



Ghana's NDC accounting tool

Daniel Benefor
Environmental Protection Agency, Ghana

Overview of Ghana's NDC

- Ghana has 31 NDC actions.
- 11 adaptation and 20 mitigation actions.
- The NDC covers seven priority areas.
- Energy, Transport, Agriculture, Water and Climate services, Industry, Health, Forestry.
- The NDC are aligned with the current national development and sectoral plans.
- Implementation is led by the line ministries.
- The Ministry of Environment coordinates implementation.
- Ghana EPA leads the technical aspects and reporting.
- The 31 actions are wide in scope, themes and are at different starting points.

Water storage and treatment

Decentralised community-run EWS

Avoided deforestation

Livestock disease management

Agroforestry Utility solar PV

Composting

Efficient aircon system

CNG in transport

NG Fuel diversification

Efficient fridges

Public transport

Biogas

Climate services

LPG Stove

On-shore wind

Reforestation

Solar mini-grid

Solar home PV

Small-medium hydro

Efficient stoves

Flood proofing

Water supply during drought

Combined heat & power

Solar lanterns

Enrichment planting

Energy storage capacitors

Conservation agriculture

Landfill methane capture

Indexed based climate insurance

NDC to achieve -45% of BAU emissions of 74 MtCO₂e by 2030

- 20 mitigation measures (mitigation potential)

- 2 unconditional >> 11 MtCO₂e
- 18 conditional >> 23 MtCO₂e
- 20 measures >> 34 MtCO₂e

- Sectors

- Energy >> 12 mitigation measures >> 14 MtCO₂e
- Forestry >> 2 mitigation measures >> 10 MtCO₂e
- IPPU >> 1 mitigation measure >> 1 MtCO₂e
- Transport >> 2 mitigation measures >> 5 MtCO₂e
- Waste >> 3 mitigation measures >> 4 MtCO₂e

Energy sector

■ Low-carbon electricity

- Fuel switch from heavy fuel to natural gas in existing power plant >> 145 ktCO₂e/yr
- Single cycle to combined cycle >> 399 ktCO₂e/yr

■ Reduced flaring

- Recovery and utilisation of associated gas from Jubilee and Tein oil fields >> 8096 ktCO₂e/yr

■ Grid connected, distributed and off-grid REs

- Solar PV, large grid >> 178 ktCO₂e/yr
- Solar home PVs >> 64.1 ktCO₂e/yr
- Solar/diesel mini-grid >> 8.1 ktCO₂e/yr
- Solar LED Lamps >> 188 ktCO₂e/yr

■ Clean cooking

- Efficient wood stoves >> 14596.5 ktCO₂e/yr
- LPG stoves replacing wood stoves >> 1163.2/yr

Forestry

- Lower deforestation and enhance carbon stocks
 - *REDD: Avoided deforestation* >> 2461.9 ktCO₂e/yr
 - *Reforestation* >> 2514.3 ktCO₂e/yr
 - *Assisted forest regeneration* >> 1257.1 ktCO₂e/yr

Waste

- Alternative waste management
 - *Landfill gas flaring* >> 2861.5 ktCO₂e/yr
 - *Composting of Municipal Solid Waste* >> 5337.8 ktCO₂e/yr
 - *Biogas from Municipal Solid Waste* >> 37 ktCO₂e/yr

Transport

- Bus-based transit
 - Bus Rapid Transit (BRT) >> 395.1 *ktCO₂e/yr*

Industry

- HFC phase down >> 1 *ktCO₂e/yr*

Funding the 20 NDC measures

- Domestic financing (ERs) – **Unconditional NDC**
- International financing - **Conditional NDC**
 - *Market based*
 - Article 6.2 (ITMOs)
 - Article 6.4 (Mitigation and sustainable development mechanism) (CERs?)
 - Regional and jurisdictional Markets (CERs – Korea ETS)
 - Voluntary market (offsets)
 - *Non-market mechanism*
 - Fund-based (FCPF type, CIF-Type, GEF-Type, GCF-Type)
 - Bilateral offsets

Tracking NDC

What are we tracking?

- NDC Progress (baselines, GHG inventory, emission targets, GHG effects of actions)
- Adaptation (risks, beneficiaries, investments)
- Co-benefits (development benefits)
- Investments (financial support – private, government and international)
- Non-financial support (awareness, capacity, technology transfer, partnerships etc)??

■ Our approach

- Integration (embed into existing government M&E arrangements) and automation.
- Developed indicators (mitigation and adaptation actions) for the line ministries to monitor the NDC.
- Developed **NDC accounting tool** based on the GACMO model and work by GIZ (Mitigation focus)

■ Who does the tracking and what level?

- National (led by National Development Planning Commission) – National annual progress reports.
- Sectors (line ministries – sector annual progress reports)
- District (local governments – district annual progress reports)

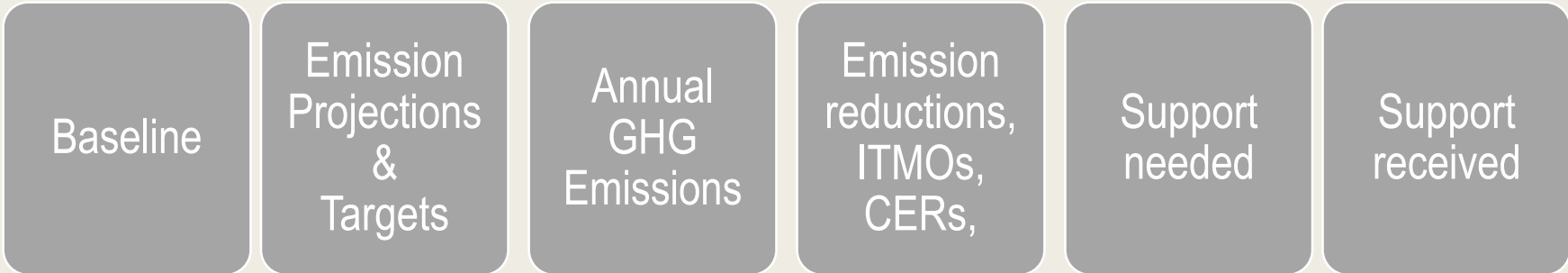
Characteristics of the NDC accounting tool

- Easy to develop and use.
- Builds on existing data from country reports.
- Simplified calculations and automation.
- Not data-intensive.
- Can be linked to other models or tools (GACMO, LEAP etc)
- Flexible and adaptable to unique data situations.
- Transparent (able to see formulae, systematic way of data inputs)
- Excel-based and open-source.

Basic data you need for the NDC accounting tool

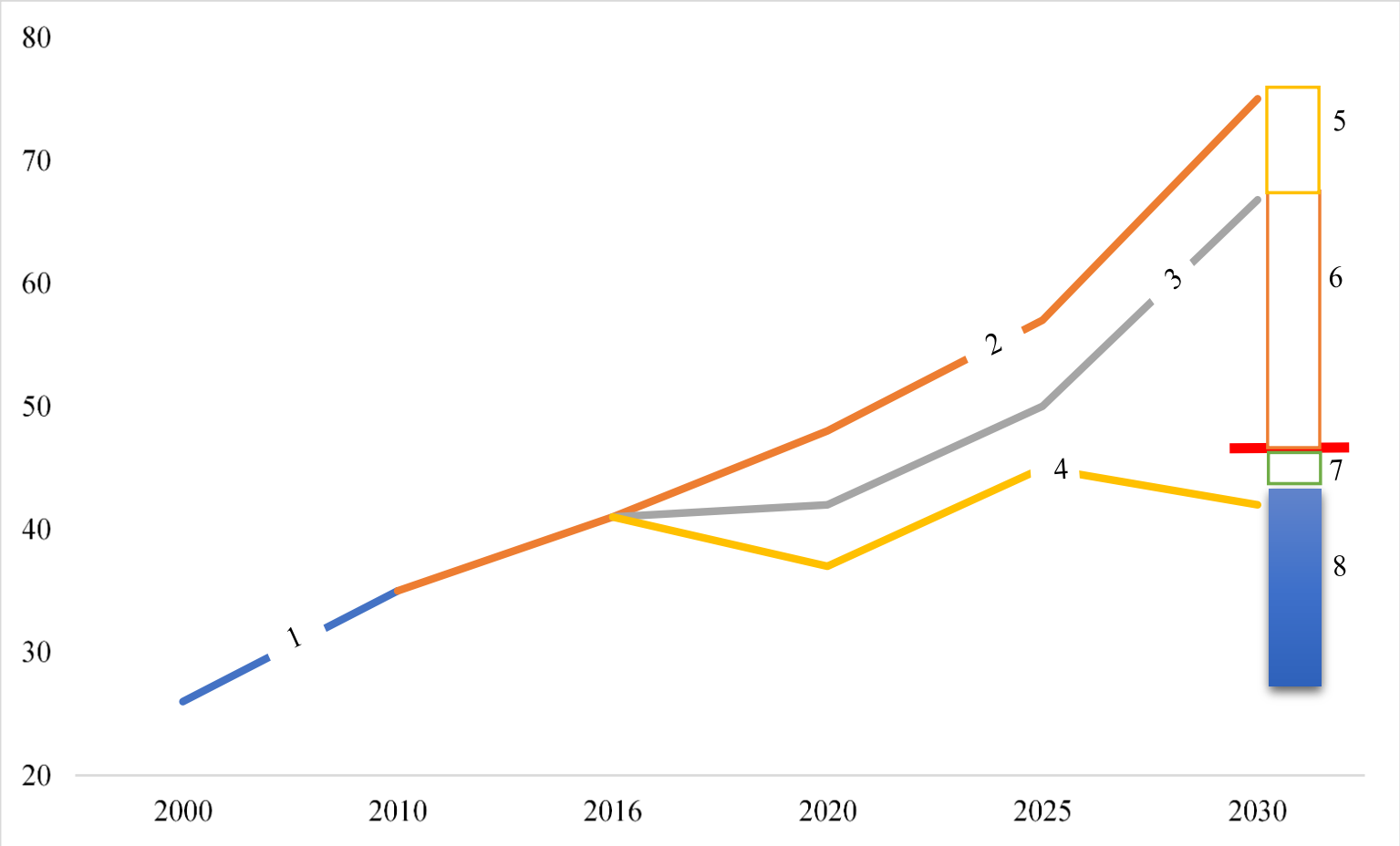
- You need data from your sectoral and national baseline emissions.
- Typically, baseline emissions data are from the calculations behind your NDC.
- Baseline emissions are build generated from your GHG inventory data
- Data from the mitigation targets, expressed per sectors or individual actions.
- Remember that, the effects of individual mitigation actions determine the mitigation targets.
- Tools like LEAP, GACMO, Excel or any other applicable ones, can be used to produce baseline emissions, and mitigation effects of NDC.
- Data from annual greenhouse inventory from the NDC base year.
- Indicators to monitor the performance your individual mitigation actions.
- Your use LEAP, GACMO, Excel or any applicable tool to compute the GHG effects of individual or aggregate mitigation actions based on the measuring indicators.

NDC Progress

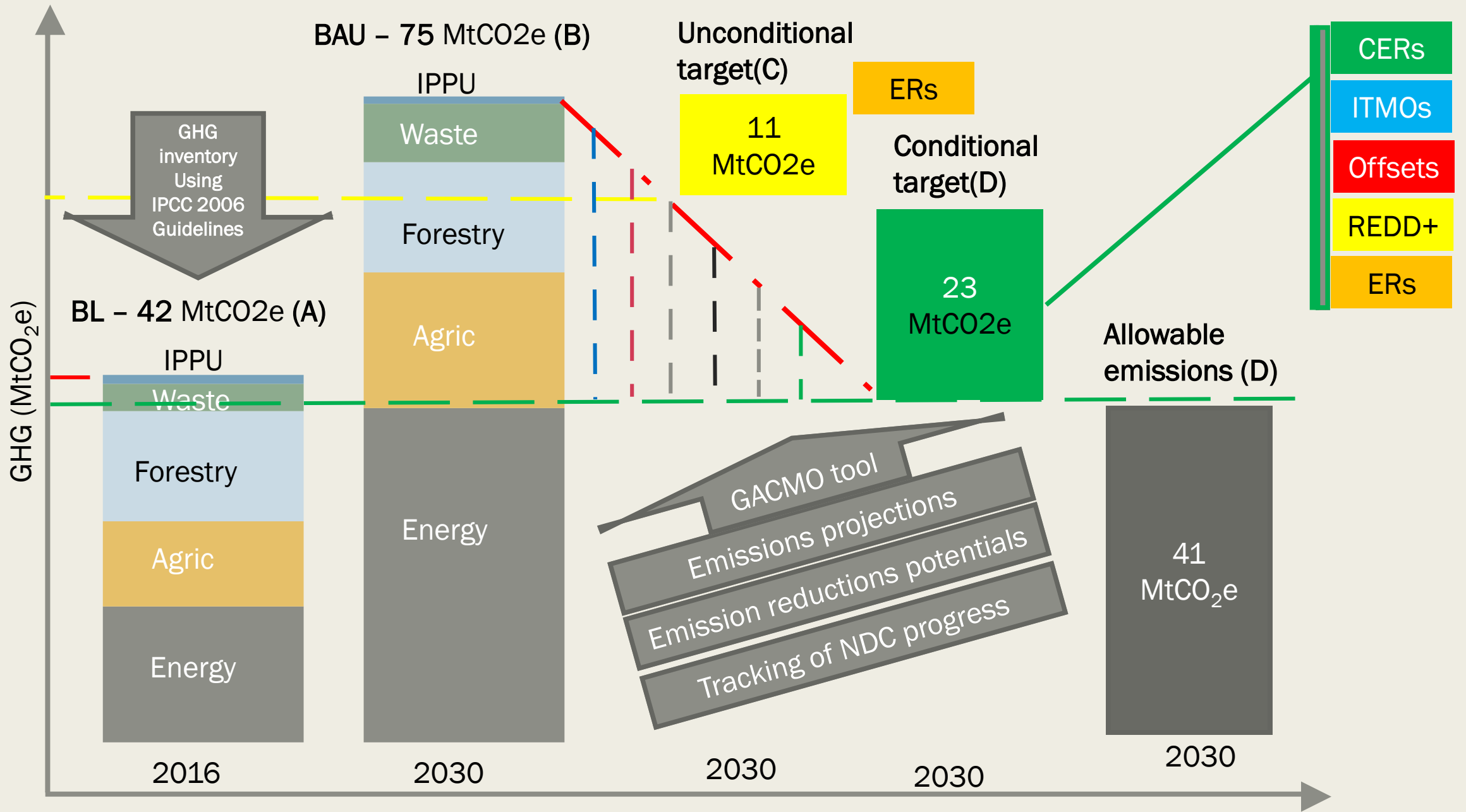


NDC Progress and Achievements

Tracking elements



1. Historical emissions
2. BAU emissions
3. Unconditional target
4. Conditional target
5. Unconditional emission reductions (in)
6. Conditional emission reductions (in)
7. Emission reduction (mitigation actions outside NDC)
8. Remaining emission from GHGI



Tracking NDC progress

- Tool – based on modified GACMO tool and work by GIZ (Ghana NDC GHG accounting tool)

- Elements for monitoring NDC progress
 - (A) *Baseline emission (BAU emissions – possible revisions every 5 year)*
 - (B) *Mitigation Commitments (45% lower than 2030 BAU emissions of 75MtCO₂e)*
 - (C) *Annual GHG inventory over NDC period*
 - (D) *NDC actions and their impacts (20 mitigation actions, 2 unconditional, 18 conditional)*
 - (F) *Corresponding Adjustments from emission transfers*

- Formulae to compute NDC progress (inventory based tracking) - **Ghana's preference approach**
 - $((A+F) - C)/(A+F) * 100$ (*indicatively in BTRs, and final accounting by 2030*)

- Option 2 - measure-based approach = $(D/A)*100$

Core indicators for mitigation actions

NDC Actions	Threshold Target by 2030	Sub-units	Indicators
Increase small-medium hydro installed capacity up to 150-300MW	300	MW	mini-hydro installed capacity
Attain utility-scale wind power capacity up to 50-150MW	150	MW	Grid-connected wind power installed capacity
Attain utility-scale solar electricity installed capacity up to 150-250 MW	250	MW	Grid-connected solar installed capacity
Scale-up the 200,000 solar systems for lighting in residential and non-residential buildings	200,000	500W	Number of installed solar home systems
Establish 55 mini-grids with average capacity of 40kW.	55	40kW	Number of 40kW mini-grids installed
Increase solar lanterns penetration in rural non-electrified households to 2 million	2,000	1000 lamps	#of LED lamps distributed
Scale-up adoption of LPG in at least 50% households	134	1000 LPG stoves	#of LPG stoves adopted, % of household using LPG for cooking
Scale-up access and adoption of 2 million efficient stoves	2,000	1000 efficient stoves	#of efficient stoves distributed
Fuel switch from heavy fuel oil to natural gas in existing electricity power plants	50	100 TJ fuel use/year	Quantity of natural gas per thermal electricity generated
Improve the efficiency of the thermal power plants by converting the single cycle power plants to combined cycle	3.3	100 MW increase	Amount of capacity added due to single cycle to combined cycle conversion
Recovery and utilisation of associated gas from Jubilee and Tein oil fields	120	1 MMSCF/day	Amount of gas recovered from oil field
Promote Efficient lighting with LED bulbs	20,000	1000 bulbs	#of LED bulbs distributed
Scale up adoption of Efficient Refrigeration	2,000	1000 refrigerators	# of efficient refrigerators distributed
Scaling up of installation of power factor correction devices in 1,000 commercial and industrial facilities (capacitor banks).	1,000	1 facilities	#of industrial and commercial facilities that have installed capacitors
Ghana Cocoa REDD+ Programme	270	Avoided deforestation 1000 ha	Avoided deforested area (ha)
Ghana Shea Landscape REDD+ Programme			
Wildfire management in the transition and savannah dry lands in Ghana			
National Forest Plantation Development Programme	660	Reforestation of 1000 ha	Areas reforested (ha)
Enrichment Planting			
HFC Reduction in the RAC sector (scale-up market share of climate-friendly and energy efficient aircondition)	70%	Market share of green and energy efficient airconditioners	% of market share of green and EE air conditioners
Expansion of intra city transportation modes (Bus Rapid Transit)	200	1 km BRT line	Length of BRT km
Expansion of inter and intra city transportation modes (Railway Transit System)	TBD	TBD	TBD
Improve effectiveness urban solid waste collection up to 70-90% and the construction of engineered landfill for methane recovery	14	200 t/day plant	Quantity of gas recovered from engineered landfills
Increase the current waste-to-compost capacity of 200 t/day to 500 t/day	0.5	1000 t/day plant	Waste-to-compost processing installed capacity
Scale-up 200 biogas facilities	1	1000 t/year plant	Quantity of biogas produced

Mitigation target, emission reduction per unit and measuring units

Reduction technology	Emission reduction Potential (ERP) (tCO ₂ /unit)	Measuring units	Unit targets		
			2020	2025	2030
Switch from fuel oil to natural gas	1,454.4	1 MW	-	100	-
Solar PVs, large grid	711.8	1 MW	50.0	150.0	250.0
Single cycle to combined cycle	120,744.0	100 MW increase	3.3	3.3	3.3
Wind turbines, on-shore	975.0	1 MW	20	50	150
Mini hydro power connected to main grid	1,720.0	1 MW	50	150	300
Efficient lighting with LEDs	78.9	1000 bulbs	2,500	5,000	7,000
Energy efficiency in industry	16,397.1	10% red. of energy demand	0.5	1.0	2.0
Efficient wood stoves	7,298.3	1000 stoves	100	500	2,000
LPG stoves replacing wood stoves	8,680.7	1000 stoves	10	50	133.5
Solar home PVs	0.3	50 W	50,000	100,000	200,000
Reduced flaring at oil field	22,613.5	1 MMSCF/day	117.5	120	120
Bus Rapid Transit (BRT)	1,975.5	1 km BRT line	54.7	100	200
Rail-Based Transit (RBT)		1 km RBT line	-	-	-
Reforestation	5,238.1	Reforestation of 1000 ha	100	100	280
REDD: Avoided deforestation	5,238.1	Avoided deforestation 1000 ha	50	150	270
Assisted forest regeneration	5,238.1	Reforestation of 1000 ha	50	50	140
Reforestation with Silvopasture	3,666.7	Reforestation of 1000 ha	50	100	70
Landfill gas flaring	124,415.2	200 t/day plant	3.0	6.6	13.7
Composting of Municipal Solid Waste	3,558,522.2	1000 t/day plant	0.5	0.5	0.5
Biogas from Municipal Solid Waste	12,186.7	1000 t/year plant	0.6	0.6	0.6
HFC phase down	613.0	All flourinated gases	0.2	0.5	1

Live demonstration of NDC accounting tool

Thank you