Unlocking Private Climate Finance in Emerging Markets

Private Sector Considerations for Policymakers

CLIMATE FINANCE LEADERSHIP INITIATIVE

EDFI European Development Finance Institutions

Global Infrastructure Facility
A G20 INITIATIVE

Bloomberg

Mr. António Guterres
Secretary-General
United Nations
760 United Nations Plaza
New York, NY 10017

Dear Mr. Secretary-General,

This Climate Finance Leadership Initiative (CFLI) report, our second, highlights the policies that governments in emerging markets can advance — with support from business and the international community — to facilitate the mobilization of private sector investment in clean energy, low-carbon mass transit, climate-friendly water and waste systems, green buildings, and sustainable land use. Data and the experience of emerging markets shows us that these policies work. Supporting investment in sustainable infrastructure, by strengthening conditions for private finance, is critical in the run-up to COP26, helping to build momentum and set the stage for a successful summit that further accelerates global progress on climate change.

The year since our last report has been marked by extraordinary turmoil and hardship. The COVID-19 pandemic continues to take an enormous toll around the world in lives lost and in economic harm, and public finances are under tremendous stress, particularly in the emerging market countries that are the focus of this report. However, the economic recovery from the pandemic is also an unprecedented opportunity to speed our progress fighting climate change, because investments that reduce greenhouse gas emissions and build resilience are also powerful drivers of job creation and inclusive economic growth. Leaders from across the global financial services sector recognize this opportunity, and the more we do to support investment and public-private partnership, the faster and stronger the recovery will be.

With this in mind, we have partnered with the Association of European Development Finance Institutions and the Global Infrastructure Facility to address these issues in this report, and help unlock private climate finance in emerging markets. All of the organizations taking part in this effort are committed to taking action on their own, and to helping find solutions that advance our shared goals.

Thank you for your support for this initiative, and for your strong leadership and advocacy on climate finance.

Sincerely,

Michael R. Bloomberg
Founder

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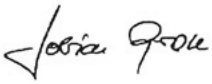

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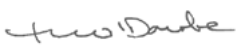

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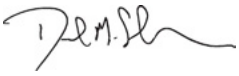

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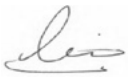

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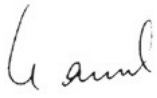

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Section 1. Preamble

In the recovery from COVID-19, private investors and developers see a powerful opportunity to accelerate investment in the transition to low-carbon economies in emerging markets. Public and private sector engagement, creating investment-friendly business environments, and building pipelines of bankable sustainable infrastructure opportunities are all important to realize this promise and mobilize private finance. Public finance institutions are actively engaged with policymakers on policy adjustments to attract greater private climate finance. Yet, thus far, a clear and unified private finance voice has been absent from the conversation. With this in mind, we—the Climate Finance Leadership Initiative (CFLI), the Association of European Development Finance Institutions (EDFI), and the Global Infrastructure Facility (GIF)—set out to raise the profile of enabling environment priorities and convened an industry-led effort to:

- Identify the most fundamental and cross-cutting factors enabling domestic and international private climate finance in emerging markets;
- Open new engagement channels with key decision-makers to identify policy improvements that will help stimulate private investment; and
- Catalyze essential collaboration between private finance, public finance, and policymakers to significantly expand pipelines of sustainable infrastructure investment opportunities.

Development of the Private Sector Considerations for Policymakers

Based on the experience of private sector lenders, banks, and investors (hereby jointly referred to as "investors") that have deployed billions in sustainable infrastructure across high-income and emerging economies over the past decade, we developed a set of key considerations to strengthen enabling environments for private climate finance. Feedback and additional input were gathered through a public consultation process that ran from November 10, 2020, to January 15, 2021. The resulting Private Sector Considerations for Policymakers (the "Policy Considerations") highlight the enabling environment factors that have the potential to:

- Catalyze new private climate finance at scale;
- Improve the cost and speed of negotiations between parties on specific investments;
- Address areas where market- and sector-specific guidance is fragmented; and
- Align with current global and national policy priorities to accelerate the transition to a low-carbon economy.

The Policy Considerations focus both on broad, cross-cutting enabling environment factors, as well as on sector-specific factors in clean energy systems, sustainable urban transport, climate-smart water and waste, green buildings and streetlighting, and sustainable land use.

Given the early stage of adaptation and resilience as a stand-alone asset class for investors, factors specific to climate adaptation and resilience have instead been integrated throughout these Policy Considerations. There is significant work underway across public and private sectors to better define adaptation and resiliency as an asset class, which will pave the way for future Policy Considerations in these areas.

Use Case for the Private Sector Considerations for Policymakers

The Policy Considerations are meant as a starting point for productive public-private dialogue on strengthening enabling environments for private climate finance.

Just as local climate action is so vital to achieving the UN's climate targets, policy solutions to facilitate more private investment in sustainable infrastructure must be tailored to local markets and sector dynamics. Still, as investors, the CFLI and its partners regularly see the need for a clear, comprehensive, and overarching set of Policy Considerations to prompt early discussion with governments and developers and guide preliminary negotiations around new investments.

With that in mind, the Policy Considerations are meant to be broad enough to offer a menu of potential policy-change opportunities to all countries, regardless of their current investment environment, or position on the path to a low-carbon, resilient economy. The Policy Considerations can also be read separately, focusing not on the comprehensive list, but on the sector and sub-sector considerations most relevant to a particular market or institution. Sector-specific Policy Consideration "tear sheets" can be downloaded at www.bloomberg.com/cfli.

The Policy Considerations are by no means a prescriptive set of expected policy changes or mandatory investment criteria. In fact, no country in the world has fully addressed all of these factors. The aim of this report is to highlight the successes different enabling environment mechanisms have had in accelerating the transition across a diverse range of economies, in support of the Policy Considerations.

The international development finance community—including multilateral and regional development banks, bilateral agencies, and international organizations—are deeply engaged in strengthening enabling environments for private investment in sustainable infrastructure across emerging markets. As an industry-led initiative, the Policy Considerations aim to reinforce those efforts, and provide a direct signal to all stakeholders of important factors from a private finance viewpoint.

Addressing these barriers to investment in a way that drives sustainable and inclusive growth will require long-term commitment and deep public-private collaboration. There is now enough experience globally to show that tackling such issues can unlock private capital at the scale and speed required to deliver low-carbon, climate-resilient development and contribute to the achievement of the Sustainable Development Goals and commitments under the Paris Agreement.

Over the coming months, the CFLI and its partners will launch a series of platforms to lift up these investment policy solutions, reinforce the excellent work many governments, donors, and development banks are doing in this area, and undertake ambitious new programs of investment to reassure governments that capital will flow. These efforts will focus on specific countries and sectors to drive change and demonstrate the nuanced, context-specific nature of the change required.

Acknowledgement

On November 10, 2020, we released the first iteration of the Policy Considerations, commencing a 60-day consultation period. In addition to public consultation, we conducted direct outreach, inviting more than 6,000 diverse stakeholders across business, government, and civil society to share feedback, which informed the development of this final version of the Policy Considerations.

We would like to thank all who participated in the consultation process and provided feedback to help ensure that the Policy Considerations represent a unified, private sector perspective on current barriers to climate finance in emerging markets.

We greatly appreciate the contributions provided by the following individuals in developing the Policy Considerations:

Ahamed Wadood, *Aviserv*

Dazzle Bhujwala, *Ceres*

Simon Thompson, *Chartered Banker Institute*

James Boyle, *City of London Corporation*

John Finnigan and Geoff Hickman, *Citibank*

Jake Cusack, *CrossBoundary*

Andy Herscowitz, *U.S. International Development Finance Corporation*

Bettina von Hagen, *EcoTrust Forest Management*

Abiodun Kila, *Entrepreneur*

Andy Sloan, *Guernsey Finance*

Jamie Martin, Vikram Raju, and Jessica Whitt, *Morgan Stanley*

Jacqueline Musiitwa, *Hoja Law Group*

Shari Friedman, Alzbeta Klein, Elizabeth Lewis, Erika Rhoades, and Vladimir Stenek, *International Finance Corporation*

Fuat Savas, *J.P. Morgan*

Kelley Hamrick, Tom Hodgman, and Charlotte Kaiser, *NatureVest*

Atma Khalsa, *PNE AG*

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Carlos Sanchez, *Willis Towers Watson*

Stephen Hammer, *World Bank Group*

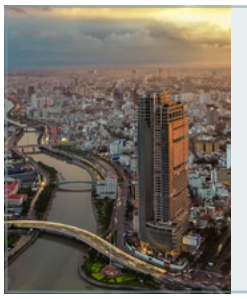
Kate Newman, Joanne Lee, Michele Thieme, Jesse Fahnestock, Ambika Sharma, and Ryan Bartlett, *World Wildlife Fund*

About this report

This report aims to provide insights on the unique context of an accelerating, but uneven transition to a low-carbon economy in which the Policy Considerations are being released. Sustainable investment over the last decade, and the success stories of countries leading in the introduction of sustainable policies, highlight the potential strong enabling environments and policy can play in mobilizing investment across the main sectors covered by the Policy Considerations. Sharing guidance and data on best practice in mobilizing sustainable investment in infrastructure is the goal of the insights and primers that accompany the Policy Considerations. The main sections of the report are structured as follow:

Section 2: The State of Energy Transition Finance in Emerging Markets ▸

Section 3: The Role of Enabling Environments in Low-Carbon Transition ▸



1: High-level, cross-cutting enabling environment factors

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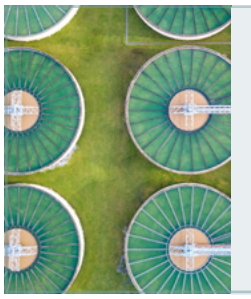

4: Climate-smart water and waste

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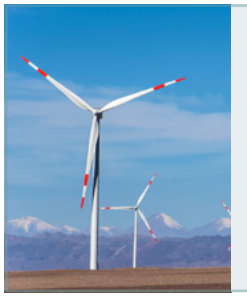

2: Clean energy systems

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5: Green buildings and streetlighting

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3: Sustainable urban transport

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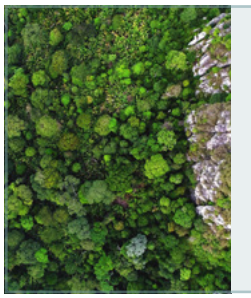


6: Sustainable land-use*

POLICY CONSIDERATION

Scope

The analysis of this report primarily focuses on the countries included in three of the World Bank's four country income groups for the 2021 fiscal year: upper-middle, lower-middle and low income. The insights and best practices presented in this report draw from the experience of a diverse group of emerging markets, representing different regions, stages of the energy transition, and economic development. Many of the lessons learned shared in this report are universal; however, the focus has been put on solutions that can be implemented right away and deliver impact at scale, especially in rapidly growing middle-income emerging economies.

*The Sustainable Land-Use Policy Considerations do not have a primer as most experiences with developing scalable solutions for private finance mobilization in the sector are still at an early stage.

Section 2. The State of Energy Transition Finance in Emerging Markets

Governments around the world are considering how best to reduce emissions with a view to avoiding catastrophic climate change while continuing to grow their economy. Many have begun to implement policies to achieve their goals, including setting a growing number of 'net-zero' targets. This trend has been encouraged by the rapid development and falling cost of clean technologies, and the surging interest from investors in sustainable asset classes. Combined, this momentum in policy, technology, and finance has affected an ever-growing list of sectors, with energy transition investment and sustainable finance flows hitting new records in 2020 despite the disturbances caused by the COVID-19 pandemic.

This section reviews some of the major trends in sustainable investment over the last decade, highlighting a story of strong growth, but also uneven distribution across regions and sectors. The data also clearly highlights that a group of leading emerging markets have recorded large volumes of sustainable investment thanks to reliable enabling environments, making headway in their transition to a low-carbon economy. The COVID-19 pandemic also brought to light the role of strong enabling environments in making the transition to a low-carbon economy more resilient.

Key trends in energy transition and sustainable finance

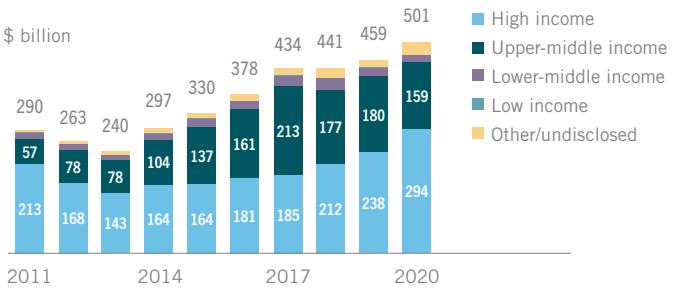
In the past 10 years, annual global energy transition[1] investment nearly doubled, from $290 billion in 2011 to $501 billion in 2020 (Figure 1). High-income markets accounted for just over half of the total investment over those 10 years, at $2 trillion. While between 2015 and 2018, emerging markets[2] accounted for an increasingly large share of global investment, high-income economies have been pulling ahead once more since 2018. This divergence widened in 2020, with high-income markets recording a 24% year-on-year increase in investment, while emerging markets experienced a 21% contraction. A further shrinkage of investment in China, and greater resiliency and economic response to COVID-19 in high-income countries, have been drivers of this trend. The last decade of energy transition investment shows a stark contrast in the experience of countries. While lower-middle and low-income countries accounted for half of the world's population in 2020, they recorded just 5% and 0.3%, respectively, of annual global clean energy transition investment over 2011-2020.[3]

High-income economies are seeing energy transition investment spread to new sectors. Electric vehicles (EVs) account for an ever-larger share of all investment and could soon overtake annual funds flowing to clean energy if current trends persist. In comparison, the vast majority – 82%, or $1.3 trillion – of emerging markets' spending on the energy transition has targeted renewable energy over the past decade (Figure 2). This is also the only energy transition sector recording significant expenditures by countries in all income groups, with 114 emerging markets recording renewable energy investment since 2011. At $2.6 billion, energy storage was the only other sector in which six emerging markets other than China and India have recorded significant levels of investment since 2011. Yet, the lack of scale does not mean there has been a lack of opportunity. Harder to capture, small-scale storage investments are growing, particularly in markets where distributed renewables can play a critical role in improving energy access, such as Mali and South Sudan.

The other sector to have drawn significant investment in emerging markets is electrified transport, accounting for 15% of 2011-2020 expenditure, at $243 billion. However, as the largest market for electrified transport globally, China accounts for nearly all of the activity. India has recorded lower but steady investment in the sector, reaching a cumulative $677 million, predominantly targeting electric buses and e-rickshaws. Not captured in this high-level figure is the moderate, but growing, trend of investment in advanced mobility in Southeast Asian countries, such as electric vehicles in Thailand and Malaysia, or electric two-wheelers in Vietnam.

FIGURE 1:

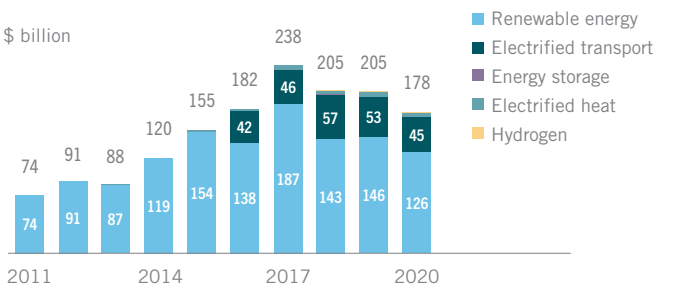
Global energy transition investment



Source: BloombergNEF. Note: Energy transition investment includes renewable energy, carbon capture and storage (CCS), electrified transport, hydrogen, electrified heat, and energy storage. Renewable energy accounts for 76% of global investment figures between 2011 and 2020.

FIGURE 2:

Emerging markets investment by sector



Source: BloombergNEF. Note: Includes disclosed investment in upper middle income, lower-middle income, and low-income markets only.

[1] BloombergNEF's (BNEF) "energy transition investment" category includes renewable energy, carbon capture and storage (CCS), electrified transport, hydrogen, electrified heat, and energy storage.

[2] Emerging markets refer to all upper-middle, lower-middle, and low-income markets, whereas developed markets refer to high-income markets, as per the World Bank Country Classification, 2021.

[3] Population data, World Bank, accessed on February 10, 2021.

Similarly, India and China are the only two emerging markets to have made large-scale hydrogen investments so far, with China being the largest investor over 2011-2020 globally at $1.8 billion. This picture is set to diversify, with markets such as Chile having outlined an ambitious 2030 hydrogen target of 25GW, which has already drawn investor interest.[4] On a smaller scale, Morocco signed a hydrogen partnership with Germany in 2020, aiming to tap into the country's abundant clean energy resources to produce and export clean hydrogen.[5]

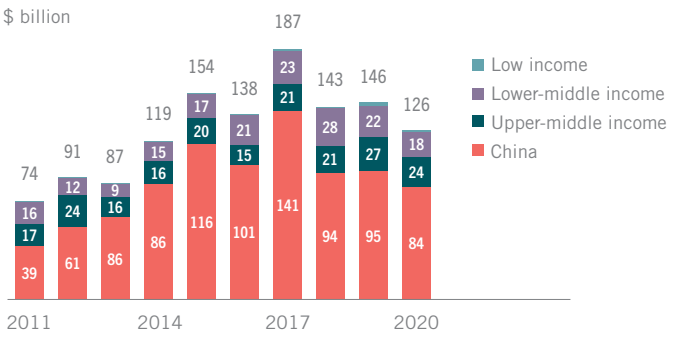
Compared with high-income countries, which are concentrated mainly in Northern latitudes, electrified heat is a less relevant sector for many emerging markets, with efficient cooling being a larger priority. Correspondingly, China was the only emerging market to record a significant level of investment in electrified heat, at $24.5 billion since 2011. However, a handful of emerging markets are making progress on decarbonizing cooling—notably India, which issued one of the world's first cooling plans with mandatory codes for new buildings; and Brazil, where energy efficiency standards for air conditioning units are tightened on a regular basis.[6,7]

Policy, technology maturity, and cost declines are helping clean energy spread to an ever-larger group of emerging markets

Clean energy has been the main driver of energy transition activity in emerging markets. Within this, asset finance of utility-scale renewable energy projects was in a rising trend until 2017, led by China, before slipping back (Figure 3). Part of this decline is attributable to falling technology costs, which mean that the deployment of the same capacity requires less and less investment. This effect has been most pronounced for solar, with the benchmark photovoltaic (PV) module price falling 89% between 2010 and 2020.[8]

FIGURE 3:

Emerging markets' new asset finance for renewable energy projects, by income group



Source: BloombergNEF. Note: Includes disclosed investment in upper middle income, lower middle income and low income markets only.

Mature renewables markets such as China, India, and Brazil largely shaped the clean energy investment narrative at the start of the decade, but activity has since spread to an ever more diverse group of emerging economies in the past few years. Notable examples include Chile, Kenya, and Vietnam, which have managed to attract a high and steady pipeline of investment by introducing effective policy packages. Chile, for instance, managed to grow the share of wind and solar in power generation from 4% to 14% between 2015 and 2019 by setting an ambitious target of 60% clean energy generation by 2035, using clearly scheduled clean energy auctions and a successful net metering scheme.[9] Similarly, Vietnam's well-structured national power development plan, in combination with a generous feed-in tariff, allowed utility-scale solar capacity to leap from 177MW in 2018 to 5.1GW in 2019, with onshore wind also set on a growth trajectory.[10]

[4] "National Green Hydrogen Strategy," Ministerio de Energia, November 2020.
[5] "Morocco, Germany Sign Green Hydrogen Cooperation Agreement," Kingdom of Morocco, June 10, 2020.
[6] "India Cooling Action Plan," Ministry of the Environment, Forect & Climate Change, March 2019.
[7] Portaria Nº 234, Official Journal, Brazil, June 29, 2020.
[8] "2H 2020 LCOE Update," BloombergNEF, December 10, 2020.
[9] Chile country profile, Climatescope 2020, BloombergNEF.
[10] Vietnam country profile, Climatescope 2020, BloombergNEF.

In terms of investment concentration, solar is the clean energy technology that reaches the widest array of emerging markets (Figure 4). Between 2011 and 2019, the number of markets securing solar investment nearly tripled to 61 countries, with 2020 coming in a little lower. This trend highlights how far the commodification of PV panels has come, with developers in most markets able to import equipment easily. Wind projects, more reliant on good resources and infrastructure, have remained fairly concentrated, with an average of 24 emerging markets recording investment in any one year over the last decade, and 2020 showing a noticeable drop to 16.

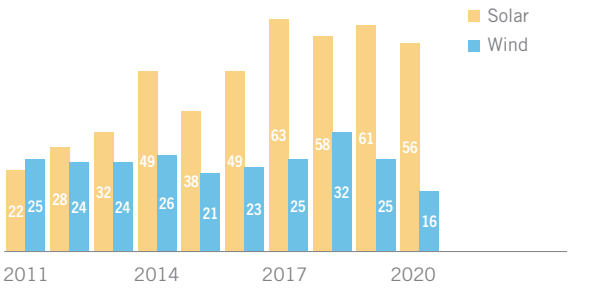
The sustainable debt boom has not yet spread to emerging markets

Sustainable debt products[11] have been one of the major growth stories of recent years. However, issuance is highly concentrated in high-income countries (Figure 5). Global sustainable debt issuance has experienced exponential growth, reaching a record $730 billion in 2020, with high-income countries accounting for 77% of the decade's headline figure. Emerging markets' issuance has hovered in the $50-60 billion range in recent years, with China accounting for the lion's share, at $165 billion issued between 2011 and 2020 (Figure 6). However, the number of emerging economies tapping sustainable markets has more than doubled over the last decade, with issuers from India and Brazil raising $33 billion and $31 billion, respectively.

This geographic diversification of sustainable debt issuance was particularly high in 2020, even though overall emerging market issuance fell 17% year-on-year. A record number of 32 emerging markets, twice as many as five years prior, recorded sustainable debt issuance. Noteworthy markets with record-level issuance included Chile, Thailand, Turkey, and Saudi Arabia, while Latin American and European emerging markets saw their highest volumes to date. Chile, for instance, used the issuance of dollar- and euro-denominated sovereign green bonds to access international capital markets to help finance its COVID-19 stimulus package.[12] Meanwhile, the Thai government issued its first sustainability bond in 2020 to fund long-term sustainable infrastructure projects and cushion social issues resulting from the impact of the pandemic.[13]

FIGURE 4:

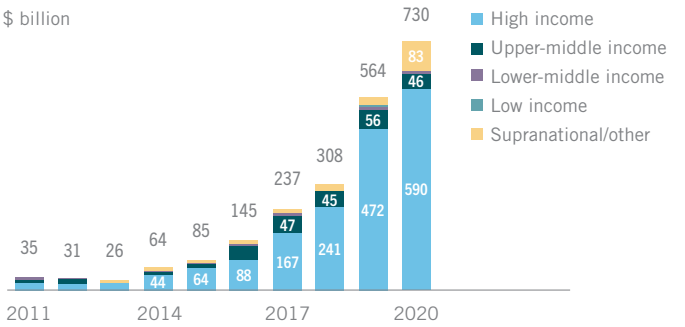
Number of emerging markets with new asset finance for renewable energy projects



Source: BloombergNEF. Note: Includes disclosed investment in upper-middle income, lower-middle income, and low-income markets only.

FIGURE 5:

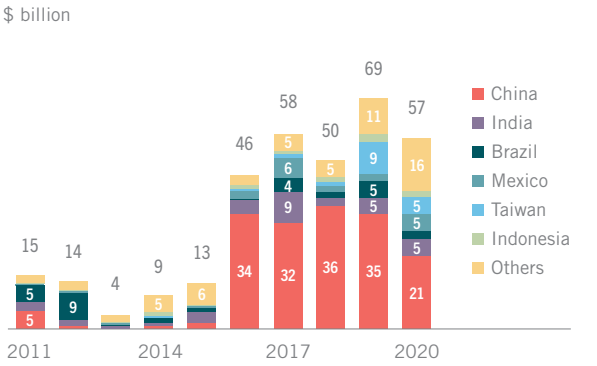
Global sustainable debt issuance



Source: BloombergNEF. Note: Includes green, social, sustainability, and sustainability-linked bonds as well as green and sustainability-linked loans.

FIGURE 6:

Emerging market top sustainable debt issuers



Source: BloombergNEF. Note: Includes disclosed issuances in upper-middle income, lower-middle income, and low-income markets only.

[11] Includes green bonds, green loans, sustainability bonds, sustainability-linked bonds, sustainability-link loans, and social bonds.

[12] "Chile obtains historical yields in euro and US dollar Green bond issuances," Ministerio de Hacienda, January 22, 2020.

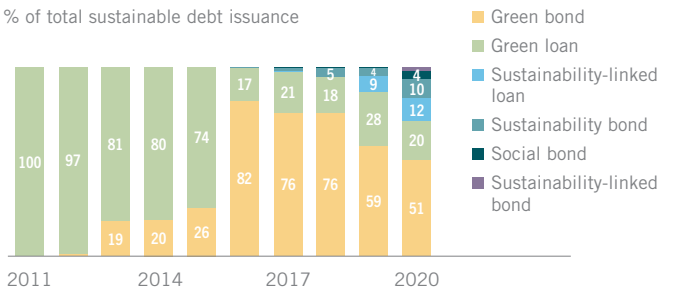
[13] "The Kingdom of Thailand's Inaugural Sustainability Bond Issuance is well received," Ministry of Finance, August 14, 2020.

As in developed economies, green bonds are the sustainable debt instrument of choice among emerging markets, accounting for 58% of the volume in 2011-2020, at $195 billion. Green loans were second most popular, at $109 billion, or 33% of the total. Yet diversification and sophistication of products are increasing along global trends, with social, sustainability and sustainability-linked bonds and loans all playing a part in 2020 (Figure 7).

While at their lowest share since 2016, green bonds in 2020 remained the most popular sustainable debt instrument in emerging markets, at $29 billion, or 51% of the total. In line with global trends, issuance of social bonds in emerging markets took off in 2020, showing a 624% increase year-on-year. Social bonds are playing an important role in financing the response to the COVID-19 pandemic, including economic stimulus packages.[14] Access to global debt markets has been a key factor in helping emerging markets manage the economic shock of COVID-19.[15] Investor confidence in the economic outlook of emerging markets, at a time of low interest rates in high-income economies, creates opportunity to raise sustainable debt in developing economies.

FIGURE 7:

Emerging markets sustainable debt themes



Source: BloombergNEF. Note: Includes disclosed issuances in upper-middle income, lower-middle income, and low-income markets only.

Lessons from the impact of COVID-19 on energy transition investments in emerging markets

While many sectors of the global economy were severely impacted in 2020 by the social distancing measures adopted in response to COVID-19, energy transition spending in high-income markets was 50% above the annual average of the prior five years, with much of the growth coming from Europe.[16] Two key factors fueled this surge in activity. First, governments in high-income economies have tightened near-term emission reduction targets in recent years, and expanded them to more and more polluting sectors of the economy. For example, European car manufacturers have to sell more EVs in order to meet the lower emissions-intensity standards that kicked in from 2020.[17] Second, the energy transition has been a major focus of the unprecedented countercyclical government spending plans set up in response to the COVID-19 economic shock. Here too, EVs have benefited, as purchase incentives are easy to introduce and car manufacturing plays an important role in the European economy and in job creation.

The countercyclical role energy transition investment has played in high-income economies is highlighted by the fact that its volume as a share of GDP nearly doubled between 2019 and 2020 (Figure 8). In comparison, middle- and low-income economies recorded a large fall in spending, suggesting that in those markets, the energy transition was not a major focus of stimulus plans and/or that governments could not afford an economic response of similar scale. More often than not, governments in these country income groups have had to focus their limited spending capacity on immediate, near-time public health and economic relief efforts.[18] Disruptions to international trade and travel, combined with the impact of social distancing measures, also has had an impact on the possibility to carry out some of the key activities tied to project investment.

[14] "Sustainable Debt Breaks Annual Record Despite Covid-19 Challenges," BloombergNEF, January 11, 2021.
[15] "The Impact of COVID-19 on Emerging Market Economies' Financial Conditions," Board of Governors of the Federal Reserve System, October 7, 2020.
[16] "Energy Transition Investment Hit $500 Billion in 2020 – For First Time," BloombergNEF, January 19, 2021.
[17] "Road transport: Reducing CO2 emissions from vehicles," European Commission, accessed on February 10, 2020.
[18] "Covid-19 Response in Emerging Market Economies: Conventional Policies and Beyond," International Monetary Fund, August 6, 2020.

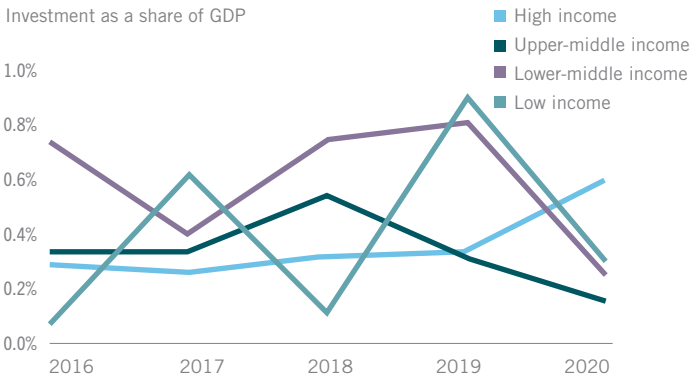
The macroeconomic hit of the global pandemic has combined with existing risks in several major emerging economies, to stymie energy transition investment. Typically, these markets have suffered from uncertainty over macro-economic outlook, energy policy, and regulatory stability, including delays or retroactive changes to clean energy investment incentives. There may also be a lack of near- and longer-term power system planning and, in some cases, macroeconomic challenges such as overreliance on commodity exports or high debt. Notable markets to experience drops in energy transition investment in 2020 were Argentina, Mexico, South Africa, and Ukraine.

On the other hand, markets such as Brazil, Vietnam, and Chile have been examples of the resiliency that strong enabling policy environments can bring to energy transition investment activity. Thanks to its strong energy sector planning, regulating authority, and demand fundamentals, Brazil has been able to schedule auctions ahead of time to ensure investor interest. It has done so flexibly enough to slow capacity procurement when it is less needed. India and China saw clean energy deployment temporarily slowed by social distancing restrictions, but their markets rebounded by the end of 2020. Both countries have delivered a positive long-term signal to energy transition investors by focusing on grid infrastructure deployment and market reform in their recovery plans.

The different impact of the COVID-19 shock on sustainable investment activity across the world has highlighted the central role played by strong enabling environments. These environments ensure that the transition to a low-carbon economy is resilient and makes a significant contribution to economic growth. The data indicates that high-income economies have been able to put the green transition at the center of their recovery plans, especially in Europe where 2020 was a record year for such investment, despite the pandemic. Some emerging markets have also shown resilience, highlighting that there is no lack of experience and lessons to learn from economies across all income groups. The next section explores the data and insights drawn from some of these success stories.

FIGURE 8:

Global energy transition investment relative to GDP by income group



Source: BloombergNEF

Section 3. The Role of Enabling Environments in Low-Carbon Transition

Against the backdrop of the economic crisis created by COVID-19, governments have the chance to seize the opportunity of delivering a green recovery that can accelerate their countries' transition towards net-zero. The experience of emerging markets that have taken a lead on climate action and saw private capital follow, and the growing pool of private investors committing climate finance across the developing world, point to the potential opportunities ahead.

The clean energy industry has provided many of the lessons learned over the last decade, and these can be adapted to other sectors. Early experience with policies targeting the decarbonization of sectors such as transport, green buildings, and waste management highlights the overlap. This section reflects on the progress countries around the world have made in creating thriving markets for sustainable investment, mobilizing billions of dollars in new investment in the process. However, these experiences also show that, when considering which policy tools to deploy, each country and sector will require an evolving mix of enabling policies over time, depending on its maturity and a wider range of market conditions.

This section brings together a diverse set of examples, intended to offer to all countries a broad range of lessons learned on potential policy opportunities for key emitting sectors. These should be regardless of current investment environment, or position on the path to a low-carbon economy. As such, the insights align with the scope and reinforce the purpose of the "Private Sector Considerations for Policymakers."

Primer: High-level, cross-cutting enabling environment factors

Participation in global climate action, political will, and execution capacity

The number of countries, cities, and businesses with net-zero targets has grown significantly over the past year. Some 58 countries – or 30% of the world's nations, and accounting for 46% of the global greenhouse-gas emissions – have announced net-zero emission targets (Figure 9 and Figure 10). China, South Korea, Japan, and the EU all made announcements in the second half of 2020. However, BloombergNEF (BNEF) has tracked just eight countries with legislated goals, covering 6% of global greenhouse-gas emissions, with 25 more nations, accounting for 10% of emissions, in the process of putting theirs into law.

Emerging markets are lagging behind. Suriname is the only country that has a legislated net-zero target out of 57 developing nations, and just eight have targets currently in a legislative process.[19] Together, these nine countries account for just 1.5% of emerging market greenhouse gas emissions. The other 19 emerging economies that have made pledges, including China, Argentina, and Ukraine, have yet to make their targets legally binding and detail their governance structure (Figure 11 and Figure 12).

[19] "Nationally Determined Contribution 2020," The Republic of Suriname, December 2019.

FIGURE 9:

Numbers of countries with national net-zero targets

% of countries

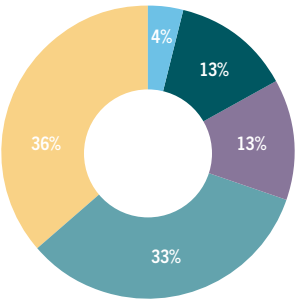


FIGURE 10:

Global greenhouse-gas emissions covered by net-zero targets

% of emissions

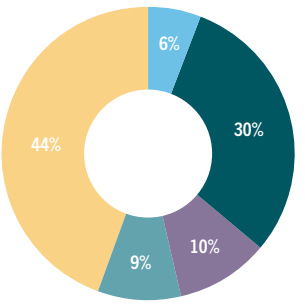


FIGURE 11:

Number of emerging markets with national net-zero targets

% of countries

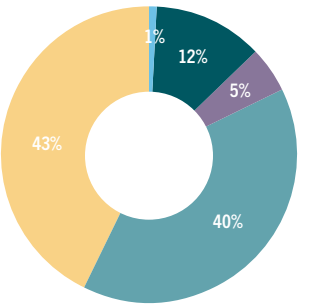
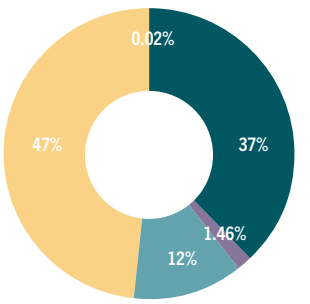


FIGURE 12:

Emerging markets greenhouse-gas emissions covered by net-zero targets

% of emissions



Legislated
Government position
In legislative process
Under discussion
No target

Source: WRI CAIT, governments, BloombergNEF. Note: As of February 2021. Based on 192 countries. Emerging markets include 157 non-Organization for Economic Cooperation and Development (OECD) nations, plus Chile, Colombia, Mexico, and Turkey. Includes 2016 greenhouse-gas emissions including land-use change and forestry.

Matching climate goals with targeted sector policies

In addition to net-zero targets, strong sector-specific policies are fundamental to enable emission reductions to take place across the economy. Sector-specific measures are particularly important in markets that are expected to go through rapid transformation, as they provide longer-term clarity, reduce market risk, and therefore help mobilize larger pools of private investors. Substantial interdependencies exist between sectors, especially when deployment of one technology is contingent on the deployment of others. Notably, to ensure that electrification of end-use sectors such as heating is accompanied by decarbonization, power systems must become greener. It will likely also mean other changes for the electricity sector, such as the need for more flexible resources.

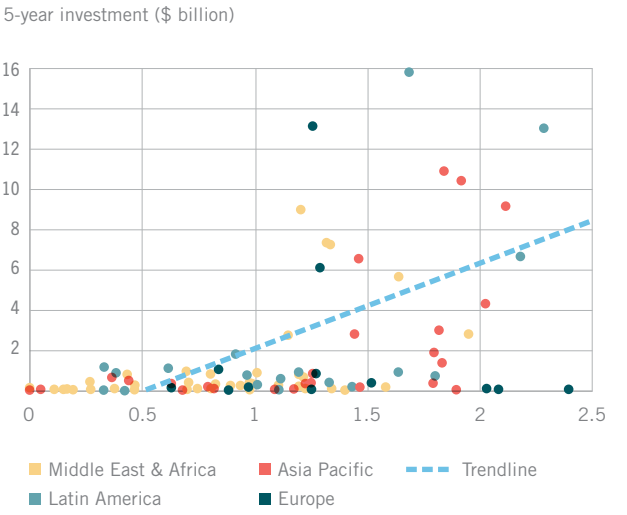
Research completed for Climatescope, BNEF's annual emerging market energy transition index, evaluates clean energy policy regimes by analyzing the ambition, access, stability, and success of each type of policy implemented.[20] Results of the 2020 ranking show that none of the bottom 60 markets received more than $2 billion in clean energy asset finance over 2015-2019, and that just four of the 60 received more than $1 billion. On average, the 60 economies attracted $275 million over the five-year period, or $55 million per year. In contrast, the remaining 47 markets surveyed (excluding mainland China), attracted almost 17 times as much, with an average of $4.6 billion over the period, or $907 million per year (Figure 13).

As highlighted earlier in this report, much of the progress achieved to date globally in deploying sustainable infrastructure has come in the power sector, especially in emerging markets. Experience in the countries that are scoring early successes in the decarbonization of transport or heat reiterates the importance of having a strong enabling environment for the decarbonization of the wider energy sector.

BNEF has evaluated the economy-wide decarbonization policies of G20 countries across 122 qualitative and quantitative metrics.[21] Taking the decarbonization of transport as an example, the eight countries that have scored 50% or more for this sector (excluding China) recorded an average of $7.8 billion of investment in 2020. China, in comparison, harnessed a record-breaking $45.3 billion. Meanwhile, the ten countries that scored less than 50% attracted on average less than $100 million in electrified transport last year (Figure 14).

FIGURE 13:

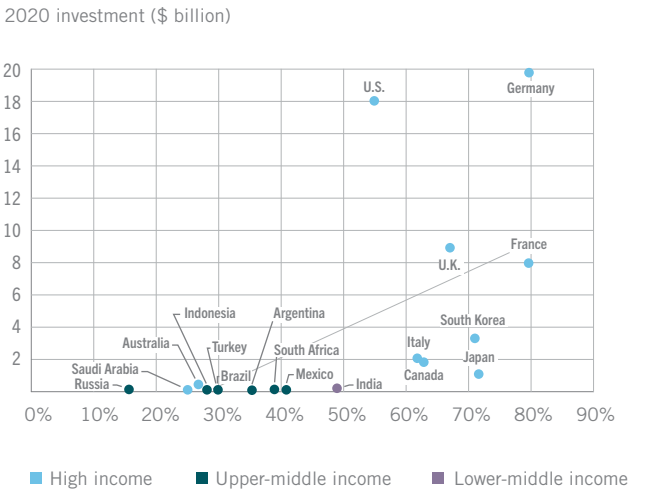
Climatescope renewable energy policy score vs. five-year clean energy asset finance in emerging markets



Source: BloombergNEF, Climatescope.

FIGURE 14:

G20 Zero-Carbon Policy Score for road transport vs. 2020 investment in electrified transport



Source: BloombergNEF. Note: Score from BNEF's G20 Zero-Carbon Policy Scoreboard Issue 2020. Gray outline highlights country where investment data is unavailable/minimal. China is an outlier and thus not included in the chart above. It scores 80% and received $45.4 billion in electrified transport investment in 2020.

[20] BloombergNEF's annual Climatescope review of the energy transition in emerging markets tracked 108 countries in 2020.

[21] "G20 Countries' Climate Policies Fail to Make the Grade on Paris Promises," BloombergNEF, February 1, 2021.

Policy stability and rule of law

A government's long-term commitment to transition plans can create markets for sustainable infrastructure investments that have scale and are resilient to shocks. On the other hand, governments risk seeing investment activity deteriorate rapidly if they tamper with the enabling environments that have been put in place. The diverging stories of the clean energy market in Mexico and Brazil provide useful examples of the importance of policy stability and government goals.

Mexico

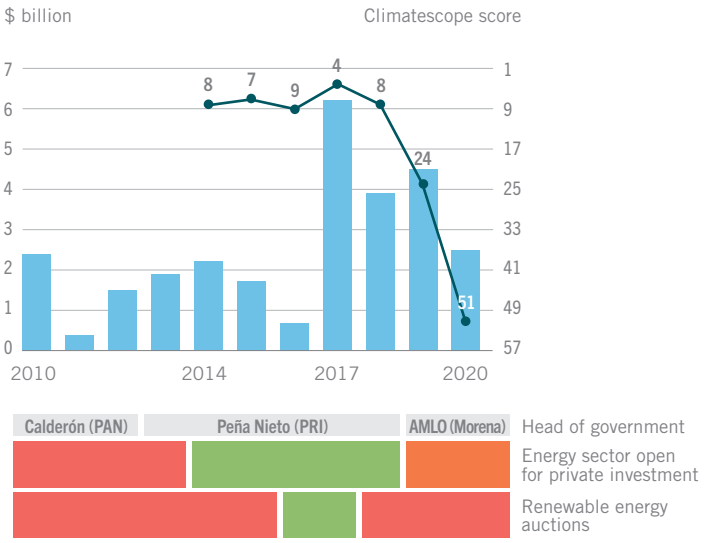
In Mexico, abrupt changes in energy policy have put a sudden halt to a boom in clean energy investment. In December 2013, an amendment to Mexico's constitution, passed under the presidency of Enrique Peña Nieto, opened up the country's power sector to private participation.[22] The reform was followed by an ambitious clean energy policy framework, including three renewable energy action rounds in 2016-2017, which led to over $21 billion in clean energy projects since 2014. Mexico's clean energy policy framework, especially the auction system, consistently ranked amongst the most attractive enabling environments for the sector across the OECD.[23, 24]

However, since assuming the presidency in late 2018, Andrés Manuel López Obrador has attempted to undo some of the reforms of his predecessors at the expense of further renewable power development in Mexico. Clean energy policy frameworks introduced by the previous administration have been halted or revoked, and a scheduled auction round has been cancelled.

The impact of these policy announcements, combined with the disruptions of COVID-19, have led to a contraction in clean energy investment, which dropped 44% between 2019 and 2020. The removal of some of the key policies that underlined Mexico's enabling environment for clean energy also affected the country's position in the Climatescope ranking, which went from five years inside the top 10, to 51st in 2020 (Figure 15).

FIGURE 15:

Mexico new clean energy investment (left) and Climatescope rank (right)



Source: BloombergNEF, Climatescope.

Brazil

Brazil is a country known for its volatile political environment, recording no less than four changes in head of state over the last decade. However, clean energy policy and investment have stayed remarkably stable. Over the past 10 years, the country has maintained one of the most comprehensive and inviting clean energy policy frameworks among emerging markets.[24] Brazil pioneered the use of competitive auctions to contract clean energy projects, adapting the level of procurement to the demand and supply balance and economic growth, leading to the procurement of 30GW of clean power at record-low prices over 2009-2019. The national development bank has played a critical role in mobilizing sustainable investments throughout the period, becoming the largest single lender to clean energy projects globally in the process.[26]

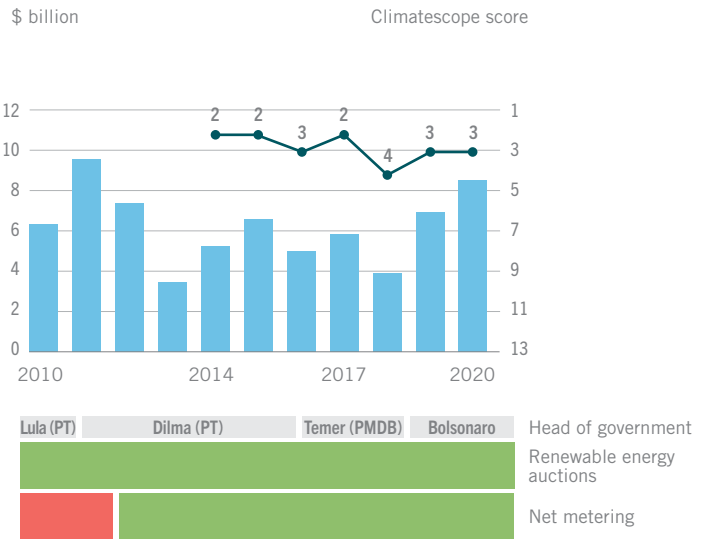
The consistency of policy has helped Brazil remain an attractive clean energy market, and even helped compensate for some of the wider challenges the

[22] Mexico country profile, Climatescope 2020, BloombergNEF.
[23] Auctions for the Support of Renewable Energy in Mexico, AURES, November 2019.
[24] Designing Renewable Energy Auctions, USAID, July 2019.
[25] Brazil country profile, Climatescope 2020, BloombergNEF.
[26] League Tables & Ranking, BloombergNEF, accessed on February 10, 2021.

country's economy has been facing. Brazil attracted around $70 billion in clean energy projects between 2010 and 2020, including significant volumes of cross-border investment. As a result of its strong, stable enabling environment, Brazil has remained in the top five of the Climatescope index every year (Figure 16).

FIGURE 16:

Brazil new clean energy investment (left) and Climatescope rank (right)



Source: BloombergNEF, Climatescope.

Currency stability

A key challenge for investors considering deploying finance in emerging markets is local currency stability, or the lack thereof. While it is true that volatility and bouts of depreciation have continued to affect some emerging market currencies, especially during the COVID-19 crisis, currency stability has improved across other emerging markets, often thanks to sound monetary policy. Today, the currency volatility of a growing group of emerging markets is increasingly in line with that of developed nations.

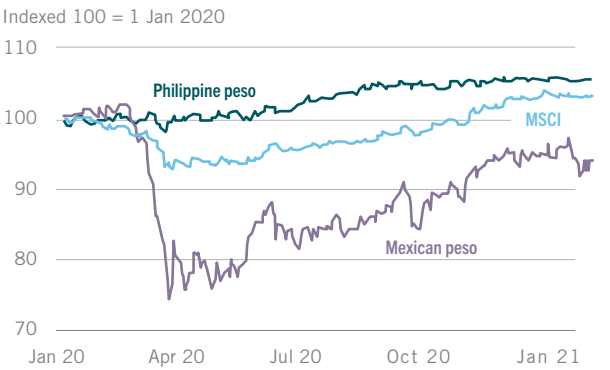
The COVID-19 pandemic had a large initial impact on emerging and advanced economy currencies alike. However, the global coordinated response of central banks to preserve access to credit, and the mobilization of public finance in advanced economies, helped the MSCI emerging market currencies index recover and finish 2020 in positive territory (Figure 17).[27] Also, the COVID-19 pandemic has offered investors a window into some of the key drivers of currency volatility. Economies relying heavily on commodity exports to generate revenue in hard currencies have recorded high currency volatility and depreciation, as has been the case in Mexico (Figure 18) and Brazil. Countries that could afford it, such as Saudi Arabia, tapped into their foreign exchange reserves to preserve the value of the domestic currency. On the other hand, markets like in

FIGURE 17:

Evolution of high-income (DXY) and emerging market (MSCI) currency indices, 2020-21

FIGURE 18:

Evolution of emerging market currency index (MSCI) and select emerging market currencies, 2020-21



Source: Bloomberg Terminal. Note: The DXY index integrates a basket of hard currencies including the euro, Japanese yen, British pound, and Swiss franc. The MSCI Emerging Markets Currency Index tracks the performance of 25 emerging market currencies against the U.S. dollar. Philippine peso and Mexican peso rates are against the U.S. dollar.

[27] "The Impact of COVID-19 on Emerging Market Economies' Financial Conditions," Board of Governors of the Federal Reserve System, October 7, 2020.

the Philippines and Vietnam, which have been able to count on growth fueled by domestic consumption in goods and services, have fared better.

This is why governments and investors looking to mobilize investment in new sustainable infrastructure need to account for the economic and currency profile of each country. Most sustainable infrastructure investments have a lifetime exceeding 15 years. Therefore, the long-term outlook of the economy they are in and the impact it will have on the currency must always be considered. Markets whose currencies are particularly exposed to volatile commodity prices, or those that have a currency that is difficult to convert as a result of insufficient internationalization, will typically need to agree to payment terms set in hard currencies or incur the added cost of foreign exchange hedges and guarantees. On the other hand, international investors looking to deploy capital to sustainable infrastructure in economies with a strong growth outlook should accept local currency risk and consider expanding their activity over the long term. Contracts awarded to clean energy investors in larger markets such as Brazil, China, Columbia, Egypt, India, Jordan, Kazakhstan, Malaysia, Pakistan, South Africa, Sri Lanka, Thailand, and Vietnam can sometimes include partial hedges, but they are typically denominated in domestic currency.

Primer: Clean energy systems

The power sector is the source of emissions that has recorded by far the highest level of transition investment and fastest decarbonization to date. The fall in the cost of clean energy technologies has also meant that an increasing amount of investment is fueled by economic imperatives rather than climate goals. This helps solar and wind grow their market shares, especially in emerging markets where demand is growing. As a result, clean energy is the sector where there are the most lessons to learn from the successes and failures of regulations and policy over the last decade. These experiences are important as clean electricity is set to play a leading role in decarbonizing the economy. Direct and indirect electrification is often the most effective way to deliver emission reductions in transport, heating, cooling, and industry due to the increasing availability of cheap clean power generation.

Cross-cutting clean energy

Energy sector targets

As economies recover from the pandemic, power demand across the majority of emerging markets is expected to rebound and continue to rise, requiring investment in additional capacity. However, most emerging markets still have low shares of clean energy sources supplying their grids, with 48 out of 108 countries tracked by BNEF (representing the bulk of power demand) averaging below a quarter of electricity supplied by clean power[28] in 2019 (Figure 19). As a result, investment signals for new clean energy capacity and its related infrastructure, as well as the market structure for the energy sector, are critical to delivering climate goals.

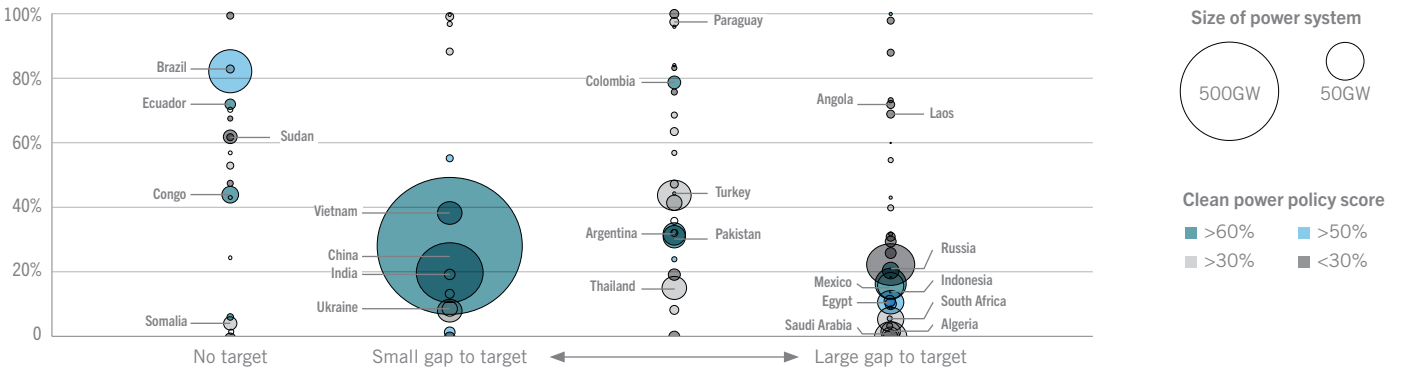
Most emerging markets already have clean energy targets, with varying levels of ambition. These can help to signal growth opportunities for new renewable energy projects. BNEF has tracked 84 emerging markets with clean power targets (Figure 19). Clean energy targets can be high-level, and ambiguous and have limited value in isolation, making it vital for governments and other relevant energy authorities to align their targets with robust policy and regulatory frameworks. Of the 84 emerging markets with targets, 44 still have large gaps to meeting their goals and only 31 have strong support for clean power (i.e., scored more than 50% in BNEF's assessment of policies to support renewable electricity).

Nonetheless, many emerging markets are ramping up their efforts to deploy renewable power and deliver their goals. China and India, for instance, have relatively small gaps to achieving their nearest approaching clean energy targets (Figure 19), as both have made quick progress in recent years on the back of subsidy schemes including clean energy auctions. India's sector-specific target for solar and widespread use of auctions and tenders have been particularly important.

[28] Including large hydro-electric dams.

FIGURE 19:

Status of clean power targets in emerging markets and policy support, compared to share of renewables in generation and size of power system



Source: BloombergNEF. Note: Gap to target is based on the capacity deployment needed to meet the nearest national clean energy target. Clean power policy score refers to the number of clean power policies in place out of 10 indicators included in BNEF's Climatescope 2020 report. The calculation for share of renewables in power generation includes biomass and waste, geothermal, large and small hydropower, solar, and wind.

Argentina, Colombia, Pakistan, and Vietnam have also set clean energy targets. They ranked well on BNEF's indicators for clean power policy among emerging markets in 2020, signaling the strong set of renewable energy support schemes in these countries. Strong renewables policies have helped mobilize investment, sometimes despite challenging financial and regulatory situation, which still need to be addressed in the wider energy sector. Meanwhile markets like South Africa, Russia, and Saudi Arabia still have fossil-heavy electricity mixes and large gaps to meeting their clean energy targets (Figure 19). These countries also have fewer measures to support renewables deployment, weakening investment signals to ensure their delivery.

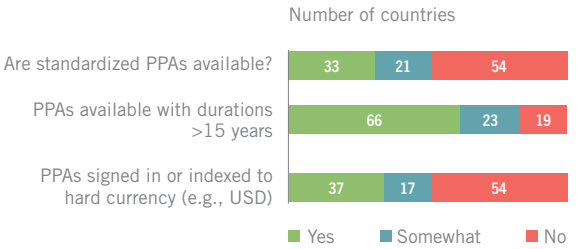
Market development

In addition to setting clean energy targets and backing these goals with policy support, governments in emerging markets are also helping to scale clean energy through supportive market frameworks. As highlighted in the 'Policy Considerations' section, regulators and governments can strengthen investment signals through measures like improving the market for private clean energy offtake and enabling generators to charge cost-reflective energy tariffs.

BNEF has tracked activity by energy sector authorities to support clean energy offtake in emerging markets. Measures assessed include whether emerging markets have made efforts to help to standardize power purchase agreements (PPAs), helping to lower transaction costs for offtake contracts; whether markets have PPAs of long-enough tenures to be bankable; and whether PPAs (including auction contracts) are signed or indexed to a hard currency, which can help to shield against exchange rate volatility (Figure 20).

FIGURE 20:

Features of power purchase agreements in emerging markets: standardization, duration, and currency

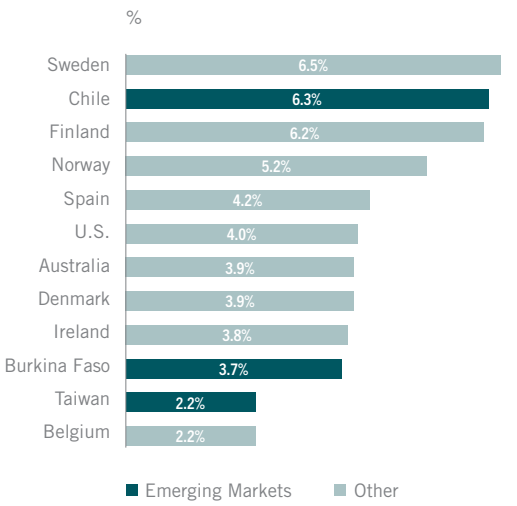


Source: BloombergNEF. Note: "Somewhat" for duration refers to PPAs of 10-14 years available.

We found that at least 89 of 108 emerging markets have PPAs with durations above 10 years. Half sign or index offtake contracts to a hard currency (although currency indexation is not always a necessary feature to ensure investor confidence, if the national currency is stable – see "Currency stability" section on page 16). Several emerging markets are leading the way in creating the innovative market frameworks that help to unlock and rapidly scale clean energy investment. Chile is a notable example where these PPA features have been particularly successful. The country had driven investment in more than 6GW of wind and solar projects by 2020. It also had more than 1.5GW of corporate renewable energy PPAs signed as of end-2020, according to BNEF data, on the back of successful reforms and market development. Relative to the 25GW size of the country's power market, Chile's corporate PPA volumes now rank the country second in the world for such offtake agreements (Figure 21).

FIGURE 21:

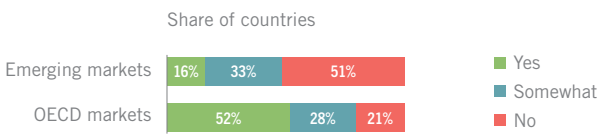
Volume of renewable energy corporate PPAs signed by end 2020, relative to size of power market



Source: BloombergNEF.

FIGURE 22:

Share of countries with deregulated retail tariffs



Source: BloombergNEF.

However, 54 of the emerging markets assessed by BNEF still do not have standardized PPAs available. Other regulatory barriers that hamper clean energy investment, such as a lack of creditworthy offtakers or tariff deregulation, are also commonplace. Price caps or regulated tariffs are often kept low in an attempt to ensure electricity supply is affordable and accessible to the general population. However, such measures often block energy sector investment signals, which means that legacy fossil fuel capacity is not put in competition with increasingly cheap clean technologies. This prevents increasingly cheaper clean energy technologies from driving an overall reduction in the cost and environmental impact of supplying power. Just half the emerging markets tracked by BNEF allow generators to charge cost-reflective energy tariffs, and only 16% allow generators to supply electricity directly at cost, compared with 52% in OECD markets (Figure 22).

Grid-connected renewable energy

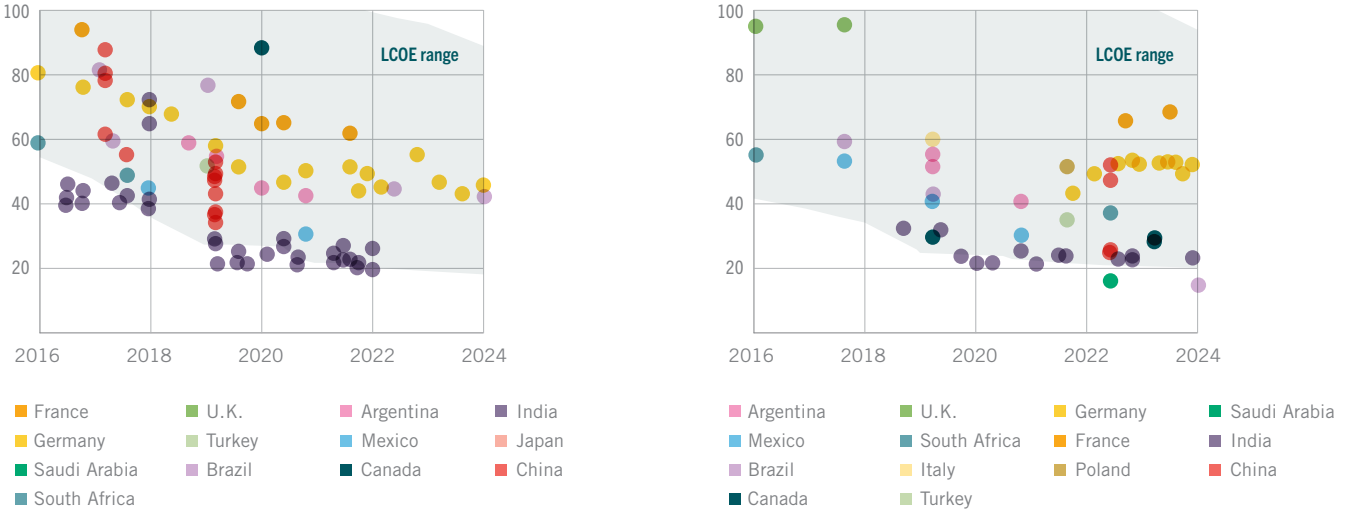
Auctions and tenders

Scaling grid-connected renewable energy capacity relies on clear investment signals as most of the capital is deployed in the project development phase. Auctions are often the policy mechanism of choice for emerging markets to procure new renewable energy capacity for their grids and attract private investment. Auctions for long-term price contracts can provide revenue certainty, drive investment into clean energy, and attract a low cost of capital to new renewables projects. Competitive allocation through auctions can also result in tariffs that better reflect ongoing technology cost trends. BNEF has tracked a general decline in levelized bid prices in auctions across emerging markets for PV and wind over recent years, reflecting falling costs of technology and fierce competition (Figure 23).

BNEF has tracked more than 352GW of clean energy auctions delivered worldwide as of 1Q 2021, from which 76% of capacity has been awarded in emerging economies. However, this activity is concentrated largely to certain markets. China and India are the global heavyweights of auction delivery, awarding to date a cumulative 183GW of clean energy capacity (Figure 24), far exceeding the 84GW of auction procurement by OECD countries. Auction deliveries in Brazil, South Africa, Mexico, Turkey, and Chile comprise a large portion of activity among the remaining emerging markets. Leading clean energy auction programs across emerging markets have helped produce some of the most innovative and impactful auction designs to date.

FIGURE 23:

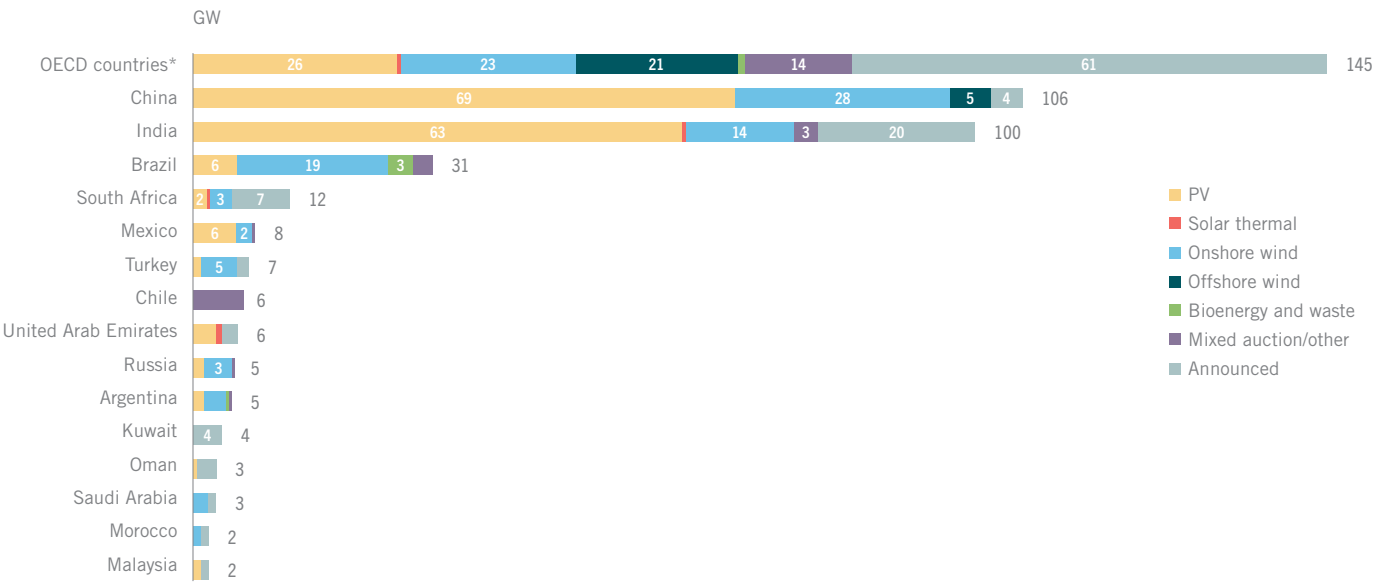
Levelized bids for auctions in select markets by project commissioning year, 2016-24



Source: BloombergNEF. Note: In order to make winning auction tariffs comparable across countries, we levelize the capacity-weighted average winning tariff – i.e., we estimate the average inflation-linked tariff for the full lifetime of the project. We remove the effect of subsidies, standardize inflation, and add a merchant tail for the duration of the project lifetime after the auction tariff expires. Levelized bids are shown by commissioning date and assume a 0% discount rate.

FIGURE 24:

Awarded and announced volumes of clean energy auction capacity in 15 emerging markets compared with OECD countries, by technology



Source: BloombergNEF. Note:*OECD countries excludes Chile, Colombia, Mexico and Turkey.

Co-ordinated auction planning

Governments can provide greater certainty by publishing long-term calendars for auction rounds, and sticking to them. Auction calendars are commonplace in many OECD countries as well as several emerging markets. It is also important that auction procedures are coordinated with a streamlined permitting process and grid planning, in order to avoid the under-delivery or late procurement of capacity.

Delays and cancellations to auctions can damage investor confidence, slow renewables deployment, and be disruptive to local supply chains, particularly where other routes to market are not available. A case in point is South Africa. Having last announced auction-round winners in 2015, years of delays followed before the PPAs for those projects were signed. The government has yet to hold another auction round. The lack of auctions has severely limited the options for developers to build new projects due to the highly regulated nature of the country's power sector. This has forced clean energy project developers and investors to look elsewhere for activity (Figure 25).

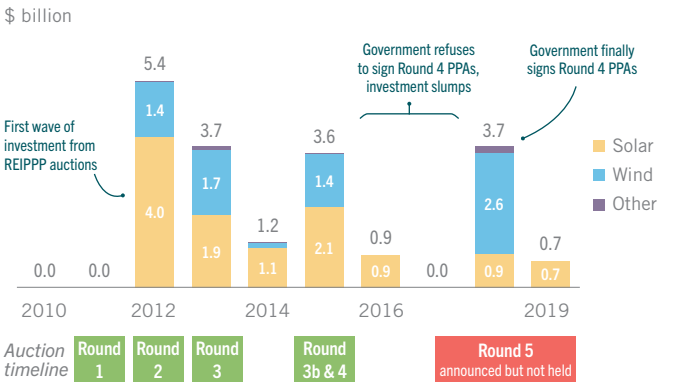
Local content requirements

Brazil, Russia, Saudi Arabia, South Africa, and Turkey, among others, have imposed local-content requirements on auctions. Under such policies, winners of auctions must meet certain conditions to execute on contracts they have won (or, in Brazil's case, to receive access to low-cost financing). These conditions may require them to build factories in the country, employ locals, or use certain volumes of locally manufactured equipment. Such conditions can help to attract investment into the development of local supply chains – but only if governments also demonstrate a commitment to renewables and visibility on future demand.

Brazil's approach to supporting the development of a domestic supply chain has been particularly successful.[29] Local content measures are not put in place as requirements but rather as incentives in the form of access to concessional debt from the country's development bank. As the clean energy sector in the country matured, local content requirements to access the incentives were raised progressively. In comparison, solar and wind manufacturers that opened facilities in South Africa to meet the government's local content

FIGURE 25:

Clean energy investment in South Africa and REIPPP auction status



Source: BloombergNEF. Note: REIPP = Renewable Energy Independent Power Producer Program.

requirements have suffered financially and closed as a result of the gap in new-build opportunities.

Supporting better renewables integration

Auctions can be designed to deliver clean power in ways that best meet grid needs, as the share of variable renewables in the system grows. Introducing time-of-day or peak load requirements to auctions can be one way to achieve this. In Chile, the government has had generators compete in technology-neutral auctions to supply power during specific periods of the day since 2014.[30] This has enabled solar in particular to benefit by providing power during a designated daytime block of demand, while other technologies serve evening demand.[31,32] In India, firm power requirements were introduced to a peak power supply auction in 2020. The cleared winners will rely on wind, solar, and energy storage to deliver dispatchable generation.

Accommodating co-located renewables (i.e., wind or solar plus storage) and oversized renewable energy projects within auction schemes can help to deliver better outcomes for the grid and for generators. This is because they can maximize the utilization of a grid connection and smooth the output from a wind or solar project. Some governments are already taking steps toward this. Co-located wind and solar auctions have been used since 2018 in India and Denmark with fairly successful results, and Portugal recently ran a co-located solar-plus-storage tender.

[29] "Local Content Requirements in Auctions Scheme for Renewable Energy," UNEP DTU, 2019.
[30] "Auctions for Renewable Energy in Chile," AURES, August 21, 2017.
[31] "Power Market Design Series: Chile," BloombergNEF, November 2, 2018.
[32] "Round-the-Clock Renewables Threaten Coal Power in India," BloombergNEF, May 13, 2020.

Power grid infrastructure

Transmission infrastructure is essential to scaling clean power in grids. Investment in reinforcing or building out power grids eases the integration of renewables, reduces the capacity required to ensure security of supply, and facilitates access to cost-efficient generation assets. Where there is substantial need for new grids, the cost of reaching the most remote areas can rise rapidly, and the role of electrification through distributed renewables should also be considered (Figure 26).

Attracting private investment

Investment in grids has typically come from state-owned enterprises, but private finance has begun to play a role in certain markets. Indefinite privatization, employed in the U.K. and the Philippines, sees private actors manage existing and new lines within a country or region. Merchant lines – private initiatives not commissioned by governments – have been commissioned in the U.S. and Australia. Yet few emerging markets have successfully implemented either model.

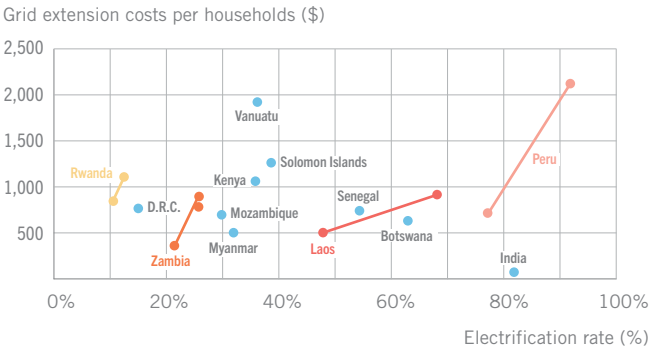
More widely applicable is the independent power transmission model, which involves individual lines, or a package of lines, being built and operated under one of several types of public-private partnership (PPP). Focusing on fewer lines helps attract finance and makes de-risking more manageable. Contracts are rarely indefinite but are generally long-term, running 25 years or more.

Many PPP structures see both construction and operation risk and capital expenditure requirements taken on by the private sector. As with renewables auctions, Latin America was a trailblazer in competitively procuring private power lines. Brazil, Peru, and later India, successfully commissioned transmission lines under the build, own, operate, and transfer model. Implemented via tenders, this sees private companies taking on upfront costs, bearing construction and operation risks, and operating completed assets.

Chile shows why transmission infrastructure is so important to integrating renewables. Breakneck wind and solar build resulted in severe curtailment and volatile wholesale power prices. The situation was only alleviated when privately financed transmission lines were built to connect the country's two main grids. The latest came online in 2019, correcting volatility on the grid nodes where midday spot prices once averaged $0, and helping price convergence between the two grids (Figure 27). While most emerging economies lack wholesale markets, the Chilean case underscores the importance of integrated grid plans accounting for renewables build.

FIGURE 26:

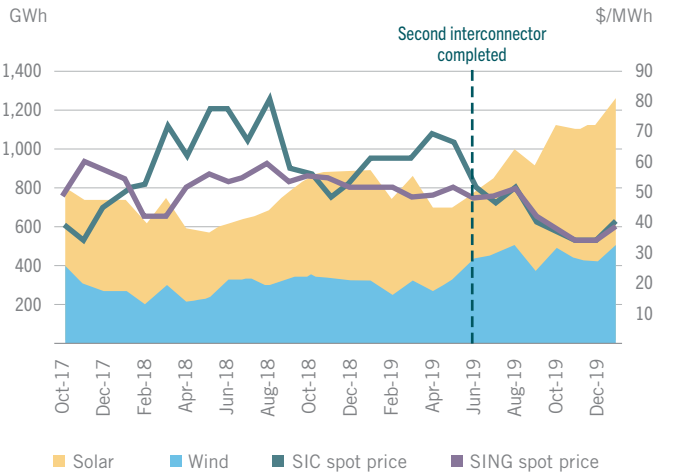
Grid extension costs and electrification rates



Source: BloombergNEF, World Bank project records.

FIGURE 27:

Chile wind and solar generation vs spot prices of both national grids



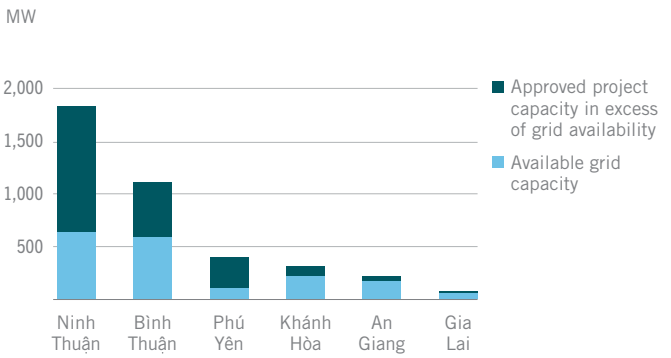
Source: BloombergNEF, CNE, CEN. Note: SIC and SING spot prices correspond to Quillota and Crucero 220kV node prices.

Equally revealing is Vietnam, where the introduction of a feed-in tariff for solar, and upward revision of the tariff awarded to wind, led to a renewables boom. The country is now Southeast Asia's largest clean power market with 5.9GW of intermittent renewables, accounting for 9.5% of installed capacity.[33] A lack of take-or-pay clauses in standard Vietnamese PPAs led to a rapid jump in curtailment, hurting project revenues. Curtailment of renewables (mostly solar) averaged 30-35% over June-July 2019, reaching 65% in some of the worst cases (Figure 28).

Priority dispatch for "new" renewables was since implemented, leading to a large hydro plant being curtailed in July 2020. Grid investment has also been prioritized, curbing curtailment from 34% to 10% in two provinces over 2019-2020. The government approved the country's first private grid project in January 2020, and passed a PPP law in June 2020. This will help attract private capital, $38 billion of which the government thinks is needed for grid projects over 2016-2030, or $2.5 billion per year. That represents a fivefold increase compared with 2008-2018.

FIGURE 28:

Available grid capacity and approved capacity of renewable energy projects in selected Vietnam provinces



Source: BloombergNEF, National Load Dispatch Centre of Vietnam.

Regional electricity markets

Building interconnectors could lead to a rise in power trading. By aggregating demand and making clean power exportable, common markets can enhance the attractiveness of renewables development. The Central American Electrical Interconnection System (SIEPAC) was commissioned in 2013, steadily increasing traded power volumes. Similarly, the Southern African Power Pool (SAPP) was formed in 1995 – competitive trading has accounted for an increasing share of cross-border flows, and an intraday market came online in 2016.

Yet efforts to interconnect countries alone does guarantee renewables growth. Power traded over the SAPP has slumped due to increasingly slim reserve margins in the region's biggest power market, South Africa. A failure to meet national clean energy deployment plans has meant that very little of the anticipated cross-border flows materialized.

Grid codes

Introducing up-to-date grid codes (or rules) is also critical to integrating variable renewables. These can govern everything from frequency control to congestion management. Generator connection codes are particularly important to developers. Getting them right is essential: too onerous, and they can slow renewables additions, but overly lax rules can threaten grid stability.

What technical requirements must be met by generators is likely to vary as larger shares of variable renewables are added (Table 1). Rules might emphasize system protection (fault mitigation) when deployment is low, but ask operators to provide synthetic inertia (for system stability) as the renewables share of generation ramps up. Here, a well-structured revision process – with rigorous verification – is critical to ensuring that rules are appropriate.

[33] Vietnam country profile, Climatescope 2020, BloombergNEF.

TABLE 1:

Intermittent renewables' impact on the grid

Variable-renewables penetration	GRID IMPACT	EMERGING-MARKET EXAMPLES
Low	None	Saudi Arabia, Indonesia, Turkmenistan
Medium	Becomes noticed by system operator. Local grid conditions affected, transmission congestion is possible.	Senegal, South Africa, Argentina
High	Significant change in power flow patterns, higher potential for transmission congestion. Flexibility is required.	Vietnam, China, Chile
Intermittent renewables cover all of demand at certain points	Requirement for grid-wide reinforcement and significant flexibility resources to maintain stability.	None yet

Source: BloombergNEF.

Brazil shows how grid codes can evolve. Congested power lines meant that, in 2013, some 2GW of wind capacity received payment despite being unable to feed power into the grid.[34] This is a common feature of so-called take-or-pay power purchase agreements in emerging markets. Since then, the curtailment risk has been taken by wind operators, with payments withheld when grid congestion prevents wind generation. This has encouraged auction bidders to site projects near the existing grid, and to account in their bids for the cost of new transmission lines.

Renewables will often be built in jurisdictions where they are not yet covered by the grid code. In these cases, PPAs or government support schemes can feature so-called change-in-law provisions, facilitating compliance with any subsequent changes to the grid code (or other regulations) that might affect power projects. Clarity on this area also applies to mini-grids, which are often built in a regulatory vacuum and as such are vulnerable to changes *post factum*.

Social and governance standards

Public consultations early on can address local acceptance issues plaguing planned lines from Germany to Japan. Such markets suffer from local pushback that hinders development on likely sites. Operators have tried to adapt. German cables are increasingly built underground at greater expense, and with limited success in quelling opposition. Yet the cost of earthing cables is too high for many emerging markets, where acceptance issues are also common.

Community opposition notably delayed a major Chilean interconnector's construction in 2019 by 17 months. Those developing West Africa's largest wind farm hedged against such issues. Commissioned in 2020, the 159MW Taiba project in Senegal pledged to spend $20 million on local development over the plant's lifetime (against an initial $330 million investment). Sited 80 km from the capital, the project requires a short cable and has faced little opposition. Like Taiba, some private line projects take the initiative to mitigate risk. Yet strong governance standards are lacking where grid investment is most needed, such as in much of sub-Saharan Africa.

[34] "Scaling up Variable Renewable Power: The Role of Grid Codes," IRENA, May 2016.

Energy storage

Investment in utility-scale energy storage is also needed as variable renewables are added to power systems. As penetration increases, adding storage smooths renewables' output by shifting power supply to better align with demand. Batteries and pumped hydro plants can also provide ancillary services to shore up grid stability. That is all the more crucial when renewables are added to small power systems with decrepit grids, as is the case in many emerging markets.

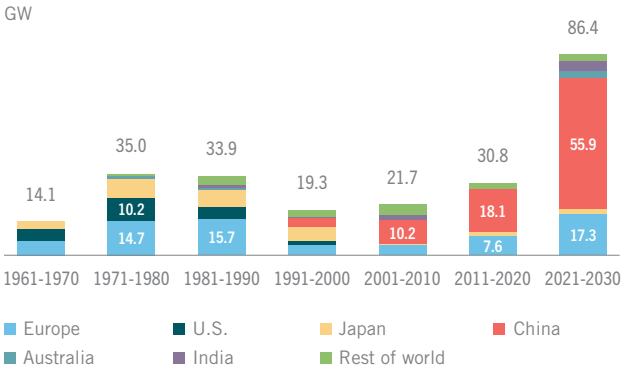
When power fleets are dominated by large, flexible hydro plants – common across equatorial swathes of Asia, Africa, and Latin America – the case for extra storage assets can be weaker. Pumped hydro projects are primarily being developed in China, India being the other emerging market with a big pipeline (Figure 29). These rely on concessional finance, with projects increasingly built to integrate renewables. In many regions, increasing droughts are a concern for both large hydro and pumped storage, although the latter is generally more resilient to low rainfall.

Pumped hydro is a mature technology, and has storage durations averaging 10.4 hours for new plants. Like large hydro, they cannot provide primary frequency response, offering more limited ancillary services than most batteries. But in China, plants are built as part of the transmission system for grid stability, and were one of the factors that cut curtailment from 17.1% of wind generation and 9.8% of solar in 2016, to 4% of wind and 2% of solar in 2019. Long development times, high capital costs, and difficult permitting have limited their spread to other emerging markets.

In contrast, utility-scale battery projects typically provide up to just four hours of storage today, although this is increasing as battery prices fall. They have a higher availability than pumped hydro, are better at rapid response, and – crucially – are simpler to site. Lithium-ion is the most promising technology. Having plunged from $1,191/kWh to $137/kWh over 2010-2020, lithium-ion battery prices are expected to fall further to $45/kWh by 2035 (Figure 30). Cost-competitiveness and long lifetimes mean that lithium-ion batteries are likely to be favored over the lead-acid type used in many mini-grids. Hydrogen can also be used for storage, but it lacks market maturity.

FIGURE 29:

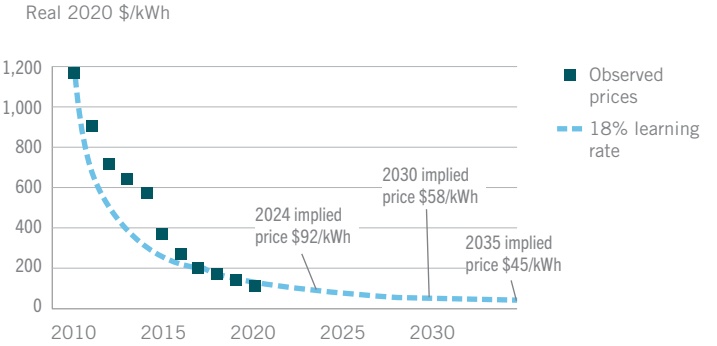
Historical and forecast additions of pumped hydro projects, 1960-2030



Source: BloombergNEF.

FIGURE 30:

Lithium-ion battery pack price



Source: BloombergNEF.

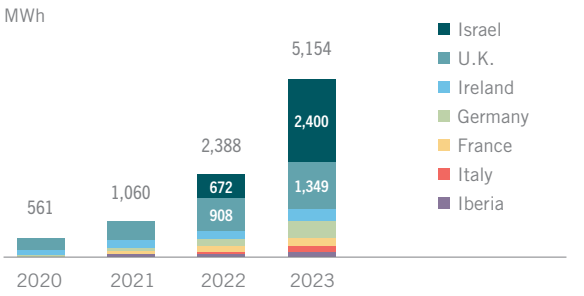
Revenue models

Utility-scale batteries have seen little deployment outside rich countries and China, but this is set to change as costs fall. A central issue is that of remuneration. Ancillary markets have played an important role in incentivizing utility-scale battery build in many countries, but are lacking in most of the developing world. Meanwhile, a lack of wholesale power markets means that operators are unable to engage in price arbitrage. In many cases, battery build cannot be merchant-based, and must be carried out by (often state-owned) utilities, or procured through PPAs.

Many governments are looking to establish wholesale or ancillary service markets, but the way to there is often tortuous and opaque. The challenges are numerous: power market reform is typically a slow process, requiring the development of technical expertise and managing the interest of the existing entities invested in the sector. Saudi Arabia has been envisioning establishing markets for electricity, capacity, balancing, and ancillary services for over a decade; all could reward batteries. The latest incremental step was back in 2017, when a single buyer was created to manage the country's electricity market. Little progress has been made since.

FIGURE 31:

Utility-scale storage forecast in largest EMEA markets



Source: BloombergNEF.

Offtake agreements

Israel shows how a country without such markets can procure storage co-located with renewables. As an "energy island," the country's lack of interconnection with neighbors makes integrating renewables a challenge. The regulator calls for 2GW/8GWh of storage to integrate the 12GW of PV it targets for 2030 (bringing renewables to 30% of power generation). As a result, batteries were added to the PV auction scheme. Two rounds were held over 2020, bringing the storage pipeline to 3.3GWh, rivaling near-term utility-scale build in other markets across EMEA (Figure 31).

Developers got 23-year PPAs, with 609MW of PV and at least 2,435MWh of batteries tendered through the second auction. The latest auction cleared at $56/MWh, and no additional revenue stream was provided for battery services. Clear regulations helped attract investors. Operators must provide four hours of storage availability for each megawatt of capacity, and the system operator can request one cycle per day. However, the fact that all but one of the successful bidders were Israeli points to a significant local value chain, something that many emerging markets lack.

One market looking to follow Israel's example is Senegal. Adding renewables has reduced the country's reliance on costly diesel, a result of policy commitment to renewables and donor support through programs like Scaling Solar. In 2020, intermittent renewables leapt to 30% of installed generation capacity, compared with less than 1% five years earlier. Coping with the sudden influx of variable power has become a challenge for the state utility, which has insufficient spinning reserve to balance out output from the country's solar and wind installations.

The government signed a memorandum of understanding in June 2020 to procure lithium-ion batteries totaling 30MW/60MWh, co-locating them with the country's 149MW wind farm, Senegal's largest intermittent renewables plant. The battery operator will receive a fixed capacity charge to compensate its asset's ability to generate when dispatched – this is already widespread in African large hydro or thermal PPAs (which also include an energy charge remunerating an agreed volume of generation).

Both the Israeli and Senegalese frameworks reward battery operators with simple tariff structures; these will attract finance where development risks are high and familiarity with battery technology low. Once familiarity increases, projects could be developed under more complex, and potentially more lucrative, arrangements. These could procure distinct ancillary services at different rates, opening the door to the revenue stacking envisaged by operators in various developed markets.

Distributed renewables

Renewables have a critical role to play in electrifying the world's population. Some 903 million people remained without access to electricity in 2018, or 11% of the world's population. That constitutes considerable progress since 2010 (Figure 32). Off-grid solar packs alongside the expansion of transmission grid infrastructure in Asia explain much of that drop, but strong population growth means the number without access in sub-Saharan Africa has hardly budged.

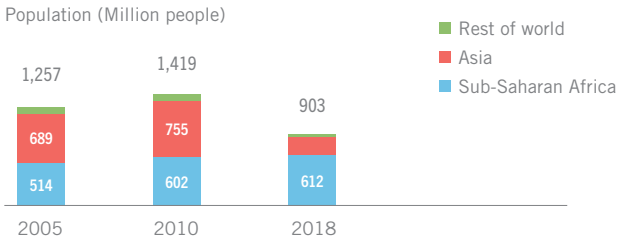
Robust policies will be required for low-cost electrification options to spread at scale. Progress needs to accelerate if policymakers want to reach universal energy access by 2030, a UN goal championed by many governments. BNEF found that most countries with large off-grid populations had an electrification plan (Figure 33). At their best, these are implemented by competent, empowered rural electrification agencies that develop energy access roadmaps and typically coordinate the distribution of operating licences and subsidy payments.

Electrification plans that outline the role of technologies like solar home systems and solar hybrid mini-grids can send strong investment signals to market entrants. In 2018, Togo outlined the role of solar home systems, mini-grids, and grid connections for over 3,000 communities distributed across the country. Access to a clear plan was viewed favorably by investors, and helped attract capital to one of West Africa's fastest-growing mini-grid markets.

Countries that have seen a high penetration of mobile pay-as-you-go services can provide a route to market for solar home system retailers capable of powering basic necessities. These are already widespread in East Africa, and they will see rapid deployment in West Africa in coming years. Yet such platforms are still inaccessible in many markets: at the last count, mobile pay-as-you-go was not widely available in 16 sub-Saharan African countries (Figure 34).

FIGURE 32:

Number of people who lack electricity access, by region



Source: BloombergNEF, World Bank.

FIGURE 33:

Rural electrification program is under way, 2019

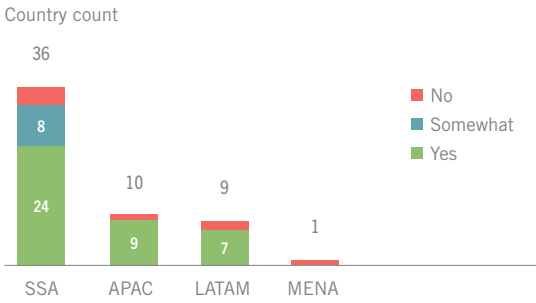
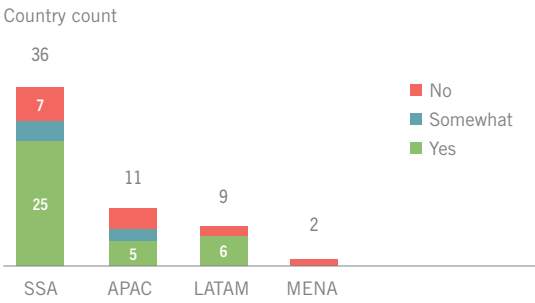


FIGURE 34:

Mobile pay-as-you-go services are widely available, 2019



Source: BloombergNEF. Note: SSA = sub-Saharan Africa, APAC = Asia Pacific, LATAM = Latin America, MENA = Middle East and North Africa.

Of the main electrification options, mini-grids are where supportive policies can make the biggest difference. These can serve almost half the 238 million households that need to gain electricity access.[35] BNEF estimates that achieving the UN's universal access target would require the number of households reached by solar-hybrid mini-grids to grow from 185 million households in the business-as-usual scenario to 238 million over 2020-2030 (Figure 35).

High upfront costs mean that capital investment would have to increase by the same order, underlining the need for extra subsidies (Figure 36). The electricity from solar hybrid mini-grids remains expensive for many rural customers who have limited ability to pay. Hence, it is important government explore the link between the economic potential of solar hybrid mini-grids and the effect fossil fuel subsidies have on delaying the point at which clean alternatives are cheaper.

Installing PV modules in mini-grids typically improves their economics as compared with relying solely on diesel. Governments would do well to support project sites where there are large enough "anchor loads" or a certain level of economic activity. This is because boosting the utilization rate of the mini-grid leads to a lower cost of electricity and higher average revenue per user (Figure 37). Increased demand from typical daytime economic activity cuts the overall cost of electricity as it aligns with the generation profiles of sun-powered PV systems.

Batteries can help cut costs. Coupled with PV systems, they reduce the running time and cost of diesel generators. Storage can allow developers to eschew diesel generators altogether, cutting operating costs and avoiding potential diesel theft. As with utility-scale batteries, the onus is on governments to design financing mechanisms that incentivize their procurement for mini-grids.

FIGURE 35:

Electrification technology used, 2020-2030

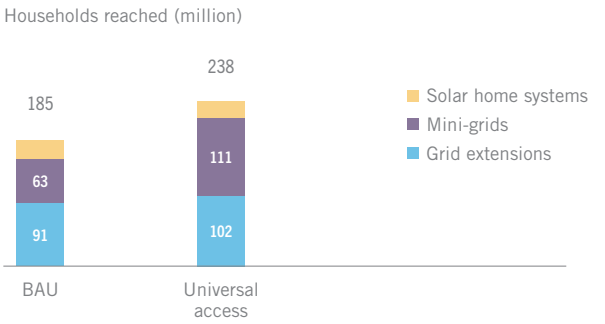
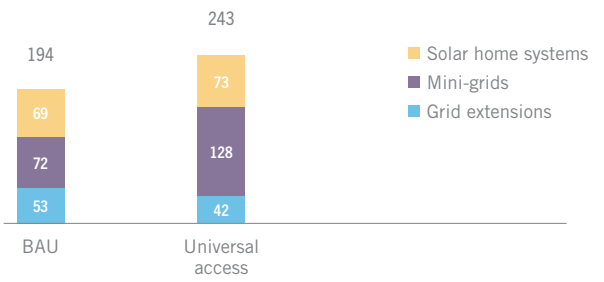


FIGURE 36:

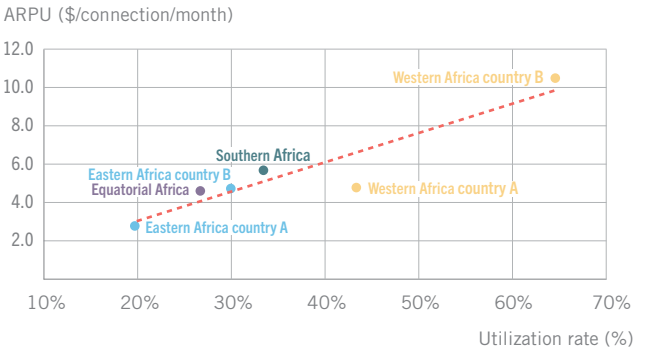
Estimated capital expenditure by electrification technology, 2020-2030



Source: BloombergNEF. Note: BAU refers to business-as-usual. Assumes all mini-grids are solar-hybrid systems.

FIGURE 37:

Correlation between utilization rate and average revenue per user



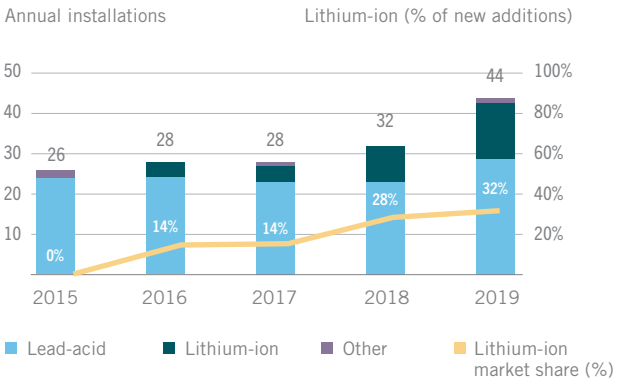
Source: Africa Minigrid Developers Association, Economic Consulting Associates. Note: ARPU = Average Revenue Per User.

[35] "State of the Global Mini-grids Market Report 2020," BloombergNEF for SE4All, July 1, 2020.

Most mini-grids with storage use lead-acid batteries, as these are more readily available and have a lower upfront cost than viable alternative technologies. However, increasing numbers are opting for lithium-ion, as costs decline (Figure 38). Lithium-ion batteries' market share in the mini-grid segment varies: it is 29% in sub-Saharan Africa versus 19% in Asia.

FIGURE 38:

Battery technologies used for installed mini-grids



Source: BloombergNEF, Carbon Trust, GIZ.

Subsidy programs

Subsidies can come from government budgets, but are often backed by donors. Multilaterals like the World Bank have played a role in backing a number of emerging-market mini-grid programs. Gauging the impact of policy interventions can be challenging; governments do not always disclose the results of mini-grid tenders and other subsidy programs. How public support is disbursed varies considerably, but many approaches fit into two categories:[36]

- **Upfront capital expenditure grants or loans** cover a portion of initial capital expenses, and can be distributed through minimum-subsidy tenders. Eight African countries launched such schemes over 2019-2020. As experienced with utility-scale renewables, auctions facilitate price discovery and drive down costs – useful benefits given the sector's relative immaturity. However, developers complain that taking part can be administratively burdensome.
- **Results-based financing**, where sums are transferred upon the completion of milestones, is usually simpler to introduce. Developers and investors interviewed by BNEF say they generally prefer results-based financing programs because they are clear and efficient to implement. Importantly, such schemes allow governments to rein in the subsidy burden by determining how many connections to support.

Nigeria has set up a robust results-based grant framework.[37] A World Bank-backed program involves performance-based payments, providing $350 for each new connection. The scheme restricts eligible projects to solar hybrid mini-grids in off-grid regions. Progress has been swift, with the first mini-grid online in December 2019, a year after financing was secured. That grants are made in U.S. dollars mitigates some of the performance risk that results-based financing shifts to the private sector.

Nigeria shows that one subsidy type need not exclude the other: a minimum-subsidy tender was launched in 2019, targeting 250 sites. It aims to drive costs below the $350-per-connection offered by the results-based financing scheme. Widely viewed as bankable and effective, Nigeria's framework for financing mini-grids could be replicated in other markets.

Tariffs and licenses

Some countries – such as India – allow mini-grids to operate in a largely deregulated environment, but most do not. Letting developers levy cost-reflective tariffs reduces the need for subsidies, but they are often limited by price caps or pegging retail rates to those of the main grid (and by what consumers can afford). Regulators should ensure that cost-reflective rates are kept in check, conducting periodic reviews against a reference internal rate of return, or by estimating how much replacing the generation asset would cost.

Investors are attracted where licencing is efficient and fair. For instance, Sierra Leone packs what would typically amount to multiple licenses in a single permit, cutting the number of administrative hoops required for project permitting. Exempting the smallest projects or those nearest the main grid creates opportunities that would otherwise get passed by. More nuanced regulations are emerging as the sector matures, adapting documentation according to project size, technology or location. These often simplify procedures for smaller or greener projects.

[36] "State of the Global Mini-grids Market Report 2020," BloombergNEF for SE4All, July 1, 2020.
[37] Nigeria country profile, Climatescope 2020, BloombergNEF.

Grid arrival

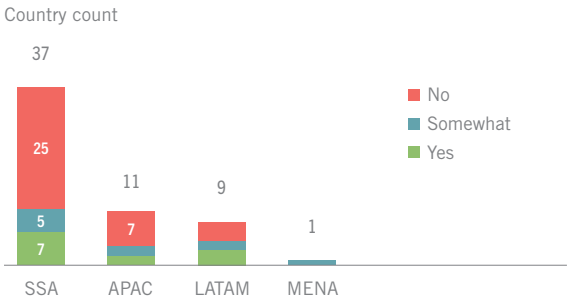
Rules on the arrival of the main grid are also a concern for distributed clean energy project developers. These mostly try to erect mini-grids that are unlikely to be within connecting distance from the main grid over the coming decade, as such a connection can wipe out an operator's revenue stream. However, not all countries make grid expansion plans public (Figure 39). Worryingly, rules clarifying what occurs upon grid arrival are lacking in more than half of surveyed countries (Figure 40). That can result in uncompensated expropriation, the worst-case scenario.

Guaranteeing compensation is one solution, and it can take many forms. For example, Senegal's framework is clear. When the grid arrives, the developer transfers ownership of the mini-grid's distribution assets to the state utility in exchange for compensation reflecting their value (Figure 41). Clear regulations offer investors much-needed visibility, incentivizing the development of projects that would have been deemed too risky.

Many countries allow operators to continue to operate, by converting to small power producers or distributors. Small power distributors purchase electricity from the state-owned utility and sell it to local clients. On the

FIGURE 39:

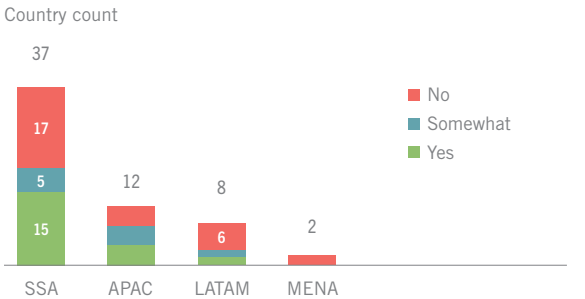
Potential mini-grid sites are specified by electrification program, 2019



Source: BloombergNEF.

FIGURE 40:

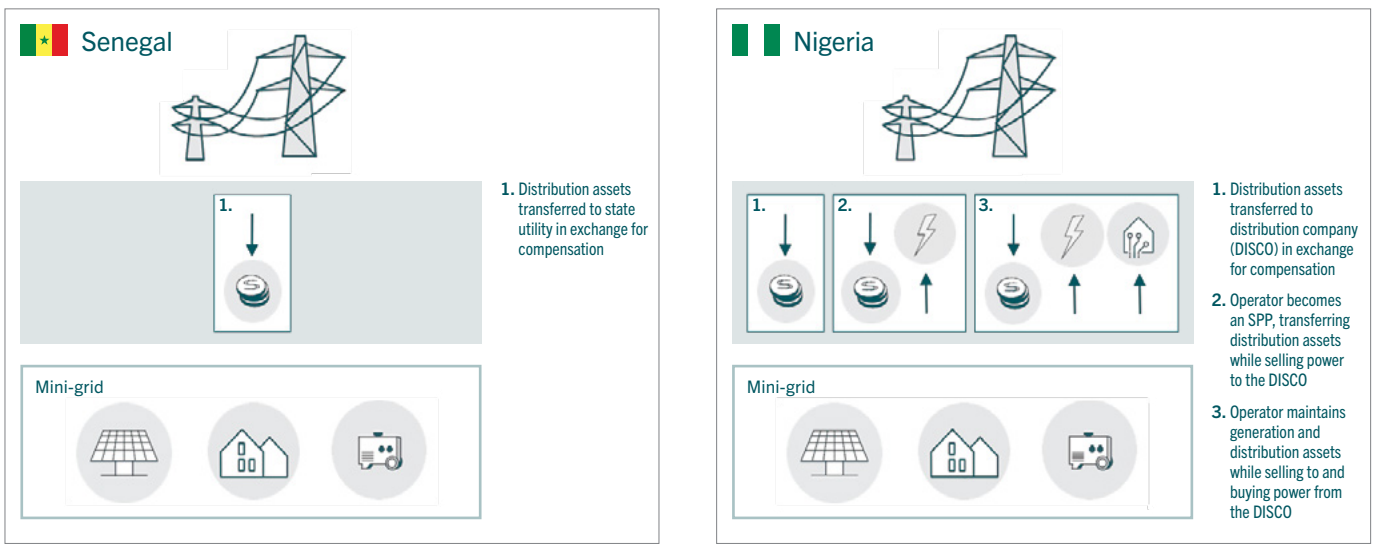
Mini-grid developers benefit from clear rules on arrival of the main grid, 2019



Source: BloombergNEF.

FIGURE 41:

Example of options available to mini-grid operators upon grid arrival



Source: BloombergNEF. Note: In Nigeria, should the mini-grid's distribution assets be transferred to the DISCO, the mini-grid operator is free to relocate generation assets. Senegal lacks detailed regulations regarding grid arrival, but in practice, compensation-backed expropriation has been carried out across the board.

other hand, small power producers no longer sell power directly to customers, but to the distribution company. This is the case in Nigeria, for instance, where operators can maintain their generation and distribution assets while selling to (and buying power from) the local distribution company (Figure 41).

Several models exist for calculating compensation. One approach focuses on unrecovered costs from operations, including those that would have been paid for through electricity sales or subsidies. Initial capital expenditure, such as that of generation units, might also be included once accumulated depreciation is discounted. Governments may also opt to pay developers for taking over assets linked to distribution, but not generation. In some cases, only larger generation assets may be deemed worthy of compensation.

The Policy Considerations in practice – clean energy systems

As shown by the great variety of experience in the transition to a low-carbon economy highlighted across this report, it is clear that every country has its own unique circumstances. Consequently, the Policy Considerations are meant to be broad enough to offer a menu of potential policy-change opportunities to all countries, regardless of their current investment environment, opportunities for sustainable infrastructure growth, or position on the path to a low-carbon, resilient economy. This is especially true in the clean energy sector, where rapid growth and innovation have created plenty of policy challenges and opportunities from which to learn.

The diagram (Figure 42) and two country examples below help better illustrate how the relevance of the Policy Considerations evolves, depending on the level of power system decarbonization countries have reached and the wider socio-economic policy priorities of governments.

Applying the framework

Country A

Context:
Country A is a small-sized, low-income country whose population and economy are growing rapidly. This growth has also translated into a rapidly growing power demand, but procurement of new generation capacity and grid infrastructure rollout has happened in a piecemeal and relatively uncoordinated fashion. Insufficient planning and benchmarking has meant that conventional generation technologies have been prioritised over cheaper clean power options. Domestic financing capacity is limited; hence, projects have tended to be carried and financed by international players and sources of financing.

Looking through the lens of the Policy Considerations:
Country A has the political will and economic outlook to support a clean energy investment drive. However, execution capacity in the energy sector is lacking, and the country's currency, while stable, is not yet internationalized enough to ensure easy convertibility. An important first step for Country A is to create - or enhance the execution capacity of - its energy sector planning authority. The authority will be able to assess the economic benefits of adding clean power to the grid, design suitable incentives and procurement mechanisms, and ensure that the country's energy strategy accounts for the importance of grid capacity and stability, and that project permitting procedures are fit for a surge in activity.

Due to Country A's relatively small experience with clean energy projects to date, the rules of participation and project specifications should ensure to maximize opportunities for international participation by limiting foreign ownership and content restrictions and using standardized contracts. The offtake will also typically need to be secured through a guarantee or other credit-enhancement measures, the level of which can be reviewed as the market matures and developers and investors become more comfortable.

Applying the framework

Country B

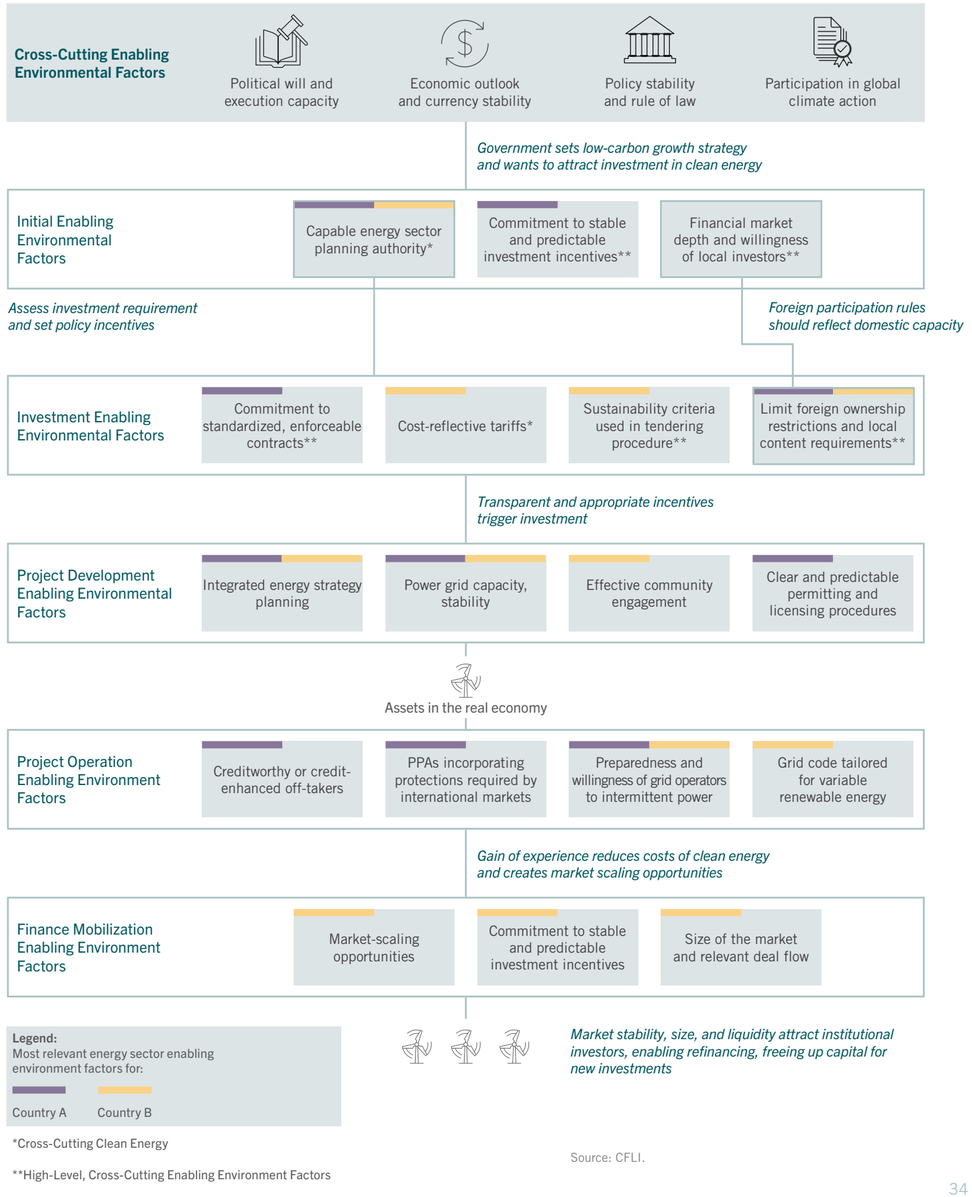
Context:
Country B is a medium-sized, lower-middle income country going through a phase of sustained economic and demographic growth. Energy demand has been growing rapidly across all sectors of the economy. This growth has encouraged authorities to embark on a large power generation fleet expansion program, which has enabled substantial investment in clean and fossil fuel power plants. As demand growth is levelling off, Country B is looking to raise its climate ambition and initiate a phase of decarbonization of the country's energy supply. The priorities of this next stage of the country energy sector plans are to improve distribution capacity, attract more international investors, and increase local value creation and retention.

Looking through the lens of the Policy Considerations:
The energy sector authority of Country B will need to expand its capabilities to plan for the integration of more renewables and the use of electricity in more sectors. The government's strategy to reduce energy sector emissions will benefit from cost-reflective tariffs, which require fossil fuel subsidies to be removed. The introduction of carbon pricing to give plant operators an incentive to shift to renewables can also be explored. Tendering procedures for new generation capacity can integrate increasingly stringent sustainability criteria that will ensure that the best projects are selected, and encourage international developers to introduce new, cleaner solutions to the market. The more rapid and larger scale of renewables deployment, combined with the closure of fossil fuel power plants, may also require more community engagement.

An important part of meeting the government's goal to attract more international investors will be to make sure that foreign ownership restrictions are minimized, and that the government's strategy provides clear evidence of future market-scaling opportunities. As auctions gain traction, and the pool of assets benefiting of stable investment incentives increased, activity on the secondary market will follow and allow developers and primary investors to free up some of their capital by selling assets.

FIGURE 42: Policy Considerations mapped for the clean energy sector

Enabling environmental factors for private climate finance in sustainable infrastructure
Focus on clean energy – selection of enabling environment factors for grid-connected clean energy



*Cross-Cutting Clean Energy

**High-Level, Cross-Cutting Enabling Environment Factors

Source: CFLI.

Primer: Sustainable urban transport

Falling battery costs will largely happen off the back of electrified transport's rapid growth and improvements in technology. BNEF expects EV battery demand to grow almost 14-fold to 1.7TWh by 2030, by which time EVs are forecast to hit 28% of global passenger vehicle sales.[38] Policies favoring EVs are common in much of the developed world, but are rarer in emerging markets, and lower spending power blunts the effect of upfront grant subsidies.

The electrification of two- and three-wheelers has the potential to change the face of urban transport in many emerging markets in the nearer term. Some 30% of global sales are already electric, with China accounting for the bulk of the global fleet (Figure 43 and Figure 44). Supportive policies, manufacturer interest, and improving economics will propel the segment to rapid growth. Already, several lower-income Asian markets have seen an uptick in sales.

Two- and three-wheelers

Two-wheeler ownership is the main source of oil demand in some Asian markets, which also have the fastest growth trajectories (Figure 45). That means that electrifying the segment could make a sizeable dent in local pollution levels. Also, many of the world's most polluted cities are on the list of the largest two-wheeler markets.

Policy has been the biggest driver of electric two- and three-wheeler adoption in large markets like China, India, and Taiwan. Here, national programs implement policies such as upfront subsidies, registration waivers, electric sales targets, or internal combustion engine (ICE) usage restrictions. Cities can also play a vital role. In China, the market first leapt in the late 1990s and early 2000s when cities like Shanghai adopted sales bans on ICE motorcycles. Also helping the change were exemptions from registration requirements, and

FIGURE 43:
Global two-wheeler sales

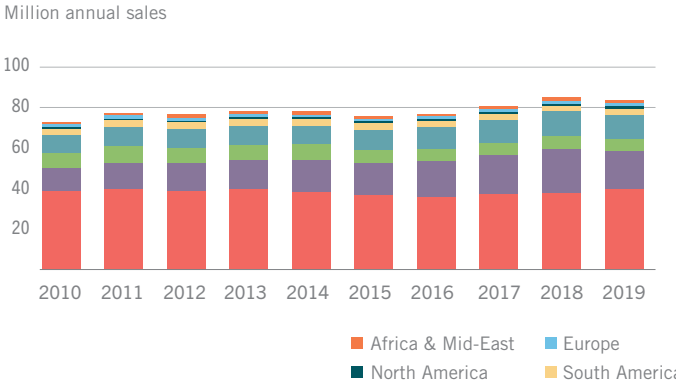
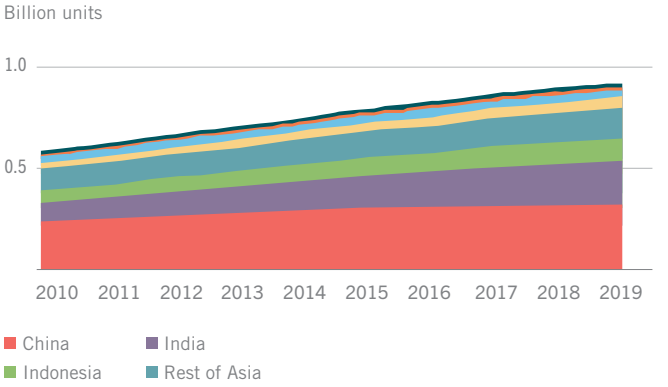


FIGURE 44:
Global two-wheeler fleet by market

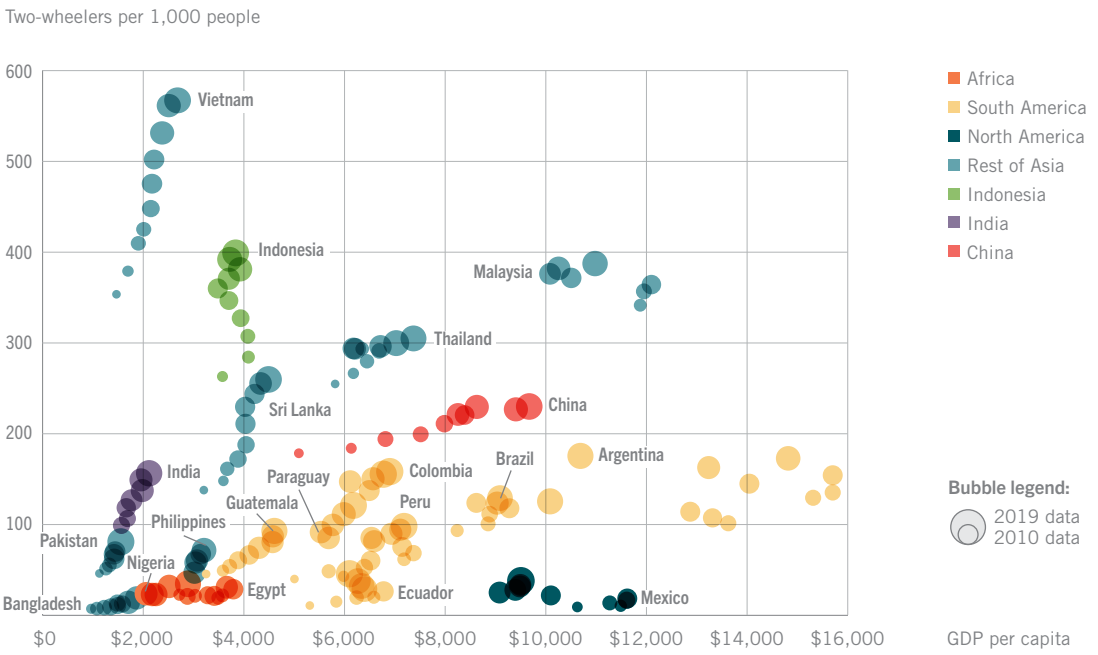


Source: BloombergNEF, China Association of Automobile Manufacturers, Society of Indian Automobile Manufacturers, Federation of Asian Motorcycle Industries, European Association of Motorcycle Manufacturers, Abraciclo, U.S. Motorcycle Industry Council, MotorCyclesData, International Road Federation, news reports.

[38] "Electric Vehicle Outlook 2020," BloombergNEF, May 19, 2020.

FIGURE 45:

Two-wheeler adoption in selected markets, 2010-2019



Source: BloombergNEF, United Nations, OECD, national governments, industry associations.

allowing electric motorcycles access to bicycle lanes. Lastly, China has a fuel consumption and vehicle emissions standard for two-wheelers.

India has focused its approach on financial incentives for electric two- and three-wheelers.[39] Two-wheelers are backed by India's $1.4 billion FAME 2 support program, which aims to subsidize over 1.6 million EVs by 2022, including two-wheelers and public transport. The program's first iteration supported lead-acid batteries, but FAME 2 only applies to units with lithium-ion batteries. The scheme's effectiveness, however, is hampered by low disbursal rates, which probably reflect the fact that many vehicle models are no longer eligible for subsidies under the scheme.

Several Indian states have adopted supportive policies at a regional level. For instance, Bihar wants to make all motor tricycles electric by 2022, and Telengana wants to support the retrofitting of non-electric rickshaws and two-wheelers. Delhi, Maharashtra, Kerala, and Uttarakhand have all passed their own targets and incentives. Meanwhile, India's government think tank was reportedly looking into requiring all 150cc-and-under two-wheelers to be electric from 2026 onward, affecting 90% of the market. However, the government appears to have shelved plans for legislation after pushback from major motorcycle manufacturers.

Still, electric three-wheelers are highly popular in India's densely populated cities. Some 630,000 were sold domestically in 2019. Market activity underscores the complementarity of public transport and EVs, which provide last-mile connectivity. Local rail operators are playing a leading role in facilitating the deployment of e-rickshaws, in particular. For instance, Delhi Metro Rail Corporation has plans to deploy over 250 EVs at its stations. Similar trends are visible in cities like Kochi and Hyderabad.

[39] "India Road Transport Electrification Outlook," BloombergNEF, August 7, 2020.

Passenger EVs

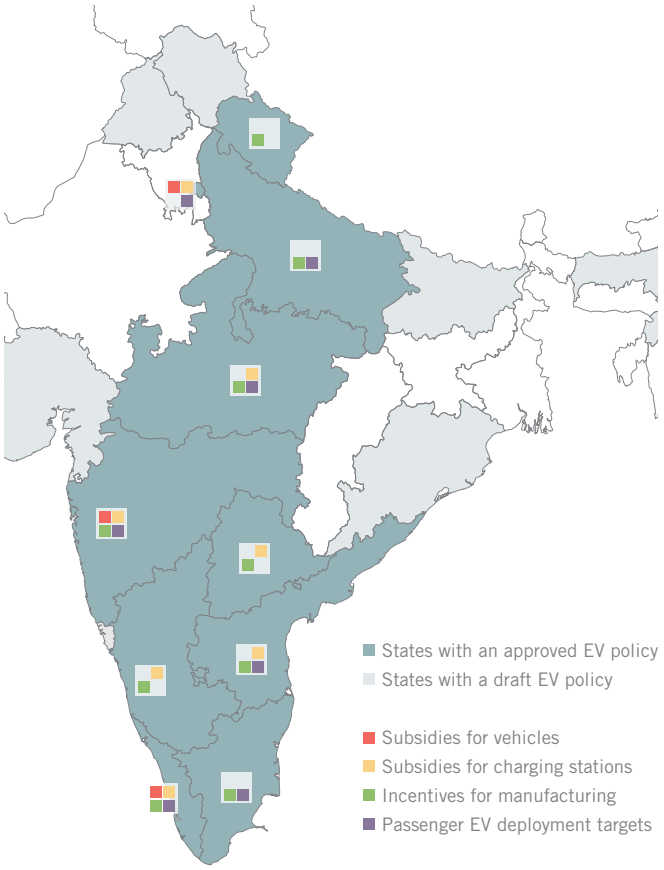
Regions and cities often step in to fill federal policy gaps. For instance, 10 Indian states have introduced broader EV policies, and seven others have released draft regulations (Figure 46). Most plans are prioritizing the electrification of commercial and public transport fleets. Four have offered purchase subsidies for EVs, and have proposed subsidy programs for the purchase of electric charging points. A number have also announced incentives to attract EV component manufacturers, offering reduced land costs, electricity tax waivers, and other fiscal exemptions.

Southeast Asian countries have also taken the lead on electric-friendly policymaking, and provided insights into its near-term limits when accelerating the deployment of passenger EVs in emerging economies. Indonesia, Malaysia, Singapore, and Thailand all have federal-level targets for EV deployment and charging infrastructure.[40] A dearth of affordable models has held back adoption in the past. However, passenger EV sales grew more than fivefold over 2015-2019, with 94% of those models sold in Thailand and Malaysia.

In Thailand, local market growth owes much to the fact that plug-in hybrid models are priced closer to comparable internal combustion-engine vehicles (Figure 47). Tax breaks and rebates favor EVs in several markets, but none of them in the region offer direct

FIGURE 46:

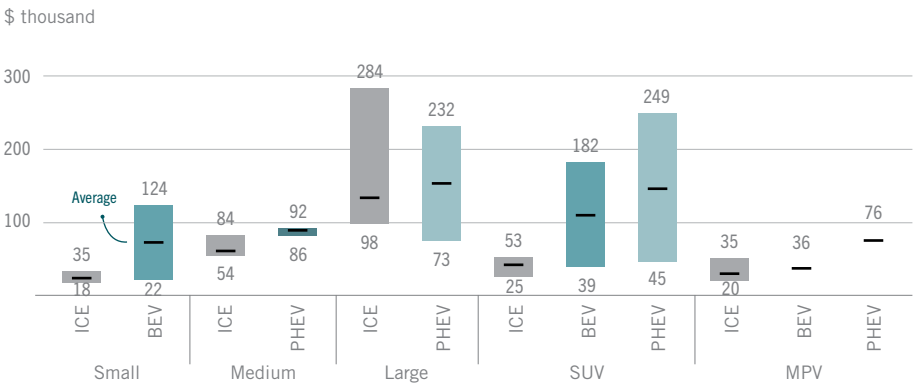
India's state-level policies for electric mobility



Source: BloombergNEF, state energy departments, news articles. Note: Map is an 'artistic vector rendering' by 24Point0, published with that firm's consent.

FIGURE 47:

Purchase price of electric and internal combustion passenger vehicles in Thailand



Source: BloombergNEF, Zigwheels. Note: Vehicle prices are the average suggested retail price in Bangkok in November 2020. The range for internal combustion engine vehicles shows the price for the best-selling models that made up 80% of sales in 2019. BEV = battery electric vehicle, ICE = internal combustion engine, PHEV = plug-in hybrid electric vehicle, SUV = sports utility vehicle, MPV = multi-purpose vehicle.

[40] "E-Vehicle Policy and Market Landscape in Southeast Asia," BloombergNEF, December 15, 2020.

subsidies for EV purchase. As a result, the high price of battery EVs will be a hurdle for further electrifying the passenger segment over the next five years. Governments are unlikely to be able to offer to close the price gap, but the rising demand for small battery-electric SUVs shows that other sectors have the potential for growth.

Bus fleets

China accounts for 99% of the global electric bus fleet, but sales growth in the country is slowing as big cities begin to complete their fleet changeovers.[41] The deployment of so-called e-buses is now increasing elsewhere, spurred on by improving economics and concerns about urban air pollution. Municipal buses are expected to electrify faster than any other segment of road transport, with e-buses making up over 67% of the global bus fleet in 2040 according to EVO 2020, BNEF's long-term outlook for the electrification of transport.

Non-electric buses will continue to play a role. Diesel and fuel-cell buses are expected to round out the rest of the 2040 fleet in areas where installing charging infrastructure is difficult, where temperatures are low, and near industrial clusters where hydrogen production is being produced. Local incumbents may also favor different technologies.

In India, the federal government has approved subsidies for 5,595 e-buses to be procured before March 2022.[42] The tendering process for their procurement is ongoing in several states (Table 2). State transport departments must procure buses under gross cost contracts whereby bus operators are paid per kilometer of use. This could help lighten the subsidy burden.

Some Indian states are going an extra mile. New bus purchases in Gujarat, for instance, are eligible for viability gap funding of 25 rupees ($0.34) per kilometer, and Maharashtra offers a subsidy of 10% on e-buses' base price. Such policies are starting to have an impact: the electric share of 2019 bus sales was only 4%, but it represents a nearly fivefold year-on-year increase.

TABLE 2:

State level e-bus targets and incentives

State	Electrification target	Incentives
Tamil Nadu	Replace 5% of ICE bus fleet with e-buses every year	Road tax and permit-fee exemption until 2022
Madhya Pradesh	By 2028, all public buses to be electric	Road tax and permit-fee exemption until 2023
Karnataka	1,000 e-buses on road by 2022	Road-tax exemption
Kerala	By 2025, all municipal buses to be electric	Road-tax exemption until 2022
Uttar Pradesh	1,000 e-buses on road by 2030	Road-tax exemption and 100% registration-fee exemption on private purchase
Andhra Pradesh	By 2029, all municipal buses to be electric	Road-tax and registration-fee exemption until 2024
Maharashtra	n/a	10% subsidy on the purchase price of first 1,000 buses
Delhi	50% of new bus purchases to be electric	Road-tax and registration-fee exemption until 2022

Source: BloombergNEF, state transport department websites, and news articles. Note: Extent of tax/registration fee exemption is state-specific. Only states with dedicated state-level EV policies have been included.

[41] "Electric Vehicle Outlook 2020," BloombergNEF, May 19, 2020.
[42] "India Road Transport Electrification Outlook," BloombergNEF, August 7, 2020.

Primer: Waste and the circular economy

The primary focus of the circular economy is to reduce waste and prevent materials at the end of their useful life from harming the environment (Figure 48). Governments are moving to implement circular economy policies to tackle plastic waste and make better use of resources. As a result, public investment in recycling, waste reduction, and sustainable packaging has accelerated markedly in recent years. Several important deals were signed in 2020, including a $300 million loan facility put in place by the Asian Development Bank targeting plastic recycling in Southeast Asia, and Circulate Capital's $19 million funding for Indian waste management companies.[43]

BNEF tracked circular economy policies in 26 markets that together account for 88% of world GDP. Typically, such policies cover landfilling, recycling, key materials including plastic bags, and extended producer responsibility schemes. Increasing globalization means that circular economy policies affect not only materials sustainability but also international trade flows.

In line with the waste hierarchy (Figure 49), countries that prioritize waste prevention, re-use, and recycling perform better than those that merely dictate rules around recovery and landfilling. Current circular economy legislation suffers from weak implementation measures, especially in emerging markets. Countries with enforceable policies such as taxes and content mandates tend to do better than those that only rely on "soft" targets where progress is slow.

Increasing the circularity of the global economy can play an important role in reducing carbon emissions, with materials responsible for roughly 20% of worldwide emissions. Reducing material demand by reusing as much as possible avoids material production emissions, and making recycled materials typically has a lower carbon footprint than new (virgin) equivalents. Recycled steel generates 84% less emissions than new steel, and recycling plastics typically saves 50-60% of greenhouse-gas output compared with virgin production.

FIGURE 48:
Elements of a circular economy

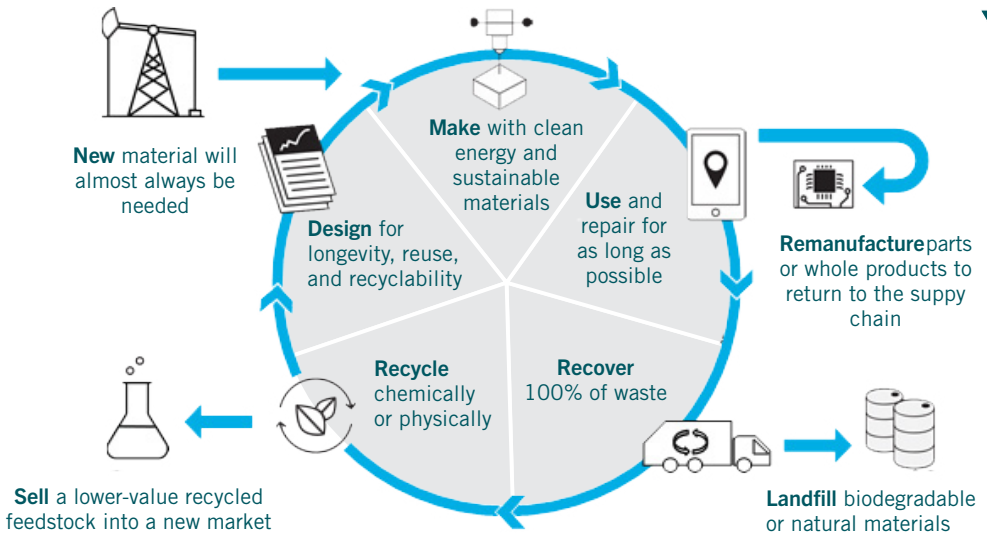
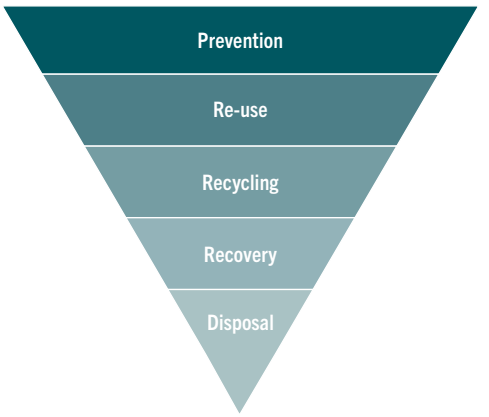


FIGURE 49:
Waste Hierarchy



Source: BloombergNEF.

[43] "4Q 2020 Advanced Materials Market Outlook," BloombergNEF, October 12, 2020.

Materials are one of the most difficult sectors to decarbonize, due to the requirements for high-temperature heat or petrochemical feedstocks in their production. Through the internationalization of supply chains, much of the new demand for raw materials is located in rapidly growing emerging markets.

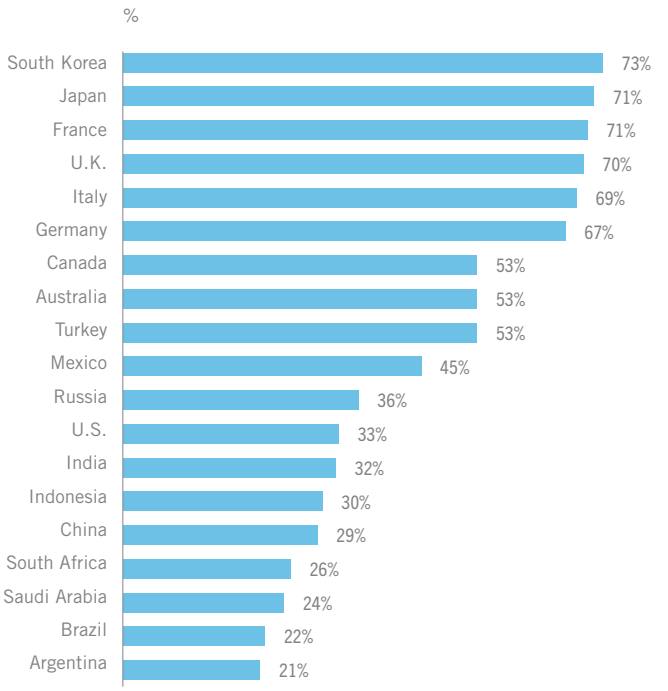
Most of the alternatives for primary production, such as hydrogen, bio-based feedstocks, and carbon capture and storage, are early-stage, costly, or both. The recycling industry is well-established for metals, plastics, glass, and paper, and can be the first step in driving down emissions from industrial energy use. However, the emission reductions from recycling are currently much smaller on an industry level than they are on a kilogram-for-kilogram basis. This is because of a lack of available scrap. The largest application for steel is construction, where material is locked away for decades.

In BNEF's assessment of G20 circular economy policies, countries fall into three groups (Figure 50): The top group comprises the first-movers – namely smaller countries with limited space for landfill. Japan, South Korea, and European nations were all early adopters of waste reduction policies such as high tipping fees and extended producer responsibility schemes. The EU, in particular, has already put legislation in place – to ban single-use plastics, to charge higher fees for packaging that is difficult to recycle, and to require a minimum recycled material content of 30% in plastic bottles by 2030. These countries have relatively high recycling rates, thanks to long-running programs of public education and widely available recycling infrastructure.

The middle group, including Canada, Australia, Mexico, and Turkey, has adopted some circular economy policies, such as recycling targets or bans on single-use plastics, but their policies are either not as comprehensive or not as stringent as those in the first-mover category. In some cases, implementation is weak or lagging.

FIGURE 50:

Country scores – circular economy



Source: BloombergNEF.

The countries with the lowest scores have only the most basic circular economy policies, as is the case in South Africa and Saudi Arabia. Alternatively, they may have ambitious plans, but have not yet passed the legislation to bring them into force, as in Indonesia, China, and Argentina. A common theme among countries with the lowest scores is the lack of policy and guidance at the national or federal level. Although waste policies are usually legislated locally, the absence of strong national legislation can result in sporadic and inconsistent circular economy policies. There are also economic concerns in emerging economies, where governments can be reluctant to put more stringent circular policies in place to avoid impacting the competitiveness of industry.

Primer: Green buildings

Energy demand from buildings is expected to continue growing rapidly across emerging economies in the coming decades, with markets outside of the U.S., Canada, and Europe representing 71% of global final energy demand from buildings by 2050 (Figure 51). This will be driven by growing populations, increasing the need for energy in cooking and water heating – as well as improved economic prosperity, which increases the use of electronic appliances and air conditioners. Unlocking investment in energy efficiency measures in buildings, as well as in the installation of efficient and low-carbon heating and cooling systems and appliances, is therefore an increasingly important component of the transition in emerging markets.

The scaling of investment in the "greening" of buildings in emerging markets must take into consideration various factors. For example, end-use applications for energy in buildings varies substantially between countries and climate; the need for space heating in mild- and warm-climate countries is relatively low compared with that in cold-climate countries (Figure 52).

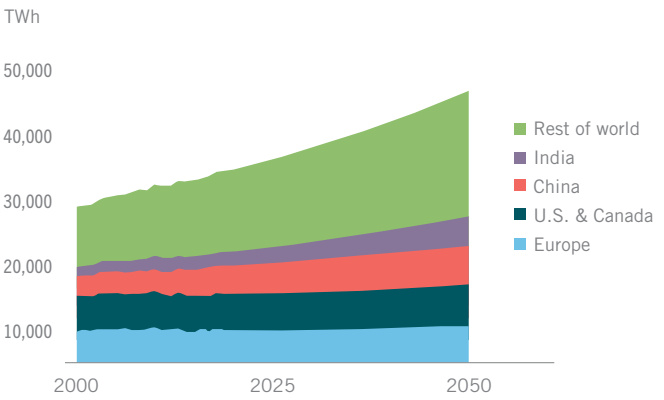
Compared to developed economies, the building stock in emerging markets is newer and continues to grow alongside the population and economy. India and China are due to see a massive growth in their building stock over the coming years, compared with a relatively flat outlook for Europe. This makes regulatory standards on new buildings in emerging markets a key driver of investments, particularly those related to the materials and construction of buildings and the carbon-intensity of energy supply.

Green heating and cooling

The fuel sources for space heating, hot water, and cooking vary across the globe, but coal, oil, and natural gas still provide the majority. Some emerging markets have particularly unique energy mixes for buildings, making for distinct challenges for enabling private investment to green heating supply. For example, district heating networks are common in Russia, China, and some parts of Europe (Figure 53). These are often highly regulated sectors that use large volumes of coal and gas, and have seen very limited progress in decarbonizing to date.

FIGURE 51:

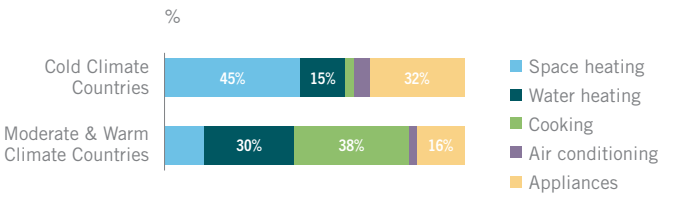
Global final energy demand from buildings by region, 2000-2050



Source: BloombergNEF New Energy Outlook 2020.

FIGURE 52:

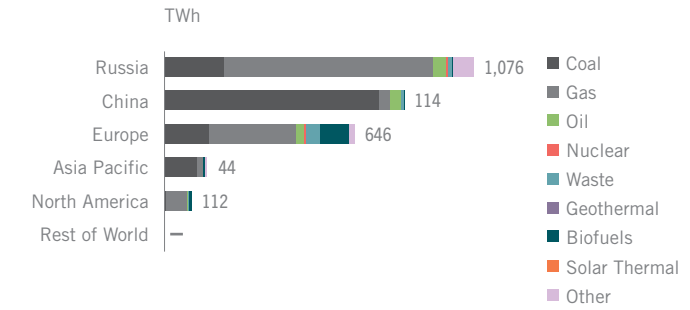
Final energy demand for buildings by end-use in 2050, and type of climate



Source: BloombergNEF New Energy Outlook 2020, WRI.

FIGURE 53:

Production of district heating in 2015 by fuel source, globally



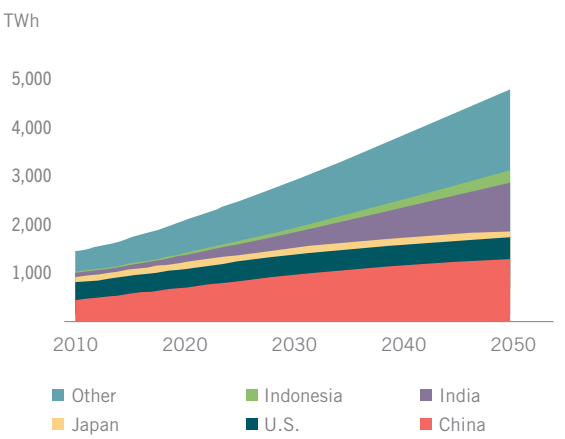
Source: IEA statistics: Electricity and Heat, BloombergNEF.

Nonetheless, some authorities in emerging markets are targeting buildings with individual heating and cooling systems, setting ambitious goals. The Clean Heating Plan in Northern China, for example, aims to remove all coal use from homes in 2021 to improve air quality.[44] This will be achieved through a combination of mandated connections to new gas networks and subsidies for households that wish to switch to cleaner heating units. Due to the often costly nature of low-carbon heating systems, these targets must be backed by meaningful enabling policy measures, including financial instruments and regulatory intervention, in order to be successful.

Cooling strategies can also help enable low-carbon and sustainable space cooling. Demand for cooling is expected to increase rapidly across emerging markets as these economies grow (Figure 54). India was the first country globally to introduce a national cooling action plan.[45] The plan aims for a 20-25% cut in overall cooling demand, as well as reducing cooling energy requirements by 25-40% and refrigerant demand by 25-30%, by 2037-38. China has since also adopted a cooling action plan, which includes a goal for a 30% increase in air-conditioning unit efficiency by 2022, and an overall improvement in cooling efficiency by 25% by 2030.[46] The plans of both China and India contain policy recommendations for research and development, passive cooling programs like cool roofs, and energy-efficiency labeling schemes. However, there are still gaps in the necessary incentives that will be available to deliver these goals.

FIGURE 54:

Total electricity consumption of air conditioners by country



Source: BloombergNEF.

Unlike heating, space cooling, lighting, and appliances are almost always supplied by electricity. As a result, their role in greening buildings is contingent on the decarbonization of the power system, and on energy efficiency. Efficiency policies can be designed to reduce total demand by improving the insulation levels of the buildings themselves or to improve the performance of installed appliances/technologies. As highlighted in the Policy Considerations, mandatory appliance and product standards, as well as ensuring the transparency of energy performance contracts, will be crucial for emerging markets to unlock private investment in energy efficiency.

Energy efficiency in new buildings

Many countries have set in place plans, targets, and incentives to promote cleaner and more energy-efficient buildings. BNEF tracked nine of the G20 countries (including Mexico and South Korea) with financial incentives already in place – like grants, loans, and tax credits – to encourage energy efficiency retrofits.[47] Mexico has a Green Mortgage program, which offers credit at affordable rates to support investment in efficient technologies, based on the premise that lower future utility bills put households in a better position to repay larger loan balances.[48] Such green mortgages are one tool that can help to unlock investment in energy efficiency measures for buildings, including as part of activities by energy service companies.

However, the majority of the building stock in emerging markets still lacks incentives for investment in energy efficiency. BNEF tracked limited activity in Russia, Saudi Arabia, Indonesia, and Argentina, for example. These countries have some efficiency standards, but they have implemented little by way of incentives. Despite this, some emerging markets are targeting new buildings with minimum energy performance standards and building codes. Mexico and India have both introduced energy efficiency measures based on their regional climates. Mexico introduced standards in 2011 to improve the performance of walls and roofs for new buildings. India implemented an energy conservation building code in 2019 for new residential buildings, focusing on the performance of the building exterior, and energy efficiency regulations for large new commercial buildings.

[44] "Clean Winter Heating Plan in Northern China," Government of China, 2017.
[45] "India Cooling Action Plan," Ministry of the Environment, Forest & Climate Change, March 2019.
[46] "Green and High-Efficiency Cooling Action Plan," Government of China, July 13, 2019.
[47] "G20 Countries' Climate Policies Fail to Make the Grade on Paris Promises," BloombergNEF, February 1, 2021.
[48] "Green Mortgage Program INFONAVIT - Mexico," INFONAVIT, undated.

Section 4. Call to Action

Trends in energy transition investment and sustainable finance and commitments to ambitious reductions in emissions across governments and the private sector, all highlight that there is an unprecedented momentum behind the transition to a low-carbon economy. A number of emerging markets are already seizing this opportunity, but the risks of seeing lower-income economies fall further behind are also increasing. Most emerging economies do not have the budgetary space to deploy the kind of economic stimulus that countries and regions like China, the U.S. and the EU launched in response to COVID-19. This unprecedented mobilization of public resources is set to benefit sustainable investments beyond the power sector, with clean transportation, heating, energy efficiency, and hydrogen, all key focuses of stimulus packages. These sectors do not yet benefit from the experience, scale, and cost declines needed to make them ubiquitous across the developing world.

Still, the examples highlighted in the previous section show that many emerging markets have been able to attract investors to sustainable infrastructure by introducing strong and innovative enabling policies. These often were the first of their kind, and were later adopted in other developed and developing economies. Importantly, governments have been able to design enabling policy packages that help leverage limited public resources to attract considerably larger volumes of private sector investment. In essence, these experiences add up to a constantly improving public-private partnership toolbox that can help governments around the world design their transition strategies, while taking into account the socioeconomic context in their country.

The "Private Sector Considerations for Policymakers" detailed in the next section reflect the experience of investors that have deployed billions in investment to sustainable infrastructure across developing countries. That experience shows that when climate leadership in emerging markets is combined with the right mix of policy enhancement and commitment by the private sector, a thriving market for clean technologies can emerge rapidly. Policymakers have an unprecedented opportunity to put in place the enabling environments that can deliver a rapid recovery, and more sustainable economic growth and contribute to meeting the goals set out in the Paris Agreement.

Section 5. Private Sector Considerations for Policymakers

The Climate Finance Leadership Initiative (CFLI)—in partnership with the Association of European Development Finance Institutions (EDFI), and the Global Infrastructure Facility (GIF)—have set out to raise the profile of enabling environment priorities and to gather industry perspectives on collective challenges. The resulting Private Sector Considerations for Policymakers (the "Policy Considerations") highlight broad, cross-cutting enabling environment factors, as well as sector-specific factors in clean energy systems, sustainable urban transport, climate-smart water and waste, green buildings and streetlighting, and sustainable land use. We hope that this will serve as a starting point for productive public-private dialogue on strengthening enabling environments for private climate finance.

Consideration 1: High-level, cross-cutting enabling environment factors

Creating investment-friendly business environments and strong pipelines of bankable sustainable infrastructure opportunities requires an approach tailored to each country and sector, as each market has its own diverse economic, legal, political, and financial circumstances.

There are, however, a set of enabling environment factors that cut across sectors and require whole-of-government and whole-of-industry efforts to address. Clear climate and sustainable infrastructure targets, backed by multi-level, integrated, systems planning across sectors provide investors with certainty and a clear roadmap when planning for a long-term commitment to a market. Well-developed local financial markets with experience in sustainable infrastructure can expedite investors looking to support local companies, projects, and developers. Transparent taxonomies and standardization of contracts in sustainable infrastructure sectors can help facilitate capital markets solutions.

These and other Policy Considerations presented below can be enormously challenging to address. Still, we present these factors here as they represent some of the most oft-cited considerations of investors looking to deploy capital in emerging markets. We also recognize that governments are fully aware of, and actively working to address, many of these high-level issues, such as stability among macroeconomics, currency, politics, and law.

These High-Level, Cross-Cutting Enabling Environment Factors Policy Considerations are by no means a prescriptive set of expected policy changes or mandatory investment criteria that must be implemented to attract private climate finance. They are presented only as a starting point for productive public-private dialogue on strengthening enabling environments with the goal of mobilizing private climate finance for low-carbon, climate-resilient development in emerging markets aligned with the Sustainable Development Goals (SDG) and the Paris Agreement.

Macroeconomic stability and economic growth prospects

Sound macroeconomic policies to drive broad-based growth and to manage inflation and interest rates provide investors with broad assurance of the financial sustainability of their investments. Strong government institutions, with a track record of good governance and the commitment and capacity to provide stable macroeconomic management, are also a major factor. As governments work to stimulate their economies in the wake of the COVID-19 pandemic, commitment to structural reforms can help bring investors on board with recovery plans. Investors also seek reliable data on the macroeconomic state of the economy (banking sector health, employment numbers, census data, etc.) to support their own reporting requirements.

Currency stability

Exchange rate risk is a key consideration for international investors. Investors will either look for a historically stable exchange rate, income indexation to a hard currency, or a market that enables affordable hedging of foreign exchange risk. Mismatches between the currency denomination of project costs, including financing, and the denomination of its revenue present extra risks to investors when neither local nor international markets provide instruments needed to hedge those risks in sufficient size and tenor, and at a reasonable cost. This is particularly problematic in countries where significant current account deficits leave those currencies vulnerable to devaluation. Therefore, the ability to denominate project revenues in a hard currency is an important advantage, though partial conversion structures and hedging instruments can also help to develop the market.

Policy stability and rule of law

Political risks, such as expropriation, sovereign breach of contract, and foreign exchange controls, are critical considerations for investors. In addition, the predictability, credibility, and reliability of rules and regulations, including investor and creditor protections, and the ability to repatriate capital, are crucial. The risk of policy delays, reversals, or renegotiations are among the biggest concerns for international investors in developing countries, particularly when such policies can be altered legally with ease or not enforced by government agencies or the judiciary. These risks can only be partially covered through international political risk insurance, which adds to transaction costs.

Multi-level, integrated, systems planning

Building a sustainable and resilient economy requires coordinated government planning across sectors, across the asset life cycle, and involving both local and national governments. Publicly available plans that are developed with private sector and civil society input can boost investor confidence in projects that align with priorities. Integrated and spatial systems planning that considers ecosystem services can protect and enhance the value of infrastructure investments, and help spur demand for more climate-friendly infrastructure. Governments send strong signals to the market about their long-term commitment to low-carbon, climate-resilient development by setting renewable energy and emission reduction targets, and implementing energy efficiency standards. This commitment is also conveyed when integrating climate adaptation into infrastructure planning by adopting international standards on climate-resilient infrastructure, including building codes, design standards, and disaster risk management guidelines. Furthermore, investors are keen to see governments increase the ambition of their Nationally Determined Contributions (NDCs) and demonstrate a path to achieving them by linking those NDCs to national development strategies and budget processes.

Government commitment to stable and predictable investment incentives

In addition to strong statements of government support for private investment in sustainable infrastructure, a variety of incentives may signal a favorable business environment for businesses, developers, and investors. These signals may include, among others, long-term favorable financing options, direct support for project development through grants, tax incentives, and preferential treatment on import duties for components of low-carbon systems.

Political will and execution capacity

Strong policy support along with clear rules and regulations are important, but equally important is the government's willingness, experience, and technical capacity to implement and enforce those policies. In addition, many developing countries have little experience engaging with cross-border investors or with negotiating and executing international commercial agreements. The ability of the government to create robust, bankable pipelines of low-carbon, climate-resilient investment opportunities that are attractive to private capital are key to encouraging investors to a country.

Procurement regimes to attract private investment

Across emerging markets, public-private partnerships (PPPs) can be a positive mechanism to attract private finance in many sectors. Strong PPP policy and regulatory frameworks coupled with effective institutional capacity for PPPs, including by well-organized roles and responsibilities among government ministries, are essential to attract private investment. E-procurement platforms show promise in terms of increasing transparency of procurement. Contract standardization and bundling of smaller projects into larger investment programs can also be more attractive to private finance. In addition to appropriate risk-sharing between government and the private sector, public obligations in PPPs, such as viability gap funding, project revenue support, or other support mechanisms, as well as termination payments, must be regarded as credible to garner private interest.

Financial market depth and willingness of local investors

The existence of local bank and capital markets that can provide financial services, such as currency and interest rate swaps, access to listed markets, and even support for a local green bond market and sustainable infrastructure debt funds, are valuable for international investors. The challenge of limited local debt and equity markets, such as the lack of long-term, fixed rate non-recourse debt, limits options for some international investors. The willingness and ability of local investors (pensions, sovereign wealth funds, national development banks, developers, financial institutions, etc.) to invest alongside international investors is important in garnering local support, execution capacity, and alignment of interests. National regulatory bodies may need to review financial sector and investment laws, including, but not limited to, local pension fund and insurance company investment guidelines, in order to allow these entities to invest in infrastructure debt and equity.

Fewer foreign ownership restrictions and local content requirements

In some jurisdictions, foreign investment is limited to minority stakes, whereas cross-border investors may seek ownership control. The limited availability of well-capitalized local partners with relevant experience can be a barrier to developing a successful project. Similarly, restrictive local content requirements, if they materially impinge on the quality or economics of the project, can stymie investment.

Clear and predictable licensing and permitting procedures

The assurance that necessary licenses and permits will be awarded based on fair, efficient, and predictable processes is crucial to project developers and investors. Establishing and digitizing land titles in markets where traditional land tenure is practiced is especially important and can often be very costly and time consuming, contributing to the uncertainty that is so problematic for investors. In some countries, governments seek to facilitate permitting processes through special units supported by technology. These practices provide positive signals to investors that such processes are streamlined.

Standardization and enforceability of contracts

For most transactions and, particularly for infrastructure projects, standardized contracts that reflect international common practice on key bankability dimensions can reduce transaction costs and shorten the timeline between award and commercial/financial close. Some standard contract features include change in law, force majeure, termination and associated payments, step-in rights, arbitration, and dispute resolution. Standardization also facilitates the development of bankable project pipelines. In more developed markets, standardized contracts can facilitate bundling and aggregation, which is especially critical for institutional investors that may not consider project-level investments or be able to carry out due diligence on bespoke financing structures. Enforceability of any contract in a timely manner in local courts is a fundamental consideration for investors.

Effective community engagement

Ensuring that local communities are consulted effectively and are engaged throughout the project life cycle is important to the success of a sustainable infrastructure project. While developers and lenders must conduct their own community engagement, governments can help by taking an active role in early infrastructure planning, prioritization, and preparation stages, as well as facilitating community engagement at the regional and local levels throughout the project's life cycle.

Strong anti-corruption and transparency measures

Corruption risks remain prevalent in many countries and sectors where private investment is most needed. Strong programs to prevent corruption and enable greater transparency and accountability help to ensure that public spending will not be abused in the form of policy capture, undue influence, creative accounting or reporting, and the mismanagement, embezzlement or misappropriation of public resources. Ensuring that projects are awarded in a transparent and a competitive way is also key to mitigating corruption risk. Investors are very sensitive to any corruption-related disputes that arise once a project's financing is in place, and clear mechanisms for fair and transparent dispute resolution are very important to them.

Government use of sustainability criteria to raise the bar in tendering and procurement

Given increasing recognition by investors that environmental, social, and governance (ESG) factors can carry significant risk to infrastructure assets and can impact financial returns, investors increasingly incorporate ESG criteria into investment decisions. In addition, institutional investors face increasing pressure from their respective regulators to incorporate sustainability factors into investment decisions. Therefore, governments that make concerted efforts to include ESG, including climate and other sustainability factors in national policies and sector development plans, upstream project preparation, and tendering and procurement for infrastructure, can send positive signals to attract greater levels of private investment.

Consideration 2: Clean energy systems

The Policy Considerations for investments in clean energy systems address, first, the enabling environment factors that affect the whole energy sector, and second, on factors specific to grid-connected renewable energy, distributed renewable energy, power grid infrastructure, and energy storage investments.

Conditions for private financing of clean energy systems are, in general, the most developed of all sustainable infrastructure sectors, although this mostly pertains to policies facilitating investment in grid-connected renewables. The toolbox of solutions that have helped to propel some emerging markets to the top ranks of global clean energy investment destinations includes the following: stable clean energy targets, auctions that award cost-covering tariffs, tax incentives, a power-generation sector open to private participation, and transparent and robust payment agreements that recognize local currency dynamics.

Following, we outline a set of related high-level and sub-sector-specific factors that investors often review in determining which clean energy markets, companies, and projects in which to invest. These factors reflect our experience as investors that have deployed billions in clean energy over the past decade. Our experience also shows that, when considering which policy tools to deploy, it is crucial to recognize that each country and sector will require a unique and evolving mix of enabling policies over time.

As such, the following Clean Energy Systems Policy Considerations are not meant to be prescriptive, but rather to catalyze the country- and sector-specific discussion, and debate, and to further action that is needed to strengthen enabling environments for private capital.

Cross-Cutting Clean Energy

Capable energy sector authority to advance an integrated energy sector strategy

A capable and empowered energy sector authority is key to setting, coordinating, and executing an integrated sector strategy. Strong master energy sector plans include supply and demand scenarios and planning assumptions, reflecting an integrated approach that includes grid-connected power and a range of distributed power sources. Such a plan helps to clarify investment needs and priorities across segments of the energy sector. Energy sector regulators that are independent and possess the technical capacity to set a regulatory framework will protect against curtailment and arbitrary government action. Regulators need the authority to negotiate, structure, implement, monitor, and enforce agreements, policies, and regulations in a consistent manner. This includes overseeing predictable, transparent, and regular auction processes for new projects, upholding fair dispatch systems that are based on actual marginal costs, and maintaining clear, stable, and efficient licensing and permitting processes.

Cost-reflective energy tariffs

Crucial to enabling private investment is ensuring that power generators can charge the necessary cost-reflective tariffs differentiated for grid-connected and various forms of distributed renewable energy. In many cases, this will require the removal of energy subsidies for the incumbent fossil fuel industry such that retail energy prices may rise to reflect their true costs. An open access framework to network infrastructure is also a critical element in creating a level playing field. An integrated clean energy system will likely require different tariffs and potentially different subsidies. In the case of mini-grids, it may mean granting local providers of electricity the autonomy to sell power at potentially higher rates than those offered by state-operated utilities.

Market-scaling opportunities

Governments can help scale market development and attract investment over time by supporting greater standardization of power purchase agreements (PPAs) and by helping to create opportunities to aggregate and pool smaller investments for investors within their countries. Looking internationally, national governments can enable cross-border energy trade by creating regional power pools that can help scale regional energy markets, attract capital, and augment supply and distribution of energy. In addition, government efforts to encourage digitalization and make data and power grid information more accessible and transparent can help accelerate the implementation of these Policy Considerations.

Grid-Connected Renewable Energy

Power purchase agreements incorporating protections required by international markets

Power purchase agreements (PPAs) must be of sufficient duration to match the tenor of financing required. International private sector lenders also often require that offtake payments are denominated in or indexed to dollars or euros, which can be challenging for offtakers whose income is in local currency. Additional elements typically required by private lenders include the following: agreement to settle any disputes in a neutral, offshore location; termination payments that cover outstanding debt, interest, and equity and that apply also in the event of a force majeure; step-in rights; and other standard protections for the developer and its lenders.

Creditworthy or credit-enhanced offtakers

In many countries, the offtaker is a government-owned utility that may require credit enhancement to support its payment obligations to the power producer. Support may come in different forms, including partial or full guarantees, liquidity facilities, and laws assuring funding for the electricity sector. The stronger the PPA, the more likely the investor and lender will accept something less than a full sovereign guarantee. Any sovereign support must be within debt capacity limits or will be discounted by investors. The level and scope of credit support needed is determined on a case-by-case basis depending on the creditworthiness of the offtaker, financial condition of the sector, affordability of service, track record, investor confidence in the country, and other terms and conditions of the PPA, such as termination price. A sovereign's track record in honoring its guarantees will, of course, be a consideration as well.

Power grid capacity, stability, and willingness of grid operators to handle intermittent power

In many countries, the national power grid has limited capacity to absorb new power and is not equipped to handle the intermittent power that is generated by most renewable energy sources. This can result in renewable energy plants being required to reduce their production, often without compensation for such curtailment. To facilitate power grid development, clear government planning is needed regarding necessary grid improvements, completion dates, and the relation between those grid improvements and proposed renewable energy projects. Safeguarding investors against the risk of the energy losses due to an inability to evacuate power produced is an important consideration.

Distributed Renewable Energy

Integration of off-grid energy solutions within national energy access strategies

In most countries without universal access to power, distributed renewable energy solutions – including dedicated commercial and industrial systems, solar home systems, and mini-grids – are highly beneficial and as integral to national energy plans. Governments can develop the market for full energy access across urban, peri-urban, and rural areas by developing tiered and integrated policies, regulations, and incentives based on different energy solutions, paving the way for attracting international investment. Effective plans often include an assessment of the areas that would be best served by distributed renewable solutions, both at the small-scale and large-scale industry levels, and at the household level. Establishing a rural electrification or dedicated agency to oversee the execution of the distributed renewable energy strategy can help to elevate these off-grid solutions and their incorporation in broader energy plans. Mini-grids can be made more scalable through standardization of contracts.

Support for expansion and integration of commercial & industrial power

Commercial & industrial (C&I) renewable energy projects are increasingly attractive to corporate consumers as they provide dedicated green power to meet corporate decarbonization objectives and can lead to reductions in operational costs. C&I energy providers may use the grid to supply their industrial consumers or may use direct, dedicated connections. In either case, by encouraging the expansion of this growing sector through supportive regulation, governments can accelerate national energy transition goals. In addition, governments can support wider energy access goals by exploring these and other new models to provide additional power and to support underserved areas.

Enabling mobile payment regulations

Mobile payment systems are a key building block for the development of pay-as-you-go solar energy and energy storage. The growth of this model can be attributed to the development of mobile money technology that allows households to make small, daily payments to repay loans taken to acquire their solar home systems. Governments that advance favorable policy frameworks for the development of mobile payment infrastructure will not only expand access to credit, savings, and other financial tools to their constituents, but also pave the way for cost-effective, rapid buildout of off-grid energy solutions.

Compensation plans for mini-grid operators upon the arrival of the main grid to a community

Compensation plans provide reassurances to mini-grid permit holders that their investment will be protected if and when the main energy grid is extended to a community. These plans can provide important reassurances to donors, concessional capital providers, and operators.

Financial and technical support for distributed renewable energy operators

Certain tax and duty exemptions, grants, guarantees, and low-interest loans can encourage distributed renewable energy development and enable commercial investors to see a path to financial self-sufficiency. Technical support in the form of quality assurance and certifications on all types of renewable energy products can help build the market and attract the highest quality companies and investors.

Power Grid Infrastructure for Renewable Energy

Grid code tailored for variable renewable energy

Grid codes, or technical connection standards subject to regular independent review and set by a technically competent but neutral entity, will help to prevent codes from being overly favorable toward incumbent power sources at the expense of variable renewable energy. Forward-looking grid code development with broad stakeholder participation can also minimize costs from grid codes compliance.

Strong consideration of sustainability criteria when planning grid expansion

Governments send positive signals to the market when integrating ESG standards into long-term grid expansion plans. This includes ensuring close consideration of impacts of new routes on nature and local communities, while addressing or even surpassing environmental and social protection standards when managing easement, rights of way, and resettlement issues. Policymakers that have constructive public engagement can improve public acceptance for grid development processes.

Integrated planning of power grids and variable renewable energy zoning

High-quality variable renewable energy resources may be located in areas that lack networks to integrate them. Identification of suitable areas for renewable energy deployment and their integration in transmission planning can have multiple advantages. Integrated planning may assist in identifying new lines to connect resource-rich areas to the neediest load centers, and in increasing developers' confidence that their assets will be put to full use.

Clear and consistent performance indicators for power transmission and distribution operators

Governments will need to determine the performance they want from independent power transmission companies and develop key performance indicators (KPIs) under the contract. Making line availability the dominant KPI as the basis for payment (as opposed to energy delivered or line use) provides both explicit performance expectations to the transmission company and reassurance to investors in renewables.

Energy Storage

Clear regulatory framework

Traditional regulatory frameworks can hinder storage development by unintentionally subjecting storage facilities to additional costs, since they can be treated as both consumers and generators of electricity. The unique characteristics of energy storage must be incorporated into regulatory frameworks so that storage facilities are not double charged for the import and export of electricity. Instead of being placed alongside existing generation or transmission regulatory frameworks, storage requires its own definitions and standards, as well as permitting and updating grid codes.

Robust mechanisms in storage offtake or lease agreements

To provide certainty to investors in storage facilities, it is helpful to address allocation of levies and charges in storage offtake and lease agreements, especially when regulatory frameworks do not address energy storage. This can include finding new ways to compensate storage facilities, such as paying them fixed fees simply for being available at hours of critical need.

Appropriate ownership, control, and revenue models

Ownership and revenue models for energy storage systems that reflect the role they play in helping renewable energy compete with conventional power sources may be worth considering. Clarity is needed on whether energy storage assets will be tendered on an independent power producer (IPP) basis or be directly procured and therefore form part of the country's transmission system. The ownership model will inform the kind of revenue model: whether the network operator has full control and supports the storage system through regulated revenues, or whether and how the scope of storage services needs to be defined under the IPP model.

Consideration 3: Sustainable urban transport

The Sustainable Urban Transport Policy Considerations are focused on attracting private sector capital to urban mass transit projects, including bus, light rail, and e-mobility infrastructure.

Global investment in sustainable transportation infrastructure has grown rapidly over the past decade as new technologies reach commercialization, and as countries begin to build back better. With the return of economic growth, demand for urban transport is expected to climb. While continued investment in sustainable transport R&D is important to advancing the sector's global prospects, clear, credible, and long-term plans for decarbonizing urban transport, integrated across levels of government, are vital for signaling opportunities to investors for private capital participation.

Below, we define a set of related high-level and sub-sector specific factors that investors often review before determining the sustainable urban transport markets, companies, and projects in which to invest. These factors reflect our experience as investors that have deployed billions in sustainable transport over the past decade. Our experience also shows that, when considering which policy tools to deploy, it is crucial to recognize that each country and sector will require a unique and evolving mix of enabling policies over time.

As such, the following Sustainable Urban Transport Policy Considerations are not meant to be prescriptive, but rather to catalyze the country- and sector-specific discussion, and debate, and to further action that is needed to strengthen enabling environments for private capital.

Capable transit authority

National and local governments can best support investors by providing and overseeing a well-funded, time-bound investment program that signals market opportunities for private sector participation. Clearly defined rules and regulations help to delineate responsibilities among the sector regulator, awarding authority, and contract supervisors. The removal of access barriers and support for healthy formal competition in the market also supports the sector's prospects. At the local level, these priorities can be implemented by an empowered transit authority that presides over an organized, formal sector structure, including: clear roles for ownership, operation, and maintenance; transparent operator permitting and licensing; route award processes; and a credible plan to manage informal competition from informal operators. Integration of urban transit planning with other transit (feeders and other modes) as well as coordination with land use plans are also important.

Public procurement programs that signal long-term sustainable transport intentions

Governments can spur interest and investments in fleet renewal and fleet electrification initiatives through a transparent, well-structured, and dedicated public procurement program in coordination with electric utilities and with local distribution companies for electric vehicle charging infrastructure. For buses and other urban mass transit, procurement programs can help to level the playing field for electric public transportation against conventional diesel buses with traditionally lower upfront costs by factoring in the total cost of ownership considerations.

Transparent fare-setting and protections against unanticipated revenue shortfalls

Implementation of time-bound, performance-based contracts with transparent remuneration schemes (typically based on commercial mileage, plus bonuses and penalties according to KPIs) is often regarded as an effective way to incentivize standards and levels of service in public transport provision. Viability gap funding, along with reliable re-setting mechanisms, can help to provide certainty and stability of cash flows and reduce risk for investors. At the local level, most cities in developing countries are not deemed creditworthy, so public transit subsidy/payment schemes may not be regarded as credible. In addition to measures to improve city creditworthiness, governments can also reduce risk for investors through the creation of centralized and ring-fenced revenue collection and financing mechanisms to cover revenue shortfalls from user fees.

Pricing mechanisms that account for the full costs of fossil fuel-based transport

In order to create a level playing field, pricing mechanisms that factor in externalities of fossil fuel-based transport are needed and could be implemented through carbon prices, fuel and vehicle taxes, congestion charges, fossil fuel subsidy reform, and/or parking levies.

Consideration 4: Climate-smart water and waste

The Climate-Smart Water and Waste Policy Considerations focus on water, wastewater, and waste sectors, which continue to lag in attracting private climate finance. Most needed investments in these sectors are still expected to come from the public sector, and more work needs to be done to show how private capital can finance what many consider to be public goods. For related reasons, there is a need for policies and government plans that ensure sufficient potential for cost recovery where private finance can play a role.

Following, we define a set of related high-level and sub-sector specific factors that investors often review before determining the climate-smart water and waste markets, companies, and projects in which to invest. These factors reflect our experience in the water and waste sectors over the past decade. Our experience also shows that when considering which policy tools to deploy, it is crucial to recognize that each country and sector will require a unique and evolving mix of enabling policies over time.

As such, the following Climate-Smart Water and Waste Policy Considerations are not meant to be prescriptive, but rather to catalyze the country- and sector-specific discussion, and debate, and to further action that is needed to strengthen enabling environments for private capital.

Water

Clear national plans for the water sector

Clear goals and targets for water and sanitation – including water conservation and development, access, network extension, cost recovery, and reliability of services – strengthen understanding and alignment across government and key stakeholders. Inter-government coordination and water-smart public awareness efforts also send important signals to investors on the long-term sustainability of a government's plans for the sector. To enable more institutional investors to invest in water-related infrastructure, larger project sizes or pooled financing approaches that achieve the necessary scale are key.

Meaningful economic regulation of water service

Given the monopolistic nature of most water services, it is vital that rules and institutions be in place to set, monitor, enforce, and regulate tariffs and service standards for water providers to ensure financial viability and cost efficiency. A robust water sector regulatory framework and strong government institutions can help provide greater certainty about sectoral approaches to cost recovery and the quality of service provision, including KPIs, for investors.

Ensure financial sustainability and cost recovery

Given the significant investment required for water and wastewater provision, putting adequate cost-recovery mechanisms in place to ensure financial sustainability is crucial. Cost-reflective pricing is critical to recover costs and stimulate private investment. Tariffs provide an effective way to recover capital, operational, and maintenance costs from users. Clear and reliable mechanisms for viability gap funding can also help private operators mitigate revenue risks. It is important that consumers be aware of the linkage between their increased costs and service improvements. In assessing plans to establish or expand water and wastewater provision, governments can consider a green infrastructure alternative along with conventional gray infrastructure approaches to evaluate the positive and negative externalities of both.

Climate resiliency plans to safeguard water resources

The impacts of climate change on water can be considered in an integrated manner. Above all, prioritizing solutions to water and energy losses from non-revenue water is essential. Government support for nature-based solutions through spatial land use planning can also reduce climate risk of water sector assets and improve the risk/return profile for investors.

Wastewater

Committed public investment in wastewater treatment

Though wastewater treatment delivers shared societal and ecosystem benefits, it is costly and the willingness to pay for these benefits is low, making the achievement of commercial viability difficult. Public-private partnerships can be successful in making wastewater treatment investments more attractive to the private sector by lowering investment risks.

Support for closed-loop wastewater technologies

New technologies have the potential to drive down wastewater treatment costs and to bring about a more efficient and sustainable water system through water recycling. Governments can incorporate water recycling systems into city planning and support the development of a robust market for recycled water. With government support for this market, investors can more easily identify and arrange for industrial buyers of recycled water.

Solid Waste

Presence of an integrated waste management approach

Municipalities can attract private capital by creating a holistic plan for solid waste management that incorporates goals and policies to support investment. Since transportation is the main cost driver of waste management, localized materials recovery stations can make a significant difference. A clear picture of the regulatory approach and timeline for waste infrastructure development can also provide reassurance to investors.

Capable waste authority

The empowerment of a capable authority can ensure the implementation, monitoring, and enforcement of favorable policies, regulations, and incentives, including reductions in waste generation, adequate pricing and tipping fees, reliable resetting, and credible sources for viability gap funding. This includes effectively managing the technicalities and standards for various waste streams to prevent environmental contamination.

Government programs to integrate informal sector workers and encourage recycling

In some countries, informal workers are the primary collectors, sorters, reclaimers, and recyclers of solid waste. Governments can integrate these workers into waste management systems through cooperatives, creating an aggregated and consistent approach to preserve economic livelihoods. Illegal dumping of waste can be detrimental to communities and to the environment, reinforcing the need for strong regulation and enforcement. In addition, national and/or municipal level recycling campaigns, buoyed by supportive regulation, can help to reduce landfills, improve circularity of certain waste with associated environmental benefits, and potentially provide additional revenue streams to investors.

Ability to achieve economies of scale by aggregating waste flows and integrating new technology

Local and national governments can help create economies of scale to attract investors by aggregating waste flows, including through the development of regional waste management approaches, adopting new waste-to-energy technology, and partnerships with neighboring cities and regional governments. The government can remove a major pain point for investors by instituting a transparent and uniform e-procurement system for bundling waste contracts.

Consideration 5: Green buildings and streetlighting

The Green Buildings and Streetlighting Policy Considerations focus on energy efficiency investment opportunities in commercial real estate, hospitality, and social infrastructure, as well as streetlighting.

Energy efficiency improvements across these sectors can provide significant carbon reductions for investor portfolios, countries, and local communities. To accelerate investment in greening buildings and improving streetlighting, policymakers must set clear standards and strengthen requirements for more sustainable practices in public procurement.

Below, we define a set of related high-level and sub-sector specific factors that investors often review before determining the green buildings and streetlighting markets, companies, and projects in which to invest.

Our experience shows that when considering which policy tools to deploy, it is crucial to recognize that each country and sector will require a unique and evolving mix of enabling policies over time.

As such, the following Green Buildings and Streetlighting Policy Considerations are not meant to be prescriptive, but rather to catalyze the country- and sector-specific discussion, and debate, and to further action that is needed to strengthen enabling environments for private capital.

National energy efficiency planning and incentives

The presence of national energy efficiency plans, dedicated entities to develop and implement the plans, along with specific targets, supporting laws, and financing incentives, are key to setting direction for all stakeholders when investing in energy efficiency. Incentives from cost-reflective electricity rate structures promote uptake of available energy efficiency, while removal of subsidies for fossil-based energy supply can make energy efficiency investments more economically viable.

Ambitious energy performance standards and building codes

Increasingly, greener building codes, minimum energy performance standards, and appliance standards all set minimum thresholds for energy performance of new and existing buildings. Alongside mandatory standards, energy efficiency labels are important complementary tools that ensure market players have appropriate information for decision-making. Renovations, retrofitting, and refurbishments can boost the value of existing buildings, reduce operational costs, and create jobs. Standards and labels tailored to local contexts, with local authorities responsible for adapting and implementing national plans, have proven essential in shifting producer and consumer activity, and in creating strong markets for energy efficiency.

Presence of energy services companies

Although energy efficiency measures typically result in overall savings, high upfront costs can discourage their adoption. Energy service companies (ESCOs) can help overcome this barrier by covering the upfront costs of efficiency investments, allowing consumers to pay back these costs over time through energy savings. In markets that lack ESCOs, government-supported "super-ESCOs" that aggregate rollout of energy efficient technologies for public sector buildings can also jump-start the private ESCO market with capacity building, project development, and facilitation. Incentives for local bank financing of energy efficiency can also be useful.

Standardization of energy performance contracts

In many developing countries, the complex contracting procedures related to energy efficiency projects can create mistrust among end users. Clear and transparent energy performance contracting frameworks, including standard definitions of how project energy savings are guaranteed, can foster trust among contracting parties and streamline negotiations on energy efficiency investments. Without standardized contracts, banks are unlikely to invest the time and resources in each transaction. Government support for contract standardization can help the sector grow more rapidly than would be the case with bespoke contracting between parties, thus providing clarity and opportunities for scaling to banks and investors.

Streetlighting retrofits

Standardization of project structuring and bidding documents can facilitate private participation in streetlighting projects. In addition to national policy frameworks and incentives, sound public-private partnership modalities can also be an effective model through which to share risks and to encourage private investment. Ensuring that KPIs are clear and measurable, such as linking energy savings with remuneration, can boost investor confidence.

Consideration 6: Sustainable land use

The Sustainable Land Use Policy Considerations focus on agriculture and forestry investments. Both have implications for carbon sequestration as well as biodiversity protection, water protection, and supply of timber and non-timber products for building, energy, and food. Recognition of these multiple benefits requires integration and coordination across government agencies and policies to prevent conflict and perverse incentives.

Scaling up such investments requires the development of a market, such as a carbon market, that accurately prices carbon, accounting for the ecosystem services and the potential for carbon sequestration provided by natural capital. Investments in sustainable forestry and agriculture can contribute to global adaptation and resilience goals, which in turn can help to insure against the physical risks of climate change.

As natural capital solutions are nascent relative to other climate mitigation investment opportunities, a succinct, uniform private sector perspective on key impediments to investment is still missing. Nonetheless, the listed considerations provide a very brief introduction to some existing challenges expressed by select private sector investors. Though, as with each Policy Consideration, this is a rapidly developing area, and agriculture and forestry are just two of the many options for policymakers considering sustainable land use.

Following, we define a set of related high-level and sub-sector factors that investors often review before determining the markets, companies, and projects in which to invest. Our experience shows that, when considering which policy tools to deploy, it is crucial to recognize that each country and sector will likely adopt a unique and evolving mix of enabling policies over time.

As such, the following Sustainable Land Use Policy Considerations are not meant to be prescriptive, but rather to catalyze the country- and sector-specific discussion, and debate, and to further action that is needed to strengthen enabling environments for private capital.

Cross-Cutting Sustainable Land Use

Existence and enforcement of land use regulations

In jurisdictions where claims to land ownership by multiple parties are commonplace, the risk of future land disputes, or delays in the acquisition rights of way, can dampen investor interest. The following are critical to addressing project interruptions prompted by land disagreements: an ability to secure land rights in a timely and transparent manner; strong enforcement of land tenure and usage regulations; and clear, streamlined permitting processes and regulations for land acquisition. In addition, it is crucial that community consultation procedures be formalized, that Indigenous Peoples' and local communities' claims to territories be respected, and that policies to prevent land grabbing are in place and enforced.

Data to identify critical natural habitats

Better data is needed to understand the benefits of biodiversity and the implications of land use on those natural ecosystems. Policymaking can use spatial analysis to assess ecosystem value in order to ensure land use investments, whether for production or conservation, to deliver positive land use outcomes whose value is recognized. Clear spatial delineation of important habitat—for biodiversity, water catchment, natural carbon sequestration, flood control, fire prevention, and coastal resilience—can help investors to be more informed of these risks in order to avoid and/or manage them. Objective, high-quality natural resource data can inform effective policymaking, forecasting, planning, measurement, reporting, and verification, as well as enhance the value of infrastructure investments.

Agro-climatic and resiliency data to inform investment decisions

Ensuring the integration and open availability of public and private agro-climatic information systems, as well as information related to climate resilience (e.g., ecosystems, geophysical), allows for more comprehensive financial risk analysis. Data from recent agricultural adaptation projects can also be leveraged. Making such data publicly available can reduce investor uncertainty by streamlining the due diligence process and reducing transaction costs.

Development of a carbon market

Forestry and agriculture are two of the largest opportunities for greenhouse gas emissions reductions globally. The development of a carbon market with carbon prices that encourage far greater investment in forestry projects is needed. A robust carbon market with participation from small landowners to large corporates is important to achieving a country's NDCs. Whether through domestic compliance schemes or nested jurisdictional REDD+* carbon accounting, carbon markets and the offsets they generate will help attract further investment in forestry and agriculture.

Community and environmental consultation

Given the potential externalities associated with forest harvesting and agriculture projects, the development of forests or other natural resources requires holistic consideration of many interconnected factors that are important for communities, and for the long-term health and integrity of forests and ecosystems. These factors include land tenure; traditional land uses, foodprovision by forests and other ecosystems, access, carbon stores, biodiversity, water provision, and others. Governments can play an important role in ensuring that investors are equipped to assess these impacts, that they comply with government policies and restrictions, and that there is free, prior, and informed consent from affected communities.

*REDD+ = Reducing emissions from deforestation and forest degradation.

Rule of law that supports sustainable land development

In the agriculture and forestry sectors, illegal imports that avoid tariffs and taxes can significantly undermine legally operating firms seeking to advance sustainable operations in the sectors. In the forestry sector, processed timber products, originating from illegal logging, pose a threat to the sustainable management of forest resources and create unfair competition for sustainable forestry firms. Government efforts to regulate illegal imports, and uphold and enforce the rule of law in these sectors are critical to scaling private investment.

Agriculture

Including climate-smart agriculture in national climate goals and sector development plans

Development of a strong agricultural sector is best accompanied by the concurrent development of supporting infrastructure and regulations, such as transportation and cold storage, that which allow for export of goods and incentivize private sector investment in climate-smart agriculture. Including "climate-smart" agriculture as a priority in a country's NDCs—in both its mitigation and its adaptation goals—signals a serious focus on the climate impact of agriculture. This is important, as agriculture has historically been sensitive due to its role in local economies.

Revision of polices that inadvertently support emissions-intensive practices

Agricultural input subsidies, price support, tariffs, and subsidies on agricultural products often undermine climate goals and indirectly incentivize the continuation of carbon-intensive practices. Government support for, and enforcement of, policies and regulations that avoid market distortions can encourage both private sector investment in the sector and investment in technological innovations that aim to increase agricultural efficiency.

Forestry

Stable and coherent forest policy

A national forest policy that supports economic activities with adequate financing is the foundation for attracting private investment to a sustainable forestry sector. Policymakers can help to level the playing field against other non-forestry land investments by addressing land use and tenure and by creating clear opportunities for investment in forest carbon offsets. This can be done through nested jurisdictional REDD+ programs or through domestic compliance markets that include Agriculture, Forestry, and Other Land Use (AFOLU) offsets. Sector policies are most successful when they address upstream activities, opportunities to build local timber processing capacity, and the removal of export barriers. Beyond the establishment of a forest policy, a capable government authority in a leading role can help with policy coordination and execution.

Responsibility for consequences of forest roads

Investments in new roads to develop forest resources can invite unplanned settlement and land tenure disputes, and can increase the risk of zoonotic pathogen spillover. A forestry project that opens up new access is best accompanied by a plan to restrict or manage additional human settlement and associated land degradation, such as the construction of additional access roads. Monitoring costs can be covered by a dedicated reserve account, funded by the forestry activity and managed by a third party.

Policy support for low-carbon innovations

Increasingly, forest products represent a substitute for high carbon intensity materials. Government design, implementation, and enforcement of forward-leaning regulations (e.g., building codes that permit mass timber) can spur private sector innovations in the materials sector, incentivizing sustainably harvested wood for downstream products that have low-carbon life cycles.

Timber and non-timber product processing

A successful forest product industry requires efficient processing and transportation. Policymakers can consider guidance and incentives to help locate these resources in places where they can serve the public interest, direct jobs where most needed, and minimize unwanted environmental impacts.

Appendix: Glossary

Bank A financial institution that uses money from depositors or investors to lend to individuals and companies. Investment banks oversee the issuance of bonds and shares, and act as trading houses.

Blended finance A form of financing that uses concessional capital from development finance institutions to de-risk investments in emerging markets and thereby mobilize private capital toward sustainable development. Most blended finance initiatives involve partnerships between DFIs and private financial institutions.

Carbon footprint A measure of the carbon dioxide or other greenhouse gas emissions associated with a particular activity or asset. In this report, carbon footprint is often applied to an investment, a portfolio, or an asset in the real economy.

Carbon-intensive Activities or assets associated with large amounts of greenhouse gas emissions that are thus misaligned with the low-carbon transition.

Clean energy/Renewable energy Zero-emissions energy technologies that convert renewable resources, such as sunlight, wind, and water flow, into usable forms of energy, such as heat and electricity.

Creditworthiness The reliability of a borrower. In the case of bank lending, it is usually assessed by a bank itself. For large, publicly listed corporations, it is usually assessed using standardized ratings from credit rating agencies.

Deregulated electricity markets Countries or regions in which multiple power producers sell electricity in competitive markets, or "wholesale markets." In these cases, the electric grid operator is independent and does not directly own generation assets. Electricity can also be sold to end-consumers through competitive processes (i.e., competitive "retail markets") where consumers can choose their suppliers.

Developed economies Countries that are characterized as high income according to the World Bank's country classification.

Development finance institution (DFI) Government development agencies or the private-sector arms of multilateral development banks that work to advance sustainable economic development in developing countries by providing equity, long-term finance, risk mitigation, and other tools that stimulate investment in development. DFIs operate as public-sector, mission-driven investment banks and are mandated to be financially self-sufficient.

Emerging economies Countries that are characterized as low-income, lower-middle income, and upper-middle income according to the World Bank's country classification.

Emissions trading system (ETS) A market-based policy mechanism that places a cap on total emissions in a specific country, region, or sector. Based on this cap, individual entities are allocated permits that allow them to produce a certain amount of emissions. These permits can be traded among emitters, allowing emitters that can reduce emissions at a lower cost to sell permits to emitters with higher costs. This market mechanism helps ensure cost-effective reduction of emissions.

Feed-in tariff A policy mechanism that provides a specified payment, or tariff, per unit of renewable electricity produced over a designated period of time. Unlike an auction, this price is set by a policymaker, rather than competitively in an auction process. A feed-in tariff can be fixed, as in an auction, or it can provide a premium over a wholesale electricity tariff.

Financial institution Any organization in the financial sector that offers or manages capital, including banks, insurers, asset managers, and asset owners.

Financial system The financial sector and the system around it, including financial regulation, central banks, and connections with the non-financial sector.

Greenhouse gas emissions (GHG emissions)/ emissions The release of gases that trap heat in the atmosphere and therefore contribute to climate change. GHGs include carbon dioxide, methane, nitrous oxide, and fluorinated gases.

High-income country Countries with a gross national income per capita of more than $12,376 in 2019, in line with the World Bank's country classification.

Institutional investor Any investing entity that is not an individual. Encompasses both asset managers and asset owners.

Investor Any entity that puts money into buying financial or physical assets with the expectation of achieving a profit.

Levelized cost of electricity (LCOE) The net present value of the cost of generating electricity, per unit of electricity generated, for the lifetime of an asset; used to compare the cost of energy from various sources.

Low-carbon In this report, economic activities or assets that result in lower GHGs, as compared with other activities and assets.

Low-carbon transition The process of moving to a trajectory that would limit average global temperature rise to well-below 2°C compared with preindustrial levels. The low-carbon transition can refer to transitions within individual entities, industries, economic sectors, countries, or the global economy.

Low-income country Countries with a gross national income per capita of less than $1,025 in 2019, in line with the World Bank's country classification.

Middle-income country Countries with a gross national income per capita between $1,026 and $12,376 in 2019, in line with the World Bank's country classification.

Power purchasing agreement (PPA) A contract between a producer of electricity and a buyer that stipulates the commercial terms of electricity sales between the two parties. In this report, PPAs are typically long-term contracts awarded to independent power producers that provide a fixed priced per unit of renewable energy generated over a specified time period.

Private sector The part of the economy not under direct government control. In this report, both financial and non-financial companies.

Public finance Sources of finance provided by public entities, including development finance institutions, sovereign wealth funds, and governments, usually derived from income raised through taxes. Public finance is usually meant to achieve social, political, or environmental goals rather than produce a profit, so it can finance loss-making propositions or help subsidize private finance.

Regulated electricity markets Countries or regions in which a single entity (e.g., an electric utility) owns and operates electricity generation, transmission, and distribution assets, and sells electricity directly to end consumers. In these markets, the utility, which is frequently a vertically integrated monopoly, is often under regulation that guides its operations, e.g., tariff setting. There are also various degrees of regulated electricity markets. For example, in some markets, additional power producers are allowed to generate and sell electricity directly to the vertically integrated utility.

Renewable energy auction A policy mechanism involving the competitive procurement of renewable energy generation. Bidders offer a price per unit of electricity and volume of renewable energy capacity. Successful bidders are offered a power purchasing agreement, which guarantees a fixed price per unit of electricity generated. This price is known as the "strike price," or the price at which the auction cleared.

Renewable portfolio standard (RPS) A policy that requires electricity providers to supply a certain portion of electricity from renewable energy sources.

Zero carbon Technologies or economic activities that do not emit any greenhouse gases. In the context of the power sector, this includes power-generation technologies such as wind, solar, nuclear, and hydropower.

About the Climate Finance Leadership Initiative

The Climate Finance Leadership Initiative (CFLI) convenes leading companies to mobilize and scale private capital for climate solutions. Michael R. Bloomberg formed the CFLI at the request of the United Nations Secretary-General António Guterres. In September 2019, the CFLI released Financing the Low-Carbon Future, a report that is aimed at mobilizing private climate finance at the scale and speed needed to support an orderly transition to a low-carbon economy. Also in September 2019, the CFLI established a partnership with the Association of European Development Financial Institutions (EDFI) to advance the public-private collaboration to address the climate finance gap in emerging markets. For more information, visit www.bloomberg.com/cfli.

About the Association of European Development Finance Institutions

The Association of European Development Finance Institutions (EDFI) promotes the work of 15 bilateral development finance institutions that invest in the private sector in emerging and frontier markets to create jobs, boost growth and fight poverty and climate change. Since EDFI was set up in 1992, its members have invested in approximately 15,000 projects, and they now manage a combined investment portfolio of US$50 billion across financial services, clean energy, industry and many other sectors in more than 100 countries. For more information, visit www.edfi.eu.

About the Global Infrastructure Facility

The Global Infrastructure Facility (GIF) is a G20 initiative with the goal of increasing private investment in sustainable infrastructure in emerging markets and developing economies. Coupling funding with hands-on technical expertise, the GIF supports end-to-end, comprehensive advisory services to client governments and multilateral development bank partners to build pipelines of bankable and sustainable infrastructure investments that are attractive to private capital. A suite of blended finance solutions to de-risk private investment is under design. As a global collaboration platform, the GIF enables collective action among a wide range of partners – including donors, development finance institutions, developing country governments, together with private sector investors and financiers – to leverage both resources and knowledge to find solutions to sustainable infrastructure financing challenges. The GIF is currently supported by Australia, Canada, China, Denmark, Germany, Japan, Singapore, and the World Bank. For more information, visit www.globalinfrafacility.org.

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