

G20 Country Experiences on Climate and Energy



A report from the G20
Climate Sustainability
Working Group (CSWG)

Foreword

The challenges of climate change that the world faces today invite us to consider that the actions of individual countries will play a role in determining the kind of path the world will take. As G20 member countries, we have a responsibility to set an example and work together to strengthen the global response to the threat of climate change. The successful implementation of the Paris Agreement also requires us to find and scale up innovative solutions.

The Argentine G20 Presidency created a working group to discuss climate change: the G20 Climate Sustainability Working Group (CSWG). The three key discussion topics chosen by the Presidency for the CSWG, are:

- Adaptation to climate change and extreme weather events with a focus on the development of resilient infrastructure and job creation,
- Long-term low greenhouse gas emission development strategies with a focus on approaches and methodologies for their design, and
- Aligning international climate finance flows to the effective implementation of nationally determined contributions (NDCs) to climate change and to long-term low greenhouse gas emission development strategies.

As part of the deliverables of the 2018 Climate Sustainability Working Group, country experiences from G20 members and invited countries were compiled covering a range of climate and energy topics in the form of specific country experiences gained through various types of policy options, processes, actions, and initiatives, including valuable lessons learned. These experiences may serve as inspiration or examples of innovative solutions for countries that are exploring or facing similar options and/or challenges.

Building on the work achieved during the German G20 Presidency in 2017 and on the work of the Climate Sustainability Working Group under the Argentine Presidency, I present the following collection of country experiences.

The adoption of this report by the CSWG in no way entails the endorsement of specific country experiences by other members, but rather reflects the result of a fruitful knowledge and information sharing experience.

In this regard, I find in G20 a valuable and representative environment to strive towards consensus and leadership in the context of countries' unique development paths and thank the proactiveness of all country members who actively engaged with my team during 2018 to prepare this compilation in a true spirit of collaboration.

Taking care of our common home is in our best interest. We all share the responsibility towards future generations. I sincerely hope these experiences will be informative and encouraging, reflecting an atmosphere of openness and trust so as to ensure a future of hope and promise for all of humanity. In this sense, I would like to encourage G20 and all other relevant partners to continue this track, take a leadership role, and challenge ourselves to go beyond what is expected from us, accelerating collaborative and consistent work towards sustainable development.

Rabbi Sergio Bergman

Minister of Environment and Sustainable Development
Buenos Aires, Argentina, 29 August 2018

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Nationally Determined Contributions



Argentina

National Cabinet of Climate Change

Summary

The Argentine National Cabinet of Climate Change was established by presidential decree 891/2016. Its main objectives are to define climate change policies across vertical and horizontal governance levels and create awareness of the importance of mitigation and adaptation. This country experience responds to the Nationally Determined Contributions topic proposed in the G20 Hamburg Climate and Energy Action Plan for Growth and recalls the specific action of good-practice sharing of the Action Plan.

A joint effort against climate change

The National Cabinet of Climate Change is presided by the Chief of Cabinet of Ministers and includes high level representatives of national ministries. Most of them are responsible for setting GHG mitigation and adaptation measures. The Secretariat of Climate Change and Sustainable Development, through its National Directorate of Climate Change, acts as the technical coordinator of the Cabinet. The work of the National Cabinet is organized around political tables with ministers and technical tables with ministerial focal points. Moreover, the work plan is articulated by the Federal Council of the Environment (COFEMA), and results are regularly validated in an 'Extended Roundtable' which ensures the participation of nongovernmental organizations (NGOs), industry associations, private sector, academic and scientific sectors, and municipalities.

Achievements of the National Cabinet of Climate Change

- On November 2016, Argentina submitted its revised Nationally Determined Contribution (NDC), being one of few countries that have increased the ambition of their NDCs since the adoption of the Paris Agreement.
- During 2017 three action plans (Forests and Climate Change, Energy and Climate Change, Transport and Climate Change) were developed and presented in Bonn during COP23. In 2018, these plans were updated and a new plan for industry was adopted.

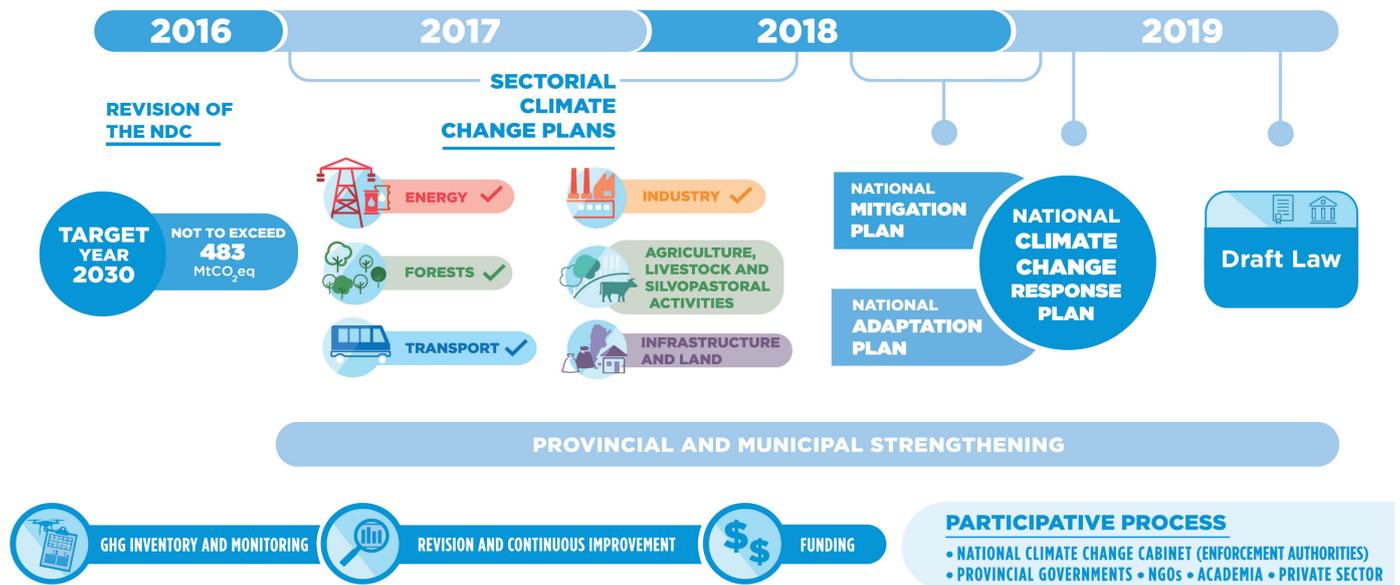
In order to strengthen provincial and municipal participation, more than 30 regional meetings and provincial trainings were held through the COFEMA and its Commission of Climate Change.

- In 2017, a climate risk platform (SIMARCC) was launched, the first national interactive tool to identify the risks emerging from climate change, to help define policies related to climate change, land use and infrastructure. (Available at: <http://simarcc.ambiente.gob.ar>).
- In 2017, an interactive platform with the most current data of the National Inventory of Greenhouse Gases was launched, with indicators and data that could be clearly and didactically observed. In 2018, the disaggregated information of provinces was added. (Available at: <https://inventariogei.ambiente.gob.ar>).

Challenges ahead

In 2019, Argentina expects to conclude sectoral climate change plans in agriculture and infrastructure. These will constitute building blocks of the development of a National Mitigation Plan. The effective implementation of the six sectoral plans, with anticipated international support, will allow the country to meet its NDC mitigation objectives by 2030. Argentina is also starting to work on a long-term low greenhouse gas emissions development strategy. A National Adaptation Plan is currently being developed; this will include sub-national and sectorial chapters and will contain the priorities identified by COFEMA and relevant actors of civil society, academia and the private sector. The National Mitigation Plan and the National Adaptation Plan will form the basis of the National Climate Change Response Plan, to be launched in 2019. It will include Argentina's NDC implementation strategy and identify mitigation measures fully aligned with sector development policy objectives and priorities.

Figure 1. Overview of National Climate Change Activities



Source: National Directorate of Climate Change - Government Secretariat of Environment and Sustainable Development

Lessons learned

- After the National Cabinet of Climate Change was created, climate change started being addressed through a strategic approach, with strong political support and a renewed commitment by ministries in charge of NDC implementation, considering both local and global needs. Its creation also opened the discussion to a great variety of stakeholders.
- As a result of the work under the National Cabinet of Climate Change, Argentina presented in 2016 a more ambitious contribution and is able to promote the continuous improvement of the action plans to implement its NDC.

+ Additional References

National Inventory of Greenhouse Gases website: <https://inventariogei.ambiente.gob.ar/>

Argentina's Nationally Determined Contribution: https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Argentina%20First/Traducción%20NDC_Argentina.pdf



Canada

Canada’s Bilateral Program Supporting NDC Implementation in Chile and Mexico

Summary

Canada’s Bilateral Program to support NDC implementation under the Paris Agreement in Chile’s waste sector and in Mexico’s oil and gas sector aims to reduce Short-Lived Climate Pollutants (SLCPs) emissions. This example responds to the Nationally Determined Contributions topic proposed in the G20 Hamburg Climate and Energy Action Plan for Growth and addresses both the calls for cooperation and providing development assistance to support partner countries among G20 members.

Background

In November 2015, Prime Minister Trudeau announced CAD 2.65 billion (approximately USD 2 billion) in international climate financing over five years to help developing countries tackle the challenges of climate change and support their transition to low-carbon and climate resilient economies. As part of this pledge, Canada announced CAD 14 million (approximately USD 10.7 million) in grant funding from 2017-2021 to support the implementation of Nationally Determined Contributions (NDCs) under the Paris Agreement in Mexico’s oil and gas sector in the amount of CAD 7M (approximately USD 5.4 million) and Chile’s waste sector, in the amount of CAD 7 million (approximately USD 5.4 million) through initiatives to reduce SLCPs emissions. (Please note that contributions are being provided in CAD over multiple years until 2021 at various exchange rates in to the future).

The Canada-Chile Program to reduce SLCP emissions from the waste sector to support NDC implementation, deployed between 2017 and 2021, is a micro-project that is focused on reducing methane emissions from the municipal solid waste sector by capturing methane for energy generation. The objective of this collaborative program is to provide capacity building and technical assistance to support clean innovation and reduce methane emissions from landfills, while exploring opportunities to divert organic matter from landfilling. The program has four main priorities, presented in Figure 1.

Figure 1. Canada-Chile Program priorities to support NDC

- 1. Reduce methane emissions through technology deployment in selected cities;
- 2. Engage in the tracking, monitoring and reporting of emission reductions, as well as exploring opportunities for new and innovative cooperative arrangements;
- 3. Leverage co-financing from public and private sector partners. It is expected that financial enabling conditions for scaled-up implementation, through engagement with international financial institutions and Multilateral Development Banks, will be created, and;
- 4. Provide technical support for communications opportunities.

The program is being deployed in several Chilean cities. For each city, the goal is to capture methane emissions from the existing landfills and create clean energy. Methane capture from the existing landfill will be complemented by the development of plans for a new facility in order to divert organic matter from landfilling. To date, the Program has made considerable progress after its first year of implementation, including advances in technology deployment.



Photo 1: La Yesca Landfill, Chile. Photo credit: Environment and Climate Change Canada



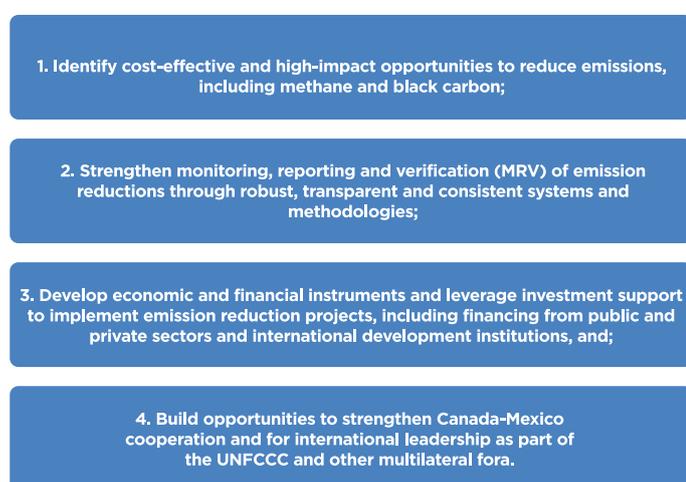
Photo 2: La Yesca Landfill, Chile. Photo credit: Environment and Climate Change Canada

The Canada-Mexico Program to support NDC implementation, deployed from 2017 to 2021, is a micro-project focused on addressing SLCP emissions from Mexico's oil and gas sector. Through the development of a comprehensive package of measures for the sector, this program supports the implementation of Mexico's NDC with the aim to leverage investments that support the reduction of emissions, including SLCPs like methane and black carbon, and deliver environmental, economic and health co-benefits. In addition to the CAD 7 million (approximately USD 5.4 million), the Government of Canada has committed an additional CAD 2 million (approximately USD 1.5 million) in funding to support technology development and research elements of the project. The program has four priorities, described in Figure 2.



Photo 3: Biogas Plant.
Photo credit: Environment and Climate Change Canada

Figure 2. Canada-Mexico Program to Support NDC Implementation



The Canada-Mexico program has made notable strides in its first year of implementation. The Program established working groups to provide stakeholder input based on the four priorities in Figure 2 and subsequently convened a study tour for the overview of the approaches to manage emissions from the oil and gas sector. Further, findings on applicable financing mechanisms supporting emission reductions in Mexico's oil and gas sector were disseminated and will inform subsequent actions aimed at unlocking investment opportunities in the country's oil and gas sector.

Lessons learned

- These programs are being implemented by Chile and Mexico between 2017 and 2021. Lessons learned will thus be developed by both countries as implementation progresses.

+ Additional References

Website of the "Reciclo Orgánicos" Program, Canada's support to Chile to reduce emissions from the waste sector:
<https://www.reciclorganicos.com/>

Further information on Canada's international climate financing: <https://climate-change.canada.ca/finance/>



Canada

The Pan-Canadian Framework on Clean Growth and Climate Change

Summary

The Pan-Canadian Framework on Clean Growth and Climate Change (PCF) is Canada’s economy-wide plan to meet or exceed its Nationally Determined Contribution (NDC), and was developed with broad stakeholder participation. This country experience is linked to the topic on NDCs proposed in the G20 Hamburg Climate and Energy Action Plan for Growth, moving forward to implementing current NDCs in line with the Paris Agreement.

Background

Recognizing the importance of establishing a national plan to reach its NDC, immediately following the Paris Conference, the Prime Minister of Canada met with all Provincial and Territorial Premiers (i.e., First Ministers) to begin working on a coordinated approach on climate change. Following extensive public consultations and analysis by working groups, First Ministers adopted the Pan-Canadian Framework in December 2016. A historic achievement, the PCF is Canada’s first climate change plan to include joint and individual commitments by federal, provincial and territorial governments, and aims to reduce emissions across all sectors of the economy, stimulate clean economic growth and build resilience to the impacts of climate change.

Overview of the Pan-Canadian Framework

The Pan-Canadian Framework includes over fifty concrete measures under four key pillars: pricing carbon pollution; complementary actions to reduce emissions; adaptation and climate resilience; and clean technology, innovation and jobs.

Figure 1. The Pan-Canadian Framework’s Pillars



Carbon pricing is at the heart of the Pan-Canadian Framework. Provinces and territories have the flexibility to design their own system aligned with federal principles and criteria, or to opt for a federal backstop carbon pricing system by January 1, 2019.

The Pan-Canadian Framework covers complementary mitigation measures in the following key areas: expanding and linking clean electricity systems; improving the energy efficiency of vehicles, buildings and industries; putting more zero-emission vehicles on the road; using cleaner fuels; and reducing emissions and increasing carbon sequestration in the agriculture, forestry and waste sectors.

In the innovation and clean technology sector, actions include: supporting Research, Demonstration and Development (RD&D) in emissions reducing technologies; enabling access to capital for clean technology businesses; and supporting Indigenous Peoples and northern and remote communities to adapt clean technology to their needs.

The Pan-Canadian Framework is supported by historic investments by the Government of Canada. This funding includes:

- Funding to support mitigation efforts under the Low Carbon Economy Fund, including CAD 1.4 billion (USD 1.08 billion) for a Leadership Fund to support action in provinces and territories, and more than CAD 500 million (USD 384 million) for the Challenge Fund, which is available to a broader range of applicants;
- Investments of CAD 21.9 billion (USD 16.8 billion) in green infrastructure, including but not limited to electricity transmission and grids, renewable energy, charging stations, and new building codes;
- Investments of CAD 20.1 billion (USD 15.4 billion) in urban public transit infrastructure; and
- CAD 2.3 billion (USD 1.7 billion) in clean technology investments, including nearly 1.4 billion (USD 1.08 billion) in financing for clean technology firms.

Recent actions undertaken by Canada:

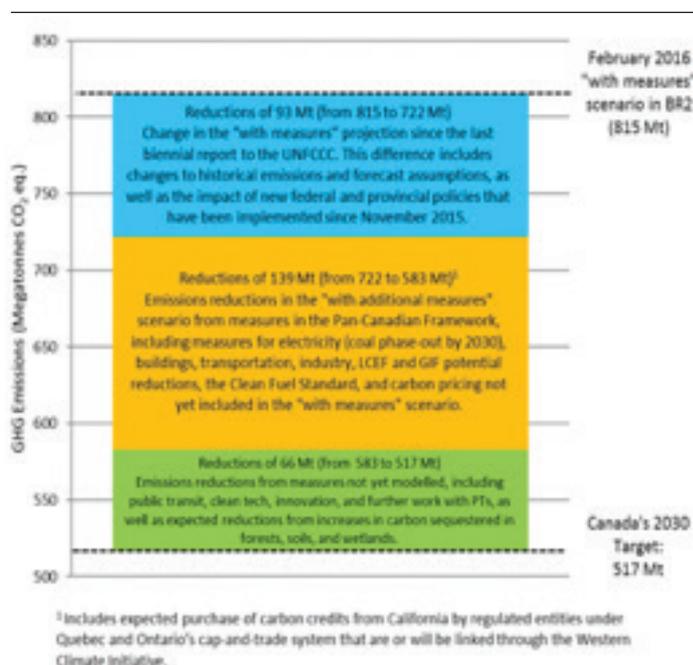
- Announced plans to accelerate the phase out of traditional coal-fired electricity by 2030 and launched the international Powering Past Coal Alliance with the UK;
- Released a framework to guide the development of the clean fuel standard, to reduce GHG emissions by 30 Mt (Megatons) in 2030;
- Published final regulations to cut methane emissions from the oil and gas sector by 40-45% by 2025 and to reduce the use of climate-warming hydrofluorocarbons, or HFCs.

Implementation to date

Governance, reporting and oversight structures have been established, including annual reports on progress to the Prime Minister and First Ministers.

Funding has been mobilized, and work is underway to implement carbon pricing systems across Canada. Canada is making progress toward its 2030 climate target. As of 2017, Canada's GHG emissions are expected to be 583 MtCO₂e (megatons of carbon dioxide equivalent) in 2030, which is 232 Mt lower than what was projected in 2016. This is the biggest improvement in Canada's emissions outlook since reporting began, and is widespread across all economic sectors.

Figure 2. Canada's 2030 Emissions Projections (2017) as reported under Canada's 7th National Communication and 3rd Biennial Report



Lessons learned

- Climate change plans involving input from all levels of government facilitates coordination in climate action and the achievement of NDCs.
- Oversight and reporting mechanisms – including annual.

+ Additional References

Pan Canadian Framework on Clean Growth and Climate Change: <https://www.canada.ca/en/services/environment/weather/climatechange/pan-canadian-framework.html>

Canada's 7th National Communication and 3rd Biennial Report: <https://www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-gas-emissions/seventh-national-communication-third-biennial-report.html>



European Union

Effort Sharing Regulation Setting Emissions Reduction Targets for the Period 2021-2030

Summary

This experience describes EU's new "effort sharing regulation", under which all EU Member States have binding targets for reducing greenhouse gas emissions for 2021-2030 in sectors outside the scope of the EU Emissions Trading System (EU ETS).

The new regulation provides two new flexibilities for Member States: they will be allowed to use emission allowances under the EU ETS and emission credits from land use and forestry, to a limited extent, to help achieve their target. Also, it is important to highlight that targets are based on the principles of fairness, cost-effectiveness and environmental integrity. The present case study responds to the Nationally Determined Contributions topic proposed in the G20 Hamburg Climate and Energy Action Plan for Growth. In this light, it follows the sharing good practices action.

Effort sharing regulation for 2021-2030

Under the "Regulation on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement" (effort sharing regulation, ESR), all EU Member States have binding targets for reducing greenhouse gas emissions for 2021-2030 in sectors outside the scope of the EU Emissions Trading System (EU ETS). These sectors, including transport, buildings, agriculture and waste, together account for almost 60% of all EU emissions, so these emission reductions will play a key role in achieving the EU's 2030 commitments under the Paris Agreement. Emissions from land use and forestry ("LULUCF") are dealt with in a separate regulation for 2021-2030.

In October 2014, EU leaders set a binding target to reduce EU-wide greenhouse gas emissions by at least 40% by 2030 compared to 1990. They specified that sectors not covered by the EU ETS must together reduce emissions by 30% by 2030 compared to 2005,

as their contribution to the target. The effort sharing regulation, adopted on 14 May 2018, translates this commitment into binding annual targets for each EU Member State for the period 2021-2030, based on the principles of fairness, cost-effectiveness and environmental integrity. The targets range from 0% to -40% for 2005-2030 and are based mainly on each Member State's economic capacity (GDP per capita).

The basic framework of the regulation is similar to that of the EU "effort sharing decision" which sets targets for Member States to reduce emissions in non-ETS sectors in the period 2013-2020. The new regulation maintains existing flexibilities of the effort sharing decision (e.g. banking, borrowing and buying and selling between Member States), while providing two new flexibilities for Member States: they will be allowed to use emission allowances under the EU ETS and emission credits from land use and forestry, to a limited extent, to help achieve their target.

The effort sharing regulation includes clear rules on reporting and tracking progress. The European Commission will evaluate and report annually on the progress towards the 2030 targets. If a Member State is not on track, they will have to make an appropriate action plan, while a comprehensive review of all Member States' emissions reports and a more formal compliance check will take place every five years. If a Member State fails to meet its annual obligation in a given year, taking into account the use of flexibilities, the shortfall is multiplied by a factor of 1.08 and this penalty is added to its emission reduction target for the following year.



Figure 1. The 2030 Effort Sharing Targets by EU Member State, Compared to 2005

Lessons learned

- EU Member States' are legally binding and their progress towards the targets will be evaluated annually, with a requirement to make an appropriate action plan if not on track, and further requirements in case of non-compliance.
- A more comprehensive review and formal compliance check will take place every 5 years, aligning with the Paris Agreement cycle. This will reduce the administrative burden and allow us to account for the potential contribution from the land use sector.
- The effort sharing regulation will be complemented by a simplified, robust and transparent governance of the EU's Energy Union with a forward-looking climate policy. Agreed by the EU legislators in June 2018, this planning, reporting and monitoring framework is due to be formally adopted shortly after the Buenos Aires Summit.

+ Additional References

Adopted legal text: <http://data.consilium.europa.eu/doc/document/PE-3-2018-INIT/en/pdf>

More information: https://ec.europa.eu/clima/policies/effort/proposal_en



European Union

Land Use and Forestry Regulation

Summary

Under the EU's land use and forestry regulation for 2021-2030, all EU Member States will have to ensure that greenhouse gas emissions from land use, land use change and forestry (LULUCF) are offset by at least an equivalent removal of CO₂ from the atmosphere in the period 2021-2030. The current regional example responds to the Nationally Determined Contributions topic proposed in the G20 Hamburg Climate and Energy Action Plan for Growth. In this light, it follows the sharing good practices action.

LULUCF regulation for 2021-2030

The EU regulation on the inclusion of greenhouse gas (GHG) emissions and removals from LULUCF in the 2030 climate and energy framework was published in the EU Official Journal on 30 May 2018 and took effect on 19 June 2018.

The EU regulation (2018/841) will implement the agreement made by EU leaders in October 2014 that all sectors of the economy, including LULUCF, should contribute to the EU's 2030 GHG emission reduction target to reduce EU-wide emissions by at least 40% compared to 1990 levels (which is the basis of the EU's **Nationally Determined Contribution** under the Paris Agreement).

The regulation sets a binding commitment for each EU Member State to ensure that accounted emissions from land use in their territory are entirely compensated by an equivalent removal of CO₂ from the atmosphere through action in the sector over the period 2021-2030. This is known as the "no debit" rule. For example, deforestation will have to be compensated by an equivalent afforestation effort, or by improving sustainable management of existing forests beyond a projected benchmark.

Although EU Member States already partly undertook the "no debit" commitment individually under the Kyoto Protocol up to 2020, the regulation enshrines

the commitment for the first time in EU law. Moreover, the scope will be extended from only forests today to agricultural land uses as of 2021, and wetlands from 2026.

The new rules provide EU Member States with a framework to incentivise more climate-friendly land use, without imposing new restrictions or administrative burdens on individual actors. This will help farmers to develop climate-smart agriculture practices and support foresters through greater visibility for the climate benefits of wood products, which can store carbon sequestered from the atmosphere and substitute for emission-intensive materials.

Furthermore, emissions of biomass used in energy will be recorded and accounted towards each EU Member State's 2030 climate commitments through LULUCF accounting. As forest management is the main source of biomass for energy and wood production, more robust accounting rules and governance for forest management will provide a solid basis for EU renewable energy policy after 2020.



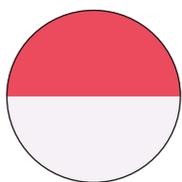
Lessons learned

- The land use and forestry sector, which includes the use of soils, trees, plants, biomass and timber, is in a unique position to contribute to a robust climate policy, as the sector not only emits GHGs but also removes CO₂ from the atmosphere.
- A balanced package of flexibilities has been included in the regulation to address the large variety of national circumstances across the EU, with forests representing a significant carbon sink in many Member States.

+ Additional References

EU regulation adopted by the Council (14 May 2018): <http://www.consilium.europa.eu/en/press/press-releases/2018/05/14/better-protection-and-management-of-land-and-forests-across-the-union-council-adopts-a-new-regulation/>

Regulation (EU) 2018/841 on the inclusion of greenhouse gas emissions and removals from land use, land use change and forestry in the 2030 climate and energy framework, and amending Regulation (EU) No 525/2013 and Decision No 529/2013/EU: <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1533295111393&uri=CELEX:32018R0841>



Indonesia

NDC Development in Indonesia

Summary

Indonesia's Nationally Determined Contribution (NDC) was developed in a participatory manner with key stakeholder's involvement and included sectoral implementation plans. Under the G20 Hamburg Climate and Energy Action Plan for Growth, this country case is framed within the Nationally Determined Contributions topic and addresses the specific action of good practice sharing.

Background

Indonesia submitted its first NDC in 2016, one year after the ratification process of the Paris Agreement and once the INDC was submitted in 2015. The process involved a series of steps to frame the NDC implementation plan, identifying a key strategic plan, revitalizing the national network needed to support its development, as well as its monitoring and evaluation, among other necessary elements that are important to be considered. The NDC submission process also showed that those steps may be undertaken iteratively, rather than strictly sequentially, in order to build engagement and involvement of high-level officials that countries need to have, as well as to assure the ownership related to information coming from government ministries and other key actors responsible for NDC implementation.

Indonesia's first NDC covers the mitigation and adaptation aspects and its paths of implementation.

The inputs for NDC's development are, but not limited to:

- existing climate-related development plans including policy, programs and activities related to climate change;
- current institutional arrangement including the existing governance landscape, and;
- current status of climate financing.

These inputs played a pivotal role to confirm the objectives of the NDC and define the scope and timeframe of its implementation plan, the relation with existing plans and processes and strategic questions for implementation and to develop sectoral action plans to deliver NDC outcomes, which are owned by key ministries and fully integrated into wider ministerial programs and/or activities.

The first NDC of Indonesia covers the sectoral implementation plans that were developed and approved by involving high-level government officials from related ministries. These plans are expected to be transparent and open for new initiatives commenced by the key ministries themselves for ensuring a bottom-up approach and ownership. This approach is expected to strengthen public support and political will for implementing the NDC.

Table 1. Projected BAU and emission reduction from each sector category

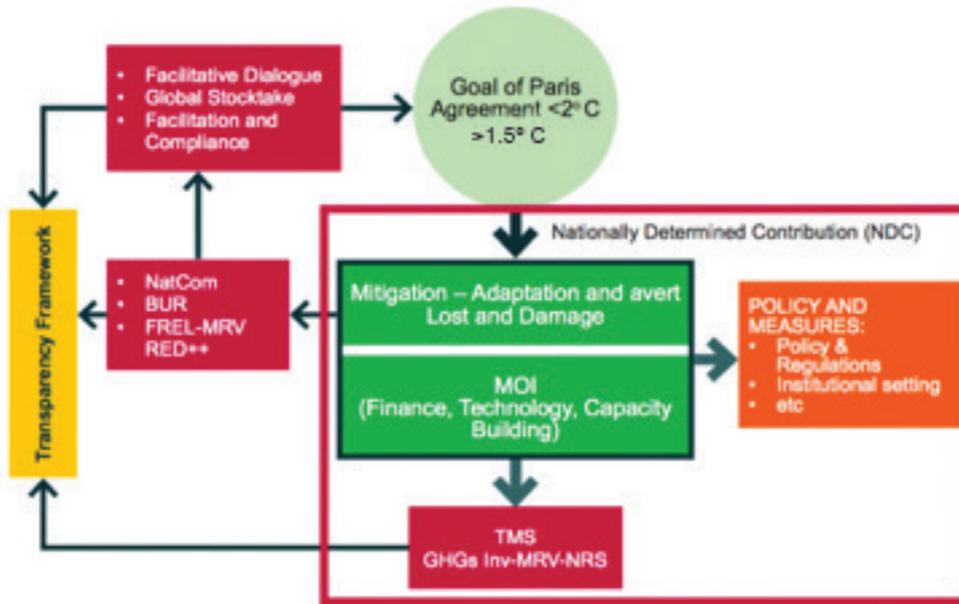
No	Sector	GHG Emission Level 2010* Mton CO ₂ e	GHG Emission Level 2030 (Mton CO ₂ e)			GHG Emission Reduction				Annual Average Growth BAU (2010-2030)	Average Growth 2010-2012*	*Including fugitive ** Including peat fire Notes: CM1 = Counter Measure 1 (unconditional mitigation scenario) CM2 = Counter Measure 2 (conditional mitigation scenario) IPPU = Industrial Processes and Product Use
			BAU	CM1	CM2	(Mton CO ₂ e)	% of Total BAU					
1	Energy*	453.2	1,669	1,355	1,271	314	398	11%	14%	6.7%	4.5%	
2	Waste	88	296	285	270	11	26	0.38%	1%	6.3%	4.0%	
3	IPPU	36	69.6	66.85	66.35	2.75	3.25	0.10%	0.11%	3.4%	0.1%	
4	Agriculture	110.5	119.66	110.39	115.86	9	4	0.32%	0.13%	0.4%	1.3%	
5	Forestry**	647	714	217	64	497	650	17.2%	23%	0.5%	2.7%	
	TOTAL	1,334	2,869	2,034	1,787	834	1,081	29%	38%	3.9%	3.2%	

NDC as a continuous and on-going project:

The NDC implementation process refers to the existing sectoral policy and development that has been strengthened with NDC commitments representing

the opportunity to shift a country’s approach to low carbon development path, which at the same time puts economic development and poverty alleviation as national priorities. Climate change actions identified in the first NDC can be integrated and embedded into development planning and do not necessarily need to be a new and separated policy.

Figure 1. Paris Agreement and its Implementation



Stakeholders involved

⊙ Ministry of Environment and Forestry, Ministry of Energy and Mineral Resources, Ministry of Transportation, Ministry of Industry, Ministry of Public Works and Housing, Ministry of Agriculture, National Development Planning Agency, Ministry of Health, National Agency of Disaster Risk Management, Geospatial Information Agency, local governments, civil society organizations, business associations, environmental associations and experts.

⊙ A total number of around 200 stakeholders were involved in this process, both in technical and public consultation meetings.

Social, environmental, economic benefits

Ensuring the constant national efforts for the food, energy, water, health, social, and financial security.

Lessons learned

- ⊙ The engagement and active participation of key stakeholders is a main point to develop and build the ownership of national plans, including the leadership of key decision makers.
- ⊙ The following three issues were identified as barriers or challenges: Different stages of understanding on climate change; the mindset of climate change as cost; and the high level of investment needed in climate resilient infrastructure.

+ Additional References

Indonesia’s Third National Communication to the UNFCCC: <https://goo.gl/vqFdxK>

Indonesia’s First Biennial Update Report (BUR): <https://unfccc.int/resource/docs/natc/idnbur1.pdf>



The Netherlands

The National Climate Agreement

* G20 invited country

Summary

The central objective of the National Climate Agreement is to unite all partners and stakeholders around national climate ambition and ensure the implementation of the most cost-effective measures to realise the new reduction target. With this, the Dutch government is taking steps to prepare the Netherlands for a greenhouse gas (GHG) emissions reduction of 49% by 2030, more ambitious than the current 40% reduction EU target. Under the G20 Hamburg Climate and Energy Action Plan for Growth, this country case answers the call for good practice sharing within the Nationally Determined Contributions topic.

Process and planning

In order to facilitate discussions and ensure concrete and integral arrangements, five “sector-tables” were created: (1) the built environment, (2) mobility, (3) agriculture and land use, (4) electricity, and (5) industry. These tables make concrete arrangements for achieving the CO₂ reduction targets.

The sector-tables will reach an agreement for their own sector but also broader issues such as innovation, finance, spatial planning and employment. A coordinating body is appointed to guide the overall progress of the Agreement, ensure that cross-cutting issues are incorporated integrally, and ensure that the Agreement enjoys internal and external support.

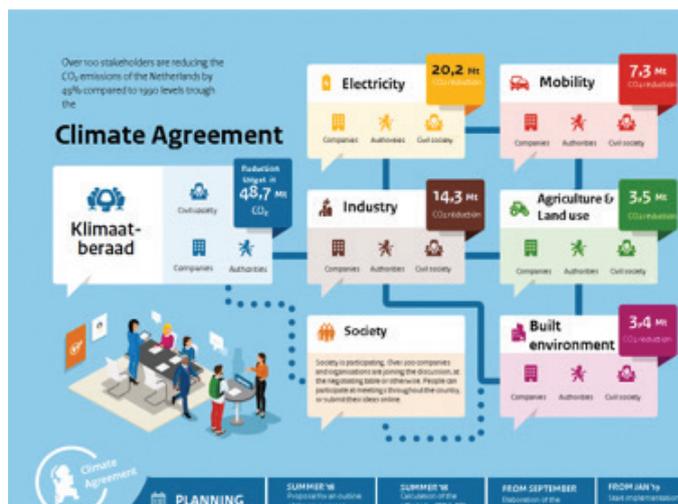
Table 1. Framework for the National Climate Agreement

Item	Description
1. Guide stakeholders towards one central goal	To reach a 49% reduction in national GHG emissions by 2030 compared to 1990 levels.
2. Cost-efficiency and decision-making	In order to ensure broad support, it is crucial to limit the costs by aiming for maximal cost-efficiency in selecting measures.
3. A clear point of departure	Some matters are not open for discussion, for example: <ul style="list-style-type: none"> - the national goal of 49% reduction and the corresponding reduction goals in megatons per sector - the amount of public funds available - coal-fired power plants are phased out by 2030
4. Future-oriented measures	In delivering on the 2030 goals, keep an eye on the long term through a three-pronged approach: <ul style="list-style-type: none"> - Scaling up cost-effective technologies and measures - Pilots and demonstration projects Research, development and innovation, with a focus on technologies which provide both CO ₂ reduction and economic benefits
5. Concrete and integral arrangements	Agreeing on technical measures and determining the policy instruments, the right financial instruments and the relevant actors.
6. Integrated approach	Setting ambitious goals an integrated approach by identifying: <ul style="list-style-type: none"> - Shared solutions: Working in a systemic manner (i.e. circular flows) - Cross-cutting issues: In choosing a sectoral approach, cross-cutting issues must be addressed by every sector individually, but also collectively.
7. Serve the public interest	A socially inclusive Climate Agreement should aim to serve more than the accumulated interests of the parties involved.
8. Quantifiable arrangements	Arrangements should be concrete, in order to make an objective assessment of the future CO ₂ reductions, the costs involved for government and for society and businesses.

Co-financing

The Government has set aside €300 million per year for pilot and demonstration projects to reduce costs and prepare for large-scale application in the market. In addition, funds for the Renewable Energy Scheme (SDE+), increasing to €3.2 billion per year, will be used to develop a cost-effective emission reduction climate package. However, it must be clear that no single government can provide all the funds necessary for the transition. The government – relying on taxes – can provide incentives, for instance by financing projects that can reduce emissions efficiently, and support research and development of climate-friendly technologies to boost the transition. All sectoral actors and stakeholders are ultimately in the right position to participate in the decision on how to contribute to meeting this common challenge.

Figure 1. National Climate Agreement Summary



The Framework

Realising the transition in an inclusive way provides opportunities to strengthen the economy. The common steps to take must be embedded regionally and locally and provide clear guidance to citizens and business. For this, the Dutch government has set the framework depicted in Table 1.

Next steps

The outline of the Agreement, including technical measures, relevant actors, and a timeline, will be elaborated in the second half of 2018 into concrete programmes. The implementation of the Climate Agreement starts in 2019.

Lessons learned

- This process shows that broad public and political support is essential if we are to achieve 2030 goals.
- International coordination is essential to ensure that national efforts are effective. While we are not necessarily more ambitious than other countries, we want to ensure we make the most of our time until 2050.
- Organizing broad public participation by a variety of stakeholders in different stages of the process is crucial to make the transition work.

+ Additional References

English version of the National Climate Agreement: <https://www.klimaataakkoord.nl/>

Government kicks off climate agreement efforts: <https://www.government.nl/latest/news/2018/02/23/government-kicks-off-climate-agreement-efforts>



Singapore

Singapore's Carbon Tax

*Invited country in representation of ASEAN (Association of Southeast Asian Nations)

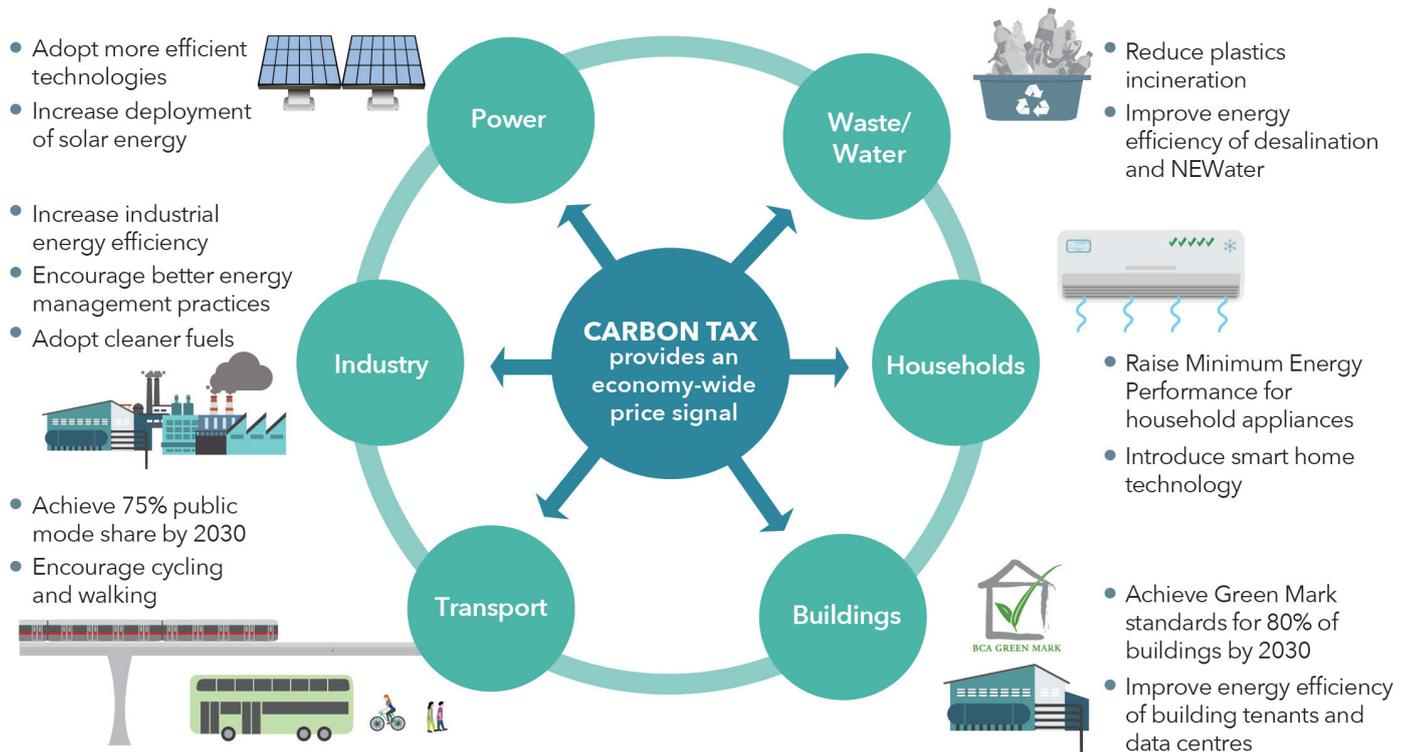
Summary

Singapore will introduce a carbon tax as a component of its national climate policy. The aim of the tax is to enhance and support Singapore's Climate Change Strategy to reduce greenhouse gas (GHG) emissions across all sectors of the economy by providing a uniform and economy-wide price signal on GHG emissions. Under the G20 Hamburg Climate and Energy Action Plan for Growth, this experience fits within the topic of Nationally Determined Contributions and responds to the specific G20 action of sharing good practice.

Background

In 2017, Singapore announced its plans to introduce a carbon tax from 2019. The tax will be applied to the total emissions of facilities that emit 25,000 tCO₂e or more of greenhouse gas (GHG) emissions per year, and cover the six GHGs that Singapore currently reports to the UNFCCC as part of its national GHG inventory. Covered facilities are required to submit annual emissions reports, which have to be verified by a third-party verifier. The first payment of the carbon tax will be in 2020, based on facilities' total emissions in calendar year 2019.

Figure 1: Singapore's Carbon Tax Will Support and Enhance Other Mitigation Measures



To give emitters time to adjust and implement energy efficiency improvement projects, the initial carbon tax rate has been set at S\$5 (USD 3.6) per tonne of carbon dioxide-equivalent (tCO₂e) for a five-year transitional period from 2019. Singapore intends to increase the carbon tax rate to S\$10-15/tCO₂e (USD 7.2-10.8/tCO₂e) by 2030. This medium term carbon tax rate is estimated to be the appropriate level to achieve an economically efficient level of emission reductions compared to other measures to achieve our national commitments under the Paris Agreement. Singapore will review the tax

Figure 2: Uniform Carbon Tax Rate with No Exemptions (in Singapore dollars)



rate by 2023, taking into account international climate change developments, the progress of our emissions mitigation efforts, and our economic competitiveness.

CLOSE TO ECONOMY-WIDE COVERAGE

Facilities with 25,000 or more tonnes of carbon dioxide-equivalent greenhouse gas emissions a year will be covered. The carbon tax will be levied across all sectors without exemption. This maintains a transparent, fair and consistent carbon price across the economy. There are around 40 companies that will be directly taxed. The tax will cover around 80% of Singapore's GHG emissions. Apart from taxing facilities' emissions, Singapore also has existing excise duties on petrol, diesel and compressed natural gas which discourage the use of these fuels and therefore reduce GHG emissions. These fuels account for about another 14% of Singapore's GHG emissions.

PREPARED TO SPEND MORE THAN REVENUE COLLECTED TO SUPPORT MERITORIOUS PROJECTS

By improving their energy and carbon efficiency,

companies can reduce their energy costs, improve their profit margins, and become more competitive in the transition towards a low-carbon future. Revenue from the carbon tax will help to fund measures to reduce emissions. To give emitters a strong push for energy efficiency improvements, for the first 5 years, Singapore is prepared to spend more than the carbon tax revenue collected to support meritorious projects.

OPEN TO LINKING CARBON TAX TO OTHER JURISDICTIONS

Taxable facilities will pay the carbon tax by surrendering credits equivalent to their emissions. These credits can be purchased from the government at a fixed price. Singapore has designed its carbon tax to be based on a fixed-price credit-based (FPCB) mechanism, as we recognise that there may be benefits to link our carbon tax framework to other jurisdictions in the longer term. The FPCB mechanism will help companies and the government build up capabilities and facilitate any future decisions to allow such linkages.

Lessons learned

- Learning-by-doing approach:
Start simple and improve or enhance the scheme over time.
- Principled approach to pricing other scarce resources helps to explain policy intent for a carbon tax:
Liberalised electricity market with no subsidies.
Water conservation taxes.
- No exemptions for energy intensive and trade-exposed sectors to maintain a transparent, fair and consistent carbon price across the economy.

+ Additional References

Singapore's National Climate Change Secretariat website: www.nccs.gov.sg

Singapore's Carbon Tax: <https://www.nccs.gov.sg/climate-change-and-singapore/reducing-emissions/carbon-tax>

Long-Term Low Greenhouse Gas Emission Development Strategies



Canada

Canada’s Mid-Century Long-Term Low Greenhouse Gas Strategy

Summary

Canada’s mid-century strategy (MCS) describes various pathways for innovative and creative solutions consistent with our international goal of holding the global average temperature rise to well below 2°C, while pursuing efforts to limit the temperature increase to 1.5°C, as called for in the Paris Agreement. This country case is framed within the Long-Term Low Greenhouse Gas Emission Development Strategies proposed in the G20 Hamburg Climate and Energy Action Plan for Growth and responds to the specific action of good-practice sharing and cooperation of the Action Plan.

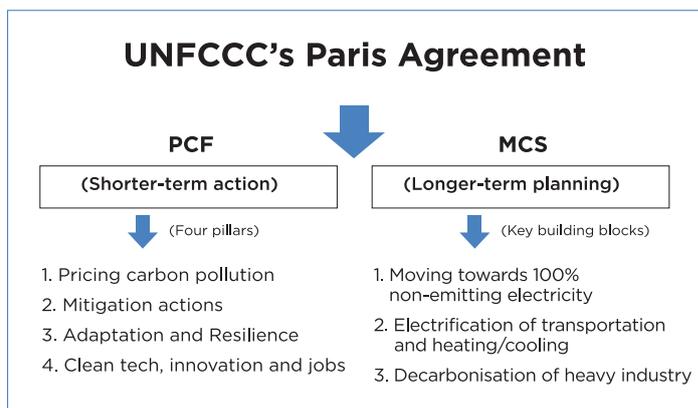
Background

In 2015, the Canadian Government played a leadership role in finalizing the Paris Agreement with a strong commitment to addressing climate change, including amplifying domestic actions and international support. Domestically, this launched a process to define a Pan-Canadian Framework on Clean Growth and Climate Change (PCF). This framework was adopted in 2016 and brought together provinces, territories and the federal government, to define a plan to meet or exceed Canada’s Nationally Determined Contribution (NDC).

The PCF is designed to ensure that existing subnational policies are complemented with federal measures as well as to harmonize rising ambition across the country and avoid a patchwork of varying climate change policies. The four pillars of the PCF are: pricing carbon pollution; complementary actions to reduce emissions; adaptation and climate resilience; and clean technology, innovation and jobs.

In parallel, the Canadian federal government developed the long-term low-greenhouse gas emission development strategy (hereinafter, MCS) incorporating key aspects of the PCF. The MCS focuses on meeting climate-change objectives and enabling growth, requiring significant long-term investments in infrastructure to support transformation to a low-carbon economy. Canada’s mid-century strategy looks beyond 2030 to start

Figure 1. Climate Change Governance Scheme



an on-going multi stakeholder conversation on the ways we can reduce emissions for a cleaner, more sustainable future by 2050.

If the PCF is the core of short terms policies and actions, the MCS allows us to elaborate on long-term considerations for inclusion within the planning of the Government of Canada as well as civil society and the business sector. It is important to emphasize that Canada’s MCS was designed to be non-policy prescriptive; however it does highlight a number of possible pathways to a low-carbon future.

Stakeholders involved

In order to engage external stakeholders and experts, including environment non-governmental organizations, industry associations, indigenous partners, academic experts, and the general public, the Government of Canada made use of the consultation processes already underway through the PCF.

In addition, Canada held an academic workshop with key experts in energy and climate change to review existing work relevant to an MCS and discuss approaches to framing such a document. Many of these experts became formal peer reviewers of the draft report and informed the strategy based on their particular area of expertise.

Conclusions

The process of drafting and publishing a long-term decarbonisation strategy started a conversation with stakeholders on the transition to a low-carbon economy.

In order to effectively communicate Canada's MCS conclusions, it has been useful to simplify the findings of the MCS into key building blocks. an on-going multi stakeholder conversation on the ways we can reduce emissions for a cleaner, more sustainable future by 2050.

Lessons learned

What went well

- The document was not policy prescriptive. This aspect helped further the discussion without dictating specific actions across the economy and allowed all sectors to see themselves in a low carbon future.
- Clear key messages (electrify end uses, decarbonized electricity system, etc.) made it easier for it to spread across communities of practice.
- The report built on existing literature on long-term decarbonisation and good summaries of existing literature. The knowledge thus gathered grounded the document in solid peer reviewed analysis, and allowed for in-text reference throughout the report, making it easier to read.

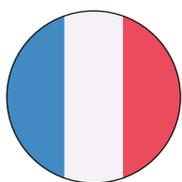
What could be improved

- The consultation process and publication date for the MCS coincided with the development of Canada's PCF, which created some challenges for our stakeholders. Additionally, had the PCF already been established, the MCS could have been more precise on certain measures focused on a long-term horizon, in order to avoid lock-in of investments and policy decisions.

+ Additional References

Link to the MCS submitted to the UNFCCC: https://unfccc.int/files/focus/long-term_strategies/application/pdf/canadas_mid-century_long-term_strategy.pdf

Link to the PCF: http://publications.gc.ca/collections/collection_2017/eccc/En4-294-2016-eng.pdf



France

Elaboration of the French National Low-Carbon Strategy



Summary

In November 2015, the French government published its 2050 strategy, the National Low-Carbon Strategy (Stratégie nationale bas-carbone, hereinafter SNBC) with a view to describe how the objective of reducing domestic GHG emissions of 75% in 2050 compared to 1990 levels would be reached. It includes carbon budgets up to 2028, and policy recommendations for each sectors of the economy. The strategy was developed in a participatory manner, with broad stakeholder involvement. The strategy is currently being revised to aim for carbon neutrality by 2050. Under the G20 Hamburg Climate and Energy Action Plan for Growth, this country experience is framed within the Long-term Low Greenhouse Gas Emission Development Strategies topic and relates to the specific action of good-practice sharing and cooperation of the Action Plan.

Stakeholder Involvement

The energy and climate prospective built on the National Debate on Energy Transition, which took place in 2012-2013, and involved various stakeholders in order to define possible energy pathways to 2050. Later, in the process of building the reference scenario, a wide range of stakeholders (private sector, NGOs, experts, academia, ministries, etc.) was consulted in order to identify the policies needed to achieve our target in each sector of the economy. Feedback on the overall approach and process was also gathered during Information and Orientation Committees organized by the Ministry of Environment.

Governance

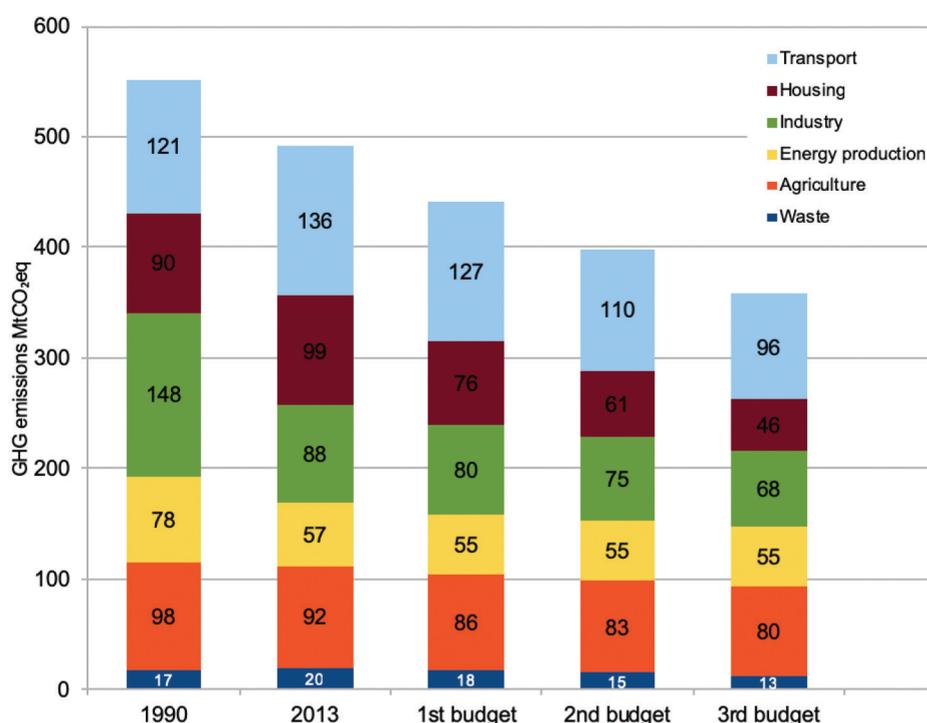
Led by the Ministry of Environment, this interministerial strategy is legally prescriptive for the public sector (it has to be taken into account in all public policies, and the energy policy framework has to be compatible with the SNBC). The strategy features a set of indicators to monitor its implementation, and a 5-year revision cycle in order to adapt the strategy to the political and economic context as well as to technological advances, and to set up future carbon budgets. This strategy is articulated with a multiannual planning regarding energy generation.

Social, Environmental and Economic Benefits

The SNBC is the only long-term strategy so far that includes a quantitative analysis of the distributive impacts, alongside the other impacts on growth and job creation. We consider it essential in order to give a clear picture of the potential barriers for implementation, and to achieve a just transition.

For example, several measures were implemented to reinforce synergies between the ecological transition and inequality reduction (e.g. fighting energy poverty and supporting housing retrofits for poorer households), thereby addressing many of the Sustainable development goals.

Figure 1: Overview of France's GHG emissions trajectory



Revision of the strategy

The government announced that France would now strive towards carbon neutrality in 2050. This important step up in ambition will be reflected in the new version of the strategy, the

publication of which is expected in December 2018. The revised version will also be better articulated with our national adaptation plan, and will set up carbon budgets for the period 2029-2033.

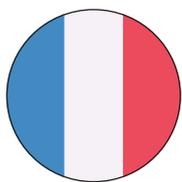
Lessons learned

- A solid modeling work is fundamental to elaborate coherent and comprehensive strategies.
- Projections up to 2050 are highly beneficial for all stakeholders:
 - For the government, it gives a clearer picture of the policies needed to reach the emissions target and, in particular, their extent and the pace needed. It also helps to come up with a realistic strategy which will be supported by all stakeholders.
 - For the private sector and for citizens, it gives an image of what our society and our economy will look like, thereby making transformational changes very concrete in their mind, as it translates how the transition would impact their lifestyles, businesses, etc. As a result, it provides predictability that can help implement the necessary changes, especially regarding investment decisions.
- The considerations of social and economic impacts are very helpful to achieve a just transition and facilitate the implementation of policies.
- Setting up a governance framework with a regular revision process is helpful to adapt the strategy to new, external, or unexpected trends which may occur.

+ Additional References

Link to the SNBC summary in French and English: http://unfccc.int/files/focus/long-term_strategies/application/pdf/snbc_4pager_fr_en.pdf

Link to the full version in English: http://unfccc.int/files/focus/long-term_strategies/application/pdf/national_low_carbon_strategy_en.pdf



France

2050 Facility: A Facility to Develop Long-Term Strategies

Summary

France has developed the “2050 Facility” program which aims to support the development of long-term strategies in developing countries. This initiative is part of AFD group’s climate change strategy of ensuring a “100% Paris Agreement-compatible” activity, and responds to the Long-term Low Greenhouse Gas Emission Development Strategies topic proposed in the G20 Hamburg Climate and Energy Action Plan for Growth. In this light, it responds to the sharing best practices action.

The 2050 Facility

The “2050 Facility” (the facility), expected to start in 2018, will be implemented by Agence Française de Développement (AFD). The aim of the facility is to support countries in the process of elaborating their long-term (2050) low greenhouse gas emission development strategies. To this aim, AFD expects to channel through this facility 30 million euros in the form of public grants, to work with up to 20 countries all over the world.

Beyond the collective objectives and the recognition that a paradigm shift in development models is necessary, the Paris Agreement entails concrete ownership processes at the country level, embodied by the publication of Nationally Determined Contributions, as well as the expected elaboration by 2020 of long-term (2050) low greenhouse gas emission development strategies. This facility will focus on the latter, and will allow cooperation with countries concerning low-carbon and climate-resilient development pathways.

The decision of the Paris Agreement invites Parties to the United Nations Framework Convention on Climate Change (UNFCCC) to formulate and communicate long-term strategies (until 2050) for low-carbon development by 2020. Answering this invitation is at the heart of the new climate change strategy of AFD.

Responding as a donor to countries’ transition challenges and to the expectations of the Paris Agreement requires that AFD enhances its approach to the climate-development nexus.

This means progressing from an approach based essentially on the direct impacts of projects towards an approach that also actively seeks the consistency of all interventions with low-carbon and climate-resilient development pathways.

This approach may involve sectoral or macroeconomic analyses and modelling as well as analyses of the demographic and social dimensions of transitions and related policies or reforms. The deployment of the GEMMES (General Monetary and Multisectoral Macrodynamics for the Ecological Shift) macroeconomic model developed by AFD will be proposed when suitable. These analyses call for cooperation and coordination with other actors (donors, think tanks from the global North and South, research institutions) and international initiatives (2050 Pathways Platform, in particular) committed to these issues.

AFD will deploy the facility from 2018 onwards to provide the means for such cooperation (technical assistance, capacity building activities, multi-actor dialogue processes, mobilization, exchanges and learning programs, among others).

The facility will be implemented along the following three axes:

1. Support the elaboration of low carbon and resilient development strategies.

2. Cooperate along governance and dialogue through international experience sharing.

3. Identify and instruct financing possibilities of implementing climate change policies.

Overall, this facility will be part of a larger effort of AFD group, and in particular, to implement the first commitment of its new climate change strategy, i.e. ensuring a “100% Paris Agreement-compatible”

activity: to make all AFD interventions consistent with low-carbon and climate-resilient development and support countries in their formulation of low-carbon and climate-resilient development trajectories.

To this end, the facility will help the AFD group to build a specific tool for the analysis of project consistency with low-carbon and climate-resilient trajectories. As such, the tool aims to be incorporated into the sustainable development

assessment analysis framework currently applied at AFD. Consistency will be assessed based on criteria allowing assessing the alignment of interventions with climate policies. Criteria may include the effects on public policies, the mobilization of financial and private actors, virtuous knock-on effects or, on the contrary, lock-in effects, and the management of uncertainty, among others.

Lessons learned

- As a donor country, enhancing the AFD's approach to the climate-development nexus is a necessary step for responding to countries' transition challenges and to the expectations of the Paris Agreement, using a holistic approach to low-carbon and climate-resilient development pathways.
- Improved analysis and assessment tools are needed for determining project consistency with low-carbon and climate-resilient development pathways; one option is to incorporate these tools into the already existing project analysis frameworks of donor agencies.

+ Additional References

AFD Climate & Development Strategy 2017-2022: <https://www.afd.fr/en/climate-development-strategy-2017-2022>

AFD GROUP - The case for long-term pathways: <https://www.2050pathways.org/wp-content/uploads/2018/05/AFD.pdf>



Germany

Climate Action Plan 2050 – Germany’s long-term plan

Summary

Germany’s Climate Action Plan 2050 is one of the first long-term strategies presented to the UNFCCC. It involved broad stakeholder participation and considers Germany to be almost greenhouse gas neutral by mid-century. This country experience responds to the Long-Term Low Greenhouse Gas Emission Development Strategies topic proposed in the G20 Hamburg Climate and Energy Action Plan for Growth, and follows the action of G20 countries’ good practice sharing in submitting their long-term strategies.

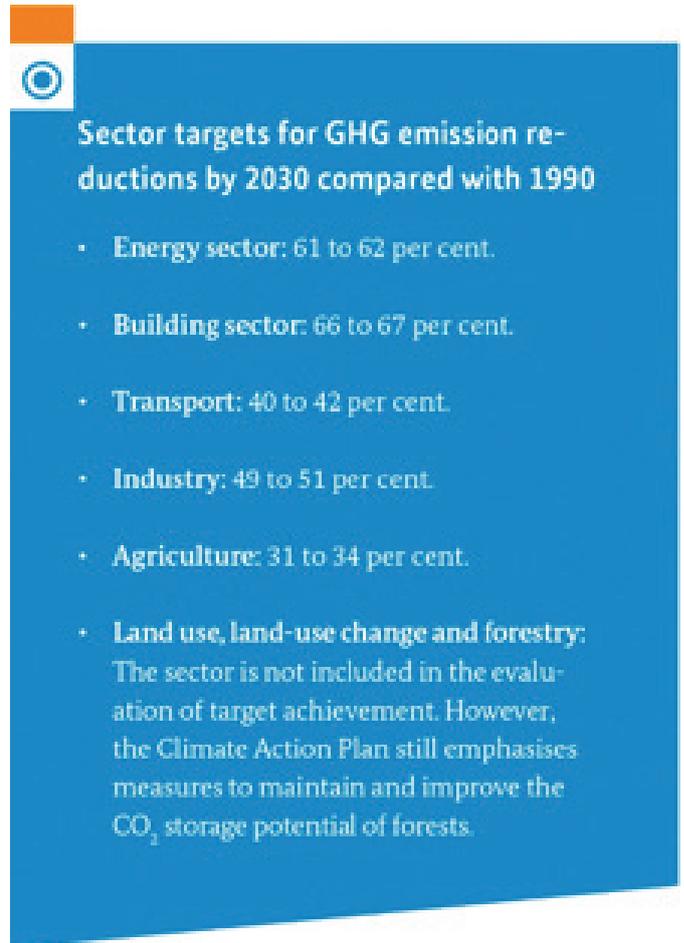
Background

Germany’s Climate Action Plan 2050 was developed over a period of approximately one and a half years, from mid-2015 until late 2016 when the first two milestones were reached: the adoption of the political strategy by the Cabinet of Ministers and the announcement of the Action Plan at COP22 in Marrakech. The decision to develop a climate action plan was adopted in the coalition agreement of 2013 and the momentum to develop an ambitious strategy was boosted further with the historical success of the Paris summit. The new German Government confirmed in its coalition agreement in March 2018 that the Climate Action Plan 2050 will be fully implemented.

Targets

The plan features a 2050 mitigation target of reduced emissions of 80 - 95% compared to 1990 levels. It is generally guided by the principle of greenhouse gas neutrality by mid-century, to a large extent. For the first time, the Climate Action Plan also defines transformative pathways for all key sectors (energy, buildings, transport, industry, and agriculture) to be accomplished by 2050 as well as, milestones and at its core reduction targets for each sector to be reached by 2030 - amounting to an emissions reduction of at least 55% compared to 1990 levels and thus assigning concrete responsibilities to each of the sectors. The plan will also be reviewed and updated in regular intervals starting towards the end of 2019 or beginning of 2020.

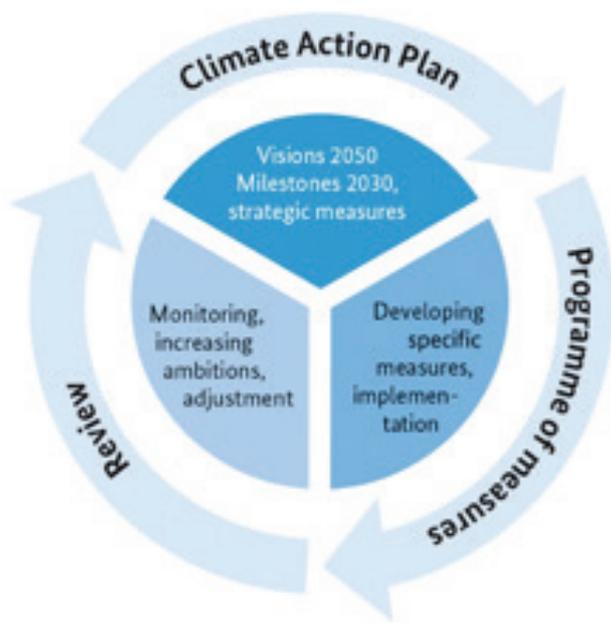
Figure 1. Sector targets for GHG emission reductions by 2030 compared with 1990



Stakeholders involved

The development of the plan involved extensive stakeholder consultations, including dialogues with more than 500 citizens in five cities, an online dialogue, as well as fora with representatives from federal states, municipalities and business associations, and environmental NGOs, among others. The input generated through this process was then pooled and integrated into considerations among the various federal government departments responsible for various aspects of the plan.

As a second pillar, the Action Plan builds on scientific efforts investigating potential pathways for reaching climate targets, and assessing macroeconomic impacts as well as the technical feasibility of such measures.



Status of implementation process

As a next step towards implementation, the action plan needs to be translated into concrete measures. Preparatory steps are underway to identify these measures and prepare a thorough impact assessment, which will be discussed in parliament, with federal states, municipalities and business associations.

The first programme to implement the Action Plan is under development. The implementation of the Action Plan will be regularly monitored.

Lessons learned

- As with the design of the Action Plan, broad-based participation as well as cooperation across different government departments is largely considered a key to successful implementation. The task of reaching the 2050 targets must be shared by all strands of government and requires mutual learning processes for the selection of best possible measures.
- Additionally, the mid-term goal by 2030 with specific sectoral targets and clearly defined responsibilities within the Government have proven to be beneficial so far. The sectoral targets provide guidance to all actors in the respective sectors as well as for clear accountability within the German Government. This concerns the development of emissions and possible adjustments regarding measures and instruments for achieving the 2030 targets.
- Process oversight by one designated entity, in this case the Ministry of Environment, facilitating alignment among government portfolios as well as pooling input from all strands of society is considered a further factor for success.
- Investing in participation upfront pays off in the end due to higher political buy-in and support by a broad range of stakeholders.
- Efforts undertaken in Germany resonate with activities promoted by the 2050 pathways platform, an initiative also launched on occasion of COP 22 and endorsed by the Hamburg Action Plan on Climate and Energy for Growth.

+ Additional References

Climate Action Plan 2050 – Germany’s long-term low emission development strategy: <https://www.bmub.bund.de/en/topics/climate-energy/climate/national-climate-policy/greenhouse-gas-neutral-germany-2050/>

Climate Action Plan 2050 – overview and explanatory film on the participation process: <https://www.bmu.de/en/topics/climate-energy/climate/national-climate-policy/greenhouse-gas-neutral-germany-2050/>



Republic of Korea

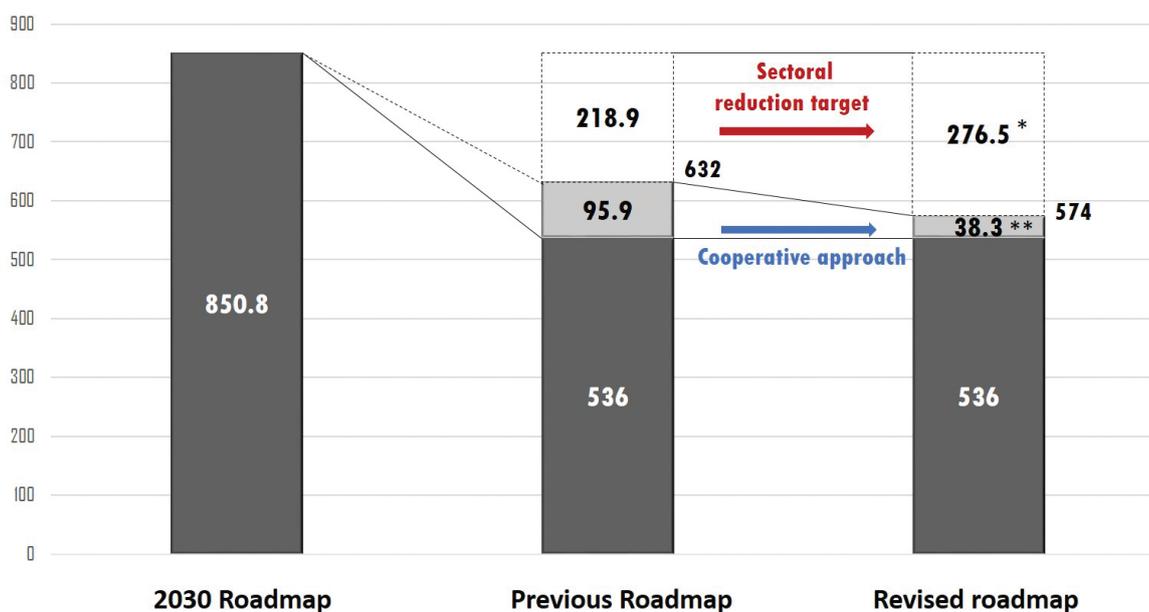
Revised Roadmap Target (2018-2030)

Summary

Along with the advent of the Paris Agreement, the Republic of Korea announced its national GHG emissions reduction roadmap in December 2016, which stated a 37% reduction from Korea's BAU emissions. The Korean government, in order to step up its sectoral reduction target, revised the roadmap in July 2018. Among the 37% reduction target, domestic policy measures will account for 32.5% of the reduction in emissions, while other measures such as collaborative approaches (mentioned

in Article 6.2 on approaches, and Article 6.4 on mechanisms, within the Paris Agreement) and the LULUCF (Land Use, Land Use Change and Forestry) will address the remainder. This country experience relates to the Long-term Low Greenhouse Gas Emission Development Strategies topic proposed in the G20 Hamburg Climate and Energy Action Plan for Growth and responds to the sharing best practices action.

Figure 1. The National GHG Reduction Roadmap (Revised in July 2018)



* Final reduction plan for energy sector will be determined by 2020, the year for submitting revised NDCs (if necessary) to the UN.

** This target is subject to change depending on the result of Paris Agreement implementation negotiations.

Revision of the Roadmap

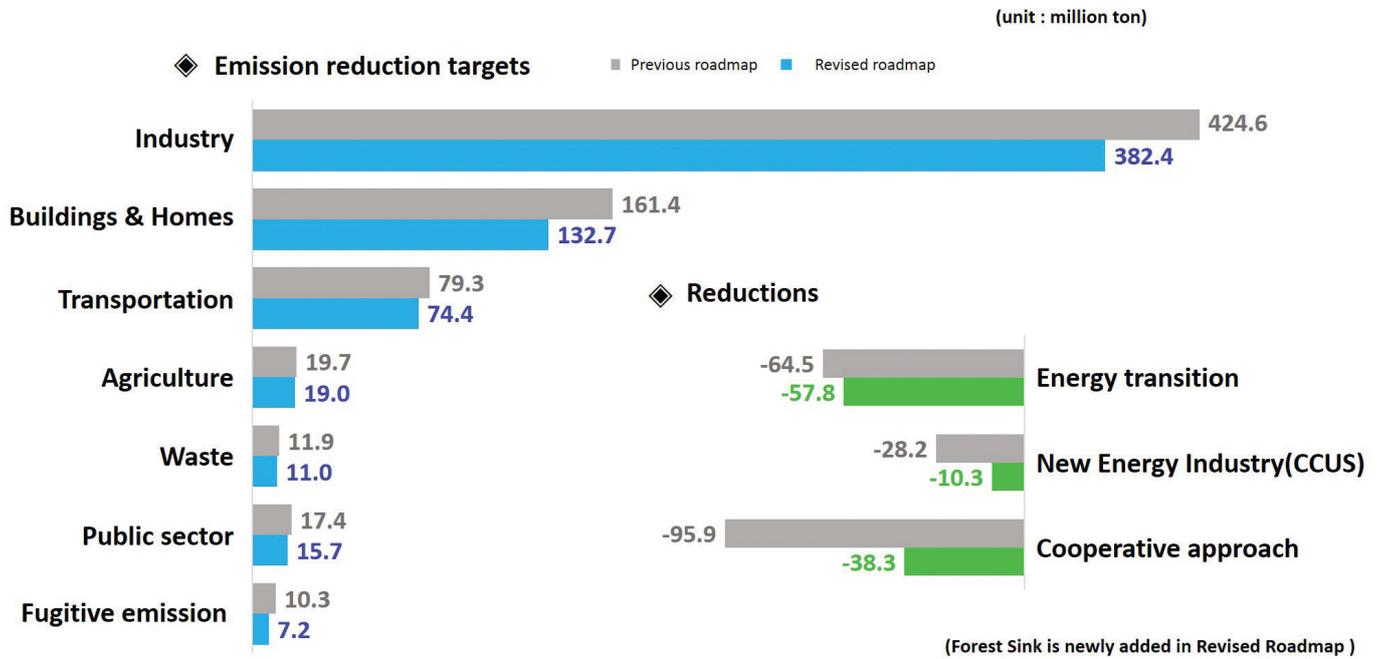
Since the introduction of the roadmap in 2016, there have been some voices of concern stating that the roadmap could help companies set their long-term investment plans. Not only that, there was feedback from civil society within and outside of Korea. Thus, with the need to align the roadmap with major policy changes, that is, maintaining coherence among the newly introduced energy transition plans (e.g. RE 3020, the "Renewable Energy 3020" implementation plan) and air quality policies (e.g. fine dust management plan), the Korean government decided to revise the roadmap.

Major measures in the revised roadmap, in the form of policies, include the following: 1) enhance a low-carbon energy mix; 2) improve industrial energy efficiency such as Factory Energy Management System; 3) develop eco-friendly gas for processes that will replace refrigerants; 4) enhance energy efficiency standards of buildings; 5) promote the use of low-carbon vehicles, with the aim of 3 million Electric Vehicles in use by 2030 (including public transportation); 6) tighten greenhouse gas emission standards; and 7) improve public transportation services by expanding inner and inter-city railways, bus rapid transit, etc.

Among the above-mentioned measures, the Korean government, for example, is endeavouring to enhance the low-carbon energy mix by increasing renewable energy to 20% by 2030; by shutting down 10 old coal plants by 2022 and replacing

6 coal plants with LNG (liquefied natural gas) plants; and by increasing the use of LNG and hydraulic power. Harvested wood products are framed within the policy, and the sector scope includes LULUCF.

Figure 2. The Revised Roadmap's Emission Reduction Targets in Comparison with the Previous Roadmap



Next steps

Pursuant to this revised roadmap, Korea is planning to undertake two important next steps. These steps are both targeting the year 2020, the time when the Paris Agreement is currently set to take effect. First, Korea will establish a 2050 low-carbon

development strategy by 2020. Second, it will seek to update Korea's NDC by 2020. With these two steps forward, Korea will work closely with the international community, engaging in joint efforts to move the Paris Agreement forward.

Lessons learned

- In order to meet the GHG emissions reduction goals (NDCs) set by the Paris Agreement, all members of society need to well understand policy measures employed by their government and also the reasons behind them.
- Persuading companies and understanding their concerns while listening to voices from civil society are important tasks for governments trying to implement bold GHG reduction policies.

+ Additional References

Ministry of Environment: <http://eng.me.go.kr/eng/web/main.do>

Greenhouse gases 2030 roadmap: 2030gas.or.kr - goo.gl/BiaWmA



Mexico

Long-term Low Carbon Development Strategy (LEDS): Planning for Action

Summary

The country case Mexico shares here describes various elements of the long-term low-carbon planning of Mexico based on the experience of the last decade, and is framed within the Long-Term Low Greenhouse Gas Emission Development Strategies topic proposed in the G20 Hamburg Climate and Energy Action Plan for Growth. Specifically, it relates to the Action Plan's proposal for G20 countries to engage in good practice sharing as they plan their long-term strategies.

Background

Mexico's experience with long-term planning of climate policy began with the preparation of National Communications and the National GHG Emissions Inventories, as part of the commitment to report progress on the implementation of the Framework Convention on Climate Change. Mexico submitted its first and second National Communications in 1997 and 2001 respectively. For the third National Communication, the country decided to fully follow the guidelines adopted under the UNFCCC for the preparation of National Communications as well as the IPCC Guidelines for National GHG Emissions Inventories.

Based on these references, the main change observed for the third National Communication was a more detailed attention quality control and assurance principles, key categories and uncertainty analyses, and the use of a common reporting framework to capture the results for the years covered by the inventory. Furthermore, the document included new and more complete modelling work projecting the energy sector and potential future emissions. Consequently, Mexican

responsible institutions adopted as practice the estimation of national GHG emissions based on the most recent data and emission factors, and to the projection into the future as an emissions baseline.

Process of creating the Long-term low carbon development strategy (LEDS)

In Mexico, the existence of an Inter-Ministerial Commission on Climate Change (CICC), created in 2005, include 14 different ministries of the federal government. In addition to the Commission, the Climate Change Council was created as an advisory body with participation of individuals from private sector, non-governmental organizations and academia.

In 2012, a General Law on Climate Change was enacted and also, a new National System on Climate Change (SINACC) was created with participation of the CICC, the Council, together with the Congress, the states, and the representation of municipalities.

From a technical point of view, the preparation of a LEDS (low-emission development strategies) makes substantial use of national GHG emissions data which often comes from the preparation of National Communications. The main technical discussions occur in the definition of mitigation actions that may take place into the future given sector specific conditions or constrains. The costs associated to this LEDS process are equivalent to those of a National Communication, with potential increases if modelling tools fees, international experts, or more meetings and operation expenses occur.

Lessons learned

- Long-term low carbon development strategies require a planning process that defines participants and roles, steps to be followed such as institutional arrangements, a defined timeline as well as technical elements such data needs, modeling tools to be used, or assumptions made.
- A wide range of stakeholders should participate in the process. Their views and concerns are as important as those who technically prepare a LEDS. The validation and gaining of political support is essential for a successful preparation and adoption in the country. The possibility of wider interaction allows for a more complete understanding of the opportunities and limitations the country may face in the transition to a low-carbon development stage.
- A thorough understanding of the principles, provisions and methodologies for the preparation of national GHG emissions inventories is a desirable and helpful first step in the preparation of a LEDS.

+ Additional References

Mexico's Mid-Century Strategy: https://unfccc.int/files/focus/long-term_strategies/application/pdf/mexico_mcs_final_cop22nov16_red.pdf

Information on Mexico's public-private dialogues in support of climate policy development: <http://dialogos.cnds.inecc.gob.mx/>

Mexico's National Communications to the UNFCCC: <https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/national-communications-and-biennial-update-reports-non-annex-i-parties/national-communication-submissions-from-non-annex-i-parties>



United Kingdom

Embedding Clean Growth in National Long-term Planning

Summary

This experience describes the UK’s milestones embedding clean growth in national long-term planning. The UK was the first country to introduce legally binding emission reduction targets through the 2008 Climate Change Act. The UK has been successful in growing our economy while reducing emissions. Since 1990, the UK Government has cut emissions by over 40 per cent while our economy has grown by two thirds. Under the G20 Hamburg Climate and Energy Action Plan for Growth, this country experience is framed within the long-term low greenhouse gas emission development strategies topic and addresses the specific action of good-practice sharing and cooperation of the Action Plan.

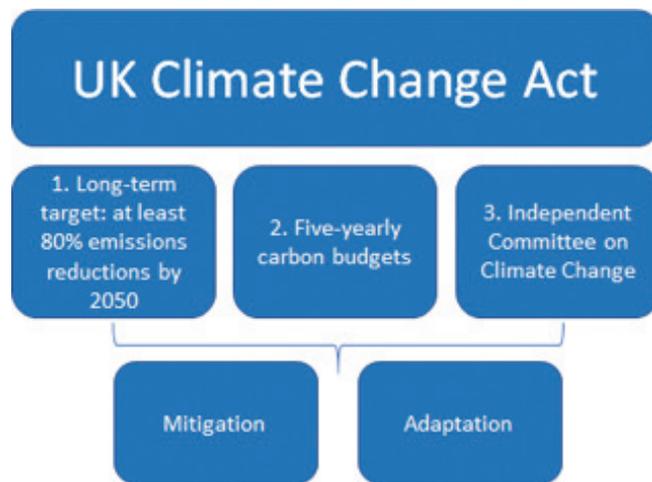
Clean growth and emissions reductions: A sustainable pathway

The UK’s legislative framework provides certainty of future direction by integrating clean growth and greenhouse gas emissions reduction into the UK’s national long-term planning. The recently published Clean Growth Strategy is a core part of this, setting out ambitious policies and proposals to meet our carbon reduction targets while seizing the opportunities of clean growth. This best practice presents key aspects of the Climate Change Act and the recently presented Clean Growth Strategy.

The Climate Change Act

The UK passed the Climate Change Act in 2008, introducing the world’s first long-term legally binding framework to reduce GHG emissions. The Act is the central piece of legislation that governs the UK approach to tackling climate change. The Climate Change Act has three key components: a long-term target, five-yearly carbon budgets and the independent scrutiny of the Committee on Climate Change.

Figure 1: Overview of France’s GHG emissions trajectory



Climate Mitigation

- The Act specifies that the UK must reduce its emissions by at least 80% by 2050 relative to 1990 levels.
- The Act requires carbon budgets be set providing a framework for meeting our statutory targets by setting a maximum emissions limit over each five-year period.
- The Act established the Committee on Climate Change (CCC) - an independent body that brings together expertise in climate science and policy, economics, business competitiveness and financial management. The CCC advises the government on emissions targets, and reports to Parliament on progress made in reducing GHG emissions, which the Government is required to respond to.

Climate Adaptation

In addition, the UK’s ongoing work on adaptation is underpinned by the Climate Change Act. The Act sets out a framework for building the UK’s ability to adapt to climate change, by establishing:

- That a UK-wide Climate Change Risk Assessment (CCRA) must take place every five years;

- That a National Adaptation Programme (NAP) must be put in place and reviewed every five years to build up UK resilience to climate change;
- A power for the government to require public authorities and public and private companies that provide our infrastructure and related services

(for example, water and energy utility companies) to report on how they have assessed the risks of climate change to their work, and what they are doing to address those risks.

UK government’s approach is to integrate consideration of climate risks and adaptation across all policies, programmes and activities within government and beyond.

The Clean Growth Strategy (2017)

The Clean Growth Strategy:

- is an ambitious strategy to cut the UK’s greenhouse gas emissions while keeping costs down for consumers, creating good jobs and growing the economy;
- sets out the UK’s plans to build on the successful decarbonisation of the power sector, while looking further across the whole of the economy and the country;
- includes ambitious proposals on housing, business, transport, the natural environment and green finance, acknowledging the need for sustainable infrastructure and both public and private investment;
- sets out how the UK will seize the opportunity from the global transition to a low carbon economy;
- benefited from extensive stakeholder engagement; and
- was submitted to the UNFCCC as the UK’s Long Term Strategy in April 2018.

Lessons learned

- By embedding clean growth into our long-term planning it is possible to achieve a low carbon economy that works for everyone; creating jobs, expanding businesses, and contributing to a healthier and safer planet.

+ Additional References

UK’s Climate Change Act: <https://www.legislation.gov.uk/ukpga/2008/27/contents>

UK’s Clean Growth Strategy: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/700496/clean-growth-strategy-correction-april-2018.pdf

A Reliable and Secure Framework for the Energy Sector Transition



Italy

Italy's National Energy Strategy

Summary

Italy's National Energy Strategy aims to increase the share of renewables and energy efficiency. The strategy was developed in a participatory manner with broad stakeholder involvement. The National Energy Strategy (SEN 2017), together with the most relevant Italian strategies and documents on climate issues will form the basis of the Integrated National Energy and Climate Plan required under the recently approved EU Regulation on the Governance of Energy Union. Such Regulation foresees wider objectives compared to the SEN 2017 as it will address the 'five dimensions' of the Energy union: energy security, solidarity and trust; the internal energy market; energy efficiency; decarbonisation of the economy; and research, innovation and competitiveness. Under the G20 Hamburg Climate and Energy Action Plan for Growth, this country experience is framed within the Promotion of a Reliable and Secure Framework for the Energy Sector Transition topic, addressing the Action Plan's call for exchanging best practices on national long-term low greenhouse gas emission energy sector strategies.

Background

The National Energy Strategy approved by the Italian Government on November 10, 2017 aims to make the national energy system more competitive, more sustainable and more secure by 2030.

The document is the result of a wide participatory process, jointly coordinated by the Prime Minister's Office, the Ministry of Economic Development and the Ministry of Environment, which had involved central public administrations, the Italian Parliament, regions and over 250 stakeholders, including associations, companies, public entities, citizens, and representatives of academia.

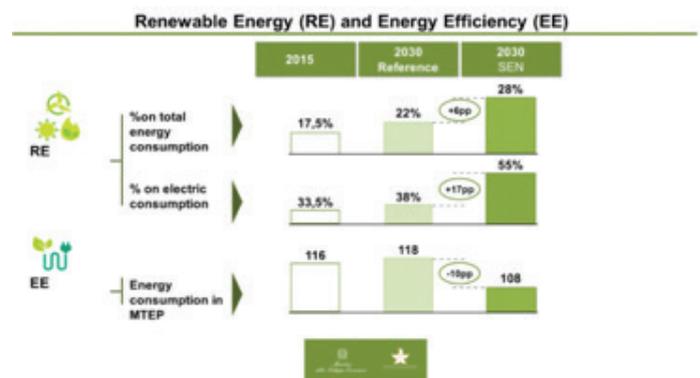
The Strategy sets the targets to be achieved by 2030, in accordance with the EU 'Clean Energy Package' and in line with EU Energy Roadmap 2050 long-term decarbonisation scenario.

The main targets set in the strategy are to:

- Reduce final energy consumption by a total of 10 Mtoe (megatons of oil equivalent) by 2030;
- Achieve a 28% share of renewables sources on total energy consumption by 2030;

- Phase out the use of coal in electricity generation by 2025;
- Reduce GHG emissions by 33% by 2030 compared to 2005 levels for sectors covered by the EU Effort Sharing Decision (ESD);
- Reduce GHG emissions by 57% by 2030 compared to 2005 levels for sectors covered by EU Emissions Trading Scheme (ETS);
- Strengthen security of supply;
- Narrow the energy price gap with the rest of Europe, and;
- Further sustainable public mobility and eco-friendly fuels.

Figure 1. Summary of RES and EE National Energy Strategy Goals



The 28% Renewable Energy Systems (RES) share target, in terms of final energy consumption, is ambitious and will be achieved as follows:

- 55% of renewables in electricity generation by 2030 (33.5% in 2015)
- 30% of renewables in heating and cooling by 2030 (19.2% in 2015)
- 21% of renewables in transport by 2030 (6.4% in 2015)

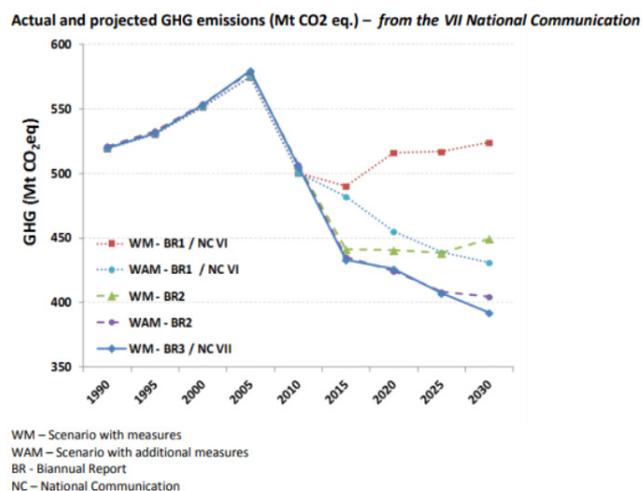
With regard to energy efficiency, the strategy intends to promote low energy-consumption initiatives selected through a best cost/benefit ratio, to achieve a 10 Mtoe (megatons of oil equivalent) reduction by 2030 on final energy consumption and to provide a substantial incentive to the Italian relevant sectors (e.g. energy-efficient buildings, energy-efficient facilities). In order to ensure effective monitoring

of the strategy's implementation, a Steering Committee coordinated by the Ministry of Economic Development and the Ministry of Environment, with the participation of Ministries of Economy, Transport, Agriculture, Health, Cultural Heritage, Regions and local administrations has been established.

Highlights of the Participatory Process

- 2 parliamentary hearings;
- 5 workshops with international experts;
- 40 meetings with trade associations companies, regulatory authorities, public entities, transmission system operators;
- 251 contributions received from citizens, companies, environmental associations, academia, public authorities;
- 9700 views of the dedicated web page of the Ministry

Figure 2. Actual and Projected GHG emissions (MtCO₂e) from Italy's National Communication



Lessons learned

- The drafting of the strategy and the public participation process have provided invaluable indications for negotiating the EU Clean Energy Package, a process that was ongoing in 2017-2018 at EU level between the European Parliament, the EU Council and the European Commission.
- In the framework of the SEN a “Modelling and Scenarios” Technical working group has been established in order to develop the analytical basis for energy and emissions projections, composed of public institutes responsible for climate and energy issues including the Italian Energy Service Manager, GSE; the Energy Systems Research center, RSE; the Italian National Agency for New Technologies, Energy and Sustainable Economic Development, ENEA; the Italian National Institute for Environmental Protection and Research ISPRA; and Polytechnic University of Milan). This work will be functional, together with the most relevant Italian strategies and documents on climate and energy issues, for the development of the National Integrated Energy and Climate Plan.

+ Additional References

Italy's National Energy Strategy brochure in english. Available at: <http://www.sviluppoeconomico.gov.it/index.php/en/202-news-english/2037432>

Italian VII National Communication under the UNFCCC. Available at: https://unfccc.int/sites/default/files/resource/258913076_Italy-NC7-2-Italy%20Seventh%20National%20Communication%20Final.pdf

Promote
Energy Efficiency



Canada

Build Smart: Canada's Buildings Strategy

Summary

Canada's Building Strategy, "Build Smart", aims to reduce emissions in the building sector through energy efficiency initiatives and regulations. Build Smart is Canada's implementation plan to meet targets set out in the Pan-Canadian Framework on Clean Growth and Climate Change (PCF), which articulates commitments by federal, provincial and territorial governments to meet Canada's emissions reduction targets, grow the economy, and build resilience to a changing climate. This country case responds to the call for sharing best practices within the Promotion of Energy Efficiency topic as proposed in the G20 Hamburg Climate and Energy Action Plan for Growth.

Background

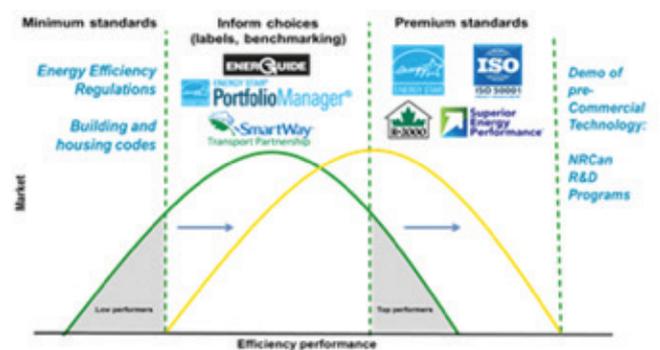
The PCF, announced by Canada's First Ministers in December 2016, is Canada's vision for action to help meet its nationally determined contribution (NDC) to the Paris Agreement. Canada's Green House Gas (GHG) emission-reduction target is 30% below 2005 levels by 2030—a critical objective in Canada's transition to a low carbon future. The PCF builds upon existing climate change actions to create a competitive and resilient low-carbon economy. As Canada transitions to a low-carbon economy, energy will play a key role in meeting our commitment, with energy production and use accounting for over 80% of Canada's existing emissions. One-third of targeted emissions reductions can be achieved through ambitious energy efficiency measures in the buildings, industrial and transportation sectors. Drilling further into the numbers, the energy we use in the residential, commercial and institutional buildings sectors accounts for 17% of Canada's GHG emissions. The projected emissions in this sector will grow modestly without interventions; however, the potential GHG emissions reductions in the buildings sector is over 20Mt.

The approach

Governments, working together, have created a vision of a future with a low-carbon, clean growth economy. Buildings and communities will be highly energy efficient, rely on clean electricity and renewable energy, be sustainable more comfortable and healthier. The actions aim to promote innovation and employment opportunities, and to create framework codes and regulations for adoption by sub-national governments and indigenous communities.

The strategy is articulated in five pillars: new buildings, existing buildings, equipment, Research, Development and Demonstration (RD&D), and indigenous communities, all backed by investments at both the federal and the provincial/territorial levels.

Figure 1. Market Transformation Standard Graphic



Buildings Strategy Pillars:

1. New buildings: Net zero energy ready building codes for new construction, published by 2022 for adoption by 2030.
2. Existing buildings: 75% of the building stock in 2030 exists today making critical the measures for existing buildings, including retrofit codes published by 2022 for adoption by 2030 and mandatory energy use labelling and disclosure by as early as 2019.
3. Equipment: Regulating the efficiency of energy-using equipment is key to improving Canada's emissions through four amendments to Canada's Energy Efficiency Regulations covering more than 40 equipment standards completed by 2021, and through continued updates to ENERGY STAR specifications for high performance equipment to incentivize product innovation and market adoption of cleaner technologies.
4. RD&D: To drive innovation and prepare the market to help meet our targets through an investment of 64 million CAD (49 million USD) in RD&D will fund 12 to 20 external RD&D projects, and through focus on demonstrating a broad variety of net zero ready building design possibilities, with at least one project from both residential and commercial

streams in every province and territory by 2025.

5. Indigenous communities: Support communities that seek to incorporate energy efficiency in construction, renovation and repair of housing by providing energy efficiency expertise, and develop a building and retrofit guide for Indigenous communities that leverages traditional knowledge.

Progress to date

- Launch of the development process for model energy codes for buildings - July 2017
 - New buildings: collaborating with provinces, territories, and industry to develop net-zero energy ready model building codes for new buildings, and to support their adoption by provinces and territories.
 - Existing buildings: developing model national energy code requirements for existing buildings by 2022.
- Draft regulations published covering 17 appliance and equipment standards - March 2018
- New ENERGY STAR certification program for buildings launched in March 2018.
 - New program expansion includes seven building types eligible to apply for certification: schools, commercial offices, hospitals, supermarkets and food stores, medical offices, senior care communities and residential care facilities, and ice/curling rinks.
- Completed government-stakeholder equipment roadmaps for next generation heating and window technologies - June 2018
- The Energy Efficient Buildings RD&D Program call for proposals closed on June 15, 2018. In total, 41 project proposals were received and are being assessed. The selection process is expected to conclude in late August.

Complementary funding

The Government of Canada is committed to meeting its NDC. The Green Infrastructure Fund investment (21.9 billion CAD/16.7 billion USD over 10 years) announced in Budget 2017 will support initiatives articulated in the PCF. Additionally, the Low Carbon Economy Fund (LCEF), also announced in 2017, is supporting the PCF with 2 billion CAD (1.5 billion USD) over five years.

Lessons learned

- Energy will play a key role in Canada's meeting its NDC commitments, with energy production and use accounting for over 80% of Canada's existing emissions. Ambitious energy efficiency measures in the buildings, industrial and transportation sectors can be reduced targeted emissions by one-third.
- One key initial component to address the energy efficiency of buildings is to initiate a development process for model energy codes for buildings, for which various stakeholders, local and regional actors need to be taken into account.

+ Additional References

Build Smart: Canada's Building Strategy: https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/emmc/pdf/Building_Smart_en.pdf

Pan-Canadian Framework on Clean Growth and Climate Change: <https://www.canada.ca/en/services/environment/weather/climatechange/pan-canadian-framework/climate-change-plan.html>



Germany

Energy Efficiency Policies and Programmes at the Country Level

Summary

Germany has been consistent with its energy efficiency commitments. The present example summarizes the main policies and programs with their respective goals, scope, facts and figures. This country experience is related to the topic of energy efficiency proposed in the G20 Hamburg Climate and Energy Action Plan for Growth, and responds to the best practice exchange of the Action Plan.

Background

Primary energy consumption rose slightly in 2015. Economic growth, population increase and the somewhat colder weather conditions contributed to this increase. Despite this, at 13,293 pico-joules (PJ) primary energy consumption was at its second lowest level since 1990.

Primary energy consumption is to drop by 20% by 2020 and 50% by 2050, compared with 2008 levels. The new government plans to adopt by early 2019 an energy efficiency strategy that will provide intermediate targets (2030, 2040) for the long-term objective, as well as a set of implementation measures with a view to 2030, building on past experience. In 2014 in the last legislative term, the Federal Government adopted the National Action Plan on Energy Efficiency (NAPE) to boost energy efficiency. The NAPE newly introduced or expanded a set of 20 measures across different sectors. The central measures of the NAPE have been implemented by now. They will be complemented and expanded with the above-mentioned energy efficiency strategy. Select examples of the 2014 NAPE can be found below.

National Action Plan on Energy Efficiency

Updated CO₂ Building Modernisation Programme (KfW funding programmes for energy-efficient construction and retrofiting).

Goals: Step up energy retrofitting of residential buildings through new and improved incentives and greater involvement of the commercial and municipal/social sector (energy-efficient new builds and modernisation of non-residential buildings).

Scope: Support particularly encompasses new building construction and building energy-retrofits to meet the KfW energy efficiency standards, as well as individual energy efficiency measures. Support is provided in the form of grants or low-interest loans combined with repayment subsidies based on the following principle: the higher the level of energy efficiency, the higher the financial support.

Facts and figures: Funding of €2 billion per year in 2015 and 2016.

Energy Efficiency Incentive Programme

Goals: Smart combination of individual measures, market rollout of fuel cell heating, and increased consumer awareness for energy efficiency.

Scope: Promote the introduction of innovative fuel cell heating on the market, the installation of ventilation systems in connection with renovation measures on the building shell, the replacement of inefficient heating systems with efficient ones, and an information campaign to promote investment measures. The programme commenced in January 2016 and has been incorporated into the established structure of the CO₂ Building Modernisation Programme and the Market Incentive Programme.

Facts and figures: Annual programme funding of €165 million through to 2018 inclusive.

Continued development of the Market Incentive Programme for renewables in the heating market and National Efficiency Label for old heating systems

Goals: Increase the rate of replacement of old, inefficient boilers.

Scope: Starting in 2016, the new efficiency label applies for boilers that are more than 15 years old, and provides consumers with an individual

assessment of the efficiency of their boiler systems.

In addition, consumers receive information about farther-reaching energy consulting services and funding programmes.

Facts and figures: Approximately 13 million boilers will be labelled over the next 8 years. The measure has the potential to increase the annual replacement rate by approximately 20% to 3.7%.

Promotion of heating optimisation using high-efficiency pumps and hydraulic balancing

Goals: Promotion of the replacement of old pumps with high- efficiency heating and warm water circulation pumps in buildings and optimised heating through the use of hydraulic balancing and low-cost measures

Scope: The funding programme seeks to support the replacement of up to 2 million pumps in buildings and the additional optimisation of up to 200,000 heating systems per year by 2020, with the aim of cutting around 1.8 million tonnes of CO₂ by 2020. The programme commenced in August 2016.

Facts and figures: Funding of roughly €100 million was available in 2016.

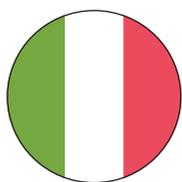
Figure 1. Summary of the key energy efficiency policies' results and opportunities

<i>National Action Plan on Energy Efficiency</i>	<ul style="list-style-type: none">•Retrofitting scale up•Funding of €2 billion per year in 2015 and 2016
<i>Energy Efficiency Incentive Programme</i>	<ul style="list-style-type: none">•Smart combination of individual measures•Annual programme funding of €165 million through to 2018 inclusive
<i>Market Incentive Programme for renewables in the heating market and National Efficiency Label for old heating systems</i>	<ul style="list-style-type: none">•Approximately 13 million boilers will be labelled over the next 8 years.•The measure has the potential to increase the annual replacement rate by approx. 20% to 3.7%.
<i>Promotion of heating optimisation using high-efficiency pumps and hydraulic balancing</i>	<ul style="list-style-type: none">•Replacement of up to 2 million pumps in buildings and the additional optimization of up to 200,000 heating systems per year by 2020.•Funding of roughly €100 million is available in 2016.

+ Additional References

National Action Plan on Energy Efficiency: <http://www.bmwi.de/Redaktion/EN/Artikel/Energy/national-action-plan-on-energy-efficiency.html>

Green Paper on Energy Efficiency: <http://www.bmwi.de/Redaktion/EN/Dossier/energy-transition.html>



Italy

Energy Efficiency Certificates

Summary

The White Certificates or Energy Efficiency Certificates (EEC), are negotiable securities that certify the energy savings achieved in the final uses of energy, implementing measures to increase energy efficiency in Italy. This country experience addresses the call for sharing best practices within the Promotion of Energy Efficiency topic as proposed in the G20 Hamburg Climate and Energy Action Plan for Growth.

The White Certificates System

The EEC system, introduced by a ministerial decree of April 24, 2001, and subsequently modified, is an incentive mechanism based on a mandatory primary energy saving scheme for electricity and natural gas distributors with more than 50,000 end customers.

Subjects that are entitled to the presentation of projects for the recognition of white certificates:

- Electricity and gas distributors not subject to the obligation;
- Energy service companies (ESCO) certified according to the UNI CEI 11352 standard;
- Public or private subjects that have appointed an expert in energy management certified according to the UNI CEI 11339 standard;
- Subjects with a certified energy management system in accordance with ISO 50001.

The parties can fulfil the savings obligation in two ways:

1. Realizing the energy efficiency projects admitted to the mechanism, directly or through the controlled companies;
2. Purchasing the white certificates from other parties admitted by the mechanism.

For each ton of oil equivalent of savings achieved thanks to the implementation of the energy efficiency project, a certificate is issued by the Energy Market Manager (GME), throughout its useful life established by the law for each type of project (from 3 to 10 years).

The volunteers and the obliged parties exchange the certificates on the market platform managed by the GME or through bilateral negotiations.

Table 1. National targets for primary energy savings 2017-2020 [Mtoe, megatons of oil equivalent]

	2017	2018	2019	2020
Primary energy saving targets (Mtoe)	7.14	8.32	9.71	11.19

The energy projects that are eligible for the mechanisms are those that have not yet been implemented and are able to generate additional energy savings.

The legislation defines the methods for evaluating the achievable saving, the baseline assessment, the benchmark and the projects requirements to apply for the White Certificates mechanism. Furthermore, if the project is not included in the regulations, the proposer can ask the national Energy Service Manager (GSE) to evaluate its admissibility.

Each intervention, depending on the type of savings achieved, can obtain a different type of EEC:

- Type 1 Securities - Reduction of electricity consumption;
- Type 2 Securities - Reduction of natural gas consumption;
- Type 3 Securities - Reduction of consumption of other forms of energy not realized in the transport sector;
- Type 4 Securities - Reduction of consumption of other forms of energy carried out in the transport sector.

Since the mechanism started in 2006 and until 2017, there have been recognized more than 47.4 million white certificates corresponding to around 25.7 Mtoe (megatons of oil equivalent) of primary energy savings.

The year 2017 recorded an increase of more than 5% of the titles recognized compared to 2016.

Table 2. Number of White Certificates Recognized in the Period 2013-2017

	2013	2014	2015	2016	2017
TOTAL	6.117.820	7.528.973	5.029.064	5.517.891	5.807.831

The price of White Certificates is not fixed, but is established by the matching of demand and supply.

The EEC scheme presents a market articulated in a platform for spot exchanges and for bilateral exchanges in which the obliged subjects can buy

the EEC from the voluntary subjects. Over the years the value of the securities has fluctuated mainly between USD 117 and USD 129 per certificate, but in the last two years there has been a strong growth due to difficulties in offering to meet the demand represented by annual obligations.

In 2017, the average price of the EEC increased by 81% compared to the previous year, reaching USD 312,75/toe (tons of oil equivalent). Even in bilateral trade, the average price rose to a historical high of USD 245.92/toe.

Lessons learned

- ⦿ It is a market scheme where the market selects the technologies and the sectors. This allows the White Certificate to be one of the most effective scheme in terms of EUR/tep (tons of oil equivalent per million EUR) saved.
- ⦿ There is no burden on Public finances unlike the other RES's schemes such as Feed-in Tariff (incentive + compensation for the energy sold).
- ⦿ The industrial sector recognizes in the White Certificate Scheme a stable investment opportunity. The high participation from Private Sector, also thanks to ESCO involvement, had positive consequences on SME growth and local economic development.

+ Additional References

Further information on Italy's Energy Efficiency Certificates: <https://www.gse.it/servizi-per-te/efficienza-energetica/certificati-bianchi>

Description of Italy's Energy Efficiency Certificates: <http://www.mercatoelettrico.org/It/Mercati/TEE/CosaSonoTee.aspx>



Italy

Thermal Account

Summary

The Thermal Account is a tool that was made available to private citizens, companies and the public administration that aims to increase energy efficiency by incentivizing the implementation of small-scale measures to increase energy efficiency and produce thermal energy from renewable sources. It allocates USD 230 million yearly for the Public Administrations (PA) and USD 820 million yearly for privates. This country case addresses the topic of energy efficiency proposed in the G20 Hamburg Climate and Energy Action Plan for Growth, and responds to the best practice exchange of the Action Plan.

Thermal Account to increase energy efficiency

In order to contribute to the achievement of the national targets, the Thermal Account upgrades buildings in order to improve their energy performance, thus reducing consumption costs and quickly recovering part of the costs incurred.

Access to incentives can be obtained in two ways:

- Through direct access: the request must be submitted within 60 days from the end of the works.
- By booking: it is possible to reserve the incentive even before the intervention is carried out but exclusively if the building is exclusively in the ownership of the PA or of the Energy Companies Service Companies (ESCOs) operating on their behalf.

Both the applications submitted to direct access and through booking are evaluated by the Energy Service Manager (GSE) according to the provisions of the administrative procedures regulated by Law 241/90.

Thermal Account provides a non-repayable grant ranging from 40% to 65% of the expenditure incurred.

In particular:

- Up to 65% for the demolition and reconstruction of almost zero-energy buildings (nZEB);
- Up to 40% for the insulation of walls and roofs, the replacement of window closures with more efficient ones, the installation of solar shading, the replacement of the lighting bodies, the installation of building automation technologies and the replacement of traditional boilers with condensing boilers;
- Up to 50% for thermal insulation interventions in the climatic zones E / F and up to 55% in the case of thermal insulation and replacement of the window closures, if combined with another system (condensing boiler, heat pumps, solar thermal);
- Up to 65% for the replacement of traditional systems with heat pump systems, boilers and biomass appliances, hybrid systems with heat pumps and solar thermal systems.

Thermal Account also finances 100% of the expenses for the Energy Diagnosis and the Energy Performance Certificate for the PA and 50% for the private individuals and the co-operatives.

In 2017, more than 43,000 requests were received (+189% compared to 2016), corresponding to incentives of USD 214 million.

Table 1. Applications Presented in the Period 2013-2017

PERIOD	TOTAL	
	N. Applications	Requested incentive (million USD)
2013-2014	9.777	49,11
2015	8.263	44,55
2016	14.955	79,86
2017	43.227	214,22
2013-2017	76.222	387,74

³ The climatic classification of Italian municipalities was introduced by the Decree of the President of the Republic n. 412 of August 26, 1993. The Italian territory is subdivided into 6 climatic zones according to the "degree days" (heat requirement necessary to maintain a comfortable climate in the home). The "degree days" are the sum, for all the days of the year, of the difference between the temperature of the internal environment (20°C per convention) and the average daily outdoor temperature. Climate zones are labelled with letters from A (the warmest) to F (the coldest).

⁴ Fraction of particles with minimum diameter or equal to x micrometers ($x = 10, 2.5, 1.0, 0.1$)

Energy and environmental results

Table 2. Applications Admitted in the Period 2013-2017

Period	DIRECT ACCESS		BOOKING	
	Contractual requests	Approved incentive (million USD)	Admitted requests	Booking incentive (million USD)
2013-2014	7.720	27.91	15	0.23
2015	7.842	37.06	4	0.23
2016	9.861	41.05	53	9.38
2017	38.775	117.51	244	40.93
2013-2017	64.198	223.41	316	50.78

Overall, the interventions promoted through the Thermal Account in 2017 have enabled the production of approximately 800 GWh of renewable thermal energy, the saving of almost 50,000 toe (tons of oil equivalent) of energy in final uses and savings of emissions in terms of greenhouse gases (100,000 t CO₂e or tons of carbon dioxide equivalent) and particulate matter (1,100 ton PM_x, whereby fraction of particles with minimum diameter or equal to x micrometers, x = 10, 2.5, 1.0, 0.1).

Lessons learned

- ◉ In order to promote the effective use at large scale of incentive mechanism it is important to implement a right communication to the end user (in particular private citizens and companies) of the advantages and define a simple and streamlined application procedure.
- ◉ Complex schemes require a continuous revision. With the DM 16/02/2016, that updates the DM 28/12/2012, the Thermal Account was revised in order to favor a wider access to the tool.

+ Additional References

Further information on Italy's Thermal Account: <https://www.gse.it/servizi-per-te/efficienza-energetica/conto-termico>

Link to the Heat Account Counter tool: <https://www.gse.it/contatore-conto-termico>



Russian Federation

Market Transformation Programme on Energy Efficiency in GHG-intensive Industries in the Russian Federation

Summary

The Market Transformation Programme on Energy Efficiency in GHG-intensive industries of the Russian Federation aims at the implementation of policies and programmes in Russia's industrial sector to reduce energy consumption, improving efficiency and reducing GHG emissions. Under the G20 Hamburg Climate and Energy Action Plan for Growth, this country case relates to the Promotion of Energy Efficiency topic and addresses the specific action of exchanging best practices.

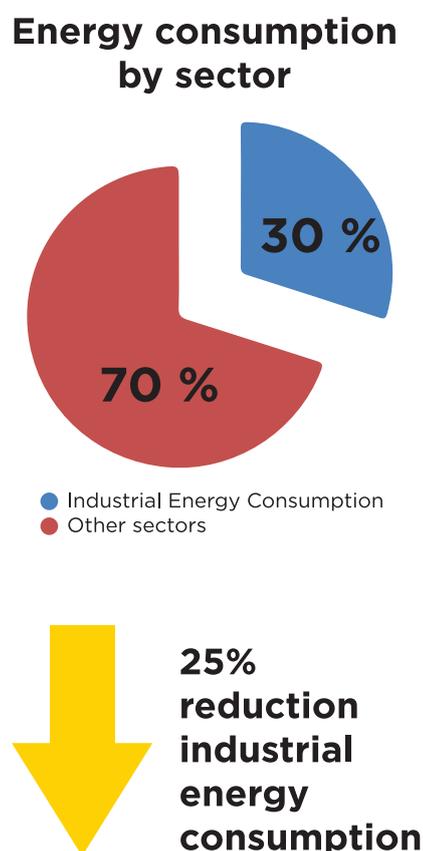
Market transformation programme

Increasing energy efficiency in industrial production is among the top priorities for the Russian Federation. The integrated plan of measures for energy efficiency improvement of the Russian Federation stipulates the implementation of measures in order to improve the energy efficiency of the Russian Federation, regarding the manufacturing enterprises, regulated entities, organizations with public participation, state owned organizations and residential buildings, and to reduce the loss of energy resources, both during their consumption and during transportation. On June 4, 2008 the Presidential Decree N°889 put forward a goal to reduce the energy intensity of Russia's GDP production by at least 40% compared to 2007. The Decree and follow-up Federal Law N°261 "On Energy Saving and on Improving Energy Efficiency" specifies economic mechanisms that stimulate companies and public organizations to use energy-saving and environmentally friendly technologies. The plan's more than 50 activities are aimed to ensure modernization of key assets, the increase of technological factor to reduce the power intensity of the gross domestic product not less than 1.5% per year, and to ensure the reduction of the technological backlog of the Russian Federation. Through Russia's close work with the United Nations Industrial Development Organization (UNIDO) as well as the International Organization for Standardization (ISO) on energy efficiency measures and compliance with international standards (for instance EnMS-ISO 50001 provides guidelines for the better management of energy usage), UNIDO-promoted operational projects in 17 countries and the certification more than 350 enterprises in ISO 50001 have already led to more than 7,000 GWh in cumulative primary energy savings.

Environmental and economic benefits

Industrial energy consumption amounts to nearly 30% of the overall use by all sectors. Energy efficiency measures such as wide-scale upgrading and the deployment of best available technologies could cut industrial energy intensity by a quarter. The most energy-intensive sub-sectors such as iron and steel, cement, petrochemicals, as well as pulp and paper production, bear the largest technical potential for energy savings at 10-40%. By reducing energy losses and saving energy resources, the reduction of greenhouse gas emissions will be ensured, thus contributing to the goal of reducing the carbon intensity of the economy and, therefore, reaching at least 60% of the target for INDC in Russia.

Figure 1. Expected Impacts of Market Transformation on the Energy Efficiency Programme



Stakeholders involved

- UNIDO
- Ministry of Energy of the Russian Federation
- Ministry of Economic Development of the Russian Federation
- Ministry of Industry and Trade of the Russian Federation
- Russian Energy Agency
- Centre for Energy Saving Technologies under the
- Cabinet of Ministers of Tatarstan Republic National Research University “MEI”
- Kazan Federal University – branch in Naberezhnyie Chelny
- Chamber of Commerce & Industry of Naberezhnyie Chelny
- Technical University of the Ural Mine and Metal Company

Table 1. Project Size (USD)

Year	Budget	Expenditures
2012	1,722,379	1,723,575
2013	1,957,688	1,957,611
2014	1,794,131	1,794,279
2015	1,284,477	1,282,187
2016	1,091,628	1,092,328
2017	302,326	304,644
2018	89,955	25,485
Future	8,584	0
Total	8,251,168	8,180,109

Status of implementation/progress

Key project component is the implementation of ISO 50001-compliant energy management system in the Russian regions. By the end of 2017 such systems were introduced at 28 Russian companies and 17 more are being introduced. Among the success stories are Baltica brewery, Ural Mining and Metallurgical Company (UMMC), Magnitogorsk Iron and Steel Works, enterprises of AK Bars Holding, JSC “Plant of Sergo, JSC QUART”. In detail:

- In 2015 alone, the Baltica Brewery has saved 72 million Rubles (1.14 million USD) in the no-cost and low-cost ways thanks to the EnMS.
- Magnitogorsk Steel Plant has saved energy resources on 1,117 billion Rubles (18.68 million USD), using low-cost actions.
- 8 enterprises of UMMC have saved 34,3 million kWh and 4,1 million m³ of natural gas that is equivalent to 94,5 million Rubles (1.5 million USD).
- 5 enterprises of the AK Bars Holding have saved up to 2 million kWh of electric power, more than 2,9 million m³ gas, more than 15 thousand m³ of water.
- JSC “Plant of Sergo” has saved 2,6 million kWh of the electric power and 1,2 million m³ gas.

Lessons learned

- On average, the financial benefits of the implementation of ISO 50001-compliant energy management systems are 1 to 3 in investment and profits.
- At Magnitogorsk Steel Plant investment of 100,000 USD in energy efficiency compliance yield a profit of approximately 18 million USD (1:180).

+ Additional References

Government Commission on the Fuel and Energy Complex, the Reserve Replacement and Improving the Economy’s Energy Efficiency: <http://government.ru/en/departments/143/events/>

Ministry of Energy of the Russian Government: <http://minenergo.gov.ru/>



Turkey

Energy Efficiency in Turkey

Summary

The implementation of different energy efficiency initiatives in Turkey made significant progress in the last years. Under the G20 Hamburg Climate and Energy Action Plan for Growth, this country experience is framed within the promotion of energy efficiency topic and addresses the specific action of exchanging best practices.

Background

Energy efficiency is a main component to reduce GHG emissions in Turkey while increasing the competitiveness of the economy. Primary Energy Intensity of the Turkish economy, measured as a ratio of total primary energy supply (TPES) per unit of real GDP adjusted for purchasing power parity was 0.152 (tons of oil equivalent (toe)/USD 1,000) in 2002. This ratio declined to 0.12 (toe/USD 1,000) in 2015 that means significant improvement was ensured (21%) between 2002 and 2015. Turkey formulated an overall target to reduce energy intensity by 20% by 2023 compared to 2008 levels (Official Gazette No 28215 “Energy Efficiency Strategy Paper 2012-2023”). Regarding the industrial sector, the aim is not only to reduce energy intensity and energy losses, but also to ensure the market transformation of energy-efficient products.

Table 1. Total Energy Efficiency Financing, Investments, and Savings for EEIP

EEIP	Number of Agreement	Total Investments (Million TRY/USD, approximate values)	Total Grant (Million TRY/USD, approximate values)	Total Energy Savings (toe)	Total Savings (Million TRY/USD)
Completed	137	55.03/14.56	13.14/3.48	48.489	60.29/15.96
On going	140	70.64/18.69	18.88/5.00	23.678	31.43/8.32
Total	277	125.67/33.26	32.02/8.47	72.167	91.72/24.27

Under the National Energy Efficiency Action Plan that will be implemented between 2017 and 2023, Turkish primary energy consumption will be reduced by 14% by 2023 through 55 actions and is projected to achieve savings of 23.9 mtoe (megatons of oil equivalent) cumulatively by 2023, with which 10.9 billion USD of investment can be realized.

Energy Efficiency Improvement Project (EEIP)

Since 2009, the EEIP has been implemented to support projects and actual investments for enhancing energy efficiency in industrial plants. The target group is industrial companies with a minimum of 1,000 toe of annual energy consumption. The government provides grants of up to 1 million TRY (Turkish Lira)/265.000 USD to minimize energy waste, losses and inefficiencies to the industry sector.

Voluntary Agreements Program

Since 2009, the Voluntary Agreements (VAs) have been implemented to encourage companies to achieve a minimum 10% decrease in the energy intensity over a three year period. If a company meets the target set by the agreement, then up to 20% of the energy costs (at most 200.000 TRY/52.928 USD) can be granted during the first year. Between 2009 and 2017, 25 companies participated in the program.

Reference: TRY/USD taking into account for the converting is 3.7787 as of 12.29.2017, the end of 2017.

Cezeri Green Technology Technical Anatolian High School

As an effort to disseminate sustainable green buildings/schools, Cezeri Green Technology Technical Anatolian High School, which is at least 80% more energy efficient than an ordinary high

Table 2. Total Energy Efficiency Financing, Investments, and Savings for VAs

VOLUNTARY AGREEMENTS	Number of Agreement	Total Investments (Million TRY/USD, approximate values)	Total Grant (Million TRY/USD)	Total Savings (TOE)	Total Savings (Million TRY/USD)
Completed	7	5.2/1.38	0.7/0.19	4.607	4.1/1.09
On going	1	0.6/0.159	0.2/0.053	278	0.9/0.24
Total	8	5.8/1.53	0.9/0.24	4.885	5.0/1.32

school, became operational in September 2017. Technologies used include solar collectors for hot water, trigeneration for heating and cooling, ground source heat pumps, preheating and cooling for different requirements for electricity demand (three different technologies, mono and polycrystalline and thin film) photovoltaic panels, wind turbine, cogeneration of high technology products such as underground piping systems, solar walls for pre-heating in ventilation, solar tubes for natural lighting indoors, motorized atrium windows, roof reclamation, rain water recycled green roof, and heat recovery systems.

Public Building Audits

Within the scope of “Regulation on Increasing the Efficiency of Energy Resources and Energy Use”, studies are undertaken to determine the measures to increase energy efficiency in public buildings which are obliged to appoint an energy manager. These studies should be renewed every ten years. Buildings with high annual energy consumption are prioritized. During the audit process, detailed reports including the theoretical, technical savings potentials of the buildings were prepared and necessary measures

for efficiency improvement were identified. Audits of 166 public buildings were completed between 2014 and 2015, 23 between 2017 and 2018, and 6 of public hospital buildings will be completed for 2018-2019, with their energy consumption periodically monitored on an annual basis.

Awareness Raising and Promotion Activities

“Energy Efficiency Week” events are held every second week of January (dates subject to change in accordance with the Ministry of Energy and Resources agenda) to promote public awareness on energy consumption habits. Within these events, Energy Efficiency Forum and Fair is one of the most comprehensive forums and trade fairs organized in Turkey. Another promotion of awareness is the “Sample Building”, which is located at the GDRE campus. The building, which is used for training activities, is available for demonstrating thermal insulation techniques, solar energy applications, geothermal heat pumps, energy efficiency methods.

Lessons learned

- ⦿ A potential of up to 30% energy savings was identified with energy audits in public buildings, nevertheless the implementation rate of energy efficiency projects is approximately 10% despite limited funds.
- ⦿ Longer reimbursements procedure and littleness of support amounts may make the applications to the support programs decrease.
- ⦿ Changing people’s behavior is more difficult than projected while working to raise their awareness of energy efficiency, so more officials, funds, and cooperation with NGOs would be helpful.
- ⦿ It is important to begin the energy efficiency studies before the building design phase and they should be closely monitored during the construction process. Also, following the building commissioning, energy monitoring and implementation of energy management systems is very crucial to tap energy savings potential.

+ Additional References

Indicative Exchange Rates Announced at 15:30 on 12/29/2017 by the Central Bank of Turkey: <http://www.tcmb.gov.tr/kurlar/201712/29122017.xml>

Scaling up Renewable Energy and other Sustainable Energy Sources



Australia

Clean Energy Innovation through the Clean Energy Finance Corporation

Summary

The Australian Government supports investment in clean energy across the innovation chain, from research through to commercial deployment; an example is the Clean Energy Finance Corporation (CEFC), which accelerates private sector investment in the clean energy economy. This case study responds to the topic of Scaling Up Renewable Energy and other Sustainable Energy Sources proposed in the G20 Hamburg Climate and Energy Action Plan for Growth, and addresses the Voluntary Action Plan on Renewable Energy adopted under the Chinese Presidency and the G20 Toolkit of Voluntary Options on Renewable Energy Deployment adopted under the Turkish Presidency.

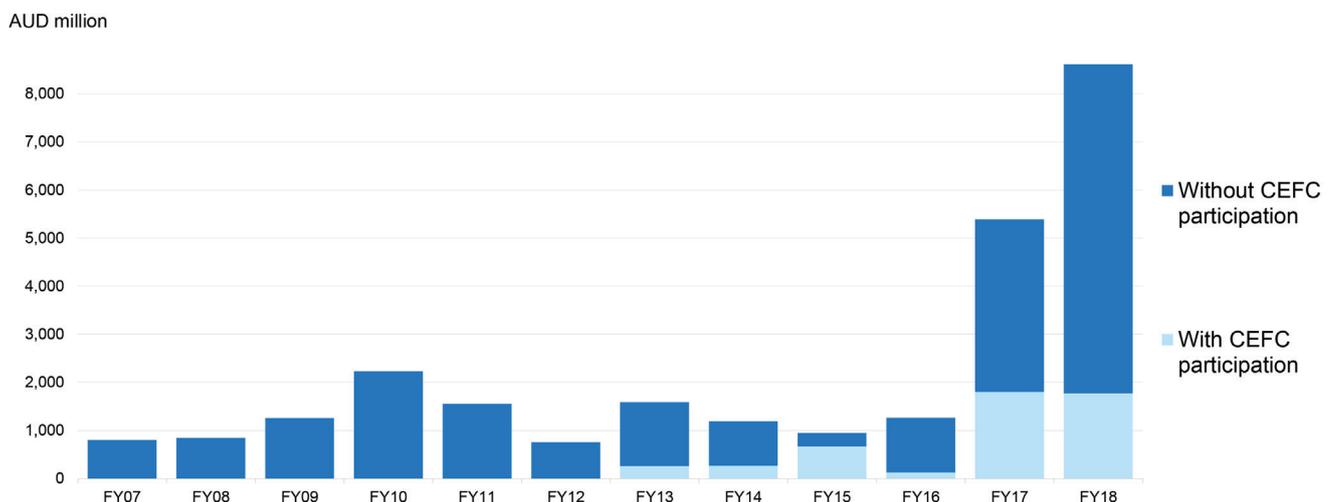
Background

The Australian Government established the CEFC through legislation in 2012 to facilitate increased flows of finance into the clean energy sector. The main function of the CEFC is to invest, directly and indirectly, in clean energy technologies. The Australian Government may also issue instructions to the CEFC Board as to policies to be pursued by the CEFC in performing its investment function, known as the Investment Mandate. The CEFC is required to earn a positive return on its investments in eligible projects. By contrast, the Australian Renewable Energy Agency (ARENA) was established to provide research, development and deployment grant funding to renewable energy projects.

Clean Energy Finance Corporation

Since inception, the CEFC has directly invested in more than 110 projects, catalyzing finance in projects across the economy, including agriculture, infrastructure, property and transport, as well as large and small scale renewable energy and energy storage. Through its co-finance model, delivered via major financial institutions, the CEFC has also indirectly financed more than 5,500 smaller-scale projects. The CEFC provides a range of financing products including project finance, co-financing programs, equity, corporate loans and climate bonds. The CEFC has access to AUD 10 billion (USD 7.4bn) of capital. At 30 June 2018, the CEFC investment commitment portfolio was AUD 5.3 bn (USD 3.9 bn), targeting estimated lifetime greenhouse gas abatement of 190MtCO₂e. Each dollar of CEFC capital committed in the 12 months to 30 June 2018 was matched by more than AUD 1.80 (USD 1.30) in private sector finance. The CEFC is required to ensure that at least 50 per cent of its funds are invested in renewable energy technologies, with the balance across energy efficiency and low emissions technologies. The CEFC Board operates independently in approving investments, giving consideration to project eligibility, market conditions, commerciality, risk and return, portfolio impact and positive externalities. Where warranted, concessional finance may be provided.

Figure 1. Large-scale Renewable Energy Investment in Australia by Fiscal Year (FY). Source: Bloomberg New Energy Finance.



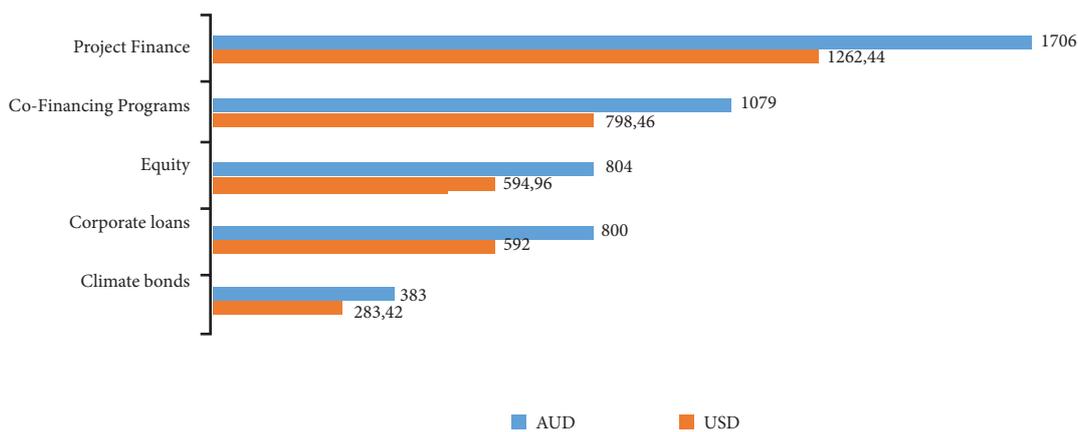
In 2016, the Australian Government instructed the CEFC to include three specific focus areas within its investment activities:

1. Clean Energy Innovation Fund, which has become Australia’s largest dedicated investor in clean energy innovation and is, operated in consultation with ARENA. It aims to invest AUD 200m (USD 147.8m) into clean energy innovation over 10 years. To 30 June 2018, the CEFC had committed venture capital of more than AUD 56 million (USD 41.4m) to nine innovative companies which, together, have raised more than AUD 140 million (USD 103.5m) of new capital. For example, the Clean Energy Innovation Fund has invested AUD 10 million (USD 7.4m) in Carbon Revolution, an Australian start up that produces the world’s only mass produced one-piece carbon fibre car wheel, which can improve energy efficiency and reduce vehicle emissions.

2. Sustainable Cities Investment Program: The Program aims to invest up to AUD 1 billion (USD 0.74bn) over 10 years in clean energy projects, supporting the national Smart Cities Agenda. To 30 June 2018, the CEFC had committed more than AUD 1.8 billion (USD 1.3bn) to more than 3,000 projects, with an estimated total project value of approximately AUD 4.9 billion (USD 3.6b).

3. Reef Funding Program: The Program aims to invest up to AUD 1 billion (USD 0.74bn) over 10 years for clean energy projects contributing to the implementation of the Reef 2050 Plan, the overarching framework for protecting and managing the Great Barrier Reef. At 30 June 2018, AUD 350 million (USD 258.8m) in investment commitments to more than 300 projects had been attributed to the Program, with an estimated project value of over AUD 1.2 billion (USD 0.89bn).

Figure 2. CEFC financing commitments at 30 June 2018 by type (million USD/AUD)



The CEFC is also active in improving market knowledge through research into investable opportunities, market reports, case studies, speeches, events, media engagement and other marketing and communication activities.

Lessons learned

- Energy efficiency upgrades in the commercial property sector require early stage investment decisions at whole of building level, beyond the energy efficiency component.
- Tailored finance offered via co-finance programs is effective in encouraging consumers to preference clean energy options in asset finance investment decisions.

+ Additional References

Clean Energy Finance Corporation: www.cefc.com.au

Australia’s 7th National Communication on Climate Change: https://unfccc.int/files/national_reports/national_communications_and_biennial_reports/application/pdf/024851_australia-nc7-br3-1-aus_natcom_7_br_3_final.pdf



Brazil

Renewable Sources Expansion in the Brazilian Electricity Sector

Summary

Brazil is committed to the expansion of renewable energy sources in its electricity sector. The present country case describes the different policies the government is adopting to continue in line with a low emission electricity sector.

This experience responds to the topic of Scaling Up Renewable Energy and other Sustainable Energy Sources proposed in the G20 Hamburg Climate and Energy Action Plan for Growth, and relates to the Voluntary Action Plan on Renewable Energy adopted under the Chinese Presidency and the G20 Toolkit of Voluntary Options on Renewable Energy Deployment adopted under the Turkish Presidency.

Background and context

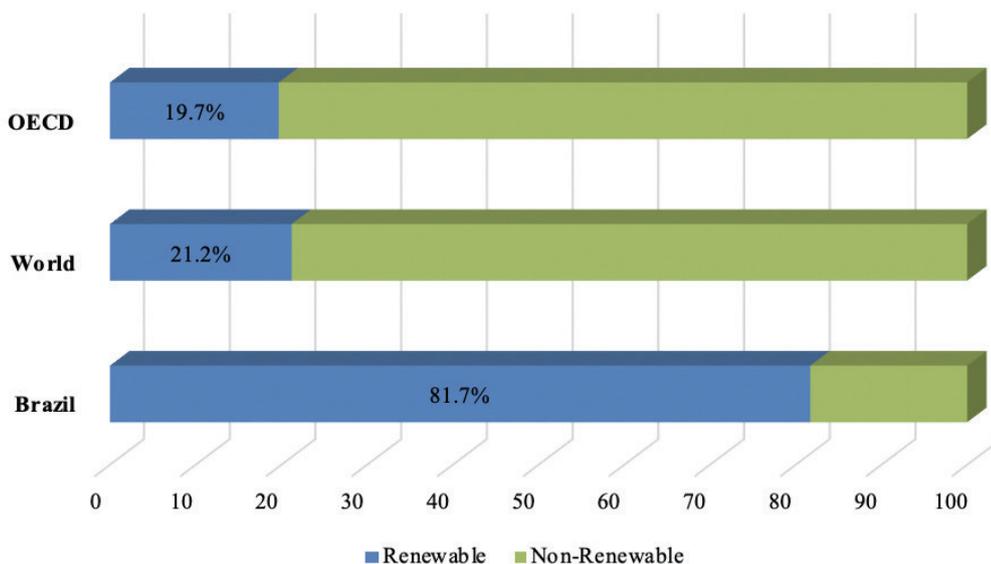
Renewable energy is a priority of the Brazilian electricity matrix. Hydroelectricity is the lynchpin of the system, being complemented by other renewables and fossil sources. This configuration provides the sector with a low GHG emissions profile that is unique among power systems of similar size around the world.

Due to this configuration, the Brazilian electricity sector can already be characterized as low carbon.

Therefore, Brazil's long-term challenge regarding the energy transition is to maintain and increase this high percentage of renewables in the mix, in the context of a developing economy facing an increasing energy demand. To address this challenge and to promote energy security, sustainability, and low energy prices, the diversification of energy sources is one of the core principles of the Brazilian energy policy. Hence, the share of renewables in the electricity mix, including wind and solar, is expected to increase in the coming years, as a result of public policies, regulation of the electricity market and adequate policy planning.

The National Energy Plan (PNE) and the Ten-Year Energy Expansion Plan (PDE) are among the main instruments providing information and guidance for the planning of the sector. The PNE is a fundamental instrument for long-term planning, assessing trends and guiding the expansion of the sector in a 30-year period. A new PNE, including updated projections up until 2050, is currently under development. The PDE is an informative document directed towards society and economic agents, presenting an indication of the prospects of future expansion of the energy sector from the Government's perspective. For agents and investors, the PDE facilitates access to information relevant for decision-making.

Figure 1. Percentage Share of Renewables in the Electricity Mix



The most recent PDE (PDE 2026) covers the period from 2016-2026, establishing the basis for a general strategy towards achieving the main objectives of the national energy policy. In this context, PDE 2026 presents the following indicative projected expansion of renewables in the Brazilian electricity sector over the next decade (see Figure 2).

The indicative expansion in the PDE 2026 is in line with the Brazilian Nationally Determined Contribution (NDC) under the UNFCCC Paris Agreement. The Brazilian NDC presents economy-wide targets, as well as indicative actions in different sectors to achieve them. The proposals regarding the energy sector aims at achieving 45% of renewables in the energy mix by 2030, including:

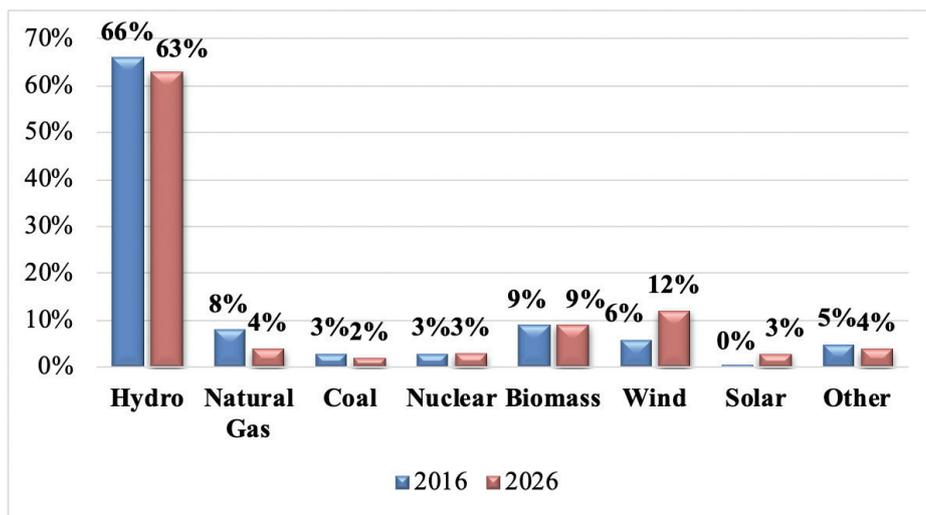
- Expanding the use of non-fossil fuel energy sources domestically, increasing the share of renewables (other than hydropower) in the

power supply to at least 23% by 2030, including by raising the share of wind, biomass and solar;

- Achieving 10% efficiency gains in the electricity sector by 2030.

Considering this indicative planning, the government promotes periodic auctions, which are the main form of contracting electricity in Brazil. Their main objective is to contract energy for the lowest price, in a regulated environment, promoting affordability and attracting investments. From 2004 to 2017, 78 auctions of the most different types were carried out, including auctions specifically designed for renewable sources - biomass, wind, solar and small hydro -, with the objective of meeting market growth and increasing the share of renewables in the energy mix. The most recent of this kind, in April 2018, resulted in the assignment of 39 new projects, 29 of them in solar energy.

Figure 2. Indicative Projected Electricity Mix (Percentage Share of Total Electricity Use) of PDE



Lessons learned

- Combining hydropower with intermittent renewables (solar and wind) is an important measure to promote energy security and sustainability;
- Renewable electricity auctions are effective instruments to promote renewables, constituting alternatives to policies based on subsidies and/or feed-in tariffs.

+ Additional References

Brazilian Energy Balance (2017). Available at: http://www.epe.gov.br/sites-en/publicacoes-dados-abertos/publicacoes/PublicacoesArquivos/publicacao-46/topico-82/Relatorio_Final_BEN_2017.pdf

Ten-Year Energy Expansion Plan 2026 (PDE 2026). Available at: http://www.mme.gov.br/documents/10584/0/PDE2026_versao_para_publicacao_08dez2017.pdf/f5d8f999-566d-4f5b-9167-d80b6ea8924e



Brazil

RenovaBio

Summary

RenovaBio is Brazil's new national biofuels policy. It creates a regulatory framework for the biofuels market that promotes the reduction of greenhouse gases (GHG) emissions in the transport sector and contributes to the security of domestic fuel supply by encouraging biofuels production and use. RenovaBio will also contribute to achieving the Sustainable Development Goals (SDGs), in particular SDG 7 (Affordable and Clean Energy) and SDG 13 (Climate Action), while favoring SDG 8 (Decent Work and Economic Growth), SDG 9 (Industry, Innovation and Infrastructure), SDG 2 (Zero Hunger) and SDG 15 (Life on Land).

Under the G20 Hamburg Climate and Energy Action Plan for Growth, this country experience is framed within the Scaling up Renewable Energy and Other Sustainable Energy Sources topic, specifically addressing the action of sharing progress related with the Voluntary Action Plan adopted under the Chinese Presidency.

Actors involved so far

The Ministry of Mines and Energy (MME), the Energy Research Company (EPE), the National Agency for Petroleum Natural Gas and Biofuels (ANP), as well as specialists from academia and private enterprises, are among the stakeholders involved in the discussion and design of the policy.

Structure and development status

To accomplish its objectives, RenovaBio sets certain mechanisms, including:

1. A decarbonization target annually set by the government;
2. The issuance of GHG emissions reduction certificates ("CBio");
3. Life cycle assessment.

Law 13.576 (December 26, 2017) established the National Biofuel Policy (RenovaBio). The law outlines a broad technologically neutral strategy based on the recognition of the role of all types of biofuels (ethanol, biodiesel, biomethane, bio-kerosene, etc.) in GHG emissions. Annual decarbonization targets (gCO₂e/MJ, or grams of carbon dioxide

equivalent per mega joule) will be set, tracking Brazil's commitments within the Paris Climate Agreement. The mandatory target will be valid through a minimum of 10 years and split into individual goals, applied to all fuel distributors, in proportion to their respective share in fossil fuel market in the previous year.

Decree 9.308 (March 15, 2018) regulates RenovaBio's law, establishing June 15th 2018 as the deadline for defining national annual goals; and July 1st 2019 for publishing individual targets for fuel distributors. It also calls for a yearly publication of the percentage of fulfilment of the individual goals. Distributors that do not buy the minimum amount of CBios required will be listed, and a fine will be applied.

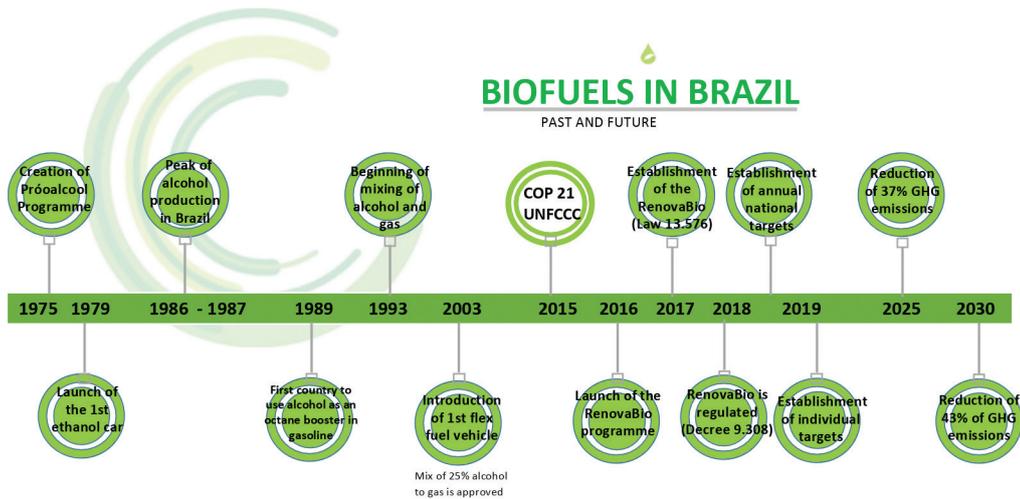
The CBio, linked to the sale of biofuels, is the mean for distributors to achieve their goals. Each credit corresponds to 1 tCO₂e/MJ (tons of carbon dioxide equivalent per mega joule). It will be a financial asset, traded on the stock exchange, issued by the biofuel producer. The amount of CBio's generated will be estimated with life cycle assessment (LCA) techniques.

LCA is a central element to RenovaBio's mechanism for qualifying biofuels according to their levels of energy-environmental efficiency, through an individual and voluntary certification process. More efficient producers will have, as a reward, the possibility of issuing more financial assets (CBio), in proportion to the energy-environmental efficiency score of the biofuel produced by them.

Follow up

A Committee (Comitê RenovaBio) will be in charge of following-up the development of the policy. It will publish a target for a 'carbon intensity index of the Brazilian fuel matrix' and monitor the level of success in achieving the overall goals.

Figure 1. Past and Future of Biofuels in Brazil



Expected benefits by 2030

It is estimated that, by 2030, the benefits from RenovaBio, taking into account the entire country and all biofuels (not only ethanol), will be:

- Investments of USD 425 billion regarding biofuels supply expansion;
- 300 billion liters of gasoline and diesel import savings, promoting energy security and decreasing the deficit in the trade balance;
- Emissions reduction of 847 million tCO₂e (tons of carbon dioxide equivalent), considering ethanol and biodiesel use. This volume is equivalent to planting 6 billion trees;
- 1.4 million new jobs.

Lessons learned

- Internalizing positive externalities, rewarding the more environmentally efficient producers, is key to scale-up production and use of low carbon fuels;
- A technology and feedstock neutral approach, focused on the scientific evaluation of the environmental performance of biofuels, is a more efficient way of promoting sustainability and GHG emissions reductions in the sector.

+ Additional References

Link to Law 13.576: <http://www2.camara.leg.br/legin/fed/lei/2017/lei-13576-26-dezembro-2017-786013-publicacaooriginal-154631-pl.html>

Opinion Article on RenovaBio-Towards a New National Biofuel Policy and a Truly Sustainable World: <https://www.omicsonline.org/open-access/renovabiotowards-a-new-national-biofuel-policy-and-a-truly-sustainable-world-2576-1463-1000164-96809.html>



Canada

AddÉnergie's Smart Infrastructure for Charging Electric Vehicles

Summary

AddÉnergie's Smart Infrastructure for Charging Electric Vehicles is an initiative supported with funding by the Government of Canada for developing and demonstrating new and innovative technologies with respect to electric vehicle charging infrastructure in Canada. This experience responds to the "Realising Access to Modern and Sustainable Energy Services for All" topic proposed in the G20 Hamburg Climate and Energy Action Plan for Growth, following up on the sharing good practices action.

Background

Lack of infrastructure to charge electric vehicles is a significant barrier to uptake by businesses and consumers. The arrival of electric vehicles creates the need to recharge batteries and to have infrastructure in convenient places where vehicles will be parked, both in public and residential spaces. This electrical supply network needs to be increasingly intelligent: it will need to include and understand the data-processing network, enabling it to interconnect the energy supplier, the electric vehicle and the intermediary for the purposes of invoicing, maintenance, and monitoring the performance of both the electric vehicle and the charging stations themselves.

Canadian company AddÉnergie Technologies Inc. has received funding to support the development and demonstration of new and innovative technologies with respect to electric vehicle charging infrastructure in Canada. The company is developing the next generation of electric vehicle fast charging stations, and is designing a new, innovative business model that will allow Canadians and businesses access to charging services through a monthly subscription, without the need to invest in charging infrastructure, much like a cable television subscription.



SmartDC charging station

In February 2017, Natural Resources Canada announced a 5.1 million USD (6.7M CAD) contribution to AddÉnergie's 12.3M USD (16.9M CAD) initiative to expand its innovative charging technologies to support transportation electrification across Canada. The project also received a 575,000 USD (748,000 CAD) from the Quebec Ministry of Economy, Science and Innovation and 1.5M USD (1.9M CAD) from private partners.

This support will allow AddÉnergie to develop the next generation of fast charging stations for EVs, to serve the greater variety of electric vehicle models that will be available to consumers in the next five years. It will also enable AddÉnergie to continue developing its innovative business model to help Canadian consumers and businesses access charging services on a monthly subscription basis, much like cable television service. This formula will address the cost barrier involved in acquiring and installing charging infrastructure in both the residential and commercial markets.

Finally, AddÉnergie will use the federal funding to install charging stations designed especially for curbside use in major Canadian cities, using the expertise developed during the rollout of several hundred such stations in Montreal in partnership with Hydro-Québec and the city administration.



SmartTWO charging station

It is anticipated that AddÉnergie's project will enable the creation of 86 permanent jobs in Canada over five years and prevent emissions of over 880,000 tonnes of CO₂ emissions. It will also allow for the installation of over 1,000 new charging stations (residential, commercial and public) by 2019, which will contribute to the expansion of the Canada-wide FLO network, operated by AddÉnergie.

Lessons learned

The project is leading to better market awareness, an increased understanding of needs and expectations of electric vehicle drivers and charging station owners, and a clarified business model for the operation of network charging stations. It has also improved software solutions to offer more services providing significant added value to electric vehicle drivers and charging station owners. For example:

- The development of a new and innovative business model which will provide Canadians and businesses access to charging services on the basis of a monthly subscription without the need to invest in charging infrastructure, much alike a cable television subscription. This approach will encourage the deployment of charging infrastructure by overcoming the acquisition and implementation costs barriers for the residential and commercial sectors.
- The implementation of charging stations specially designed for street-side installation in 5 major Canadian cities will allow related operational and logistical challenges to be addressed, which will be a key step for the increased uptake of electric vehicles in Canada.
- The roll out of 240 residential smart charging stations connected to a management server to demonstrates the viability of such an infrastructure in an operational setting and to improve it based on learnings from the project. This enabled AddÉnergie to offer a solution that is completely responsive to the needs of energy suppliers for smart residential charging management.

+ Additional References

AddÉnergie Technologies: <https://addenergietechnologies.com/en/partnership/>

NRCan: AddÉnergie - Commercial Demonstration of a Management System for Electrical Vehicle Charging Station Networks: <http://www.nrcan.gc.ca/energy/funding/current-funding-programs/eii/16157>

Canada-wide FLO network: <https://flo.ca/on-the-go>



India

Jawaharlal Nehru National Solar Mission

Summary

The Jawaharlal Nehru National Solar Mission is an initiative from the Government of India that seeks to position India as a major solar player by developing enabling policy conditions to increase solar energy production. Under the G20 Hamburg Climate and Energy Action Plan for Growth, this country case is framed within the scaling up renewable energy and other sustainable energy sources topic, responding to the specific call for sharing progress related with the Voluntary Action Plan on Renewable Energy adopted in 2016 under the Chinese Presidency and the G20 Toolkit of Voluntary Options on Renewable Energy Deployment, adopted in 2015 under the Turkish Presidency.

Background

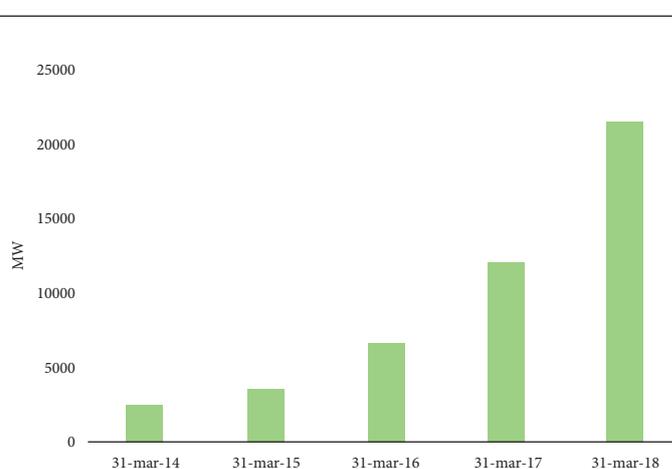
India's geographic location is such that it benefits from sunshine for a longer period and at higher intensity, making solar energy a strong contender as the energy source of the future. Solar energy has the advantage of permitting the decentralized distribution of energy, thereby empowering people at the grassroots level. The Jawaharlal Nehru National Solar Mission launched in 2010 seeks to establish India as a major player in solar energy by creating policy conditions for its diffusion across the country. The mission is part of the National Action Plan on Climate Change. It aims to increase the share of solar energy in the total energy mix through development of new solar technologies, while attempting to expand the scope of other renewable and non-fossil options such as wind energy, small hydro power and biomass.

The Mission has adopted a three-phase approach. The cumulative targets under the mission for Grid Connected Solar Power Projects of 100 GW by 2022 consists of 40 GW Grid connected Rooftop projects and 60 GW large and medium size land based solar power projects. The new solar target of 100 GW (earlier target was 20GW at the launch of the Mission in 2010, which was revised in 2015) is expected to abate over 150 million tonnes of CO₂ every year. Solar Power projects have a life of around 25 years.

Results

As a result of the Government of India's efforts to encourage solar power, considerable progress has been made in the installation of solar power in recent years. Between March 2016 and March 2018, the installed capacity of solar power increased from around 6.8 GW to 21 GW

Figure 1. Solar Power Installed Capacity Evolution



(Figure 1). To facilitate such a massive target, there has been a push given to various Ministries to initiate supporting interventions like the ones presented in the following text box.

National Solar Mission Supporting Interventions

- Incorporating changes in land use regulations and tenancy laws to facilitate aggregation and leasing of land by farmers/developers for solar projects;
- Identification of large chunks of land for solar projects;
- Identification of large government complexes/buildings for rooftop projects;
Clear survey of wastelands and identification of transmission/road infrastructure using satellite technology for locating solar parks;
Development of power transmission network/Green Energy Corridor;
- Setting up of exclusive parks for domestic manufacturing of solar PV modules;
- Provision of roof top solar and 10% renewable energy as mandatory reform under the new scheme of Ministry of Urban Development;
- Amendments in building bye-laws for mandatory provision of roof top solar for new construction or higher Floor Area Ratio (FAR);
- Considering infrastructure status for solar projects; raising tax free solar bonds; providing long tenor loans; making roof top solar a part of housing loan by banks/National Housing Bank (NHB);
- Suitable amendments to the Electricity Act for strong enforcement of Renewable Purchase Obligation (RPO) and for
- Incorporating measures in Integrated Power Development Scheme (IPDS) for encouraging distribution companies and making net-metering compulsory.

Lessons learned

- Government incentives and policy certainty can play a role in achieving renewable energy policy objectives.
- The experience of Solar Parks have shown that provision of basic infrastructure services can encourage the private sector to invest in solar energy.

+ Additional References

National Action Plan on Climate Change. Government of India. Available at: http://www.moef.nic.in/modules/about-the-ministry/CCD/NAP_E.pdf

More Details in the Jawaharlal Nehru Solar Mission. Available at: https://mnre.gov.in/sites/default/files/uploads/mission_document_JNNSM.pdf



Jamaica

Renewable Energy Technology Development Using Wind Power

* Invited country in representation of CARICOM (The Caribbean Community)

Summary

The development of Wigton Windfarm Limited (WWFL) aims to diversifying Jamaica’s energy mix. WWFL is the first and only Clean Development Mechanism (CDM) project in Jamaica. Under the G20 Hamburg Climate and Energy Action Plan for Growth, this experience is framed within the scaling up of renewable energy and other sustainable energy resource topics. In this regard, it recalls the specific action of sharing progress related to the Voluntary Action Plan on Renewable Energy adopted in 2016 under the Chinese Presidency and the G20 Toolkit of Voluntary Options on Renewable Energy Deployment, adopted in 2015 under the Turkish Presidency. The WWFL project has contributed to Sustainable Development Goals (SDGs) 1, 4, 5, 7, 8, 13 and 17.

Background

The WWFL is a wholly owned subsidiary of the Petroleum Corporation of Jamaica (PCJ). The PCJ is the government-owned agency mandated to implement the National Energy Policy, which includes the development of indigenous energy resources. The company’s main objective is to drive Jamaica’s energy diversification by promoting alternating forms of energy. Generally, the phased projects of WWFL supports the following national objectives: (1) fostering, facilitating and encouraging the development of new renewable energy sources and (2) reducing reliance on fossil fuel imports which will have added economic and social benefits. WWFL is the first commercial scale grid connected wind power plant in Jamaica and the Caribbean region. This wind farm is the largest wind energy facility in the English-speaking Caribbean at 62.7 MW and currently comprises wind power plants which were installed in three (3) phases:

Table 1. Phases of Wigton Windfarm Project Expansion

	Installed Capacity	Date of Commissioned
Phase I	20.7 MW	April 2004
Phase II	18.0 MW	December 2010
Phase III	24.0 MW	March 2016
Total	62.7 MW	

For Phase I of the project, there was reliance on the project’s ability to generate carbon emission reductions (CERs) as additional revenue generated by carbon credits, making the project more attractive. The potential trading of CERs was therefore evaluated and promoted as steps began to develop a clean development mechanism (CDM) project. Phase I of the project was one of 18 CDM projects selected to trade its carbon credits to the Dutch Government’s Certified Emissions Reduction Unit Procurement Tender Programme (CERUPT).

WWFL successfully negotiated an Emissions Reductions Purchase Agreement (ERPA) signed in December 2005. Wigton has the distinction of being Jamaica’s first Clean Development Mechanism (CDM) project to be registered under the United Nations Framework Convention on Climate Change (UNFCCC). The estimated amount of emission reductions over the 10-year crediting contract period was 525,400 tCO₂e (tons of carbon dioxide equivalent) and the estimated income for the period was over USD 3 million.

Local impact

WWFL has a mandate for technology transfer and has been strategically moving to take over the maintenance of each phase of the wind farm using local engineering labour. WWFL also established its training arm in 2010 called the Wigton Renewable Energy Resource Centre. The facility was further enhanced in 2016 with the commissioning of a renewable energy training lab with a curriculum developed by Renewables Academy (RENAC), Germany. This facility is positioned to becoming the leading practical training facility for renewable energy professionals in the region.

In 2007, the company received the Jamaica Bureau of Standards’ National Quality Award for excellent demonstration of the application of standards and quality systems in production and service delivery. The company also won the Jamaica Institution of Engineers award for Project of the Year for the Phase I and Phase II projects and was nominated for the Phase 3 Project.

Main Stakeholders involved

- Ministries with responsibility for energy and for the environment
- The Petroleum Corporation of Jamaica (PCJ)
The National Environment and Planning Agency (NEPA)
- Land owners, community groups and local farmers
- Port Authority of Jamaica (PAJ)
- Electric utility company
- Financial institutions (local and multinational)

Type of financing

Wigton Phase I utilized parent company equity, Dutch government grant and commercial bank loan. Wigton Phase II utilized 100% debt from the PetroCaribe Development Fund. At the time of Wigton Phase II financing agreement, the commercial bank loan for Phase I, was taken over by the PetroCaribe Development Fund. At Phase 3, Wigton contributed 20% equity and 80% was debt financed from the PetroCaribe Development Fund.

Table 2. Financing of the Wigton Wind Farm

	Wigton I	Wigton II	Wigton III & Training Lab
Project Cost	USD 26 million	USD 47.5 million	USD 45 million
Project Finance	PCJ Equity: USD 3.2 million (12%)	PetroCaribe Debt: USD 47.5 million (100%)	Wigton's Equity: USD 9 million (20%)
	Dutch Grant: USD 6.6 million (26%)		PetroCaribe Debt: USD 36 million (80%)
	Debt (National Commercial Bank loan later refinanced in 2010 by PetroCaribe): USD 16 million (62%)		

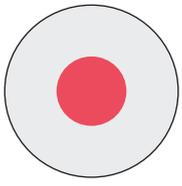
Lessons learned

- Wigton is not only an established energy producer but it also houses a training facility for capacity development in renewable energy, acting as a valuable educational resource.
- Jamaica has strict grid connection rate tariffs, where any imports of reactive energy demand are heavily penalized. Through the project development phases and collaboration with the Jamaica Public Service Company, Wigton learnt the importance of specific technical requirements such as the need to use distributed wind turbine controls, capacitor systems, and centralized capacitor bank systems.

+ Additional References

Wigton Wind Farm Project Design Document. Retrieved from: <https://cdm.unfccc.int/Projects/DB/DNV-CUK1137055328.94/view>

Wigton Wind Farm Offering Renewable Energy Training Course. Retrieved from: <https://jis.gov.jm/wigton-wind-farm-offering-renewable-energy-training-course/>



Japan

Science Based Targets - Encouraging Japanese Companies to Accelerate Their Actions

Summary

Japanese government has set a goal of reducing greenhouse gas emissions by 26% by fiscal year (FY) from April to March) 2030 compared to FY 2013. To achieve this goal, Ministry of the Environment Japan (MOEJ) is providing supports to accelerate actions (e.g. setting Science Based Target, or SBT) by companies and other Non-State Actors. SBT aims to promote climate change mitigation measures by private entities. MOEJ recognizes that it can play a significant role to accelerate their actions that covers global supply chain activities. Under the G20 Hamburg Climate and Energy Action Plan for Growth, this country experience is framed within Scaling Up Renewable Energy and Other Sustainable Energy Sources topic, addressing the specific action of sharing best practices.

already approved by the SBT Secretariat. Japan has the second largest number of companies (22 companies) behind United States (29 companies). 316 companies in the world (including 40 Japanese companies) have already committed that they will set their SBTs in 2 years.

Timeline

The program started in 2017 and is currently being implemented.

Status of implementation/progress

Through this program, five companies have set their targets, 19 committed (As of July 23, 2018).

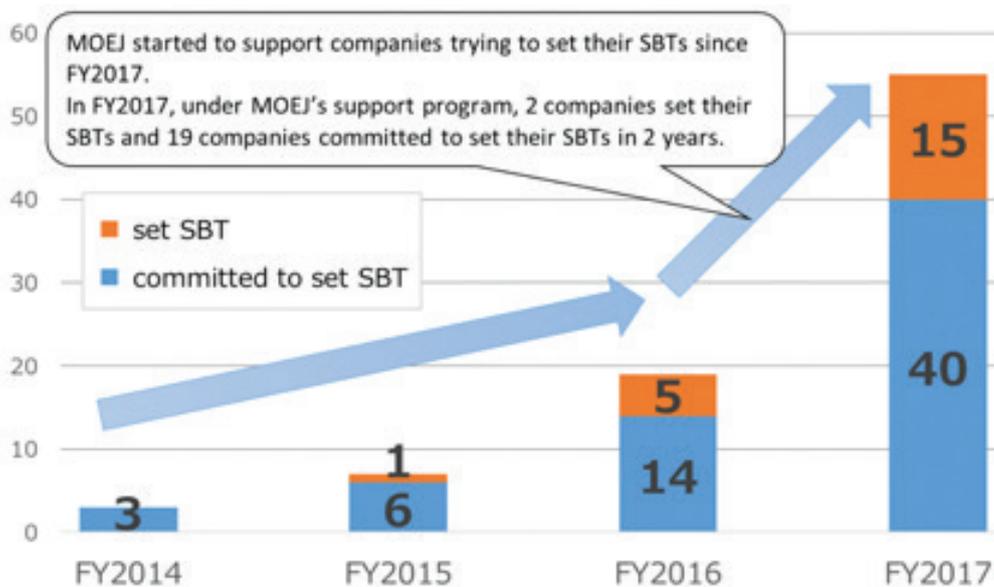
Science Based Targets

The MOEJ advises Japanese companies about how to set their own SBT and formulate achievement plan. Foreign Minister Taro Kono announced at One Planet Summit in Paris on December 12, 2017 Japan's aim to have 100 companies be approved by March 2020. As of July 2018, 120 companies are

Stakeholders involved

42 Japanese private companies.

Figure 1: The number of Japanese companies trying to set their SBTs by Fiscal Year (FY)



Highlight remarks on Japanese Initiative on climate change mitigation

To assist Japanese companies working on climate change programs, Japan will support the development and implementation of corporate's target consistent with Paris 2-degree target (Science-Based Target, SBT) as well as their activities to contribute to global emission reduction based on the respective industry's action plan towards a low-

carbon society, and promote emission reduction in the global value chain of Japanese companies in addition to domestic emission reduction. In this regard, MOEJ held orientation sessions and follow-up meetings for individual companies in FY 2017. MOEJ will also provide these supports in FY 2018.

Lessons learned

MOEJ supported 42 companies including NYK, Ltd. and Sekisui House, Ltd. through this program in FY 2017.

- In the case of NYK, Ltd., we found that for setting a SBT, it is important to analyze the demand and supply trend in the future market through hearings to each sector. Through this program, NYK, in view of the future technology trend, could set a goal of reducing CO₂ emission per transportation unit by 30% by 2030, and by 50% by 2050 compared to the level of 2015.
- In the case of Sekisui House, Ltd., we found that for setting a SBT, it's important to analyze carbon emission by usage of their products in detail. Through this program, Sekisui House could set its SBT based on strengthening decarbonization of the household sector including ZEH (Zero Energy House).

+ Additional References

Science Based Targets (SBT): <https://sciencebasedtargets.org/>

Remarks on SBT by Foreign Minister Kono at One Planet Summit (December 12, 2017): https://www.mofa.go.jp/ic/ch/page4e_000725.html



Turkey Renewable Energy Zones

Summary

Turkey's Renewables Energy Zone (RE-ZONE) business initiative aims to increase renewable energy systems deployment. RE-ZONE introduced a regulation that enables the construction and operation of wind and solar power plants. Under the G20 Hamburg Climate and Energy Action Plan for Growth, this country case is framed within the scaling up renewable energy and other sustainable energy sources topic, and responds to the specific call for sharing progress related with the Voluntary Action Plan on Renewable Energy adopted in 2016 under the Chinese Presidency and the G20 Toolkit of Voluntary Options on Renewable Energy Deployment, adopted in 2015 under the Turkish Presidency.

Description

Turkey has recently introduced RE-ZONE business model and held two auctions each 1 GW capacity based on solar and wind energy.

The business model is aiming for:

- Using renewable energy resources effectively and efficiently by creating large scale RE-ZONE on public, treasury and private estates,
- Attracting the investments with a clear road map, rapid realization of investments by allocating these areas to the investors, clear permits/procedures and licensing process,
- Taking joint actions with the investors and the Ministry of Energy and Natural Resources,
- Ensuring sustainability of the investments with R&D activities,
- Creating synergy with technology suppliers, multinational manufacturers, contractors and suppliers.

Local content requirements for the auction have been designed as a win-win basis for manufacturers. Turkey is offering its logistical advantages, skilled manpower, existing industrial capabilities and financial stability among other countries in the region. Local content is also a guideline for existing local industry capabilities increasing sustainability of the project.

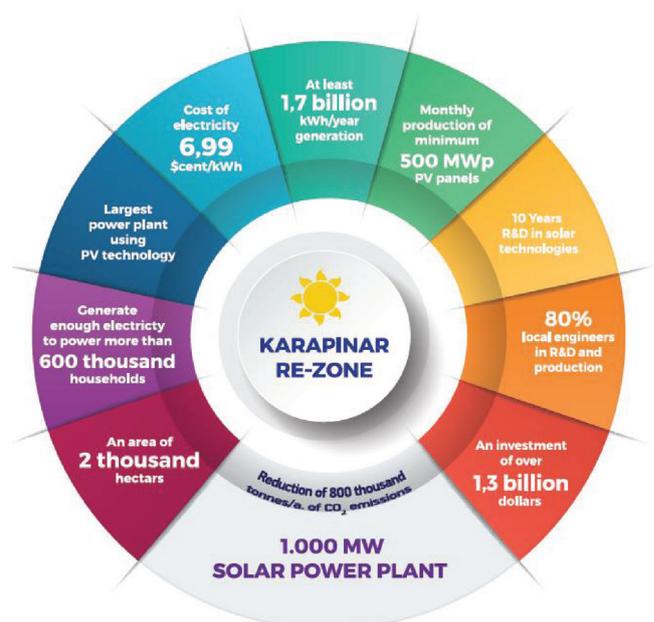
First RE-ZONE Solar Auction

Karapinar RE-ZONE, in the Central Anatolian region of Turkey, with its 19.19 km² surface, has 1,000 MW installed power and 1,700 GWh annual electricity production potential.

The Kalyon-Hanwha Q-Cells consortium won the tender on March 20, 2017 for the construction of Turkey's biggest solar power plant in Karapinar, at a cost of 6.99 USD cent per kilowatt hour (¢/kWh) for 15 years. The tender requested local production of equipment and stipulated that local engineers should constitute 80% of the employment in the project. The photovoltaic solar module production factory, which will produce the equipment for Karapinar RE-ZONE power plant, will be constructed in the following 21 months after the signature of the agreement.

The agreement was signed with the winner of the tender on September 15, 2017. Factory investment began by November 2017. It is planned to start production by completing the factory construction at the beginning of 2019, within a shorter period than pledged by contract. Meanwhile, establishing the connection agreement, zoning arrangements of the plant site, and transformer construction preparations are on-going.

Figure 1. Summary of KARAPINAR (SOLAR) RE-ZONE Auction



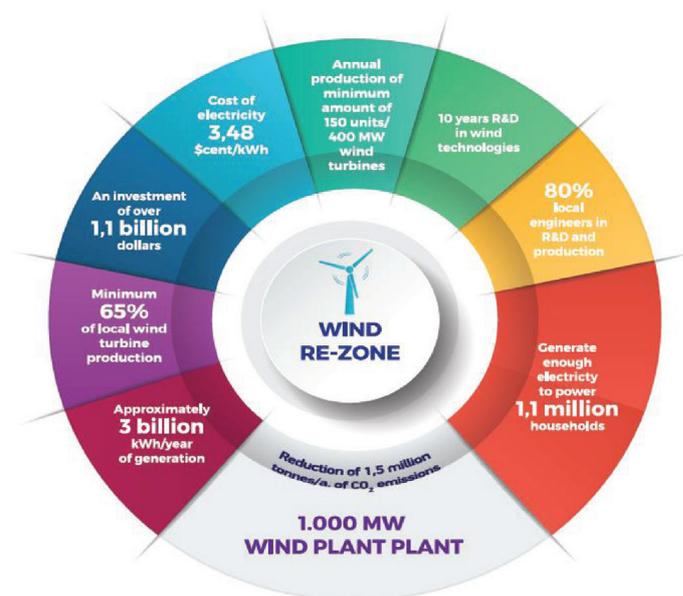
Second RE-ZONE Wind Auction

Siemens - Turkerler - Kalyon consortium won the first wind auction offered by Turkey's RE-ZONE Project on August 3, 2017. The consortium offered the lowest price at 3.48 USD cent per kilowatt hour (¢/kWh) for 15 years. The consortium will construct a wind turbine factory in Turkey in the next 21 months, following the signature of the agreement. Up to 450 wind turbines, each with a minimum capacity of 2.3 MW, will be manufactured at the factory. The RE-ZONE wind projects aim to generate approximately 3,000 GWh of electricity per year, powering 1.1 million homes annually.

Wind power in RE-ZONE will enable the country to install high wind capacity at a cost of around USD 1.2 billion and will avoid 1.5 million tonnes of carbon emissions each year.

Factory investment and supply chain establishment has started. Wind turbine locations selection is under progress.

Figure 2. Summary of WIND RE-ZONE Auction



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Lessons learned

- Both projects increased public awareness regarding clean energy sources, mainly solar and wind.
- Requirements of the projects triggered awareness to increase educational capacity both at the vocational school and university levels.
- Auction prices clearly show that the cost of renewable electricity production in Turkey decreased to fossil fuel range, as evidently observed worldwide in recent years.
- Public authorities started to have a more investor-friendly approach and reduced bureaucracy.

+ Additional References

Turkey's Renewable Energy Market and Investment Opportunities: <http://www.invest.gov.tr/en-US/infocenter/publications/Documents/RENEWABLES.ENERGY.INDUSTRY.pdf>

Renewable Energy Zones: <http://www.res-legal.eu/search-by-country/turkey/single/s/res-e/t/promotion/aid/tenders-renewable-energy-zones-yeka-zones/lastp/207/>



United Kingdom

Carbon Initiative for Development (Ci-Dev)

Summary

The UK supports the Carbon Initiative for Development (Ci-Dev), a World Bank fund which invests in clean energy access projects, with a focus on sub-Saharan Africa. Here we focus on the case of Rwanda: Inyenyeri cookstoves. This country experience responds to the Scaling up Renewable Energy and other Sustainable Energy Sources topic proposed in the G20 Hamburg Climate and Energy Action Plan for Growth. There are strong links between Ci-Dev activity and these UN Sustainable Development Goals: Good Health and Wellbeing, Affordable and Clean Energy, Sustainable Cities and Communities, and Climate Action.

Over the course of its lifetime up to 2025, the World Bank estimates that Ci-Dev projects are projected to bring the following benefits:

- 17.2 million beneficiaries reached
- 7.5 million tonnes CO₂ emissions saved
- 310 megawatts of clean energy installed
- £161m (USD 231m) public finance leveraged
- £208m (USD 299m) private finance leveraged

Carbon Initiative for Development

Ci-Dev connects homes and communities to renewable sources of energy and 'the stimulation of private capital flows for sustainable development' is one of its three overarching goals. Projects seek to leverage private finance, build local capacity and test different combinations of geography, technology and financing instruments to identify replicable, scalable and transformative approaches. Ci-Dev opened for proposals in 2013 and is funded by the UK (£50m), Sweden (USD 23m) and the Swiss Climate Cent Foundation (USD 23m). It has developed and signed off on 11 projects, with two more in development. The first Ci-Dev emission reductions were officially issued in early 2018. Ci-Dev projects include:

The UK's investment pays for the Certified Emission Reductions generated by Ci-Dev projects, project development, outreach and the methodological work that helps make sure project entities comply with UN Framework Convention on Climate Change (UNFCCC) requirements. The rules that will underpin the functioning of this market from 2020 onwards are currently being negotiated. Ci-Dev projects allow negotiators to draw on examples to help shape and inform this process. Much depends on the negotiation outcomes, but it is possible that Ci-Dev projects could be at the 'cutting edge' of market-based approaches to mitigation. Work to inform this is supported by two Ci-Dev pilot projects in Senegal, and in Rwanda, that are demonstrating process improvements and reduced transaction costs that could boost Least Developed Countries' capacity, increase country ownership and enable replication of private sector driven activities to support ambitious host sectoral strategies.



Figure 1. Ci-Dev Host Countries and Regions

- Madagascar: Ethanol cookstoves
- Ethiopia: Biogas
- Ethiopia: Off-Grid Renewable Energy
- Senegal: Rural Electrification
- Mali: Rural Electrification
- West African Biodigesters
- Uganda: Rural Electrification
- Rwanda: DelAgua cookstoves
- Rwanda: Inyenyeri cookstoves
- Kenya: Solar Lighting
- Kenya: Simgas

Case Study: Rwanda Inyenyeri cookstoves

Inyenyeri sells, on a commercial basis, biomass fuel pellets at a price competitive with or below the cost of charcoal to households in Rwanda. Alongside this, the company aims to lease or distribute for free about 345,000 clean cookstoves to approximately 188,000 families. It collects sustainably-sourced raw biomass from rural households to manufacture cooking pellets, which it will sell to households that currently buy charcoal. The company has used a Ci-Dev commercial agreement to secure up-front financing.

Development benefits include: Cleaner air in households; Reducing CO₂ and black soot carbon emission; Improving livelihoods by saving money; Less time spent cooking and collecting fuel.

Ci-Dev's knowledge management strategy looks specifically at addressing barriers to Least Developed Country access to carbon markets, including regulatory, financial and behavioral barriers. Work to date in this area has included: Capacity building workshops and outreach; Development of new methodologies; UNFCCC process simplification; Ci-Dev impacts on household decision-making; gender-informed design and energy access.



Photo: Inyenyeri Cookstoves in Action.

Lessons learned

A recent independent evaluation of Ci-Dev noted, among other observations, that:

- Ci-Dev has provided additional value to developing and strengthening international carbon markets; and
- No other entity appears to be conducting such activities with the same prominence.

+ Additional References

Ci-Dev website: <https://www.ci-dev.org/>

Article: The Senegalese Ci-Dev project: <https://blogs.worldbank.org/climatechange/senegal-pilots-carbon-finance-connect-people-power>



United Kingdom

Success in Developing Offshore Wind

Summary

The UK is the world leader in offshore wind which has provided sustained social, economic and environmental benefits. This country experience responds to the Scaling Up Renewable and Other Sustainable Energy Sources topic proposed in the G20 Hamburg Climate and Energy Action Plan for Growth, and is aligned with the Voluntary Action Plan on Renewable Energy adopted under the Chinese Presidency and the G20 Toolkit of Voluntary Options on Renewable Energy Deployment adopted under the Turkish Presidency.

Progress

The UK is the world leader in offshore wind with over 7 GW operational, rising to 14 GW by 2023. At the end of 2017, the UK accounted for 43% of Europe's total installed offshore wind capacity.

Offshore wind share of generation

The proportion of electricity generated by offshore wind in the UK has risen year on year helping, to reduce the carbon intensity of the UK's electricity system.

Stakeholders

The UK Government has successfully worked in partnership with industry and other stakeholders to develop offshore wind. In 2011 the Government set up an industry led Cost Reduction Task Force to produce a path and action plan to reduce the costs of the technology by 2020. The Government also set up an Offshore Wind Industry Council to be the principal forum for working with industry to find and implement solutions for barriers to deployment and to develop a UK based supply chain.

Table 1. Renewable Energy Share by Source

Renewable share of electricity generation (%)	2010	2011	2012	2013	2014	2015	2016	2017 (p)
Onshore wind	1.9%	2.9%	3.4%	4.7%	5.5%	6.8%	6.2%	8.6%
Offshore wind	0.8%	1.4%	2.1%	3.2%	4.0%	5.1%	4.8%	6.2%
Shoreline wave / tidal	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Solar photovoltaics	0.0%	0.1%	0.4%	0.6%	1.2%	2.2%	3.1%	3.4%
Hydro	0.9%	1.5%	1.5%	1.3%	1.7%	1.9%	1.6%	1.8%
Bioenergy	3.2%	3.6%	4.0%	5.1%	6.7%	8.6%	8.9%	9.5%
All renewables	6.9%	9.6%	11.3%	14.9%	19.1%	24.6%	24.5%	29.4%

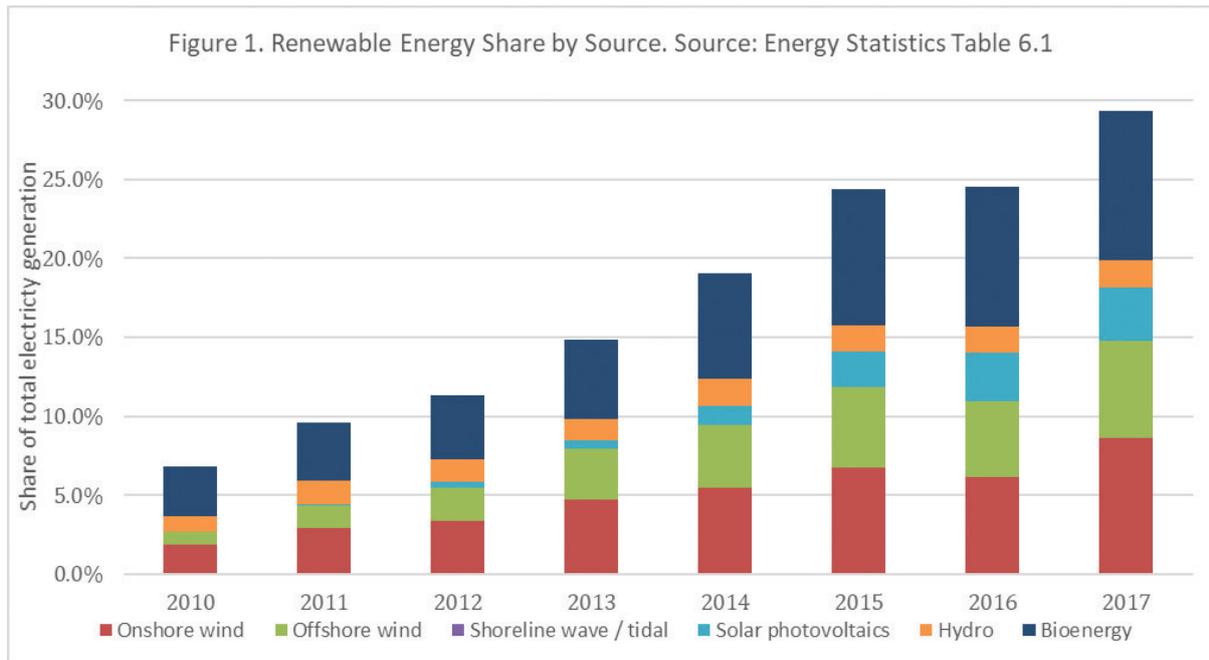
[Source: WindEurope Offshore Wind Key Trends & Statistics 2017, Energy Statistics Table 6.1]

Project size, financing

Offshore wind projects require significant up-front investment and the UK has the largest projects in the world. The 630MW London Array windfarm will be superseded in 2018 as the world's largest windfarm by the 659 MW Walney Extension. In turn, Walney Extension will be overtaken by the 1,200 MW Hornsea One project in 2019. Over time the risk profile of the technology has decreased as experience of installation and operation has grown and technology has improved. This has attracted new sources of finance including institutional investors, helping to lower the cost of capital and lower support levels.

Socio economic benefits

The UK has a growing supply chain and approximately 75% of the value of operations and maintenance contracts for UK offshore wind farms are won by UK businesses. Given their locations, much of the economic activity from offshore windfarms takes place in coastal areas, many of which have seen declines in traditional industries such as fishing. Examples include Siemens Games and ABP's investment in a blade manufacturing facility in Hull which has created over 1,000 direct jobs and Grimsby becoming a hub for operation & maintenance.



Lessons learned

- The UK's leadership has been achieved by combining favourable natural resources (shallow, close to shore sites with favourable wind resource) with a long-term policy framework and financial support mechanisms to incentivise investment. This long term certainty has enabled the sector to invest in new technology, resulting in the cost of the technology falling rapidly and development of a growing UK based supply chain.
- The Contract for Difference has been key in providing certainty and attracting investors, with competitive allocation to drive down costs and ensure better value for consumers. Costs and support levels have fallen significantly. In the 2017 auction, the two cheapest projects cleared at half the price of the cheapest project clearing the 2015 auction. The Government has set aside up to £557 million for further Contract for Difference auctions (for less established renewable technologies) with the next auction to open by May 2019.

+ Additional References

Key trends in offshore wind in Europe, 2017: <https://windeurope.org/about-wind/statistics/offshore/european-offshore-wind-industry-key-trends-statistics-2017/>

Renewables statistics from the latest quarterly edition of Energy Trends: <https://www.gov.uk/government/statistics/energy-trends-section-6-renewables>

Realising Access to Modern and Sustainable Energy Services for All



European Union

Smart Finance for Smart Buildings Initiative

Summary

The EU's "Smart Finance for Smart Buildings" initiative sets out specific measures to further unlock private financing and enable market actors to implement their projects through attractive and appropriate financing solutions. Under the G20 Hamburg Climate and Energy Action Plan for Growth, this experience is framed within the topic of Realising Access to Modern and Sustainable Energy Services for All. In this sense, it recalls the specific action of sharing best practices in mobilizing financial resources to improve investments in energy for productive use, especially heating and cooling.

The initiative

Along with setting the right regulatory framework, the EU offers a number of financing strands to mobilise energy efficiency investments:

- The European Structural and Investment Funds (ESIF) is investing €18 billion in energy efficiency from 2014-2020.
- The European Fund for Strategic Investments as of June 2018 had already triggered €65 billion of investments in the overall energy sector.
- The European Investment Advisory Hub (EIAH) provides advisory and technical assistance services with the aim of strengthening Europe's investment and business environment, and the European Local Energy Assistance (ELENA) facility, providing grants to help project promoters develop their investment programmes in the area of sustainable energy.
- The energy efficiency call of the EU's Horizon 2020 research programme includes funding for projects in the area of energy efficiency finance.

In November 2016, as part of the Clean Energy for All Europeans package, the European Commission launched the "Smart Finance for Smart Buildings" initiative. It builds upon existing key financing strands and is based on the recommendations provided by the Energy Efficiency Financial Institutions Group (EEFIG) in their 2015 report.

The initiative includes specific measures to further unlock private financing and enable market actors

to implement their projects through attractive and appropriate financing solutions. It is focused on three main objectives: more effective use of public funding, aggregation and assistance with project development, and de-risking. As part of the initiative, the European Commission is organising a series of Sustainable Energy Investment Forums to showcase best practices in developing investment projects and programmes in sustainable energy and engage in dialogue with the financial sector, public authorities, and all stakeholders involved in sustainable energy investments. On de-risking, two products have been developed together with EEFIG: the De-risking Energy Efficiency Platform (DEEP), the Underwriting Toolkit, and a value and risk appraisal guide.



Energy efficiency is often less attractive to the financial sector as compared to other investments, with investments often being small, non-standardised projects. While financial sector interest in energy efficiency projects is increasing, it is difficult to measure and quantify. There is no clear classification of what investments qualify as energy efficiency investments, or what minimum requirements they need to comply with. From 2021, around €177 billion will need to be mobilised every year as additional investments in order to reach the EU's 2030 energy and climate targets. Around 75% of this amount would be necessary for investments in the building sector, where the current renovation rate is slightly above 1% per year, and thus would need to be significantly increased in order to reach

the objective of a decarbonised building stock by 2050. In March 2018, the European Commission finalised an Action Plan for Financing Sustainable Growth, aimed at re-orienting private capital to more sustainable investments. It has three main objectives: to redirect capital flows towards green and sustainable investments; to embed sustainability into risk management; and to increase transparency and long-term thinking in financial and economic activity. One of the first steps will be to provide a unified and clear set of definitions for sustainable activities – a first EU classification system to help investors identify sustainable activities and allocate capital accordingly. Energy efficiency will be an important aspect, considering the level of investment required in this area.

Lessons learned

- ◉ Financial instruments are key to further mobilise private financing for energy efficiency and renewables in buildings.
- ◉ Many project promoters, including cities, individuals, or businesses, need assistance to take their energy efficiency projects from idea to implementation.
- ◉ Although there is evidence that risks associated with energy efficiency investments are lower than the level perceived by the market, it remains difficult for banks and investors to assess these risks.

+ Additional References

Smart Finance for Smart Buildings Initiative: <https://ec.europa.eu/energy/en/topics/energy-efficiency/financing-energy-efficiency>

Information on financing energy efficiency in the EU: <https://ec.europa.eu/energy/en/topics/energy-efficiency/financing-energy-efficiency>

Clean Energy for All Europeans Package: <https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/clean-energy-all-europeans>

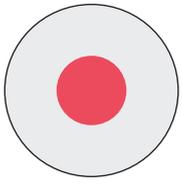
Accelerating clean energy in buildings: Annex to the Communication from the European Commission “Clean Energy For All Europeans”: https://ec.europa.eu/energy/sites/ener/files/documents/1_en_annexe_autre_acte_part1_v9.pdf

Energy Efficiency Financial Institutions Group (EEFIG) 2015 Report: <http://www.eefig.eu/index.php/the-eefig-report>

Sustainable Energy Investment Forums: <https://ec.europa.eu/energy/en/financing-energy-efficiency/sustainable-energy-investment-forums>

De-risking Energy Efficiency Platform: <https://deep.eefig.eu/>

Underwriting Toolkit: <https://valueandrisk.eefig.eu/>



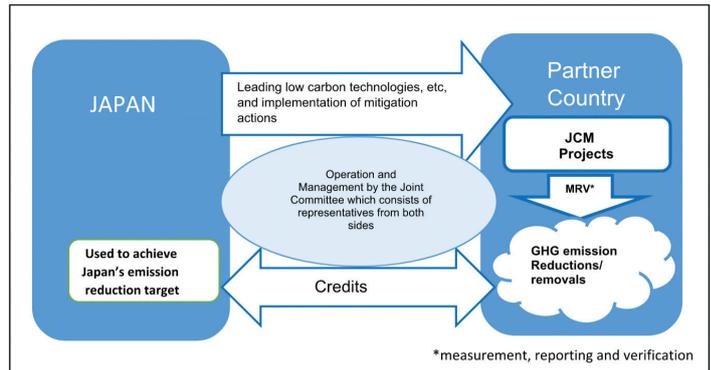
Japan

Joint Crediting Mechanism

Summary

Japan has been implementing the Joint Crediting Mechanism in order to effectively address climate change mitigation and achieve low-carbon growth all around the world by mobilising technology, market, and finance. Joint Crediting Mechanism (JCM) is a means to facilitate the diffusion of leading low-carbon technologies, systems, and so forth in developing countries. Under the G20 Hamburg Climate and Energy Action Plan for Growth, this country experience is framed within the topic of Realizing Access to Modern and Sustainable Energy Services for All, with the aim to accelerate access to affordable, reliable, sustainable, and modern energy in the Asia Pacific and other regions to address energy poverty through national, bilateral and multilateral actions and initiatives.

Figure 1. Joint Credit Mechanism



Description

- JCM is facilitating diffusion of leading low carbon technologies through contributions from Japan and evaluating realized GHG emission reductions or removals in a quantitative manner to use them for achieving Nationally Determined Contributions (NDCs).
- Japan will address the high initial cost barrier of introducing advanced low-carbon technologies in the Partner countries (17 countries as of July 2018) through the JCM (Government of Japan implements several supporting schemes)

Basic concept of the JCM

- Facilitating diffusion of leading low carbon technologies, products, systems, services, and infrastructure as well as implementation of mitigation actions, and contributing to sustainable development of developing countries.
- Appropriately evaluating contributions from Japan to GHG emission reductions or removals in a quantitative manner and use them to achieve Japan's emission reduction target.
- Contributing to the ultimate objective of the UNFCCC by facilitating global actions for GHG emission reductions or removals.

Timeline

2013 – until now.

Status of implementation/progress

Japan has held consultations for the JCM with developing countries since 2011 and has established the JCM with 17 partner countries such as Mongolia, Bangladesh, Ethiopia, Kenya, Maldives, Viet Nam, Lao PDR, Indonesia, Costa Rica, Palau, Cambodia, Mexico, Saudi Arabia, Chile, Myanmar, Thailand and the Philippines. More than 130 projects have been realized through the JCM financing programme by the Ministry of the Environment and JCM demonstration project by New Energy and Industrial Technology Development Organization (NEDO). As of July 23, 2018, total amount of 11,081 tCO₂ of JCM credit has been issued from 5 countries including Indonesia, Mongolia, Vietnam, Palau, and Thailand. Accumulated emission reductions or removals by FY 2030 through governmental JCM programs to be undertaken within the government's annual budget are estimated to be ranging from 50 to 100 million tCO₂.

Stakeholders involved

17 partner countries, Japan, private sector, and local government.

Highlight remarks on Japanese Initiative on climate change mitigation

Towards the diffusion of advanced low carbon technologies, Japan has been implementing the Joint Crediting Mechanism (JCM) with 17 partner countries, facilitating diffusion of leading low carbon

technologies through contributions from Japan and evaluating realized GHG emission reductions or removals in a quantitative manner to use them for achieving Japan's emission reduction target. As of July 2018, more than 130 projects are in the pipeline, facilitating public and private partnership.

Lessons learned

- Showcasing advanced technologies and sustainable business development
Project participants succeed to implement a project by reducing initial investment cost using JCM financing programme for advanced efficient cooling system which has potential demands for deployment while facing barriers for dissemination due to, e.g., high price. Using the project as a showcase, their business was developed horizontally in ASEAN countries. Further business development is expected through packaged supports matching with establishment of energy efficiency standards and relevant institutional arrangements.
- Elaborating specifications in procurement standards
Project participants succeeded in introducing amorphous high efficiency transformers in Northern, Central and Southern Power Grids in Viet Nam reducing initial investment cost using JCM financing programme. Local energy distribution companies included specifications for hiring the technology in its procurement standards based on understanding of its effectiveness. Further business development of advanced technology domestically and internationally is foreseen.

+ Additional References

A Proposal for our Future ver. 7.0- Toward Low Carbon Growth through the Joint Crediting Mechanism: https://www.carbon-markets.go.jp/eng/en_publications/

The Joint Crediting Mechanism Homepage: <https://www.jcm.go.jp/>



United Kingdom Renewable Energy Performance Platform

Summary

The Renewable Energy Performance Platform (REPP) seeks to mobilise private sector development and investment in renewable energy projects in sub-Saharan Africa. The programme is supported by the UK's International Climate Fund (ICF). This example responds to the "Realising Access to Modern and Sustainable Energy Services for All" topic proposed in the G20 Hamburg Climate and Energy Action Plan for Growth, accelerating access to affordable, reliable, sustainable, and modern energy in Africa.

Background

The ICF supports international poverty reduction, by helping developing countries to adapt to the impacts of climate change, take up low-carbon growth and tackle deforestation. The ICF is investing £5.8bn between 2016 and 2020, which is split between three government departments which focus on different approaches (at the time of the announcement, this was equivalent to USD 8.8bn). REPP seeks to mobilise private sector development activity and investment in small-scale renewable energy projects (up to 25MW) in sub-Saharan Africa, where less than one third of the population has access to electricity. REPP has a wide range of technologies in scope: biogas, biomass, geothermal, off-grid and grid-connected solar PV, run-of-river hydropower, waste-to-energy, and wind. The original concept for REPP was developed by the European Investment Bank and UN Environment, in response to the UN's SE4All initiative, which seeks to ensure universal access to modern energy services and double the share of renewable energy in the global energy mix. The UK Department for Business, Energy and Industrial Strategy is the sole donor to the programme, and has committed £48m (approximately USD 62m) of ODA funding for five years to 2020. REPP is managed by Camco Clean Energy, a UK-based company with regional offices in sub-Saharan Africa.

Rationale for the programme

Both public and private renewable energy projects have succeeded in sub-Saharan Africa, but investment at scale has not followed, even in countries which have introduced a supportive regulatory environment and offer competitive

tariffs for renewable energy. New projects face a range of risks outside their direct control – such as late payment, foreign exchange risk or political risk. These risks act to escalate the cost of finance to the point where the project becomes "unbankable". As a result, few projects are delivered, local banks remain highly risk-averse to the sector, private investment does not flow, and government policies fail to deliver. REPP seeks to support small-to-medium-sized renewable energy project developers as they bring their projects to the point where they can access finance.

Programme components

The programme seeks to assist project developers throughout the project development life cycle.



Technical Assistance:

- Capacity-building support direct to project developers, providing expertise in early-stage operational issues. This improves the developers' ability to access private finance.
- Providing links to REPP Partners, enabling project developers to access risk mitigation instruments.
- Development stage funding: Assisting developers with costs associated with projects set up, including feasibility studies, environmental and social impact assessments, and legal costs.

- Gap financing: Helping to bring projects to financial close using a range of financial structures
- including bridge financing, construction loans, equity conversion options, results-based finance, subordinated debt, and working capital loans.

pipeline. By 2020 REPP is likely to have exceeded its target of installing 150 MW of renewable energy capacity, with 2 million new connections, avoiding 5.7 million tCO₂e (tons of carbon dioxide equivalent) over projects' 25-year lifespans. REPP supports Virunga Power in two run-of-river mini-hydro power plants, Mathioya and Sakhala, in the Murang'a and Bungoma counties of Kenya. The projects will have a combined generated capacity of 10 MW, and will supply the national grid as well as local communities.

Impact

After two years of operation REPP is supporting 15 projects, and the programme has a healthy ongoing

Lessons learned

- In addition to providing first-time access to clean, reliable electricity, or enhancing the quality of the existing supply, in many cases projects provide additional benefits to local people. These include improvements to infrastructure and job creation.
- REPP has created a set of environmental and social standards and procedures, which are comparable to the IFC Performance Standards on Environmental and Social Sustainability. Areas under scrutiny include: labour and working conditions; pollution prevention; community health, safety and security; land acquisition and involuntary resettlement; biodiversity issues; and indigenous peoples.

+ Additional References

Renewable Energy Performance Platform: <http://www.repp-africa.org/>

International Climate Finance: <https://www.gov.uk/guidance/international-climate-finance>



United States of America

Increasing Access to Affordable and Diverse Energy Sources through Innovation

Summary

Supporting and promoting innovation is a core element of the United States' strategy to reduce emissions while growing our economy and increasing access to affordable, efficient, and reliable energy. In the United States, early-stage government R&D (research and development) support, strong public-private partnerships, and smart investment policies to encourage private sector investments have helped lower energy costs while increasing accessibility and diversity of energy sources, not only for our own citizens, but around the globe. The United States' ongoing commitment to drive innovation can be seen in our experiences around shale development; Carbon Capture, Utilization, and Storage (CCUS); and LED technology development.

Background

The United States supports a balanced approach to climate change that promotes economic growth and improves energy security while protecting the environment. America's energy revolution has produced affordable, reliable energy for consumers along with stable, high-paying jobs, all while dropping carbon emissions to their lowest level in 25 years. In fact, U.S. greenhouse gas emissions have fallen by 12% since 2005, even as our economy has grown by 17.5%. Decades of U.S. commitment to innovation and entrepreneurship by our national laboratories, universities, and companies have produced the early stage R&D that underpins virtually all key energy technologies today. And our open, competitive, market-driven economy has enabled a dynamic private sector to bring technologies to market at scale.

Three examples illustrate the transformational impacts of U.S. innovation:

U.S. Shale Development

The U.S. shale gas development boom stemmed from over three decades of government and industry R&D for accessing oil and gas reserves. An estimated \$220 billion in public expenditures on unconventional gas R&D from 1976 to 1992, leveraged with substantial private R&D, have resulted in an estimated \$100 billion in annual economic activity from shale gas production alone. The United States

now leads global natural gas production. Abundant lower-cost natural gas reduced energy costs and helped reduce the United States' CO₂ emissions by more than 2 billion metric tons between 2005 and 2016. The shale gas boom has changed the domestic and global energy landscape and lowered energy costs, and the technology breakthroughs developed through U.S. investment can enable other countries to benefit as well.

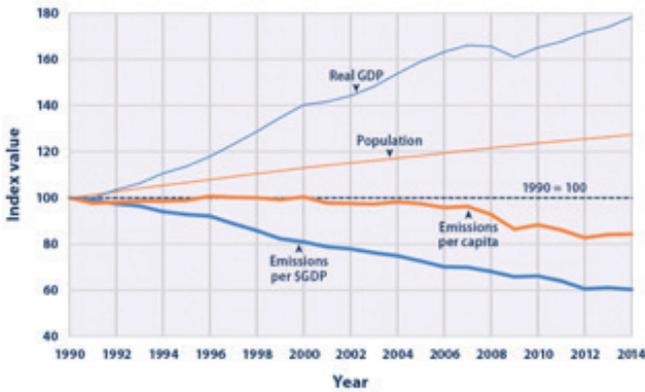
Carbon Capture, Utilization, and Storage (CCUS)

CCUS is a critical technology for reducing carbon emissions from fossil-fuelled power plants and other industrial activities. CCUS generates economic growth through the productive use of captured CO₂, as well as supporting energy security and access, and environmental stewardship. The U.S. hosts nine out of the 18 operational CCS plants worldwide, including the world's largest retrofit of a coal-fired power plant with CCS technology. Carbon capture technologies are now moving from basic research to deployment as the costs per ton have reduced from \$100 to \$45, as demonstrated in pilots of second-generation technologies. CCUS can still benefit from incentives that foster promising early-stage advanced energy technologies and fuel sources.

LED Technologies

Light-emitting diodes (LEDs) are spurring a dramatic change in lighting due to their energy savings potential, lower costs, improved performance, and long lifetime. Driven by a 94% reduction in cost since 2008, U.S. installations of LED A-type bulbs increased one-hundred-fold from 2011 through 2016, and continued installation could save an additional \$630 billion by 2035. U.S. government and industry R&D investments helped reduce costs, improve efficiency and performance, and foster domestic manufacturing. For example, DOE launched a 2008 competition to refine the first commercial-grade LED light. The winning entry was 83% more efficient than standard bulbs, and led the way to making LED technologies commercially viable.

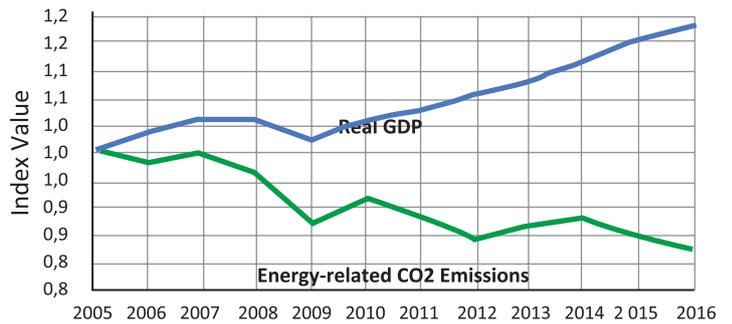
U.S. Greenhouse Gas Emissions per Capita and per Dollar of GDP, 1990–2014



Data source: U.S. EPA (U.S. Environmental Protection Agency) 2016. Inventory of U.S. greenhouse gas emissions and sinks: 1990–2014. EPA 430-R-16-002. www.epa.gov/climatechange/ghgemissions/usinventoryreport.html.

For more information, visit U.S. EPA's "Climate Change Indicators in the United States" at www.epa.gov/climate-indicators.

U.S. Energy-Related CO₂ Emissions and Real GDP, 2005–2016 (2005=1.0)



Lessons learned

Innovation is complex, but decades of U.S. experience show that it involves both:

- Early-stage government R&D support with strong public-private partnerships.
- Smart investment policies that encourage private sector investments which bring innovative technologies to commercial scale so that they can flourish in an open, market-driven economy.

+ Additional References

U.S. Department of Energy, "75 Breakthroughs by the U.S. Department of Energy's National Laboratories," 2017: <https://www.energy.gov/sites/prod/files/2018/02/f48/75%20Breakthroughs%20National%20Labs.pdf>

U.S. Department of Energy, "Revolution Now," September, 2016: https://www.energy.gov/sites/prod/files/2016/09/f33/Revolutiona%CC%82%E2%82%ACNow%202016%20Report_2.pdf

U.S. Environmental Protection Agency, "Climate Change Indicators: U.S. Greenhouse Gas Emissions," August, 2016: <https://www.epa.gov/climate-indicators/climate-change-indicators-us-greenhouse-gas-emissions>

U.S. Energy Information Administration, U.S. Department of Energy, "U.S. Energy-Related Carbon Dioxide Emissions, 2016," October 5, 2017: <https://www.eia.gov/environment/emissions/carbon/>

Bureau of Economic Analysis, U.S. Department of Commerce, "Table 1.1.6. Real Gross Domestic Product, Chained Dollars," July 27, 2018: <https://www.bea.gov/iTable/iTable.cfm?reqid=19&step=2#reqid=19&step=3&isuri=1&1910=x&0=-9&1903=6&1904=1990&1905=2017&1906=a&1911=0>

Enhancing Climate Resilience and Adaptation Efforts



Argentina Climate Change Risk Map System

Summary

The Climate Change Risk Map System (SIMARCC) is an interactive web platform developed by the Argentine National Directorate of Climate Change that provides visualization of risk maps related to projected climate change to support policy and decision-making. Under the G20 Hamburg Climate and Energy Action Plan for Growth, this country experience is framed within the topic of Enhancing Climate Resilience and Adaptation Efforts, and responds to the Action Plan's call for sharing best practices and promoting enhanced efforts for adaptation and resilience.

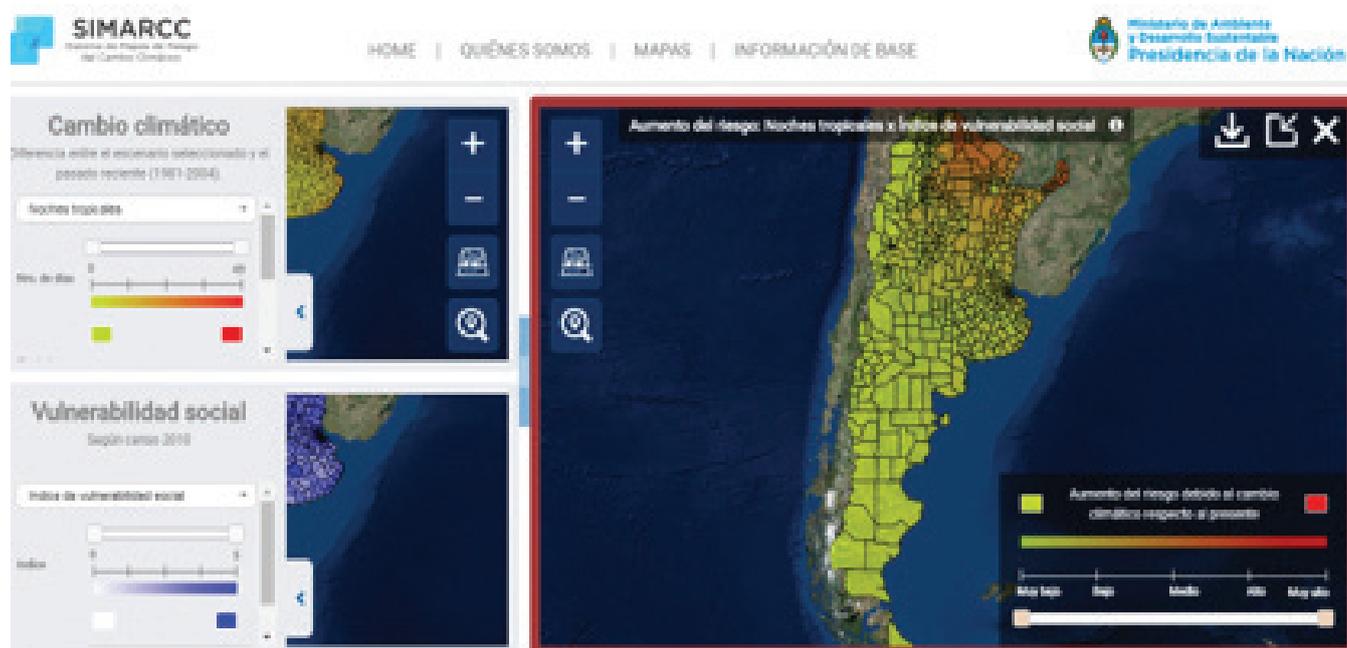
and business as usual emissions). These maps show the sites with the greatest variation of climatic variables in the different scenarios and timeframes.

On the other hand, the vulnerability maps allow identifying at the department level, those sites with the greatest social vulnerability. When future climate trends are crossed with different layers of social vulnerability, the resulting risk map allows us to identify, at the state level, those areas with the greatest variability (in percentage) of the selected climatic variable together with the greatest social vulnerability. Future climate projections were obtained using climate models, which are reliable and credible tools to simulate the characteristics of the future climate. The climatic scenarios of the 21st century were calculated on two temporal horizons: near future (2015-2039) of interest for adaptation policies, and distant future (2075-2099) informative on the long term. To date, the platform shows ten indexes of climatic extremes (related to temperature and precipitation) and seven indexes to evaluate the social vulnerability, chosen according to their relevance for impact studies and according to data availability. Currently, additional layers of information are being uploaded to the platform in order to expand the assessment of climate risks to productive areas (e.g. agriculture) and key infrastructure assets (e.g. transport, energy and water resources).

Climate Change Risk Map System

The design and implementation of adaptation policies and measures requires having quality information on climate projections in a way that it is easy to access, process and use. In this sense, the Argentine National Directorate of Climate Change has developed the Climate Change Risk Map System (SIMARCC) - an interactive web platform for the visualization of risk maps on different scenarios of threats and vulnerabilities related to climate change. The platform allows the visualization of climate projections in Argentina for the 21st century, both for the near and distant future, and for two available emission scenarios (moderate emissions

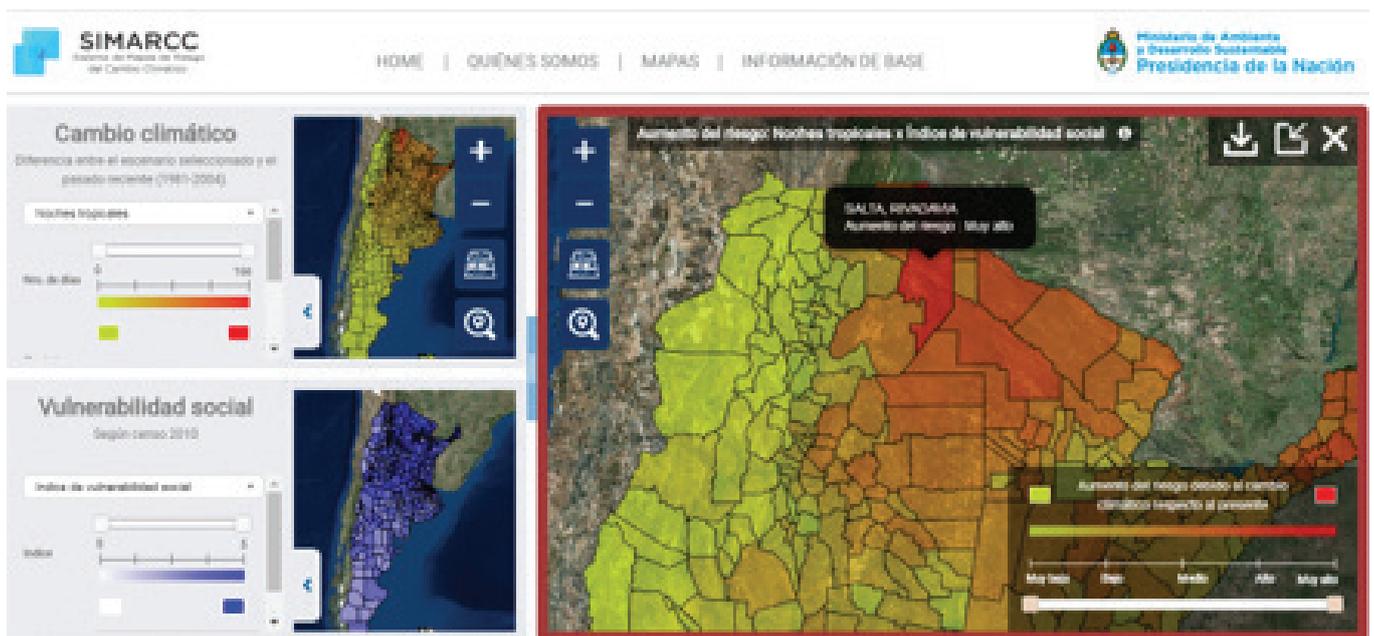
Figure 1. SIMARCC Interphase



SIMARCC's features

- ◉ Friendly, dynamic, interactive, open interface that allows easy access to data associated with different climate change scenarios, threats and vulnerabilities.
- ◉ Provides climate change projections as geo-services. The information can be downloaded and the database is accessible for use in climate change related studies.
- ◉ The maps allow the incorporation of climate projections and their influence on health, the environment, sustainable and social development, infrastructure and public works, supporting the long-term planning and investment processes.
- ◉ Useful tool to inform policy and decision-makers and to strengthen adaptation planning and the development of adaptation measures at the local, regional and national levels.
- ◉ It can be used by the private sector in investment planning, design of risk transfer mechanisms, planning of primary production systems, the orientation of programs, etc.
- ◉ It can also be used by educators, scientists and academics, for example, in the analysis of databases, for teaching, awareness rising, dissemination and capacity building.

Figure 2. SIMARCC Displaying Risk at the Departmental Level



Lessons learned

- ◉ With this interactive and friendly platform, data is easy to appreciate and understand through maps, and the database is available as geo-services that can be downloaded and utilized for different purposes. The platform has facilitated the access to information on climate projections and enabled dissemination to a wider and more diverse audience.
- ◉ This is an example of a dynamic tool that will be updated and expanded in a process of continuous improvement and in interaction with the different sectors and users, in order to incorporate new layers of information as it becomes available, and adjusting the tool according to users' needs.
- ◉ It is necessary to highlight the importance of improving data transparency, as well as facilitating open source databases and incentivizing institutions in charge of generating data to use comparable standards or protocols. The aim is to simplify the process of information usage, data analysis, comparative studies, etc.

+ Additional References

SIMARCC tool: <http://simarcc.ambiente.gov.ar/>

Website of the National Directorate of Climate Change of Argentina: <https://www.argentina.gov.ar/ambiente/sustentabilidad/cambioclimatico>



Brazil

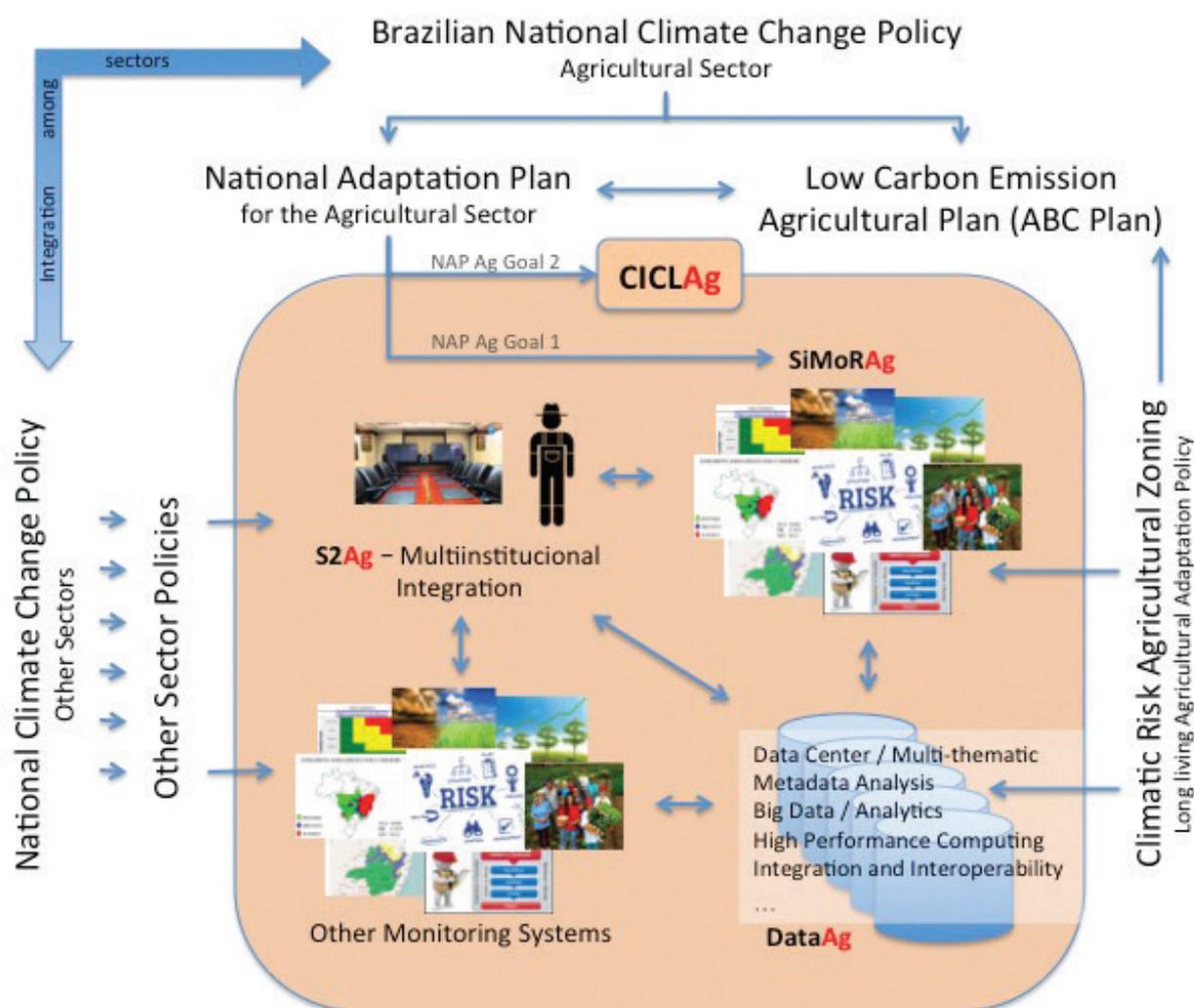
Center for Agricultural Climate Intelligence (CICLAG)

Summary

The Center for Agricultural Climate Intelligence (CICLAG) initiative seeks to support adaptation in the agriculture sector in Brazil on a local, regional and national levels, through data acquisition and processing that focuses on vulnerability monitoring and climate risk management. Under the G20 Hamburg Climate

and Energy Action Plan for Growth, this experience is framed within enhancing climate resilience and adaptation efforts and responds to the specific action of sharing best practices and of promoting enhanced efforts for adaptation and resilience.

Figure 1. Relation between the National Adaptation Plan, the Agriculture Adaptation Strategy and CICLAG Strengthening and Building Upon Adaptation Policy in Brazil



For more than 20 years, the Agricultural Climate Risk Zoning (ZARC) has been consolidated as a very successful policy that provides support for the agricultural production through investments in the form of credit as well as insurance. The Brazilian Agricultural Research Corporation (Embrapa) plays a central role in the implementation of ZARC and the information delivered by this policy became

strategic and has been instrumental for unfolding opportunities and supporting other specific policies. Using crop models and data series from an extensive weather network, it informs at the municipal level, the probabilities of success, best time to plant and harvest, for more than 50 crops. The implementation of this system has catalyzed a dramatic reduction in losses due to climatic risks and has induced both the adoption

as well as the development of new technologies. ZARC is a fine example of a successful and long living adaptation policy that has consistently supported the development of the sustainable tropical agricultural systems implemented in Brazil. This system has been evolving over those last decades and again, it is time for further advancements with the incorporation of modern and more complex integrated climate risk analysis as well as further shortening the gap between critical information and decision makers as well as farmers with the development of a Center for Agricultural Climate Intelligence.

The Center for Agricultural Climate Intelligence (CICLAg) is an important component of the national strategy for adaptation to the negative impacts of climate change in the agricultural sector. The Center is aligned with the provisions established in the Sectorial Plan for Mitigation and Adaptation to Climate Change for the Consolidation of a Low Carbon Economy in Agriculture (“Plano ABC”). CICLAg is currently being rolled out with two convergent and complementary axes: agricultural risk and vulnerability monitoring and simulation, and climate risk management for Brazilian agricultural policy. When fully implemented, CICLAg will integrate and communicate with local, regional and national actors, with a robust data acquisition and processing model integrated with a national data center.

The following CICLAg elements will be implemented

to increase adaptation and reduce vulnerability in the agricultural sector:

- S2Ag - Situation Room on Agricultural Climate Intelligence - managed by the Ministry of Agriculture, Livestock, and Supply (MAPA), the Situation Room will present the results and support strategic decision-making in long-term and structural policy-making, in particular for public policy impact evaluation with a focus on increasing resilience, adaptive capacity and competitiveness or positioning of the Brazilian agricultural sector in the international market.
- DATAg - Data Center Storage and Processing Unit of CICLAg - managed by Embrapa, will provide data storage and processing, including integration and analysis of different databanks, supporting analytical processing and interoperability of the SiMoRAg models and results in a high performance computing infrastructure.
- SiMoRAg - System for Monitoring and Simulating Risk and Agricultural Vulnerability - located at Embrapa, will develop and improve data acquisition techniques, information processing, and models for risk simulation and vulnerability evaluation of agricultural systems. The system will use data and processing capacity provided by the DATAg data center and other sources for model building and risk simulations. It will also provide vulnerability assessments of agricultural systems to the S2Ag.

Lessons learned

- The evolutionary and integrative strategy of Agricultural Climate Risk Zoning (ZARC) is a key factor of its success. CICLAg will build upon ZARC as a natural evolutionary process of incorporation of risk and vulnerability management.
- Technology induction driven by credit has been a very effective way to promote efficiency and resilience that translates as improvements in the adaptive capacity of agro systems to the negative impacts of climate change.
- Having science and technology-based policies well concatenated to a decision support system has been a structural factor for the success of Brazilian Sectorial Policy and for the process of governing complex problems like climate change. ZARC has already proven itself as a robust tool that will be further enhanced with the structuration of the intelligence center and analytical improvements implemented with CICLAg.

+ Additional References

Third National Communication of Brazil to the UNFCCC (2016). Available at: <https://unfccc.int/resource/docs/natc/branc3es.pdf>

Sectorial Plan for Mitigation and Adaptation to Climate Change for the Consolidation of a Low Carbon Economy in Agriculture (“Plano ABC”) description. Available at: <http://www.agricultura.gov.br/assuntos/sustentabilidade/plano-abc/plano-abc-agricultura-de-baixa-emissao-de-carbono>

Summary of Brazil’s National Adaptation Plan to Climate Change: <http://www.mma.gov.br/publicacoes-mma/category/164-us?download=1328:national-adaptation-plan-to-climate-change-executive-summary>

Brazil’s Submission to the UNFCCC on Agriculture: <http://www4.unfccc.int/sites/SubmissionPortal/Documents/201804111110---Submiss%C3%A3o.Agricultura.Brasil.pdf>



Canada

Canada's Climate Change Adaptation Platform

Summary

Canada's Climate Change Adaptation Platform (the Platform), established in 2012, is a national forum that brings together diverse key actors across Canada to collaborate on adaptation priorities. Presented here is a description of the platform; a review of the work completed and the lessons learned. Under the G20 Hamburg Climate and Energy Action Plan for Growth, this country experience is framed within enhancing climate resilience and adaptation efforts, and relates to the specific action of sharing best practices and promoting enhanced efforts for adaptation and resilience.

Background

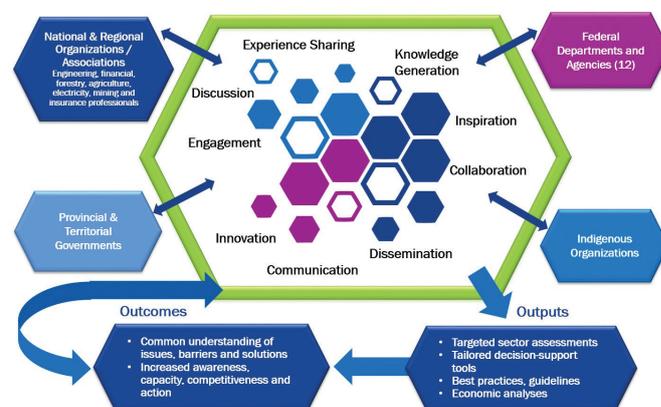
Members of the Platform include representatives from federal, provincial and territorial governments, indigenous organizations, industry and professional associations, and the academy. The multidisciplinary membership is a key characteristic of the Adaptation Platform, recognizing that legislation and policies from all levels of government affect decisions driven by local or industry needs. Platform members are the users and producers of the adaptation knowledge and tools resulting in a demand-driven process that directly responds to the needs of decision-makers. The results of these collaborations have advanced climate adaptation knowledge and action in Canada at the national, sub-national and local level, and have built partnerships across disciplines and jurisdictions.

The Adaptation Platform structure includes Plenary (the governance body), a series of subject-matter specific Working Groups, and a Secretariat. Figure 1 depicts the membership, as well as the outcome and outputs created through the Platform, while Figure 2 shows Plenary (the governing body), subject-specific Working Groups, the funding processes and Regional Adaptation Collaboratives, which are regional hubs.

Plenary

Plenary is the coordinating forum for the Platform including senior-level representatives that meet biannually in different areas of the country. Plenary works to define priority areas for collaboration, align interests and resources, and identify emerging opportunities. Natural Resources Canada chairs the Plenary and is supported by a Vice-chair that changes annually depending on theme and location of the meeting.

Figure 1. Canada's Climate Change Adaptation Platform Plenary



Working Groups

The Working Groups bring together experts on specific issues or sectors to focus efforts and collaborate on shared priorities. Membership within working groups includes representatives from private and public sectors, academia and professional associations. Working Group members identify priority areas of work specific to their thematic area; contribute by providing funding, expertise, and information from their organizations; act as advisory committee members on projects, and host meetings. The outputs of the Working Groups are decision-support tools, and targeted information and resources that are delivered directly to climate change adaptation practitioners and policy-makers.

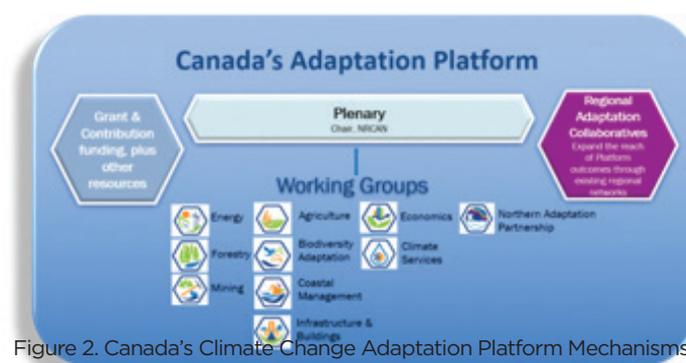


Figure 2. Canada's Climate Change Adaptation Platform Mechanisms

Secretariat

The Government of Canada (NRCan) performs the secretariat duties, delivering technical expertise, providing project funding, supporting Plenary, managing a shared workspace, facilitating interactions amongst the working groups, running a webinar series, and producing the annual report and regular newsletters.

Work Completed

Over 85 projects have been completed, producing and deploying practical information and tools to help regions and economic sectors in Canada increase their resilience to climate change. Projects

funded under the Platform are cost-shared between the funding program, the proponent, and relevant partner organizations. Projects address knowledge gaps and capacity issues identified by the Working Groups, and vary in size from a total project amount of USD 38,000 to USD 700,000.

Examples of the Climate Change Adaptation Platform's results:

- The application of an infrastructure vulnerability protocol to hydro-electric system in Canada's largest city (Toronto) and the resulting implementation of actions to reduce vulnerability in the systems capital and maintenance programs.
- Mapping of future storm surge flooding for a transportation corridor that annually moves USD 33 billion worth of trade goods and links the Provinces of Nova Scotia and New Brunswick. This resulted in these sub-national governments collaborating to develop policies and plans to protect this link.
- Assessment of increased sea level and storm surge risks to marine infrastructure to help the Ministère des Transports du Québec climate-proof community infrastructure assets worth an estimated USD 68 million in Nunavik, Québec.

Lessons Learned

- Creating a mechanism for adaptation knowledge sharing between jurisdictions and disciplines, as done through the Adaptation Platform, leads to action-oriented results.
- Having built these relationships over several years and through biannual face-to-face meetings enabled the community to work together effectively to develop the Adaptation and Climate Resilient component of the Pan-Canadian Framework for Clean Growth and Climate Change (the national policy on climate change).
- Convening several levels of government from all regions of the country with multidisciplinary experts from across many different sectors has resulted in unexpected collaborations and partnerships. Costs for operating the Platform are not high as Plenary members pay their own travel costs to meetings, and Working Group meetings are virtual. This, however, depends on adaptation remaining a high priority for participants.
- Costs for operating the Platform are not high as Plenary members pay their own travel costs to meetings, and Working Group meetings are virtual. This, however, depends on adaptation remaining a high priority for participants.

+ Additional References

Canada's Climate Change Adaptation Platform: <https://www.nrcan.gc.ca/environment/impacts-adaptation/adaptation-platform/10027>

Webinar on Canada's Climate Change Adaptation Platform (in pdf format): http://www.climateontario.ca/doc/RAC4/OCCIAR_Webinar_an_Introduction_to_the_Adaptation_Platform_Slides.pdf

Access to the Webinar on Canada's Climate Change Adaptation Platform: https://mirarco.adobeconnect.com/_a813213423/pjtnknp4z14/?launcher=false&fcsContent=true&pbMode=normal



Canada

Forest Climate Change Adaptation

Summary

This experience describes the Forest Climate Change Program led by the Canadian Forest Service (CFS), which provides information about the impacts of climate change on Canada's forests and on how industry, stakeholders and the public can adapt to and help mitigate climate change. Collaboration and strategic partnerships have enabled the transfer of forest climate change science into action at multiple scales. This country case responds to the call for sharing best practices within the Enhancing Climate Resilience and Adaptation Efforts topic proposed in the G20 Hamburg Climate and Energy Action Plan for Growth.

Background

The Government of Canada has committed to addressing climate change through both adaptation and mitigation, in keeping with the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement. The Pan-Canadian Framework (PCF) on Clean Growth and Climate Change was developed to meet Canada's emissions reduction commitments under the Paris Agreement and to ensure Canada can better project, prepare for, and respond to climate-related impacts, while maintaining a competitive economy and fostering job creation. The PCF includes commitments by Canada's federal, provincial and territorial governments to take adaptation and mitigation actions involving forests and wood use.

The Forest Climate Change Program

The Forest Climate Change Program led by the Canadian Forest Service (CFS) within Natural Resources Canada provides information about the impacts of climate change on Canada's forests and on how industry, stakeholders and the public can adapt to and help mitigate climate change. In 2017, the Forest Climate Change Program began developing a 10-year national collaborative research agenda that builds on forest research in climate change within Canada. The program team has been meeting with partners and stakeholders across the country, including academia, NGOs, industry, Indigenous groups, provincial and territorial governments, and other federal departments to understand the needs of the forest sector and

communities. This research will build upon and extend the existing Blueprint for Forest Carbon Science in Canada: 2012–2020.

Forests and Climate Change

Forest adaptation science aims to enhance the resiliency of Canada's forests and forest sector. This includes a national integrated assessment on the effects of climate change on disturbance regimes, forest productivity and composition, timber supply, the forest products supply chain, and communities. Results from this assessment highlight the need to examine adaptation options at a regional level, which is being done through Regional Integrated Assessment (RIA) projects strategically located across Canada. Transitioning from a national to regional focus helps to direct research and inform stakeholders and their adaptation strategies.

The Program has developed climate change indicators that track and project climate change impacts on Canada's forest, and an adaptation toolkit in which climate change science is translated into tools and resources for adaptation and decision-making. These will be used within the RIAs to integrate localized knowledge of vulnerabilities and opportunities.

The CFS is also engaged in efforts to understand and implement climate change mitigation activities involving forests and wood use. The CFS is developing spatially explicit carbon capabilities to improve assessments of mitigation options, and estimation and reporting of forest-related GHG emissions and removals. Highly relevant to mitigation, the CFS is undertaking initiatives aimed at fostering increased use of wood in construction, including tall wood buildings, and advancing the appropriate use of bioenergy as a substitute for fossil fuels.

Many complex issues face Canada's forests and forest sector in a changing climate – addressing them requires multi-disciplinary teams. On-going collaboration and engagement will strengthen partnerships – for example, with professional foresters, engineers, architects, community planners, social workers, applied scientists, experts and knowledge translators – to transfer forest climate change science into action at local, landscape, regional or national scales.

Figure 1: Climate Change Adaptation in Canada's Forests

The climate is changing and so are Canada's forests

Here are 6 ways Canada's forest sector and communities are adapting.



© Her Majesty the Queen in Right of Canada, as represented by the Minister of Natural Resources, 2016

Lessons Learned

- Adapting to a changing climate needs to happen at the regional to local scale. Large-scale modelling can provide a foundation for incorporating localized knowledge.
- It is important to balance both short- and long-term adaptation goals, and to provide information and tools that can help stakeholders move from reactive to more proactive adaptation.
- Adaptation needs to be “mainstreamed” into forest management, and that means challenging a common, implicit assumption that the future forest will be the same as the forest of yesterday.

+ Additional References

Climate Change: <https://www.nrcan.gc.ca/forests/climate-change/13083>

Forest Change Indicators: <https://www.nrcan.gc.ca/forests/climate-change/forest-change/17768>

Forest Change Adaptation Toolkit: <https://www.nrcan.gc.ca/forests/climate-change/tools-resources/17770>



Canada

National Adaptation Plans (NAP) Global Network

Summary

Canada's support to the National Adaptation Plans (NAP) Global Network aims to enhance national adaptation planning and action in developing countries. This country case informs the results of the collaboration with Fiji in terms of adaptation, and responds to the Enhancing Climate Resilience and Adaptation Efforts topic proposed in the G20 Hamburg Climate and Energy Action Plan for Growth, specifically relating to the expression of support for the National Adaptation Plan Global Network.

Background

In November 2015, Prime Minister Trudeau announced USD 2.65 billion in international climate financing over five years to help developing countries tackle the challenges of climate change and support their transition to low-carbon and climate resilient economies. As part of Canada's USD 2.65 billion climate finance commitment, Canada provided USD 2 million over 2017/18, to the International Institute for Sustainable Development (IISD), for the National Adaptation Plans (NAP) Global Network. The NAP Global Network aims to enhance national adaptation planning and action in developing countries and to facilitate international peer learning and exchange.

This funding will assist developing countries to build their capacity to plan, develop and implement climate change adaptation actions, while supporting them in the process to formulate and implement National Adaptation Plans and promote the effective implementation of the Paris Agreement. Canada's support will also facilitate peer-learning and knowledge exchange by convening workshops, forums and other events for developing countries, including particularly vulnerable South Pacific small island developing states. Recognizing the importance of data to develop and implement adaptation plans, Canada's support helped facilitate the collection of community-level feedback in Kiribati, the Solomon Islands and Tuvalu. This work also led to the creation of integrated vulnerability assessment databases in all three countries.

With support from Canada's contribution, the NAP Global Network convened training workshops to provide developing countries with practical information and share best practices on developing

Figure 1: Climate Change Adaptation in Canada's Forests



and implementing National Adaptation Plans. One of the workshops, held in Fiji, enabled a wide range of adaptation policy-makers and adaptation practitioners to build their capacity to integrate gender considerations into their national adaptation planning process, by identifying priority actions and sharing experience. In addition, participants learned about ways to design, implement and utilize measurement and evaluation tools and enhance their communication on adaptation. Funding also enabled Fiji to launch its national adaptation plan framework, which will help build national capacity to design and implement medium- and long-term adaptation solutions. See Figure 1, for an overview of Fiji's national adaptation plan process.

In addition, Canada's funding has enabled other

developing countries, including Kiribati and the Solomon Islands, to explore options to strengthen gender considerations as part of their adaptation planning at the national level. Through a review of existing gender considerations in Kiribati's current National Adaptation Plan (Joint Implementation Plan on Climate Change and Disaster Risk Management) as well as stakeholder consultations, a set of recommendations were developed that identify

steps to strengthen gender considerations in the countries adaptation plan. These recommendations were shared with the Office of the President and the Ministry of Women, Youth and Social Affairs of Kiribati to explore as part of the revision of their NAP.

Lessons Learned

- The training workshops hosted by the Network reinforced the value of bringing together countries with diverse experience and capacities, and at different stages of their national adaptation planning processes.
- The National Adaptation Planning process is a key opportunity to address gender considerations that influence vulnerability to climate change.

+ Additional References

National Adaptation Plans Global Network. Canada Supports Adaptation in Four Pacific Island States: <http://www.napglobalnetwork.org/2018/04/canada-supports-adaptation-four-pacific-island-states/>

International Forum on Adapting to Climate Change: <http://napglobalnetwork.org/2018/02/fiji-hosts-international-forum-adapting-climate-change/>



Canada

Public Infrastructure Engineering Vulnerability Committee Risk Assessment Tool

Summary

The Public Infrastructure Engineering Vulnerability Committee (PIEVC) Engineering Protocol of Canada enables engineers to assess the vulnerability of infrastructure to climate change. This country experience addresses the Enhancing Climate Resilience and Adaptation Efforts topic proposed in the G20 Hamburg Climate and Energy Action Plan for Growth, responding directly to the call for best-practices sharing.

Background

The Public Infrastructure Engineering Vulnerability Committee (PIEVC) was created in 2005 to conduct an engineering assessment of the vulnerability of Canada’s public infrastructure to the impacts of climate change. Noting a gap in methods to undertake such assessments, it developed the PIEVC Protocol. Using the results of the assessments, the Committee also facilitated the first review of national and local codes and standards for infrastructure design, operation and maintenance. Co-funded by Engineers Canada (the national organization of the regulators that license Canada’s 290,000 professional engineers) and Natural Resources Canada, the Committee supported the deployment of the Protocol, taking a mentorship approach to its application and developing training materials for use in universities and professional development.

The PIEVC Protocol

The PIEVC Protocol is a process that analyzes vulnerability of infrastructure to current and projected climate parameters. The Protocol systematically guides the user through a review of historical climate information and projects the nature, severity and probability of future climate changes and events. It also establishes the resilience of an individual infrastructure as determined by its design, operation and maintenance.

To date, the PIEVC Protocol has been applied to 45 Canadian and 2 international projects.

Currently, it is available for use at no financial charge through a license agreement with Engineers Canada. In return, users are asked to make the results of their analysis public, where possible, in order to improve overall understanding of infrastructure vulnerabilities.

Figure 1. PIEVC Overview



CASE STUDY RESULTS

British Columbia Ministry of Transportation and Infrastructure (BCMoTI) Provincial Highway Infrastructure

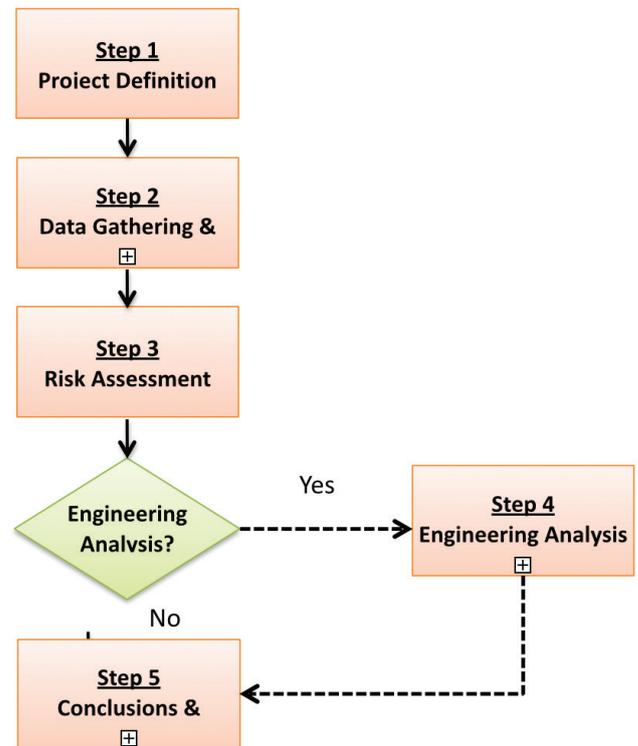
The BCMoTI is responsible for providing provincial transportation infrastructure, transportation services, undertaking transportation planning and policy development, and providing emergency management services. Five separate assessments of infrastructure along sections of highway across the province were undertaken between 2010 and 2015. Overall, the process provided Ministry staff with important findings about the vulnerabilities that the highways would encounter with a changing climate, and acted as a catalyst in ensuring that the Ministry mainstreamed climate change adaptation by formalizing the engineering and design practice.

Toronto Hydro Electrical Distribution Infrastructure

Toronto Hydro is the largest municipal electrical distribution company in Canada and serves the City of Toronto. As of March 2017, the utility supplied approximately 768,000 customers and owned approximately USD 3 billion worth of overhead, underground, and distribution assets. Toronto Hydro completed two PIEVC studies exploring both the current and projected impacts of climate change respectively on their distribution assets. Through the assessments, an internal working group was formed to bring together specialists from across Toronto Hydro's Engineering and Investment Planning Division in order to examine the methods of integrating the findings and learnings. The working group developed an internal report that highlighted 14 different initiatives that could be undertaken.

Toronto Hydro staff reported an important shift in the organization's thinking with regard to climate change, which is now seen as a priority issue for the organization. The ongoing work to review existing standards and planning guidelines exemplifies how climate change is being integrated into design and construction practices.

Figure 2. Part 2 of the PIEVC Process



Lessons Learned

- The PIEVC Protocol has allowed organizations to explore climate change risks and raise staff and organizational awareness of climate change issues.
- There has been an increase in assessments that explore climate change impacts, vulnerabilities, and risk across Canada. These efforts are due in part to the development and application of assessment tools and frameworks – such as the PIEVC Protocol.
- The PIEVC Protocol has been a very effective tool to catalyze climate action. It is an important step in raising awareness on climate adaptation across a diverse range of disciplines, sectors, and regions in Canada, and internationally.

+ Additional References

Public Infrastructure Engineering Vulnerability Committee (PIEVC): <https://pievc.ca/>

Results of assessments of the PIEVC Protocol: <https://pievc.ca/assessments>



China

Changde Climate Resilient City Pilot

Summary

The Changde Climate Resilient City Pilot is an example of the multiple benefits obtained when integrating resilience and sustainability to urban development. It is an excellent example of a sponge city construction promoted by the Chinese government. This country experience responds to the topic of Enhancing Climate Resilience and Adaptation Efforts and addresses the call for sharing good practices.

the building of the pilot city, Changde worked on improving the absorption, storage and release capacity of rainfall by buildings, roads, grassland and wetland, building infrastructure on climate change adaptation, and raising adaptation capacity. The overall goal was to improve the city's resilience to cope with heavy rain and drought caused by extreme weather.

Background

Changde is a city located in the northern part of Hunan province of China that covers an area of about 18000 sq. km and has a residential population of around 6 million. Due to the effects of climate change, extreme weather events such as local winds, torrential rains, floods caused by rainstorms, and droughts have been taking place more frequently in Changde in recent years. Developing sponge cities and improving climate resilience capacity is one of the key approaches of the measures taken by the Chinese government in promoting urbanization while combating climate change, building ecological civilization and enhancing China's beauty. In 2015, the State Council of China released the Guiding Opinions on Promoting Sponge Cities Construction.

Figure 2. Progress of the Sponge City Construction in Changde



Figure 1. Schematic Diagram of a Sponge City



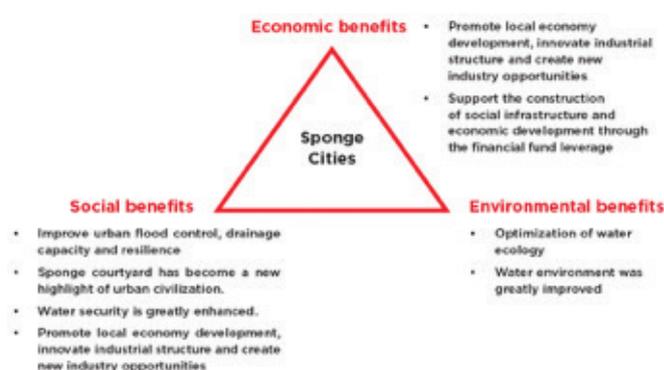
Many effective measures and concrete actions have been taken in order to promote the sponge city construction in Changde. Rich experience and lessons could be learned from the case, including but not limited to, integrating the building of climate-related infrastructure into overall urban planning in accordance with the characteristics of urban development; drafting task lists and action plans as well as setting up a quantified target; establishing the guarantee mechanism of coordination supervision, investment and financing cooperation, project design review and performance appraisal; diversifying financing channels and profit models; and promoting infrastructure construction through projects and research.

The idea of a sponge city is to improve the urban infrastructure to better cope with extreme weather, rainstorms in particular, while recycling the precipitation for sustainable use. Changde became one of the pilot sponge cities of China in 2015, and one of the pilot climate resilient cities in March 2017. During

By May 2017, around USD 704.6 million from both public and private sources had been invested for the pilot sponge city program in Changde. By the end of May 2017, 89 projects of the pilot sponge city construction in Changde were finished covering an area of around 20 square kilometers. 15 water-logging areas (of a total 16) in the pilot zone have been renovated. The area without water-logging has reached 35 square kilometers, accounting for 97% of the pilot zone. The water pollution in 3 rivers has been controlled. The area without polluted water has reached 34 square kilometers, accounting for 94% of the pilot zone. The achievement is termed by local people as “light rain with no puddles, heavy rain with no waterlogging, black and smelly water being eliminated and urban heat island effect in dissolution”.

Results of the sponge and climate resilient city program

Figure 3. Sponge Cities’ Social, Economic, and Environmental Benefits



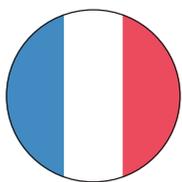
Lessons Learned

- Increasing the absorption capacity of cities can decrease water-logging and flooding in urban areas, improving living conditions for inhabitants, circulation of transport, and safety.
- The developing of Changde as a sponge and climate resilient city has resulted in multiple co-benefits such as high quality urbanization, development of new industries, job creation, enhanced water quality and improved urban landscape. This experience provides good practices for sustainable urban development that could be a great example for other developing countries for rapid urban growth.

+ Additional References

Guiding Opinions of the General Office of the State Council on Promoting the Construction of the Sponge City: http://www.gov.cn/zhengce/content/2015-10/16/content_10228.htm

Article on Sponge City by the Ministry of Finance of the People’s Republic of China: http://www.mof.gov.cn/xinwenlianbo/hunancaizhengxinxilianbo/201503/t20150305_1198215.html



France

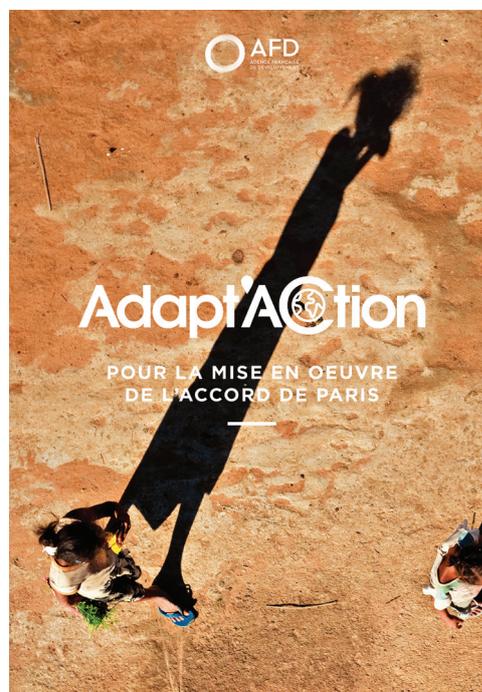
Adapt'Action Facility, a EUR 30M Facility to be Implemented in 15 Countries

Summary

France's "Adapt'Action Facility" (the Facility) is a grant program designed to contribute to the implementation of low-carbon and climate-resilient development pathways in vulnerable and least developed countries. The Facility, through technical assistance and capacity building activities, is acting as a driving force in speeding up investments that have co-benefits for adaptation to climate change through strengthening climate governance, supporting the formulation of sectoral policies based on Nationally Determined Contributions (NDCs), and assisting in the preparation of adaptation projects. Under the G20 Hamburg Climate and Energy Action Plan for Growth, this country experience is framed within the topic of Enhancing Climate Resilience and Adaptation Efforts, in accordance with the country's NDC, and responds to the specific actions of sharing best practices and of promoting enhanced efforts for adaptation and resilience.

Adapt'Action Facility

The success of the Paris Agreement in December 2015 relied on the range of commitments made by countries in the context of COP21, which is illustrated by the submission of their NDCs. The challenge now lies in its operationalization through the implementation of these various national contributions. A large number of developing countries, which have ratified the Agreement, have clearly expressed their desire to obtain technical assistance for the institutional, methodological and operational deployment of their NDC and the achievement of their objectives. Adaptation objectives are an important part of the NDCs: 137 countries, mostly in Africa, have an adaptation component in their NDCs, including 46 least developed countries. Agence française de développement (AFD) has launched Adapt'Action in 2017, a 30 million EUR facility from public finance in the form of grants. This facility supports some of the most vulnerable countries to achieve low-carbon and climate-resilient development pathways. Through technical assistance and capacity building activities, the Facility is acting as a driving force in speeding up investments that have co-benefits for adaptation to climate change in the most vulnerable geographical areas (Africa, Least Developed Countries and Small Island Developing States).



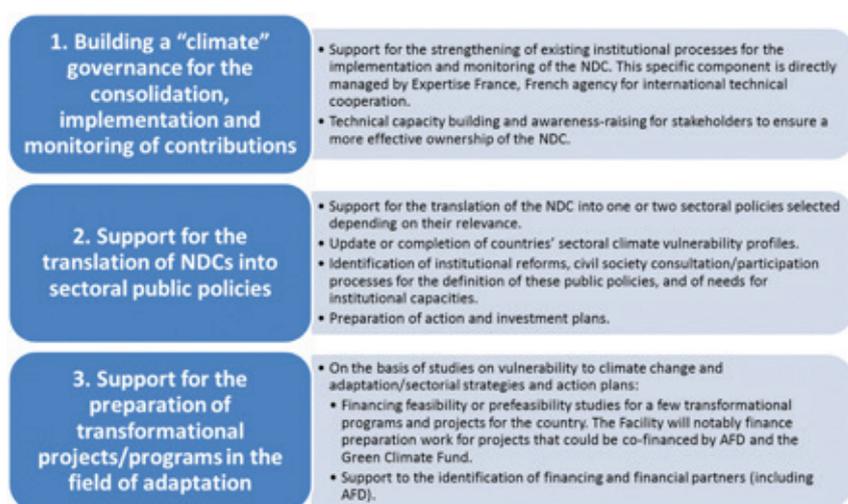
The Adapt'Action Facility aims to assist 15 countries and regional organisations in:

- Strengthening their climate governance to ensure the successful implementation of their NDCs;
- Translating their NDCs into sectoral public policies, combined with concrete action plans for the most vulnerable sectors to climate change (water resources management and securing supply, agriculture and biodiversity, risk reduction for extreme climate events, etc.);
- Designing transformational climate programs and projects, with a priority focus on adaptation to climate change.

The Facility also aims to give countries the means to mobilize international climate finance, to scale up their action in terms of adaptation to climate change and set them on resilient development pathways.

The Facility is based on three simultaneous and complementary areas of operation financed by AFD, as presented in Figure 1.

Figure 1. Areas of Operation Financed by AFD



To date, the Facility has signed Memoranda of Understanding (MoU) with 7 countries (Comoros, Mauritius, Tunisia, Madagascar, Niger, the Republic of Congo and the Dominican Republic) and two regional organisations (the Indian Ocean Commission and the Organisation of Eastern Caribbean States), in which the activities will begin soon. Additionally, three other countries have already been confirmed as beneficiaries of the Facility: the Republic of Guinea, Senegal, and Cameroon. The Facility will expand its activities in three more countries.

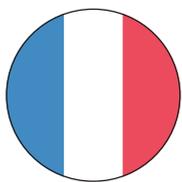
Lessons Learned

- Important to ensure an efficient coordination between the initiatives financed by the various technical and financial partners, including the international donors, in the field of adaptation to climate change.
- The Facility participates in the mainstreaming of climate change at the local and regional levels, which in turn allows for a stronger ownership of the project by the local and regional stakeholders.
- Very important to have local or regional resource persons to oversee the Facility's smooth implementation
- Relevant to provide resources for capitalisation and communication activities or events (workshops, etc.), also concurring in mainstreaming climate change and strengthening ownership.

+ Additional References

Adapt'Action web page (in french): <https://www.afd.fr/fr/adaptaction-ensemble-face-au-changement-climatique>

Adapt'Action web page (in English): <https://www.afd.fr/en/adaptaction-working-together-tackle-climate-change>



France (Chair) with Australia, Germany, Luxembourg and the Netherlands

The Climate Risk and Early Warning System (CREWS) initiative

Summary

The CREWS initiative, launched at the 2015 UNFCCC Conference of Parties (COP21) in Paris as part of the Climate Change Action Agenda, aims to significantly increase the capacity of Least Developed Countries (LDCs) and Small Island Developing States (SIDS) to generate and communicate effective, impact-based, multi-hazard, gender-informed, early warnings and risk information. This example responds to Enhancing Climate Resilience and Adaptation Efforts topic, and related G20 actions, proposed in the G20 Hamburg Climate and Energy Action Plan for Growth.

The CREWS Initiative

In 2017, 7 projects were approved, 19 LDCs and SIDS received CREWS support and USD 17 million were disbursed for implementation. Investments have been initiated in Burkina Faso, the Democratic Republic of the Congo, Mali, Niger, Papua New Guinea, and the Pacific and the Caribbean regions. Australia, France, Germany, Luxembourg and the Netherlands contribute to a pooled trust fund, managed by the World Bank, and provide oversight to CREWS operations through the CREWS Steering Committee. France is the current Chair of the CREWS Steering Committee. CREWS is linked to the InsuResilience Global Partnership, which promotes the adoption of risk finance and insurance solutions as part of comprehensive disaster risk management strategies. The initial financing target for CREWS is USD 100 million by 2020. The budget, as of 2017, is USD 30 million. CREWS implementation support to countries is provided by the World Bank and its Global Facility for Disaster Reduction and Recovery (GFDRR), the World Meteorological Organization (WMO) and the UN Office for Disaster Risk Reduction (UNISDR).

Examples of results achieved in 2017 include Tuvalu's preparation of a national drought policy, the Democratic Republic of the Congo's flood early warning systems development, and in the Caribbean after the worst hurricane season in recorded history devastated the region, the approval of a post-disaster assessment to update early warning system gaps analysis.

The CREWS initiative has enabled countries to access additional resources to strengthen forecasting, early-warning and weather services for better protection of lives and livelihoods. For instance, in Mali, a CREWS grant of USD 3.3 million to strengthen meteorological,

hydrological, food security and civil protection services has leveraged an USD 22.75 million grant from the Green Climate Fund and an additional USD 8.25 million from the country's World Bank International Development Association resources. Overall, CREWS funds have leveraged an additional USD 106 million in 2017.



Photo: Weather forecasters checking an Automated Weather Station in Niamey, Niger (CREWS, 2017)

CREWS operations ensure that projects are driven by needs identified by countries, building on existing capacities and resources, and building on technical innovations that are enhancing forecasting capacity in lower income countries. CREWS ensures sustained engagement with the National Meteorological and Hydrological Services (NMHSs) driven by systematic, consultative and long-term planning among donors and with governments. Among the early good practices are the cooperation between NMHSs in countries with stronger expertise with countries with less capacity through bilateral cooperation and assistance, and facilitating access to high-cost forecasting products that few countries can afford.

Gender-sensitive programming is a key programming principle that guides CREWS project development and approved new procedures for CREWS investments in 2017. It recognizes that women's empowerment is fundamental for building climate resilience and that men and women access, process, interpret and

respond to information and warnings in different ways.

CREWS monitors its impact against its overall objective, the outcomes and outputs contained in the CREWS Monitoring Framework and the CREWS Project Proposals. Through its operations, CREWS, in cooperation with its recipient countries, has developed metrics to monitor the impact and effectiveness of its investments against countries' ability to issue effective risk-informed and impact-based early warning systems and, ultimately, loss of lives and livelihoods.

Figure 1. People at Center of CREWS Expected Results



Lessons Learned

- Least Developed Countries (LDCs) and Small Island Developing States (SIDS) require long-term and sustainable support to develop their early warning system capacities, driven by short-term high programme performance.
- Effectiveness of CREWS country portfolios relies both on programme ownership by national institutions and the ability to align the relevant expert service from other countries, and regional and international organizations.
- Starting small has allowed CREWS to develop a scalable business model. The target of USD 100 million by 2020 would allow CREWS to expand its geographical reach and leverage additional funds.

+ Additional References

CREWS initiative website: www.crews-initiative.org

InsuResilience Global Partnership website: www.insuresilience.org/

World Meteorological Organization (WMO) website: www.wmo.int

Global Facility for Disaster Reduction and Recovery (GFDRR) website: www.gfdrr.org

UN Office for Disaster Risk Reduction (UNISDR) website: www.unisdr.org



Germany

Work Program on Climate Resilience and Adaptation and Launch of InsuResilience Global Partnership

Summary

The InsuResilience Global Partnership was launched at the 2017 UN Climate Conference in Bonn, and Germany's contribution to the G20 Adaptation Work Program. This country experience relates to the Enhancing Climate Resilience and Adaptation Efforts topic proposed in the G20 Hamburg Climate and Energy Action Plan for Growth, responding to the call to develop a work program aiming at sharing best practices and promoting enhanced efforts for adaptation and resilience building. The "Global Partnership for Climate and Disaster Risk Finance and Insurance Solutions" was thus created with the aim of closing the protection gap and invites relevant partners from G20 and other countries, international organisations and, as appropriate, civil society and the private sector to engage according to their respective capacities.

Background

Germany supports its partner countries in managing the spectrum of climate-related risks through support for averting climate change by reducing greenhouse gas emissions, minimizing and addressing climate risks through a smart mix of instruments that are already applied in climate change adaptation and disaster risk reduction complemented by more innovative adaptation tools such as risk finance and insurance as well as transformational approaches.

InsuResilience Global Partnership

Following the mandate from the Hamburg Climate and Energy Action Plan for Growth to create a Global Partnership for Climate and Disaster Risk Finance and Insurance Solutions, the "InsuResilience Global Partnership" was launched at COP23. As of June 2018, 47 governments and organizations (civil society, private sector, academia, implementing organizations) have become members of the Partnership.

The Partnership aims to strengthen the resilience of developing countries and to protect the lives and livelihoods of poor and vulnerable people from the impacts of disasters. It will seek to (1) amplify the impact of ongoing initiatives, including

regional catastrophe risk pools, such as the African Risk Capacity (ARC), the Caribbean Catastrophe Risk Insurance Facility (CCRIF), and the Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI); (2) develop new climate and disaster risk finance and insurance solutions to help meeting growing needs in developing countries worldwide; and (3) ensure risk financing is well integrated within a broader dialogue on, and systems for, disaster risk management and humanitarian financing - including in-country systems. Through its alliance of support programs, the Partnership will:

- Scale up and enhance catastrophe risk insurance as part of the countries' pre-arranged financing strategies by facilitating efficient and coordinated technical and financial support (e.g. financing capital, reserves, start-up and operating costs as well as concessional lending).
- Establish financially sustainable climate risk products in developing countries and emerging economies by catalyzing partnerships between public entities (e.g. national or regional government bodies), NGOs, humanitarian organisations and private companies in the insurance sector.
- Provide neutral advice and training to governments and humanitarian agencies, invest in research, data, innovation and learning, bring together partners from across the development, humanitarian and financial communities, and assist countries to boost their own inclusive insurance markets by building enabling environments.

Developing the G20 Adaptation Work Program

As a contribution to the G20 Work Program to share best practices and promote enhanced efforts on climate resilience and adaptation, Germany asked the World Bank to prepare a case study with recommendations to be presented during the second G20 CSWG meeting. Consistent with one of the main topics of the Argentine Presidency, the study focuses on ‘climate-resilient urban infrastructure’.

On the basis of first considerations, the recommendations may contribute to (1) improving infrastructure planning and public investment processes by addressing climate and disaster risk coherently, (2) creating conducive policy and regulatory frameworks that drive private investments in resilient infrastructure projects and sustainable business strategies as well as encourage fair and adequate risk transfer instruments to protect infrastructure assets, (3) increasing cities’ scope of action by strengthening their capacities and fiscal authority to access different funding sources and create dedicated finance instruments for climate-resilient urban infrastructure, and (iv) identifying entry points for action by the G20.



Photo 1. Construction of a Tidal Power Plant at the Harbor of Beira, Mozambique, to Regulate the River Chiveve (Source: Thomas Trutschel/photothek.net)

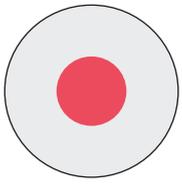
Lessons learned

- G20 countries recognize the importance of promoting and coordinating their best practices on adaptation efforts and of promising approaches for delivering on climate adaptation objectives, such as financing climate resilient infrastructure systems and strengthening financial resilience.
- To close the protection gap, uniting experts and countries within the InsuResilience Global Partnership is helpful to achieve more coherent action.

+ Additional References

InsuResilience Global Partnership: <http://www.insuresilience.org>

Concept Note: https://www.insuresilience.org/wp-content/uploads/2018/05/20180502_Concept-Note_InsuResilience-Global-Partnership.pdf



Japan

Asia-Pacific Climate Change Adaptation Information Platform (AP-PLAT) and Key Adaptation Initiatives in the Region

Summary

The Asia-Pacific Climate Change Adaptation Information Platform (AP-PLAT) of Japan is an initiative that supports effective climate risk management and adaptation by providing scientific information and datasets on climate change projection, impact assessment, and case studies on adaptation measures. Some key adaptation initiatives related with the Asia-Pacific region are also presented in this case study. Under the G20 Hamburg Climate and Energy Action Plan for Growth, this country experience is framed within enhancing climate resilience and adaptation efforts. In this sense, it recalls the specific action of sharing best practices and of promoting enhanced efforts for adaptation and resilience.

Background

The AP-PLAT is an initiative proposed by Japan at COP22 to support both state and non-state actors in the Asia Pacific region in the development of a national adaptation plan and its implementation. The AP-PLAT aims to become the platform for communication and interaction to facilitate partnership and collaboration for climate change adaptation to promote sustainable development in the Asia-Pacific region by integrating scientific information into their decision-making. Japan will take a lead in the following activities under the Platform:

1. Develop a dataset on projections of climate change impacts in the region through bilateral & intensive studies
2. Develop supporting toolkits for officials and stakeholders engaged in adaptation planning
3. Build capacity on climate change impact assessment/adaptation planning

AP-PLAT will be established by 2020 to share climate risk information online with research institutes and universities in both developing and developed countries. The prototype of AP-PLAT was presented during COP23 at Japan Pavilion in November 2017. The stakeholders involved include countries in Asia Pacific and other Regions, their governments, research institutions, international organizations and private sectors. The type of financing is public, on a regional scale. The social, environmental, and economic benefits include the

development of policy e.g. national/local adaptation planning, urban planning, land-use planning, and the development of capacity to conduct scientific impact assessment of climate change.

Figure 1. Asia Pacific Climate Change Adaptation Information Platform (AP-PLAT) Showing Temperature

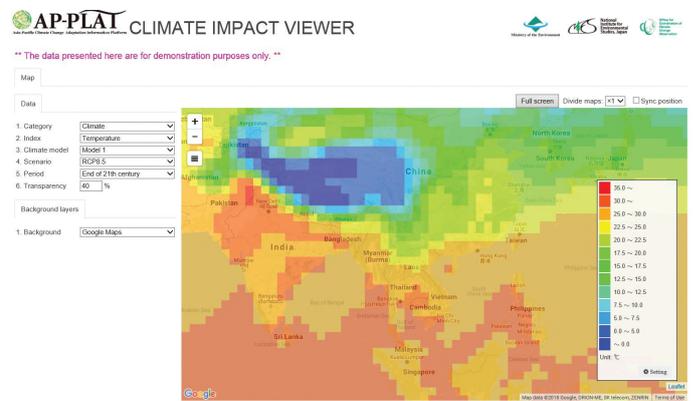


Figure 2. Asia Pacific Climate Change Adaptation Information: Climate Prediction Showing Precipitation

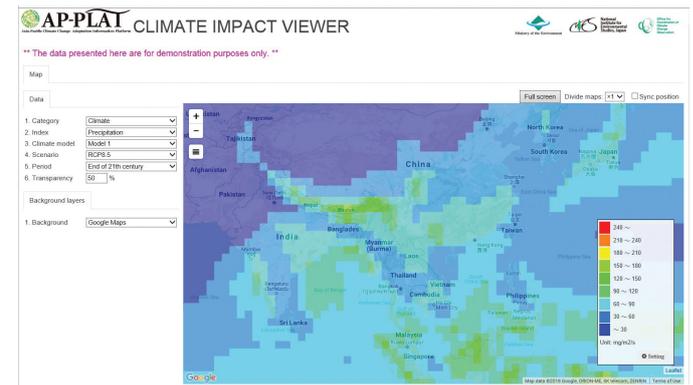
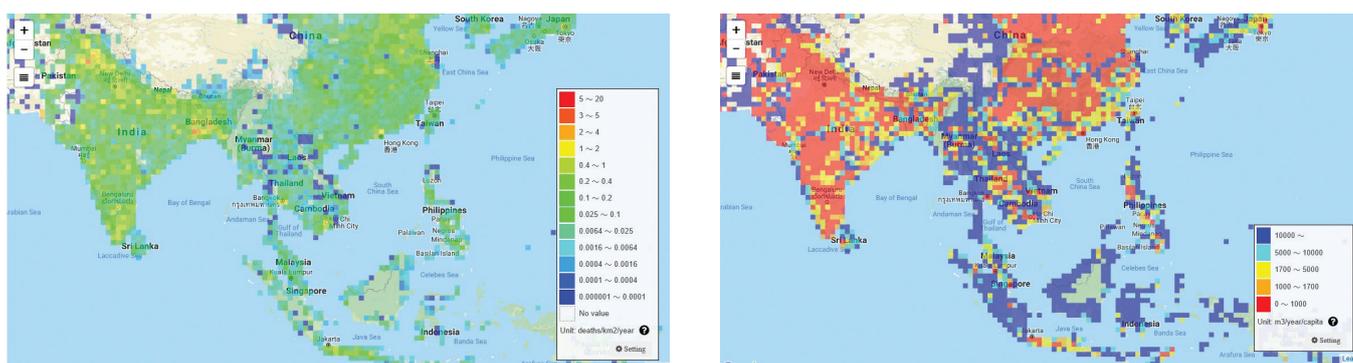


Figure 3. Climate Risk Data (Left: Heat Stress / Right: Water Resource)



Highlights of Japanese initiatives on Adaptation

1. Adaptation Projects

Through collaboration with Japanese cooperation organizations or governmental financial institutions, including Japan International Cooperation Agency (JICA) and Japan Bank of International Cooperation (JBIC) and international development and financial institutions, Japan will support adaptation projects based on priorities and needs of each country, while diversifying the financial resources, including mobilization of private finance.

2. Climate Risk Sharing

Japan will cooperate with developing countries in the Asia-Pacific region and the Asian Development Bank (ADB) to establish the “Asia-Pacific Climate Change Adaptation Information Platform (AP-PLAT)” as the information database on climate risk and adaptation measures. National Institute for Environmental Study (NIES) in Japan will collaborate with the Global Centre of Excellence on Climate Adaptation (GCECA) and contribute by sharing its experiences and knowledge in adaptation information infrastructure development.

3. Strengthen International Cooperation under Climate Change Adaptation Act

In June 2018, the National Diet of Japan enacted the Climate Change Adaptation Act. The Act promotes climate adaptation efforts through formulation of climate change adaptation planning, provision of knowledge and information on impact of climate change and climate adaptation and other necessary actions. This enables the Government of Japan to

enhance international cooperation through setting up climate-related information infrastructure to share knowledge and information globally, implementing technical assistance for developing countries.

4. Construction of the Pacific Climate Change Center

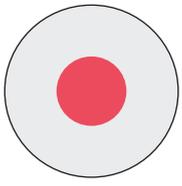
In February 2017, the Japan International Cooperation Agency (JICA) signed a grant agreement (G/A) with the Government of the Independent State of Samoa in Apia, the capital city, to provide grant aid of up to 962 million Yen (8.5 million USD) for the Project for Construction of the Pacific Climate Change Center. The project will construct a Pacific Climate Change Center (PCCC) at the main office of the Secretariat of the Pacific Regional Environment Programme (SPREP) in Samoa. The PCCC will function as a hub for human resource training in the field of climate change in the Pacific to improve the resilience of the region against climate change.

5. Japan’s initiative on climate change and fragility risks

On 6 September 2017, the Ministry of Foreign Affairs of Japan published a report on climate change and fragility, titled Analysis and Proposal of Foreign Policies Regarding the Impact of Climate Change on Fragility in the Asia-Pacific Region - With focus on natural disasters in the region. Japan will employ and disseminate the outcome of this report not only on the climate change negotiations but also in various diplomatic endeavors to cooperate for development, prevent disasters and achieve the Sustainable Development Goals.

+ Additional References

AP-PLAT web page. Available at: <http://www.adaptation-platform.nies.go.jp/en/ap-plat/index.html>



Japan

Japan's Approach on Climate Change and Fragility

Summary

Japan has been discussing recent initiatives on climate change and fragility with other countries and taking action on climate change and fragility issues with a view to recognizing the urgency of addressing climate-fragility risks and stressing the importance of aligning efforts on foreign policy towards the common goal of reducing the risks in order to increase resilience against global climate change. Under the G20 Hamburg Climate and Energy Action Plan for Growth, this country case is framed within the topic of Enhancing Climate Resilience and Adaptation Efforts. In this sense, it recalls the specific action of sharing best practices and of promoting enhanced efforts for adaptation and resilience-building at home and in our cooperation with partner countries.



Three Initiatives on Climate Change and Fragility

1. Holding a roundtable seminar

The Ministry of Foreign Affairs of Japan organized a roundtable seminar on climate change and fragility implications on international security on January 19, 2017. Around 100 participants, including both experts and general audiences, attended the seminar and shared their views and information about the possible impact brought by climate change in each field, deepened their understanding on the complicated and compounded risks to climate change and fragility, and discussed how the international community should tackle those issues. The seminar and its follow-up review meetings proposed such actions as: Study and discuss climate change and fragility in Asia and Pacific region; explore concrete approaches to be taken by the government.



Photo1 (Left): Prof. Kiichi Fujiwara from The University of Tokyo giving a keynote speech at the seminar
Photo 2 (Right): Around 100 people attended the seminar from in and outside of Japan

2. Japan's report on climate change & fragility

Japan published a report, "Analysis and Proposal of Foreign Policies Regarding the Impact of Climate Change on Fragility in the Asia-Pacific Region," on climate change impacts to natural disasters in Asia and Pacific region and correlation with socioeconomic fragility in the region, in October 2017. The findings of the report were shared at the COP23 Preparatory Workshop in Suva, Fiji in September 2017 as well as at a side event during COP23 in Bonn, Germany and at the Planetary

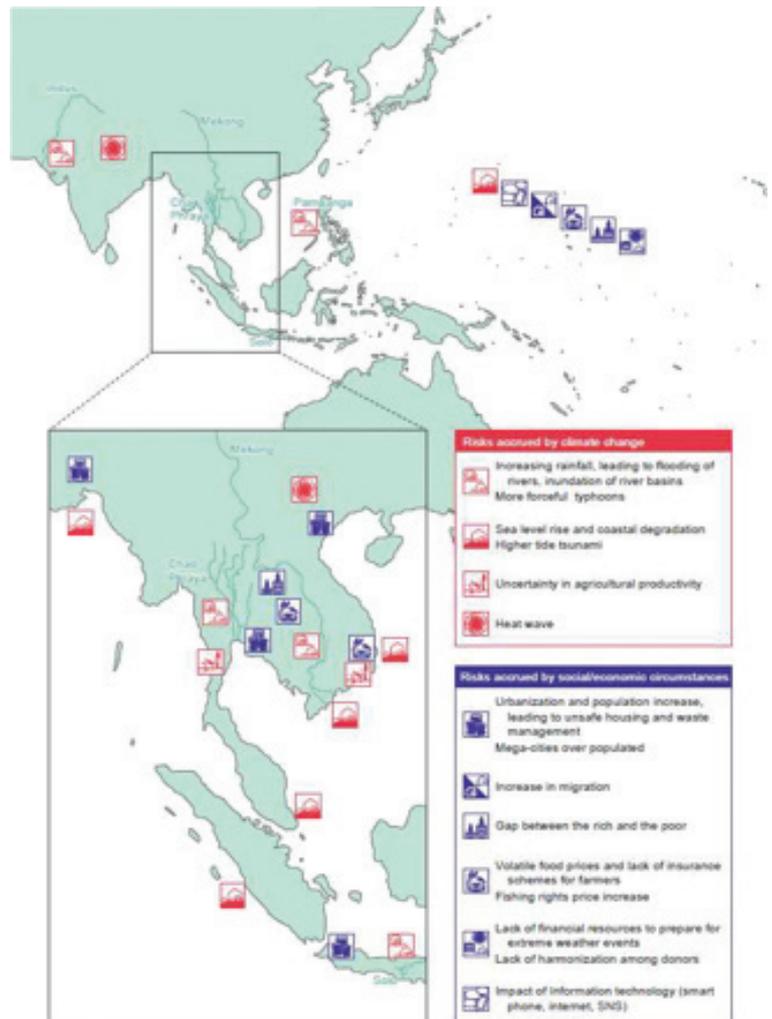
Security Conference in The Hague in December 2017.

3. Holding an international conference

In order to broaden the scope of the discussion from the previous meeting and to build upon the findings of the report, Japan will convene a second international conference with added focus on climate finance, resilient infrastructure and long-term planning in line with the theme of the G20 Climate Sustainability Working Group of 2018. Inviting corporate executive professionals

Figure 1. Correlation between Climate Change and Socioeconomic Fragility in the Asia-Pacific Region

and risk managers with businesses or investments throughout the region, climate researchers, regional experts, development assistance professionals, Japanese NGOs, think tank representatives and government representatives, the Ministry held an international conference on climate change and fragility in the Asia-Pacific region in Tokyo, Japan, on July 12, 2018. The attendees discussed the challenges posed by climate risks in the region, and how countries and regions would ensure sustainable development of their economy and society while addressing such challenges as rapid urbanization, movement of people, extreme weather events and food insecurity. The key findings of this conference will be presented to various international fora by the Ministry of Foreign Affairs of Japan so as to promote a more holistic approach towards climate change diplomacy that encompasses development, security, business and finance. The Foreign Ministry intends to draw up lessons from the conference to be utilized at international fora such as G20 and COP.



Lessons learned

- ⦿ Since climate change affects not only the environment but also economic prosperity and global security, an integrated approach that incorporates considerations of economic development and environmental protection is critical.
- ⦿ Robust climate actions supported by a wide range of stakeholders is an engine that enables economic growth.
- ⦿ Linkage among science, regional studies and business is imperative in taking holistic and inclusive climate actions and collaboration among various experts must be enhanced.

+ Additional References

Informal meeting among experts on climate change and regional affairs follow-up on the report on climate change and fragility Available at: https://www.mofa.go.jp/ic/ch/page23e_000512.html

International conference on climate change and fragility in the Asia-Pacific region Overview and Key findings. Available at: https://www.mofa.go.jp/ic/ch/page22e_000847.html



Republic of Korea

Climate Change Adaptation Policy

Summary

In December 2015, the Korean government established the 2nd National Climate Change Adaptation Plan (NAP) for 2016-2020. It encompasses five principles: sustainable development, climate resilience for vulnerable populations, science-based measures, an integrated approach, and active public participation. With the key changes in the 2nd NAP and lessons learned from the 1st NAP, the Korean government has a well-coordinated system and countermeasures to promote climate change adaptation policy. Under the G20 Hamburg Climate and Energy Action Plan for Growth, this experience is framed within enhancing climate resilience and adaptation efforts. In this sense, it recalls the specific action of sharing best practices and of promoting enhanced efforts for adaptation and resilience.

supporting green growth through climate change adaptation. It was the first official nation-wide master plan for responding to climate change. The Korean government improved the master plan into the 1st National Climate Change Adaptation Plan in 2010. The 1st NAP for 2011-2015 proposes an adaptation plan to achieve a long-term vision and prepares a plan based on existing adaptation issues.

2nd National Climate Change Adaptation Plan (2016-2020)

There are some key changes in the 2nd NAP compared to the first adaptation plan. The 2nd NAP differentiates mid and long-term goals for climate change adaptation at the national level. Rather than being limited to climate change adaptation, it seeks to generate co-benefits of mitigation and adaptation. The 2nd NAP exploits a science-based approach with climate change impact and risk assessment. It enhances monitoring of climate change impacts and integrated performance assessment.

Background

In 2008, the Republic of Korea developed a National Climate Change Adaptation Master Plan (2009-2030) with the vision of building a safe society and

Figure 1. Monitoring & Evaluation Process of the 2nd NAP

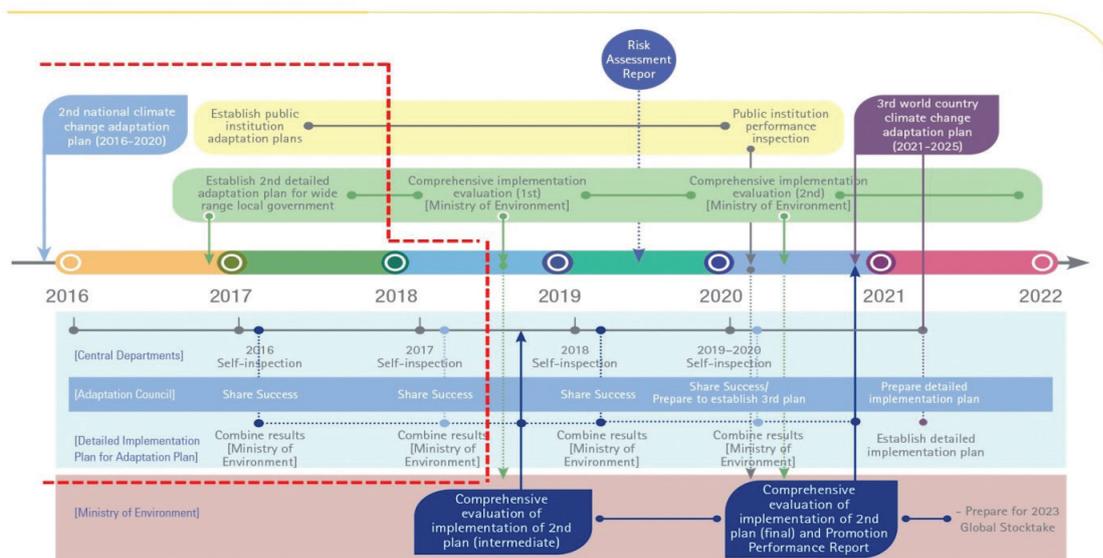
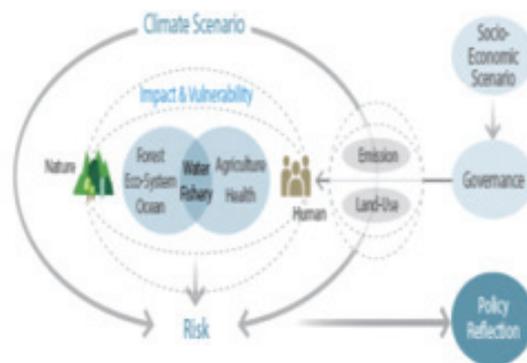


Figure 2. Local-driven and Participatory Project Model for Adaptation



One of the many concerns in implementing climate change adaptation based on good governance is the regional participation business model. Participation projects should involve not only the local government, but indeed local citizens, civil society, local research institutions, and experts. The Korean government is in the process of designing a model of regional governance participating in every process of self-diagnosing local problems, finding and implementing ways to improve them, and reassessing this in light of results.

Figure 3. Development of MOTIVE (Model Of inTEgrated Impact and Vulnerability Evaluation)



To build good governance and provide scientific information, the MOTIVE (2014-2020) has been launched. It is an integrated evaluation model reflecting Korean circumstance to be utilized for designing ‘science-based adaptation strategies’. It assesses main policy issues related to climate change and develops methodologies for outlining risk-centric adaptation policy and maximizing its application. The Korean government is pursuing R&D to provide a comprehensive and integrated view of climate change impacts in all sectors through MOTIVE.

Lessons learned

- Adaptation should be based on the participation of all; participatory governance and bottom-up action is needed.
- Adaptation is related to all sectors, but there is no policy only for adaptation. All the national policies should be aligned and interlinked in the view of adaptation.

+ Additional References

Ministry of Environment: eng.me.go.kr

Korean adaptation center on climate change: ccac.kei.re.kr/eng2014.index.do

Model of integrated impact and vulnerability evaluation of climate change: motive.kei.re.kr(Korean only)



Saudi Arabia

Addressing Climate Change through the Co-Benefits of Adaptation and Economic Diversification

Summary

Adaptation and economic diversification co-benefits are the vehicle the Kingdom of Saudi Arabia (KSA) is using to address climate change and related actions. These include a National Center to address the impact of climate change and its action, integrating climate change in the Kingdom's Vision 2030 program and in all adaptation actions, investing in research and development as well as carbon capture, utilization and storage technologies (CCUS), international cooperation, and economic diversification.

KSA Circumstances

Physical, economic and social factors determine the vulnerability of a country to climate change and the Kingdom of Saudi Arabia exhibits significant vulnerability in all three aspects. The Arabian Desert dominates the country, which spans approximately 2.2 million km² of the Arabian Peninsula. Many of Saudi Arabia's biggest environmental challenges are related to its aridity, very limited rainfall, high evapotranspiration and water scarcity. In the long term, a significant share of the infrastructure on the coastlines may be vulnerable to sea level rise. Trade and services may also be vulnerable to heatwaves and sandstorms as well as other indirect vulnerabilities including price volatility in exports and imports of goods and services. Hydrocarbon production, processing (and related value chain) and export are the primary economic activities of the Kingdom. The Kingdom economy's reliance on limited income resources puts at risk its ability to maintain a level of growth in the long run.

Measures taken by KSA to address climate change and its actions

Economic diversification is a key factor influencing the stability and sustainability of the growth of Saudi Arabia's economy. Measures include:

1. Establishing a National Center to address the impact of Climate Change and its action.

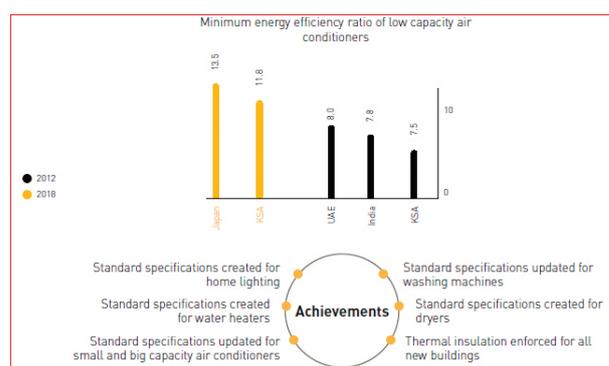
In 2009, Saudi Arabia established a national center called DNA (Designated National Authority for CDM) to oversee all climate change issues, track the



implementation of the Kingdom's contribution at the national level, in a manner that ensures sustained economic growth while managing greenhouse gas emissions, raise KSA climate resilience, analyze socioeconomic impacts of response measures, and coordinate the preparation of reports under the UNFCCC. It is represented by 14 stockholders.

2. Integrating Climate Change action within the program of the Kingdom's Vision 2030

The main mechanism to manage climate change risks involves the implementation of Vision 2030 through the encouragement of economic diversification measures that have co-benefits in the form of emission avoidance, adaptation to the impacts of climate change and response measures. Examples include increasing energy efficiency through programs designed by the Saudi Energy Efficiency Center (SEEC) in buildings, industry, and land transportation; renewable energies, whereby the Kingdom has set a target to produce 3.45 GW of renewable energy by 2020 and 9.5 by 2030; carbon capture and utilization/storage, by building the world's largest carbon capture and use plant (capacity of 1,500 tons of CO₂ per day); utilization of, and encouraging investment in, gas; and methane recovery and flare minimization through a corporate flare minimization roadmap and recovery system.



3. Integration of Climate Change in all Adaptation Action

Saudi Arabia differentiates its adaptation measures into those with mitigation co-benefits and those that are entirely aimed at adaptation and raising resilience. Adaptation measures can also contribute to economic diversification. Examples of actions that will enhance resilience and accelerate the diversification process include: water and waste water management, through a reference framework and comprehensive water strategy; urban planning, through the King Abdulaziz Project for Public Transport in Riyadh; marine protection, through conservation of the Kingdom’s coral reefs and planting of mangrove seedlings along its coasts; and reduced desertification by setting up protected natural areas that are constantly increased.



4. Invest in R&D and the “Emission to Value” (CCUS)

Saudi Arabia affirms that technological research



and innovation can offer cost-effective solutions to climate change challenges. Potential use of CO₂ includes beverages, fire extinguishers, dry ice, urea, blanketing, and shield gas in welding, among others. Examples of CCUS activities in Saudi Arabia include the Saudi Aramco Uthmaniyah CO₂-EOR demonstration pilot which captures about 800,000 tons CO₂ yearly from a natural gas liquefied plant and transports it through an 85 km pipeline for Enhanced Oil Recovery assessment in Saudi oil fields; Saudi Aramco’s breakthrough CO₂ to polymer technology (commercializing high performance polymers containing up to 50% CO₂ by weight); and the world’s largest CO₂ to chemicals plant in Jubail in the Eastern part of Saudi Arabia converting 500,000 tons of CO₂ to valuable products such as methanol and urea.

5. International cooperation and its role in advancing KSA plans

The Kingdom has established an international collaboration campaign to better understand and effectively address the challenges posed by climate change issues. The initiatives include the Global Methane Initiative (GMI), Mission Innovation (MI), Clean Energy Ministerial (CEM), and Carbon Sequestration Leadership Forum (CSLF).



Lessons learned

- Creation of climate change national center helps to address climate change through a strategic approach, with ownership and supports of its stakeholders;
- Integrating a climate change strategy with the country’s sustainable development plans can ensure best optimization of natural resources; and
- Economic diversification is a key factor influencing the stability and sustainability of the growth of the country’s economy

+ Additional References

Saudi Arabia’s Voluntary National Review of SDGs (2018): <https://sustainabledevelopment.un.org/memberstates/saudiarabia>



South Africa

Practices on Climate Change Adaptation

Summary

South Africa has developed the policy framework aimed at enhancing the country adaptation to the effects of climate change. In this regard, South Africa developed the National Climate Change Response Policy which prioritised adaptation. The country is currently working on the development of a national climate change bill as well as the national adaptation strategy that will be central towards the country response to the impacts of climate change impacts in the country. Under the G20 Hamburg Climate and Energy Action Plan for Growth, this experience is framed within enhancing climate resilience and adaptation efforts. In this sense, it recalls the specific action of sharing best practices and of promoting enhanced efforts for adaptation and resilience.

Background

The government of South Africa has established tools which can be used to facilitate building resilient infrastructure such the Spatial Planning and Land Use Management Act (SPLUMA). The Act is set to aid an effective planning and land use management. Furthermore, the Green Building Council has established standards to ensure that the green building incorporate design, construction, and operational practices that significantly reduce the impact associated with climate change. Green

capacity support for the municipality under the climate support programme which facilitate the mainstreaming of climate change into integrated development plans of various municipalities. In this regard, the government under the leadership of the Department of Environmental Affairs undertook the risk and vulnerability assessment at the district level as well as the associated response plan. It will be critical for the municipality to include integration of climate change into their by-laws thereby, ensuring that development and in particular engineering design take this phenomenon into account.



Photo 2

Nature based (soft-engineering) such as the ecological infrastructure is crucial to reduce and/or eliminate some climate risks such as floods. In this regard, the restoration of wetlands in cities can provide the benefit of flood attenuation whilst improving water quality and water ground level of the surrounding. South Africa has a nature-based programme, under the working for water programme which include among others the rehabilitation of wetlands, removal of alien species, etc. The Department has developed an ecosystem-based adaption strategy which will provide the strategic direction on the ecological infrastructure. In the regard, the department has established the working programme which includes the rehabilitation of wetlands, and removal of alien invasive species. The working for water programme, aims to restore the composition, structure and function of degraded land, thereby enhancing ecosystem functioning, such as carbon sequestration, water regulation and purification. In so doing, and by reducing environmental risks, it will improve the sustainability of livelihoods and productive potential of land, and promote economic empowerment in rural



Photo 1

buildings are energy efficient, resource efficient and environmentally responsible. The department of Environmental Affairs has established

areas, improve natural species diversity and landscape and catchment stability and resilience, and promote the development of a market for ecosystem services. Photos 1 and 2 depict the degraded and rehabilitated sites providing ecosystem services.



Photo 3

Since 2004, 639 wetlands have been rehabilitated at a total cost of 500,000 USD. Wetland ecosystems help regulate climate by capturing and storing carbon, with “peatlands”, in particular serving as effective ‘carbon sinks’. Maintaining and rehabilitating wetlands would be a crucial element of South Africa’s climate change adaptation mechanisms. Furthermore, through the Adaption Fund a number of innovative projects through innovative mechanism called direct access are being implemented across the country, covering the following aspects: Raising climate resilient livestock, producing climate resilient rooibos tea, climate smart vegetable production, investments in water security, investments in saving schemes, and investments in climate proof infrastructure.

The “uMngeni Resilience Project” is located in the uMgungundlovu District Municipality (UMDM), KwaZulu-Natal. Flooding, storms, droughts, heat waves, and wildfires are all expected to become worse as a result of climate change, with poor and



Photo 4

disadvantaged communities being impacted the most. The project has been designed to address these impacts through interventions in climate smart agriculture, climate proofing settlements, investment in ecological infrastructure and the installation of early warning systems, using near real time weather stations and community monitors. The project is being implemented in the rural areas of Vulindlela, Swayimane and Nhlazuka and in low-lying, high-density settlements on the outskirts of the city of Pietermaritzburg. Photos 3, 4 and 5 depict sustainable livelihoods projects funded under the Adaption Fund.



Photo 5

Lessons learned

- Ecosystem Based adaption provide opportunity for capacity building at the community level thereby promoting social cohesion. This has improved significantly the ecosystem services to the surrounding community.
- The really warning system has improved small scale farming at the local level. There has been significantly learning in integrating convention science and traditional knowledge systems.

+ Additional References

Long Term Adaptation Scenario, Together Developing the Adaptation Responses for future Climate, South African National Botanic Institute & Department of Environmental Affairs, 2013: https://www.environment.gov.za/sites/default/files/docs/summary_policymakers_bookV3.pdf

Let’s Respond Toolkit, Department of Environmental Affairs, 2014: <https://www.sustainable.org.za/uploads/files/file105.pdf>



Spain

Natural River Reserves and Climate Change

* G20 invited country

Summary

Spain's project on rivers and basins included within "Plan PIMA Adapta" (Plan to Promote Environmental Adaptation to Climate Change) aims to implement a climate change monitoring and participatory basin management to reduce vulnerability and increase river and basin adaptation. Under the G20 Hamburg Climate and Energy Action Plan for Growth, this country experience is framed within enhancing climate resilience and adaptation efforts and recalls the specific action of sharing best practices and of promoting enhanced efforts for adaptation and resilience. The project addresses United Nation's Sustainable Development Goals 6,11, and 13.

Natural River Reserves and Climate Change

Local climate conditions with long periods of drought and unprecedented floods in Spain as well as the special orography make the rivers and their basins particularly vulnerable to changes in temperature, levels of precipitation and to frequency and intensity of extreme events. Streams and flows are being affected, riparian vegetation is being replaced and we can already witness changes in fauna migration patterns. Climate change may entirely transform Spanish fluvial systems. We need to deepen our knowledge on these impacts and their magnitude in order to look for adaptation actions that minimize them. In order to reduce the knowledge gap, the Spanish Ministry for Ecological Transition has implemented some policies, rules and projects which will ensure the rivers' protection and enable the assessment of climate change impacts on rivers. The Spanish Water Law requires that State River Basin Management Plans must include a list of river basins to be declared as Fluvial Nature Reserves. This legal framework gives protection to those stretches of rivers that have little or no anthropogenic alterations. Preserving these stretches from human intervention is not only valuable because of their rich biodiversity but also because of their scientific potential. Since these rivers are remarkably close to their natural status, any change observed in them may be assumed as a direct consequence of climate change conditions, providing ideal places for the study of global warming effects. Currently, there are 135 Fluvial Nature Reserves (82 declared on November 2015 and 53 on February 2017). Thanks to this legal status, the Directorate-General

for Water of the Ministry for Ecological Transition and the Spanish Office of Climate Change have designed a set of projects within the framework of the "Plan PIMA Adapta" (Plan to Promote Environmental Adaptation to Climate Change in Spain). After the screening phase, 37 out of the 135 natural river reserves were selected to establish a climate change tracking network. This network will allow for detection, assessment and monitoring of changes suffered by these rivers, which might be direct consequences of the global warming process. In the future, the outcomes of this study will provide more insight into knowledge of climate change, improving the design of more accurate and reliable river restoration and adaptation projects.

Future project outcomes

A management plan is also being developed for each of the 135 Fluvial Nature Reserves. They will include measures to ensure rivers are and will be kept in their best conditions, both in the present and future environmental conditions. Additionally, public workshops will be held in each of the reserves with the aim of enabling local citizens, students, and interested groups to exchange knowledge and learn about the topic.



Photo 1. Technical Team Monitoring River Quality

Relation of the project with the 2030 UN Sustainable Development Goals

SDG 6 - Clean water and sanitation:

By reinforcing climate change impacts knowledge, measures and investments in appropriate infrastructures and in protection and restoration of water-related ecosystems will be more cost-effective.

SDG 11 - Sustainable cities and communities:

The information gathered will help to reduce risks due to unexpected flooding episodes for people living in the areas next to the river basins.

SDG 13 - Climate action:

In order to be able to adapt to climate change, higher understanding of its consequences and impacts is the first step to decrease the uncertainty associated to this topic.

Figure 1. Natural River Reserves and Basins Selected for Monitoring



Lessons learned

- Governance to tackle climate change can take advantage of legal frameworks adopted for ecological conservation
- Reinforcing monitoring and protection standards for natural resources can increase resilience to climate change
- Nature-based solutions / ecosystem based adaptation are cost-effective approaches to climate change adaptation in water management.

+ Additional References

National Fluvial Reserves Proposals. Available at: <http://www.mapama.gob.es/es/cartografia-y-sig/ide/descargas/agua/RNF-propuestas.aspx>

Plan PIMA Adapta Agua: <https://www.mapama.gob.es/es/agua/planes-y-estrategias/plan-pima-adapta-agua.aspx>



United Kingdom

Evidence Based Climate Change Adaptation Policy

Summary

This country case describes the UK's experience in developing climate change adaptation policy and the evidence that supports it, corresponding to the Enhancing Climate Resilience and Adaptation Efforts topic proposed in the G20 Hamburg Climate and Energy Action Plan for Growth.

Background

The UK's 2008 Climate Change Act set the framework for adaptation policy by establishing a climate change risk assessment (CCRA), a national adaptation programme (NAP), a reporting mandate, an independent Adaptation Sub-Committee (ASC) of the Committee on Climate Change (CCC) and an Adaptation Reporting Power (ARP). The UK government also funds the Met Office Hadley Centre (MOHC) Climate Programme, which provides state of the art climate science and climate projections.

Adaptation policy in the UK

National Plans

In 2018 the UK government published the second NAP setting out commitments under five themes: natural environment; infrastructure; people and the built environment; business and industry; and local government. The Department for the Environment, Fisheries and Rural Affairs (DEFRA) leads on adaptation, but the NAP cuts across all government departments. The NAP is primarily for England, with the devolved administrations (DAs) of Scotland, Wales and Northern Ireland setting out their own programmes of activity. Scotland and Northern Ireland will both publish their second adaptation programmes in 2019. The Welsh Government has strengthened its commitment through the statutory framework provided by the Environment (Wales) Act and the Well-being of Future Generations (Wales) Act and will publish its adaptation plan in 2018.

Adaptation Reporting

The ARP enables the government to ask 'persons or bodies with a function of a public nature' and 'statutory undertakers' to report on how they

are preparing for climate change. This includes infrastructure operators, national parks and public sector bodies. In Wales, the Well-being of Future Generations Act established Public Service Boards (PSBs), which are required to consider climate change in their well-being assessments and local well-being plans. In 2015, the Scottish Government introduced an order requiring certain Public Bodies, including local councils, to report annually on their compliance with the climate change duties.

Supporting evidence

The Climate Change Risk Assessment

UK CCRA's were published in 2012 and 2017. The 2017 CCRA was supported by evidence produced by the ASC which assessed 60 key climate risks and opportunities, current levels of adaptation and how risks may change in the future. Six priority risk areas were identified: flooding, water scarcity, overheating, natural capital, food security, and pests and diseases.

The Adaptation Sub-Committee

The ASC is an independent body set up to provide advice and assistance in relation to the implementation of the Climate Change Act. It evaluates progress on NAP implementation and provides evidence for the CCRA.

UK Climate Projections

The UK Climate Projections (UKCP09) give projections of future changes to the UK climate to the end of this century. 2018 will see an updated set of projections (UKCP18), which will provide greater regional detail, improved projections of national and global climate change and more information on extremes.

Interaction between policy and evidence

The UK's leading climate services provide a robust

evidence base for policy development. The iterative policy cycle as shown in Figure 1 means that assessments and plans are reviewed and updated as knowledge and experience build. Similarly, experience of planning and delivery steers the direction of further research. For example:

- National plans consider ASC evaluation, the CCRA and ARP reports.
- The CCRA takes a policy-focused approach, using the concept of urgency to prioritise.
- The NAP and the DA plans include research commitments, such as Scotland’s USD 1.3m annual funding to the ClimateXChange programme.

Figure 1: Adaptation Policy Cycle Timeline



Lessons learned

- The iterative approach allows for interaction between evidence and policy and enables the pursuit of long term goals in the face of uncertainty.
- To be effectively mainstreamed across government, the development of adaptation policy requires strong governance and communication arrangements.

+ Additional References

National Adaptation Programme: <https://www.gov.uk/government/publications/climate-change-second-national-adaptation-programme-2018-to-2023>

The Committee on Climate Change: <https://www.theccc.org.uk/>

Aligning Climate Finance Flows for NDC and LTS Implementation



Canada

Natural Resources Canada Energy Innovation and Clean Growth Programs

Summary

The investments through Natural Resources Canada (NRCan)'s suite of funding programs to support research, development and demonstration (RD&D) of energy innovation and clean growth programs, including green infrastructure, contribute to commitments to federal investments in clean technology, research, development and demonstration as part of efforts to accelerate global clean energy innovation. They help ensure clean energy technologies are widely affordable and drive economic growth. This experience responds to the Aligning Finance Flows topic proposed in the G20 Hamburg Climate and Energy Action Plan for Growth. In this light, it follows the sharing good practices action. Also, Natural Resources Canada's energy innovation and clean growth programs help support Canada's commitments to 2030 Sustainable Development Goals 7, 9, 11 and 13.

Background

In December 2016, the Government of Canada signed a Pan-Canadian Framework on Clean Growth and Climate Change (PCF) with provinces and territories, which will serve as the basis for action to meet or exceed Canada's 2030 emissions targets and transition Canada to a stronger, more resilient low-carbon economy. Accelerating innovation to support clean technologies and create jobs is a key pillar of the Framework, alongside pricing carbon pollution, complementary measures to further reduce emissions, and measures to adapt to the impacts of climate change and build resilience.

Recognizing innovation as a key pathway for driving competitiveness and environmental leadership in natural resources sectors, through the last 3 federal budgets the Government of Canada launched a suite of funding programs to support research, development and demonstration (RD&D) of energy innovation and clean growth programs, including green infrastructure.



This included initiating the following Natural Resources Canada Energy Innovation Programs in 2016-17, including:

- Electric Vehicle Infrastructure Demonstrations (EVID) program: 35.4 million (M) USD (46.1M CAD) in funding over 2 years, to support the demonstration of next-generation electric vehicle (EV) charging infrastructure in Canada;
- Clean Energy Innovation Program (EIP): 37.6M USD (49M CAD) over 3 years to support clean energy innovation in the following priority areas: renewable, smart grid and storage systems; reducing diesel use by industrial operators in northern and remote communities; methane and volatile organic compounds (VOC) emission reduction; reducing greenhouse gas emissions in the building sector; carbon capture, use and storage; improving industrial efficiency; and,
- Oil and Gas Clean Tech Program (OGCT): 37.9M USD (49.4M CAD) and an additional 91.5M USD (119.2M CAD) in leveraged funding from project partners over 2 years to support development of clean oil and gas technologies, in order to help develop Canada's hydrocarbon resources in sustainable ways.

Building on the 2016 programs, Natural Resources Canada also recently launched:

- 5 national Green Infrastructure programs (629,500,000 USD/820M CAD): Clean Energy for Rural and Remote Communities (167M USD/218M CAD over 6 years); Emerging Renewable Power (153.5M USD /200M CAD over 5 years); Smart Grids (76.8M USD/100M CAD over 4 years) ; Electric Vehicle and Alternative Fuel Infrastructure (92M USD/120M CAD over 4 years); and Energy Efficient Buildings (140M USD/182M CAD over 8 years).
- The Clean Growth Program: Federal government investing 118,700,000 USD (155M CAD) over 4 years to advance clean technology RD&D, up to first commercial demonstration, in Canada's natural resources sectors (energy, mining and forestry). The program requires co-funding from

provinces and territories and encourages new collaborations and partnerships in order to bring together traditional natural resource companies, clean technology producers, and end-users to support both environmental and economic growth opportunities.

- Impact Canada - Clean Technology Stream (57.6M USD/75M CAD over 4 years) NRCan has developed and launched five prize-based challenges including as Women in Clean Technology, Biojet Fuel and Off-Diesel in Rural & Remote Communities Challenges.

Lessons Learned

- Given the crosscutting nature of clean technologies, there is value in designing programs with a broad outcomes-based scope in order to incentivize projects that provide maximum impact for a variety of sectors and industries.
- Collaboration is imperative to effectively leveraging and supporting clean technology firms, the majority of which are SMEs. Programs should emphasize the importance of collaboration, and seek out opportunities for partnerships.

+ Additional References

Natural Resources Canada Clean Growth and Energy Innovation Program Funding: <https://www.nrcan.gc.ca/energy/funding/21146>

Impact Canada Clean Technology Stream: <https://impact.canada.ca/en/challenges>



China

New Development Bank Provides Financial Resources for Renewable Energy Projects in China with a View to Facilitating China's Low-Carbon Transition

Summary

China is committed to a long-term low carbon energy transition. The present case describes the alignment of finance flows from Multilateral Development Bank for two renewable energy projects in China. This example responds to the call for best-practice sharing within the topics of Aligning Finance Flows and the Role of the Multilateral Development Banks.

Background

The New Development Bank (NDB), initiated by the BRICS countries, aims to mobilize resources for infrastructure and sustainable development projects in BRICS and other emerging economies and developing countries, complementing the existing efforts of multilateral and regional financial institutions for global growth and development. Up to now, several projects in China have benefited from cooperation with the NDB. Two examples are projects on renewable energy include the Lingang Distributed Solar Power Project and Putian Pinghai Bay Offshore Wind Power Project, deployed with the support from the NDB.

LINGANG DISTRIBUTED SOLAR POWER PROJECT

The objective of the project is to reduce carbon emissions and promote renewable energy development, through using roof-top solar photovoltaic power technology to generate electricity in Shanghai Lingang Industrial Area (SLIA). The project aims to reduce 73,000 tons of carbon emissions per year, providing electricity generated through 100 MW roof-top solar photovoltaic power. The project will be divided into more than 30 sub-projects and be sequentially implemented over a 3-year period. The NDB has provided a loan of RMB 525 million (approximately 75.7 million USD) for the initiation and implementation of the project, accounting for about 2/3 of the total cost, while the Lingang Group provided the rest RMB 225 million (approximately 32.4 million USD).

PUTIAN PINGHAI BAY OFFSHORE WIND POWER PROJECT

Offshore wind sites are explored for their capacity to provide a vast wind source at sea, without the constraint of lands onshore. Fujian is a province on the southeast

coast of China which has the geographic advantage and the physical capacity to support offshore wind energy projects. Currently, the energy capacity in Fujian is falling short of the province's demand, with an estimated power deficit in the coming years. Putian Pinghai Bay Offshore Wind Power Project is designed to help Fujian province cope with the power challenge and to support the development of wind power energy in China. The project will provide 873 million kWh of electricity per year, to meet the demand of rising power consumption in Fujian province. The project includes 3 phases, and its total targeted capacity is 700 MW offshore wind power. In phase one, 10 turbines were constructed with a total power capacity of 50 MW. In phase 2, a capacity of 250 MW will be added over a period of 3 years, building on the existing turbines. In phase 3, a feasibility study is being conducted for an additional targeted capacity of 400 MW. The project is co-financed by the NDB (RMB 2 billion or approximately 288 million USD), the Fujian Investment and Development Group Co., Ltd (RMB 0.99 billion or approximately 144 million USD), and Chinese banks (RMB 1.97 billion or approximately 284 million USD). The NDB will cover the cost of equipment and civil works.

Large-scale financial support is needed to enhance green development in China as well as other developing countries, and multilateral development banks including the NDB can play an important role in mobilizing financial resources. China is exploring closer cooperation with them to accelerate its low-carbon transition and sustainable development.

Figure1: Social, Environment, and Economic Benefits of the Projects

Social, environment, and economic benefits				
	Facilitating low-carbon transition		Reducing air pollution (tons/year)	Other benefits (tons/year)
	GHG emission reduction (tons/year)	Alternative of fossil fuel (tons/year)		
Lingang distributed solar power project	CO ₂ :73,000	Gas: 23,000 Coal: 32,000	No _x :1,300	Promote new industry; Create employment opportunities;
Putian Pinghai Bay offshore wind power project	CO ₂ : 869,900	Coal: 314,100	NO _x : 13,090 SO ₂ :26,175 Flue gas: 237,300	Enhance Local economy

Lessons Learned

- As sovereign projects, the two projects are proposed by the Chinese government after consultation with the NDB. A standardized rate scheme for sovereign loans is applied.
- The two projects have demonstrated a successful cooperation model on aligning financial flows consistent with a pathway to achieve Paris Agreement goals and other SDGs.
- As a new multilateral development bank, the NDB is making its contribution to promote green projects in developing countries with the provision of local currency financing and respect for national circumstances.

+ Additional References

Lingang distributed solar power project. Available at: <https://www.ndb.int/lingang-china/>

Putian Pinghai Bay offshore wind power project. Available at: <https://www.ndb.int/pinghai-china/>



European Union

Revision of the EU Emissions Trading System

Summary

The EU has agreed a revision of its Emission Trading System (EU ETS) for 2021-2030, including the creation of two low-carbon funding mechanisms: an Innovation Fund and a Modernisation Fund. This experience responds to the Aligning Finance Flows topic proposed in the G20 Hamburg Climate and Energy Action Plan for Growth. In this light, it follows the sharing good practices action.



EU ETS in 2021-2030

The EU ETS limits greenhouse gas (GHG) emissions by more than 11,000 installations in the power sector and energy-intensive industry, and from aviation within Europe, through a market-based cap-and-trade system. It is a cornerstone of EU climate policy and will play a key role in the EU's fulfilment of its Paris Agreement commitment to reduce GHG emissions by at least 40% by 2030, compared to 1990.



The revised EU ETS Directive (Directive (EU) 2018/410), which will regulate the fourth trading period starting in 2021, was published in the EU Official Journal on 19 March 2018 and entered into force on 8 April 2018.

The key points are as follows:

- The overall EU ETS emissions cap will decrease by 2.2% annually, compared to 1.74% in the third trading period (2013-2020). This “linear reduction factor” will result in a total GHG reduction of 43% by 2030 compared to 1990.
- To address the surplus of EU ETS emission allowances, the Market Stability Reserve (MSR) will absorb 24% of the surplus every year for the first five years of its operation, from 2019 to 2023 (as opposed to the previously agreed 12%). From 2023, the number of allowances held in the MSR will be limited to the auction volume of the previous year; holdings above this amount will lose their validity.
- For free allocation of allowances, the list of eligible sectors will be revised to better reflect the risk of carbon leakage and the free allocations that companies receive will be based on regularly updated benchmarks to incorporate technological progress.

In addition, two new low-carbon funding mechanisms will be established:

- The Innovation Fund (IF) is aimed at fostering innovative low-carbon technologies. It is intended to support in particular carbon capture and storage (CCS) and renewable energy systems (RES) projects, but also breakthrough technologies in industries covered by the EU ETS. The IF will operate EU-wide and will be endowed with at least 450 million allowances, the auctioning proceeds of which will determine the total amount of money available. The European Commission is currently developing the detailed rules for the fund's operation.
- The Modernisation Fund (MF) will contribute to the modernisation of the energy systems in lower-income EU Member States. It will contain

2% of the total quantity of EU ETS allowances (some 310 million allowances). A distinction will be made between priority projects – those in priority areas such as RES, energy efficiency and just transition – and non-priority projects. Importantly, no support to energy generation from solid fossil fuels can be granted under the MF, except for district heating projects in Bulgaria or Romania.



Up to 2030, at least 750 million EU ETS allowances will be monetised under these two funds, with the aim of providing substantial support for low-carbon investments across the EU, open to all proponents EU-wide.

Lessons learned

- The EU ETS has proved that carbon pricing and trading can work, bringing cost-effective emission reductions in the installations covered. EU ETS emissions are falling as intended, by over 8% from 2013 to 2016, and due to the revision adopted for 2021 onwards, they are set to be 43% lower in 2030 than in 2005.
- For energy-intensive industrial sectors and the power sector, the low-carbon transition presents innovation and investment challenges. Carbon pricing not only offers a direct incentive to innovate and invest, but also gives rise to revenue that can reinforce the transition. This is why the new Innovation Fund and the Modernisation Fund have been agreed for 2021 onwards.

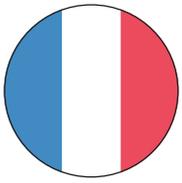
+ Additional References

Directive (EU) 2018/410 of the European Parliament and of the Council of 14 March 2018 amending Directive 2003/87/EC to enhance cost-effective emission reductions and low-carbon investments, and Decision (EU)

2015/1814: <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018L0410&from=EN>

Reform of the EU ETS: <http://www.consilium.europa.eu/en/policies/climate-change/reform-eu-ets/>

Questions and answers on the EU ETS revision: https://ec.europa.eu/clima/sites/clima/files/ets/revision/docs/high_level_qa_en.pdf



France

Carbon Pricing in France

Summary

The CREWS initiative, launched at the 2015 UNFCCC Carbon pricing in France has been carried out by two initiatives: a carbon component in energy taxes and the EU emissions trading system. The results show positive social, economic and environmental outputs. This country case responds to the call for sharing best practices in the topic of Aligning Finance Flows in the G20 Hamburg Climate and Energy Action Plan for Growth.

Carbon Pricing in France

In France, the following two measures have been put in place to implement carbon pricing in all sectors of the economy:

1. A carbon component in energy taxes

The Law on Energy Transition for Green Growth has set a path for the value of carbon to reach 100 €/tCO₂e (tons of carbon dioxide equivalent) in 2030 (around 120 USD/tCO₂e). A carbon component was thus introduced in 2014 within energy taxes (fuel, gas and coal) with a level of 7 €/tCO₂e in 2014 (around 8.4 USD/tCO₂e), up to 86.2 €/tCO₂e in 2022 (around 103.6 USD/tCO₂e). The prices follow an increasing

pathway, set by law, in order to give enough visibility to consumers (see graph below).

A work on the carbon price reference level was initiated at the beginning of the year 2018. The long-term targets for carbon component will have to be updated in order to take into account the results of that work.

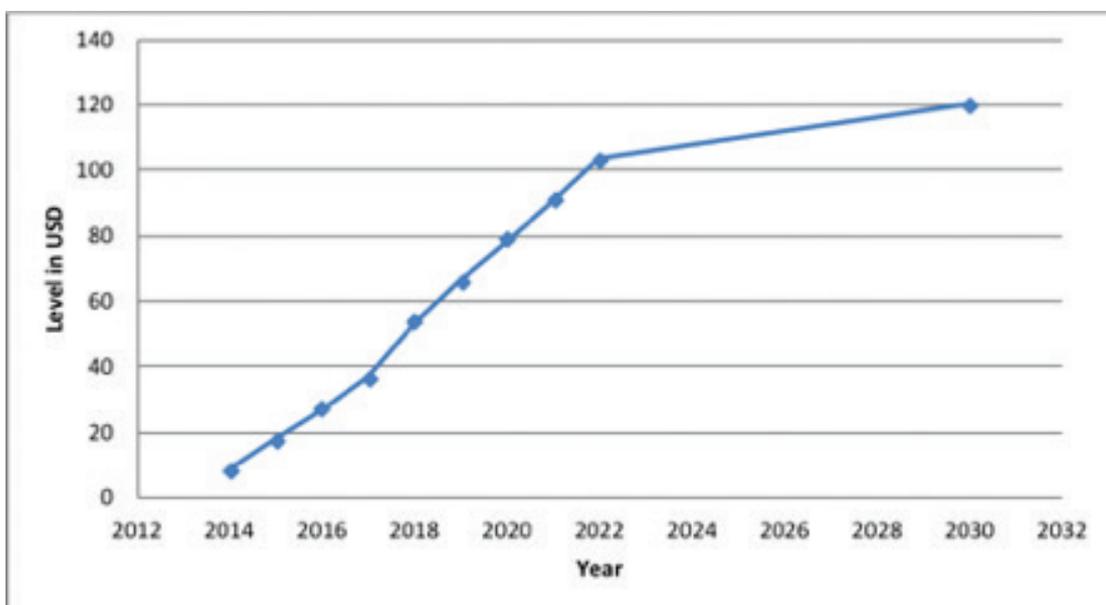
The carbon component especially impacts fuels for vehicles and household and tertiary heating. The sectors bound by the European Union emissions trading system are exempted, as well as the sectors of road freight transport, agriculture and commercial aviation.

2. The EU emissions trading system, an European carbon market

The power and heat generation sectors, industry sectors and domestic commercial aviation are submitted to the European emissions trading system (EU ETS).

The EU ETS is a cap and trade system. A cap is set on the total amount of greenhouse gases that can be emitted. Within this cap, emitters receive or buy emission allowances (depending on their exposure to international competition), which they can trade with one another as needed. After one year, each emitter

Figure 1. Carbon Component in Energy Taxes (in USD per year)



must surrender as many allowances as the quantity of greenhouse gas released during the year. A market stability reserve will be put in place in 2019 to withdraw the allowances in excess, in order to reinforce their price. The new allowances are sold by the Member States within the European Union. In France, the income from this sale finance improvements of building isolation for low-income households.

2018 and 6 MtCO₂e in 2022 (1.4% of French emissions). The economic impacts of the carbon component are expected to be positive. Its revenue has been used to finance tax reduction for business and to finance the budget for the energy transition.

3. Social, Environmental and Economic Benefits

The implementation of carbon pricing leads to a reduction of the greenhouse gas emissions of the covered sectors. The emissions reduction achieved due to the French carbon component are estimated at 3 MtCO₂e (megatons of carbon dioxide equivalent) for

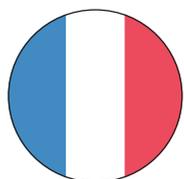
Lessons learned

- The implication of stakeholders during the design phase is essential.
- A long-term price visibility is important to ensure that investments in low-carbon technologies are made soon enough. For the carbon component of a tax, this visibility can be given by fixing a long-term pathway in the law.
- The price should be high enough to give a strong incentive to invest in low-carbon technologies. For market-based approaches regulated by quantities, mechanisms should be put in place to ensure that a meaningful price is reached (for example setting up a minimum price and/or a mechanism to withdraw allowances in excess).
- Implementing carbon pricing generates incomes for governments. It is important to reflect on how this income will be used: for example, to finance climate actions; to finance actions in favor of a just transition; to mitigate the negative effects or even generate positive effects for economic actors, notably through a tax shift in the general budget of the government.

+ Additional References

Website of the European Commission describing the EU ETS: https://ec.europa.eu/clima/policies/ets_en

Website of the French Ministry for an Ecological and Inclusive Transition describing the carbon component in the national energy taxes (in French): <https://www.ecologique-solidaire.gouv.fr/fiscalite-des-energies>



France

Green Finance

Summary

Besides engaging actively in the international sphere, France has led several key initiatives domestically in order to promote green finance, thus contributing to the alignment of private finance flows to the goals of the Paris Agreement. This country experience addresses the topic of Aligning Climate Finance Flows for NDC and LTS Implementation proposed in the G20 Hamburg Climate and Energy Action Plan for Growth, specifically relating to the sharing best practices action.

Reporting on climate-related issues for companies and investors

In the area of reporting, the 2015 law on energy transition strengthened climate-related disclosure for a large spectrum of companies. Additionally, the law asked institutional investors and asset managers to disclose the way they took into account Environment, Social, and Governance (ESG) criteria in their investment strategies and operations. The latter reporting obligation includes disclosures on climate change-related risks whether they should be associated to physical risks or transition risks. It also asks institutional investors and asset managers to communicate about the way their investment strategies are consistent with, and, when appropriate, their contribution to, the international objectives to limit climate change. The law and associated secondary legislation does not enshrine specific methodologies or metrics. The spirit of this regulation is to foster appropriation of climate-related issues and to lead companies to investigating and challenging their own practices. However, they are asked to disclose their own methods, to justify their choices and to explain why they consider risks as material or not, enabling the emergence of innovative and useful methodologies. Finally, companies must disclose their action plan to take into consideration these risk analyses and the way they are integrated to their governance policies. The first reports have been published in 2017. At this juncture, we strongly encourage market-led initiatives that would allow further development of methodologies and the establishment of best practices.

Dedicated financial products

The Socially Responsible Investment label (SRI label) promotes funds that declare specific ESG objectives according to certain criteria. To qualify for certification, financial products have to meet standards defined by the finance ministry. Among other things, a fund must exclude 20% of its initial investment universe on the basis of ESG criteria, or the average ESG rating of a portfolio must be higher than the rating of the benchmark index used to measure its financial performance. Asset managers that want to obtain the public SRI label for one or more of their products have to choose a labelling organisation among those that will be approved by the French Accreditation Committee. The label is awarded for a three-year period, during which follow-up certification audits are conducted.

The Energy and Ecological Transition for Climate Label (Label TEEC) is different in nature and guarantees the orientation of investments towards financing the ecological and energy transition. The TEEC certification scheme identifies products that genuinely finance activities with measurable environmental benefits. It defines the eco-sectors in which these products must be invested: from transport and renewable energies to waste management and energy efficiency, while also defining some excluded sectors (exploration, production, and use of fossil fuels).

More recently, initiatives have been taken up to ensure that labelled products can be subscribed through existing investment schemes. For example, insurance companies have announced their commitment to offer in every life insurance contract before the end of the year 2018 the option to invest in a fund with an ESG or climate label, such as the French ISR or TEEC labels.

Green bonds

On January 24, 2017, the French Debt Management Office (Agence France Trésor) launched the first French sovereign green bond, the Green OAT 1.75% 25 June 2039 for an issuance amount of €7 billion. By becoming the first country in the world to issue a sovereign green benchmark bond, France confirmed its role as a driving force for the implementation of the

goals of the December 2015 Paris Climate Agreement. On January 1, 2018, the outstanding amount of the bond stands at €9.7 billion after two taps. By the June 26, the outstanding amount was €14.8 billion after 4 taps.

Figure 1. Summary of France's Green Finance Initiatives



Lessons learned

- The importance for companies and investors to enforce international recommendations. Several market led initiatives are already set to develop methodologies and metrics in order to accompany and involve each stakeholder.
- Initiatives promoting dialogue and exchanges within the financial sector and with other stakeholders (for example the academics and NGO) should be supported.

+ Additional References

Further information on the first French sovereign green bond, the Green OAT: <https://www.aft.gouv.fr/en/green-oat>

A Global Investor Briefing on the French Energy Transition Law: <http://www.unepfi.org/fileadmin/documents/PRI-FrenchEnergyTransitionLaw.pdf>



Germany

Aligning Finance Flows

Summary

Germany remains fully committed to implementing the G20 Hamburg Action Plan on Climate and Energy for Growth and takes action, nationally, within the European Union and in various international fora to create an enabling environment for making financial flows consistent with the Paris Agreement. This includes aligning finance flows with NDCs and LTS, as the G20 Hamburg Action Plan calls for.

Taking action in Germany and within the European Union

- Goals: Provide long-term guidance and investment certainty by climate legislation, transforming public budgets and funding pilot projects.
- Scope: At the national level, the German Climate Action Plan 2050 identifies robust transformation pathways for all areas of action and defines sectoral targets for 2030, thus creating an environment that provides guidance and certainty for investment decisions. Germany established the Commission on Growth, Structural Change and Employment which will prepare a set of measures forward-looking structural development in regions depending on lignite mining and a plan for the gradual reduction and phase-out of coal-based power generation. The German Government agreed to pass a law in 2019 that ensures compliance with the climate protection targets for 2030.
- At the European level, The European Commissions has proposed to increase the quota for climate-friendly investments and projects to 25% of its total funding resources for the next EU budget (2021-2027). In May 2018 the Commission presented a package of measures as a follow-up to its action plan on financing sustainable growth. Germany generally welcomes these proposals and will further examine their implications and practicability.

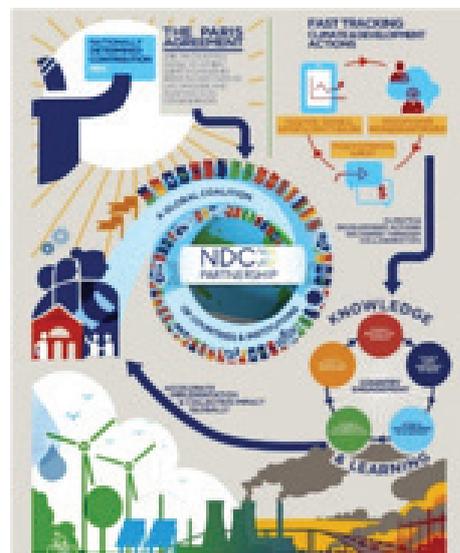
Contribution to the joint mobilization goal of USD 100 billion per year

- Goals: Industrialized countries committed to a joint mobilization goal of 100 billion USD per annum by 2020 from public and private sources for climate action in developing countries. Germany remains committed to this goal and works with partners to ensure the joint delivery.

- Scope: In 2015, Chancellor Angela Merkel announced that Germany seeks to double its international climate finance from budgetary resources from €2 billion to €4 billion by 2020 (with grant elements of development loans). In 2016, the German government provided €3.4 billion from budgetary sources for international climate finance. With mobilized public climate finance on top, the international climate finance in 2016 came to a total of €8.5 billion.
- As part of its climate finance, Germany has contributed €750 million to the GCF in 2014, and €350 million to the 6th replenishment of the Global Environment Facility (GEF) 2014-2018. During GEF-7, Germany scaled up its contributions to 420 million, resulting in a 9% increase compared to GEF-6 contributions. Germany encourages a substantial replenishment of the GCF and works for accomplishing the ambition of the GCF to contribute to a paradigm shift.
- Germany supports the Least Developed Country Fund (LDCF) and the Adaptation Fund through voluntary contributions. With a total contribution of €240 million each for adaptation projects, Germany is the largest contributor to the LDCF.

Aligning International Support with NDCs and LTS of Partner Countries

Figure 1: NDC Partnership



- Goals: Germany is seeking to align its climate finance with national priorities put forward by partner countries This includes a harmonization of tendering procedures, enhanced exchange and cooperation with partner countries, in particular through the NDC Partnership.
- Scope: Germany is a member of the NDC Partnership. The Partnership is a coalition of developed and developing countries and international institutions working together to ensure countries receive the Goals: Germany is seeking to align its climate finance with national priorities put forward by partner countries This includes a harmonization of tendering procedures, enhanced exchange and cooperation with partner countries, in particular through the NDC Partnership.

Scope: The initiative will provide a roadmap to transformation and explores how various actors, by combining the agendas of scaling-up long-term finance and shifting investment to climate-compatible futures, could contribute to the radical reallocation of financial flows to climate-compatible infrastructure. The initiative has identified seven transformation areas:

1. Align short-term infrastructure plans with mid-century decarbonisation strategies
2. Harness innovation, in technologies, business models, financing tools
3. Make resilient infrastructure the norm
4. Enhance transparency to mainstream climate risk in investors' decisions
5. Disentangle government's fiscal reliance on fossil fuels
6. Leverage development finance institutions financing potential
7. Enable local governments to finance an inclusive low-emission transition

First findings of this initiative were presented to the G20 Climate Sustainability Working Group, a full report will be released during COP 24.

Figure 2: Financing Climate Futures-Rethinking Infrastructure Investments



Financing Climate Futures- Rethinking Infrastructure Investments:

- Goals: With the new initiative “Financing Climate Futures- Rethinking Infrastructure”, Germany supports OECD, UN Environment and World Bank to respond to the G20 invitation from the G20 Hamburg Action Plan on Climate and Energy for Growth “to compile ongoing public and private activities within G20 for making finance flows consistent with the Paris goals, and to analyze potential opportunities for strengthening these efforts and present this analysis in 2018.”

Lessons learned

- Sustainable infrastructure is key to meet the Paris Agreement objective. Climate-compatible infrastructure does not cost much more. But developing the necessary climate-compatible infrastructure requires a radical shift in infrastructure investment and technology.
- Providing long-term guidance and investment certainty, transforming public budgets and funding pilot projects is key for spurring investments in low-emission and climate resilient development.
- International climate finance needs to be aligned with national priorities put forward by partner countries within their Nationally Determined Contributions (NDCs) and mid-century long-term low GHG emissions

+ Additional References

German Climate Action Plan 2050 (English, summaries in Chinese, French, Russian, Spanish) <https://unfccc.int/process/the-paris-agreement/long-term-strategies>

Supporting Partner Countries: NDC Partnership: <https://ndcpartnership.org/>

International Climate Initiative: https://www.international-climate-initiative.com/en/?iki_lang=en

Financing Climate Futures- Rethinking Infrastructure: www.oecd.org/environment/cc/climate-futures/

Investing in Climate, Investing in Growth: <http://www.oecd.org/environment/investing-in-climate-investing-in-growth-9789264273528-en.htm>



Republic of Korea

Emissions Trading Scheme (KETS)

Summary

In January 2015, the Korean government officially launched the Korean Emissions Trading Scheme (KETS), becoming the first East Asian country to implement a nationwide cap-and-trade program. The 2nd Phase of the KETS started this year, and it will continue to 2020. This country experience is linked to the topic of Aligning Climate Finance Flows for NDC and LTS Implementation proposed in the G20 Hamburg Climate and Energy Action Plan for Growth, and responds to the sharing best practices action.

Background

The legal foundation of the KETS is provided by the “Act on the Allocation and Trading of Greenhouse Gas Emission Permits” which was enacted in November 2012. The First Basic Plan of KETS covering Phase 1 (2015-2017) and the Phase 1 Allocation Plan were released in 2014 as the basis for the launch. The Basic Plan of KETS is a mid to long-term integrated plan for the implementation of KETS, which should be established a year before the beginning of each trading period. The Second Basic Plan of KETS covering Phase 2 (2018-2020) was released in January 2017. The Phase 2

Allocation Plan, which was to be released in the first half of 2017, but was delayed to reflect the change of environment and energy policies. As the new government amended the GHG reduction roadmap, the Phase 2 Allocation Plan was released along with the 2030 GHG roadmap.

Status of the KETS

The Korean Emissions Trading System (KETS) covers approximately 591 business entities for the year of 2018, emitting nearly 70% of national GHG emissions. From the 2nd Allocation Plan, industries are categorized into free allocation and auctioning: 37 out of 63 industries were allocated free of charge, and 26 industries were classified as 3% auctioning.

Next Steps

The calculation of allocations for each target entities and reception of applications will be completed by August 31, 2018. The allocations will be determined and notified by October, and reception and review of the formal objections will be conducted by the end of the year (November-December).

Table 1. Key Features of Phase 2 Allocation Plan and Policy Direction for Phase 3

Phase 1 (2015-2017)	Phase 2 (2018-2020)	Phase 3 (2021-2025)																									
<p>Methodology</p> <ul style="list-style-type: none"> • 20 out of 23 industries: GF-based allocation • 3 industries (cement, refinery and aviation): BM-based allocation <p>Free allocation</p> <ul style="list-style-type: none"> • 100% free during Phase 1 in order to minimize financial burden of entities 	<p>Expansion of BM allocation</p> <ul style="list-style-type: none"> • 3 BM industries (Phase 1) → 7 BM industries (Phase 2) <p>Incentive for reduction activities</p> <ul style="list-style-type: none"> • Give an allocation incentive to companies which reduced GHG emissions by investing in low-carbon equipment/facilities <p>Auctioning</p> <ul style="list-style-type: none"> • 3% of the allocation via auctioning to the entities of the non-CL industries from 2019 	<p>Fixation of BM allocation</p> <ul style="list-style-type: none"> • Develop additional methodologies for BM allocation and update BM factors reflecting the latest advanced technologies <p>Expansion of auctioning</p> <ul style="list-style-type: none"> • Increase the auctioning portion to at least 10% of total allocation from Phase 3 																									
<p>Trading results</p> <ul style="list-style-type: none"> • A summary of yearly trading volumes and prices on Exchange is shown below • Due to lack of willing sellers, trading volumes are low and prices have been growing steadily overall. <table border="1"> <thead> <tr> <th></th> <th>Year</th> <th>Av. Price (KRW/t)</th> <th>Trading vol. (kt)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">2015</td> <td>KAU</td> <td>12,028</td> <td>321</td> </tr> <tr> <td>KCU</td> <td>10,889</td> <td>920</td> </tr> <tr> <td rowspan="2">2016</td> <td>KAU</td> <td>17,367</td> <td>2,562</td> </tr> <tr> <td>KCU</td> <td>18,105</td> <td>1,884</td> </tr> <tr> <td rowspan="2">2017</td> <td>KAU</td> <td>21,122</td> <td>13,336</td> </tr> <tr> <td>KCU</td> <td>20,622</td> <td>41</td> </tr> </tbody> </table> <p>(KAU=Korea Allowance Unit; KCU=Korea Credit Unit)</p> <p>Cap-setting by entities</p> <ul style="list-style-type: none"> • Entities were classified by 5 sectors with 26 industries 		Year	Av. Price (KRW/t)	Trading vol. (kt)	2015	KAU	12,028	321	KCU	10,889	920	2016	KAU	17,367	2,562	KCU	18,105	1,884	2017	KAU	21,122	13,336	KCU	20,622	41	<p>Operation of periodic auctions</p> <ul style="list-style-type: none"> • Promote market activation through monthly auctioning from 2019 • Allow only the entities of the paid-allocation industries to participate in auctions <p>Considering market-maker function</p> <ul style="list-style-type: none"> • Consider introducing a market-maker system from 2019 to activate the market when the market liquidity is low, inviting public financial institutions as market-makers • Amendment of Auctioning regulation and the relevant decree <p>Cap-setting by sector</p> <ul style="list-style-type: none"> • To get aligned with the roadmap and enhance equity between industries With some exceptions regarding the characteristics of each industries. 	<p>Extension of market participants</p> <ul style="list-style-type: none"> • Activate the market by allowing 3rd party traders including intermediaries to participate in emissions trading, and prepare policy measures to prevent from market abuse or interference
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Lessons learned

- The 2nd Phase Allocation Plan seeks to ensure consistency with the GHG reduction goals (NDCs) set by the Paris Agreement.
- Since the ETS is the key policy measure for NDC implementation, the total Cap should reflect the NDC from the 3rd Phase.



The Netherlands Climate Investor One



* G20 invited country

Summary

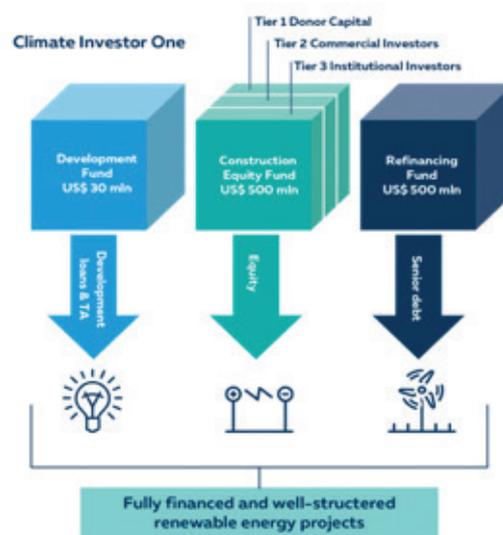
The Netherlands is committed to the expansion of renewable energy sources. Climate Investor One (CIO) is a blended finance facility managed by Climate Fund Managers (CFM), mandated with delivering renewable energy at affordable prices in developing markets through its financial and technical contribution to the early-stage development, construction, and operational phases of a project's lifecycle. This country experience responds to the topics of Scaling Up Renewable Energy and other Sustainable Energy Sources and Aligning Finance Flows proposed in the G20 Hamburg Climate and Energy Action Plan for Growth. In this light, it follows up the Voluntary Action Plan on Renewable Energy adopted under the Chinese Presidency and the G20 Toolkit of Voluntary Options on Renewable Energy Deployment adopted under the Turkish Presidency. It also complements the action of making public and private investments consistent with the goals of the Paris Agreement. CIO contributes to the goal of the Paris Agreement to keep global temperature rise below 20C and seven United Nations Sustainable Development Goals: 5. Gender Equality; 7. Affordable and Clean Energy; 8. Sustained, Inclusive & Economic Growth; 9. Industry, Innovation and Infrastructure; 12. Responsible Consumption and Production; 13. Climate Action; 17. Partnerships for the Goals.

Background

CIO has a primary focus on solar, wind & run-of-river hydro technologies, targeting projects between the 25-100MW ranges, with a geographical investment focus in Sub-Saharan Africa, developing Asia and Latin America. It is an initiative started by FMO – the Dutch Development Bank in collaboration with Sanlam InfraWorks – part of the Sanlam group, of South Africa. CIO comprises 3 distinct but operationally inter-linked funds:

- A USD 30 million Development Fund (DF) that provides development loans and technical assistance to the early stage development of a project;
- A USD 500 million Construction Equity Fund (CEF) that provides equity only finance during construction, and;
- A USD 500 million Refinancing Fund (RF) that provides post construction stage debt to the project company.

Figure 1. CIO Blended Finance Funds Scheme



Combined, the three funds that make up CIO operate with a recycling of capital mechanism. This enables a greater number of projects to become operational, in a faster time, culminating in a greater global societal and environmental impact.

The Impact of Climate Investor One

With a Construction Equity Fund size of USD 500 million, CIO will be able to deliver ~20 renewable energy projects to developing countries in the 20-year lifetime of the fund, with ~3,200 GWh of clean energy produced annually to ~8 million people, avoiding ~1.2 million tons of GHG emissions a year – the equivalent to removing 250,000 passenger cars off the road.

Blended Finance

The uniqueness of CIO lies not in the types of projects it finances, but rather in how it finances them. CIO defies the traditional approach to project financing by combining funding for the high-risk development phase with an equity only approach for construction and an operational debt facility, post construction. Public funding from the Netherlands Directorate-General for International Cooperation (DGIS) (USD ~55

million), USAID (USD 5 million), Nordic Development Fund (EUR 5 million) and the European Commission (EUR 30 million) is directed towards both project development activities as well as in being positioned as risk-reducing capital during construction, leveraging private sector capital at this stage. Through this

blended approach to financing, projects are able to pass through development & construction phases in a more expeditious manner than those that follow a classic project finance model. A graphical description is presented below.

Lessons learned

In the past few years CIO developed from a concept to an operational facility that is on track to achieving its target size. There were many lessons learned during this process:

- The main insights were into the complexities of blended finance and difficulties in matching donor and commercial investor expectations. The private and public sides of blended finance operate at different speeds and have different requirements in terms of impact, risks, returns and expectations from the program manager.
- Many investors are still unfamiliar with blended finance and investing in the emerging markets. It is therefore not surprising that it takes time for a market innovation, such as CIO, to gain traction, however, considering the potential of blended finance and the urgency of issues that can be solved with it, donors and investors can be encouraged more to work and act together on innovations in development and climate finance.
- In order to achieve the goals of the Paris Agreement and the United Nations SDG's, public and private resources must be pooled to create more impact and to avoid the wheel is reinvented multiple times. In recent years there have been many initiatives that try to address the lack of quality clean energy infrastructure and corresponding project finance in developing countries, however they are often too fragmented in their approach to have significant impact.

+ Additional References

Description of Climate Investor One in the Climate Finance Lab: <https://www.climatefinancelab.org/project/fmo-climate-development-finance-facility/>

FMO, the Dutch Development Bank: <https://www.fmo.nl/>



Russian Federation

Nord-Hydro Power Plant: MDB Financing for Renewable Energy

Summary

The Nord-Hydro Power Plant showcases green finance for sustainable energy in Russia. The best practice describes alignment of MDB financing with nationally determined priorities, contributing to the sustainable development of Karelia (a Russian province). Under the G20 Hamburg Climate and Energy Action Plan for Growth, this experience is framed within the alignment of financial flows. In this light, it follows up the specific action of mobilizing financial resources for mitigation and adaptation in developing countries of the Action Plan. With regard to the Sustainable Development Goals (SDGs), the project will contribute to Goal 7 (access to affordable and clean energy) and Goal 13 (action on climate change).

Background

Russia has vast untapped renewable energy resources, with non-fossil fuel based energy currently only accounting for 3% of total primary energy consumption of the country. In Karelia, a federal subject of Russia, energy generation capacity is low, with power imported from other regions of Russia. Power supply in Karelia is still not sufficient. Developing power generation projects in Karelia using renewable sources will help tackle this challenge and contribute to the region's sustainable development. In this context, the project, with Nord-Hydro as a model project, is designed to enhance power generation capacity in the region and facilitate renewable energy development. The project is in alignment with the New Development Bank's (NDB) objective to accelerate green financing and promote renewable energy development. The NDB will provide two loans to support Eurasian Development Bank (EDB) and International Investment Bank (IIB) to on-lend to renewable energy projects. The two loans will finance the Nord-Hydro project to increase energy supply in Karelia region through renewable energy resource. The energy generated by the new hydroelectric power plants will be supplied to remote and hard-to-reach regions at a preferential tariff in accordance with the Energy strategy of the Russian Federation. Moreover, Nord-Hydro benefits from certain incentives and subsidies as a producer of "green" energy, reducing CO₂ emissions. With this project, a small dam and two hydroelectric

generation plants will be constructed, providing a total installed capacity of 49.8 MW. A 220 kV power transmission line of 10-km will be constructed.

Highlights

The construction of hydropower plants in Karelia is the first major joint investment programme of the IIB and EDB, funded by the NDB and aimed to benefit the national economy of Russia. The Russian Federation is a key shareholder in these three multilateral development banks. Supporting renewable energy initiatives is consistent with the new policies of both banks.

Timeline

2016-2021

Environmental and Social Aspects

The proposed hydro power generation will avoid 48,000 tons of carbon dioxide emissions per year. To avoid the common issues inherent in constructing hydro-electric power plants, the dam parameters for this project were designed to avoid resettlement and minimize impact on ecology. The Implementing Agency (Nord-Hydro Bely Porog) shall closely monitor implementation of proposed mitigation measures and the NDB shall conduct annual supervision.

Status of Implementation/Progress

The project is estimated to be implemented over 3 years. Suppliers for the project will be selected through a competitive and transparent bidding process. Selection criteria include technical expertise, experience in execution of similar projects and costs of construction. The Implementing Agency shall closely monitor implementation of proposed mitigation measures and the NDB shall conduct annual supervision.

Stakeholders Involved

- New Development Bank
- Eurasian Development Bank
- International Investment Bank

Total Project Investment

The total cost of the project is USD 161.9 million. The two NDB loans add up to USD 100 million. A loan of USD 50 million is provided to the EDB. The other loan of USD 50 million is provided to IIB.

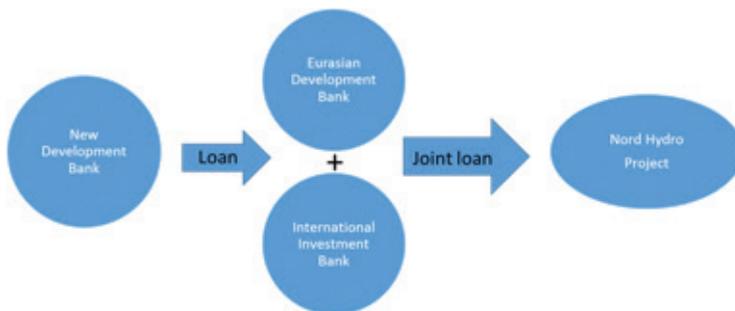
Table 1. Summary of Financing Sources for the Nord-Hydro Power Plant

Financing Source	Amount (million USD)
New Development Bank (via EDB and IIB)	100.0
Other Bank Loans	6.1
Subordinate Loans	29.0
Equity	26.8

Type of financing:

Private

Figure 1. Finance Flows Alignment for Sustainable Energy Implementation



Lessons learned

- The project provided an opportunity to streamline the process of financing projects in Russia with the participation of NDB.
- The project brought to light the importance of conducting a preliminary technical research and taking preventive measures: when Nord-Hydro started working on the project it revised technical parameters of the Project – it was decided to build two hydroelectric plants with a capacity of 24.9 MW each instead of just one, and thus the flooding area was significantly reduced along with the risk of flooding, which was absolutely indispensable for the successful implementation of the project.
- The project demonstrated that creating a special purpose entity is an efficient way of completing such kind of projects; therefore the mechanism may be successfully used in the future.

+ Additional References

Nord-Hydro Website Press Room: <http://www.nord-hydro.ru/press-tsentr/klyuchevye-sobytiya/>

Implementation Agency Website: <https://www.ng-bp.ru/kompaniya/info/>

New Development Bank Website: <https://www.ndb.int/edbiib-russia/>



United Kingdom

Green Finance Taskforce

Summary

The UK Government established the Green Finance Taskforce to accelerate the growth of green finance. This country experience describes the work done by the Taskforce, relating to the Aligning Finance Flows topic proposed in the G20 Hamburg Climate and Energy Action Plan for Growth. Specifically, it responds to the Action Plan's call for sharing best practices in this subject.

Background

The 2016 New Climate Economy Report estimates that USD 90 trillion will be invested in infrastructure between 2015 and 2030 with not much more needed to achieve global Sustainable Development Goals and climate objectives. Green finance, investment in environmental technology, infrastructure and services, is therefore central to the future of the UK and global economy. Article 2.1c of the Paris Agreement, 'making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development' highlights the need for international action to accelerate the growth of green finance. In recognition of this opportunity, and challenge, the UK Government established a Green Finance Taskforce, to provide recommendations on how to accelerate the growth of green finance.

HM Treasury and the Department for Business, Energy and Industrial Strategy co-hosted the Green Finance Taskforce, which brought together leading experts from the financial sector, academia and civil society. This included the CEO of the London Stock Exchange, the CEO of Legal and General Investment Management, the Chair of the Environment Agency as well as senior representatives from the Bank of England, Aviva, Barclays, HSBC and more. The Taskforce was given six months to work with their industry peers to identify up to ten recommendations to: help deliver the investment required to reach the UK's legislated emissions reduction targets; further consolidate the UK's leadership in financing international clean investment; and maximise the opportunities to be had for UK businesses in green finance.

The Taskforce was established in September 2017, and over a six-month period consulted more than 140 organisations through over 40 industry workshops and roundtables. More than 100 possible recommendations were identified throughout this process, demonstrating the wide-reaching nature of the work. The Taskforce prioritised these recommendations, including by seeking feedback from UK Government officials. Given the breadth of the Taskforce's work and the wide-reaching nature of their recommendations, twelve different UK

Figure 1: How Green Finance Can Support Clean Growth

Clean Growth Sectors	Ambition set out in Clean Growth Strategy	How green finance can help deliver
 Innovation	Investing over £2.5bn in low carbon innovation	Increasing venture investment to support the commercialisation of innovative clean technologies Theme 5
 Business and Industry	Improve business energy efficiency by at least 20%	Developing new green lending products that can facilitate widespread and affordable energy efficiency improvements Theme 4
 Homes	Aspiration for as many homes to be EPC Band C by 2035	
 Power	Phasing out unabated coal by 2025	Mobilising increased investment in large and small-scale power Themes 6, 7 and 8
 Transport	End the sale of new conventional petrol and diesel cars and vans by 2040	Driving investment and finance that can reduce the cost of low emission vehicles both for manufacturers and consumers Themes 4 and 5
 Natural Resources	Deliver better environmental outcomes	Ensuring the financial sector is resilient to climate change, and that investors consider environmental factors Themes 3 and 10
 Public Sector	Voluntary public sector target of 30% reduction in carbon emissions by 2021	Maximising the carbon reduction impact of public spending, through targeted investment and flexible procurement Theme 9

Government Departments provided support for the process.

The Taskforce published their final report to Government on March 28, 2018, almost six months to the day after the initial Taskforce meeting. The Report “Accelerating Green Finance” outlined 30 recommendations grouped under ten themes and highlighted key areas of green finance that would contribute towards the Sustainable Development Goals. The Taskforce report will form an important resource in guiding future Government policy on green finance. The UK Government recognised

the importance of working closely with the private sector to deliver the investment required to achieve domestic and international climate targets, as the power of public purse alone will not be sufficient. The Taskforce has been instrumental in forging a strong collaborative partnership between UK Government and the financial services sector on green finance. The work of the Taskforce has also been effective in galvanising increased private sector action on green finance. HSBC launched a revised Energy Policy with additional focus on green finance and Barclays launched a new green mortgages product following publication of the report.

Figure 2: The Green Finance Taskforce, kick off meeting 26th September 2017, London



Lessons learned

- The Taskforce’s first recommendation, to relaunch UK green finance activities through a new unified brand, has already been pivotal in maintaining positive momentum and accelerating progress. The Chancellor of the Exchequer announced the establishment of a new Green Finance Institute in June, delivering on the first of the Taskforce’s recommendations. This Institute will provide a compelling and supportive focal point for green finance activities in the UK and will underpin future public-private collaboration on green finance.

+ Additional References

The 2018 Report of the Global Commission on the Economy and Climate: <https://newclimateconomy.report/>

Green Finance Taskforce report on accelerating green finance: <https://www.gov.uk/government/publications/accelerating-green-finance-green-finance-taskforce-report>



United Kingdom Sustainable Infrastructure Programme (SIP) in Latin America

Summary

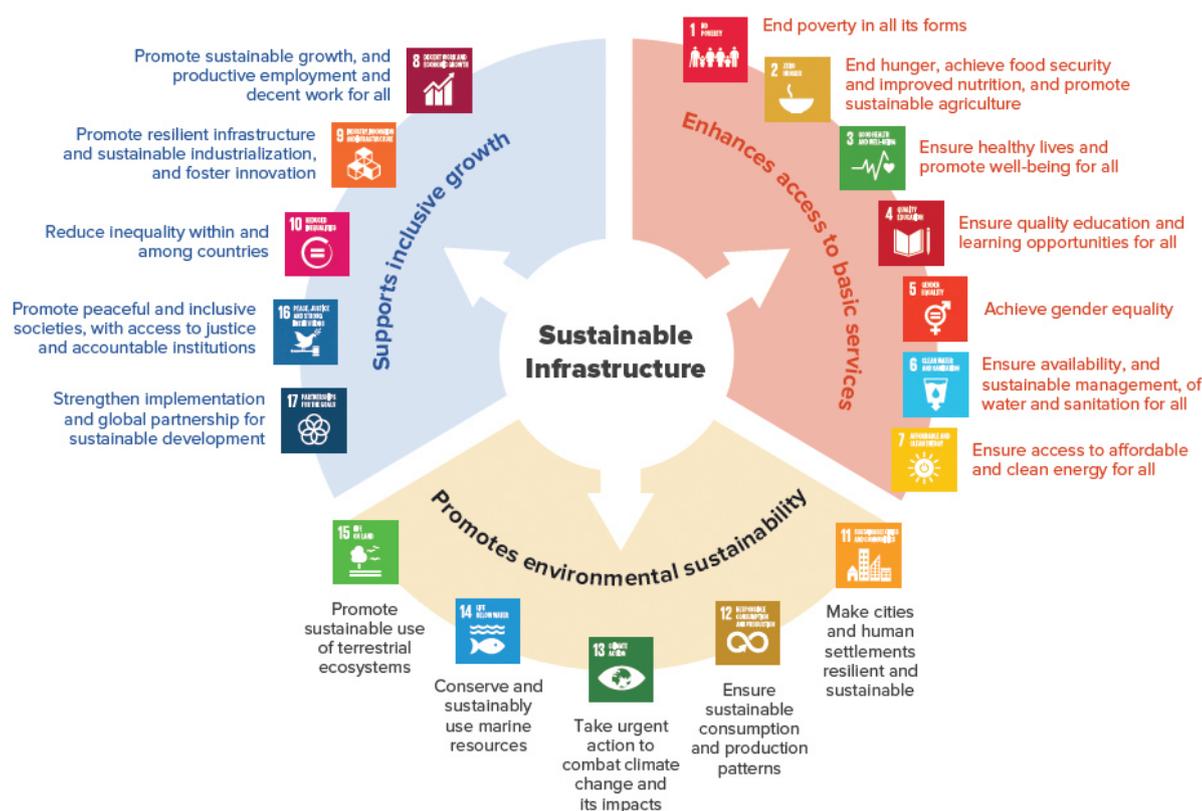
The United Kingdom's Sustainable Infrastructure Programme (SIP) supports partner countries to accelerate the implementation of their Nationally Determined Contributions by mobilizing private sector investments into sustainable infrastructure. Funded by the UK and delivered by the Inter-American Development Bank (IDB), the programme deploys a combination of climate finance for low-carbon infrastructure investments and technical assistance in Latin America; focusing on Brazil, Colombia, Mexico and Peru. This country case relates to the "Aligning Finance Flows" topic proposed in the G20 Hamburg Climate and Energy Action Plan for Growth and responds to the sharing best practices action.

reduce poverty. Three UK government departments have responsibility for the ICF (established in 2011), which will invest £5.8bn (at the time of the announcement, this was equivalent to USD 8.8bn) between 2016 and 2020. SIP is a £177m climate finance commitment under the ICF (at the time of the announcement, this was equivalent to USD 268m) - a bilateral programme, solely funded by the UK and delivered by IDB. Investing in sustainable infrastructure is key to delivering the Sustainable Development Goals, reducing climate risk and enabling global growth. As the demand for infrastructure grows, assets must be sustainable if high carbon growth 'lock-in' is to be avoided. However, the higher up-front capital costs of climate-smart infrastructure (on average 6% more than more carbon-intensive forms), often discourages investment despite the long-term costs savings. The public sector remains a key source of infrastructure investment (about 60-65% in developing economies), which highlights a significant need to scale-up private finance.

Background

The UK International Climate Fund (ICF) supports countries to adapt to the impacts of climate change, adopt low-carbon growth, tackle deforestation and

Figure 1. Sustainable Infrastructure and the Sustainable Development Goals



Purpose

SIP works in Brazil, Colombia, Mexico and Peru to support their emission reduction commitments under the Paris Agreement, through sustainable infrastructure projects where the perceived financial risk in the market is currently too high to attract commercial investors.

Design

There is evidence that providing access to capital in emerging economies (and getting projects off the ground) requires technical assistance at all levels, from governments to financial institutions. The programme therefore deploys a high ratio of technical cooperation to blended finance (£25m to £150m / USD 38m to 223m). The blended finance component deploys relatively small amounts of funding on concessional terms to leverage larger volumes of capital into sustainable infrastructure

projects across specific sectors (renewable energy, energy efficiency, transport, water and waste). This is combined with technical assistance to overcome regulatory and institutional barriers and capacity building to improve access to domestic green finance. All SIP activities are identified in collaboration with partner countries, support local plans and are designed to unlock private capital into projects that would otherwise fail to reach financial close.

Status

Early-stage implementation started in April 2018. SIP will follow a phased approach: firstly working with partner countries to identify sectors with significant barriers to investment and requiring technical support; secondly deploying technical assistance both with governments and with local financial institutions; and thirdly investing concessional finance to de-risk and attract private investme

Lessons learned

- SIP builds on the following lessons learned from seven years of UK ICF programming:
Combine technical assistance with capital to address the full range of barriers to investment
- The programme works closely with partner countries to support national plans, recognising that local buy-in is essential.
- Target specific sectors based on local needs, demand, investment gaps, and where UK International Climate Finance can be truly additional and generate real impact.
- Flexible approach, working closely with partner countries and stakeholders to understand how programme activities can be as relevant and transformational as possible.

+ Additional References

Press release for SIP launch: <https://www.iadb.org/en/news/news-releases/2017-11-14/idb-and-uk-establish-infrastructure-fund%2C11956.html>



United Kingdom

Transforming Markets with UK International Climate Finance (ICF)

Summary

The UK is among the largest contributors of public climate finance and is committed to providing support which is transparent, transformative and in line with the needs and priorities of developing countries. The UK has pledged to spend at least £5.8bn (at the time of the announcement, this was equivalent to 8.8bn USD) between 2016 and 2020 (all from the aid budget), aiming for an even split between mitigation and adaptation. As part of this, we committed to provide USD 5bn with Germany and Norway for countries who bring forward ambitious projects to halt deforestation. This finance helps to deliver the UK's commitment as part of the Paris Agreement to keep global temperature rises to well below 2 degrees. Under the G20 Hamburg Climate and Energy Action Plan for Growth, this country experience is framed under the Alignment of Climate Finance Flows and addresses the sharing best practices action.



Photo: The Rosh Pinah solar power plant in Namibia is providing clean, reliable electricity to thousands of homes.

The ICF prioritises three key areas:

1. Building the resilience of the poorest people and communities. It supports countries to prepare for and adapt to climate change, improving how disasters are managed and reducing the harm they cause and the costs of responding.
2. Working to ensure that the vast expansion in infrastructure in developing countries is low-carbon and climate resilient – using our finance to build capacity and unlock greater flows of private finance towards clean growth, bringing down the costs of a global low-carbon transition in the process.
3. Supporting work to halt deforestation and create new supply chains that are both profitable and sustainable. We help communities to use land in ways that reduce emissions and improve productivity whilst protecting and restoring forests that support important biodiversity and fragile ecosystems.

This builds capacity and capability in developing countries to implement their NDCs and raise ambition further.

Best Practice

UK climate finance has been instrumental in building the market for Concentrated Solar Power in developing countries. Through the Clean Technology Fund, we have helped to finance the first full scale power plants in South Africa and Morocco, driving down technology costs in Morocco by 35%. This demonstrates how renewable energy can be cost competitive or even cheaper than fossil fuels, in order to crowd in the private sector.

Reaching the 100 billion USD goal

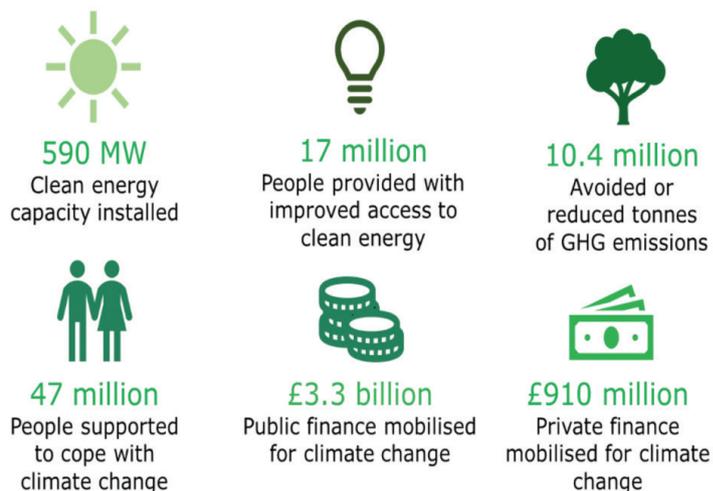
The ICF delivers the UK's share of the Paris Agreement commitment to jointly mobilise 100 billion USD per year in climate finance in developing countries from a range of sources by 2020. The UK works closely with the EU member states and other major donors, for example Australia and Canada, to drive ambition in the negotiations and realise this goal.

Results

The ICF has already helped 34 million people to cope with the effects of climate change, supported 12 million people to access clean energy and reduced or avoided 9.2 million tonnes of greenhouse gas emissions. These positive impacts will continue to grow as we deliver new and ambitious programmes, harnessing British expertise and UK commercial leadership.

UK International Climate Finance directly supports the Sustainable Development Goals on climate action and affordable and clean energy, as well as indirectly supporting many others. It also, of course, supports the objectives of the Paris Agreement

Figure 1. 2018 ICF Results



Lessons learned

We ensure that lessons learned from our research and from the monitoring and evaluation of the ICF portfolio are factored into new programme design. Some examples of lessons learned to date include:

- The success of programmes depends on local buy-in;
- Technical assistance helps to make interventions sustainable in-country;
- Robust value for money scrutiny avoids over-subsidy or crowding out the private sector;
- Climate programming often takes much longer than other aid projects to deliver results;
- There is still a lack of investment-ready projects at scale – they take time, capacity and the right enabling environment to build a viable investment pipeline.

+ Additional References

UK ICF case studies and results to date can be found at: <https://www.gov.uk/guidance/international-climate-finance>

UK-funded Clean Technology Fund project recognized at UN Conference of Parties: <http://www.solarpaces.org/kaxu-solar-one-recognized-un-climate-change-award-cop23/>

Role of the Multilateral Development Banks (MDBs)



Canada

Canadian Climate Fund for the Private Sector in Asia: Eastern Indonesia Renewable Energy Project

Summary

The Eastern Indonesia Renewable Energy Project, partly funded by the Canadian Climate Fund for the Private Sector (CFPS II), aims to catalyze private investment in climate change action in developing countries, in this case for a utility-scale renewable energy project (solar and wind) in Indonesia. The objective of the CFPS II is to play a key role in helping the private sector overcome development risks by offering financing on concessional terms and conditions to projects that would not proceed solely on a commercial basis. The fund was established as a trust fund and will help offset cost hurdles and initiate, scale-up and replicate high impact projects in markets that show strong potential for growth. This country experience responds to the Role of Multilateral Development Banks (MDBs) topic proposed in the G20 Hamburg Climate and Energy Action Plan for Growth and relates to both the Principles and Ambitions for crowding in private finance, and MDBs enhanced action for mitigation finance actions.

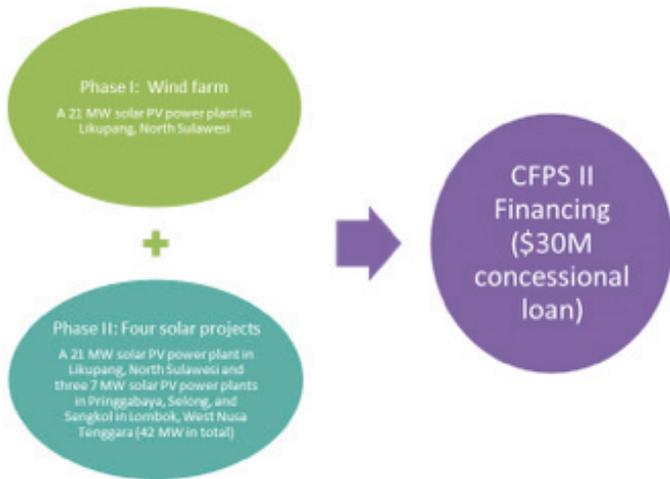
Background

As part of Canada's climate finance commitment of CAD 2.65 billion (approximately USD 2 billion) announced by Prime Minister Trudeau in 2015 years to help developing countries tackle the challenges of climate change, Canada is providing CAD 200 million (approximately USD 150 million) from 2016 to 2020 for the second phase of the Canadian Climate Fund for the Private Sector in Asia (CFPS II) at the Asian Development Bank. CFPS II aims to catalyze private investment in climate change action in developing countries, including small-island developing states. In recent years, Canada has scaled up its commitments to private sector climate initiatives and partnered with MDBs, including the Asian Development Bank, to this end. CFPS II invests in a combination of private sector led climate mitigation and adaptation activities. This includes, but is not limited to, clean and renewable energy, sustainable transport, waste management, water supply and management, resilient infrastructure and disaster risk management. Supported projects also contribute to increased gender-responsive economic development and integrate gender equality outputs and align with concessional finance principles.

Using concessional financing, this fund enables private investment in climate change projects that would not otherwise happen due to market barriers to investment. It will help overcome perceptions of risk, including market, technology, financing, regulatory and other risks, and will improve returns to overcome first-mover risks as well as address various technical and regulatory challenges. As such, given the Fund's catalytic purpose, financing may be, for instance, below market-based lending rates, or be used to provide unhedged financing. For example, CFPS II is providing USD 30 million to support the construction and operation of a wind power project and four solar power projects in remote areas of eastern Indonesia. This will be the first utility-scale solar project development by the private sector in Indonesia, with finance made available for the construction and operation of the portfolio.

Indonesia's power infrastructure is struggling to keep up with the country's strong economic growth. The government aims to increase the renewable energy share in the generation mix from 12% in 2013 to 23% in 2025 (Source: ADB), recognizing the many benefits renewable energy can have for the country in terms of health and environmental impacts, macro-economic impacts and energy security and access. The projects are located in relatively remote parts of the country, in eastern Indonesia, and will provide power to underserved grids. The CFPS II concessional loan of USD 30 million will support the financing of a portfolio of five projects in two phases: Phase I; A 72MW wind power project in Tolo, South Sulawesi, and Phase II; Four solar power projects with a total capacity of 42MW in Likupang, North Sulawesi and Lombok. These are presented in figure 1.

Figure 1. CFPS II Concessional Loan Projects (where \$ represents USD)



The Phase 1 wind project will contribute to climate mitigation through the expansion of Indonesia’s installed renewable energy production and by avoiding an equivalent of 159,000 tCOe (tons of carbon dioxide equivalent) emissions annually. It will also accelerate private sector investment in clean energy infrastructure in line with the government’s objectives and further expand the power distribution network in Eastern Indonesia, where energy access rates are lowest and where renewable energy options are often the most economically viable. The project will also take into account gender impact considerations and create jobs for local workers. Overall, it will help to encourage further private sector participation in renewable energy generation by demonstrating the success and viability of new large-scale renewable projects in Indonesia. This project alone will mobilize an additional USD 115 million from the ADB-administered Leading Asia’s Private Sector Infrastructure (LEAP) Fund, and in private equity. For the combined project portfolio, the CFPS II concessional loan is expected to mobilize approximately USD 130 million in financing from the Asian Development Bank (ADB), the ADB-administered Leading Asia’s Private Sector Infrastructure (LEAP) Fund, and in equity.

+ Additional References

Canadian Climate Fund for the Private Sector: <https://www.adb.org/site/funds/funds/canadian-climate-fund-for-the-private-sector-in-asia-2>

Canada’s Climate Finance website: <https://climate-change.canada.ca/finance/>



Germany

How MDBs Facilitate the Implementation of the Paris Agreement

Summary

The implementation of the Paris Agreement requires that investments and policy initiatives are aligned with low-carbon, climate-resilient development pathways. Development finance institutions, especially multilateral development banks (MDBs), are uniquely positioned to facilitate this alignment given their role in providing finance for their client countries' development agendas. This experience describes current results of a study commissioned by the German Federal Ministry for Economic Cooperation and Development (BMZ) to the World Resources Institute (WRI), Germanwatch, NewClimate Institute, and Fundación Avina. This country experience responds to the "Role of the MDBs" topic proposed in the G20 Hamburg Climate and Energy Action Plan for Growth, and follows the call on MDBs for cooperation and enhanced action towards Nationally Determined Contributions (NDCs) and Long-Term Low Greenhouse Gas Emission Development Strategies (LTS) financing.

Background

In recent years, MDBs and other development finance institutions have made progress to incorporate climate change into their decision-making processes. The study, conducted in consultation with the MDBs, highlights lessons learned, remaining barriers, and emerging solutions with the aim to provide actionable policy recommendations. The study targets three areas: 1. MDBs' role in supporting NDC and LTS implementation; 2. Tools to test MDB portfolios on their Paris Alignment; and 3. Strengthening MDBs' action on climate resilience.

1. NDCs and MDBs

The NDCs provide the scaffolding for the implementation of the Paris Agreement, linking governments' actions on climate change with their development policies. MDBs are increasing their support to NDC implementation, e.g. through technical assistance initiatives. Yet, these programs are small relative to Banks' overall investments (USD 20 million or smaller) and, thus, limited in their capacity to advance NDC implementation.

MDB	NDC Support Program
AfDB	NDC Hub
AsDB	Advance
EBRD	NDC Support Program
IaDB	NDC Invest
WBG	NDC Support Facility

Table 1. NDC Support Programmes in MDBs

At the same time, MDBs are increasingly integrating NDCs into the country-level strategies jointly produced with the governments. While more than half of the recent country strategies include the NDCs, they often lack detail in how they will support NDC implementation (e.g. inclusion in results framework, direct translation of projects or programs, etc.). In addition, more country strategies support thermal energy investments than NDCs do.

2. Aligning MDBs' portfolios with the Paris temperature goals

Implementing NDCs is the first step towards reaching the goals of the Paris Agreement. However, given their investments' long-term nature, MDBs need to think beyond the 2030-horizon of current NDCs to limit global warming to close to 1.5°C. During the last years, MDBs have increased efforts to integrate climate aspects into investment decisions, using instruments such as GHG-accounting, internal carbon pricing, and exclusion lists. Yet, for many technologies, 1.5°C target alignment is conditional on a variety of factors, and MDB still lack criteria to determine their alignment.

Figure 1. NDCs mentioned in MDB country strategies

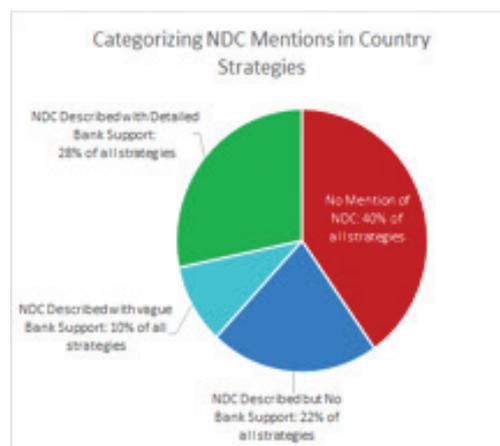


Figure 2. Tools for integration of climate aspects into portfolios

Practice	Examples
References to Paris Agreement alignment in guiding documents	<ul style="list-style-type: none"> • AfDB: Environmental and Social Framework: emissions reductions "in accordance with the aims of the Paris Agreement" • ADB: Climate Change Operational Framework: "ultimate intent to support this transition, in line with the Paris Agreement"
Portfolio-wide GHG accounting	<ul style="list-style-type: none"> • EIB: portfolio-wide accounting and reporting
Portfolio-wide GHG targets	<ul style="list-style-type: none"> • ADB: Peaking at the latest by 2030
Exclusion of non-aligned projects	<ul style="list-style-type: none"> • EBRD, EIB, IDB, WBG: restrictions on coal finance • WBG: exclusion of upstream oil and gas
Climate in environmental and social safeguards	<ul style="list-style-type: none"> • AfDB: Climate Safeguard System • WBG: Environmental and Social Framework
Internal carbon pricing	<ul style="list-style-type: none"> • EIB, EBRD, WBG, ADB

Next Steps of the Study

Draft study results will be made available to MDBs and other stakeholders shortly. The final report will be published at COP24.

3. MDBs and Resilience to Climate Change

Supporting climate resilience means investing in people's ability to cope with climate impacts, understanding any climate-related risks facing investments, and addressing such risks wherever possible. Most MDBs installed processes to alert teams to potential climate impacts on investments but several challenges in systematically integrating this information remain:

- Ensuring that screenings and assessments take place at the right time in the project cycle.
- Determining an acceptable level of risk.
- Paying for both in-depth climate vulnerability assessments and adjustments to projects.
- Ensuring that scarce adaptation resources are used for the greatest resilience impact.

Lessons learned

- NDC alignment could be enhanced by MDBs through additional technical assistance, stronger integration of NDCs in country strategies, extension of climate focus on wider set of instruments and stronger collaboration in the NDC Partnership.
- Investment criteria and tools to determine 1.5°C/2°C alignment of investments could be integrated in existing decision-making tools by MDBs.
- Internal MDB incentive structures should be oriented towards the implementation of the Paris Agreement to stimulate enhanced action.
- Portfolio transparency of MDBs should be enhanced through application of TCFD (Task Force on Climate-related Financial Disclosures) guidelines.
- MDBs could increase country support to identify adaptation opportunities and to reiteratively screen for and address climate risks in investments.

+ Additional References

One Planet Summit - Joint IDFC-MDB Statement - Together Major Development Finance Institutions Align Financial Flows with the Paris Agreement: <https://www.afdb.org/en/news-and-events/one-planet-summit-joint-idfc-mdb-statement-together-major-development-finance-institutions-align-financial-flows-with-the-paris-agreement-17685/>

World Bank Group Announcements at One Planet Summit: <http://www.worldbank.org/en/news/press-release/2017/12/12/world-bank-group-announcements-at-one-planet-summit>



Russian Federation

Ufa Eastern Exit Project

Summary

Russia is investing in sustainable infrastructure projects. The case describes the Ufa Eastern Exit Project (the Project), a transport corridor implemented through a public-private partnership (PPP) in the city of Ufa, which will increase the resilience of the economy. This country experience addresses the Role of the Multilateral Development Banks (MDBs) in the G20 Hamburg Climate and Energy Action Plan for Growth and responds to the specific action related to the MDBs supporting countries' climate-resilient development.

Background

Russia has made efforts on many fronts to strengthen its economic growth and increase productivity by improving infrastructure and connectivity with coordinated policy and private sector participation. Tackling Russia's urban transport challenge is therefore an important component of the country's development agenda. As part of the long-term target of increasing capital spending in key sectors, the federal government of Russia is committed to investing in high quality infrastructure projects and has set a target of doubling the length of renovated and built roads from the previous decade. In this context, the Ufa Eastern Exit Project is designed to help the city of Ufa to connect better and to address the issue of the widening gap between rising traffic volume and inadequate road infrastructure. The Project is in alignment with the New Development Bank's (NDB) objective to support sustainable infrastructure development in order to foster stronger economic growth in member countries. In accordance with the concept of resilient infrastructure for a changing climate, the primary challenge in developing countries and emerging economies is to build new infrastructure for the expansion of urban areas and the development of new cities, to provide access to energy for all, safe drinking water and connect people through transport links and telecoms. The goal of the project is to tackle this challenge by developing sustainable infrastructure - Ufa Eastern Exit that will be constructed with regard to sustainable development guidelines and will contribute to reducing traffic congestion and concentration of vehicles' emissions.

The objective of the Project is, through construction of a transport corridor at the east end of the Ufa city center, to promote the development of the city's industrial and residential districts and to reduce traffic congestion on the existing roads. The transport corridor will link the industrial centers in the north and west of the city to the residential suburbs in the east of the city. The Project will be supported through public-private partnership (PPP) and will be a model for future PPP projects in Russia.

The detailed components of the transport corridor includes a 1.2-kilometer road tunnel connecting to the Prospekt Salavat Yulaev on the west, a 2.5-kilometer bridge crossing the Ufa River, a 10.2-kilometer road connecting to the M-5 federal highway in the east, toll collection points, road maintenance facility, and automated system for traffic control. The successfully carried out PPP funding plan can constitute a blueprint for future sustainable infrastructure projects, thus serving as a best practice.

Environmental and Social Aspects

The Project contributes to balanced spatial development of the city of Ufa. Multiple residential and industrial districts are expected to develop in the gravity area of the transport corridor, and on the east of Ufa River. Traffic congestions will be reduced and transport connectivity will be improved. The Project is assigned as Category "B". The impacts on environmental and social aspects are site-specific and few of them are irreversible. The impacts include minimal deforestation, land acquisition, noise, and debris from construction. Mitigation measures have been made and will be implemented in accordance with Russia's country system.

Financial Aspects

The overall cost of the Project is estimated to be RUB 40.7 billion (USD 646.1 million) over a 4-year period. The proposed financing plan includes a loan of up to RUB 4.6 billion (USD 73 million) from NDB, capital grants of RUB 19.9 billion (USD 315.8 million) from the Government of Russian Federation,

Concessionaire's own funds of RUB 11.2 billion (USD 177.8 million), and a VAT refund of RUB 5.0 billion (USD 79.4 million).

Concessionaire will procure goods and services using private sector procurement processes according to the NDB procurement policy. The loan will be repayable in 12 structured semi-annual installments over 6 years.

Implementation

The Project is estimated to be implemented over 4 years. The Concessionaire has been selected on a basis of transparent, competitive, and fair bidding process in accordance with the national laws. The

Table 1. Funding Structure of the Ufa Eastern Exit Project

Financier	Amount (RUB billions)	Amount (USD millions)
New Development Bank	4.6	73
Government of Russian Federation	19.9	315.8
Concessionaire	11.2	177.8
VAT refund	5.0	79.4

Lessons learned

- The project provides an opportunity to streamline the PPP funding scheme for sustainable infrastructural projects.
- The project provides an opportunity to streamline the process of financing projects in Russia through the New Development Bank.

+ Additional References

Ufa Eastern Exit Project Description: <https://www.ndb.int/ufa-road-russia/>

Bashkortostan Government discussed with Turkish general contractor Eastern Exit from Ufa: https://pravitelstvorb.ru/en/press-office/news.php?ELEMENT_ID=18605



Australia

MRV Capacity Building in the Land Sector

Summary

Australia has significant expertise in measurement, reporting and verification (MRV) of land sector emissions and supports several countries advancing their land sector MRV. This country experience addresses the topic of Global Action and Transformation in Other Fora and Processes proposed in the G20 Hamburg Climate and Energy Action Plan for Growth, and responds to the specific action of supporting parties in implementing the Paris Agreement. Australia's work to reduce land sector emissions links directly to the UN Sustainable Development Goals (SDG), particularly Goal 13 (Climate Action) and Goal 15 (Life on Land).

Background

Australia has significant institutional and policy capacity in land sector management, and has developed technical expertise in MRV of land sector emissions through its National Greenhouse Gas (GHG) Inventory. Australia is successfully reducing emissions in its land sector through the Emissions Reduction Fund. The Fund is the centerpiece of the Australian Government's suite of emissions reduction policies. Land sector methods will account for 154 MtCO₂e (megatons of carbon dioxide equivalent) of emission reductions by 2030.



Photo 1. Eucalyptus trees, tea fields and indigenous forest. (Source: Patrick Shepherd/CIFOR.)

Australia has provided support of various kinds to countries implementing or improving their land sector MRV, including Indonesia, Kenya and South Africa. This support allows countries to accurately

track and report their emissions, opening the way for transparent carbon markets. Australia also plays a significant role in building capacity through the Global Forest Observations Initiative (GFOI), and the Asia-Pacific Rainforest Partnership, described below. Australia developed REDDcompass for the GFOI; an interactive online platform that provides the framework for the REDD+ capacity-building initiatives of all GFOI partners. These activities play an important role in the development of robust and credible carbon markets. They ensure access to low-cost abatement opportunities globally and build momentum for the transition to low-carbon economies. These factors will be vital to the success of the Paris Agreement and other multilateral emissions reduction initiatives.

International Capacity Building

Australia focuses on bolstering the institutional and technical capacity of countries in our region to support their domestic climate change activities and priorities. By sharing specialist expertise and supporting local efforts, we help countries develop their mitigation and adaptation policies, build systems to measure and report on emissions, and engage effectively in climate change negotiations.

- **Global Forest Observations Initiative:** The Australian Government is a founding member of the GFOI, which supports the design and implementation of robust national forest monitoring systems that help developing countries meet UNFCCC emissions reporting requirements, deliver on NDCs related to reducing emissions from forest-related activities, and achieve SDGs such as improved forest management and food security.
- **Asia-Pacific Rainforest Partnership:** This partnership promotes action and provides a platform to progress activities to reduce emissions from deforestation and forest degradation in the Asia-Pacific region. The Partnership works with governments, the private sector and civil society to support implementation of the Paris Agreement and REDD+ in the region.

Bilateral MRV Programs

- System for land-based emissions estimation in Kenya: Australia has provided AUD 12.7 million (USD 9.5m) to support the development and implementation of an MRV system for Kenya's land sector GHG accounting. The project has delivered a tailor-made, leading-edge carbon accounting system to the Government of Kenya. It helps Kenya quantify and report its land sector emissions to the UNFCCC, and evaluate different land-use scenarios for sustainable development.
- Indonesia land sector MRV support: Australia has funded AUD 11 million (USD 8.2m) for support that will allow Indonesia to improve and maintain its capacity for land sector MRV.
- South Africa land sector MRV capacity development: This AUD 875,000 (USD 673,000) project commenced in 2013 and has enhanced South Africa's ability to monitor and measure emissions from land use, which improves the country's ability to meet international reporting requirements and gain accreditation for climate finance. Australia shares its land sector (and other emissions) MRV expertise with other countries to help inform effective emission abatement policies, and implement Paris Agreement commitments.

Lessons learned

To deliver sustainable outcomes, programs building MRV capacity should:

- Be tailored to each country's priorities and domestic circumstances;
- Have realistic timeframes;
- Focus on in-country ownership and capacity, and;
- Go beyond technical guidance, supporting good governance, and improving industry buy-in and interdepartmental cooperation (for example, by developing processes for data access and sharing).

+ Additional References

Emissions Reduction Fund : <http://www.environment.gov.au/climate-change/government/emissions-reduction-fund>

Global Forest Observations Initiative: <http://www.gfoi.org/>

For more on GFOI partner initiatives, see: <https://www.reddcompass.org/mgd-material>

The Asia Pacific Rainforest Partnership: <https://www.asiapacificrainforestpartnership.org/>

The System for Land-based Emissions Estimation in Kenya (SLEEK): <http://www.sleek.environment.go.ke>



European Union and Other Members

Global Covenant of Mayors for Climate and Energy

Summary

The Global Covenant of Mayors for Climate and Energy (GCoM) is a global alliance of cities and local governments aimed at fighting climate change, reducing its unavoidable impacts and facilitating access to sustainable and affordable energy. This example describes progress made in the initiative in contributing to the implementation of the Paris Agreement.

Under the G20 Hamburg Climate and Energy Action Plan for Growth, this best practice is framed within the Global Action and Transformation in Other Fora and Processes topic. In this sense, it recalls the specific action of engaging cities and local governments in climate action and the registration of actions through the UNFCCC NAZCA Platform.

Background

Cities and local governments are essential for turning climate action pledges into concrete action, supporting the implementation of Nationally Determined Contributions to the Paris Agreement, national adaptation plans and other global goals, such as the Sustainable Development Goals.

The Global Covenant of Mayors for Climate and Energy is a global alliance of cities and local governments voluntarily committed to fighting climate change, reducing its unavoidable impacts and facilitating access to sustainable and affordable energy across the world. It is co-chaired by the UN Secretary-General's Special Envoy for Climate Action Michael R. Bloomberg and European Commission Vice President Maroš Šefčovič.

Under the GCoM's shared vision, Mayoral boards have been set up at global and European level to enable Mayors to steer the work. Regional or National Covenants are the backbone of the initiative, assisting cities and local governments in different regions across the world by adapting the common principles of the GCoM to meet local realities and build on existing initiatives. These efforts are supported by Regional Secretariats and a Global Secretariat.

Status of Implementation/Progress

By joining the GCoM, cities from around the world have made voluntary commitments to take significant

actions on climate change that are in line with, and in many cases more ambitious than, their respective national governments.

GCoM resulted from the June 2016 merger of the Covenant of Mayors and the Compact of Mayors. It is supported by the EU and Bloomberg Philanthropies. Other founding partners include global and regional city networks and UN Habitat. Since then, the GCoM has worked to consolidate commitments into one cohesive alliance. As of August 2018, more than 9,100 cities and towns across the world representing more than 780 million people have made a commitment to the Global Covenant, including the climate action plan of the City of Buenos Aires.

European cities have already achieved a reduction in greenhouse gas emissions of 23% compared to 1990 levels and had reduced average energy consumption per capita by 22% – significant contributions to the EU's 2020 climate and energy targets.

Global Covenant cities and local governments have already made commitments that, if fully realised, could collectively reduce 1.3 billion tons of CO₂e (carbon dioxide equivalent) emissions per year from business-as-usual by 2030. This is equivalent to taking off the road all cars in the United States for one year. Mobilising additional cities to join the alliance could significantly increase the overall global reduction of CO₂e.

Figure 1. Buenos Aires, One of the 9,149 Cities and Towns Committed to GCoM Worldwide (as of 31 Aug. 2018)



Total Investment

The EU is currently supporting the establishment and operation of Regional Covenant of Mayors Secretariats (between EUR 10-15 million per year overall). In addition, substantial financial resources are being allocated to implementing projects on the ground in cities, through regional development funds, development cooperation instruments and

also blending instruments with European and international financial institutions. Bloomberg Philanthropies is supporting the GCoM Global Secretariat.

Lessons learned

- A key lesson and priority for the GCoM is the need to embed actions by cities and local governments in Nationally Determined Contributions (NDCs) to the Paris Agreement and in national adaptation plans.
- In December 2017, the GCoM presented a One Planet Charter and a Call for Vertical Integration of Local Authorities in national climate investment plans, spearheaded by the Mayors of Quito, Buenos Aires, Medellin, Mexico City and Seville.
- In May 2018, the GCoM presented the Edmonton Declaration and launched the Innovate4Cities initiative to accelerate climate innovation and promote cities' needs in national research agendas.
- In September 2018, the GCoM presented a new Common Reporting Framework to facilitate robust climate action planning, implementation and monitoring phases, as well as streamline measurement and reporting procedures.

+ Additional References

Global Covenant of Mayors: www.globalcovenantofmayors.org

European Covenant of Mayors: www.covenantofmayors.eu



United Kingdom and Canada

Clean Growth and Climate Change Partnership

Summary

This example describes the UK and Canada's national experiences in jointly launching the Clean Growth and Climate Change Partnership, and responds to the Global Action and Transformation in Other Fora and Processes topic proposed in the G20 Hamburg Climate and Energy Action Plan for Growth.

Background

The Canada-UK Partnership on Clean Growth and Climate Change (the Partnership) was established by Prime Ministers May and Trudeau in September 2017 to advance low carbon innovation and clean renewable energy with support from government officials and representatives from the private sector (please see reference 1).

The Partnership is being taken forward in collaboration under seven different workstreams, namely:

- Mission Innovation - demonstrating the potential of Mission Innovation to achieve improvements in clean energy that will benefit our communities, environment and economy.
- Carbon Capture Utilization and Storage (CCUS) - improving the business case for CCUS, particularly to reduce its costs, in order to accelerate private sector investment and deployment.
- Clean Growth - working to establish permanent, practical link for joint projects to accelerate commercialization of low carbon opportunities between Canada and the UK.
- Green Finance - promoting knowledge sharing to help assess the potential of financial sector mechanisms to crowd in private finance to help scale up clean technologies.
- Carbon Pricing - promoting UK and Canadian experience where carbon pricing has facilitated the low carbon transition, by sharing best practices regarding the role of carbon pricing policy and programs in promoting public and private low-carbon investment.
- Powering Past Coal Alliance - establishing a voluntary international alliance in support of the transition from unabated coal fired power.

- Climate Adaptation and Greening Government - sharing best practice on adaptation planning, climate change risk assessments and resilience and measures to green government operations.

This experience highlights key progress made under the three most advanced of the seven workstreams included under the Partnership.

Mission Innovation

In support of the goals of Mission Innovation, in October 2018 the UK and Canada launched the Power Forward Challenge. Jointly funded with over £11 million (CAD 19 million, or approximately USD 14.5 million - please see reference 2) in total by the UK and Canada, the Challenge will bring together innovators from the UK and Canada to drive forward the development of clean, robust and flexible power grids and energy systems that anticipate and meet the needs of networks around the world, looking ahead to 2030 and beyond.

Carbon Capture Utilization and Storage (CCUS)

There is global recognition that CCUS will be critical in meeting the aims of the Paris Agreement and supporting clean growth. This workstream is seeking to accelerate the deployment of this technology. Through strong linkages under existing multilateral fora such as the Mission Innovation CCUS Innovation Challenge, the Carbon Sequestration Leadership Forum, and the Clean Energy Ministerial CCUS Initiative, the UK and Canada are working together to enhance collaboration on CCUS policy and technology. These efforts are aimed at: improving the business case for CCUS; catalyzing improvements in the performance and cost of carbon capture technologies; and finding ways to create revenue opportunities from carbon-based products.

Powering Past Coal Alliance

In support of the Partnership, at COP23, the UK and Canada launched the Powering Past Coal Alliance (the Alliance) bringing together governments, businesses, and organizations to accelerate clean

growth and climate protection. Since its launch, the Alliance has grown to include 28 countries, 19 subnational governments and 28 businesses and organisations. By signing the Alliance Declaration (please see reference 3) each member makes a voluntary commitment to support the phase-out

of unabated coal fired electricity from the power sector within a timeframe compatible with the Paris Agreement. As a voluntary Alliance, we hope that members will work together constructively to decrease the global dependence on unabated coal.

Lessons learned

- The development of a broad Partnership on Clean Growth and Climate Change has enabled the UK and Canada to share best practice and learning both bilaterally and with other international partners.
- The Partnership has enabled progress to be made internationally on several areas critical to accelerating the low carbon transition in the spirit of the Paris Agreement.
- The Powering Past Coal Alliance has provided a clear set of voluntary actions for governments and businesses looking to transition away from unabated coal and its growing membership is an indication of the rapid transformation of energy systems across the world.

+ Additional References

Reference 1 - Prime Minister of Canada Announces Closer Collaboration with the United Kingdom: <https://pm.gc.ca/eng/news/2017/09/18/prime-minister-canada-announces-closer-collaboration-united-kingdom>

Reference 2 - October 2018 monthly exchange rates (GBP to other currencies): https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/743999/exrates-monthly-1018.csv/preview

Reference 3 - Powering Past Coal Declaration: <https://www.gov.uk/government/publications/powering-past-coal-alliance-declaration>

