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Green Public Procurement: Catalysing the Net-Zero Economy

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Foreword

If we are to limit global average temperature increases to 1.5°C, we must reduce carbon dioxide equivalent (CO₂e) emissions by 45% by 2030 and reach net zero by 2050.¹ This will require drastic transformations in how we produce and use energy and other resources. Governments, as major consumers, can and must do their part.

Last year's report, *Net-Zero Challenge: The Supply Chain Opportunity*,² by the World Economic Forum and the Boston Consulting Group, highlighted how companies can multiply their climate impact by decarbonizing their supply chains. This report examines the role of governments as consumers in the global effort to combat climate change: why their contribution is critical and how they can reduce their carbon footprint across their operations and supply chains.

The 26th UN Conference of the Parties (COP26), which took place in November 2021, generated considerable momentum, with many national governments and major cities pledging to make their procurement processes greener. The governments of the United Kingdom, India, Germany, the United Arab Emirates and Canada, under the new Industrial Deep Decarbonization Initiative (IDDI), all announced intentions to buy low-carbon steel and concrete.³

We must build upon this momentum to ensure that more governments use their purchasing power to buy low-carbon goods and services, making sure that their own actions contribute towards setting us on a path to a net-zero world.

Executive summary

A systematic framework will enable procurement officials to overcome the challenges of setting and reaching net-zero goals.

The procurement activities of national, state and local governments are directly or indirectly responsible for 15% of global greenhouse gas (GHG) emissions. Abating these emissions will help considerably in reaching the goal of the Paris Agreement to slow global warming to well below 2°C.

Greener public procurement will likely cost more, at least in the short run. And the bureaucratic

complexity of public procurement operations will make it difficult to align on decarbonization strategy. But these barriers can and must be overcome if governments are to help us reach our climate goals.

This report analyses the benefits and challenges of green public procurement and provides specific guidance on how procurement officials can ensure that their procurement activities contribute to our net-zero goals.

The opportunity

The vast majority of the emissions for which public procurement is responsible – up to 70% of the total – stem from the activities of just six industries: defence and security, transport, waste management services, construction, industrial products and utilities. The burning of fossil fuels in public transport and defence and security activities is responsible for almost all public procurement's Scope 1 emissions. Its Scope 2 emissions, from the purchase of electricity to run operations,

make up 13% of the total. Upstream Scope 3 emissions generated by the companies from which governments procure goods and services make up the rest, as much as 67%.

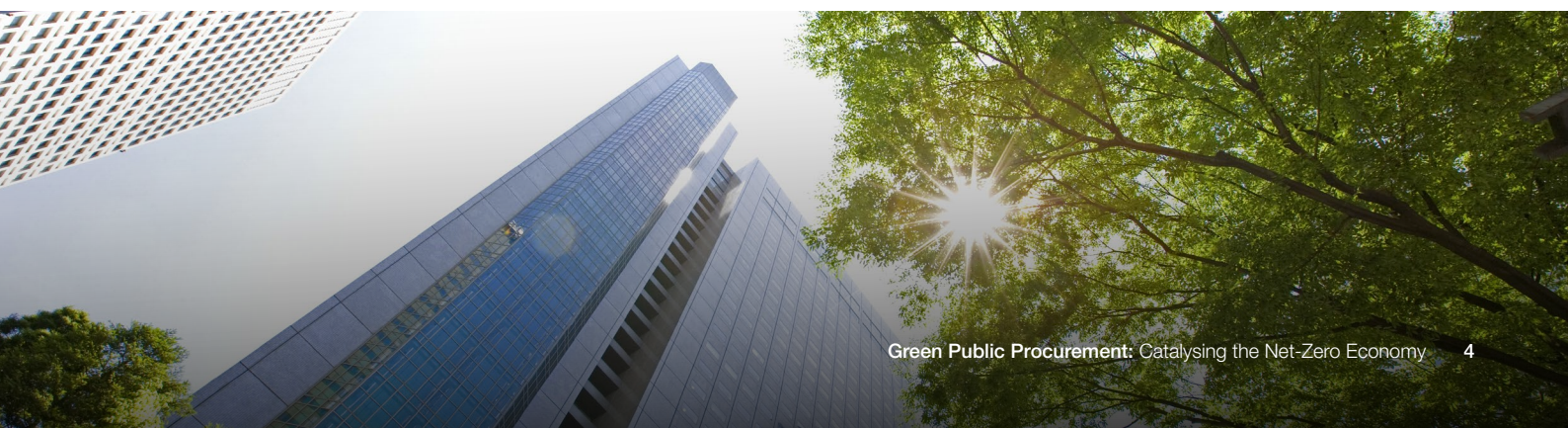
Abating these emissions will have several benefits. It will lead to an estimated \$4 trillion boost to the green economy, create around 3 million net new jobs and considerably reduce the social cost of carbon.

The challenges

Greener public procurement will likely increase costs to governments. According to our analysis, approximately 40% of all public procurement-related emissions can be abated for less than \$15 per tonne of CO₂e, although the amount varies by industry. In total, efforts by the world's governments to reach net-zero emissions will increase procurement costs by between 3% and 6%.

A further challenge is the highly decentralized nature of government procurement activities. On average,

less than half of 2019 public procurement spending in Organisation for Economic Co-operation and Development (OECD) countries took place at the federally centralized level. In addition, the added costs of green public procurement will have to compete for funding with other governmental priorities such as health and education. And because transparent data on public sector emissions is lacking, setting emissions baselines, defining decarbonization targets and tracking progress are difficult.



The solution

We offer a ten-step framework for overcoming the challenges of greener public procurement. These include baselining current emissions and future goals, optimizing for climate-friendly goods and services, working with suppliers, engaging with industry ecosystems to promote decarbonization and enabling the procurement organization to meet its climate goals.

Steps 1 and 2: Create transparency in baselines and targets. Collect the data, identify heavy-emitting suppliers, prioritize efforts by economic value, determine common metrics and set targets.

Steps 3 and 4: Optimize products for greenhouse gas abatement across the life cycle. Develop an abatement roadmap outlining the emissions reduction levers to be pulled to reach targets. Include factors such as cost, impact and feasibility.

Steps 5 and 6: Define product and supplier standards and engage suppliers.

Set procurement standards for both internal operations and external suppliers, then assess and prioritize suppliers in terms of progress in setting and reaching emissions targets.

Steps 7 and 8: Develop the wider ecosystem and create buying groups. Work with industry coalitions to promote decarbonization and certify companies and materials. Join buying groups to help create markets for low-carbon products.

Steps 9 and 10: Transform the procurement organization and align across agencies. Realign the steering model, individual responsibilities and communications processes, boost capabilities and upgrade data and information systems.

Given its sheer scale and spending power, public procurement can exert considerable influence in the effort to combat global warming. We urge all public procurement officials to take on this crucial task, work in concert with all stakeholders and begin the process now.



1

Introduction

Through its scale and spending, public procurement has the potential to positively impact global efforts to slow climate change.

Governments worldwide are making progress in encouraging the decarbonization of their countries' economies through regulation, taxation, direct funding, incentive programmes and other means. As of November 2021, 92 countries had pledged to meet net-zero emissions targets, accounting for approximately 85% of global greenhouse gas (GHG) emissions.⁴

Yet governments themselves can have a profound positive effect on efforts to reduce the world's carbon footprint. Public procurement alone is directly responsible for 3% of GHG emissions (Scope 1) and indirectly responsible for another 12% through the emissions released by the companies from which they procure the goods and services they require to maintain their operations (scopes 2 and 3). So abating these emissions – 15% of the total – will make a huge difference in reaching the Paris Agreement goal to slow global warming to well below 2°C.

To do so, governments must pull every lever available to abate their direct emissions while working with their suppliers to lower their own emissions as well. The \$11 trillion⁵ that governments around the world currently spend annually on procurement should give them the power needed to influence the climate-friendly practices of the industries they buy from. And

the time is now: unless we can slow global warming, public procurement costs will skyrocket as governments spend to adapt to the effects of climate change.

Admittedly, greener procurement will likely cost more, at least in the short run. And the sheer multi-layered complexity of public procurement operations makes aligning on decarbonization strategy a challenge. But these barriers can be overcome. Indeed, they must be if governments are to play their part in reaching global net-zero goals.

While lowering the global public sector's overall operational emissions will be critical to the efforts to slow global warming, this report focuses specifically on the emissions generated, directly or indirectly, in the production and use of the goods and services purchased through public procurement. Through their procurement processes, governments can have a significant positive impact on the climate-friendliness of the goods and services they buy.

In what follows, we analyse the benefits and challenges of green public procurement and provide detailed guidance on how procurement officials can bring about the positive changes needed to ensure that government procurement contributes fully to global net-zero goals.

2

The green opportunity

In addition to far lower emissions, climate-sensitive public procurement will stimulate the green economy, reduce the social cost of carbon and lead entire industries towards a net-zero future.

To date, many governments have been lagging in their efforts to set overarching emissions reduction goals covering all of their operations or targets for abating the indirect emissions related to the goods and services they procure. There are exceptions: for example, the US, Germany and Canada have each set net-zero targets covering their operations. But none of them have published specific details on how they plan to reach their targets.

That is unfortunate, given that the world's governments have an enormous positive role to play in helping lower GHG emissions, in addition to their current efforts to regulate the private sector companies operating within their borders. Indeed, given its enormous scale and buying power, the potential influence of

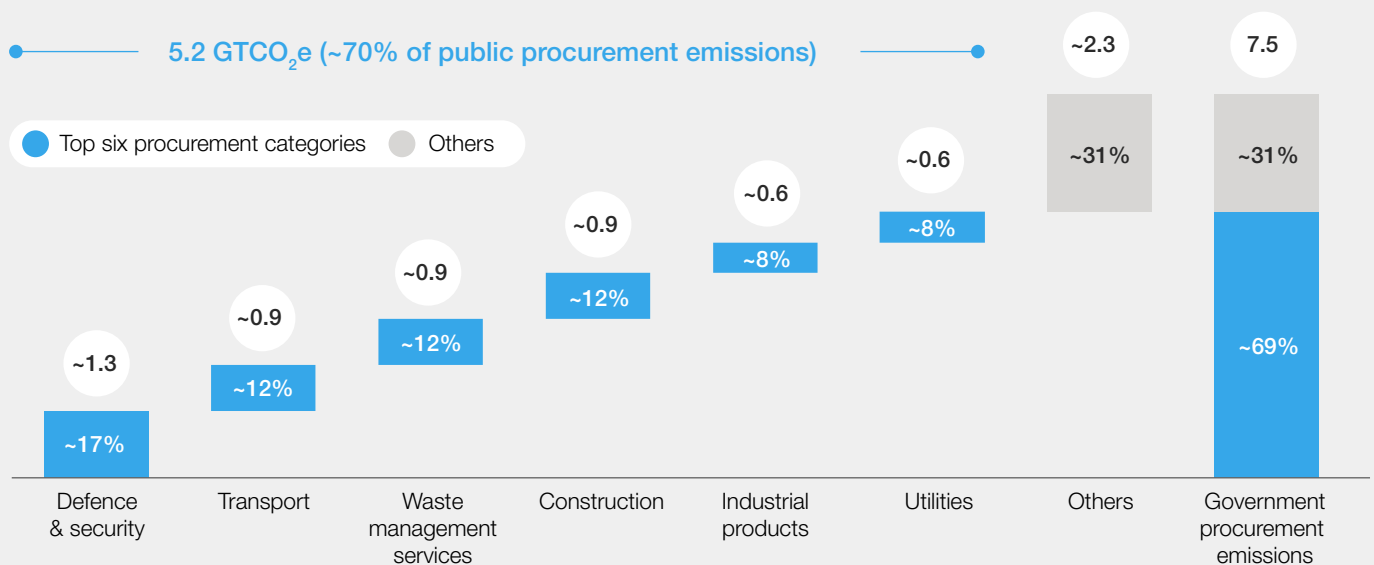
public procurement is so great that it can play a leading role in encouraging key industries to reach their own net-zero goals, promoting innovation across the green economy and considerably reducing the social cost of carbon.

The data tells the story:

Scoping the challenge. As noted, public procurement is responsible for the release of 7.5 billion tonnes of CO₂e into the atmosphere every year, or 15% of total global GHG emissions.⁶ The vast majority of these emissions – up to 70% of the total – stem from the activities of just six industries: defence and security, transport, waste management services, construction, industrial products and utilities (see Figure 1).

FIGURE 1 **Six industries alone account for almost three-quarters of the 7.5 billion tonnes of public procurement emissions**

Contribution to government procurement emissions (GTCO₂*)



* Emissions in gigatonnes of CO₂ equivalent

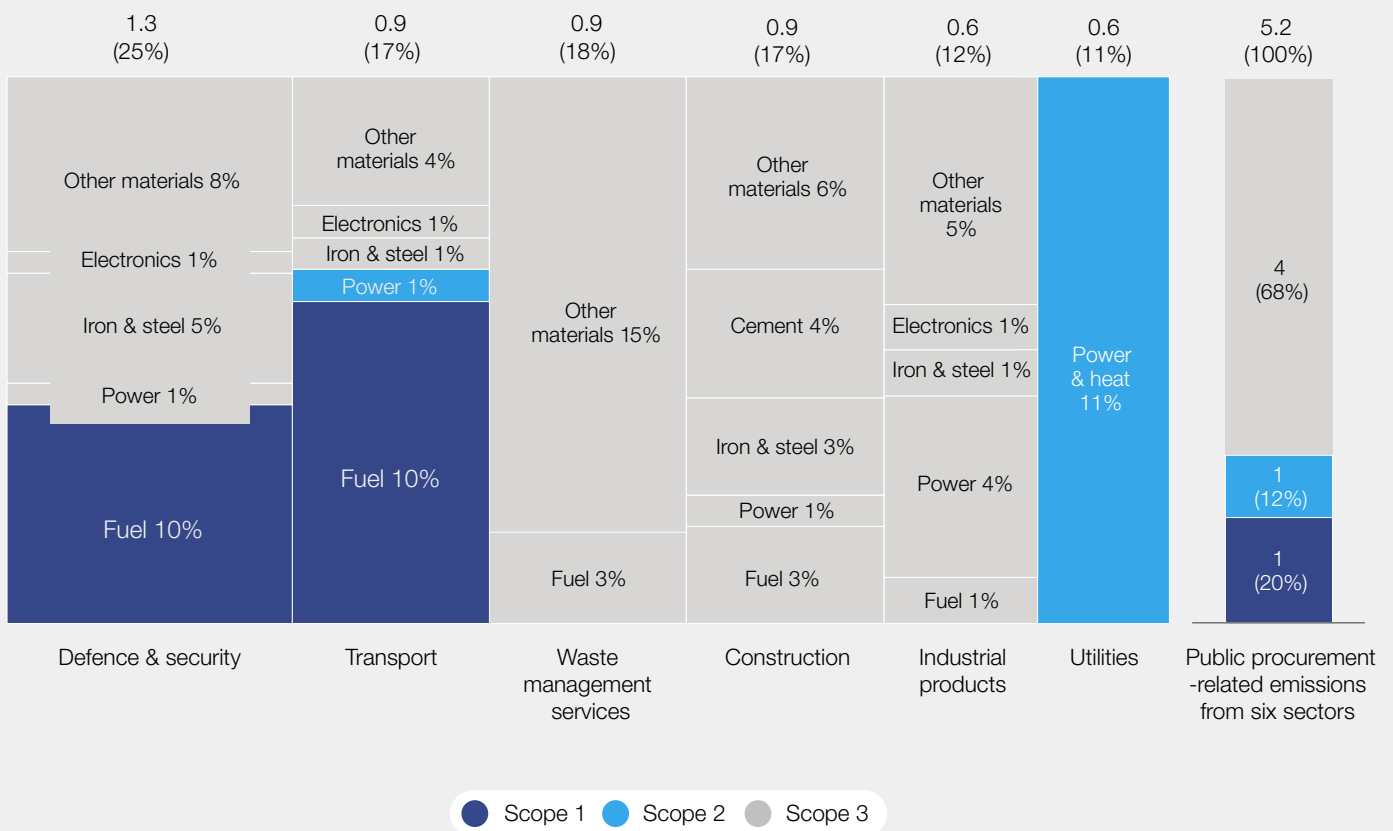
Source: United Nations Framework Convention on Climate Change (UNFCCC) greenhouse gas (GHG) data (2019); Our World in Data Emissions by Sector (2020); BCG analysis

The burning of fossil fuels in public transport and defence and security activities is responsible for almost all of public procurement's Scope 1 emissions – as much as 20% of all the emissions for which governments are responsible. Its Scope 2 emissions – the purchase of electricity from the utilities industry to run operations – makes up 12% of the total. Upstream Scope 3 emissions – those generated by the companies from which it procures the goods and services it needs – make up the rest, as much as 68%.

Government-funded construction activities, for example, are responsible for up to 17% of total procurement-related emissions and 4% of that total comes just from making the cement needed for government construction projects. The defence and security industry contributes approximately another 25% of total emissions, largely through the burning of fossil fuel and the manufacturing of the iron, steel and other materials used to build the defence- and security-related goods that governments buy, from radios to submarines (see Figure 2).

FIGURE 2 Scope 3 emissions make up two-thirds of the public procurement-related total

Emissions (GtCO₂e*) and share (%) by sector and scope



* Emissions in gigatonnes of CO₂ equivalent

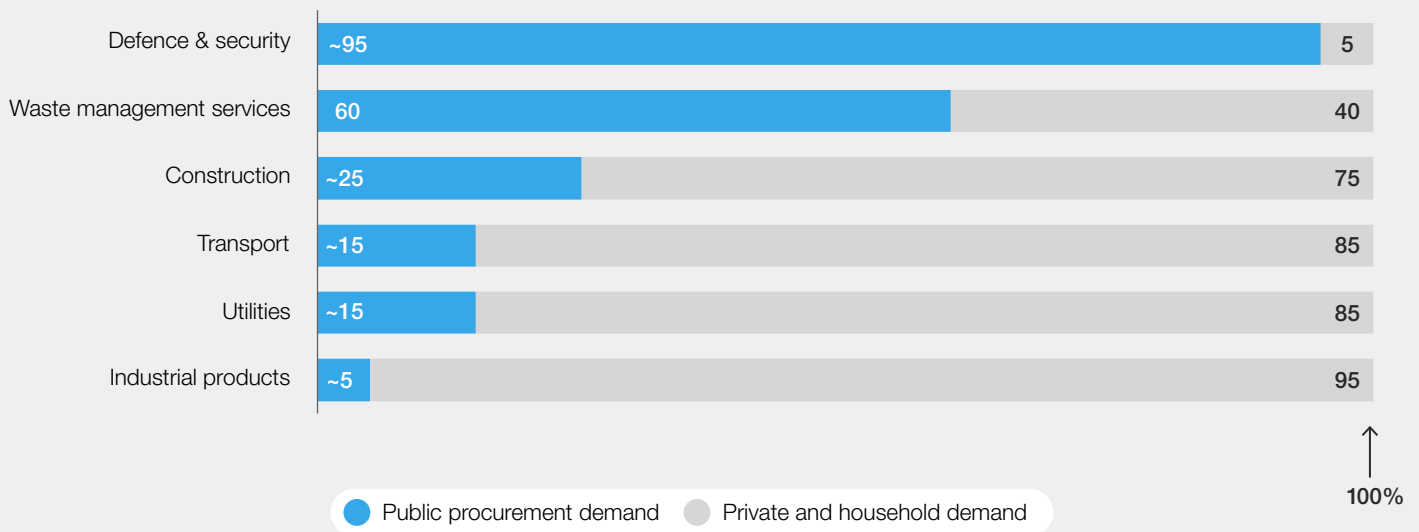
Source: UNFCCC GHG data (2019); BCG analysis

All of these purchased goods and services cost global governments a total of \$11 trillion each year, or 13% of global GDP – an amount that should give procurement officials a considerable amount of influence over the industries they buy from and especially those that are particularly dependent on public procurement. In the defence and security

industry sector, 95% of revenues come through public procurement, for example, as does 60% for waste management services and 25% for the construction industry (see Figure 3). The green demand signals emanating from public procurement activities should have a particularly meaningful impact on these sectors.

FIGURE 3 **Public procurement has a great deal of influence, especially over the defence and security, waste management services and construction sectors**

Source of revenues for each sector (%)



Source: US census monthly construction spending (Oct 2021); France public employment (2020); opentender.eu; sector expert interviews; BCG analysis

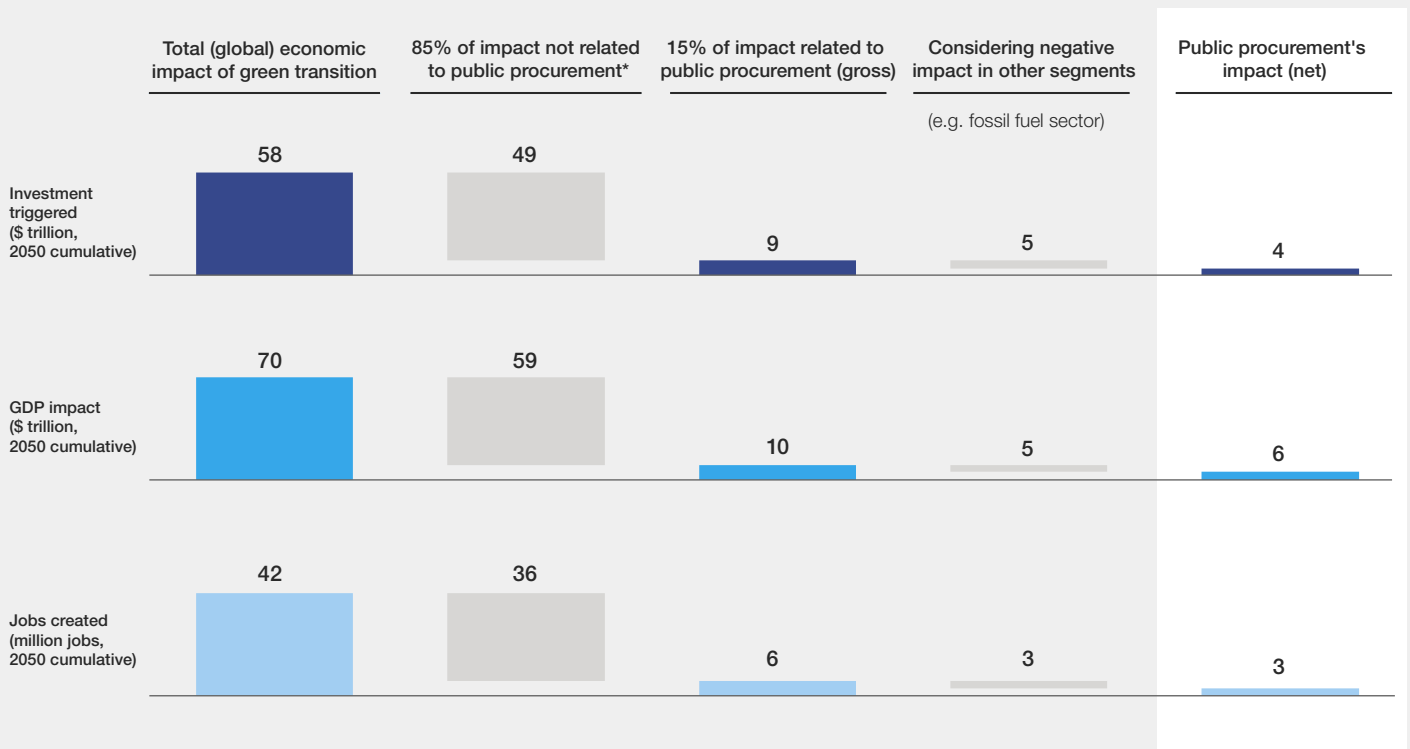
The green economy. Assuming that public procurement is responsible for 15% of global GHG emissions, its efforts to promote green practices in its own operations and through its procurement practices should trigger about \$4 trillion of private sector investment needed to reach net-zero emissions by 2050 (see Figure 4). The majority of these investments will likely be made in the next decade.

This procurement-driven investment activity, in turn, is expected to be responsible for the creation of around 3 million net new jobs by 2050 as the number of jobs in fossil fuel-driven sectors like oil

and gas and manufactured goods declines. That's assuming that total global green investment is sufficient to keep global warming well below the Paris Agreement goal of 2°C.

And the private investment and new jobs triggered by greener public procurement, taken together, will boost global GDP by around \$6 trillion by 2050, according to estimates – a significant proportion of the green economy's total GDP of \$70 trillion. The additional jobs created through investment in wind farms, for example, will increase both consumption and tax revenues, boosting GDP further.⁷

FIGURE 4 | Green public procurement can trigger private sector investment, provide economic stimulus and create new jobs



* Public procurement's economic impact is determined by applying public procurement's 15% share of global emissions to the total impact

Source: International Renewable Energy Agency, *World Energy Transitions Outlook* (2021); BG analysis

The social cost of carbon. Carbon emissions and the global warming they are triggering are inflicting huge costs on society across virtually every aspect of life. These include the cost of changes in crop yields, adapting to sea level rise, redesigning water management and heating and cooling systems, and increased medical expenses, among others. The social cost of carbon increases as the amount of carbon released into the atmosphere increases and is forecast to reach \$115 per tonne of CO₂e by 2050.⁸ If global public procurement succeeds in fully abating all of the

15% of carbon emissions it is responsible for by 2050, the cost of GHG emissions to society will be lower by as much as \$930 billion annually.

Leading by example. The number of private companies pledging to reduce their carbon footprints is rising rapidly; more companies made commitments in just the first ten months of 2021 than in all the previous years combined. With the influence they wield, government procurement functions can help show many more companies, in every industry, the way forward.



Now is the time for governments to step up and lead the way for the private sector by setting interim reduction targets and aligning their own procurement activities with the goal to reach net zero by 2050.

Rana Ghoniem, Chief, Energy Systems and Infrastructure Division, UNIDO

3

Facing the challenges

Procurement officials must overcome several challenges in their efforts to reduce their organization’s carbon footprint: cost, complexity, competing priorities and poor data transparency.

The rewards of greener public procurement are considerable, but reaping them will take a substantial effort on the part not just of public agencies, policy-makers, regulators and procurement officials, but also the companies in the industries that provide the goods and services governments require. The cost of greener procurement is just one of the challenges. Others include the bureaucratic complexity and decentralized structure of public procurement organizations and activities, the politics inherent in prioritizing green procurement in the light of other governmental obligations and needs, and the lack of data covering procurement emissions baselines and targets.

While these challenges are indeed significant, they can be overcome. Doing so will take a strategically astute and carefully organized effort from government officials in order to keep global warming

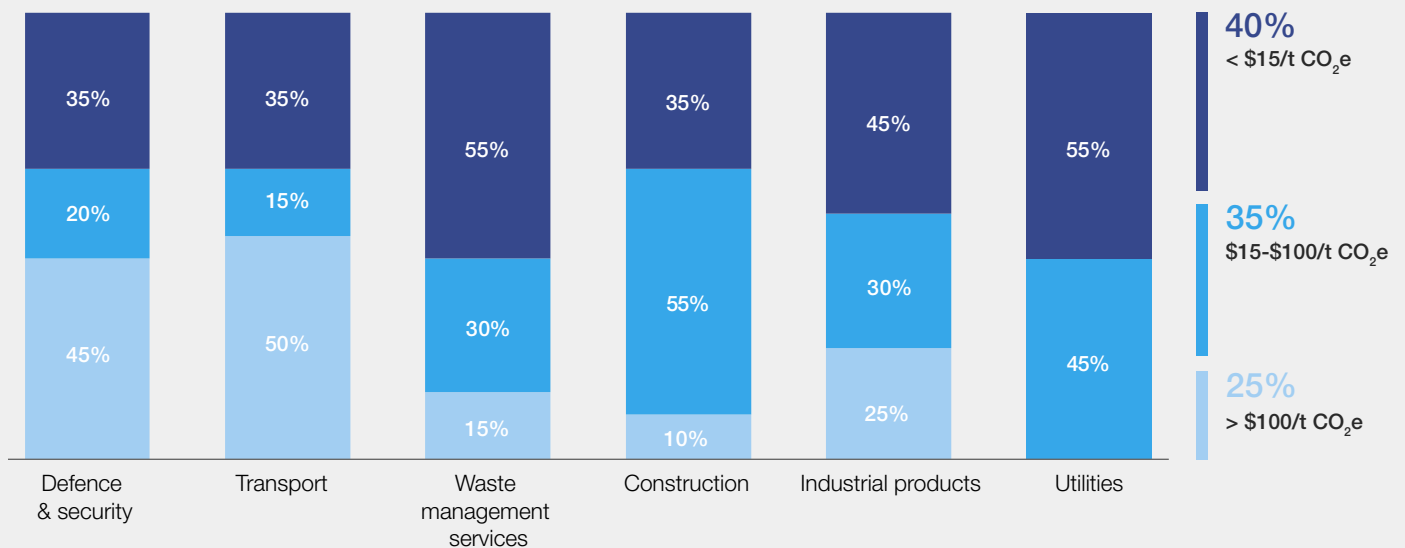
to less than 1.5°C and to maintain the willingness to pull all the decarbonization levers available.

Costs. The technologies needed to decarbonize the goods and services that governments procure require significant private sector investments, so reducing the GHG emissions for which public procurement is responsible will increase the cost of public procurement. The key question is, by how much?

That, of course, depends on the various abatement levers available to governments and the industries they deal with. By aggregating the abatement potential of the key levers for each of the six sectors and then sorting them by cost, we estimate that, while the amount varies depending on the industry, 40% of public procurement-related emissions can be abated for less than \$15 per tonne of CO₂e (see Figure 5).

FIGURE 5 40% of emissions can be abated at a cost of less than \$15 per tonne (t) of CO₂e*

Cost of abatement by key sectors (%)








* Carbon dioxide equivalent

Source: Sector expert interviews; World Economic Forum and BCG, *Net-Zero Challenge: The supply chain opportunity* (2021)

Altogether, we expect that the efforts of the world's governments to reach net-zero emissions will increase procurement costs by between 3% and 6%. How did we arrive at this figure? We estimated each major sector's share of public procurement emissions and its share of total public procurement spending. By calculating the price impact of reaching net zero for each sector, we arrived at the resulting overall price impact in dollars (see Figure 6).

By far, the highest cost will involve the abatement of emissions from the fuel used in the defence and security and transport sectors, which will increase fuel prices by up to 70% by 2050. The increase in construction costs as the industry reaches net zero, however, will raise costs by just 1% to 3% by 2050, adding between \$40 billion and \$60 billion to global public procurement costs.

FIGURE 6 Net-zero goals can be achieved with a 3% to 6% “green premium”

Global view				
	Share in public procurement's emissions	Share in public procurement's spend	2030 product price impact* (%)	Public procurement budget impact (\$)
 Defence & security	~17%	15-20%	7-9%	\$100-140bn
 Transport	~12%	5-10%	23-25%	\$80-120bn
 Waste management	~12%	2-5%	10-12%	\$40-60bn
 Construction	~12%	20-25%	1-3%	\$40-60bn
 Industrial products	~8%	5-10%	1-3%	\$20-40bn
 Utilities	~8%	2-5%	7-9%	\$5-15bn
Total	~69%	50-75%	3-6%	\$300-450bn

* Price impact in % based on US baseline for 2021 – variations to be expected for other countries ; price impact based on average abatement cost by procurement category, adjusted to reflect 2030 costs, assuming similar costs between 2030 and 2050 and applied to projected emissions in 2050. The total 2030 product price impact (%) is the sum of each category's 2030 product price impact weighted by the respective share in public procurement's spend.

Source: BCG analysis

The increased cost of green procurement can be seen as a “green premium”, providing suppliers with the funds to invest in the technological innovation needed to help them decarbonize. This approach

is an alternative to instituting a carbon tax, which would incentivize suppliers to decarbonize their goods and services in order to avoid the tax.



Decision-makers tend to overestimate the green premium they need to pay for less emitting products and services. With scale and technology progress, this premium will decrease much faster than many expect.

Jens Burchardt, Partner and Associate Director,
Climate Impact, Boston Consulting Group

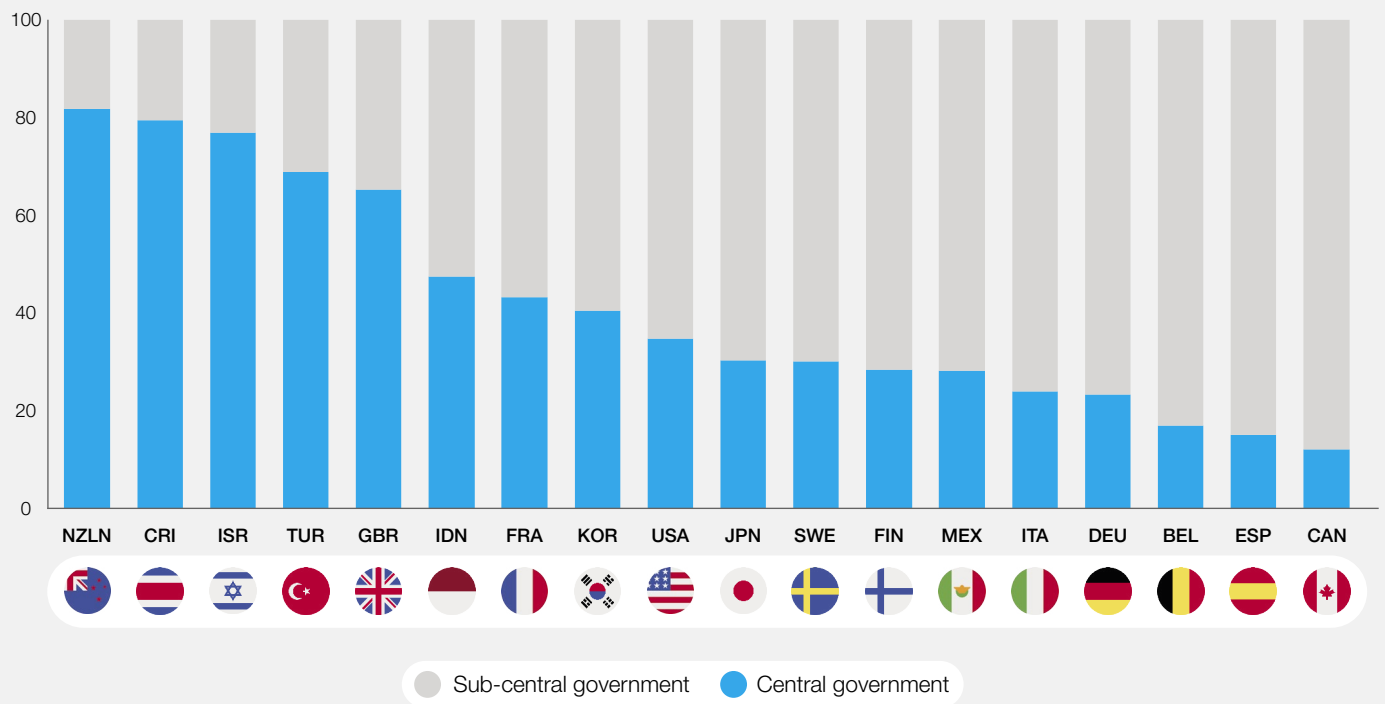
Decentralized bureaucracy. As a rule, public procurement in most countries is highly decentralized, making it difficult to devise coherent strategies for decarbonizing procurement across all levels of government – an additional challenge for governments in their efforts to lower their carbon footprint. On average, less than half of 2019 public procurement spending in OECD countries took place at the federally centralized level.⁹ And the range is wide: while New Zealand spends more than 80% at the federal level, Canada spends just 12% (see Figure 7). This is especially true regarding purchases from the construction and

waste management services sectors, though less so in defence and security, where procurement is typically more centralized.

Decentralization also adds significantly to the overall complexity of procurement activities in most countries. Public procurement processes are inherently complicated and frequently inefficient. And while procurement policies are often established at the federal or state level, the actual procuring of goods and services is likely to be carried out by a range of public agencies at different levels of government.

FIGURE 7 Most government procurement spending takes place below the federal level

Federal vs. sub-federal procurement spending, 2019 (%)



Source: OECD, *Government at a Glance* (2021)

Competing priorities. Government budgets are tight in just about every country around the world, so the added costs of green public procurement will have to compete with other governmental priorities. This is especially true at the local level, where budgets are particularly constrained and where the great majority of public funding already goes to such critical priorities as education and health. It is therefore essential that procurement officials at every level of government engage in discussions about the fiscal trade-offs that may be necessary when increasing purchases of greener goods and services.

Poor transparency. A final challenge lies in the lack of transparent data on public sector emissions. While our estimates offer an overview of the opportunity available to governments in reducing their carbon footprint, the devil, as they say, is in the details. Complete and transparent datasets covering emissions resulting from public sector operations and procurement are generally lacking, making it difficult or impossible to set emissions baselines, define realistic, achievable decarbonization targets, compare data across products, sectors and countries, and track progress. Discrepancies between different official sources of data only add to the difficulty.

4

Ten steps to greener public procurement

Achieving net-zero emissions will require a systematic approach to the task, from determining its scope to working with suppliers to transforming how procurement organizations operate.

The key to success in green public procurement lies in facing the inevitable challenges – cost, prioritization, transparency and complexity – and devising solutions and processes that will help public procurement organizations reduce their carbon footprint methodically and systematically.

Our ten-step framework for reaching and maintaining green procurement goals carries procurement organizations through from baselining current emissions and future goals, optimizing for climate-friendly goods and services and working with suppliers, to engaging with industry ecosystems to promote decarbonization and enabling procurement organizations to meet their climate goals (see Figure 8).

The ten steps discussed below can be applied to procurement functions at every level of the public sector, from the federal government to small local procurement offices, and can be adapted to country-specific situations. EU countries, for example, could collaborate regionally, while signatories to the World Trade Organization's agreement on government procurement should ensure continued adherence to the agreement. The key is collaboration: reaping the full benefits of green public procurement will only happen if all stakeholders across the entire public procurement ecosystem work together to set and reach their net-zero goals.



Procurement today largely focuses on price and delivery schedule, where emissions are typically not part of specifications. Implementing emissions standards in procurement will require building capabilities in understanding sustainability standards, baselining emissions from current operations, setting targets and defining and implementing a green public procurement roadmap.

Peter Ong, Chairman, Enterprise Singapore

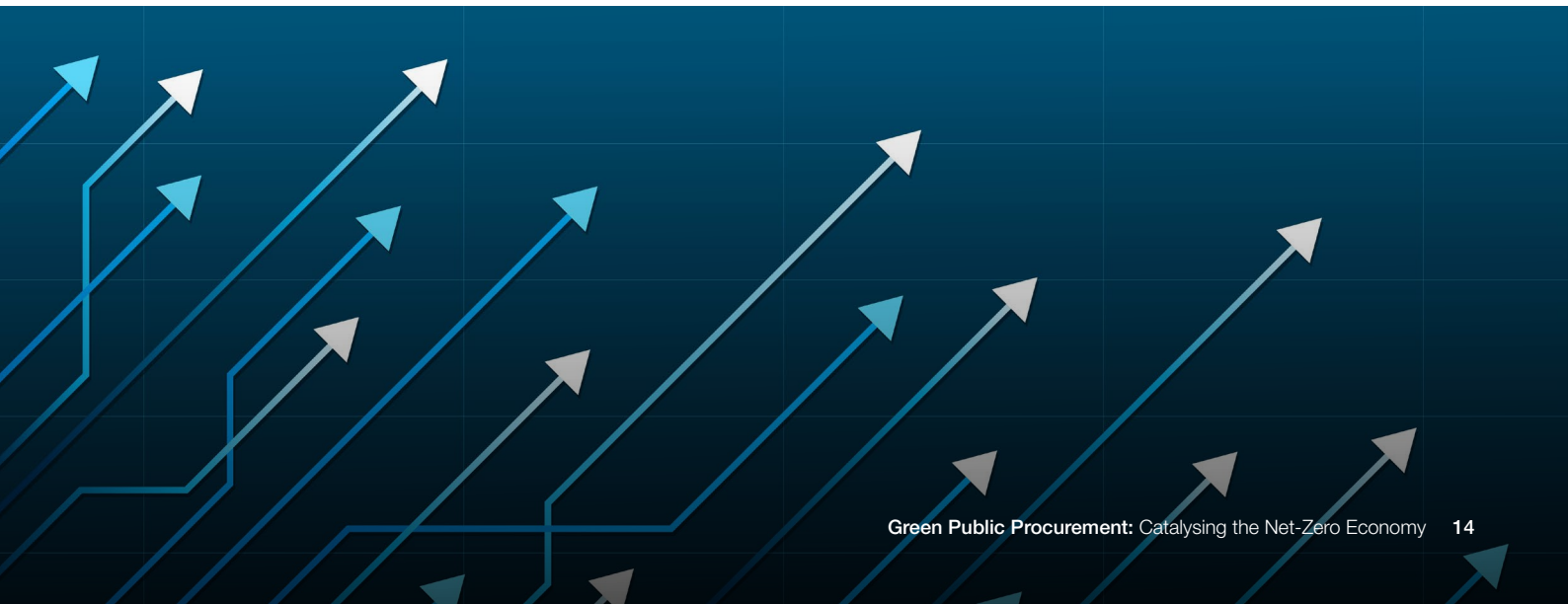
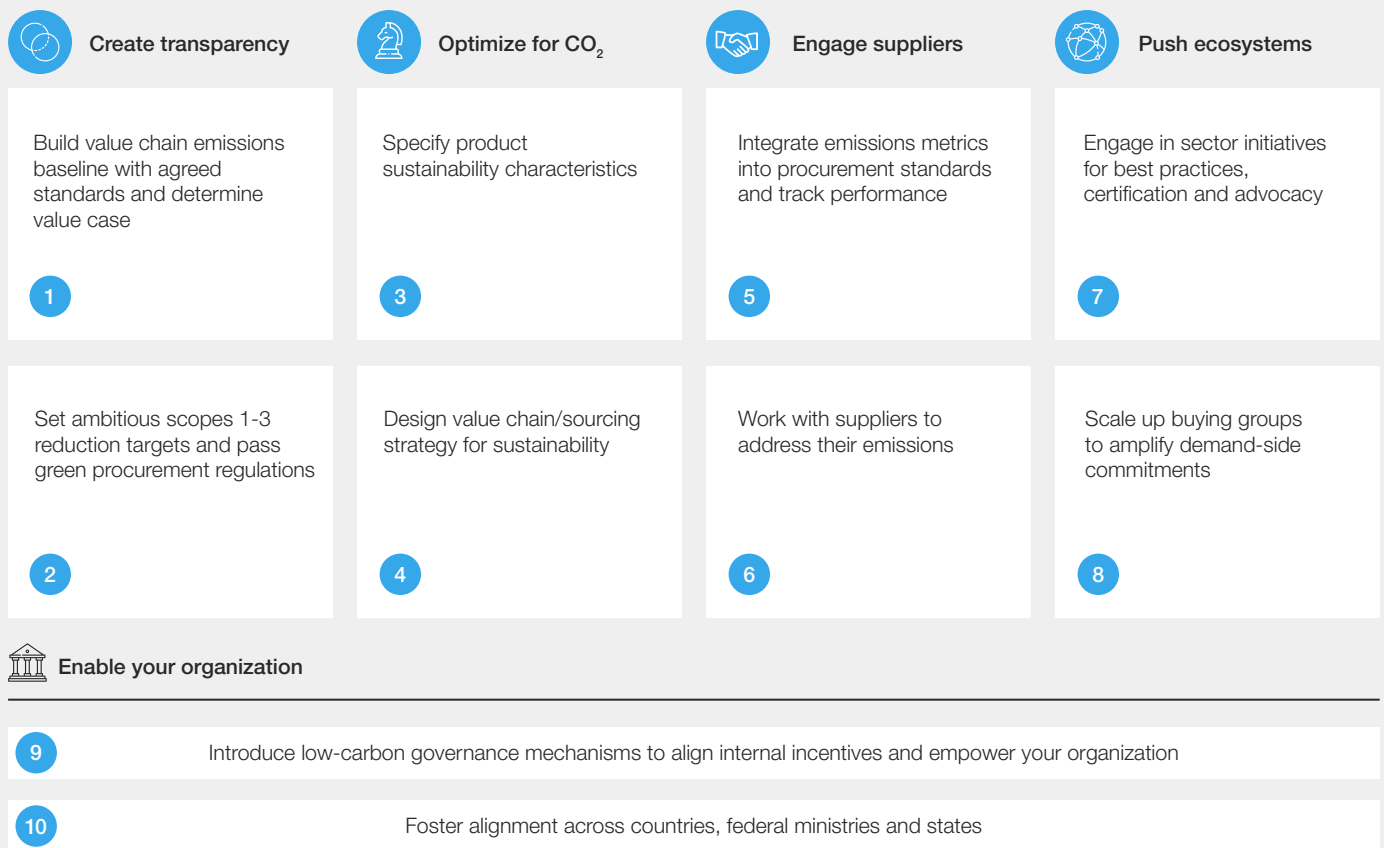


FIGURE 8 | Ten steps to accelerate public procurement decarbonization



Source: Expert interviews; BCG analysis

4.1 Steps 1 and 2: Create transparency in baselines and targets

No effort to decarbonize public procurement can proceed without a clear understanding of the current status of the emissions for which the procurement function is both directly and indirectly responsible. This effort will enable procurement officials not just to gain a complete picture of where they stand but also to measure the costs and value inherent in their decarbonization efforts.

Once the baseline and decarbonization value proposition have been determined, procurement functions can move to set their reduction targets for all three emissions scopes. This is also the time to devise and enact regulations promoting public procurement's net-zero goals.

Collect available data. Given the urgency regarding climate and carbon emissions, it is important to find a balance between the

quality of the data gathered to establish the baseline and the speed at which it is collected. As such, countries should strive to create a baseline with readily available data to develop an initial understanding of the challenge at hand (see Box 1).

The baseline can then be refined with the collection of additional data. Procurement officials should begin by mapping the procurement supply chain and identifying suppliers for each focus area. They should then collect data from suppliers covering their emissions related to raw materials, energy and fuel, upstream and downstream transportation and other relevant factors. Finally, they should estimate the total Scope 3 emissions from each supplier, using industry benchmarks and calculating standard emission factors over each product's entire life cycle, from the supply of raw materials to disposal and recycling.

In 2017, the Dutch Ministry of Infrastructure and Water Management¹⁰ decided to create a methodology for computing the sustainability impact of its procurement policies using easily available data. The study focused on eight product categories: transport (including vehicles, transport contracts and services); energy (including gas, electricity and solar panels); and occupational clothing.

The assessment was carried out in three steps:

1. Tenders for each category published in 2015 and 2016 were identified and collected from TenderNed, the country's statewide electronic tendering platform, then reviewed to ensure relevancy. A sample of ten representative tenders was selected for each category. The samples were searched for sustainability criteria and to determine each contract's economic value, and interviews were conducted with contract managers to determine the result of each tender: i.e. how much of the product or service was finally acquired and used, whether sustainability criteria were respected and other factors.
2. For each category, products were qualified as "green" using the minimum Dutch green procurement requirements. For example, "green" vehicles included any gas-powered, hybrid or electric vehicle that complied with the Euro 6 standard. The environmental benefits of each product were estimated in terms of CO₂e reduction, with other benefits, such as savings in fossil-based raw materials or avoidance of other pollutants, also assessed where relevant.
3. Results were then extrapolated based on what the sampling represented in economic terms compared with the entire procurement category. This allowed Dutch procurement officials to determine each category's environmental and economic impacts.



“ Ultimately, the framework will support stronger collaboration and better decision-making among all stakeholders.

Agree on common metrics. The current lack of harmonization and granularity in procurement data and non-standardized computation methods often prevent a good understanding of the baseline starting point, a clear definition of the objectives and the ability to track progress accurately. Therefore, governments need to agree internally on common, user-friendly frameworks of metrics that leverage existing standards (such as those established by the International Organization for Standardization or the European Committee for Standardization), using common assessment tools, such as Environmental Product Declarations (EPDs) for each sector, in concert with industries and decarbonization experts.

A workable framework should provide a set of simple and objective measures built on existing standards, with the option to add further details once widely adopted (see Box 2). It should be developed in concert with the industry, as well as

third-party certification bodies. It should encompass the entire life cycle of a product, from the supply of raw materials to disposal and recycling, and the entire value chain, including subcontractors. And it should complement current certification schemes to provide alignment and integration.

A complete and well-prepared framework will give all stakeholders a better understanding of the current baseline, the principles on which it is based and the methods for tracking progress. This, in turn, will encourage alignment across the entire value chain, from the different third-party certification bodies to the private suppliers and subcontractors. And it will enable comparisons of baselines, targets and progress nationwide, across geographical areas and for specific parts of the procurement portfolio. Ultimately, the framework will support stronger collaboration and better decision-making among all stakeholders.

BOX 2 | A green building code

The EU's Level(s) framework¹¹ for the construction industry is a comprehensive guide that uses existing standards to provide a common language for ensuring the sustainability of all buildings, enabling certification providers, legislators and companies to align legislation and policies governing construction standards, building practices, materials and environmental sustainability throughout a building's life cycle.

It was created in collaboration with the industry and outside experts and refined and tested through more than 80 projects across 21 countries. Most major European construction certification standards bodies supported its development and plan to align their own standards with the Level(s) framework.

The standards on which it is built include Environmental Product Declarations EPDs independently verified and registered documents that communicate transparent and comparable information about the environmental impact of a specific product over its entire life cycle.

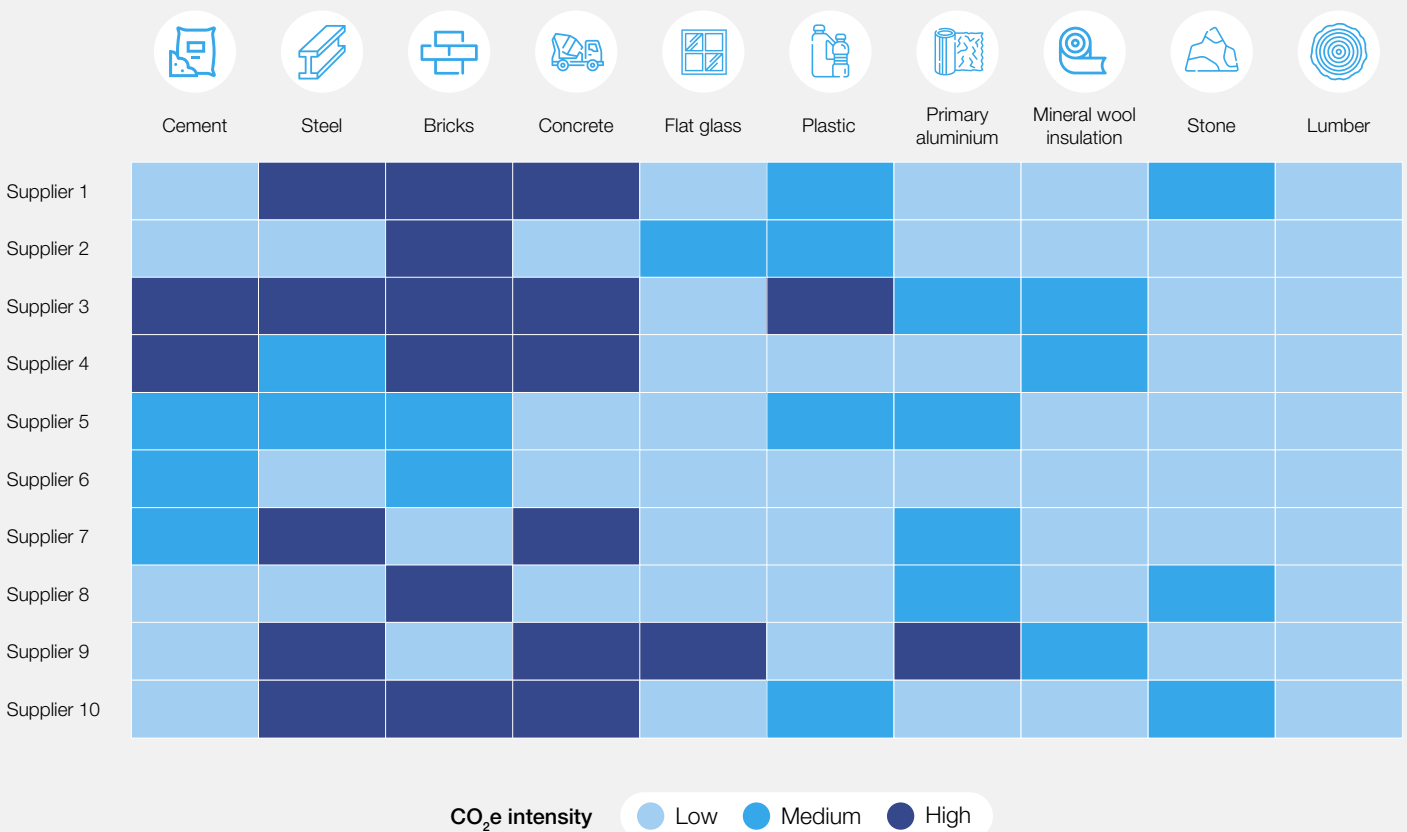
Created and registered by EPD programme operators using a framework based on internationally recognized ISO standards, EPDs are emerging as a key basis for common public procurement metrics in construction, as they allow for comprehensive and verified third-party reporting of environmental impacts.¹² Required indicators of green compliance include measures of the impact of GHG emissions, such as acid rain, ocean acidification, the depletion of fossil fuels and other effects.¹³

Identify hot points. Procurement officials should then gather detailed data from suppliers in each industry to assess their specific contributions to the procurement function's Scope 3 emissions. This data can then be arranged as a matrix, indicating the emissions intensity of the materials

used by each supplier within a particular industry, such as construction (see Figure 9). This will enable the identification of particularly heavy-emitting suppliers. Procurement officials can then plan to work with these suppliers to form an action plan to lower their emissions.

FIGURE 9 | A supplier and materials matrix helps identify heavy-emitting suppliers

Example matrix for the construction industry



Source: Expert interviews; BCG analysis

Make the case for value. Once the full baseline is created for each procurement purchase category – and ultimately for all procurement – countries can build the value case for implementing their net-zero procurement programme. This should include the reduction in total emissions needed to reach net zero as well as such value-based benefits as the amount of new private sector investment and net new jobs created, the increase in GDP and the annual social cost of carbon avoided.

Set targets. A common set of clear, high-level abatement targets at the country level will be needed in order to develop a workable decarbonization strategy. This will involve several steps:

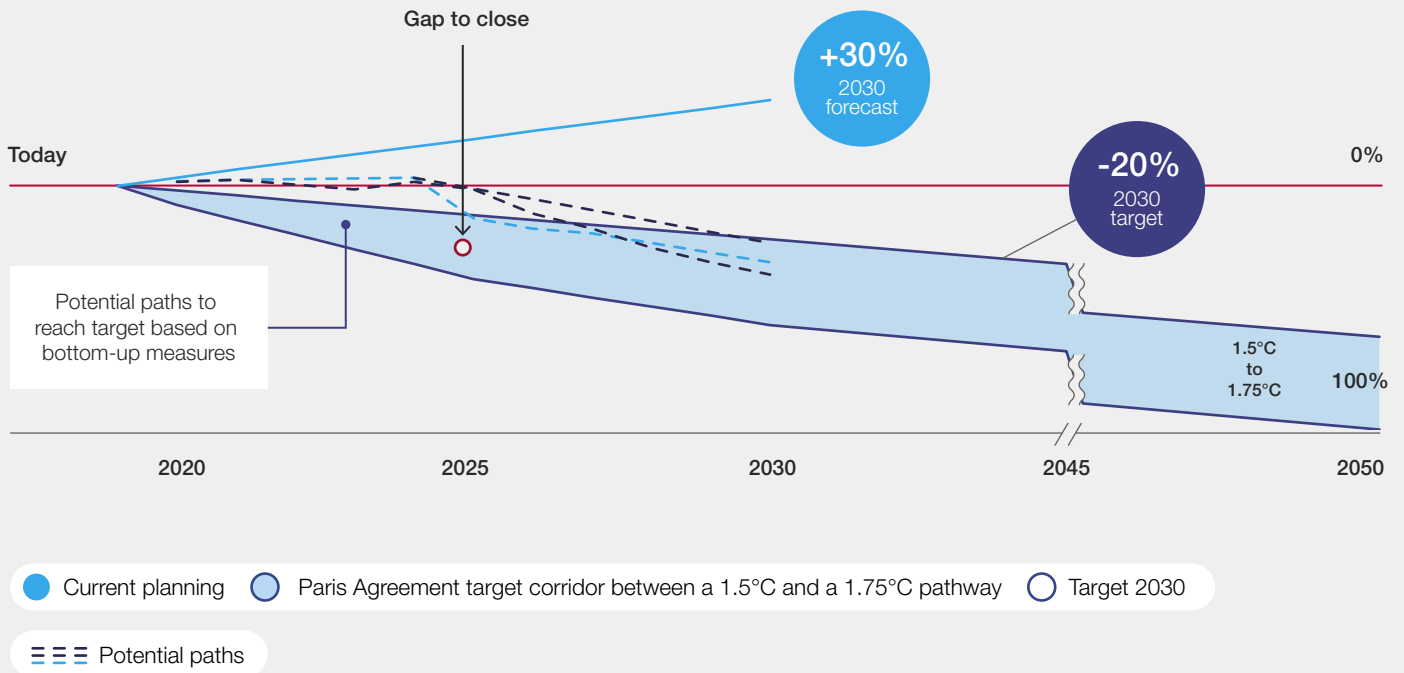
- Generate a view of the forecasted decarbonization trajectory based on the baseline.

- Set 2050 and interim 2030 targets in accordance with the Paris Agreement and in alignment with Nationally Determined Contributions (NDCs), leveraging targets as set by the Science-Based Targets Initiative (SBTs), which are calculated to limit global warming to 1.5°C for each sector.
- Use a flexible approach to achieve the targets, determining the corridor of possible pathways for reaching them by defining the measures required to reach them, their timing and cost, in consultation with suppliers and experts (see Figure 10).
- Over time, refine intermediary milestones and iterate on measures as needed, based on ongoing assessments of current progress and the development of technological improvements potentially affecting decarbonization levers and goals.

FIGURE 10

Starting from the baseline, set realistic emission targets by leveraging science-based targets and adopting a flexible approach

Emissions (GtCO₂e*)



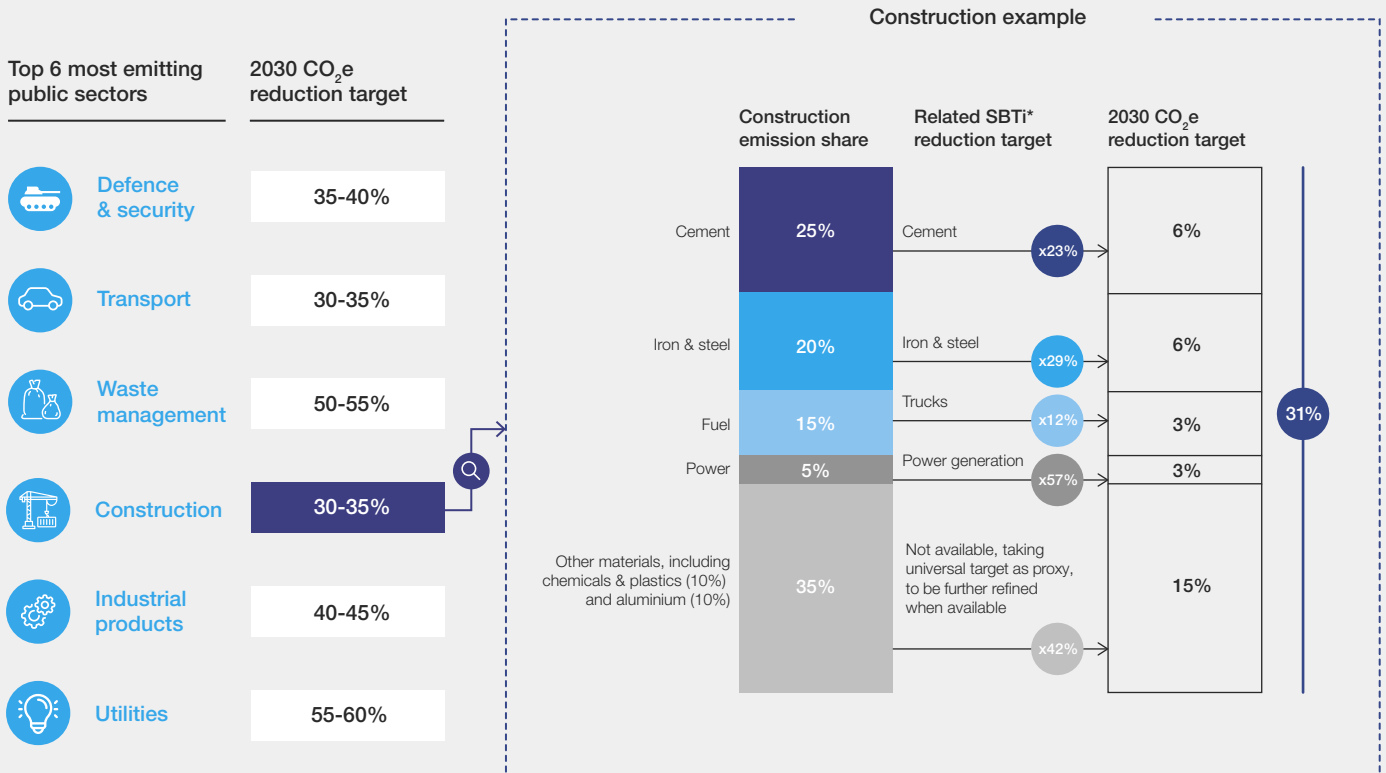
* Emissions in gigatonnes of CO₂ equivalent

Source: BCG analysis

Figure 11 illustrates the target definition process¹⁴ and how governments can leverage SBTs to ensure their own high-level targets are in line with the Paris Agreement's goals. For example, to determine the construction sector's overall 2030 emissions reduction target, governments first need to identify the materials that generate the sector's emissions and the percentage of the total emissions each

material is responsible for. Then they need to identify the SBT for each material to know what can be realistically abated. Cement, for example, represents 25% of the construction sector's total emissions, 23% of which can be scientifically targeted for abatement. Aggregating the targets for all of the sector's materials results in a single target for the entire sector of 31%.

FIGURE 11 **Establish realistic emission reduction targets reflecting the Paris Agreement goals and leveraging science-based targets**



* Science Based Targets initiative

Source: SBTi Net-Zero Corporate Manual: Version 1.1 for company road test, Science Based Targets, (July 2021); BCG analysis

Pass supporting regulations. A workable framework, accurate baseline and clear targets will give governments the evidence needed to set policies and enact regulations promoting green procurement (see Box 3). One such regulatory approach is Buy Clean, which aims to incorporate the requirements for purchasing low-carbon construction materials into

government procurement. To achieve this goal, Buy Clean sets the maximum acceptable global warming potential limit for select construction materials such as cement, steel and glass. The State of California enacted the first Buy Clean policy in the US in 2017, and now policies are also being explored at the federal, state and local levels across the country.

BOX 3 | Full range of climate regulations needed

In addition to promoting greener public procurement, governments will need to enact additional cross-sector and sector-specific emissions reduction regulations to deliver on their net-zero ambitions.

The most effective mechanism is a meaningful price on carbon emissions. Widely recognized as the most impactful and cost-effective way to decarbonize across economies,¹⁵ carbon pricing is endorsed by every major multilateral institution, including the International Monetary Fund, the UN and the World Bank.

However, while carbon pricing is regarded as an effective and necessary lever, it is unlikely to be sufficient. Other cross-sector levers include measures to prevent carbon leakage, such as a carbon border adjustment tax and the elimination of subsidies on fossil fuels. Sector-specific regulations could include targets for the use of renewable energy, incentives for the purchase and use of electric vehicles and industry-specific efficiency standards.

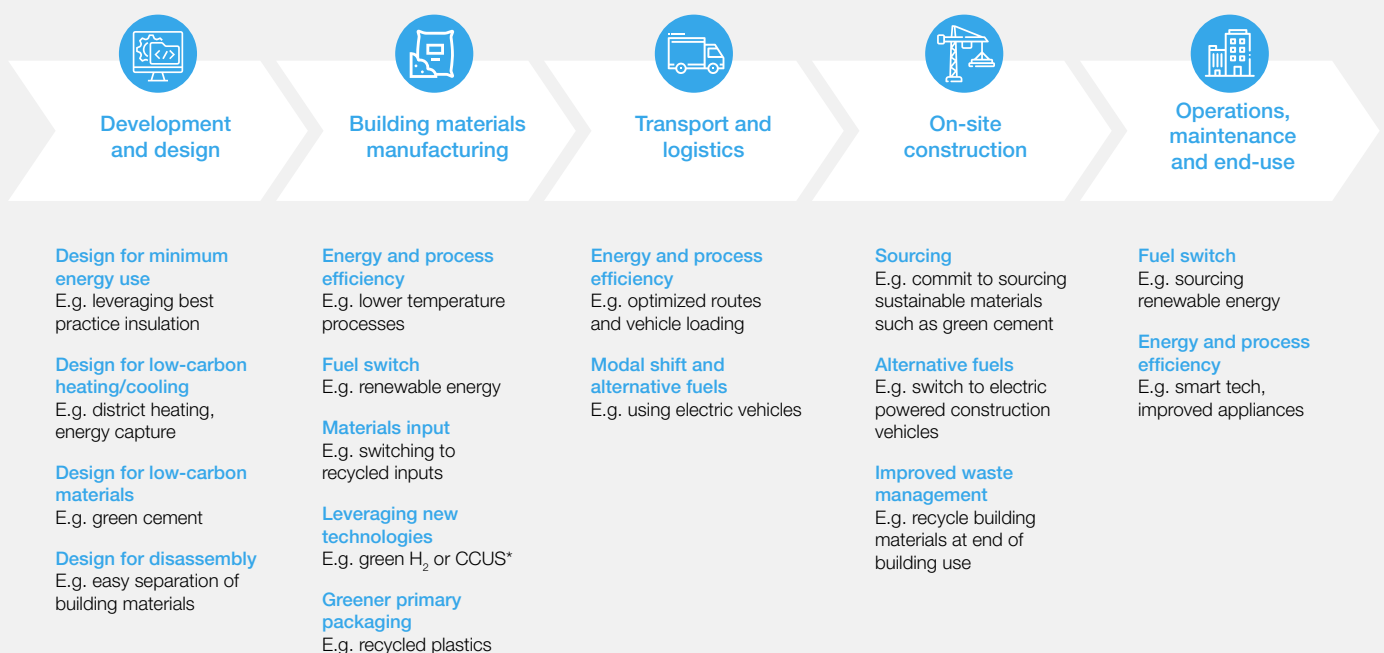
4.2 Steps 3 and 4: Optimize products for greenhouse gas abatement across their life cycle

Once the baseline is established and realistic targets are set, procurement officials will need to develop a roadmap with suppliers that clearly outlines the reduction levers to be pulled to reach them. Factors to consider in designing the roadmap for the optimal reduction in CO₂e emissions include cost, impact and feasibility.

Reduction levers. The first step in building the roadmap is to develop a complete list of potential emission reduction levers covering both government operations and supplier activities and

materials. For example, the range of potential levers in procurement from the construction industry should begin with the design and development of construction projects, taking into account the insulation and other materials to be used, energy consumption and the end-of-life re-use of all materials. The list of potential levers should then be extended to include the materials used and how they are manufactured, the transport of materials to the building site, the construction process itself and the operation of the building, once completed (see Figure 12).

FIGURE 12 Procurement of construction materials and services offers a range of potential emissions reduction levers



* Carbon capture, use and storage

Source: BCG analysis

Cost and impact. From the long list of potential levers, procurement officials should then determine the balance between the cost of each lever and its impact on emissions levels. Abatement curves can provide guidance for making these critical cost-benefit analyses. For example, reducing materials waste at construction sites can actually

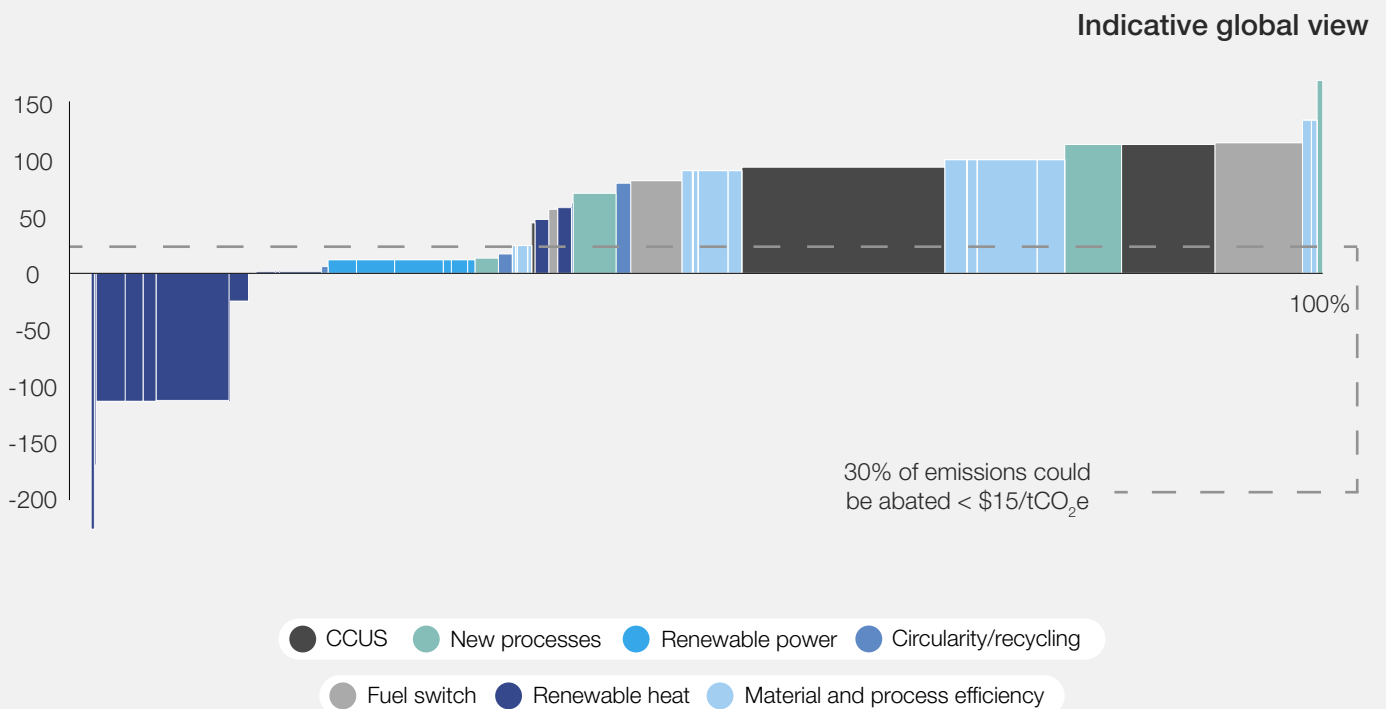
reduce costs while lowering emissions. Companies can switch to renewable energy at a reasonable cost, where available, whereas the use of carbon capture and storage technologies in manufacturing would be far more expensive – at least until the technology is further developed and scaled up (see Figure 13).

FIGURE 13

Close to a third of construction supply chain emissions can be abated for less than \$15 per tonne of CO₂e

Construction abatement curve

Abatement costs \$/t CO₂e (2030)



Source: World Economic Forum and BCG Net-Zero Challenge: *The supply chain opportunity* (2021)

Lever feasibility. In addition to the cost and emissions reduction impact, procurement officials will need to consider other factors in assessing the viability of their decarbonization roadmap. Answers to the following questions, to be worked out in concert with suppliers, will help clarify the factors that can affect the implementation of the roadmap:

- Which levers have already been successfully implemented by peers or suppliers?
- Which levers might conflict with other priorities, such as product performance?

- Which levers are already economically viable today, and which ones will require a longer payback?
- Which levers require more private sector investment to further develop and scale up?
- What other capabilities will our organization and suppliers need to build to enhance our ability to reach our emissions reduction goals?

4.3 Steps 5 and 6: Define product and supplier standards and work with suppliers

“ Procurement officials must define clear and sustainable procurement standards covering both their internal operations and the expectations of external suppliers.

Once procurement officials have identified emissions reduction levers and settled on a roadmap, they must determine the standards with which procurement decisions are to be made and engage directly with suppliers to ensure they meet the new standards and address their own emissions. Working successfully with suppliers will require three critical actions on the part of procurement officials.

Defining standards

Procurement officials must define clear and sustainable procurement standards covering both their internal operations and the expectations of external suppliers. Standards should cover a full range of products, services and project activities, such as the proportion of power from renewable energy, mandated SBTs for CO₂e emissions generated in producing materials such as green steel and green project management goals. And there should be clearly defined consequences for suppliers who fail to meet the standards.

In the US, for example, the Biden administration has proposed a new rule that would require major suppliers to the federal government to publicly disclose their GHG emissions and climate-related financial risk and set SBTs for reducing them. The rule would also require that the social cost of GHG emissions be considered in procurement decisions, and where appropriate and feasible, it would give preference to bids and proposals from suppliers with a lower social cost of GHG emissions. The goal is to spend 80% of procurement funds with suppliers that have set SBTs for their Scope 1 and 2 emissions by 2023.¹⁶

In a similar move, the British government has released new measures as of September 2021 requiring that companies bidding for government contracts worth more than £5 million a year must commit to achieving net-zero emissions by 2050 in their United Kingdom operations. In addition, they must publish carbon reduction plans and provide

reporting of their Scope 1 and 2 emissions and a sub-set of their Scope 3 emissions.^{17,18}

Assessing and tracking suppliers

Once emissions standards are established, procurement officials need to assess and prioritize their current suppliers with respect to their progress in setting and reaching their emissions targets. To do so, they should consider two factors: their capacity to influence specific suppliers and each supplier's ability to meet its targets.

Supplier prioritization. Officials should rank suppliers across two dimensions: How much is spent with each supplier? And how much does that spending contribute to each supplier's total revenue? The larger the spend and the greater its proportion of the supplier's revenue, the more influence procurement has over that supplier.

Supplier assessment. Once the degree of influence over key suppliers is determined, officials should then rank suppliers across several criteria, including standard supplier performance metrics and progress in setting emissions baselines and meeting targets. Standard procurement metrics will likely include product cost and quality, flexibility and others, and should be evaluated and compared across the entire supplier portfolio.

Sustainability metrics should include emissions baselines, water and energy use, the amount of waste and a full analysis of each supplier's commitment to sustainable emissions goals and strategy for meeting emissions targets. For example, suppliers could be ranked in terms of both the relative ambitiousness and specificity of their sustainability goals and their progress in meeting them. Do they specify SBTs in their net-zero goals? Are those goals aligned with the Paris Agreement's 1.5°C ambitions? And do they report progress to organizations such as the Climate Disclosure Project regularly?

“Fostering a long-term, mutually beneficial partnership mentality is critical in ensuring that both procurement functions and suppliers can meet climate-related goals.

Supplier criteria. Once the priority suppliers are determined and qualified according to their contribution to the procurement organization’s ability to meet its own emissions reduction goals, all contract specifications should be framed according to specific standards and targets. Assessment criteria and the scoring system should be sufficiently detailed without being overly prescriptive.

Procurement officials could choose one of two types of assessment criteria:

- **Results-based criteria.** Criteria specify expected performance levels such as “30% more efficient buildings” or “10% less CO₂-intensive construction activities”. Results-based criteria are generally simpler to define and leave more room for innovation, since only the results are stipulated. However, they may be more time-consuming for the reviewer to evaluate, as the proposed solutions will often vary for each bidder.
- **Materials- and method-based criteria.** Criteria specify the types of materials and methods to be used, such as banning fossil fuel vehicles or delivering supplies on a monthly versus a daily basis. These criteria are easier to assess and compare, but need to be used carefully to avoid being too prescriptive and preventing innovation.

Once the type of criteria is chosen, procurement officials must decide whether each criterion should be a requirement for supplier qualification or part of the system for awarding contracts.

- **Requirements.** This involves passing or failing specific suppliers based on their compliance with specific criteria, such as excluding any bidder using fossil fuel-based vehicles. This method allows procurement officials to easily set minimum requirements and filter out bidders without having to go over all the criteria and it can be applied to large contracts with a broad set of requirements. However, it risks becoming too restrictive and stifling innovation on the part of suppliers.
- **Awards.** This involves actively judging potential suppliers based on their compliance with specific criteria. Bidders might get points for using eco-friendly steel, for example, thus increasing their chances of winning the contract. This system provides bidders with the opportunity to improve their compliance with the criteria and encourages them to adopt new emissions reduction technologies and methods without being overly restrictive. However, the award criteria

must be carefully constructed, both specific enough and sufficiently comprehensive to reflect all emissions reduction priorities.

Procurement functions frequently use a combination of the two methods. For example, the Maltese government sent out a tender for constructing a school building that would be energy self-sufficient through on-site renewable energy production. The tender included minimum energy and water efficiency requirements, while additional points were awarded for increased performance. The winning bidder installed solar panels and wind turbines near the school, producing a total of 35,000kWh over the first ten months. The combination of requirements and awards enabled the agency to set minimum criteria while encouraging bidders to deliver more, and the result-based criteria gave bidders the freedom to innovate.¹⁹

In another example, the Swedish Transport Administration (STA) requires that contractors use specific materials that comply with predefined performance and climate-related criteria. The STA also uses a reward/penalty system, where each tonne of CO₂e avoided beyond the emissions reduction requirement is rewarded financially and larger penalties are penalized if the requirement is not met. By requiring specific materials, the agency can easily assess compliance and the monetary reward/penalty system gives suppliers an added incentive to meet the requirements, even after the contract has been signed.²⁰

Working with suppliers

The key to a successful engagement involves establishing clear guidelines on accountability for compliance and incentives and an agreed understanding of the consequences of non-compliance. Fostering a long-term, mutually beneficial partnership mentality is critical in ensuring that both procurement functions and suppliers can meet climate-related goals. Therefore, procurement officials should establish a long-term relationship with their suppliers and provide them with the support they need to succeed, including training, technology, financing and innovative products.

Large and long-term engagements can create added incentives for suppliers to meet climate goals. For example, framework agreements can be designed to allow multiple call-off contracts to be awarded without repeating the entire procurement assessment process. Such pooling of demand over time and across different government authorities for goods and services from single suppliers will increase the supplier’s incentive to offer environmentally enhanced solutions and enable it to recoup any private sector investments needed to meet contracted emissions reduction requirements (see Box 4).

Long-term engagements can create an ideal environment to provide added support to suppliers, a strategy that companies in the private sector have used successfully.

For example, Grosvenor Britain & Ireland, a large property business, estimated that its supply chain will be responsible for 49% of its business-as-usual emissions between 2019 and 2030. As part of the company's strategy to reach net-zero emissions by 2030, it expects those suppliers producing 40% of its Scope 3 emissions to set SBTs and procure energy from renewable sources by 2030. All vehicles

supplying its London operations must be electric by 2025.²¹

In support of its suppliers, Grosvenor has published a list of 12 standards that suppliers must abide by, such as "Tackling climate change together", "Sourcing and using material responsibly", and "Eradicating waste". It also offers free training on sustainability and off-site construction and management techniques, and maintains a dedicated reporting system to monitor and map the environmental impact of its supply chain. And it is working with its suppliers to develop action plans in areas where its emissions abatement standards and goals have not yet been met.



4.4 Steps 7 and 8: Develop the wider ecosystem and create buying groups

In addition to working with individual suppliers to set and reach emissions abatement goals, procurement organizations could opt to work together and with industry coalitions to encourage the use of best practices in decarbonization, certification of companies and materials, and the promotion of net-zero activities and goals. They could also work through buying groups to help create markets for low-carbon products. Cross-industry examples include the Industrial Deep Decarbonization Initiative (IDDI), the First Movers Coalition, the Climate Group, Race to Zero and C40 Cities (see Box 5).

For example, the IDDI,²² launched in 2021, is a global coalition of public and private organizations that are working to increase demand for low-carbon industrial materials. In conjunction with COP26, the IDDI announced its Green Public Procurement programme, intended to align its

member governments' procurement activities to further the creation of markets for low-carbon industrial products. The idea is to use governments' purchasing power to trigger a thriving market for greener steel and concrete. The IDDI's goal is to have at least ten countries commit to purchasing low-carbon concrete and steel within the next three years. Its current members, including the United Kingdom, Canada, Germany, India and the United Arab Emirates, have also pledged to disclose the amount of CO₂e emitted in their major public construction projects by 2025 and reach net-zero emissions in all their construction projects by 2050.

Other examples of organizations developing public-private partnerships include the Mission Possible Partnership, an alliance of business, finance and policy leaders focused on promoting the decarbonization of the world's highest-emitting industries, and the World Economic Forum itself.

C40 Cities is a network of the mayors of nearly 100 of the world's leading cities who have come together to confront the climate crisis. Its Clean Construction Declaration²³ initiative is designed to encourage relevant construction industry stakeholders to deliver decarbonization results quickly. Its goals include reducing emissions by at least 50% for all new buildings, major retrofits and infrastructure projects by 2030 while striving for at least 30% by 2025 and the use of zero-emissions construction machinery in all municipal projects starting in 2025.

Among the actions the group plans to take in support of these goals:

- Prioritize the use, repurposing and retrofit of existing building stock and infrastructure across the cities to ensure their optimal use before considering new construction projects.
- Require life-cycle assessments (LCAs) of all new projects, including procuring or requiring zero-emissions construction machinery and circular building designs that use low-carbon materials and other resources efficiently.
- Demand transparency and accountability in all projects, including requiring LCAs in planning, processes and building codes, and the public disclosure of LCA data.
- Approve at least one flagship net-zero emissions project by 2025.
- Advocate for and work with regional, national and supranational governments outside the boundaries of their control to take relevant climate action.
- Publicly report every year on the progress its cities are making towards these goals.

4.5 Steps 9 and 10: Transform the procurement organization and align across agencies

“ Procurement organizations must realign their steering models, individual responsibilities and communications processes, boost their capabilities and upgrade their data and information systems.

In parallel with the effort to assess, qualify and engage with suppliers, procurement organizations must also transform their internal operations and governance processes to align internal incentives, link to their country's NDCs and ensure the achievement of their climate goals and targets. To accomplish this, procurement organizations must realign their steering models, individual responsibilities and communications processes, boost their capabilities and upgrade their data and information systems.

Steering model. The goal of the green procurement steering model is to ensure clear decision rights and accountability across complex organizations and set comprehensive management-level key performance indicators (KPIs) for achieving carbon targets. While every country is different, most procurement policies covering green procurement are led nationally through the Ministry of Environment and the agency in charge of procurement or their equivalents. It is typically the responsibility of the Ministry of Environment to define the green procurement KPIs and related measures.

The agency or agencies in charge of procurement, often ministries of finance, should oversee the procurement budget and determine any trade-offs to be made in the light of any added costs of green procurement. Other ministries, including the ministries of health, agriculture and transport, as

well as individual regional government units and research institutes, should share their expertise on specific topics and issues.

Responsibilities and communication.

Procurement organizations face several challenges in implementing new green procurement initiatives. They include a lack of clearly defined and achievable milestones and objectives for measuring progress, poor commitment on the part of leaders, resistance from employees, insufficient funding and poor communication.

Implementing a central green procurement hub at the ministry level can help overcome these challenges by providing a wide-angle view of a government's green procurement efforts and progress and taking an active role in pursuing its emissions abatement goals. A central hub can help break down communication siloes and boost oversight and discipline while providing leaders with the level of detail needed to successfully manage multiple initiatives, including the development of metrics and reports and conflict resolution. Its task should include setting priorities and timing to mutually reinforce climate initiatives, creating overall programme target roadmaps and helping agency-level procurement programmes to meet their own goals. It should also coordinate efforts to communicate the green procurement programme and its goals to all stakeholders, why it is needed and how people will be affected.

“ Governments should, when possible, try to encourage alignment from the top down by implementing centralized federal procurement policies and regulations that can also be applied at the state and local levels.

South Korea is one of the few countries to have a central emissions database, which has allowed the country to measure the impact of its green procurement policy since 2005. This database collects data from all public authorities targeted by its sustainable procurement policy, at both the local and national level – a total of more than 30,000 organizations in 900 separate agencies. The system tracks volume and spending data on green and non-green purchases for products with the Korea Eco-label and Green Recycled Mark by public authority and product group.

Implementing artificial intelligence (AI) as part of systems can deliver deep insights and quick cost-cutting wins and reduce the difficulty and expense of measuring and reducing emissions nationwide while helping officials make a sustainable transition to greener procurement. AI can be leveraged in three key areas:²⁴

- **Collecting data.** AI can be used to automatically track emissions covering the entire carbon footprint and collect data from operations and the entire value chain, including materials and components suppliers, transporters and even downstream users. AI technology can also generate approximations of missing data and estimate the level of certainty of the approximations.
- **Finding insights.** Predictive AI can forecast future emissions across the procurement organization’s entire carbon footprint, considering current reduction efforts, new carbon reduction methodologies and future demand. As a result, procurement officials can set, adjust and achieve reduction targets more accurately.
- **Optimizing actions.** By providing detailed insights for every aspect of the value chain, prescriptive AI and optimization analysis can improve efficiency in production, transportation and elsewhere, further reducing carbon emissions and cutting costs.

Germany’s government is taking a leadership role in using AI to promote sustainability. It plans to set up an application lab for AI and big data to develop data-based applications for attaining the country’s Sustainable Development Goals. As part of the

programme, it also plans to maintain cloud-based environmental data, provide transparent access to scientists, businesses and the public, and further develop sustainable AI applications. Germany has provided around €3 billion to initiate and develop 50 AI applications dedicated to promoting sustainability.²⁵

Agency alignment. As noted above, public procurement activities are highly decentralized, with a highly complex structure, making the alignment of policies, baselines and targets across federal and local procurement agencies essential in promoting the adoption of green procurement and simplifying progress tracking and enforcement.

Governments should, when possible, try to encourage alignment from the top down by implementing centralized federal procurement policies and regulations that can also be applied at the state and local levels. As a rule, this can be more challenging for heavily federalized countries such as Canada and Germany than for centralized countries such as Italy and South Korea. However, there are numerous examples of both types of countries that have successfully developed national green procurement guidelines that also apply to their states and local governments, including Belgium, Italy, France, South Korea and the US.

Governments can employ different types of incentives to encourage procurement agencies at every level of government to comply with central guidelines and regulations. One option is financial incentives. In South Korea, for example, public institutions that perform well on emissions targets receive a performance bonus, while high-performing local governments are rewarded with a larger budget. In Canada, provinces are supported with transfer payments from the federal government, which often come with specific conditions regarding their green procurement progress, including their progress in reporting and the ambitiousness of their emissions reduction targets.

In contrast, the US Department of Energy’s GreenBuy Award Programme recognizes Department of Energy agencies for excellence in “green purchasing” extending beyond minimum compliance requirements. Agencies are encouraged to purchase from a Priority Products List of more than 40 products through the programme to meet their specific sustainability goals.



Conclusion

With public procurement responsible for 15% of global greenhouse gas emissions, it is critical that government procurement organizations determine their emissions baseline, set targets and define the product and services standards needed to reduce their contribution to global warming. The costs over time will be reasonable and the benefits real – not just lower emissions, but also a boost to the green economy, more jobs and healthier people.

To succeed, public procurement organizations must work in concert with all stakeholders to combat global warming. Their suppliers and industry coalitions will, of course, be critical to the effort, but policy-makers, legislators and public-private partnerships, too, have crucial roles to play.

The considerable influence that public procurement officials wield makes them instrumental in reaching global climate goals. Now is the time to start using it.

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Endnotes

1. UN Climate Change, *Full NDC Synthesis Report: Some Progress, but Still a Big Concern*, 17 September 2021, <https://unfccc.int/news/full-ndc-synthesis-report-some-progress-but-still-a-big-concern> [press release] (accessed 25 November 2021).
2. World Economic Forum in collaboration with Boston Consulting Group, *Net-Zero Challenge: The supply chain opportunity*, 21 January 2021, <https://www.weforum.org/reports/net-zero-challenge-the-supply-chain-opportunity> (accessed 25 November 2021).
3. “World’s largest steel and concrete buyers make game-changing push for greener solutions”, *UNIDO*, 9 November 2021, <https://www.unido.org/news/worlds-largest-steel-and-concrete-buyers-make-game-changing-push-greener-solutions> (accessed 25 November 2021).
4. *Net Zero Tracker, Zero Tracker*, no date, <https://www.zerotracker.net> (accessed 25 November 2021).
5. Erica Bosio, Simeon Djankov, “How large is public procurement?”, *World Bank*, 5 February, 2020 <https://blogs.worldbank.org/developmenttalk/how-large-public-procurement#:~:text=Public%20procurement%20%E2%80%94%20the%20process%20by,is%20spent%20following%20procurement%20regulation> (accessed 25 November 2021).
6. Boston Consulting Group analysis based on United Nations Framework Convention on Climate Change greenhouse gas inventory.
7. International Renewable Energy Agency (IRENA), *World Energy Transitions Outlook: 1.5°C Pathway*, June 2021, <https://irena.org/publications/2021/Jun/World-Energy-Transitions-Outlook> (accessed 25 November 2021).
8. “Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide, Interim Estimates under Executive Order 13990”, *United States Government Interagency Working Group on Social Cost of Greenhouse Gases*, February 2021, https://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf (accessed 25 November 2021).
9. “Government at a Glance 2021”, *OECD*, 9 July 2021, <https://www.oecd.org/gov/government-at-a-glance-22214399.htm> (accessed 25 November 2021).
10. United Nations Environment Programme (UNEP), *Green Public Procurement in the Republic of Korea: A decade of progress and lessons learned*, 2019, <https://wedocs.unep.org/bitstream/handle/20.500.11822/32535/GPPK.pdf?sequence=1&isAllowed=y> (accessed 25 November 2021).
11. “Level(s): European framework for sustainable buildings”, *European Commission*, https://ec.europa.eu/environment/levels_en (accessed 25 November 2021).
12. Ali Hasanbeigl, Astrid Nilsson, Gokce Mete, Germain Fontenit, Dinah Shi, “Fostering industry transition through green public procurement: A ‘How to’ guide for the cement & steel sectors”, *UNIDO and LeadIT*, 1 June 2021, <https://www.industrytransition.org/insights/industry-transition-through-green-public-procurement-how-to-guide-cement-steel-sectors/> (accessed 25 November 2021).
13. “Impact indicators”, *EPD International System*, no date, <https://www.environdec.com/resources/indicators> (accessed 25 November 2021).
14. “The SBTi Net-Zero Corporate Manual: Version 1.1. for company road test”, *Science Based Targets*, July 2021, <https://sciencebasedtargets.org/resources/files/SBTis-Net-Zero-Standard-Corporate-Manual.pdf> (accessed 25 November 2021).
15. “Economists’ Statement on Carbon Pricing”, *The European Association of Environmental and Resource Economists (EAERE)*, June 2019, <https://www.eaere.org/statement> (accessed 25 November 2021).
16. “Using Federal Procurement To Combat Climate Change: A Survey Of Options For The FAR Council And Risks For Contractors”, *JDSUPRA*, June 2021, <https://www.jdsupra.com/legalnews/using-federal-procurement-to-combat-8203028/> (accessed 25 November 2021).
17. “Procurement Policy Note – Taking Account of Carbon Reduction Plans in the procurement of major government contracts”, *UK Government*, June 2021, <https://www.gov.uk/government/publications/procurement-policy-note-0621-taking-account-of-carbon-reduction-plans-in-the-procurement-of-major-government-contracts> (accessed 25 November 2021).
18. “Firms must commit to net zero to win major government contracts”, *UK Government*, 7 June 2021, <https://www.gov.uk/government/news/firms-must-commit-to-net-zero-to-win-major-government-contracts> (accessed 25 November 2021).
19. “Buying green! A handbook on green public procurement, 3rd edition”, *European Commission*, February 2016, https://ec.europa.eu/environment/gpp/buying_handbook_en.htm (accessed 25 November 2021).
20. “Steeling Demand: Mobilising buyers to bring net-zero steel to market before 2030”, *Energy Transitions Commission and Material Economics*, June 2021, <https://www.energy-transitions.org/publications/steeling-demand/> (accessed 25 November 2021).

21. James Raynor, "Our Pathway to a better future", *Grosvenor Britain & Ireland*, 9 December 2020, <https://www.grosvenor.com/news-and-insight/all-articles/think-zero-our-pathway-to-a-better-future> (accessed 25 November 2021).
22. "Industrial Deep Decarbonization Initiative", *United Nations Industrial Development Organization*, no date, <https://www.unido.org/IDDI> (accessed 25 November 2021).
23. "Clean Construction Declaration", *C40 Cities*, no date, <https://www.c40.org/declarations/clean-construction-declaration/> (accessed 25 November 2021).
24. Charlotte Degot, Sylvain Durantou, Michel Fredeau, Rich Hutchinson, "Reduce carbon and costs with the power of AI", *Boston Consulting Group*, 26 January 2021, <https://www.bcg.com/publications/2021/ai-to-reduce-carbon-emissions> (accessed 25 November 2021).
25. "The role of AI in the European Green Deal", *European Parliament*, May 2021, <https://www.europarl.europa.eu/committees/en/the-role-of-ai-in-the-european-green-dea/product-details/20210607CAN61223> (accessed 25 November 2021).



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