient technologies can be costly, especially for SMEs. The war in Ukraine is both generating supply barriers and triggering increases in the export prices of materials such as copper and aluminium.⁹¹ Shortages or price increases in some building materials can lead to increased demand for alternative materials, causing knock-on effects in terms of shortages and price increases.

3.3. Technological advances

59. The recent technological advances adopted by the building materials industry have transformed it, although their integration into the world of work may be uneven across the world. These numerous technological advances range from incremental innovations in traditional materials and new material combinations to radically innovative materials that feature new functionalities.⁹² Investments in research and development and innovation are geared to optimize operations and maintenance, as well as to reduce production costs. Increasingly, such investments are also driven by the need to reduce the carbon footprint of the industry and maximize resource efficiency across the supply chain.
60. Specific segments of the building materials industry are making substantial investments in automation, robotics, digital connectivity and supply chain management in order to improve operational efficiency, streamline maintenance practices and reduce production costs. There is also potential in this industry to adopt technological advancements based on AI. The integration of data and technology has the potential to revolutionize design and construction methods. However, this necessitates substantial investment in research and development and many businesses, particularly SMEs, may lack the capacity to take full advantage of this opportunity due

⁸⁷ ILO, "Impact of COVID-19 on the Construction Sector".

⁸⁸ ILO, "Impact of COVID-19 on the Construction Sector"; Consigli, "COVID-19 Impact: Construction Materials", 24 March 2020.

⁸⁹ For example, in China, see World Bank, "East Asia and Pacific" in *Global Economic Prospects: June 2024*, 2024.

⁹⁰ Joachim Harder, "Cement Industry Challenges in the New Decade", *ZKG Cement Lime Gypsum* 1 (2021).

⁹¹ Mortenson, "2023 Construction Materials Supply Chain Trends", 31 October 2022.

⁹² WEF, *Shaping the Future of Construction*; Xing Quan Wang et al., "Artificial-Intelligence-Led Revolution of Construction Materials: From Molecules to Industry 4.0", *Matter* 6, No. 6 (2023): 1831–1859; Lucy Barnard, "Hey ChatGPT, Finish this Building ...: Some of the Generative AI Tools Transforming Construction", *Construction Briefing*, 12 January 2024.



to skills and resource constraints. Supporting SMEs in the building materials industry as they progress in their digital transition is crucial in order for them to harness the full potential of new technologies, while ensuring that digitalization does not compromise decent work.

61. The technological advances driving transformation in the construction sector have also influenced the building materials industry. Technologies such as three-dimensional building information modelling (BIM) are increasingly being used in construction projects, while several advanced countries are encouraging their use in public projects.⁹³ BIM is transforming the selection and subsequent supply of building materials. The application of digitalization in prefabrication and modular construction is being used to reduce material waste before materials reach a construction site.⁹⁴ Depending on the digital solutions applied, waste reduction can range from 23 to 100 per cent.⁹⁵ In addition, BIM plays a central role as an enabler of and facilitator for many other technologies.⁹⁶ For example, the University of São Paulo signed an agreement in 2020 with the Brazilian Portland Cement Association and the National Cement Industrial Trade Union to establish Brazil's first cooperative hub for industrial digital innovation and construction in order to accelerate the transition of the construction industry to a digital and circular economy.⁹⁷
62. Building passports are also being advocated by the Global Alliance for Buildings and Construction (GlobalABC) and the UNEP.⁹⁸ Building passports could be a tool to improve the management of building-related data and information more systematically and coherently, as they would be used throughout the buildings' life cycle. These passports encompass not only administrative documentation and site and location details but also technical and functional characteristics, as well as environmental, social and financial performance.⁹⁹
63. Further technological change based on advancements in automation and AI will also impact the building materials industry. For example, in segments such as cement and steel, the use of machine learning is making other key technologies, such as CCUS, alternative fuels, clean hydrogen and synthetic fuels, more commercially viable and scalable.¹⁰⁰ There are also a growing number of building material producers that connect with end-consumers through digital platforms and online marketplaces.¹⁰¹ At the same time, AI may be applied to managing work processes and worker performance in the workplace and in certain human resources processes based on extensive data. AI can help in decision-making at the firm level, with the potential for improving productivity, while it also has implications for various dimensions of decent work.¹⁰² However, the adoption of such practices by firms across different sectors in advanced and



⁹³ Agnès Audier et al., "BIM Revolution Comes to Building Materials", BCG, 8 February 2017.

⁹⁴ Alessio Miatto et al., "Tracking the Material Cycle of Italian Bricks with the Aid of Building Information Modeling", *Journal of Industrial Ecology* 26, No. 2 (2022).

⁹⁵ UNEP, *Building Materials and the Climate*.

⁹⁶ WEF, *Shaping the Future of Construction*.

⁹⁷ Adriana Cruz, "USP e ABCP criam hub de inovação na área de construção digital", *Jornal da Universidade de São Paulo*, 7 December 2020.

⁹⁸ UNEP, *Building Materials and the Climate*.

⁹⁹ UNEP/GlobalABC, *The Building Passport: A Tool for Capturing and Managing Whole Life Data and Information in Construction and Real Estate*, 2021.

¹⁰⁰ Sumit Gupta, Suresh Subudhi and Ileana Nicorici, "Why Cement Producers Need to Embrace Industry 4.0", BCG, 7 December 2018; PROIDS, "Alternative Fuels Special Issue 2021", September 2021; Rui Tong et al., "The Digitization Work of Cement Plant in China", *Cement and Concrete Research* 173 (2023); Kübra Tümay Ates et al., "Sustainable Production in Cement via Artificial Intelligence-Based Decision Support System: Case Study", *Case Studies in Construction Materials* 15 (2021).

¹⁰¹ Daniel Feldkamp et al., "Building Materials Makers Forge a Digital Path to Homeowners", BCG, 7 June 2018.

¹⁰² ILO, *Realizing Decent Work in the Platform Economy*, ILC.113/V(1), 2024; Mike Scott, "Can Artificial Intelligence Pave the Way for Greener Cement and Steel?", *Reuters*, 8 January 2024.

developing countries remains unclear and needs further exploration to better understand how these practices interact with existing organizational structures in specific industries such as building materials.¹⁰³

► 4. Opportunities and challenges for the promotion of decent work and a just transition in the building materials industry

4.1. Sectoral policies and initiatives

64. The widespread adoption of green building techniques and technologies depends on regulations and public policies, as well as on how buyers and businesses respond to these policies and incentives. In that regard, sectoral policies such as building regulations and other government interventions in the built environment are essential. Public information campaigns, financing schemes, subsidies, advisory services and training and certification schemes for service providers are relevant strategies to be promoted.¹⁰⁴
65. At the 2023 United Nations Climate Change Conference (COP28), the [Buildings Breakthrough](#) initiative was launched to strengthen coordination between countries to “make clean technologies and sustainable solutions in the buildings and construction sector the most affordable, accessible, and attractive option in all regions by 2030”.¹⁰⁵ It is co-led by the Ministry for Ecological Transition and Territorial Cohesion of France and the Ministry of National Territory Planning, Land Planning, Housing and City Policy of Morocco. This initiative is coordinated under the auspices of the UNEP-hosted GlobalABC and is part of the Breakthrough Agenda, which provides a framework for countries, businesses and civil society to strengthen their actions in key emitting sectors. Among other activities implemented under the Buildings Breakthrough, an annual assessment of global progress in the built environment will be undertaken by the UNEP/GlobalABC secretariat, the IEA and the International Renewable Energy Agency, together with the UN Climate Change High-level Champions.¹⁰⁶
66. Many governments aim to set an example for their societies by prioritizing sustainability in public buildings, which helps drive green building practices and materials forward and generates opportunities for businesses focused on green building. There are also sustainability building standards, certifications and assessment frameworks at the national level.¹⁰⁷ Governments are also increasingly adopting green procurement initiatives in order to limit the environmental impact of their purchases of goods and services.¹⁰⁸ At COP28, the member countries of the [Industrial Deep Decarbonisation Initiative](#), which is coordinated by the United Nations Industrial Development Organization (UNIDO), committed to the Green Public Procurement Pledge, seeking



¹⁰³ Pawel Gmyrek, Janine Berg and David Bescond, *Generative AI and Jobs: A Global Analysis of Potential Effects on Job Quantity and Quality*, ILO Working Paper 96, 2023.

¹⁰⁴ ILO, *Skills and Occupational Needs in Green Building*, 2011, xx.

¹⁰⁵ UNEP, “The Buildings Breakthrough: Global Push for Near-Zero Emission and Resilient Buildings by 2030 Unveiled at COP28”, 6 December 2023.

¹⁰⁶ UNEP/GlobalABC, *Beyond Foundations*.

¹⁰⁷ See, for instance, the Minergie building standard in Switzerland: Constantin Kempf, “Construction Costs and Initial Yield Effects of MINERGIE Certification and Sustainable Construction Measures in New Multifamily Houses in Switzerland”, *Journal of Sustainable Real Estate*, 15, No. 1 (2023); and the Sello de Vivienda Sustentable in Argentina: ILO, *Hacia una transición laboral justa en el sector de la construcción: Desafíos y oportunidades en el marco del futuro del trabajo*, 2024.

¹⁰⁸ ILO, *Skills and Occupational Needs in Green Building*, 61.

to procure low-emission steel, cement and concrete, as well as to support innovation and the deployment of technological advances by stimulating demand for, and the commercialization of, near-zero emission materials.¹⁰⁹

► **Box 2. Building materials and construction in G7 and G20 decarbonization efforts**

During Germany's 2022 G7 Presidency, the [G7 Climate, Energy and Environment Ministers' Communiqué](#) indicated the need for deploying relevant policy measures and stimulate private initiatives for scaling up near-zero emission primary steel and clinker used in cement. Building on the findings of the IEA's 2022 report [Achieving Net Zero Heavy Industry Sectors in G7 Members](#), the communiqué underlined the need "for a common understanding of ambitious general definitions for near-zero-emission steel and cement production, taking into consideration circumstances unique to each sector and region for near-zero industrial production processes." The communiqué also acknowledged the need for a comprehensive set of different policies addressing key areas, as identified in the [Industrial Decarbonisation Agenda](#).

Brazil's G20 Presidency in 2024 provides an opportunity to achieve further progress on these issues, especially as the G20 countries are responsible for 76 per cent of the world's GHGs. The Brazilian presidency leads the [Task Force for the Global Mobilization against Climate Change](#), which aims to foster high-level dialogue among governments, financial institutions and international organizations in order to implement the objectives of the United Nations Framework Convention on Climate Change and the Paris Agreement on Climate Change.

67. In March 2024, the [Ministerial Declaration of Chailot](#) was adopted by representatives of 70 countries at the first-ever Buildings and Climate Global Forum under the auspices of France and the UNEP. The declaration seeks to engage the entire value chain of the buildings sector and puts forward commitments to enable progress towards a rapid, fair and effective transition of the sector, while underlining the importance of cooperation and coordination and taking into account the specificities of each country. Among other priorities, the declaration makes explicit reference to improving skills by strengthening local knowledge and announces the establishment of the Intergovernmental Council for Buildings and Climate, coordinated by the GlobalABC, to facilitate and monitor the implementation of the declaration.
68. The GlobalABC is a global platform of major relevance for the building materials industry. It was founded at COP21 and is hosted by the UNEP. It brings together governments, the private sector, civil society and research and intergovernmental organizations committed to accelerating the sustainability transformation of the building sector. The GlobalABC develops global and regional road maps for buildings and construction in Africa, Asia and Latin America to set pathways to achieve the decarbonization of the buildings and construction sector by 2050. These road maps are structured around eight themes, including urban planning, new buildings, existing buildings, building operations, appliances and systems, materials, resilience and clean energy. The road maps were developed in partnership with the IEA through a consultative process, involving more than 700 experts, and were refined based on new data and examples obtained from various regions and countries.
69. The [Programme for Energy Efficiency in Buildings](#) (PEEB) also illustrates efforts to transform the built environment. The PEEB aims to promote sustainable building design and construction, including through building materials. For that, it follows a two-pronged approach combining support to financing for energy efficiency in large-scale projects with technical assistance at the regional and country levels. From a circular economy perspective, several initiatives are being put

¹⁰⁹ United Nations Industrial Development Organization (UNIDO), "[Seven Key Governments Generate Demand for Cement and Steel Decarbonization Technologies via UNIDO-led Green Public Procurement Campaign](#)", 5 December 2023.



forward. Under the [Sustainable Buildings and Construction Programme](#), particular attention is being paid to circularity in building materials.¹¹⁰

70. Regulatory approaches and financial instruments designed to support the transition to a green economy have proliferated, including through classification systems or taxonomies that set out criteria for sustainable economic activities, in particular the building materials industry. The introduction of the [EU taxonomy for the manufacturing of cement](#) will influence the future of the industry. It aims to channel funds into projects that will help meet the EU's climate goals. Cement producers are asked to report how much of their production aligns with minimum performance thresholds for emissions of clinker and cement or alternative binders. Investors are also asked to report their alignment with the EU taxonomy. Under the EU taxonomy, companies should comply with minimum safeguards in alignment with the OECD Guidelines for Multinational Enterprises on Responsible Business Conduct and the UN's Guiding Principles on Business and Human Rights, as well as the principles and rights set out in the fundamental Conventions identified in the ILO Declaration on Fundamental Principles and Rights at Work (1998), as amended in 2022, and the International Bill of Human Rights.
71. There are additional considerations concerning the selection of building materials in the environmental and social safeguards frameworks of major international organizations such as the World Bank and the International Finance Corporation (IFC). Safeguards are integrated into construction projects at the design phase and considered during implementation in order to limit or minimize the potential negative social and environmental consequences of the projects while maximizing their positive impacts. These safeguards can include environment-friendly procedures that are designed to mitigate negative impacts while contributing to a greener world and international environmental goals, as well as provisions to promote decent working conditions and OSH.¹¹¹
72. Some building codes and building regulations have evolved to include provisions that address the energy efficiency of buildings. While building codes would typically apply to all new buildings with different standards across commercial, residential and industrial categories, they increasingly also cover existing buildings that undergo renovation.¹¹² The choice of – and thereby the demand for – building materials is affected by all such changes.
73. Green building standards and certification programmes such as the United Kingdom [BRE Environmental Assessment Method](#) and the United States [Leadership in Energy and Environmental Design](#) standards can contribute to market development for green building materials and technologies, while contributing to foster skills development and raising expectations about the environmental performance of buildings.¹¹³ However, in many developing and emerging economies, green building materials and technologies are not yet widely accessible and the upfront costs are a major constraint to the construction of new green buildings in these countries.¹¹⁴
74. There is momentum indicating the need for this industry to take ambitious action on environmental and climate change and pursue the realization of the goals and commitments of the Paris Agreement and, as appropriate, other international environmental agreements relevant



¹¹⁰ Usha Iyer-Raniga and Pekka Huovila, [Global State of Play for Circular Built Environment](#) (UNEP, 2021).

¹¹¹ See for instance, ILO, [Employment-Intensive Investment Programme \(EIIP\): Environmental and Social Safeguards Guidelines](#), 2022.

¹¹² ILO, [Skills and Occupational Needs in Green Building](#), 27.

¹¹³ ILO, [Skills and Occupational Needs in Green Building](#), 5.

¹¹⁴ ILO, [Skills and Occupational Needs in Green Building](#), 24.

to a just transition. In the Paris Agreement, governments committed themselves to considering the imperatives of a just transition of the workforce and the creation of decent work and quality jobs. To deliver sustainable development, all its economic, social and environmental dimensions should be addressed, as well as the linkages between them.

75. The transition in the building materials industry towards lowering GHG emissions will require implementing policies and measures that will inevitably affect both the workforce and the enterprises in the building materials industry.¹¹⁵ A just transition involves gradually phasing out high-carbon footprints and transitioning to low-carbon practices, while at the same time ensuring that policies promote decent work and ensuring that no one is left behind in the transition process.¹¹⁶
76. The [Guidelines for a just transition towards environmentally sustainable economies and societies for all](#) (Just Transition Guidelines), which were adopted in 2015 by representatives of governments and of employers' and workers' organizations, offer a crucial policy framework and practical tool for addressing environmental change in a manner that prioritizes social justice and fosters the creation of decent work. In 2023, through the [Resolution concerning a just transition towards environmentally sustainable economies and societies for all](#), the International Labour Conference endorsed the Just Transition Guidelines and called for their accelerated implementation by promoting inclusive, sustainable and job-rich economies; advancing social justice; managing the process of just transition; and financing a just transition. The importance of social dialogue at all levels for forging ambitious policies and measures for a just transition cannot be overstated.

4.2. Green jobs creation, skills and enterprise development

Green jobs creation

77. The building materials industry can be a catalyst for growth through significant spillover effects on the related sectors, as well as an engine for job creation and enterprise development. The IEA estimates that investments in building efficiency retrofitting and the construction of efficient buildings can generate between 10 to 15 jobs for every US\$1 million invested.¹¹⁷ Promoting green building materials therefore has the potential for generating new jobs. In some contexts, locally sourced building materials can provide more sustainable and environmentally friendly solutions with lower production and transportation costs.¹¹⁸
78. Introducing an appropriate mix of policy efforts aimed at the creation of green jobs, while ensuring a just and inclusive transition to a low-carbon and environmentally sustainable industry, is a priority. Conducting green jobs assessments of the building material industry can provide valuable insights about the policy options to reorient the industry away from carbon-intensive production, while tapping into the potential for job creation and transformation in the context of sustainable and environmentally friendly economic activities.¹¹⁹ For instance, based on a preliminary green jobs assessment, the ILO provided technical support in the Philippines through

¹¹⁵ ILO, "[Sectoral Policies for a Just Transition Towards Environmentally Sustainable Economies and Societies for All](#)", ILO Policy Brief, 2022.

¹¹⁶ ILO, "Sectoral Policies for a Just Transition".

¹¹⁷ IEA, [Sustainable Recovery: World Energy Outlook Special Report](#), 2020, 39.

¹¹⁸ ILO, "[Employment Intensive Investment Programme: Improving Informal Urban Settlements through Local Infrastructure Development](#)", EIIP Technical Brief, December 2022.

¹¹⁹ ILO, [Guidelines on Green Employment Diagnostics for Just Transitions](#), 2023; UNEP, [Guide for Conducting Sustainable Buildings and Construction Country Assessments](#).



an integrated employment promotion approach in order to introduce new green building products in the social housing sector.¹²⁰ In Argentina, as part of the efforts under the UN Partnership for Action on Green Economy (PAGE), the national labour adaptation plan for a sustainable construction sector was formulated based on social dialogue with national tripartite constituents. The formulation was informed by a comprehensive analysis of the sector that also looked into the potential for promoting green building materials.¹²¹

- 79.** Increasing attention has recently been paid to green infrastructure investments, including in developing countries. The ILO supports the application of labour-intensive and local resource-based technology (LRBT) approaches, which build the capacity to use green building materials in infrastructure development programmes and have great potential for employment creation.¹²² LRBT approaches comprise work methods and technologies in which the use of local resources, including labour, is favoured and optimized in the delivery and maintenance of infrastructure assets. LRBT approaches are relevant not only in terms of climate mitigation but also in terms of adaptation works to enhance the resilience against more frequent extreme weather events. Furthermore, these approaches are implemented not only in a developmental context but also in reconstruction efforts after a disaster or a humanitarian crisis.¹²³ The Employment and Decent Work for Peace and Resilience Recommendation, 2017 (No. 205), recognizes the importance of promoting a just transition in order to build environmental resilience in fragile contexts to support the most vulnerable people. Sustainable construction can promote green job creation in the construction sector and boost the local production of building materials. Reconstruction processes that support the introduction of green methods, practices and technologies can generate jobs for architects, engineers and construction workers, while also boosting employment in utility provision and other related sectors.¹²⁴

Skills development

- 80.** The transition towards a greener and climate-neutral building materials industry will involve the introduction of policy measures that will have an impact on the future workforce profiles and skills. Such implications should be considered when formulating skills development policies. Promoting skills development and lifelong learning, including quality apprenticeships, in the building materials industry is critical for a just transition to a future of work that contributes to sustainable development in its economic, social and environmental dimensions.¹²⁵ The involvement of social partners is key for the development of skills development policies, in line with the Convention on Human Resources Development, 1975 (No. 142) and its Recommendation, 2004 (No. 195).
- 81.** While the importance of skills for green jobs is recognized for the green transition in the building materials industry, there are considerable investment gaps at the national level, especially in low-

¹²⁰ ILO, “Promoting Green Jobs and Livelihoods in Environmentally Sustainable Construction of Social Housing”, 2012.

¹²¹ ILO, *Hacia una transición laboral justa en el sector de la construcción*.

¹²² ILO, *Green Works: Creating Decent Jobs through Investments: Promoting Forest Restoration, Irrigation, Soil and Water Conservation, and Flood Protection*, 2020; ILO, *Local Investments for Climate Change Adaptation: Green Jobs through Green Works*, 2011.

¹²³ ILO, *Towards Sustainable Construction and Green Jobs in the Gaza Strip*, 2012; UNIDO, “Green Reconstruction of Ukraine through Standards and Technical Regulation: The Role of Municipalities”, 24 January 2024.

¹²⁴ ILO, *Towards Sustainable Construction and Green Jobs in the Gaza Strip*.

¹²⁵ ILO, *ILO Centenary Declaration for the Future of Work*, International Labour Conference, 108th Session, 2019; *Resolution concerning skills and lifelong learning*, International Labour Conference, 109th Session, 2021; and *Resolution concerning a just transition towards environmentally sustainable economies and societies for all*, International Labour Conference, 111th Session, 2023.



and middle-income economies. The greening of enterprises faces bottlenecks due to skill mismatches and widening skill gaps, notably in non-energy-related sectors. Skills shortages and deficiencies can constrain sustainable enterprise development towards more environmentally sustainable production and green building materials.¹²⁶ In the building materials industry, there is a need for skills development in areas such as energy efficiency, water management and renewable energies, while new occupations are also emerging, such as that of energy efficiency analyst. Moreover, there is an increasing requirement to upgrade workers' skills for many existing occupations. Those displaced from declining industries may potentially relocate to green building materials production if relevant reskilling programmes are available.¹²⁷

82. The early identification of skill needs for green building materials, as well as the timely and adequate provision of skills for future demand, can make an important contribution to the transition to a sustainable economy. Aligning school and training institutions' curricula with labour market demand, through close collaboration with employers' and workers' organizations, is crucial for ensuring the relevance of skills development and technical and vocational education and training (TVET) programmes. For instance, the social partners in Europe's cement industry acknowledged the need for environmental and digital skills to be integral across all industry functions and collaborated to map future skill needs through 2050, while engaging with European institutions in shaping the Skills Agenda and Industry 5.0.¹²⁸ For instance, one ILO assessment of skills needs in the Indonesian cement sector, which was conducted with tripartite involvement, reviewed existing systems for developing a skilled workforce in the sector, while considering the required changes to the sector due to the introduction of green technologies.¹²⁹ These efforts underline the relevance of sector-based analysis to informing tripartite dialogue on the best approach to promoting access to skills for green jobs and the greening of existing jobs in the building materials industry.
83. Future efforts in terms of vocational training, education and human resources policies should enable workers and enterprises in the building materials industry to adapt to the energy transition and to technological advances, such as automated production processes and digitalization. Workers will need to be trained on using green building materials, handling and adjusting to new low-to-zero-carbon production methods and technologies, and meeting the additional OSH measures and other requirements that this may involve. Policies that promote mobility and reskilling can contribute to absorbing workers displaced from conventional industries. Skills development programmes that ensure the inclusion of specific disadvantaged and vulnerable workers in the industry will also become relevant.¹³⁰
84. Adapting and harmonizing vocational training systems to meet the needs of workers in the sector throughout their lives will require increased investment and stronger links between education and TVET systems that are targeted to competences in the building materials industry and construction sector more broadly.¹³¹ At the same time, the greening TVET agenda offers opportunities to ensure that programmes, qualifications and provisions are suitable for equipping



¹²⁶ ILO, *Skills and Occupational Needs in Green Building*.

¹²⁷ ILO, *Skills and Occupational Needs in Green Building*; The European Cement Association (CEMBUREAU), "[Transformation of the Workforce: Contribution to Industry 5.0 and EU Skills Agenda](#)", 2 October 2023; *EFBWW News*.

¹²⁸ CEMBUREAU.

¹²⁹ ILO, *Skills Trends For Green Jobs in the Cement Industry in Indonesia*, 2014.

¹³⁰ ILO, *World Employment and Social Outlook 2018*.

¹³¹ Platform for Advancing Green Human Capital (PAGHC), *Advancing Green Human Capital: A Framework for Policy Analysis and Guidance*, 2017.

workers and employers with the skills they need for the green transition.¹³² In sectors such as those related to the built environment, industry-led sector skills councils that are responsible for the development of national occupational standards and qualifications play a key role. For example, in the construction sector, the Indian Green Building Council and the National Bureau of Energy Efficiency conduct training programmes for energy managers and grant national certification for energy auditors.¹³³

85. According to ILOSTAT data for 85 countries, about 2.5 per cent of young people (aged 15–24) participate in work-based learning (apprenticeships or internship programmes). While there is significant variation across countries, sex and age groups, the available data indicate that there is potential for strengthening work-based learning in order to provide initial training and reskilling and upskilling opportunities for both young and prime-age workers and meet the challenges of the twin green and digital transitions.¹³⁴ The Quality Apprenticeships Recommendation, 2023 (No. 208), and other relevant ILO instruments provide relevant guidance to foster opportunities for individuals of all ages to acquire, enhance and continuously update their skills.
86. In refocusing the building sector towards greater sustainability, the role of employment services and active labour market policies is important. They can play a critical role in job placement and income support, as well as in retraining unemployed and hard-to-employ workers.

Enabling environment for sustainable enterprises

87. Green buildings and green building materials are generating substantial business opportunities, not just for construction businesses and construction professionals but also for businesses supplying the technologies, materials and services required. These opportunities drive entrepreneurship and enable existing businesses scope to diversify and expand.¹³⁵ There is increased awareness about the importance of pursuing environmentally sustainable business models in the building materials industry, with enterprises identifying opportunities and generating solutions that can not only boost their business performance but also underline their commitment to take action to address climate change (see box 3).

► Box 3. Examples of industry-led initiatives to transform the building materials industry

The [World Green Building Council \(WorldGBC\)](#) is a global network of businesses, governments and about 70 green building councils and their 36,000 members. In its [strategy](#), the WorldGBC aims to transform the building and construction sector across three strategic areas — climate action, health and well-being, and resources and circularity. Specific to cement, the Global Cement and Concrete Association (GCCA) committed in 2023 to producing net zero concrete by 2050, through the [GCCA 2050 Cement and Concrete Industry Roadmap for Net Zero Concrete](#). The industry has identified a suite of interventions, including technology, financial and policy interventions, that are needed to reduce and eventually eliminate emissions. The World Business Council for Sustainable Development hosted the Cement Sustainability Initiative, which brought together 24 leading cement producers with operations in more than 100 countries, aiming to facilitate sustainable development of the cement and concrete sectors and their value chains. In 2018, the Initiative was transferred to the GCCA.^a

^a GCCA, “Partnership with World Business Council for Sustainable Development Work of Cement Sustainability Initiative to transfer to GCCA”, press release, 2 August 2018.

¹³² ILO, *Greening TVET and Skills Development: A Practical Guidance Tool*, 2022; EFBWW News.

¹³³ ILO, *Greening TVET and Skills Development*, 21.

¹³⁴ ILO, *Greening TVET and Skills Development*, 59–60; ILO, “*Insights into Youth Participation in Work-Based Learning*”, ILOSTAT database, 2024.

¹³⁵ ILO, *Skills and Occupational Needs in Green Building*, 21.



88. Through its close linkages with the construction sector and related activities, the building materials industry has significant multiplier effects on the local and national economy through the creation of indirect and induced employment and business opportunities for SMEs in local communities and value chains (see box 4).

► **Box 4. Promoting green jobs in the construction sector in Zambia**

In partnership with other UN agencies, the Government of Zambia, social partners and other construction sector stakeholders, the ILO-led [Zambia Green Jobs Programme](#) (2013–2018) aimed to enhance competitiveness and sustainable enterprise development among micro, small and medium-sized enterprises (MSMEs) in the Zambian construction sector. It increased incomes and livelihoods for households and helped create sustainable and green jobs, [particularly for young men and women](#), including in rural areas in which poverty is widespread. By using a value-chain development approach, the programme undertook coordinated measures at various system levels, including by creating awareness of the benefits of green construction in order to stimulate the market demand for green building products and services; strengthening the sector's regulatory framework to stimulate demand among private and public housing developers for environmentally friendly building materials, products and methods; and building the capacity of local MSMEs.

89. Governments are increasingly using local content policies, which aim to ensure that a significant proportion of project inputs are sourced at the local level and to harness the industry's potential for development, creating business opportunities for local businesses and potentially generating more indirect jobs along the supply chain. To encourage building materials and construction companies to use local sourcing, governments are contemplating both demand- and supply-side policies, such as requirements for a certain percentage of goods and services to be locally sourced from domestic businesses or technology transfer requirements, as well as by providing incentives such as financial support and tax incentives.
90. Government initiatives to promote entrepreneurship in sustainable materials could be expanded to support the industry's transition to sustainable materials. There is also a need for government efforts to facilitate investments in research and development for the development and implementation of new sustainable building materials and technologies. This can be achieved through targeted fiscal policies or by strategically reallocating public funds to prioritize sustainable innovation.
91. However, a number of challenges are faced by enterprises in the building materials industry, especially micro and small enterprises in developing countries, in achieving the transition towards a more environmentally sustainable economy. Such challenges are compounded by an inadequate enabling environment for the development of sustainable enterprises and limited access to financial services, modern technology and infrastructure.¹³⁶
92. The [Conclusions concerning the promotion of sustainable enterprises](#), adopted by the International Labour Conference in 2007, highlight 17 conditions for a conducive environment for sustainable enterprises, which, inter alia, encourage investment and entrepreneurship, uphold workers' rights and facilitate social dialogue, including by improving access to financial services and technical or entrepreneurship skill development opportunities, in particular for women and

¹³⁶ Elina Karttunen et al., "Toward Environmental Innovation in the Cement Industry: A Multiple-Case Study of Incumbents and New Entrants", *Journal of Cleaner Production* 314 (2021); ILO, *Greening Enterprises: Transforming Processes and Workplaces*, 2022; Oluwaseun S. Dosumu and Clinton Aigbavboa, "An Investigation of the Barriers to the Uptake of Local Materials in Africa: A Literature Review Approach", *African Journal of Science, Technology, Innovation and Development* 12, No. 4 (2020); IFC, "IFC Cement Portfolio: Findings and Lessons on Development Results", August 2009.



young people, and by enhancing support to access recognized standards and certifications for sustainable building materials, among other measures. The [Conclusions concerning small and medium-sized enterprises and decent and productive employment creation](#), adopted by the International Labour Conference in 2015, as well as the Job Creation in Small and Medium-Sized Enterprises Recommendation, 1998 (No. 189), address the particular constraints faced by MSMEs and their workers and provide guidance on effective SME policies for creating productive employment and decent work.

Transition to formality

- 93.** The construction sector is one of the sectors with the largest shares of informal employment worldwide, with almost 74 per cent of informal employment.¹³⁷ Parts of the building materials industry are also exposed to informality, especially in developing countries.¹³⁸ In the context of advancing towards a just transition in the building materials industry, the linkages between informality and the environment vary according to the nature of activities in the informal economy and their reliance on natural resources. Furthermore, in many countries industry sites are situated in vulnerable areas, including informal settlements such as slums, that may be highly susceptible to environmental hazards and climate shocks and where workers may find themselves at an increased risk of exposure to hazards. At the same time, activities in the informal economy have an impact on the environment.¹³⁹ The Just Transition Guidelines and the Transition from the Informal to the Formal Economy Recommendation, 2015 (No. 204), map out key policy areas and potential entry points to advance both environmental sustainability and formalization objectives.

4.3. Occupational safety and health, and working conditions

Occupational safety and health

- 94.** A safe and healthy working environment is not only a fundamental principle and right at work but also an essential requirement for fostering sustainable and inclusive economic growth, full and productive employment and decent work for all. It is thus relevant for the building materials industry as workers continue to grapple with various OSH challenges, especially in the context of advancing towards a just transition in the sector.
- 95.** With the adoption by the ILO of a safe and healthy working environment as a fundamental principle and right at work in 2022, Members have an obligation to respect, to promote and to realize the principles set out in the Occupational Safety and Health Convention, 1981 (No. 155), and the Promotional Framework for Occupational Safety and Health Convention, 2006 (No. 187), in relation to all workers, including those in the building materials industry. These two fundamental Conventions set out the actions that governments, as well as employers' and workers' organizations shall put in place to ensure a safe and healthy work environment and tailor systems for the promotion of physical and mental health in the workplace. They also place a strong emphasis on a culture of preventative safety and health (see section 4.6 below). Many of the international labour standards focusing on OSH address various risks associated with the sector. The Safety and Health in Construction Convention (No. 167) and Recommendation (No. 175), 1988, are also relevant to the building materials industry. The [ILO code of practice on](#)

¹³⁷ ILO, *Women and Men in the Informal Economy: A Statistical Update*, 2023.

¹³⁸ Jill Wells, "Informality in the Construction Sector in Developing Countries", *Construction Management and Economics* 25, No. 1 (2007): 87–93.

¹³⁹ ILO, *A Double Transition: Formalization and the Shift to Environmental Sustainability with Decent Work*, 2022, 11.



[safety and health in construction](#) of 2022 provides supplementary practical information and guidance.

96. The nature of the work in the building materials industry exposes workers to increased risks of accidents and diseases, such as exposure to hazardous substances, noise and vibration, musculoskeletal disorders and biological agents, as well as psychosocial risks and stress that can lead to alcohol or drug abuse or violence or harassment.¹⁴⁰ In parts of the cement industry, manual handling injuries are a cause of concern due to the heavy weight of cement bags.¹⁴¹ In some instances, cases of serious injuries or even fatal accidents have been reported in cement plants.¹⁴²
97. Occupational exposure to hazardous substances needs to be considered in this industry. Silica is prevalent in various materials processing and construction sites. In that regard, the ILO code of practice on OSH in construction provides guidance for the prevention and control of exposure to silica (see box 5). While asbestos is being eliminated and banned in many countries, exposure to asbestos is still a cause of concern, including for workers in the building materials industry. The ILO code of practice on OSH in construction provides guidance on the safe removal of asbestos-containing materials, in accordance with the Asbestos Convention (No. 162) and Recommendation (No. 172), 1986, as well as relevant provisions of the ILO code of practice on safety in the use of asbestos of 1984.¹⁴³

► Box 5. Occupational exposure to silica in the buildings materials industry

Silica constitutes the second-largest proportion of cement ingredients, as well as in the glass industry.^a Inhaling silica can lead to various lung-related diseases, including lung cancer and silicosis. The ILO code of practice on OSH in construction provides guidance in this regard, indicating measures to eliminate respirable crystalline silica-related risks, as prioritized in the joint ILO/World Health Organization (WHO) Global Programme for the Elimination of Silicosis and described in the ILO/WHO Outline for a National Programme for the Elimination of Silicosis.^b The ILO code of practice on OSH in construction underscores, among other things, the imperative to avoid skin contact with hazardous chemicals, and recommends measures such as the use of personal hygiene and appropriate clothing to prevent chemical exposure.

^a Nora Wintour, *The Glass Industry: Recent Trends and Changes in Working Conditions and Employment Relations*, ILO Sectoral Policies Department Working Paper No. 310, 2015; Arshad Husain Rahmani et al., "Effect of Exposure to Cement Dust among the Workers: An Evaluation of Health Related Complications", *Macedonian Journal of Medical Sciences* 6, No. 6 (2018).

^b ILO, *Exposure to Hazardous Chemicals at Work and Resulting Health Impacts: A Global Review*, 2021; ILO, *Safety and Health in Construction. ILO Code of Practice*, 2022.

98. OSH risks in the building materials industry are evolving as a result of climate change, including but not limited to extreme heat and weather events, as well as the introduction of new technologies and materials. The scope of the ILO code of practice on OSH in construction includes construction practices that are gaining prominence with the advancement of circular practices and other lower-carbon approaches. Transitioning to green construction and a circular economy in the built environment can introduce new OSH challenges. Some of these OSH risks are new

¹⁴⁰ ILO, *Safety and Health at the Heart of The Future Of Work: Building on 100 Years of Experience*, 2019; BWI, *The Global Cement Industry*, 2016; United States, Occupational Safety and Health Administration, "Concrete and Concrete Products: Industry Segments and Controlling Hazards".

¹⁴¹ BWI, *The Global Cement Industry*.

¹⁴² BWI, *The Global Cement Industry*; IndustriALL Global Union (IndustriALL), "Three Workers Killed in Explosion at Indian Cement Factory", 24 July 2023.

¹⁴³ ILO, *Safety in the Use of Asbestos: An ILO Code of Practice*, 1984.



compared with traditional construction sites and are associated with the use of new green materials, technologies or design. Other risks are well known to the industry but have arisen in new situations or combinations associated with green buildings that demand consideration.¹⁴⁴ The ILO code of practice also recognizes OSH-related issues related to the manufacturing and use of prefabricated structures, as well as waste management and recycling associated with the dismantling and demolition of buildings and construction structures.

99. OSH risks are furthermore higher in countries with an emerging building materials industry and limited experience in the management of these risks. OSH hazards in larger enterprises of the industry can be considerably different from those prevalent in smaller-sized businesses, especially in the informal economy. Moreover, while consistent data is lacking, the available evidence about OSH performance tends to show worse outcomes in countries that lack robust OSH legislation and policies in place and the capacity of labour inspectors to enforce these.
100. To promote a preventative OSH culture, actions are needed at both the workplace and national levels. Cooperation between employers, workers and their representatives is an essential element for the implementation of preventive and control measures. Workers' active participation is a critical component of the OSH management system in a building materials facility and more generally at construction project sites. It is also key to ensure the establishment and efficient functioning of a safety and health committee and the recognition of workers' safety and health representatives, in accordance with national laws and practice.¹⁴⁵ Particular attention should also be paid to improving OSH in SMEs in the industry.¹⁴⁶
101. Given the close intersectoral linkages, addressing OSH issues in the building materials industry can be instrumental in promoting OSH in the construction sector and related sectors of the built environment. It is also important to put in place national laws and regulations to ensure that building materials do not entail dangers to the safety and health of those using them, as well as to ensure that manufacturers facilitate information concerning their requirements for the correct use of substances, including information about the hazards and risk control measures to be followed.¹⁴⁷
102. As in many other sectors, cases of violence and harassment are reported in parts of the building materials industry and the construction sector.¹⁴⁸ With an increasingly diverse workforce, the sector needs integrated and gender-responsive approaches, inclusive of migrant workers, in order to prevent and eliminate violence and harassment in the workplace, in line with the Violence and Harassment Convention (No. 190) and Recommendation (No. 206), 2019.
103. Governments play a critical role in supporting the effective implementation of international labour standards and national labour laws, including through their labour inspectorates. As recognized



¹⁴⁴ European Agency for Safety and Health at Work (EU-OSHA), "Occupational Safety and Health Issues Associated with Green Building", E-FACTS No. 70, 31 May 2013; *Foresight Study on the Circular Economy and its Effects on Occupational Safety and Health: Phase 2 – Micro-Scenarios*, 2023; Melissa Edmondson and Scott Earnest, "Envisioning the Future of Construction: Challenges and Opportunities for Occupational Safety and Health", United States, Centers for Disease Control and Prevention, *NIOSH blog* (blog), 2 February 2021.

¹⁴⁵ ILO, *Safety and Health in Construction: ILO Code of Practice*, 2022.

¹⁴⁶ ILO, *Improving Occupational Safety and Health in Small and Medium-Sized Enterprises: Participant Handbook*, 2021; Wintour.

¹⁴⁷ ILO, *Safety and Health in Construction*.

¹⁴⁸ ILO, *Violence and Harassment against Women and Men in the World of Work: Trade Union Perspectives and Action*, 2017; ILO, *Violence and Harassment in the World of Work: A Guide on Convention No. 190 and Recommendation No. 206*, 2021; BWI, "Frequently Asked Questions (FAQ): C190 – Violence and Harassment Convention (2019)", 2019.

by the Labour Administration Convention, 1978 (No. 150), labour administration is an essential tool at the disposal of governments in fulfilling their responsibilities towards social issues.¹⁴⁹

- 104.** Labour inspection is key for supporting the creation of better working conditions for women and men by verifying how national labour standards are applied in the workplace, and can advise employers and workers and their organizations in the building materials industry how to make improvements in areas such as working time, wages and OSH. In line with the Labour Inspection Convention, 1947 (No. 81), there is great potential to make labour inspection more effective in the building materials industry by, among other things, promoting awareness of the purposes and benefits of inspection; strengthening the role of current labour inspection systems; revising outdated legislation relating to labour inspection; promoting the proper planning of regulatory activities; and providing employers and workers and their representatives with advice on OSH-related matters.

Working conditions and labour protection

- 105.** In the building materials industry, a growing number of workers are in diverse forms of work or contractual arrangements, including subcontracting, that are characterized by different levels of labour and social protection.¹⁵⁰ Although these diverse work arrangements may have generated opportunities and eased the access to employment for workers who face high barriers in entering and remaining in the labour market, they have also led to new challenges for labour protection and classification of workers.¹⁵¹
- 106.** The employment status of workers in the building materials industry can vary considerably among countries and income groups and is also determined by the types of building materials used. In low-income and middle-income countries, the prevalence of informality means that many of the sector's workers have low-paid or insecure jobs. Workers may be exposed to lower levels of labour and social protection, as well as greater occupational hazards and risks and a lack of access to skills development opportunities. Also, they are often unaware of their rights and/or lack the collective voice to demand that they be upheld.¹⁵²
- 107.** In terms of classification, the distinction between dependent employment and self-employment has become increasingly blurred.¹⁵³ The heterogeneity of the self-employed has become apparent. This category of workers comprises persons who perform entrepreneurial activities, as well as persons who are in a situation of strong economic dependence relative to their principals. The variety of skills required in a construction project, particularly building projects, means that the subcontracting of packages of work that require particular expertise (specialized trades) has always been important. Subcontracting has increased dramatically in many parts of the world in recent years and not just in the specialized trades. Employment by the main contractor may not necessarily imply a direct employment relationship between the worker and the contractor, as



¹⁴⁹ ILO, *Labour Administration in a Changing World of Work*, ILC.112/III(B), 2024.

¹⁵⁰ Steve Davies et al., "Labour Standards and Capacity in Global Subcontracting Chains: Evidence from a Construction MNC", *Industrial Relations Journal* 42, No. 2 (2011): 124–138.

¹⁵¹ ILO, *Resolution concerning the second recurrent discussion on labour protection*, International Labour Conference, 111th Session, 2023, para. 7 of the conclusions.

¹⁵² BWI and Laudes Foundation, *Social Dialogue and Collective Bargaining in the Green Transition in BWI Sectors* (BWI, 2023); IndustriALL, *Materials Industries Report – 2017*, 2017; BWI, *The Global Cement Industry*; Jill Wells, *Exploratory Study of Good Practices in the Protection of Construction Workers in the Middle East* (ILO, 2018), 4–5.

¹⁵³ ILO, *Leaving No One Behind: Building Inclusive Labour Protection in an Evolving World of Work*, ILC.111/V(Rev.), 2023; BWI, *The Global Cement Industry*; IndustriALL, *Materials Industries Report*.

principal contractors may be employing workers through intermediaries.¹⁵⁴ In the cement industry, subcontracting may be utilized for general services but also for more operational activities, such as maintenance, logistics or production.¹⁵⁵ According to an IndustriALL Global Union (IndustriALL) report, in the context of a building materials MNE with approximately 480,000 workers, there were 160,000 direct employees, while subcontracting and temporary agency work emerged as dominant contractual arrangements.¹⁵⁶ There is a need for ensuring the correct classification of employment relationships in the industry.¹⁵⁷

- 108.** Convention No. 167 stipulates that the term “employer” encompasses “as the context requires, the principal contractor, the contractor or the subcontractor”. It also stipulates that in cases in which multiple employers are engaged in simultaneous activities at a construction site, “the principal contractor, or other person or body with actual control over or primary responsibility for overall construction site activities, shall be responsible for co-ordinating the prescribed safety and health measures”. In accordance with national laws and regulations, they must also ensure compliance with these measures or appoint a competent substitute. In broader terms, Convention No. 155 provides that when two or more undertakings conduct activities simultaneously at a workplace, they must collaborate in applying the requirements of the Convention. Another relevant aspect concerning subcontracting is found in the Labour Clauses (Public Contracts) Convention, 1949 (No. 94), which mandates the inclusion of clauses in public procurement contracts to guarantee that workers involved in contract execution benefit from level of wages and other working conditions not less favourable than those established locally in similar trades or industries. The Convention explicitly applies to work conducted by subcontractors or assignees of contracts, and competent national authorities must take appropriate measures to ensure its application. The Private Employment Agencies Convention (No. 181) and Recommendation (No. 188), 1997, provide guidance, including on protection for workers who are employed through third parties such as private employment agencies.

4.4. Other fundamental principles and rights at work and international labour standards

- 109.** The application of international labour standards and their principles is central to ensuring a rights-based approach to development, while providing an enabling environment for improved productivity and performance. Aligning regulatory and policy frameworks to fundamental principles and rights at work, ratified Conventions, and relevant Recommendations, as appropriate, and ensuring that all workers in the building materials industry are covered by relevant standards are important for the promotion of decent work and ensuring a just transition in the building materials industry, including cement.
- 110.** All countries, by virtue of being an ILO Member State, have the responsibility to respect, promote, and realize the fundamental principles and rights at work. The relevant fundamental ILO Conventions protect and apply to all workers, including those in the building materials industry under the conditions set out in each Convention. In that regard, governments have undertaken to:

¹⁵⁴ Wells, *Exploratory Study of Good Practices in the Protection of Construction Workers in the Middle East*, 4–5.

¹⁵⁵ BWI, *The Global Cement Industry*.

¹⁵⁶ IndustriALL, *Materials Industries Report*.

¹⁵⁷ ILO, Resolution concerning the second recurrent discussion on labour protection.



- recognize the important role of social partners in the industry, taking into account the Freedom of Association and Protection of the Right to Organise Convention, 1948 (No. 87), and the Right to Organise and Collective Bargaining Convention, 1949 (No. 98);
- respect, promote and realize equality of opportunity and treatment for women and men without discrimination of any kind, taking into account the Equal Remuneration Convention (No. 100) and Recommendation (No. 90), 1951, and the Discrimination (Employment and Occupation) Convention (No. 111) and Recommendation (No. 111), 1958;
- take measures to prevent and eliminate child labour in the building materials industry, taking into account the Minimum Age Convention (No. 138) and Recommendation (No. 146), 1973, and the Worst Forms of Child Labour Convention (No. 182) and Recommendation (No. 190), 1999;
- pursue policies that prevent and eliminate the use of compulsory labour in the building materials industry, and protect victims and provide access to remedies, in accordance with the Forced Labour Convention, 1930 (No. 29), and its Protocol of 2014, and the Abolition of Forced Labour Convention, 1957 (No. 105); and
- undertake progressive and sustained improvements towards the provision of safe and healthy working environments, in accordance with Conventions Nos 155 and 187 (see section 4.3 above).

111. While important achievements to prevent child labour and forced labour continue to be made in many developing countries, there are still many children and workers who are unable to enjoy the fundamental right to be free from child labour and forced labour. Specific to the building materials industry, there are no global estimates on the incidence of child labour and forced labour, while national-level statistics are limited to certain countries and for certain types of building materials (see box 6).

► Box 6. Decent work challenges in traditional brickmaking

Approximately 1,500 billion bricks are produced every year, especially in Asia.^a Bricks produced in traditional brick kilns contribute significantly to the construction sector in many South Asian countries. Evidence from ILO reports focusing on traditional brickmaking in several of these countries notes that challenges to decent work in this sector include child labour, forced labour and violations of workers rights. For instance, working hours in brick kilns tend to be higher than in other sectors and one of the reasons for that is the payment system, which is often based on piece-rate modalities. Workers in the brick kilns are exposed to many OSH hazards, including exposure to extreme temperatures and dust. While many of the brick kilns are located in rural areas that play a key role in these local economies, the sector remains largely informal and unorganized and many workers lack access to social protection.^b The ILO has been working with tripartite constituents towards the elimination of child labour and forced labour in brick kilns in South Asia. In 2022, working with constituents in Pakistan, the ILO provided support to promote the fundamental principles and rights at work, while greening the brick kiln sector. By building the capacity of local brick kilns to adopt more environmentally sustainable solutions, there were productivity gains and improvements in the working conditions and OSH protection of brick kiln workers.^c

^a Laura Nicolaou et al., “Brick Kiln Pollution and its Impact on Health: A Systematic Review and Meta-Analysis”, *Environmental Research* 257 (May 2024).

^b ILO, *A Study of Deficits in the Fundamental Principles and Rights at Work in the Brick Kiln Supply Chain: Focusing on Child Labour and Bonded Labour in Pakistan's Brick Kiln Sector*, 2022; Nepal (Central Bureau of Statistics), ILO and UNICEF, *Report on Employment Relationship Survey in the Brick Industry in Nepal*, 2020; ILO, The Brooke Hospital for Animals (BROOKE) and The Donkey Sanctuary, *Environment, Human Labour, and Animal Welfare: Unveiling the Full Picture of South Asia's Brick Kilns and Building the Blocks for Change*, 2017.

^c ILO, “Promotion of Decent Work Opportunities for the Economic Empowerment of Vulnerable Segments of Society”.



112. The general acceptance of the principles of non-discrimination with respect to employment and occupation is reflected in the high rates of ratification of Conventions Nos 100 and 111, including among countries that play a major role in the building materials industry. These issues are particularly relevant for groups of workers in the sector who are at greater risk of socio-economic vulnerability. These groups include, but may not be limited to, women, migrant workers and young people. In the case of migrant workers, the ratification and effective implementation of the fundamental ILO Conventions and other relevant standards, such as the Migration for Employment Convention (Revised), 1949 (No. 97), and the Migrant Workers (Supplementary Provisions) Convention, 1975 (No. 143), can help address these gaps, thereby ensuring the ability of all workers to exercise their rights and make an effective contribution to the sector and to economies and societies at large.
113. The ILO's [General principles and operational guidelines for fair recruitment and Definition of recruitment fees and related costs](#) of 2019 provide guidance in the area of recruitment policies and practices with a view to ensuring equality of treatment and non-discrimination with respect to nationals and all other workers, in all aspects of employment, as well as ensuring that workers do not pay recruitment fees or related costs. These are key to ensuring that migrant workers have decent working conditions and can continue to contribute to societies and economies, all of which is particularly relevant for the industry.
114. The ILO [Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy](#) (MNE Declaration) provides policy guidance for governments, social partners and enterprises on the promotion of sustainable enterprises. Most recently updated in 2022, this global instrument serves as a reference point for the ILO's engagement on the fundamental principles and rights at work and responsible business conduct, and aligns itself with the OECD Guidelines for Multinational Enterprises on Responsible Business Conduct (updated in 2023) and the UN's Guiding Principles on Business and Human Rights.
115. Several ILO instruments, in addition to the fundamental Conventions mentioned above, relating to social dialogue, tripartite consultation, minimum wage, labour administration and inspection, employment policy, human resources development, labour procurement and social security, are important for the building materials industry. Annex 1 of the ILO Guidelines for a Just Transition set out a number of international labour standards and ILO resolutions that may be relevant to a just transition framework. The bibliography of the ILO code of practices on OSH in construction also provides relevant international labour standards relevant to the building materials industry and construction sector more broadly.



4.5. Social protection

116. In line with the Social Security (Minimum Standards) Convention, 1952 (No. 102), and the Social Protection Floors Recommendation, 2012 (No. 202), social protection provides coverage against risks over the course of a person's life, including medical care, sickness benefit, unemployment benefit, old-age benefit, employment injury benefit, family benefit, maternity benefit, invalidity benefit, and survivors' benefit. In so doing, social protection is an important tool for reducing poverty and inequality, as highlighted in targets 1.3, 3.8 and 10.4 of the Sustainable Development Goals. Social protection is also widely recognized as a key strategy for building resilience in the face of shocks and structural transformations, as outlined in the Employment Promotion and Protection against Unemployment Convention, 1988 (No. 168). In the building materials industry as well, social protection systems are key given the structural changes that are occurring, with an increased likelihood of layoffs and increasing unemployment in those parts of the industry that will be affected by lower reliance on carbon-emitting building materials. The ILO Just Transition

Guidelines emphasize the significance of social protection and urge that Governments, in consultation with social partners, should:

integrate social protection into policy measures and responses to environmental impacts and the challenges of the transition for those likely to be negatively affected, in particular workers largely dependent on natural resources or facing major structural changes. In this context, also consider, among others, the use of measures to protect retirement security, in line with national legislation; (paragraph 28(b))

and

foster tripartite mechanisms to identify and understand challenges posed by climate change and formulate adequate, predictable and innovative social protection measures that protect, where appropriate, existing benefits and take into account emerging social needs; (paragraph 28(h)).

117. As the industry undergoes such structural changes, there is a need for providing unemployment protection to all workers in the industry, including those in informal employment, combined with labour market and employment services, in order to help drive job creation.¹⁵⁸ In countries that face an ageing workforce, including in the building materials industry, many workers might take early retirement and rely on their pensions. Challenges may be pronounced in countries that lack robust, resilient and sustainable social protection systems. The ILO estimates that only 47 per cent of the global population is effectively covered by at least one social protection benefit, which implies that 4.1 billion people have no access to social protection. Moreover, only 35 per cent of the world's employed are protected in case of work injury or occupational disease, while only 18.6 per cent of them receive an unemployment benefit.¹⁵⁹
118. To ensure that the transition towards an environmentally sustainable building materials industry becomes a socially just transition, social protection systems need to be reinforced. The 2021 [Resolution concerning the second recurrent discussion on social protection \(social security\)](#) called on governments to provide universal access to social protection systems, including floors, to safeguard populations against adverse impacts, reduce vulnerability and strengthen resilience to facilitate a just transition. This can be achieved through "actions and measures to realize the human right to social security by progressively building and maintaining nationally appropriate social protection systems, so that everyone has access to comprehensive, adequate and sustainable protection over the life cycle, in line with ILO standards".¹⁶⁰ More specifically, it entails reinforcing key social protection schemes and programmes, such as unemployment protection, social assistance, old-age pension, employment injury and social health protection, as well as strengthening links with skills development and active labour market policies.¹⁶¹ Certain policy areas need to be strengthened to help constituents adjust to these changes. For instance, unemployment protection schemes and cash transfer programmes play a critical role in supporting workers who face job and earnings losses and can facilitate their transition to new jobs, especially when combined with skills development and job placement or relocation measures. Other options are early retirement for workers of advanced age who are at risk of losing their jobs. Finally, social protection is key to addressing the challenges of skills shortages and attracting and retaining young talent.



¹⁵⁸ ILO, ["Social Protection for a Just Transition"](#), Just Transition Policy Brief, January 2023.

¹⁵⁹ ILO, ["World Social Protection Data Dashboards"](#).

¹⁶⁰ ILO, [Resolution concerning the second recurrent discussion on social protection \(social security\)](#), ILC.109/Resolution III, 2021, para. 3 of the conclusions.

¹⁶¹ ILO, ["Social Protection for a Just Transition"](#).

4.6. Social dialogue and tripartism

119. Social dialogue, based on the respect of freedom of association and the effective recognition of the right to collective bargaining, plays a central role in designing and implementing effective policies, including legislation, in order to promote decent work and advance a just transition in the building materials industry.¹⁶²
120. Effective social dialogue at the national, sectoral, local and enterprise levels plays a critical role in promoting policies that bring together social, economic and environmental concerns, including sustainable industrial policies and plans for a just transition in the sector. Key issues to be addressed include employment protection and creation measures supporting business, with an emphasis on public investment in the greening of the sector and digitization of the economy; OSH; skills development; an enabling environment for sustainable enterprises; and labour and social protection measures.¹⁶³ Because of the ongoing and future transformations in the building materials industry, establishing good workplace relations is of critical importance and can positively impact the retention of staff and the overall attractiveness of the sector for younger generations. Social dialogue plays also a key role in increasing productivity in building materials enterprises, while ensuring that the sector workers benefit from adequate working conditions.
121. The ILO's Just Transition Guidelines provide guidance on social dialogue, which is particularly relevant for the building materials industry in the context of advancing towards a just transition. Governments should actively promote and engage in social dialogue across all levels from policy design to implementation and evaluation. They should also encourage the establishment, growth and formalization of dialogue mechanisms and structures at various levels. Social partners, in turn, are tasked with raising awareness and understanding of the topic among their members. They should actively participate in the formulation, implementation and monitoring of national sustainable development policies, advocating for the interests of their members. Social partners should also effectively represent their members in social dialogue and policymaking processes, promoting the inclusion of environmentally specific provisions based on national industrial relations practices.¹⁶⁴
122. The MNE Declaration, with its recommendations on employment, training, living and working conditions and industrial relations, also serves as a framework for advancing social dialogue at the sectoral, national, regional and international levels.
123. Social dialogue is crucial to the promotion of sustainable enterprises in the sector. The [Conclusions concerning the promotion of sustainable enterprises](#), adopted by the International Labour Conference in 2007, establish that "[h]uman resource development in sustainable enterprises should be based on social dialogue and workers' participation. Sustainable enterprises view skilled workers as a major source of competitive advantage and view employees both as assets and agents for change".
124. Some climate-related issues are progressively being included in processes of social dialogue at various levels in the industry. At the international level, dialogue can involve multinational enterprises and global union federations, such as through international framework agreements



¹⁶² ILO, *World Employment and Social Outlook 2018*; ILO, *Social Dialogue Report 2022: Collective Bargaining for an Inclusive, Sustainable and Resilient Recovery*, 2022.

¹⁶³ ILO, *A Review of Wage Setting through Collective Bargaining*, 2023; ILO, *Social Dialogue Report 2022*.

¹⁶⁴ ILO, "The Role of Social Dialogue and Tripartism in a Just Transition towards Environmentally Sustainable Economies and Societies for All", Just Transition Policy Brief, August 2022.

(IFAs). At the national and sectoral level, social dialogue can contribute to aligning environmental sustainability objectives with the decent work agenda.¹⁶⁵

125. Employers' and workers' organizations are pivotal in supporting a just and inclusive transition towards an environmentally sustainable economy.¹⁶⁶ Employer and business membership organizations (EBMOs) and trade unions promote social dialogue in the building materials industry, including by shaping policies and regulatory environments; coordinating bargaining processes; providing relevant services to their members such as training and information delivery; and in some cases negotiating collective agreements within national contexts. The significance of their representation is twofold: it determines how effectively they can articulate organized interests in social dialogue and contributes to the legitimacy of the dialogue outcomes. Given the ongoing transformations in the world of work, the organizational capacity of EBMOs and trade unions – which is evident in their membership, structure and services – is continually evolving.¹⁶⁷
126. EBMOs play a crucial role in raising awareness, providing services to members, advocating for public policies and business enabling environments, and promoting the adoption of sustainable practices in all sectors of the economy. They emphasize the importance of transitioning to renewable energies, adopting low-carbon production processes and embracing clean technologies.
127. At the global level, the International Organisation of Employers (IOE) is committed to supporting the transition to a low-carbon global economy in order to limit the rise in global temperatures and avoid devastating economic and environmental consequences. Together with the IOE at the global level, there are number of EBMOs representing the building materials industry at all levels. For example, the GCCA is a significant player in this context. At the regional level, the European Cement Association actively represents the cement industry in Europe. In the Americas, the Portland Cement Association in the United States and the Brazilian Portland Cement Association are pivotal in advocating for the cement industry. In Africa, the Cement and Concrete SA of South Africa has played a critical role. In Asia, the Cement Manufacturers' Association of India and the China Building Materials Federation significantly contribute to representing and advancing the interests of their region's building materials sectors. In the steel industry, the World Steel Association represents about 85 per cent of global steel production.
128. At the global level, the International Trade Union Confederation (ITUC), together with the Building and Wood Workers' International (BWI) and IndustriALL, are representing workers in the building materials industry. Trade unions in the sector are calling for action to ensure a just transition. The demands of the ITUC for a just transition include "respect the contribution that workers in fossil-fuel industries have made to today's prosperity and provide them with income support, retraining and redeployment opportunities, as well as secure pensions for older workers". A just transition should also be backed up by essential social protection and a just transition fund in every nation and should be based on social dialogue with all relevant parties, collective bargaining with workers and their unions and the monitoring of agreements that are public and legally enforceable. The BWI has identified climate change as one of the strategic priority areas of action, including by strengthening the provisions on a just transition in international framework agreements and increase their effectiveness.¹⁶⁸ The formation of MNE global union networks has



¹⁶⁵ ILO, *World Employment and Social Outlook 2018*, 71.

¹⁶⁶ ILO, *Social Dialogue Report 2022*.

¹⁶⁷ ILO, *Social Dialogue Report 2022*.

¹⁶⁸ BWI and Laudes Foundation.

been promoted in order to foster dialogue with some of the major MNEs operating in the building materials industry.¹⁶⁹

► Box 7. International framework agreements

IFAs with a focus on just transition in the building materials remain very limited in number and are recent. Those that exist are negotiated solely with large building materials enterprises in high-income countries, especially in Europe. Some IFAs recall the commitments to decarbonization and green transition, as well as developing skills for green jobs and labour and social protection for all workers, including workers in subsidiary sites and subcontractors, and they also foresee structures of social dialogue, including bipartite committees for climate and just transition issues. Some IFAs may comprise innovative elements to facilitate the active participation of workers and their representatives in discussing (the design and implementation of) environmental policies at the workplace.

- 129.** Collective bargaining agreements play a crucial role in determining and improving working conditions in the building materials industry. Since the outbreak of the COVID-19 pandemic, the exercise of the rights to freedom of association and collective bargaining has proven critical for building effective, consensus-based policies in response to the challenges of emergency response and recovery from the subsequent crises. Some sectoral or enterprise collective agreements in the industry have started to look at how to tackle issues of working conditions and social protection related to a just transition in the building materials industry.¹⁷⁰ Such agreements can include skills, job classifications, remuneration, OSH, welfare and collective transport, workers' voice representation and joint committees for the monitoring and evaluation of environmental policies and standards. However, these agreements remain limited, especially in emerging and developing countries.



¹⁶⁹ Wintour; IndustriALL, "Solidarity is Key for Heidelberg Materials Union Network", 25 October 2023.

¹⁷⁰ Nicola Duell, Tim Vetter and Inga Pavolvaite, *Thematic Review 2023: Fair Transition towards Climate Neutrality – Synthesis Report*, European Commission, 2023; Juan Escribano Gutiérrez and Paolo Tomassetti, *Labour and Environmental Sustainability: Comparative Report*, ADAPT University Press, 2020.