



Mondulkiri, 10-11 September 2020

# GHG-I Report of Cambodia's 1<sup>st</sup> BUR under UNFCCC

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DDG of GDEKI/MoE

# **Goal & Objective**

**General goal:** To make BUR report available in time for MoE to apply for REDD+ Result Based Payment (RBP) from Green Climate Fund (GCF)

### **Specific Project objectives:**

- 1. The estimation of the national GHG emissions by sources and sink 2000 2016;
- 2. The development of the BUR chapters (GHG-I & mitigation actions).





# Inst. Arrangement and WG for this special report preparation

**Coordination Group** 

Chair: H.E. Sao Sopheap, Secretary of State, MoE

Vice Chairs: H.E. Chea Sam Ang, Under Secretary of State

H.E. Tin Ponlok, Secretary General, GSSD



**General Directorate of Administration for Nature Conservation and Protection** 

### **Technical & Financial Supports**

- UNDP & FAO (FCPF II)
- GEF (UNEP/GSSD)

### Technical Team MRV (25), GHG-I

(15), CCTWG (25)

National Consultant (05)

National coordinator (01)

International Experts (03)

- Energy
- Waste
- **IPPU**
- **AFOLU**
- Mitigation actions





# **Report Preparation Process and** key deliverables

#### 21 July 2017

9th meeting of the REDD+ Task force:

- Recognizing the important work on BUR -Selected UNDP as Accredited Entity to assist preparing concept note for RBP to GCF

#### Aug 2018

#### Inst. Arrangement

- Existing: GHG-I, MRV, CCTWG
- Nat . & Int. consultant recruited
- Sectoral data review/data collection started
- Inception workshop (29 Aug)

#### 26-29 Nov. 2018

2<sup>nd</sup> mission of int, experts:

- Sectoral data assessment,
- Data improvement plan
- Data archiving
- Training Workshop on GHG-I with 2006 IPCC software
- **GHG** Estimate

#### March 2019

The draft report on GHG-I is available from int. experts

#### 30 April 2019

Final Review Workshop on GHG-I, and the chapters of BUR

#### **BUR Contents**

**Chapter 1: National Circumstance and Institutional Arrangements** 

Chapter 2: Greenhouse Gases Inventory, &

Chapter 3: Mitigation actions

Chapter 4: Information on the support received and needs

Chapter 5: Measurement, Reporting and verification system

**By June 2019** FBUR is ready

























#### 29 June 2018 LoA between GDANCP-GSSD signed.

#### 1-5 October 2018

1th mission of int. experts:

- Sectoral data review,
- Data gaps fulfillments
- Data archiving
- Capacity Building (training on data assessment-analysis)

**GDANCP** 

#### Feb. 2019

Internal Technical Review on the 1st draft of GHG-I, uncertainty analysis, and improvement plan

**GSSD** 

#### 5 April 2019

The draft report on GHG-I was sent to CCTWG, Nat. GHG-I, MRV, DPs and others for comments

#### Early May 2019

GDANCP submits all deliverables to GSSD



#### Key deliverables:

- 1- GHG-I Report
- 2- Chapter of GHG-I & MAs of BUR
- 3- Data assessment Report
- 4- Key Category Analysis Report
- 5- Mission Reports (1&2)
- 6- Datasheets (Data archiving)

#### **July 2019** MoE submits application

for RBP to GCF Concept note

- NRS
- FRL
- SIS & SOI
- FBUR + Technical Annex on forestry

#### 13 Aug 2020

BUR1 submitted to UNFCCC







### **Photo Gallery: Training activities**







# **Summary Result**

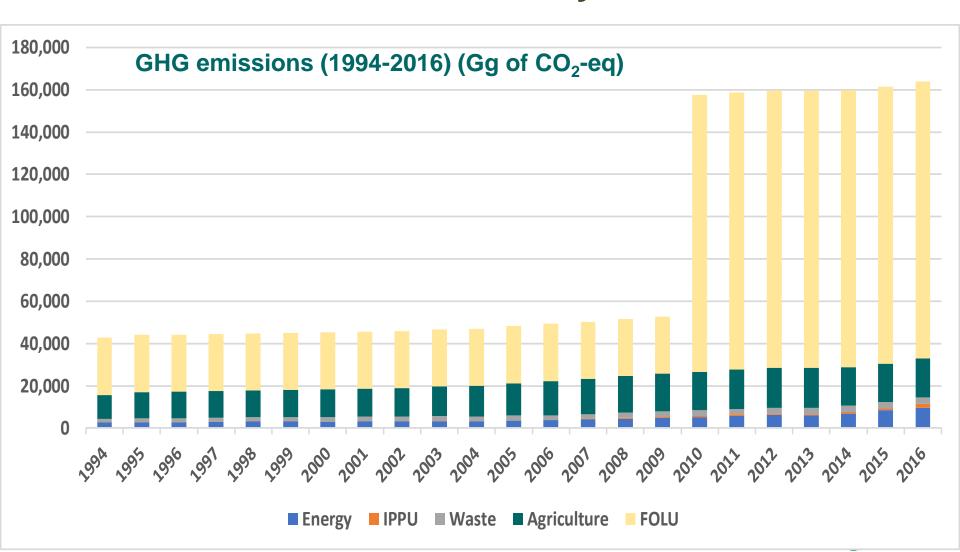
### 1. National GHG Inventory

Trend of emissions (GHG, Gg CO2-eq)

| Inventory Sector                            | 1994     | 2000     | 2005     | 2010      | 2015      | 2016      |
|---|----------|----------|----------|-----------|-----------|-----------|
| Energy                                      | 2690.95  | 3102.73  | 3454.41  | 5306.37   | 8356.31   | 9601.61   |
| IPPU  | 3.81     | 6.04     | 12.73    | 492.84    | 1001.38   | 1821.15   |
| Waste                                       | 1756.18  | 2111.61  | 2415.89  | 2633.62   | 2974.53   | 3050.67   |
| Agriculture<br>(3A + 3C)                    | 11202.58 | 13032.31 | 15336.38 | 18136.08  | 18068.35  | 18397.67  |
| Forest and Other<br>Land Use<br>(FOLU) (3B) | 27018.62 | 27018.62 | 27018.62 | 131011.24 | 131011.24 | 131011.24 |
| Total<br>(without FOLU)                     | 15653.52 | 18252.70 | 21219.42 | 26568.91  | 30400.57  | 32871.10  |
| Total<br>(with FOLU)                        | 42672.14 | 45271.32 | 48238.04 | 157580.15 | 161411.82 | 163882.35 |

# **Key Reports and Findings**

### 1. National GHG Inventory



#### **Key messages**

- The national GHG inventory includes emissions for the years 1994-2016 of the gases CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O and HFC and the sectors of Energy, Industrial Processes and Product Use (IPPU), Agriculture, Forestry and Other Land Use (AFOLU) and Waste.
- The inventory has been calculated following the methodologies of the 2006 IPCC Guidelines. The global warming potentials uses are those of the Fourth Assessment Report of IPCC, based on the effects of GHGs over a 100-year time horizon. Data used are tier 1 and tier 2 mostly.
- The major contributor to the GHG emissions during the entire period is the Forest and Other Land Use sector (FOLU). The second largest emitter sector in the country is the Agriculture sector. The third and fourth largest emitter sectors in the country are the Energy and Waste sectors. The fifth contributor the national total GHG emissions is IPPU.
- Emissions (including FOLU) per capita have increased from 4.00 to 10.44 tonnes CO<sub>2-eq</sub>/inhabitant/year (with FOLU), and emissions per capita have increased from 1.47 to 2.09 tonnes CO2-eq/inhabitant/year (without FOLU).
- Conversely, GHG emissions (including FOLU) per unit of GDP have been reduced from a 15.41 to 8.26 tonnes Co<sub>2-eq</sub>/thousand USD/year. Without FOLU, emissions per unit of GDP have decreased from 5.65 to 1.66 tonnes Co<sub>2-eq</sub>/thousand USD/year. This reduction is due to the fact that the expansion of GDP is significantly higher than the increase of GHG emissions.

# Key Result by sector







Waste GHG emissions show an increasing trend in all categories. The **increased population** and **GDP** are the main drivers for the emissions of the energy sector.

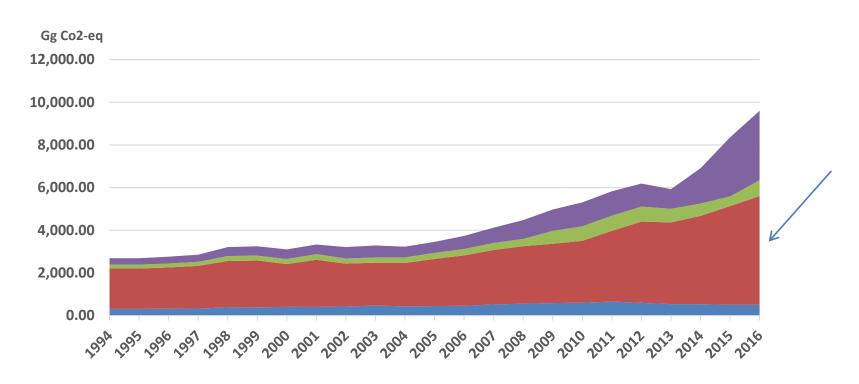
The energy demand has experienced a significant increase, transport sector is expanding, and the population is migrating to cities; all these factors combined led to increasing fuel consumption and higher GHG emissions in the energy sector.

GHG, Gg CO2-eq

| <b>Emission source</b>                                  | 1994     | 2000     | 2005     | 2010     | 2015     | 2016     |
|---|----------|----------|----------|----------|----------|----------|
| 1A1 Energy  | 298.87   | 450.75   | 512.49   | 1 120.27 | 2 766.58 | 3 255.58 |
| 1A2 Manufacturing construction                          | 186.38   | 236.59   | 287.03   | 682.46   | 458.28   | 746.19   |
| 1A3 Transport   | 1 892.04 | 2 003.53 | 2 205.42 | 2 897.00 | 4 625.81 | 5 094.21 |
| 1A4 Other<br>(commercial/residenti<br>/public services) | 313.66   | 411.87   | 449.47   | 606.64   | 505.64   | 505.64   |
| Total   | 2 690.95 | 3 102.73 | 3 454.41 | 5 306.37 | 8 356.31 | 9 601.61 |



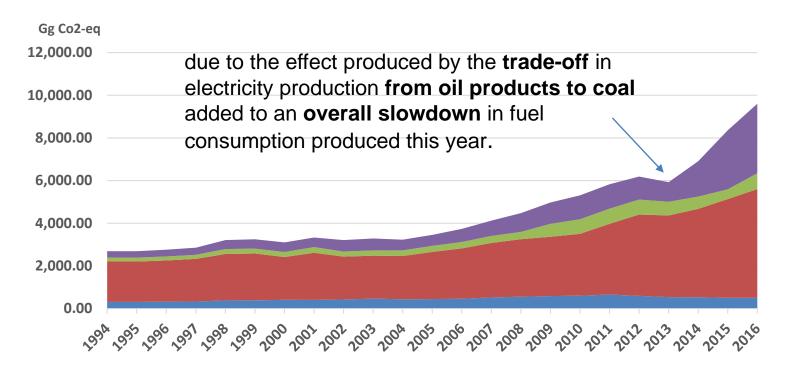
The main contributor to the emissions of the sector the main contributor to energy sector emissions is **transport** (category 1A3), with a contribution that ranges from a 70.5% in 1994, to a 52.9% in 2016.







The second contributor to GHG emissions of the energy sector is **energy industries** (category 1A1), with a contribution that ranges from a 11.1% in 1994 to a 33.8% in 2016.

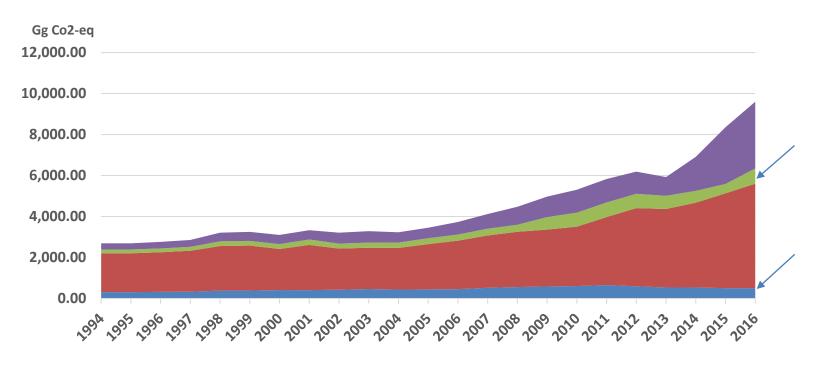






The third contributor to the emissions is the sector **other** (category 1A4), with a contribution that ranges from a 11.4% in 1994 to a 5.2% in 2016

The fourth contributor to the emissions is the sector is **manufacturing and construction industry**, **which** contributes with a 7.0% of emissions in 1994 and increased up to 8.2 in year 2016.



■ 1A4 Other - Total ■ 1A3 Transport - Total ■ 1A2 Manufacturing Industry ■ 1A1 Energy Industries

### **IPPU**



IPPU GHG emissions show an increasing trend in all emission categories. The increasing consumption of F-gases and production of cement, in turn motivated from an increasing GDP trend, are the main drivers of the sector.

GHG, Gg CO2-eq

| Emission source              | 1994 | 2000 | 2005  | 2010   | 2015     | 2016     |
|------------------------------|------|------|-------|--------|----------|----------|
| 2A1. Cement production       | NE   | NO   | NO    | 370    | 653      | 1 421    |
| 2D1. Lubricants              | 3.81 | 6.04 | 6.41  | 8.60   | 28.25    | 28.50    |
| 2F. Subst. for ODS (F-gases) | NO   | NO   | 6.32  | 114.10 | 320.24   | 371.68   |
| Total                        | 3.81 | 6.04 | 12.73 | 492.84 | 1 001.38 | 1 821.15 |





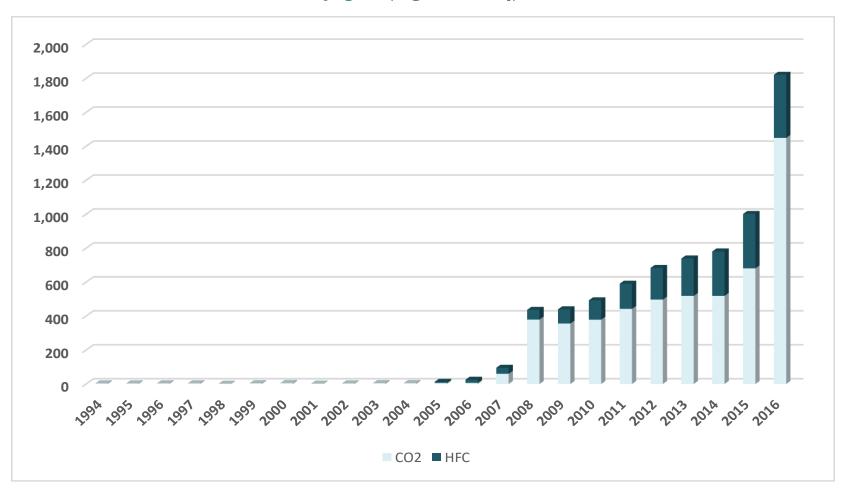




### **IPPU**



### Emission by gas (Gg CO2-eq)











### Waste



Waste GHG emissions show an increasing trend in all categories. The **increased population** and the **changes in waste management and sanitation** are the main drivers for the emissions of the waste sector.

GHG, Gg CO2-eq

| Emission source                       | 1994     | 2000     | 2005     | 2010     | 2015     | 2016     |
|---------------------------------------|----------|----------|----------|----------|----------|----------|
| 4A Solid waste disposal               | 539.20   | 693.44   | 875.61   | 1 077.14 | 1 288.36 | 1 345.77 |
| 4B Biological treatment               | 8.81     | 10.57    | 11.74    | 12.99    | 13.69    | 13.92    |
| 4C Incineration and Open Burning      | 836.27   | 950.24   | 1 016.52 | 1 011.41 | 1 079.29 | 1 093.05 |
| 4D Wastewater treatment and discharge | 371.91   | 457.35   | 512.02   | 532.09   | 593.18   | 597.93   |
| Total                                 | 1 756.18 | 2 111.61 | 2 415.89 | 2 633.62 | 2 974.53 | 3 050.67 |





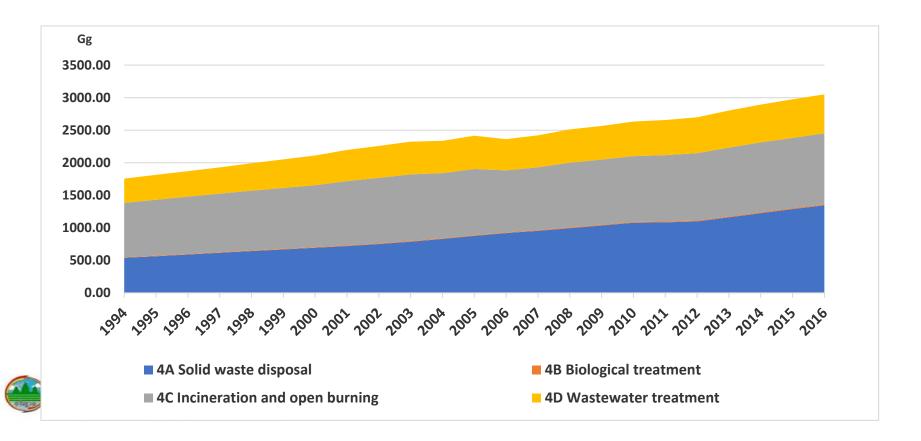




### Waste



The main contributor to the emissions of the sector is category 4A Solid waste disposal followed by 4C Incineration and open burning and 4D Wastewater treatment and discharge. Biological treatment of waste emissions are not yet significant. The evolution of the emissions is explained by the evolution of waste and wastewater practices (see assumptions).



### AFOLU



| Categories \ Emissions & removals (ktCO <sub>2</sub> e) | 1994   | 2000   | 2005   | 2010    | 2015    | 2016    |
|---|--------|--------|--------|---------|---------|---------|
| Total   | 38 221 | 40 051 | 42 355 | 149 147 | 149 080 | 149 409 |
| 3.A - Livestock   | 5 371  | 5 679  | 6 100  | 6 400   | 5 363   | 5 385   |
| 3.A.1 - Enteric Fermentation                            | 4 249  | 4 525  | 4 756  | 5 118   | 4 173   | 4 188   |
| 3.A.2 - Manure Management                               | 1 121  | 1 154  | 1 344  | 1 282   | 1 190   | 1 196   |
| 3.B - Land  | 27 019 | 27 019 | 27 019 | 131 011 | 131 011 | 131 011 |
| 3.C – Crop cultivation                                  | 5 832  | 7 353  | 9 236  | 11 736  | 12 706  | 13 013  |
| 3.C.1 - Biomass burning                                 | 134    | 143    | 148    | 160     | 169     | 156     |
| 3.C.2 - Liming  | 0      | 0      | 0      | 0       | 0       | 0       |
| 3.C.3 - Urea application                                | 2      | 2      | 2      | 30      | 17      | 17      |
| 3.C.4 - Direct N2O from managed soils                   | 684    | 764    | 850    | 1 000   | 974     | 944     |
| 3.C.5 - Indirect N2O from managed soils                 | 266    | 293    | 329    | 388     | 440     | 404     |
| 3.C.6 - Indirect N2O from manure management             | 144    | 158    | 171    | 182     | 166     | 169     |
| 3.C.7 - Rice cultivation                                | 4 603  | 5 994  | 7 737  | 9 977   | 10 939  | 11 323  |
| 3.C.8 – Other   | 0      | 0      | 0      | 0       | 0       | 0       |
| 3.D - Other   | 0      | 0      | 0      | 0       | 0       | 0       |



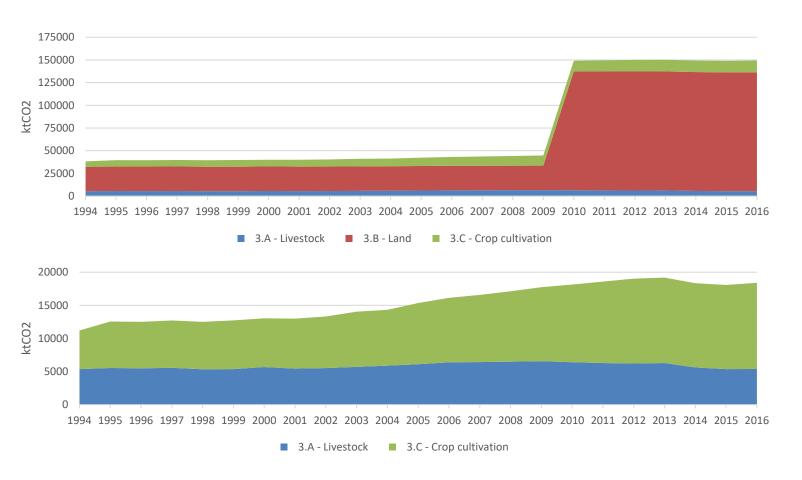






### **AFOLU**

Two different periods are actually monitored for the category 3B (2006-2010 and 2010, 2014). It leads to a **very large** emissions for the most recent years. CH<sub>4</sub> from rice is also increasing a lot in relation with **rice development** in Cambodia.



# Improvement Plan

- Archiving system
- Inventory Compilation team
- Institutional arrangements and roles and responsibilities
- Improvement of AD & EF
- Improvement of national statistics and ensure the consistency of the time series

## **THANK YOU**

