



Outcome document – Opportunities and Gaps identified during the Construction Value Chain Consultations

Contents

Introduction.....	2
The Value-Chain Approach	2
A methodology for action.....	3
The Construction Value Chain: Understanding the value chain and identifying intervention points....	3
The Construction Value Chain: Consolidating existing action and identifying opportunities	5
Mapping of Policies and Activities across One Planet network.....	5
Bringing together actors of the construction value chain to improve natural resource use and environmental impacts	7
Main messages from the construction value chain consultations	7
Leveraging public procurement to drive change along the construction value chain	7
Using financial instruments to shape the construction value chain	10
Opportunities for planning and design to influence the construction value chain	12
Role of the most influential actors along the construction value chain to help shift the construction sector from linear to circular	14
Improving sustainability across the construction value chain through capacity building.....	14
With better data towards more sustainable construction value chain.....	15
Conclusions.....	15
Annex.....	18



Introduction

This report presents the main conclusions from [a series of consultations](#) with experts across the construction value chain, continuing the implementation of the work of the [One Planet network and the International Resource Panel Task Group](#) (OPN-IRP Task Group) requested in the frame of the 4th United Nations Environment Assembly. It aims to catalyse science-based policy action on sustainable consumption and production through the implementation of [the Value Chain Approach](#).

This jointly developed¹ summary report will inform the collaborative development of science-based priorities for moving the construction sector towards sustainable consumption and production and circularity. The report brings together some of the main messages, opportunities, and gaps identified throughout the series of expert consultations workshops, in mapping real world action and ongoing initiatives against the strategic intervention points brought forward by [the Construction value chain analysis](#). These intervention points are:

- 1) Focusing on the initial stages of the construction value chain. The financing stage and the planning and design stage, comprising mostly of governments, international organisations, financial institutions and major market players, largely shape activities along the value chain and influence to a high extent both production and consumption practices.
- 2) Leveraging the power of governments, who exert significant influence along construction value chain through their role as regulators of financial markets, the banking system, and tax system; as urban and territorial planners, and regulators of the construction sector; as well as investors in the construction sector through the public procurement of buildings and infrastructure.

The report uses a number of sources of information including direct inputs from over a fifty organisations during the consultation series, the report of the OPN-IRP Task Group '[Catalysing Science-Based Policy Action on Sustainable Consumption and Production: The Value -Chain Approach and its Application to Food, Construction and Textiles](#)', UNEP's [2020 Global Status Report for Buildings and Construction: Towards a Zero-emission, Efficient and Resilient Buildings and Construction Sector](#), resources and initiatives disclosed within the One Planet network annual reporting, such as the [Global State of Play for Circular Built Environment](#) and [Guidance Document on Procuring Sustainable Buildings and Construction](#), and policies officially reported by Member States under SDG 12.1.1.

The Value-Chain Approach

[The Value-Chain Approach](#) anchors natural resource use and environmental impacts within the socio-economic reality of production and consumption and uncovers actionable insights on how the management of resources is connected with the 2030 Agenda for Sustainable Development. By taking a systemic look at the drivers of natural resource use and environmental impacts, this approach allows for an examination of the complex drivers and feedback loops that determine and influence the operations and behaviours of actors along the value chain. Simply put, the approach goes beyond looking for solutions at the point of impact, to uncover where the greatest opportunities for improvement lie.

¹ This outcome document was developed by the 10YFP Secretariat in a close cooperation with One Planet network's Sustainable Buildings and Construction and Sustainable Public Procurement programmes, UNEP's Sustainable Infrastructure Team, the Global Alliance for Buildings & Construction, Green Fiscal Policy Network, UN-Habitat and UNOPS; and with inputs collected from more than 50 participant organizations.

A methodology for action

Critically, the value-chain approach is a methodology for catalysing science-based policy action on sustainable consumption and production which identifies key points of intervention within economic systems to reduce natural-resource use and environmental impacts through a common agenda for action. Its implementation follows the steps summarized in Figure 1.

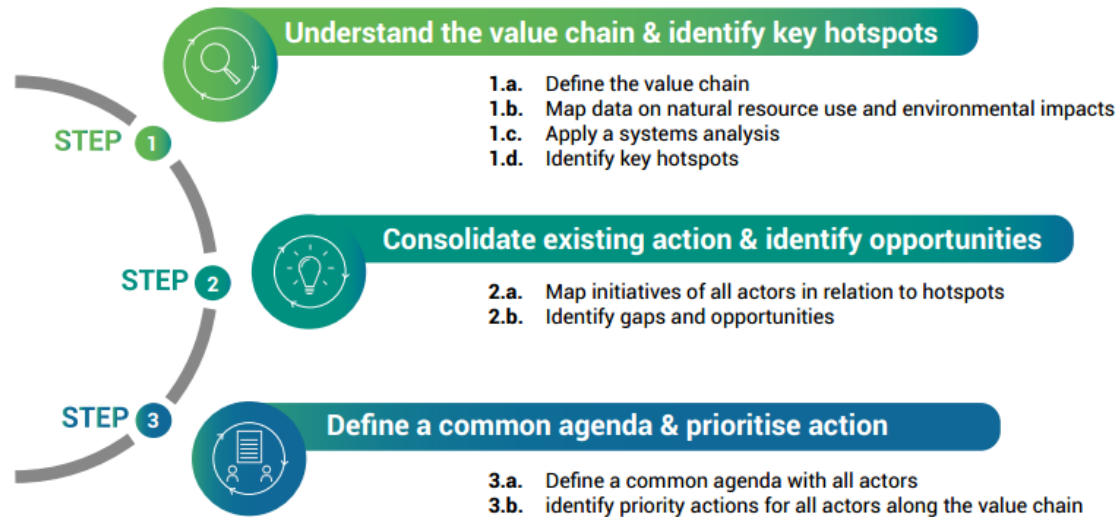


Figure 1: Overview of key steps of the Value-Chain Approach

The Construction Value Chain: Understanding the value chain and identifying intervention points

The first step of this approach implemented for the construction value chain identified that the majority of natural resource use and environmental impacts along the construction value chain take place at the material extraction and production stage, the construction stage and the use stage. However, the systems analysis highlights that there is limited scope at these stages of the value chains to make changes to reduce natural resource use and environmental impacts for a number of reasons, including the informality, fragmentation, complexity at these stages, as well as limitations in knowledge, awareness and available options.

In contrast, the systems analysis demonstrates that the most influential actors along the construction value chain are governments, international organisations, financial institutions and major market players, who are primarily acting at the financing stage, and the planning and design stage of the construction value chain. The key decisions made at these stages largely determine what type of construction is built, how many construction projects are built, and how they are built, and thereby shape the activity along the rest of the value chain.

Construction Value Chain

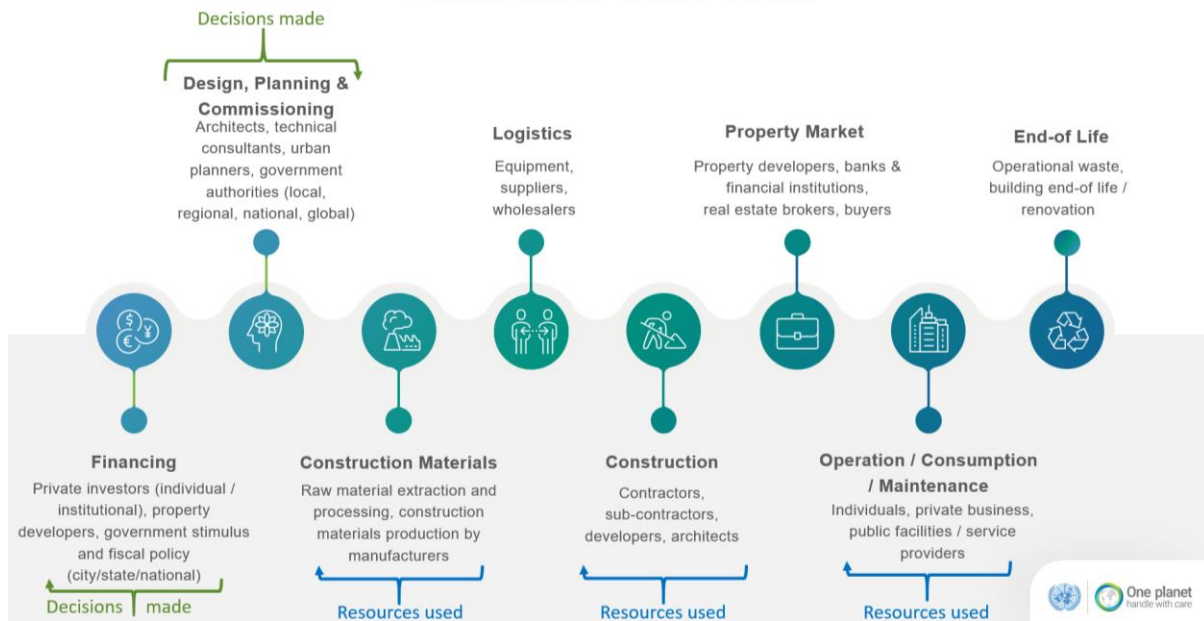


Figure 2: Stages of the construction value chain highlighting stages where decisions are taken and stages in which most natural resource use occur

The analysis of the construction value chain also identified three core challenges in terms of how to make practices along its stages more sustainable and circular:

- 1) What type of construction is built and used, and where: different types of construction built in different locations and regions contribute in different ways to meeting needs of societies and achieving the Sustainable Development Goals, and can cause different pressures on the use of resources and environmental impacts.
- 2) How much is being built: the construction market is growing worldwide, which causes pressures on resources and environmental impacts. However, construction does not necessarily follow demand. For example, empty buildings and property speculation is registered in many developed countries, while there is a construction gap in developing countries.
- 3) How they are built: the impacts of construction are associated with: type and amount of construction materials used, consumption of resources in the operation of buildings, and construction and demolition processes. Changing design, construction and use practices is fundamental to use resources more efficiently and reducing environmental impacts.

It was further highlighted that, compared to other sectors, the role of governments and multilateral organisations in shaping activity along the construction value chain is significant, and occurs in three key ways:

1. As **regulators of financial markets**, the **banking system**, and **tax systems**, governments influence how much and what type of constructions are built, especially for housing, particularly at the financing stage and property market stage of the construction value chain.



2. As **investors in the construction** sector through the **public procurement** of buildings and infrastructure, governments can directly influence what is being built, how much is being built and how constructions are being built through the procurement criteria they apply and the vendors they choose to engage.
3. As **urban and territorial planners**, and **regulators of the construction sector**, governments also indirectly determine what is being built, how much is being built and how constructions are being built. How governments regulate the construction sector through tools such as building codes and zoning laws can influence the operations of actors along the construction value chain, especially at the planning and design stages; the construction material stages; the construction stages; and, as a result, the use stage. It also influences how post end-of-life decisions are made.

Through the above three levers, governments have a major influence along the construction value chain on shaping what is being built, how much is being built and how constructions are being built, and it is these three levers that governments already use a combination of when stimulating the construction sector to boost economic activity or promote recovery during times of economic downturn or crisis. Governments, therefore, have a strong opportunity to reduce the natural resource use and environmental impacts of the construction sector through using these three key levers to drive resource efficiency in the sector and ensure construction activity is directed towards meeting the 2030 Agenda for Sustainable Development.

The Construction Value Chain: Consolidating existing action and identifying opportunities

The second step of the Value-Chain Approach – and main focus of this report - involves the mapping of ongoing initiatives and action along the stages of the construction value chain in relation to the identified strategic intervention points and challenges, to identify gaps and opportunities. This process benefited from three sources:

- 1) Policies officially reported by Member States under SDG 12.1.1 on sustainable consumption and production policies.
- 2) Activities of partners and programmes across the One Planet network collected through an established annual reporting process.
- 3) Data and information collected through three expert consultative workshops with participants from private companies, civil society, governments, scientific and technical organisations, United Nations and intergovernmental organisations. Full list of participants can be seen in the Annex 1.

Mapping of Policies and Activities across One Planet network

The mapping of policies and activities on construction across the One Planet network highlighted a number of trends, opportunities and gaps. The source of this mapping was the official reporting by countries in 2019 on SDG indicator 12.1.1, on the implementation of SCP related policies, where 56 policy instruments referring to construction were retained for analysis. The One Planet network reporting 2013-2019 collected 471 activities related to the construction sector which were included in this mapping as well. There are particular insights into the multiple roles that governments play



along the entire value chain, and how their actions are powerful drivers for more sustainable outcomes when properly leveraged. The analysis shows:

- The selection of policies analysed have a clear focus on ‘how we build’, related often to the procurement of sustainable construction materials upstream, and improving the environmental performance of construction at the operation/use stage. In line with the conclusions of [the Construction value chain analysis](#), there is a strong focus on energy efficiency measures and less on resource/material use and impacts on biodiversity and pollution.
- The regulatory measures taken at the initial stages of the value chain – which can have the most impact on resource use further down the line – tend to focus mostly on energy efficiency measures, not necessarily taking into account the impacts such measures have on aspects such as biodiversity and pollution.
- The lesser focus on the challenges of ‘what we build’ and ‘how much we build’ points to a potential gap in addressing the certain factors – demographic, socioeconomic, geographic – which are not necessarily addressed by looking only at how things are built. Similarly, a lack of attention paid to the volume of construction has obvious implications in the volume of natural resource extraction.
- Nearly all of the measures identified focus on the power of governments to act as regulators of the financial and tax systems, with very few focusing on their role as urban planners and regulators. The lack of measures implicating governments as urban and spatial planners is in line with the observation that the policies analysed do not focus on the challenge of ‘how much we build’, which would naturally be more concerned with issues of urban and spatial planning.
- One opportunity to be leveraged at the operational stages of the value chain is through public procurement, which is cited in several policies as a means by which the government can help to shift the market incentives towards more sustainability. Procurement, however, is often siloed and operates on a specific phase of the value chain such as the procurement of construction materials, or construction and operation services. It is crucial that the decision-makers are linked with actors later along the value chain who are doing the actual procurement, so that incentives are aligned and all actors can understand the benefit of such policies.

In the meantime, existing activities and resources are key to operationalise voluntary measures put forward in policies and beyond. The activities of the One Planet network on construction provide an indication of where key activities and resources that can be leveraged to address identified intervention points and challenges can be found. While acknowledging that the One Planet network activities remain a limited dataset in a global context, a number of broad trends, opportunities and gaps emerge. These include:

- Following the trend identified under the policy analysis, activities implemented by the One Planet network have an emphasis on the initial (financing, planning, design) and operation/use stages of the construction value chain. The initial stages are of particular importance, where key decisions that influence the construction value chain at large are taken, and where the network can leverage and consolidate ongoing work to inform what needs to be done to achieve the greatest impact.



- There is an imbalance in the challenges being addressed, with activities heavily concentrating on “how construction is built and used”. This signals a need for the network to enhance activities that promote and enable adequate and sustainable construction, as well as activities that support the alignment of development needs with supply of construction worldwide.
- The objectives of the activities implemented at the operation stage of the construction value chain predominantly relate to reducing energy consumption. The ability to reduce natural resource use and environmental impacts at the use and operation stage of the construction value chain is to a degree pre-determined before the construction is built by decisions that are taken at the design and planning stage of the value chain. Further opportunities at this stage of the construction value chain exist on supporting building renovation processes that drive resource efficiency.
- Activities at the construction material stage are underrepresented. As global construction activity grows and demand for construction materials increases, ensuring governance, oversight and regulation of materials extraction and production will be crucial to reducing natural resource use and environmental impacts. Together with the Sustainable Buildings and Construction programme, other programmes of the One Planet network, in particular the Sustainable Public Procurement and Consumer Information programmes could reinforce their attention to this stage of the construction value chain.

Bringing together actors of the construction value chain to improve natural resource use and environmental impacts

The expert consultative workshops were convened by the 10YFP Secretariat in close cooperation with One Planet network’s Sustainable Buildings and Construction and Sustainable Public Procurement programmes, UNEP’s Sustainable Infrastructure Team, the Global Alliance for Buildings & Construction, Green Fiscal Policy Network, UN-Habitat and UNOPS. These multi-stakeholder consultative workshops comprised of representatives from private companies, civil society, governments, scientific and technical organisations, United Nations and intergovernmental organisations.

Each workshop gathered various actors along the construction value chain to reflect and provide input on the key findings of the construction value-chain analysis, namely on how public procurement, financing, and planning & design influence the construction value chain. These are captured in the following sections.

Main messages from the construction value chain consultations

Leveraging public procurement to drive change along the construction value chain

The first workshop focused on how public procurement practices can improve sustainability across the construction value chain. Number of opportunities and challenges were explored.

Circular Procurement

For the sector to transit from linear to circular, public procurement processes must be revised to encompass the whole lifecycle at the end-of life - from deconstruction and transformation of existing built components to design, renovation and new construction with secondary materials. Number of initiatives and resources were identified during the workshop on how public



procurement could influence the construction value chain to be more circular, and thus more resource efficient:

- The construction sector should develop a similar initiative to the [Circular and Fair ICT Pact \(CFIT\)](#), which is an international procurement-led partnership to accelerate circularity, fairness and sustainability in the ICT sector. CFIT's aim is to stimulate the use of common, easy-to-use procurement criteria, provide guidance and facilitate knowledge sharing. CFIT is an action under the UN One Planet network Sustainable Public Procurement programme.
- [EU Interreg ProCirc Project](#) was set up to experiment, implement and learn how circular economy and procurement can benefit the EU region. To fully benefit from circular opportunities and to contribute to the international development of circular economy, ProCirc aims to conduct 30 pilots to demonstrate procurement opportunities.
- The Big Buyers Initiative provides in the [Public Procurement of Circular Construction Materials Report](#) key recommendations to promote circular economy approaches to the construction sector, focussing on construction materials in civil and building works, and covering the value chain from disassembly to material transformation and new construction. By applying circular economy principles to public construction projects and supporting the growth of a local circular economy sector, their goal is:
 - o to keep existing materials in use and retain their value, thus avoiding waste,
 - o to stimulate market innovation for less resource intensive materials (e.g. bio-based building blocks or low carbon concrete), and
 - o ultimately, to reduce the embodied carbon of construction materials and lessen the environmental impact of raw material demand.
- [The challenges and potential of circular procurements in public construction projects](#), produced as part of the EIT Climate-KIC Circular Cities project provides a unique overview of the benefits of incorporating circular procurement at city and district level, including an assessment of the associated financial benefits as well as the potential negative effects. It highlights number bottlenecks that can occur during planning and design stage if circular procurement processes are not implemented. For example, it highlights that one of the most critical steps in circular building is procurement of design services. Sustainability expertise of designers and architects is crucial and influences the sustainability across the whole value chain and therefore sufficient time and resources must be reserved for the procurement of design services and the design process itself.

Common Language, Sustainability Standards and Ecolabels and Criteria

Sustainability standards and ecolabels provide an opportunity to improve resource efficiency of the construction sector. They are commonly used mechanisms for addressing a great number of environmental and socio-economic challenges throughout the construction value chain, providing an integrated way to accomplish a broad range of environmental goals. However, it was highlighted that multi-stakeholder collaboration is needed to develop consistent processes applicable internationally and ensure that standards do not leave gaps and are capable of being used by the majority of the market (i.e., not restrictive or limiting procurement responses). For example, the Environmentally Preferable Purchasing programme from the United States Environmental Protection Agency aims to catalyse a more sustainable marketplace for all. It helps federal government purchasers utilise private sector standards and ecolabels to identify and procure environmentally preferable products and services, providing a convenient and streamlined way to make sense of the often-complex sustainable products marketplace. The program does this is by coordinating U.S. government technical input into the development of [voluntary consensus product sustainability standards](#) and issuing [Recommendations of Specifications, Standards, and Ecolabels for Federal](#)



[Purchasing](#) across several key purchase categories. It also assists federal agencies in procuring products meeting the recommended specifications, standards, and ecolabels.

There is increasing competition in the sustainability certification and eco-label marketplace. They have adopted a wide range of approaches (cross-sector, supported by certification programmes, some are multi-attribute (project level) whilst others refer to specific products), so they need to be adequately assessed as otherwise they could overwhelm purchasers. There is a need to develop consistent processes applicable internationally. A good example of this on a European level is [Level\(s\) – European Framework for Sustainable Buildings](#), providing a common language for assessing and reporting on the sustainability performance of buildings. Furthermore, [Guidance Document on Procuring Sustainable Buildings and Construction](#), developed by One Planet network's Sustainable Buildings and Construction Programme, provides a practical overview of the options and methods for procuring sustainable buildings and construction in developing countries and emerging economies as well as specific building certification and rating tools.

Developing relevant public procurement criteria is crucial for the sector to improve its sustainability. During the public procurement workshop, participants recommended the [Roadmap for Circular Land Tendering for Amsterdam](#), which enumerates 32 performance-related criteria that could be used to promote adherence to circular principles in the urban development process. [Procurement Criteria for Low Carbon Building in Finland case study](#) was also discussed as procurement of low-carbon residential buildings using life-cycle assessment criteria to steer the design and the construction. In this specific case, the wooden structure requirement of the project, the carbon footprint estimation and the low energy efficiency value, as well as the requirements for renewable energy and a fossil-free worksite, have proven to be particularly important in reducing the greenhouse gas emissions resulting from this particular type of procurement. It was also highlighted during the workshop that voluntary public procurement criteria can be an opportunity to start engaging private actors by sending a signal to the market and thus providing an incentive for suppliers to innovate and build the required capacity.

Adding social cost of carbon to procurement decisions

Mandatory integration of the social cost of carbon in procurement decisions is an enabler for scaling and mainstreaming sustainability. It is also related to the risk component: climate risk has a great impact on public budgets. There is a need to incorporate the avoided cost (such as health cost) of natural disaster that will hit infrastructures. Incorporating these costs in the risk assessment and in green procurement are two possible opportunities. This was for example done in the USA through the executive order on the mandatory integration of the social cost of carbon in federal procurement decisions. This is positive development in terms of scaling and mainstreaming sustainability.²

Increasing intensity of use

In terms of reducing greenhouse gasses, there is an opportunity for public procurement to leverage on the potential of increasing intensity of use, i.e., fewer square meters per person. [Resource Efficiency and Climate Change - Material Efficiency Strategies for a Low-Carbon Future Report](#) from International Resource Panel suggests that: *“increased intensity of use of residential buildings through shared and smaller housing is shaped by building codes but also zoning and land use regulation; property, carbon and other taxes; urbanization; demographic trends; and consumer preferences. Shared and smaller housing can be encouraged through changes in regulation and taxation but will also require changes in behaviour and lifestyle. Furthermore, policies exist for some*

² [Executive Order on Climate-Related Financial Risk](#), The White House, 2021



aspects of material efficiency in these sectors, especially at end of life, while in other life-cycle stages, such as material-efficiency design and increased intensity of use, policy is less evolved – signalling a need for more policy development.” However, there is an opportunity for public procurement to support both planning and design and financing stages by adding criteria or requirements for intensity of use, where relevant.

Using financial instruments to shape the construction value chain

The second workshop looked at the role of governments at the financing stage, but opportunities for the private sector were also discussed as it plays an important role across the construction value chain.

Regulation

The Paris Agreement and pledges on carbon neutrality have fostered increased action on green building policies and regulations at national level, offering opportunities to improve resource efficiency in the sector. Stable and predictable regulatory framework for green construction is also important for attracting investment. For example, infrastructure is in many countries categorised as a private asset, however, in terms of regulation, the inclusion of infrastructure as a liquid asset could lower the investment threshold for private investors with less stringent regulatory standards and, as a result, stimulate investment. Robust framework and engagement with all relevant stakeholders can also enable easier access to finance.

Consistent classification of green and transition activities, guidance on best practices in climate disclosure and technology solutions for easier disclosures, piloting innovative green finance solutions and facilitation of knowledge transfer can all assist in accelerating green finance in the construction sector. [Green Finance Measures Database](#) by the Green Finance Platform includes policy and regulatory measures issued by public authorities, including governments, central banks, financial regulators, and public financial institutions.

[Circular Construction Economy - Building towards the circular economy in the Netherlands in 2050 together](#) report describes the ambition to make the entire built environment in the country circular before 2050, including housing, utility construction and the civil engineering sector. It however highlights that there is still insufficient supply and demand, and financiers are wary of the risks of innovations and new policies and amendments to legislation and regulations are needed to remove barriers and to encourage circularity.

Taxation

Taxation can be an important instrument for improving the resource efficiency of the construction sector. It can be used for internalizing external costs and creating a fair level playing field by reducing or fully phasing out the subsidization of harmful activities, which distort the full-cost-pricing of resources. For example, environmentally harmful subsidies worth over €57 billion were granted in 2012.³ The revenues can, in turn, be used for activities that improve environmental and socio-economic impacts.

Other possible interventions include primary resource taxes, lower taxes for low-carbon materials, preferential tax rates for companies' resource management, return-benefits for reused and recycled materials, lower value added tax on retrofit, repair and recycling activities and materials.

³[Environmentally Harmful Subsidies](#), Umweltbundesamt, 2017



Investment in low-carbon constructions

Enabling investment into low-carbon constructions, by for example choosing materials like timber can help the construction value chain improve its environmental impacts. The [Timber Finance Initiative \(TFI\)](#) is developing financial products and instruments to bridge the gap between investors and the timber industry. Insurance companies can also enable lower carbon constructions, such as through cheaper insurance for timber constructions.

Financial incentives to encourage circular economy

Financial (investment) incentives can also play a crucial role in encouraging circularity/cradle to cradle approach, and not cradle to grave, so that at the end of the life of a building a new life from the components, modularity and building materials can start again. This would reduce the carbon footprint, the materials used in the process and increase the value of the industry.

Moving away from short-term investment

Construction companies often adopt a short-term perspective when evaluating construction investments, missing the longer-term sustainability perspective. However, there is an increasing trend in the global capital market not to give access to the capital without a sustainability strategy. When evaluating an investment opportunity for a construction project, it is important to consider long-term planning and to establish robust environmental and social system framework to implement sustainability from the early stages and throughout the entire construction value chain. Such holistic approach should consist of looking at climate resilience and the environmental impact, the quality of life of the inhabitants, new technologies and design concepts, and establish circular economy principles. For instance, specific to climate resilience, deeper foundations for bridges to protect them from being washed away or buildings built off the ground in flood prone areas might cause some additional costs upfront, however, such measures can save costs and resources in the long run because the built environment assets will last longer.

The initial investor might not always wish to consider the life cycle of their building as a relevant factor, as they might want to sell their building after a few years. To minimise such risk, government regulations might be needed to ensure a life cycle perspective.

Integrated ESG (Environmental, Social, Governance) Investing

ESG criteria allow investors to measure sustainability impacts of an organisation/project they plan to invest into. Integrated ESG investing is being mainstreamed, especially in institutional investing, such as pension and insurance funds, and is increasingly happening in bank lending, green bonds, outcome linked bonds and lending, sustainable outcomes tied into borrowing rates, and such similar strategies. This change is being driven primarily by the asset owners (pensions, savings, etc.) and regulations such as disclosures regulations (TCFD, TNFD etc.) that are obliging organizations to measure and report their impact which causes other actors in the value chain to decide who they want to support and work with. This means there is an increased search for positive sustainability-related impacts.

In the current situation, government investments to stabilize and recover economies from the COVID-19 pandemic offer a unique opportunity to provide support only on the basis of integrated ESG criteria.

ESG framework can also help with risk evaluation and mitigation. It is crucial to de-risk construction projects in the financial structures. Blending public funds with private, policy levers, creating scale and diversification can all reduce the risk profile of a project enabling capital flow. Banks and



insurance companies can also play a role in minimizing risks by providing project preparation facilities and guarantees.

Greenwashing is a big challenge in the construction sector. It can come from weak certifications or energy standards, but also from false claims. There is a need of strong certifications and alignment of financial ESG obligations with corporate non-financial reporting obligations. For example, the current activities and aim of the EU of classifying economic activities within the [EU Taxonomy for Sustainable Activities](#) within the framework of sustainable finance can provide very useful guidance. As part of the [Green Action Finance Plan](#), Singapore has also identified taxonomy development as one of the main industry initiatives to accelerate green finance.

Opportunities for planning and design to influence the construction value chain

The third workshop focused on how planning and design shape the construction value chain and explored number of opportunities on how the actors of this stage can drive sustainability across the whole value chain.

Role of governments

Workshop participants stressed that some countries lack of land use policies or have outdated land use plan/building codes and standards, allowing room for unplanned and illegal construction development, further highlighting the need of better planning of construction and infrastructure activities.

To better manage construction and infrastructure planning from a government's perspective, the United Nations Office for Project Services (UNOPS) brought forward the need to start looking at infrastructure as a system with three components - assets, knowledge, and institutions, where the latter two support an enabling environment. Such system-based approach can help countries transition to a more sustainable and resilient infrastructure development paradigm. As a result, they have developed [the Capacity Assessment Tool for Infrastructure \(CAT-I\)](#) aiming to help countries facilitate better infrastructure development. The tool is designed to help governments identify gaps in the capacity of their enabling environment to plan, deliver, and manage their infrastructure systems. Based on these gaps, the tool can be used to develop a pipeline of projects to build national, state, city, or ministerial capacity using technical and advisory services.

Innovation should be a part of this planning process and governments have an opportunity to adopt and encourage successful pilot methodologies promoting local innovative solutions within their policies and legislation that can be further implemented for larger construction projects.

Targeting embodied carbon

There is a need to rethink how we construct buildings to reduce embodied carbon. Strategies range from building less, to improved designs that have a longer lifetime, require less material or use low-carbon materials. Measures targeting embodied carbon need to be taken into consideration already during the planning and design stage of the construction value chain. This is because low-carbon design practices, especially when they target embodied carbon, are the most efficient and cost-effective in the early phases of a building project. For example, when a carbon target has been set during planning and design stage, it becomes a target for the design team working on the construction and sets the embodied carbon limitations the designers need to follow. This is further elaborated in the [Embodied Carbon Review](#), which also offers various best practice examples and case studies for embodied carbon reduction strategies in the construction sector.



Choice of construction materials during planning & design

During the workshop, choice of construction materials was discussed as an important element to be addressed during planning and design as they are crucial in reducing resource use and improving environmental impacts. Using local construction materials and techniques, where possible, helps to create low-cost, low-energy, low-waste and easy-to-repair buildings. It also minimizes negative environmental impacts caused by transportation and it supports local suppliers and, as a result, has a positive socio-economic impact locally. Number of various solutions that need to be done during planning and design stage were explored and presented:

- Depending on the location, use of compressed earth technologies can act as a catalyst for local development. Soil-stabilised brick or compressed brick, a technology that has been around for many years but never industrialized, can lead to affordable resource-efficient housing.
- Setting up mobile brick plants in rural areas enables brick production close to the construction sites and thus minimizes transport costs.
- 3D printing can be a time saving, more affordable and sustainable solution for certain constructions. For example, [14Trees](#) is 3D printing affordable housing and schools in Africa

It was also highlighted that, while in many developed countries the construction sector needs to focus on re-using existing buildings and materials, there is a need for construction of new buildings in developing countries. For that, environmentally friendly solutions are necessary. Adding sustainability related targets to the design process, such as carbon, energy and water targets is an important step to ensure improved sustainability across the construction value chain. Understanding material ingredients is more important now, and low carbon and low chemical materials are one of the solutions. In this context, dematerialization is also an important opportunity, as simpler architectural designs have significant impacts on resource efficiency and CO2 levels.

In some countries, the majority of material vendors that have a chemical ingredients disclosure are those with imported materials from highly known brands. Some certification systems might unintentionally promote imported accredited material with good data, rather than local materials that may be better, but have no or poor data and accreditation. One approach could therefore be to go back to basics and focus on using natural materials, such as bio-based simple local materials that create local benefits.

Consideration during planning and design to embrace circularity

Decarbonization must be done along the whole construction value chain, taking into consideration the operation and the end-of-life of buildings, not only the products or materials being used. Re-using at the end-of-life, rather than just recycling can reduce the material footprint of the construction sector. Decisions on what will happen with these materials needs to be planned for during the design stage. The carbon footprint due to circularity of the process will be, as a result, significantly reduced, and less new materials will be needed. Such approach will also minimise transportation costs and transportation itself, which causes significant environmental footprint.

Once a building is demolished, in some countries, the materials are downcycled, recycled and/or are re-used for infrastructures. This is however not yet circular, as circularity is more than recycling. It requires strategic thinking at the planning and design stage as to what will happen at the end-of-life stage with the building. Some construction might be planned for a shorter term, like for example, the Brummen Town Hall, which was deliberately undertaken for 20 years, and with a design made for disassembly. The suppliers were involved in the design process, for example, the timber supplier wanted to provide timber of larger dimensions because it will be easier to reuse in 20 years when



the supplier gets the materials back. It is clear that the future plan for the construction materials and details for their second life have been considered. The case study can be found in [the 3rd Edition of the Building a Circular Future report](#) together with additional case studies on circular construction.

Role of the most influential actors along the construction value chain to help shift the construction sector from linear to circular

The need of the construction sector to become circular is clear was echoed throughout the consultations and the solutions need to consider the entire value chain. Present practices are locked into a linear way of planning, designing, building and operating the built environment. The One Planet network Sustainable Buildings and Construction programme has developed a visualisation of how the circular construction value chain could look like in order to improve sustainability across the entire value chain (Annex 2). Their [From Linear to Circular - First Global Mapping of Circularity in the Built Environment](#) study also summarises recommendations to boost a transition from linear practices to a more circular built environment. These include the following:

- Shift in thinking from linear to circular should be a priority as governments consider catalysing economic recovery packages in a COVID-19 world.
- Procurement processes must be revised. Procurement practices can drive supply chains and the transition from product to service procurement or mix of products and services will result in sustainability outcomes.
- New business models can boost the transition. Business models that encourage cross-sectoral collaborations such as between IT and the built environment to support building passports or track and trace materials for reuse or repurpose also need to consider qualifications criteria for the reuse of construction and de construction waste. Supply and demand needs to be balanced.
- Monitoring and reporting is crucial to ensure that we stay on track and reach the goal of living and working in a world that enables efficient resource use, has little or no environmental impact, and ensures a just society. The SDGs can assist in monitoring and reporting as the foundational principles of circular economy and sustainability are the same.

Improving sustainability across the construction value chain through capacity building

There is a need for capacity building of actors across the construction value chain. In frame of the work on how the most influential actors of the construction value chain can influence its sustainability, the following training priorities were highlighted:

1. Procurers - Training and capacity building for procurers and construction project teams, both at an individual and institutional level, are necessary to ensure they are better able to integrate and apply sustainability requirements at the key stages within procurement and project cycles.
2. Financial intermediaries on green mortgages - Capacity building of financial intermediaries such as banks need to be improved to identify a pipeline and make sure they can offer sustainable technical advice and have the ability to create green mortgages. For example, a [Handbook on Implementing Environmental Risk Management for Asset Managers Banks and Insurers](#) has been launched by the Green Finance Industry Taskforce in Singapore to help strengthen their capabilities in environmental risk management.
3. Decision makers on new materials and solutions - New technology and new materials are not always easy for the market to start using them due to lack of skills of the workers. There



is a gap in the knowledge needed for the implementation of new solutions. Successful implementation and scale-up of innovative solutions and new technologies can benefit from endorsements from governments as well as require local capacity building and training of construction workers.

With better data towards more sustainable construction value chain

The lack of sustainability data is an overarching challenge across the construction value chain. There is an overall lack of data on natural resource use and environmental impacts at a sectoral level. Where data does exist, it is highly fragmented in many different locations and analyses, and there does not exist to date a full analysis of all-natural resource use and environmental impacts of the sector (rather these might look at individual materials e.g., cement, steel, or otherwise consider buildings, or housing or infrastructure).

Collaboration of all stakeholders to gather and share relevant data is necessary in order to improve resource efficiency of the sector. It is important to connect research, policy, data and monitoring with implementation and work in practice to learn from each other, as that is often forgotten.

There is a need for tools that provide quantitative data, especially in developing countries, to enable governments/architects to choose materials that create positive social and environmental impacts. This can be done by expanding and making easily accessible information systems and resource banks that collect primary data of different materials, e.g., from material passports, such as [One Click LCA](#), an easy and automated life cycle assessment software that helps calculate and reduce the environmental impacts of building and infrastructure projects, products and portfolio.

Embedding data management, such as BIM (Building Information Modelling), helps connect different platforms and different layers of information, and therefore offers a stepped-up approach to enforce compliance along the value chain, from both environmental and social sustainability point of view.

Most tools used for building assessment are based on design or design and as-built. Very few (for instance [NABERS in Australia](#)) measure actual building performance. The actual performance is important as the performance data present the 'proof of the pudding' and justify upfront costs for making buildings more energy or water efficient, making it independent of grid energy, etc. While there is growing evidence to state that green buildings are not costing, and should not cost more, the operational cost tracking provides the evidence that well designed and operated buildings will provide savings in the long run. This can be for example seen in multiple case studies collected by the World Green Building Council in the reports ['Doing Right by Planet and People: The Business Case for Health and Wellbeing in Green Building'](#) and ['The Business Case for Green Building: A Review of the Costs and Benefits for Developers, Investors and Occupants'](#).

A law for climate declaration for all constructions can offer an opportunity to improve knowledge and gather needed data to assess further steps to reduce negative environmental impacts, as well as to include limit values on climate impact. Sweden has, for example, developed such [proposal for legislation on climate declarations for buildings](#).

Conclusions

The outcome of the workshops clearly highlighted multiple opportunities for the initial stages of the construction value chain, namely financing stage and planning & design stage, to create an enabling



environment to improve resource efficiency and environmental impacts across the construction value chain. It also highlights specific levers that can be done through public procurement.

Public Procurement

Strong public procurement criteria and standards are crucial to accomplish a broad range of sustainability goals. By **applying circular economy principles** in the construction projects, such as **keeping existing materials in use** and retaining their value, thus **avoiding waste**; and stimulating market innovation for **less resource intensive materials** (e.g., timber), public procurement can significantly contribute to improving resource use and environmental impacts of the construction value chain. Mandatory **integration of the social cost of carbon in procurement decisions** is an enabler for scaling and mainstreaming sustainability. However, **multi-stakeholder collaboration** is needed to break silos and **develop consistent processes applicable internationally**, and ensure that standards do not leave gaps and are capable of being used by the majority of the market.

Procurers must also take into consideration the whole value chain when applying their criteria, as for example, one of the most critical steps in circular building is **procurement of design services**, because designers and architects can play a crucial role in influencing sustainability across the whole value chain. They can support in further implementation of other procurement criteria, such as on intensity of use, resulting in more sustainable use of natural resources.

Financing

As regulators of financial markets, the banking system, and tax systems, governments influence how much and what type of constructions are built. As a result, **governments need to develop stable and predictable regulatory framework** for sustainable construction to attract investment. They should also **provide guidance on best practices in climate disclosure** and **technology solutions for easier disclosures**, **pilot innovative green finance solutions** and **facilitate knowledge transfer** to assist in accelerating green finance in the construction sector. What is more, financiers can be wary of the risks of innovations and new policies, and therefore amendments to legislation and **regulations are needed to remove barriers and to encourage circularity**.

Taxation is also an important instrument **for internalizing external costs** and **creating a fair level playing field** by **phasing out the subsidization of harmful activities**, which distort the full-cost-pricing of resources. Other possible interventions include primary resource taxes, lower taxes for low-carbon materials, preferential tax rates for companies' resource management, return-benefits for reused and recycled materials, lower value added tax on retrofit, repair and recycling activities and materials.

When looking at **the private sector**, construction companies **often adopt a short-term perspective** when evaluating construction investments, **missing the longer-term sustainability perspective**. However, there is an increasing trend in the global capital market **not to give access to the capital without a sustainability strategy**. Government regulations might also be a solution to ensure a life cycle perspective. What is more, **integrated ESG investing is being mainstreamed**, especially in institutional investing, such as pension and insurance funds, and is increasingly happening in bank lending, green bonds, outcome linked bonds and lending, sustainable outcomes tied into borrowing rates, and such similar strategies. However, there is **a need of strong certifications and alignment of financial ESG obligations with corporate non-financial reporting obligations**.

Planning and Design

As urban and territorial planners, and regulators of the construction sector, governments also indirectly determine what is being built, how much is being built and how constructions are being



built. With **lack of land use policies or outdated land use plan/building codes and standards in some countries**, it was brought forward that there's a **need for better planning of construction and infrastructure activities at a country level**. Existing tools need to be expanded and more widely used.

Circular thinking needs to be central to planning and design as it is a key stage to influence decisions across the construction value chain in terms of circularity. **Choice of construction materials also needs to be addressed during planning and design** as it is crucial in reducing resource use and improving environmental impacts. Using **local construction materials** and techniques, where possible, helps to create low-cost, low-energy, low-waste and easy-to-repair buildings. **Reducing embodied carbon and prioritising low carbon and low chemical materials** are also a way forward. **Dematerialization** is an important opportunity, as simpler architectural designs have significant impacts on resource efficiency and CO2 levels.

There is a contrast between developed and developing countries in terms of construction planning. While in many **developed countries the construction value chain needs to focus on re-using existing buildings and materials**, there is a **need for construction of new buildings in developing countries**. Adding **sustainability related targets to the design process**, such as carbon, energy and water targets is an important step to ensure improved sustainability across the construction value chain.

Capacity Building and Better Data

Better training of actors across the construction value chain is needed to be able to make more sustainable choices. **Capacity building opportunities for procurers, financial intermediaries on green mortgages, and decision makers on new materials and solutions**, were highlighted as important next steps.

The lack of sustainability data is an overarching challenge across the construction value chain. Where data does exist, it is **highly fragmented** in many different locations and analyses, and **there does not exist to date a full analysis of all-natural resource use and environmental impacts** of the sector. **Collaboration of all stakeholders to gather and share relevant data is necessary** in order to improve resource efficiency of the sector. It is important to **connect research, policy, data and monitoring with implementation** and **work in practice to learn** from each other, as that is often forgotten. A **law for climate declaration for all constructions** can offer an opportunity to improve knowledge and **gather needed data to assess further steps** to reduce negative environmental impacts, as well as to **include limit values on climate impact**.

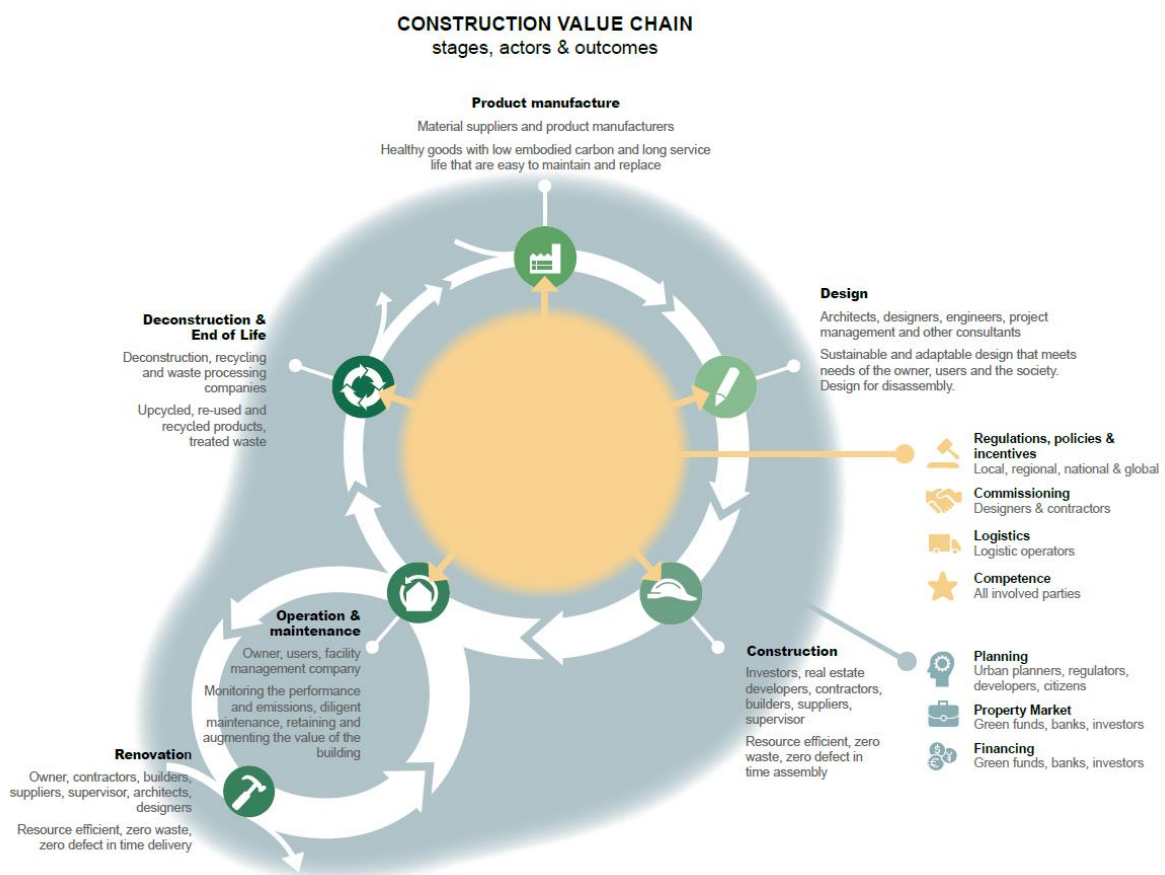
Way forward

The recommendations from this outcome document will be used to inform One Planet network's prioritisation process in the post-2022 Global Strategy on SCP and SDG 12.



Annex

1. Circular visualisation of the construction value chain by the One Planet network's Sustainable Buildings and Construction programme (@Ninni Westerholm):



2. List of Workshop Participants

Participants who joined at least one of the three workshops.

	Organisation	Expert's name
1	14Trees, Holcim Group	Francois Perrot
2	Action Sustainability	Helen Carter



3	Alliance for an Energy Efficient Economy (AEEE)	Aafsha Kansal
4	AR CONSTRUCCIONES S.A.S - Colombia	Diego Andres Hernandez Atehortua
5	Arabtech Jardaneh	Razan Rashid
6	ARDOR Architects	Vu Linh Quang
7	Atelier Conception Patrimoine	Amélie Essesse
8	Bankers without Boundries	Rufus Grantham
9	BPI RDC, Congo	Anaclet Mutombo
10	BRS Convention	Kei Ohno Woodall
11	BUUR (Sweco)	Teodora Capelle
12	Casaideal srl	Javier Via Giglio
13	China Environmental United Certification Center	Jing Wang
14	Circular Berlin	Dina Padalkina
15	CityScape	Ebi Bozimo
16	Climate Policy Initiative India	Dhruba Purkayastha
17	Climate Science and Policy Professional	Sandeep Goswami
18	Construction et Développement Durable	Amelie Essesse
19	Construction Site Associate - Nigeria	Osarogie Edo-Osagie
20	Costa Rica - Ministerio de Vivienda y Asentamientos Humanos	Christian Aguilar Barquero
21	Costa Rica - Ministerio de Vivienda y Asentamientos Humanos	Christian Escobar Barquero
22	Deloitte Haskins & Sells, LLP	Amrish Shah
23	Ecologic Institute	Marin Hirschnitz-Gabers
24	Ecosis	Rushdana Doobory
25	Ecuador - Ministerio Ambiente, Agua y Transición Ecológica	Estuardo Jaramillo
26	Ecuador - Ministerio Ambiente, Agua y Transición Ecológica	Mayra Herrera Jaramillo



27	Ecuador - Ministerio Ambiente, Agua y Transición Ecológica	Santiago Fernando Salazar Benavides
28	Edge Buildings IFC GBCSA	Kemele Moloji
29	Eds Global	Lakshmi
30	Empower Retirement	Sangeetha Arunkumar
31	Environmental Design Solutions	Nidhi Gupta
32	Environmental Design Solutions	Tanmay Tathagat
33	Environmental Design Solutions (EDS)	Nidhi Gupta
34	Envy Restoration + Construction	Dean Young
35	European Commission	Philippe Moseley
36	Finland - Ministry of the Environment	Harri Hakaste
37	Finland - Ministry of the Environment	Taina Nikula
38	Finland - Ministry of the Environment	Taru Savolainen
39	Finland - Ministry of the Environment, One Planet Sustainable Buildings and Construction programme	Pekka Huovila
40	FIR – Fédération Internationale du Recyclage	Geert Cuperus
41	Forum Ökologisch-Soziale Marktwirtschaft	Kai Schlegelmilch
42	Gauge	Jeremy Gibberd
43	GBK Architects	Boineelo Masuku
44	GBK Architects	Gorata Bontle Kgafela
45	GHL Bank PLC	Efua Ampomah
46	Greater Accra	Maame Efua Brameah Awuni
47	Green Building Council Mauritius	Tony Lee
48	Green Building Council South Africa	Jo Anderson
49	Green Buildings Council Mauritius	Joya Bhandari



50	Green East Master	Ajaye Jogoo
51	Green Edifica	Diana Paes
52	Green Fiscal Policy Network	Himanshu Sharma
53	Green Growth Knowledge Platform	Camille Andre
54	GreenSquareMetre	Shani Eribo
55	Hilti Foundation	Johann Baar
56	ICLEI	Kaitlyn Dietz
57	IFC - International Finance Corporation	John Anagnostou
58	IFC - International Finance Corporation	Michelle Marie Farrell
59	IFMA - Singapore	Kian Seng Ang
60	iiSBE (International Initiative for a Sustainable Built Environment)	Nils Larsson
61	India - Ministry of Railway	Sanjay Kumar
62	Infraestructura Tecnológica y Comunicaciones en Consejo Nacional Electoral del Ecuador	Estuardo Jaramillo
63	Institute for Sustainable Development	Ronja Bechauf
64	International Finance Corporation	Ayesha Malik
65	International Institute for Sustainable Development	Liesbeth Casier
66	International Resource Panel	Maria Jose Baptista
67	ISCTE - University Institute of Lisbon	Ricardo Costa Agarez
68	Kazachstan - National Centre of Sustainable Production and Consumption	Zulfira Zikrina
69	Kings College London	Anthony Graham
70	LEAF S.A.C.	Analu Granda
71	Legend Holdings Ltd and LegendQ Technologies LLC	Jerry Raji
72	Low Carbon Cementitious Materials Initiative (LCCI)	Vanderlay M. John
73	Mass Design	James Kitchin



74	Mindful Materials	Annie Bevan
75	Ministry of Rural Development and Local Government - Trinidad and Tobago	Nadine David-Figaro
76	Mitre Realty	Caio Perri Lima
77	Newgate Technologies	Robert-Jan Nieuwpoort
78	OECD	Ana Maria Ruiz Rivadeneira
79	OECD	Matthieu Cahen
80	OIP	Ward Autumn
81	Paraguay - Secretaría de Defensa del Consumidor y el Usuario (SEDECO)	Hector Corrales
82	Puri Constructions Pvt. Ltd.	Devendra Singh
83	Recurso V	Ana María Esquivelzeta Rabell
84	RMIT University	Usha Iyer-Raniga
85	Skidmore Owings and Merrill (SOM)	Mina Hasman
86	Slovak Environment Agency	Tatiana Guštafikova
87	SMEC (Africa Division)	Amani Mchugh
88	South Delhi Polytechnic for Women	Eng Hillary
89	Spectrum Valuation & Asset Solutions Pty Ltd	Valentia Roberts
90	Swedish Environmental Protection Agency	Asa Ekberg Osterdahl
91	Tamil Nadu Shelter Fund	Vidhyabharathi Balasubramaniam
92	Tamil Nadu Shelter Fund	Vivek Sharma
93	The Netherlands - Ministry of Infrastructure and Water Management	Cuno van Geet
94	The Netherlands - Ministry of Infrastructure and Water Management	Maurice van Rooijen
95	The Netherlands - Ministry of Infrastructure and Water Management, One Planet Sustainable Public Procurement programme	Mervyn Jones
96	Timber Finance Initiative	Alexander Wiese



97	Trinidad and Tobago - Ministry of Labour and Small and Micro Enterprise Development	Nadine David-Figaro
98	Trinidad and Tobago - Ministry of Rural Development and Local Government	Madho Balroop
99	U.S. Green Building Council	Eliana Peralta-Sapienza
100	UNEP	Amelie Ritscher
101	UNEP	Chengchen Qian
102	UNEP	Jorge Laguna Celis
103	UNEP Finance Initiative	Kai Remco Fischer
104	UNEP, One Planet Sustainable Buildings and Construction programme	Jonathan Duwyn
105	UNEP, One Planet Sustainable Public Procurement programme	Lukas von Schuckmann
106	UNEP, OzonAction	Ayman Eltalouny
107	UN-Habitat	Alicia Regodon
108	Universidad de Antioquia	Sixto Anonio Palacios Quinto
109	Universitat de Lleida	Lidia Rincon
110	University of Bradford	Crina Oltean-Dumbrava
111	University of Northampton	Haithan Askar
112	UNOPS	Apoorva Bajpai
113	UNOPS	Samantha Stratton-Short
114	US Environmental Protection Agency	Alison Kinn
115	US Environmental Protection Agency (EPA)	Maxwell Torney
116	Venezuelan Council for Sustainable Construction (CVCS)	Jose Solano
117	World Green Building Council	Yvonne Soh
118	Yale University School of the Environment	Reid Lifset
119	10YFP Secretariat	Andrew Schmidt
120	10YFP Secretariat	Branislav Mizenko



121	10YFP Secretariat	Charles Arden-Clarke
122	10YFP Secretariat	Elena Giordano
123	10YFP Secretariat	Emma Stewart
124	10YFP Secretariat	Fabienne Pierre
125	10YFP Secretariat	Gina Torregroza
126	10YFP Secretariat	Yulia Rubleva