

ENERGY: TAXES & TRANSITION

IN INDIA



Prayas (Energy Group)

Energy: Taxes and Transition in India

Working Paper

Ashwin Gambhir | Ashok Sreenivas | Aniruddha Ketkar

9th February, 2021



Prayas (Energy Group)

About Prayas

Prayas (Initiatives in Health, Energy, Learning and Parenthood) is a non Governmental, non-profit organization based in Pune, India. Members of Prayas are professionals working to protect and promote the public interest in general, and interests of the disadvantaged sections of the society, in particular. Prayas (Energy Group) works on theoretical, conceptual regulatory and policy issues in the energy and electricity sectors. Our activities cover research and intervention in policy and regulatory areas, as well as training, awareness, and support to civil society groups. Prayas (Energy Group) has contributed in the energy sector policy development as part of several official committees constituted by Ministries and Planning Commission. Prayas is registered as SIRO (Scientific and Industrial Research Organization) with Department of Scientific and Industrial Research, Ministry of Science and Technology, Government of India.

Prayas (Energy Group)

Unit III A & III B,
Davgiri, Kothrud Industrial Area,
Joshi Railway Museum Lane, Kothrud Pune 411 038.
Maharashtra Phone: 020 - 2542 0720
E-mail: energy@prayaspune.org; <http://www.prayaspune.org/peg>

Acknowledgements

This working paper benefitted greatly from the feedback and comments received from various experts. We particularly thank Dr. C. Rammanohar Reddy, Rahul Renavikar and Ann Josey for their review of the paper and for providing constructive suggestions. We also thank other colleagues at Prayas (Energy Group) for their feedback and suggestions. Any shortcomings or weaknesses in this paper are our own.

Suggested citation: Prayas (Energy Group). (2021, February). Working Paper on 'Energy: Taxes and Transition'.

February 2021
For Private Circulation only

Copyright: Any part of this report can be reproduced for non-commercial use without prior permission, provided that Prayas is clearly acknowledged, and a copy of the published document is sent to Prayas.

Table of Contents

1. Introduction	1
2. Energy and Public Finance	3
3. Motivation for this study	5
4. Data and Methodology	6
5. Revenue from fossil fuels and related sectors	8
6. State-wise revenues	13
7. Scenarios of likely energy transition	16
8. Implications and challenges/opportunities	18
9. Conclusions	20
10. Annexure	21
References	22
Glossary of terms	26

List of Figures

Figure 1: Central and State revenue from coal, petroleum & gas and electricity in 2018-19	11
Figure 2: Central and State revenue from coal, petroleum & gas and electricity in 2019-20	11
Figure 3: Source of Centre's energy taxes in 2018-19 and 2019-20	12
Figure 4: Source of States energy taxes in 2018-19 and 2019-20	12
Figure 5: Source of Centre and States energy taxes in 2018-19 and 2019-20	12
Figure 6: Coal and renewables capacity addition by utilities in India	16

List of Tables

Table 1: Contribution of taxes to final petrol and diesel prices in Delhi, January, 2021	3
Table 2: State electricity subsidy in India between FY16 and FY19	4
Table 3: Data sources used for the analysis	7
Table 4: Central and State revenue from coal, petroleum and electricity in 2018-19 & 2019-20	9
Table 5: Share of energy in the overall revenue of some select states in 2018-19	14
Table 6: Share of energy in the overall revenue of some select states in 2019-20	21

1. Introduction

India's energy sector is in the early stages of a slow but steady transition. There are several contributing factors and drivers of this transition. Cost competitiveness of renewable energy (especially wind and solar PV) coupled with reducing costs of battery storage and rising costs of new baseload coal power is steadily increasing the share of renewables in the supply of electricity. From ~25% share of non-fossil fuel¹ electricity generation in 2019-20, India is likely to reach ~45% by 2029-30 (CEA, 2020a). Further, in the medium-long run, end-uses such as transport, cooking, and industrial processes which presently consume conventional sources of energy are likely to be electrified or shift to other non-conventional sources such as hydrogen.

Apart from this inevitable energy transition of moving away from fossil fuels which is mainly being driven by external technology and economic changes, there are various factors which will drive India's future energy sector. These include an emphasis on improving energy access, a renewed drive to manufacture locally, reducing energy imports to improve energy security and its macroeconomic effects, India's international climate commitments, efforts to reduce local pollution from the energy sector and a greater move towards competitive pricing and market operations. All these trends have the potential to effect a paradigm change in the energy sector in the medium to long run. The energy governance framework will have a significant bearing on the transition, since depending on how it evolves, it has the potential to accelerate or slow down the transition.

Energy governance is a sensitive political issue as it involves various stakeholder groups and negotiations among them to balance their concerns. Electricity is a concurrent subject in the Indian Constitution and adds its own federalism-related challenges. The central government and state governments in India often have differing priorities with respect to the energy sectors. The Centre's perspective is informed by macroeconomic stability, economic growth, and geostrategic issues, while states are driven more by local concerns and political realities, including energy access and affordability, and local jobs and economies. A transition in the energy sector is likely to bring these differences into sharper focus since its ramifications would be different for the Centre and the states and further will differ across states.

Since the energy transition would invariably involve some winners and losers, some tricky political questions would also have to be addressed (Sreenivas & Gambhir, 2019). The 'losers' are likely to be the traditional energy sectors of coal and thermal power. Since these sectors, particularly the coal sector, are concentrated in the eastern and relatively poorer part of the country, the impact of any job and revenue losses due to a decline in the share of coal are likely to be significant. These states are also less renewable resource rich, and therefore less likely to benefit from the 'new' energy sector. Similarly, a shift in the transport sector towards greater electrification and Mobility as a Service (MaaS) is likely to lead to fundamental shifts in the petroleum industry, automobile industry, and its ancillary services, with repercussions for the economy and employment. A significant public ownership (both by the Centre and states) of the energy sector adds another layer of

1. This includes 155 TWh (Billion Units) from large hydro, 138 from RE and 46 from Nuclear (CEA, 2020).

complexity to this equation. In order to ensure that these changes result in a fair, optimal, and sustainable development that provides its citizens with affordable and reliable access to energy, India has to tread a very careful path that considers the multiple dimensions of the energy transition, understands the challenges and trade-offs, and formulate policy with such considerations.

2. Energy and Public Finance

While there are various studies which analyse the potential pace of the transition with a focus on decarbonisation, its required physical infrastructure and associated investments, one relatively neglected dimension is the implication of the energy transition on public finance in general, and energy taxation in particular.

Revenue from Energy Sector

The energy sector, and in particular, fossil fuels are a significant contributor to the overall revenue of India's central and state governments. For example, the erstwhile National Clean Energy Fund (later the National Clean Environment Fund and now the Good and Services (GST) Compensation Cess), which started in 2010-11 with a cess of ₹50/ton on all coal has kept increasing over the years and now stands at ₹400/ton. Further, governments have traditionally depended heavily on taxes from petrol and diesel, and recent increases in excise and VAT further demonstrate this. As shown in Table 1, as on 1st January, 2021, 62% and 58% of the final prices of petrol and diesel respectively are made up of taxes in Delhi². Considering the increasing share of renewables and electrification of mobility over the coming two decades, these revenues would stagnate or even reduce without suitable changes to the taxation regime.

Table 1: Contribution of taxes to final petrol and diesel prices in Delhi, January, 2021

Price breakup of petrol and diesel in Rs/litre	Petrol	Diesel
Price Charged to Dealers (excluding Excise Duty and VAT)	27.7	28.7
Dealer Commission	3.7	2.5
Excise Duty	33.0	31.8
VAT (including VAT on Dealer Commission)	19.3	10.9
Retail Selling Price at Delhi, 1st January, 2021	83.7	73.9
Share of Excise and VAT in final selling price	62%	58%

Source: Prayas (Energy Group) analysis based on (Indian Oil Corporation, 2021)

Energy Subsidies and Cross-Subsidies

In the electricity sector, subsidies have been increasing and expanding to more categories of consumers including in some cases to traditional cross-subsidising industrial consumers. In addition, the provision of electricity and LPG connections to many poor households in the recent past is likely to exert further pressure on the need to enhance subsidies as these consumers begin to consume greater quantities of electricity and LPG. Further, as per the Power Minister's conference held in July 2020, agriculture, which gets highly subsidised or free electricity consumed ~211 billion units (BU) of electricity (18% of the total consumption in 2018-19) through 2.2 crore pumps. The total subsidy bill for this was roughly ₹1.1 lakh crore in 2018-19. State subsidy received by all DISCOMs in India

2. It should be remembered that Delhi has among the lowest taxes on petroleum products in the country.

in FY19 was ₹ 98,653 crore, which is 60% higher than the MGNREGA spending in the same year³ (Power Finance Corporation, 2020). As seen in Table 2, actual revenue subsidies paid by states have been growing on average at 10% per year and are 17% of total DISCOM revenue from operations in FY 19, though there is wide variation between states. In spite of such significant support by the state exchequer, the financial viability of DISCOMs remains weak and just to sustain operations, four major financial bail-outs have been needed since 2001⁴. As per the latest data, the outstanding dues to generators continue to grow and are presently at ₹1.33 lakh crore⁵.

Table 2: State electricity subsidy in India between FY16 and FY19

Financial Year	2015-16	2016-17	2017-18	2018-19
State subsidy committed (₹ Cr)	75,608	83,856	93,061	1,10,391
State subsidy received (₹ Cr)	74,515	78,938	88,919	98,653

Source: (Power Finance Corporation, 2020)

The central government subsidises LPG for use in cooking, but the total amount of LPG subsidy (about ₹37,000 crore per year) is lesser than the subsidy to electricity consumers. The ability to 'cross-subsidise' electricity services for the poorer sections from other sections is likely to dwindle. For example, industrial and commercial consumers of electricity will opt for open-access or captive generation from renewable sources which would be cheaper than procuring from the electricity distribution company. Similarly, the railway's ability to subsidise passenger transport based on revenues from freight traffic - of which coal is the largest component - will decrease in the long run as the share of coal in the freight basket goes down. The dependence of the railways on coal can be seen from the fact that revenue from coal has grown at 11.3% p.a. between 2007-08 and 2018-19, and coal contributed nearly 32% of the gross traffic revenue of the railways in 2018-19 (Indian Railways, 2007-08 to 2018-19). This points to an emerging issue in terms of the inevitable increase in direct state budgetary subsidies if affordability of services for poorer sections needs to be maintained.

While the Gol has proposed a liquidity infusion of ₹90,000 crore for DISCOMs, they are still likely to incur cash losses of ~ ₹58,000 crore in 2020-21, which is almost double that of last year and they may end up owing lenders ₹4.5 lakh crore by end of 2021⁶. The impact of the pandemic coupled with the ever-increasing costs and sales migration makes the financial situation of the DISCOMs critical and persistent. Similarly, with movement being severely restricted during the pandemic, transport fuel demand had also reduced significantly, thus having a negative impact on state and central revenues.

The changes in the energy sector described above are likely to put further strain on the fiscal position of the central and state governments as the energy transition gathers pace in the coming years, though the effects of this strain may be different in different states.

3. MGNREGA actual revenue expenditure was Rs 61,815 crore in 2018-19; (<https://www.indiabudget.gov.in/doc/eb/sbe85.pdf>)

4. ₹41,473 crore State Electricity Board bailout in 2001, Transfer scheme during unbundling of utilities in 2003, ₹1.19 lakh crore Financial Restructuring Plan in 2012, ₹2.79 lakh crore Ujjwal DISCOM Assurance Yojana in 2015 (Mandal, Nhalur, & Josey, 2020 (forthcoming))

5. <https://www.bloombergquint.com/business/discoms-outstanding-dues-to-power-generators-rise-47-in-june>

6. <https://www.crisil.com/en/home/newsroom/press-releases/2020/06/discom-debt-to-hit-all-time-high-of-rs-4point5-lakh-crore-this-fiscal.html>

3. Motivation for this study

In this context, there is a need for a deeper understanding of the role of the energy sector in the country's public finance, and how this is likely to be impacted with the energy transition. Past discourse on this issue has tended to focus on the 'subsidies' provided to the energy sector or energy consumers (Garg, 2020; Taylor, 2020). There is little attention given to the other side of the equation, i.e. taxes, cesses, duties and royalties levied on the energy sector, namely the revenues accruing from the energy sector⁷. Such an understanding can help to begin a conversation that can help identify suitable fiscal alternatives and taxation regimes to ensure that public revenue streams can be suitably reworked as the structure of the energy sector changes. The objective of this working paper is to develop such an understanding in order to build a discourse around this important topic. Though the energy transition will play out gradually over a decade or two, reforming the tax regime is equally complex and hence it is important to anticipate the fiscal challenges that may arise out of the transition and prepare for it. Through this paper, we hope to help build a discourse around this topic, rather than to recommend any specific measures.

7. Few previous studies which do look at tax revenue from the energy sector are (ERIA, TERI, 2019) and (Mukherjee, 2019)

4. Data and Methodology

We analyse the share of the energy sector in general and fossil fuels in particular, in government revenue for the centre and the states. The revenues from the energy sector are broadly classified into two categories:

1. **Tax revenue:** This category includes all the tax-related revenues from the energy sector and includes cesses and duties. In particular, it includes the following:
 - a. **Coal:** GST and GST compensation cess, customs duty and other taxes
 - b. **Crude and natural gas:** cess, customs, excise duty, National Calamity Contingent Duty (NCCD) and sales tax / VAT
 - c. **Petroleum products:** service tax, sales tax / VAT on products outside GST (petrol, diesel, and ATF), and GST on products under GST
 - d. **Electricity:** Taxes and Duties on electricity levied by states
2. **Non-tax revenue:** This category includes the other revenues to the state and centre from the energy sector which include
 - a. **Royalty:** This category consists of royalty on coal, crude oil and natural gas production in the country as well as the contribution to the District Mineral Fund (DMF).
 - b. **Dividend:** This category consists of the dividend income contributed by the public sector coal, lignite and oil companies⁸

The revenues from the energy sector as compiled above are then compared with total government revenues under the same two broad categories of tax and non-tax revenues, as published by the Ministry of Finance and the Reserve Bank of India (RBI). All the figures are compiled and compared for FY 2018-19 and FY 2019-20, which is the last year for which complete data is available for comparison. Though the detailed analysis has been done only for two years, the broad trends observed are similar across years. The analysis of tax and non-tax revenues is done for the central government, all states combined, and for a few select states to understand inter-state differences. We also do a slightly deeper analysis of tax revenues to understand the relative shares of different energy sources.

8. We have currently not included the dividend contributed by other public sector energy companies such as NTPC, NHPC, DVC, NPCIL, REC, PFC, POWERGRID and so on.

Data for this exercise has been compiled from a variety of sources as shown in Table 3 below⁹.

Table 3: Data sources used for the analysis

Topic	Sources
Total Government Revenue	(Ministry of Finance, 2020; Reserve Bank of India, 2019; Ministry of Finance, 2021; Reserve Bank of India, 2020) ¹⁰
Coal	(CIL, 2019; SCCL, 2019; Coal Controller's Organization, 2019; CIL, 2020; SCCL, 2020; Coal Controller's Organisation, 2020)
Petroleum & Natural Gas	(Petroleum Planning & Analysis Cell, 2021)
Taxes and Duties on Electricity	(Reserve Bank of India, 2019; Reserve Bank of India, 2020)

The revenue estimates from the energy sector are conservative since we consider only the primary revenue sources i.e. direct contribution from the fuels and electricity to the exchequer. For example, it does not include revenue from the following sources though they are also directly related to the structure of the current energy sector.

- a. Corporate tax from public and private energy companies.
- b. Dividend revenues from other public sector companies related to energy (e.g. electricity power generation companies such as NTPC and NHPC, transmission or distribution companies such as POWERGRID, energy equipment supply companies and energy consultancy companies such as BHEL, BEML and EIL).
- c. GST paid on inputs, input services and capital goods (input tax credits foregone) by businesses dealing in production and distribution of petroleum products and electricity which are outside GST.

Based on an understanding of the current share of the energy sector in public revenues for the centre and states, we present the implications of the energy transition on such revenues to get an understanding of the likely pace at which current revenue streams are likely to come under pressure as the transition gathers pace over the coming years.

9. All the data is not directly available from these sources. Therefore, in some cases, estimations have had to be made. For example, the GST compensation cess and customs duty collected from coal imports are not directly reported and are calculated based on data of imports and customs duty rate and GST compensation cess rate. It is also not clear that the various data sources use the same definitions and report similar items under similar headings. Our analysis is based on a best-effort basis based on our understanding.

10. Data for States & UTs are Revised Estimates for 2019-20.

5. Revenue from fossil fuels and related sectors

According to (Niti Aayog, 2021), out of the total primary commercial¹¹ energy supply of about 734 MToe in 2018-19, about 707 MToe or an overwhelming 96% was from fossil fuel sources¹². Coal and Lignite alone accounted for 58% while the share of oil and natural gas was 32% and 7% respectively. Similarly, if we analyse the fuel-wise share in electricity generation, coal remains the principal source with a 76% share¹³. The total share of fossil-fuel based electricity generation is a substantial 80% if one includes the 4% share of natural gas.

Table 4, Figure 1 and Figure 2 present a summary of the public revenue accruing from the energy sector to the Centre and states in FY 18-19 and FY 19-20. In both the years, the total earnings from the energy sector were around ₹6.6 lakh crores, which represented 14.8% and 13.4% of the total government revenue in 2018-19 and 2019-20 respectively. The Centre was more dependent on these revenues than states, as the share of the energy sector to its revenues over the two years was 20.3% and 18.8% respectively. The corresponding values for states over the two years were 11% and 9.8% respectively.

While these values are by no means insignificant, the situation is much starker when one looks only at tax revenues, because about ₹5.9 to ₹6 lakh crore of the ₹6.6 lakh crore revenue (about 90%) from the energy sector is from taxes. Considering only tax revenues, the total government tax revenue depended on the energy sector to the tune of 18% and 17.6% over the two years. The Centre's dependence on the energy sector for its tax revenues was as high as 25% in both the years, while states depended on the energy sector for about 13% of their tax revenues over the two years.

An interesting aside is that though the Centre depends on the energy sector more for its tax revenues, its contribution to energy subsidy is lower than states. In 2018-19, though the Centre earned ₹3.7 lakh crore as tax revenue from the energy sector, its energy related subsidy outgo (for LPG and kerosene consumption) was only about ₹0.37 lakh crores (Petroleum Planning & Analysis Cell, 2020a). In contrast, against an energy tax revenue of ₹2.9 lakh crore, the electricity related subsidy burden on states was much higher at ₹1.33 lakh crore¹⁴ (Reserve Bank of India, 2019).

11. Note that 'non-commercial' energy - primarily in the form of biomass and solid fuels used for cooking - is a significant energy source in India. But the share of such energy sources is decreasing, data for them are scarce and they do not contribute to public revenue. Hence, they are not considered in this analysis.

12. The balance 4% comprises electricity from sources such as nuclear, hydro and renewable sources such as solar and wind.

13. This includes a very small share of generation from diesel.

14. (Power Finance Corporation, 2020) reported a subsidy committed of ₹1.1 lakh crore by States.

Taxation revenue

The bulk of the revenue from the energy sector comes from taxes, as seen above. Hence, we analyse these revenues in a little more detail. Moreover, since the broad pattern of tax revenue is similar across 2018-19 and 2019-20, we discuss only values for 2018-19 here. Figure 5 shows the split of the energy sector tax revenues by energy source for the Centre and state governments taken together. As can be seen, 83% of the tax revenue from the energy sector accrues from the oil and gas sector, while coal and electricity contribute about 10% and 7% each respectively. Figure 3 shows the same split for the Centre and Figure 4 shows the split for all the state governments together. While the share of oil and gas remains the same across Centre and state governments (83%), the Centre depends on the coal sector for the balance 17%, while state governments depend on electricity to the tune of 15% and coal only for 2% of their energy tax revenues. The governments rely on the oil and gas sector alone for as much as 15% of their tax revenue, with the Centre's dependence being as high as 21%. States depend on the oil-gas sector for about 11% of their tax revenues. The reliance of the Centre and states on the petroleum sector to shore up their revenues was brought into focus during the COVID pandemic, as the Centre hiked the excise duty on petrol and diesel while various state governments also hiked the VAT on petrol and diesel¹⁵. This shows that the greatest impact on energy tax revenues from the energy transition will be from the transition away from petroleum and natural gas. The Centre will be affected to a tune of about 4% by a move away from coal. States (taken together) will be less affected by the shift away from coal, though as will be seen later, some coal-bearing states would be seriously impacted.

Table 4: Central and State revenue from coal, petroleum and electricity in 2018-19 & 2019-20

All Figures in Rs crore		2018-19			2019-20		
Source	Type of revenue	Centre	All States and UTs	Centre + States & UTs	Centre	All States and UTs	Centre + States & UTs
Coal	Taxes, Duties, Cesses	57,876	4,417	62,293	55,280	4,675	59,955
	Royalties, Dividends	6,154	17,252	23,406	5,192	16,983	22,174
	Sub-Total, Contribution to Exchequer	64,029	21,670	85,699	60,472	21,657	82,129
Petroleum & Natural gas	Taxes, Duties, Cesses	2,73,785	2,14,026	4,87,810	2,81,938	2,08,959	4,90,897
	Royalties, Dividends	29,280	13,565	42,846	23,781	12,097	35,878
	Sub-Total, Contribution to Exchequer	3,03,065	2,27,591	5,30,656	3,05,719	2,21,056	5,26,775

15. <https://www.financialexpress.com/economy/record-excise-duty-hike-on-petrol-diesel-unlikely-to-boost-economic-growth-help-bridge-fiscal-gap-warns-report/1952528/>, https://m.timesofindia.com/city/mumbai/petrol-diesel-to-cost-rs-2-more-as-maharashtra-hikes-cess/amp_articleshow/76114652.cms

All Figures in Rs crore		2018-19			2019-20		
Source	Type of revenue	Centre	All States and UTs	Centre + States & UTs	Centre	All States and UTs	Centre + States & UTs
Electricity	Taxes and Duties on Electricity		40,345	40,345		46,487	46,487
Coal, Petroleum, gas and Electricity	Taxes, Duties, Cesses	3,31,660	2,58,788	5,90,449	3,37,218	2,60,121	5,97,339
	Royalties, Dividends	35,434	30,818	66,252	28,973	29,079	58,052
	Total Contribution to Exchequer	3,67,095	2,89,606	6,56,700	3,66,191	2,89,200	6,55,391
Tax and Non tax revenue for Centre and States	GROSS TAX REVENUE	20,80,465			20,10,059		
	State's share in Central taxes ¹⁶	7,61,454			6,50,677		
	Tax Revenue of the Central Government / State Govt	13,19,011	19,62,000	32,81,011	13,59,382	20,43,371	34,02,753
	TOTAL - NON-TAX REVENUE	4,87,452	6,59,000	11,46,452	5,88,701	8,96,322	14,85,024
	TOTAL - REVENUE RECEIPTS	18,06,463	26,21,000	44,27,463	19,48,084	29,39,693	48,87,777
Shares of energy tax and non-tax revenue in total	Share of coal, petroleum, gas and electricity taxes in Tax revenue	25.1%	13.2%	18.0%	24.8%	12.7%	17.6%
	Share of coal, petroleum and gas in Non Tax revenue	7.3%	4.7%	5.8%	4.9%	3.2%	3.9%
	Share of coal, petroleum, gas and electricity in total revenue receipts	20.3%	11.0%	14.8%	18.8%	9.8%	13.4%

Source: Prayas (Energy Group) compilation from the data sources listed in Table 3

16. This only represents the tax devolution (share of union tax revenue shared with states) as per the 14th Finance Commission and does not include Grants in aid.

Figure 1: Central and State revenue from coal, petroleum & gas and electricity in 2018-19

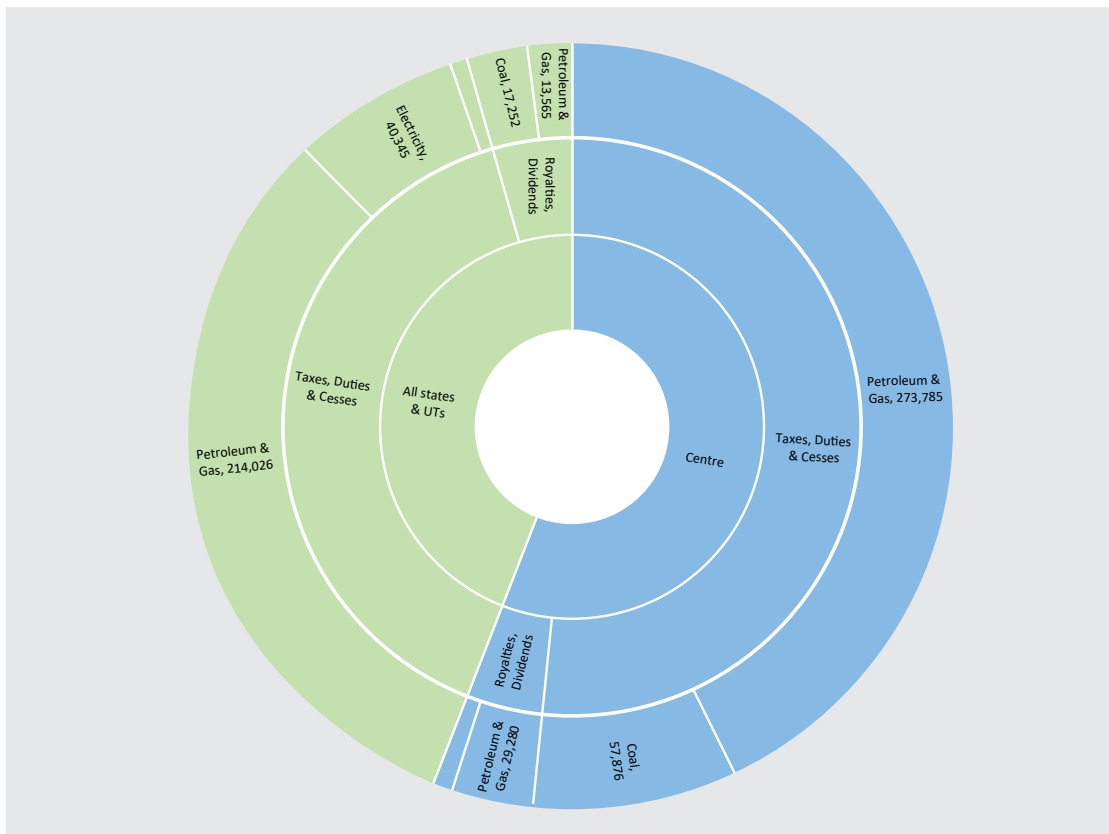


Figure 2: Central and State revenue from coal, petroleum & gas and electricity in 2019-20

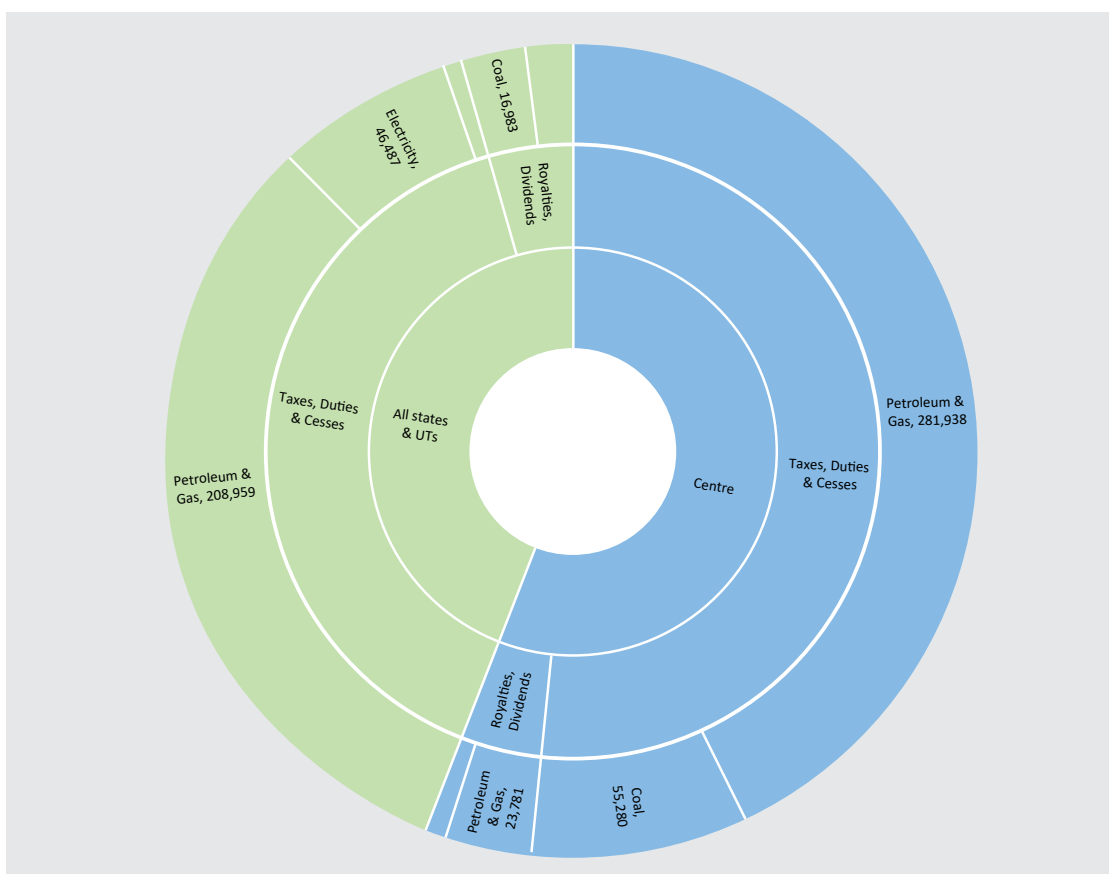


Figure 3: Source of Centre's energy taxes in 2018-19 and 2019-20

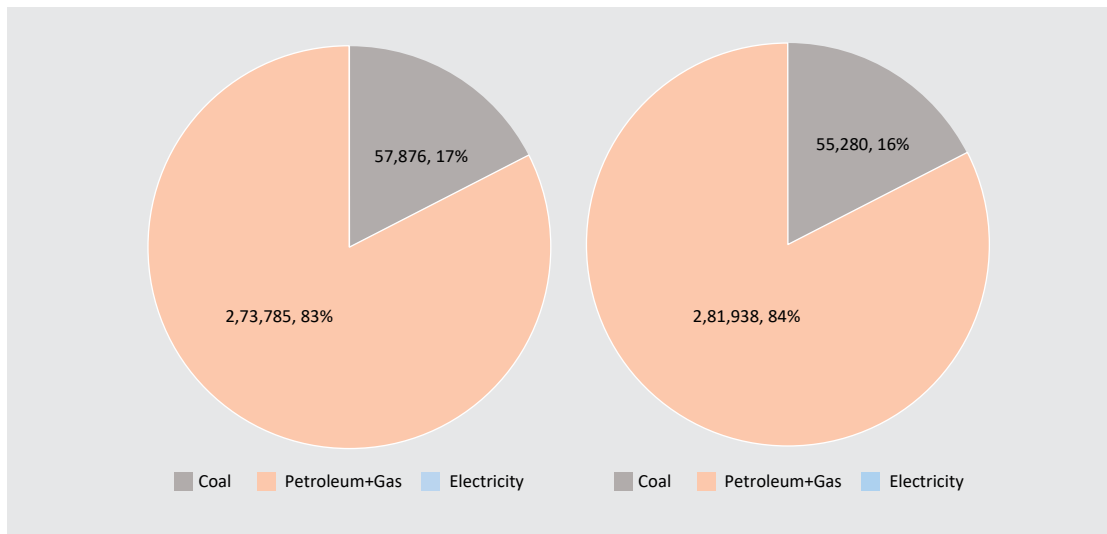


Figure 4: Source of States energy taxes in 2018-19 and 2019-20

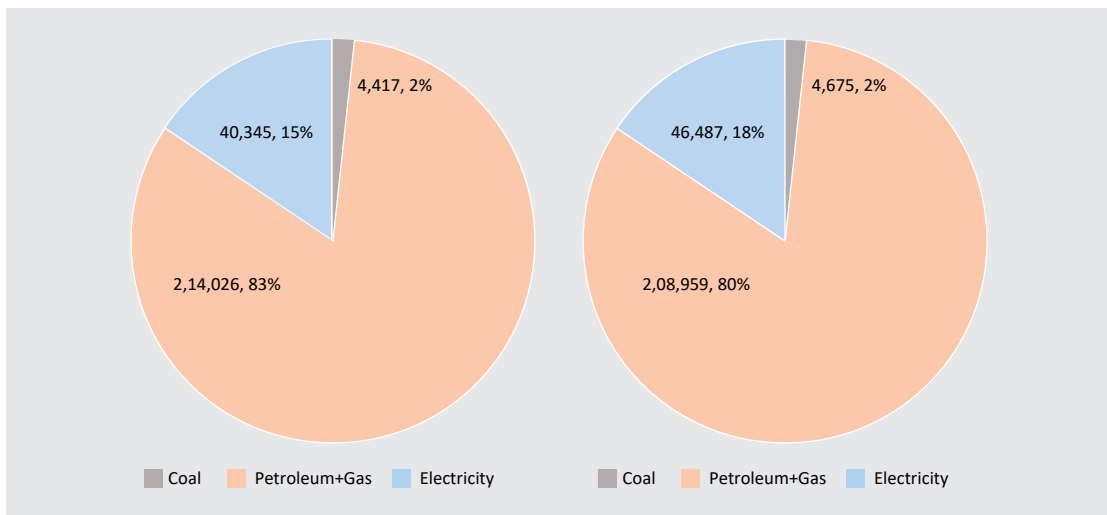
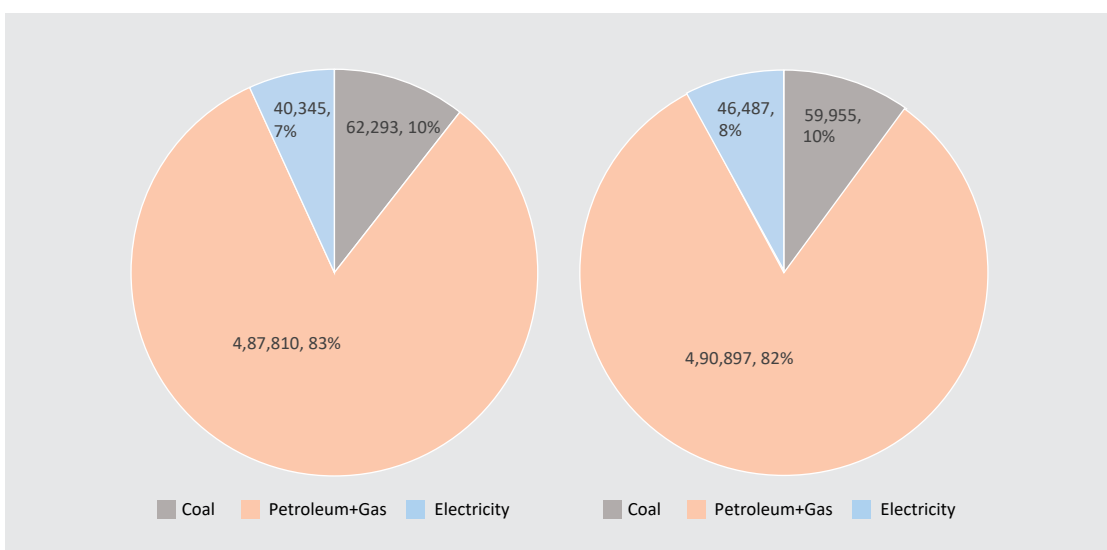


Figure 5: Source of Centre and States energy taxes in 2018-19 and 2019-20



6. State-wise revenues

Indian states are very diverse in terms of their natural resource endowment, level of per-capita incomes, level of industrialization and so on. Therefore, there is also a lot of variance among states in terms of their revenue sources and also dependence on energy for their revenue. It is important to understand these differences as the impact of the energy transition on the finances of each state is going to be diverse and unique.

Table 5 presents the data of energy-sector and overall revenues for five select states, namely Assam (AS), Chhattisgarh (CG), Maharashtra (MH), Rajasthan (RJ) and Tamil Nadu (TN) in 2018-19. These states were chosen to cover most geographical regions of the country, and pick fossil-fuel-rich states (AS, CG), renewable rich states (RJ, TN), relatively richer states (MH, TN) and relatively poorer states (AS, CG). Data for 2019-20 is presented in the annexure, since the conclusions are broadly similar.

The dependence of these states on the energy sector for their overall revenue ranges from 5% (AS) to 13-14% (MH) – this indicates a wide variance across states for their dependence on the energy sector. As expected, taxes form the predominant part of energy sector revenues in most of these states as it is in the country as a whole. The exception is Chhattisgarh where non-tax revenues from the energy sector are as high as 54% of the tax revenues from the energy sector in 2018-19, because of about ₹3,450 crores royalties from the coal sector. The same is the case with Jharkhand (not reported here), where the revenue from royalties and dividends exceeds the tax collection from energy sources. Hence, for some states (in particular, the coal-bearing states), it is also important to factor in royalty earnings while considering the impact of the transition.

The contribution of the energy sector to the total tax revenues of the selected states varies from 10% (AS) to about 17% (MH), indicating that states are quite dependent on the energy sector for their tax revenues, and that there is a significant variation across states. As expected, petroleum & natural gas is the biggest contributor to states' energy-sector tax revenues, though here too there is significant variation across states. The share of petroleum in states' energy taxation revenues ranges from a low of 63% in CG to a high of 98% in AS.

Taxes and duties on electricity also contribute a significant portion of the total energy-sector tax revenue to states. Across all states, it contributes just under a sixth of energy-sector tax revenues, while among the selected states it varies from 3.2% (TN) to as high as 26% (MH).

Table 5: Share of energy in the overall revenue of some select states in 2018-19

All Figures in Rs crore, for 2018-19	Type of revenue	All States and UTs	AS	CG	MH	RJ	TN
Coal	Taxes, Duties, Cesses	4,417	21	564	149	-	61
	Royalties, Dividends	17,252	58	3,448	1,533	-	400
	Sub-Total, Contribution to Exchequer	21,670	79	4,012	1,682	-	460
Petroleum & natural gas	Taxes, Duties, Cesses	2,14,026	4,438	4,004	28,463	12,919	18,785
	Royalties, Dividends	13,565	-	-	-	-	-
	Sub-Total, Contribution to Exchequer	2,27,591	4,438	4,004	28,463	12,919	18,785
Electricity	Taxes and Duties on Electricity	40,345	73	1,790	10,085	2,148	621
Coal, Petroleum, Gas and Electricity	Taxes, Duties, Cesses	2,58,788	4,532	6,359	38,697	15,067	19,466
	Royalties, Dividends	30,818	58	3,448	1,533	-	400
	Total	2,89,606	4,590	9,807	40,229	15,067	19,866
Tax and Non tax revenue of States	Tax Revenue of State Govt	19,62,000	43,724	46,415	2,30,982	1,03,759	1,40,817
	TOTAL - NON-TAX REVENUE	6,59,000	46,130	27,613	55,518	44,425	39,801
	TOTAL - REVENUE RECEIPTS	26,21,000	89,854	74,028	2,86,500	1,48,184	1,80,619
Shares of energy tax and non tax revenue in total	Share of coal, petroleum, gas and electricity taxes in Tax revenue	13.2%	10.4%	13.7%	16.8%	14.5%	13.8%
	Share of coal, petroleum gas in Non Tax revenue	4.7%	0.1%	12.5%	2.8%	0.0%	1.0%
Shares of energy tax and non tax revenue in total	Share of coal, petroleum, gas and electricity in total revenue receipts	11.0%	5.1%	13.2%	14.0%	10.2%	11.0%

Source: Prayas (Energy Group) compilation from sources mentioned in Table 3

To conclude the analysis of revenues from the energy sector to Centre and state governments:

1. The energy sector, dominated by fossil fuels, contributes significantly to the tax revenue of the Centre and states. Its contribution to non-tax revenue, in the form of royalties and dividends, is less significant.
2. The energy sector contributed about 18% to the tax revenue of the Centre and states in 2018-19, with the Centre's dependence being greater (25%). This can be contrasted with energy taxes contributing EUR 280 billion to the revenue of EU member states, which amounts to just 4.7 % of total tax revenue (European Commission, 2019).
3. At an aggregate level, states depend on the energy sector for 13% of their tax revenues. There are significant differences across states, with the variation being 10% to 17% across five select states in 2018-19. One of the selected states, Chhattisgarh, also depends on the energy (coal) sector for 10.5-12.5% of its non-tax revenue.
4. The petroleum sector is by far the largest contributor to the overall tax revenue, with the Centre depending on it for 21% of its tax revenue and many states being dependent on it to a significant extent. In most states, the petroleum sector contributes ~10% of the tax revenues.

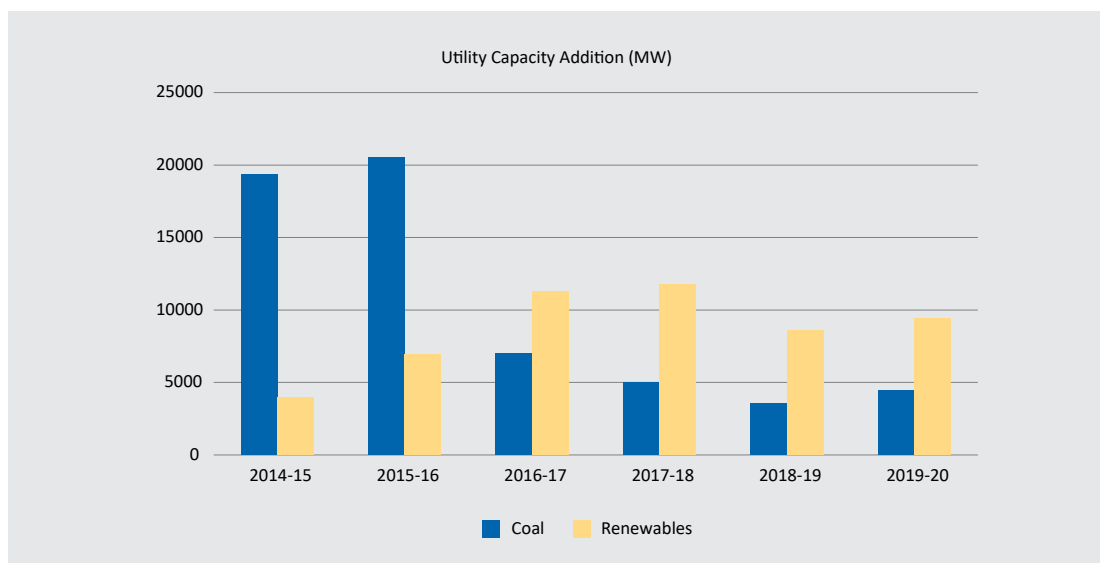
As the country's energy transition gathers pace and moves away from fossil fuels and conventional vehicles, these revenue streams would come under pressure without suitable reform in taxation.

7. Scenarios of likely energy transition

India is already in the early stages of a transition away from fossil fuels towards renewable sources of energy. The transition in the electricity sector is already visible, with rapidly falling prices of solar and wind-based electricity making them economically attractive options. Though coal-based electricity remains the bedrock of the Indian power system, its foundations are shaking. Figure 6 shows the installed electricity generation capacity from coal and renewables by utilities over the last few years. It can be seen that there is a clear shift away from coal towards renewables capacity addition. A similar trend can be observed in electricity generation too: between 2014-15 and 2018-19 coal-based generation increased at 4.8% p.a. while renewables-based generation increased at 14.8% p.a., though from a much smaller base (MoSPI, 2020). The monthly generation data reported by the Central Electricity Authority, during the COVID-induced lockdown months of April and May 2020 shows that coal-based generation decreased by 34% compared to the same months of the previous year, even as renewables-based generation increased by about 9%. Coal-based power plants, which are expected to run at 80% or above utilization factor, have been running at around 60% over the last few years. Some studies project the share of coal based generation coming down from the existing ~75% to about 49-54% by 2030 (CEA, 2020; Prayas (Energy Group), 2020). All these are indications of an ongoing transformation in the Indian electricity sector.

While some technical and regulatory issues related to integrating variable renewable energy into the electricity mix remain to be addressed, falling prices of battery-electricity storage and innovative models of renewable electricity procurement indicate that the transition in the electricity sector is only going to gather pace moving forward (Deorah, Abhyankar, Arora, Gambhir, & Phadke, 2020; Gambhir, Dixit, & Josey, 2020). This is also reflected in the ambitious target of 450 GW of solar and wind-based capacity by 2030 announced by the government.

Figure 6: Coal and renewables capacity addition by utilities in India



Source: (MoSPI, 2020)

If the electricity sector is leading the transition, the transport sector is likely to follow suit with its ambitious plans for electrification. While the transition pathway for transport is not as clear as it is for electricity, the indications are that electrification of mobility will gather pace. Falling storage prices are an important driver for electrification of transport too, and this is reflected in falling prices (and increasing 'ranges') of electric vehicles. There have also been policy announcements regarding electrification of transport, such as an announcement of full electrification from Indian Railways by 2023¹⁷ and the Delhi government's incentive scheme for electric vehicles to increase their share of registration to 25% by 2024 (GoNCT, 2020). This, coupled with an optimistic outlook from automobile manufacturers¹⁸ should help accelerate this transformation. Given the currently dominant share of petroleum among transport fuels and the heavy dependence of the Centre and states on petroleum for their tax revenues, the transport sector's transition towards electric and other non-petroleum fuels is likely to have the greatest impact on tax revenues.

The energy transition away from fossil fuels and towards renewables which is underway in India, is only likely to accelerate going forward, though given the complex interactions of the energy sector with other sectors and the scale of the investments involved, the transition is likely to be gradual and play out over a few decades. The pace of the transition will be different across different sectors. The electricity sector is likely to undergo a transformation faster than the other parts of the energy sector – implying reduced use of coal. This will impact the tax revenues of the Centre (about 4% of its tax revenues), and royalty earnings of coal-bearing states.

The big change would come from the gradually reduced use of petroleum products for transport. While this transition is likely to trail the transition in the electricity sector, its signs are already visible. Given that petroleum and natural gas contribute more than 80% of the energy sector tax revenues to both the Centre and states, this will lead to a major shortfall in tax revenues, if the issue is not addressed. In particular, the Centre depends for over 20% of all its tax revenues on just the petroleum and natural gas sectors.

17. <https://www.hindustantimes.com/india-news/100-electrification-in-railways-in-next-3-5-years-piyush-goyal/story-mlKq8324njLO6G8oeY1oXL.html>

18. See, for example, <https://www.bloomberquint.com/business/electric-vehicles-to-dominate-in-india-by-2030-mahindra-says>

8. Implications and challenges/opportunities

It is clear from the above analysis that the various taxes, cesses, royalties, duties etc. levied on the energy sector (particularly petroleum and coal) is a very significant contributor to Central and state government public finances. Current studies project growing future revenue from fossil fuel taxes based on past trends, and do not account for the energy transition taking place (CEFT, Xavier University, 2019; Mukherjee, 2019). While the energy transition away from fossil fuels is only beginning, it is likely to accelerate in the coming years and unless there is a fundamental paradigm shift in the country's approach to taxation in general and energy taxation in particular, there will be serious consequences for tax revenue, and in turn for all sectors of the economy and development. Therefore, there is an urgent need for a critical discourse on the future principles of energy taxation which not only respects federalism but also seeks to balance various conflicting objectives.

On the one hand, the objective of increasing energy consumption, particularly among India's poorer classes, would require lower energy taxes or higher energy subsidies. But this has to be balanced with the need to ensure that public revenue to the Centre and states is not unduly affected. Moreover, there is also an argument that energy products such as diesel and electricity, which are used as productive inputs, should not be taxed heavily so as to prevent undue inflation. Internalising the social and environmental externalities of fossil fuels would mean higher Pigouvian taxes on them, raising their prices. While this could result in some gains in tax revenue, it would hamper the objective of affordable energy and further accelerate the energy transition to non-fossil sources, and herald a faster loss of tax revenue in the medium to long term unless the taxation regime is also reformed.

There has been a continuing discourse on the need and practicality of bringing in electricity, diesel and petrol under the GST framework (Sacchidananda Mukherjee, 2014; Singh S. , 2020). Evolving principles to bring in these commodities under the GST framework would either mean exceptions to the GST rates or higher GST rates for all other products to maintain revenue neutrality for the states and Centre, along with more sophisticated ways of sharing revenue with states. While experts and industry associations have highlighted the benefits of this move for consumers (The Hindu Businessline, 2020) and the Indian economy (Ghosal, 2020), this would need significant consensus building and political commitment from States (PTI, 2020).

The energy transition will see an increased electrification of various end-uses such as mobility, cooking, heating and some emerging industrial uses. The share of electricity in total end-use of commercial energy will thus go up from its current share of about 26% (Niti Aayog, 2021). One possible implication of this would be that the electricity sector will have to contribute – at least partially – towards making up the loss of taxation revenue from petroleum, natural gas and coal unless there is a comparable increase in direct tax revenues or newer sources of indirect tax revenue are found outside the energy sector. Presently, while the electricity sector is itself dependent on subsidies (direct state government subsidies in 2018-19 stood at ₹98,653 crore, as against electricity taxes and duty revenues of ₹40,156 crore), the energy transition would need the electricity sector to not only be self-sufficient but perhaps also contribute to public revenue in the long run - a challenging task.

A simple thought exercise

As a purely illustrative example, consider the taxation impact of a new small passenger car being electric rather than a petrol car. The high level of taxes on petrol (Rs 53.2/litre & mileage of 20km/litre works to a tax revenue of Rs 2.6/km) combined with the high energy efficiency of EVs (~ 5km/kWh mileage) would imply that a very high level of tax (~13 ₹/kWh) would have to be levied per kWh of electricity, if the entire loss of tax revenue from petrol is to be hypothetically recovered only from the electricity used by the EV. This certainly does not appear sustainable and practical. However, this need not be the case if this loss of tax revenue is spread across all electricity sales, in which case the impact per kWh would be much lower.

Assuming a life of 10 years and an annual mileage of 10,000 kms and a discount rate of 10%, the Net Present Value (NPV) of the loss in revenue from petrol taxes (@ Rs 2.6/km) works to Rs 1.6 lakhs. Further, currently EVs are taxed only at a nominal 5% GST rate while small passenger cars are taxed at 29% (incl. cess). If we assume the pre-tax price of the petrol car to be Rs 6 lakh and the EV to be Rs 12 lakh, then there is an upfront GST loss of Rs 1.14 lakh. Thus there is a total loss of Rs 2.75 lakh (1.6+1.14) per small passenger car if one shifts from a petrol car to an EV, assuming the existing levels of taxation to remain same even in nominal terms. Some states are exempting road and registration taxes on EVs as well to encourage adoption which would further add to these presumptive losses (Singh B., 2021).

This illustrates the scale and complexity of the taxation revamp that would be required to meet the competing objectives.

In an attempt to encourage electric vehicles, currently tax exemptions are given to such vehicles. At the same time, states collected vehicle taxes (on non-electric vehicles) to the tune of ₹74,433 crore in 2019-20. As the share of electric vehicles in vehicle sales increases, the taxes (GST, road and registration) on vehicles also need to be relooked at.

In the global North, there is considerable discourse on how energy taxation can be used as a means to finance the energy transition and accelerate it towards decarbonisation (Robinson, 2017; Assia Elgouacem, 2019; Brugel, 2017). The situation is quite different in the Indian context, wherein taxes on the energy sector have not been so much a means to internalise environmental externalities but as a major contributor to the state exchequer. Perhaps the best example of this is the cess on coal which was introduced as a mechanism to support 'clean energy' by contributing to the National Clean Energy Fund, but has now been subsumed under the GST compensation cess, to compensate states for their loss of revenue under the GST regime. Consequently, energy in India is already taxed at very high levels, making it nearly impossible, and perhaps improper, to further tax it in order to internalise environmental externalities and aid the transition. This only makes the challenge of using taxation as a tool to encourage a shift to cleaner energy even harder.

9. Conclusions

The analysis in this paper shows that the governments at the Centre and states are quite dependent on the energy sector for their taxation revenues, with the Centre's dependency being as high as 25%. This revenue predominantly comes from the petroleum (& natural gas) and coal sectors, which contribute about ₹6 lakh crore of the total ₹6.5 lakh crore revenue from the energy sector in 2019-20. As the energy sector moves away from fossil fuels and shifts towards a greater share of renewables and greater electrification, these tax revenues will come under strain. While this transformation away from fossil fuels is likely to take place gradually over decades, the attendant reform in the tax regime is also likely to be very complex and involve nuanced political negotiations. Therefore, it is desirable to commence discussions on a gradual transformation of the taxation regime, going beyond just the energy sector or even just indirect taxes. We present a few recommendations to initiate and facilitate such a discourse.

1. **Expert group on energy taxation:** An expert group on energy taxation can be set up by the Ministry of Finance, or the 16th Finance Commission, to study this issue in greater detail and come up with recommendations for the short as well as long term. It may also be considered whether the expert group can be made a 'permanent expert group' that can periodically review the situation and make recommendations once every, say, 3 years. The expert group should ensure that the 'losers' of the energy transition are compensated adequately to ensure a just transition, and reduce the adverse impacts of the transition on already poor regions of the country. Further, such a group should also track global best practices in this regard and adapt them for India.
2. **Transparency on energy taxes and subsidies:** It is currently very difficult for research teams to collect data on energy taxes and energy subsidies. The information is either not available, or available in a scattered form. Moreover, it is not clear whether all the agencies reporting such data use consistent definitions of how taxes are accounted for. However, public access to such information is critical to have a meaningful public discourse on the topic. Therefore, the government should set up a publicly accessible database containing details of energy sector related taxation, subsidies and other revenues and expenditures, to enable rich independent research that can feed the policy process. As part of this, the budget documents of the Centre and States could consider a new consolidated section on energy sector taxes, subsidies and finance.
3. **Need for greater state-level analysis:** As pointed out in this study, different states are dependent on the energy sector to different extents. Moreover, the energy transition is also likely to proceed at a different pace in various states. Therefore, the impacts of the transition on each state is likely to be quite different and calls for better state-specific analyses. State governments can take the lead in this activity along with other research groups.

India's taxation policy in general, and energy taxation in particular, needs to be redesigned in order to ensure that the country's public finances do not suffer an unforeseen shock as the country's energy transition away from fossil fuels gathers pace.

10. Annexure

Table 6: Share of energy in the overall revenue of some select states in 2019-20

All Figures in Rs crore, for 2019-20	Type of revenue	All States and UTs	AS	CG	MH	RJ	TN
Coal	Taxes, Duties, Cesses	4,675	12	560	149	-	62
	Royalties, Dividends	16,983	41	3,171	1,551	-	489
	Sub-Total, Contribution to Exchequer	21,657	53	3,731	1,700	-	551
Petroleum & natural gas	Taxes, Duties, Cesses	2,08,959	4,116	3,886	27,917	13,495	18,737
	Royalties, Dividends	12,097	-	-	-	-	-
	Sub-Total, Contribution to Exchequer	2,21,056	4,116	3,886	27,917	13,495	18,737
Electricity	Taxes and Duties on Electricity	46,487	143	2,200	9,820	2,804	1,443
Coal, Petroleum, Gas and Electricity	Taxes, Duties, Cesses	2,60,121	4,271	6,647	37,886	16,299	20,242
	Royalties, Dividends	29,079	41	3,171	1,551	-	489
	Total	2,89,200	4,312	9,818	39,438	16,299	20,731
Tax and Non tax revenue of States	Tax Revenue of State Govt	20,43,371	56,227	45,396	2,35,754	1,06,401	1,47,202
	TOTAL - NON-TAX REVENUE	8,96,322	36,799	30,300	74,127	50,315	44,659
	TOTAL - REVENUE RECEIPTS	29,39,693	93,026	75,696	3,09,881	1,56,716	1,91,861
Shares of energy tax and non tax revenue in total	Share of coal, petroleum, gas and electricity taxes in Tax revenue	12.7%	7.6%	14.6%	16.1%	15.3%	13.8%
	Share of coal, petroleum, gas in Non Tax revenue	3.2%	0.1%	10.5%	2.1%	0.0%	1.1%
	Share of coal, petroleum, gas and electricity in total revenue receipts	9.8%	4.6%	13.0%	12.7%	10.4%	10.8%

Source: Prayas (Energy Group) compilation from sources mentioned in Table 3

References

- Assia Elgouacem, H. H. (2019). *The fiscal implications of the low-carbon transition*. Paris: GGSD Forum, OECD. Retrieved from https://www.oecd.org/greengrowth/GGSD_Forum%20Paper_Fiscal%20Implications.pdf
- BNEF. (2020). *Electric Vehicle Outlook, 2020*. Retrieved September 21, 2020, from <https://about.bnef.com/electric-vehicle-outlook/>
- Brugel. (2017, October 17). Fiscal aspects of the Energy Transition. Brussels, Belgium. Retrieved from <https://www.bruegel.org/events/fiscal-aspects-of-the-energy-transition/>
- CEA. (2020, March). *Monthly executive summary for March, 2020*. Retrieved September 21, 2020, from http://www.cea.nic.in/reports/monthly/executivesummary/2020/exe_summary-03.pdf
- CEA. (2020). *Report on optimal generation capacity mix for 2029-30*.
- CEA. (2020, January). REPORT ON OPTIMAL GENERATION CAPACITY MIX FOR 2029-30. Delhi. Retrieved from https://cea.nic.in/old/reports/others/planning/irp/Optimal_mix_report_2029-30_FINAL.pdf
- CEA. (2020a, January). *Report on Optimal Generation Capacity Mix for 2029-30*. Retrieved September 21, 2020, from http://cea.nic.in/reports/others/planning/irp/Optimal_mix_report_2029-30_FINAL.pdf
- CEFT, Xavier University. (2019). *Projection of Tax Revenue on Petroleum products and Sales Tax and State's Own Tax Revenue (SOTR) Effort Analysis of States in India*. New Delhi: 15th Finance Commission. Retrieved from https://fincomindia.nic.in/writereaddata/html_en_files/fincom15/StudyReports/Projection%20of%20tax%20revenue%20on%20petroleum%20products%20and%20sales%20tax%20and%20states%20own%20tax%20revenue%20effort%20analysis.pdf
- CIL. (2019). *Annual Report & Accounts, 2018-19*. Retrieved from <https://www.coalindia.in/performance/financial/>
- CIL. (2020). *Annual Report & Accounts, 2019-20*. New Delhi. Retrieved from <https://www.coalindia.in/performance/financial/>
- Coal Controller's Organisation. (2020). *Provisional Coal Statistics 2019-20*. Kolkatta. Retrieved from <http://www.coalcontroller.gov.in/pages/display/20-provisional-coal-statistics>
- Coal Controller's Organization. (2019). *Provisional Coal Statistics 2018-19*. Retrieved from <http://www.coalcontroller.gov.in/pages/display/20-provisional-coal-statistics>
- Deorah, S., Abhyankar, N., Arora, S., Gambhir, A., & Phadke, A. (2020, May). *Estimating the Cost of Grid-Scale Lithium-Ion Battery Storage in India*. Retrieved September 21, 2020, from <https://www.prayaspune.org/peg/publications/item/462>
- ERIA, TERI. (2019, October). *Energy Pricing in India: A Study on Taxes and Subsidies*. (S. K. Han Phoumin, Ed.) Retrieved from https://www.think-asia.org/bitstream/handle/11540/11295/RPR_FY2018_15.pdf?sequence=1
- European Commission. (2019, January). *Energy prices and costs in Europe*. Retrieved from https://ec.europa.eu/energy/sites/ener/files/epc_report_final_1.pdf
- Gambhir, A., Dixit, S., & Josey, A. (2020, July). A critical look at the recent "Round-the-Clock" Supply of 400 MW RE Power tender by SECI. Retrieved September 21, 2020, from <https://www.prayaspune.org/peg/resources/power-perspective-portal/242-re-rtc.html>
- Garg, V. B. (2020, April). *Mapping India's energy subsidies 2020: Fossil fuels, Renewables and Electric Vehicles*. Retrieved from <https://www.iisd.org/library/india-energy-transition-2020>

- Ghosal, S. (2020, May 5). Bring petrol, diesel under GST; any hike in taxes to depress demand: ASSOCHAM. Retrieved from <https://economictimes.indiatimes.com/news/economy/policy/bring-petrol-diesel-under-gst-any-hike-in-taxes-to-depress-demand-assochem/articleshow/75558446.cms?from=mdr>
- GoNCT. (2020, August 7). *Delhi Electric Vehicles Policy, 2020*. Retrieved September 21, 2020, from https://transport.delhi.gov.in/sites/default/files/All-PDF/Delhi_Electric_Vehicles_Policy_2020.pdf
- IEA. (2019, November). *World Energy Outlook 2019*. Retrieved September 21, 2020, from <https://www.iea.org/reports/world-energy-outlook-2019>
- Indian Oil Corporation. (2021, January 30). *Indian Oil*. Retrieved from Price Build up of Petrol and Diesel in Delhi: <https://iocl.com/Products/PetrolDieselPrices.aspx>
- Indian Railways. (2007-08 to 2018-19). *Indian Railways Annual Statistical Publications*.
- Jain, A. (2018). A fine balance: Lessons from India's experience with petroleum subsidy reforms. *Energy Policy*, 242-249. doi:<https://doi.org/10.1016/j.enpol.2018.04.050>
- Mandal, M., Nhalur, S., & Josey, A. (2020 (forthcoming)). The critical role of state government revenue subsidy in electricity supply. In ". f. Accountability", *State of Finance in India*.
- Ministry of Finance. (2020). *STATEMENT I - CONSOLIDATED FUND OF INDIA - REVENUE ACCOUNT - RECEIPTS*. New Delhi. Retrieved from <https://www.indiabudget.gov.in/doc/AFS/afs1.pdf>
- Ministry of Finance. (2021, February). *STATEMENT I - CONSOLIDATED FUND OF INDIA - REVENUE ACCOUNT - RECEIPTS*. New Delhi. Retrieved from <https://www.indiabudget.gov.in/doc/AFS/afs1.pdf>
- MoHIPE. (2015, March 10). National Electric Mobility Mission Plan. Retrieved September 21, 2020, from <http://pibarchive.nic.in/archive2/PrintRelease.aspx?relid=116719>
- MoSPI. (2020). *Energy Statistics 2020*. Retrieved September 21, 2020, from http://www.mospi.gov.in/sites/default/files/publication_reports/ES_2020_240420m.pdf
- Mukherjee, S. (2019). *Estimation and Projection of Petroleum Demand and Tax Collection from Petroleum Sector in India*. New Delhi: National Institute of Public Finance and Policy. Retrieved from https://www.nipfp.org.in/media/medialibrary/2019/09/WP_279_2019.pdf
- Niti Aayog. (2021, February). India Energy Dashboards. *Energy Balance Tables*. Delhi. Retrieved from <https://niti.gov.in/edm/#balance>
- Petroleum Planning & Analysis Cell. (2020a). *Under recoveries to Oil Marketing Companies (OMCs) on Sale of Sensitive Petroleum Products (Rs. Crore)*. New Delhi. Retrieved from https://www.ppac.gov.in/content/150_1_Subsidy.aspx
- Petroleum Planning & Analysis Cell. (2021). *Contribution to Central and State Exchequer*. New Delhi. Retrieved from https://www.ppac.gov.in/WriteReadData/userfiles/file/PP_4_ContributionToExchequer.xls
- Power Finance Corporation. (2020). *Report on Performance of State Power Utilities, 2018-19*. New Delhi.
- Prayas (Energy Group). (2020, September). Detailed presentation deck of Rumi, the bottom-up demand-oriented open-source energy systems model developed by PEG. Pune. Retrieved from <https://www.prayas-pune.org/peg/publications/item/468.html>
- PTI. (2020, May 06). *Petrol, diesel under GST unlikely in near future, say BJP, Congress leaders*. Retrieved from The Hindu: <https://www.thehindu.com/news/national/petrol-diesel-under-gst/article31516073.ece>
- Reserve Bank of India. (2019). *STATE FINANCES : A STUDY OF BUDGETS, Appendix I*. RBI. Retrieved from <https://www.rbi.org.in/scripts/AnnualPublications.aspx?head=State+Finances+%3A+A+Study+of+Budgets>

- Reserve Bank of India. (2020, October 27). STATE FINANCES : A STUDY OF BUDGETS, Appendix I. Retrieved January 2021, from <https://www.rbi.org.in/Scripts/AnnualPublications.aspx?head=State%20Finances%20:%20A%20Study%20of%20Budgets>
- Reuters. (2020, September 26). India plans \$4.6 billion in incentives for battery makers in electric vehicle push: Document. New Delhi. Retrieved from <https://energy.economictimes.indiatimes.com/news/power/india-plans-4-6-billion-in-incentives-for-battery-makers-in-electric-vehicle-push-document/78327671>
- RMI, NITI Aayog. (2017, May). *India leaps ahead: Transformative mobility for all*. Retrieved September 21, 2020, from http://niti.gov.in/writereaddata/files/document_publication/RMI_India_Report_web.pdf
- Robinson, D. (2017). *Fiscal policy for decarbonisation*. The Oxford Institute for Energy Studies. Retrieved from <https://www.oxfordenergy.org/wpcms/wp-content/uploads/2017/09/Fiscal-policy-for-decarbonization-of-energy-in-Europe-EL-25.pdf>
- Rose, A., Chernyakhovskiy, I., Palchak, D., Koebrich, S., & Joshi, M. (2020). *Least-Cost Pathways for India's Electric Power Sector*. National Renewable Energy Laboratory.
- Sacchidananda Mukherjee, R. K. (2014). *Exploring policy options to include petroleum, natural gas and electricity under the Goods and Services Tax regime in India*. New Delhi: National Institute of Public Finance and Policy. Retrieved from https://www.nipfp.org.in/media/medialibrary/2014/05/WP_2014_136.pdf
- SCCL. (2019). *98th Annual Report & Accounts, 2018-19*.
- SCCL. (2020). Balance Sheet as at 31st March 2020. Retrieved from https://sclmines.com/sclclnew/performance_financial.asp
- Shell. (2018). *Sky Scenario*. Retrieved September 21, 2020, from <https://www.shell.com/energy-and-innovation/the-energy-future/scenarios/shell-scenario-sky.html>
- Shukla, P., Dhar, S., Pathak, M., Mahadevia, D., & Garg, A. (2015). *Pathways to deep decarbonization in India*. Retrieved September 21, 2020, from https://orbit.dtu.dk/files/120569341/DDPP_IND_Final.pdf
- Singh, B. (2021, Feb 4). No Road Tax, Zero Registration Fee for EVs in Telangana From Feb 3. Retrieved from <https://www.saurenergy.com/solar-energy-news/no-road-tax-zero-registration-fee-for-evs-in-telangana-from-feb-3>
- Singh, R. K. (2020, June 24). Govt plans new import tax on solar equipments starting August. Mumbai. Retrieved from <https://www.livemint.com/industry/energy/govt-plans-new-import-tax-on-solar-equipments-starting-august-11592991158963.html>
- Singh, S. (2020, September 25). *Government begins deliberations on bringing power sector under GST: Report*. Retrieved from The Economic Times: <https://economictimes.indiatimes.com/industry/energy/power/govt-begins-deliberations-on-bringing-power-under-gst/articleshow/78303166.cms?from=mdr>
- Spencer, T. (2020). *BENDING THE CURVE: 2025 FORECASTS FOR ELECTRICITY DEMAND BY SECTOR AND STATE IN THE LIGHT OF THE COVID-19 EPIDEMIC*. TERI. Retrieved September 21, 2020, from https://www.teriin.org/sites/default/files/2020-09/Bending-the-Curve_Report.pdf
- Sreenivas, A., & Gambhir, A. (2019). Aligning Energy, Development, and Mitigation. In N. Dubash, *India in a Warming World* (pp. 427--458). Oxford University Press.
- Sreenivas, A., Dabadge, A., Kharabe, A., Kaul, M., Pai, N., & Dukkupati, S. (2020, September). *Rumi, a bottom-up demand-oriented open-source energy systems model*. Retrieved September 21, 2020, from <https://prayaspune.org/peg/publications/item/468>
- Taylor, M. (2020). *ENERGY SUBSIDIES: Evolution in the Global Energy Transformation to 2050*. Retrieved from IRENA: https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2020/Apr/IRENA_Energy_subsidies_2020.pdf

- Thakkar, K. (2020, February 2). Government hikes duty on import of electric vehicles by 5-15%. Mumbai. Retrieved from <https://economictimes.indiatimes.com/industry/auto/auto-news/government-hikes-duty-on-import-of-electric-vehicles-by-5-15/articleshow/73845858.cms>
- The Hindu Businessline. (2020, July 10). *Fuel Prices, How High is too High*. Retrieved from <https://www.thehindubusinessline.com/multimedia/video/knowledge-series/fuel-prices-how-high-is-too-high/article32045506.ece>
- TNN. (2020, August 22). Rajasthan: Solar power companies protest against new land tax. Jaipur, Rajasthan, India. Retrieved from <https://energy.economictimes.indiatimes.com/news/renewable/rajasthan-solar-power-companies-protest-against-new-land-tax/77686276>
- UNU-WIDER. (2020). *Global Revenue Dataset*. Retrieved September 21, 2020, from <https://www5.wider.unu.edu/#/?graph=line&indicators=14&activeIndicators=14&countries=AUS,IND,GBR,USA,DEU,FRA,CHN,BRA,ZAF,ESP,RUS&activeCountries=AUS,IND,GBR,USA,DEU,FRA,CHN,BRA,ZAF,ESP,RUS&years=1990,1991,1992,1993,1994,1995,1996,1997,1998,1999,2000,2001>

Glossary of terms

BU	Billion Units (of Electricity)
Cess	Special tax levied over and above base tax for 'specific purposes' or some special administrative expense e.g. health or road cess
Consolidated Fund of India	Fund or account into which all government's receipts are credited, and which it uses for financing its expenditure.
Corporation Tax	Tax imposed on the net income of a company registered under Companies Act 1956.
Customs duty	Indirect Tax imposed on goods that are imported into India
DISCOM	(Electricity) Distribution Company
DMF (District Mineral Fund)	Trust formed as a benefit sharing mechanism to work for the interest and benefit of people and areas affected by mining
Dividend	Distribution of profits by a corporation to its shareholders
Excise duty	Indirect Tax imposed on goods manufactured in India
Goods and Services Tax (GST)	Single tax on the supply of goods and services right from the manufacturer to the consumer, essentially on the value addition at each stage.
GST Compensation Cess	Cess to compensate the state governments for any losses during the first five years of implementation of GST
Income Tax	Tax on the income of individuals, firms etc. other than Companies, under the Income-tax Act, 1961.
LPG	Liquified Petroleum Gas
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
Mtoe	Million Tons of Oil Equivalent
NCCD	National Calamity Contingent Duty - Levied as duty of excise on certain manufactured goods under 7th schedule of Finance Act 2001.
PV	Photo Voltaic
Revenue Receipts	Money earned by the government through tax and non-tax sources (e.g. dividend income) and not having a direct impact on its assets and liabilities.
Royalty	Charge by the owner of mineral (government) in consideration for extraction of mineral resource by the lessee (developer / operator)
Sales Tax	Tax collected by retailer at the final sale in the supply chain.
Surcharge	Surcharge is a tax on tax for the purposes of the Union.
Tax revenue	Money collected by government for public purposes through taxes, duties and cesses (and enforceable by law)
Value Added Tax (VAT)	VAT is tax collected by all sellers in each chain of the supply chain.

India's energy sector is in the early stages of a slow but steady transition. While there are various studies which analyse the potential pace of the transition with a focus on decarbonisation, its required physical infrastructure and associated investments, one relatively neglected dimension is the implication of the energy transition on public finance in general, and energy taxation in particular. The energy sector, and in particular, fossil fuels are a significant contributor to the overall revenue of India's central and state governments. This revenue predominantly comes from the petroleum (& natural gas) and coal sectors, which contributed about Rs. 6 lakh crore of the total Rs. 6.5 lakh crore revenue from the energy sector in 2019-20. The Centre and states are quite dependent on the energy sector for their taxation revenues, with the Centre's dependence being as high as 25%.

As the energy sector moves away from fossil fuels and shifts towards a greater share of renewables and greater electrification, these tax revenues will come under strain. While this transformation away from fossil fuels is likely to take place over the next two decades, the attendant reform in the tax regime is also likely to be very complex and involve nuanced political negotiations. Therefore, it is important to anticipate the fiscal challenges that may arise out of the transition and prepare for it. A starting point is to commence discussions on a gradual transformation of the taxation regime, going beyond just the energy sector or even just indirect taxes. In this context, there is a need for a deeper understanding of the role of the energy sector in the country's public finance, and how this is likely to be impacted with the energy transition. Such an understanding can help to begin a conversation that can help identify suitable fiscal alternatives and taxation regimes to ensure that public revenue streams can be suitably reworked as the structure of the energy sector changes.