Why making infrastructure climate-adapted and resilient will help meet the SDGs

Integrating climate adaptation and resilience across all infrastructure is necessary to meet the SDGs. Clear definitions on climate adaptation and resilience and improved disclosure across green and other thematic bonds are catalysts to scale investment. This second instalment in CBI's briefing series explores the synergies between climate change, green bonds and the SDGs.

Climate action underpins the SDGs

Climate change action will be critical to meeting the full set of the UN Sustainable Development Goals (SDGs) in a long-lasting manner. The first instalment in this briefing series, "Green bonds as a bridge to the SDGs", sets out the basic link between climate action, the SDGs and the green bond market. This second briefing dives deeper into the linkages between adaptation and resilience and the SDGs.

Climate change presents the single biggest threat to development […] Urgent action to combat climate change and minimize its disruptions is integral to the successful implementation of the Sustainable Development Goals.

UN: Sustainable Development Goals

Climate action must include adaptation and resilience

The latest climate science makes it clear that climate action must include extensive adaptation and resilience as well as rapid mitigation: a significant level of global warming is already locked in by past emissions and emissions that will occur from assets that are already in place, like existing fossil fuel power plants. Impacts of climate change are already being experienced. One example is the mounting evidence that climate change is already increasing wildfires. Investing in adaptation and resilience must happen in parallel with rapid emission reductions.

Climate risks: Chronic stress and acute shocks

Adaptation and resilience measures need to respond to both chronic climate stress, like sea level rise, higher average temperatures and increased water stress, and acute climate risks, in the form of increased frequency and magnitude of extreme weather events, like droughts, floods, hurricanes and wildfires.

The SDGs target climate adaptation and resilience

The SDGs include targets for both climate adaptation and resilience, notably they are explicitly covered under the goals related to reduction of poverty (SDG1.5), food (SDG 2.4), water (SDG 6.6), infrastructure (SDG9.a), cities (SDG11.b, 11.c, 11.5) and climate action (SDG13.1).

The 17 SDGs are interdependent rather than an independent list. This means climate adaptation and resilience are also relevant for those SDGs that do not include specific adaptation or resilience targets.

For example, climate adaptation and resilience in water infrastructure can impact on gender equality. Women are most often tasked with collecting water in the absence of adequate infrastructure, and the time spent collecting water can have a negative impact on women's education (SDG4) and ability to undertake paid work (SDG8).

Integrating adaptation and resilience in infrastructure expansion

Adaptation and resilience to climate change requires a wide range of actions.

A first step is to ensure the infrastructure that is being built to meet the SDGs is addressing climate risks.

This means ensuring that hospitals (SDG3) and schools (SDG4), water and sanitation assets (SDG6), buildings and transport (SDG9) and all city infrastructure (SDG11) can continue to operate when faced with both chronic climate stress and increased frequency and magnitude of extreme weather events.

Infrastructure assets are in place for a long time and climate risks can impact their ability to continue operating as intended throughout their lifespan.

Proactive planning instead of reactive response

Embedding climate adaptation and resilience attributes and metrics into infrastructure expansion will be more cost-effective than adopting a strategy of reactive response in the future, and it can avoid detrimental social and economic impacts on the SDGs as a whole.

For example, new hospitals that can't operate if the electricity grid fails during more intense and frequent hurricanes will hamper efforts to meet the health goal of the SDGs in the long-term (SDG3). Looking at hospitals as an example also illustrates the interdependency of the SDGs. Hospitals (SDG3) are reliant on energy infrastructure (SDG7), but also water (SDG6) and transport infrastructure (SDG9). All the infrastructure that serves the hospital must be able to operate during and after extreme event to meet the SDGs.

Integrating climate adaptation and resilience measures in infrastructure investments to achieve the SDGs is the focus of the remainder of this briefing.

Future briefings will explore environmental, social and economic components of climate adaptation and resilience further and how they relate to the SDGs and the bond market.

US$280-500bn/year by 2050

The investment required for climate adaptation and resilience in developing countries alone is estimated to be US$140 billion to US$300 billion per year by 2030, escalating to US$280 billion to US$500 billion annually by 2050, according to the UN. Adaptation and resilience in developed countries adds to the total global investment estimates.

The investment needed for climate adaptation and resilience is dependent on the amount of climate mitigation that is achieved. Higher emissions trajectories mean the required adaptation and resilience investments will skyrocket.

Adaptation and resilience in the green bond market

The bond market is one avenue for mobilising capital at scale for climate adaptation and resilience. To date the green bond market has had climate change investments (SDG13) as its primary investment theme, with investments focused largely on mitigation:

Only 3-5% of green bond proceeds go to adaptation and resilience.

A key reason for the slant towards mitigation is a limited understanding of what qualifies as adaptation and resilience investments across sectors. The terms *adaptation* and *resilience* are mostly used interchangeably in the green bond market.

Green bonds that do allocate proceeds to adaptation and resilience most often include it as a minority theme alongside mitigation investments.

Clean water and sanitation (SDG6)

So far, the water sector accounts for the highest share of adaptation and resilience integration in the green bond market. Issuers include municipalities and municipality-linked entities such as utilities and municipal banks.

South Africa's Cape Town has issued green bonds to finance climate-adapted water infrastructure, while simultaneously aiming to reduce emissions. US municipalities are also significant issuers of bonds allocating proceeds to water adaptation. Recent examples include San Francisco Public Utilities Commission and New York State Environmental Facilities Corporation.

In the utility space, DC Water in the US and K-Water in Korea are two examples of green bond issuers that have financed climate-adapted water infrastructure.

Netherland's NWB Bank highlights how municipal banks can issue green bonds to provide loans to local water authorities to fund water projects that integrate adaptation components.

Clean energy (SDG7)

Clean energy (SDG7) remains the largest share of the green bond market (40%), but few bonds to date have been dedicated specifically to making energy infrastructure resilient. One example is Latvian power utility Latvenergo, which includes flood protection in their bonds issued for renewable energy and grid efficiency.

Integrating adaptation and resilience in energy is critical to guarantee stable and reliable access to energy. For instance, solar panels must be elevated above flood levels and hydropower plants must be resilient against variable water flows.

Sustainable industry, innovation and infrastructure (SDG9)

Low-carbon buildings are the second largest segment of the green bond market to date (24%), followed by low-carbon transport (15%). Both sectors contribute to sustainable industry, innovation and infrastructure (SDG9).

In the buildings space, the focus of most green bonds remains on energy efficiency improvements rather than adaptation and resilience. Sweden's Östersund municipality provides an example of including the adaptation of buildings in the green bond framework alongside emission reductions.

Similarly, adaptation and resilience is rarely integrated in the low-carbon transport segment of the green bond market. Transport company Hong Kong MTR included adaptation as an eligible category of projects in its green bond framework, but it is unclear whether the adaptation is specific to transport. Given the nature of its business it is likely, but the green bond framework also includes projects related to water infrastructure and buildings.

An example for future integration in the transport sector would be financing rail infrastructure that can operate despite sea level rise (chronic climate risk) and extremely hot weather and flood events (acute climate risks).

Sustainable cities and communities (SDG11)

Many of the assets financed by green bonds are located in cities, addressing the SDG of sustainable cities and communities (SDG11). Local governments and related entities, such as utilities and transport companies, are a significant issuer of green bonds and well placed to implement adaptation and resilience measures.

Most of the local governments and affiliated entities issuing green bonds for adaptation are located in the US. Examples include the New Jersey Environmental Infrastructure Trust, San Diego Unified School District, and State of Vermont. Proceeds primarily go to flood protection, improving drinking water supply, and ecosystem restoration. Many municipalities and local governments in Sweden have also issued green bonds that cover adaptation and resilience.

The green bonds from the utility DC Water that finance climate adaptation of water assets (SDG6) also contribute to the category of sustainable cities and communities (SDG11), offering another illustration of the interdependencies and overlaps between the various SDGs.

Life on land (SDG15)

A smaller share of green bonds (3%) finances sustainable forestry, agriculture and land-use, contributing to life on land (SDG15). This investment theme contributes to climate adaptation and resilience mainly through addressing environmental resilience.

The State of California, a leading US municipal green bond issuer, has issued bonds with proceeds going towards coastal protection and restoration of rivers and watersheds. Midpeninsula Regional Open Space District and Martha's Vineyard Land Bank are repeat green bond issuers targeting land conservation and the preservation of ecosystem services.

Another example is China's Chouzhou Commercial Bank, which issued a green bond where over 50% of proceeds would finance ecological protection and adaptation, including land rehabilitation.

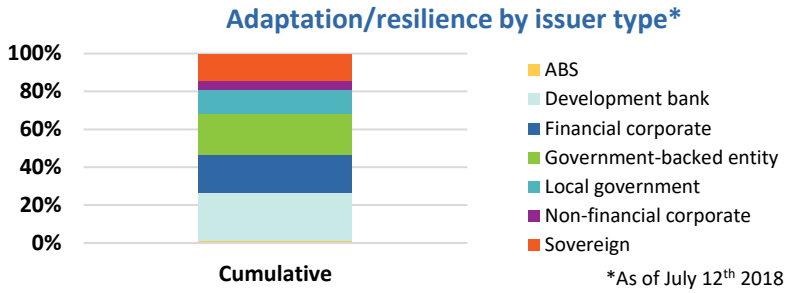
The next instalment in this briefing series will go into environmental resilience in more detail.

Adaptation and resilience for unspecified sectors

A significant share of green bond issuers does not specify which sector the climate adaptation investments will occur in. Disclosure often states proceeds will be allocated to "adaptation".

For multi-sector issuers with green bond frameworks that cover a wide range of sectors – like development banks, financial corporates, sovereigns and local governments – lumping adaptation investments together without specifying the sector makes it a challenge to get a fully comprehensive picture of how the green bond market is financing adaptation related to each of the SDGs.

Some multi-sector issuers do disclose an intended sector-breakdown of their adaptation investment in their green bond frameworks. The World Bank for example discloses that adaptation can be broken down into adaptation related to flooding (including reforestation and watershed management), food, agriculture and forestry. The sovereign green bonds that have allocated proceeds to adaptation also provide a certain level of specificity of what sectors this will focus on. Fiji focuses on agriculture and water; France on extreme weather research and monitoring systems.



Ensuring that multi-sector issuers provide sector-specific disclosure of adaptation is valuable given that they account for most adaptation and resilience issuance to date. Development banks and financial corporates account for the largest shares of green bonds proceeds allocated to adaptation and resilience, followed by government-backed entities. Non-financial corporates are underrepresented in allocating proceeds to adaptation and resilience: corporates account for only 5% of adaptation and resilience proceeds but 19% of overall green bond issuance.

Explaining the investment gap

There are several reasons for the relatively limited focus on adaptation and resilience in the green bond market, and other thematic bonds markets, to date.

Understanding and metrics are more developed for mitigation

The market has focused on understanding mitigation before tackling adaptation and resilience.

Climate mitigation investment is simpler to understand – the focus is clear: lowering greenhouse gas emissions, primarily CO_2. Mitigation impact is also easier to measure and quantify. Established metrics exist.

Climate adaptation and resilience on the other hand need to respond to several different chronic climate impacts and acute climate risks, and the systemic considerations make it more difficult to measure with a single or simple metric.

Intangible investments are small

Resilience requires non-tangible asset-management strategies to complement specific asset measures. For example, resilient agriculture involves a significant component of training and implementation of improved management practices alongside investments in sustainable agriculture assets.

The green bond market has tended to focus on financing tangible assets rather than intangible processes, with a few exceptions such as the French sovereign bond funding R&D. Asset management strategies for resilience will likely account for a small share of green bond issuance going forward as well, since both the direct financial return on investment and the climate impacts can be difficult to capture, as intangibles such as R&D and education require subsequent affirmative action to deliver the investment and the impact. This makes these investments less attractive for private investment and bond issuance.

However, local governments and sovereigns could and do issue green bonds, which allocate a share of proceeds to intangible resilience investments (e.g. R&D) alongside tangible asset-level resilience.

Investments without a green label

The green bond market and other thematic bond markets do not offer a full picture of the bond proceeds going to climate adapted and resilient assets. Climate adaptation and resilience measures can be incorporated in assets financed by unlabelled bonds, that do not disclose the nature of investments in sufficient detail or do not provide a breakdown of the use of proceeds.

Furthermore, climate adaptation and resilience might already be integrated to a certain extent in asset features through increasingly stringent building codes and engineering standards, particularly in developed countries.

Drivers for scaling investment

Evolving thematic bond markets

As the green bond market has evolved and market players have become comfortable with mitigation investments, conversations are expanding to include adaptation and resilience alongside mitigation.

Adaptation and resilience are also highly relevant for the growing segment of other thematic bonds – SDG-bonds, sustainability bonds, ESG-bonds and social bonds – discussed in the first briefing in this series, "Green bonds as a bridge to the SDGs".

Regulatory changes

Anticipated regulatory changes in the real economy (such as building codes) and the financial system (such as the Taskforce for Climate-related Financial Disclosure) are drivers for increased focus on climate risk, and therefore for climate adaptation and resilience financing in the bond market.

More evident physical risks

Physical climate risks are increasingly well understood in the financial sector. Attributing specific extreme weather events to climate change or natural variation is also an emerging field that may contribute to increased awareness and understanding of physical risks.

National Adaptation Plans

Countries are increasingly progressing on National Adaptation Plans. On the back of these, a pipeline of investable adaptation projects suitable for future bond issuances can be established. Sovereign green bonds can raise capital directly for the National Adaptation Plans, as Belgium did with its sovereign green bond issued in February 2018.

Definitions emerging

Clear definitions of what is defined as climate-adapted and resilient infrastructure in each of the sectors set out above – water (SDG6), energy (SDG7), buildings (SDG9), transport (SDG9), other city infrastructure (SDG11), land-use and agriculture (SDG15) - can help catalyse increased investments and bond issuance.

So far, criteria for what is considered climate-aligned is more advanced on the mitigation side. Definitions for adaptation and resilience are emerging.

A key development to highlight is the work of the EU Technical Expert Group, established in June 2018. The group is looking at climate adaptation alongside mitigation and broader environmental assets to develop a European Taxonomy for sustainable assets and projects.

The Climate Bonds Standard is also moving to integrate adaptation and resilience in its sector-specific criteria. An Advisory Committee for Adaptation and Resilience comprised of external experts is being established.

Integration of adaptation and resilience across thematic bonds to meet the SDGs

To close the climate adaptation and resilience gap in the bond markets, it's the assets that matter – the label is a communication tool to drive disclosure and connect with investors. That means climate adaptation and resilience measures should be integrated also in the assets financed by bonds carrying the ESG, SDG, sustainability or social label (or no label at all), and the level of adaptation integration should be clearly disclosed to investors.

The sustainability bond issued by the Massachusetts Bay Transport Authority provides an example of where more information could assist investors. A share of proceeds goes to climate resilient bus transport, but for other social assets financed by the bond, the disclosure at issuance did not offer details on the climate adaptation, resilience and mitigation benefits.

Investor awareness of linkages between climate and social

Disclosure of climate adaptation and resilience would enable investors to assess to what extent the financed assets can continue to operate over their whole life-span as the climate changes.

Disclosure of climate adaptation across thematic bonds is also valuable to educate investors and other market players about the interlinkages between social and green investment themes. Fostering an understanding amongst investors that social and green are not separate markets, and that climate adaptation and resilience are essential also for social projects and assets is crucial to achieving the SDGs.

Principles for adaptation and resilience definitions

1. Integration

A key principle going forward would be to integrate adaptation and resilience criteria with existing mitigation definitions. Adaptation and resilience at the asset level cannot be separated from low-carbon requirements. The same water infrastructure, buildings and transport networks, energy and land use systems need to be both low-carbon and climate-resilient to meet climate targets.

2. Science-based

Using the latest climate science on expected future physical climate impacts under different expected emission trajectories to form the basis for climate adaptation and resilience criteria will allow issuers to identify more robust assets and projects to finance.

Consequently, the asset financing will be more robust and less prone to climate related risks, which in turn would be favourable for investors.

3. Distinguishing between adaptation and resilience

While adaptation and resilience are used interchangeably in the green bond market and for other thematic bonds to date, there should be a distinction between the terms.

The Intergovernmental Panel on Climate Change (IPCC) defines adaptation as "adjustment in natural or human systems to a new or changing environment" while resilience covers the ability to anticipate, reduce, accommodate and bounce back from climate impacts.

A translation of what this distinction means for assets in different sectors is necessary.

Clear definitions for both adaptation and resilience will allow more granularity in disclosure. It will enable investors to see clearly if an issuer is integrating both adaptation and resilience components in the assets financed by a bond, maximising its ability to operate in a future climate.