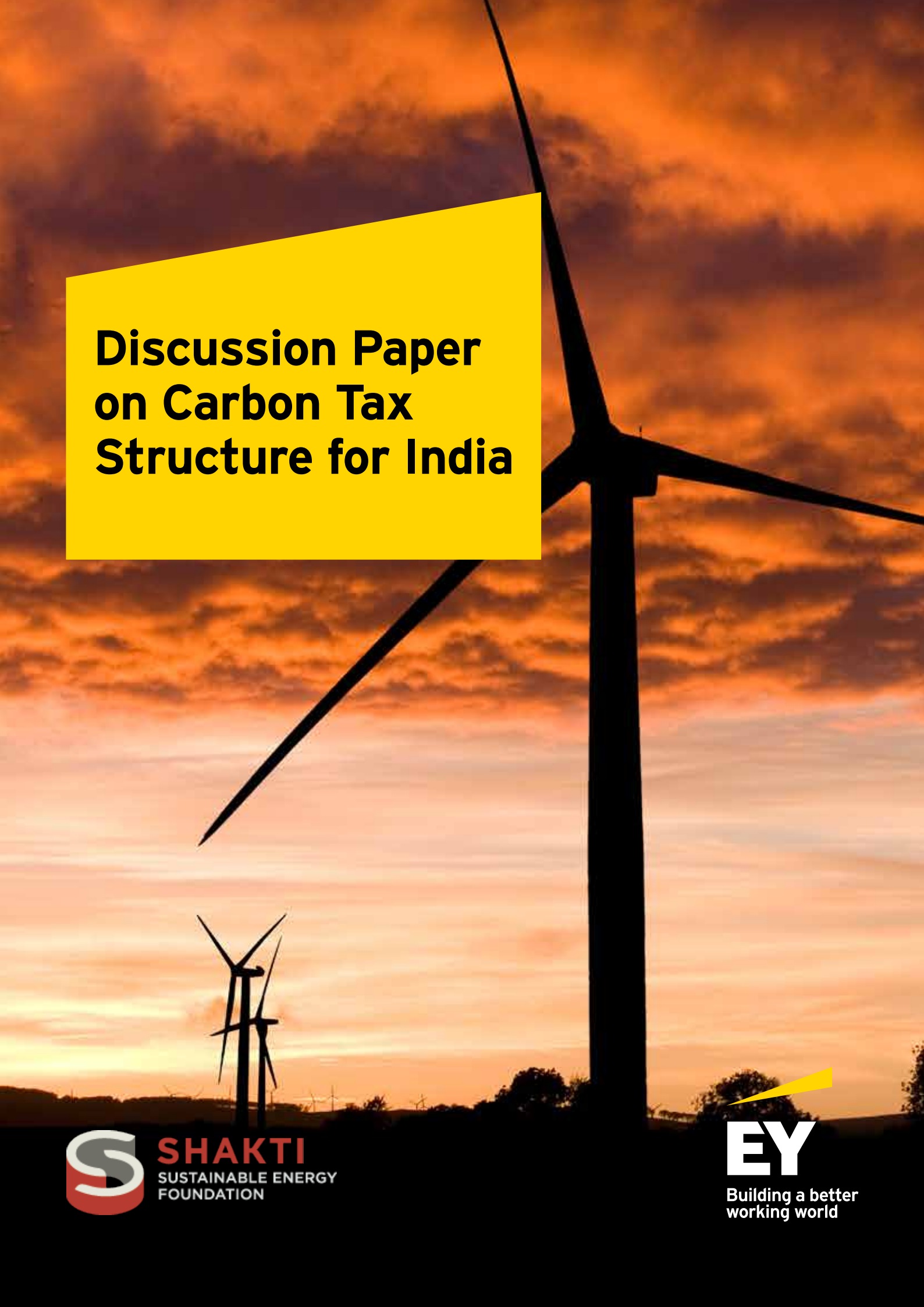


Discussion Paper on Carbon Tax Structure for India

SHAKTI
SUSTAINABLE ENERGY FOUNDATION

EY
Building a better working world

Ernst & Young LLP

EY | Assurance | Tax | Transactions | Advisory

About EY

EY is a global leader in assurance, tax, transaction and advisory services. The insights and quality services we deliver help build trust and confidence in the capital markets and in economies the world over. We develop outstanding leaders who team to deliver on our promises to all of our stakeholders. In so doing, we play a critical role in building a better working world for our people, for our clients and for our communities.

EY refers to the global organization, and may refer to one or more, of the member firms of Ernst & Young Global Limited, each of which is a separate legal entity. Ernst & Young Global Limited, a UK company limited by guarantee, does not provide services to clients. For more information about our organization, please visit ey.com.

Ernst & Young LLP is one of the Indian client serving member firms of EYGM Limited. For more information about our organization, please visit www.ey.com/in.

Ernst & Young LLP is a Limited Liability Partnership, registered under the Limited Liability Partnership Act, 2008 in India, having its registered office at 22 Camac Street, 3rd Floor, Block C, Kolkata - 700016

ED None
EYIN1807-011

RS1

Shakti Sustainable Energy Foundation

About Shakti

Shakti Sustainable Energy Foundation works to strengthen the energy security of India by aiding the design and implementation of policies that support renewable energy, energy efficiency and sustainable transport solutions.

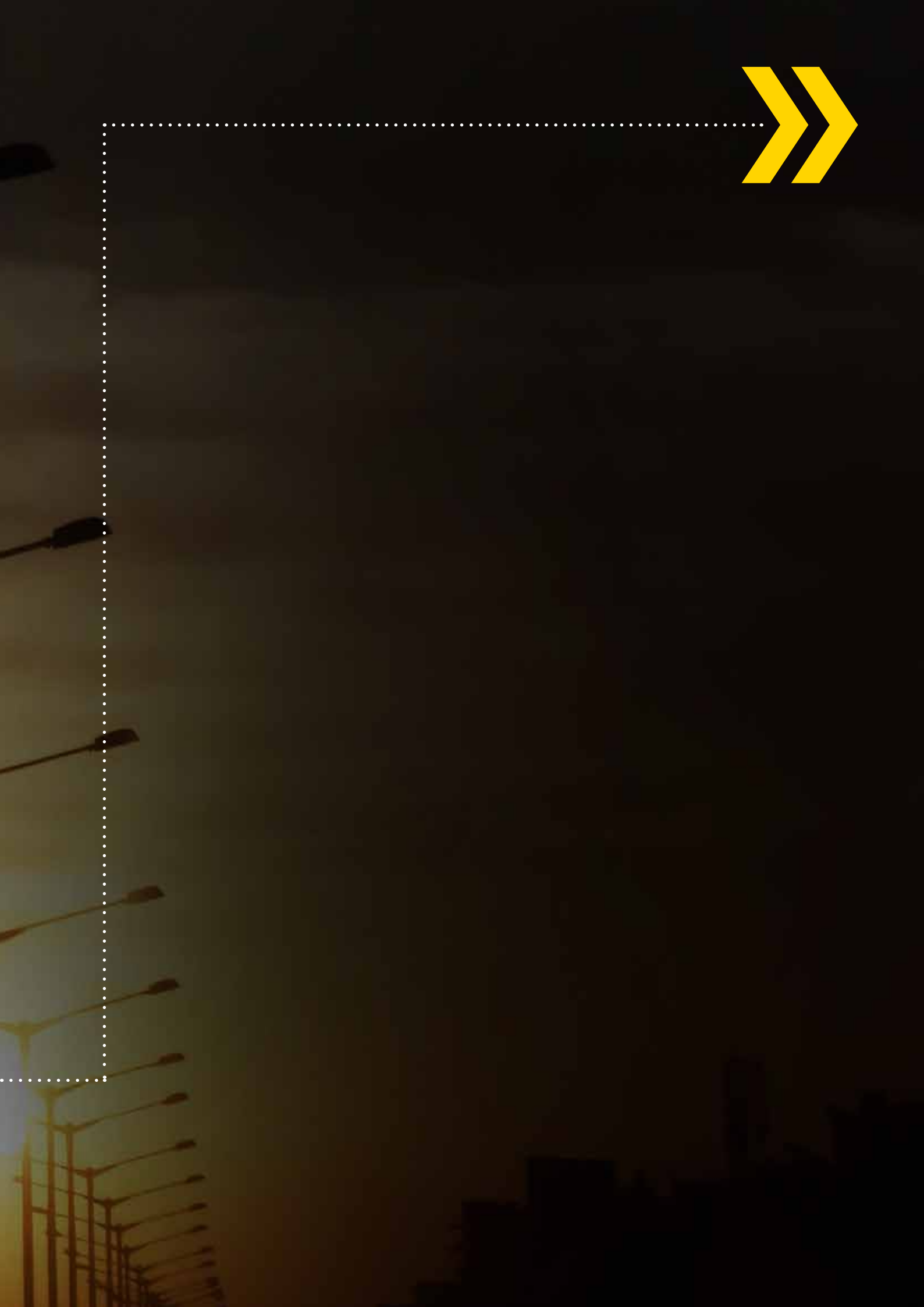
Disclaimer:

The views/analysis expressed in this document do not necessarily reflect the views of Shakti Sustainable Energy Foundation. The Foundation also does not guarantee the accuracy of any data included in this publication nor does it accept any responsibility for the consequences of its use.

For private circulation only.

ey.com/in

@EY_India EY|LinkedIn EY India EY India careers ey_indiacareers



List of Figures

List of Tables

Abbreviations

APM	Administrative pricing mechanism
ATF	Aviation Turbine Fuel
BS	Bharat Stage
CAFC	Corporate Average Fuel Consumption
CBA	Cost-benefit analysis
CBEC	Central Board of Excise and Customs
CBM	Certain Coal Bed Methane
CCA	Climate Change Authority
CCS	Carbon Capture and Storage
CCTA	Central Customs and Tax Administration
CDP	Carbon Disclosure Project
CEA	Central Electricity Authority
CENVAT	Central Value Added Tax
CH4	Methane
CHP	Combined Heat and Power Production
CIL	Coal India Limited
CO2	Carbon Dioxide
CPM	Carbon Pricing Mechanism
CSR	Corporate Social Responsibility
CST	Central Sales Tax
CVD	Additional Customs Duty
DICE	Dynamic Integrated Climate and Economy Model
DICE	Dynamic Integrated Climate-Economy Model
DST	Department of Science and Technology
ECS	Equilibrium climate sensitivity
ETS	Emissions Trading System
EU	European Union
FAME	Faster Adoption and Manufacturing of Hybrid and Electric Vehicles
FUND	Framework for Uncertainty, Negotiation and Development
GDP	Gross Domestic Product
GHG	Green House Gas
GRIHA	Green Rating for Integrated Habitat Assessment
GST	Goods and Services Tax
H2O	Water Vapour
HEP	Hydrocarbon Exploration Policy
HSD	Diesel
IAM's	Integrated Assessment Models
IAWG	Interagency Working Group
IEA	International Energy Agency
IGCC	Integrated Gasification Combined Cycle
INDC	Intended Nationally Determined Contribution
IPT	Initial pulse timescale
KKC	Krishi Kalyan Cess
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
MDM	Mid-Day Meal
N2O	Nitrous Dioxide
NAPCC	National Action Plan on Climate Change
NCEEF	National Clean Energy and Environment Fund
NDCs	Nationally Determined Contributions
NELP	New Exploration and Licensing Policy
NHAI	National Highway Authority of India

OASI	Old-Age and Survivors Insurance
OECD	Organisation for Economic Co-operation and Development
OMCs	Oil and Marketing Companies
PAGE	Policy and Analysis of Greenhouse Effect
PAT	Perform Achieve and Trade
PDS	Public Distribution System
PFCs & HCFCs	Perfluorinated Carbons and hydro chlorofluorocarbons
PMGSY	Pradhan Mantri Gramin Sadak Yojana
PSC	Product Sharing Contract
REC	Renewable Energy Certificates
RPO	Renewable Purchase Obligation
SARS	South African Revenue Service
SAT	Tax Administration Service (SAT, as per the Spanish acronym)
SBC	Swachh Bharat Cess
SCC	Social Cost of Carbon
SF6	Sulphur Hexafluoride
SKO	Kerosene
SSA	Sarva Shiksha Abhiyan
SUV	Sport-Utility Vehicle
TCR	Transient climate response
TCRE	Transient climate response to emissions
TFEC	Total final energy consumption
TPES	Total primary energy supply
UNFCC	United Nations Framework on Climate Change
UNFCCC	United Nations Framework Convention on Climate Change
VAT	Value Added Tax

Executive Summary

The increase in global temperatures and the resultant climate change is a matter of global concern. India is among the 175 nations who have ratified the Paris Agreement under the United Nations Framework Convention on Climate Change (UNFCCC). India has agreed to further propagate a healthy and sustainable way of living and to adopt a climate friendly and a cleaner path. More specifically, it has committed in its Nationally Determined Contribution (NDC), to reduce the emissions intensity of its GDP by 33 to 35 percent by 2030 from 2005 level, achieve about 40 percent cumulative electric power installed capacity from non-fossil fuel based energy resources by 2030 and create an additional carbon sink of 2.5 to 3 billion tonnes of CO_2 equivalent by 2030.

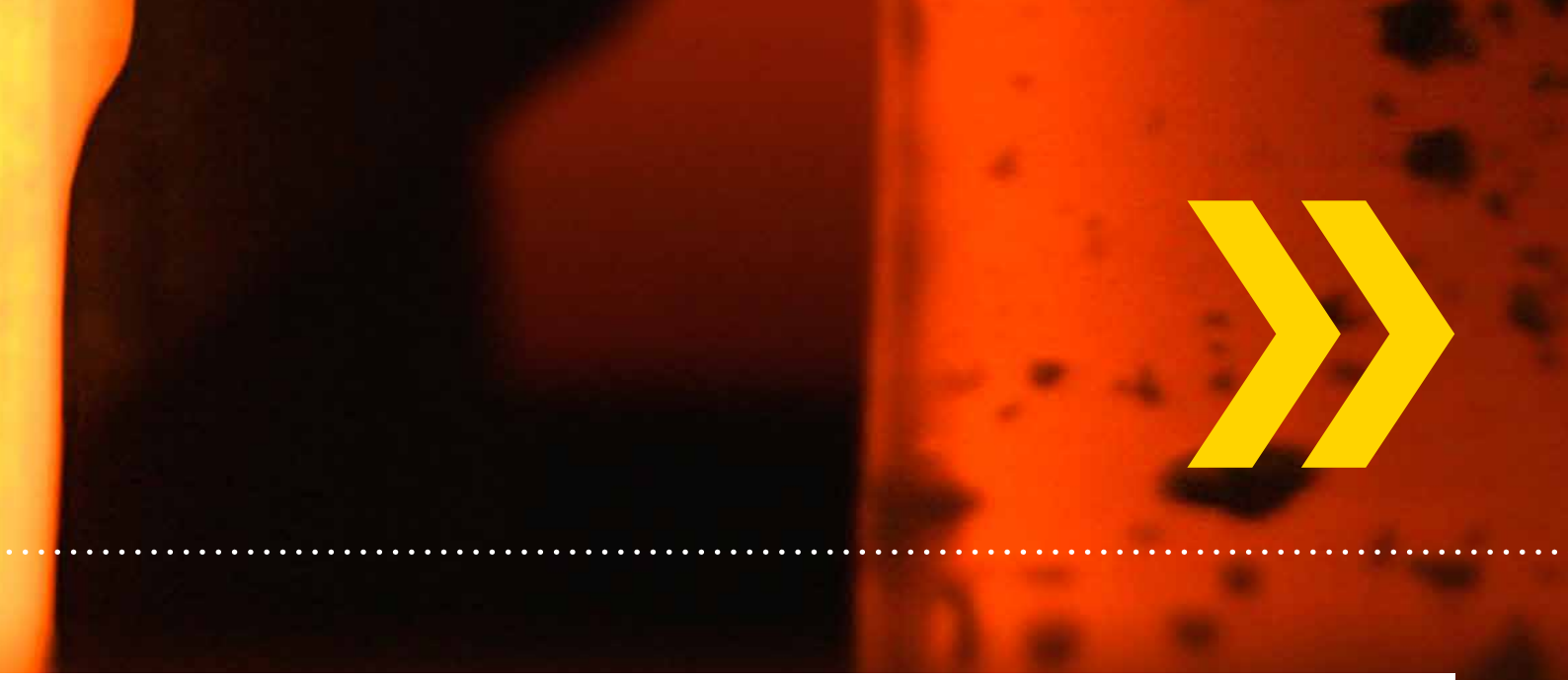
India has undertaken several measures, both regulatory and fiscal, to achieve its NDC goals. India aims to achieve more than five times increase in the installed capacity of renewable energy generation from 35 GW in March 2015 to 175 GW by 2022. The Perform, Achieve and Trade (PAT) scheme aims to decrease energy consumption in industry and thereby reduce emissions. Series of other measures, such as the flagship programmes on Smart Cities, Cleaning of rivers and Swachh Bharat Mission are in sync with India's climate change actions. The National Energy Policy brought out by the NITI Aayog reiterates the importance of de-carbonisation through the twin interventions of energy efficiency and renewable energy.

India has also adopted fiscal measures to reduce carbon emissions. A cess of INR 400 per tonne is applied to coal. Further, the decisions to make the diesel and petrol prices market determined, withdrawal of subsidies (the LPG subsidy withdrawn for consumers with taxable income of more than INR 10 lakh) and rationalisation of the quota of Kerosene under the Public Distribution System (PDS) over the years, are in line with the aim of reduction in carbon emissions.

These measures have had varied degrees of effectiveness and the carbon emitters do not actively monitor and limit their CO_2 output. It is in this context that a carbon tax structure in India is proposed to be examined in this Paper. A carbon tax is a tax that is levied to the greenhouse gas (GHG) emissions. First introduced by Finland in 1990, the carbon tax has seen a growing interest in the recent years around the world. It is considered by some countries to be an effective, transparent and low cost means of inducing carbon abatement. It can lead to economy-wide reductions in the CO_2 emissions and produce important co-benefits, for example reductions in air pollution or raising valuable public revenue.

India would need to take decisions about the timing and level of carbon tax, based on its own development priorities and needs. This Paper explores the following aspects:

- The level of GHG emissions in India and the sources that are contributing to the emissions.
- An assessment of the current tax and non-tax measures being taken by India towards reducing carbon emissions and the effectiveness of these measures
- International experience of the carbon tax structures and their effectiveness.
- Impact of Goods and Services Tax (GST) on the current tax instruments for mitigating GHG emissions and exploring if the carbon tax could be implemented within the framework of GST.
- The design and structure of carbon tax in India, rate(s) and exemption(s), the implementation framework, assessment of the impact of carbon tax on CO_2 emissions and utilisation of revenues.



Sources and levels of emissions

Greenhouse gas (GHG) emissions, attributed to be the most significant factor leading to climate change, primarily consist of six gases: water vapor (H_2O), carbon dioxide (CO_2), nitrous dioxide (N_2O), Methane (CH_4), Sulphur hexafluoride (SF_6) and Halocarbons (PFCs & HCFCs).

CO_2 originates mainly from the combustion of fossil fuels and biomass. Other activities that increase CO_2 in the atmosphere are deforestation, land clearing for agriculture and degradation of soils. The primary sources of methane are domesticated animals (e.g., dairy cows, pigs), and activities related to rice growing, gas flaring and mining. Nitrous oxide mainly originates from agricultural land management, animal manure management, combustion of fossil fuels, and the production of fertilizers and nitric acid.

CO_2 emissions constitute more than 70% of global GHG emissions, thus giving rise to the global concerns about reducing carbon emissions and devising ways and means by which carbon emissions can be restricted and cleaner forms of energy can be promoted. This Paper focuses on CO_2 emissions.

For the purposes of computing emissions, the Paper uses the methodology of applying emissions factor to the quantity of the fuel used in an activity across the following sectors:

- Domestic distribution sector: Households which cannot be categorized as commercial or industrial
- Transportation sector: Modes of transportation including aviation, shipping, road transport and railways. International aviation and marine bunkers have not been included
- Energy sector/ Power generation: Power generated as utility and captive power generation by private players
- Industrial sector: Mining and manufacturing. Manufacturing includes several categories such as chemicals, iron and steel, cement production, metallurgical, engineering goods, aluminium, textiles and ceramics.
- Agriculture: Total fuel consumed in production of fertilizers and other agricultural consumption of fuels.
- Miscellaneous sectors include resellers/retail consumption, private imports and other miscellaneous

No emission estimates have been made for biomass and biofuels owing to non-availability of data and the risk of double counting. We have not considered the emissions from Land Use, Land Use Change and Forestry (LULUCF) and emissions from domesticated animals like cows, buffalos, camels etc. Despite significant contribution to India's national emissions LULUCF and domestic animals are not accounted for, in national inventories, due to lack of reliable data.

Coal contributes more than 70% of the total emissions in India. Diesel (including both high speed diesel and low density oil) is the second highest carbon emitter with 10.9% of the total emissions. Natural gas and motor spirit/petrol contribute 5.83% and 3% respectively to the total emissions in India. Other notable sources of emissions are LPG (2.63%), naphtha (1.90%), kerosene (0.98%), ATF (0.91%), bitumen (0.86%) and lubes (0.51%).

1. www.unfccc.com
2. http://www.mospi.gov.in/sites/default/files/publication_reports/climateChangeStat2015.pdf

Basis for determining the carbon tax rate

The rate of carbon tax is a significant aspect that determines the impact that the tax will have on carbon emissions. The basis on which the rate will be determined becomes important in the context of the goals or policy objectives that the carbon tax plans to achieve. For the purposes of this Paper, two approaches have been considered for determining the carbon tax rate:

Social cost of carbon (SCC) approach - SCC is an estimate of the cost that the society bears from the emission of one tonne of CO_2 or carbon equivalent emissions at a given point of time. The social cost is associated with factors such as damage to human health, damages to property, adverse impact in the climate and the eco system, the shift in the tropical heat belts to name a few. Using the SCC approach, the carbon tax rate is equated to the social cost of carbon. The SCC approach is useful as it helps balancing the costs and benefits of the measures for reducing CO_2 emissions. The most prevalent models globally for estimating the SCC are the Integrated Assessment Models, such as Dynamic Integrated Model of Climate and Economy (DICE), Regional Integrated Model of Climate and Economy (RICE), Policy and Analysis of Greenhouse Effect (PAGE) and Framework for Uncertainty, Negotiation and Development (FUND). This Paper has considered DICE 2016 model which puts the global SCC at USD87, given India's regional SCC is assumed at 12% . This estimates India's social cost of carbon at USD 10.44 or, rounding off, at USD 10.

Abatement approach – This approach is useful in the cases where the carbon tax aims to meet a specific emissions reduction target, for example, the targets promised in the NDCs under the UNFCCC. This Paper uses the carbon tax rate estimates by Ian Parry and others (2017). Parry and others have brought out that even in a Business As Usual (BAU) scenario, the emissions intensity of India will fall, but only by 24% by 2030 compared to 2005 levels. The NDC target is to reduce the emissions intensity by 33-35% by 2030 as against the 2005 levels. A carbon tax of USD 10 per tonne of CO_2 emission could further reduce the emission intensity by 8% as against BAU levels. A higher carbon tax of USD 35 per tonne of CO_2 emission could reduce the emission intensity by 22% against BAU levels. That is, if the carbon tax is gradually increased in equal yearly increments such that it reaches USD 35 per tonne by 2030, it could lead to a reduction in the emission intensity by 22% against BAU level.

Fuels	Coverage under GST	GST Rate (%)	Emission factor (Kilograms CO2 per Million Btu) Kg CO_2/MBtu
LPG	Yes	5 (Domestic) 18(Non-domestic)	64.01
Kerosene	Yes	5(Fertilizer) 18 (Non-fertilizer)	72.30
Naphtha	Yes	18	72.80
Bitumen and Asphalt	Yes	18	75.61
Coal	Yes	5 (+GST compensation cess @ Rs. 400/ton)	95.35
Petroleum coke	Yes	5	102.10
Other Fuels	**Coverage under GST**	**Effective tax burden**	
Natural gas	No	0 - 25	53.07
ATF(Aviation turbine fuel)	No	14 - 62	70.90
Petrol	No	113	71.30
High Speed Diesel	No	78	73.16

3. Under the models used India's contribution to the global SCC is 12%, estimated on the basis of factors such as GDP (output), population, emissions, emissions and temperature sensitivity.
4. IMF Working paper on 'Reforming Energy Policy in India: Assessing the Options' Prepared by Ian Perry, Victor Mylonas and Nate Vernon

Assessment of measures undertaken by India to reduce carbon footprint

The government has introduced many measures, regulatory and fiscal, to reduce India's carbon footprint. An assessment of these measures brings out the following aspects that need attention:

- The current regulatory measures do not comprehensively cover all the emission sources. The main focus is on the transportation and electricity sector, which accounts for approximately 63% of the emissions. Manufacturing sector, which accounts for 26% of the emissions, is not fully covered by the government's regulatory measures.
- The number of measures taken require the government to make periodic changes in regulatory standards such as, energy efficiency standards for industries subject to PAT scheme and appliance efficiency standards. The success of these measures is dependent on the government's enforcement capability.
- India does not follow a uniform approach towards pricing of fuels. Prices can be subsidised, determined on a cost plus basis, based on an administered pricing mechanism or be market based. For example, price of domestically produced natural gas (based on formula prescribed by the government) is different from the price of imported gas (based on international price). Using different approaches to price fuels reduces the effectiveness of taxation in tackling the problem of carbon emissions.
- Imposition of clean environment cess is currently not linked to the quantum of carbon emissions. Further, availability of cleaner fuels such as natural gas, and actual usage of the power generation capacity of the renewable sources of power, need to be augmented to incentivize the switch from a polluting fuel like coal to a cleaner fuel, if the former is subject to higher tax.
- Petrol and diesel already suffer a high tax burden. Government's ability to impose additional taxes on these two fuels is limited.
- Under GST, the tax rates on fuel and the inclusion of fuels in the GST base are not guided by emission concerns, but by revenue considerations.
- A carbon tax could potentially cover all emissions other than biomass and biofuels and provide an incentive to users to consider using cleaner sources of energy.

International experience

Carbon taxes were first introduced in the early 1990s. Finland first adopted such a tax in 1990, followed by Norway and Sweden in 1991, and Denmark in 1992. The early 2010s saw, for the first time, carbon taxes being used in emerging economies. Countries such as South Africa, Mexico, and Chile are either employing carbon taxes or are contemplating implementing the imposition of a carbon tax. According to a World Bank report (March 2017), over 20 national and sub-national level jurisdictions (e.g., British Columbia in Canada) have adopted or are proposing to adopt carbon taxes.

The design and implementation of carbon taxes may vary from jurisdiction to jurisdiction. There are differences in rates, applicability, and point of taxation, coverage, administration and the usage of the revenues collected through carbon taxes. However, there are also similarities in the approach towards taxing carbon. Further, the level of success has varied across countries. On one hand carbon taxes in Nordic countries have been continuing for over two decades, and on the other hand, carbon tax (called the carbon pricing mechanism) in Australia was repealed within 2 years of introduction.

This Paper examines the experience of carbon tax design and structure in select jurisdictions and attempts to draw in learnings that could inform the design of a carbon tax mechanism for India. The countries selected include those where carbon tax led to reduction in carbon emissions (Denmark, Finland, Switzerland), those where carbon tax faced challenges (Australia), the BRICS countries (South Africa) and emerging economies (Mexico).

The following learning points emerge from the study of international experience:

Phased and incremental approach:

Countries with a successful history of carbon taxation, have followed a phased and incremental approach. Tax rates and the coverage have been gradually increased. Exemptions and rebates have been reduced over a period of time.

Tax base and point of incidence:

Indirect taxes on all fossil fuels imposed at the point of initial sale are the most common. The application of the tax to the carbon content of fossil fuels serves as an effective and simple proxy for CO_2 emissions as the price is passed down. Consumers' behaviour is thus directly targeted. These are comparatively easy to implement and administer. Tax Rates: Tax rates vary from a high of USD 132 in Sweden to a low of US$ 1 in Mexico. Carbon taxes that are applied only to fuels, emissions are measured based on the application of an agreed emissions factor (based on the carbon content of the fuel) to the amount of fuel sold.

Exemptions from carbon tax:

Exemptions vary across countries and are driven by the perceived economic objectives of the country. Further, the list of exemptions gets modified over a period of time and as a general principle, they reduce with time.

Administrating authorities:

The existing indirect tax authorities are most commonly used for administering a carbon tax.

Usage of revenues:

Countries use different policies for achieving revenue neutrality as well as using the money to fund specific programmes. Proceeds from imposition of carbon taxes have been used to reduce other taxes such as income taxes. They have also been used to fund contributions towards social security, thereby reducing the government expenditure towards such schemes. They have also been used for energy efficiency and environmental programmes.

Design of carbon tax

This Paper discusses five broad elements of the carbon tax design:

- Determination of the tax base,
- Estimation of the tax rate,
- The implementation mechanism,
- Utilisation of revenues from carbon tax and
- Addressing distributional impact

3. Under the models used India's contribution to the global SCC is 12%, estimated on the basis of factors such as GDP (output), population, emissions, emissions and temperature sensitivity.
4. IMF Working paper on 'Reforming Energy Policy in India: Assessing the Options' Prepared by Ian Perry, Victor Mylonas and Nate Vernon

Following recommendations are made:

Tax base

In most countries, carbon tax is usually imposed on the polluting inputs as opposed to directly taxing pollution on account of the measurement and implementation difficulties that the latter poses. Implementing a tax on inputs such as fuels can be considered the same as taxing emissions. A unit of fossil fuel will emit the same amount of carbon irrespective of when and where it is burned (assuming that they are fully burnt).

Carbon tax should be applied to all fuels that are sources of carbon emissions.

Point of levy of carbon tax

Taxation of fuels upstream (i.e. at the production/import level) would be the most appropriate point of levy as:

- Administratively, it will involve monitoring fewer producers as against a large number of consumers.
- Upstream fuel taxes can be easily implemented through the use of existing tax laws, systems and agencies for administering indirect taxes.
- They do not require the computation of emissions by the polluter and thus there will be no requirement of new institutional capacities to undertake the tasks.
- Upstream tax on fuels will not be perceived as a new tax on the consumers as the tax will be paid closer to the production point.

Legislative framework

There could be three options for introducing a carbon tax in India:

1. Amendment to the Constitution: The introduction of a carbon tax as a separate tax in India will require an amendment to the Constitution to empower the Centre and the States to legislate for the new tax.
2. Using Article 248: Carbon tax can be introduced as a new tax using the residuary powers of the Parliament under Article 248 of the Constitution.
3. Introduce carbon tax under the existing GST laws

The first option, i.e., amendment to the Constitution, can be a long drawn process:

- A Constitution (Amendment) Bill will be required to be passed in both the Houses of the Parliament separately, by absolute majority (more than 50% of the strength of the Parliament) and special majority (approval by 2/3 of the members present and voting}. The Bill must also be ratified by the legislatures of half of the states by a simple majority.
- After the Constitutional amendment, a new legislation for levying carbon tax will need to be drafted and passed by the Parliament and the State legislatures.
- Rules governing the administration of the new tax will need to be framed.

The second option of introducing carbon tax using Article 248 of the Constitution, will not require a Constitutional amendment. However, it would require a new legislation for levying carbon tax (to be passed by the Parliament), followed by the rules / regulations for its administration. The second option will have a limitation as, in this case, only the Centre will be able to impose the tax and the States will not have the power to impose a carbon tax.

Legislative framework

Given the above, the third option of applying a carbon tax within the existing legislative framework, i.e. within the GST would be most suitable. This option would involve amendment to the existing GST laws after a recommendation by the GST Council.

Applying a carbon tax within the existing legislative framework of GST would be most feasible. This option will involve a recommendation by the GST Council to this effect, followed by amendment to the existing GST laws.

Under this option it is suggested that all fuels should be brought under the GST, subject to GST plus an additional supplementary cess. The quantum of cess for each fuel should be determined on the basis of carbon emissions and calibrated to protect the government revenues.

Specific suggestions on tax base

Coal	Immediate term (0-2 years)	Medium to long term (3-12 years)
	In the short to medium term, India's dependence on coal as a source of energy would continue. Keeping these aspects in mind: ▸ Coal should continue to be subject to GST and a supplementary cess. ▸ The current cess on coal under GST should be linked to the quantum of carbon emissions from coal. The government should give a clear message to all stakeholders about its intent to link the cess to carbon emissions. ▸ The 'carbon cess' on coal should be applied only at the first point of supply. No set-off should be allowed for the cess paid. ▸ Ideally, since carbon tax is linked to the quantum of emissions, cleaner coal should be subject to a lesser tax burden compared to a more polluting variety of coal. However, in the interest of simplicity initially at the time of implementing carbon tax, same tax rate may be applied to all types of coal.	While coal continues under the purview of the GST: ▸ The supplementary cess should be increased gradually. ▸ The collections from the carbon cess on coal could be earmarked for environment objectives. This was also the objective of the clean environment cess when it was initially introduced.

5. The GST Council is a joint forum of the Centre and the States. It is chaired by the Union Finance Minister, with the Revenue and Finance Ministers of all the States as members.

Specific suggestions on tax base

Petroleum fuels outside the GST base	Immediate term (0-2 years)	Medium to long term (3-12 years)
Petrol, diesel, natural gas, aviation turbine fuel (ATF)	▸ Maintain status quo for petrol, diesel and ATF i.e. no carbon taxes should be imposed until petrol and diesel are brought under the purview of GST. ▸ There is a strong case for including natural gas in GST as it is largely used as an intermediate product and in business to business transactions. In case the States continue to have reservations about the inclusion of the petroleum products in GST, at a minimum, natural gas should be included in the GST. ▸ For equality of tax treatment, natural gas should be subject to the same GST rate as coal (5% currently), with additional, non-creditable, supplementary levy linked to carbon emissions.	▸ All the currently excluded petroleum products should be brought into the GST base. ▸ The GST rate should be uniform, with an additional non-creditable, supplementary levy or cess. ▸ The quantum of cess for each fuel should be determined on the basis of the carbon emissions and calibrated to protect the government revenues. ▸ In case the States do not support the additional levy under the GST ▸ (Compensation to the States) Act, 2017 as this legislation empowers only the Centre to levy the tax, the GST Council may consider the alternative of a supplementary levy by the Centre and the States outside the GST, as is the current practice.
Others (LPG, kerosene, naphtha, furnace oil, low sulphur heavy stock / and other residues, bitumen and asphalt, lube oil/greases and petroleum coke)	▸ Measures to reduce subsidies on kerosene and LPG and switch to market based pricing should continue ▸ They should be subject to a GST plus an additional non-creditable cess, linked to the carbon emissions.	▸ Continue GST and supplementary cess. ▸ Increase cess gradually keeping in mind the overall acceptable burden

Rate of carbon tax

Social cost of Carbon (SCC) approach

Under the SCC approach to determine the quantum of carbon emissions by different fuels, using the emission factors, this Paper estimates the social cost of carbon for India at USD 10.44, or rounding off, at USD 10 per tonne of CO_2 emissions based on DCE estimates for the year 2015.

Abatement approach

This Paper uses the estimates in the Study by Ian Parry and others (2017) which brings out that compared to 2005 levels, the emission intensity of India will fall by 2030, but only by 24%, if it is a business as usual (BAU) scenario, with no further policy interventions. A carbon tax of USD 10 per tonne of CO_2 emission could further reduce the carbon intensity by 8% and a higher carbon tax of USD 35 per tonne of CO_2 emission could further reduce the carbon intensity by 22%.

The following need to be considered:

- The abatement approach brings out that for India to achieve its goal of 33-35% reduction in emission intensity by 2030, an additional carbon tax should be imposed across all fuels such that it reaches USD 35 (INR 2310) per tonne of CO2 emission by 2030. Since petrol and diesel are already heavily taxed, the additional burden will have to fall on coal and other fuels.
- The SCC approach reflects that while the other fuels are already heavily taxed, coal is under-taxed. At a minimum, the carbon tax on coal should be increased from the current level of INR 400 per tonne to INR 1,176 per tonne, based on a SCC of USD 10 per tonne of CO_2 emission.
- The current tax burden on petroleum products is already very high, leaving limited scope for increasing the burden any further.
- All petroleum products should be included under the GST at the earliest. All fuels should be subject to a uniform GST (5% currently) with an additional non-creditable supplementary cess linked to carbon emissions.
- India has rich reserves of coal and it is a cheap source of providing energy to the numerous Indian users. In short to medium term, India's dependence on coal as a source of energy would continue. Therefore, the quantum of the additional supplementary tax for coal and other fuels should be increased in a phased manner to the levels estimated under the SCC approach / abatement approach. The relative tax increase on coal and other fuels will have to be decided based on India's own economic priorities and circumstances.

It is expected that the high tax would encourage the consumers to shift to cleaner sources of energy, bring improvements in energy efficiency and reduce the use of energy-consuming products. The revenues from the additional taxes would also supplement the government's ongoing efforts to promote energy efficiency and encourage the renewable sources of energy.

The following table illustrates the level of carbon taxes when imposed at USD 10 per tonne of CO_2 and at USD 35 per tonne of CO_2.

Fuels	Carbon tax - USD 10/ Ton of CO_2		Carbon tax - USD 35/ Ton of CO_2	
	Using exchange rate, 1USD= INR 66			
	Carbon tax INR ton/ MBTU	Carbon tax (INR/ Ton)	Carbon tax INR ton/ MBTU	Carbon tax (INR/ Ton)
Natural Gas	35.03	1,853	122.59	6,486
LPG	42.25	1,940	147.86	6,791
Aviation Turbine Fuel	46.79	2,099	163.78	7,348
Petrol	47.06	2,049	164.70	7,173
SKO	47.72	2,089	167.01	7,311
Naphtha	48.05	2,074	168.17	7,260
Diesel	48.29	2,119	169.00	7,415
LSHS	48.84	2,290	170.94	8,016
Furnace Oil	48.84	2,130	170.94	7,454
Lubes and Greases	48.98	2,089	171.43	7,311
Bitumen	49.90	2,089	174.66	7,311
Coal	62.93	1,176	220.26	4,116
Petroleum coke	67.32	2,229	235.62	7,803

Exemptions

It is suggested that exemptions from carbon tax may be considered only for those industries where fuels are used as feedstock at the first point of supply.

The institutional mechanism

The options for taxation of coal, petroleum products and other fuels discussed above would not require a separate institutional mechanism to be put in place. The additional taxes suggested can be implemented within the existing tax law framework. For administration and enforcement too, the existing laws for implementation of GST, Central Excise and State VAT will provide a ready, simple and transparent mechanism.

Utilisation of revenues

Carbon tax can raise significant revenues, depending on how comprehensively it is implemented. Ian Parry and others (2017) estimate that a carbon tax of USD 35 per tonne of CO_2 emissions levied by India in phases from 2017 to 2030 can yield a revenue of more than 2% of GDP.

The GST Council, while deliberating on the application of cess on polluting fuels under the GST framework may also recommend the sharing of carbon tax revenues with the States.

As an illustration, the additional revenues mobilised from carbon tax may be utilised for the following purposes:

- Promoting research and deployment of clean coal technologies by setting up a Clean Coal Fund (CCF) and Clean Coal Technology Fund (CCTF).
- **Supporting renewable energy projects** – India envisages an increase in the overall renewable energy capacity to 175 GW by 2022, including 100 GW of solar, 60 GW of wind, 10 GW of biomass, and 5 GW of small hydro power capacity. The carbon tax revenues can be utilised for developing new technologies for renewable energy projects.
- **Augmenting natural gas production and distributi**on – Production of natural gas has experienced declining production from old and marginal fields and delay in completion of projects, shutdown of wells, processing platform/plants, pipelines. More investments in this direction could promote greater use of natural gas.
- Incentivising a shift from more polluting fuels to less polluting fuels by subsidising cleaner fuels – The government has been encouraging the substitution of biomass with LPG. A part of the carbon tax revenues could be utilised towards enhancing the direct transfer of LPG subsidies to the consumers' bank accounts. .
- **Mitigating the regressive impact of carbon tax** - A part of the carbon tax revenues could be utilised for mitigating the impacts on the vulnerable households and firms.

Distributional impact

The use of environmental taxes could be regressive in nature and may impact the vulnerable groups such as low income families or people in the disadvantaged regions. The additional tax burden on account of environmental taxes can also impact industry competiveness particularly in the international market. Even the taxes that are, on the face of it, levied on producers are often passed on to consumers in the form of higher prices. In other jurisdictions, the distributional impact is addressed through various measures such as:

- Support measures, such as output-based rebates, support programs, and other subsidies reduce taxpayers' overall financial burden on account of the carbon tax.
- Personal income tax reliefs or higher direct subsidy transfers to the poorer households can provide relief.
- Tax exemptions and reductions directly eliminate or reduce the amount of carbon tax paid by the entity liable to tax.
- Reducing carbon emissions may also affect workers in energy-intensive industries. Phasing-in the policies according to a clear timetable, and helping workers to retrain or move to other forms of employment, are examples of measures that can help to smooth the transition to a low-carbon economy.

A case in example is Denmark, which uses carbon tax revenue to reduce taxes on labour, subsidize energy efficiency investments, and subsidize the associated administrative costs of small companies. Approximately 40 percent of the tax revenue is used for environmental incentives, while the remaining 60 percent is returned to industry through reduced social insurance, reduced pension contributions, and compensation of administrative expenses for small businesses with limited payrolls. India could derive some lessons from these experiences.

Some concluding thoughts

Explicit carbon tax can be introduced: There is a case for introducing a proper carbon tax in India that comprehensively covers all fuels at a uniform rate, differentiated on the basis of the level of emissions. To make the concept more acceptable for the stakeholders, the level of carbon taxes should be increased gradually in a phased manner.

The carbon tax design proposed in this Paper can be implemented under the current regulatory and institutional mechanism in a relatively short period of time. No new institutional framework will be needed.

Social cost estimates may need a review: The criteria suggested in this Paper for arriving at a suitable carbon rate are the social cost of carbon and the emission factors. Estimation of social cost suffers from an inherent subjectivity and hence there would be a need for a better analysis of the social costs for India. If the social cost is considered as per the global estimates, it would be too high for India.

Other pollutants: This Paper has focused on estimating the CO_2 and accordingly suggesting a carbon tax for India. Once this concept is accepted, a similar tax could be introduced for other harmful emissions too such as nitrous dioxide (N_2O), Methane (CH_4), Sulphur hexafluoride (SF6) and Halocarbons (PFCs & HCFCs).

Impact would be visible only in medium to long term: Since it is important for the carbon taxes to be acceptable, it has been suggested that the carbon tax should initially not be any higher than the current tax burden and should be increased in phases. Further, the price elasticity estimates show that in the short term, the demand for consumption of fuels is unlikely to be impacted significantly by the change in prices of fuels. However, in the medium to long term, the price elasticities tend to be higher. It is therefore expected that the impact of carbon tax would be visible only in the medium to long term.

Stability and predictability of tax policy is important: It would be important that the carbon tax rates, once decided, are not changed frequently and should see only a gradual rise. This is important for the stakeholders to plan ahead.

Shakti Sustainable Energy Foundation Address:

Capital Court, 104 B/2, 4th Floor,
Phase - III, Munirka,
New Delhi - 110067
Tel: +91 11 4747 4000
Fax: +91 11 4747 4043

EY office

3rd & 6th Floor, Worldmark-1
IGI Airport Hospitality District
Aerocity, New Delhi - 110037
Tel: + 91 11 6671 8000
Fax + 91 11 6671 9999

Notes

Notes