



جابتن قران منتری
PRIME MINISTER'S OFFICE
BRUNEI DARUSSALAM

سیکریٹاریات قروہن اقلیم نکارا برونی دارالسلام
BRUNEI CLIMATE CHANGE SECRETARIAT

Brunei Darussalam's National GHG Inventory System and GHG Estimates from the Energy Sector

Session IV: Methodology for the Energy Sector
The 20th Workshop on GHG Inventories in Asia (WGIA20)
June 26–29, 2023



CLIMATE CHANGE GOVERNANCE IN BRUNEI DARUSSALAM

BRUNEI DARUSSALAM NATIONAL COUNCIL ON CLIMATE CHANGE

CO-CHAIR

Minster at the Prime Minister's Office and
Minister of Finance and Economy II

CO-CHAIR

Minister of Development

MEMBER

Minister of Primary
Resources and Tourism

MEMBER

Minister of Transport and
Infocommunications

MEMBER

Deputy Minister (Energy)
at the Prime Minister's Office

MEMBER

Deputy Minister of Finance and
Economy (Economy)

EXECUTIVE COMMITTEE ON CLIMATE CHANGE

Secretariat: Brunei Climate Change Secretariat (BCCS)

INDUSTRIAL EMISSIONS COMMITTEE

Secretariat:
Energy Transition Division (DoE)

ELECTRIC VEHICLE JOINT TASK FORCE

Secretariat:
Land Transport Department (MTIC) and
Energy Transition Division (DOE)

ADAPTATION & RESILIENCE WORKING GROUP

Secretariat:
Brunei Climate Change Secretariat

INSTITUTIONAL ARRANGEMENTS OF BRUNEI DARUSSALAM'S GHG INVENTORY

TIMELINE
(ANNUAL)

Q4

Dissemination

INVENTORY
SUBMISSION



National GHG
Inventory Report



Q2 – Q3

Internal Review and/or
Verification by 3rd Party

NATIONAL
INVENTORY
COORDINATOR

سيكرتاريات قروهن اقليم نكارا بروني دارالسلام

BRUNEI CLIMATE CHANGE SECRETARIAT

Q2

Quality Check
Documentations

SECTOR LEAD
COMPILERS

ENERGY
IPPU

DEPARTMENT OF
ENERGY, PMO

AGRICULTURE

DEPARTMENT OF
AGRICULTURE &
AGRIFOOD, MPRT

FORESTRY AND
OTHER LAND USE

FORESTRY DEPARTMENT,
MPRT

WASTE

DEPARTMENT OF
ENVIRONMENT, PARK AND
RECREATION, MOD

30 APRIL

Collect Activity Data and
Emission Factors

DATA
PROVIDERS

ALL FACILITIES THAT EMITS AND/OR REMOVES GREENHOUSE GAS INCLUDING ALL ACTORS IN THE RELEVANT SECTORS' VALUE CHAIN:

- GOVERNMENT AGENCIES
- PRIVATE SECTORS
- STATISTICAL AGENCIES

MANDATORY REPORTING DIRECTIVE



DIRECTIVE

ON MANDATORY REPORTING ON GREENHOUSE GAS

2.3 Reporting of Greenhouse Gas Inventories

As part of the effort to ensure Brunei Darussalam's accountability and responsibility to provide transparency of national greenhouse gas emissions and/or removals in supporting climate change mitigation actions under the Brunei Darussalam's Nationally Determined Contributions (NDC) and the Brunei Darussalam National Climate Change Policy (BNCCP), the Facility/Facilities shall submit a report(s) relating to greenhouse gas emissions and/or removals.

DIRECTIVE

OBJECTIVES

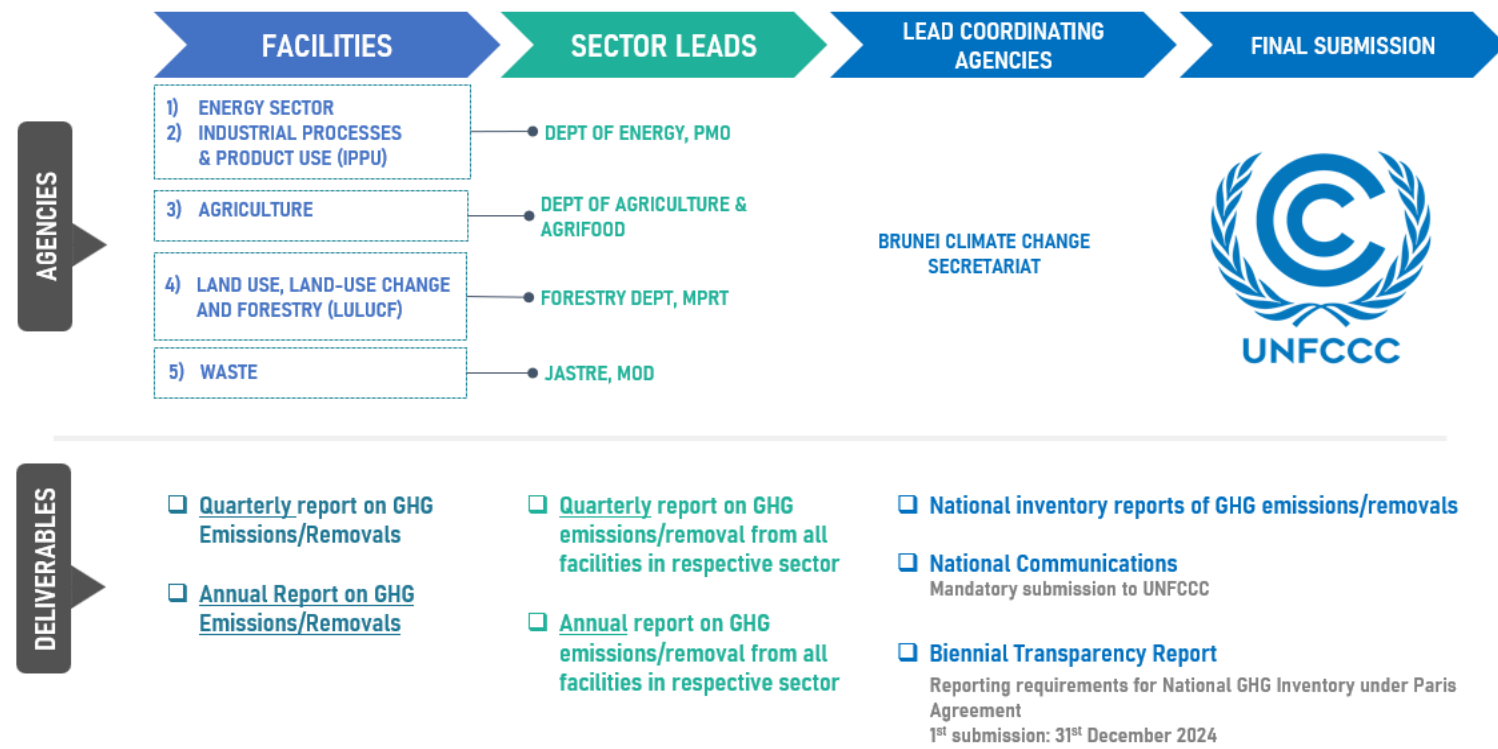
- 01 To enhance Monitoring, Reporting & Verification (MRV) of national GHG inventories
- 02 Ensure Transparency, Consistency, Comparability, Completeness Accuracy
- 03 Support climate Change mitigation & adaptation actions

TIMELINE

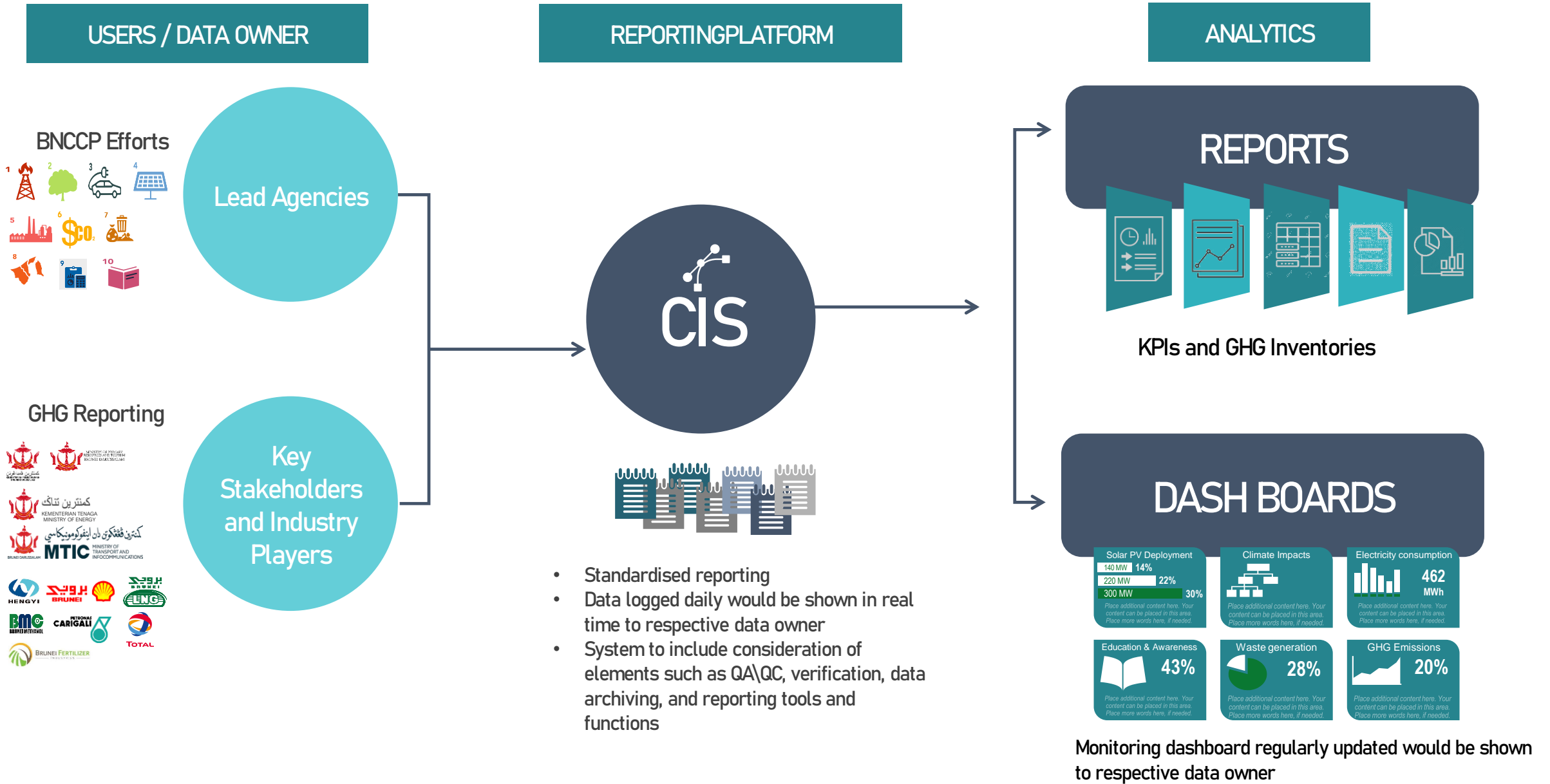
SUBMISSION	2023												2024		
	Q1			Q2			Q3			Q4			Q1		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
QUARTERLY				Q1 2023 REPORT 30 APR 2023			Q2 2023 REPORT 30 JUL 2023			Q1 2023 REPORT 29 OCT 2023			Q1 2024 REPORT 28 JAN 2024		
ANNUAL				2022 ANNUAL REPORT 30 APR 2023			Q1 2023 REPORT 30 APR 2023			2023 REPORT 30 APR 2023					

*Grace period – first two years, enabling quarterly submission past their formal quarterly deadlines (2023 and 2024)

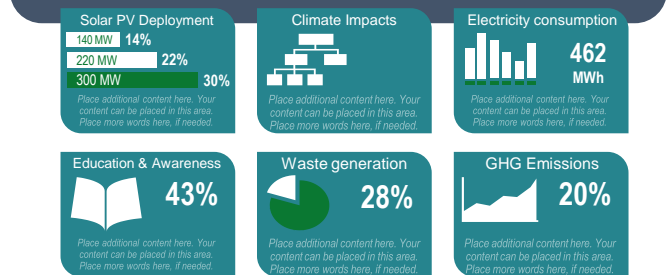
PROCESS



CENTRALISED INVENTORY SYSTEM



- Standardised reporting
- Data logged daily would be shown in real time to respective data owner
- System to include consideration of elements such as QA\QC, verification, data archiving, and reporting tools and functions

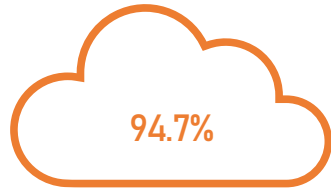


Monitoring dashboard regularly updated would be shown to respective data owner

OVERVIEW OF GHG EMISSIONS AND REMOVALS (2010 – 2021), BY SECTOR AND BY TYPE

As a predominantly oil and gas country, energy sector remains the largest emitting sector, accounting for more than 94% of the total emissions

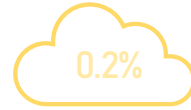
Type of GHG



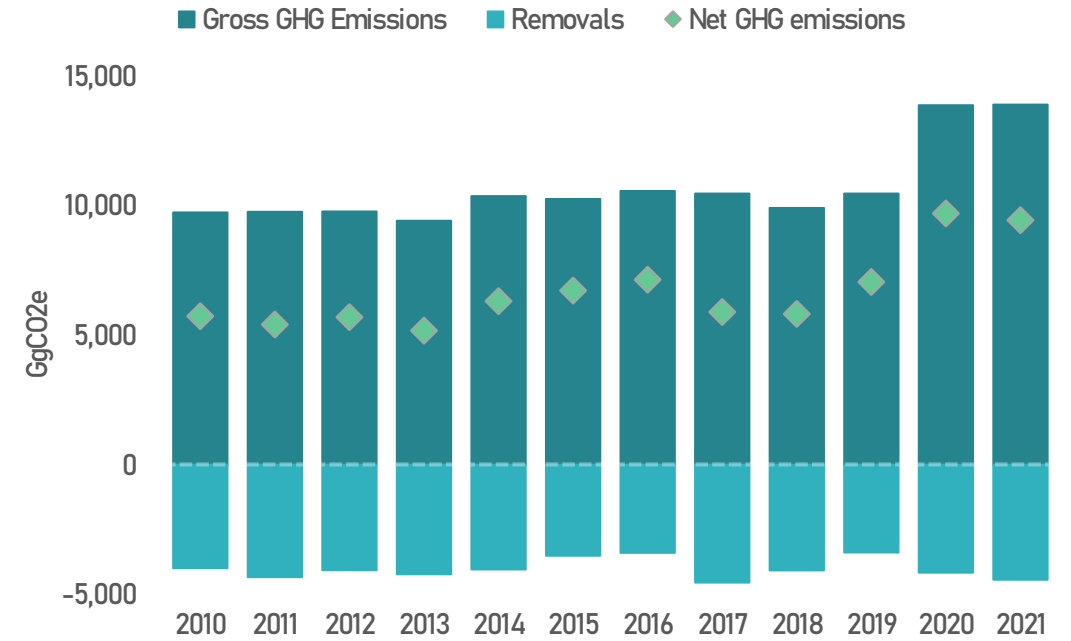
Carbon Dioxide (CO₂)



Methane (CH₄)



Nitrous Oxide (N₂O)



GHG Emissions by Sector

50%



Industrial Sector (Power Generation & Own Use)

23%



Public Utilities Power Generation

11%



Venting and Flaring

8.4%



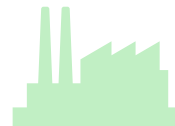
Land Transportation

2.8%



Non-specified Industries

2.3%



Industrial Processes

1.5%



Waste

0.8%



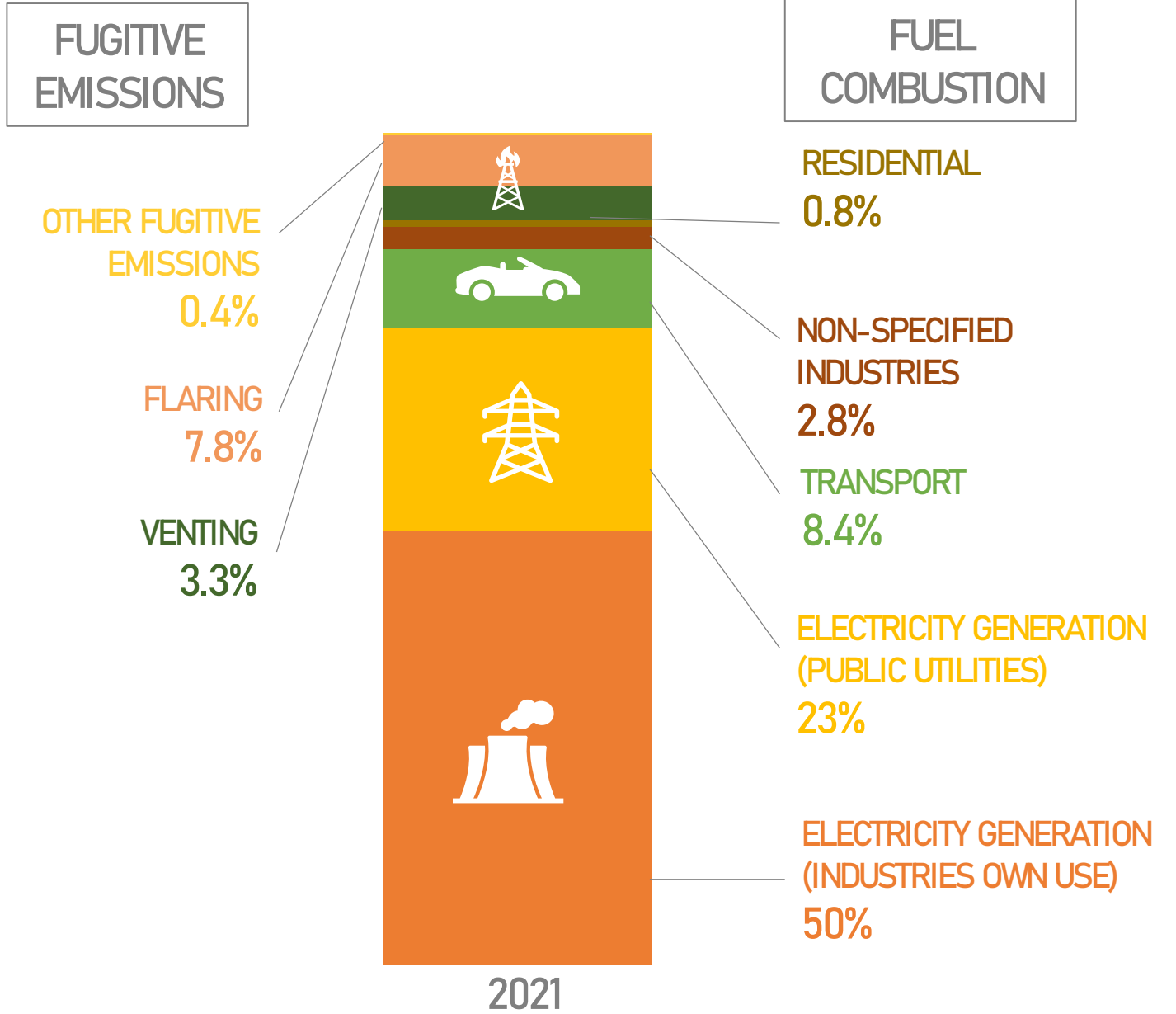
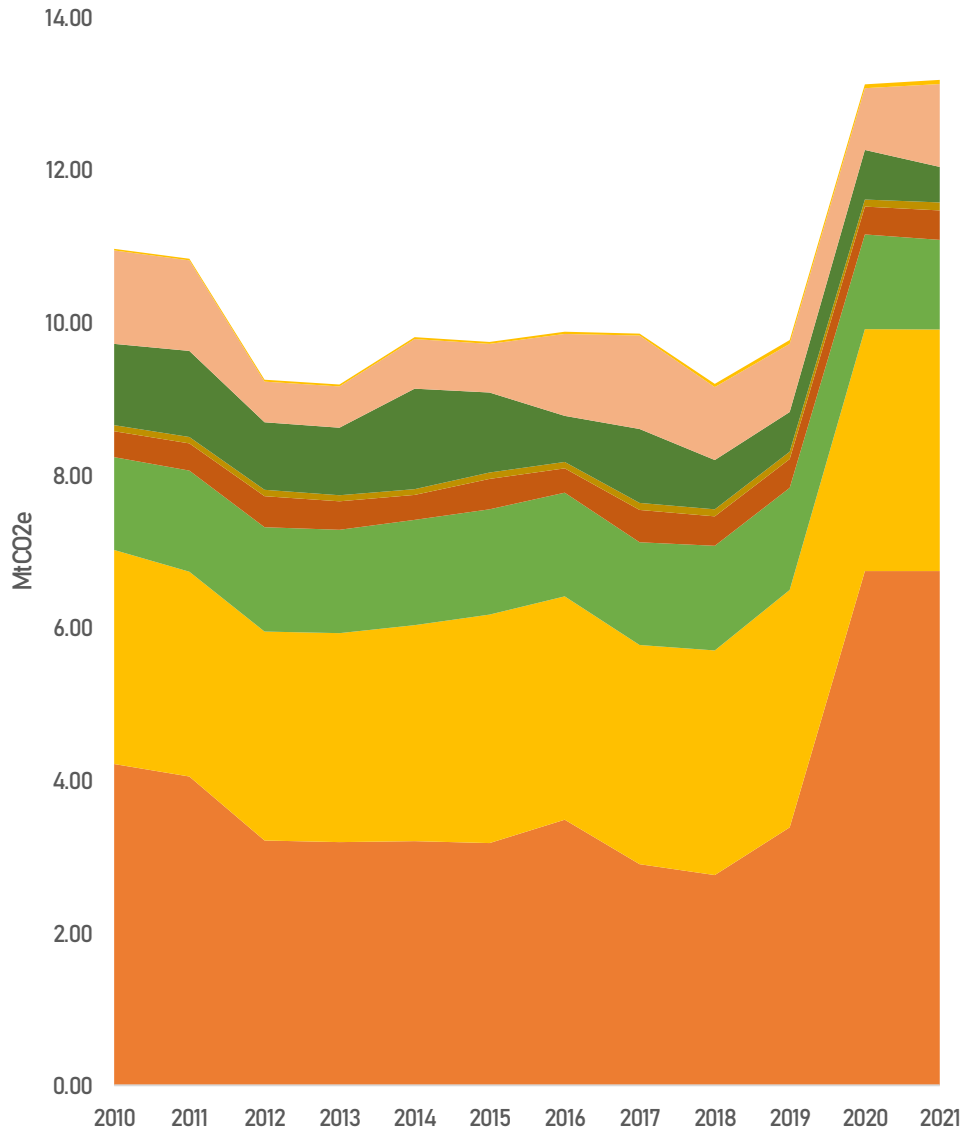
Residential

0.2%






Agriculture


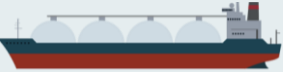


OVERVIEW OF GHG EMISSIONS FROM THE ENERGY SECTOR (2010-2021)



METHODOLOGY: TIER 1 (FUEL COMBUSTION)

IPCC Sub-Category	Activity Data: Fuel Consumption	Emissions Factor	Activity Data Sources
1A1ai Electricity Generation	Natural Gas (Dry), Diesel Oil	  	Department of Energy
1A2m Non-Specified Industry	Other Kerosene, Diesel Oil		Department of Energy
1A3aii Domestic Aviation	Jet A1 Kerosene		Brunei Shell Marketing Brunei Shell Petroleum
1A3b Road Transportation	Motor Gasoline, Diesel Oil		Department of Energy
1A3eii Off-road	Diesel Oil		Brunei Shell Marketing
1A4b Residential	Other Kerosene, Diesel Oil, LPG		Department of Energy

METHODOLOGY: TIER 1 (FUEL COMBUSTION)

IPCC Sub-Category	Activity Data: Fuel Consumption	Emissions Factor	Activity Data Sources
 <p>1A3ai International Aviation</p>  <p>1A3di International water-borne navigation</p>	<p>Jet A1 Kerosene</p> <p>Diesel Oil</p>	 <p>INTERGOVERNMENTAL PANEL ON climate change</p> 	<p>Brunei Shell Marketing</p> <p>Maritime and Port Authority of Brunei Darussalam (MPABD)</p>

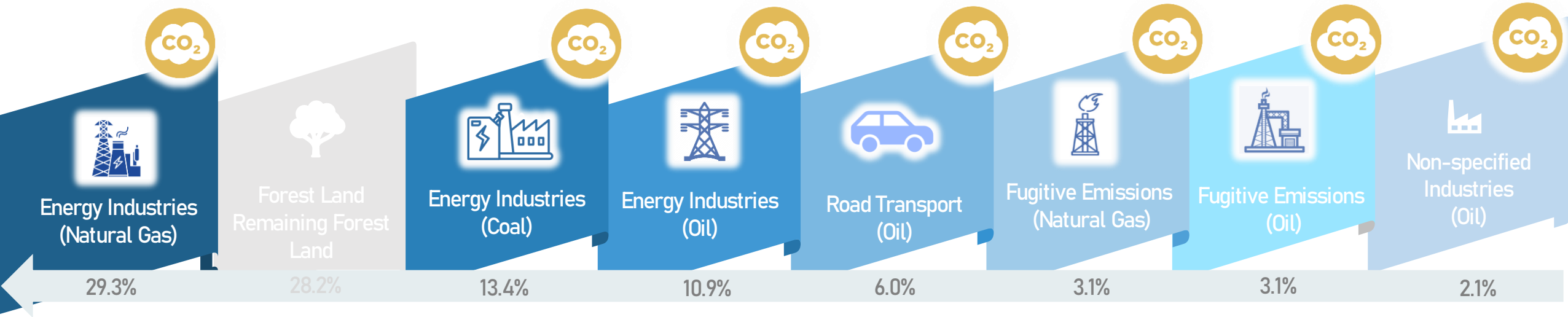
METHODOLOGY: TIER 3 (FUEL COMBUSTION)

IPCC Sub-Category	Activity Data: Fuel Consumption	Emissions Factor	Activity Data Sources
1A1b Petroleum Refining	Natural Gas (Dry), Coal	Plant-specific (CO ₂ , CH ₄ , N ₂ O)	Brunei Shell Petroleum HENGYI Industries
1A1cii Other Energy Industries	Natural Gas (Dry)		Brunei LNG
1A2c Chemicals	Natural Gas (Dry)		Brunei Methanol Company

METHODOLOGY: TIER 3 (FUGITIVE EMISSIONS)

IPCC Sub-Category	Activity Data	Emissions Factor	Activity Data Sources
<p>1B2ai Oil – Venting 1B2aiaii Oil – Flaring 1B2aiaiii4 Refining 1B2bia Natural Gas – Venting 1B2biaii Natural Gas – Flaring 1B2biaiii3 Processing</p>	<ul style="list-style-type: none">• Crude oil and condensate production• Associated and non-associated natural gas production• Venting and Flaring Activities• Other fugitives activity	<p>Plant-specific (CO₂, CH₄, N₂O)</p>	<p>Brunei Shell Petroleum HENGYI Industries Brunei LNG TOTAL Energies</p>

KEY CATEGORIES (2021)



METHOD: TIER 3
EF: PLANT-SPECIFIC

METHOD: TIER 3
EF: PLANT-SPECIFIC

METHOD: TIER 3
EF: PLANT-SPECIFIC

METHOD: TIER 3
EF: PLANT-SPECIFIC

METHOD: TIER 1
EF: IPCC DEFAULT

METHOD: TIER 1
EF: IPCC DEFAULT

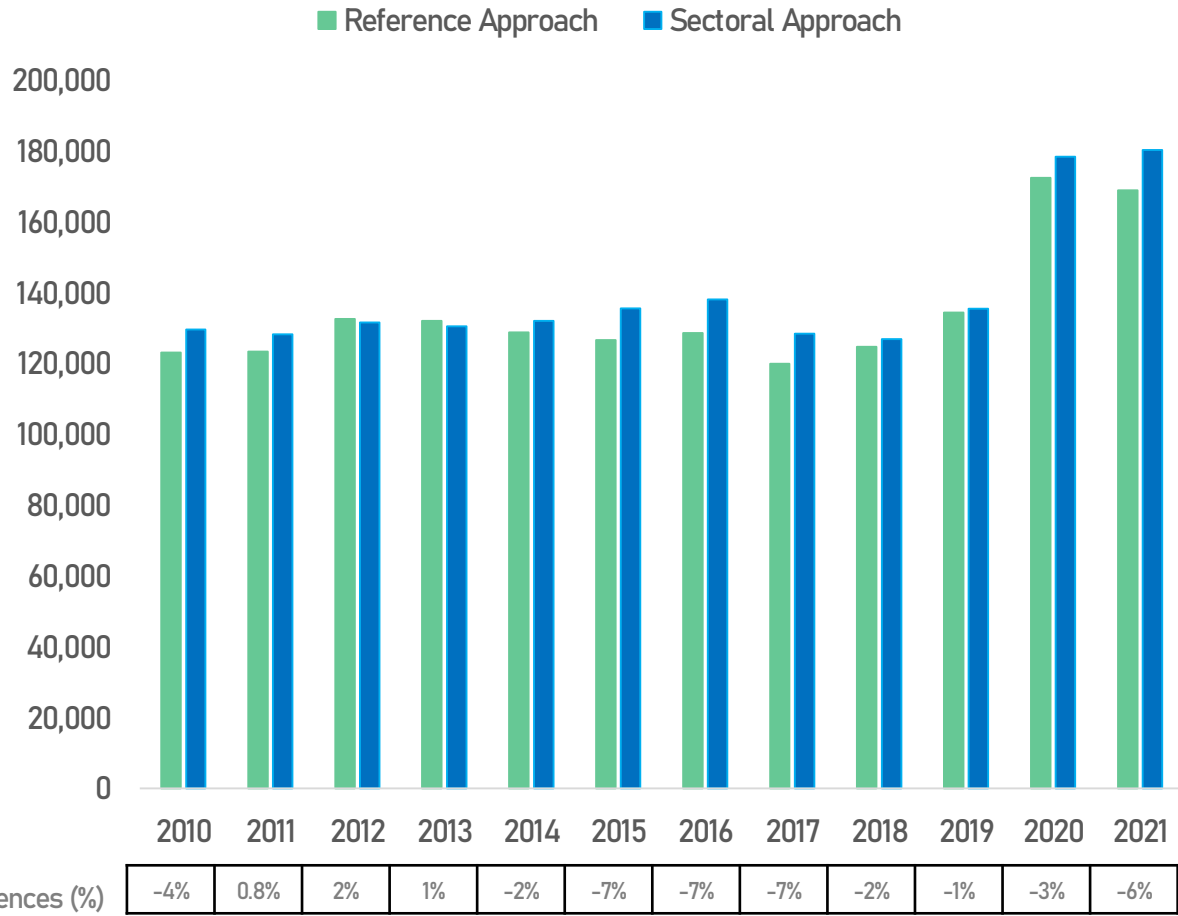
METHOD: TIER 1
EF: IPCC DEFAULT

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EF: IPCC DEFAULT

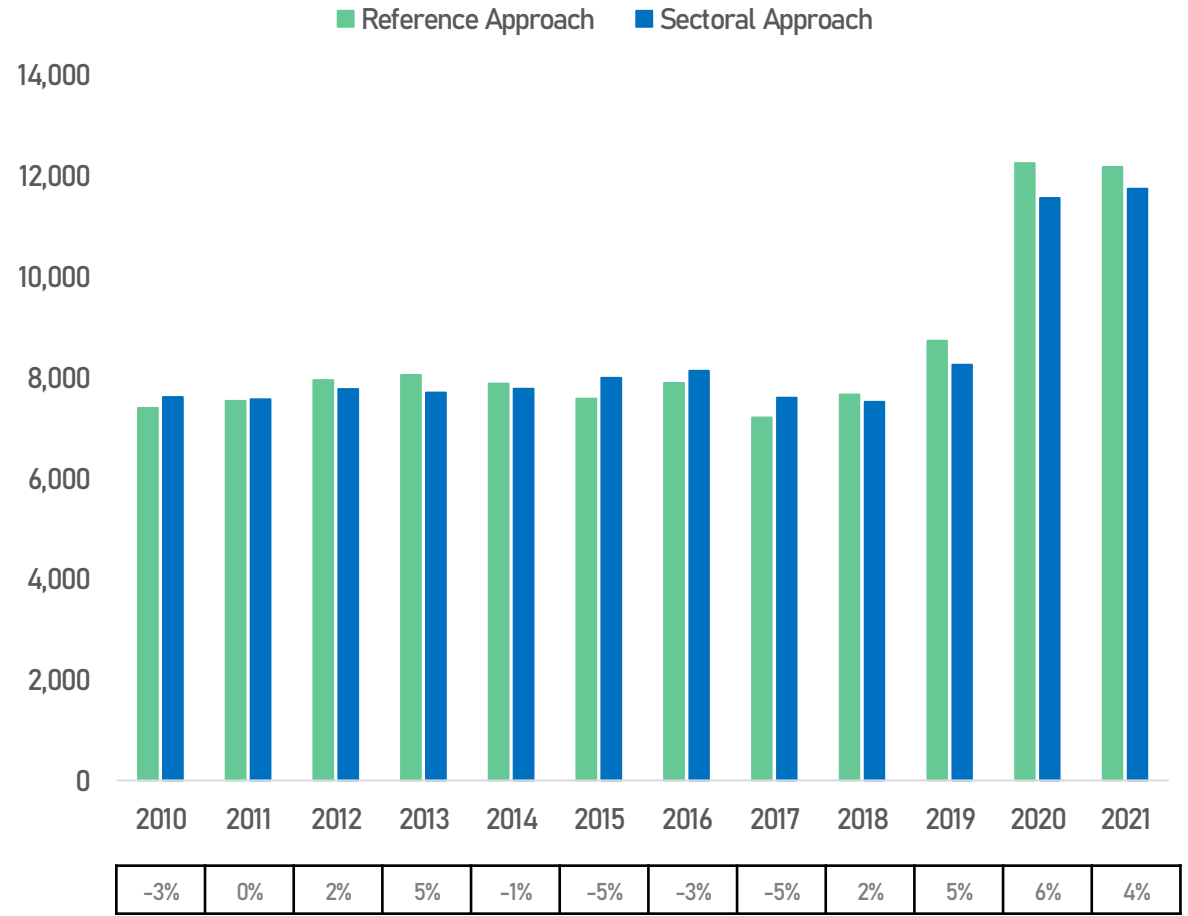
METHOD: TIER 1
EF: IPCC DEFAULT

REFERENCE VS. SECTORAL APPROACH

Energy Consumption (TJ)



CO₂ Emissions (Gg)



UNCERTAINTY ANALYSIS

10%

8%

6%

4%

2%

0%

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Uncertainty in Total Inventory	1.6%	4.0%	4.0%	4.3%	3.8%	3.6%	3.3%	3.9%	3.9%	3.3%	4.4%	4.7%
Trend Uncertainty		4.2%	4.4%	4.2%	4.4%	4.4%	4.5%	4.3%	4.2%	4.4%	7.7%	7.7%

Uncertainty in Total Inventory

Trend Uncertainty

QUALITY CHECK

General inventory QC procedures have been conducted in accordance with 2006 IPCC Guidelines:

- ✓ Check assumptions and selection of data are documented
- ✓ Check transcription errors and references
- ✓ Check units and conversion factors
- ✓ Ensure emissions are accurately estimated
- ✓ Check data consistency between sources and in time series
- ✓ Check recalculations
- ✓ Completeness checks
- ✓ Archiving and documentation

QUALITY ASSURANCE



- Held in August 2022 in Brunei Darussalam
- Jointly facilitated by UNFCCC Secretariat from the Transparency Division
- Objectives:
 - ✓ Examine the effectiveness of GHG inventory management system
 - ✓ 2006 IPCC guidelines
 - ✓ Basis for effective implementation of ETF
 - ✓ Strengthen national capacity
 - ✓ Lay groundwork for future GHG inventory improvements

VERIFICATION

- Verification of national inventory of anthropogenic emissions by source and removals by sink for all GHG in 4 sectors (Energy, IPPU, AFOLU, Waste) were conducted by a third-party firm
- Two verification exercises were conducted (in 2020 and 2023), for the GHG Inventories, which covered reporting period of:
 - ✓ 2010 – 2019
 - ✓ 2020 – 2021

PLANNED IMPROVEMENTS

- Draft an NIIP, and to update on regular basis, based on QA/QC results, KCA and uncertainty analysis
- TACCC
- Uncertainty Analysis
- Enhance internal coordination for preparation of GHG Inventory

An aerial photograph of a dense, vibrant green forest. A turquoise river winds through the center of the forest, forming a large loop. The water is clear and bright, contrasting sharply with the deep green of the trees. The forest appears to be a tropical or subtropical rainforest, with a variety of tree species visible from above.

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THANK YOU

www.climatechange.gov.bn