GHG Platform INDIA

Trend Analysis of GHG Emissions of JAMMU and KASHMIR

GHG Platform India is a civil society initiative providing an independent estimation and analysis of India's Greenhouse Gas (GHG) emissions across key sectors.

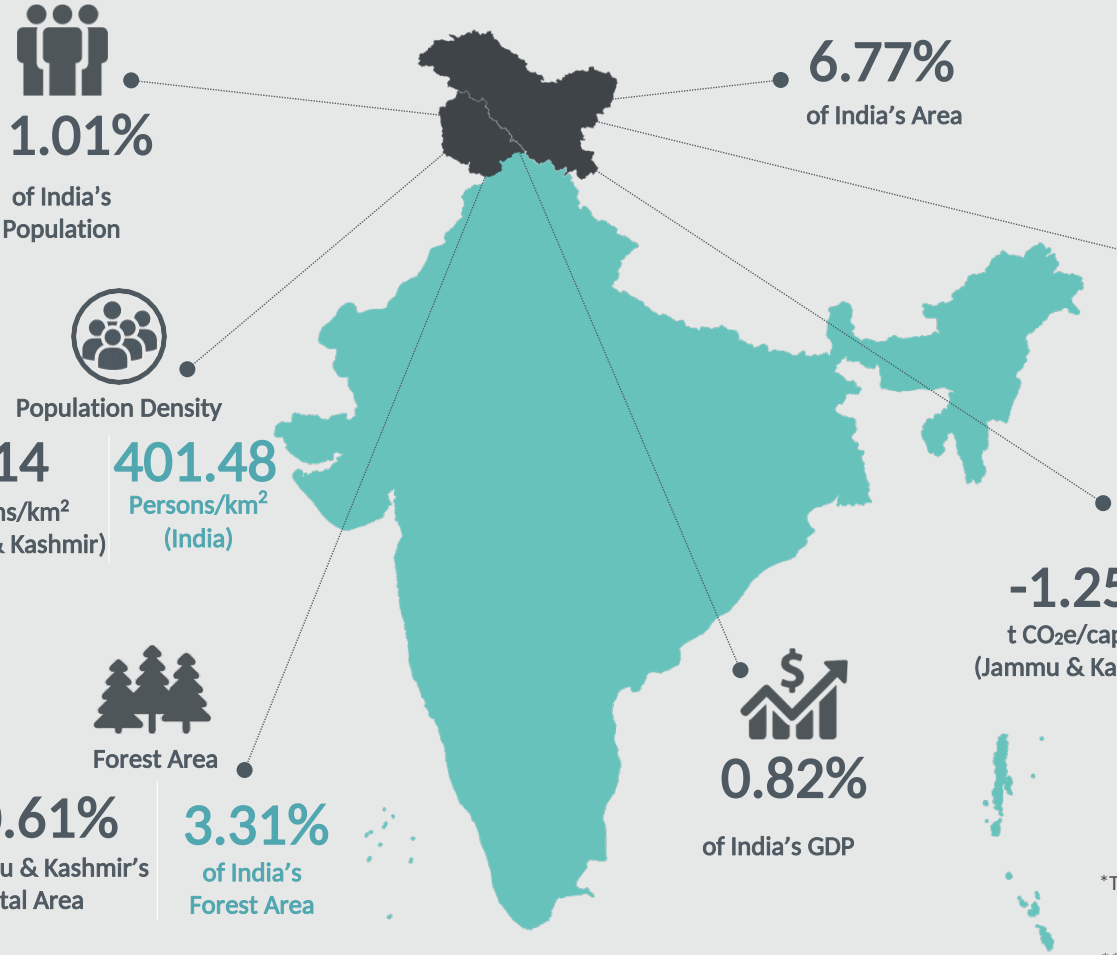
The Platform seeks to add value to the various ongoing GHG emissions estimation efforts by helping address existing data gaps and data accessibility issues, extending beyond the scope of national inventories to state inventories, and by increasing the volume of analytics and policy dialogue on India's GHG emissions sources, profile, and related policies.

The initiative estimates and assesses GHG emissions and removals from the following sectors:

ENERGY | IPPU* | AFOLU | WASTE

*Fuel combusted for captive electricity generation (auto-producers) and direct fuel combustion (industrial energy) has been reported under Energy sector.

Jammu & Kashmir at a Glance (2018)



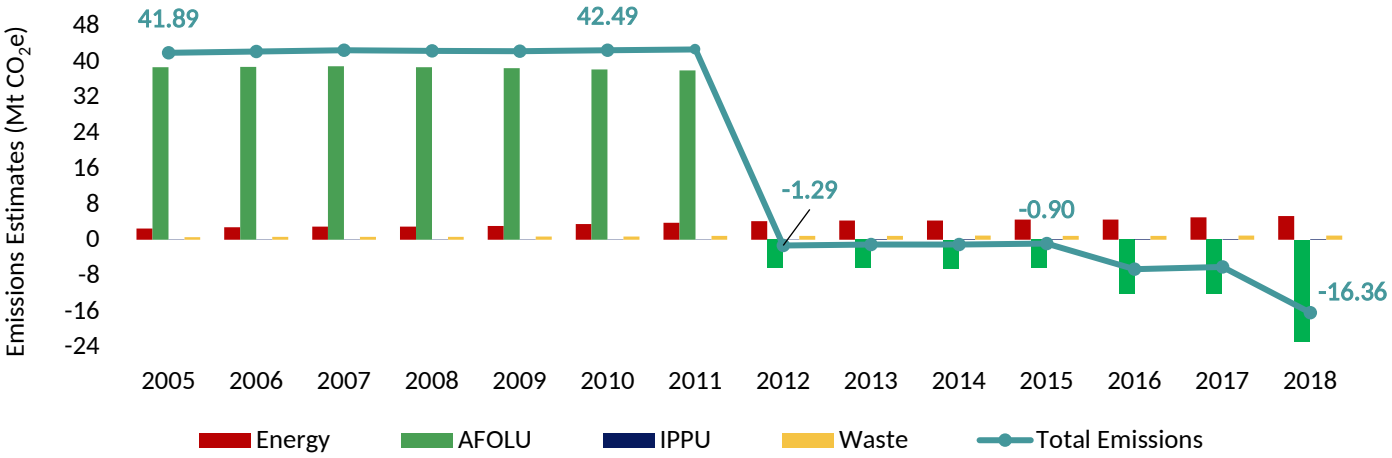
*The data on this map represents both J&K and Ladakh till 2018, before its bifurcation into two union territories

** J&K and Ladakh are net sink of GHG emissions in 2018.

Mt CO_2e – Million Tonnes of Carbon Dioxide Equivalent | CAGR – Compound Annual Growth Rate

Economy-wide Emissions Estimates

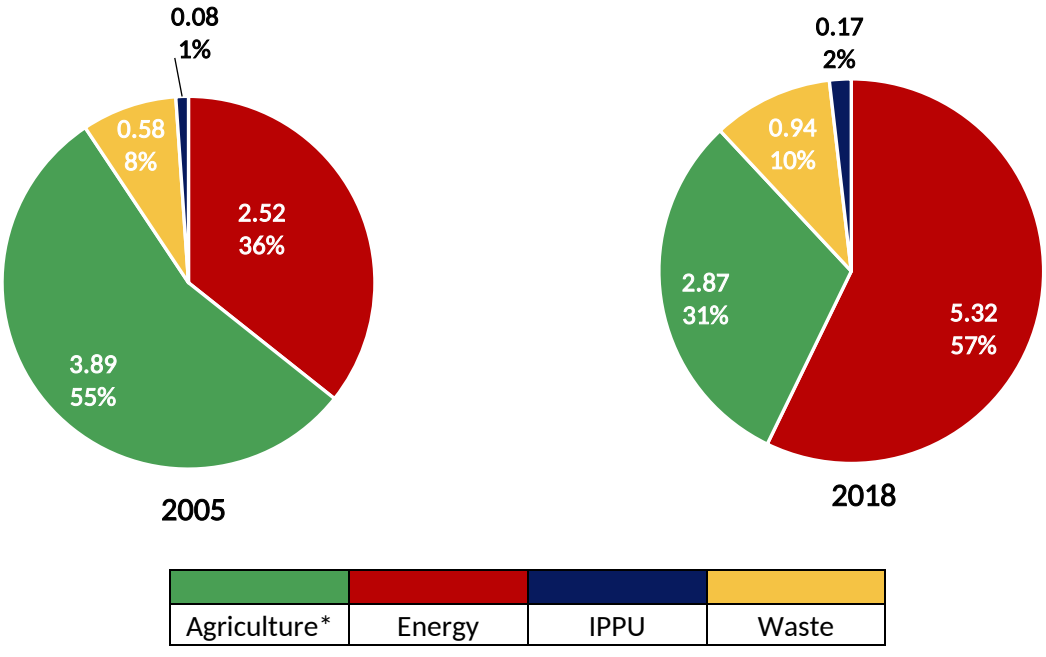
Figure 1: GHG Emissions Estimates of Jammu & Kashmir (2005 to 2018)



Jammu & Kashmir was a net GHG emitter till 2011 and its emissions increased at a CAGR of 0.31% from 41.89 Mt CO_2e in 2005 to 42.67 Mt CO_2e in 2011. However, 2012 onwards Jammu & Kashmir became a net sink, with net removals increasing from 1.29 Mt CO_2e in 2012 to 16.36 Mt CO_2e in 2018 at a rate of 52.75% (compounded annually) as illustrated in Figure 1.

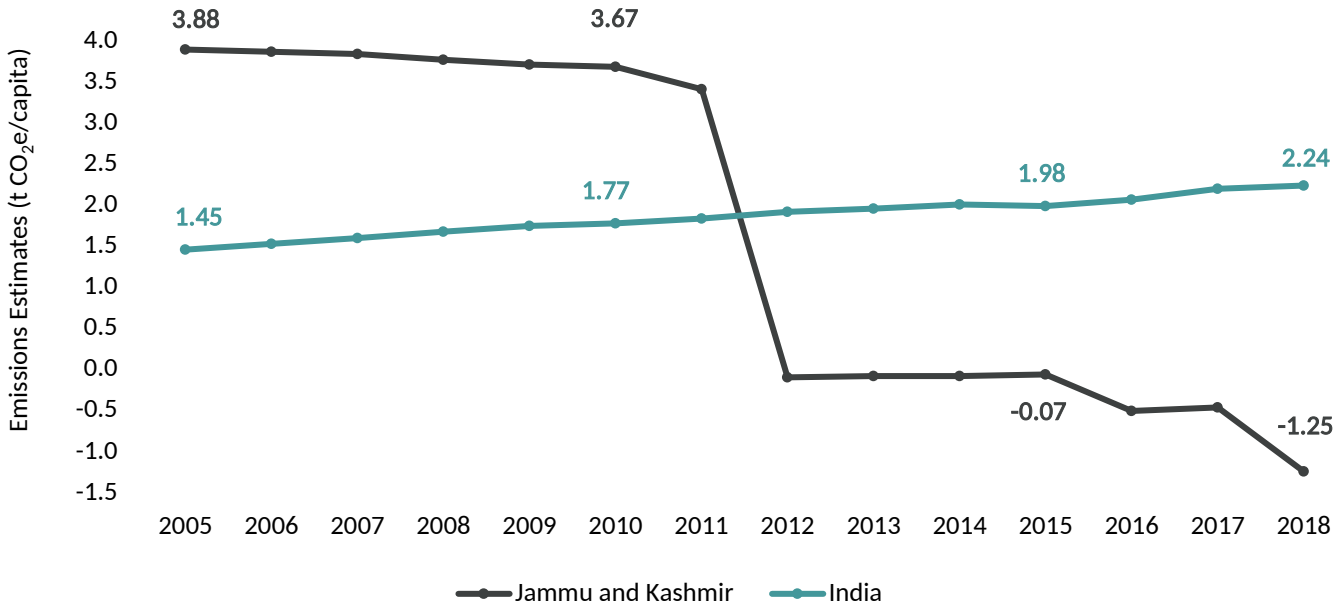
In 2005, the share of Energy sector emissions in gross economy-wide emissions (excluding Land sub-sector within AFOLU) was ~36%. This was followed by Agriculture (excluding the Land sub-sector in AFOLU), Waste and Industrial Process and Product Use (IPPU) sectors with shares of 55%, 8% and 1%, respectively. In 2018, the share of Energy sector emissions increased to ~57%. The share of Waste and IPPU sector emissions increased to ~2% and ~10%, respectively, in 2018, while Agriculture emissions declined to ~31 %.

Figure 2: Sector-wise Contribution (Mt CO_2e) and Percentage Share in Gross Economy-wide GHG Emissions (excluding Land sub-sector within AFOLU) of Jammu & Kashmir



** For the purpose of this comparison, agriculture emissions do not include removals from lands and forests. For further details, please see the section on AFOLU emissions below.*

Figure 3: Per Capita Net GHG Emissions of Jammu & Kashmir and India (2005 to 2018)



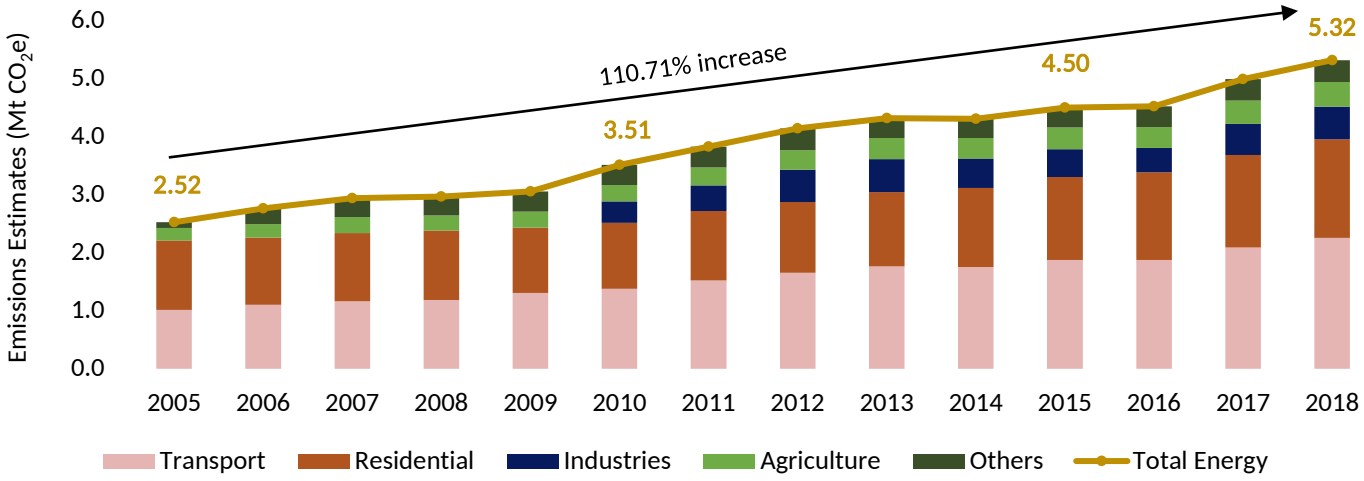
In 2018, the per capita emissions of Jammu & Kashmir were -1.25 t CO_2e/capita, significantly lower than India's, since the erstwhile state, now bifurcated into two union territories, was a net sink. As seen in Figure 3, between 2005 and 2011, Jammu & Kashmir's per capita emissions were much higher than India's. With the decline in overall emissions in the erstwhile state, now bifurcated into two union territories, the per capita emissions dropped below India's value from 2012 onwards, decreasing rapidly at a CAGR of 51.34% from 2012 to 2018.

Energy Sector

The Energy sector comprises of emissions from Fuel Combustion and Fugitive Emissions. Fuel Combustion includes emissions from Public Electricity Generation, Transport, Industries, Captive Power Plants and Agriculture, Commercial and Residential categories. Fugitive Emissions are due to Fuel Production.

The Energy sector of Jammu & Kashmir accounted for ~57% of gross economy-wide emissions (excluding Land sub-sector within AFOLU) in 2018. Emissions from the Energy sector increased at a CAGR of 5.90% from 2.52 Mt CO_2e in 2005 to 5.32 Mt CO_2e in 2018 (see Figure 4).

Figure 4: GHG Emission Estimates of Energy Sector - Jammu & Kashmir (2005 to 2018)



Within the Energy sector, Transport category was the major contributor to the GHG emissions with a share of ~42% in total Energy emissions in 2018. This was followed by Residential and Industrial Energy categories with shares of ~32% and ~11%, respectively (see Figure 5).

Within the Fuel Combustion sub-sector, Liquid Petroleum Fuels were the major contributor to GHG emissions across the reference years, with an average share of ~67%. This was followed by emissions from combustion of Other Fuels with an average share of ~16% between 2005 and 2018. Gaseous Petroleum Fuels had an average share of ~12%, while Coal accounted for ~6% of the Fuel Combustion emissions during the reference period (see Figure 6).

Figure 5: Category-wise Emissions (Mt CO_2e) and Percentage Share in Total Energy Sector Emissions (2018)

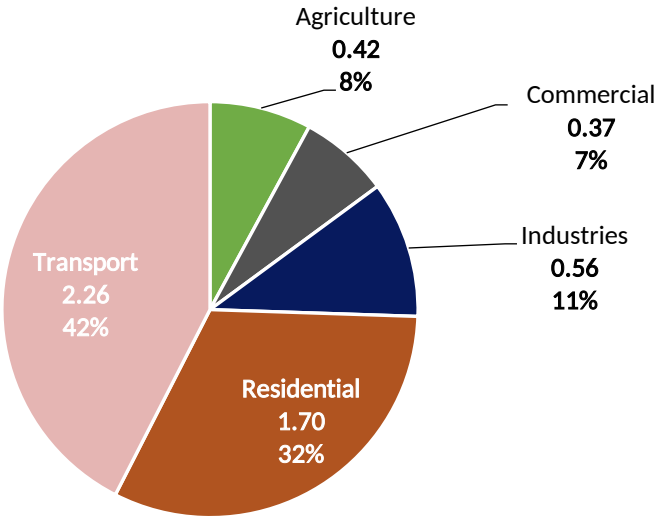
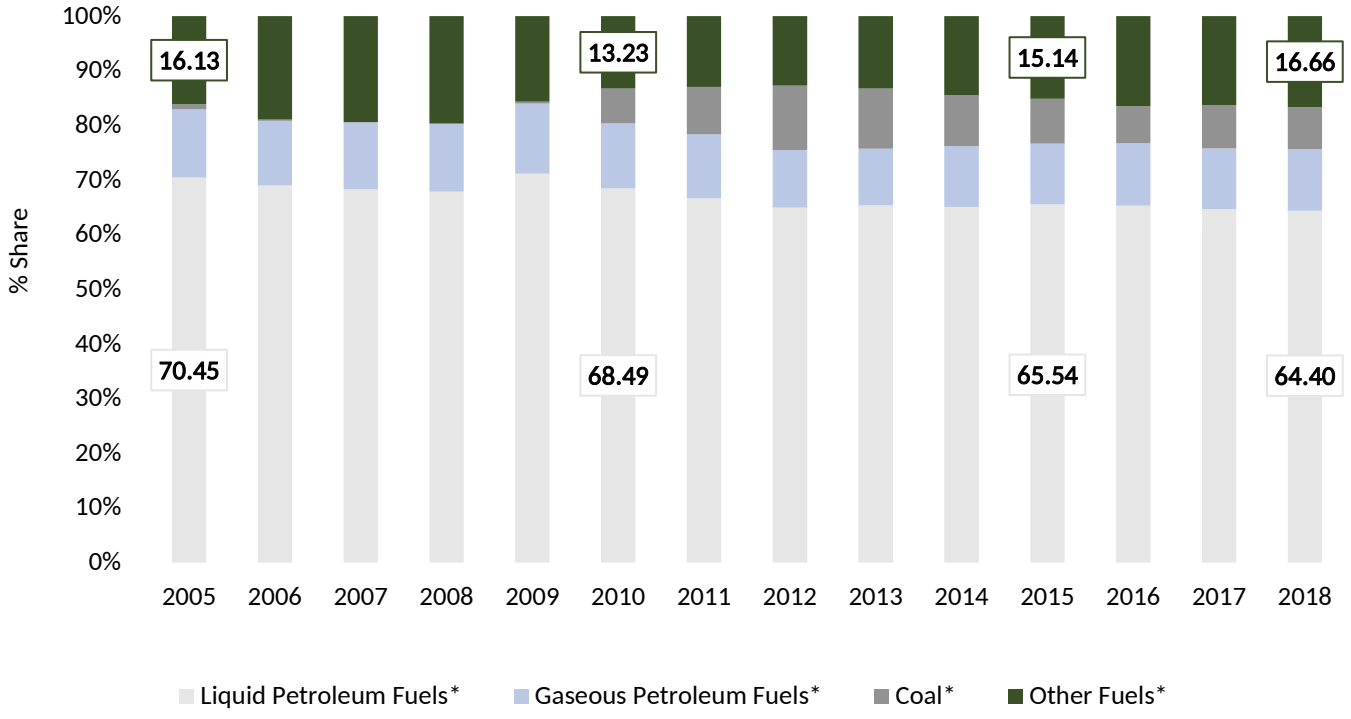


Figure 6: Percentage Share of GHG Emissions by Fuel Type due to Fuel Combustion in Energy Sector (2005 to 2018)



**Notes*

1. *Liquid Petroleum Fuels- ATF, diesel, kerosene, motor spirit and other liquid fuels*
2. *Gaseous Petroleum Fuels- natural gas, LPG and other gaseous fuels*
3. *Coke is included in Coal because the bifurcation of pet-coke and coke was not available.*
4. *Other Fuels comprise of Firewood and Charcoal*

IPPU Sector

Emissions from the Industrial Processes and Product Use (IPPU) sector are largely driven by Chemical, Metal, Mineral Industries and Non-Energy Products from Fuels and Solvent Use. In Jammu & Kashmir, the key contributing sectors were Mineral Industry and Non-Energy Products from Fuels and Solvent Use.

The IPPU sector of Jammu & Kashmir represented ~2% of the gross economy-wide emissions (excluding Land sub-sector within AFOLU) in 2018. The emissions from IPPU sector grew at a CAGR of 6.26% from 0.08 Mt CO_2e in 2005 to 0.17 Mt CO_2e in 2018, owing to the increase in emissions from Mineral Industry sub-sector, primarily from Cement Industry (see Figure 7).

Figure 7: GHG Emission Estimates of IPPU Sector- Jammu & Kashmir (2005 to 2018)

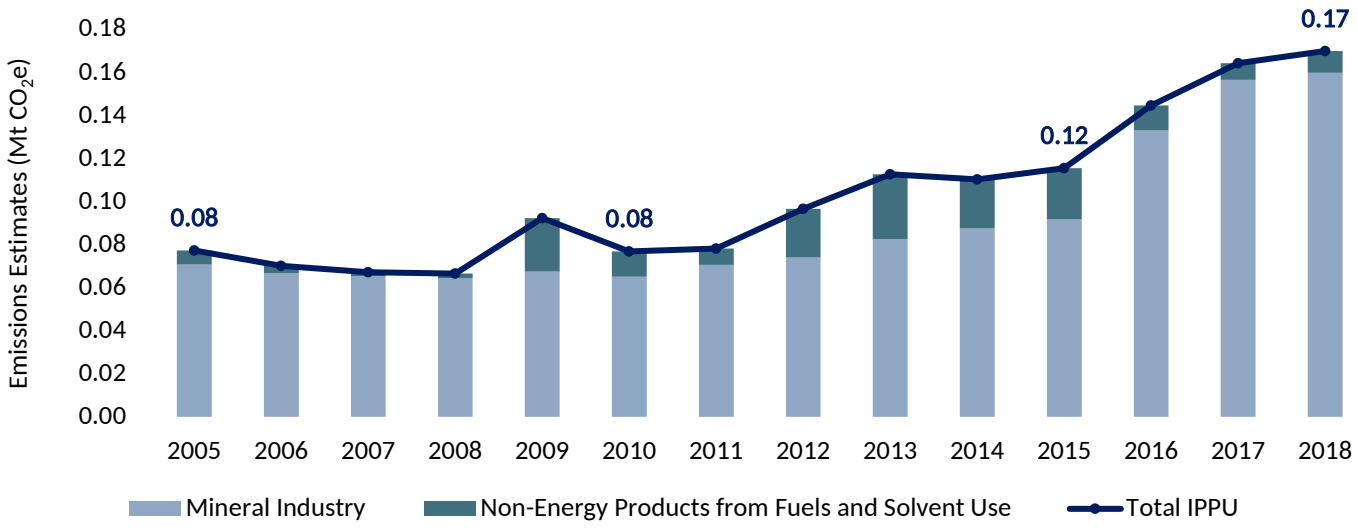
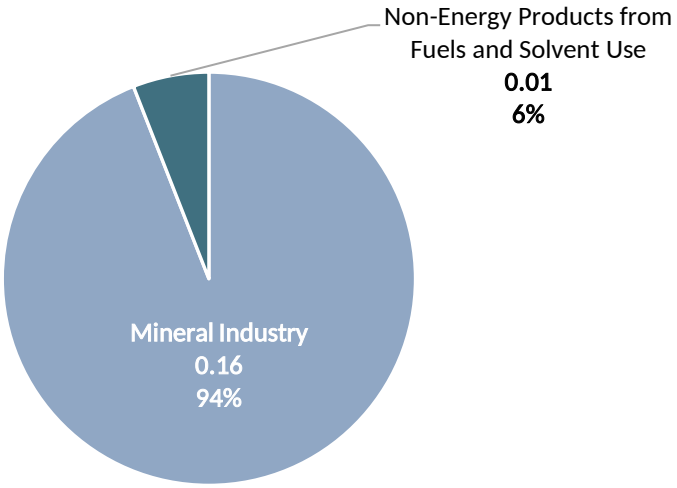
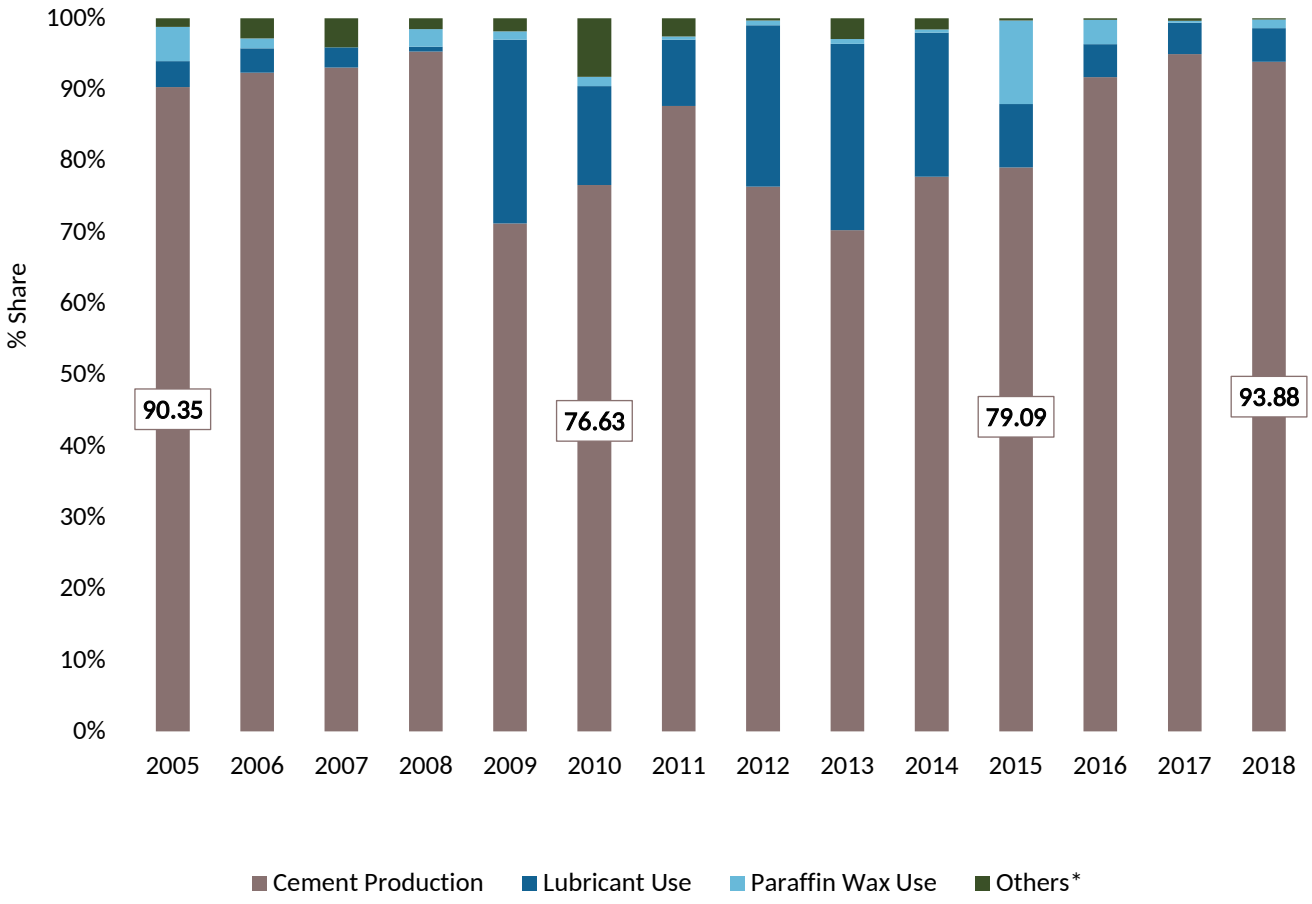


Figure 8: Sub-Sector Emissions (Mt CO_2e) and Percentage Share in Total IPPU Emissions (2018)



In Jammu & Kashmir, Mineral Industry was the major contributor to the IPPU sector emissions, with a share of 94% in 2018 (see Figure 8). Within the Mineral Industry sub-sector, Cement Production was the major contributor to the total emissions of IPPU sector, with an average share of ~85% between 2005 and 2018. Notably, its share in total IPPU emissions increased from ~90% in 2005 to ~94% in 2018. Significant emissions were also registered from Lubricant Use with average share of ~11%, during the reference period (see Figure 9).

Figure 9: Percentage Share of GHG Emissions from IPPU Categories (2005 to 2018)



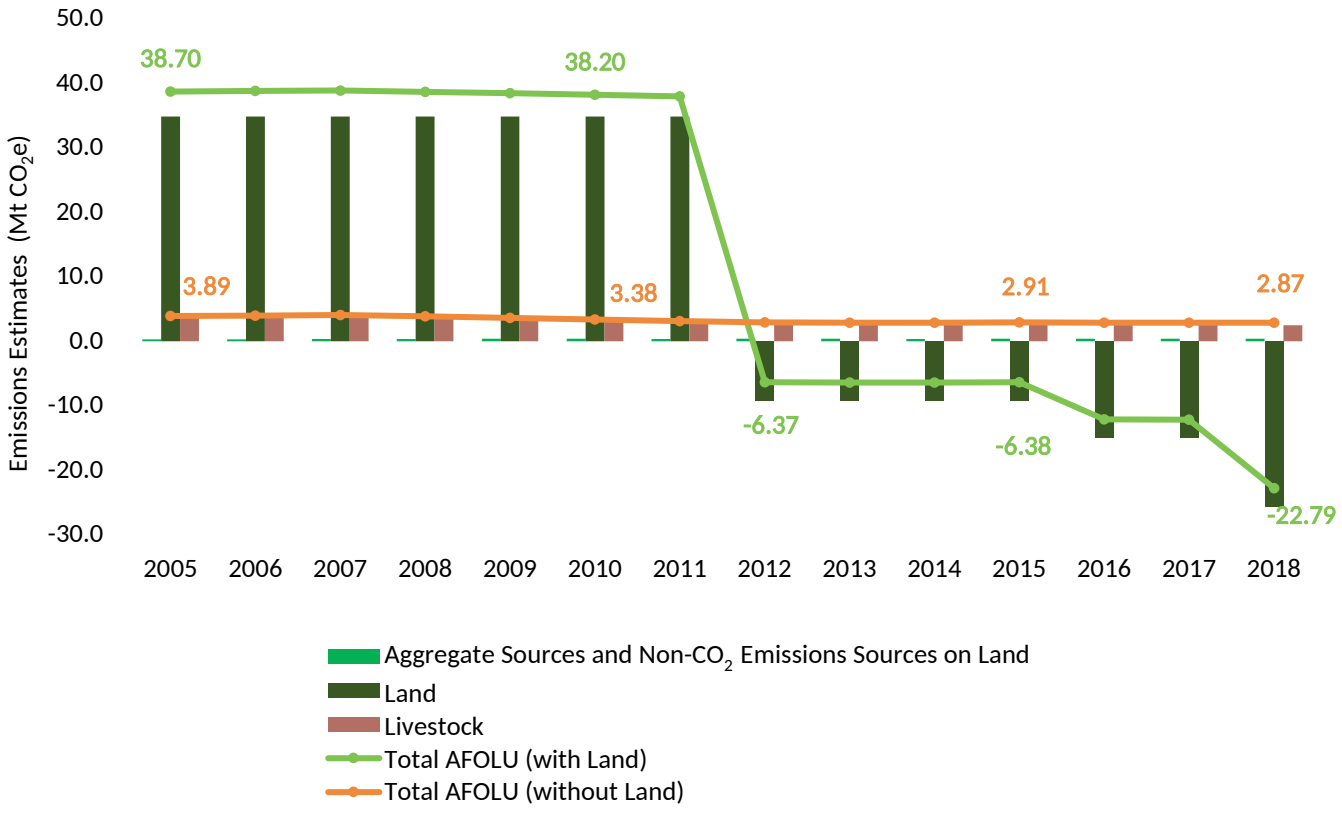
*Others category includes Glass Production, Lime Production and Other Uses of Soda Ash categories

AFOLU Sector

Emissions from the Agriculture, Forestry and Other Land Use (AFOLU) sector arise from three main sub-sectors: Livestock, Land, and Aggregate sources and Non-CO_2 Emissions Sources on Land*. In Jammu & Kashmir, the Aggregate Sources and Non-CO_2 Emissions Sources on Land and Livestock sub-sectors were net emitters throughout the reference period. The Land sub-sector was a net emitter from 2005 to 2011 and its emissions declined at a rate of 0.33% (compounded annually) from 38.70 Mt CO_2e in 2005 to 37.94 Mt CO_2e in 2011. However, 2012 onwards, the Land sub-sector became a net sink due to the increase in removals from Grassland and Other Land categories. Further, significant increase in the overall removals from Land sub-sector was observed in 2016 and 2018, owing to the increase in the removals from the Forest Land category (see Figure 10). This is in turn was a result of enhanced forest cover of the erstwhile state, now bifurcated into two union territories, as reported by Forest Survey of India (2019 and 2021)**.

Between 2012 and 2018, the average annual emissions from Livestock and Aggregate Sources sub-sectors were 2.89 Mt CO_2e that were neutralized by CO_2 removals from the Land sub-sector which was, on an average, annually removing 10.38 Mt CO_2e during the reference period.

Figure 10: GHG Emissions of AFOLU Sector - Jammu & Kashmir (2005 to 2018)



The Livestock sub-sector had the maximum share of ~87% of the positive AFOLU emissions (excluding Land sub-sector) of Jammu & Kashmir in 2018. Within Livestock sub-sector, Enteric Fermentation category was the major contributor to positive AFOLU emissions with an average share of ~81% across the reference years. Emissions from this category declined at a rate of 2.76% from 3.29 Mt CO_2e in 2005 to 2.29 Mt CO_2e in 2018.

Within the Aggregate Sources sub-sector, Agriculture Soils and Rice Cultivation were major contributors to positive AFOLU emissions with average shares of ~6% and ~3%, respectively, during the reference period. The share of emissions from Agriculture Soils increased from ~4% in 2005 to ~8% in 2018, whereas the share of emissions from Rice Cultivation increased nominally from ~2% in 2005 to ~3% in 2018 (see Figures 11 and 12).

** The sub-sector called 'Aggregate Sources and Non-CO_2 Emissions Sources on Land' includes emissions from Rice Cultivation, Agriculture Soils, and Biomass Burning in Cropland and Forestland.*

*** FSI Report 2019 reports for 2017 and FSI Report 2021 reports data for 2019.*

Figure 11: Category-wise Emissions (Mt CO_2e) and Percentage Share in Positive AFOLU Emissions (excluding Land sub-sector) (2018)

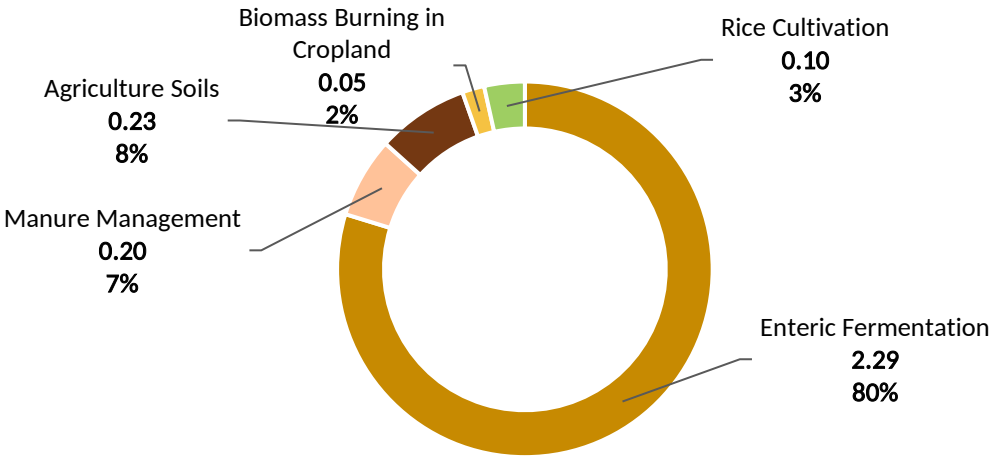
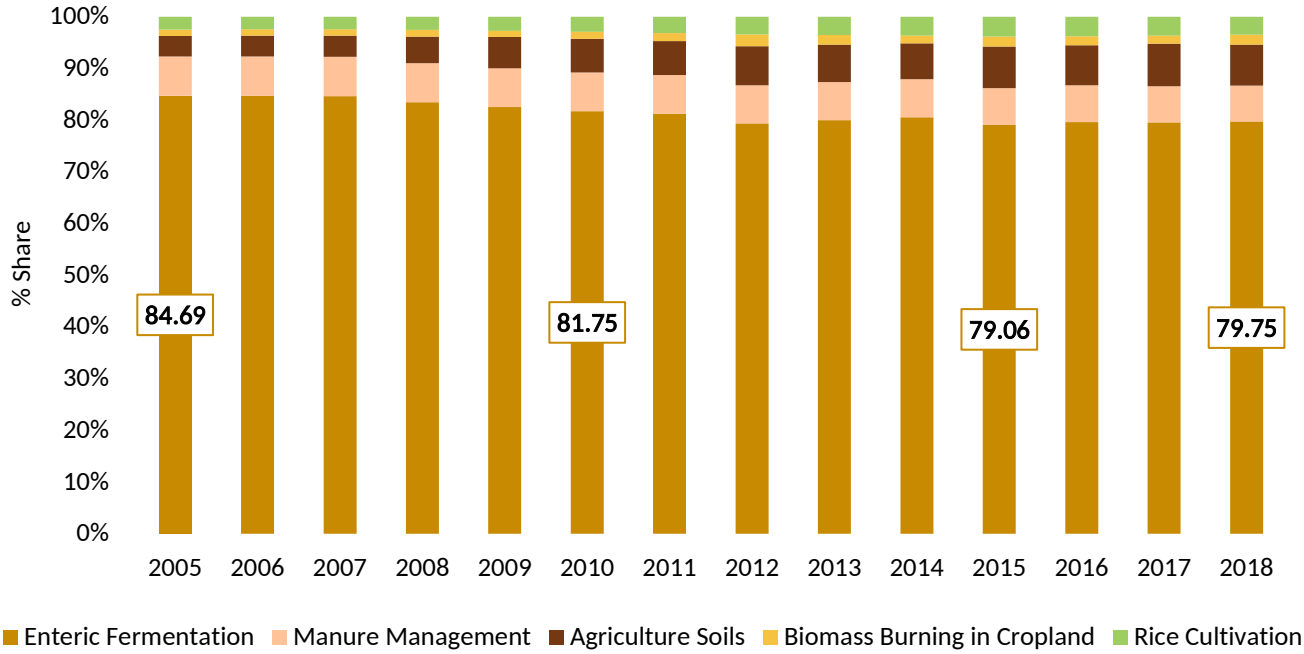


Figure 12: Category-wise Percentage Share in Positive AFOLU Emissions (excluding Land sub-sector) (2005 to 2018)



Waste Sector

Solid Waste Disposal, Domestic Wastewater and Industrial Wastewater are the key sources of GHG emissions in the Waste sector. In Jammu & Kashmir, the Waste sector contributed to almost ~10% to gross economy-wide emissions (excluding Land sub-sector within AFOLU), in 2018. The GHG emissions from Waste sector grew at a CAGR of 3.74% from 0.58 Mt CO_2e in 2005 to 0.94 Mt CO_2e in 2018. The overall Waste sector emissions increased post 2011 due to the increase in emissions from Domestic Wastewater sub-sector (see Figure 13). However, a slight dip was observed in total Waste sector emissions, in 2015, due to the reduction in emissions from Industrial Wastewater sub-sector.

Figure 13: GHG Emission Estimates of Waste Sector - Jammu & Kashmir (2005 to 2018)

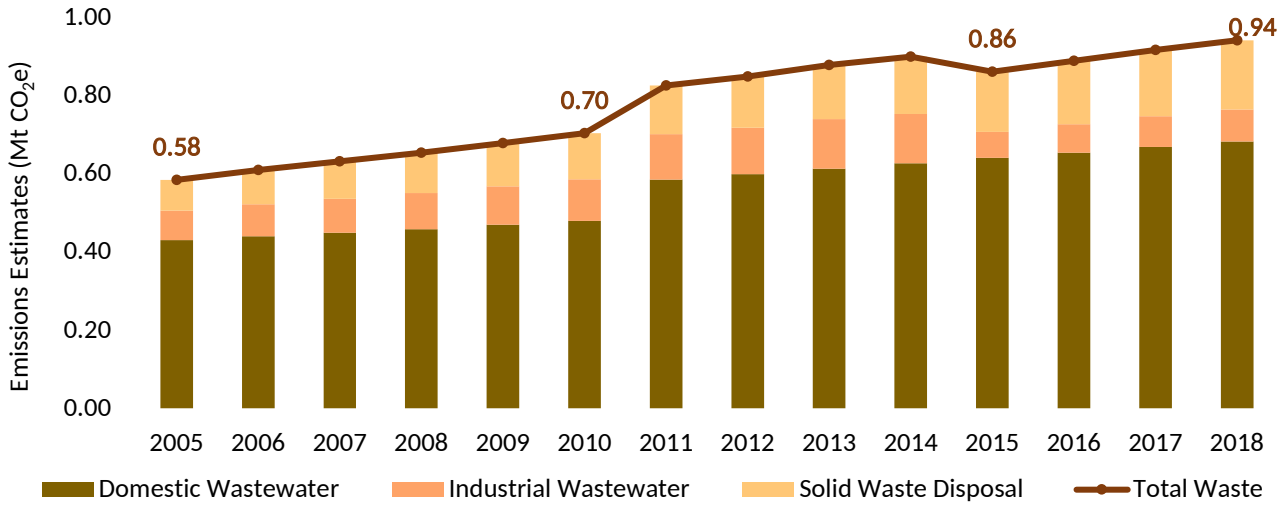
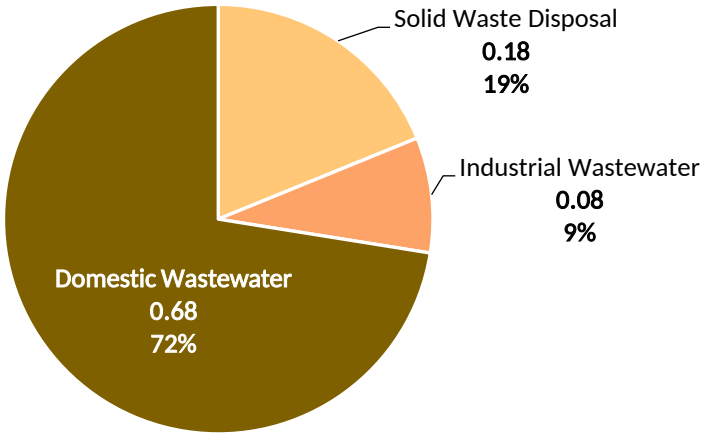


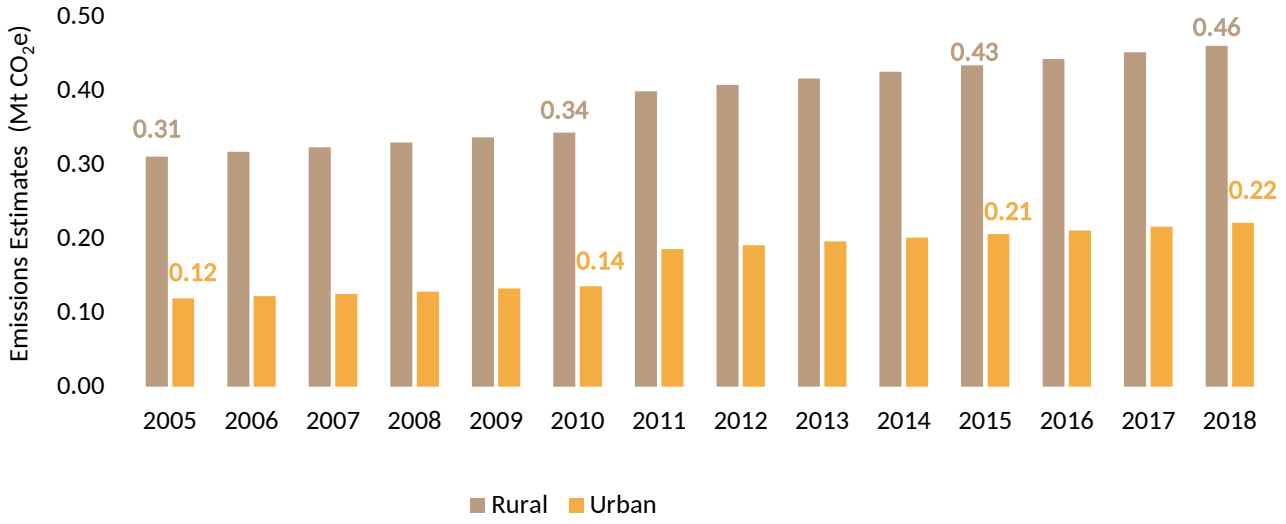
Figure 14: Sub-sector Emissions (Mt CO_2e) and Percentage Share in Total Waste Sector Emissions (2018)



Discharge of untreated wastewater and use of septic tanks are the key drivers of emissions due to Domestic Wastewater sub-sector. Domestic Wastewater had a share of ~72% in the total Waste sector emissions of Jammu & Kashmir in 2018. Nearly, ~19% of the Waste sector emissions were from Solid Waste Disposal in 2018 which grew at an estimated CAGR of 6.41% from 0.08 Mt CO_2e in 2005 to 0.18 Mt CO_2e in 2018. Industrial Wastewater accounted for nearly ~9% of Waste sector emissions in 2018 and grew at a CAGR of 0.71% from 0.07 Mt CO_2e in 2005 to 0.08 Mt CO_2e in 2018 (see Figure 14).

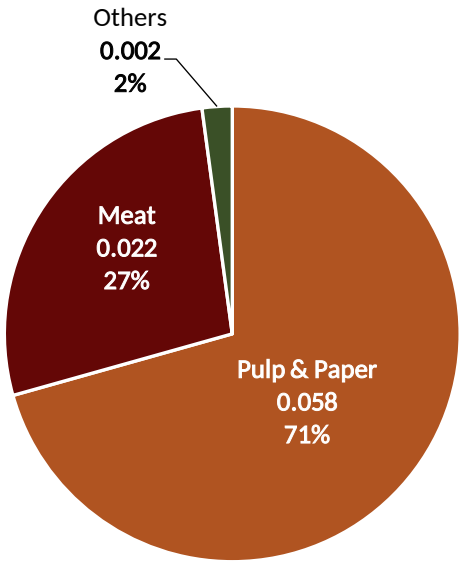
The emissions from Domestic Wastewater of both rural and urban areas grew at a CAGR of 3.60% from 0.43 Mt CO_2e in 2005 to 0.68 Mt CO_2e in 2018. The majority of the Domestic Wastewater emissions were observed from the rural areas of Jammu & Kashmir with a share of ~68% in 2018 (see Figure 15).

Figure 15: Area-wise GHG Emissions Estimates of Domestic Wastewater (2005 to 2018)



The Pulp and Paper Industry was the major contributor to the Industrial Wastewater emissions with a share of 71~% in 2018. This was followed by Meat (~27%) and Other Industries (~2%), as illustrated in Figure 16.

Figure 16: Category-wise Emissions (Mt CO_2e) and Percentage Share in Industrial Wastewater Emissions (2018)



GHG Platform INDIA

The GHG Platform India is a civil society initiative providing an independent estimation and analysis of India's Greenhouse Gas (GHG) emissions across key sectors, namely- Energy, IPPU, AFOLU and Waste.

The Platform comprises of the following civil society:

The **Council on Energy, Environment and Water (CEEW)** is one of South Asia's leading not-for-profit policy research institutions. It uses data, integrated analysis and strategic outreach to explain – and change – the use, reuse, and misuse of resources.

The International Maize and Wheat Improvement Center (CIMMYT) is the global leader in agricultural research for development in wheat and maize-based farming systems.

Center for Study of Science, Technology and Policy (CSTEP) is a not for profit research organisation incorporated in 2005 u/s 25 of The Companies Act, 1956.

ICLEI - Local Governments for Sustainability is a leading global network of over 1,500 cities, towns and regions committed to building a sustainable future.

Vasudha Foundation, set up in 2010, is a not for profit organisation, working in the clean energy and climate policy space.

Secretariat Contact
Vasudha Foundation, CISRS House, 14, Jangpura B,
Mathura Road, New Delhi - 110014, India
Phone No. - 011-24372680

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