

Coverage of SLCPs in Nationally Determined Contributions (NDCs)

Introduction

This is an informal and narrative analysis prepared by the CCAC Secretariat in collaboration with the Institute for Sustainable Governance (IGSD) to illustrate how 31 countries have integrated and accounted for short-lived climate pollutants (SLCPs) and air-pollution as part of their Nationally Determined Contributions (NDCs) and Mid-Century Strategies submitted to the United Nations Framework Convention on Climate Change (UNFCCC). It also summarizes how countries have pledged specific actions relevant to the reduction of SLCPs. While not all countries chose to list specific actions in their NDCs, many listed actions relevant to SLCPs, including sixty-six specifically targeting methane from the waste sector. This analysis updates an earlier version that was first published in March 2016.

March 2017 Update Summary – What’s new

As of 27 March 2017, 192 countries have submitted INDCs to the UNFCCC, up from 189 in March 2016. In addition, 140 countries have ratified the Paris Agreement and 134 have submitted their first NDCs. In addition to the three countries new INDCs, 11 countries also used the ratification of the Paris Agreement to make changes to their previously submitted INDCs. Many of the amended NDCs include new emissions pledges, such as Guyana which addressed methane emissions for the first time, or new activities which address SLCPs. However, in a few select instances the new NDCs also omit SLCP-relevant activities or language which had been in the original INDCs.

The new numbers for coverage of SLCPs in the I/NDCs are as follows:

- **Methane** – 177 (92.1% of the total) NDCs target methane; 100% of CCAC countries target methane;
- **HFCs** – 99 (51.8% of the total) NDCs target methane; 62.7% of CCAC countries target HFCs;
- **Black Carbon** – 3 (1.6% of the total) NDCs target black carbon; all three NDC are from CCAC countries (Mexico, Chile, Nigeria); and,
- **31 NDCs** (up from 29) specifically mention SLCPs or air pollution as a consideration or driver for action.

In general, the new INDCs and NDCs show a trend towards increasing levels of detail and analysis of mitigation options and co-benefits over previous versions. For example, DPR Korea, Guyana, and Rwanda all address reduced air pollution as an important co-benefit of mitigation activities. A majority of the new submissions include new activities, however in a few instances activities relevant to SLCPs that had been in previous versions were omitted in the new submissions. For example, the Bahamas and Belize both omitted measures to improve energy efficiency in appliances and cooling systems which had been included in their first submissions.

Despite these positive trends, there is still significant opportunity to continue to communicate the importance of addressing all SLCPs in NDCs as well as highlight how SLCPs are being addressed but not recognized in existing pledges. For example, 36 countries included improved cookstove measures in their pledges, but only 10 (28%) of those address air quality as a co-benefit of their mitigation actions. An updated list of SLCP-relevant activities can be found in Annex 1 below.

This analysis also shows that there is significant interest among countries outside of the CCAC to address emissions of SLCPs which could help grow the Coalition or help guide outreach from the Initiatives. For example, Indonesia’s new NDCs includes a list of mitigation activities, many of which overlap with existing CCAC activities in municipal solid waste and agriculture. Indonesia also includes a measure to capture methane from residential and industrial wastewater, which is one of the original 16 SLCPs measures identified in the 2011 UNEP/WMO Assessment.

Summary of New or Amended I/NDC Pledges Since March 2016

- **Argentina** submitted a new NDC in November 2016 which converts its original 2015 pledge of a 30% reduction of CO₂eq emissions compared to BAU by 2025, into a maximum annual CO₂e emissions pledge of 369 million tonnes by 2030. Under a BAU scenario, Argentina is expected to reach annual CO₂eq emissions of 593 MMT by 2030, but will achieve a reduction of 109 MMT CO₂eq through unconditional measures, and an additional 114 MMT CO₂eq through conditional measures. According to Argentina's analysis, this new target reduces new emissions by 87 MMT more than the 2015 pledge by 1) correcting an overestimation of agricultural emissions (79 MMT) and revising and strengthening their unconditional pledges (8 MMT). As with its 2015 INDC, Argentina pledges to reduce emissions of CO₂, methane, N₂O, HFCs, PFCs, and SF₆ from the energy, industrial, transport, agriculture, forestry and waste sectors.
- The **Bahamas** submitted its NDC in October 2016 which retained the original mitigation pledge of a 30% reduction compared to BAU by 2030. The original INDC focused on CO₂, methane, and N₂O from the energy and forestry sectors, but the new NDC pledge covers the all economic sectors and all GHGs. However, the new NDC does not include a discussion of measures to improve building energy efficiency including cooling systems, which was part of the original INDCs.
- **Belize's** new NDC expands the list of covered emissions to include methane from the waste sector in addition to CO₂ emissions from energy, forests and transport sectors. The NDC also now includes the methane and air quality co-benefits of their National Solid Waste Management Strategy and Plan. Finally, the NDC adds a new activity for cookstoves, but omits an activity on appliance and building energy efficiency which was in the original INDC.
- The **DPR Korea** NDC addresses all Kyoto greenhouse gases, including methane and HFCs, and specifically mentions the connection between air pollution and climate change. The DPR Korea also includes specific projects relevant to the HFC, Bricks, Waste, Cookstoves, and Agricultural Initiatives.
- **Guyana's** new NDC focuses only on CO₂ emissions from energy and forestry sectors, but recognizes that the agricultural sector is a source of methane and N₂O emissions. However, Guyana considers the climate-driven threats to agriculture so severe that they address the sector exclusively as an adaptation issue. The NDC includes a new measure to increase the use of bio-digesters among farmers to provide clean household cooking, which will address emissions of methane and BC.
- **Indonesia** updated its NDC by including a new annex which lists specific mitigation activities. The list of new activities includes: 1) municipal solid waste; 2) manure management for biogas and feed supplement for cattle; 3) wastewater treatment for domestic and industrial waste.
- **Morocco** submitted a new NDC which increased its total pledged reductions from 32% to 42% below BAU by 2030 (17% unconditional). Morocco's conditional mitigation scenario is based on implementation of 54 mitigation actions, which are not enumerated in the report. As with the INDC, Morocco's NDC also notes that they will develop an SLCP national plan, with the support of the CCAC, including SLCP inventories.
- **Nepal** in its new NDC increased pledged mitigation actions from 10 to 14 focused on reducing emissions from the transport sector, increasing renewable energy deployment, and reducing deforestation.
- **New Zealand's** new NDC retains the same pledges and coverage of emissions and sectors but omits the mention of New Zealand's membership in the CCAC which was included in the INDC.
- **Pakistan** submitted its first INDC in 2015, but submitted an updated version in 2016. Pakistan's new NDC, like the previous version, does not specifically target any climate forcing emissions, but does now include a conditional mitigation pledge of 20% below BAU CO₂eq emissions by 2030. Pakistan's new NDC also specifically targets emissions from a number of SLCP-relevant sectors including: Energy; Industrial Processes; Agriculture; and, Waste. Finally, the NDC also includes specific projects relevant to the HFC and Agriculture Initiatives.
- **Panama's** NDC focuses specifically on CO₂ mitigation, primarily through deployment of renewable energy and protecting and increasing forest and carbon sinks. It makes no reference to SLCPs, air pollution, co-benefits, or any climate forcers other than CO₂.
- **Rwanda** submitted its NDC with new expanded descriptions of its pledged mitigation and adaptation activities. The NDC included a new action on vehicle emissions standards relevant to the Diesel Initiative and a new

improved cookstove activity. The cookstove activity notes improved indoor air quality and quality of life as co-benefits.

- **Sri Lanka** submitted its first INDC in Oct 2015, a new version in April 2016, and the new NDC in September 16. Sri Lanka's new NDC sets new separate conditional and unconditional mitigation pledges for the energy sector and combined pledges for the transport, industry, waste and LULUCF sectors. Sri Lanka's new NDC, like its previous INDC, focuses on mitigating emissions of CO₂, methane, and N₂O. Sri Lanka's new NDC includes specific projects relevant to the Diesel Initiative and the Waste Initiative. Sri Lanka's updated INDC included specific actions for improving appliance energy efficiency, but were removed in the NDC and replaced with a more general action of "introduction of Demand Side Management (DSM) activities."
- **Timor-Leste** submitted its first INDC in March 2017, pledging to address emissions of CO₂, methane, and N₂O from the energy, waste, agriculture, and forestry sectors. The INDC includes specific measures relevant to the Cookstove, Municipal Solid Waste, HFC, and Agriculture Initiatives.

Summary of NDCs that specifically include SLCPs & air pollution

While nearly every country that has submitted an NDC is addressing SLCPs directly or indirectly in their pledged contributions and actions, a few specifically mention SLCPs or air pollution as a consideration or driver for action. **31 countries** have specifically mentioned SLCPs, air pollution, or relevant mitigation co-benefits in their NDC submissions: Bahrain; Bangladesh; Belize; Benin; Cameroon; Canada, Central African Republic; Chile; Cote d'Ivoire; Democratic People's Republic of Korea, El Salvador; Ethiopia; Ghana; India; Lichtenstein; Jordan; Mauritius; Mexico; Mongolia; Morocco; Myanmar; Nigeria; Nepal, Qatar; Rwanda; Saint Lucia; Saudi Arabia; Senegal; Trinidad and Tobago; Togo; United Arab Emirates (UAE); and Zambia.

The NDCs of **Mexico, Chile, and Nigeria** each include separate specific sections on SLCPs and also specifically discuss black carbon mitigation.

- In its NDC, **Mexico** states that "*actions to abate SLCPs simultaneously contribute to climate change mitigation in the near term and to the immediate improvement of air quality, as well as to generate positive impacts on human health and ecosystems conservation.*"ⁱ Mexico is also the only country to specifically pledge conditional and unconditional emissions reductions targets for black carbon. Pledging an unconditional 51% reduction in black carbon emissions by 2030, compared business as usual, increasing up to 70% with additional support and technology transfer.ⁱⁱ
- **Chile** recognized that reducing SLCPs can provide a "*substantial contribution to the mitigation of the causes of Climate Change,*" while also providing co-benefits such as "*reducing the levels of local atmospheric pollution in urban centers.*"ⁱⁱⁱ Noting the important contribution of black carbon to PM_{2.5} air pollution, the Chilean Government is contemplating implementation of atmospheric decontamination plans for fine particulate matter as part of its 2014-2018 Atmospheric Decontamination Strategy.^{iv}
- **Nigeria** specifically highlighted the importance of reducing emissions of SLCPs for improved air quality and public health calling poor air quality the "bane of urban residents and a health threat."^v Nigeria identified a number of specific actions for reducing black carbon and methane from cars, trucks, small generators, industry, gas flaring, and oil and gas sector. Nigeria also highlighted the importance of preventing 'dumping of HCFC and HFCs' as they phased out or otherwise controlled by OECD countries.

Cameroon, Central African Republic, Côte d'Ivoire, Mauritius, Morocco, and Nepal also specifically noted the importance of SLCPs or described plans to address SLCPs in their NDCs.

- **Côte d'Ivoire** states that it is reducing short-lived climate pollutants, in addition to long-lived greenhouse gases, and will develop a national action plan to address SLCPs by 2018.^{vi}
- The **Central African Republic** lists SLCP measures as a conditional activity within its NDC, stating that "*The Central African Republic's INDC is a development policy with low carbon emissions and low emissions of short-lived climate pollutants.*"^{vii} anada
- **Cameroon** notes that reducing short-lived pollutants is a co-benefit of its energy-waste strategy.^{viii}
- **Mauritius** is unique, having listed in the scope of gases covered in its NDC only "*CO₂ and short-lived climate forcers (SLCFs)*"^{ix}

- **Morocco** pledges to develop a national plan to “*combat short-lived climate pollutants with support from the Climate and Clean Air Coalition.*”^x
- **Nepal** pledged to “*strive to decrease the rate of air pollution through proper monitoring of sources of air pollutants like wastes, old and unmaintained vehicles, and industries.*”^{xi}

Bangladesh, Belize, Democratic People’s Republic of Korea, El Salvador, Ghana, Jordan, Mongolia, Myanmar, Rwanda, Senegal, Saint Lucia, Trinidad and Tobago, Togo, and Zambia all list specific mitigation actions within their NDCs and include the co-benefits of reduced air pollution and improved public health.

- **Bangladesh** used co-benefits, such as improved air quality, as criteria for selecting the actions included in their NDC.^{xii}
- **Belize’s** new NDC includes reduced air pollution as a co-benefit of its National Solid Waste Management Strategy and Plan.^{xiii}
- **DPR Korea** notes that its recent climate mitigation activities “*resulted in the advances towards the protection of air pollution and climate change.*”^{xiv}
- **El Salvador** will require that actions to address emissions report on the co-benefits for adaptation and vice-versa and notes specifically that low-carbon urban development will reduce the incidence of diseases associated with pollution.^{xv}
- **Ethiopia’s** NDC discusses a number of co-benefits from its pledged emission reduction initiatives including: improved public health through better air and water quality, food security; economic growth, and green jobs.^{xvi}
- **Ghana** describes that health and indoor air pollution benefits of their proposed cookstove projects.^{xvii}
- **Senegal** notes that “*Measures to reduce CO₂ emissions in the areas of power generation, biomass and waste are likely to provide the following benefits: Reduction of local air pollution and thus lower adverse effects on health; Use of modern forms of energy in homes thus reducing the workload of women and helping to improve school performance of children.*”^{xviii}
- As one of the concrete actions in its NDC, **Jordan** pledged to develop and share “*real-time air quality monitoring data to establish the link between respiratory diseases and air pollution and climate change.*”^{xix}
- **Mongolia** notes that reducing air pollution is a co-benefit of its pledged action to improve household stove fuel efficiency.^{xx}
- One of **Myanmar’s** specific mitigation strategies includes “*reduc[ing] the increasing rate of GHG emissions and air pollution caused by the transport sector, especially from road transport.*”^{xxi}
- **Rwanda’s** new NDC includes improved air quality and quality of life as an adaptation co-benefit of activities to promote environmentally sustainable use of biomass fuels including through the deployment of improved cookstoves.
- **Saint Lucia** states that its pledged mitigation actions will provide benefits to human health and are consistent with its medium-term development vision.^{xxii}
- **Trinidad and Tobago** notes that National Climate Change Policy will reduce carbon emissions while also providing significant additional co-benefits such as improved air quality and associated public health costs.^{xxiii}
- **Togo** pledges to take actions that “*bring out the best co-benefits opportunities for reducing GHG emissions that result from synergies between adaptation and mitigation.*”^{xxiv}
- **Zambia** includes an analysis of co-benefits for all of their pledged contributions which include improving air quality and public health for many actions.^{xxv}

Bahrain, Qatar, Saudi Arabia, and the United Arab Emirates also discuss co-benefits of action, but instead of describing the co-benefits of mitigation, these countries make an important distinction by defining climate mitigation as a co-benefit of other strategic goals such as economic diversification.

- **Bahrain** pledged to diversify its economy by reducing its dependence on the oil and gas sector, which will produce “co-benefits in the form of emission reductions” as well as minimizing pollution.^{xxvi}
- **Qatar** also pledged to work towards economic diversification, including away from hydrocarbons, and noted that it has been “*contributing indirectly to the global efforts to mitigate climate change by exporting Liquefied Natural Gas as a clean energy.*”^{xxvii}

- **Saudi Arabia** pledged to act to achieve goals of economic diversification and adaptation which will result in the co-benefit of avoiding 130 MtCO₂eq annually by 2030.^{xxviii}
- The **UAE** also pledged to pursue a strategy of economic diversification which will provide co-benefits for both climate mitigation and adaptation. The UAE also stated that is working to improve air quality measuring and reporting, noting the impact of air pollution on human health.^{xxix}

Benin and **India** specifically note the importance of addressing and/or monitoring air pollution within their NDCs.

- **Benin** included a *National Struggle Against Air Pollution Strategy* within its INCD pledge, which focuses primarily on reducing emissions from the transport sector.^{xxx}
- Within its current mitigation strategies, **India** lists the *National Air Quality Index*, launched in 2014, which is “based on six pollutants and is notified every day serving as public information tool to disseminate information on air quality in qualitative terms.”^{xxxi} The *Continuous Emission Monitoring System* (CEMS) is another Indian program on pollution emissions which “mandates the highly polluting industries to install 24X7 real time monitoring of emission and effluent discharge points.”^{xxxii}

Finally, **Lichtenstein**

- **Lichtenstein** was unique among the submitted NDCs, not because it included SLCPs or air pollution activities, but because of its methodology for prioritizing emission reduction projects to provide co-benefits beyond reducing GHG emissions.^{xxxiii}

Annex 1: Specific SLCP & CCAC actions in NDCs

In addition to the countries listed above many more countries included projects and activities in their NDC submissions that are directly relevant to the work of the CCAC and SLCP reductions. The following sections are clippings from submitted NDC pledges that are relevant to specific CCAC Initiatives. These clippings could represent potential opportunities for action and future outreach for the CCAC and its Partners, for additional avenues of action (e.g. coalmine methane), opportunities to highlight the work of the Partnership, and possibly may include opportunities for measuring and demonstrating the impacts of the Coalition.

Initiative or Measure	Number of NDCs
Diesel Initiative	25
Oil & Gas Initiative	18
Waste Initiative	67
Bricks Initiative	4
HFC Initiative	27
Cookstove Initiative	36
Agriculture Initiative	34
Urban Health Initiative	1
Coalmine Methane	2
Kerosene Lighting	1
Wastewater Methane	1

These clippings should not be considered an exhaustive list of the specific SLCP-relevant actions that countries plan to undertake, as many countries do not fully list all potential domestic activities. The clippings also do not include many of the additional details about specific activities including e.g. estimated mitigation potential, estimated costs, and national policy instruments for implementation. Anyone interested in a specific clipping can find more details in the appropriate NDC, all of which can be downloaded and read at the UNFCCC's interim NDC registry website here: <http://www4.unfccc.int/ndcregistry/Pages/All.aspx>.

Diesel Initiative

1	Algeria	National Program for Renewable Energy and Energy Efficiency - This ambitious program aims to reduce 9% of overall energy consumption by 2030 and aims to make the thermal insulation of a major housing program; and the conversion to LPG one million cars and buses of more than 20,000.
2	Bangladesh	Possible mitigation actions to deliver the conditional contribution Modal shift from road to rail, delivered through a range of measures, including underground metro systems and bus rapid transit systems in urban areas. Co-benefits will include reduced congestion, improved air quality and improved traffic safety. To achieve a shift in passenger traffic from road to rail of up to around 20% by 2030 compared to the business as usual.
3	Barbados	GOB is investing in alternative vehicles and fuels such as compressed natural gas, liquid petroleum gas, ethanol, natural gas, hybrid and electric and encouraging their adoption through tax incentives.
4	Belize	Development of a domestic transportation policy and implement the National Transportation Master Plan. Aim is to achieve at least a 20% reduction in conventional transportation fuel use by 2030 and promote energy efficiency in the transport sector through appropriate policies and investments.
5	Benin	National Struggle Against Air Pollution Strategy Develop transport intra- urban and inter- urban transit; Establish differential taxation for older used vehicles exceeding five (05) years; Introduce duty relief of taxes on public transport vehicles; Continue promoting 4T four times at the expense of mopeds mopeds 2T (the tax and customs exemption on 4T motorcycles and parts thereof); Improve traffic flow transportation in major cities ; Pursue fight against the proliferation of the sale of adulterated gasoline.
6	Bhutan	Promotion of low carbon transport system by: Improving mass transit and demand side management of personal modes of Transport Exploring alternative modes of transport to road transport such as rail, water and gravity ropeways Improving efficiency in freight transport Promoting non-motorized transport and non-fossil fuel powered transport such as electric and fuel cell vehicles Improving efficiency and emissions from existing vehicles through standards and capacity building Promoting use of appropriate intelligent transport systems
7	Brazil	Actions: In the transportation sector, further promote efficiency measures, and improve infrastructure for transport and public transportation in urban areas.
8	Burkina Faso	Conditional Actions: Alternative hydrocarbon biofuels: bioethanol production units (substitute 10% of the super consumption in 2030) Alternative hydrocarbon biofuels: biodiesel production units (substitute 5% of diesel consumption in 2030)

9	Canada	The Government of Canada has put in place progressively more stringent greenhouse gas emission standards for passenger automobiles and light trucks as well as regulations for heavy-duty vehicles. As a result of these regulations, greenhouse gas emissions from new passenger vehicles, light trucks and heavy-duty vehicles are steadily declining. For example, 2025 model year passenger vehicles and light trucks will emit about half as many greenhouse gases as 2008 models.
10	China	Unconditional Actions: To develop a green and low-carbon transportation system, optimizing means of transportation, properly allocating public transport resources in cities, giving priority to the development of public transportation and encouraging the development and use of low-carbon and environment-friendly means of transport, such as new energy vehicle and vessel; To improve the quality of gasoline and to promote new types of alternative fuels; To promote the share of public transport in motorized travel in big-and-medium-sized cities reaching 30% by 2020; To promote the development of dedicated transport system for pedestrians and bicycles in cities and to advocate green travel; and To accelerate the development of smart transport and green freight transport.
11	Costa Rica	Public Transportation needs to improve its fleet composition as well as its working design. This can be accomplished through an Integrated Public Transportation system where routes are improved, train service strengthened, and availability of non-motorized transportation enhanced, etc. Costa Rica has made the intercity electric train a priority, which will provide a significant contribution to the country's emission mitigation goals, creating new employment and low emissions mobility. It is necessary to improve the freight sector through multi-modal options. This will require an ambitious investment portfolio in sustainable transportation over the coming decades.
12	El Salvador	3.7.3. El Salvador will submit before COP 22 regulations to improve the quality of diesel fuel in the country served, to be implemented from 2018. 3.7.4. El Salvador during the period 2018-2025, will promote clean mobility in the metropolitan area of San Salvador, gradually incorporating cleaner engines and momentum of a development strategy of cycle routes, including the awareness of the population
13	Gambia	Conditional actions: Reduce fuel consumption through efficiency standards
14	Grenada	The transport sector (land and marine) contributed an average 39% of Grenada's greenhouse gas emissions in the 2010 to 2014 period. Grenada plans to reduce its emissions in the transport sector by 20% by 2025. In order to meet its commitment Grenada plans to undertake several policies/actions including introduction of biofuel blends (specifically liquefied natural gas and diesel blend), implementation of gasoline and diesel taxes and implementation of fuel efficiency standards for vehicles through incentives.
15	Liberia	Actions: 5. Blend up to 5% of palm oil biodiesel with both gasoline and diesel by 2030 for vehicles.
16	Myanmar	To reduce the increasing rate of GHG emissions and air pollution caused by the transport sector, especially from road transport. Policies such as the National

		Transport Master Plan and National Implementation Plan on Environmental Improvement in the Transport Sector are being developed. Cities, like Yangon, are studying options for sustainable transport development for example, and CSOs are engaged in proposing solutions to challenges for implementation.
17	Qatar	Qatar continues to improve the emission standards for new motor vehicles, in accordance with regional and global emission standards.
18	Rwanda	4.1 Bus Promotion of public transport, improvement of transport infrastructure, setting vehicles' emission standards and regulations and integrated national transportation planning *** Setting emission standards (equivalent to Euro standards)
19	South Sudan	17. Transport Sector: i. Establish emissions standards for vehicles ii. Establish exhaust testing centers and cars that fail the tests by emitting fumes above allowable emissions levels will be subjected to mandatory repairs or scrapped. iii. Consider measures to restrict importation of vehicles that do not adhere to allowable emissions levels.
20	Sri Lanka	2. Upgrade of Fuel Quality Standards (FQS) to reduce harmful emissions that cause environmental pollution and health hazards. 2.1 Introduce 95 octane petrol.
21	Togo	In terms of road transport, the planned actions designed to reduce 20% of fossil fuel consumption in Togo during the period under review to through the improvement of the road network, the promotion of public transport, limiting age means of Imported Vehicles (5-7 years) and means of promoting active transportation (bicycles, feet to walk, bike paths development). Cost: USD 460 million.
22	Turkey	Unconditional Actions: Scraping of old vehicles from traffic Implementing green port and green airport projects to ensure energy efficiency Implementing special consumption tax exemptions for maritime transport
23	Uruguay	Actions: Enhancement of the vehicle fleet through higher power efficiency standards and lower emissions.
24	Vietnam	Encourage buses and taxis to use compressed natural gas and liquefied petroleum gas (LPG); implement management solutions for fuel quality, emissions standards, and vehicle maintenance;
25	Zambia	Program involves implementing - Fuel switch (diesel/HFO to biodiesel) - Fuel switch (coal to biomass) - Switch from existing isolated diesel to mini-hydro

Oil & Gas Initiative

1	Algeria	The government's action plan aims to reduce gas flaring to 1% of BAU by 2030.
2	Azerbaijan	Actions in the oil and gas sector

		<p>Application of new and modern environmental-friendly technologies in the oil and gas processing, production of fuel in line with EURO-5 standards in a new refinery complex by 2019 and strengthening the capacity of the staff;</p> <p>Modernization of gas pipelines, gas distribution system and other measures to decrease losses up to 1% by 2020 and ensure the volume of reduction in compliance with international standards by 2050;</p> <p>Based on adopted strategy, accumulation of gases emitted to the atmosphere during oil-gas production, prevention of gas leakages during oil-gas processing and at distribution networks.</p>
3	Bahrain	Bahrain Petroleum Company (BAPCO) Energy Conservation Policy promotes the efficient use of natural resources, focusing on four key improvement areas: the improvement of heater efficiency; maximize condensate recovery; reduce mass loss; reactivate on-line energy intensity index.
4	Brunei	Other mitigation measures - Studies are being undertaken to identify measures to reduce flaring and venting during gas extraction, which in turn will reduce emissions of methane and carbon dioxide. Gas flaring and venting also wastes valuable energy resources that could be used to support economic growth.
5	Canada	Canada intends to develop regulations to address methane emissions from the oil and gas sector, as well as greenhouse gas emissions from natural gas fired electricity, chemicals and nitrogen fertilizers through our responsible sector-by-sector regulatory approach that ensures Canada's economic competitiveness is protected
6	China	To enhance the recovery and utilization of vent gas and oilfield-associated gas
7	Congo	Representing 23% of the direct emissions in 2000, emissions from gas flaring associated with oil production were the subject of several measures, framing of Congo with the participation this year at the initiative "Zero Flaring Routine of 2030 ". The gas flared is not valued part in two new gas plants Djéno (50MW) and Maltève Coast (300MW). This policy, already in force, is reflected in the trend scenario.
8	Gabon	Representing 23% of the direct emissions in 2000, emissions from flaring associated gas in oil production have been the subject of several measures. These measures are, among others, in 2007 joining the initiative "Global Gas Flaring Reduction" (GGFR) of the World Bank, the promulgation in 2014 of Act No. 011/2014 concerning regulation of the oil sector in the Gabonese Republic prohibiting continuous flaring in Gabon and this framing with Gabon's participation this year at the initiative "Zero flaring Routine 2030" launched by the GGFR.
9	Iran	E. Financial and Technological Needs - Due to the significant share of energy sector in emissions (more than 90%) and consequently the high potential of this sector in emissions mitigation, its major technological requirements are as follows: Technologies needed to curb and utilize gas flares; Reducing natural gas leakage in the distribution networks;
10	Iraq	<p>Unconditional – Work on investing in gas associated with the currently flared crude oil production and reduce dependency on heavy fuel used for the purposes of generating electricity as well as other uses such as transportation and industry</p> <p>Conditional - Improving standards of oil production in order to be in accordance with the latest international standards through the establishment of a sophisticated refineries and the rehabilitation and upgrade existing oil refineries - The use of liquefied petroleum gas as fuel for vehicles to reduce dependency on gasoline in the</p>

		country - Work on investing in gas associated with the production of crude oil in the national fields
11	Israel	Measures to increase the use of natural gas. The recent discovery of additional natural gas reserves off the coast of Israel has and will continue to contribute to a partial switch from coal to natural gas in Israel's fuel mix and which contributed to GHG emissions reduction between 2012 and 2015. The government is now working on the further development of gas fields, expected to have significant mitigation potential;
12	Nigeria	
13	Oman	Type of mitigation contributions: Reduction in Gas flaring from oil industries;
14	Papua New Guinea	Oil and Gas sector: This sector is a generator of jobs and national economic growth and consequently considerable capital is being spent on developing this sector. Unfortunately the sector is responsible for considerable emissions and if the world does mitigate climate change seriously the production situation may change dramatically and the capital expended in the sector may become a stranded asset. While this change is unlikely to happen before 2030, if the world does follow mitigation strategies that reduce all fossil fuel use to zero, as required by IPCC AR5 RCP 2.6, there will of course be no market for hydrocarbons after 2050.
15	Saudi Arabia	5. Methane recovery and flare minimization: Actions will be taken to conserve, recover and reuse hydrocarbon resources and minimize flaring and fugitive emissions.
16	UAE	The UAE's oil companies are among the most efficient globally. The UAE's national oil company was the first in the region to promote the reduction of gas flaring, in order to reduce greenhouse gas emissions. In energy intensive industries, overall performance indicators will be improved through carbon abatement measures and increased resource efficiency.
17	US	Under the Clean Air Act, the United States Environmental Protection Agency is developing standards to address methane emissions from landfills and the oil and gas sector.
18	Venezuela	The industry is currently developing a number of projects to minimize or use of gas flared and / or vented by PDVSA in its exploration and production; this implies the adequacy of operations and facilities in terms of infrastructure and facilities for the use of natural gas. It is estimated that over a period of two years is no longer released into the atmosphere, by the use of natural gas, a cumulative total of 516 kton CO ₂ eq. For the period 2016-2019 it is planned to culminate future projects, and it is estimated that through the implementation of these projects fail to deliver to the atmosphere the amount of 538.2 kton CO ₂ eq / year.

Waste Initiative

1	Afghanistan	Mitigation Sectors: Waste Management (solid waste management and wastewater recycling/composing of biodegradable waste instead of landfill, and methane recovery from landfill)
2	Algeria	In terms of methane reduction, Algeria intends to give priority to the management of household solid waste. It aims to achieve, by 2030, full coverage of its territory for the collection of waste and causing a considerable reduction in CO ₂ emission equivalent amounts.

		Key actions in the waste sector: Waste recovery; Composting of organic waste and green waste; Recovery and energy recovery of methane from landfill centers and sewage treatment plants.
3	Antigua & Barbuda	Conditional Mitigation Targets - By 2020, finalize the technical studies with the intention to construct and operationalize a waste to energy (WTE) plant by 2025.
4	Armenia	4) The main sectors included in the mitigation contribution are: e. Waste management; (solid waste, waste water, agricultural waste),
5	Azerbaijan	Waste sector - Develop modern solid waste management system at big cities of the country.
6	Bangladesh	Existing mitigation actions - composting of organic waste and waste biomass-based thermal energy generation Increase composting of organic waste (50% of the managed waste fraction is diverted from landfill to composting) Promote landfill gas capture and power generation (70% of landfill gas captured and used for electricity generation)
7	Bhutan	Minimize GHG emission through application of zero waste concept and sustainable waste management practices: Enhancement of the three R principles including the conversion of waste to resources Improving the current system and infrastructure for waste management
8	Barbados	Aside from the energy sector, emissions from waste represent the other main contributor to national GHG emissions (16% in 2008). Projects to divert waste from landfill and to develop waste-to-energy plants are underway to deliver savings in this sector.
9	Belize	Implementation of the Solid Waste Management strategy and plan. Its overall goal is to assist the Government of Belize (GoB) in promoting sustainable development by ensuring that “The system for managing solid wastes in Belize is financially and environmentally sustainable, and contributes to improved quality of life”. It will focus on preventing, re-using, recycling or recovering waste wherever feasible and beneficial and disposing of waste safely only as a last resort. The plan also aims to reduce methane emissions by capping and closing open dumps, capturing and utilizing landfill gas, and ensuring proper waste handling and organics management.
10	Benin	National sanitation strategy of wastewater in urban areas Develop sanitation master plans; Develop urban sanitation. Waste Collection Actions Promote waste management focused on increasing upgrading capacity for biodegradable and non-biodegradable industry; Optimize waste collection systems; Develop a decentralized management system of waste by sector nationally. Provide municipalities of Benin from landfills ; To limit the negative impacts of solid waste on the environment in municipality; Improve the technical capabilities and management of pre-collection NGOs;

		Increase the rate of pre-collection and collection in municipalities (currently ranging from 2-30 % in some municipalities around 60 % by 2030)
11	Brunei	Utilizing the 10-15 MW potential of waste to energy resources that have already been identified in the Energy White Paper.
12	Burkina Faso	Conditional actions: Methane recovery from waste water of the city's purification station Ouagadougou Methane Recovery from Solid Waste Landfill Technology Centre of the city of Ouagadougou
13	Cabo Verde	Seek to provide proper waste management coverage (with waste segregation, recycling, and treatment in sanitary landfills) for at least 50% of the more vulnerable municipalities by 2030, including: implementing educational programs for the separation of basic waste types by households and waste producers; planning and building 5 waste collection and recycling facilities and/or general drop off points by 2025; planning and building at least 1 landfill equipped with gas-to-energy systems by 2025; and developing stand-alone bio-energy solutions. Seek to promote the use of the resulting sludge from the wastewater treatment process for the production of clean energy; Seek to further develop and implement the Waste Roadmap for Cabo Verde, as well regulate and implement the new General Solid Waste Law; Seek to further develop and implement the water and sanitation master plans ("Planos Diretores de Água e Saneamento - PDAS"), as well as regulate and implement the new Water and Sanitation Code; and Seek to improve governance, institutional and technical capacities by: collecting and organizing relevant data on waste generation; designing an inter-municipal integrated waste management system; and capacitating the public sector to engage with private sector operators and technology providers.
14	Cameroon	Strengthen the waste management policies (by 2035, all major cities should have landfills furnished with at least 70% methane capture); - Promote the development of a circular economy; - Recover / use agricultural and forestry waste; composting; - Valuation / treatment of other waste (sewage treatment plant, faecal sludge, etc.).
15	Chad	Mitigation actions - Waste processing plants in large urban centres
16	China	Actions: promoting the reutilization of building wastes and intensifying the recovery and utilization of methane from landfills; To improve waste separation and recycling system.
17	Comoros	It is indeed a solid waste management policy and liquids but its implementation is not yet effective. Projects identified for household waste include composting and sorting after burial in large cities and biogas production elsewhere. Composting and the production of biogas will help to reduce emissions (Table 8).
18	Costa Rica	Solid waste is the third biggest emission source and is continuously growing. The publication of Official Urban Development Plan for the Metropolitan Area and the Land Use Planning National Policy, involve critical measures that have a bearing on GHG emissions. Costa Rica's has begun the design of a Low Emission Development

		<p>Strategy for the urban sector, together with potential NAMAs in transportation and waste management, sustainable housing, all together represent important steps to reduce emissions from cities. The strategies main stakeholders would be the Ministry of Housing (MIVAH), as the director for urban development, the Ministry of Health (MINSAL), as the director in waste management, the Ministry of Environment and Energy and the municipalities around the country, especially those located in the metropolitan area of San José. The measures related to sustainable construction and targeted to reduce its carbon footprint, such as, construction waste reduction, through increased use of lumber, adoption of technology, new material and operations that are climate smart, combined with sustainable urban development measure may generate significant emission reductions. Among some of the abatement measures discussed during the sectoral dialogues, Integrated Waste Management was one that can help to address the growth in emissions from solid waste, which include waste segregation at the source and broader recycling and organic composting programs.</p>
19	Dominica	<p>9. Reduce Methane Emissions from Landfill</p> <p>Dominica's existing landfill commenced operation in 2005. It is a modern, engineered landfill, with a liner, leachate collection, and capping. Methane collection vents were installed from the start, and have been venting the methane produced from the organic waste decomposition process ever since. This project will abate most of this methane by: (a) diverting organics from the waste stream that is currently deposited in the landfill; and (b) suitably preparing the landfill, and installing a flaring system. In addition, the present landfill needs to be expanded if it is expected to receive more waste within the next 5 years. The previous dumpsites that were closed off also need to be considered for methane collection and flaring system. These are the Point Ronde and Stockfarm dumpsites which were closed when the new site was commissioned. In order to further reduce methane emissions and reach our target, the present volume of organic waste brought into the landfill (40% of all waste) has to be reduced. This can be done by implementing a fully integrated solid waste management program that involves the following:</p> <ul style="list-style-type: none"> (i) Public awareness and extension program throughout the island; (ii) Curbside pickup of organic waste (separation from source with revised collection system); (iii) Curbside pickup of individual types of non-organic waste (separation from source with revised collection system); (iv) Material recovery facilities and composting facilities in selected regions on the island.
20	DPR Korea	<p>7) Introduce sustainable waste management system - Prepare waste management plans - Promote the reduction and recycling of waste - Building capacity for waste management and introduce technologies for the advanced waste management - Introduce methane recovery and destruction technologies from industrial waste Mitigation measures prioritized for conditional contribution – 14) to build biogas plants treating municipal solid waste</p>
21	Egypt	<p>Stimulate mitigation actions through a portfolio of strong and coordinated policies for the efficient reduction of GHGs across industry sectors and different geographic areas, including solid waste.</p>
22	El Salvador	<p>3.7.2. El Salvador will submit before COP 22 a plan to reduce emissions of all landfills to be implemented between 2018 and 2025. The present plan estimating reduce</p>

		emissions relative to a path without mitigation action (BAU) and means of implementation needs beyond the reach of national finances.
23	Equatorial Guinea	5.2.5. Waste Sector Actions Development of efficient policy and construction waste treatment plant for recycling and reuse.
24	Eritrea	Eritrea Sectoral Coverage under the mitigation measure: Composting of Municipal Solid Waste
25	Gabon	The Gabon is committed to halve GHG emissions related to waste processing and water waste 2025. Taking into account the expected development horizon of the population, this commitment must reduce greenhouse gas emissions over 2000 GgCO ₂ on 2015-2025, or 16% the trend scenario (50% in 2025).
26	Gambia	Waste management is a major concern for Gambian Authorities, given that roughly 90% of waste is currently disposed in open dumps (e.g. Bakoteh Dump Site). This leads to severe environmental consequences (Sanneh et al. 2011), which can be exacerbated by the expected growth in waste generation volume in the future. Enhancement of the waste collection system is hindered by lack of vehicles. Specialized vehicles are too expensive to buy and maintain for the municipalities who are responsible for waste management. Over 40% of the population lives in the Greater Banjul Area (GBA). As such, the Government included in its NAMA agreed list the implementation of an Integrated Management initiative for solid and liquid waste in the GBA, which is expected to reduce emissions significantly but is also associated with an estimated implementation cost of USD 68 million.
27	Ghana	Adopt alternative urban solid waste management Improve effectiveness of urban solid collection from 70% to 90% by 2030 and disposed all to an engineered landfills for phase-out methane recovery from 40% in 2025 to 65% by 2030 Scale up 200 institutional biogas in senior high schools and prisons nation wide Double the current waste to compost installed capacity of 180,000tonne/annum by 2030.
28	Grenada	The waste sector contributed to approximately 10% of Grenada's emissions. Grenada currently has plans to construct a controlled (or capped) landfill with engineering techniques to compact and cover the waste and collect the methane gas generated for electricity production. Any methane not captured from the landfill will be released into the atmosphere. However, it is possible with this process to reduce methane emissions from waste by 90%. Activities such as waste reduction, sorting and recycling can further reduce GHG emissions in the waste sector.
29	Guatemala	Existence of Solid Waste Policy (currently under development), by the Ministry of Environment and Natural Resources, MARN, to consolidate actions in this sector. Implementation of Regulation -Agreement Governmental Wastewater 236-2006, as an instrument for the treatment of emissions from this sector.
30	Haiti	Define and implement a National Solid Waste Management Policy (Management plans following the model 5RVE: Source Reduction, Recycling, Reuse, Recycling, Reuse, Recovery and Landfill).
31	Indonesia	Enhancement of LFG recovery from 2010 to 2030; Enhancement of the percentage of waste utilization by composting and 3R (paper). No mitigation actions. 22% in

		2020, 30% in 2030*. 22% in 2020, 30% in 2030*. 3. Enhancement of the percentage of PLTSa/RDF (Refuse Derived Fuel) implementation, compare to total waste.
32	Iraq	Unconditional - Pass a law on solid waste management which will encourage recycling waste, converting waste into energy, and eliminating waste incineration Conditional - Use of plasma technology to produce electricity from waste; Apply an integrated system of waste management; Utilize landfills methane
33	Japan	Reduction of municipal solid waste disposed of by direct landfill Introduction of semi-aerobic landfill system for final disposal site of municipal solid waste
34	Jordan	<i>Developing a system for sorting, re-using and recycling</i> (KPI-style “target” to reduce percentage of solid waste that is disposed of in landfills from 80% to 60% in 2025 and increasing percentage of treated and re-used solid waste from 20% to 40% in 2025.
35	Kuwait	projects related to energy production from municipal solid waste which will start operating its first project By 2020.
36	Lesotho	Promoting commercial and household waste recycling through: Development of infrastructure (e.g. collection systems, depots, and processing plants, etc.) to support recycling activities Design of incentives to promote recycling activities Construction of proper landfill sites in all 10 districts of Lesotho with methane recovery facilities Development of a national Waste Management Programme including e-Waste Development of a well-integrated country Waste Management Plan
37	Liberia	2. Develop waste management infrastructure. 3. Implement and strengthen policy that promotes private investment in waste management. 4. Capture methane gas emitted from landfills and used for fuelling vehicles, cooking at home or generation of power.
38	Madagascar	Biogas production from waste water; Sustainable management (compost) of organic household waste (50% of waste treated in urban agglomerations).
39	Malawi	Construct controlled landfill for biogas recovery to generate up to 240 GWh of primary energy per year Promote solid and water waste reduction practices at household, institutional and industry level to reduce waste generation Process municipal solid wastes into fertilizers
40	Marshal Islands	Reduction in methane production in landfills through pre-sorting of waste and entrapment of methane;
41	Mauritius	Sustainable and integrated waste management, including waste to energy;
42	Monaco	With regard to waste-to-energy, the Principality of Monaco has had a tri-generation plant since 1982, and this is due to be replaced soon. Reducing emissions from this source and from waste management more broadly is a priority for the Government. The focus is on both technical treatment systems and defining a new way to manage waste. In this area, the technical choices made will have an impact on emissions for the next 30 years. The Government has launched a number of studies on this subject, some of which are currently underway.
43	Mongolia	Mongolia is also interested to pursue some additional mitigation actions:

		Waste sector (development of a waste management plan, including recycling, waste-to-energy, and best management practices),
44	Morocco	<p>National Waste Recovery Program:</p> <p>Mainstream household waste management master plans and standardize them for all regions and provinces of the Kingdom.</p> <p>Improve the collection of household waste to achieve an urban collection rate of 90% by 2020 and 100% by 2030.</p> <p>Establish landfill and recycling centres for household waste for the benefit of all urban areas by 2020.</p> <p>Rehabilitate or close all illegal landfills by 2020.</p> <p>Make the management of the sector more professional.</p> <p>Develop chains of “sorting---recycling---recovering” with sorting pilot projects to achieve a 20% recycling rate by 2020.</p> <p>Train and raise awareness of stakeholders on waste issues.</p>
45	Mozambique	<p>Implementation of Policies’ and Programmes’ actions:</p> <p>8. Mozambique’s Integrated Urban Solid Waste Management Strategy (2013 – 2025)</p> <p>11. Project to build and manage two solid waste landfills with the recovery of methane; and</p>
46	Namibia	Waste can be valorised through various systems to curb down emissions usually associated with the management practices being used presently. These will be reviewed to reduce emissions from both municipal solid waste and wastewater. It is planned to convert municipal solid waste and sludge from wastewater management systems from the main cities to energy. This measure will lead to a reduction of some 200 Gg CO ₂ -eq. Additional benefits such as a cleaner environment, better sanitation, with fewer risks for health problems, will be reaped while the treated water can be used for irrigation to alleviate problems linked with water scarcity.
47	Nepal	<p>e. Waste Management and Air Pollution Control</p> <p>Nepal promotes the generation of energy from waste, by converting and managing waste and minimizing the release of methane.</p>
48	Oman	Fund, capacity building and transfer of technology from the UNFCCC will be required by the Sultanate of Oman to make further efforts in the following areas: Methane recovery from solid waste dumping sites
49	Palau	Reducing Methane Emissions from the Solid Waste Sector - Palau has developed a “National Solid Waste Framework” but has not had funding to implement the planned actions. A key next step is to analyze landfill gas emissions and evaluate the potential for landfill gas capture projects at the national landfill site.
50	Qatar	<p>3. Adaptation actions with Mitigation Co-benefits - 3.3. Waste Management</p> <p>Qatar uses state-of-the-art waste treatment technologies which treats most of the collected waste generating significant amount of clean energy. Efforts are focused on adopting a strategy to contain the levels of waste generated by household, commercial sites and industries. To improve waste management, the government recognizes a hierarchy of actions to alleviate the pressure on the environment and to reduce, reuse or recycle generated waste in addition the reduction of methane emissions. The waste management facilities will have the capability to convert</p>

		waste to energy. Awareness programs are planned to encourage a sense of shared responsibility towards the environment.
51	Senegal	Construction of 3 integrated waste recycling centers (DIC) in the municipalities of Tivaoune, Touba and Kaolack
52	Seychells	Data regarding methane (CH ₄) emissions from the old landfill in Mahe was provided by the SEC. Currently, the emissions are not captured neither for flaring nor for electricity generation. The projected emissions profile of CH ₄ is shown in the figure below for the period covering 2012 and 2030. The INDC has included a conservative scenario where only 50% of the emissions are captured for flaring. There is currently no provision for power generation using the captured emissions.
53	Sierra Leone	Strategy 5: Enhancement of waste management systems at all levels to reduce pollution and greenhouse gas emissions under the category so as to improve health of both humans and animals and reduce global warming.
54	Sri Lanka	The NDCs for the waste sector include: 1. Introducing a source separation system at the household level and a proper collection mechanism. 2. Improving the compost preparation system for each local authority and increasing the supply of organic fertilizer to agricultural purposes by providing facilities to control quality of compost and introduce a market for the compost fertilizer production. 3. Introducing energy generation by waste (waste to energy programmes). 4. Improving the waste collection mechanism. 5. Designing and implementing comprehensive solid waste management strategies for 40% to 60% of LAs before 2030. 6. Monitoring of waste management activities. 7. Systematic management of industrial/hazardous and clinical waste management.
55	St Lucia	Pursuing a Waste Management Strategy that includes the conversion of waste to energy
56	Sudan	4.Waste to Energy: 80 MW (grid connected) will be applicable in several intended sites The objective is to treat the whole generated waste and ensure that no waste is sent to the landfill. This will lead to GHGs emission reduction, pollution control; land used saving and income generation. It could be achieved through recycling, composting and energy recovery.
57	Suriname	As stated in Suriname's National Energy Policy 2013-2033, the government of the Republic of Suriname is committed to implement the following projects to supply the coastal area and the Interior with renewable energy by the year 2033: waste-to-energy projects.
58	Tanzania	Application of modern and practical way of managing waste including the enhanced use of engineered/sanitary landfills. b) Promotion of waste to energy programmes. c) Promoting co-generation activities.
59	Timor-Leste	Landfills and landfill gas – Reducing unspecified treatment of MSW by increasing the amount of MSW brought to the landfill will increase GHG emission from SWDS, therefore this action must be supported by development of managed landfill equipped with LFG (landfill gas) recovery system for flaring or utilization

		Composting resource recovery and recycling – reducing open burning through composting and applying 3R will significantly decrease GHG emissions from open burning
60	Tunisia	<p>Waste: The mitigation plan provides for the implementation, from 2016, of a plan to install facilities to transform solid waste into RDF (refuse derived fuel) intended for cement facilities, as well as a programme for introducing degasification systems in controlled landfills. It is planned to recover electricity from captured gases, at least at the main landfills. This energy option is covered in the low-carbon scenario for the energy sector.</p> <p>The mitigation plan in the sanitation sector provides in particular for the installation of solar PV capacity at water treatment plants (STEPs), biogas digesters for electricity production and a reduction in the chemical oxygen demand (COD) of industrial wastewater.</p>
61	Turkey	<p>Making studies to increase use of waste as an alternative fuel at the appropriate sectors</p> <p>Sending solid wastes to managed landfill sites:</p> <p>Reuse, recycle and use of other processes to recover secondary raw materials, to utilize as energy source or to remove wastes</p> <p>Recovering energy from waste by using processes such as material recycling of wastes, bio-drying, bio-methanization, composting, advanced thermal processes or incineration</p> <p>Recovery of methane gas from landfill gas from managed and unmanaged landfill sites</p>
62	UAE	The UAE will increase the amount of treated waste, and waste diverted from landfill, through a number of key initiatives, including: • developing a federal law to regulate and oversee waste management; • defining a federal roadmap for integrated waste; and, • developing a federal database to gather and collect information regarding waste
63	Uruguay	With regard to the waste sector, even though different methane capture and flaring measures have been implemented in landfills (in some cases with power generation) and cogeneration from agroindustrial and forest waste, there is still an additional potential for mitigation. The continuation of these policies will allow for a reduction of the emission intensity of the sector per unit of GDP of 44%, from 1990 levels, by means of domestic resources, and a total 68% with additional means of implementation (see below for list of additional mitigation measures).
64	US	Under the Clean Air Act, the United States Environmental Protection Agency is developing standards to address methane emissions from landfills and the oil and gas sector.
65	Venezuela	<p>National Sanitation Plan and Landfill Construction Landfill. Among the achievements of the Plan are:</p> <ul style="list-style-type: none"> ▪ Drainage of landfills, construction of landfills, transfer stations, recovery of final disposal sites. Proper operation sites waste disposal and solid waste, minimizing the occurrence of infectious diseases (vector-borne diseases), while allowing the controlled capture of CH₄ generated, establishing conditions to implement a short-term system for disposal. Management Reports and various Technical Reports
66	Vietnam	Develop waste management planning and enhance waste management capacity; promote reducing, reusing and recycling waste;

		Research and apply advanced waste treatment technologies; deploy modern waste treatment technology in urban and rural areas; strengthen the management and treatment of industrial and household wastewater; Utilise landfill gas and solid waste combustion for power generation.
67	Yemen	Landfill gas capturing for flaring or using for power generation

Bricks Initiative

1	Bangladesh	Existing mitigation actions - Improving kiln efficiency in the brick making industry,
2	Cambodia	Priority Actions - Promoting use of renewable energy and adopting energy efficiency for garment factory, rice mills, and brick kilns. Implementation of Climate Change Action Plan for Manufacturing Industry and Energy Sectors (2014-2018)
3	DPR Korea	Mitigation measures prioritizes for conditional contribution – 17) To replace tunnel brick kilns with vertical shaft brick kilns
4	Iraq	Unconditional – Replace some incineration systems in brick kilns that belong to the private sector with more efficient and environmentally friendly systems Conditional - Replace incineration systems in brick kilns that belong to the private sector with more efficient and environmentally friendly systems

HFC Initiative

1	Antigua & Barbuda	Conditional Mitigation Targets - 1. By 2020, establish efficiency standards for the importation of all vehicles and appliances.
2	Australia	The Australian Government is commencing the development of a range of policies that will reduce emissions into the post-2020 period, including ... the enhanced management of synthetic greenhouse gas emissions under ozone protection laws and the Montreal Protocol.
3	Bhutan	8. Energy demand side management by promoting energy efficiency in appliances, buildings and industrial processes and technologies.
4	Bosnia and Herzegovina	to reconstruct and modernize district heating grids, boilers and district heating substations
5	Brazil	In the industry sector, promote new standards of clean technology and further enhance energy efficiency measures and low carbon infrastructure;
6	Canada	The federal government is currently developing additional regulatory measures that will: establish more stringent standards in the transportation sector for heavy-duty vehicles of post-2018 model years; gradually phase down HFCs, which will limit potent GHG emissions that are expected to increase substantially in the next 10 to 15 years;
7	China	To phase down the production and consumption of HCFC-22 for controlled uses, with its production to be reduced by 35% from the 2010 level by 2020, and by 67.5% by 2025 and to achieve effective control on emissions of HFC-23 by 2020;

8	Djibouti	Conditional activity - Diagnosis on lighting and air conditioning systems within the various administrative buildings. "Green Mosque" - Implementation of efficiency and energy efficiency in the country's mosques solutions.
9	Dominica	2. Energy Efficiency (EE) Programme This EE program will be country wide, and will include the Manufacturing, Commercial and Institutional sectors. Such programmes carried out in other jurisdictions in the Latin America and Caribbean Region have resulted in energy savings in the order of 15 to 20% of total energy usage, and should achieve similar results in Dominica. Market based mechanisms are to be introduced to enhance the uptake of these programmes. The EE programme for Dominica will be designed and implemented to address the specific issues of this country and shall focus on retrofitting of energy efficient lighting, air-conditioning, appliances, and a vigorous education and awareness drive. Estimated installation costs have been based on the results of the audits of similar facilities in the LAC Region.
10	DPR Korea	Encourage the use of energy efficient appliances in the residential sector: Mitigation measures prioritized for conditional contribution – 6) To use energy-efficient air conditioners and heat pumps instead of coal-fires space heating at households and offices
11	Eritrea	Eritrea Sectoral Coverage under the mitigation measure: Efficient residential air-conditioning Efficient refrigerators
12	Ethiopia	The plan to mitigate GHG emissions is built on the following four pillars: 4) Leapfrogging to modern and energy efficient technologies in transport, industry and Building sectors.
13	Ghana	Green Cooling Africa Initiative - Abatement of fluorinated-gases (HFC-22 and HFC-410) from stationery air-conditioners
14	Japan	Measures to control overall emissions of fluorinated gases (Act on Rational Use and proper management of Fluorocarbons, emission control through industries' voluntary action plans, etc.)
15	Lesotho	Implementing incentives for retro-fitting of existing buildings with more energy-efficient appliances
16	Mauritius	leapfrog to low global warming potential refrigerants.
17	Pakistan	Mitigation Options in Energy Demand Sector (Medium Priority) Efficient refrigerators: Average existing inefficiencies, so average potential – cost per device is high; Efficient air conditioners: only part of the population impacts – average existing inefficiencies, so average potential – Cost per device is significantly high
18	Seychelles	The implementation of a National Energy Efficiency Programme includes the following activities: Promotion of energy-efficient appliances: target of 10% energy savings in 2035 New Regulations on the use of air-conditioning, target of 20% energy savings in the service sector,
19	Sri Lanka	[NDC Language] NDC 5: Introduction of Demand Side Management (DSM) activities <ul style="list-style-type: none"> [Updated INDC language] Introduction of Demand Side Management (DSM) activities in order to improve the load factor of the system and to upgrade the

		efficiency at consumer end such as increase efficiency of fans, pumps, motors, compressors, refrigerators and Building Management System (BMS) for the commercial, government and domestic sector.
20	St. Lucia	Proposed Interventions - Energy Efficient Appliances; National Energy Efficiency Labelling Standards (Air-Conditioning units, tubular and compact fluorescent lamps)
21	St Vincent & the Grenadines	Energy efficiency: there is an objective to achieve a 15% reduction in national electricity consumption ⁹ compared to a BAU scenario by 2025. Planned measures in this sector include the retrofitting of street lighting nationally, a new building code and an energy labelling scheme for appliances.
22	Swaziland	Mitigation Actions: Phasing out the use of HFCs, PFCs and SF6 gases
23	Timor-Leste	Hydrochlorofluorocarbon Phase-out Management Plan (HPMP) – Timor-Leste is part of the Vienna Convention on the Protection of the Ozone Layer. It also ratified the Montreal Protocol on Substances that Deplete the Ozone Layer. Timor-Leste is in the process of phasing out HCFCs and replacing this with low GWP HFCs.
24	Tonga	Enforcement of Minimum Energy Performance (2013-2017)
25	UAE	District cooling: air-conditioning accounts for a significant share of energy consumption, given the UAE's harsh climate. Comprehensive infrastructure investments are being undertaken to move towards district cooling and improve efficiency as compared to decentralized cooling. Appliance efficiency standards: the UAE introduced the region's first efficiency standards for air-conditioning units, eliminating the lowestperforming 20% of units on the market, and is introducing efficiency standards for refrigeration and other appliances. The UAE has also established an indoor lighting standard that introduces energy efficient lighting products and phases-out inefficient lighting products in the UAE market.
26	US	Under the Clean Air Act, the United States Environmental Protection Agency is moving to reduce the use and emissions of high-GWP HFCs through the Significant New Alternatives Policy program. Under the Energy Policy Act and the Energy Independence and Security Act, the United States Department of Energy is continuing to reduce buildings sector emissions including by promulgating energy conservation standards for a broad range of appliances and equipment, as well as a building code determination for residential buildings.
27	Yemen	Launch energy-efficiency programs through establishing energy efficiency standards, energy use regulations and labeling and public awareness. - Promote active use of solar energy through use of solar water heaters instead of electric water heaters and use of solar-driven air-conditioning and solar refrigeration. (Solar Water Heaters: 40 percent of market potential in 2025 (200,000 units) representing a saving potential of 457 GWh)

Cookstove Initiative

1	Afghanistan	Mitigation sectors: Energy Production (hydropower, solar systems, wind and biomass, commercial, domestic: clean cook stoves and fuels, and solar energy
2	Bangladesh	Existing mitigation actions - More than 1.5 million Improved Cook Stoves (ICS) and 4.0 million Solar Home Systems have already been distributed across the country Table 5: Possible conditional action-based contributions Put in place policy mechanisms to incentivise the uptake of improved (more efficient) gas cookstoves (70% market share of improved biomass cookstoves, reaching 20 million households in 2030) Support the replacement of biomass with LPG for cooking purposes (40% market share of improved gas cookstoves) Promoting policies to induce greater level of energy efficiency and conservation in the household sector based on the Bangladesh Energy Efficiency and Conservation Masterplan (10% market switch from biomass to LPG for cooking compared to the business as usual)
3	Belize	Emissions savings potential of efficient cook stoves comes from a reduction of wood used for the same result. Aim is to achieve a reduction of fuel wood consumption by 27%-66%, depending on the technology, the duration of cooking and the replacement technology. The anticipated emission reductions would be between 2.1Gg CO ₂ per year in 2020 and 12.4Gg CO ₂ by 2030. Expected cumulative reduction would be up to 118Gg CO ₂ between 2020 and 2030 (depending on population growth).
4	Benin	Strategy in the Energy Sector To promote household access to butane gas cooking equipment; Increase production of electricity from natural gas; To promote economic households.
5	Cambodia	Priority Actions - Efficient cookstoves, biodigesters, water filters
6	Central African Republic	Unconditional measures - the promotion of improved cook stoves. Conditional measures - National programme for advanced conversion of wood; Improved cook stoves programme
7	Chad	Mitigation actions - Use of butane gas and promotion of efficient domestic energy
8	Comoros	Mitigation activities: Promote the use of LPG instead of oil and wood. The extension of the use of LPG by households and possibly replace gasoline in cars also promote lower emissions. An annual penetration 3% consumption was taken as a hypothesis but not decide between the end uses. Promote improved stoves. This option has not been evaluated for its attenuation capacity since its adoption has not had much success despite the efforts invested. Furthermore, results are difficult to quantify. For the purposes of the study, it was considered that the introduction of improved stoves domestically and in the production of essential oil Ylang Ylang would lead to a gradual decrease of 5% across 2020, 2025 and 2030 the volume of wood used. Therefore, estimates of emissions reductions were made together under the option reducing the volume of firewood. This reduction in volume wood used is included with other actions considered under the LULUCF section below where emission estimates are normally made.
9	Congo	The energy consumption is dominated more than 80% by demand for wood energy household. Given an increase of 3% of the population and attractiveness of cities,

		<p>the population is expected to reach 8.5 million by 2035 and 83% is urban, while the rural population is expected to stagnate.</p> <p>In terms of domestic consumption, the objective is to provide access to electricity to 75% urban in 2025 and 100% in 2035 with respectively 50% and 75% in rural areas. Furthermore, the extension of improved stoves with charcoal, as well as achieving improved by grinding coal is expected to significantly reduce energy consumption.</p>
10	Djibouti	<p>Reduction of the energy consumption of wood for cooking</p> <p>Decrease in wood consumption for cooking, estimated at 56 100 tonnes per year, replacing 1,000 units by LPG Systems.</p>
11	DPR Korea	<p>Mitigation measures prioritized for conditional contribution – 7) To use biogas from livestock manure and domestic sewage instead of coal or firewood for cooking. - 8) To replace coal use for hot water with solar hot water system at households. – 9) To replace conventional wood stoves for cooking with efficient wood stoves at rural households. 15) to replace conventional coal stoves for cooking with efficient electric cookers at the households.</p>
12	Eritrea	<p>Eritrea Sectoral Coverage under the mitigation measure:</p> <p>Efficient wood stoves</p> <p>LPG stoves replacing wood stoves</p>
13	Gambia	<p>Actions:</p> <p>Reduce firewood and charcoal consumption and the overuse of forest resources through deployment of efficient cookstoves</p>
14	Ghana	<p>Scale up adoption of LPG use from 5.5% to 50% peri-urban and rural households up to 2030.</p> <p>Scale up access and adoption of 2 million efficient cook stoves up to 2030</p>
15	Guinea	<p>Guinea aims between now and 2030 to reduce final demand for firewood and charcoal by 50% per capita (in urban and rural areas) as compared to 2011, particularly through:</p> <ul style="list-style-type: none"> • organization of local industrial supply chains to enable the introduction of at least 1 million improved stoves; • establishment of 5000 wood carbonization units giving a better charcoal yield; • replacement with butane (40k toe); • extension of pilot initiatives to disseminate improved smokehouses and stabilized earth blocks.
16	Haiti	<p>Promote the use of energy efficient stoves in replacement of traditional homes (energy gain by 25-30% stove).</p> <p>Improving the energy efficiency of coal production furnaces Wood (pass yields of 10- 15% to 30-45%).</p>
17	Honduras	<p>Additionally, the Republic of Honduras is committed, as a sectoral target, afforestation / reforestation of 1 million hectares of forest by 2030. In addition, through the NAMA efficient stoves is expected to reduce by 39% the consumption of firewood in families, helping in the fight against deforestation.</p>
18	Lesotho	<p>To disseminate efficient stoves to reach a penetration rate of 30% in 2030;</p> <p>To reduce progressively the use of wood for heating in order to reach 10% by 2030;</p> <p>Replacement of fuel-wood with LPG at the rate of 10% a year from 2020 to 2030</p>

19	Liberia	Replacing cooking stoves with low thermal efficiency (5-10%) with the higher-efficiency (40%) stoves. Produce and distribute 280,543 energy saving cook stoves that use fuel wood and 308,004 energy saving cook stoves that use charcoal by 2030.
20	Madagascar	Disseminate improved stoves (by 2030: 50% of households adopting improved stoves).
21	Malawi	Distribute energy saving cookstoves to 400,000 households Increase the number of households adopting energy saving stoves to 2,000,000 by 2030
22	Marshall Islands	Transition to electric and solar cook stoves from LPG cook stoves;
23	Mongolia	Mongolia is also interested to pursue some additional mitigation actions: Reduce fuel use in individual households through improving stove efficiency (with co-benefit of air pollution reduction),
24	Myanmar	To increase the number of energy efficient cook-stoves disseminated in order to reduce the amount of fuel wood used for cooking. Indicative goal: To distribute approximately 260,000 cookstoves between 2016 and 2031. MOECAAF, as part of the Comprehensive Plan for Dry Zone Greening (2001-31), has distributed approximately 286,000 cook-stoves during 2001-15, and plans to distribute an additional 260,000 cookstoves between 2016 and 2031. The project falls under the National Forestry Master Plan and National Energy Policy, in order to reduce the use of wood from natural forests for cooking by 2030 (please see section 2.2 for further details).
25	Nepal	<ul style="list-style-type: none"> • Increase the share of biogas up to 10% as energy for cooking in rural areas; and • Equip every household in rural areas with smokeless (improved) cooking stoves (ICS) by 2030.
26	Niger	Energy Actions: Cooking Energy: reducing the demand for wood energy per capita by massive distribution of improved stoves, with a penetration rate 100% in urban areas and 30% in rural areas; promoting gas domestic biogas and biofuels on an industrial scale family. Dissemination of multifunctional platforms.
27	Rwanda	3.2 Promote environmentally sustainable use of biomass fuels Given the fact that poor performing cook stoves are still used in most cases leading to inefficiencies in fuel consumption and health effects, Rwanda intends to increase the diffusion of improved cook stoves and reach 100% of all households in needs 2030. Additional supporting initiatives are mainly the installation of 35 000 domestic biogas digesters and 15 institutional biogas digesters annually, and increasing average charcoal yields up to 50% by 2030. In addition, Rwanda will enhance the use of LPG14 through tax reductions on importations.
28	Senegal	Actions: Installation of 27,500 domestic bio digesters Production and distribution of 4.6 million Enhanced Homes for firewood; Production and distribution of 3.8 million improved stoves charcoal.
29	Somalia	Project Profile 4: UN Joint Programme on Sustainable Charcoal Production and Alternative Livelihoods (PROSCAL) to Mitigate Against Deforestation. Component

		2 - Promotion of Alternative Energy Sources Accelerated diffusion of energy efficient cook-stoves for reduction in charcoal consumption
30	South Sudan	15. Energy generation and Energy Use: iv. Increase the efficiency of biomass use (particularly fuel wood and charcoal) in the traditional energy sector.
31	Tanzania	Expanding the use of natural gas for power production, cooking, transport and thermal services through improvement of natural gas supply systems throughout the country. d) Promoting energy efficient technologies for supply, transmission/transportation and demand side as well as behavioral change in energy use. e) Promoting rural electrification.
32	Timor-Leste	In Timor-Leste, 95% of households use firewood for cooking and 83% households cook over open fire. MCIE through the Directorate General for Environment has signed a MoU on the 5th of July 2016 with Mercy Corps on the promotion of clean cookstoves in Timor-Leste. The use of firewood and inefficient traditional stoves are posing serious public health, socioeconomic and environmental consequences for the people of Timor-Leste. Currently, the GoTL-UNDP-GEF supported promoting sustainable bio-energy efficient cookstoves, which is estimated to cover approximately 10% of the Timorese population. The project will also promote industrial stoves (e.g., for bakeries, restaurants) and institutional stoves (e.g., for schools), Energy Efficient Cookstoves – Reduce dependency on fossil fuels for cooking. – Reduce the average amount of fuel-wood used for cooking in private households, and thereby deforestation) by introducing fuel substitution and supporting the use of energy-efficient cookstoves”
33	Togo	In the field of biomass This will implement a proactive policy (incentives, support and training craftsmen, appropriate distribution channels, etc.) capable of promoting the dissemination of improved stoves allowing a wood economy and charcoal from 50 to 60%. The focus will also be on the introduction of solar equipment in households and capacity building various stakeholders.
34	Uganda	Additional mitigation ambition: Promotion and wider uptake of energy efficient cooking stoves or induction cookers. (Residential biomass burning: ~30 MtCO ₂ e in 2000). Approx. 40% efficiency saving over traditional cooking stoves.
35	Zambia	Improved cooking devices to include improved biomass stoves, use of ethanol and LPG stoves, and switch to electric stoves
36	Zimbabwe	Promoting the use of liquefied petroleum gas (LPG) as the substitute for or alternative to grid electricity. This has several economic, social and economic benefits to people of Zimbabwe especially in rural areas where population is spaced, Figure 3b. Constructing institutional biogas digesters (50 to 80m ³ in size) in all provinces with a target of at least 1,250 digesters by 2030.

Agriculture Initiative

1	Afghanistan	Mitigation Sectors: Agriculture and Livestock (manure management, land use/change for agriculture); Rice paddies: modified rice strains
2	Azerbaijan	Based on adopted strategy, accumulation of gases emitted to the atmosphere during oil-gas production, prevention of gas leakages during oil-gas processing and at distribution networks.
3	Bangladesh	Agriculture (non-energy related) Increase mechanisation in agriculture leading to a reduction in numbers of draft cattle (and therefore lower methane emissions) (50% reduction in draft animals compared to the business as usual) Increase the share of organic manure in the used fertilizer mix (35% increase in organic fertilizer share compared to the business as usual) Scale up rice cultivation using alternate wetting and drying irrigation (20% of all rice cultivation uses alternate wetting and drying irrigation)
4	Bhutan	6. Promote climate smart livestock farming practices to contribute towards poverty alleviation and self sufficiency through: Organic livestock farming and eco-friendly farm designs Improvement of livestock breeds, including conservation of native genetic gene pool/diversity Expansion of biogas production with stall feeding Agro-forestry or agro-silvo pastoral systems for fodder production 7. Promote climate smart agriculture to contribute towards achieving food and nutrition security through: Organic farming and conservation agriculture Development and promotion of sustainable agricultural practices Integration of sustainable soil and land management technologies and approaches
5	Central African Republic	Unconditional Measures - the outreach programme to gradually abandon slash-and-burn agriculture and burning of agricultural waste
6	China	To promote the low-carbon development in agriculture, making efforts to achieve zero growth of fertilizer and pesticide utilization by 2020; To control methane emissions from rice fields and nitrous oxide emissions from farmland; To construct a recyclable agriculture system, promoting comprehensive utilization of straw, reutilization of agricultural and forestry wastes and comprehensive utilization of animal waste;
7	Comoros	Agriculture : • Promote conservation agriculture Conservation agriculture, as improved stoves, made a breakthrough with shy farmers. This option also remains difficult to assess and project into the future. It therefore does not was quantified for its impact on GHG emissions.
8	Costa Rica	The National Low Carbon Livestock Strategy sets goals for the country's low carbon development in the milk and beef value chains, which will be benefited from technology and organizational innovation derived from the ongoing pilot programs within the Livestock NAMA. Other efforts such as the creation of a National Territorial Information System (SNIT), within the National Registry, should include land use change monitoring systems, which will significantly contribute to the

		Monitoring, Verifications and Reporting (MRV) systems improvement proposed under FONAFIFO's Emission Reduction Program.
9	DPR Korea	Conduct scientific research for and develop methodologies of GHG emission reduction in agriculture and livestock breeding - Widely introduce recycling technologies of agricultural residuals for the production of biogas and organic fertilizer
10	Egypt	Stimulate mitigation actions through a portfolio of strong and coordinated policies including in the following sectors: enteric fermentation; manure management; rice cultivation; agricultural soils; field burning of agricultural residues
11	El Salvador	3.5.3. El Salvador will submit before COP 22, quantifiable targets for the eradication of the practice of burning cane and transition to sustainable farming and certified for the period 2021-2025.
12	Ethiopia	The plan to mitigate GHG emissions is built on the following four pillars: 1) Improving crop and livestock production practices for greater food security and higher farmer incomes while reducing emissions;
13	Gambia	System of rice intensification – Reduce methane emissions through water management, less flooded areas, reduced fertilizer usage Under the Agriculture sector, two conditional mitigation options (NERICA Rice production and Rice efficiency) have been assessed and reported on in this INDC (see Figure 4 to the right). For production of NERICA upland production in place of Swamp Rice, estimated emission reductions are 124.1 GgCO ₂ e in 2020, 397.7 GgCO ₂ e in 2025 and 2030. For the promotion of efficiency in rice production, estimated emission reductions are 437.8 GgCO ₂ e in 2020, 707.0 GgCO ₂ e in 2025 and 2030.
14	Guyana	The Government of Guyana will continue to work closely with farmers in agricultural areas across Guyana to encourage the use of bio-digesters to reduce waste, produce biogas and provide affordable, healthy and efficient cooking means at the household level.
15	Haiti	Improving the quality of especially grazing cattle herd with legumes.
16	Iraq	Conditional - Improve techniques of growing rice and the management of natural fertilization in order to reduce the emissions of CH ₄ ; improve techniques of using nitrogen fertilizers in order to reduce N ₂ O
17	Japan	Measures to reduce CH ₄ emissions from agriculture soils (paddy rice fields)
18	Kiribati	Greenhouse gas emissions are the result of combustion of imported fossil fuels in the energy sector for: Electricity generation; Sea transport; Land transport;Kerosene for lighting on outer islands; and LPG and kerosene for cooking.
19	Mali	In the sector of agriculture, the steps mitigation of emissions of GHG the more appropriate concern three sub – sectors which are: There rice irrigated, livestock and the management of fertilizer. For the under sector of There rice irrigated, mitigation will be focused on management of water by irrigation intermittent to avoid flooding permed of land rice, source resignation by fermentation.
20	Madagascar	Large scale dissemination of intensive/improved rice farming techniques (SRI/SRA);

		Large scale implementation of conservation agriculture and climate-smart agriculture;
21	Mongolia	Mongolia is also interested to pursue some additional mitigation actions: Agriculture (development of a comprehensive plan for emission reductions in the livestock sub-sector for implementation between 2020 and 2030),
22	Myanmar	To mitigate GHG emissions from the agriculture sector from combustion of agricultural residues and growing rice in paddy fields. The Ministry of Agriculture and Irrigation is researching alternative wet and dry paddy production techniques. This is an example of how Myanmar is resolving the need to mitigate climate change whilst also adapting to it. To reduce GHG emissions from the burning of crop residues in fields, the Ministry of Agriculture and Irrigation is implementing effective mitigation actions such as energy from crop residues, promoting the use of organic fertilisers, and methods to shorten the time of composting agricultural byproducts. The bio-char program is also being planned and will reduce GHG emissions to atmosphere as a result of less anaerobic decomposition in the production process. At the same time, this will increase crop production.
23	Namibia	Increasing the number of livestock heads in feedlots to reduce enteric fermentation by some 4%;
24	Pakistan	Mitigation Options in Agricultural Sector (high priority)– <ul style="list-style-type: none"> • Manage water in rice cultivation to control release of methane from agricultural soils and introduce low water dependent rice varieties: High emission reduction potential – Included in numerous strategy / policy documents – High sustainable development benefits – cost is reasonable; • Promote use of green manure, better manure storage and management: Medium emission reduction potential – Prioritized in 2013 Framework for Implementation – High sustainable development benefits – cost is reasonable; Mitigation Options in Agricultural Sector (medium priority) <ul style="list-style-type: none"> • Use agricultural and animal wastes to produce biogas and organic fertilizer: Medium emission reduction potential – Prioritized in numerous government documents – Medium sustainable development benefits – High cost of investment; • Introduce feedstock mixes, dietary oils, and additives for livestock, to reduce methane production from enteric fermentation: High emission reduction potential – included in numerous strategy/policy documents – Low sustainable development benefits – High cost of research, development, and investment
25	Timor-Leste	Livestock management – Promotion of Biogas and composting for reduction of agricultural emissions Sustainable agriculture – Reducing slash and burn practices by introducing permanent agriculture with improved management practices and sustainable, climate smart agriculture technologies and processes.
26	Togo	At the Agriculture sector, mitigation options identified in the areas of livestock, rice cultivation, agricultural soils and savannah burning. In terms of livestock, actions will focus on the introduction of fodder for better animal digestion, support

		the promotion of local breeds and ranching. In the rice sector, the actions include research and the promotion of upland rice varieties, support and accompaniment to a more appropriate use of organic matter (faster decomposition) in the rice paddies.
27	Tonga	Emissions in the agriculture sector are principally a function of livestock numbers. Some mitigation cobenefits may result from plans to enhance the climate resilience of the agriculture sector (e.g. through improved soil management practices, development of agro-forestry systems, and increased use of biogas systems that also provide organic fertilizers). Additionally, improvements in animal welfare through greater water availability to stock and improvements in feed quality could likely lead to reduced methane emissions
28	Tunisia	Agriculture, Forestry and Changes in Land Use: The mitigation plan aims to intensify the CO ₂ absorption capacities of forestry and arboriculture by stepping up reforestation and by consolidating and increasing carbon reserves in forest and pastoral environments. The carbon footprint for agriculture will also be improved by using practices that generate fewer emissions, such as optimizing the diets of domestic animals, promoting biological agriculture or conservation-oriented agricultural practices, or recovering energy from animal waste.
29	Uganda	Livestock breeding research and manure management practices (Enteric fermentation: 19% of national GHG emissions (7 Million tons of carbon dioxide equivalent per year (MtCO ₂ eq/yr).) in 2000. Projected to increase by 4 times by 2030)
30	Uruguay	Reduce methane emission in rice production through flood management and other practices.
31	Vanuatu	Planned cooperation with New Zealand and other nations interested in mitigating methane (CH ₄) and associated emissions for ruminant and pasture management
32	Vietnam	Research and develop solutions to reduce GHG emissions in farming, livestock, fisheries and animal feed and food processing; Research and apply production processes and economic technologies that efficiently use seedlings, feed, agricultural materials, soil, water, and other inputs and reduce GHG emissions from agricultural production; Widely replicate technologies that treat and reuse by-products and waste from agricultural production to produce animal feed, mushrooms, materials for industries, biogas, and organic fertilizer.
33	Yemen	Proper land management to reduce methane from soil
34	Zambia	Covered Sectors: Agriculture (i.e. Enteric Fermentation and Manure Management, Rice Methane, Agriculture Soils, Burning of Savanna and Agriculture waste)

Urban Health Initiative

1	India	1.3 DEVELOPING CLIMATE RESILIENT URBAN CENTERS Government of India in recent times has launched a number of schemes for transformation and rejuvenation of urban areas including Smart Cities Mission, Atal
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		<p>Mission for Rejuvenation and Urban Transformation (AMRUT) and National Heritage City Development and Augmentation Yojana (HRIDAY):</p> <p>1) Under the Smart Cities Mission, 100 smart cities are planned with the objective to develop new generation cities, which will provide core infrastructure and a decent quality of life to its citizens by building a clean and sustainable environment. Smart solutions like recycling and reuse of waste, use of renewables, protection of sensitive natural environment will be incorporated to make these cities climate resilient.</p> <p>2) Atal Mission for Rejuvenation and Urban Transformation (AMRUT), a new urban renewal mission has been launched by Government of India for 500 cities with focus on ensuring basic infrastructure services such as water supply, sewerage, storm water drains, transport and development of green spaces and parks by adopting climate resilient and energy efficient policies and regulations.</p>
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Coalmine Methane

1	Afghanistan	Mitigation sector: Coal mines: gas recovery in coal mines
2	Bosnia and Herzegovina	This scenario for major sectors implies the implementation of the following activities: to install the equipment for power generation from methane from two underground mines (five coal-pits)

Kerosene Lighting

1	Marshal Islands	Specific areas of action contemplated to make progress towards the INDC targets include: Reduction of kerosene for lighting in outer atolls;
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Wastewater Methane

1	Indonesia	Sludge recovery in septic tank/latrine management. - LFG recovery communal septic tank and biodigester management. - Operationalization of aerobic septic tank. Pulp and paper industry implement the waste water treatment sludge management, and utilization of methane. Pulp and paper industry implement the waste water treatment sludge management and utilization of methane. Waste water treatment (palm oil mill effluent or POME) in palm oil industry: implement methane capture & utilization.
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ⁱ Mexico (2015) [INTENDED NATIONALLY DETERMINED CONTRIBUTION](#), 2 (“SLCPs have an important Global Warming Potential and a shorter life span in the atmosphere than CO₂. Actions to abate SLCPs simultaneously contribute to climate change mitigation in the near term and to the immediate improvement of air quality, as well as to generate positive impacts on human health and ecosystems conservation; in consistence with the recommendations contained in the 5th Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), as well as with the guidelines of the Clean Air and Climate Coalition (CCAC) of which Mexico is a member.

ⁱⁱ Mexico (2015) [INTENDED NATIONALLY DETERMINED CONTRIBUTION](#), 2 (“Mexico is committed to reduce unconditionally 25% of its Greenhouse Gases and Short Lived Climate Pollutants emissions (below BAU) for the year 2030. This commitment implies a reduction of 22% of GHG and a reduction of 51% of Black Carbon.... The 25% reduction commitment expressed above could increase up to a 40% in a conditional manner, subject to a global agreement addressing important topics including international carbon price, carbon border adjustments, technical cooperation, access to low-cost financial resources and technology transfer, all at a scale commensurate to the challenge of global climate change. Within the same conditions, GHG reductions could increase up to 36%, and Black Carbon reductions to 70% in 2030.”).

ⁱⁱⁱ Chile (2015) [INTENDED NATIONALLY DETERMINED CONTRIBUTION OF CHILE TOWARDS THE CLIMATE AGREEMENT OF PARIS 2015](#), (official English translation) 17 (“In the same way as other countries, Chile recognizes that the actions aimed at reducing short-lived climate pollutants (SLCP) entail a substantial contribution to the mitigation of the causes of Climate Change. In addition, these actions have known concomitant benefits, in terms of reducing the levels of local atmospheric pollution in urban centers.”).

^{iv} Chile (2015) [INTENDED NATIONALLY DETERMINED CONTRIBUTION OF CHILE TOWARDS THE CLIMATE AGREEMENT OF PARIS 2015](#), (official English translation) 17-18 (“Black carbon, which is considered a SLCP, accounts for a substantial part of the particulate (PM_{2.5}) measured in Chilean cities. Main sources of black carbon in Chile come from diesel transport, heating and residential wood fired cooking. The 2014-2018 Atmospheric Decontamination Strategy of the Chilean Government contemplates the implementation of atmospheric decontamination plans for fine particulate matter. Our country considers that the efforts made in reducing black carbon in the regions which have high levels of this substance will make a significant contribution to the sustainability of Chile’s development and various forms of technical cooperation and international financing to support such initiatives will be welcome.”).

^v Nigeria (2015) (“4.2.6 Short-lived pollutants and air quality Poor air quality is the bane of urban residents and a health threat. Drastic measures to reduce soot (black carbon) pollution from cars and trucks, small generators and industry are needed. Failure to do so could make Nigeria’s mega-cities unliveable. This includes enforcement of the importation ban of cars over 15 years’ old, stricter inspections, and further consideration of setting efficiency standards for new cars similar to those in South Korea. Those who rely on fuel wood and charcoal for cooking and heating, primarily women, are exposed to serious indoor air pollution. Providing affordable clean alternatives is the only way forward. Other short-lived pollutants with a high global warming impact, such as industrial gasses, are not produced in Nigeria. Here the adoption of standards for imported equipment will be considered, in particular in the field of refrigeration and air conditioning where there is a risk of dumping of HCFC and HFC installations that are being phased out in OECD countries. Methane emissions are discussed in the section on gas flaring.”).

^{vi} Côte d'Ivoire (2015) [CONTRIBUTIONS PREVUES DETERMINEES AU NIVEAU NATIONAL DE LA COTE D'IVOIRE](#), 3 (“Côte d'Ivoire has undertaken to reduce short-lived air pollutants affecting the climate in addition to long-term greenhouse gas. The country will develop for this purpose, by 2018 , a national action plan to reduce PCDV / SLCP whose contributions to global warming are clearly established by UNEP in its 2011 report.”) (unofficial translation).

^{vii} Central African Republic (2015) [INTENDED NATIONALLY DETERMINED CONTRIBUTION \(INDC\)](#), 8 (“Programme for the reduction of short-lived climate pollutants (emissions avoided 250 ktCO₂e/year.”).

^{viii} Cameroon (2015) [INTENDED NATIONALLY DETERMINED CONTRIBUTION](#) (“Co-benefits of energy waste strategy - improving business productivity... Reduced congestion and local pollution (including short-lived pollutants)”) (“- diminution des congestions et de la pollution locale (notamment les polluants à courte durée de vie)”).

^{ix} Mauritius (2015) [INTENDED NATIONALLY DETERMINED CONTRIBUTION FOR THE REPUBLIC OF MAURITIUS](#), 2 (“Scope of gases included in the contribution – Carbon dioxide (CO₂) and Short Lived Climate Forcers (SLCF)”).

^x Morocco (2015) [INTENDED NATIONALLY DETERMINED CONTRIBUTION \(INDC\) UNDER THE UNFCCC](#), 4 (“In a near future, Morocco also intends to develop a national plan to combat short-lived climate pollutants (SLCPs), with support from the Climate and Clean Air Coalition. As part of this process, Morocco will develop SLCP emission inventories and assess the benefits of reducing SLCPs for climate, health and agricultural production”).

^{xi} 10. By 2025, Nepal will strive to decrease the rate of air pollution through proper monitoring of sources of air pollutants like wastes, old and unmaintained vehicles, and industries

^{xii} Bangladesh (2015) [INTENDED NATIONALLY DETERMINED CONTRIBUTION \(INDC\)](#) (“Modal shift from road to rail, delivered through a range of measures, including underground metro systems and bus rapid transit systems in urban areas. Co-benefits will include reduced congestion, improved air quality and improved traffic safety.” “The shortlist of mitigation options analysed for the INDC was created from a longer list by applying certain criteria, one of which was co-benefits. All the measures are expected to therefore have some co-benefits. These include improved air quality (e.g. from increased renewables or reduction in traffic congestion), improved road safety (from modal shift to public transport and reduced traffic congestion), economic benefits from developing green jobs, cost savings to families (e.g. from lower running costs of cars and from energy efficient appliances) and improved access to energy (e.g. from localised biogas production). For more information on mitigation-adaptation synergies, see section 3” “)

^{xiii} BELIZE

^{xiv} DPR Korea (2016) [Intended Nationally Determined Contribution of Democratic People’s Republic of Korea](#) (“The respected Comrade Kim Jong Un said: “Environmental protection work should be improved so as to protect and increase the country’s resources and keep its air, rivers and seas completely free from pollution” Under the wise guidance of the respected Comrade Kim Jong Un, chairman of the State Affairs Commission of DPR Korea, the Republic recently has made much progress in conducting the forest restoration campaign, thus has achieved a great success in establishing the sufficient material and technical foundation for environment protection, afforestation and enclosing-with-park throughout the country. Besides, large or medium and small hydro power stations including the Paektusan Hero Youth Power Station were constructed and much progress has been made in improving the efficiency of electricity generation and consumption, as well as in scaling up the utilization of the renewable energy. All these efforts resulted in the advances towards the protection of air pollution and climate change.”)

^{xv} El Salvador (2015) [INTENDED NATIONALLY DETERMINED CONTRIBUTIONS \(INDC\)](#) (“As previously noted, water resources, agriculture, road infrastructure, health and tourism development are being increasingly affected by climate change, so it is essential to define a strategic framework for action to identify and put up of priority actions for adaptation to climate change in these sectors. The alleged actions, commitments and national contributions in each of these sectors seek to be synergistic, ensuring that each intervention substantive report co-benefits in the other.... The 2015-2019 Five Year Development Plan (PRD) has set its objectives and lines of action to promote energy efficiency, promote renewable energy, controlling emissions in the transport sector and associated wastes and effluents. The contributions provided for in these areas report simultaneously economic and social benefits that strengthen national conditions for sustainable development and resilient low carbon.... In that sense, a low carbon urban development for El Salvador not only slow down GHG emissions but also improve the conditions for economic competitiveness of urban areas and reduce the incidence of diseases associated with pollution and the heat island phenomenon diseases cities, improving the quality of life and urban comfort.”)

^{xvi} Ethiopia (2016) [Intended Nationally Determined Contribution \(INDC\) Under the UNFCCC](#) (“The foundation Of Ethiopia’s Intended Nationally Determined Contributions (EINDC) is Its CRGE Strategy. Many of the emission reduction initiatives contained under the EINDC offer positive returns on investment, thus directly promoting economic growth and creating additional high-quality green jobs. The implementation of the emission reduction component of EINDC to the fullest will also lead Ethiopia to achieve carbon neutrality. Further development co-benefits of The emission reduction component of the EINDC include, among others: Improved public health through better air and water quality; and Strengthened rural economic development through higher agricultural production, leading consequently to greater food security.”).

^{xvii} Ghana (2015) [GHANA’S INTENDED NATIONALLY DETERMINED CONTRIBUTION \(INDC\) AND ACCOMPANYING EXPLANATORY NOTE](#), 12 (“co-benefits: 39,500 hectares of woodland is saved from degradation; Reduction in indoor pollution resulting from wood fuel

usage; Reduction in smoke related respiratory and eye diseases; Reduction in household cooking fuel expenditure; Job creation through the manufacture and sale of the efficient stoves”).

^{xviii} Senegal (2015) [CONTRIBUTION PREVUE DETERMINEE AU NIVEAU NATIONAL \(CPDN\)](#).

^{xix} Jordan (2015) [INTENDED NATIONALLY DETERMINED CONTRIBUTION \(INDC\)](#) (“The proposed adaptation measures and projects are: ... Adopting more effective and rapid electronic exchange of surveillance data for rapid intervention, and establish, with the relevant ministry(ies), access to real-time air quality monitoring data to establish the link between respiratory diseases and air pollution and climate change”).

^{xx} Mongolia (2015) [INTENDED NATIONALLY DETERMINED CONTRIBUTION \(INDC\) SUBMISSION BY MONGOLIA TO THE AD-HOC WORKING GROUP ON THE DURBAN PLATFORM FOR ENHANCED ACTION \(ADP\)](#), 2 (“Mongolia is also interested to pursue some additional mitigation actions: Reduce fuel use in individual households through improving stove efficiency (with co-benefit of air pollution reduction),”).

^{xxi} Myanmar (2015) [MYANMAR’S INTENDED NATIONALLY DETERMINED CONTRIBUTION-INDC](#), 8.

^{xxii} Saint Lucia (2015) [INTENDED NATIONALLY DETERMINED CONTRIBUTION UNDER THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE \(UNFCCC\)](#) (“Achievement of the mitigation targets will translate to significant sustainable development benefit for Saint Lucia. The medium-term vision for Saint Lucia is: An innovative and industrious nation, grounded in the principles of patriotism, integrity, and good governance, striving towards sustainable development and equitable development for all. The benefits to flow from the mitigation interventions are consistent with this vision and include significant investments and technological advancement, with the accompanying employment generation, significant savings of foreign exchange to pay for fuel, as well as savings in energy costs across all sectors. They will also result in reduced emissions, with accompanying benefits to the local and global environments, and human health.”)

^{xxiii} Trinidad and Tobago (2015) [INTENDED NATIONALLY DETERMINED CONTRIBUTION \(INDC\) UNDER THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE](#) (“Therefore, implementing the provisions of the National Climate Change Policy is critical and necessary to ensure a sustainable development path that will redound to the benefits of society as a whole in the short, medium and long terms. Building climate resilience through the reduction of carbon emissions and reducing climate vulnerability in all sectors will create green jobs and have significant co-benefits from an air quality and associated public health costs perspective, as well as enhance the coping ability and capacity to the adverse impacts of climate change.”)

^{xxiv} Togo (2015) [INTENDED NATIONALLY DETERMINED CONTRIBUTION \(INDC\) WITHIN THE FRAMEWORK OF THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE \(UNFCCC\)](#) (“The Togo intends to use an approach based both on contributions based on the measures to implement and contributions based on the results to bring out the best co-benefits opportunities for reducing GHG emissions that result from synergies between adaptation and mitigation.”)

^{xxv} Zambia (2015) [ZAMBIA’S INTENDED NATIONALLY DETERMINED CONTRIBUTION \(INDC\) TO THE 2015 AGREEMENT ON CLIMATE CHANGE](#) (“Co-benefits were assessed utilizing the Development Impact Assessment Visual Tool, available at <https://www.ec-leds.org>.”)

^{xxvi} Bahrain (2015) [INTENDED NATIONALLY DETERMINED CONTRIBUTION](#) (“The Kingdom of Bahrain’s Economic Vision 20301 provides the long-term vision for a policy to diversify the economy. The aim is to inter alia reduce Bahrain’s dependence on oil & gas, focusing on the financial, manufacturing and tourism sectors. In line with Decision 24/CP.18, and putting forward current actions and plans in pursuit of economic diversification that have co-benefits in the form of emission reductions, Bahrain’s Vision 2030 maintains that “protecting our natural environment will include conserving our natural spaces for future generations to enjoy; implementing energy-efficiency regulations; directing investments to technologies that reduce carbon emissions, minimize pollution and promote the sourcing of more sustainable energy.”).

^{xxvii} Qatar (2015) [INTENDED NATIONALLY DETERMINED CONTRIBUTIONS \(INDCs\) REPORT](#) (“Economic diversification is crucial to Qatar in order to maintain a steady and robust economy. Qatar seeks to enhance the diversification of its economy away from hydrocarbon in consistent with decision 24/CP.18. Qatar has been contributing indirectly to the global efforts to mitigate climate change by exporting Liquefied Natural Gas as a clean energy.”).

^{xxviii} Saudi Arabia (2015) [THE INTENDED NATIONALLY DETERMINED CONTRIBUTION OF THE KINGDOM OF SAUDI ARABIA UNDER THE UNFCCC](#) (“The actions and plans outlined in this submission seek to achieve mitigation co-benefits ambitions of up to 130 million tons of CO₂eq avoided by 2030 annually through contributions to economic diversification and adaptation.”).

^{xxix} UAE (2015) [SUBMISSION BY THE UNITED ARAB EMIRATES](#), 3 (“The UAE welcomes the inclusive structure of the INDC model, which is consistent with a recognition of the special circumstances of developing countries with high dependence on fossil fuel production – an issue which was recognized by the COP in Decision 24/CP.18 on economic diversification. The UAE’s actions are based on a strategy for economic diversification that will yield co-benefits in terms of both mitigation and adaptation.... The UAE has launched a process to develop a full national inventory of greenhouse gas emissions. The UAE is also undertaking a process to improve its air quality measuring and reporting, in terms of pollution and the negative effects it may have on human health.”).

^{xxx} Benin (2015) [CONTRIBUTIONS PREVUES DETERMINEES AU NIVEAU NATIONAL \(CPDN\)](#) (“National Struggle Against Air Pollution Strategy: Develop transport intra- urban and inter- urban transit; Establish differential taxation for older used vehicles exceeding five (05) years; Introduce duty relief of taxes on public transport vehicles; Continue promoting 4T four times at the expense of mopeds mopeds 2T (the tax and customs exemption on 4T motorcycles and parts thereof); Improve traffic flow transportation in major cities; Pursue fight against the proliferation of the sale of adulterated gasoline.”).

^{xxxi} India (2015) [INDIA’S INTENDED NATIONALLY DETERMINED CONTRIBUTION: WORKING TOWARDS CLIMATE JUSTICE](#), 17 (“India has recently launched many programmes and schemes to address the problem of pollution... In 2014, a National Air Quality Index (AQI) was launched for Indian cities. AQI is based on six pollutants and is notified every day serving as public information tool to disseminate information on air quality in qualitative terms.”).

^{xxxii} India (2015) [INDIA’S INTENDED NATIONALLY DETERMINED CONTRIBUTION: WORKING TOWARDS CLIMATE JUSTICE](#), 17 (“Continuous Emission Monitoring System (CEMS) mandates the highly polluting industries to install 24X7 real time monitoring of emission and effluent discharge points.”).

^{xxxiii} Liechtenstein (2015) [LIECHTENSTEIN’S INTENDED NATIONALLY DETERMINED CONTRIBUTION \(INDC\)](#), 5 (“Liechtenstein’s main focus for its contribution, towards achieving the objective of the Convention as set out in its Article 2, is to reduce domestic emissions as much as possible. Albeit Liechtenstein is already highly efficient in its energy use some costs for further reductions within the country would be unreasonably high. Therefore Liechtenstein aims at the supplemental realization of emission reductions abroad. To that respect Liechtenstein emphasizes to invest in emission reduction projects of high quality standards which besides the mitigation of greenhouse gases also lead to social, health and environmental benefits.”).