India's Energy Transition:

Subsidies for Fossil Fuels and Renewable Energy, 2018 Update

REPORT

IISD International Institute for Sustainable Development

Global Subsidies Initiative

CEEW THE COUNCIL

Abhinav Soman
Ivetta Gerasimchuk
Christopher Beaton
Harsimran Kaur
Vibhuti Garg
Karthik Ganesan

Published by the International Institute for Sustainable Development.

International Institute for Sustainable Development

The International Institute for Sustainable Development (IISD) is an independent think tank championing sustainable solutions to 21st–century problems. Our mission is to promote human development and environmental sustainability. We do this through research, analysis and knowledge products that support sound policy-making. Our big-picture view allows us to address the root causes of some of the greatest challenges facing our planet today: ecological destruction, social exclusion, unfair laws and economic rules, a changing climate. IISD's staff of over 120 people, plus over 50 associates and 100 consultants, come from across the globe and from many disciplines. Our work affects lives in nearly 100 countries. Part scientist, part strategist—IISD delivers the knowledge to act.

IISD is registered as a charitable organization in Canada and has 501(c)(3) status in the United States. IISD receives core operating support from the Government of Canada, provided through the International Development Research Centre (IDRC) and from the Province of Manitoba. The Institute receives project funding from numerous governments inside and outside Canada, United Nations agencies, foundations, the private sector and individuals.

Head Office

111 Lombard Avenue, Suite 325
Winnipeg, Manitoba
Canada R3B 0T4

Tel: +1 (204) 958-7700
Website: www.iisd.org
Twitter: @IISD_news

About GSI

The IISD Global Subsidies Initiative (GSI) supports international processes, national governments and civil society organizations to align subsidies with sustainable development. GSI does this by promoting transparency on the nature and size of subsidies; evaluating the economic, social and environmental impacts of subsidies; and, where necessary, advising on how inefficient and wasteful subsidies can best be reformed. GSI is headquartered in Geneva, Switzerland, and works with partners located around the world. Its principal funders have included the governments of Denmark, Finland, New Zealand, Norway, Sweden, Switzerland and the United Kingdom, as well as the KR Foundation.

Global Subsidies Initiative

International Environment House 2,
9 chemin de Balexert
1219 Châtelaine
Geneva, Switzerland
Canada R3B 0T4

Tel: +1 (204) 958-7700
Website: www.iisd.org/gsi
Twitter: @globalsubsidies

Council on Energy, Environment and Water

The Council on Energy, Environment and Water is one of South Asia's leading not-for-profit policy research institutions. The Council uses data, integrated analysis, and strategic outreach to explain and change the use, reuse, and misuse of resources. It prides itself on the independence of its high-quality research, develops partnerships with public and private institutions and engages with the wider public. In 2018, CEEW has once again been featured across nine categories in the "2017 Global Go To Think Tank Index Report." It has also been consistently ranked among the world's top climate change think tanks. Follow us on Twitter @CEEWIndia for the latest updates.

Council on Energy, Environment and Water (CEEW)

Sanskrit Bhawan, A-10, Qutab Institutional Area
Aruna Asaf Ali Marg, New Delhi - 110067, India

Tel: +91 11 40733300
Website: www.ceew.in
Twitter: @CEEWIndia

India's Energy Transition:
Subsidies for Fossil Fuels and Renewable Energy, 2018 Update

December 2018

Written by Abhinav Soman, Ivetta Gerasimchuk, Christopher Beaton, Harsimran Kaur, Vibhuti Garg and Karthik Ganesan

Acknowledgements

The authors of this update would like to thank the following individuals and institutions for the valuable comments and recommendations that they provided as peer reviewers of this publication:

- Tim Buckley, Director of Energy Finance Studies, Australasia, Institute for Energy Economics and Financial Analysis
- Tara Laan, Associate, Energy Program, International Institute for Sustainable Development
- Shelagh Whitley, Head of Climate and Energy Programme, Overseas Development Institute
- Leah Worrall, Senior Research Officer, Climate and Energy Programme, Overseas Development Institute

The authors would also like to thank Balasubramanian Viswanathan for conducting a quality control review of the data, sources and calculations in this project's review of subsidy estimates.

Finally, we would like to thank the Growald Family Fund and the governments of Sweden and Denmark for their generous support of this publication. The opinions expressed and the arguments employed in this update do not necessarily reflect those of the peer reviewers and funders, nor should they be attributed to them.

Contents

List of Abbreviations

ARC	Asset Reconstruction Company
BPL	Below Poverty Line
DBTL	Direct Benefit Transfer for LPG
DVC	Damodar Valley Corporation
EV	electric vehicle
FAME	Faster Adoption and Manufacturing of Hybrid and Electric vehicles
FGD	flue gas desulfurization
FY	financial year
GBI	generation-based incentive
GST	Goods and Services Tax
IBC	Insolvency and Bankruptcy Code
IEP	Integrated Energy Policy
IISD	International Institute for Sustainable Development
INDC	Intended Nationally Determined Contribution
INR	Indian Rupee
LPG	liquefied petroleum gas
MoEFCC	Ministry of Environment, Forest and Climate Change
MoP	Ministry of Power
NEMMP	National Electric Mobility Mission Plan
NEP	National Energy Policy
NTPC	National Thermal Power Corporation
O&G	oil and gas
OMC	oil marketing companies
PDS	Public Distribution System
PM	particulate matter
PPA	Power Purchase Agreement
SDG	Sustainable Development Goals
SECI	Solar Energy Corporation of India
SWES	small wind energy and hybrid systems
T&D	transmission and distribution
UDAY	Ujjwal DISCOM Assurance Yojana
USD	United States dollar
VAT	value added tax

1.0 Introduction

This update highlights the most significant developments in the dynamic domain of India's energy subsidy policies in FY2017.

Pricing drives economic decision making, and subsidies (along with taxation) are one of the key tools that governments use to influence prices, and through them investment decisions and consumer behaviour. Subsidies may be intended to help achieve many policy goals. In India, the government's goals include: universal energy access at affordable prices; meeting energy demand efficiently; energy security; greater sustainability; and economic growth (NITI Aayog, 2017). But good intentions do not necessarily lead to well-functioning policies. If energy subsidies are not well designed, targeted and monitored, they may: fail to meet objectives; distort markets in negative ways; benefit unintended groups who do not need assistance; encourage wasteful and polluting energy consumption; and be very expensive, taking up scarce resources (Beaton et al., 2013). Fossil fuel subsidies in particular often fail to meet intended objectives efficiently, and India has committed to reform inefficient and wasteful fossil fuel subsidies as part of commitments with the G20 and the Sustainable Development Goals (SDGs) (Gerasimchuk et al., 2018).

This paper updates the subsidy database from 2017's *India's Energy Transition* mapping the magnitude and trends of India's energy subsidies up to FY2017, the latest year for which complete data are available. It then explores the role that subsidies play with respect to four themes: energy access; the role of coal; prospects for renewables; and a transport sector transition. Accompanying spreadsheets with multi-year data and descriptions of new subsidies are available on the IISD website. Three forthcoming policy briefs in IISD's India Energy Transition series will then separately explore, in depth, other related topics under the titles of *The Impact of GST on the Cost of Solar vs Coal-based Electricity; Stranded Coal Power, Subsidies and the Just Transition; and Subsidies and the Costs of Compliance with Environmental Norms*.

KEY FINDINGS

- Total quantified energy subsidies have declined from INR 2,15,974 crore (USD 35.7 billion) in FY2014 to INR 1,51,484 crore (USD 23.0 billion) in FY2017.
- Electricity transmission and distribution is the largest single recipient of energy subsidies: INR 83,313 crore (USD 12.9 billion) in FY2017.
- A growing share of subsidies are dedicated to making India's energy mix cleaner, while fossil fuel subsidies are in decline. Despite this, subsidies to oil, gas and coal were more than triple the value of subsidies to renewables and electric vehicles in India in FY2017.
- Subsidies for oil and gas decreased by 76 per cent between FY2014 to FY2017, from INR 1,57,678 crore (USD 26.1 billion) to INR 36,991 crore (USD 5.5 billion).
- In the same period, subsidies to coal mining and coal-fired power have remained stable, at INR 15,992 crore (USD 2.4 billion) in FY2017.
- Government support for renewables grew almost six-fold, from INR 2,608 crore (USD 431 million) in FY2014 to INR 15,040 crore (USD 2.2 billion) in FY2017.
- Subsidies to electric vehicles are growing, but are still relatively small in scale, at INR 148 crore (USD 22.1 million) in FY2017.

2.0 Approach and Scope

The update uses the same approach as the previous review by Garg et al. (2017), relying on the subsidy definition from the Agreement on Subsidies and Countervailing Measures of the World Trade Organization. According to this definition, energy subsidies come in four distinct forms: direct budgetary transfers (outlays); tax expenditure (reduced tax rates and tax exemptions); income and price support through market regulations (including their non-enforcement); and government-owned goods and services (such as land and water provided at below-market rates). The terms "subsidies" and "government support" are used as synonyms throughout this paper.

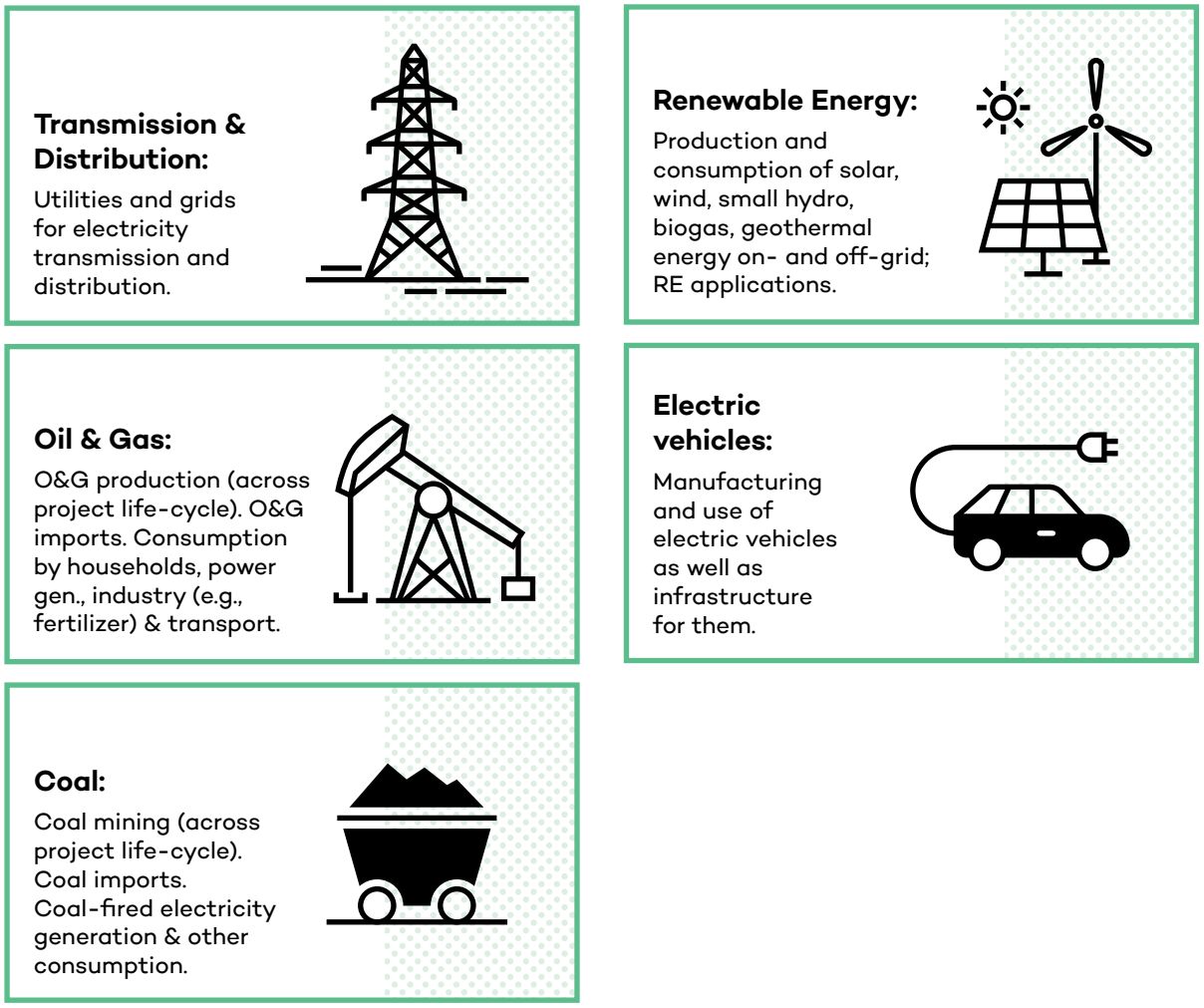
The scope of the analysis includes all energy subsidies in India, apart from subsidies to nuclear power and large hydropower, which were excluded due to lack of data. The subsidies are grouped as follows: (a) electricity transmission and distribution (T&D); (b) oil and gas (O&G); (c) coal; and (d) renewable energy (see Figure 1). In addition, given the growing importance of transition in the transport sector, a new group has been included: (e) subsidies to electric vehicles. All categories include subsidies along the entire value chain of production and consumption: for example, the O&G group includes upstream subsidies for refineries and downstream subsidies for retail consumers of oil and gas products.

The estimates are conservative because they are, with few exceptions, only able to capture subsidies at the national (federal) level. Additional state-level subsidies do exist, and illustrative examples of these subsidies and their possible scale are recorded in the accompanying data spreadsheets and the previous report (Garg et al., 2017). One policy—the *Ujwal DISCOM Assurance Yojana* (UDAY) scheme (referred to in this review as the "DISCOM bailout") launched in 2015 and administered at the state level—is included in the review but excluded from the total subsidy numbers. This is because it is not an annual subsidy for electricity distribution companies, and its exceptional size and nature can confuse the

interpretation of trends for electricity T&D. In most cases, subsidy values are estimated based on official government estimates. However, some subsidies are identified but listed as "non-quantified" due to lack of data (see Annex 1 at the end of this paper).

In India, the financial year runs from April 1 to March 31 of the subsequent year. The estimates for FY2014 and FY2015 are the same as in Garg et al. (2017); estimates for FY2016 have been updated, where new data have become available, and FY2017 estimates have been added. In addition, subsidies have been reviewed for FY2018 and, if available, included in data spreadsheets and subsidy descriptions. Due to as-of-yet incomplete data, however, this brief makes no total estimate of energy subsidies for FY2018. For more details on the methodology, see Garg et al. (2017) as well as the data spreadsheets and the new subsidy description templates accompanying this policy brief.

Figure 1. Grouping of energy subsidies



3.0 Context

India's challenge is to meet the energy needs of a large population that spans a large income spectrum. At one end, programs aim to improve living standards and opportunities for the underserved—a reliable life-line supply of electricity and shifting consumers away from the use of solid fuels for various end uses, especially in cooking, which impacts millions of households. At the other end, there is a need to cater to the increased penetration of appliances, transportation demand and overall growing aspirations of the population. Given its low energy consumption base, India's energy consumption is projected to grow the fastest among all major economies by 2040 (IEA, 2018).

Today, coal and oil dominate India's energy mix, and this is projected to remain the case by 2040 (see Figure 2). India's draft National Energy Policy, however, envisages their replacement with gas and renewables, driven by concerns about climate change and local air pollution, as well as to improve energy security by using domestic sustainable energy resources (wind and solar) (NITI Aayog, 2017).

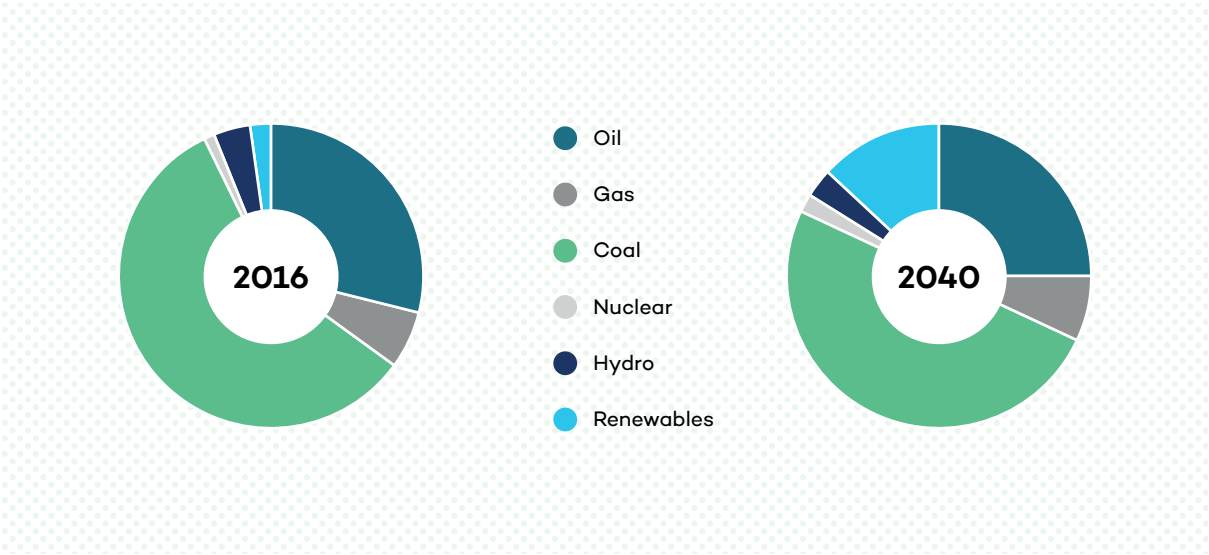


Figure 2. India's primary energy consumption in 2016 and 2040

Source: Based on BP, 2018.

The role of renewables, and their disruptiveness, is keenly debated. In its Intended Nationally Determined Contribution (INDC) for the Paris Agreement on climate change, India committed to installing 175 GW of renewable energy capacity by 2022, and reducing emissions intensity by 33–35 per cent by 2030 compared with 2005 levels (Government of India, 2015). The 2022 target consists of 100 GW solar power, 60 GW wind power, 10 GW biomass energy and 5 GW small hydro power.

Dramatic reductions in solar and wind power costs and resulting competitive prices in auctions have made the government confident that the targets will be achieved, and even exceeded. Nonetheless, as of August 2018, much remained to be done: a total of 70.6 GW of renewable energy capacity was installed, with 23 GW of solar power, 34.3 GW of wind power, 8.8 GW of bio-power and 4.5 GW of small hydropower (CEA, 2018). Senior officials at the Ministry of New and Renewable Energy have stated that considerable investment—USD 125 billion—is still needed (Varadhan, 2018). The integration costs of renewables is another critical issue that will grow in importance as they take up a larger overall share of the electricity generation mix (Chaturvedi, Koti, & Chordia, 2018).

At present, renewable energy's role is largely limited to power generation. In future, electric vehicles (EVs) could be another major disruptor in India's energy system. While no formal target has been established, government officials have suggested that 30 per cent of vehicle sales will be EVs by 2030 (Press Information Bureau [PIB], 2018, Bloomberg Quint, 2018). This will depend on many factors, such as development of battery technologies (including domestic manufacturing capacity), and the creation of infrastructure to enable the use of EVs across the country.

4.0 Key Trends in Energy Subsidies From FY2014 to FY2017

HIGHLIGHTS:

- Government support is shifting away from fossil fuels to cleaner energy. However, India's subsidies to oil, gas and coal (INR 52,983 crore or USD 7.9 billion in FY2017) remain more than triple the value of subsidies to renewables and electric vehicles (INR 15,188 crore or USD 2.2 billion in FY2017).

As illustrated in Figure 3, the total value of quantified energy subsidies has declined from INR 2,15,974 crore (USD 35.7 billion) in FY2014 to INR 1,51,484 crore (USD 23.0 billion) in FY2017. This can be explained by the following trends:

- Electricity transmission and distribution becoming the largest recipient of subsidies, growing from INR 40,037 crore (USD 6.6 billion) in FY2014 to INR 83,313 crore (USD 12.9 billion) in FY2017. A major share is subsidies for electricity distribution companies ("discoms"), selling electricity at below-market rates to certain consumer groups. A much smaller component goes to expansion of infrastructure and thereby household electricity connections.
- A major cut in oil & gas subsidies: INR 1,57,678 crore (USD 26.1 billion) in FY2014 to 36,991 crore (USD 5.5 billion) in FY2017. This is largely driven by a decrease in world oil prices and various reforms of subsidies for the consumption of petrol, diesel, LPG and kerosene.
- Relatively stable support for coal mining and coal-fired power: INR 15,650 crore (USD 2.6 billion) in FY2014 to INR 15,992 crore (USD 2.4 billion)[1] in FY2017.
- An almost six-fold increase in support for renewables: INR 2,608 crore (USD 431 million) in FY2014 to INR 15,040 crore (USD 2.2 billion) in FY2017.
- Nascent subsidies to electric vehicles are gaining momentum, but are still relatively small in value: INR 1.7 crore (USD 0.3 million) in FY2014 to INR 148 crore (USD 22.1 million) in FY2017.

Further to this, India's bailout for discoms, UDAY, was equal to INR 78,689 (UDS 11.8 billion) in FY2017. UDAY is a short-term policy to help improve the solvency of discoms, created by many years of under-recoveries, linked to numerous causes such as delays in disbursement of other subsidies to discoms. It has not been included in the estimate of total subsidies for any year because its exceptional nature would bias the interpretation of trends.

[1] The value in USD shows a decline on account of the INR devaluation from FY2014 to FY2017.

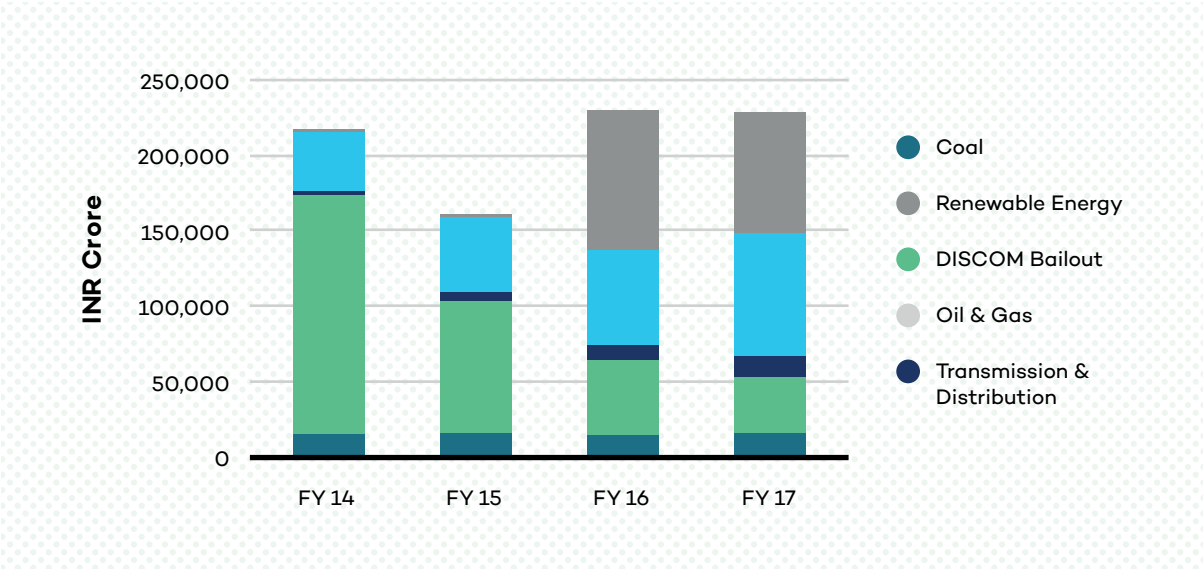


Figure 3. Subsidies to Coal, Oil & Gas, Renewables and Electricity Transmission & Distribution, FY2014–FY2017 (INR crore)

Source: Authors' calculations; see accompanying spreadsheets for more details. Subsidies for electric vehicles are too small to be visible and are thus not depicted.

Since FY2016, seven new energy subsidies have been introduced and 11 have been discontinued (see Annex 2 at the end of this paper and accompanying spreadsheets for details).

In particular, two newly introduced major schemes targeted energy access: Saubhagya, for electricity, and Pradhan Mantri Ujjwala Yojana (PMUY or Ujjwala) for LPG (see Section 5). Saubhagya has a total planned expenditure of INR 2,000 crore (USD 310.3 million) in FY2018. By December 2018, it aims to electrify all remaining unelectrified households in India by providing free electricity connections to below poverty line (BPL) households. The Ujjwala scheme provides LPG connections to BPL households to help shift them away from conventional biomass-based cooking, which causes respiratory and cardiovascular problems, particularly among women, who are typically responsible for cooking. The subsidies amounted to INR 2,999 crore (USD 447 million) in FY2017 and INR 2,496 crore (USD 387 million) in FY2018.

Further, the introduction of the Goods and Services Tax (GST) changed many tax-related subsidies (see Box 1). Most other changes were renewable energy subsidies that reached the end of their lifespans and were not renewed, including the Biomass Gasifier Program, the Small Wind Energy and Hybrid Systems program, the Ashoka Urja Shops Program and the Generation-Based Incentive (GBI) for Grid Interactive Wind Power Projects program.

BOX 1. THE INTRODUCTION OF THE GOODS AND SERVICES TAX (GST)

The Goods and Services Tax Act came into effect on July 1, 2017. The GST subsumes a plethora of taxes that existed previously, including sales taxes charged at the state level and excise duties. It also includes an input tax credit mechanism, so that taxes on intermediate goods and services do not cascade and lead to high net tax rates on final products (Gagnon-Lebrun et al., 2018). The GST is intended to improve tax efficiency and make compliance easier by simplifying administration and harmonizing tax rates and procedures.

Consequently, GST introduction has also resulted in changes to certain energy subsidies linked to tax expenditure, as estimated in FY2017 compared with FY2016:

- **Coal** was subject to an average sales tax rate of 11–12 per cent under the previous tax regime, whereas after the introduction of the GST this has been reduced to a standard GST rate of 5 per cent (ClearTax, 2018; *Economic Times*, 2018a; MERC, 2018). Meanwhile, imported coal no longer enjoys concessional customs duty of 2.5 per cent and is subject to a total import duty of 15 per cent (unless sited in a Special Economic Zone e.g., Mundra).
- **Domestic Liquefied Petroleum Gas (LPG) and Public Distribution System (PDS) Kerosene** were previously exempt from excise duty and now are taxed at 5 per cent under GST.
- **Equipment for renewable energy generation** was previously subject to tax breaks, such as on the basic customs duty (BCD) for solar PV modules. Now it is also taxed at 5 per cent under GST.

Further, as part of GST introduction, the Clean Environment Cess on coal production was replaced by a GST Compensation Cess. The tax rate on coal production remained the same: INR 400 per tonne, which, based on factors stated in India's NDC, translates to USD 4 per tonne of carbon dioxide (Government of India, 2015). But the revenues are used differently: revenue from the Clean Environment Cess contributed to the National Clean Energy and Environment Fund, supporting renewable energy technologies; while revenue from the GST Compensation Cess is used to compensate states for losses arising from the shift to the GST.

There are conflicting views on the net impact of the GST on the cost of generation for renewables and coal thermal power. For more details please refer to the forthcoming policy brief in this series on *The Impact of GST on the Cost of Solar vs Coal-based Electricity*.

5.0 Energy Access and Subsidies

HIGHLIGHTS:

- Subsidies to directly reduce consumer prices for connections and consumption of electricity and clean cooking energy are large: 72 per cent of all quantified FY2017 subsidies, at INR 109,618 crore (USD 16.3 billion).
- The largest are under-pricing of electricity and DBTL cash transfers for LPG, worth INR 74,925 crore and INR 12,905 crore, or 49 per cent and 9 per cent of all quantified energy subsidies, respectively.
- While these subsidies could be called "energy access" subsidies, many of their benefits go to higher-income households. Given their high costs, the targeting of such subsidies is key. Targeting can free up more resources to promote energy access or pursue other policy goals.

In 2016, 100 million households in India still relied primarily on traditional solid fuels for cooking energy, around 40 per cent of the population as of the last census (Ministry of Petroleum & Natural Gas, 2016). As of October 2017, 31.2 million households (12.6 per cent of the population) did not have an electricity connection, and many more had problems with electricity reliability and quality of supply (Ministry of Power, 2018). These numbers have fallen dramatically compared with previous years—but they also illustrate the scale of the remaining energy access challenge in India.

The government's approach to providing universal energy access is split between meeting demand and ensuring the affordability of electricity and clean cooking. To meet demand, policy emphasizes the importance of coal-fired electricity and generation from renewables, both on- and off-grid, as well as generally strengthening the quality and efficiency of transmission and distribution. But such policies are also pursuing non-access objectives, such as meeting demand for higher-income consumers, energy security, economic growth and pollution, and do not directly change consumer prices. As a result, it is hard to categorize and tally such subsidies as "energy access support" alone.

In contrast, most policies that target the affordability of clean cooking and electricity are designed to directly alter consumer prices of connections or ongoing consumption. This is aligned with energy access research, which finds that both these costs are major access barriers for the poor in India (Jain, Agrawal, & Ganesan, 2018). Such "direct" energy access subsidies were substantial in FY2017: INR 109,618 crore (USD 16.3 billion), or 72 per cent of all quantified subsidies. The "direct" energy access subsidies for clean cooking and electricity access are discussed separately below.

Given their high costs, a major future concern for these subsidies is to improve targeting. Poorly targeted subsidies are available to all or most consumers and come at high costs. They typically benefit the rich more than the poor, because high-income households can afford to buy more energy. If targeting can be improved, it is possible to free up scarce resources to have even larger impacts on access, or to make progress with other policy priorities, as appropriate (see Box 2). Connection subsidies are generally better targeted than consumption subsidies, because they only benefit households with no existing access—but even these subsidies can be less or more well targeted.

BOX 2. FUNDING ENERGY ACCESS WITH FOSSIL FUEL SUBSIDY REFORM

Globally, fossil fuel subsidies were estimated at USD 425 billion in 2016 (Zinecker, Sanchez, Sharma, & Beaton, 2018). In most cases, they are not targeted well enough to benefit the poor and improve energy access. Sustainable Development Goal (SDG) 12 ("Responsible Consumption and Production") commits to rationalizing inefficient fossil fuel subsidies as a means of implementation for the SDGs. Zinecker et al. (2018) found that the global finance gap for universal access to electricity and clean cooking can be met if less than 1/7 of subsidies to fossil fuels are reallocated to access. Globally, this would facilitate the achievement of SDG 7 ("Affordable and Clean Energy")—noting, however, that regions with large subsidies do not always overlap with regions with access needs (Zinecker et al., 2018). Targeting subsidies for access is a key to efficient delivery of sustainable policies.

Clean cooking subsidies have largely focused on LPG, first decreasing by almost two thirds between FY2014 to FY2017 and then growing again starting in FY2018 (Figure 4). The main subsidies in FY2017 have been for LPG consumption:

- An excise duty exemption for domestic LPG, worth INR 5,844 crore in FY2017 (USD 0.9 billion)
- The DBTL cash transfer for LPG, worth INR 12,905 crore in FY2017 (USD 1.9 billion)

The excise duty exemption is an untargeted subsidy, as is the lower GST rate effective from FY2018. These two subsidies reduce prices for all consumers. The Direct Benefit Transfer for LPG Consumers (DBTL) has seen some targeting attempts, but significant scope remains for improvements (Box 3).

May 2016 also saw the introduction of Ujjwala, an LPG connection policy. The policy targets subsidies to women in below poverty line (BPL) households. It initially targeted 50 million new connections by March 2019. The government reports that this was met by August 2018, at which time it expanded the target to 80 million households (PIB, 2018a).

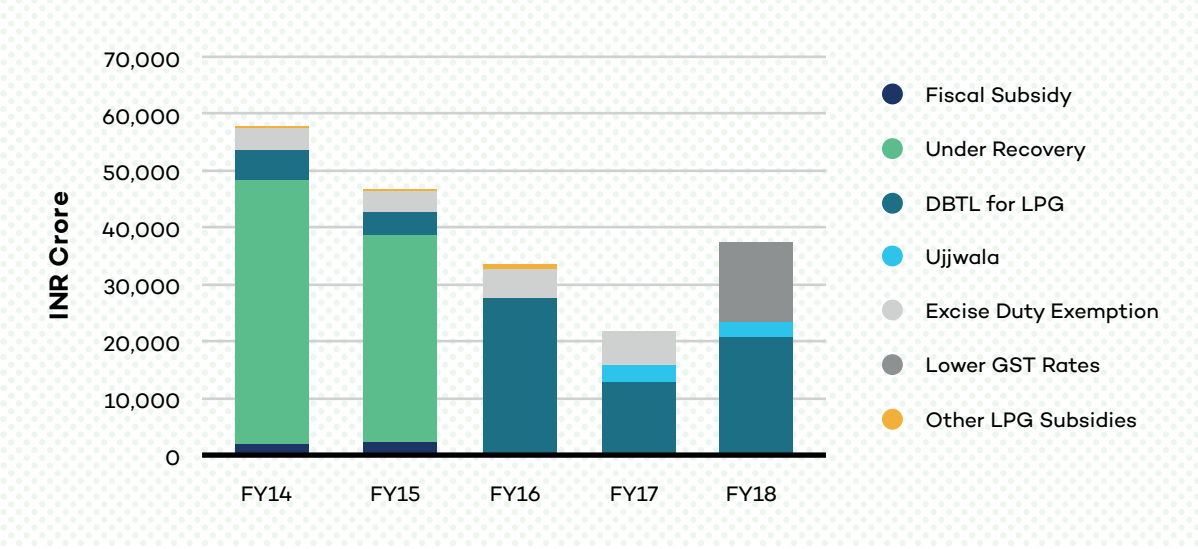
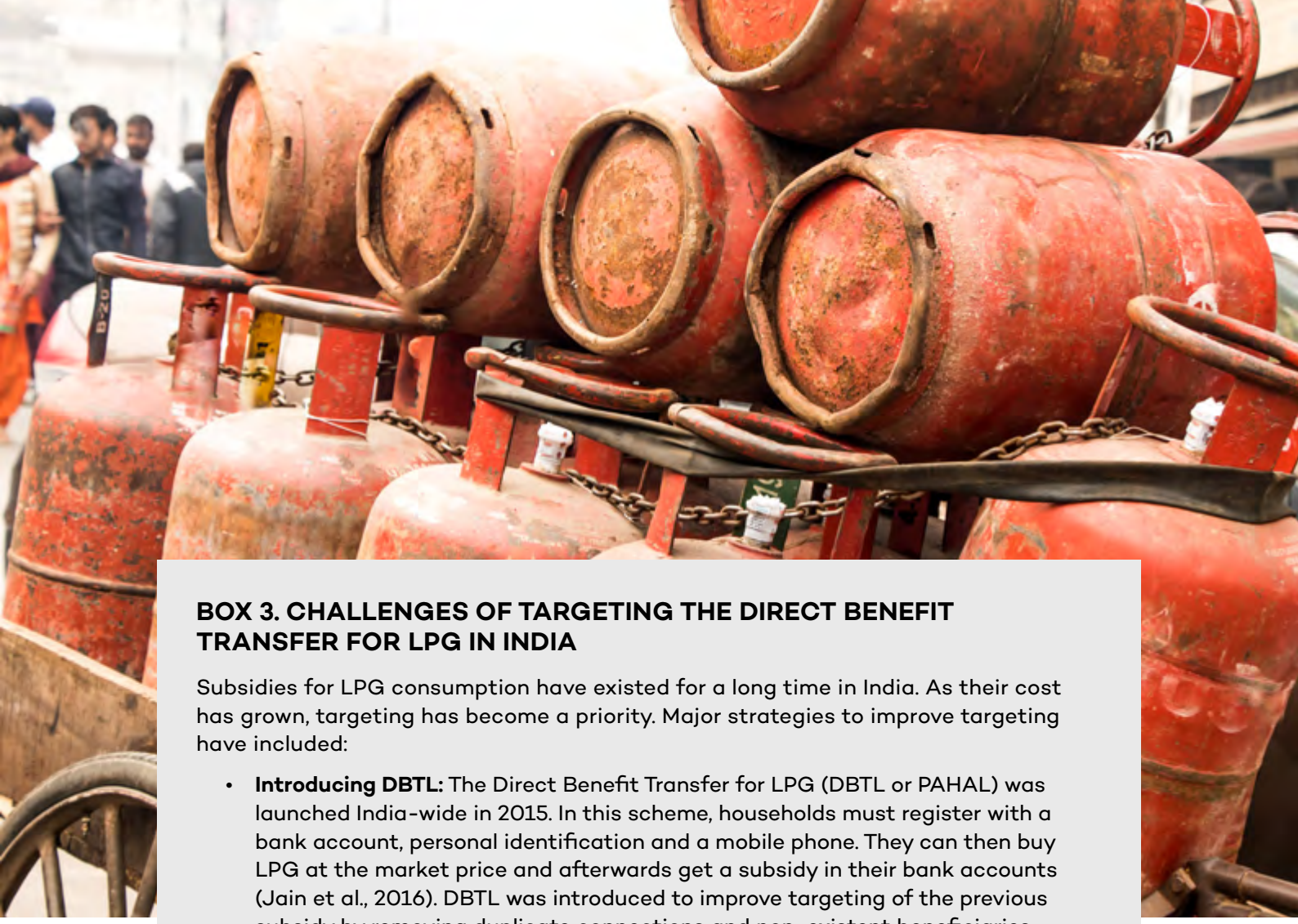


Figure 4. Trends in subsidies for LPG as a modern cooking solution

Source: Authors' calculations, see the accompanying spreadsheets for more details.



BOX 3. CHALLENGES OF TARGETING THE DIRECT BENEFIT TRANSFER FOR LPG IN INDIA

Subsidies for LPG consumption have existed for a long time in India. As their cost has grown, targeting has become a priority. Major strategies to improve targeting have included:

- **Introducing DBTL:** The Direct Benefit Transfer for LPG (DBTL or PAHAL) was launched India-wide in 2015. In this scheme, households must register with a bank account, personal identification and a mobile phone. They can then buy LPG at the market price and afterwards get a subsidy in their bank accounts (Jain et al., 2016). DBTL was introduced to improve targeting of the previous subsidy by removing duplicate connections and non-existent beneficiaries, as well as preventing black market re-sale of subsidized LPG. Official records report that 34,700,000 connections were weeded out (Standing Committee on Petroleum and Natural Gas, 2017). This is equivalent to 15 per cent of the total active connections in 2018 (GSI, 2018a). These numbers may, however, have included some deserving beneficiaries. A 2015 survey in Uttar Pradesh found only 65 per cent of households had all necessary prerequisites for registration (Parikh et al., 2016).
- **The #GiveItUp campaign:** A voluntary call to more affluent households to opt out of their LPG subsidy for the poor. Prime Minister Narendra Modi led this call, saying that "to give is as joyful as to receive, I assure you that the subsidy you give up will reach those who need it" (www.GivItUp.In). In its initial period, 1 crore (10 million) households, less than 5 per cent of total active connections in 2018, are reported to have given up DBTL (GSI, 2018a).
- **Mandatory exclusion** of individuals who declare to the Ministry of Petroleum and Natural Gas an income over INR 10 lakh (USD 15,500) per year. As of March 2018, the government reported that approximately 800,000 LPG consumers, or less than 1 per cent of total active connections, were excluded in this way (GSI, 2018a).

As it stands, DBTL is still available to most consumers in India. A major barrier to better targeting is insufficient data to link subsidies with household welfare. As a result, DBTL is likely to be costly for years to come. One easy, no-regrets strategy to improve targeting in the short term would be to set a smaller cap on annual LPG refills: few low-income households consume close to the current cap of 12 refills per year (GSI, 2018a; Parikh et al., 2016).

Direct electricity consumer subsidies have also grown substantially between FY2014 to FY2017. The main subsidies in FY2017 were:

- Support for under-recovery of distribution companies ("discoms") selling electricity at below-market prices, usually for residential and agricultural users. This was the single largest source of energy subsidy expenditure in FY2017: INR 74,925 crore (USD 11.2 billion), or 49 per cent of all quantified subsidies.[2]
- DDUGJY, the government's program to electrify villages and issue new connections to poor households, as well as strengthening related sub-T&D infrastructure. In FY 2017, it was INR 2,966 crore (USD 0.4 billion), or 2 per cent of all quantified energy subsidies.

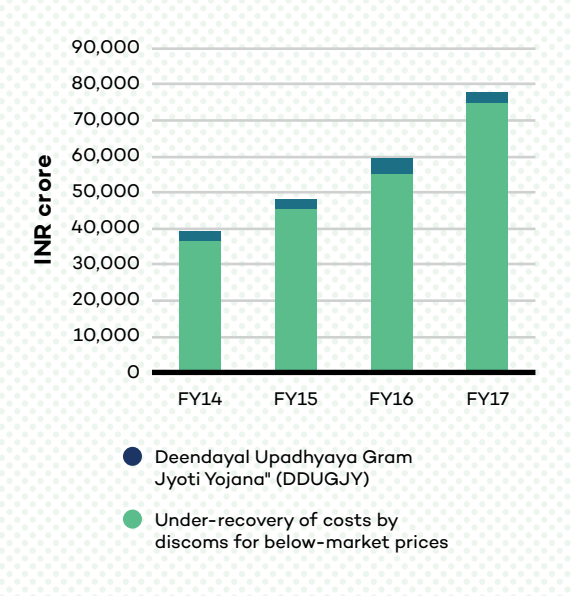


Figure 5. Increase in main "direct" subsidies for electricity consumers

Source: Authors' calculations, see the accompanying spreadsheets for more details.

Below-market pricing of electricity is an example of an energy subsidy policy where targeting is an important issue. Targeting efficiency varies significantly by state,[3] but analysis suggests that on average the subsidies are not well targeted because many high-income households receive the subsidies too (Mayer et al., 2015). Examples are the National Capital Territory of Delhi, which provides subsidies to consumers using up to 400 kWh per month, benefitting nearly 85 per cent of users (Tongia, 2017); and Tamil Nadu, which provides a subsidy on the first 50 kWh per month for all households, rich and poor alike, as well as subsidized rates for higher consumption brackets (TNERC, 2017). Our estimate does not capture the full size of the subsidy because it includes only formal state budget transfers. In fact, part of the total subsidy cost is paid by cross-subsidies (higher prices for other consumer groups like industry and commerce). There is no good multi-year data on this aspect of the subsidy, so it has not been included in the estimate.

A significant new electricity subsidy was introduced in FY2018: the Saubhagya scheme. This provides free electricity connections and subsidies for small-scale renewable energy projects. No expenditure was incurred in FY2017, but a budget of INR 2,000 crore was allocated for FY2018.

As noted previously, many of India's energy subsidies either target electricity generation or the improvement of T&D, and energy access is often one of several stated objectives for such policies. Among these, the most significant scheme is UDAY, implemented at the state level.[4] UDAY is a short-term policy to help improve the solvency of discoms, created by many years of under-recoveries, linked to numerous causes such as delays in disbursement of other subsidies to discoms. UDAY aims to enable

[2] For FY2014-FY2016, data are taken from Power Finance Corporation reports. For FY2017 and FY2018, PFC data have not yet been published, so provisional estimates have been taken from reporting by ICRA Limited. The authors have received confirmation that these estimates are close in value to as-of-yet unpublished, formal estimates of these subsidies on the government's UDAY portal. Once PFC estimates are available, this brief will be updated so that a single consistent source is used across all years.

[3] Most energy subsidies in this review are central government policies. Under-recoveries for electricity are an important exception. These subsidies are set by state level policy and paid by state-level budgets. They are included because: a national estimate has already been prepared by authoritative third parties; they exist across almost all states; and they are very large, so their exclusion would represent a serious omission.

[4] As explained in Section 2, the UDAY Scheme is included in the review (see spreadsheets), but excluded from the total subsidy numbers because its exceptional size and nature can confuse the interpretation of trends for electricity T&D.

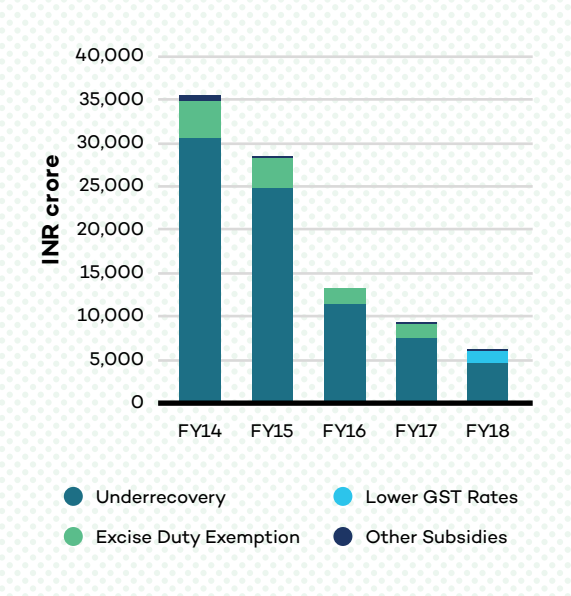


Figure 6. Reduction in subsidies PDS Kerosene as it is replaced with electricity and LPG

Source: Authors' calculations, see the accompanying spreadsheets for more details.

financial turnaround of discoms by requiring states to take over 75 per cent of discom debt over a period of two to three years by issuing bonds. The discoms receive the payment as a grant and states pay the interest on the bonds. In addition, states may offer loans to cover any additional debt, the interest for which cannot exceed the rate of interest for state bonds (MoP, 2015). A total of 32 states and union territories have signed up for UDAY. In FY2017, the value of the UDAY scheme amounted to INR 78,689 crore (USD 11.7 billion), but the scheme is time-limited, so this is not expected to be sustained indefinitely. For FY2018, INR 15,591 crore (USD 2.3 billion) was budgeted.

The role of kerosene is often discussed as part of India's energy access policies. Households that use kerosene predominantly do so for lighting, but a small share also use it for cooking, particularly during monsoon season, so there are cross-linkages with electricity and clean cooking.

Kerosene does not represent a modern and clean fuel for either lighting or cooking. The World Health Organization (WHO) recommends that countries should discourage household use of kerosene because levels of particulate matter and other pollutants exceed safe guidelines (WHO, n.d.). Kerosene is also easily diverted, so large volumes of PDS kerosene go to unintended beneficiaries, often blended with diesel, making subsidies highly inefficient (Shenoy, 2010).

In line with the government-supported switch of households from kerosene to LPG and electricity, subsidies for kerosene have fallen significantly between FY2014 and FY2017 (Figure 6). Kerosene subsidies have been reduced in two main ways: lower allocations of PDS kerosene to the states; and rising prices of PDS kerosene for consumers (Gill et al., 2018). The subsidy reductions have also been driven by low world oil prices. In particular, from FY2014 to FY2017:

- Under-recoveries from selling PDS kerosene at below-market prices fell by 75 per cent, to INR 7,595 crore (USD 1.1 billion).
- An excise duty exemption on PDS kerosene more than halved, to INR 1,561 crore (USD 0.2 billion).

The reductions in kerosene subsidies in India are a good example of a fossil fuel subsidy "swap," where one inefficient fossil fuel subsidy has been reduced, while support levels have increased for more modern and cleaner alternatives, such as LPG and electricity. There is more scope for such swaps in India, particularly with respect to renewable energy appliances and decentralized renewable energy (see Box 4).

BOX 4. KEROSENE-SOLAR SWAPS

Despite recent advances in grid connectivity, many households still rely on kerosene as their primary source of lighting or as a backup during power outages. In CEEW's ACCESS 2018 survey of states, 20 per cent of households used kerosene as their primary source of lighting (Jain et al., 2018). These households experience poor quality lighting, indoor air pollution and increased fire risk. Given the ongoing removal of kerosene subsidies, some form of reallocation could assist households struggling with last-mile connectivity challenges or electricity reliability problems.

Off-grid solar technologies such as lanterns, home systems or mini-grids are cheaper than kerosene over time, but households struggle to buy them because of large upfront costs. On average per year, household kerosene consumption costs INR 5,000: INR 2,000 paid by households, and INR 3,000 in subsidies (GSI, 2018b). An entry-level solar lantern costs only INR 500, while a solar home system can cost around INR 3,500 (GSI, 2018b). Solar home systems last well over five years, leading to much greater savings for households and the government, as well as delivering electrical power in addition to lighting.

Targeted financial support—potentially using some of the kerosene subsidy savings—could assist marginalized households to make the transition to clean energy and help achieve the government's objectives for universal electrification. In a recent large-scale energy access survey in six Indian states, over 84 per cent of households stated that they would support government subsidies on solar lanterns, even if it came at the cost of lower kerosene subsidies (Jain et al., 2018).

6.0 The Role of Coal

HIGHLIGHT:

- The role of coal and coal subsidies is a subject with enhanced sensitivities in India that requires good analysis to promote informed discussion.
- Unlike most other fossil fuel subsidies, the value of quantified coal subsidies has stayed stable from FY2014 to FY2017, although some non-quantified subsidies may have declined.
- The biggest coal subsidies are concessional customs and excise duties for coal, which reduce input costs for coal-fired power generation—in FY2017, worth INR 7,523 crore (USD 1.1 billion) and INR 6,913 crore (USD 1 billion), respectively.
- Coal has significant external costs, including local air pollution and greenhouse gas emissions. Studies suggest that the local health costs of coal are even larger than climate impacts.

Coal subsidies benefit coal through the entire value chain, from mining to the construction and operation of coal power plants. Unlike most other fossil fuel subsidies, the level of quantified subsidies to coal has remained relatively stable, at INR 15,650 crore (USD 2.6 billion) in FY2014 and INR 15,992 crore (USD 2.4 billion)[5] in FY2017 (Figure 7).

The biggest subsidies in the coal sector were focused on lowering input costs for coal-based electricity generation. In FY2017, these were:

- Concessional custom duty on imported coal, as compared with other minerals, at INR 7,523 crore (USD 1.1 billion).
- Concessional excise duty on coal production, at INR 6,913 crore (USD 1 billion).

[5] The value in USD shows a decline on account of different exchange rates in FY2014 and FY2017.

These policies saw large changes following tax reforms, but the net value of subsidies is not expected to significantly change in FY2018.

The major tax reforms were the abolition of the concessional custom duty rates and the introduction of the GST, which established a new concessional sales tax rate for coal of 5 per cent. While the former change eliminated one subsidy, the latter change created a new subsidy provision that largely made up the difference, INR 12,122 crore (USD 1.9 billion) for FY2018 (Figure 7).

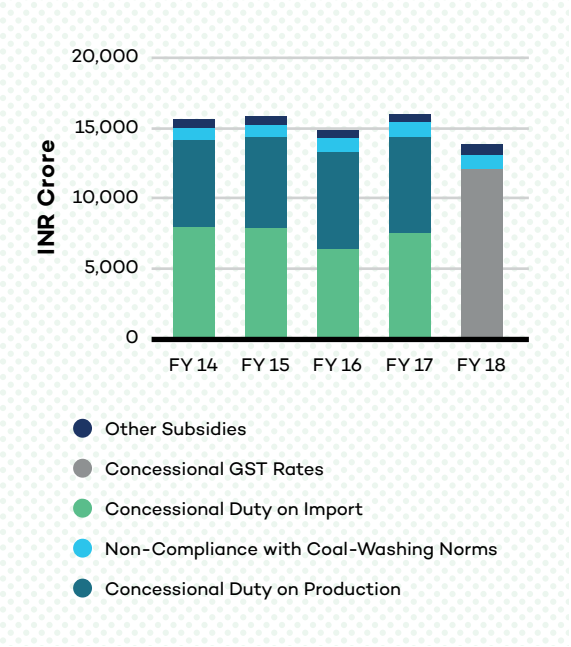


Figure 7. Total Subsidies for the coal sector in India

Source: Authors' calculations, see the accompanying spreadsheets for more details.

Another important group of coal subsidies in India is linked to non-compliance with environmental norms. The conservative approach used in this paper only defines non-compliance as a "subsidy" if a law exists, and special exemptions have been granted or good data exist on non-compliance. The largest subsidy identified in this group is the lack of penalties for non-compliance with coal-washing requirements. This resulted in cost savings for thermal power companies of INR 853 crore (USD 141 million) in FY2014 and INR 981 (USD 146 million) in FY2017 (Figure 7). In addition to this, unwashed domestic coal in power generation also results in reduced efficiency of power plants, requiring coal imports to improve the overall combustion characteristics (Powell & Sati, 2017).

Subsidies associated with non-compliance would be larger if a less conservative approach adjusted the "subsidy" definition to include external costs ("externalities") associated with coal, regardless of whether a benchmark policy exists. The main external costs are negative impacts on air quality and associated health problems, environmental problems caused by the fallout from fly-ash around power plants and greenhouse gas emissions (Box 5).

While this update finds that quantified coal subsidies have remained relatively stable, some of the non-quantified subsidies may have declined since FY2014. These include:

- Concessional rates for railway freight for long distance coal transportation: rates were increased over this period, with the most recent adjustments in January 2018 (Dastidar, 2018).
- An income tax exemption for coal power: discontinued in March 2017.

Further, subsidies in the form of Coal India Limited's pricing concessions may change due to the change in methodology, though details need further analysis (Chatterjee, 2018).

Finally, it is worth noting that subsidies to T&D essentially support the consumption of electricity from mostly coal-fired power plants, and are thus effectively coal subsidies—though this may change as renewables get a bigger share in the electricity mix.

BOX 5. COAL POWER PLANTS, EXTERNAL COSTS AND NON-COMPLIANCE WITH ENVIRONMENTAL NORMS

Coal-fired power plants produce a range of external costs, including local air pollution. The Health Effects Institute (2018) finds that coal is one of the largest sources of fine particulate matter (PM2.5) in India today, and it will be the single largest source by 2050, responsible for 1.3 million deaths per year. Coal is also the largest single source of greenhouse gas emissions that drive climate change.

Today, the price of coal does not fully reflect these costs, although India has begun to internalize some of them through its coal cess: a tax of INR 400 (USD 5.7) per tonne of coal. India's Intended National Determined Contribution (NDC), under the Paris climate change agreement, refers to the coal cess as an equivalent of a carbon tax (Government of India, 2015). Based on factors stated in the NDC, it is today equal to a charge of around USD 4 per tonne of carbon dioxide.

Stricter air pollution emissions norms are another step toward internalizing the full cost of coal into prices. The Ministry of Environment, Forest and Climate Change (MoEFCC) notified stringent norms for emissions control from coal power plants in 2015, varied by the age of the plant (CPCB, 2018). NOx, SO2, mercury and particulate matter, among the largest sources of air pollution in India, were specifically targeted. For existing plants, two years were granted for complying, ending in December 2017. For new plants, compliance was required at the point of commissioning from January 2017. Compliance requires the introduction of several technologies, including flue gas desulfurization (FGD) (CPCB, 2018). Their installation and operation involves significant costs. CEEW estimates that the total capital cost of retrofits is around INR 75,000 crore (USD 11.6 billion), if all notified plants carry out retrofits (Ghosh & Ganesan, 2018). The Ministry of Power (MoP) recommended that costs be passed through into consumer tariffs.

However, the December 2017 deadline was not met by the plants that were to install FGD. It was extended to December 2022. Out of all affected plants, 415 units, totalling 162 GW, will need to install FGD by 2022; while the other 235 units are either already in compliance, planned for phase-out or are yet to submit a plan for FGD (CPCB, 2018). The Supreme Court admonished the central government for extending the deadlines and directed 57 units of National Power Thermal Corporation (NTPC) and Damodar Valley Corporation (DVC) to meet the norms by 2021, as they are in densely populated, critically polluted areas (Behl, 2018). The delays are effectively a benefit to plant operators, at the cost of public health. It is estimated that complying with the emissions norms would avoid 3-3.2 lakh premature deaths between 2019 to 2030. The monetized value of these health benefits by 2030 is INR 9,62,222 crore (USD 149.3 billion) (Srinavasan, et al., 2018).

In a global study by the International Monetary Fund (IMF), the total untaxed external costs associated with coal use were worth USD 196 billion in India in 2015 (INR 12,25,000 crore) (Coady et al., 2015). This analysis was based on a carbon price of USD 36 per tonne (Clements et al., 2013). Globally, only one quarter of the total costs associated with coal were linked to greenhouse gas emissions—the remaining three quarters were all costs of local air pollution.

For more details please refer to the forthcoming policy brief in this series *Subsidies and the Costs of Compliance with Environmental Norms*.

Overall, views on the effectiveness and efficiency of India's coal subsidies are likely to be heavily influenced by views on the role for coal in India's energy future. Advocates for coal argue that coal is:

- The least-cost option to meet India's growing energy demand, including for energy access, so it provides low prices for consumers.
- A rich domestic resource that helps energy security.
- A source of base load and potentially even balancing capacity for variable renewable energy.
- Subject to many charges and taxes, while renewables receive large subsidies per unit of energy generated, so subsidies are needed to help redress the balance.

Critics of coal argue that:

- As of recent auctions, grid-scale solar and wind are now fully competitive with coal.
- That coal imposes additional costs on citizens, including local air pollution and greenhouse gas emissions.
- That subsidies for access should focus on the consumer price of electricity, but promote competition between sources of generation.
- That comparisons with renewables are unfair, because coal is a fully developed conventional energy technology.
- A complex system of subsidies in order to balance out taxes and charges is cumbersome and non-transparent, and ultimately only in the interests of industry.

Ongoing research is needed to help encourage an informed debate on these issues.

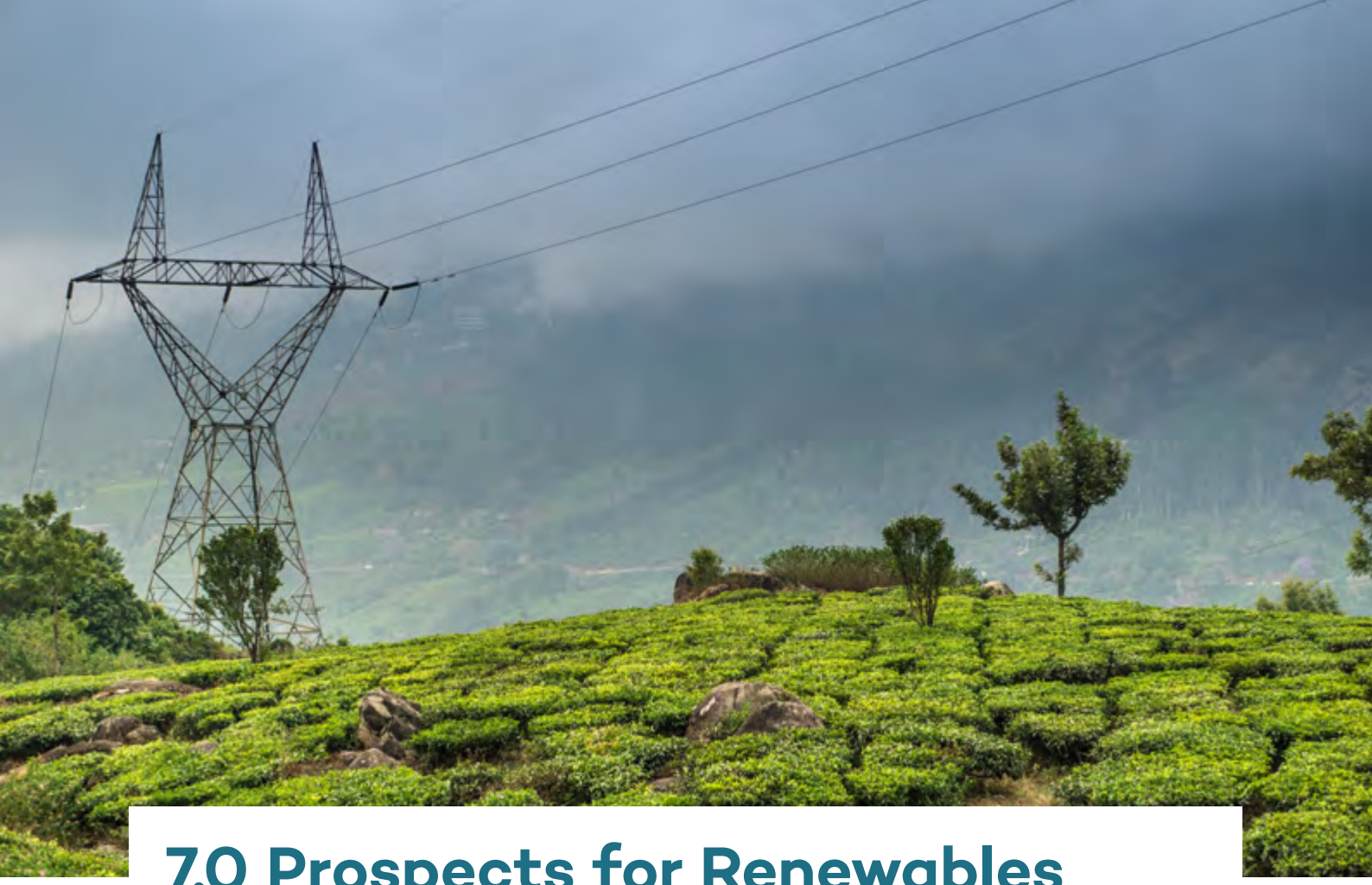
One relatively new development in this debate has been the rapid rate at which new coal power plants have become so-called "stressed" assets (see Box 6). The government is facing a choice: recognize that various policies, including subsidies, may have encouraged overinvestment or risk exacerbating overinvestment through a bailout, which may involve further subsidies (Worrall et al. 2018). The assets are a significant part of state-owned banks' portfolios, so they may also affect banks' financial stability.

BOX 6. SUPPORT FOR "STRESSED" COAL POWER PLANTS

In India, 34 coal power plants with a total capacity of 40,130 MW are currently defined as financially "stressed" for a variety of reasons. These include the absence of assured sale of power through power purchase agreements (PPA); an unsteady supply of coal leading to reliance on high-priced imports; inability to infuse further equity and working capital; regulatory and contractual issues; delays in project implementation; aggressive bidding leading to unviable tariff rates; and rising rail freight charges (Standing Committee on Energy, 2018).

In order to avoid insolvency, government-owned banks have been working on a scheme to bail out these "stressed" plants. At the time of writing, schemes under consideration include debt-equity swaps and setting up an Asset Reconstruction Company (ARC). Banks would then either sell assets or partner with third parties to operate and manage projects. However, these stop-gap solutions do not address the fundamental drivers that have created the problem (Financial Express, 2018; Pillay, 2018). Moreover, as India continues to internalize the social costs of coal, there will likely be added pressure on cost-competitiveness. For example, to meet India's goal of reducing emissions intensity by 33–35 per cent, it is estimated that new coal plants can likely only run at 65 per cent of their rated capacity (Shearer et al., 2017).

For more details please refer to the forthcoming policy brief in this series *Stranded Coal Power, Subsidies and the Just Transition*.



7.0 Prospects for Renewables

HIGHLIGHT:

- Government support to renewable energy increased six-fold: from INR 2,608 crore (USD 431 million) in FY2014 to INR 15,040 crore (USD 2.2 billion) in FY2017.
- The key future challenge will be to adjust government support schemes for clean energy, in pace with dynamically changing needs.

Central government support to renewables has increased almost six-fold: from INR 2,608 crore (USD 431 million) in FY2014 to INR 15,040 crore (USD 2.2 billion) in FY2017. This is a positive trend, showing public finances flowing in line with major sustainability objectives and goals to improve India's energy security via increased use of domestic resources. However, at 10 per cent of total quantified energy subsidies, it remains a minor share of overall energy subsidies. It should be noted, nonetheless, that "more subsidies" does not necessarily mean "good value for money"—renewable energy subsidies deserve the same critical analysis of effectiveness and efficiency as subsidies for other energy sources.

The largest central government subsidies for renewables in FY2017 were (see Figure 8):

- An accelerated depreciation scheme for wind, solar, biomass and small hydro, at INR 5,471 crore (USD 0.8 billion).
- Tax breaks on excise and custom duty for selected renewable energy machinery, including components for solar and wind energy, at INR 4,660 crore (USD 0.7 billion).
- The viability gap funding (VGF) scheme, which supports the deployment of grid-connected solar power, at INR 2,593 crore (USD 0.4 billion).

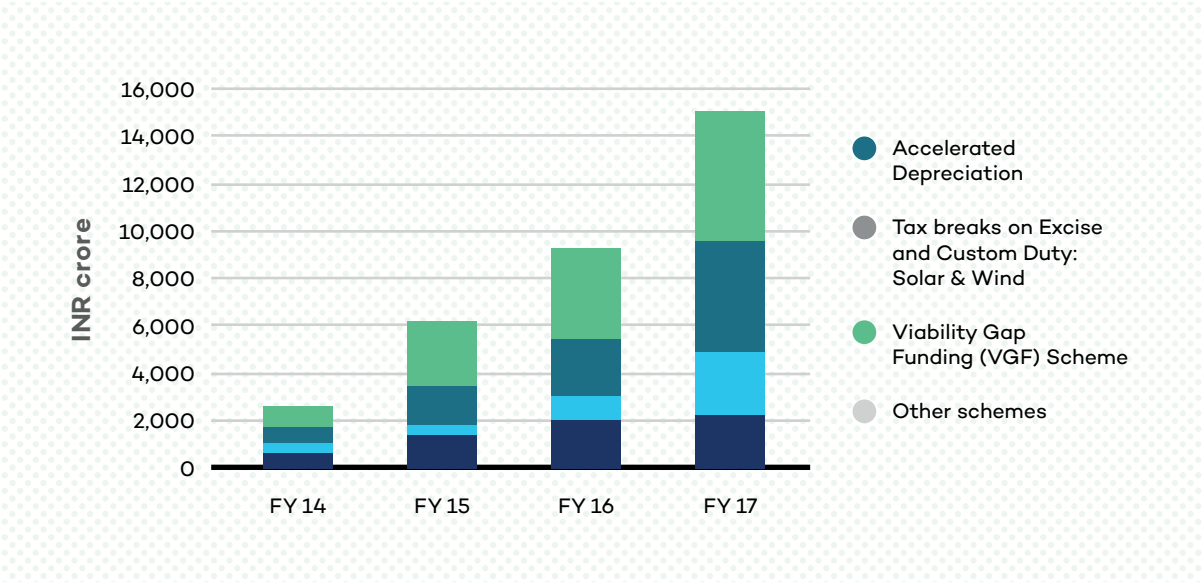


Figure 8. Total subsidies for renewables in India

Source: Authors' calculations, see accompanying spreadsheets for more details.

The major challenge for renewable energy subsidies in India will be to adapt policy to highly dynamic technological and market changes across multiple sub-sectors. The most dramatic recent changes have been grid-scale wind and solar power becoming cost-competitive. In a September 2018 auction by the Solar Energy Corporation of India Ltd. (SECI), solar tariffs fell to the lowest level to date: INR 2.44 (USD 3.7 cents) per kWh (Chandrasekaran, 2018a). In auctions held in August 2018, wind tariffs reached INR 2.77–2.83 (USD 4.1-4.3 cents) per kWh (Chandrasekaran, 2018a, 2018b, 2018c). At these rates, renewables compare very favourably relative with coal power tariffs, which average at INR 3-5 (USD 4.7–7.7 cents) per kWh for domestic coal and at INR 5-6 (USD 7.7–9.3 cents) per kWh for imported coal (IEEFA, 2018).

In light of these developments, the Economic Survey 2018 hinted at reconsidering subsidies to the renewable energy sector as utility-scale projects have achieved grid parity (MoF, 2018).

Partial data on subsidies in FY2018 show that this is already being reflected in policy. Accelerated depreciation and tax breaks on excise and customs duty—India's two most costly renewable energy subsidies in FY2017—were reformed with the introduction of the GST. A low GST and customs duty was also granted, but at a smaller value: around one quarter the size of the subsidies that were removed. The viability gap funding scheme is already designed to offer support only to projects that operate above a reference price, so projects operating at cost-competitiveness would not receive

benefits. Further, subsidies to small-scale renewables such as the Biomass Gasifier Program, Small Wind Energy and Hybrid Systems (SWES) program and the Akshay Urja Shops scheme have reached the end of their intended lifetime and were not renewed.

While it may be appropriate for subsidies in some areas to decline in coming years, as technology matures, public support may need to be sustained or to increase in other areas (see Box 7).

BOX 7. FUTURE FOCUS AREAS FOR PUBLIC SUPPORT OF RENEWABLE ENERGY?

Despite recent decreases in the costs of grid-scale wind and solar PV, public support may still be required to help stimulate the market viability of renewable energy in other areas of India's energy transition. Key areas where government support may be needed include:

- **Balancing and integrating variable renewable energy:** This includes grid infrastructure upgrades, balancing costs, energy storage and reduced utilization of thermal coal power plants. A study on pathways to meet India's INDC found that subsidies for such needs could ramp-up uptake of solar energy in the near and long term (Chaturvedi et al., 2018). Numerous T&D subsidies in FY2017 were focused on improving transmission networks, but the most relevant to this objective were the Green Energy Corridor scheme and the National Smart Grid Mission, at INR 75 crore (USD 11.6 million) and INR 3.7 crore (USD 0.6 million), respectively.
- **Small-scale renewable energy solutions:** Decentralized renewable energy can be an effective solution for households in remote areas or that need backup for unreliable or low-quality electricity. In some cases, it may be cheaper than a conventional, centralized system. In particular, a total rooftop solar capacity of 40,000 MW is targeted for 2022, but its uptake has been limited by the prohibitive costs for homeowners (Economic Times, 2018b). Subsidy swaps, such as a reallocation of kerosene subsidies toward small-scale solar energy, may be one effective source of financing.
- **Clean cooking:** Currently, India's expenditure on clean cooking is almost exclusively dedicated to LPG. While it is a clean and modern fuel, LPG is also a costly import and a fossil fuel, and usually considered to be a transition fuel (Narula & Beaton, 2018). This challenge is recognized by India's draft National Energy Plan, currently under consultation, which recommends extending subsidies for a variety of fuels and cookstoves, including biogas (Niti Aayog, 2017).

8.0 Subsidies in the Transport Sector

HIGHLIGHT:

- Fossil motor fuels were once expensively subsidized but are now sold at market prices and taxed.
- Taxation of fossil motor fuels has maintained prices in recent years, despite the global slump in oil prices. Increasing oil prices, as has been the recent trend, may result in the government reducing taxes.
- Government support to electric vehicles is an emerging trend and presents an opportunity to reduce imported oil use in transportation, thus improving India's energy security and addressing local air pollution in cities.

Gasoline and diesel are the two major sources of motor transport energy today in India. They have been sold at market-linked prices and taxed since 2010 and 2014, respectively, following government leadership in the removal of inefficient consumer subsidies. Electric vehicles (EVs) are a future opportunity for India to reduce its oil use in transportation while addressing local air pollution in cities. With smart grid infrastructure and vehicle-to-grid systems, EVs can also support greater renewable energy penetration by absorbing peaks and excess electricity in the grid (Richardson, 2013).

The reform of fossil transport subsidies has been a huge source of fiscal savings and improved efficiency. In FY2014, diesel subsidies were one of the largest items of subsidy expenditure: INR 62,837 crore (USD 10 billion), almost 30 per cent of all energy subsidies in that year. Since FY2016, this

expenditure has been completely freed up for other priorities (Figure 9). The only remaining quantified subsidy for transport fuels in FY2017 was expenditure on strategic petroleum reserves, at INR 2,030 crore (USD 0.3 billion).

In early November 2018, gasoline and diesel reached all-time high prices of INR 84 per litre (USD 1.18) and INR 91 (USD 1.28) per litre for petrol, respectively. The central government responded by reducing the excise duty and ordering oil marketing companies (OMCs) to absorb part of the price rise, cutting prices by INR 2.5 per litre. State governments were also asked to cut taxes by an additional INR 2.5 per litre (USD 0.03) (*Business Today*, 2018). These efforts are expected to cost INR 10,500 crore (USD 1.6 billion) in FY2019. Despite these cost reductions, the Minister of Petroleum has categorically stated there will be no going back on petrol and diesel price deregulation (*Times of India*, 2018).

Subsidies for electric vehicles are relatively new and remain modest (Figure 10). The Faster Adoption and Manufacturing of Hybrid and Electric vehicles (FAME) scheme, introduced in 2016 (PIB, 2015b), is the largest subsidy at INR 144 crore in FY2017 (USD 11.5 million). A concessional excise duty, continued in the GST regime, has grown from INR 1.7 crore (USD 0.3 million) in FY2014 to INR 4.1 crore (USD 0.6 million) in FY2017. Together, this is only 7 per cent of the funds dedicated to petroleum reserves. As of 2017, less than 0.1 per cent of India's 21 million vehicles sold were electric (Engelmeier, Gaihre, & Anand, 2018). The barriers to EV include upfront costs, lack of charging infrastructure and the absence of a clear policy (Engelmeier et al., 2018; Society of Indian Automobile Manufacturers [SIAM], 2017). Subsidies have played a key role in the promotion of renewables in India—EVs are a similar nascent sector, where continued and increased support may be warranted.

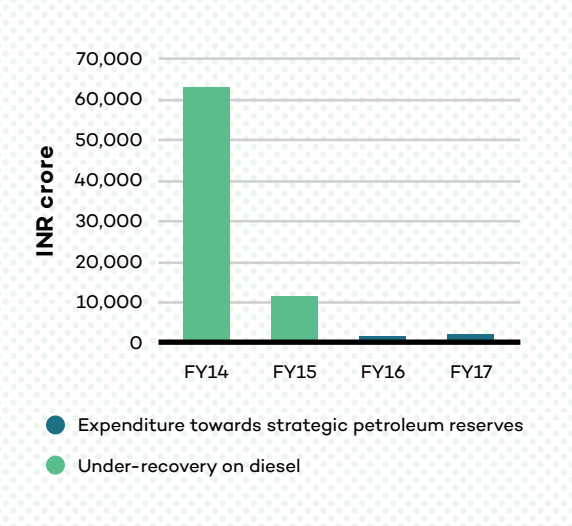


Figure 9. Subsidies to fossil motor fuels in India

Source: Authors' calculations, see accompanying spreadsheets for more details.

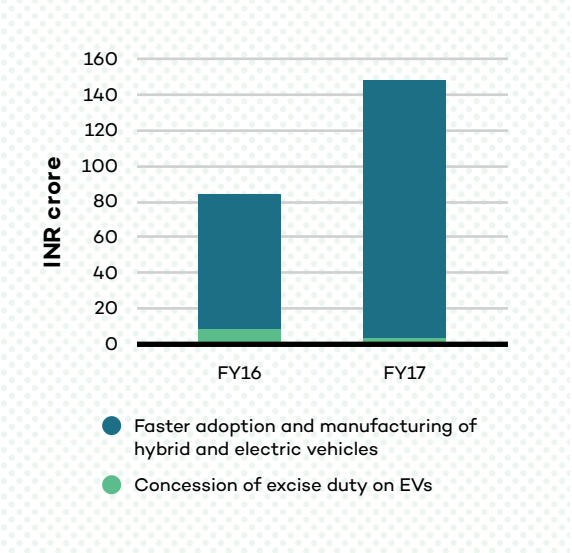


Figure 10. EV subsidies in India

Source: Authors' calculations, see accompanying spreadsheets for more details.

9.0 Conclusions and Recommendations

The Government of India and state governments juggle several energy policy objectives, such as reducing dependence on fossil fuel imports and building energy security by best leveraging domestic natural resources (coal, hydro, wind and solar), providing universal energy access at affordable prices, meeting energy demand in an efficient way, ensuring greater sustainability and supporting economic growth (NITI Aayog 2017). Energy subsidies are tools for meeting these objectives, but do not always deliver against them and require ongoing scrutiny.

The total value of quantified energy subsidies has declined from INR 2,15,974 crore (USD 35.7 billion) in FY2014 to INR 1,51,484 crore (USD 23.0 billion) in FY2017. Subsidies to fossil fuels have declined over this period, while subsidies to renewables and electric vehicles (EV) have increased. However, the absolute value of subsidies to fossil fuels is much greater than those to renewables and EV.

Electricity T&D subsidies have been on the rise and were the largest energy subsidy in FY2017. In part, this is because they are essential for meeting India's goal of universal energy access, but it is also because the largest subsidy—price support for electricity—is not well targeted. The same is true of price support for LPG, also intended to support energy access.

The overview contained in this policy brief leads to the following high-level recommendations:

- **The Government of India and state governments should evaluate performance of energy subsidies against their objectives and wider strategic goals and continue, discontinue or modify these subsidies as required.** Subsidies may distort the level playing field for different energy technologies and create wasteful behaviour patterns. In particular, subsidies for energy access and poor and vulnerable consumers should be targeted more specifically to the intended beneficiaries.
- Even though utility-scale solar and wind projects have proved to be cost-competitive against coal, **clean technologies will continue to require budgetary support from the government.** Subsidies to cover grid integration costs can potentially accelerate penetration of variable renewable energy. Support for offshore wind, energy storage, renewable cooking technologies and electric vehicles would also be needed to diversify the renewable portfolio.
- There are a lot of questions regarding the rationale of subsidies for coal. Further analysis is required to determine the options for reform of coal subsidies and coal taxation while ensuring affordability and generation capacity to meet present and future energy demands. **Considering the health and environmental externalities associated with coal mining and use, timely enforcement of environmental norms and appropriate penalties to deter violation of these norms are necessary.**
- **The Government of India and state governments should improve energy subsidy reporting at both national and state level through self-reporting and international peer reviews of energy subsidies, for instance under the G-20 process or the SDGs** (Gerasimchuk et al., 2017). While authors have been able to collect data on energy subsidies from a variety of government sources, the data are incomplete and are not analyzed by the government and other stakeholders in a consistent manner. Improved energy subsidy reporting will allow for evaluation of subsidies and evidence-based decision making to help meet India's energy policy objectives.

Annex 1. List of Subsidies Non-Quantified for FY2017 Due to Lack of Data

This review is a best attempt to identify the major energy subsidy expenditure in India today. No such review can ever be fully comprehensive, as there are many such policies, and the data required for estimation are not always available. The full list of subsidies that were identified—quantified and non-quantified—is available in the data spreadsheets accompanying this review. In this review, some subsidies that were previously quantified could not be updated for FY2017. Of these, the following are believed to be significant in magnitude and may benefit from further study:

- Permanent Cash Advance pertaining to DBTL (Energy Access subsidies)
- Project Management Expenditure pertaining to DBTL (Energy Access subsidies)
- OMC Support for Extension of LPG connection to poor families under CSR Scheme (Energy Access subsidies)

Annex 2. List of Discontinued and New Subsidies Between FY2014 and FY2018

Discontinuation of Subsidy Schemes

- Concessional Custom Duty Rates on import of Coal
- Concessional Excise Duty Rates on Coal Production
- Under-recovery on Domestic LPG
- Excise Duty Exemption on Domestic LPG
- Excise Duty Exemption on PDS Kerosene
- Income Tax exemption to companies engaged in production of "mineral oil" from National Exploration Licensing Policy National Exploration Licensing Policy (NELP) blocks
- Biomass Gasifier Programme
- Small Wind Energy and Hybrid Systems (SWES) Programme
- Akshay Urja Shops Programme
- Tax breaks on Excise and Custom Duty: Solar & Wind
- Generation-Based Incentive (GBI) for Grid Interactive Wind Power Projects

New Subsidies (All Introduced in FY18)

- Green energy corridor projects
- Pradhan Mantri Sahaj Bijli Har Ghar Yojana (Saubhagya)
- Ujjwala scheme – LPG subsidies for the poor
- Concessional GST on coal production
- Concessional GST rates for Domestic LPG
- Concessional GST rates for PDS Kerosene
- Concessional GST rates for Solar and Wind projects

References

Avora, B. (2018). India says never targeted 100% electric mobility by 2030, scales down Aim. *Bloomberg Quint*. Retrieved from https://www.bloombergquint.com/business/india-says-never-targeted-100-electric-mobility-by-2030-scales-down-aim

Beaton, C., Gerasimchuk, I., Laan, T., Lang, K., Vis-Dunbar, D., & Wooders, P. (2013). *A guidebook to fossil-fuel subsidy reform for policy-makers in Southeast Asia*. Winnipeg/Geneva: IISD/GSI. Retrieved from https://www.iisd.org/library/guidebook-fossil-fuel-subsidy-reform-policy-makers-southeast-asia

Behl, M. (2018). Supreme Court to 57 power plants: Clean up act within 28 months. *Times of India*. Retrieved from https://timesofindia.indiatimes.com/city/nagpur/supreme-court-to-57-power-plants-clean-up-act-within-28-months/articleshow/65761232.cms

BP. (2018). *BP Energy Outlook - India*. Retrieved from https://www.bp.com/content/dam/bp/en/corporate/pdf/energy-economics/energy-outlook/bp-energy-outlook-2018-country-insight-india.pdf

Buckley, T. & Shah, K. (2018). Karnataka electricity sector transformation: India's leading renewable energy state. Institute for Energy Economics and Financial Analysis (IEEFA). Retrieved from http://ieefa.org/wp-content/uploads/2018/07/Karnataka-Electricity-Sector-Transformation_July2018.pdf

Business Today. (2018). Why petrol and diesel prices can touch an all-time high again. Retrieved from https://www.businesstoday.in/current/economy-politics/why-petrol-and-diesel-prices-can-touch-an-all-time-high-again/story/281534.html

Central Electricity Authority of India (CEA). (2018). *Monthly installed capacity report*. Retrieved from http://www.cea.nic.in/reports/monthly/installedcapacity/2018/installed_capacity-08.pdf

Central Pollution Control Board (CPCB). (2018). *CBCB notification*. Retrieved from http://cpcb.nic.in/openpdffile.php?id=UHVibGljYXRpb25GaWxlLzE2MTlfMTUyMzg3MTY5OF9tZWRpYXBob3RvMTMzMzgucGRm

Chandrasekaran, K. (2018a). Solar tariffs once again hit all-time low of Rs 2.44 a unit at SECI auction. *Economic Times*. Retrieved from https://economictimes.indiatimes.com/industry/energy/power/solar-tariffs-once-again-hit-all-time-low-of-rs-244-a-unit-at-seci-auction/articleshow/64834531.cms

Chandrasekaran, K. (2018b). Wind tariffs rise in NTPC's 1200 mw auction. *Economic Times*. Retrieved from https://economictimes.indiatimes.com/industry/energy/power/wind-tariffs-rise-in-ntpcs-1200-mw-auction/articleshow/65492623.cms

Chandrasekaran, K. (2018c). Solar tariffs hit their record low once again. *Economic Times*. Retrieved from https://economictimes.indiatimes.com/industry/energy/power/solar-tariffs-hit-their-record-low-once-again/articleshow/65847030.cms

Chatterjee, A. (2018). Coal India defers new pricing methodology. *Financial Express*. Retrieved from https://www.financialexpress.com/industry/coal-india-defers-new-pricing-methodology/1121797/

Chaturvedi, V., Koti, P.N., & Chordia, A.R. (2018). *Sustainable development, uncertainties, and India's climate policy: Pathways towards nationally determined contribution and mid-century strategy. CEEW*. Retrieved from https://www.ceew.in/sites/default/files/CEEW_Sustainable_Development_Uncertainties_India_Climate_Policy_30Apr18.pdf

ClearTax. (2018). *Impact of GST rate on coal*. Retrieved from https://cleartax.in/s/6815

Clements, B., Coady, D., Fabrizio, S., Gupta, S., Alleyne, T. & Sdralevich, C. (2013). *Energy subsidy reform: lessons and implications*. Washington, D.C. : International Monetary Fund.

Coady, D., Parry, I., Sears, L. & Shang, B. (2015). *How large are global energy subsidies?* (IMF Working Paper). Washington D.C., International Monetary Fund. Retrieved from: https://www.imf.org/external/pubs/ft/wp/2015/wp15105.pdf

Dastidar, A.G. (2018). Railways tweak coal freight rates. New Delhi, *The Indian Express*. Retrieved from https://indianexpress.com/article/business/business-others/railways-tweaks-coal-freight-rates-5019658/

Economic Times. (2018a). New tax rate to help power companies save Rs 6,000 crore, says CIL boss. Retrieved from https://economictimes.indiatimes.com/industry/energy/power/new-tax-rate-to-help-power-companies-save-rs-6000-crore-says-cil-boss/articleshow/60518799.cms

Economic Times. (2018b). With 4 years to go, only 6% of solar rooftop capacity target met - ET EnergyWorld. Retrieved from https://economictimes.indiatimes.com/industry/energy/power/with-4-years-to-go-just-6-of-solar-rooftop-target-installed/articleshow/65323516.cms

Engelmeier, T., Gaihre, N., & Anand, M. (2018). *The case for electric mobility in India | TFE Consulting*. Retrieved from https://www.tfeconsulting.com/_website/wp-content/uploads/2018/05/TFE_Report-India-electric-mobility.pdf

Financial Express. (2018). Stressed power projects: RBI blames government for crisis - The Financial Express. Retrieved from https://www.financialexpress.com/economy/stressed-power-projects-rbi-blames-government-for-crisis/1279875/

Garg, V., Gerasimchuk, I., Beaton, C., Bandyopadhyay, K.R., Whitley, S., Worrall, L., Scott, A., . . . Tripathi, S. (2017). *India's energy transition: Mapping subsidies to fossil fuels and clean energy in India*. Winnipeg: IISD. Retrieved from https://www.iisd.org/library/india-energy-transition-mapping-subsidies-fossil-fuels-and-clean-energy-india

Gerasimchuk, I., Wooders, P., Merrill, L., Sanchez, L. & Kitson, L. (2017). *A guidebook to reviews of fossil-fuel Subsidies: From self-reports to peer learning*. Winnipeg: IISD. Retrieved from: https://www.iisd.org/sites/default/files/publications/guidebook-reviews-fossil-fuels-subsidies.pdf

Gerasimchuk, I., Whitley, S., Beaton, C., Bridle R., Doukas A., Di Paola, M. & Y. Touchette. (2018). *Stories from G20 countries: Moving public money out of fossil fuels*. Winnipeg: IISD. Retrieved from https://www.iisd.org/library/stories-g20-countries-shifting-public-money-out-fossil-fuels

Ghosh, A., & Ganesan, K. (2018). The DISCOM is dying, long live the DISCOM. *Business Standard*. Retrieved from https://www.business-standard.com/article/opinion/the-discom-is-dying-long-live-the-discom-118042301120_1.html

Global Subsidies Initiative (GSI) (2018a). *Support for clean cooking in India: Tracking the latest developments in LPG subsidies*. Winnipeg: IISD. Retrieved from: https://iisd.org/story/cooking-with-gas-in-india/

Global Subsidies Initiative (GSI) (2018b). *Kerosene-solar subsidy swap: Supporting India's energy transition*. Winnipeg: IISD.

Government of India. (2015). *India's intended nationally determined contribution: Working towards climate justice*. Retrieved from https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/India%20First/INDIA%20INDC%20TO%20UNFCCC.pdf

Health Effects Institute. (2018, January). *Burden of disease attributable to major air pollution sources in India*. Retrieved from https://www.healtheffects.org/system/files/GBD-MAPS-SpecRep21-India-revised_0.pdf

International Energy Agency (IEA). (2018). *World energy outlook 2018*.

Jai, S. & Pillay, A. (2018). Banks are designing a scheme for bailing out stressed power assets. *Business Standard*. Retrieved from https://www.business-standard.com/article/finance/banks-are-designing-a-scheme-for-bailing-out-stressed-power-assets-118051001438_1.html

Jain, A., Agrawal, S., & Ganesan, K. (2016). *DBTL Performance Evaluation: Insights from the world's largest subsidy benefit transfer scheme*. Winnipeg: IISD. Retrieved from https://www.iisd.org/sites/default/files/publications/dbtl-performance-evaluation.pdf

Maharashtra Electricity Regulatory Commission (MERC). (2018). *MERC Order No. 124 of 2018*. Retrieved from http://www.mercindia.org.in/pdf/Order%2058%2042/Order-124%20of%202018-03082018.pdf

Mayer, K., Banerjee, S.G. & Trimble, C. (2014). *Elite Capture: Subsidizing Electricity Use by Indian Households*. Washington D.C.: World Bank. Retrieved from https://elibrary.worldbank.org/doi/abs/10.1596/978-1-4648-0412-0

Ministry of Finance. (2018). *Economic Survey 2018*. Retrieved from http://mofapp.nic.in:8080/economicsurvey/

Ministry of Petroleum & Natural Gas. (2016). *About PM Ujjwala Yojana*. Retrieved from http://www.pmujjwalayojana.com/about.html

Ministry of Power. (2015). *UDAY (Ujwal Discom Assurance Yojana) Scheme for Operational and Financial Turnaround of Power Distribution Companies (DISCOMs)*. Retrieved from https://powermin.nic.in/pdf/Uday_Ujjawal_Scheme_for_Operational_and_financial_Turnaround_of_power_distribution_companies.pdf

Ministry of Power. (2018). *Saubhagya dashboard*. Retrieved from http://saubhagya.gov.in/

NITI Aayog. (2017). *Draft National Energy Policy*.

Parikh, J.K., Sharma, A., Singh, C. & Neelakantan, S. (2016). Providing Clean Cooking Fuel in India: Challenges and solutions. Winnipeg: IISD. Retrieved from https://www.iisd.org/sites/default/files/publications/clean-cooking-india-challenges-solutions_0.pdf

Powell, L., & Sati, A. (2017). *Coal beneficiation: Policy priorities for India*. Observer Research Foundation. Retrieved from https://www.orfonline.org/research/coal-beneficiation-policy-priorities-for-india/

Press Information Bureau (PIB). (2015). National Electric Mobility Mission Plan. Retrieved from http://pib.nic.in/newsite/PrintRelease.aspx?relid=116719

Richardson, D.B. (2013). Electric vehicles and the electric grid: A review of modeling approaches, Impacts, and renewable energy integration. *Renewable and Sustainable Energy Reviews 19*, 247–254. https://doi.org/10.1016/j.rser.2012.11.042

Shearer, C., Fofrich, R., & Davis, S.J. (2017). Future CO2 emissions and electricity generation from proposed coal-fired power plants in India. *Earth's Future 5*(4), 408–416. https://doi.org/10.1002/2017EF000542

Shenoy, B. (2010). *Lessons learned from attempts to reform India's kerosene subsidy*. Winnipeg: IISD. Retrieved from: https://www.iisd.org/pdf/2010/lessons_india_kerosene_subsidy.pdf

Society of Indian Automobile Manufacturers (SIAM). (2017). *Adopting pure electric vehicles: Key policy enablers*. Retrieved from http://www.siam.in/uploads/filemanager/114SIAMWhitePaperonElectricVehicles.pdf

Srinavasan S., Roshna N., Guttikunda S., Kanudia A., Saif S., & Asundi J. (2018). *Benefit cost analysis of emission standards for coal-based thermal power plants in India*. Retrieved from http://shaktifoundation.in/wp-content/uploads/2018/07/Benefit-cost-analysis-of-emission-standards-for-coal-based-thermal-power-plants-in-India-1.pdf

Standing Committee on Energy. (2018). *Stressed /non-performing assets in electricity sector*. Retrieved from http://164.100.47.193/lsscommittee/Energy/16_Energy_37.pdf

Standing Committee on Petroleum and Natural Gas. (2017). *Demand for Grants, 18th Report*. Retrieved from http://164.100.47.193/lsscommittee/Petroleum%20&%20Natural%20Gas/16_Petroleum_And_Natural_Gas_18.pdf

Tamil Nadu Electricity Regulatory Commission (TNERC). (2017). *Determination of tariff for generation and distribution*. Retrieved from http://www.tnerc.gov.in/orders/Tariff%20Order%202009/2017/TariffOrder/TANGEDCO-11-08-2017.pdf

Times of India. (2018). No going back on fuel price deregulation: Dharmendra Pradhan. *Times of India*. Retrieved from https://timesofindia.indiatimes.com/business/india-business/no-going-back-on-fuel-price-deregulation-pradhan/articleshow/66119503.cms

Tongia, D.R. (2017). *Delhi's household electricity subsidies: Highly generous but inefficient?* Brookings India. Retrieved from https://www.brookings.edu/wp-content/uploads/2017/04/impact-series-paper_delhi-power-subsidies_tongia.pdf

Varadhan, S. (2018). India will need at least $125 bln to fund renewables dream: govt official. Reuters. Retrieved from https://www.reuters.com/article/india-renewables/india-will-need-at-least-125-bln-to-fund-renewables-dream-govt-official-idUSL3N1PB241

Worrall, L., Whitley, S., Garg, V., Krishnaswamy, S. & C. Beaton. (2018). *India's stranded assets: how government interventions are propping up coal power*. Retrieved from https://www.odi.org/publications/11185-india-s-stranded-assets-how-government-interventions-are-propping-coal-power

Zinecker, A., Sanchez, L., Sharma, S., Beaton, C., & Merrill, L. (2018). *Getting on target: Accelerating energy access through fossil fuel subsidy reform*. Winnipeg/Geneva: IISD/GSI. Retrieved from https://www.iisd.org/sites/default/files/publications/getting-target-accel


IISD

Global Subsidies
Initiative

CEEW
THE COUNCIL