



Climate Action Now

Summary for Policymakers 2015



United Nations
Climate Change Secretariat

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For further information contact
United Nations Climate Change Secretariat
Platz der Vereinten Nationen 1
53113 Bonn, Germany
Telephone +49 228 815 10 00
Telefax +49 228 815 19 99

For more information, please visit:
<climateaction2020.unfccc.int>

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FOREWORD



By Christiana Figueres
Executive Secretary
United Nations Framework Convention on Climate Change

Climate action now offers every nation on the planet a clear path towards the shared aim of a healthier, more prosperous and more secure future. Nations now increasingly understand that economic prosperity, sustainable development and environmental stewardship present an intertwined challenge that must be addressed with coordinated and consistent policies both in and across ministries and nations. Nations all also understand that climate change presents the single biggest threat to the hard won advances the world has made under the Millennium Development Goals and will be a defining factor in the success or failure of the 2015 Sustainable Development Goals, depending on whether or not we allow the global temperature rise this century to exceed 2 degrees Celsius.

Yet at the heart of this sobering dynamic lies its remarkable solution: the very policies that must deal with climate change also offer the most effective, readily achievable set of responses to reach a prosperous and stable environmentally healthy world for all. In the past two years, this fact has been recognized at every level of government, business and civil society. Under the UN Climate Change Convention governments have led a significant effort during their series of technical expert meetings to identify and scope out the type and form of policies that lead to effective climate action.

That is why I am delighted and honoured to present this Summary for Policymakers, representing as it does the distillation of these efforts and insights from across the globe. This summary, for example, shows how the strong deployment of policies within renewable energy, energy efficiency, transport, land use, carbon capture, use and storage and non-CO₂ gases dramatically reduces greenhouse gas emissions at the same time as advancing goals in no less than 15 other areas, including citizens' quality of life, health and work, lower government spending and higher tax revenues, better energy security and delivery and improved private sector profits. Moreover, these good practice policies, which relate specifically to sectors and areas with a high mitigation potential, can be replicated, tailored and scaled up based on countries' national circumstances.

This summary also identifies specific actions and avenues of cooperation that countries could pursue to increase their ambition to reduce greenhouse gases. Many of these also speak to the urgency of adaptation and building more resilient countries and communities. This comprehensive vision must also be realized through an unprecedented level of cooperation regionally and internationally and through full engagement with the already massive and ever increasing mobilization of non-state actors in support of and as a supplement to public climate policy. As a result, this summary serves as a straight forward, inspiring go-to-reference providing comprehensive information to assist ministers, advisors and policymakers pursuing climate actions now and into the future.

The world will emerge from Paris in 2015 with a new, universal climate change agreement which articulates a far reaching and long-term vision of a world free from of poverty through the social and economic opportunities created by the transition to a low-emission and climate resilient future. We are at a turning point which sends a loud, clear and serious signal from governments to citizens and the private sector that the transformation of the global economy is inevitable, beneficial and already underway.

Responding to climate change is a generational journey, an effort that must be sustained and increased over decades to come. But the sooner and faster the world acts the greater chance of arriving at the future we all need. This summary can help to elevate the global response now and into the future by setting out options for clear, well-designed and cooperative policies that have been tested and proven to work to the benefit of all people.

INTRODUCTION

Parties have been actively engaging a broad range of stakeholders to encourage climate action and enhance ambition in the pre-2020 period. A prominent forum under the United Nations Framework Convention on Climate Change (UNFCCC) to facilitate this engagement and participation is the in-session technical expert meetings organized under the technical examination process. These technical expert meetings, which began in 2014, provide a platform for Parties to engage international organizations, civil society, subnational authorities, academic institutions and the private sector on climate change; identify policy options, practices and technologies with high mitigation potential; and support the accelerated implementation of policy options by Parties.

To reflect on the information resulting from the in-session technical expert meetings, the SPM draws on the associated technical papers on the mitigation benefits of actions, submissions from Parties and observer organizations, initiatives and options to enhance mitigation ambition identified during discussions, and other relevant information on the implementation of policy options. The aim of this SPM is to transform this information into a comprehensive, high-level summary of concrete actions Parties can pursue, in accordance with their national circumstances, in the pre-2020 period to increase their ambition and strengthen broad-based international cooperation.

Specifically, the SPM:

- Highlights key messages for policymakers;
- Provides a brief overview of the current global state of play of climate change;
- Identifies good practice policies, initiatives and actions that could be scaled up and replicated by Parties to realize significant mitigation potential in the areas of renewable energy, energy efficiency, carbon capture, use and storage, transport, non-CO₂ greenhouse gases (GHGs) and land use. Related adaptation co-benefits are also highlighted;
- Identifies international organizations and cooperative initiatives¹ that can help to support and increase pre-2020 ambition by Parties, including the United Nations Framework Convention on Climate Change (UNFCCC) and its constituted bodies;
- Highlights the numerous commitments and actions being taken by non-State actors to address climate change, as well as their vital role in achieving future emission reductions; and
- Identifies overarching, concrete actions Parties can take now to increase their pre-2020 ambition and further engage non-State actors.

By utilizing the information contained in the SPM, Parties can increase their pre-2020 ambition, further reduce the emissions gap to limit global warming to 2°C, and lay the foundation for post-2020 action.

For the online version of the SPM, please visit:

climateaction2020.unfccc.int

KEY MESSAGES FOR POLICYMAKERS

1. Enhanced action is urgently needed as current pre-2020 pledges fall short

The pre-2020 emissions pledges made by more than 90 Parties through the Cancun Agreements under the UNFCCC are significant but do not go far enough to limit global warming to 2 °C, the upper limit Parties have agreed upon. The United Nations Environment Programme (UNEP) estimates that global emissions will continue to increase, reaching 53 gigatonnes of carbon dioxide equivalents (Gt CO₂ eq) (range 52-54 Gt CO₂ eq) in 2020 and 60 Gt CO₂ eq (range 58-62 Gt CO₂ eq) in 2030, taking into account the Cancun pledges and commitments under the Kyoto Protocol. This would result in global emissions remaining well above the 2 °C-compatible emissions pathways, resulting in a significant “emissions gap”.

2. Solutions exist to limit warming to 2 °C

Failure to close the gap between the current emissions pathways implied by the Parties' pledges and the 2 °C compatible emissions pathways will result in significantly greater climate risks, higher mitigation and adaptation costs and negative impacts on human health and sustainable development. To address the emissions gap, there is a range of policies, measures and actions that Parties could replicate and scale up now as part of their efforts to accelerate pre-2020 mitigation action. This could also lay the foundations for post-2020 action as identified in Parties' Intended Nationally Determined Contributions (INDCs) submitted in the context of the new agreement to be adopted in Paris in December 2015. Parties have identified, through the technical examination process under the UNFCCC, six thematic areas with high mitigation potential, opportunities for action and various co-benefits, namely renewable energy, energy efficiency, the urban environment (including transport), carbon capture, use and storage, methane and other non-CO₂ GHGs and land use.

3. Leadership and willingness to act are required to overcome barriers to mitigation action

Realizing this mitigation potential and harnessing the multiple co-benefits associated with climate action and sustainable development requires both sustained political will and concerted efforts to overcome a range of financial, technological and capacity-related barriers. Overcoming these barriers will require leadership at the national and international levels, and the cooperation of governments at all levels, working with civil society and private sector actors, with the support of multilateral organizations. Such leadership is also essential to communicate the linkages between climate change, economic growth and sustainable development to encourage immediate action of the necessary scale.

4. Financial support, technology transfer and capacity-building at scale are urgently needed

The provision of financial resources, technology transfer and capacity-building support to developing countries is central to achieving significant progress in developing and implementing mitigation actions in all thematic areas. Targeted support at the necessary scale would contribute to efforts by developing countries to implement climate policies, transition to low-carbon economies, build climate resilience and ensure future sustainable development.

5. Cooperative initiatives are essential to mobilize climate action across a range of stakeholders and need to be further promoted

Cooperative initiatives allow Parties and various non-State actors to actively engage one another in efforts to encourage more ambitious climate action at the subnational, national and international levels. In addition, cooperative initiatives help accelerate the development and implementation of low-emission solutions by coordinating efforts among Parties and non-State actors, such as cities, regional authorities and the private sector. To build on the recent mobilization of climate action, such as the UN Secretary-General's Climate Summit in September 2014 and the Lima-Paris Action Agenda, further promotion and scaling up of cooperative initiatives is essential.

6. The UNFCCC has the potential to play a catalytic role in helping countries overcome barriers and realize their mitigation potential

UNFCCC, through its Technology and Financial Mechanisms, which include the Clean Development Mechanism (CDM), the Climate Technology Centre and Network (CTCN), the Technology Executive Committee (TEC), the Green Climate Fund (GCF) and the Global Environment Facility (GEF), provides essential elements of the overall framework and tools that are urgently needed for delivering finance, technology development and transfer, and capacity-building to developing countries. In addition, the technical examination process has begun to inspire further ambition by providing a forum for Parties, international organizations, subnational authorities, civil society and the private sector to discuss actions and activities that are transformative, replicable and scalable.



“Human influence on the climate system is clear and growing, with impacts observed on all continents. However, many options are available to adapt to climate change and to reduce greenhouse gas emissions to ensure the risks from climate change remain manageable.”

Intergovernmental Panel on Climate Change (IPCC)

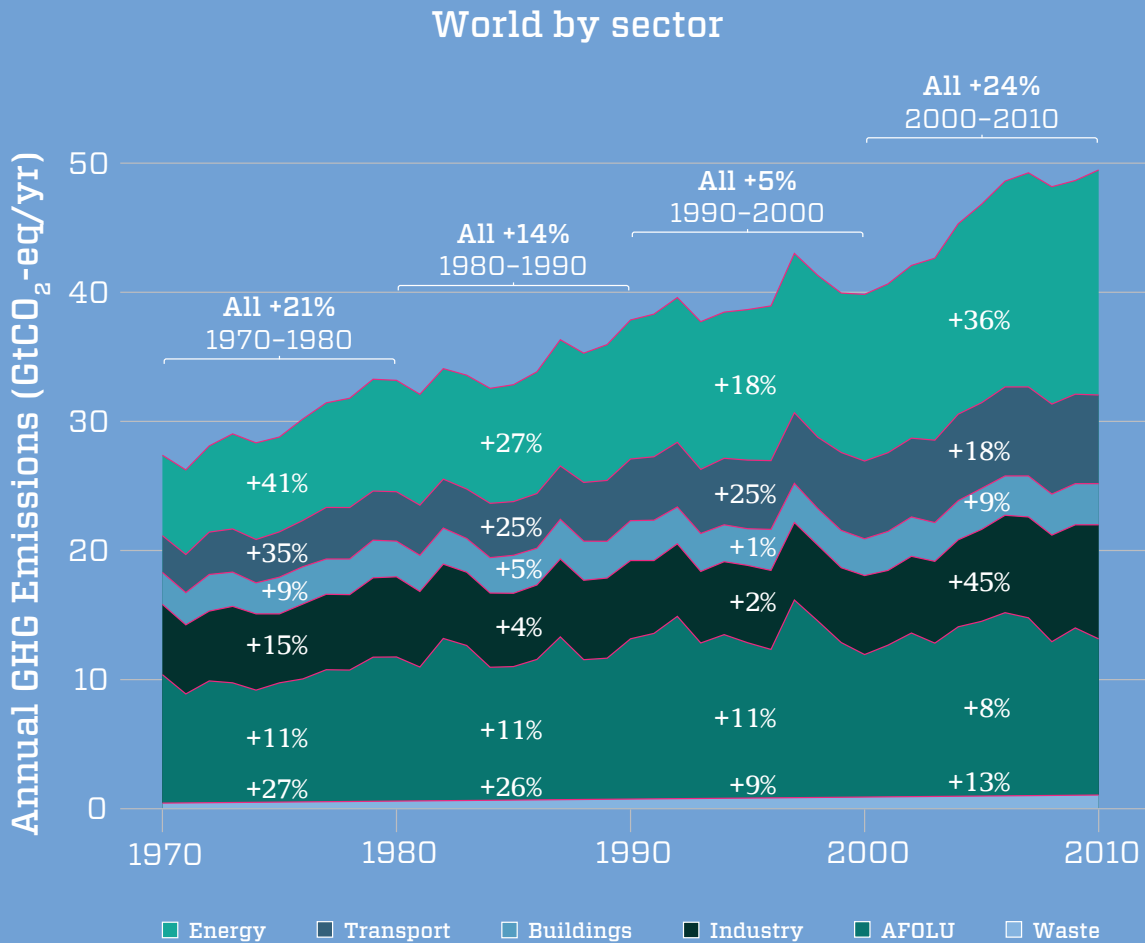
CHAPTER I

Scientific and policy context for climate action

The scientific case for urgent action

The scientific community has established that it is extremely likely that human influence has been the dominant cause of the global warming observed over the past 50 years. That warming has already led to observed changes in the global water cycle, reductions in snow and ice, global mean sea level rise and temperature extremes. The future climate change impacts could be unprecedented in scale, and limiting them will require “substantial and sustained reductions of GHG emissions”.²

This warning, from the Intergovernmental Panel on Climate Change (IPCC)’s Fifth Assessment Report (AR5) published in 2013, is the strongest yet from the global scientific community. Moreover, the IPCC report is only one of numerous warnings over recent decades from scientists regarding the effects of humankind’s increasing GHG emissions on communities, ecosystems and economies around the world. As GHG emissions have continued to rise, these warnings have become more urgent and dire.

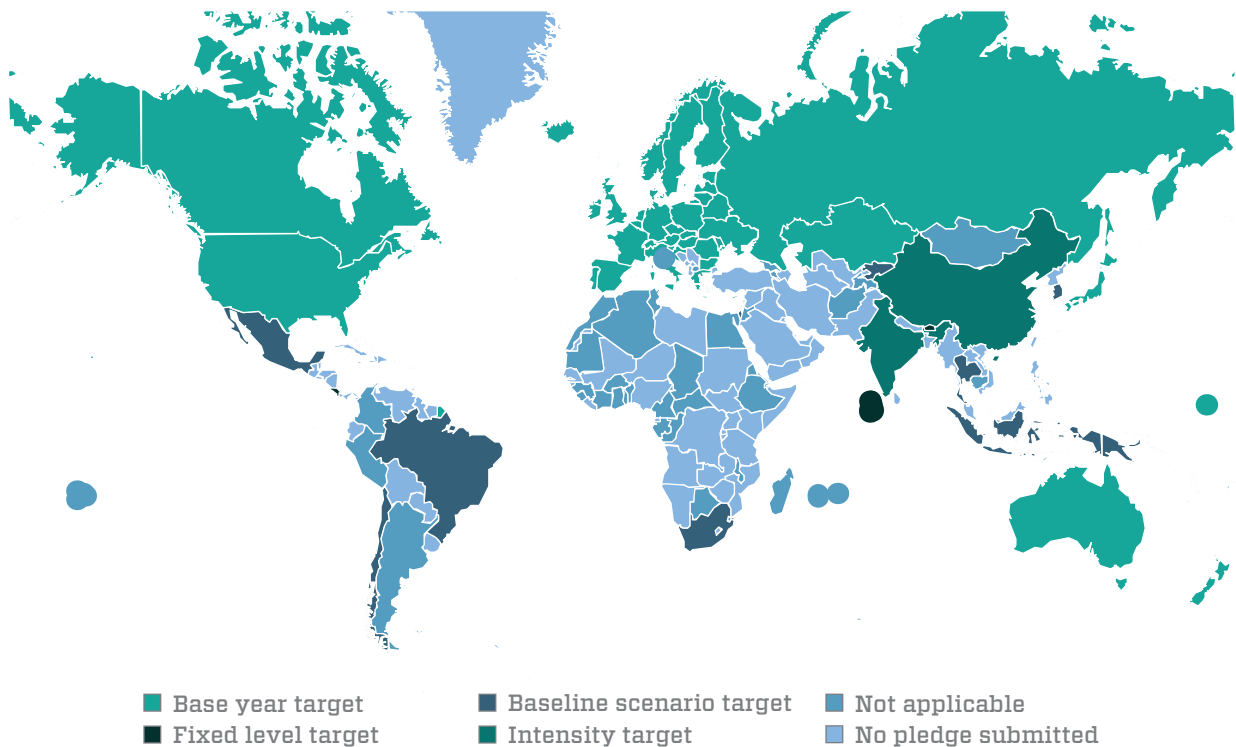


Source: IPCC Climate Change 2014 Synthesis Report - Summary for Policymakers

At the 2009 United Nations Climate Change Conference in Copenhagen, the world's leaders pledged at the highest political level to limit the increase in global average temperatures to below 2 °C, or potentially

1.5 °C. That goal was reaffirmed in the following year's Cancun Agreements, under which more than 90 countries, accounting for 80 per cent of total global GHG emissions, pledged to reduce their emissions by 2020.³

Greenhouse Gas Emissions Target Type of Pre-2020 Pledges



Source: World Resources Institute, Available at <<http://www.wri.org/blog/2015/03/tracking-2020-climate-action-pledges-road-paris>>

However, a gulf exists between the scientific assessment of the scale of the problem and the ambition of Parties' existing pledges. There is a significant gap between the expected collective GHG emission reduction effort by 2020 and beyond, and emission pathways consistent with a high probability of preventing warming above 2 °C later this century.⁴

UNEP previously estimated that global emissions would rise from 54 Gt CO₂ eq in 2012 to 59 Gt CO₂ eq in 2020 under a business-as-usual scenario. When taking into account the current pre-2020 pledges, UNEP estimated that global emissions would reach 52–54 Gt CO₂ eq in 2020, which is 8–10 Gt CO₂ eq above levels consistent with a likely chance of holding global warming to below 2 °C.⁵ The most

recent emissions projections by UNEP estimate global emissions levels of 53 Gt CO₂ eq (range 52–54 Gt CO₂ eq) in 2020 and 60 Gt CO₂ eq (range 58–62 Gt CO₂ eq) in 2030, which remain well above the 2 °C-compatible emissions pathways.⁶

If emissions continue to rise unabated, the impacts could be profound. Therefore, taking immediate action to bring emissions in 2020 as close as possible to the 2 °C-compatible emissions pathway is vital to avoid costly mitigation and adaptation actions in the future. Such action will also help to reduce the risk of locking in carbon and energy intensive infrastructure and the need for negative emissions in the second half of the century to limit the increase in global average temperatures to below 2 °C.

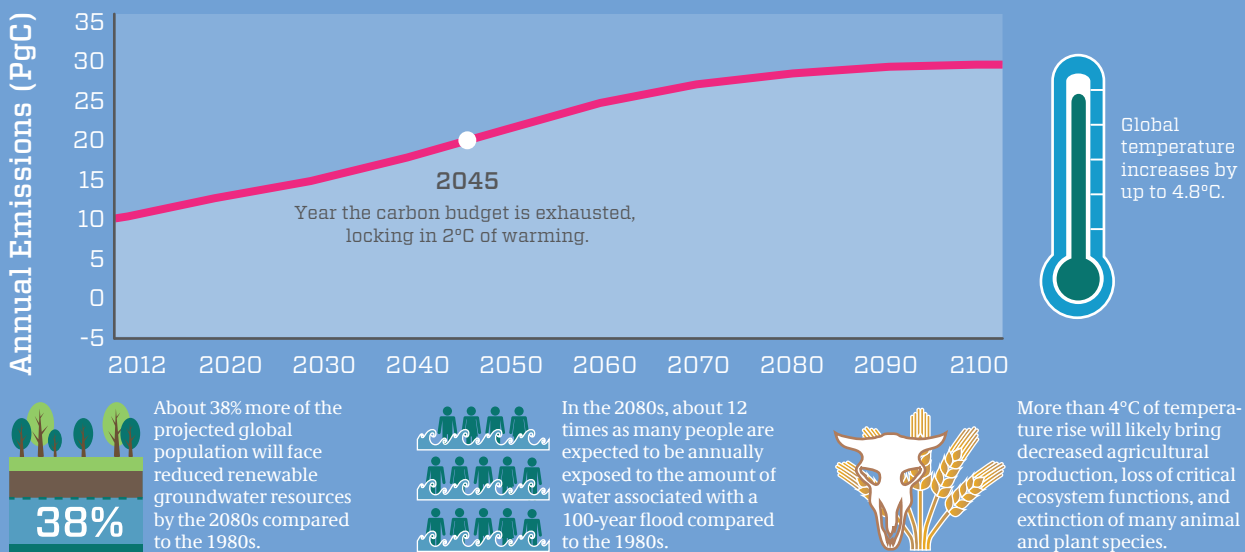
The effects of inaction

The global community has deemed that limiting the temperature rise to below 2 °C would offer a reasonable chance of avoiding the worst impacts of climate change.

However, in the absence of efforts beyond those already in place, global mean surface temperatures will increase by 3.7-4.8 °C above pre-industrial levels this century (with a full range of 2.5-7.8 °C when uncertainty is taken into account).⁷ Such a temperature rise would have profound effects on the global environment and human society – and there is no certainty that adaptation measures in the face of a 4 °C global average temperature rise would be successful.⁸

Highest Emissions Scenario

Annual carbon dioxide emissions continue to rise through 2100, rising 108 percent above 2010 levels by 2050.



But even delaying the actions needed to meet the 2 °C objective raises the risks humankind faces from climate change. The longer emission reductions are postponed, the more difficult and expensive it becomes to stay below the 2 °C target and ensure future sustainable development. For example, if emissions continue unabated and reach 55 Gt CO₂ eq by 2030, global emissions will need to be reduced by an unprecedented 6 per cent annually between 2030 and 2050 to limit warming to 2 °C. This would increase mitigation costs by 44 per cent.⁹

Source: World Resources Institute. Available at <<http://www.wri.org/ipcc-infographics>>

Based on information contained in the IPCC AR5 and the Representative Concentration Pathway Database.

The good news is that there are cost-effective mitigation actions with economic, social and environmental co-benefits that can close the estimated emissions gap. These types of co-benefits can influence policy choices and assist Parties in achieving their economic priorities and the sustainable development goals adopted by the United Nations General Assembly in September 2015. Mitigation

co-benefits include cost savings, poverty reduction, food security, job creation, energy security, improved public health, reductions of pollutants and associated health risks, reduction in adaptation needs and biodiversity improvements. The figure below provides an overview of mitigation co-benefits, with more specific information on co-benefits for each thematic area provided in chapter II.



Barriers to action

While numerous potential mitigation actions have been identified, obstacles to scaling up and deepening climate action remain for many countries, including economic, institutional, informational and capacity barriers. Specifically, four barriers recur across many or all sectors: a lack of institutional, regulatory and legal frameworks; a lack of carbon

pricing; the existence of inefficient subsidies; and inadequate financial support for developing countries. Overcoming some of these barriers will require international cooperation, but many can be tackled by national, subnational or regional governmental bodies acting in concert or alone, as highlighted in the figure below.

A lack of institutional, regulatory and legal frameworks

To facilitate effective climate action, governments must develop the appropriate strategies, institutions, regulations and laws with the engagement of civil society and private sector actors. Without such instruments, facilitating effective climate action will be difficult, if not impossible. The institutions charged with implementing or overseeing climate actions need to be equipped with appropriate resources and mandates.

The existence of inefficient subsidies

Many activities that cause climate change benefit from government subsidies. For example, USD 548 billion was paid in 2013 in direct fossil fuel subsidies globally, which encourages continued fossil fuel consumption in lieu of transitioning to other, low-carbon fuel sources.¹² The Group of Twenty (G20), which consists of the world's 20 largest economies, have pledged to phase out inefficient fossil fuel subsidies, as have the members of the Asia-Pacific Economic Cooperation forum.¹³ In addition, a number of developing economies, such as Angola, Egypt, Ethiopia, Indonesia, Iran and Morocco, are taking advantage of low oil prices to cut fossil fuel subsidies.¹⁴

A lack of carbon pricing

The absence of a price on carbon emissions means that emitters do not bear the full environmental and social costs of climate change. Putting an adequate price on carbon, whether through carbon taxes or cap-and-trade programmes, will encourage changes such as investment in and use of low-carbon technologies and fuels. Around 40 national and more than 20 subnational jurisdictions responsible for almost a quarter of global emissions have already introduced, or have plans to introduce, a price on carbon.¹⁰ While this is triple the coverage of a decade ago, it is still far short of what is likely to be necessary to help to limit warming to 2 °C.¹¹

Inadequate finance, technology and capacity-building support

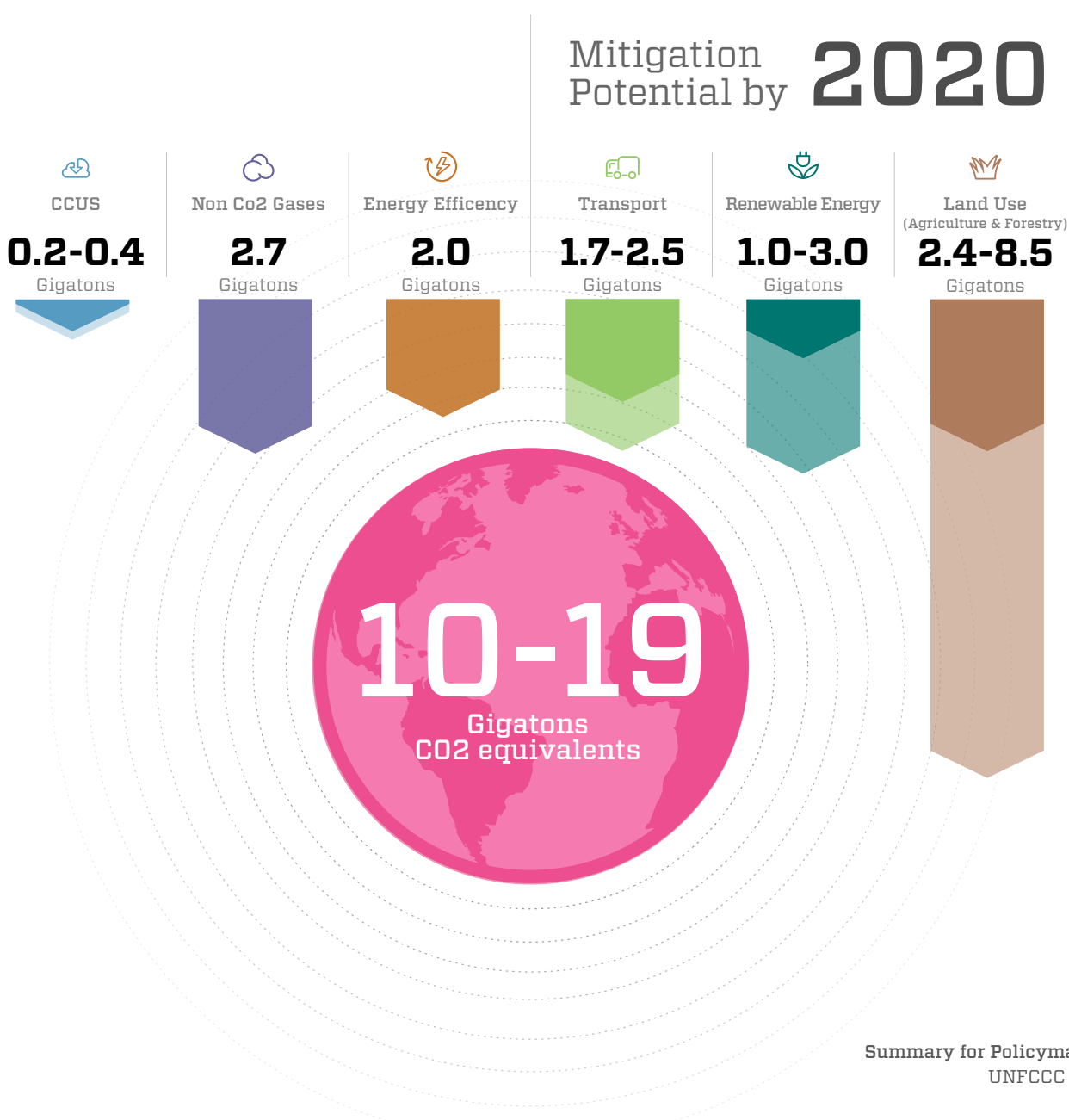
In the absence of strong carbon pricing, many low-carbon technologies available are more expensive than their business-as-usual carbon-intensive alternatives, or may require upfront funding to purchase technology and/or build institutional, regulatory or technical capacity. Therefore, substantial grants, loans or concessionary finance are needed to support many of these actions, particularly in developing countries. In 2013, global climate finance from public and private sources together stood at USD 331 billion.¹⁵ However, the International Energy Agency (IEA) estimates that additional investment averaging USD 1 trillion per year will be needed in the energy sector until 2050 in order to stay below the 2 °C threshold.¹⁶

Realizing mitigation potential and harnessing multiple co-benefits from action


Recognizing the emissions gap and the urgent need to address it, as well as potential barriers to implementation, Parties to the UNFCCC have repeatedly called for “enhanced ambition” from Parties ahead of 2020. In response, the UNFCCC secretariat has been coordinating technical expert meetings since 2014 to assist Parties in examining opportunities for actions with high mitigation potential, including those with adaptation, health and sustainable development co-benefits. The ultimate focus is on the implementation of policies, practices and technologies that are substantial, scalable and replicable.

The objective of these meetings is to promote cooperation on concrete actions related to identified mitigation opportunities in accordance with nationally defined development priorities. The technical expert meetings have covered a wide range of thematic areas with high mitigation potential and co-benefits, including renewable energy, energy efficiency, urban environments (including transport), carbon capture, use and storage, non-CO₂ GHGs and land use.

This SPM reflects the thematic areas of the technical expert meetings and highlights their mitigation potential, as summarized in the figure below.







“An increase in global temperature is proportional to the build-up of long-lasting greenhouse gases in the atmosphere, especially CO₂. Taking more action now reduces the need for more extreme action later to stay within safe emission limits.”

Achim Steiner, United Nations
Under-Secretary-General
and Executive Director of UNEP

CHAPTER II

Priority thematic areas



Priority thematic areas

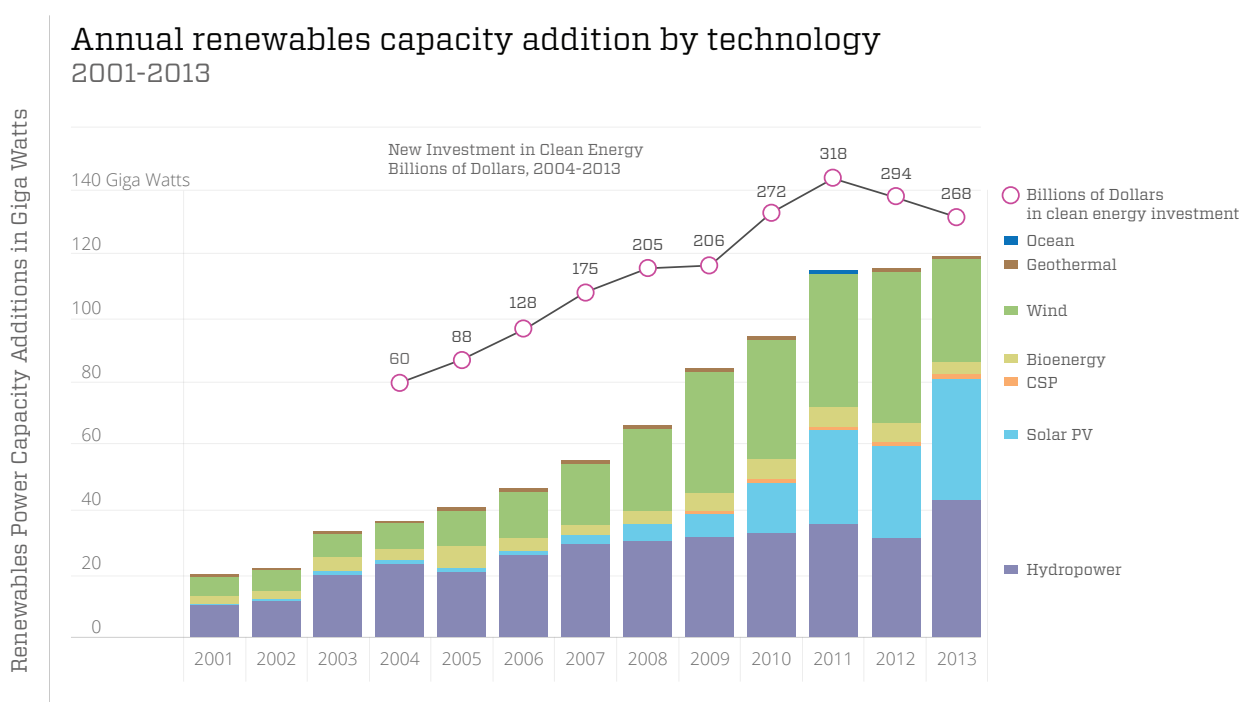
RENEWABLE ENERGY



Mitigation potential and co-benefits

Renewable energy, excluding hydropower, accounted for 9.1 per cent of global electricity generation in 2014,¹⁷ up from just 1.8 per cent in 2004. In addition, investment in renewable energy has grown 500 per cent since 2004, reaching USD 270 billion in 2014.¹⁸ This momentum has led to approximately 58.5 per cent of net additions to global power capacity in 2014 coming from renewables, which is more than from coal and gas combined.¹⁹

Within the energy sector, actions to scale up renewable energy offer significant promise for large-scale emission reductions. UNEP estimates that renewable energy could deliver 1.0-3.0 Gt CO₂ eq of reductions by 2020,²⁰ while doubling renewable energy penetration could lead to annual reductions of 8.6 Gt CO₂ eq by 2030 according to the International Renewable Energy Agency (IRENA).²¹



Sources: IRENA Rethinking Energy 2014 and Bloomberg New Energy Finance

Virtually all countries have renewable energy resources they can tap, and the technical potential for their use is enormous: studies suggest renewable energy could meet 95 per cent of global energy demand by 2050.²² In addition, renewable energy policies can produce multiple sustainable development co-benefits, including cost savings, poverty reduction, job creation, enhanced productivity and competitiveness, energy security, trade benefits associated with decreased energy imports or expanded energy exports, energy access, improved energy system stability and resilience, improved health and well-being and reductions in GHG emissions and other pollutants, among others.²³

However, barriers to meeting this potential include the relatively high cost of some renewable energy technologies, a lack of affordable upfront finance, technical issues such as grid access and stability, a lack of research and development tailored to local circumstances and a lack of capacity to develop stable policy environments.²⁴



Moving forward through policy options

Significant policy development experience has helped drive the recent growth in renewable energy technology deployment. Many of these policies have been shown to be scalable, replicable and transformative for developed and developing countries alike. Such policies include grid access and distributed generation, renewable energy targets, feed-in tariffs and tax incentives.

GRID ACCESS AND DISTRIBUTED GENERATION FOR RENEWABLES:

For many countries, successful renewable energy deployment involves ensuring that systems have access to electricity grids and that those grids are sufficiently robust to absorb a growing proportion of often intermittent generation. Meanwhile, for the nearly-1.3 billion people worldwide living without electricity access, the World Bank and the IEA estimate approximately 60 per cent would be more efficiently and cost-effectively served through mini-grids or other small-scale off-grid systems than through grid extension.²⁵

Smart technical and regulatory solutions for renewable energy



Republic of Korea

“Smart grids” that use digital technology to manage flows of power more efficiently are seen as vital for integrating a large volume of distributed, intermittent, low-carbon generation while improving energy efficiency. Countries such as the Republic of Korea, which has launched a smart grid initiative and road map, see the development and implementation of smart grid technology as a major economic opportunity.²⁶



Kenya

In Kenya, the Rural Electrification Authority (REA) was established under Energy Act No. 12 of 2006 to enhance rural electrification. To address energy access issues, the REA supports mini-grid deployment in a number of rural areas, where renewable energy and hybrid renewable energy-diesel systems offer the most economically feasible solutions.²⁷



The United States of America

The United States Department of Energy’s SunShot Initiative, which aims to make solar energy cost-competitive by the end of this decade, includes a solar integration programme. It seeks to find solutions to issues related to grid performance and reliability caused by dispersed solar energy systems.²⁸



RENEWABLE ENERGY TARGETS:

As of early 2015, at least 164 countries had renewable energy targets in place, typically requiring suppliers to source a certain percentage of the power they sell from specific renewable energy technologies.²⁹

Renewable energy targets as drivers towards higher ambition



India

India aims to scale up its renewable energy capacity five-fold from 35 GW in 2015 to 175 GW by 2022. In addition, India aims to achieve approximately 40 per cent cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030 with the help of technology transfer and low-cost international finance, including from the Green Climate Fund (GCF).³⁰



European Union

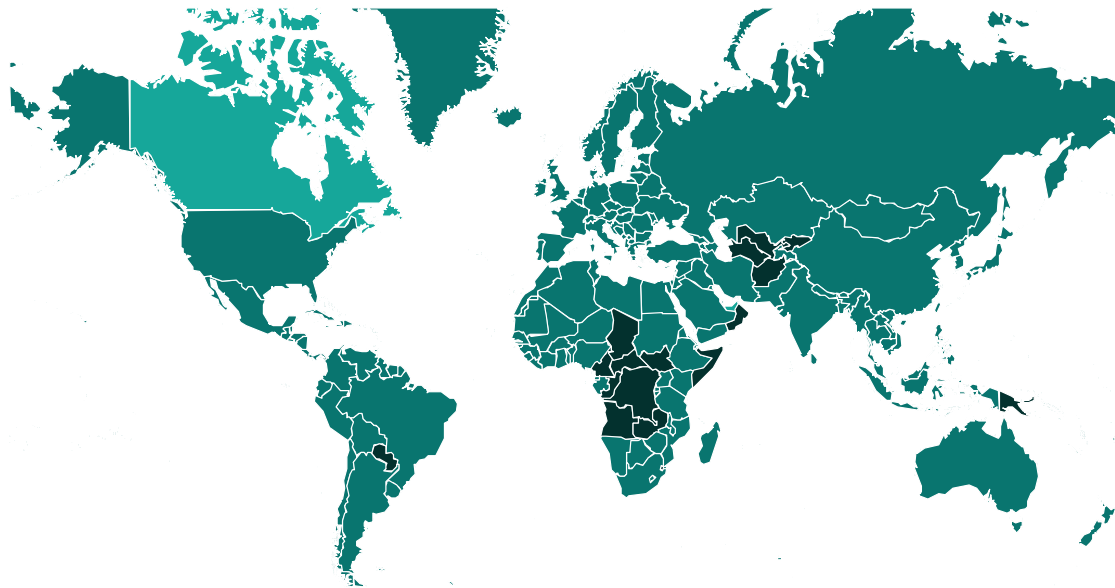
The 2020 climate and energy package of the European Union (EU) includes a target to derive 20 per cent of its energy supply from renewable sources by 2020.³¹ In addition, under its 2030 Framework for climate and energy, the EU has committed to at least a 27 per cent share of renewable energy consumption by 2030.³²



China

In 2010 China noted its voluntary renewable energy target of increasing the share of non-fossil fuels (including, but not limited to, renewables) in primary energy consumption to around 15 per cent by 2020.³³ Since then, it has increased that target to 20 per cent by 2035, as outlined in its INDC.³⁴

Global Map of National Renewable Energy Targets of All Types, 2015



■ Countries with at least one type of national renewable energy target ■ Countries with targets at the sub-national level only ■ Countries without targets

The designation employed and the presentation of material in this map do not imply the expression of any opinion on the part of IRENA concerning the legal status of any region, country, territory, or area, or concerning the delimitation of frontiers or boundaries. Source: IRENA Renewable Energy Target Setting, June 2015



FISCAL AND FINANCIAL INCENTIVES:

Many countries choose to support renewables by offering developers or operators tax breaks or other favourable taxation treatment, or by removing subsidies for competing fossil fuel-fired generation, which makes renewable energy more price-competitive.

Fiscal and financial incentives with impact on renewable energy



Sweden

Sweden's renewable certificate programme has been integral in supporting renewable electricity through an innovative bilateral partnership with Norway. Under the market-based, technology-neutral scheme, electricity suppliers and certain end users purchase renewable energy certificates allocated to renewable energy producers on the basis of megawatts (MW) produced. The policy allows suppliers to meet their renewable energy quota while also providing additional revenue to renewable energy producers.³⁵



Ethiopia

In 2008, Ethiopia removed fossil fuel subsidies, which were costing USD 600 million per year. This raised domestic fuel prices — for domestic kerosene by 50.4 per cent, petrol by 5.6 per cent, diesel by 39.4 per cent, light fuel oil by 31.7 per cent and black fuel oil by 26.5 per cent³⁶ — thereby indirectly making investments in renewable energy more attractive and cost-competitive.

FEED-IN TARIFFS:

Feed-in tariffs are one of the most widely used policies in the world for accelerating renewable energy deployment. They are used to encourage new entrants into renewable energy markets by paying renewable energy producers a guaranteed fee for the power they produce. As of early 2015, 108 countries, states or provinces had feed-in tariffs in place.³⁷

Feed-in tariffs: from pioneering efforts to recent widespread adoption



Germany

In 1990, Germany introduced its Electricity Feed-in Law, which required utilities to connect renewable energy generators to the grid and to buy the electricity produced at a specified rate.³⁸ Germany's renewable energy policies were updated under its 2000 Energy Act to include 20-year technology-specific tariffs that are periodically adjusted as renewable energy costs fall.³⁹ This tariff programme has seen renewables grow from meeting 7 per cent of electricity consumption in 2000 to 25.8 per cent in 2014.⁴⁰



Thailand

Thailand has been gradually extending a feed-in tariff programme to various types of renewable energy generation, including a goal of adding 2 GW of large solar installations by 2021.⁴¹ In 2013, it launched a programme to underwrite 1 GW of small-scale solar systems with guaranteed 25-year tariffs.⁴²



Solutions through international cooperation

IRENA and a wide range of other international organizations and initiatives are supporting countries to establish renewable energy policy frameworks, strengthen human and institutional capacity and access the finance necessary to deploy renewables. These organizations and initiatives also facilitate policy coordination among Parties, collect and disseminate information on best practices and effective mechanisms, and streamline access to relevant information on renewable energy. Examples include:



The African Group renewable energy partnership proposal, which was presented during the technical expert meeting on renewable energy supply in June 2014, aims to establish a global partnership to accelerate energy transformation in African countries towards wider use of renewable energy, which could be supported by feed-in tariffs and other incentives. By 2020 the partnership could enable the installation of at least 10 GW of renewable energy capacity in Africa. In the longer term, by 2030, the partnership could catalyse a major transformation by achieving the goal of universal energy access across the continent.⁴³

The Clean Energy Solutions Centre is an initiative of the Clean Energy Ministerial, a global forum for sharing best practices that encourage and facilitate the transition to a global clean energy economy. The Centre helps governments design and adopt policies and programmes that support the deployment of clean energy technologies by offering no-cost expert policy assistance, webinars and training forums, clean energy policy reports, data and tools in partnership with more than 35 leading international and regional clean energy organizations.

Additional initiatives include: the **Sustainable Energy for All (SE4All) initiative**, which supports gap analyses, helps develop national action plans and catalyses investment and implementation; the **IRENA SIDS Lighthouses** initiative, which aims to mobilize funding and political will to advance renewable energy deployment in island settings around the world; the **IRENA Africa Clean Energy Corridor initiative**, which promotes renewable power to support Africa's economic growth; and the **Global Geothermal Alliance**, which provides customized support in addressing key challenges to scaling up geothermal energy deployment in developing countries.

Other international bodies such as the **GEF**, the **IEA**, **Local Governments for Sustainability (ICLEI)** and the **World Bank** have significant renewable energy programmes.⁴⁴



Priority thematic areas

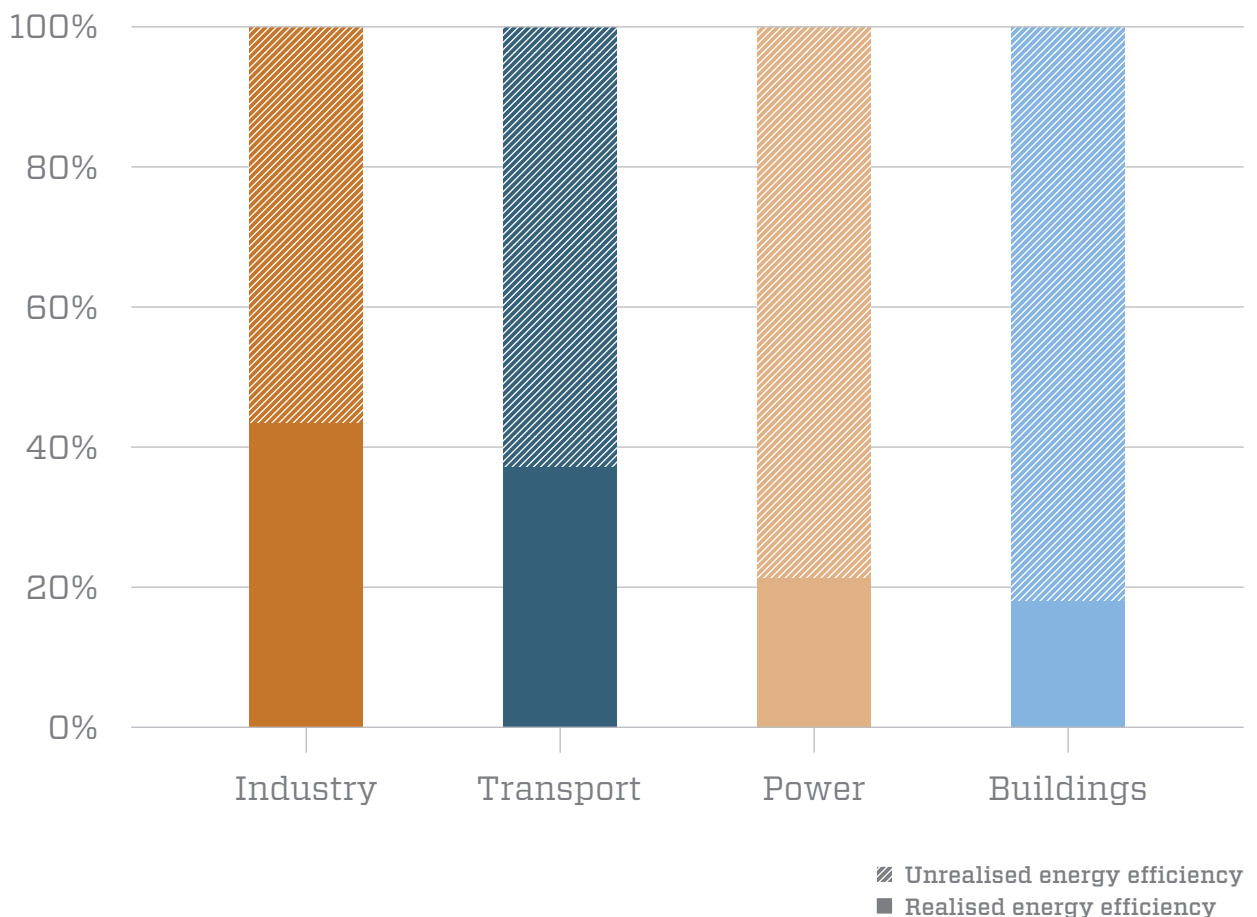
ENERGY EFFICIENCY



Mitigation potential and co-benefits

Improving energy efficiency reduces energy demand and in turn the need to build new energy production systems, resulting in GHG emission reductions that can be achieved at low or negative costs, with short payback periods. Scaling up investment in energy efficiency could therefore generate a net increase in economic output of USD 18 trillion globally by 2035.⁴⁵ Energy efficiency investments become even more compelling if their benefits beyond reduced energy demand and GHG emissions are considered. For example, such investments offer quantifiable impacts on macroeconomic development, public budgets, health and well-being, industrial productivity and energy system reliability.⁴⁶

Potential for energy efficiency under the International Energy Agency New Policies Scenario by 2035



Source: International Energy Agency. 2013. World Energy Outlook 2013

UNEP estimates the mitigation potential of energy efficiency at 2.0 Gt CO₂ eq in 2020.⁴⁷ However, economic and institutional barriers remain to the realization of energy efficiency opportunities, including access to large-scale financing to implement large energy efficiency projects, a lack of capacity in designing and implementing effective policies, a lack of technical expertise⁴⁸ and poor coordination among public-sector stakeholders.⁴⁹



Moving forward through policy options

Successfully scaling up energy efficiency will require institutional, legal and regulatory frameworks. In addition, successful implementation will require a portfolio of policies and measures, such as those identified in 25 policy recommendations by the IEA, including electrical appliance standards and labelling programmes, energy certification programmes, energy performance standards and incentives and tax breaks.⁵⁰

INTRODUCTION OF ELECTRICAL APPLIANCE STANDARDS AND LABELLING PROGRAMMES:

More than 75 countries have introduced energy efficiency standards for electrical appliances and labelling programmes to ensure that manufacturers inform consumers about their products' energy use.

Standards and labels are key to promoting appliance efficiency



The United States

The United States Energy Star programme, which covers products, buildings and industrial plants, allows appliance makers to display an Energy Star logo if their product exceeds energy efficiency standards set by the Government. From 1992 to 2013, the programme delivered estimated savings of more than USD 295 billion on utility bills and avoided more than 2.1 Gt CO₂.⁵¹



Ghana

Efficient lighting schemes, with aims such as replacing incandescent light bulbs with high-efficiency ones, could reduce emissions by 490 Mt CO₂ annually if adopted globally.⁵² Ghana launched such a programme in 2007 and, within two years, had reduced the need for power capacity at peak times by 124 MW. This saved USD 33 million per year in crude oil for power generation, and reduced emissions by more than 100,000 tonnes CO₂ per year.⁵³

PROVIDING TAX INCENTIVES:

Tax incentives are ways of reducing taxes for businesses and/or individuals in exchange for specific desirable actions or investments. For example, tax incentives for energy or carbon-pricing programmes can help encourage energy efficiency investments.

Incentives to channel investments into energy efficient solutions



Netherlands

The Netherlands' Accelerated Depreciation of Environmental Investments allows companies making environmentally beneficial investments to reduce their tax bill in the early years of the investment.



South Africa

South Africa's Section 121 Tax Allowance offers attractive tax breaks and is open to investments in cleaner production technologies or technologies that improve energy efficiency.⁵⁴

**ENERGY PERFORMANCE STANDARDS FOR BUILDINGS AND CERTIFICATION PROGRAMMES:**

Minimum energy performance standards for buildings, appliances or vehicles also have significant promise for reducing GHG emissions.⁵⁵ In addition, certification programmes require the energy efficiency of buildings to be assessed and disclosed when they are built, sold or rented.

Harnessing the vast mitigation potential in the buildings sector**Singapore**

Singapore developed a Green Building Master Plan, with the goal of certifying 80 per cent of buildings with the “Green Mark” by 2030. The initiative certifies buildings on the basis of energy and water efficiency, indoor environmental quality, green space integration and the use of eco-friendly materials, and emphasizes high standards for measurement and verification.⁵⁶

**Japan**

Since its implementation in 1998, Japan’s Top Runner programme, which sets mandatory standards based on the most efficient products on the market, has reduced energy consumption by 8 per cent in the residential sector and 5 per cent in road transport.⁵⁷ In 2013, the Top Runner Programme began to include building materials that contribute to the prevention of heat loss from houses and/or buildings.

ENCOURAGING ENERGY EFFICIENCY IN INDUSTRY:

Government programmes that assist industry to increase energy efficiency have significant promise. Such programmes are usually able to focus on knowledge-sharing and technical support, providing financial incentives, streamlining market transformation, and promoting operational and behavioural changes.

The promise of energy efficiency in industry**Cambodia**

Cambodia has actively pursued the development of green growth and policies on climate change and energy efficiency in the industrial sector. Its National Policy, Strategy and Action Plan on Energy Efficiency sets out the following strategic objectives: to improve energy efficiency in the industrial sector by 28 per cent; strengthen capacity-building in industry energy efficiency; and to raise awareness among factory owners and managers regarding energy efficiency issues.

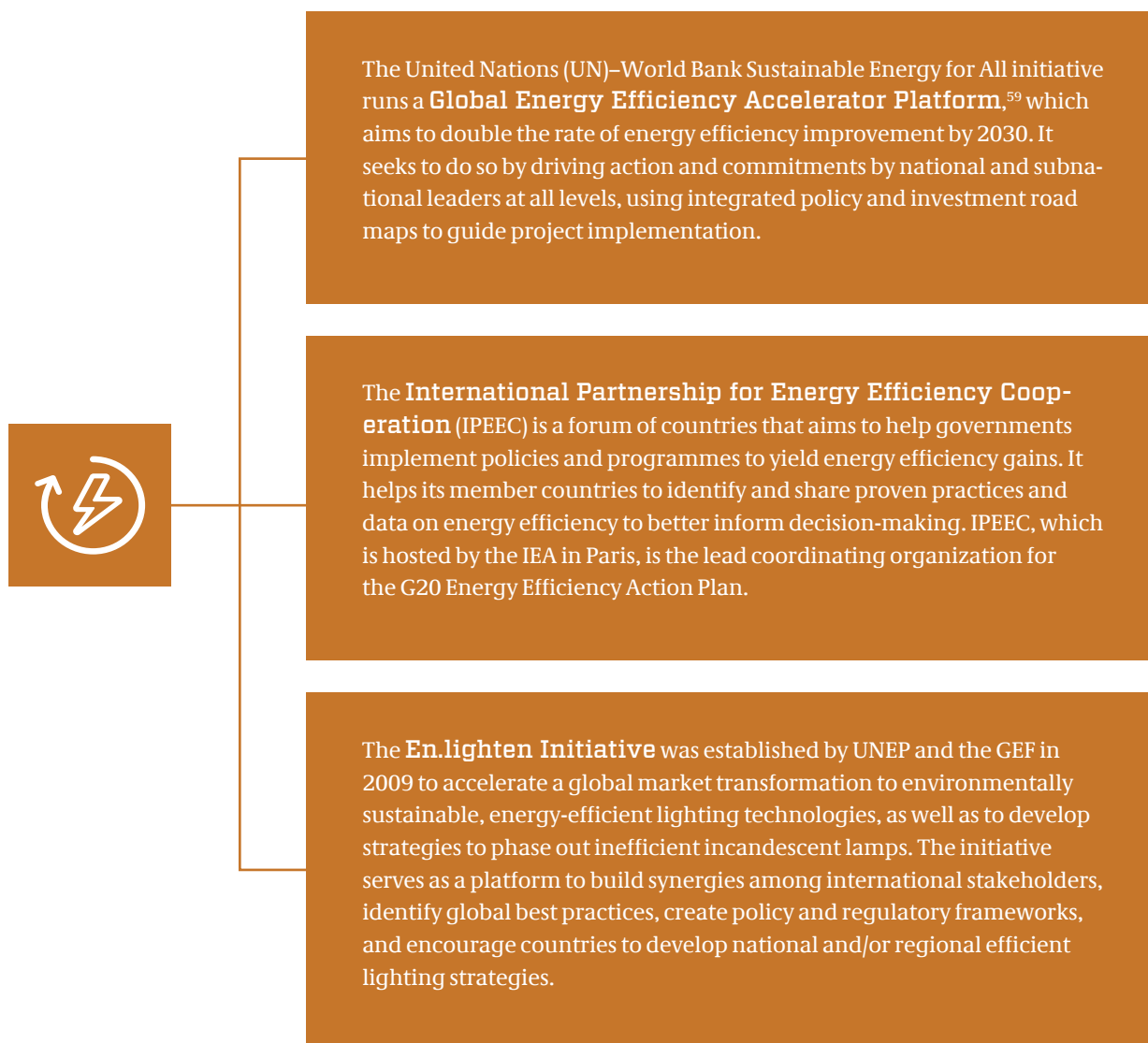
**Denmark**

Denmark’s energy savings goals, set with energy distribution companies through its National Energy Efficiency Obligation Scheme, have been consistently exceeded. The programme offers cost-neutrality for participants by allowing them to pass costs on to end users, and flexibility to trade credits received.⁵⁸



Solutions through international cooperation

There are a number of international initiatives in place to assist Parties in increasing their portfolios of energy efficiency policies and measures, including:



Other initiatives include the European Bank for Reconstruction and Development's **Sustainable Energy Initiative**, which offers technical assistance and grants to support energy efficiency, and the **Renewable Energy and Energy Efficiency Partnership**, which invests in clean energy markets in developing countries to reduce CO₂ emissions and build prosperity.

Other international bodies such as the **GEF**, **ICLEI**, the **IEA** and the **World Business Council for Sustainable Development** have robust energy efficiency programmes.



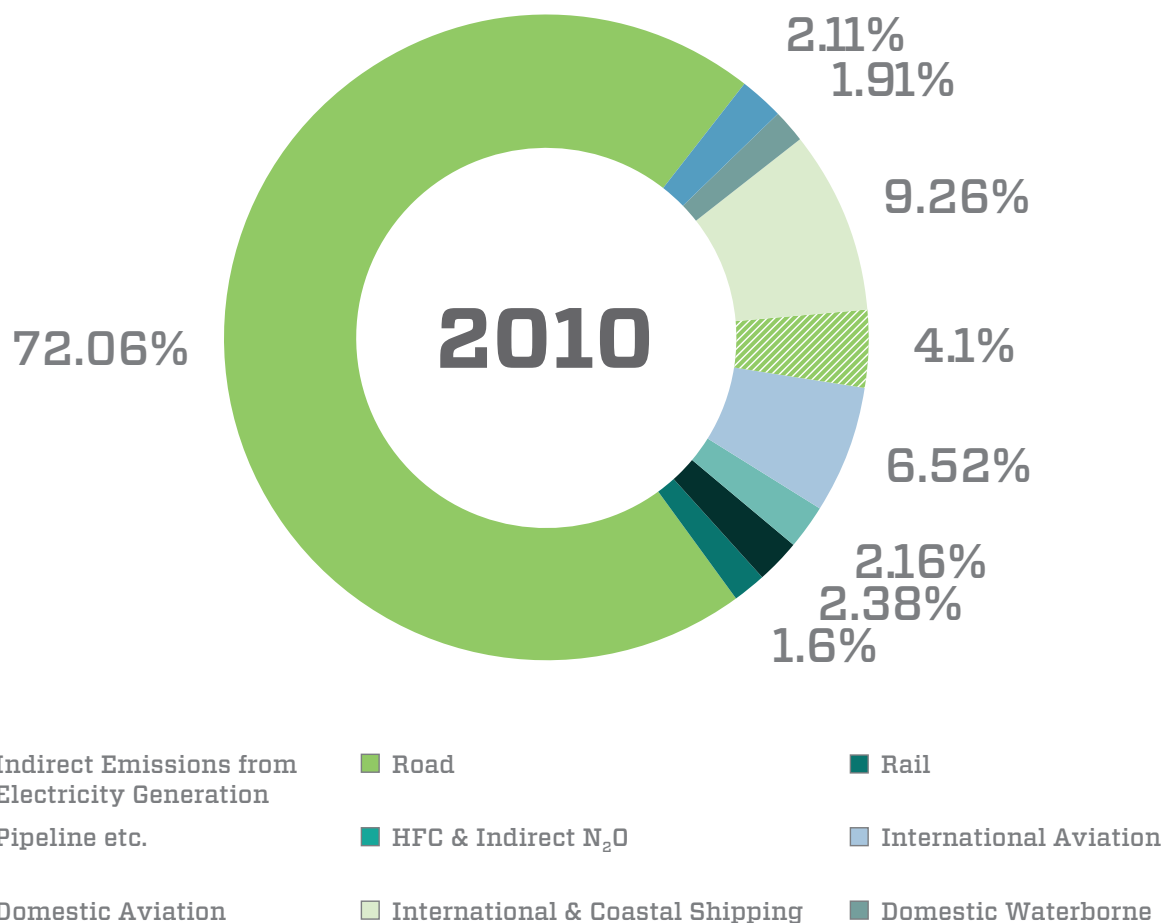
Priority thematic areas

TRANSPORT



Mitigation potential and co-benefits

The transport sector generated 7.0 Gt CO₂ eq of GHG emissions globally in 2010, making it responsible for approximately 23 per cent of total energy-related CO₂ emissions.



Source: IPCC Working Group III AR5, Figure 8.1

Given current rates of growth for passenger and freight transportation, the transport sector's emissions could increase globally by up to 50 per cent by 2035 and almost double by 2050.⁶⁰ However, UNEP estimates that reductions of emissions from land transport, aviation and shipping of 1.7–2.5 Gt CO₂ eq, or from one quarter to more than one third of current emissions from the sector, are possible by 2020.⁶¹

Addressing the climate impacts of transportation can bring about co-benefits such as improvements in local air pollution, energy security, decongestion of roads, improved safety and increased general mobility. It can also create jobs in mass transportation, energy-efficient vehicle manufacturing and biofuel production. In addition, the IEA estimates that a shift to sustainable, low-carbon transport by 2050 could save governments, companies and individuals up to USD 70 trillion.⁶²

The main barriers to implementing mitigation actions in the transport sector include a lack of infrastructure for new technologies, such as electric car charging stations, a lack of capital to invest in public transport options and insufficient regulatory support and key performance indicators.



Moving forward through policy options

Emissions from the transport sector can be reduced through ‘shift’ policies, which encourage users to favour lower-emission forms of transport; ‘avoid’ policies, which reduce the need for travel; and ‘improve’ policies, which aim at increasing the energy efficiency of vehicles.⁶³ All three policies are critical to facilitate a paradigm shift to reconcile transportation and climate change objectives.

SHIFT POLICIES:

These policies aim to encourage a shift from higher-emitting modes of transport to lower- or zero-carbon modes of transport. Bus rapid transit (BRT) schemes, for example, have helped cut private car use, reducing emissions and congestion.

Climate-friendly alternatives to private cars in urban environments



Mexico

In 2005, Mexico City opened Metrobus, a BRT corridor along one of the city’s busiest streets. During the first six years of operation, the first BRT line managed to reduce CO₂ eq emissions by 300,000 metric tons, corresponding to USD 800,000 of income for the city, and reduce commute times from 1.5 hours to 1 hour for this route.⁶⁴ Mexico City has since expanded the use of BRT corridors, leading to one tenth of the users of the BRT system shifting from private cars.⁶⁵



Indonesia

The city of Bogor, Indonesia, developed an urban development and mobility enhancement strategy, backed up by a public awareness campaign, to improve mobility and reduce the city’s transport sector GHG emissions by 33.8 per cent. The strategy included developing mass transit options and improved pedestrian access, as well as road network enhancements.⁶⁶



France

Bicycle-sharing schemes have been set up in a number of cities around the world. Among the best known is the Parisian Vélib’ scheme, launched in 2007, which now boasts more than 20,000 bikes around the city. One fifth of its long-term subscribers say they drive less since signing up.⁶⁷



Serbia

Belgrade, Serbia, along with the Urban Planning Institute, undertook an extensive evaluation of its transport-related challenges and developed its Master Plan to 2021. The plan takes into account multiple actions to optimize connectivity, improve the safety and quality of public transport, reduce traffic volume, oversee land-use planning and provide funding for transport projects. Initial evaluations show a tripling of ridership within the first six months of refurbishing and increasing frequency of suburban rail lines.⁶⁸

**AVOID POLICIES:**

These policies seek to reduce or avoid the need for travel through strategic urban development and spatial planning strategies that address transportation needs.

How urban development and planning can help with the transportation challenge

**Brazil**

In Curitiba, Brazil, high-density transit corridors were integrated into the city's master plan to promote residential and industrial development in those areas.⁶⁹ As a result of these corridors and other smart transit planning decisions, Curitiba has one of the most heavily used yet low-cost transit systems in the world.

**Japan**

In 2010, Japan released its Low Carbon City Development Guidance to support local authorities in promoting and planning for low-carbon city development. This included a description of methods and measures to pursue compact urban areas where people can live closer to their workplaces, thereby reducing travel distances and alleviating transportation demand.⁷⁰

**Turkey**

A number of cities in Turkey (Istanbul, Antalya, Sakarya, Eskişehir, Konya and Kayseri) have worked to address the need for infrastructure that supports active or non-motorized transport by improving cycling conditions since 2010. Successful BikeLab projects aim to develop city-wide networks of bike lanes with the goal that bike lanes will allow non-motorized transport to be an integral component of the cities' transport systems by 2023.⁷¹

IMPROVE POLICIES:

These policies aim to reduce the climate impact of existing modes of transport. Vehicle energy efficiency standards, which represent the most effective of such policies, have been introduced by a number of countries and regions. In addition, there are also standards for the share of biofuel use for vehicles.

Solutions through efficiency standards that save money and reduce emissions



Brazil,  Canada,  China,  the EU,  India,  Japan,  Mexico,



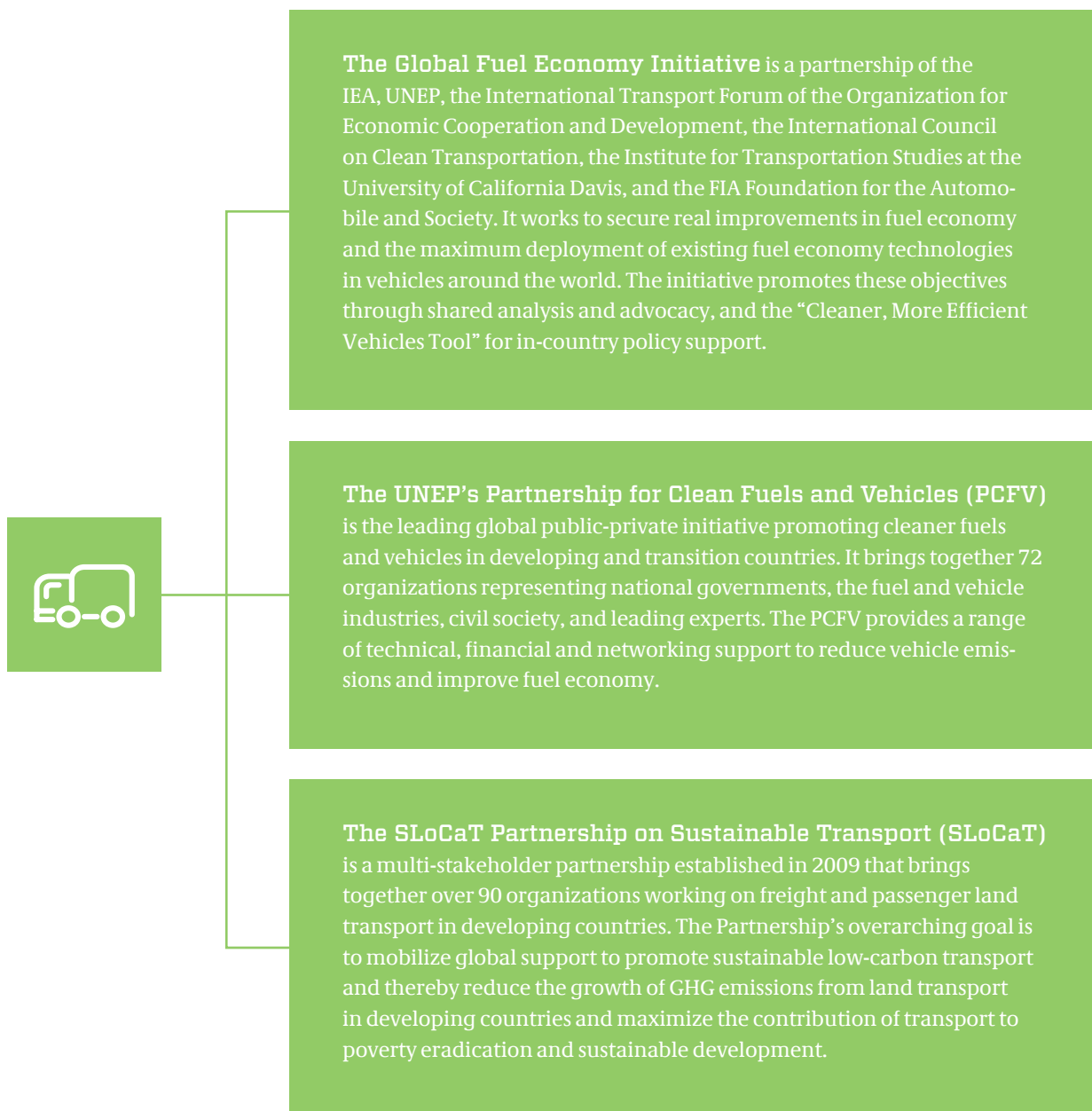
the Republic of Korea and  the United States of America

Nine jurisdictions – Brazil, Canada, China, the EU, India, Japan, Mexico, the Republic of Korea and the United States of America, which account for over 80 per cent of car sales worldwide – have established or proposed GHG emission standards for light-duty vehicles.⁷² These standards are expected to improve the average fuel efficiency of such vehicles by around 50 per cent between 2000 and 2025.⁷³



Solutions through international cooperation

There are a large number of international initiatives that promote clean transport, including:



Other initiatives include the **Public Transport Declaration on Climate Leadership**, from the International Association of Public Transport, which aims to double the share of public transport by 2025; the **Urban Electric Mobility Initiative**, which promotes electric car penetration; and the **Low-Carbon Sustainable Rail Transport Challenge**, which aims to reduce the emission intensity of the sector by 50 per cent by 2030.

Other international bodies such as the **International Civil Aviation Organization (ICAO)** and **the International Maritime Organization (IMO)** lead work to reduce emissions from aviation and shipping, respectively.



Priority thematic areas

CARBON CAPTURE, USE AND STORAGE



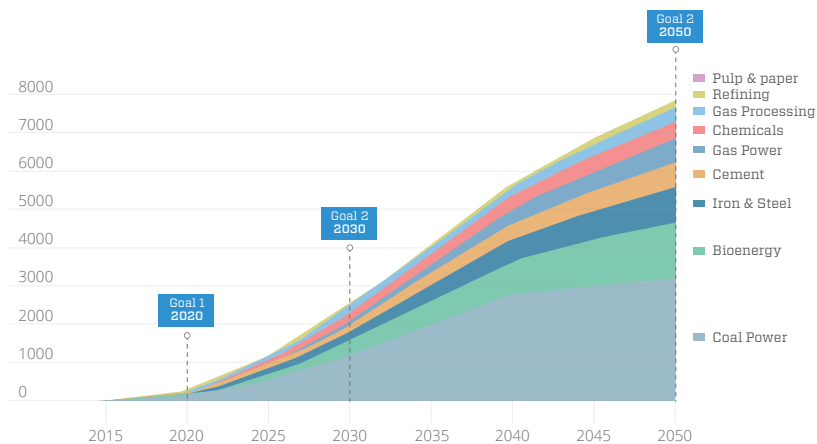
Mitigation potential and co-benefits

Alongside energy efficiency, renewable energy and other non-fossil fuel sources, carbon dioxide capture, use and storage (CCUS) is another element of the transition to a low emissions future. CCUS involves the capture of CO₂ from power plants and other energy-intensive industrial processes, and its long-term sequestration, typically in geological formations. Utilization of the captured CO₂ is an alternative to its geological storage.

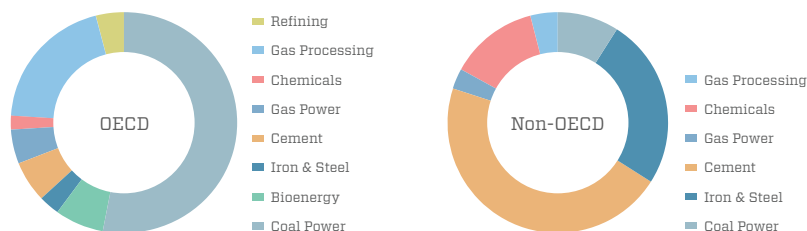
Not only does CCUS offer the potential to capture emissions from the power sector but it could play a wider role in reducing the GHG emissions from industries with significant process emissions, such as chemicals, cement and steel production, and agricultural processing.⁷⁴ In many cases, the CO₂ captured could be utilised within the same industries, such as a propellant in the food and beverage industry. In addition, CCUS can assist countries that currently heavily rely on fossil fuels to make the transition to low-emission fuel sources while limiting the disruption to the local economy and employment.

Globally, there are 12 operational carbon dioxide capture and storage (CCS) projects, with a further 10 under construction.⁷⁵ The IEA estimates that if sufficient support is provided and financing is secured, CCS projects could capture 50 Mt CO₂/year by 2020.⁷⁶ Within the power sector, UNEP estimates that the emission reduction potential for CCS is 0.2–0.4 Gt CO₂ eq in 2020.⁷⁷

Carbon capture use and storage applied in various sectors in the 2°C scenario between 2015 and 2050



Sectors in 2020



Source: International Energy Agency, 2013. Technology Roadmap Carbon Capture and Storage

However, the chief barrier to broad deployment of CCUS is the low or absent price on carbon. Other barriers include the lack of regulatory frameworks, especially those addressing safety and liability issues, and potential public opposition.



Moving forward through policy options

FINANCIAL SUPPORT AND RESEARCH AND DEVELOPMENT:

As with other climate mitigation measures, the successful realization of the potential of CCUS will require a suite of policies and financing programmes to underpin the business case for the technology. Specifically, given the high costs involved in CCUS, substantial public funding is needed to implement large-scale demonstration projects and begin deployment, particularly in developing countries.⁷⁸ In addition, investments in research, development and demonstration programmes are needed to build CCS/CCUS expertise and stimulate the sharing of knowledge.

Financial innovation and support for CCUS



Canada

The Boundary Dam project in Canada is the world's first power station with large-scale post-combustion capture, which was inaugurated in October 2014. The main drivers of this project are federal and provincial government support (CAD 240 million in 2008) and revenues from enhanced oil recovery. The 110 MW retrofit of SaskPower's Boundary Dam coal-fired power plant is designed to store around 1 Mt CO₂/year.⁸²



China

In China, the National Development and Reform Commission, the Ministry of Science and Technology, the Ministry of Environment and other Government departments have established various funding schemes to promote the development of CCS technology.⁷⁹



United Arab Emirates

Some countries have begun to provide financing towards pilot projects. For example, in the United Arab Emirates, the national oil company and a national sovereign wealth fund are developing a project to capture CO₂ emitted by a steel plant.⁸⁰



United Kingdom

The United Kingdom is implementing a GBP 1 billion CCS commercialization programme to support the design, construction and operation of the country's first commercial-scale CCS projects in order to generate learning-by-doing, help drive down the costs of CCS, test the CCS regulatory framework, encourage industry to develop suitable CCS business models and contribute to the development of infrastructure for CO₂ transport and storage.⁸¹



REGULATORY AND LEGAL FRAMEWORKS:

CCUS deployment depends on the development of targeted regulatory and legal frameworks, which ensure that storage of CO₂ is undertaken safely and in accordance with clear rules. Such frameworks should include transparent permitting procedures and well defined responsibilities and liabilities for long-term storage sites. The IEA recommends regulations requiring new-build fossil fuel power generation to be “CCS-ready”.⁸³

Framework and a road map to CCS



European Union

The EU’s CCS Storage Directive provides a legal framework for the environmentally safe transport and storage of CO₂, and requires operators of power plants with capacity higher than 300 MW to undertake an assessment of their CCS-readiness.⁸⁴



South Africa

South Africa has charged its Centre for Carbon Capture and Storage with developing and implementing a national road map for the commercial application of CCS. It is currently developing a pilot project to explore issues around safety and local geological suitability.⁸⁵



The Republic of Korea

The Republic of Korea has developed a national CCS master action plan to promote CCS deployment. The plan calls for establishing national networks for technology development and demonstration and a legal and regulatory framework.⁸⁶

CARBON PRICING:

Imposing a sufficiently high price on carbon — whether through an emissions trading scheme or carbon taxes — is important for creating an economic incentive for emitters to pursue CCUS. For example, coal-fired power plants using CCS technology require CO₂ prices of between USD 48 and USD 109/t to be cost-competitive with traditional coal-fired plants.⁸⁷

Putting a price on carbon to encourage CCS



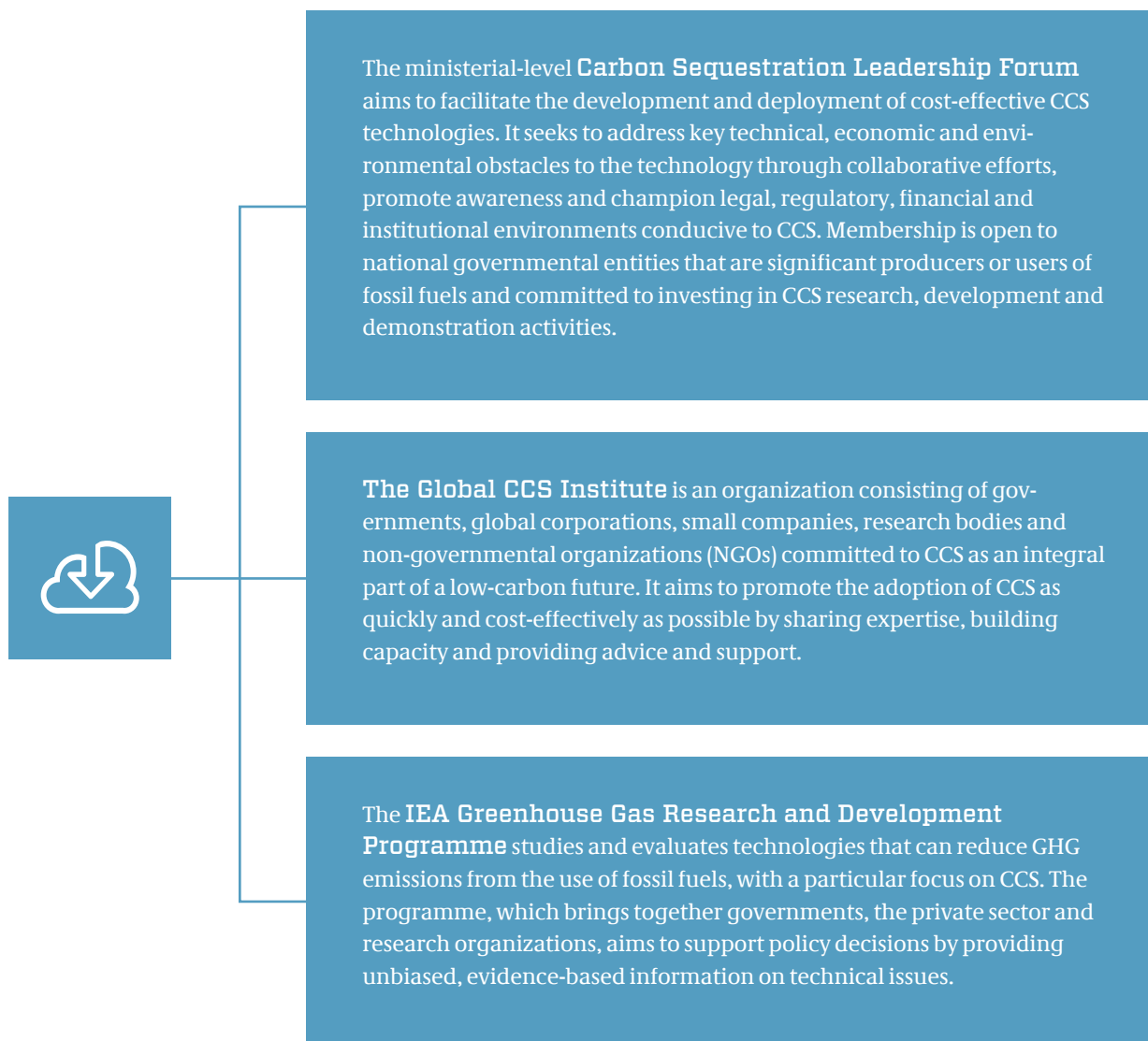
Norway

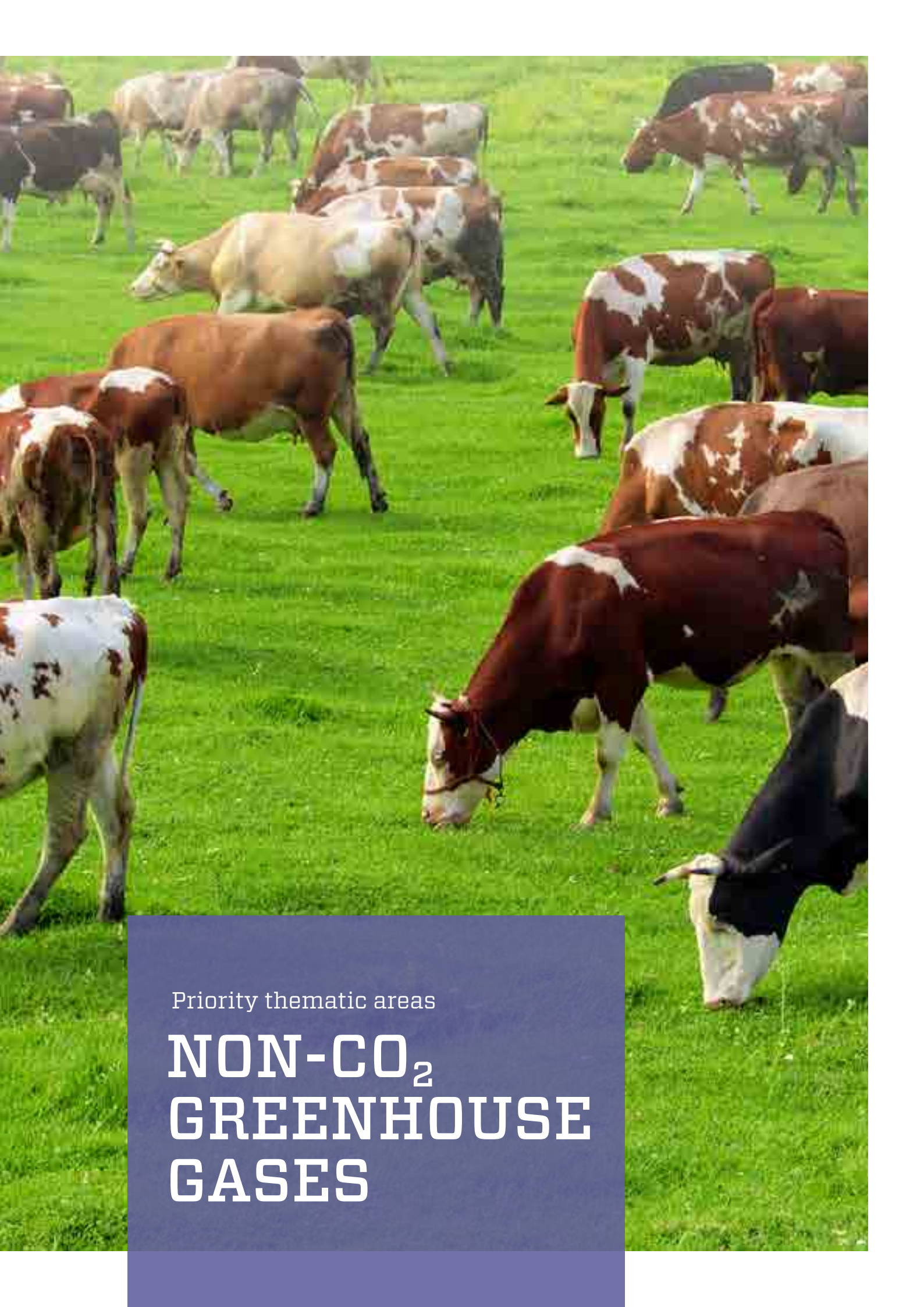
Norway’s carbon tax, established in 1991, has gradually increased over time, thereby creating an incentive to store CO₂ and resulting in the sequestration of 0.9 Mt of CO₂ each year.⁸⁸



Solutions through international cooperation

International organizations and initiatives relating to CCUS include:





Priority thematic areas

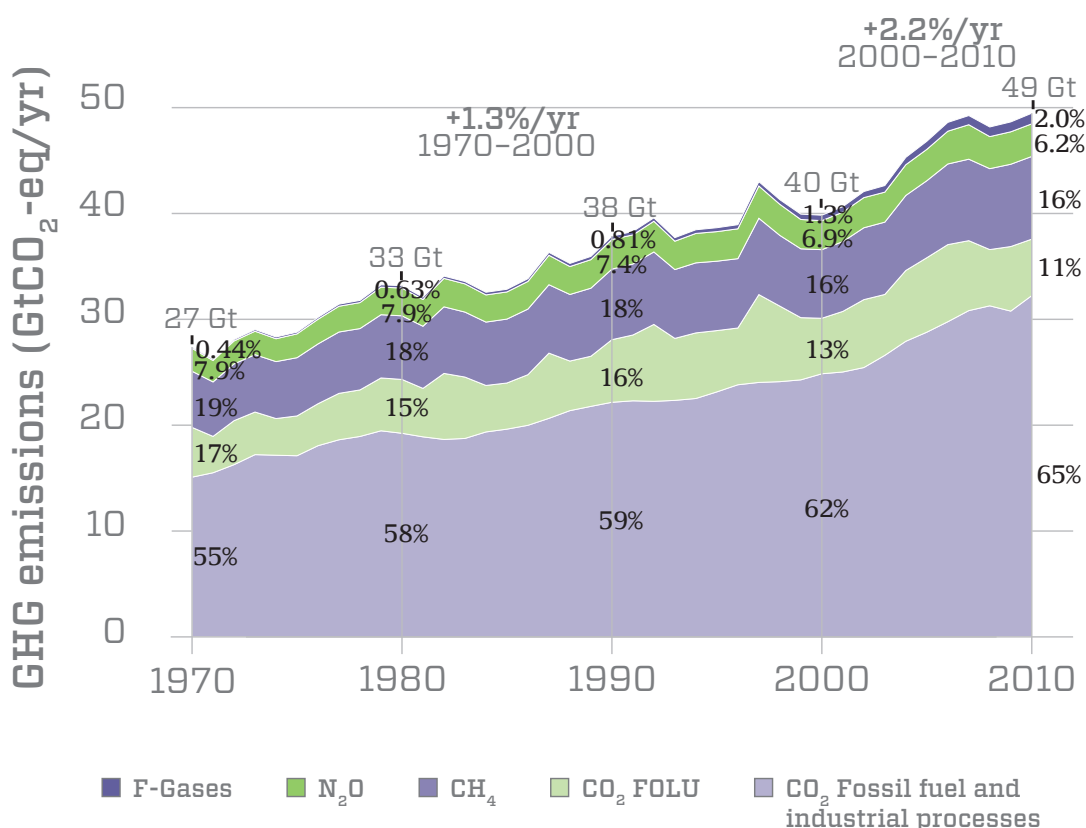
NON-CO₂ GREENHOUSE GASES



Mitigation potential and co-benefits

Non-CO₂ GHGs accounted for 25 per cent of anthropogenic GHG emissions in 2010, equivalent to 12 Gt CO₂. Of these, methane (CH₄) is the most significant, accounting for 16 per cent of global emissions, followed by nitrous oxide (N₂O), at 6 per cent, and fluorinated gases, including hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆), at 3 per cent.⁸⁹ These gases are emitted from a range of sectors: CH₄ from fossil fuel extraction and combustion, industrial processes, agricultural sources and waste management; N₂O from industrial processes, agriculture and the waste sector; and fluorinated gases from industrial processes.⁹⁰

Total annual anthropogenic GHG emissions by gases 1970-2010



Source: IPCC. 2014. Summary for Policymakers. WGIII to the AR5

The United States Environmental Protection Agency (EPA) estimates that 2.7 Gt CO₂ eq of global non-CO₂ GHG emissions could be mitigated by 2020 at a cost below USD 50/t CO₂ eq. Almost one-quarter of these reductions can be made at or below a breakeven cost (USD 0/t CO₂ eq) with a substantial portion generating an immediate financial return.⁹¹ The co-benefits of reducing non-CO₂ emissions include protection of the ozone layer and increased health and sanitation benefits. Reducing emissions in the agriculture sector contributes to improved water quality, erosion control and more efficient fertilizer use. In addition, processing coal seam gas in coal mines improves health and safety conditions.⁹²

However, barriers to realizing these reductions include the lack of regulatory or legislative requirements, the lack of sufficiently high and consistent carbon prices to fund mitigation, and, for some of the fluorinated gases, technological barriers that make their substitution difficult or expensive.⁹³



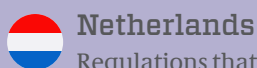
Moving forward through policy options

A wide range of applicable policies can address non-CO₂ GHGs. Their impact depends on the sector, the region and national circumstances of the country. Countries have introduced regulations and policies that encourage improved agricultural practices and economic instruments to reduce non-CO₂ emissions. A number of countries have also developed voluntary initiatives and directed investments towards research and development related to the reduction of non-CO₂ gases.

REGULATORY MEASURES:

There are many opportunities to provide clear and comprehensive regulatory frameworks and policies across various sectors relating to non-CO₂ gases.

Emission reductions through waste management and other regulations



Netherlands

Regulations that require the integrated management of waste can have significant effects on methane emissions. The Netherlands' waste management strategy has been particularly effective by using a mix of regulation and financial incentives to reduce waste streams and encourage recycling. Since 2008, more emissions have been prevented by reusing rather than recycling products and by reducing incineration and landfilling than have been generated by the Dutch municipal solid waste management system.⁹⁴



Mexico

In Mexico, the national Electricity Law allows public or private investors to form a cogeneration company to provide electricity to its partners. An example of a partnership between the government and a private company is a cogeneration project that provides electricity from the BENLESA plant in Salinas Victoria using the biogas from landfill as fuel. The plant has an installed capacity of 17 MW and has avoided the release of more than 81,000 tonnes of CH₄ as of February 2010, which is equivalent to the reduction in emissions of 1.7 million tonnes of CO₂.⁹⁵



Spain

Spain introduced a progressive national tax on F-gases in 2014, with full implementation expected by 2016. The national tax applies to F-gases with a global warming potential (GWP) greater than 150 and is calculated based on the GWP of the F-gases or their mixtures.⁹⁶



Russia

In line with the National Energy Efficiency and Energy Sector Development Programme by 2020, The Russian Federation's national Gazprom Company adopted an Energy efficiency Concept for 2011-2020 (the Concept). As outlined in the Sixth National Communication of the Russian Federation, the Concept has already resulted in annual emission reductions of approximately 11.2 Mt CO₂ eq in 2013. The implemented measures include technological upgrades in gas transmission through the replacement of old compressors, use of metering systems and leakage reduction in gas transmission and distribution networks.



ECONOMIC INSTRUMENTS:

Economic instruments have been used successfully in many countries and across a broad range of projects to encourage the reduction of non-CO₂ emissions.

The effectiveness of cap-and-trade schemes and credits to reduce non-CO₂ emissions



Brazil

Brazil used revenues from the Clean Development Mechanism to reduce its industrial N₂O emissions by 50.5 per cent.⁹⁷



European Union

The EU Emissions Trading System helped reduce N₂O emissions from nitric acid plants. N₂O emissions in 2013 were 85 per cent lower than in 1990.⁹⁸

SUPPORT FOR RESEARCH AND DEVELOPMENT:

Investment in research, development and demonstration projects can help to deliver new technologies for reducing non-CO₂ emissions.

Targeted research seeking solutions for N₂O and CH₄ from agriculture



New Zealand

New Zealand's Agricultural Greenhouse Gas Research Centre has become internationally renowned for its mitigation work in the agriculture sector, including on low-methane producing animals and reducing N₂O inputs.⁹⁹



Ireland

Through its Sustainable Healthy Agri-Food Research Plan, Ireland is conducting research into reducing methane emissions from livestock through feeding strategies and breeding.¹⁰⁰



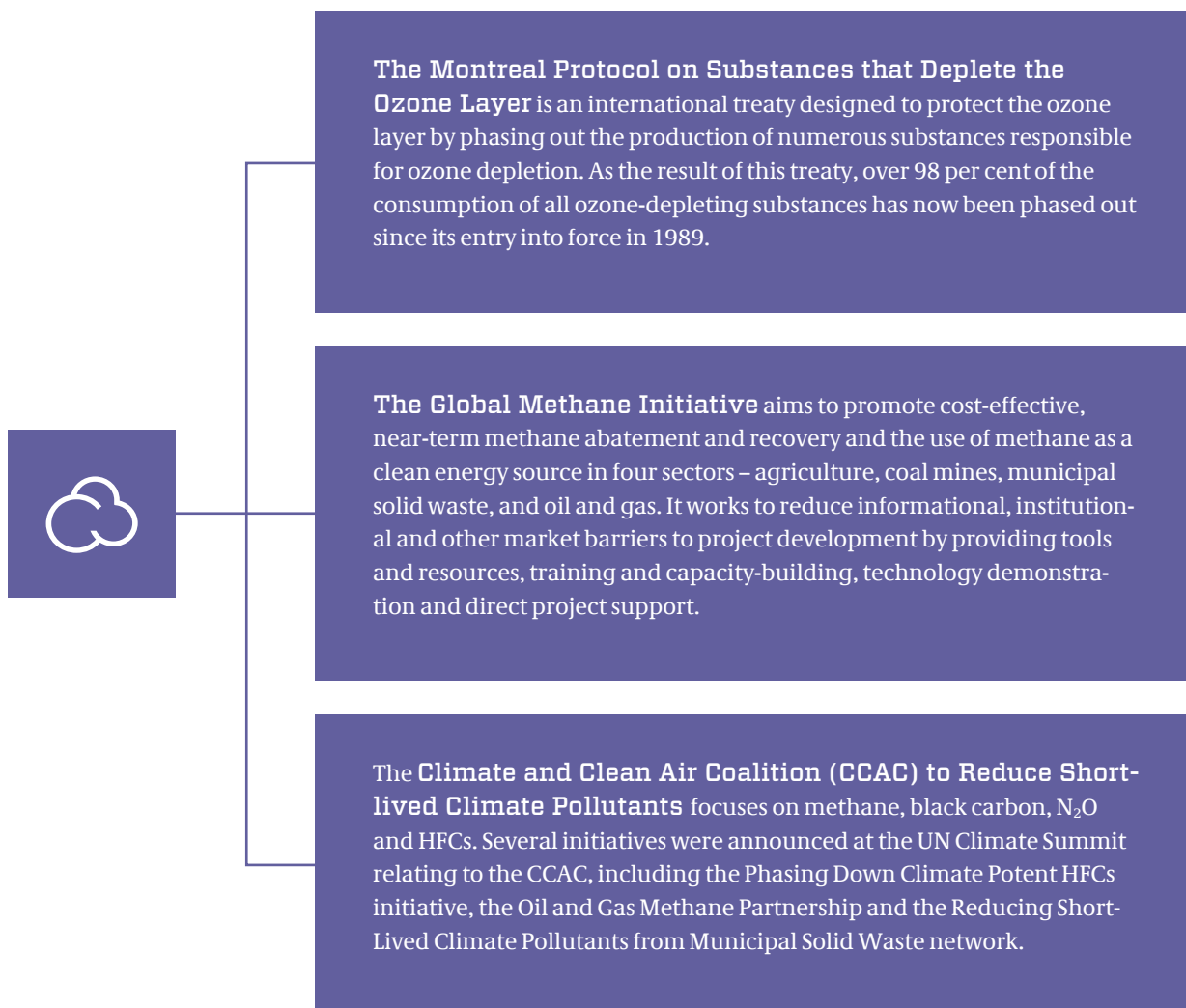
Uganda

Uganda is seeking support, through its nationally appropriate mitigation actions (NAMAs), for a research programme on reducing methane emissions from livestock, including through silvopastoral techniques, which have shown to be effective in this regard.¹⁰¹



Solutions through international cooperation

Several international initiatives are assisting Parties in reducing their emissions of non-CO₂ gases:



Other international bodies such as the **Food and Agriculture Organization of the United Nations (FAO)**, the **World Bank** and the **United Nations Industrial Development Organization** have significant CH₄ and other non-CO₂ GHG programmes.



Priority thematic areas

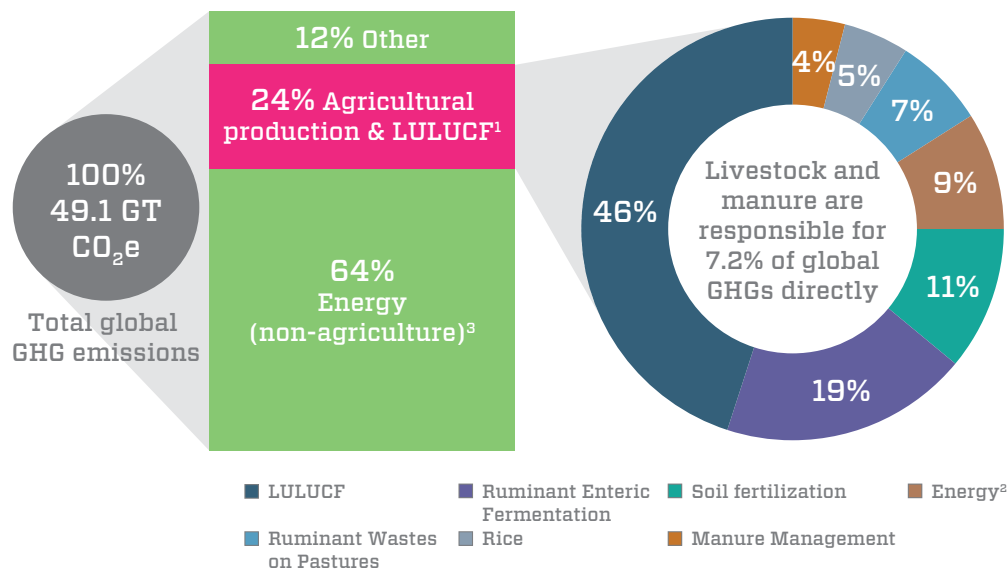
LAND USE CLIMATE ACTION



Mitigation potential and co-benefits

Emissions from agriculture, forestry and other land use accounted for around 25 per cent of total global GHG emissions in 2010, or 10–12 Gt CO₂ eq per year.¹⁰² Agriculture accounts for 10–12 per cent of total emissions, and emissions from forestry and other land use account for around 12 per cent.¹⁰³ Land use is often the dominant source of emissions in low-income countries with limited industrial bases, often generating more than 50 per cent of national emissions.¹⁰⁴ Emissions from agriculture have been growing and are expected to become an increasingly significant source, given that, according to FAO estimates, food production will need to increase by 70 per cent between 2007 and 2050.¹⁰⁵

Land use and forestry have the biggest emissions impact, followed by livestock
Global AFOLU greenhouse gas emissions by sub-sector (2010)



1: LULUCF = Land Use, Land Use Change, and Forestry.

2: Includes emissions from on-farm energy consumption as well as from manufacturing of farm tractors, irrigation pumps, other machinery, and key inputs such as fertilizer. It excludes emissions from the transport of food.

3: Excludes emissions from agricultural energy sources described above.

4: Comprised of Ruminant enteric fermentation, Ruminant wastes on pastures, and Manure Management Source: WRI Analysis for percentages.

Source: World Resources Institute analysis based on UNEP, 2012; FAO, 2012; EIA, 2012; IEA, 2012; and Houghton, 2008, with adjustments

There are low-cost mitigation opportunities in agriculture, forestry and other land use that include additional co-benefits such as increased food security and agricultural productivity, abatement of air pollution, water protection, reduced adverse health effects and lower heating costs.¹⁰⁶ UNEP estimates that at marginal costs of less than USD 50–100 per tonne of CO₂ eq, the direct emission reduction potential of agriculture lies in the range of 1.1–4.3 Gt CO₂ eq and of forestry in the range of 1.3–4.2 Gt CO₂ eq in 2020, or as much as two thirds of current emissions from these sectors.¹⁰⁷

Barriers to mitigation action in the land use sector include: long implementation timeframes, a lack of building readiness capacity, and inadequate subnational integration and multilevel governance. In addition, many actions are site-specific or cannot easily be replicated and scaled up across different ecosystems or under different governance structures.¹⁰⁸



Moving forward through policy options

IMPROVED FOREST MANAGEMENT:

The most cost-effective policy options to reduce emissions in the forestry sector are related to improved forest management. This includes activities aimed at reducing emissions from deforestation and forest degradation, the conservation of forest carbon stocks, the sustainable management of forests and the enhancement of forest carbon stocks in developing countries (REDD-plus). The restoration and reforestation of degraded land is another activity with large mitigation potential and co-benefits, for example in arid and semi-arid lands or peatlands. In addition, afforestation and reforestation activities to enhance forest carbon stocks are also being implemented in many countries.¹⁰⁹

Enhancing forest carbon actions and standards



China

In order to achieve its ambitious goal of increasing the net increment of forest area by 40 million hectares by the end of 2020 compared with 2005, China is combining a number of afforestation, forest protection and sustainable forest management policies and practices, with the aim of further increasing forested area and integrating forest carbon into its national carbon emissions trading system pilot programme.¹¹⁰



Panama

In Panama, a public-private alliance known as the Alliance for 1 Million has been created to reforest 1 million hectares of land over the next 20 years. Specifically, in support of Panama's National Forestry Plan, the Alliance for 1 Million will reforest over 13 per cent of the country's land area and help to meet cross-sectoral sustainable development goals, support the nation's mitigation commitments and protect the rich biodiversity and delivery of critical ecosystem services.¹¹¹



United Kingdom

The Woodland Carbon Code in the United Kingdom was developed between 2007 and 2011 to address the lack of confidence, lack of standards and disrepute prevailing in the United Kingdom forest carbon markets at that time. The standards developed under the Code address mitigation but also require an assessment of resilience to climate change. In total, 202 projects were registered, encompassing 15,401 hectares and with a potential of 5.7 Mt CO₂ eq lifetime sequestration.¹¹²



IMPROVED AGRICULTURAL PRACTICES:

Improved agricultural practices nested in geographic and social scales can unlock large mitigation potential while at the same time contributing to improved productivity and resilience and promoting rural development. Such practices include conservation agriculture, improved livestock and manure management, more carbon-efficient and profitable livestock production systems, lower fertilizer use and improved land use management and planning.

Strategic agriculture production approaches and carbon offsetting



Brazil

Brazil has developed its Low-Carbon Agriculture Plan (ABC Plan) to promote sustainable practices for agricultural production systems. The objective of the ABC Plan is to stimulate specific activities such as no-tillage agriculture, the recuperation of degraded land, the integration of crops, livestock and forest, the planting of commercial forests, biological nitrogen fixation, and treatment of animal residues. Between 2005 and 2013, national crop production increased by 64 per cent, while the area used for agriculture increased by only 9 per cent.¹¹³



Australia

Australia launched in 2011 its Carbon Farming Initiative. The initiative provides a voluntary carbon offsets scheme, under which farmers and land managers are able to generate credits for activities undertaken on their land that lead to reductions in carbon emissions or increase the removal of carbon from the atmosphere.



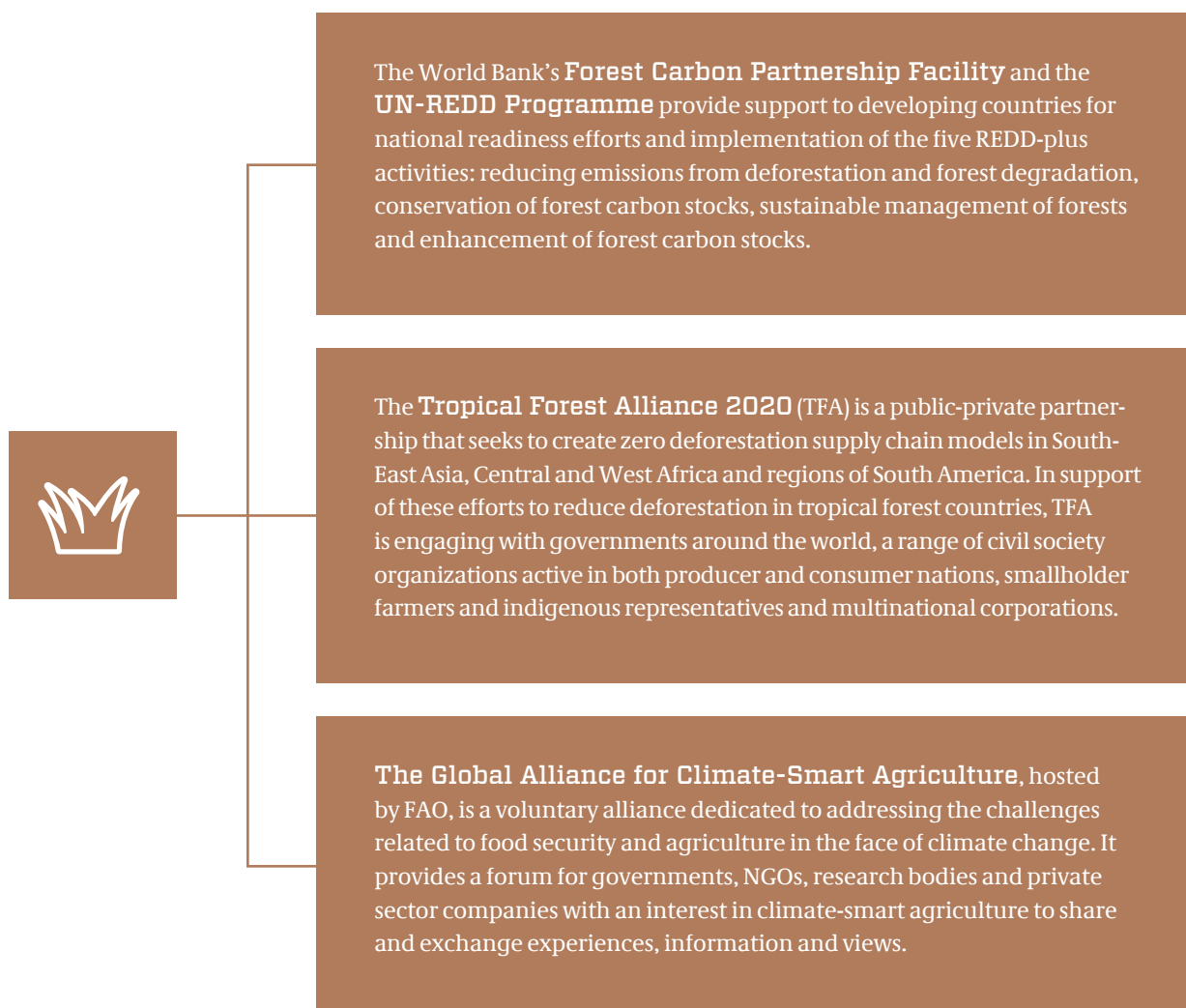
New Zealand

New Zealand's agriculture mitigation efforts focus on increasing the productivity of the agriculture sector while simultaneously reducing the emissions per unit of produce (emissions intensity). While absolute emissions from agriculture have increased by 15 per cent since 1990, emissions intensity has decreased by 20 per cent. New Zealand actively engages in national and international research and collaboration to share experiences and to scale up the reduction of emissions intensity.¹¹⁴



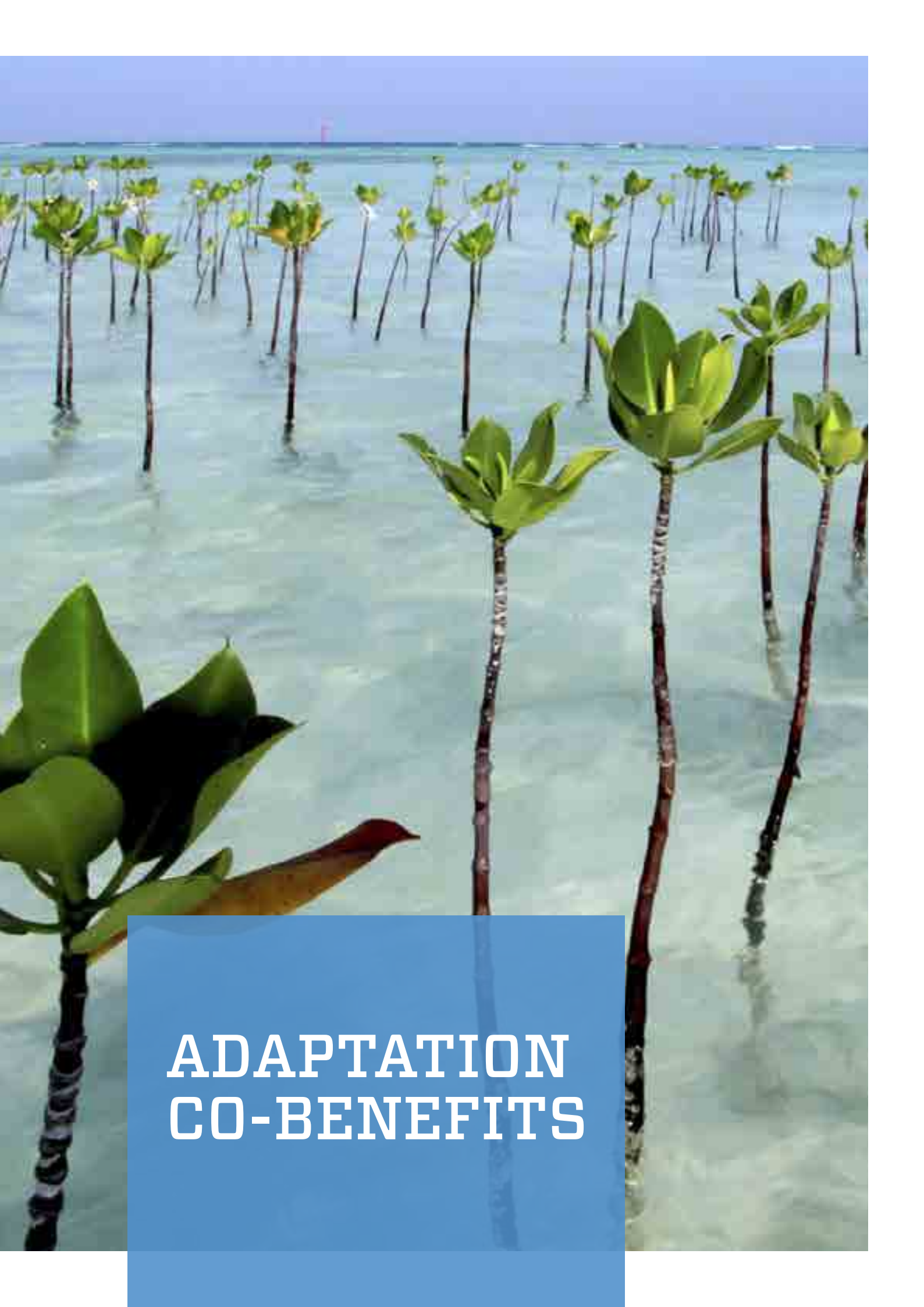
Solutions through international cooperation

International cooperation and partnerships can play a key role in fostering technical readiness and political will towards land use climate action. Public–private sector partnerships could also scale up the impact of land use actions with climate benefits by providing access to additional resources, spurring the development of new models for sustainable land use, and identifying innovative mechanisms to ensure sustainability. For example, such existing initiatives include:



Other initiatives include bilateral support for REDD-plus through initiatives such as Norway's **Forest and Climate Initiative** and Germany's **REDD Early Movers Programme**. The **New York Declaration on Forests** aims at slowing, halting and reversing global forest loss, while enhancing food security. Related to restoration, the **Bonn Challenge** aims to restore 150 million hectares of the world's deforested and degraded lands by 2020. Further initiatives for international cooperation in the agricultural sector include the **Addressing Short-Lived Climate Pollutants from Agriculture initiative** and the **Global Research Alliance on Agricultural Greenhouse Gases**.

International organizations such as **FAO** and the **World Bank** are engaged in a range of other initiatives aimed at the land-use sector, which in many cases also address climate change.



ADAPTATION CO-BENEFITS

Co-benefit potential

Adaptation and mitigation are complementary strategies for reducing and managing the risks of climate change. The impacts of climate change that have already occurred and are being addressed by adaptation are widespread and include impacts on food and water security, human health and well-being, biodiversity and ecosystem services, economic activities and infrastructure, and the exacerbation of inequalities and poverty.¹¹⁵ As GHG emissions increase, the risks of climate change impacts on people, economies and ecosystems that are severe, pervasive and irreversible are growing.

Mitigation action to reduce GHG emissions in many areas has the potential to reduce the scale of the adaptation required and to enable many adaptation co-benefits. Energy efficiency, for example, can improve the ability of communities to adapt to climate change by reducing the peak demand they put on power systems during high temperatures or unexpected weather and improving the comfort level of buildings in uncertain weather.¹¹⁶ Science states that substantial emission reductions, even over the next few decades, can reduce future climate risks, increase the prospects for effective adaptation, reduce the costs and challenges of mitigation in the longer term and contribute to climate-resilient pathways for sustainable development.¹¹⁷

Moving forward through policy options

A significant number of policy approaches and low-cost mitigation opportunities with adaptation co-benefits exist in many areas, including water management, land use, human settlements, infrastructure and energy systems, as well as human health. Such approaches address the issues of food security, environmental sustainability, climate adaptation needs and socioeconomic development in a holistic, interconnected manner.

Specific examples include: improved agricultural practices; effective cropland and grazing land management; research, development and deployment and application of efficient land-use management and planning; improved land-use productivity and resilience; improved livestock productivity; reduction of food loss and waste; implementation of REDD-plus; improved forest management; and afforestation and reforestation.¹¹⁸

Solutions through international cooperation

A number of cooperative initiatives and national practices, such as the [Global Alliance for Climate-Smart Agriculture](#) mentioned under the land-use section, address the nexus between mitigation, adaptation and related co-benefits and help to promote good practices. As another example, the [Global Resilience Partnership](#) aims to help millions of vulnerable people in the Sahel, the Horn of Africa and South and South-East Asia better adapt to shocks and chronic stresses and invest in a more resilient future. This new Partnership will help the global community pivot from simply reacting in the wake of disasters to driving evidence-based investments that enable cities, communities and households to better manage and adapt to inevitable shocks.

National adaptation plans

Through the [Integrating Agriculture in National Adaptation Plans](#) programme, FAO and UNDP will work with ministries of agriculture in Nepal, Kenya, the Philippines, Thailand, Uganda, Uruguay, Viet Nam and Zambia to incorporate agricultural sectors into national adaptation plans in order to safeguard livelihoods, raise agricultural production and boost food security. In particular, the initiative aims to help countries make improvements in medium-to long-term planning and budgeting processes.

Financing strategic approaches to agriculture and land-use

The African Development Bank is piloting forest-based mitigation and adaptation strategies, recognizing the synergies between REDD-plus and facilitating adaptation to climate change.¹¹⁹

The [Adaptation for Smallholder Agriculture Programme \(ASAP\)](#) channels climate finance to smallholder farmers in more than 30 developing countries so they can access information, tools and technologies to help build their resilience to climate change. Launched by the International Fund for Agricultural Development, ASAP has become the largest global financing source dedicated to supporting the adaptation of poor smallholder farmers to climate change.

Managing our water resources

The African Development Bank's [Integrated Water Resources Management \(IWRM\)](#) approach seeks to build adaptive capacity in African countries through the coordinated development and management of water, land and related resources in order to maximize economic and social well-being without compromising the sustainability of vital ecosystems.¹²⁰ The African Development Bank has applied the IWRM approach in Malawi, Namibia, Zambia and the Mano River basin in Western Africa.

Assessing the health impacts of climate change

Reconciling Adaptation, Mitigation and Sustainable Development for Cities (RAMSES) is a European Integrated Project with contributions from the World Health Organization in assessing and estimating past and future impacts of climate change on health. RAMSES aims to deliver evidence on the impacts of climate change and on the costs and benefits of a wide range of measures, such as land-use planning and infrastructure modification. Case studies will be conducted in cities in Europe and developing countries.

Sharing knowledge and capacity-building experience

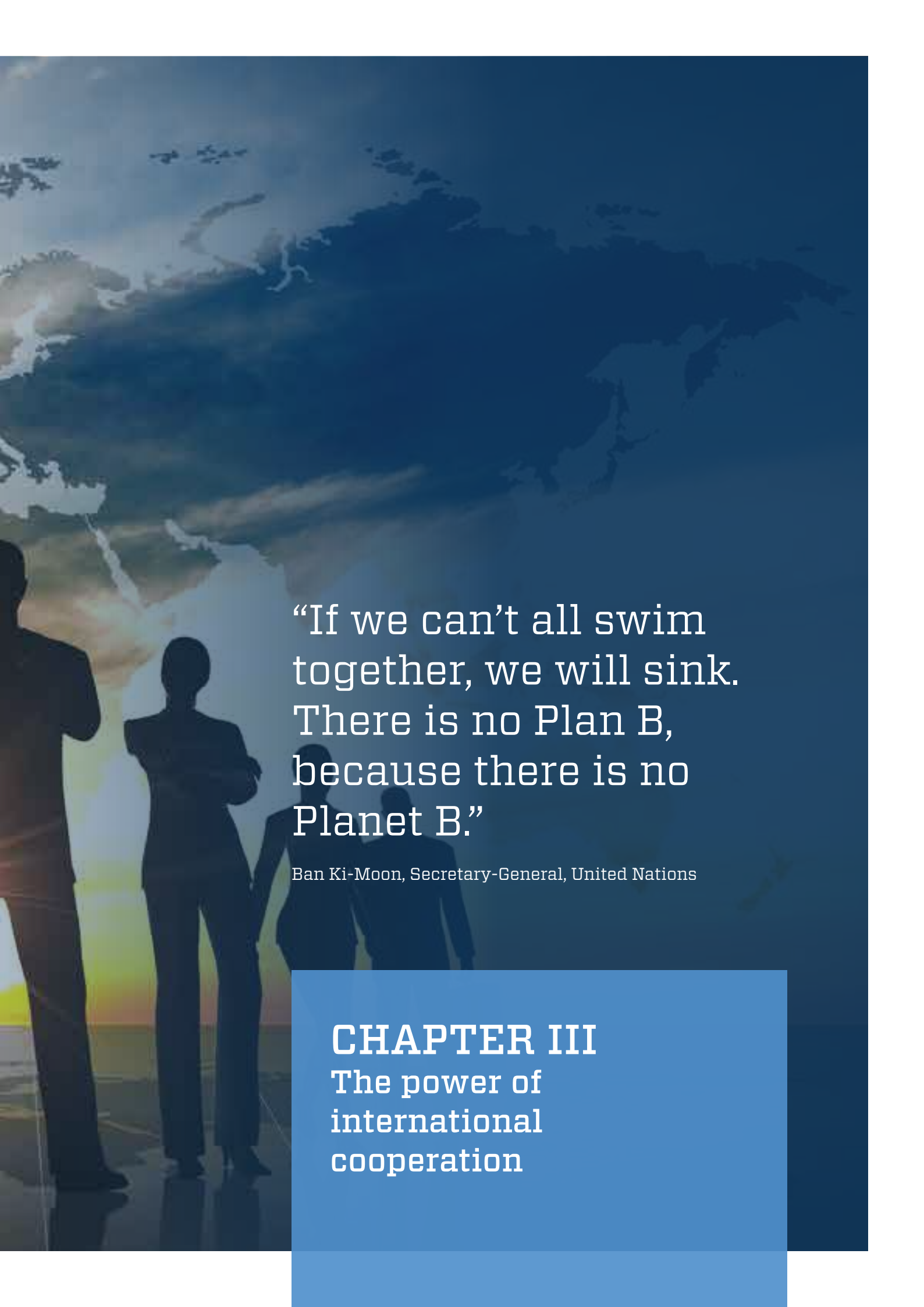
The United Nations Institute for Training and Research brought together nine organizations from Africa, Asia, the Caribbean, Europe and the Pacific to form a knowledge- and capacity-development network. Each organization contributes its specialized experience to develop and apply tools and methodologies in order to support decision-making related to climate change adaptation and mitigation for developing countries.¹²¹

Climate risk preparedness

The Climate Risk and Early Warning Systems (CREWS) coalition is led by France in collaboration with Norway, the World Meteorological Organization, the United Nations Office for Disaster Risk Reduction and the Global Facility for Disaster Reduction and Recovery managed by the World Bank. It aims to strengthen and broaden the work of the international community in supporting early warning systems in vulnerable countries, with the goal of fully covering the global population exposed to extreme climate events by 2020.

The **G7 Climate Risk Insurance Initiative** aims to increase the number of people benefiting from direct or indirect insurance covering the negative impacts of climate change-induced hazards in low and middle-income countries by up to 400 million by 2020. Efforts include stimulating the creation of effective climate risk insurance solutions and markets, and the smart use of insurance-related schemes to enable climate change adaptation and contribute to enhancing economic growth, poverty reduction and climate resilience.





“If we can’t all swim together, we will sink. There is no Plan B, because there is no Planet B.”

Ban Ki-Moon, Secretary-General, United Nations

CHAPTER III

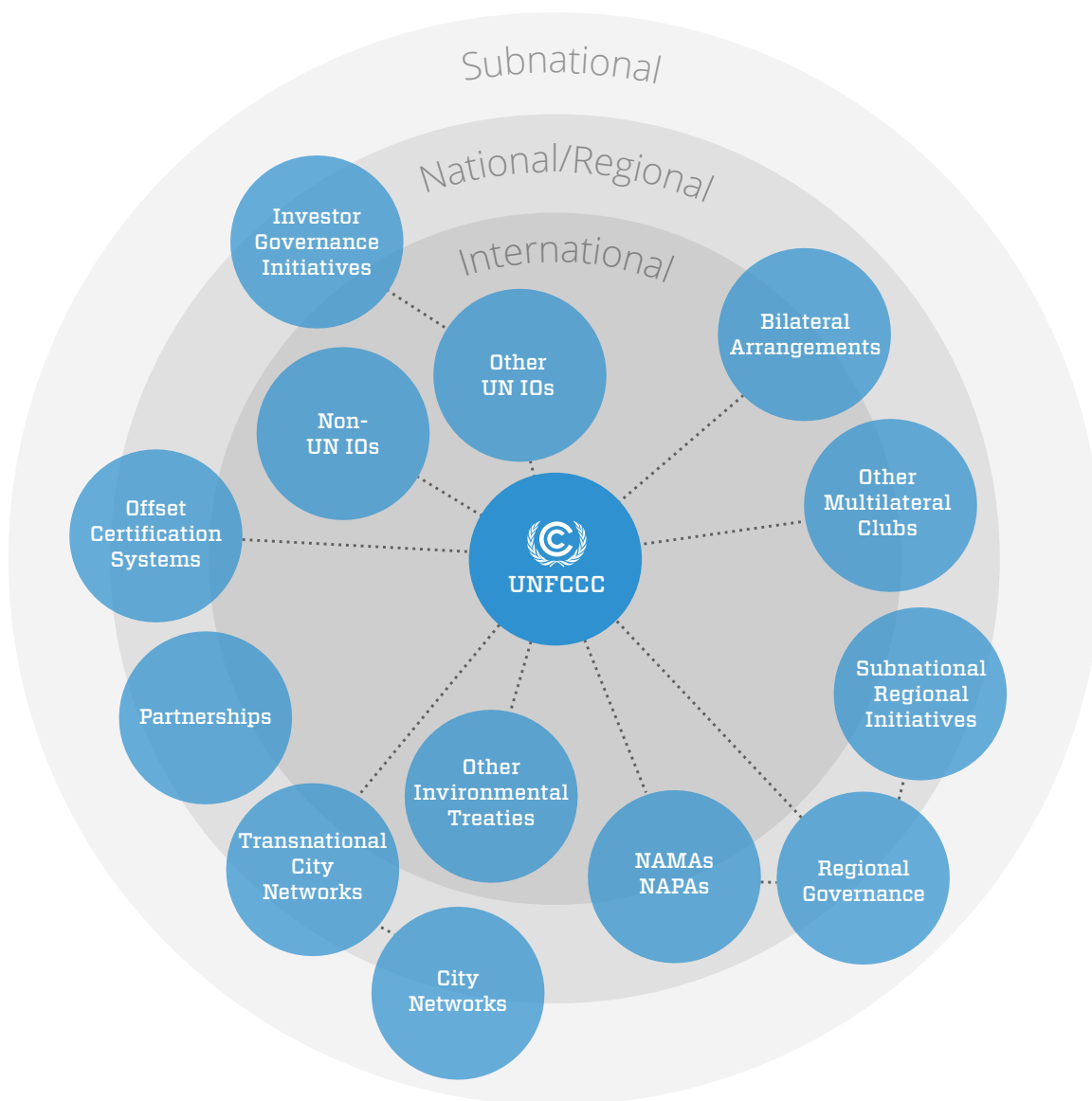
The power of international cooperation

Facilitating climate action through international cooperation.

Climate change is a global problem and extensive international cooperation is critical for effective solutions. The UN has led the international response to climate change through the institutions created under the UNFCCC and with support from other UN bodies and multilateral agencies. Countries and non-State actors, such as cities, states, regions and the private sector, have also come together to cooperate on climate action and create alliances, initiatives and partnerships.

International organizations and cooperative initiatives, such as those mentioned below and within

each thematic area, can help Parties increase their pre-2020 ambition. However, international support must be paired with national-level climate strategies, regulations and plans to better enable such organizations and initiatives to provide Parties with targeted financial support, technology transfer and capacity-building.¹²² In addition, increased collaboration among Parties, UNFCCC institutions, international and multilateral organizations and non-State actors is critical to ensuring the complementarity of efforts, preventing duplication and supporting the effective implementation of policies and actions.



Source: The IPCC Fifth Assessment Report

The catalytic role of the UNFCCC

The UNFCCC has the potential to play a crucial catalytic role in helping Parties to raise their ambition and deliver higher levels of mitigation through 2020 and beyond. It is already doing so through a number of UNFCCC-constituted bodies and tools established to support Parties and their mitigation actions. These include:



Intergovernmental organizations and development institutions that foster climate action

A number of other UN institutions, multilateral agencies and development financial institutions offer support to Parties and other stakeholders in one or more of the thematic areas with high mitigation potential. They include:

- **The Food and Agriculture Organization of the United Nations**, which sees addressing climate change as central to its goal of eliminating hunger, food insecurity and malnutrition, runs a number of programmes to promote ecologically sustainable food production and climate-smart agriculture. It also offers support in monitoring the effects of climate change on food production and helps to implement the [UN-REDD Programme](#), along with the United Nations Development Programme and the United Nations Environment Programme.
 - **The International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO)** address emissions from international aviation and shipping, respectively. In 2010, governments agreed under the auspices of ICAO to improve aviation sector average fuel efficiency by 2 per cent per year, and committed to cap the sector's net CO₂ emissions from 2020 onwards.¹²⁶ Since 2012, the IMO has required ships to draw up energy efficiency management plans, and ships built after 2013 must meet a mandatory CO₂ emission standard.
 - **The International Energy Agency** aims to help ensure reliable, affordable and clean energy by providing authoritative statistics, analysis and policy advice. Its climate change work includes finding and sharing examples of best practice, and supporting cooperation between countries through expert events and technical analysis for climate change negotiations.
 - **The International Renewable Energy Agency (IRENA)** supports countries in their transition to a sustainable energy future and serves as the principal platform for international cooperation and a repository of policy, technology, resource and financial knowledge on renewable energy. IRENA promotes the widespread adoption and sustainable use of all forms of renewable energy in the
- pursuit of sustainable development, energy access, energy security and low-carbon economic growth.
- **The United Nations Development Programme (UNDP)** works in more than 170 countries and territories to help eradicate poverty and reduce inequalities and exclusion. It helps countries to develop policies, leadership skills, partnering abilities and institutional capabilities and build resilience in order to sustain development results. UNDP focuses on helping countries build and share solutions in sustainable development, democratic governance and peacebuilding, and climate and disaster resilience.
 - **The United Nations Environment Programme (UNEP)** is “the voice of the environment within the United Nations system”. Its work includes assessing global, regional and national environmental conditions and trends, developing international and national environmental instruments, and helping to strengthen institutions to better manage environmental issues. Its Emissions Gap reports provide authoritative information on the mitigation challenges facing Parties.
 - **Regional Development Banks**, such as the [African Development Bank](#), the [Asian Development Bank](#), the [European Bank for Reconstruction and Development](#) and the [Inter-American Development Bank](#), are multilateral financial institutions that provide financial and technical assistance for development within their regions. Finance is allocated through low-interest loans and grants for a range of development sectors such as environmental and natural resource management.
 - **The World Bank Group** sees climate change as posing a threat to its mission of poverty reduction and works with recipient countries to identify mitigation opportunities and their links to climate resilience, adaptation, sustainable development and growth. Its climate-related programmes include the [Climate Pricing Leadership Coalition](#), the [Creditworthiness Programme](#), the [Carbon Partnership Facility](#), the [Forest Carbon Partnership Facility](#) and the [Pilot Auction Facility for Methane and Climate Change Mitigation](#).¹²⁷

Inspiring action by non-State actors

In addition to the efforts of the UN and other multilateral institutions, numerous important commitments and actions are being taken by non-State actors such as cities, other subnational authorities and the private sector to address climate change. In order to draw attention to the critically important role of non-State actors in addressing climate change, the UNFCCC secretariat established a special initiative called [Momentum for Change](#), which recognizes each year game-changing initiatives of organiza-

tions, cities, industries, governments and other key players taking the lead on tackling climate change.¹²⁸

A number of new commitments and actions were also announced in September 2014 at the [UN Climate Summit](#) in New York, including the [Oil and Gas Climate Initiative](#), the [Compact of Mayors](#) and the [Compact of States and Regions](#). Many of these actions, along with thousands of others, are collected on the [Non-State Actor Zone for Climate Action \(NAZCA\) Portal](#), which was launched by the Peruvian presidency of COP 20 in Lima.¹²⁹

Cities

Urban areas are currently estimated to be responsible for 71–76 per cent of energy-related CO₂ emissions.¹³⁰ In 2014, 54 per cent of the world's population was living in cities, and this figure is expected to rise to 66 per cent by 2050.¹³¹ As cities expand and the urban population continues to grow, the demand for infrastructure stemming from rapid urbanization provides a major opportunity to enable transformation and build new urban systems that avoid locking in carbon-intensive infrastructure.

Many cities are achieving successful results through international cooperation via such organizations and initiatives as:

- **ICLEI**, launched in 1990, brings together more than 1,000 metropolises, cities and urban regions. Its climate-focused projects include the carbon*n* Climate Registry of local government climate actions, the Urban Low Emission Development Strategies project and the Local Government Climate Roadmap.¹³⁵
- **The C40** is a network of 75 of the world's largest cities aimed at driving urban action to reduce GHG emissions and climate risks while increasing the health, well-being and economic opportunities of urban citizens. C40 supports cities to collaborate effectively, share knowledge and drive meaningful, measurable and sustainable action on climate change.¹³⁶
- **The Compact of Mayors** is an agreement among a network of cities striving to take a transparent approach to reducing city-level emissions, reducing vulnerability and enhancing resilience to climate change. In total, 171 cities, representing 3.5 per cent of the total global population have committed to the Compact of Mayors, with many more signatories expected before the twenty-first Conference of the Parties (COP21) in Paris.

UNEP calculated that the three main city-level initiatives it analysed — C40, the Compact of Mayors and the carbon*n* Climate Registry — would deliver 1.08 Gt CO₂ eq of reductions by 2020.¹³⁷

Cities pave the way for climate action

A recent review by C40 of 144 cities that have announced short-term GHG emission reduction targets estimates that the achievement of these targets will result in emission reductions of 2.8 Gt CO₂ eq below business-as-usual levels by 2020. According to the same review, an additional 27 cities made emission reduction commitments for 2030, which, when combined with the commitments of the previously mentioned 144 cities, makes for a potential total emission reduction of 6.1 Gt CO₂ eq below business-as-usual levels by 2030.¹³²



Sydney, Australia is aiming to reduce its GHG emissions by 70 per cent in 2030 from 2006 levels. In addition, by 2030, it is aiming to increase its share of renewables in the final energy mix to 30 per cent.¹³³



Rio de Janeiro, which has an emission reduction target of 20 per cent below 2005 levels by 2020, became the first global city to reach full compliance with the Compact of Mayors.¹³⁴

Other subnational authorities

In addition to cities, other subnational authorities pursuing climate action include States, regions and provinces. The climate policies enacted by subnational authorities could serve as examples to their national governments and be scaled up accordingly.

Subnational authorities lead by example on climate action



In September 2015, Chinese President Xi Jinping announced that China would work towards implementing a national carbon emissions cap-and-trade programme by 2017. The design of the national cap-and-trade programme will be based on the results of its pilot cap-and-trade programmes that have been active since 2013 and 2014. These pilot programmes, which include five cities and two provinces, have allowed China to accumulate experience with developing and implementing cap-and-trade programmes at the subnational level, which will be scaled up to the national level.



In April 2015, Governor Edmund G. Brown set California's 2030 state-wide GHG emission reduction target at 40 per cent below 1990 levels. California's path to 2030 will be based on achieving 50 per cent electricity from renewables, doubling the energy efficiency of existing buildings, aggressive action on short-lived climate pollutants and active management of natural and working lands to serve as significant carbon sinks. These goals will be achieved through a range of policy mechanisms, including carbon pricing via a carbon market, direct regulation and voluntary measures, including expansion of zero-emission vehicles, methane capture, and improved efficiency across all sectors.

Similar to cities, subnational authorities are achieving successful results through international cooperation via organizations and initiatives.

- **The Compact of States and Regions** announced at the UN Climate Summit in New York in September 2014 is the first global accounting of the GHG inventories and the accompanying GHG reduction targets of state and regional governments. Twenty state and regional governments from around the world contributed to the first reporting period, representing over 10 per cent of global GDP and 220 million people. The current plans reported by these 20 governments will reduce emissions by 2 Gt CO₂ eq by 2020 relative to business-as-usual and reduce emissions by 7.9 GtCO₂e by 2030.¹³⁸ Since the first reporting period concluded, the number of governments that reported to the Compact of States and Regions has more than doubled to over 40, spanning 18 different countries and six continents.
- **The Under 2 MOU** — as the Sub-national Global Climate Leadership Memorandum of Understanding is better known — originated from a partnership between two members of the States & Regions Alliance, California and Baden-Württemberg, and the desire to bring together ambitious states and regions willing to make a number of key commitments towards reducing emissions and helping galvanize action at COP 21. Central to the agreement is that all signatories commit to either reducing GHG emissions by 80 to 95 per cent below 1990 levels by 2050 or achieving a per capita annual emission target of less than 2 metric tonnes by 2050. As of September 2015, a total of 41 jurisdictions representing 19 countries on five continents had signed or endorsed the Under 2 MOU, accounting for more than USD 12.3 trillion in GDP and more than 387 million people. **Jurisdictions are invited to sign or endorse the MOU until COP 21 in December 2015.**¹³⁹

The private sector

The 1,000 highest-emitting companies are responsible for around 20 per cent of global emissions.¹⁴⁰ As such, the private sector plays a pivotal role in addressing climate change worldwide. The 2014 Climate Summit in New York and the Lima-Paris Action Agenda illustrate that a growing number of cooperative initiatives involving private sector actors are emerging with the potential to have a significant impact in reducing GHG emissions and bridging the emissions gap.


Companies make ambitious climate pledges

In July 2015, the United States of America launched the American Business Act on Climate Pledge as part of the White House initiative to recruit private sector commitments ahead of COP21 in Paris. As part of this pledge, executives from 13 major United States corporations announced at least USD 140 billion in new low-carbon investments and more than 1,600 MW of new renewable energy to decrease their carbon footprints.¹⁴¹ As of October 2015, an additional 68 companies have joined the 13 original signatories. These 81 companies have operations in all 50 states, employ over 9 million people, represent more than USD 3 trillion in annual revenue, and have a combined market capitalization of over USD 5 trillion.¹⁴²

Leading private sector initiatives include:

- **The 2014 Global Investor Statement on Climate Change** has been signed by over 370 investors with more than USD 24 trillion in assets. The statement sets out steps that institutional investors, both asset owners and asset managers, can take to address climate change, and calls on governments to support a new global agreement on climate change by 2015, in addition to national and regional policy measures.
- **Caring for Climate** aims to advance the role of business in addressing climate change. Participants commit to voluntary targets for improving energy efficiency and reducing their carbon footprint. It is led by the UN Global Compact, the UNFCCC secretariat and UNEP.
- **The Oil and Gas Climate Initiative** is industry-driven and aims to catalyse practical action on climate change in areas such as natural gas, carbon reduction instruments and tools, and long-term energy solutions. It fosters the sharing of best practices and collaboration within the industry, and communicates what actions are being taken among its members.
- **Low Carbon Technology Partnerships initiative (LCTPi)**, led by the World Business Council for Sustainable Development (WBCSD) in partnership with the Sustainable Development Solutions Network and the IEA, aims to present a series of action plans at COP21 for the large-scale development and deployment of low-carbon technologies through dialogue between business and government. Focus areas include renewables, carbon capture and storage, cement and chemicals.
- **The Portfolio Decarbonization Coalition (PDC)** is a multi-stakeholder initiative that will drive GHG emission reductions by mobilizing a critical mass of institutional investors committed to gradually decarbonizing their portfolios through carbon-footprinting and portfolio decarbonization targets. The PDC also offers knowledge exchange and stakeholder dialogue opportunities for its members.
- **RE100** is a partnership between the Climate Group and the Carbon Disclosure Project (CDP) that aims to encourage the world's most influential businesses to commit to sourcing 100 per cent of the power they use from renewable sources. RE100 is supported by the We Mean Business coalition. It also works closely with IRENA's Coalition for Action and is among the cooperative initiatives in which the UNFCCC secretariat is engaged.
- **We Mean Business (WMB)** is a coalition of seven organizations, Business for Social Responsibility, CDP, Ceres, The B Team, The Climate Group, Corporate Leaders Group and WBCSD that forms a common platform to amplify the business voice, catalyze bold climate action and promote smart policy frameworks. To date 326 businesses and investors have signed up to WMB-led initiatives.¹⁴³





“We will move to a low-carbon world because nature will force us, or because policy will guide us. If we wait until nature forces us, the cost will be astronomical.”

Christiana Figueres,
Executive Secretary of the UNFCCC

CHAPTER IV

The path towards greater ambition and climate action through 2020 and beyond

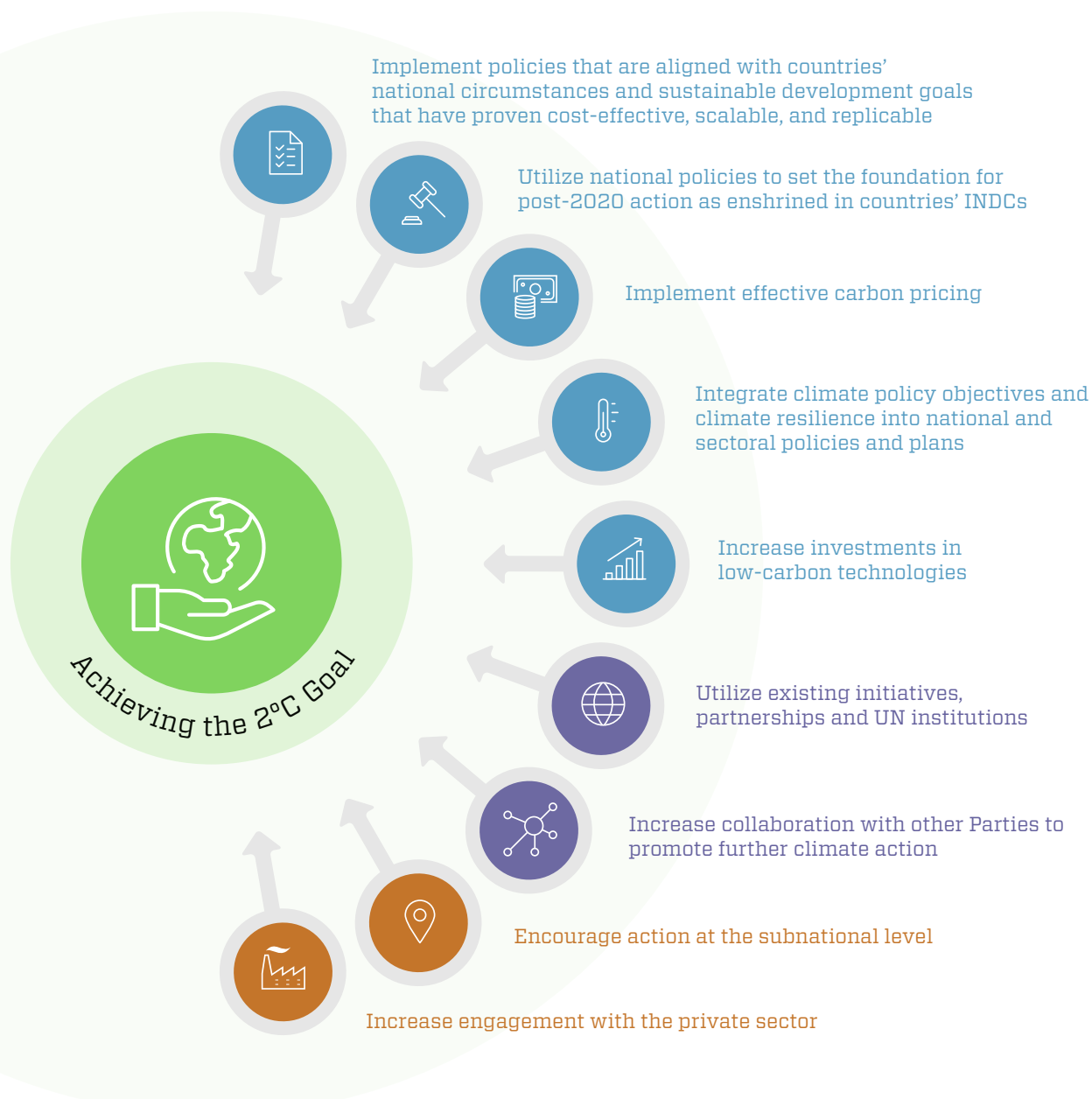
Achieving the 2 °C goal

Achieving the goal of limiting the increase in global average temperatures to below 2 °C requires immediate action and the full engagement of Parties and other relevant stakeholders. To that end, the UNFCCC plays an important role in catalysing political will among Parties, keeping track of global emission levels and reductions, providing a platform for Parties to raise their pre-2020 ambition and maintaining momentum for action after 2020.

To achieve the 2 °C goal, however, it is ultimately up to Parties to decide to increase their pre-2020 ambition and to take climate action now. It will

also be critical for Parties to lay the foundation for post-2020 action in the new international climate agreement to be reached at COP 21, namely setting the long-term direction of global emissions and providing the necessary framework for the transition to a low-emissions, climate-resilient economy.

Below is a list of overarching and cross-cutting actions that could help facilitate the transition towards a low-emissions future, improve the likelihood of achieving the 2 °C goal and lay the foundation for post-2020 climate action.



National policies that stimulate investment in low-carbon development and sustainable growth



Implement policies that are aligned with countries' national circumstances and sustainable development goals that have proven cost-effective, scalable and replicable

There are many policy options and instruments that Parties can implement to increase their pre-2020 ambition. While this SPM does not include an exhaustive list of such policies, it does provide a broad range of options that have been shown to be cost-effective, scalable and replicable, and which Parties can implement while taking into account their national circumstances and sustainable development goals.



Utilize national policies to set the foundation for post-2020 action as enshrined in countries' INDCs

In addition to increasing pre-2020 ambition, implementing climate policies now would provide an opportunity for Parties to strengthen the institutional, regulatory and legal frameworks and the relevant in-country human and institutional capacity required to successfully implement the policies identified in their INDCs for post-2020 action. By laying the foundation for such frameworks now, Parties will send a clear signal to all stakeholders that comprehensive climate action is under way and set the course towards long-term economic transformation and change.



Implement effective carbon pricing

Carbon prices play an important role in guiding long-term public and private investments and consumption choices. Effective carbon pricing makes investment in low-carbon or carbon-free technologies attractive and reduces the demand for carbon-intensive fossil fuels. Almost 40 countries and more than 20 cities, states and provinces already use carbon-pricing mechanisms or are planning to implement them. To achieve global coverage by 2020, Parties could strive to introduce or strengthen carbon pricing now.



Integrate climate policy objectives and climate resilience into national and sectoral policies and plans

Parties could better integrate climate policy objectives and climate risk assessments into their national and sectoral policies and plans to better guide investment strategies and infrastructure decisions. This could provide strong incentives to pursue low-emission, climate-resilient investments and could prevent the locking-in of carbon-intensive and polluting investments. In addition, this would allow countries to better plan for climate change-related risks to national facilities, operations and programmes, and provide information and tools to assist non-State actors in making strategic decisions to improve preparedness and resilience. Such actions would lead to stronger and safer communities and infrastructure at the national and subnational levels.



Increase investments in low-carbon technologies

Promoting and enhancing action on the development and transfer of low-carbon technologies is critical to reducing GHG emissions and the adverse effects of climate change. Low-carbon technologies can achieve better penetration of national and global markets through increased investments in research, development, demonstration and deployment, and dedicated public-private partnerships.

In particular, public finance can play a catalytic role in fostering the transformational change needed to scale up innovation in low-carbon technologies by driving down costs and leading to a wider range of technological solutions. Efforts to scale up investment in low-carbon technologies can be coupled with complementary efforts such as promoting the use of innovative business models, providing financial incentives for the large-scale deployment of low-carbon technologies, and putting in place measures to reduce financial risks and market and social barriers in order to stimulate investments.

Fostering international cooperation on climate change



Utilize existing initiatives, partnerships and UN institutions and enhance support for developing countries

A broad range of cooperative initiatives, partnerships and UN institutions are identified in this SPM that can assist Parties in developing and implementing relevant policy options and achieving their enhanced pre-2020 climate action goals and objectives. Many involve a diverse range of stakeholders and are able to provide information on best practices, assistance with the design and adoption of policies and programmes, training, and a wide range of other tools. Together with developed country Parties and other Parties in a position to do so, these initiatives, partnerships and UN institutions could further enhance the financial, technology and capacity-building support to developing country Parties. Such support could help Parties in implementing climate policies more quickly, efficiently and effectively.



Increase collaboration with other Parties to promote further climate action

International collaboration between Parties plays a fundamental role in supporting the effective design and implementation of policies and fostering climate action. For example, international partnerships allow countries to share the costs of innovation, research and development, with the benefits being shared by all stakeholders. This can be particularly beneficial to developing countries, whose limited financial capabilities and human and infrastructure capacity can hinder development and innovation.

Parties could increase pre-2020 ambition by launching new partnerships and initiatives, such as the African Group Renewable Energy Partnership that was presented during the technical expert meeting on renewable energy supply in June 2014. This could sustain the groundswell of climate action that has already been mobilized and further close the emissions gap.

Encouraging further engagement by subnational actors and the private sector



Encourage action at the subnational level

There are numerous commitments and actions being taken by cities and other subnational authorities to address climate change. While some of these actions are being pursued unilaterally, national policies can assist cities and subnational authorities in implementing low-carbon urban development strategies.

In particular, national policies can assist cities in increasing investments in public transportation, waste management, building efficiency and renewable energy development by establishing relevant policy frameworks. In addition, Parties can engage cities through initiatives or dialogues to encourage greater climate action and ambition, exchange experiences, information and views, and collaborate on technology and policy innovations.



Increase engagement with the private sector

The private sector is playing an increasingly important role in reducing GHG emissions, helping close the emissions gap and gearing investment towards low-emission and climate-resilient infrastructure. Through various cooperative initiatives and multilateral actions, the private sector has been able to mobilize and implement climate actions on a local, regional, national and global scale. However, in many countries, actions by the private sector have been hindered by the limited engagement of national governments and weak national climate policy frameworks.

To increase engagement, Parties could enhance the dialogue with the private sector, whether through formal national policy frameworks or voluntary arrangements. For example, national policies can be implemented to recognize, encourage and assist major businesses in adopting emission reduction targets and developing relevant action plans, as well as to facilitate the disclosure of GHG emission data and emission reduction efforts. To ensure maximum participation and cooperation, Parties could actively engage the private sector when developing such policies.

ENDNOTES

- 1 While there is a broad range of initiatives and partnerships available that facilitate pre-2020 action, the initiatives identified were included for their inclusiveness, ambition, capacity to deliver, transparency and accountability.
- 2 IPCC. 2013. Summary for Policymakers. In: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, pages 17 and 19.
- 3 FCCC/TP/2014/3, paragraph 11.
- 4 FCCC/TP/2013/4, paragraph 31.
- 5 UNEP. 2014. *The Emissions Gap Report 2014*, page xviii.
- 6 UNEP. 2015. *The Emissions Gap Report 2015*, under publication.
- 7 Technical Summary. In: *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*.
- 8 World Bank. 2012. *Turn down the heat: Why a 4°C warmer world must be avoided*, page xviii.
- 9 Technical Summary. In: *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, table TS.2.
- 10 The World Bank Group. 2015. *Carbon Pricing Watch 2015*.
- 11 New Climate Economy. 2015. *Seizing the Global Opportunity*, page 18.
- 12 IEA. 2014. *World Energy Outlook 2014*.
- 13 New Climate Economy. 2015. *Seizing the Global Opportunity*, page 42
- 14 Nicola, S. *Fossil Fuel Subsidies Fall in Gain for Renewables*. Available at <<http://www.bloomberg.com/news/articles/2015-01-30/fossil-fuel-subsidies-fall-in-gain-for-renewables>>.
- 15 Climate Policy Initiative. 2014. *The Global Landscape of Climate Finance, 2014*, page iv.
- 16 IEA. 2012. *Energy Technology Perspectives 2012: Pathways to a Clean Energy System*, page 1.
- 17 UNEP/BNEF. 2015. *Global Trends in Renewable Energy Investment 2015*.
- 18 UNEP/BNEF figures, 2004 figure from IEA (2007). *Renewables in Global Energy Supply*.
- 19 Renewable Energy Policy Network for the 21st Century, *Renewable 2015 Global Status Report*, page 6.
- 20 UNEP. 2013. *The Emissions Gap Report 2013*, page xvi.
- 21 FCCC/TP/2015/4, paragraph 13.
- 22 New Climate Economy. 2014. *Better Growth, Better Climate*, page 15.
- 23 FCCC/TP/2015/4/Add.1, paragraph 10.
- 24 UNFCCC. TEM to unlock mitigation opportunities in RE, March 2014, page 1.
- 25 European Union Energy Initiative Partnership Dialogue Facility (EU EI), 2014.
- 26 World Energy Council. 2015. *World Energy Trilemma, Priority actions on climate change and how to balance the trilemma*.
- 27 *Rural Electrification Authority*. Available at <<http://www.rea.co.ke/>>.
- 28 FCCC/TP/2014/3/Add.1, spotlight box 1, and the SunShot Initiative website available at <<http://energy.gov/eere/sunshot/sunshot-initiative>>.
- 29 Renewable Energy Policy Network for the 21st Century, *Renewable 2015 Global Status Report*, page 7.
- 30 *India's Intended Nationally Determined Contribution*. Available at <<http://www4.unfccc.int/submissions/INDC/Published%20Documents/India/1/INDIA%20INDC%20TO%20UNFCCC.pdf>>.
- 31 FCCC/TP/2014/3/Add.1, spotlight box 4.
- 32 *European Union 2030 Energy Strategy*. Available at <<http://ec.europa.eu/energy/en/topics/energy-strategy/2030-energy-strategy>>.
- 33 Letter from Su Wei, Director-General of the Department of Climate Change in the National Development and Reform Commission of China to UNFCCC Executive Secretary Yvo de Boer, 20 January 2010.
- 34 China's Intended Nationally Determined Contribution. Available at <http://www4.unfccc.int/submissions/indc/Submission%20Pages/submissions.aspx>
- 35 Presentation made by Sweden at the Ad Hoc Working Group on the Durban Platform for Enhanced Action technical expert meeting on renewable energy in June 2015.
- 36 Green Fiscal Policy Network. Available at <<http://www.greenfiscalspolicy.org/countries/ethiopia/>>.
- 37 Renewable Energy Policy Network for the 21st Century, *Renewable 2015 Global Status Report*, page 7.
- 38 *E-parliament website*. Available at <<http://www.e-parl.net/eparliament/pdf/080603%20FIT%20toolkit.pdf>>.
- 39 FCCC/TP/2014/3/Add.1, box 5.
- 40 Agora Energiewende. 2015. *Report on the German Power System*, page 13.
- 41 Available at <<http://www.iea.org/policiesandmeasures/pams/thailand/name-43052-en.php>>.
- 42 Available at <<http://www.iea.org/policiesandmeasures/pams/thailand/name-43052-en.php>>.
- 43 FCCC/TP/2015/4, page 52.

- 44 UNFCCC, TEM to unlock mitigation opportunities in RE, March 2014, page 2.
- 45 OECD/IEA. 2014. *Capturing the Multiple Benefits of Energy Efficiency*, page 19.
- 46 OECD/IEA. 2014. *Capturing the Multiple Benefits of Energy Efficiency*, page 22.
- 47 FCCC/TP/2014/3, paragraph 40.
- 48 FCCC/TP/2015/4/Add.2, paragraph 16 and Table 1.
- 49 FCCC/TP/2014/3, paragraph 46.
- 50 FCCC/TP/2014/3/Add.1, table 5.
- 51 *The United States Energy Star Program*. Available at <www.energystar.gov/about>.
- 52 FCCC/TP/2014/3, paragraph 55.
- 53 Energy Commission. 2009. *Final Report - CFL Exchange Programme Impact Assessment*.
- 54 *The Department of Trade & Industry, Republic of South Africa*. Available at <https://www.thedti.gov.za/financial_assistance/financial_incentive.jsp?id=45&subthemeid=26>.
- 55 FCCC/TP/2014/3/Add.1, paragraph 44.
- 56 FCCC/TP/2014/3, spotlight box 6.
- 57 OECD. 2010. *OECD Environmental Performance Reviews JAPAN*, page 136. Available at <<http://library.haverford.edu/file-id-387>>.
- 58 FCCC/TP/2014/3/Add.1, spotlight box 8.
- 59 FCCC/TP/2015/4, page 36, spotlight box 3
- 60 IPCC. 2014. *Transport, in Climate Change 2014: Mitigation of Climate Change*, page 603.
- 61 FCCC/TP/2013/8/Add.1, paragraph 67.
- 62 United Nations press release. Available at <<http://www.un.org/climatechange/summit/wp-content/uploads/sites/2/2014/05/TRANSPORT-PR.pdf>>.
- 63 UNEP. 2012. *The Emissions Gap Report 2012*, page 38
- 64 See <http://www.nyc.gov/html/ia/gprb/downloads/pdf/Mexico%20City_Metrobus.pdf>.
- 65 FCCC/TP/2013/8/Add.1, paragraph 73(b).
- 66 FCCC/TP/2015/4/Add.2, spotlight box 5 .
- 67 Midgley P. 2009. The role of smart bike sharing scheme systems in urban mobility. *Journeys*. May 2009: page 25.
- 68 International Energy Agency. 2013. *A Tale of Renewed Cities: A policy guide on how to transform cities by improving energy efficiency in urban transport systems*.
- 69 FCCC/TP/2013/8/Add.1, paragraph 73(a).
- 70 See <http://www.mlit.go.jp/kokusai/itf/kokusai_itf_000023.html>.
- 71 World Resources Institute. *Great expectations: EMBARQ Turkey grows BikeLab project*.
- 72 See <<http://www.theicct.org/info-tools/global-passenger-vehicle-standards>>.
- 73 FCCC/TP/2013/8/Add.1, paragraph 73(c).
- 74 UNFCCC, TEM on CCS, October 2014, page 1.
- 75 UNFCCC, TEM on CCS, October 2014, page 1.
- 76 FCCC/TP/2014/13/Add.3, paragraph 12.
- 77 UNEP (2011). *Bridging the Emissions Gap*. Page 34.
- 78 FCCC/TP/2014/13/Add.3, paragraph 23.
- 79 Notable CCS Projects in China. Available at <<https://www.globalccsinstitute.com/insights/authors/TonyZhang/2014/11/26/notable-ccs-projects-china>>.
- 80 Masdar & ADNOC Take Carbon Capture, Usage & Storage Proj. Forward at Emirates Steel's Musafah Facility. Available at <<http://www.masdar.ae/en/media/detail/masdar-and-adnoc-take-carbon-capture-usage-storage-project-forward-at-emira>>.
- 81 *CCS Commercialisation competition*. Available at <<https://www.gov.uk/guidance/uk-carbon-capture-and-storage-government-funding-and-support#ccs-commercialisation-competition>>.
- 82 FCCC/TP/2014/3. Add. 3, page 8
- 83 FCCC/TP/2014/13/Add.3, paragraphs 36–39.
- 84 Report from the Commission to the European Parliament and the Council. *Implementation of Directive 2009/31/EC on the geological storage of carbon dioxide*. Available at <<http://ec.europa.eu/transparency/regdoc/rep/1/2014/EN/1-2014-99-EN-F1-1.Pdf>>
- 85 *South African Centre for Carbon Capture and Storage*. Available at <<http://www.sacccs.org.za/roadmap/>>.
- 86 FCCC/TP/2014/3. Add. 3, page 14
- 87 Global CCS Institute (2015). *The Costs of CCS and other Low-carbon Technologies – 2015 Update*, page 1.
- 88 UNFCCC, TEM on CCS, October 2014, page 2.
- 89 FCCC/TP/2014/13/Add.4, paragraph 1.
- 90 FCCC/TP/2014/13/Add.4, paragraph 2.
- 91 United States Environmental Protection Agency. *Global Mitigation of Non-CO2 Greenhouse Gases: 2010 to 2020*. Executive Summary. Available at <http://www3.epa.gov/climatechange/Downloads/EPAactivities/GM_ES.pdf>.
- 92 FCCC/TP/2014/13/Add.4.

- 93 FCCC/TP/2014/13/Add.4, table 3.
- 94 European Environment Agency. 2013. *Municipal Waste Management in the Netherlands*.
- 95 UNEP. 2011. *Near-term Climate Protection and Clean Air Benefits: Actions for Controlling Short-lived Climate Forcers*.
- 96 FCCC/TP/2014/13/Add.4 paragraph 36.
- 97 FCCC/TP/2014/13/Add.4 paragraph 26.
- 98 FCCC/TP/2014/13/Add.4, paragraph 26.
- 99 NZAGRC: *New Zealand research & development into mitigation solutions and knowledge source for greenhouse gases*. Available at <<http://www.nzagrc.org.nz/>>.
- 100 Department of Agriculture, Food and the Marine. *Sustainable Healthy Agri-Food Research Plan*. Available at <<http://www.agriculture.gov.ie/media/migration/research/whatsnew/SustainableHealthyAgriFoodResearchPlan300315.pdf>>.
- 101 NAMA submission to the UNFCCC.
- 102 FCCC/TP/2014/13/Add.1, paragraph 4.
- 103 FCCC/TP/2014/13/Add.1, paragraph 4.
- 104 FCCC/TP/2014/13/Add.1, paragraph 9.
- 105 FCCC/TP/2014/13/Add.1, paragraphs 6 and 7.
- 106 FCCC/TP/2014/13/Add.1.
- 107 FCCC/TP/2014/13/Add.1, paragraph 10.
- 108 FCCC/TP/2014/13/Add.1, paragraph 15.
- 109 FCCC/TP/2014/13/Add.1, page 16.
- 110 FCCC/TP/2014/13/Add.1, page 16.
- 111 Autoridad Nacional del Ambiente, Panama. 2014. Press release. Available at <<http://anam.gob.pa/index.php/homepage/ultimas-noticias/otras-noticias/700-gobierno-nacional-y-sociedad-civil-sembraran-un-millon-de-hectareas-y-sustentan-compromiso-con-la-agenda-ambiental>>.
- 112 FCCC/TP/2014/13/Add.1, page 10.
- 113 FCCC/TP/2014/13/Add.1, page 11.
- 114 FCCC/TP/2014/13/Add.1, page 12.
- 115 IPCC. 2014. *Summary for policymakers*. In: *Climate Change 2014: Impacts, Adaptation, and Vulnerability*
- 116 Alliance to Save Energy. 2012. *Energy Efficiency: A Tool for Climate Change Adaptation*.
- 117 IPCC. 2014. *Synthesis report*, Fifth Assessment Report.
- 118 UNFCCC. 2015. Updated compilation of information on the mitigation benefits of actions, initiatives and options to enhance mitigation ambition. Technical paper.
- 119 African Development Bank Group. 2014. *Piloting forest-based joint mitigation and adaptation strategies*.
- 120 African Development Bank Group. 2012. *Solutions for a Changing Climate*.
- 121 *United Nations Institute for Training and Research*. Available at <<http://www.c3d-unitar.org/>>
- 122 FCCC/TP/2014/13, page 111.
- 123 FCCC/TP/2014/13, table 7, paragraphs 42 and 43.
- 124 FCCC/TP/2014/13, paragraph 118.
- 125 *The Green Climate Fund*. Available at <<http://www.gcfund.org/about/the-fund.html>>
- 126 FCCC/TP/2013/8/Add.1, paragraph 86.
- 127 FCCC/TP/2014/13, box 11.
- 128 *Momentum for Change*. Available at <<http://www.momentum4change.org>>
- 129 *NAZCA Portal*. Available at <<http://climateaction.unfccc.int/>>
- 130 *IPCC statement by Renate Christ*. 2014. Available at <https://www.ipcc.ch/pdf/unfccc/sbsta40/140610_urban_environment_Christ.pdf>.
- 131 See the 2014 revision of the World Urbanization Prospects by UN DESA's Population Division
- 132 FCCC/TP/2014/13/Add.2, paragraph 14
- 133 See <<http://climateaction.unfccc.int/city-commitments.aspx?id=1044>>.
- 134 See <<http://voices.nationalgeographic.com/2015/08/26/rio-de-janeiro-just-became-worlds-first-compact-of-mayors-compliant-city/>>
- 135 FCCC/TP/2014, table 8, and the ICLEI website, available at <<http://www.iclei.org/>>.
- 136 FCCC/TP/2014 Table 8, and the C40 website, available at <<http://www.c40.org/>>.
- 137 UNEP. 2015. *Climate commitments of subnational actors and business*, page 13.
- 138 *The Climate Group*. Available at <<http://www.theclimategroup.org/what-we-do/programs/compact-of-states-and-regions/>>.
- 139 *Under 2 MOU*. Available at <http://under2mou.org/?page_id=238>.
- 140 UNEP. 2015. *Climate commitments of subnational actors and business*, page 7.
- 141 See <www.whitehouse.gov/the-press-office/2015/07/27/fact-sheet-white-house-launches-american-business-act-climate-pledge>.
- 142 See <www.whitehouse.gov/the-press-office/2015/10/19/fact-sheet-white-house-announces-commitments-american-business-act>.
- 143 *We Mean Business Coalition*. Available at <<http://www.wemeanbusinesscoalition.org/>>.



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