Greenhouse Gas Inventory Systems in India

- India is the world’s third largest emitter of CO₂
- India has comparatively low emissions per capita

Indian Institutions involved in GHG Inventory Preparation

- Convened in 1998 by WBCSD and WRI
- Mission: to develop international GHG accounting & reporting standards for business through an inclusive and transparent multi-stakeholder process
- Corporate inventories & GHG mitigation projects

Multi-Stakeholder Process
- GHG Protocol Standard
  - Corporate module
  - Project module

Builds on Existing Approaches

Adoption and Continuous Improvement

Source of Data: https://www.google.com/
• **Carbon dioxide (CO₂):** Fossil fuel use is the primary source of CO₂

• **Methane (CH₄), Nitrous oxide (NOₓ), Fluorinated gases (F-gases):** Agricultural activities, waste management, energy use and biomass burning all contribute to CH₄ emissions.

• Accounting emissions from subsidiaries, JVs, etc.

• Based on financial accounting practices

• Overall framework remains same: two main accounting options for consolidation: Equity and Control

• Companies now have a choice to use either the control or the equity share approach

• More accurate definition of/criteria for control

• Some new/simpler definitions which need to be decided on

• Guidance on contractual arrangements and leasing provided

---

**Businesses using GHG Protocol in INDIA**

- Godrej & Boyce, HCC Limited, Ford Motor Company (India), Mahindra Sanyo Steel, Jet Airways, Tata Teleservices, Bayer Group, Infosys Technologies, Tata Chemicals, NTPC, ITC, Yes Bank, Cummins India, Forbes Marshall, JK Tyres, Shree Cements, United Technologies, Ambuja Cement and GAIL

---

### Reporting GHG emissions

<table>
<thead>
<tr>
<th>Entity</th>
<th>What to Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reporting for Control</td>
<td></td>
</tr>
<tr>
<td>Controlled</td>
<td>100% of Emissions</td>
</tr>
<tr>
<td>No Control</td>
<td></td>
</tr>
<tr>
<td>Reporting for Equity Share</td>
<td></td>
</tr>
<tr>
<td>Wholly owned or controlled</td>
<td>Equity Share of Emissions</td>
</tr>
<tr>
<td>Significant Influence/Associated Entities</td>
<td>Equity Share of Emissions</td>
</tr>
<tr>
<td>No Control/ No Influence (Fixed Investments)</td>
<td>------</td>
</tr>
</tbody>
</table>
Three scopes guarantee transparency:

- Scope 1: Direct emissions (must report)
- Scope 2: Indirect Emissions - imported electricity, heat, or steam (must report)
- Scope 3: Other relevant indirect emissions (voluntary)

### Building Universal Standard

1. Business Goals
2. Accounting Principles
3. Organizational Boundaries
4. Operational Boundaries
5. GHG Reductions and Offsets
6. Tracking Emissions Over Time (formerly “Setting a Historic Performance Datum”)
7. New Chapter: Voluntary GHG Targets
8. Identifying and Calculating GHG emissions
9. Managing inventory quality
10. Reporting GHG emissions
11. Verification

### Sectoral Toolset

- Adipic Acid
- Aluminium
- Ammonia
- Cement
- HCFC-22
- Iron and Steel
- Lime
- Nitric Acid
- Pulp and Paper
- Refrigeration and Air-conditioning
- Semiconductors
- Wood Products

### Why set a GHG target?

Steps in setting and reporting progress towards a GHG target

1. Obtain senior management commitment
2. Choose the target type (absolute vs. intensity)
3. Decide on the target boundaries
4. Decide on the use of external offsets
5. Choose a type of base year (fixed vs. rolling base year)
6. Decide on the level of reduction
7. Tracking GHG performance against target

Selection of scope/s depends on objectives of inventory (e.g. internal risk management vs. trading markets).
Energy makes up nearly three-quarters of global emissions, followed by agriculture. Within the energy sector, the largest emitting sector is electricity and heat generation, followed by transportation and manufacturing. Land use, land use-change and forestry (LULUCF) is both a source and sink of emissions and key sector to get to net-zero emissions.

Gujarat Solar Park, Gujarat, India, in 2013. It now has an installed capacity of 1637 MW.
Road transport sector accounted for 90% of the total GHG emissions from the transport sector, followed by civil aviation (6%), railways (3%) and water borne navigation (1%).

Source of Data: https://www.google.com/

The dependence of business on the transport sector is relatively higher as compared to other sectors (6.4% share of India’s GDP)

Green House Gas Emission in India

Source of Data: https://www.climatewatchdata.org/ghg-emissions
Global Warming Potential (GWP)

- Carbon dioxide: 1
- Methane: 21
- Nitrous oxide: 310
- HFC-23: 11,700
- Perfluoromethane: 6,500
- Perfluoroethane: 9,200
- Sulphur hexafluoride: 23,900

Source of Data: IPCC, Second Assessment Report

The electricity generation target of thermal, hydro, nuclear & Bhutan import for the year 2021-22 has been fixed as **1356 Billion Unit (BU)**, i.e., growth of around 9.83% over actual generation of 1234.608 BU for the previous year (2020-21).
65.07% of the people of India lives in rural areas and 34.93% live in urban areas in 2020.

<table>
<thead>
<tr>
<th>Census Year</th>
<th>Population (in mn)</th>
<th>Variation over past decade (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rural</td>
<td>Urban</td>
</tr>
<tr>
<td>1901</td>
<td>212.54</td>
<td>25.85</td>
</tr>
<tr>
<td>1921</td>
<td>223.23</td>
<td>28.09</td>
</tr>
<tr>
<td>1931</td>
<td>245.51</td>
<td>33.46</td>
</tr>
<tr>
<td>1951</td>
<td>298.64</td>
<td>62.44</td>
</tr>
<tr>
<td>1961</td>
<td>360.30</td>
<td>78.94</td>
</tr>
<tr>
<td>1971</td>
<td>439.05</td>
<td>109.11</td>
</tr>
<tr>
<td>1981</td>
<td>523.87</td>
<td>159.46</td>
</tr>
<tr>
<td>1991</td>
<td>628.86</td>
<td>217.57</td>
</tr>
<tr>
<td>2001</td>
<td>742.62</td>
<td>286.12</td>
</tr>
<tr>
<td>2011</td>
<td>833.09</td>
<td>377.11</td>
</tr>
</tbody>
</table>
Development of Web-Based Programme

Methodology

Identification of wells and rain gauging stations

Data Collection

Data Transmission

Data Compilation

Data Processing and Analyzing

Jalsurakshak

Hydrologist and Geo-Hydrologist

Mobile SMS / Internet

Web-Based Program (Server)

Expected Outcome

Prediction of water excess or scarcity villages on real time basis using the decision support tool

‘Phailin’ Super Cyclone on Bay of Bengal 11.10.2013

Source of Data: https://www.google.com/
India is determined to continue with its on-going interventions, enhance the existing policies as detailed in previous sections to achieve the contributions and launch new initiatives in the following priority areas:

1. Introducing new, more efficient and cleaner technologies in thermal power generation.
2. Promoting renewable energy generation and increasing the share of alternative fuels in overall fuel mix.
3. Reducing emissions from transportation sector.
4. Promoting energy efficiency in the economy, notably in industry, transportation, buildings and appliances.
5. Reducing emissions from waste.
6. Developing climate resilient infrastructure.
7. Full implementation of Green India Mission and other programmes of afforestation.
8. Planning and implementation of actions to enhance climate resilience and reduce vulnerability to climate change.

- India is very vulnerable to climate change, notably due to the melting of the Himalayan glaciers and changes to the monsoon.

- As part of its pledge under the 2015 Paris climate agreement, India, the world’s third-biggest carbon emitter, is supposed to reduce its carbon footprint by 33-35% from 2005 levels by 2030. India also aims to produce 40% of its power from non-fossil fuel sources by 2030.

Afforestation Programme in India

• https://www.epw.in/journal/2020/15/special-articles/key-drivers-indian-greenhouse-gas-emissions.html
• csj_ghg_CS_11.pdf
• https://climateactiontracker.org/countries/india/
• https://edgar.jrc.ec.europa.eu/
• https://www.carbonbrief.org/the-carbon-brief-profile-india

Acknowledgement: United Nations COP 26 and Ministry of Environment, Republic of Korea
09.11.2021

Thank You