

# India's Energy Transition: Mapping subsidies to fossil fuels and clean energy in India

GSI SUMMARY REPORT



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## Introduction

India is the world's third largest economy with a rapidly expanding population, and hence substantial increases in energy demand. India's government is looking for ways to power further economic growth needed to raise the living standards of about one fifth of Indians who still live in poverty (World Bank, 2016). The government also seeks to expand electricity access to the 240 million people without grid electricity (International Energy Agency [IEA], 2015), to improve the quality of electricity supply and to boost per capita energy consumption.

Energy subsidies reviewed in this report are key to India's development trajectory. These subsidies determine how India's energy demand is and will be met, locking in several critical choices. Which energy sources will power India's economic growth: renewables or the fossil fuels that accounted for up to 92 per cent of the country's total primary energy supply in 2015 (BP, 2017)? Which industries and households—poor or rich—are to enjoy affordable energy? Which investments are to pay off or become stranded? Energy subsidies also lock in the choice of how polluted or clean the Indian environment will be, with important implications for the climate and health of Indians.

This report maps out the context, magnitude, trends and impacts of India's energy subsidies. The aim of the study is to enhance transparency and dialogue on energy choices in India and assist in tracking the shift in government support from fossil fuels to renewables, in line with the country's goals of increasing access to low-carbon and energy-efficient services.

## India's Energy Policies and the Role of Subsidies

At present, India follows an “all-of-the-above” approach to energy supply, in particular promoting electricity based on both clean energy and fossil fuels. Meanwhile, India's Nationally Determined Contribution, linked to the Paris Agreement on climate change, aims to cut the country's emissions intensity by up to 35 per cent and increase the share of power sourced from low-carbon sources to at least 40 per cent of the total generation by 2022 (equivalent to 175 GW) (Government of India, 2016).

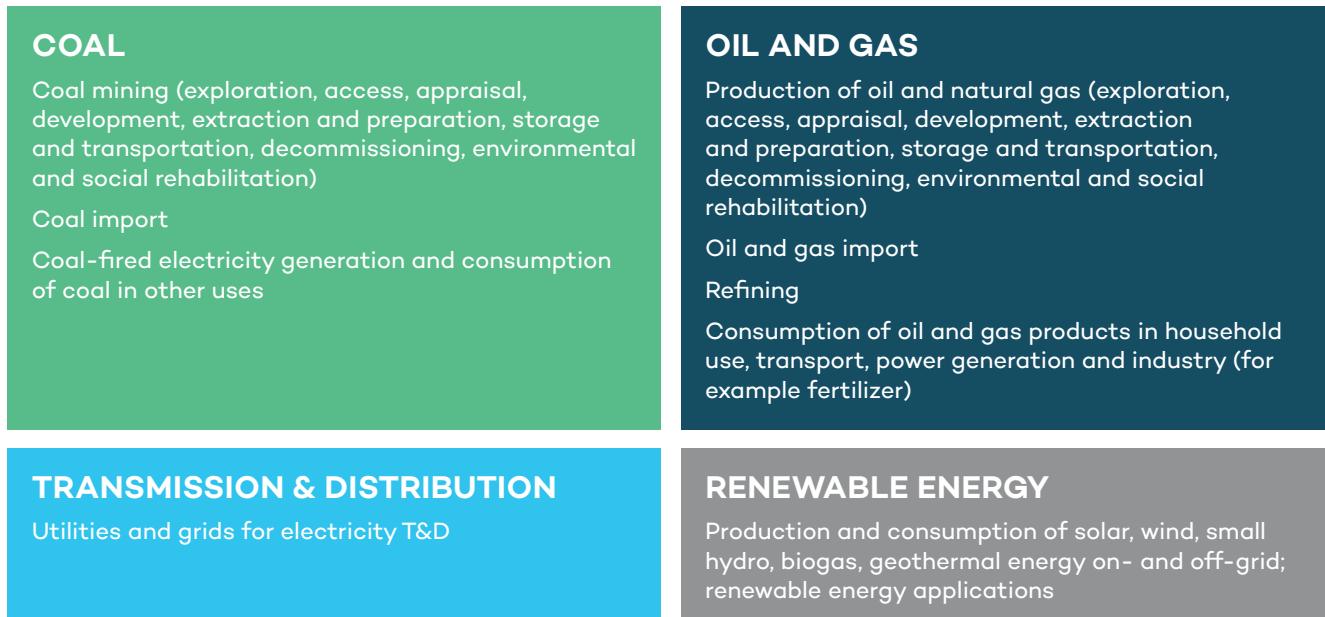
India uses several levers to shape its energy mix, including subsidies in the form of fiscal incentives, regulated energy prices and other forms of government support. For example, the Clean Environment Cess on the use of coal discourages the production and consumption of coal by increasing its cost, while part of the government revenue from the cess is reallocated to support renewable energy development.

As a member of the G20, India committed in 2009 to “phase out inefficient fossil fuel subsidies that encourage wasteful consumption, while providing targeted support for the poorest” (G20, 2009). India already has significant experience reforming its energy subsidies: its pricing reforms, mainly for gasoline (2010) and diesel (2014), cut the country's energy subsidies bill in 2014 by USD 15 billion (IEA, 2015), while leading in parallel to the implementation of the world's largest cash transfer program targeted to the vulnerable households.

## Inventory of Energy Subsidies in India

This report presents the first inventory of all energy subsidies in India, apart from subsidies to nuclear power and large hydropower, which were excluded due to the lack of data. The reviewed subsidies are grouped according to the energy type they benefit: a) coal; b) oil and gas; c) renewable energy. In addition, we single out the grouping of subsidies to d) electricity transmission and distribution (T&D) that are, in theory, neutral to the energy source, though in practice benefit mostly coal because of its dominance in India's electricity generation. Figure 1 includes more detail on what activities are included in each of the groupings. The inventory covers three financial years: FY2014, FY2015 and FY2016.<sup>1</sup>

<sup>1</sup> Where available, data for FY2017 are provided. However, at the time of the publication, the FY2017 data were incomplete.



**Figure 1.** Groupings of subsidies discussed in this report

The first step of the analysis was subsidy identification. The identified subsidies have been quantified where possible, but many still remain unquantified. The total values of subsidies in each of the four groupings are reported only for subsidies conferred at the level of the central government. The report itself provides examples and values of certain state-level energy subsidies for illustrative purposes.

To assist in the analysis, the description of the identified energy subsidies uses three parallel classifications. The first classification draws on the renowned approach of the Organisation for Economic Co-operation and Development (OECD), which is also adopted and applied by the Global Subsidies Initiative (GSI) in other studies and countries (OECD, 2015; GSI, 2010). This classification is based on these subsidy mechanisms: a) budgetary transfers (this category does not include government loans and government loan guarantees<sup>2</sup>), b) government revenue foregone (tax breaks), c) provision of government-owned goods and services below market value (for example, the use of rail and other government infrastructure at below-market rates or preferential access to land; this category does not include investments of state-owned enterprises<sup>3</sup>), and d) market and price support (such as regulated fuel prices).

The second classification indicates whether subsidy beneficiaries are energy producers, energy consumers or both (including prosumers in the case of renewable energy subsidies). The third classification is based on stimulated activity in the value chain and varies depending on the energy type (for example, exploration, access, appraisal, development, extraction and preparation, storage and transportation, decommissioning, environmental and social rehabilitation in the case of coal mining). Many subsidies are found to be cross-cutting through different activities, for example, both coal mining and transport.

## Findings: Trends in Energy Subsidies in India

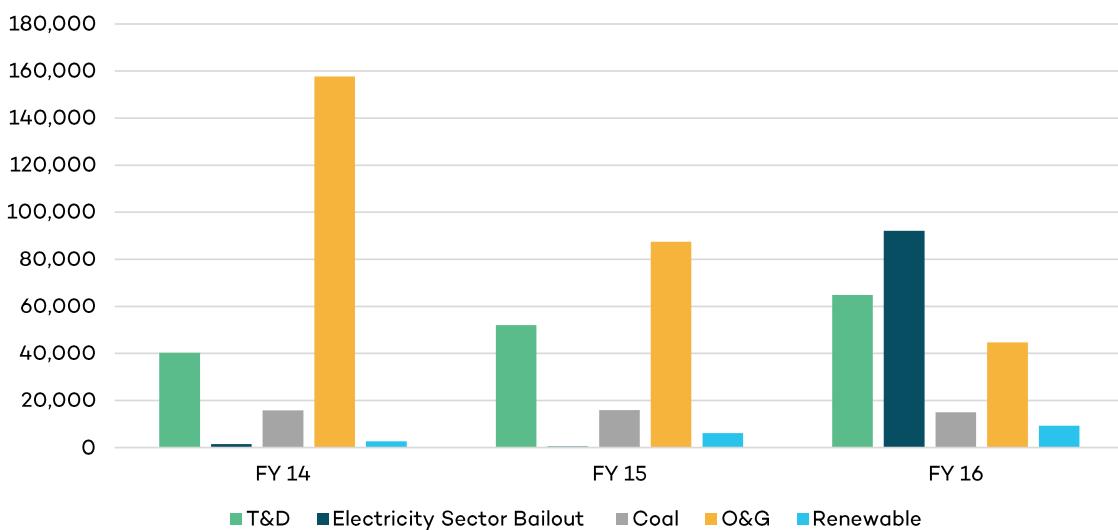
The total value of energy subsidies from the central government, quantified in this inventory, has declined substantially between FY2014 and FY2016, from INR 216,408 crore (USD 35.8 billion) in FY2014 to INR 133,841 crore (USD 20.4 billion) in FY2016 (in current prices). In addition, the inventory identified a range of subsidies that could not be quantified due to lack of data. However, even this incomplete quantification of subsidies is representative of the overall trends.

<sup>2</sup> For a review of India's government loans to fossil fuels, see Garg, Bossong, & Whitley (2015).

<sup>3</sup> For a review of investments of state-owned enterprises in India see Garg et al. (2015).



Figure 2 presents the main trends in energy subsidies in India. In FY2014 oil and gas subsidies, mainly in the consumption sphere, were by far the largest of all energy subsidies in India, at INR 157,678 crore (USD 26 billion). In FY2016, oil and gas subsidies amounted to INR 44,654 crore (USD 6.8 billion), implying a reduction by almost three quarters, partially due to India's reforms and partially due to the decrease in the world price for oil. Subsidies to electricity T&D increased from INR 40,331 crore (USD 6.7 billion) in FY2014 to INR 64,896 crore (USD 9.9 billion) in FY2016, and this grouping became the main recipient of energy subsidies in India. The total subsidies to coal have remained relatively stable over the reviewed years and amounted to INR 14,979 crore (USD 2.3 billion) in FY2016. Subsidies to renewables have significantly increased from INR 2,607 crore (USD 431 million) in FY2014 to INR 9,310 crore (USD 1.4 billion) in FY2016. Overall, the scale of support to fossil fuels (coal, oil and gas) has remained more significant than subsidies to renewables through the entire review period.



**Figure 2.** Subsidies to coal, oil & gas, renewables and electricity T&D in India, FY2014–2016 (INR Crore)

Source: Author's calculations

## Subsidies to Electricity T&D

Electricity T&D in India faces several challenges, such as ageing infrastructure and a lack of financial resources for existing utilities, as well as expanding access for Indians still living without electricity. Subsidies seek to strengthen T&D infrastructure and provide financial support to distribution utilities under a range of programs that are funded by both central and state governments.

Subsidies to T&D are, in theory, neutral to energy types, as the T&D infrastructure channels power regardless of its origin. However, because of the coal dominance in India's electricity generation, in practice, these subsidies can also be described as benefitting fossil fuels. This is particularly the case where T&D subsidies entrench a centralized form of power system to the detriment of off-grid or mini-grid renewable energy solutions.

This inventory has identified 14 subsidies to T&D provided by the central government. Their total value has increased from INR 40,331 crore (USD 6.7 billion) in FY2014 to INR 64,896 crore (USD 9.9 billion) in FY2016.<sup>4</sup> There are two main reasons for this increase. First, allocations under ongoing schemes were increased, including in the form of budgetary transfers to distribution companies (DISCOMs) to cover losses for supplying power at low rates to agriculture and household consumers. Second, new schemes were introduced, such as the National Electricity Fund Scheme and the Power Sector Development Fund.

<sup>4</sup>This excludes debt taken over by various state governments under UDAY (INR 92,113 crore in FY2016 and INR 78,689 crore in FY2017).



The central subsidies to T&D are likely to increase further as the government announced another new scheme, Saubhagya, in September 2017. The objective of Saubhagya is to provide universal electricity access to all households in India by December 31, 2018. The total cost of the scheme is budgeted at INR 16,320 crore (USD 2.5 billion), based on an average of INR 5,400 (USD 84) per connection (Bridge to India, 2017).

In addition, the central and the state governments have provided bailout packages to DISCOMs from time to time to improve their operational and financial performance. A Financial Restructuring of State DISCOMs scheme was introduced in 2012, but it did not change the poor financial health of DISCOMs. This led to another restructuring scheme announced by the government, Ujwal DISCOM Assurance Yojana (UDAY), under which the government has committed to taking over 75 per cent of DISCOMs' debt, totalling INR 170,000 crore (USD 25 billion), over a two-year period in FY2016 and FY2017. In this inventory, the value of UDAY is excluded in the totals of subsidies to T&D for methodological reasons and marked as a standalone Electricity Sector Bailout in Figure 2 (see more details in the main report).

For illustrative purposes at the state level, T&D subsidies have been quantified only for Rajasthan. The report identified four subsidies with a total value increasing from INR 3,904 crore (USD 645 million) in FY2014 to INR 4,884 crore (USD 746 million) in FY2016. Most state-level support in Rajasthan was provided to distribution utilities for losses incurred by selling electricity at below cost-recovery levels.

## **Subsidies to Renewable Energy**

Renewable energy generation has witnessed massive growth, with installed capacities doubling over the last five years (2012–2017), from 12 to 17.5 per cent of installed national capacity. The strong push to renewable energy is largely driven by the government's renewable energy targets. The government has provided a range of subsidies to the sector to accelerate the deployment of renewable energy.

The inventory identifies 24 renewable energy subsidies provided by the central government. The total value of these subsidies has increased from INR 2,607 crore (USD 431 million) in FY2014 to INR 9,311 crore (USD 1.4 billion) in FY2016. By FY2016, two thirds of these subsidies were tax exemptions, such as the exemption from excise and custom duties, as well as benefits with respect to the income tax. Further, direct budgetary transfers to renewables under various schemes have increased by approximately 400 per cent in the last four years. This is mainly due to the introduction of new schemes and increased allocation under ongoing schemes. Given government targets to increase renewable energy capacity, subsidy support to the sector is expected to continue or even increase in the near future.

For illustrative purposes at the state level, the inventory highlights renewable energy subsidies for one state: Tamil Nadu. The analysis shows five subsidies provided by the Tamil Nadu government, and their total value has grown from INR 94 crore (USD 16 million) in FY2014 to INR 287 crore (USD 44 million) in FY2016. This includes transfers of funds and liabilities for promoting solar power and feed-in tariffs for generators.

## **Subsidies to Coal**

Coal India Ltd is the main government-owned coal mining company, which operates through its various subsidiaries and was responsible for nearly 84 per cent of total coal production in India in FY2016 (Coal Controller's Organisation Kolkata, Ministry of Coal, 2015; Coal India Ltd., 2017). The Coal Mines Special Provision Act, 2015 is aimed at opening up the sector for commercial mining by private companies.

The report identified 18 subsidies provided by the central government to both coal mining and coal consumption, predominantly in power generation. But financial information was not publicly available for six of these subsidies, which thus remained unquantified.



This inventory finds that total subsidies for the coal mining sector have decreased from INR 15,791 crore (USD 2.6 billion) in FY2014 to INR 14,979 crore (USD 2.3 billion) in FY2016. Subsidies are largely provided through tax breaks (government revenue foregone), with concessional duties and taxes making up around 90 per cent of total coal subsidies. Budgetary transfers only account for 10 per cent of the total subsidy amount over the review period. Aims of the subsidies include: to improve the conservation and safety of coal mines, exploration in difficult areas, special benefits to employees and not complying with coal washing requirements. Due to major overhauls in the tax system through the introduction of the Goods and Services Tax (GST), coal subsidies are likely to change in 2017 and future years. Insufficient data were available for an indicative estimate to be prepared, but given the effective tax exemption under the GST, it is likely that central subsidies for coal will increase. It is difficult to identify if net subsidization will rise or fall, because the GST absorbs state-level taxation, effectively removing any state-level tax subsidies, and it was not possible to review these existing state-level tax subsidies in this study.

Coal-fired electricity generation benefits from subsidies such as income tax exemptions and access to land at preferential rates. This study was unable to quantify subsidies to coal-fired generation and other coal consumption in India due to lack of data. Measures of support to coal consumption in India include the overall coal pricing regime and concessional import duty on coal.

For illustrative purposes at the state level, coal subsidies were analyzed for Chhattisgarh. The analysis identified that one subsidy provided by the Chhattisgarh government increased from INR 1,127 crore (USD 186 million) in FY2014 to INR 1,590 crore (USD 243 million) in FY2016. The aim of this subsidy was a lower value-added tax on the sale of coal in the state.

## **Subsidies to Oil and Gas**

India's demand for petroleum products and natural gas has increased in tandem with its economic growth, resulting in a growing reliance on imports from overseas. In 2016 domestic production supplied less than 20 per cent of its own demand for crude oil and petroleum and 40 per cent of its demand for natural gas (BP, 2017). Government policy has sought to disincentivize inefficient consumption through a reduction in direct budgetary support for petroleum products, and increase domestic exploration and production through research and development, tax exemptions and access to exploration blocks (without formal bidding).

A total of 38 subsidies provided by the central government was identified, but financial information was not publicly available for 12 of these subsidies that thus remained unquantified. This inventory finds that total oil and gas subsidies have decreased from 157,678 crore (USD 26 billion) in FY2014 to INR 44,654 crore (USD 6.8 billion) in FY2016. In FY2014, only a fraction of subsidies (5.4 per cent) were direct spending (with the majority provided through tax breaks, etc.), while by FY2016 almost half of all subsidies were provided through direct transfers.

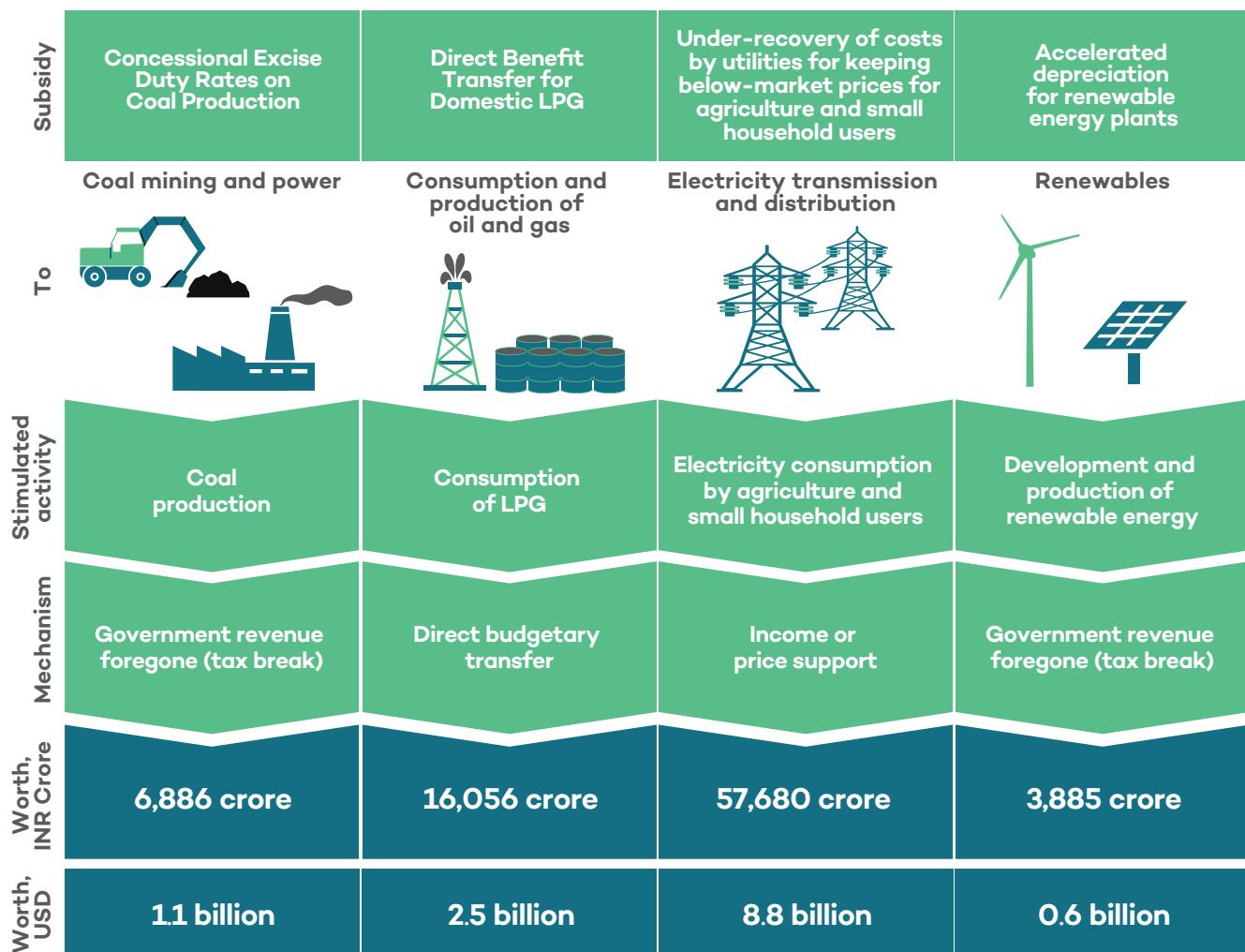
This largely reflects the deregulation of diesel and gasoline prices and the sharp fall in world oil prices from 2014 that led to the removal of most, though not all, subsidies in India's transport sector. By contrast, the ultimate goal of the absolute majority of the oil and gas subsidies discussed in this report is to lower the end price of oil and gas products to end consumers, particularly consumers of liquefied petroleum gas (LPG) and kerosene for household use. In the transport sector, the only remaining subsidies were under-recoveries for diesel up to FY2015 that stopped with the elimination of diesel subsidies in 2014 (calendar year) as well as diesel subsidies in drought- and rain-affected areas worth INR 7.4 crore (USD 1 million) in FY2017.

Many producer subsidies, such as tax exemptions and concessional royalties, could not be estimated due to insufficient information in the public domain.



The government's recent announcements to reduce subsidies to kerosene and LPG mean it is likely that expenditure will continue to decline in the near future if oil prices on the world market remain constant. A sudden sharp increase in global oil prices could trigger increases in subsidy values.

Oil and gas sector subsidies have been not been quantified at the state level, owing to data and time limitations.



**Figure 3.** Largest subsidies provided by the Government of India to each energy type in FY2016.

Source: IISD-GSI

## Impacts of Subsidies

Energy subsidies are a cost to the central and state governments: directly, in the case of fiscal transfers, or indirectly through foregone government revenue. Energy subsidies also have wide ramifications beyond government budgets, including on the markets, society and the environment.

**Economic impacts.** Consumer subsidies reduce costs of energy to consumers, thus artificially inflating demand, while producer subsidies reduce the costs of energy production, thus driving potentially unneeded supply. Both consumption and production subsidies lock in energy choices for present and future generations. Subsidies are generally believed to reduce the efficiency of resource allocation in the economy, and to distort the playing field for different energy types. These impacts of subsidies are critical to the success of major development and capital-



intensive and long-lived infrastructure projects that anchor energy systems. Whenever investment decisions rely on such subsidies, however, their removal increases the risk of asset stranding.

**Social welfare impacts.** In India, electricity, kerosene and LPG are subsidized to protect consumers. However, if untargeted, consumer subsidies benefit the rich and the middle class more than the poor. In India, it is estimated that 87 per cent of electricity subsidy payments are received by households above the poverty line (Climate Home, 2017). The majority of people living below the poverty line rely on biomass (e.g., wood, dung), and hence receive little or no benefit from these subsidies.

**Impacts on energy access.** Many subsidies are introduced to provide access to modern electricity and clean energy for cooking and other needs. Relying on the T&D subsidies discussed in this report—for example, the rural electrification program, Deendayal Upadhyaya Gram Jyoti Yojana (DDUGJY) and the Saubhagya scheme introduced in September 2017—the Government of India aims to achieve universal access to electricity by December 31, 2018. However, some T&D subsidies entrench a centralized form of power system to the detriment of off-grid or mini-grid renewable energy solutions. Relying on several LPG subsidies and biogas subsidies, the National Mission on Clean Cooking aims to achieve universal access to clean cooking by 2022, with a complimentary aim of 75 per cent LPG coverage by 2019.

**Health and environmental impacts.** In India, fossil fuel and biomass-based energy are major causes of air pollution, particularly emissions from transport, coal-fired power plants and traditional cookstoves. The latter primarily affects the health of women and children, who are responsible for meal preparation and spend more time at home being exposed to toxic fumes from smoky open fires. The associated health costs are estimated at 3 per cent of India's GDP. One estimate has India accounting for half of all global deaths due to ambient air pollution (1.8 million deaths in India in 2015) (Landrigan et al., 2017). Recent estimates find that reforms to fossil fuel subsidies and fuel taxation could help India prevent 65 per cent of the premature deaths caused by air pollution (Health and Environment Alliance, 2017). In particular, India's many LPG subsidies seek to expand access to clean cooking with positive impacts on health, while kerosene subsidies still lead to more indoor pollution and slow down the proliferation of healthier solar energy. Further, any increase in fossil fuel consumption and production due to subsidies leads to greater negative environmental impacts such as greenhouse gas emissions driving climate change, water pollution and soil contamination and subsidence.



## Conclusions and Recommendations

To inform their decisions, policy-makers and other stakeholders in India need a coherent and clear presentation of information on energy subsidies: their costs and impacts, including potential distortion of the playing field for different energy types. This inventory makes the first attempt to bring together such information not just on fossil fuel subsidies, but also on subsidies to renewables as cleaner, healthier and increasingly cheaper alternatives. However, the inventory has revealed significant gaps in subsidy reporting. Many of the identified subsidies could not be quantified due to data limitations.

Based on the analysis, there are three recommendations that stand out:

- 1) The Government of India can benefit from improved energy subsidy reporting by launching an inter-agency process of consultations and information sharing.
- 2) There is a need for comprehensive evaluation of the efficiency and impacts of different energy subsidies against their stated policy objectives. At present, fossil fuel subsidies may act as a barrier to the development of renewable energy—an impact that, in its turn, the government attempts to overcome with renewable energy subsidies. Further, some energy subsidies introduced to protect the poorest may not be delivering against this objective due to insufficient targeting. Energy subsidies also have intended and unintended impacts on the health of Indians, their energy access, the environment and greenhouse gas emissions. Evaluation and rationalization of energy subsidies in India can help better allocate government support to those who are in need of it the most.
- 3) China and Indonesia, India's largest peers in Asia and fellow members of the G20, have both opted for self-reports and peer reviews of fossil fuel subsidies as a first step and practical tool to “phase out inefficient fossil fuel subsidies that encourage wasteful consumption while providing targeted support for the poorest” (G20, 2009). Many other members of the G20 and Asia-Pacific Economic Cooperation have also resorted to peer reviews of fossil fuel subsidies, and many countries are expected to voluntarily report fossil fuel subsidies under the UN Sustainable Development Goals (SDGs). Volunteering for a self-report, a peer-review or an SDG report on fossil fuel subsidies can enable India to address its domestic policy-making needs with the help of the international best practices.

India has accomplished significant improvements in energy access and development of cleaner energy in the past years. Government support at the central and state levels has played a crucial role in this progress—it is a powerful tool that should be used with care and prudence.



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