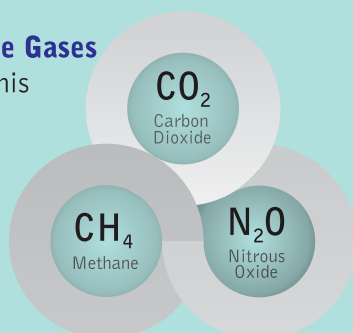


Trend Analysis of GHG Emissions in India

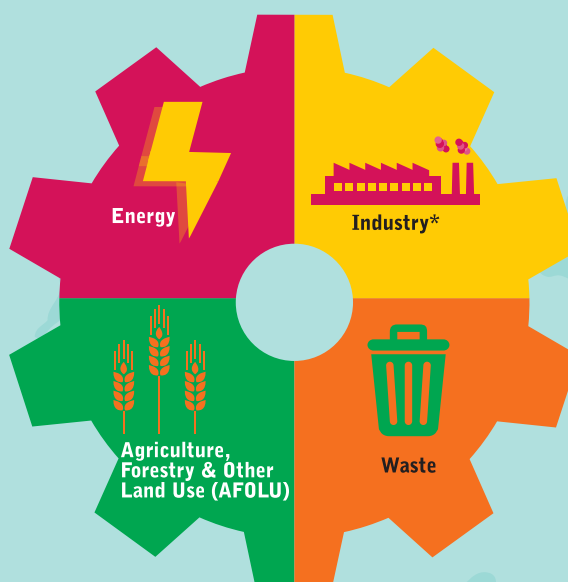


Analysis of Greenhouse Gas Emission Trends from 2007 to 2012

The Greenhouse Gases covered under this exercise are:



The Study Estimates and Assesses Greenhouse Gas Emissions and Removals from the following sectors:



**64%
Energy**

**24%
Industry**

**8%
AFOLU**

**4%
Waste**

Economy Wide Emission Estimates-

Sector Share with Land Use, Land Use Change and Forestry (LULUCF), 2012

Economy Wide Emission Estimates-
Sector Share without LULUCF, 2012

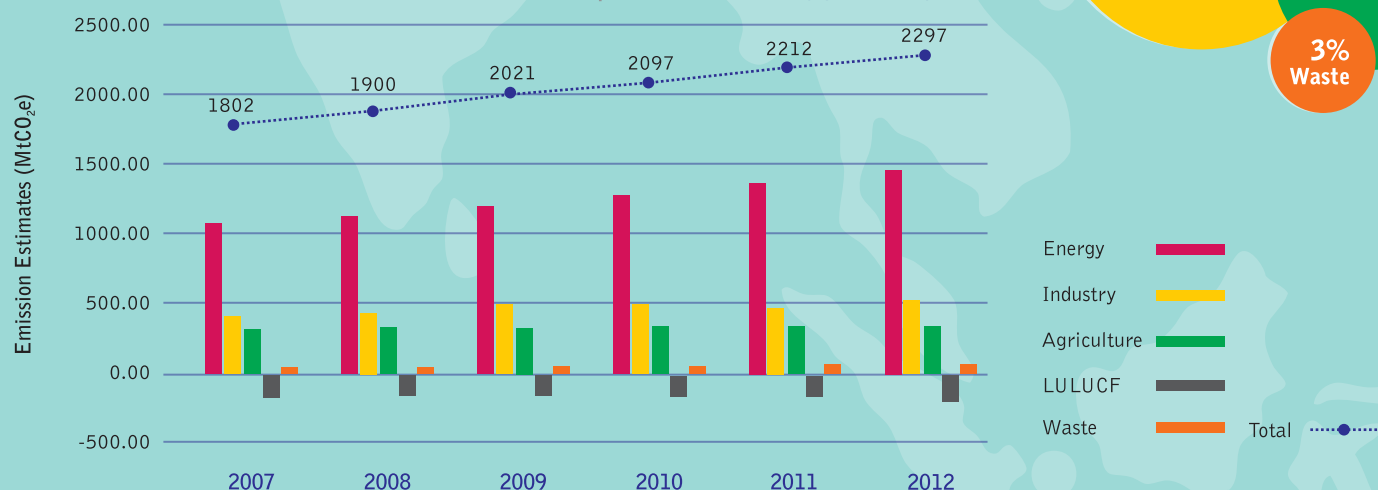
**60%
Energy**

**22%
Industry**

**15%
Agriculture****

**3%
Waste**

**Economy wide GHG Emission Estimates
Trend from 2007 to 2012**



*Industry emissions include Industrial Process and Product Use (IPPU) and Industrial Fuel Combustion (Fuel combusted for captive electricity generation has not been recorded under industry emissions)

**Agriculture emissions include both Farming and Livestock

Energy

CSTEP Analysis

Fuel Combustion: Electricity Generation; Transport; Residential, Agriculture and Commercial

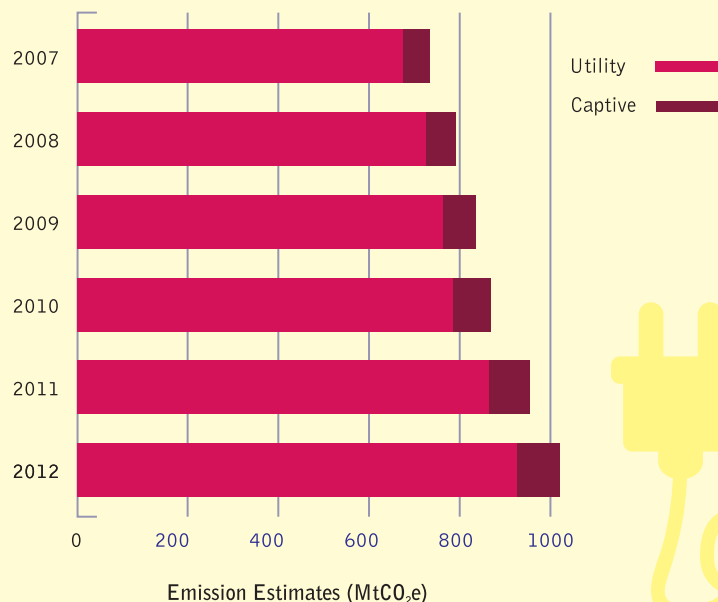
Fugitive Emissions

Electricity generation is the single largest emitting category in India's emissions portfolio, accounting for over 40% emissions as per official inventories. Electricity emissions have grown at 7% CAGR*, with CO₂ constituting almost 99% emissions.

Industrial captive emissions have grown at over 10%, compared to 6% growth in utility-based emissions**. Emission intensity of electricity generation increased by 2% in the reference period to 1.04 kg CO₂/kWh in 2012-13[#].

Overall, there has been increased reliance on coal, lignite, and natural gas, whereas oil-based (furnace oil, diesel, LSHS/HHS^{##}) emissions have shown a declining trend.

Emissions from Electricity Generation



CEEW Analysis

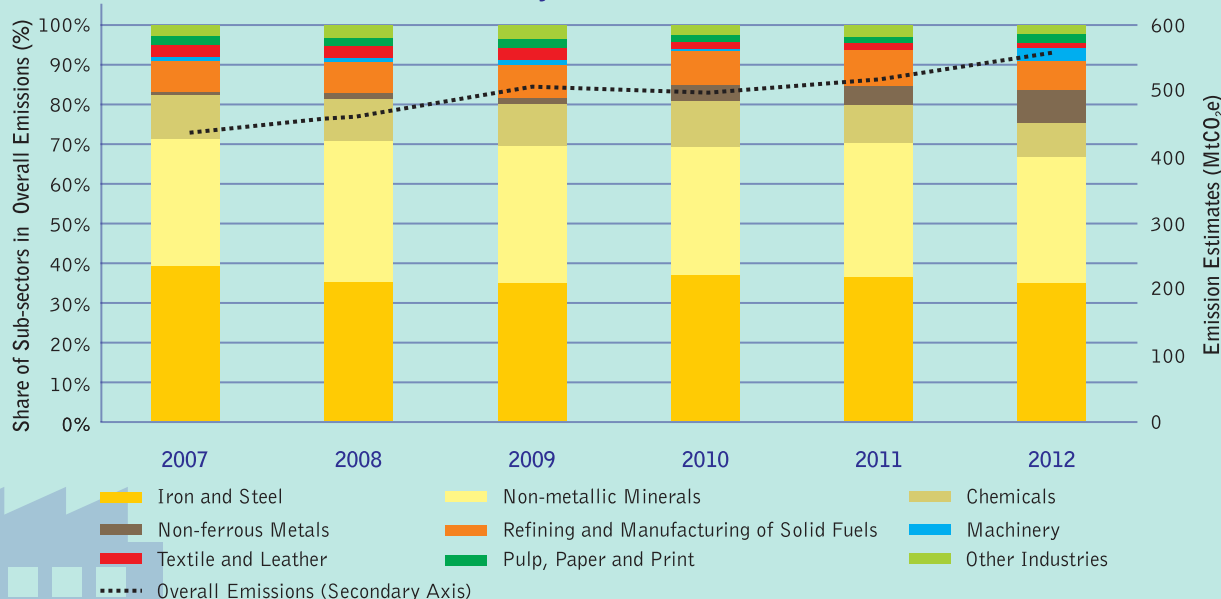
Industry

Industrial Fuel Combustion^{***}

Industrial Process and Product Use (IPPU)

Industry sector represents ~25% of the overall national estimates for the greenhouse gas emissions. As per our estimates, GHG emissions from industries grew at a CAGR of approximately 4% between 2007 and 2012.

Trend of Greenhouse Gas Emissions by Various Industrial Sub-sectors



Fuel use by industries contributes 69% to 74% of overall Industry emissions, while rest comes from the IPPU activities. Manufacturing of iron and steel contributes the largest share of emissions (35% to 39%) closely followed by non-metallic minerals (primarily cement).

*Compound Annual Growth Rate

**Captive generation is known to be more inefficient and its rising share in electricity emissions is concerning

[#]Despite Renewable Energy generation growing by 34% in the same period

^{##}Low Sulphur Heavy Stock/Hot Heavy Stock

^{***}Fuel combusted for captive electricity generation has not been recorded under industry emissions

Vasudha Foundation Analysis

AFOLU

Agriculture

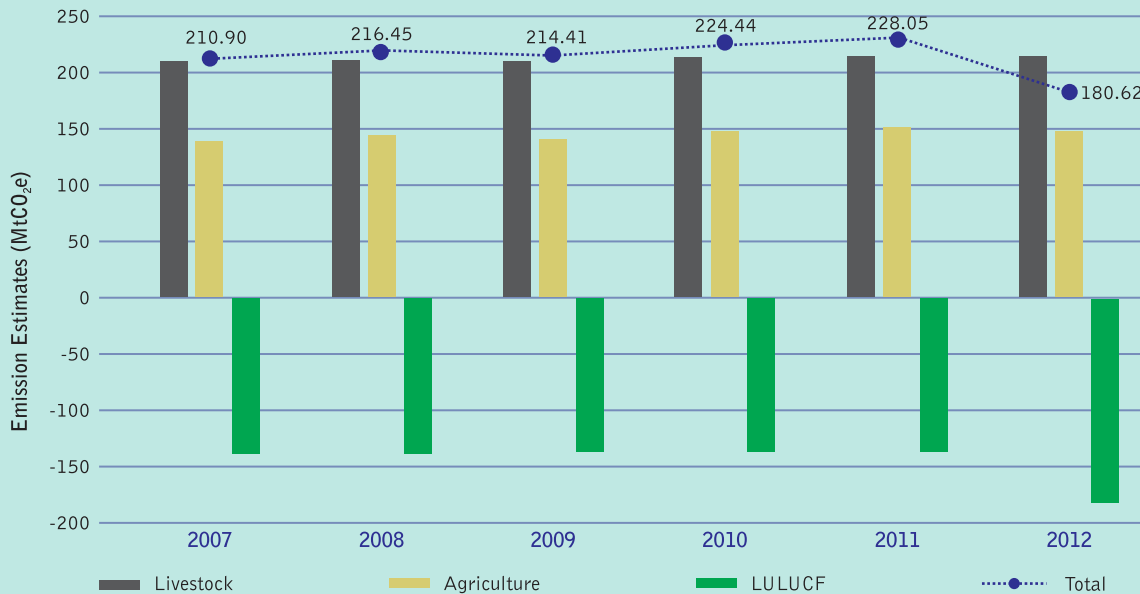
Livestock

LULUCF

In 2007 the AFOLU sector contributed around 12% of India's overall GHG emissions which gradually dropped to around 8% by 2012.

Total Emissions from AFOLU Sector from 2007 to 2012

Emissions from livestock and agriculture sector increased from 2007 to 2012 at a compound annual growth rate of 0.39% and 1.19% respectively. LULUCF sector, which acts as a greenhouse gas sink, observed a growth (in net removal) of 5.61% compounded annually.



9% Livestock

8% LULUCF (Sink)

6% Agriculture

Percentage Contribution to the Economy in 2012

Waste

Solid Waste Disposal

Domestic Wastewater

Industrial Wastewater

India's Waste Sector emitted 86.8 MtCO₂e in the year 2012, contributing to 3.8% (with LULUCF) of India's total GHG emissions. Changing solid waste composition and increasing waste generation due to urbanization and changing lifestyles has increased the intensity of GHG emission from solid waste disposal over time. The largest contributing sectors from industrial wastewater treatment and discharge are Pulp and Paper, Coffee, Soft Drink, Meat and Tannery.

ICLEI South Asia Analysis

62% Industrial Wastewater

22% Domestic Wastewater

16% Solid Waste Disposal

Sub-sector Contribution to the Waste Sector in 2012

GHG Emission Estimates for Waste Sector in India from 2007 to 2012



Trend Analysis of GHG Emissions in India

India's emissions have grown at the rate of

4.97%
(compounded annually)
from 2007 to 2012

Energy sector is the **Largest** contributor to GHG Emissions in India

Sector-wise Emissions Growth Rate from 2007 to 2012

These growth rates have been compounded annually.



- National Solar Mission
- National Urban Transport Policy
- Auto Fuel Policy
- 175 GW Renewable Energy by 2022
- Supercritical and Ultra Supercritical Coal
- 24X7 Electricity Access for All
- Deen Dayal Upadhyaya Gram Jyoti Yojana (Rural Electrification)
- LPG Access Schemes (PAHAL Scheme, Pradhan Mantri Ujjwala Yojana)

- National Mission for Sustainable Agriculture
- Direct Seeding of Rice
- System of Rice Intensification
- National Mission for Green India (Afforestation and Reforestation)



- National Mission on Enhanced Energy Efficiency including Perform Achieve and Trade Scheme (Industries)
- Zero Defect, Zero Effect Scheme (focuses on production mechanism to improve overall efficiency alongside achieving zero adverse environmental and ecological effects)

- National Mission on Sustainable Habitat
- National Urban Sanitation Policy
- Municipal Solid Waste (Management and Handling) Rules
- E-waste (Management and Handling) Rules
- Atal Mission for Rejuvenation and Urban Transformation
- Swachh Bharat Mission
- Centrally Sponsored Scheme of Common Effluent Treatment Plants
- MNRE Schemes for Energy Recovery from Municipal and Industrial Waste and Effluents

The GHG Platform India is a collective civil society initiative providing an independent estimation and analysis of India's Greenhouse Gas (GHG) emissions across key sectors, namely, Energy, Industry, Agriculture, Livestock, Forestry, Land-use and Land-use change, and Waste.

The platform comprises civil society groups as under:



In collaboration with



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