Mapping India's Energy Policy 2025

Annex

Swasti Raizada, Saumya Jain, Godwin Paul Chandra Sekar, Deepak Sharma, Sonakshi Saluja, Gayatri Milind Dixit

December 2025

Accompanying report:
https://www.iisd.org/publications/report/mapping-india-energy-policy-2025

Acknowledgements

The authors extend their gratitude to the previous collaboration between the International Institute for Sustainable Development (IISD), ICF India, the Overseas Development Institute, Vasudha Foundation, and the Council on Energy, Environment and Water, which was instrumental in creating the subsidy database that underlies this publication. For this update, most of the new data and revisions from the previous data on government support and receipts were contributed by co-authors Deepak Sharma, Saumya Jain, Godwin Paul Chandra Sekar, and Swasti Raizada from IISD.

Purpose

Overall, tracking both government support and revenues gives a comprehensive view of how public finance underpins the energy system, to make it possible to calibrate policies for a fair, fiscally sound energy transition.

This annex serves as a supplementary note to the *Mapping India's Energy Policy 2025* report. This report is the latest publication in a series of reviews undertaken by IISD in the past (see 2017, 2018, 2020, 2021, 2022a, 2022b, and 2023 for more background information). The study aims to ensure transparency and support the initiatives of the Government of India in aligning public financial flows with India's long-term 2070 net-zero goal.

Approach and Methodology

The 2025 report gathers and updates the latest available data on energy-related government support and revenues in India, including fiscal year 2023–2024 (FY 2024). The full dataset comprises decadal data between fiscal FY 2014 and FY 2024. In India, the FY runs from April 1 to March 31. Since new data can be made available by government and state actors retrospectively, the findings in our latest publication supersede older publications.

It includes central- and state-level data wherever available. We also collect data on energy revenues—fuel taxes, mining royalties, electricity levies, and similar receipts. In short, the study gathers the best available data on subsidies, public sector undertaking (PSU) investments, and energy sector revenues.

Subsequent sections provide information on IISD's methodology to map these measures, which includes the following modules:

1. Government Support for Energy
2. Government Receipts and Externalities From the Energy Sector

For this report, we use IISD's broader definition of "government support" (or public financial flows) (Viswanathan et al., 2021). Government support goes beyond direct budgetary transfers (the most visible form of subsidies). It can come in many forms—such as tax breaks, provision of goods and services, income or price support, investments by state-owned enterprises (referred to domestically as PSUs), or public financial institutions (PFIs).

We also classify government support and revenues into six groups: coal, renewable energy, electricity transmission and distribution (T&D), oil and gas (O&G), bioenergy, and electric vehicles (EVs). Certain items are excluded. We omit nuclear power and large hydro subsidies owing to insufficient public data. We are also unable to capture state-specific subsidies beyond direct budgetary transfers due to insufficient public data at the state government level. There are also many income or price support measures (such as public procurement of thermal power and EVs above market prices) that are identified but were unquantified at the time of writing. We do attempt to value the wider social and environmental costs of energy to the extent possible (such as air pollution and climate damage) to inform taxation measures. Private sector finance (domestic and international), indirect benefits outside formal budgets,

and off-budget consumer transfers without clear government accounting are beyond our scope. Also excluded is general infrastructure spending with incidental energy effects (e.g., roads, although fossil-fuelled transportation benefits indirectly). In effect, the focus is on direct public financial flows that can be traced in government records.

Types of Government Support

Subsidies

Subsidies, as defined by the World Trade Organization Agreement on Subsidies and Countervailing Measures (World Trade Organization, n.d., 2006), are financial contributions by a government or any public body that confers a benefit, such as

- direct transfers of funds (e.g., grants, loans, and equity infusion), including potential transfers (e.g., loan guarantees)
- foregone government revenue (e.g., tax expenditure)
- a government provision of goods or services other than general infrastructure or government procurement
- income or price support.

Alongside categorizing subsidies based on the key World Trade Organization subsidy categories, the accompanying dataset also classifies subsidies according to the formal guidelines for measuring fossil fuel under SDG indicator 12.c.1 to enhance reporting (Wooders et al., 2019).

Our subsidy estimates are drawn from government sources, including Union budgets, ministry websites and annual reports, parliamentary questions and answers, standing committee reports, and tariff orders of electricity distribution companies (discoms). For publicly unavailable estimates, we have followed estimated subsidies independently using standard international methodologies.

The following sections provide an in-depth background for all subsidies that have been adjusted since our 2023 review. As the government releases new and improved quality data, the foundational data for each subsidy may change. This enhances our measurements or changes in the design of the subsidy measures. A comprehensive summary of subsidy data is provided as a separate data spreadsheet that accompanies the 2025 report, or visit the interactive platform that showcases key trends.

New Subsidies

Coal

- C.22 Scheme for promotion of Coal/Lignite Gasification

O&G

- OG.56 Mission Anveshan

Renewables

- RE.45 PM Surya Ghar Muft Bijli Yojana

Electric Vehicles

- EV.10 Electric Mobility Promotion Scheme-2024
- EV.11 Scheme to Promote Manufacturing of Electric Passenger Cars in India (SMEC)
- EV.12 PM-eBus Sewa Scheme
- EV.14 PM Electric Drive Revolution in Innovative Vehicle Enhancement (PM E-DRIVE) Scheme
- EV.15 PM-eBus Sewa-Payment Security Mechanism (PSM) for procurement and operation of e-Buses by Public Transport Authorities (PTAs)

Biomass and Biofuels

- B.7 Global Biofuels Alliance
- B.8 Scheme for providing financial support for collection of biomass
- B.9 Scheme for Development of Pipeline infrastructure for injection of Compressed Bio Gas (CBG) in City Gas Distribution (CGD) Network
- B.10 GST Concession on Ethanol for Blending purposes
- B.11 GST Concession on Biodiesel for Blending purposes
- B.12 GST Concession on Compressed Biogas

New Subsidies: Summary tables

Subsidy category	Direct and indirect transfer of funds and liabilities → Direct funding
Stimulated activity	Production
Subsidy name	**C.22 Scheme for Promotion of Coal/Lignite Gasification**
Jurisdiction	Central government
Legislation/endorsing organization	Union Cabinet
Policy objective(s) of subsidy	The scheme aims to achieve a target of 100 MT of coal gasification by 2030.
End recipient(s) of subsidy	Coal and lignite companies
Time period	FY 2024 onward
Background	Launched in January 2024, with an outlay of INR 8,500 crore, the scheme provides financial assistance for gasification projects across three categories: • In category I – INR 4,050 crore is provisioned for government PSUs. • In category II – INR 3,850 crore is provisioned for the private sector and government PSUs. • In category III – INR 600 crore is provisioned for demonstration projects using indigenous technology.
Amount of subsidy conferred	No data till FY 2024. Expenditures expected in future years.
Disbursements	No data till FY 2024. Expenditures expected in future years.

Subsidy category	Direct and indirect transfer of funds and liabilities → Direct funding
Stimulated activity	Production
Subsidy name	**OG.56 Mission Anveshan**
Jurisdiction	Central government
Legislation/endorsing organization	Union Cabinet
Policy objective(s) of subsidy	The objective of this scheme is to map O&G reserves.
End recipient(s) of subsidy	O&G explorers
Time period	FY 2024 onward
Background	To reduce imports of crude oil, the Union government launched Mission Anveshan in 2024 as an extension of the National Seismic Programme. With a total outlay of INR 792 crore over 2 years, the scheme supports the Oil and Natural Gas Corporation and Oil India Limited to process, interpret, and map hydrocarbon reserves. The scheme is set to continue until FY 2027.
Disbursements	No data till FY 2024. Expenditures expected in future years.

Subsidy category	Direct and indirect transfer of funds and liabilities → Direct funding
Stimulated activity	Consumption
Subsidy name	**RE.45 PM Surya Ghar Muft Bijli Yojana**
Jurisdiction	Central government
Legislation/endorsing organization	Union Cabinet
Policy objective(s) of subsidy	To subsidize rooftop solar photovoltaic (PV) systems and provide free electricity up to 300 units every month to 1 crore households.
End recipient(s) of subsidy	Consumers
Time period	FY 2024 onward
Background	PM Surya Ghar Muft Bijili Yojana was launched on February 13, 2024, by the Union government with an outlay of INR 75,021 crore to subsidize rooftop solar PV systems up to 3-kW systems and provide 300 units of free electricity to households every month. The scheme is to be implemented till FY 2027.
Disbursements	No data till FY 2024. Expenditures expected in future years.

Subsidy category	Direct and indirect transfer of funds and liabilities → Direct funding
Stimulated activity	Production and consumption
Subsidy name	**EV.10 Electric Mobility Promotion Scheme-2024 (EMPS)**
Jurisdiction	Central government
Legislation/endorsing organization	Union Cabinet
Policy objective(s) of subsidy	This scheme aims to promote the adoption of electric two- and three-wheelers.
End recipient(s) of subsidy	Consumers
Time period	FY 2025
Background	The EMPS was launched by the Ministry of Heavy Industries and originally set to run from April 1, 2024, to July 31, 2024, with an outlay of INR 500 crore. This scheme was extended by 2 more months, up to September 30, 2024, and the budget increased to INR 778 crore. It aims to replace FAME-II, to advance the Government of India's green initiatives and foster the growth of the EV manufacturing ecosystem. The scheme targets to support 5,60,789 EVs, including electric two-wheelers, e-rickshaws/e-carts, and three-wheelers.
Disbursements	No data till FY 2024. Expenditures expected in future years.

Subsidy category	Direct and indirect transfer of funds and liabilities → Direct funding
Stimulated activity	Production
Subsidy name	**EV.11 Scheme to Promote Manufacturing of Electric Passenger Cars in India (SMEC)**
Jurisdiction	Central government
Legislation/endorsing organization	Union Cabinet
Policy objective(s) of subsidy	This scheme aims to attract domestic investment in the manufacturing of electric passenger cars.
End recipient(s) of subsidy	Global EV manufacturers
Time period	FY 2025 onward
Background	This scheme was operationalized in June 2024 to attract investments from global EV manufacturers and promote India as a manufacturing destination for EVs. Through this scheme, investors are allowed to import high-end electric cars priced at over USD 35,000 under a reduced 15% customs duty for 5 years, provided they invest at least INR 4,150 crore in local manufacturing.
Disbursements	No data till FY 2024. Expenditures expected in future years.

Subsidy category	Direct and indirect transfer of funds and liabilities → Direct funding
Stimulated activity	Consumption
Subsidy name	**EV.12 PM-eBus Sewa Scheme**
Jurisdiction	Central government
Legislation/endorsing organization	Union Cabinet
Policy objective(s) of subsidy	This scheme aims to electrify 10,000 urban buses across Indian cities.
End recipient(s) of subsidy	Public/state transport authorities
Time period	FY 2024–ongoing
Background	This scheme was launched on August 16, 2023, to support the deployment of 10,000 e-buses under a public–private partnership model across Indian cities. With an estimated cost of INR 57,613 crore, the Union government is expected to provide INR 20,000 crore, while the rest is borne by the state governments. This scheme will cover cities with a population of 3 lakh and above. This scheme is expected to generate 45,000–55,000 direct jobs. This scheme is expected to support the operation of e-buses for a period of 12 years.
Disbursements	No data till FY 2024. Expenditures expected in future years.

Subsidy category	Direct and indirect transfer of funds and liabilities → Direct funding
Stimulated activity	Production and consumption
Subsidy name	**EV.14 PM Electric Drive Revolution in Innovative Vehicle Enhancement (PM E-DRIVE) Scheme**
Jurisdiction	Central government
Legislation/endorsing organization	Union Cabinet
Policy objective(s) of subsidy	The objective of this scheme is to accelerate the adoption of EVs and strengthen EV infrastructure.
End recipient(s) of subsidy	Consumers
Time period	FY 2024 onward
Background	The Union government notified this scheme on September 29, 2024, to promote the adoption of EVs, including two-wheelers, three-wheelers, buses, trucks, and ambulances. It deploys e-vouchers for streamlined subsidies and enhances the charging infrastructure. The scheme has an outlay of INR 10,900 crore for a period of 2 years, starting from October 1, 2024, to March 31, 2026; it was later extended to March 31, 2028.
Disbursements	No data till FY 2024. Expenditures expected in future years.

Subsidy category	Direct and indirect transfer of funds and liabilities → Direct funding
Stimulated activity	Production and consumption
Subsidy name	**EV.15 PM-eBus Sewa-Payment Security Mechanism (PSM) for procurement and operation of e-Buses by Public Transport Authorities (PTAs)**
Jurisdiction	Central government
Legislation/endorsing organization	Union Cabinet
Policy objective(s) of subsidy	This scheme ensures timely payment to electric bus operators under the PM-eBus Sewa scheme.
End recipient(s) of subsidy	Private e-bus operators
Time period	FY 2024 onward
Background	This scheme was announced on October 28, 2024, with a budget of INR 3,435.33 crore allocated from FY 2024 to FY 2029. Under this scheme, Convergence Energy Services Ltd implements a dedicated fund to make payments on behalf of Public Transport Authorities due to payment delays under the Gross Cost Contract model. This approach derisks private investors and encourages private sector participation.
Disbursements	No data till FY 2024. Expenditures expected in future years.

Subsidy category	Direct and indirect transfer of funds and liabilities → Direct funding										
Stimulated activity	Production										
Subsidy name	**B.7 Global Biofuels Alliance**										
Jurisdiction	Central government										
Legislation/endorsing organization	Union Cabinet										
Policy objective(s) of subsidy	The objective of this alliance is to accelerate the global adoption of sustainable biofuels.										
End recipient(s) of subsidy	Biofuel producers										
Time period	FY 2024 onward										
Background	This initiative brings together governments, international organizations, and industries to drive biofuel deployment. This alliance functions as a knowledge-sharing hub and a catalytic platform for fostering global collaboration for the advancement and widespread adoption of biofuels.										
Amount of subsidy conferred	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
(In INR crore, real 2024)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	60
(In USD million, real 2024)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	7
Information sources	Notes on Demands for Grants, Expenditure Budget, Ministry of New and Renewable Energy (MNRE) and the Ministry of Petroleum and Natural Gas (MoPNG), Indian Budget (different years)										

Subsidy category	Direct and indirect transfer of funds and liabilities → Direct spending
Stimulated activity	Production
Subsidy name	**B.8 Scheme for Providing Financial Support for Collection of Biomass**
Jurisdiction	Central government
Legislation/endorsing organization	Union Cabinet
Policy objective(s) of subsidy	The objective of this scheme is to provide financial support for the collection of agricultural residues.
End recipient(s) of subsidy	Consumers
Time period	FY 2024 onward
Background	On February 2, 2024, the Union government launched this scheme with a budget allocation of INR 564 crore for FY 2024 to FY 2027 to provide financial support to facilitate biomass aggregation and marketing for the initial 100 compressed biogas (CBG) plants. Through this initiative, the government aims to monetize untapped agri-residue and convert it to CBG and bio-manure.
Disbursements	No data till FY 2024. Expenditures expected in future years.

Subsidy category	Direct and indirect transfer of funds and liabilities → Direct spending
Stimulated activity	Production
Subsidy name	**B.9 Scheme for Development of Pipeline infrastructure for injection of Compressed Bio Gas (CBG) in City Gas Distribution (CGD) Network**
Jurisdiction	Central government
Legislation/endorsing organization	Union Cabinet
Policy objective(s) of subsidy	The objective of this scheme is to incentivize the integration of CBG into the CGD network.
End recipient(s) of subsidy	CBG producers
Time period	FY 2024 onward
Background	This scheme was launched on March 15, 2024, with a budget outlay of INR 994.5 crore during the period of FY 2024 to FY 2026. Under this scheme, the Union government financially supports the development of pipeline infrastructure projects to integrate CBG into the CGD network. This initiative reduces the challenges associated with CBG transportation.
Disbursements	No data till FY 2024. Expenditures expected in future years.

Subsidy category	Government revenue foregone → Tax breaks and special taxes										
Stimulated activity	Production										
Subsidy name	**B.10 GST Concession on Ethanol for Blending Purposes**										
Jurisdiction	Central government										
Legislation/endorsing organization	Union Cabinet										
Policy objective(s) of subsidy	The objective of this scheme is to promote ethanol blending in petrol by reducing the Goods and Services Tax (GST) on ethanol.										
End recipient(s) of subsidy	Oil marketing companies (OMCs)										
Time period	FY 2021–ongoing										
Background	Under this scheme, the Union government reduced the GST on ethanol for blending with petrol from 18% to 5%. This GST reduction incentivizes blending operations, lowers carbon emissions, and helps India achieve blending targets faster.										
Amount of subsidy conferred	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
(In INR crore, real 2024)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	707	3,868	4,603
(In USD million, real 2024)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	95	481	556
Information sources	Ethanol blended with petrol: *Annual Statistical Publication*, MOPNG 2023-24 Weighted ethanol price: https://pib.gov.in/PressReleasePage.aspx?PRID=1668399 Weighted ethanol production: https://bioenergytimes.com/esy-2024-25-omcs-allocate-around-837-crore-litres-for-ethanol-supply/ GST rate on ethanol: https://pib.gov.in/pressreleasepage.aspx?prid=1782275										

Subsidy category	Government revenue foregone → Tax breaks and special taxes										
Stimulated activity	Production										
Subsidy name	**B.11 GST Concession on Biodiesel for Blending purposes**										
Jurisdiction	Central government										
Legislation/endorsing organization	Union Cabinet										
Policy objective(s) of subsidy	The aim of this scheme is to support biodiesel blending by reducing GST on biodiesel supplied to oil companies.										
End recipient(s) of subsidy	OMCs										
Time period	FY 2022–ongoing										
Background	Under this initiative, the GST council has reduced the GST on biodiesel from 12% to 5% for biodiesel supplied to OMCs. This tax concession aims to incentivize the use of biodiesel across the transport sector by lowering blending costs.										
Amount of subsidy conferred	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
(In INR crore, real 2024)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	42	259
(In USD million, real 2024)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	5	31
Information sources	Biodiesel blended with diesel: https://energyportal.in/petroleum/biodiesel-purchase-policy, (p. 168), *Annual Statistical Publication*, MOPNG 2023-24 Biodiesel price: https://www.autocarpro.in/news/indian-omcs-kick-off-biodiesel-procurement-for-fy-2026-with-major-tender-125941?utm_source=chatgpt.com GST rate on biodiesel (for blending): https://www.pib.gov.in/PressReleasePage.aspx?PRID=1989224 GST rate on biodiesel (for other purposes): https://www.taxscan.in/5-gst-payable-on-bio-diesel-supplied-to-oil-marketing-companies-for-blending-with-high-speed-diesel-cbic/134674/										

Subsidy category	Government revenue foregone → Tax breaks and special taxes										
Stimulated activity	Production										
Subsidy name	**B.12 GST Concession on Compressed Biogas**										
Jurisdiction	Central government										
Legislation/endorsing organization	Union Cabinet										
Policy objective(s) of subsidy	This scheme aims to encourage the production and adoption of CBG by reducing the GST.										
End recipient(s) of subsidy	CBG producers and OMCs										
Time period	FY 2024–ongoing										
Background	Under this initiative, the Union government reduced the CBG's GST rate from 12% to 5% to promote its market adoption and price competitiveness with fossil fuels. This initiative has a broader focus on reducing emissions, improving waste management, and enhancing energy security.										
Amount of subsidy conferred	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
(In INR crore, real 2024)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	4	6
(In USD million, real 2024)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.47	1
Information sources	CBG sales: *Annual Statistical Publication* (p. 169), MOPNG 2023-24 CBG price per kg: https://iocl.com/download/Frequently_Asked_Questions_on_CBG.pdf GST on CBG: https://iocl.com/download/Frequently_Asked_Questions_on_CBG.pdf										

Subsidies Methodology Revised–Retrospectively

Coal

- C.16 Pricing of coal
- C.17 Concessional GST rates on coal sales

O&G

- OG.39 Lower GST rates for domestic LPG
- OG.40 Lower GST rates for PDS kerosene
- OG.44 Under-recovery on non-subsidized LPG sale

Electric Vehicles

- EV.13 Deduction in respect of purchase of electric vehicle (section 80EEB)

Biomass and Biofuels

- B.6 Financing and non-financing schemes: IREDA and other organizations

Subsidies Methodology Revised–Retrospectively: Summary tables

Subsidy category	Income or price support → Market price support and regulation										
Stimulated activity	Consumption										
Subsidy name	**C.16 Pricing of coal**										
Jurisdiction	Central government										
Legislation/ endorsing organization	Union Cabinet										
Policy objective(s) of subsidy	The objective is to keep domestic coal prices lower for grid-based electricity generation.										
End recipient(s) of subsidy	Thermal power plants										
Time period	FY 2014–ongoing										
Background	The grade-wise notified coal price is lower for utilities (including independent power producers) compared to captive power plants. Underpricing of coal to power utilities is quantified by taking the difference between the wise price applicable for utilities versus other sectors. As granular data on grade-wise notified prices for utilities and other sectors became available at the level of Coal India Limited (CIL) subsidiaries and Singareni Collieries Company Limited (SCCL), the methodology was revised to track company-wise, subsidiary-wise, and grade-wise pricing and dispatch of coal. This improves transparency and ensures a more precise calculation of coal underpricing.										
Amount of subsidy conferred	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
(In INR crore, real 2024)	17,941	19,691	19,359	13,625	13,710	15,843	15,248	13,147	15,844	18,301	19,058
(In USD million, real 2024)	2,960	3,229	2,957	2,031	2,127	2,266	2,151	1,771	2,127	2,277	2,302
Information sources	Total coal dispatch to the utilities sector: https://coal.nic.in/sites/default/files/2024-05/srn-march-2024.pdf Grade-wise dispatch to the utilities sector: https://coal.gov.in/sites/default/files/2022-01/25-01-2022.pdf Grade-wise production of coal: https://coal.gov.in/sites/default/files/2022-01/25-01-2022.pdf Grade-wise notified price for the sector: https://coal.gov.in/sites/default/files/2022-01/25-01-2022.pdf Grade-wise notified price for captive/others: https://coal.gov.in/sites/default/files/2022-01/25-01-2022.pdf										

Subsidy category	Government revenue foregone → Tax breaks										
Stimulated activity	Production and consumption										
Subsidy name	**C.17 Concessional GST rates on coal sales**										
Jurisdiction	Central government										
Legislation/endorsing organization	Union Cabinet										
Policy objective(s) of subsidy	The objective is to keep domestic coal prices low for end-use sectors.										
End recipient(s) of subsidy	Thermal power plants and industry										
Time period	FY 2014–ongoing										
Background	The government imposed a GST rate of 5% on coal starting in FY 2018. The GST rate on mineral ores was 5% between FY 2018 and the first half of FY 2022 and then was raised to 18%. The GST imposed on mineral ores like iron ore, manganese, copper, etc., is considered a benchmark to estimate the GST concession on coal. The methodology has been revised from the previous year's inventory because the government started publishing the full GST collection on coal in the Coal Directory, covering CIL subsidiaries and private coal producers. Earlier, estimates of GST concessions were based only on CIL's reported GST collections, reconstructed using basic cost, crushing, and transport. The revised methodology now uses the actual GST collections (Central Goods and Services Tax [CGST], State Goods and Services Tax [SGST], and Integrated Goods and Services Tax [IGST]) reported for both public and private coal producers, ensuring a more comprehensive and accurate estimate of revenue foregone.										
Amount of subsidy conferred	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
(In INR crore, real 2024)	n/a	n/a	n/a	n/a	0	0	0	0	7,572	18,862	20,039
(In USD million, real 2024)	n/a	n/a	n/a	n/a	0	0	0	0	1,016	2,347	2,421
Information sources	Total production (million tonnes), basic cost (INR crore): CIL annual reports (through the years) Coal Directory (various years): https://www.coalcontroller.gov.in/coal-directory-india Crushing charges (INR per tonne): http://www.cercind.gov.in/2019/orders/17-MP-2019.pdf, CIL annual reports (through the years) Surface transportation costs (INR per tonne): https://mstcindia.co.in/MSTC_Static_Pages/Coal/Revised_20Crushing_20Sizing_20and_20transportation_20charges.htm, CIL annual reports (through the years) Concessional GST rate on coal (%): https://cbic-gst.gov.in/gst-goods-services-rates.html GST rates on mineral ores (%): https://cbic-gst.gov.in/gst-goods-services-rates.html										

Subsidy category	Government revenue foregone → Tax breaks and special taxes										
Stimulated activity	Production and consumption										
Subsidy name	**OG.39 Lower GST rates for domestic LPG**										
Jurisdiction	Central government										
Legislation/ endorsing organization	Union Cabinet										
Policy objective(s) of subsidy	The objective is to keep the domestic LPG prices lower.										
End recipient(s) of subsidy	Consumers										
Time period	FY 2018–ongoing										
Background	The GST imposed on domestic LPG was set at 5%, effective starting January 2024. This GST rate is significantly lower than the 18% GST levied on non-domestic or automotive LPG. The methodology for estimating the GST concession on domestic LPG was revised from the previous year's inventory by using monthly LPG consumption and sales data from Petroleum Planning and Analysis Cell (PPAC) for PSUs and domestic consumers, combined with weighted monthly prices exclusive of GST. The revenue foregone is calculated on a monthly basis, providing a transparent and precise estimate of the GST concession. The previous methodology calculations were restricted to annual average domestic LPG prices and applied a 5% GST on the estimated basic price without accounting for monthly fluctuations in the LPG price or differentiating between PSU and domestic consumption.										
Amount of subsidy conferred	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
(In INR crore, real 2024)	n/a	n/a	n/a	n/a	14,758	17,565	15,946	15,454	20,319	22,858	20,812
(In USD million, real 2024)	n/a	n/a	n/a	n/a	2,290	2,512	2,249	2,082	2,727	2,844	2,514
Information sources	LPG consumption: https://ppac.gov.in/consumption/products-wise										

Subsidy category	Government revenue foregone → Tax breaks and special taxes										
Stimulated activity	Production and consumption										
Subsidy name	**OG.40 Lower GST rates for Public Distribution Scheme (PDS) kerosene**										
Jurisdiction	Central government										
Legislation/endorsing organization	Union Cabinet										
Policy objective(s) of subsidy	The objective is to keep the domestic LPG prices lower for affordability to lower-income households.										
End recipient(s) of subsidy	Consumers										
Time period											
Background	Under the GST regime, kerosene supplied via PDS, primarily used as cooking fuel for economically vulnerable households, is taxed at 5%, significantly lower than the non-PDS kerosene taxed at 18%. The methodology for estimating the GST concession on PDS kerosene was revised from the previous year's inventory by using monthly PDS kerosene consumption and sales data from PPAC for domestic consumers and commercial and other users, combined with monthly prices per litre exclusive of GST. The revenue foregone is calculated by the difference between the 5% GST levied on PDS kerosene and 18% levied on non-PDS kerosene. This approach provides a transparent and precise estimate of the GST concession. The previous methodology calculations were restricted to annual average PDS kerosene prices and applied a 5% GST on the estimated basic price without accounting for monthly price fluctuations in PDS kerosene.										
Amount of subsidy conferred	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
(In INR crore, real 2024)	n/a	n/a	n/a	n/a	1,550	1,751	1,389	709	993	390	299
(In USD million, real 2024)	n/a	n/a	n/a	n/a	240	250	196	96	133	49	36
Information sources	Kerosene consumption: https://ppac.gov.in/consumption/products-wise										

Subsidy category	Provision of goods or services below market value										
Stimulated activity	Production										
Subsidy name	**OG.44 Under-recovery on non-subsidized LPG sale**										
Jurisdiction	Central government										
Legislation/endorsing organization	Union Cabinet										
Policy objective(s) of subsidy	This scheme aims to compensate OMCs for losses incurred from selling non-subsidized LPG cylinders below market-determined prices.										
End recipient(s) of subsidy	OMCs										
Time period	FY 2024 onward										
Background	Under-recovery on domestic LPG in India is the financial loss incurred by OMCs when the cost of sourcing LPG is higher than the price at which it is sold to consumers. In India, domestic LPG cylinders are supplied at regulated prices to consumers by the public sector OMCs. The Union government bears the under-recovery costs and frequently compensates OMCs to manage price shocks.										
Amount of subsidy conferred	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
(In INR crore, real 2024)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	9,051	22,701	9,474	0
(In USD million, real 2024)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1,219	3,047	1,179	0
Information sources	PPAC Ready Reckoner: https://ppac.gov.in/subsidy/subsidies-under-recoveries-to-oil-marketing-companies-omcs-on-sale-of-sensitive-petroleum-products-rs-crore										

Subsidy category	Government revenue foregone → Tax break										
Stimulated activity	Consumption										
Subsidy name	**EV.13 Deduction in respect of purchase of electric vehicle (section 80EEB)**										
Jurisdiction	Central government										
Legislation/endorsing organization	Union Cabinet										
Policy objective(s) of subsidy	This scheme incentivizes tax deduction up to INR 1.5 lakh annually for interest paid on loans taken to purchase EVs.										
End recipient(s) of subsidy	Consumers										
Time period	FY 2021–ongoing										
Background	Under this scheme, individual taxpayers are eligible to claim a tax deduction of INR 1.5 lakh annually on the interest taken from financial institutions for the purchase of EVs for loans taken between April 1, 2019, and March 31, 2023.										
Amount of subsidy conferred	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
(In INR crore, real 2024)	n/a	n/a	n/a	n/a	n/a	n/a	-	-	250	439	469
(In USD million, real 2024)	n/a	n/a	n/a	n/a	n/a	n/a	-	-	34	55	57
Information sources	Notes on Demands for Grants, Expenditure Budget, Ministry of Heavy Industries, Indian Budget (different years)										

Subsidy category	Direct and indirect transfer of funds and liabilities → Credit support										
Stimulated activity	Production										
Subsidy name	**B.6 Financing and non-financing schemes: IREDA and other organizations**										
Jurisdiction	Central government										
Legislation/endorsing organization	Union Cabinet										
Policy objective(s) of subsidy	To catalyze investment in renewable energy, IREDA and other organizations offer financial support services.										
End recipient(s) of subsidy	Project developers										
Time period	Ongoing										
Background	IREDA and other PFI's like Power Finance Corporation (PFC) and Rural Electrification Corporation (REC) offer both financial support (loans, co-lending) and non-financial support (credit guarantees) for bioenergy. In particular, IREDA offers loans for bioenergy projects at interest rates lower than prevailing market rates. The methodology has been updated this year due to the availability of granular data on loans offered across different bioenergy sectors. Previously, only biomass projects were covered; the revised approach now includes biomass power and cogeneration, waste-to-energy, and ethanol. This ensures a more comprehensive assessment of concessional finance for bioenergy.										
Amount of subsidy conferred	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
(In INR crore, real 2024)	0	0	20	20	18	21	22	20	21	56	146
(In USD million, real 2024)	0	0	3	3	3	3	3	3	3	7	18
Information sources	Loan Disbursed: IREDA annual reports (different years) SBI prime lending rates: https://sbi.co.in/web/interest-rates/interest-rates/benchmark-prime-lending-rate-historical-data IREDA Financing interest rate for biomass: http://www.ireda.in/forms/contentpage.aspx?lid=740										

State-Owned Enterprises

We quantify the investments by state-owned enterprises (SOEs) by tracking their annual capital expenditures. These expenditures include expenditure of state-owned energy companies (with at least 51% government shareholding) engaged in activities such as coal mining, exploration and development of O&G fields, pipeline development, refinery construction, city gas distribution, electricity generation, and T&D. Monitoring these investments over time helps us understand the diversification of revenue shifts for the governments, which are significant state actors.

Since the 2023 report, for the central and state PSUs operating in the energy sector, IISD is tracking their year-on-year project-level capital expenditure (CapEx) (for projects above INR 150 crore). We obtain data on central PSUs from the *Monthly Flash Reports* published by the Ministry of Statistics and Programme Implementation. These project-level expenditures help us capture the evolving landscape of the energy sector and the investment divergence of SOEs into clean energy. Previously, IISD tracked the capital expenditure solely at the aggregate level for the largest SOEs in the energy sector.

For this, CapEx in the following sub-sectors have been tracked since 2017:

- Coal mining
- Coal washery
- Thermal power plants
- Oil
- Gas
- Gas power plants
- Transmission
- Transmission – Renewable
- Hydro (tracked but excluded from reporting)
- Nuclear (tracked but excluded from reporting)
- Solar
- Wind
- Biofuel
- Others

Domestic Public Financial Institutions

In addition to the PSUs, PFIs (public financial companies or public sector banks with at least 51% government shareholding) can be important investors in energy projects. PFIs are also an important unit of analysis because they often help SOEs mobilize capital. A large part of their investment in energy comes in the form of debt financing, whether offered at market rates or at subsidized terms. When offered at subsidized terms, the concessional rates contribute to the subsidy estimates described above. To do this, we track PFI lending through annual disbursements, which helps clarify the changes in perceived risks for fossils and clean energy.

IISD also tracks yearly loan disbursements by select domestic state-owned financial institutions to fossil and clean energy to map government support. Currently, we track the loan disbursements for IREDA, PFC Ltd. and REC Ltd. The source of data is these

companies' annual reports, earnings reports, and investor presentations. We exclude the equity investments of PFIs due to the limited availability of data. The loan disbursements are tracked across the following sectors:

- Conventional generation
- Non-conventional generation
- Transmission
- Distribution
- Others

Government Receipts and Externalities From Energy

Government Receipts From Energy

In addition to monitoring government support, IISD also tracks government revenues in the energy sector. This includes both the tax and non-tax revenues from coal, O&G, T&D, and renewable energy. These revenues are tracked from the annual reports of SOEs, official statistics, monthly reckoners of PPAC, and the Reserve Bank of India's (RBI) state finance reports. The accompanying database collates the receipts from FY 2014 to FY 2024 to the extent possible. Table A1 provides information on the source of the receipt measures.

Table A1. Fuel-wise revenue instruments

S. No.	Description	Fuel type	Source
1	Basic Customs Duty	Coal– Non-coking coal	IISD estimation
2	Central GST – CIL	Coal	CIL Annual report
3	Central sales tax – CIL	Coal	CIL Annual report
4	GST compensation cess	Coal – Non-coking coal	IISD estimation
5	Integrated GST – CIL	Coal	CIL Annual report
6	Integrated GST – imports	Coal – Non-coking coal	IISD estimation
7	Contribution to NMET - CIL	Coal	CIL annual report
8	Dividend – CIL	Coal	CIL annual report
9	Dividend - SCCL – Centre	Coal	SCCL annual report
10	Entry tax	Coal	CIL annual report
11	State Cess on Coal – CIL	Coal	CIL annual report
12	State GST – CIL	Coal	CIL annual report
13	Dividend - SCCL – State	Coal	SCCL annual report
14	Contribution to DMF – CIL	Coal	CIL annual report
15	Contribution to DMF - SCCL	Coal	SCCL annual report
16	State Royalty – CIL	Coal	CIL annual report
17	State Royalty – SCCL	Coal	SCCL annual report
18	Basic Customs Duty	Coal – Coking Coal	IISD estimation
19	Central GST	Coal – Lignite	NLC annual report
20	Clean Energy Cess – CIL	Coal	CIL annual report

S. No.	Description	Fuel type	Source
21	Clean Energy Cess – NLC	Coal – Lignite	NLC annual report
22	Central Excise Duty – CIL	Coal	CIL annual report
23	GST compensation cess	Coal – Coking Coal	IISD estimation
24	GST compensation cess	Coal – Lignite	IISD estimation
25	Integrated GST – imports	Coal – Coking Coal	IISD estimation
26	NMET paid by other public and private companies (except CIL and SCCL)	Coal	Provisional coal statistics
27	Dividend – CIL	Coal	CIL annual report
28	State VAT – CIL	Coal	CIL annual report
29	State GST – Lignite	Coal – Lignite	NLC annual report
30	DMF paid by other public and private companies (except CIL)	Coal	Provisional coal statistics
31	Royalty paid by other public and private companies (except CIL and SCCL)	Coal	Provisional coal statistics
32	State Royalty – NLC	Coal – Lignite	NLC annual report
33	Income Tax – CIL	Coal	CIL annual report
34	Income Tax – SCCL	Coal	SCCL annual report
35	Income Tax – NLC	Coal	NLC annual report
36	Dividend – NLC	Coal – Lignite	NLC annual report
37	Dividend distribution tax – NLC	Coal – Lignite	NLC annual report
38	Dividend distribution tax – CIL	Coal	CIL annual report
39	Dividend distribution tax – SCCL	Coal	SCCL annual report
40	Contribution to exchequer by NTPC	Coal – Thermal power	NTPC Ltd. annual report
41	Central GST (all private and public companies except CIL and SCCL)	Coal	Coal Directory
42	State GST (all private and public companies except CIL and SCCL)	Coal	Coal Directory
43	Integrated GST	Lignite	Coal Directory
44	Central GST - SCCL	Coal	Coal Directory
45	State GST – SCCL	Coal	Coal Directory
46	Contribution to NMET – SCCL	Coal	Coal Directory
47	DMF paid by other public and private companies (except CIL and SCCL)	Coal	Coal Directory
48	DMF paid by all private and public companies	Lignite	Coal Directory
49	NMET paid by all private and public companies	Lignite	Coal Directory
50	Cess on crude oil	O&G	PPAC
51	CGST (Central GST)	O&G	PPAC
52	Customs duty	O&G	PPAC
53	Excise duty	O&G	PPAC
54	IGST (Integrated GST)	O&G	PPAC
55	Service tax	O&G	PPAC

S. No.	Description	Fuel type	Source
56	Royalty on crude oil/natural gas – Central	O&G	PPAC
57	Corporate/income tax	O&G	PPAC
58	Dividend distribution tax	O&G	PPAC
59	Dividend income to Central govt.	O&G	PPAC
60	National Calamity Contingent Duty	O&G	PPAC
61	Profit Petroleum on exploration of oil/ gas	O&G	PPAC
62	Others	O&G	PPAC
63	Entry and other taxes	O&G	PPAC
64	GST – state and UT	O&G	PPAC
65	Octroi, duties incl. electricity duty	O&G	PPAC
66	Value-added tax	O&G	PPAC
67	Dividend – State & UT	O&G	PPAC
68	Royalties on petroleum – state	O&G	PPAC
69	Electricity duty	T&D	RBI State Finance
70	Contribution by Power Grid Corporation of India (PGCIL) to exchequer	T&D	PGCIL annual report
71	Safeguard duty	Renewables	IISD estimation
72	BCD collections	Renewables	IISD estimation
73	GST on solar	Renewables	IISD estimation
74	GST on wind	Renewables	IISD estimation
75	Contribution by IREDA to exchequer	Renewables	IREDA annual report
76	Contribution by SECI to exchequer	Renewables	SECI annual report

Externalities

Climate Change, Cost of Carbon, and Methane

Climate change externalities were estimated from the total carbon dioxide (CO_2) and methane emissions associated with each energy source. For fossil fuels, this includes CO_2 emissions from fuel combustion and methane emissions from coal production (steam, coking, lignite, and peat) and end use, as well as from the O&G sectors, divided into upstream, gas transportation, and other segments. Upstream covers emissions from production, gathering, and processing across onshore and offshore O&G facilities. Gas transportation includes emissions from transmission, distribution, and liquefied natural gas processes, such as regasification. Other segments comprise refining, oil transport, and end-use emissions. For renewables, life-cycle assessment (LCA) emissions were considered, covering greenhouse gas (GHG) emissions released during equipment manufacturing, installation, operation, and decommissioning. In the case of LCA emissions of grid-scale PV, we have considered a weighted average for ground-mounted and rooftop PV based on their respective emissions.

Fossil fuel climate change externality estimates are conservative since we do not include LCA emissions.

We have considered a social cost of carbon in India to be in the range of with a confidence interval of USD 49–USD 157/tCO_2 equivalent (CO_2e). To maintain a conservative approach, USD 49/tCO_2e was used when we were calculating per-unit true costs for different energy sources in the study (Ricke et al., 2018).

Table A2.GHG emissions by energy source and social cost of CO_2 and methane

Externality	Unit	Data	Source
Coal			
CO_2 emissions	tCO_2e (2023)	2,030,000,000	Ritchie & Roser, n.d.
Methane emissions	tonnes (2023)	3,042,300	International Energy Agency, 2025
Oil			
CO_2 emissions	tCO_2e (2023)	717,800,000	Ritchie & Roser, n.d.
Methane emissions	tonnes (2023)	647,208	International Energy Agency, 2025
Gas			
CO_2 emissions	tCO_2e (2023)	132,400,000	Ritchie & Roser, n.d.
Methane emissions	tonnes (2023)	451,650	International Energy Agency, 2025
Solar PV			
Solar generation	(KWh million) (2024)	115,975.1	Central Electricity Authority, 2024
LCA emissions – grid-scale PV	(gCO_2/kWh)	318.14	Prabhu et al., 2021
Onshore wind			
Wind generation	(KWh million) (2024)	83,385.35	Central Electricity Authority, 2024
LCA emissions – grid-scale PV	(gCO_2/kWh)	15	Bhandari et al., 2020
Cost of carbon			
Carbon price (conservative)	USD/tCO_2e (2018)	49	Ricke et al., 2018
Carbon price (less conservative)	USD/tCO_2e (2018)	157	Ricke et al., 2018
Methane price (conservative)	USD/tCO_2e (2022)	240	Kumari et al., 2019
Methane price (less conservative)	USD/tCO_2e (2022)	1,239	Kumari et al., 2019

Morbidity From Air Pollution and Working Days Lost

Morbidity due to air pollution has been measured only in working days lost (WDL), given the difficulty of estimating medical expenses and productivity losses arising from illness and the unavailability of this data. The number of WDL for coal and transport fuels was estimated from the total WDL from all ambient air pollution in India of 1.3 billion in 2020 (Dalberg Advisors et al., 2021), and then attributed to coal and oil. The share for coal-fired power was 9% (Cropper et al., 2021), and the share for transport fuel combustion was 15% (Upadhyay et al., 2018). We used a conservative value of INR 418 for the value of a WDL, corresponding to

the daily wage of a casual labourer in India—the minimum wage level (National Sample Survey Office, 2024). The less conservative estimate of INR 645 uses the average wage across self-employed, regular wage/salaried, and casual labour categories (National Sample Survey Office, 2024).

Table A3.WDL by energy source and value of a WDL

Externality	Unit	Data	Source
Coal			
WDL	# days (2021)	117,000,000	Dalberg Advisors et al., 2021
Oil			
WDL	# days (2021)	195,000,000	Dalberg Advisors et al., 2021
Value of WDL			
Value of WDL (conservative)	INR (2024)	645	National Sample Survey Office, 2024
Value of WDL (less conservative)	INR (2024)	418	National Sample Survey Office, 2024

Value of a Statistical Life

The value of a statistical life (VSL) represents the amount individuals are willing to pay to reduce the risk of death. It does not place a monetary value on a human life—which would be unethical and impossible to quantify—but rather estimates the economic value of risk reduction. Various methodologies exist for estimating VSL. In our analysis, we use two values: a conservative estimate of USD 275,000 (Viscusi & Masterman, 2017) and a less conservative estimate of USD 640,000 (Majumder & Madheswaran, 2018).

Table A4. Deaths by energy source and the VSL of a death

Externality	Unit	Data	Source
Coal			
Deaths (conservative)	# deaths (2025)	164,000	Guttikunda & Jawahar, 2018
Deaths (less conservative)	# deaths (2025)	197,500	Guttikunda & Jawahar, 2018
Oil			
Deaths	# deaths	168,300	Lelieveld et al., 2023; assigned 11% to oil based on Dalberg Advisors et al., 2021
VSL (conservative)	USD (2017)	275,000	Viscusi & Masterman, 2017
VSL (less conservative)	USD (2018)	640,000	Majumder & Madheswaran, 2018

Traffic Accidents, Congestion, and Road Damage

Estimating congestion and road damage is challenging, as congestion depends on understanding the marginal cost of driving and the impact of one additional vehicle on the road. For road damage, we use International Monetary Fund estimates based on highway maintenance expenditures, which provide the cost per litre of petrol and diesel consumed in causing congestion and road damage. These are then scaled to India's fuel consumption. See Black et al. (2023) for a detailed description of the methodology.

For road accidents, we have, for simplicity, considered only fatalities, as accurately estimating injuries is complex, given limited reliable secondary data. The number of deaths is multiplied by the VSL to calculate the cost of road accidents.

Grid integration costs: Renewable energy generation involves external costs due to variability in production, creating challenges for grid operators, including short-term balancing and maintaining standby capacity for periods of low renewable output. These have also been considered based on solar and wind generation.

Table A5. Electricity generated by energy source and grid integration costs

Externality	Unit	Data	Source
Renewable energy			
Renewable energy generation	(KWh million) (2024)	199,360.46	Central Electricity Authority, 2024
Grid integration costs (conservative)	(INR/KWh)	1	Samadi, 2017
Grid integration costs (less conservative)	(INR/KWh)	1.2	Heptonstall & Gross, 2021

References

Bhandari, R., Kumar, B., & Mayer, F. (2020). Life cycle greenhouse gas emission from wind farms in reference to turbine sizes and capacity factors. *Journal of Cleaner Production, 277*(20), Article 123385. https://www.sciencedirect.com/science/article/pii/S0959652620334302

Black, S., Antung, A., Parry, I., & Vernon, N. (2023). *IMF fossil fuel subsidies data: 2023 update*. International Monetary Fund. https://www.imf.org/-/media/Files/Publications/WP/2023/English/wpiea2023169-print-pdf.ashx?

Central Electricity Authority. (2024). *Monthly renewable energy generation report*. Government of India. https://cea.nic.in/wp-content/uploads/resd/2024/03/Monthly_RE_Generation_report_March_2024-3.pdf

Cropper, M., Cui, R., & Song, X. P. (2021). The mortality impacts of current and planned coal-fired power plants in India. *Proceedings of the National Academy of Sciences, 118*(5), Article e201179361118. https://doi.org/10.1073/pnas.2017936118

Dalberg Advisors, Blue Sky Analytics, & Confederation of Indian Industry. (2021). *Air pollution and its impact on business: The silent pandemic*. Clean Air Fund. https://www.cleanairfund.org/wp-content/uploads/01042021_Business-Cost-of-Air-Pollution_Long-Form-Report.pdf

Guttikunda, S., & Jawahar, P. (2018). Evaluation of particulate pollution and health impacts from planned expansion of coal-fired thermal power plants in India using WRF-CAMx modeling system. *Aerosol and Air Quality Research, 18*(12). https://aaqr.org/articles/aaqr-18-04-oa-0134

Heptonstall, P., & Gross, R. J. K. (2021). A systematic review of the costs and impacts of integrating variable renewables into power grids. *Nature Energy, 6,* 72–83. https://doi.org/10.1038/s41560-020-00695-4

International Energy Agency. (2025). *Methane tracker* [Data set]. https://www.iea.org/data-and-statistics/data-tools/methane-tracker-data-explorer

Kumari, S., Hiloidhari, M., Naik, S. N., & Dahiya, R. P. (2019). Social cost of methane: Method and estimates for Indian livestock. *Environmental Development, 32,* Article 100462. https://www.sciencedirect.com/science/article/abs/pii/S2211464517302944

Lelieveld, J., Hains, A., Burnett, R., Klingmüller, K., Munzel, T., & Pozzer, A. (2023). Air pollution deaths attributable to fossil fuels: Observational and modelling study. *BMJ, 383,* Article e077784. https://doi.org/10.1136/bmj-2023-077784

Majumder, A., & Madheswaran, S. (2018). *Value of statistical life in India: A hedonic wage approach*. Institute for Social and Economic Change. https://www.isec.ac.in/value-of-statistical-life-in-india-a-hedonic-wage-approach/

National Sample Survey Office. (2024). *Periodic Labour Force Survey (PLFS) July 2023–June 2024* (In Hindu). https://dge.gov.in/dge/sites/default/files/2024-10/Annual_Report_Periodic_Labour_Force_Survey_23_24.pdf

Ricke, K., Drouet, L., Caldeira, K., & Tavoni, M. (2018). Country-level social cost of carbon. *Nature Climate Change, 8,* 895–900. https://www.nature.com/articles/s41558-018-0282-y.epdf?author_access_token=XLBRLEGdT_Kv0n8_OnvpedRgNojAjWel9jnR3ZoTv0Ms70oz073vBeHQkQJXsJbey6vjdAHHSPxkHEN8nflPeQI6U86-MxWO1T1uUiSvN2A-srp5G9s7YwGWt6-cuKn2e83mvZEpXG3r-J0nv0gYuA%3D%3D

Ritchie, H., & Roser, M. (n.d.). *India: CO_2 country profile*. Our World in Data. https://ourworldindata.org/co2/country/india

Samadi, S. (2017). The social costs of electricity generation—Categorising different types of costs and evaluating their respective relevance. *Energies, 10*(3). https://doi.org/10.3390/en10030356

Prabhu, V. S., Shrivastava, S., & Mukhopadhyay, K. (2021). Life cycle assessment of solar photovoltaic in India: A circular economy approach. *Circular Economy and Sustainability, 2,* 507–534. https://link.springer.com/article/10.1007/s43615-021-00101-5

Upadhyay, A., Dey, S., Chowdhury, S., & Goyal, P. (2018). Expected health benefits from mitigation of emissions from major anthropogenic $PM_{2.5}$ sources in India: Statistics at state level. *Environmental Pollution, 242, Part B,* 1817–1826. https://doi.org/10.1016/j.envpol.2018.07.085

Viscusi, W. K., & Masterman, C. J. (2017). Income elasticities and global values of a statistical life. *Journal of Benefit-Cost Analysis, 8*(2). https://www.cambridge.org/core/journals/journal-of-benefit-cost-analysis/article/income-elasticities-and-global-values-of-a-statistical-life/5AE299883F668DCC265C41A377E1E063#figures

Viswanathan, B., Viswamohanan, A., Aggarwal, P., Naraswamayany, D., Geddes, A., Sumarno, T. B., Schmidt, M., Beaton, C., Goel, S., Dutt, A., & Ganesan, K. (2021). *Mapping India's energy subsidies 2021: Time for renewed support to clean energy*. International Institute for Sustainable Development. https://www.iisd.org/system/files/2021-07/mapping-india-energy-subsidies-2021.pdf

Wooders, P., Steenblik, R., & Zinecker, A. (2019). *Measuring fossil fuel subsidies in the context of the Sustainable Development Goals*. International Institute for Sustainable Development. https://www.iisd.org/publications/report/measuring-fossil-fuel-subsidies-context-sustainable-development-goals

World Trade Organization. (n.d.). *WTO Analytical Index*. https://www.wto.org/english/res_e/publications_e/ai17_e/subsidies_art14_jur.pdf

World Trade Organization. (2006). Defining subsidies. In *World trade report 2006* (pp. 47–54). https://www.wto.org/english/res_e/booksp_e/anrep_e/wtr06-2b_e.pdf

© 2025 International Institute for Sustainable Development

Published by the International Institute for Sustainable Development.

This publication is licensed under a Creative Commons Attribution-Non-Commercial-ShareAlike 4.0 International License.