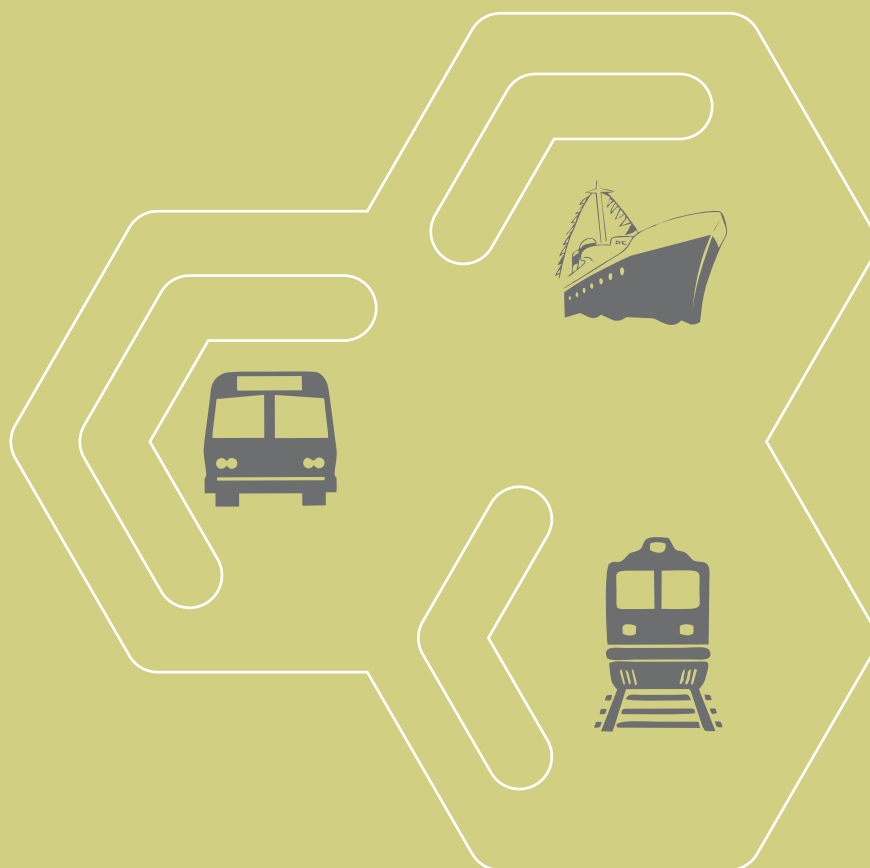




*Tracking Public Expenditure Priorities
for Low Carbon Strategies for
Transport Sector in India:
Policy and Budgetary Analysis*



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1. Context

A sustainable and efficient transportation system is important to ensure sustained economic growth, social progress and environmental protection. The global transport sector is currently responsible for 13 percent of Green house gas (GHG) emissions (IPCC, 2007) and 23 percent of CO₂ emissions (International Energy Agency, 2009). As per India's GHG inventory, the share of transport sector has increased from 6.4 percent in 1994 to 7.5 percent in 2007. Amongst all modes, road transport alone emits 87 percent of the total GHGs emissions.

This research paper intends to map the various interventions by relevant ministries/departments at the Union Government level under the low carbon framework, in order to provide policy-makers, researchers, international organisations and other stakeholders a reference document for tracking low carbon transport in the context of climate change. To finance low-carbon transport under Avoid (Integration of better land use planning and transport networks or strengthening of public transportation system) – Shift (shifting from motorized transport to more energy efficient non-motorized transport system) – Improve (promotion of clean fuel) framework, several funding mechanisms are available within public policy settings. This paper tracks the Union policies and schemes in the last seven years, i.e. the period after implementation of National Action Plan on Climate Change (NAPCC), 2008 and attempts to make policy recommendations for Low Carbon Strategies for Transport Sector.

Transportation, planning and policy has direct linkage with the concept of sustainable development in the context of its impact on reducing oil imports, improvement of air quality, reducing traffic congestions and improving travelling facilities (Intergovernmental Panel on Climate Change, 2007).¹ Further, the predominance use of petroleum in the transport sector, which limits the potential or reduced of Green House Gases (GHGs), poses multiple environmental risks such as loss of biodiversity, land degradation and conflict with food production².

The Government of India recently announced Intended Nationally Determined Commitments (INDCs) which declared a voluntary goal of reducing the emissions intensity of its GDP by 20–25 percent, over 2005 levels by 2020. Given this announced target, it is of utmost importance to opt for *low carbon transport* as it accounts for nearly 18 percent of the total energy consumed in India, second only to the industrial sector. Besides, the transport sector is highly energy intensive and its share has increased from 6.4 percent in 1994 to 7.5 percent in 2007 as per India's GHGs inventory.³ The global transport sector is currently responsible for 13 percent of GHG emissions (IPCC, 2007) and 23 percent of CO₂ emissions (International Energy Agency, 2009). Amongst all modes, road transport alone emits 87 percent of the total GHGs emissions (123.6 million tonnes of CO₂e), followed by civil aviation sector with emission of 10.2 million tonnes of CO₂e and the Railways with emission of 6.8 million tonnes of CO₂e.⁴

Opting for low carbon transport is likely to generate significant co-benefits⁵. Low carbon public transport reduces traffic congestion, and hence have a positive impact on air and noise pollution and xxxxxxxxxxxxxx on the overall

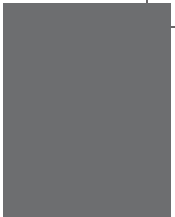
¹ Advancing Sustainable Low-Carbon Transport through the GEF- A STAP Advisory Document, available: <http://www.thegef.org/gef/sites/thegef.org/files/publication/STAP-Sustainable%20transport.pdf> (accessed on May 20, 2013)

² IPCC (2007), Climate Change 2007 synthesis report, available: http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf (accessed on May 20, 2013)

³ This represents the 2007 baseline figure of GHGs inventory of India. Source: Ministry of Environment and Forest, (2010). Alternative information is also provided by India's Second National Communication to UNFCCC (2012: 48) with the 2000 baseline data. As per the report, the total GHG emission from the transport sector in 2000 was 98,104.12 Gg CO₂ eq. This is 9.6% of the total CO₂ eq. emissions from the energy sector and is 6.3% of the total GHG emission from the country, in 2000. Of the total CO₂ eq. emissions from the transport, 95,976.8 Gg was emitted as CO₂, 9.5 Gg as CH₄, and 6.2 Gg was emitted as N₂O.

⁴ Arora S., Vyas and L.R. Jhonson (2011) Projections of highway vehicle population, energy demand and CO₂ emissions in India to 2040. Natural Resources Forum 35(1). pp.49-62

⁵ Dubash et al (2013:51), "Indian Climate Change Policy: Exploring a Co-Benefits based Approach, Economic & Political Weekly, Vol XLVIII, No.22 (June 1, 2013) articulate that "the co-benefits analysis is intended to provide a framework to analyse the impact of any policy objective under consideration on the full range of outcomes across economic, social and environmental goals. The intent is to compel explicit consideration of these impacts, both positive and negative, into policy consideration."



environment and human health. Such interventions in the metros can also open up opportunities for generating additional funding under Clean Development Mechanisms (CDM) and carbon related funding schemes. Supply side interventions like integrated land-use and transport planning in cities, policy priorities on strengthening public transport system and increasing its usability, the shift in freight transportation from road to rail and waterways, and use of non-motorised public transport (Metro, Monorail, Inland Shipping, etc.) would add to those co-benefits.

According to NAPCC “several studies have estimated that policy and technological measures can lead to significant energy and thereby emission savings in the transport sector. The estimates of the Planning Commission indicate that by increasing the share of railways and improving efficiencies of different modes of transport, there can be the possibility of energy saving of 115 million tonnes of oil equivalent (mtoe) in the year 2031-32. Similarly, The Energy Research Institute (TERI, 2006) estimates indicate an energy saving of 144 mtoe in 2031 by including efficiency improvement across modes as well as considering enhanced use of public transportation and rail based movement, use of bio-diesel as compared to business-as-usual (BAU) trends. The corresponding CO₂ emissions reduction is estimated at 433 million tonnes in 2031.”

Low carbon economy (LCE) in the transport sector can be broadly examined in the context of enforcing certain measures pertaining to regulation, execution and enforcement of policy or fiscal instruments such as budgetary spending and incentivizing research and development (R&D) support for enhancing fuel efficiency standards, or promoting alternative fuels, strengthen and enhance public infrastructure so as to ensure that transportation system in the country becomes less energy intensive and generates fewer GHGs to the country's inventory.

In the above context, this paper intends to track the various interventions by relevant ministries/departments at the Union Government level under the low carbon frameworks, in order to provide a reference document for tracking sustainable transport in the context of climate change policy-makers, researchers, international organizations and other stakeholders. To finance low-carbon transport under Avoid (Integration of better land use planning and transport networks or strengthening of public transportation system) –Shift (shifting from motorised transport to more energy efficient non-motorised transport system) –Improve (promotion of clean fuel) framework, several funding mechanisms are available within the domestic and international policy settings.

In this paper, the scrutiny of budget entails largely the extent of public provisioning to mitigate the effects of climate change and also measures the magnitude of budgetary outlays needed to embark on a low-carbon economy path. The present assessment of public expenditure can also be the starting point for the prioritisation between alternative applications of the scarce resources. This study makes an assessment of the alignment of public finance resources with stated policy objectives. This can serve as an input to the planning and budget process, contributing to the selection, prioritisation and allocation of resources to expenditure programmes. Further, it can also highlight policy objectives that require additional financing and generating resources by opening up dialogue with development partners.

2. Methodological Framework for Tracking Public Expenditure for Low Carbon Transport

The paper maps the various interventions by relevant ministries/departments at the Union Government level under the low carbon framework. To finance low-carbon transport under A-S-I framework, several funding mechanisms are available within the domestic and international policy settings. However, the study limits its scope only on assessing domestic policy and spending priorities in the country.

The methodological framework for assessing expenditure priorities for low carbon transport is based on certain considerations discussed in previous section. The assessment period is set from 2009-10 to 2015-16 due to two reasons. *First*, being the onset of a comprehensive policy initiative undertaken by the country in the form of NAPCC, which also include focus on low carbon transport within the A-S-I framework; *Second*, several interventions are being implemented since 2007-08 after the formulation of first ever National Urban Transport Policy (NUTP) in India. Although these two policy initiatives are of recent origin, Government has been spending on key transport sectors like Railways and Shipping (IWT). The assessment of budgetary allocation by the Union Government over this period attempts a comprehensive estimation of low carbon transport expenditures in the country.

Several classifications of expenditure are attempted in the methodological framework, while looking into supply side interventions by various departments and ministries having any component under the A-S-I frameworks (**See Annexure I**). This led to the classification of expenditures as *Directly Related* and *Indirectly Related*. Directly related expenditures are considered to be all those expenditures which have all the inputs of low carbon transport measure, for example budgetary allocation for various Metro-rail projects (shift), budgets for electrification of railways traction (improve), budgets for National Mission on Sustainable Habitats (Avoids). However, certain interventions are partially related to the A-S-I framework and are categorised as *indirectly related* expenditures. For instance, the JNNURM as a flagship scheme has urban development components like construction of sewerage, sanitation, drinking water facilities besides developing transport facilities. This classification is an attempt to bracket expenditures under “Liberal” and “Conservative” estimates, in the context of their direct and indirect impacts on promoting low carbon transportation.

The budget tracking of transport sector can be undertaken by looking into the expenditures made out of the Revenue Account, Capital Account and expenditures made as Loans for transport and related projects. *Revenue Expenditures* are those expenditures which do not have anything to do with creation of assets or reduction of liabilities of the government. These are mostly recurring expenditures that the government incurs periodically. *Capital Expenditure* is usually meant for increasing the government's assets or reducing its liabilities (non-recurring expenditures). It is generally used to create infrastructure facilities. Loans and external aided projects are also classified as Capital Expenditures.

Another important classification is the *Plan* and *Non-Plan* expenditure. Plan Expenditure refers to government expenditure which is meant for financing the programmes and schemes framed under the ongoing Five Year Plan or the unfinished programmes and schemes of the previous Five Year Plans. All kinds of expenditure on any programme under a specific Five Year Plan in its duration, whether revenue or capital in nature, is treated as plan expenditure. However, once a Plan programme or scheme completes its duration, the expenditure towards the maintenance of the assets/ infrastructure created (if any) and a salary of staff running the programme is no longer treated as Plan Expenditure. In short, all expenditure by the government which are not included in the Plan Expenditure are called Non-Plan Expenditure. A scrutiny of Detailed Demands for Grants on specific programme as identified under **Annexures 1-4** provides key components of expenditures in both Plan and Non-Plan heads.

Finally a broad level observation can be made about the magnitude of budgets going for the low carbon transport under A-S-I framework. A trend analysis of budgetary data since 2008-09 till 2013-14 may reflect the overall priority

attached to the sector. A closer scrutiny of budgets of key ministries pertaining to transport set the sectoral expenditure priorities based on the objectives and deliverables of the interventions that promote low carbon transportation. Interventions translated into spending in budgetary heads may not have similar nomenclatures in the budgets documents; hence attempts have been made to look critically at the budgets of the programmes.

2.1 Significance of Public Expenditure in Low Carbon Transport Sector in India

Public spending is considered as an important and necessary source of financing low carbon measure in key sectors like transport. While developing countries are not bound by emission reduction targets, they are encouraged to adopt low carbon development policies which have economic consequences as well. Early investment in low carbon sector avoids locking-in an environmentally destructive long-term development path.

At the institutional level, the responsibilities of transport system in India are divided between the Union and State Governments. In broad terms, the Union Government is responsible for railways, national highways, major ports & international shipping, civil aviation and national inland waterways. State Governments are responsible for state and rural roads, minor ports and coastal shipping, inland water transport, urban transport, trucking and intercity bus services. This division of responsibility is not absolute as the Union Government also plays a role in coastal shipping, motor vehicle transport, and urban transport through policy formulation, regulations, and financial support. **(See Annexure I for various interventions initiated by the Union Government in this sector after 2005-06).**

As road transport is a State subject, most of public provisioning is incurred through respective state budgets. However, it can well be assumed that significant interventions under A-S-I (specifically the modal shifting) have inter-state implications and hence can fall under the Union Government's jurisdiction. While 'urban transport', 'rural road and bridges' subjects fall within the purview of the State List, other important inter-state transportation such as Railways, Shipping, Inland Water Transport, Aviation, and other transport measures fall under the jurisdiction of the Union List⁶. Pertaining to Union jurisdiction, the responsibility for each mode resides in a specific ministry within the Union Government. Convergences of interventions of these ministries take place while formulating policies and executing policy decisions.

The fact that not only larger policy mandate lies with the Union Government on transport sector, but also the capacity of incurring huge expenditure to develop the sector is with Union Government. Given that the Centre spends more than all the States put together, the assessment of expenditure priorities for the transport sector in the Union Budgets become much more critical. The country has put in significant public investment in the core sectors of economy since independence. From approximately Rs. 2000 crore in the First Plan, the plan outlays in the 11th Plan have gone upto Rs. 36,00,000 crore. Certain carbon-intensive core sectors of the economy such as Energy, Transport, Industry and Minerals, Agriculture and Allied activities, Rural Development, etc. have attracted high public investment and are at the forefront of national planning and budgeting (Table1). Energy and Transport sectors have received approximately 23 percent and 15 percent budgetary spending respectively since 7th Five Year Plan.

⁶ The Constitution of India mandates the Centre to mobilize revenue through levy of taxes on subjects listed in the Union List (97 subjects) and is also empowered to take policy decisions on the Concurrent List (47 subjects), leaving aside certain subjects in the public policy domain of the State (66 subjects).

Table 1: Central Government Expenditure for Transport Sector in India (in Rs. crore)

Financial Year	Non-Plan Exp. (1)	Plan Exp.* (2)	Total Budget for Transport (1+2)	Plan Exp. as % of Total Central Plan	Total Transport Exp. as % of Total Exp.	Total Transport Exp. as % of GDP**
2008-09	1910	78269	80179	20.2	8.9	1.44
2009-10	1720	86453	88173	21.2	8.6	1.35
2010-11	3139	94205	97344	20.3	8.1	1.27
2011-12	2382	107531	109913	21.1	8.4	1.22
2012-13 RE	2608	103023	105631	18.5	7.4	1.05
2013-14 BE	3541	133488	137029	19.6	8.2	1.20

Note: * this includes the GBS and IEBR Components; ** The GDP estimates for the year 2011-12 is calculated on the first revised estimates (1RE) and the estimate for the year 2012-13 is the advanced estimate (AE) by the CSO. For the year 2013-14, Ministry of Finance projected GDP assuming growth at 14 percent over the previous year.

Source: Compiled from Expenditure Budget (Vol.1) of various years.

Similarly, while analyzing the last six annual budgets of the Union Government, it can be inferred that high priority was given to the transport sector as 8.2 percent of total budget and 1.2 percent of GDP in FY 2013-14 was allocated (see Table 2) to transport. Pertaining to public investments in key areas of transport sector, Railways and Road & Bridges received higher public spending. On the other hand, sectors like shipping and inland water transport are under-prioritised. While Railways, due to its separate budget and huge infrastructural layout and capacity, receive nearly 46.6 percent of Central Plan budget on transport, the road and bridges component, which involve investments on national highways, assistance to State under rural roads under the programme *Pradhan Mantri Gram Sadak Yojana* (PMGSY) appropriates nearly 41 percent of the total budget of the transport sector.

Table2: Central Plan Expenditure in important Transport Sector in India (in Rs. crore)

	2009-10	2010-11	2011-12	2012-13 RE	2013-14 BE
Railways	38867	39857	47001	51163	62261
Ports and Lighthouses	1261	1381	1920	2665	4749
Shipping	1119	3277	1908	2570	2034
Civil Aviation	11148	6142	3866	9268	8865
Road and Bridges	33842	43363	52654	37155	55304
Inland Water Transport	127	134	113	98	120
Other Transport Services	90	50	69	104	155
Total	86453	94205	107532	103023	133488

Source: Compiled from Statement 13, Expenditure Budget (Vol-1) for various years.

The allocation for low-carbon interventions under the overall transport budget, as provided above, needs a detailed analysis of various components of such interventions and their budgetary allocations under the Avoid/Reduce-Shift-Improve (A-S-I) framework. Even though some of the line ministries can be categorized as low-carbon, in hindsight, due to its overall mandate to formulate policies and jurisdictions for implementing measures towards low carbon transport measures, there is a requirement for the identification and scrutiny of only those measures which directly enforce A-S-I framework (**See Annexure I for various interventions initiated by the Union Government in this sector after 2005-06**).

2.2 Sources of Information

A mapping of the programme and scheme guidelines falling under low carbon transport sector can be captured from various budget documents. The policy guidelines provide information on the key objectives of such interventions. Besides, the study of *Outcome Budgets* and *Annual Reports* of relevant ministries also provide information on interventions of the programme, key deliverables of the intervention and progress made in a particular year.

Budgetary information at the aggregate level could be compiled from the *Expenditure Budget (Vol-1 & 2)*. An analyses of the *Detailed Demands for Grants* of various ministries and departments have been used to capture the broad expenditure classification at the level of Plan and Non-Plan, Capital and Revenue, under various budgetary heads. Also to further classify expenditures at the Object Head level such as salary, administrative expenses, professional expenses, and budget for capital assets creation, *Detailed Demands for Grant (DDGs)* is used. This analysis can be case specific in order to show expenditure priorities within a specific intervention. Moreover, this paper also provides Actual Expenditure figures for some of the previous years. Aggregate level information on Gross Budgetary Support⁷ and Internal and Extra Budgetary Resources (IEBR)⁸ which is reflected in budgetary heads such as *Investment in Public Enterprises* is significantly relevant to trace LCE expenditures in the transport sector and have also been captured. Certain interventions under 'Improve' and 'Shift' frameworks are in terms of IEBR, hence a detailed scrutiny may not be feasible due to lack of disaggregate level of budgetary information in the budget documents.

2.3 Limitations of the Study

While assessing the expenditure for low carbon transport sector, the methodology is subject to certain limitations. First, there are schemes and programmes which may not be defined under low carbon parameters but may possibly contribute to the growth of LCE in the transport sector. For instance, urban planning and development programmes is one such example. Besides, the investments on road and bridges which have been partially met through the Central Road cess may contribute to the growth of Low Carbon Transportation. Similarly all the policies analysed above may not have similar budgetary heads, hence its semblance may appear in some schemes and programme. Second, recurring expenses like housing for railways staff can be considered as low carbon expenditure; however, this may not fall within the methodological considerations.

Another important limitation is observed in terms of the scope of analysis at the Union Government level. In this, one is clearly overlooking the combined expenditures of States which is nearly 44 percent of the total public expenditure in the country. It also fails to capture some important ULBs in several metropolis including Brihan Mumbai Municipal Corporation and Municipal Corporation of Delhi, whose annual budgets are bigger than the budgets of some of the states in India. Moreover, there are private investments in the infrastructure sector in the country which are out of the purview of this analysis. Also, to capture the public expenditures for LCE in the transport sector, actuals figures have not been available in certain interventions. The study intends to refer to the Revised Estimates (RE) and Budget Estimates (BE) on a case-by-case basis. Finally, mere budget allocations do not translate into effective utilisation of funds. The study has not delved into issues of utilisation and implementation within these sectors.

⁷ Gross Budgetary Support (GBS) is the total size of the plan which includes Central Assistance to State and UTs, and Budget Support for the Central Plan. It can be traced at the level of departmental budgets and also at the overall Union Budget for a particular financial year.

⁸ IEBR is an important part of the Central Plan of the Government of India and constitutes the resources raised by PSUs through profits, loans and equity.

3. Description of Avoid/Reduce-Shift-Improve (A-S-I) Framework

The policy decision for mitigation in transport sector is a complex exercise. Interventions in this area are characterised by large and long term low carbon investments to enable major infrastructural changes, reducing dependence on a single fuel source, involvement of a large number of stakeholders in the context of transport planning, integration of technology and also ensuring large scale co-benefits for the green economy of the country. This requires huge public investment and adherence to careful planning based on certain key parameters, better known as A-S-I framework in the discourse of low-carbon transportation⁹.

The A-S-I framework consists of a combination of policy measures aimed at (i) avoiding the need to travel, which can be best achieved by the integration of better land use planning and transport networks or strengthening of public transportation system which will instill adequate influence on the private (individual) fuel based vehicle users to shift to public transportation system; (ii) shifting travel to the most efficient and sustainable mode, which in most cases will be either non-motorized or public transport, and also shifting the freight transportation system to more energy efficient and sustainable forms – viz. rail and water transportation system; and finally (iii) improving existing modes of transport through technological improvements to make engines and fuels less carbon intensive (ADB, 2009:9). Several studies have attempted to classify activities which can be considered as low carbon measures in the transport sector (See Table 3 for detailed shift measures as analysed by other studies). Broadly, the following are the key policy interventions have been suggested under several studies for the low carbon transportation under the A-S-I framework:

3.1 Avoid Interventions

- Strengthening public transportation system such as Metro rail, monorails and shuttle bus services.
- Mixed land use planning in cities to bring residential areas and livelihood activities closer with opportunities of low carbon transportation system such as walking and cycling, etc.
- Urban transport planning for expanded road connectivity, less traffic congestion, creation and renovation of parking lots.
- Awareness creation against commuting in private vehicles and incentivising the use of public transport system.
- Development of cycle tracks and footpaths for encouraging pedestrians

3.2 Shift Interventions¹⁰

- Shifting the share of freight transportation from road to railways and waterways.
- Modal shift from passenger transport to public transport.

3.3 Improve Interventions

- Promotion of CNG, electric and LPG Vehicles.
- Explore the opportunities of developing hydrogen fuel vehicles.
- Promoting and enforcing fuel economy standards / labels in vehicles.
- R&D support for technical improvements to reduce tyre and engine friction.
- Lower vehicle weight and increase aerodynamics efficiency.
- Low carbon vehicle technologies need to be mainstreamed, through reduction of customs duties in importing

⁹ Daniel Bongardt, Manfred Breithaup and Felix Creutzig Eschborn (2011), Beyond the Fossil City: Towards Low Carbon Transport and Green Growth, Sustainable Urban Transport, Technical document # 6, Bonn: GIZ Transport Policy Advisory Services; K. Sakamoto, H. Dalkmann and D. Palmer (2010), A Paradigm Shift towards Sustainable Low Carbon Transport, New York: Institute of Transportation & Development Policy.

¹⁰ The Interim Report (2011) while citing McKinsey (2009) report, consider the two as key shift measures. See **Annexure 1** for detailed shift measures as analysed in other studies.

highly efficient engines, hybrids, plug-in hybrids and electric vehicles.

- Consumer awareness on development and dissemination of efficient tyre and tyre labeling program.
- Energy conservation awareness in commuting with private vehicles.
- Improving the tree canopies around the road to reduce suspended particulate matter and air pollution

Table 3: Studies Identifying Low carbon Parameters in Transport Sectors under A-S-I Framework

Study	“Avoid / Reduce”	“Shift”	“Improve”
Planning Commission (2011:48-55)	<ul style="list-style-type: none"> • Reducing the need for transport through policies to locate industries so as to minimise movement of raw materials and finished products, and urban planning to suit commuting needs. • Promoting non-motorised transport (walking, cycling, cycle-rickshaws etc.) 	<ul style="list-style-type: none"> • Shifting the share of freight transport to rail by making rail freight more attractive • Increasing investment in rail infrastructure (including freight corridors) • Introduce competition, provide time-tabled freight service, increase containerised cargo movement by rail, improve operation efficiency. • Improving the efficiency of road freight. • Promoting public transport system 	<ul style="list-style-type: none"> • Opting for differential efficiencies and fuel taxation • Label individual vehicles on a kmpl basis by either star rating or a mention of the worst and best fuel efficiencies or on the basis of weight • Define a minimum efficiency standard for the country's vehicle fleet
Mckinsey Report (2009:28-29)	<ul style="list-style-type: none"> • Integrate urban planning across transport modes and within cities as transport infrastructure is built 	<ul style="list-style-type: none"> • Modal shift-Shifting freight transport from road to railways and waterways • Increased use of Public Transport-Shifting passenger transport to public transport in tier I, II and III cities 	<ul style="list-style-type: none"> • Improving vehicle efficiency by lowering vehicle weight, reducing tyre and engine friction and improving fuel combustion • Alternative fuel –using biofuels such as ethanol • Introducing hybrid cars and electric two-wheelers
TERI Report (2006:39-58)		<ul style="list-style-type: none"> • Increased share of public transport and rail transport in passenger transport • Increasing the share of rail in freight movement 	<ul style="list-style-type: none"> • Increasing efficiency of vehicles • Introducing cleaner fuels-biodiesels • Increasing electrification of railway tracks

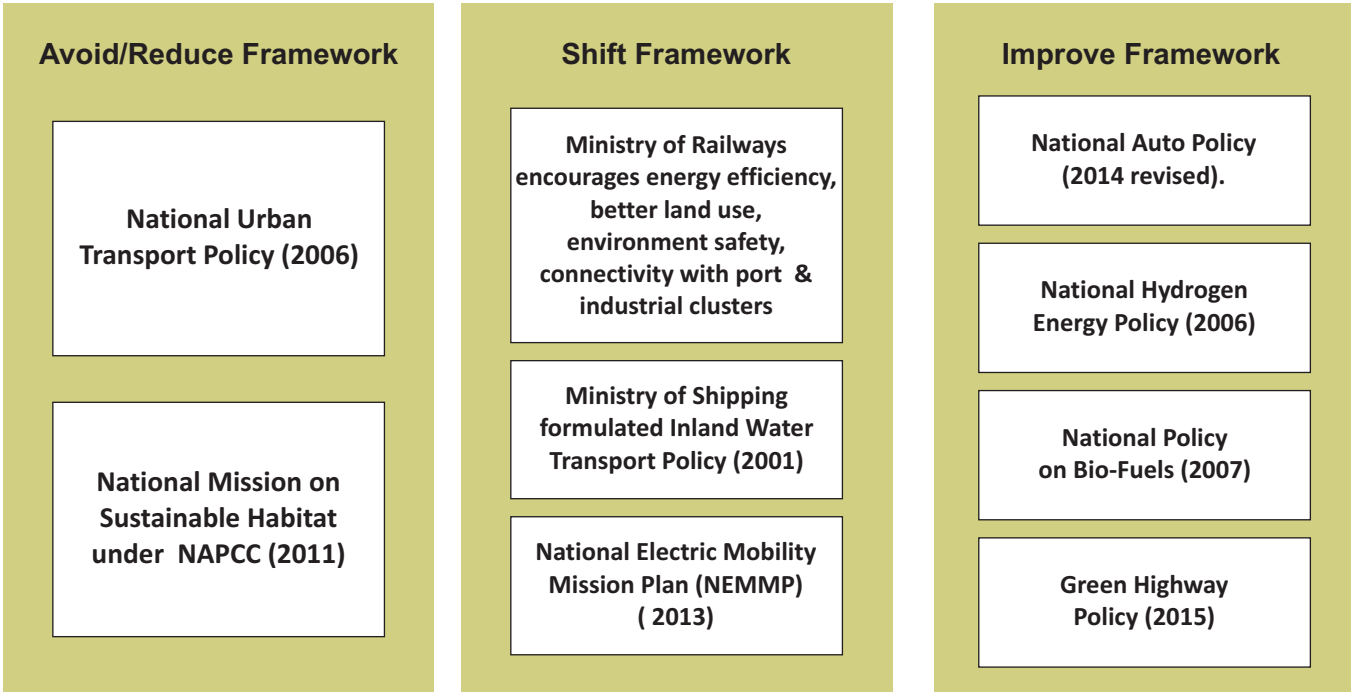
Study	"Avoid / Reduce"	"Shift"	"Improve"
Confederation of Indian Industries (2008:100)	<ul style="list-style-type: none"> • Manage growth in vehicle use (with "carrots" and "sticks") • Coordinate government strategies and activities (transport and land use, infrastructure investments, industrial policy and transport, etc.) 	<ul style="list-style-type: none"> • High quality, affordable mass transit system • Organise and emphasise freight transportation using waterways 	<ul style="list-style-type: none"> • Improve technology (scooters, cars using advanced technologies, e.g. battery operated vehicles, fuel cell) • Formulate and implement fuel economy standards for HMTVs, LMTVs at the maximum rate possible and available technology. • Update/increase the standards on a regular basis. • Improve fuel efficiency by reducing vehicle weight, horsepower or non-critical amenities or by developing step-out technologies
ADB (2009:15)	<ul style="list-style-type: none"> • Avoidance of growth in emissions through urban and rural development that maximises access to housing, jobs, shopping, services, employment, sales, and leisure activities without requiring traversing of long distances in individual light-duty vehicles. 	<ul style="list-style-type: none"> • Shifting transport to modes with intrinsically low-carbon emission per unit of transport provided, e.g. from car or light truck to bus, rail or metro and maintaining high shares of those modes. 	<ul style="list-style-type: none"> • Improving vehicles, fuels, and operators to mitigate emissions in existing and future vehicles and traffic by improving operational efficiency and traffic (transport measures), as well as by selecting different fuels, more efficient vehicle technologies and less powerful, lighter vehicles, which are true "CO₂" mitigation measures.

4. Categorisation of Various Public Policies, Programs and Schemes aiding A-S-I Framework

4.1 Policies aiding low carbon transport under A-S-I Framework

The transport policy landscape in India has evolved extensively with the implementation of several national and sub-national transport policies with the objective of enhancing passenger mobility, improving logistics of freight transport, improving efficiency, promoting penetration of cleaner fuels and vehicles, and reducing air pollution and congestion. Most of these policies of Government of India fall under the A-S-I analytical framework (Chart 1). Inland Water Transport Policy and National Auto Policy are amongst the earliest policies aiding the framework.

Chart 1: Policies under A-S-I Analytical Framework



Improving coastal shipping and inland water-based transport is now receiving some attention and has been mentioned as one of the focus areas in the National Urban Transport Policy and INDC. Policies for alternate fuels, such as the National Electric Mobility Mission Plan and the National Biofuels Policy (NBP) are aimed at increasing penetration of low-carbon fuels and technologies in the country. The Auto Fuel Policy lays down the vision and roadmap for advancing fuel quality and vehicle emission norms in the country.

Recently, Union Ministry of Road Transport and Highways, launched the *Green Highways Policy 2015*. The aim of the policy is to promote greening of Highway corridors with participation of the community, farmers, private sector, NGOs and Government institutions.

The NAPCC (2008) has proposed the following mitigation options for transport sector, whose reference are observed in the above mentioned A-S-I framework:

- Promoting the use of coastal shipping and inland waterways, apart from encouraging the attractiveness of rail-based movements relative to long-distance road based movement
- Encouraging energy R&D in the Indian Railways
- Introducing appropriate transport pricing measures to influence and use of vehicles in respect of fuel efficiency and fuel choice
- Tightening of regulatory standards such as enforcing fuel-economy standards for automobile manufacturers

- Establishing mechanisms to promote investments in developing of high capacity public transport systems (e.g. offer equity participation and/or viability gap funding to cover capital cost of public transport systems)
- Abandoning old vehicles to be made illegal with suitable legislation and fixing the responsibility of handing over the end-of-life vehicle to collection centers on the last owner of the vehicle
- Setting up of a demonstration unit to take up recycling of vehicles. Especially two wheelers which require new technology
- Setting up a combustion research institute to facilitate R&D in advanced engine design
- Providing tax benefits and investment support for recovery of materials from scrap vehicles

4.2 Various Programs and Schemes aiding A-S- I Framework

4.2.1 Policies and Programs aiding “Avoid/Reduce” Framework

Though urban transport is a State subject, several policy measures have also been initiated at the Union level. The Ministry of Urban Development (MoUD) for the first time formulated a comprehensive *National Urban Transport Policy* (NUTP) in 2006, which encouraged greater use of public transport and non-motorised modes and use of cleaner technologies by offering financial assistance to the urban local bodies in the country¹¹. The NUTP suggested a comprehensive strategy which included integrated land use and transport planning, equitable allocation of road space, priority attached to the use of public transport, quality and pricing of the public transport system, and various technologies for the public transport infrastructure.

Box 1: New initiatives such as Smart Cities Mission and Atal Mission for Rejuvenation and Urban Transformation (AMRUT) and its component with respect to Transport sector

The objective of AMRUT is to provide basic services (e.g. water supply, sewerage, urban transport) to households, build amenities in cities for improving the quality of life for all, especially the poor and the disadvantaged.

Smart Cities Mission is an area-based development programme. Some of the strategic components of the mission are city improvement (retrofitting), city renewal (redevelopment) and city extension (Greenfield development) plus a pan-city initiative in which Smart Solutions are applied covering larger parts of the city.

Some of typical features of AMRUT schemes and Smart Cities Mission particularly with respect to transport sector are as follows:

- Reduce pollution by switching to public transport or constructing facilities for non-motorised transport (e.g. walking and cycling) under AMRUT scheme;
- Promoting a variety of transport options - Transit Oriented Development (TOD), public transport and last mile para-transport connectivity under Smart Cities Mission;
- Creating walkable localities – reduce congestion, air pollution and resource depletion, boost local economy, promote interactions and ensure security. The road network is created or refurbished not only for vehicles and public transport, but also for pedestrians and cyclists, and necessary administrative services are offered within walking or cycling distance under Smart Cities Mission.

¹¹ The NUTP (2006) is available at http://moud.gov.in/sites/upload_files/moud/files/pdf/TransportPolicy.pdf

MoUD offers financial support for investments in public transport, infrastructure for greater use of non-motorized modes, construction of parking facilities and demonstrative pilot projects. It encourages capacity building at institutional and individual levels, innovative financing mechanisms, institutional coordination, association of the private sector and need for public awareness and cooperation (**See Annexure 2 for various interventions initiated by the Union Government under “Avoid” strategy**). The Ministry has also introduced service level benchmarks to assess the progress and improve service delivery by ULBs in such programmes¹².

To boost urban infrastructure, two sub-missions - Urban Infrastructure & Governance (UIG) and Urban Infrastructure Development Scheme for Small and Medium Towns (UIDSSMT) was launched under the flagship programme of *Jawaharlal Nehru National Urban Renewal Mission* (JNNURM) in 2005. The focus of this intervention was integrated development of urban infrastructure. UIG had a focus on 65 major cities in the country whereas UIDSSMT covered other smaller cities. The most important aspect of JNNURM is that it is a reform based Mission with union financial assistance. Reforms envisaged under JNNURM were made conditional that should be met by the states and cities to avail such assistance. Some of these conditions are preparation of the Comprehensive Mobility Plan integrating land use and transport planning, setting up of Unified Metropolitan Transport Authority, setting up a Dedicated Urban Transport Fund at State and city level, approval and implementation of transit oriented development policy, parking policy and advertisement policy, setting up of a city specific Special Purpose Vehicle (SPV) for managing the city bus operations, setting up of Traffic Information and Management Control Centre etc.

However, with the change of Government, Budget 2015-16 announced revamping of JNNURM program as three Umbrella schemes which are, **Atal Mission for Rejuvenation and Urban Transformation (AMRUT)**, **Swachh Bharat Abhiyan Shahari** and **Smart Cities Mission**. Amongst these, AMRUT and Smart Cities Mission has core mission of urban rejuvenation and inclusive urban development covering some features for development of transport sector (See Box 1).

Besides interventions through JNNURM to implement various components of the NUTP, the MoUD has launched a several schemes such as *Capacity Building in Urban Transport*, *Urban Transport Planning Scheme* and *Sustainable Urban Transport Project* (SUTP) Scheme.

Other mission of relevance for low carbon transport development is the *National Mission on Sustainable Habitat* (2011). This is one of the eight missions under the NAPCC. The mission has highlighted the need for a sustainable urban transport system. An emphasis was put on integrated land use and transportation plans, achieving a modal shift from private to public mode of transportation, encouraging the use of non-motorised transport, improving fuel efficiency and encouraging use of alternate fuels.

4.2.2 Policies and Programs aiding “Shift” Framework

The policy measures under “Avoid/Reduce” component in the previous section are mostly administered by MoUD. The “Shift” interventions require modal shifting from motorised transport to more energy efficient non-motorised transport system such as using railways and waterways as preferred ways of freight movement¹³. The “Shift” component requires long-term infrastructural planning and investment. The important ministries for such interventions are the Ministry of Railways and Ministry of Shipping (**See Annexure 3 for various interventions initiated by the Union Government under “Shift” Strategy**).

¹² The Service Level Benchmarking (SLB) for Urban Transport have identified for the following areas of intervention: (a) Public transport facilities, (b) Pedestrian infrastructure facilities, (c) Non-Motorized Transport (NMT) facilities, (d) Level of usage of Intelligent Transport System (ITS) facilities, (e) Travel speed (Motorised and Mass Transit) along major corridors, (f) Availability of parking spaces, (g) Road safety, (h) Pollution levels, (i) Integrated land use transport system, (j) Financial sustainability of public transport.

¹³ See Table 1 for changes in modal shifting from 1951 to 2008

The Indian Railways is the world's largest state-run railway establishment providing passenger and freight services. It is a single system which consists of 64,410 km of track on which more than 19,186 trains ply, carrying more than 25 million passengers and hauling nearly 2.5 million tonnes of freight daily. The railway service is rendered through a nationwide rail infrastructure covering tracks, stations, sidings, freight terminals, locomotives, coaches and wagons and an array of infrastructure inputs like signaling, telecom, electrical installations, maintenance workshops, etc. As compared to road transport, the railway is more efficient in energy consumption and land use and significantly more superior from the standpoint of environment impact and safety.

Besides railways, Inland Waterways Transportation (IWT) is another cost effective and climate friendly mode of transport. The IWT in India includes river systems, canals, back-waters, creeks and tidal inlets which can be developed as commercially viable waterways. As the rail and road modes of transport are overburdened and congested, IWT need to be actively developed to take reasonable share in the inter-modal mix of inland transport. An optimal mix of road, rail and inland water transport can provide an efficient transport system with high mobility, flexibility and cost effectiveness. The Ministry of Shipping formulated the IWT Policy (2001) with a major thrust on increasing the coverage of National Waterways through creation of necessary infrastructure for shipping and navigation.

4.2.3 Policies and Programs aiding “Improve” Framework

Fuel efficiency constitutes the core component of the Improve policy framework. This can be ensured with the induction of cleaner alternative fuels; improving vehicle technologies through R&D, setting standards in fuel efficiency of operational vehicles fleets, etc. **(See Improve Section in Annexure 3)**. Several initiatives have been undertaken by the Union Government to improve energy efficiency in transport sector since the unveiling of National Auto Fuel Policy (2003) and subsequent revision in policy with the formation of a New Fuel Policy Committee in January 2013. Broadly, the policy gives a roadmap for achieving various vehicular emission norms over a period of time and the corresponding fuel quality upgradation requirements¹⁴. The starting point recommendations for New Auto Fuel Policy Committee were; mandating 10ppm Sulphur fuel nationwide by 2020; target to reach Bharat VI fuel quality standards by 2020.

Besides National Auto Policy, several policy initiatives have been unveiled to increase alternative fuels for the transport sector. Specific reference can be made to the National Hydrogen Energy Roadmap (2006) and National Policy on Bio-Fuels (2007). Hydrogen can be used directly as a fuel for producing mechanical / electrical energy through internal combustion engines. It can also be used in fuel cells to generate electricity for stationary, portable and transport applications. The National Hydrogen Energy Road Map has visualised that by 2020, one million hydrogen fueled vehicles, mostly two and three wheelers and 1000 MW aggregate hydrogen based power generation capacity would be established in the country. A total investment requirement of Rs. 25,000 crores has been projected to create this capacity by 2020, including Rs. 1000 crores for R&D and demonstration activities¹⁵.

Fuel Cell Vehicles (FCV) fueled by hydrogen has high efficiency with zero CO₂ emission (zero tailpipe emissions)¹⁶. The Ministry of New and Renewable Energy (MNRE), as the nodal ministry for this sector, has been implementing a broad based Research, Development and Demonstration Programme on Hydrogen Energy and Fuel Cell Technologies for more than two decades **(See Annexure 4 for various interventions initiated by the Union Government under “Improve” Strategy)**. To provide cleaner fuel for the transport sector and work towards climate change mitigation,

¹⁴ National Auto Policy Announced, PIB Press Release (06 October 2003), see URL <http://pib.nic.in/archieve/Ireleng/tyr2003/roct2003/06102003/r0610200313.html> (As Accessed on 14 July 2013).

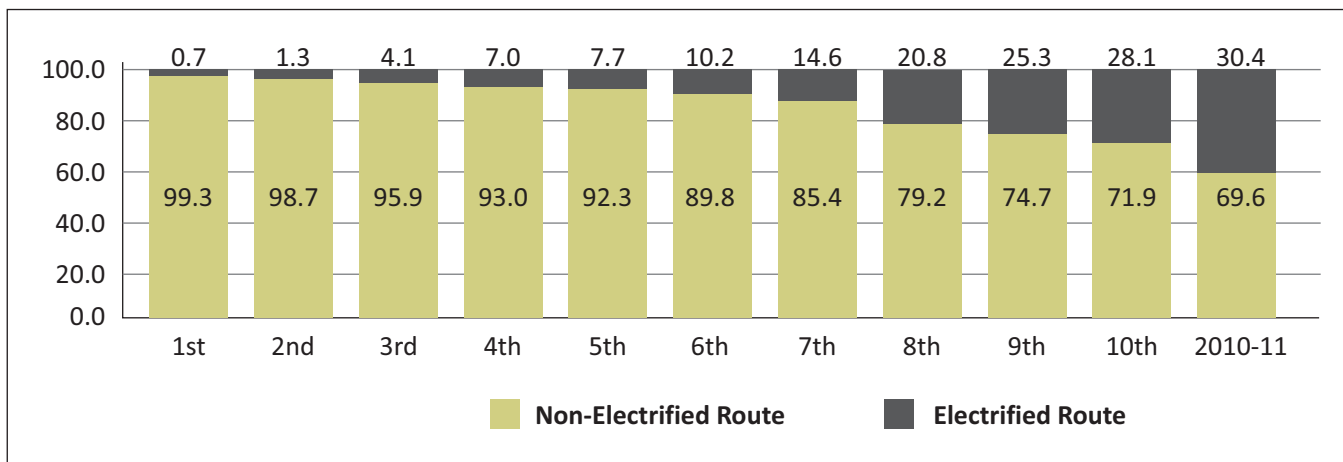
¹⁵ National Hydrogen Energy Roadmap, PIB Press Release on 01 June 2007. See URL <http://www.pib.nic.in/newsite/erelease.aspx?relid=28385> (As Accessed on 14 July 2013)

¹⁶ 'National Mission on Sustainable Habitat' in National Action Plan on Climate Change (page 31)

MNRE has launched the National Policy on Bio-fuels (2007) to promote cultivation, production and use of biofuels to substitute petrol and diesel. A target of 20 percent blending of biofuels, both for bio-diesel and bio-ethanol, by 2017 is proposed¹⁷.

Besides improving fuel efficiency, several initiatives by the Railways, especially in the traction sector, also falls under the “Improve” framework. Electrification of railway tractions has increased particularly in the 11th Five Year Plan period, even though the electrification process of traction dates back to 1925. During the 11th Plan period, originally 3,500 km of rail route was targeted for electrification which has been reset to 4,500 km route in the mid-term appraisal of the Plan period¹⁸. By the end of the year 2010-11, around 30 percent of the total rail route kilometres were electrified). Railways have also targeted to increase the electric locomotives and coaches for increasing efficiency in the sector (see Fig.2).

Figure 2: Share of Electrified Route in Indian Railways since Ist Five Year Plan (in %)



¹⁷ National Policy Bio-fuels is available with MNRE website, See URL http://mnre.gov.in/file-manager/UserFiles/biofuel_policy.pdf (As Accessed on 14 July 2013)m, (j) Financial sustainability of public transport.

¹⁸ Executive Summary of the Working Group Report on Railways for the 12th Plan.

5. Budget and Strategy Analysis

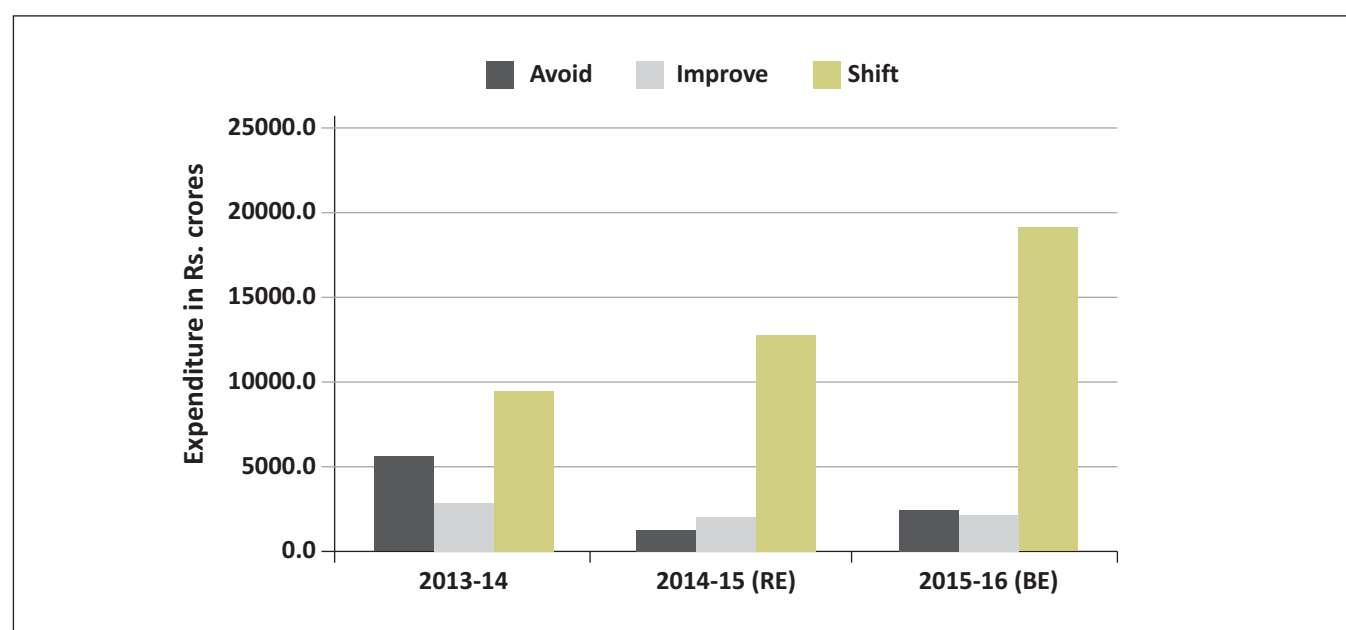
Annexure 1-4 provides information on relevant program and schemes of various ministries with scope analogous to the strategies defined on A-S-I methodological framework. Data on Budgetary allocation for various program and schemes has been presented in **Annexure 5** for last seven years (2009-10 to 2015-16). Following sections provide few observations from an analysis of the budget for low carbon development of transport sector based on A-S-I framework.

Need to Balance the Activities under A-S-I Strategies

The Ministry of Urban Development is predominant looking after the strategies under “Avoid” framework while the Ministry of Petroleum & Natural Gas, the Ministry of Railways and the Ministry of Shipping are looking at the strategies under “Improve” and “Shift” framework respectively.

The maximum expenditure incurred under each of the three strategies of A-S-I framework in the last three years, *was under the “Shift” strategy* (See Figure 3). This is largely due to huge expenditures incurred by the Ministry of Railways which is a dedicated ministry with a separate budget. There is relatively much less budgetary allocation for “Avoid” and “Improve” Strategies. However there have been increasing policy attention as it appears from large number of programmes and schemes under these two categories.

Figure 3: Total Expenditure under each Strategy in the A-S-I Framework



Source: Budget compilation presented in Annexure 5

Need for Performance Review of JNNURM Programme

Within the “Avoid” strategy frame, JNNURM was the flagship program which had been roll backed recently with launch of new programs such as “Smart Cities Mission” and “AMRUT”. Accordingly budgetary allocation has been shifted towards these two newly launched programs in the last Union Budget. There is a drastic reduction in budgetary allocation for JNNURM from Rs. 2381 crore in 2013-14 to merely Rs. 14 crore in Union Budget 2015-16 while budget of “Smart Cities Mission” has seen major allocation from Rs. 240 crore in 2014-15 to Rs. 2002 crore in budget 2015-16. According to a media report, there is a loss of nearly Rs. 40 crore due to an abrupt roll back of the

JNNURM program¹⁹. There is a need to have a mechanism of performance review and appraisal before rolling back of a program so that learnings can be incorporated in future programs.

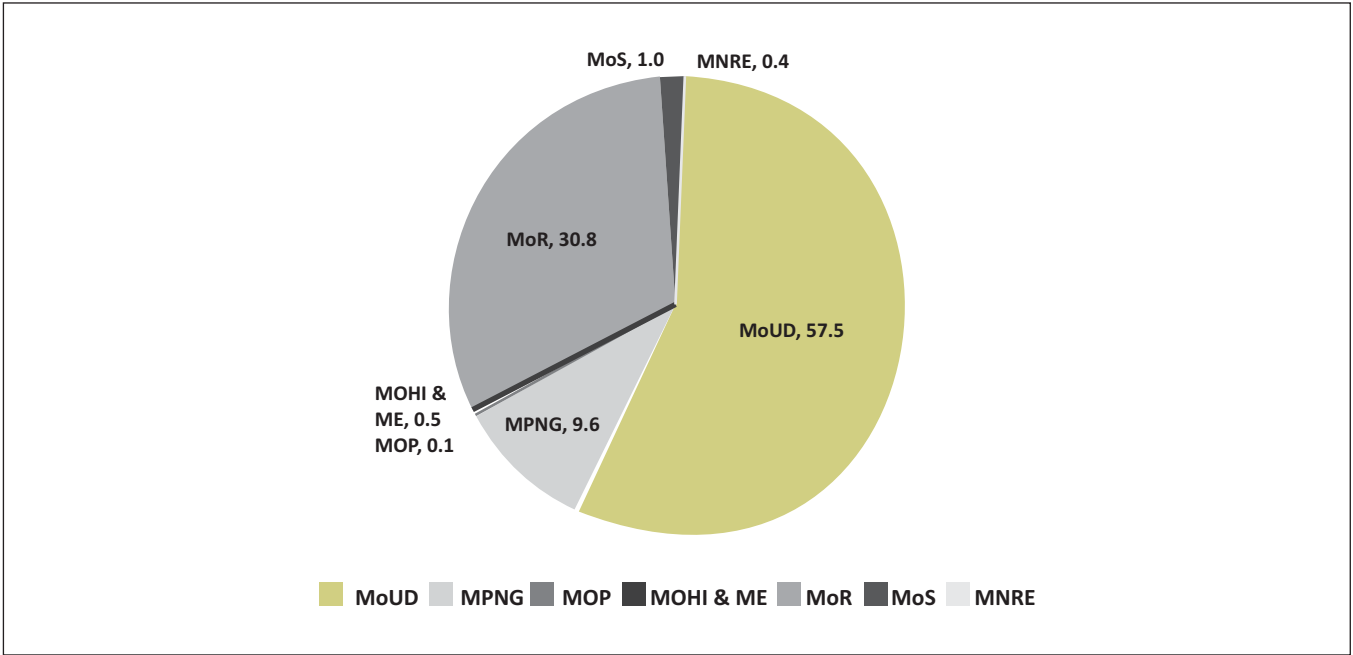
Need to Encourage Financial Allocation for Energy Conservation and Promotion of Clean Fuels and Electric Vehicles

Under the “Improve” Strategy, fuel quality improvement, energy efficiency, encouraging clean fuels are the major activities being implemented. Within these activities, it is observed that xxxxxx attention is being paid towards improvement of fuel quality with maximum budgetary allocation as the Ministry of Petroleum and Natural Gas is the dedicated ministry implementing fuel refining programs. There is also a need to allocate xxxxxxxx budget for other programs related to energy efficiency and promotion of clean fuels/electric vehicles such as Research, Design and Development program in New and Renewable Energy by MNRE; National Automotive Testing, R&D Infrastructure Project, Scheme for Testing Infrastructure and R&D Projects for Electric Vehicles by the Ministry of Heavy Industries and Small Enterprises, the current budget allocation for these interventions stand at merely few Rs.100 crores.

Coordination among the Implementing Ministries

Currently there are a number of ministries and agencies responsible for compliance and enforcement in India. There is a clear lack of coordination among these institutions. There is also a need for a clear demarcation of roles and responsibilities of various ministries. Figure 4 presents share of expenditure budgeted by various ministries in 2015-16 for low carbon development of transport sector under A-S-I framework. It shows that Ministries of Urban Development and Railways are the largest spending ministries while the other ministries' share is comparatively much less despite their significant role in the implementation of LCD strategies.

Figure 4: Share of Exp. by various Ministries in 2015-16



Source: Estimates of budgetary allocation in year 2015-16 for various programs aiding to A-S-I framework (See Annexure 5)

²⁰ The Hindu Newspaper Article: Centre puts the brakes on JNNURM research projects, capacity building, September 2015, Available at <http://www.thehindu.com/news/national/centre-puts-the-brakes-on-jnnurm-research-projects-capacitybuilding/article7686250.ece>

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Annexure 1: Tracking Low Carbon Expenditure Heads in Transport Sector

Broad measures for Low Carbon Economy in the Transport Sector	Implementing Ministries ²⁰	Programmes/Schemes	Expenditure Classification and Source Document
Shift in the share of passengers using private transport to public and non-motorised transport system. Expanding road and vehicles lanes	Ministry of Urban Development (MoUD) ²¹	Jawaharlal Nehru National Urban Renewal Mission (JNNURM): Sub-Mission for Urban Infrastructure and Governance (UIG) (JNNURM Guidelines 2006) Components which are captured under UIG: <ul style="list-style-type: none"> Urban Transport, including roads, highways/expressways/ MRTS/metro projects. Parking lots/spaces on Public Private Partnership basis. 	<ul style="list-style-type: none"> Central Plan Assistance is provided by the Ministry of Finance to States and UTs (Outcome Budget 2011-12, MoUD)
Promoting Metro, light rail transits within city Developing waterways /shipping for passengers	Ministry of Urban Development (MoUD)	Investment through Public Enterprises to promote Metro rail in the country particularly in Delhi, Chennai, Bangalore, Kolkata and other cities (Outcome Budget 2011-12, MoUD).	<ul style="list-style-type: none"> Central Equity investment for assets creation (capital outlay) Loans and Advances to Delhi Metro Rail Corporation, Bangalore Metro Rail Corporation, Bangalore Mass Rapid Transit System, Kolkata East West Corridor Project, Chennai Metro Rail Corporation, other Metro Projects (Assistance from JBIC-Japanese Bank for International Cooperation) Subordinate Debt - Interest free loan to Delhi Metro Rail Corporation, Bangalore Metro Rail Corporation, Kolkata Metro Rail Project, Chennai Metro Rail Corporation, other Metro Projects (Detailed Demands for Grants 2011-12, MoUD)

²⁰ The matrix intends to capture the expenditure side of departmental budgets.

²¹ Under the Budgets of the Ministry of Urban Development, the Matrix intends to capture the transport components of the JNNURM programme

Ministry of Urban Development (MoUD)	Urban Transport Planning: The scheme aims to cover a wide gamut of urban transport matters for promoting comprehensive & integrated urban transport planning, integrated land use and transport planning, comprehensive mobility plans, preparation of DPR, clean development mechanism (CDM). The schemes deliverables are Traffic & Transportation Studies; Comprehensive mobility plan; Detailed Project Report (DPR) for MRTS Projects; Regional Rapid Transit System (RRTS) (<i>Outcome Budget 2011-12, MoUD</i>).	<ul style="list-style-type: none"> Central Assistance to States and UTs for transport planning (<i>Outcome Budget 2011-12, MoUD</i>).
	National Mission on Sustainable Habitat: The Mission objective is to promote sustainability of habitats through improvement in efficiency in building, urban planning, improved management of solid/liquid waste including recycling and power generation, Modal shift towards public transport and conservation. (<i>Outcome Budget 2011-12, MoUD</i>)	<ul style="list-style-type: none"> Administrative Expenses Professional Services Grants-in-aid-General Grant-in-aid-for creation of Capital assets (<i>Detailed Demands for Grants 2011-12, MoUD</i>)
Ministry of Railways ²²	Construction of New lines, Doubling, Conversion to Broad Gauge, Maintenance and Repair of old lines and machines. (<i>Railway Budget 2011-12</i>)	No such expenditure class given in the Railway Budget
Ministry of Railways	Metropolitan Railways Projects (<i>Railway Budget 2011-12</i>)	No such expenditure class given in the Railway Budget

²² In the absence of disaggregated data, attempt has been made to capture only those expenses which promote the shift of private transport to rail transport.

Modal shifts of freights from road transport to other modes such as rail and wherever required using water/shipping transport as medium of increasing domestic freight operation.	Ministry of Shipping ²³	<p>Inland Water Transport: This Centrally Sponsored Scheme has provision of financial assistance of 90 to 100 per cent grant-in-aid for various IWT activities – surveys / studies, waterway development navigation aids, terminal facilities, procurement of vessels for development and regulation etc. Under this there are provisions for the development of water Transport Services –Grants to Inland Water Transport Authority of India (IWA). IWA is implementing projects for providing IWT infrastructure namely fairway, terminals and navigational aids with the objective of making them fully functional. With this infrastructure in place these waterways are in a position to act as 'dedicated IWT freight corridors'. (<i>Outcome Budget 2011-12, Ministry of Shipping</i>)</p>	<ul style="list-style-type: none"> • Training and Research • Grants to Inland Water Transport Authority of India and also for the creation of Capital Assets • Salaries and Wages <p>(<i>Detailed Demands for Grants 2011-12, Ministry of Shipping</i>)</p>
	Ministry of Shipping	<p>Development of Ports Sector: Development of the Major ports with the objective to provide necessary and adequate cargo handling capacity to meet India's EXIM trade requirement, a major portion of which is borne by the sea route (Outcome Budget 2011-12, Ministry of Shipping). Under this the following ports are covered</p> <ul style="list-style-type: none"> • Rail Connectivity Project of Cochin Port Trust • Capital Dredging Project of Cochin Port Trust • Capital Dredging Project of Paradip Port Trust • Loans (External Aided Project- JBIAC) to Visakhapatnam Port Trust • Capital Dredging Project of Tuticorin Port Trust • Capital Dredging Project of Ennore Port Ltd. • EAP Loan to Mormugao Port Trust • Dredging and Survey Organisation • Development of Minor Ports • Expenditure for Research and Development Schemes <p>(<i>Demands for Grants 2011-12, Ministry of Shipping</i>)</p>	<ul style="list-style-type: none"> • Grants-in-aid General • Subsidies • Dredging and Surveying • Salaries of the employee • Directions and Administration • Research and Development <p>(<i>Detailed Demands for Grants 2011-12, Ministry of Shipping</i>)</p>

²³ In the Ministry of Shipping, attempt has been made to capture those budgetary heads which facilitate domestic water shipping and minor and major ports in the country which increased freight operations.

	Ministry of Railways	Dedicated Freight Corridors (Railways Budget 2011-12)	No such expenditure class given in the Railway Budget
Improve fuel efficiencies in the transport sectors.	Ministry of Railways	Electrification Projects (Railways Budget 2011-12)	No such expenditure class given in the Railway Budget
	Ministry of New and Renewable Energy (MNRE)	Research, Design and Development in New and Renewable Energy: Under this programme, Ministry is promoting new technologies like Hydrogen Energy, Fuel Cells, Electric and Hybrid electric Vehicles, Geothermal Energy are the emerging technologies that are relevant to transport and power generation sectors. (Outcome Budget 2011-12, MNRE)	<ul style="list-style-type: none"> Grant-in-aid General Administrative Expenses Professional services (Detailed Demands for Grants 2011-12, MNRE)
	Ministry of Petroleum and Natural Gas (MPNG)	Investment in Public Enterprises for Oil Exploration & Production, Refining & Marketing Sector: Under this budgetary head, the Government is pushing Auto Fuel Policy (2003) particularly to control vehicular pollution that comply with Euro III & IV and Bharat Stage III (BS) fuel emission norms. (Outcome Budget 2011-12, MPNG)	<ul style="list-style-type: none"> Budgets of IOCL, HPCL, BPCL and others to implement those norms. (Outcome Budget 2011-12, MPNG)

Annexure 2: Tracking Low Carbon Programme Expenditure for the “Avoids/Reduce” Interventions in Transport Sector

- Mix land use planning in cities to bring housing complexes and activities closer with opportunities of low carbon transportation system such as walking and cycling, etc.
- Awareness creation to avoid / reduce the commuting in private vehicles and incentivising the uses of public transportation system.
- Reducing the need for transport through policies to locate industries so as to minimize movement of raw materials and finished products, and urban planning to commute needs.
- Avoidance of growth in emissions through urban and rural development that maximises access to housing, jobs, shopping, services, employment, sales, and leisure activities without travelling long distances in individual light-duty vehicles.

Ministry / Department	Guidelines	Nature of Expenditure and Source Document
Ministry of Urban Development (MoUD) Programme / Scheme: Jawaharlal Nehru National Urban Renewal Mission (JNNURM): <ul style="list-style-type: none"> • Sub-Mission for Urban Infrastructure and Governance (UIG) • Urban Infrastructure Development for Small and Medium Towns (UIDSMT) Implemented as Central Sector Scheme since 2006-07	UIG administered by the MoUD as Sub-Mission of JNNURM focuses on infrastructure Projects which among other also relate to road network, urban transport and redevelopment of old city areas with a view to upgrading infrastructure. Urban transportation projects including roads, highways, expressways, MRTS, and metro projects are eligible for funding under this sub-mission. UIDSMT aims at improvement in urban infrastructure in towns and cities in a planned manner. The Sub-mission has components such as the construction / upgradation of roads, highways/expressways and opportunities for developing parking lots/spaces on Public Private Partnership basis	Central Plan Assistance is provided by the Ministry of Finance to States and UTs SM-UIG: Assistance under JNNURM is additional central assistance, which would be provided as 100 percent central grant to the implementing agencies. UIDSMT: The sharing of funds would be in the ratio of 80:10 between Central Government & State Government and the balance 10 percent could be raised by the nodal/implementing agencies from the financial institutions. Implementing agencies may substitute internal resources for funds to be raised from financial institutions. <i>(Outcome Budget 2012-13 MoUD).</i>

<p>Ministry of Urban Development (MoUD) <i>Programme / Scheme: Urban Transport Planning</i> Implemented as Central Sector (CS) Scheme since 2008</p>	<p>The scheme covers the wide gamut of urban transport matters for promoting comprehensive & integrated urban transport planning, integrated land use and transport planning, comprehensive mobility plans, preparation of DPR, clean development mechanism (CDM), Intelligent Transport System (ITS), launching of awareness campaign in line with National Urban Transport Policy, 2006. The objective of this scheme is to facilitate implementation of National Urban Transport Policy 2006 right from the initial planning stage.</p>	<p>Nearly 80 percent Central Assistance to States and UTs for planning to take up traffic & transportation studies, and for the preparation of DPRs of MRTS the central financial assistance is limited up to 50 percent. <i>(Outcome Budget 2012-13, MoUD)</i></p>
<p>Ministry of Urban Development (MoUD) <i>Programme / Scheme: National Mission on Sustainable Habitat (NMSH)</i> Implemented as Central Sector Scheme since 2011-12</p>	<p>The Mission objectives of the NMSH are to address the issue of mitigating climate change by taking appropriate action with respect to the transport sector such as evolving integrated land use and transportation plans, achieving a modal shift from private to public mode of transportation, encouraging the use of non-motorised transport, improving fuel efficiency, and encouraging use of alternate fuels, etc. Further, the objective is to evolve strategies for adaptation in terms of realignment and relocation, design standards and planning for roads, rail and other infrastructure to cope with warming and climate change. <i>(Outcome Budget 2012-13, MoUD)</i></p>	<p>Expenditure classification for the Mission include Administrative Expenses, Professional Services, Grants-in-aid-General, Grant-in-aid-for creation of Capital assets <i>(Detailed Demands for Grants 2011-12, MoUD)</i></p>
<p>Ministry of Urban Development (MoUD) <i>Programme / Scheme: Development of Satellite cities / Counter Magnet cities</i> Implemented as Central Sector Mission since 2007-08</p>	<p>To develop urban infrastructure facilities such as transport and other infrastructures to channelize their future growth so as to reduce pressure on million plus Urban Agglomerations (UAs). <i>(Outcome Budget 2012-13, MoUD)</i></p>	<p>The financing pattern for the development of satellite townships shall be Central Grants 80 percent, State 10 percent and ULBs 10 percent respectively. <i>(Guidelines for scheme of urban infrastructure Development in satellite towns / counter magnets of Million plus cities, MoUD)</i></p>

Ministry of Urban Development (MoUD) <i>Programme / Scheme: Capacity Building in Urban Transport Sector – Assistance from World Bank</i> Implemented as Central Sector Scheme since 2009	<p>The scheme envisages setting up of Unified Metropolitan Transport Authority and Urban Transport Cell in various cities/ULBs to carry forward the urban transport agenda. The scheme has components of training on urban transport planning, education on transport planning and institutional building on urban transport.</p> <p><i>(Outcome Budget 2012-13, MoUD)</i></p>	<p>This is 100 percent Union sponsored.</p> <p><i>(Outcome Budget 2012-13, MoUD)</i></p>
Ministry of Urban Development (MoUD) <i>Programme / Scheme: National Capital Region Planning Board (NCRPB)</i> Implemented as Central Sector Scheme since 1985	<p>NCRPB was constituted for the preparation of a regional plan for development of NCR as well as for coordination and monitoring of the implementation of the plan and evolving harmonious policies for control of land use and development of infrastructure in the NCR so as to avoid haphazard development of the region.</p> <p>The Functional Plan on Transport prepared and approved by the NCR Planning Board in 1995 envisaged an organised transport network to improve accessibility and the movement of goods and passengers within the region. The Functional Plan on Transport suggested construction of road and rail linkages along the high-density routes, in and around the Capital and also in the National Capital Region.</p>	
Ministry of Urban Development (MoUD) <i>Programme / Scheme: Sustainable Urban Transport Project (SUTP)</i> Implemented as External Aided Project mainly supported by Global Environmental Facility (GEF) since 2010	<p>Making cities dependent on sustainable urban transport as opposed to private vehicles has become a primary objective of the SUTP. The project's development objective (PDO) is to promote environmentally sustainable urban transport in India and to improve the usage of environment-friendly transport modes through demonstration projects in selected cities. Further, the objective is to foster a long-term partnership between GoI and state/local governments in planning and implementation of Urban Transport Projects supporting</p>	<p>This is an External Aided Project (EAP) which is supported by Global Environment Facility (GEF), World Bank and UNDP.</p> <p><i>(Annual Report 2011-12, MoUD)</i></p>

	<p>greener environment in line with principles of NUTP. Efforts to reduce or contain environmental risks form an important component of SUTP.</p> <p><i>(Annual Report 2011-12, MoUD)</i></p>	
<p>Atal Mission for Rejuvenation and Urban Transformation (AMRUT) since 2015</p>	<p>The purpose of Atal Mission for Rejuvenation and Urban Transformation (AMRUT) is to (i) ensure that every household has access to a tap with assured supply of water and a sewerage connection; (ii) increase the amenity value of cities by developing greenery and well maintained open spaces (parks); and (iii) reduce pollution by switching to public transport or constructing facilities for non-motorized transport (e.g. walking and cycling). Five hundred cities will be taken up under AMRUT.</p> <p>(http://moud.gov.in/schemes_programmes)</p>	<p>MoUD website</p>
<p>Smart Cities Mission since 2015</p>	<p>In the approach of the Smart Cities Mission, the objective is to promote cities that provide core infrastructure and give a decent quality of life to its citizens, a clean and sustainable environment and application of 'Smart' Solutions. The focus is on sustainable and inclusive development.</p> <p>(http://moud.gov.in/schemes_programmes)</p>	<p>MoUD website</p>

Annexure 3: Tracking Low Carbon Programme / Expenditure Heads for the “Shift” interventions in Transport Sector

- Shifting the share of freight transport to rail by making rail freight more attractive
- Increasing investment in rail infrastructure (including freight corridors)
- Introduce competition, provide time-tabled freight service, increase containerized cargo movement by rail, improving operation efficiency.
- Improving the efficiency of road freight
- Promoting public transport system
- Increased use of Public Transport- Shifting passenger transport to public transport in tier I, II and III cities
- High quality, affordable mass transit system

Ministry / Department	Guidelines	Nature of Expenditure and Source Document
Ministry of Railways	Dedicated Freight Corridors (<i>Railways Budget 2011-12</i>)	No such expenditure class given in the Railway Budget
Ministry of Railways²⁴	Construction of New lines, Doubling, Conversion to Broad Gauge, Maintenance and Repair of old lines and machines. (<i>Railway Budget 2011-12</i>)	No such expenditure class given in the Railway Budget
Ministry of Railways	Metropolitan Railways Projects (<i>Railway Budget 2011-12</i>)	No such expenditure class given in the Railway Budget
Ministry of Urban Development (MoUD)	Investment through Public Enterprises to promote Metro rail in the country particularly in Delhi, Chennai, Bangalore, Kolkata, and other cities (<i>Outcome Budget 2011-12, MoUD</i>).	<ul style="list-style-type: none"> • Central Equity investment for assets creation (capital outlay) • Loans and Advances to Delhi Metro Rail Corporation, Bangalore Metro Rail Corporation, Bangalore Mass Rapid Transit System, Kolkata East West Corridor Project, Chennai Metro Rail Corporation, other Metro Projects (Assistance from JBIC-Japanese Bank for International Cooperation) • Subordinate Debt- Interest free loan to Delhi Metro Rail Corporation, Bangalore Metro Rail Corporation, Kolkata Metro Rail Project, Chennai Metro Rail Corporation, other Metro Projects (<i>Detailed Demands for Grants 2011-12, MoUD</i>)

²⁴ In the absence of disaggregated data, attempt has been made to capture only those expenses which are promoting the shift of private transport to rail transport.

<p>Ministry of Shipping²⁵</p> <ul style="list-style-type: none"> • Inland Water Transport (A Centrally Sponsored Scheme) 	<p>Inland Water Transport: This Centrally Sponsored Scheme has provision of financial assistance of 90 to 100 percent grant-in-aid for various IWT activities – surveys/studies, waterway development navigation aids, terminal facilities, procurement of vessels for development and regulation etc. Under this there are provisions for the development of water Transport Services –Grants to Inland Water Transport Authority of India (IWAI). IWAI is implementing projects for providing IWT infrastructure namely fairway, terminals and navigational aids with the objective of making them fully functional. With this infrastructure in place these waterways are in a position to act as 'dedicated IWT freight corridors'.</p> <p><i>(Outcome Budget 2011-12, Ministry of Shipping)</i></p>	<ul style="list-style-type: none"> • Training and Research • Grants to Inland Water Transport Authority of India and also for the creation of Capital Assets • Salaries and Wages <p><i>(Detailed Demands for Grants 2011-12, Ministry of Shipping)</i></p>
<p>Ministry of Shipping.</p> <p>Development of Port Sector</p>	<p>Development of Ports Sector: Development of the Major ports with the objective to provide necessary and adequate cargo handling capacity to meet India's EXIM trade requirement, a major portion of which is borne by the sea route (Outcome Budget 2011-12, Ministry of Shipping). Under this the following ports are covered</p> <ul style="list-style-type: none"> • Rail Connectivity Project of Cochin Port Trust • Capital Dredging Project of Cochin Port Trust • Capital Dredging Project of Paradip Port Trust • Loans (EAP (External Aided Project) - JBIAC) to Visakhapatnam Port Trust • Capital Dredging Project of Tuticorin Port Trust • Capital Dredging Project of Encore Port Ltd. • EAP Loan to Mormugao Port Trust • Dredging and Survey Organisation • Development of Minor Ports <p><i>Expenditure for Research and Development Schemes (Demands for Grants 2011-12, Ministry of Shipping)</i></p>	<ul style="list-style-type: none"> • Grants-in-aid General • Subsidies • Dredging and Surveying • Salaries of the employee • Directions and Administration • Research and Development <p><i>(Detailed Demands for Grants 2011-12, Ministry of Shipping)</i></p>

²⁵ In the Ministry of Shipping, attempt has been made to capture those budgetary heads which facilitate domestic water shipping and minor and major ports in the country which increased freight operations.

Annexure 4: Tracking Low Carbon Programme Expenditure Heads for the “Improve” Interventions in Transport Sector

- Promotion of CNG, electric and LPG Vehicles.
- Explore the opportunities of developing hydrogen fuel, tyre and engine friction.
- Lower vehicle weight, and increase aerodynamics vehicles.
- Use of bio-fuels in the existing transportation fuel structures.
- Promoting and enforcing fuel economy standards / labels in vehicles.
- R&D support for technical improvements to reduce efficiency.
- Low carbon vehicle technologies need to be mainstreamed, through reduction of customs duties in importing highly efficient engines, hybrids, plug-in-hybrids and electric vehicles
- Consumer awareness on development and dissemination of efficient tyre and tyre labeling program
- Energy conservation awareness in commuting through private vehicles

Ministry / Department	Objectives / Outcomes	Nature of Expenditure and Source Document
Ministry of Petroleum and Natural Gas (MPNG) Society for Petroleum Laboratory Following interventions are implemented as Investment in Public Enterprises- (for Exploration, Production, Marketing by Public Sector Undertakings in India)	For operation and maintenance of Society for Petroleum Laboratory which is engaged in testing of MS/HSD/SKO samples at the Fuel Testing Laboratory, Supply of Piped natural gas(PNG) and Compressed Natural Gas(CNG); Reduction of pollution levels Supply of Piped natural gas(PNG) and Compressed Natural Gas(CNG) & Auto LPG ; Reduction of pollution levels in the city of Hyderabad.	Reported as Plan Budget of 1.36 crore under Outcome Budget of MPNG (2012-13). Equity Investments (It is reported as Plan Budget of 249 crore in Outcome Budget of MPNG 2012-13) Proposed as Plan Budget of 208 crore in Outcome Budget of MPNG (2012-13). Reported as Plan Budget of 800 crore under Outcome Budget of MPNG (2012-13).
Gas Authority of India Ltd: <ul style="list-style-type: none"> • Equity investments in project blue sky (JV -GGL, CUGL, MINGL, BGL, AGL, TNGCI, Rajasthan, Vododara)& CNG dispensing facility • RGPL – Ratnagiri Gas and Power Private Limited 	To build-up the capabilities in the areas of refining technology, pipelines, biofuels and alternate sources of energy	Reported as Plan Budget of 15 crore under Outcome Budget of MPNG (2012-13). Reported as Plan Budget of 15 crore under Outcome Budget of MPNG (2012-13).

<p>Indian Oil Corporation (IOC): Investment in R&D</p> <p>Hindustan Petroleum Corporation Limited (HPCL) :</p> <ul style="list-style-type: none"> • Diesel Hydro treater at Mumbai Refinery • Clean Fuels & Emission Control Project at Visakh Refinery • Diesel Hydrotreater at Visakh Refinery • HPCL: Avantika Gas Ltd. • CREDA-HPCL Biofuel Ltd. <p>Bharat Petroleum Corporation Limited (BPCL)</p> <ul style="list-style-type: none"> • Refinery- Fuel quality upgrade at Mumbai Refinery. • Capacity expansion cum modernisation Project – Phase II in Kochi Refinery • Integrated refinery expansion project at Kochi Refinery • Marketing – Investment in JVC; Maharashtra Natural gas Ltd • Marketing – Investment in JVC; Central UP Gas Ltd • Marketing – Investment in JVC for City gas project in Karnataka and Kerala 	<p>Production of EURO IV compliant Diesel as per Auto Fuel Policy</p> <p>Production of Euro-III/IV compliant MS as per Auto Fuel Policy</p> <p>Production of EURO IV compliant Diesel as per Auto Fuel Policy Distribution and marketing of Environmental friendly fuels (green Fuels) viz. CNG and Auto LPG in the state of Madhya Pradesh in JV with M/s GAIL.</p> <p>Cultivation of Jatropa and other non-edible plants in the State of Chhattisgarh to facilitate production of environmental friendly energy 'Biofuel'.</p> <p>To supply Mumbai requirement of EURO IV High Speed Diesel (HSD) / Motor Spirit (MS)</p> <p>The project is for improving the quality of MS & HSD to meet Euro III equivalent norms and low cost expansion of the refinery</p> <p>To Increase the refining capacity and modernize the refinery to produce auto fuels confirming to Euro –IV specification</p> <p>To set up facilities for distribution CNG to domestic and commercial customers through pipeline in the city of Pune and installation of CNG outlets to feed the automobile sector.</p> <p>To set up facilities for distribution CNG to domestic and commercial customers through pipeline in the city of Kanpur and installation of CNG outlets to feed the automobile sector.</p> <p>To set up facilities for distribution CNG to domestic and commercial customers through pipeline in the city of Karnataka and Kerala and installation of CNG outlets to feed the automobile sector.</p> <p>For supply of CNG to the household and automobiles sector in the city of Gandhinagar, Mehsana and</p>	<p>Reported as Plan Budget of 20 crore under Outcome Budget of MPNG (2012-13).</p> <p>Reported as Plan Budget of 40 crore under Outcome Budget of MPNG (2012-13).</p> <p>Reported as Budgetary Estimate (BE) of 1 crore under Outcome Budget of MPNG (2012-13).</p> <p>Reported as Plan Budget of 100 crore under Outcome Budget of MPNG (2012-13).</p> <p>Reported as Plan Budget of 330 crore under Outcome Budget of MPNG (2012-13).</p> <p>Reported as Budget Estimates (BE) of 0.10 crore under Outcome Budget of MPNG (2012-13).</p> <p>Reported as Budget Estimates (BE) of 0.10 crore under Outcome Budget of MPNG (2012-13).</p> <p>Reported as Budget Estimates (BE) of 0.10 crore under Outcome Budget of MPNG 2012-13.</p> <p>Reported as Budget Estimates (BE) of 0.10 crore under Outcome Budget of MPNG (2012-13).</p> <p>Reported as Budget Estimates (BE) of 0.10 crore under Outcome Budget of MPNG (2012-13).</p> <p>Reported as Plan Budget of 4394 crore under Outcome Budget of MPNG (2012-13)</p> <p>Reported as Plan Budget of 102.26 crore under Outcome Budget of MPNG (2012-13)</p>
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<ul style="list-style-type: none"> Marketing – Investment in JVC for City gas project in Sabarmati Gas Ltd Investment in JVC – Bharat Renewable Energy Ltd <p>Mangalore Refinery and Petrochemicals limited (MPRL):</p> <ul style="list-style-type: none"> MPRL: Refinery up-gradation com expansion Phase III and Polypropylene Unit <p>Chennai Petroleum Corporation Limited (CPCL): Revamp of CDU / VDU of Ref II – to increase the capacity of refinery –II</p> <ul style="list-style-type: none"> CPCL: Auto Fuel Project to meet Euro IV specification 	<p>Sabarkantha districts</p> <p>The project envisages plantation of Jathropa in 1 million acres of waste and fallow land which has the potential of creating 1 million tonnes of bio-diesel with an investment of Rs 1000 crores in the next 10 years.</p> <p>Among other objectives, one objective is to create additional facilities to meet Euro III/ Euro IV norms for MS & HSD</p> <p>Availability of additional value added products like LPG, Naptha, SK, HSD meeting Euro-IV fuel quality norms</p> <p>Quality of MS Diesel meeting Euro IV fuel norms.</p>	<p>Reported as Plan Budget of 20 crore under Outcome Budget of MOP (2012-13)</p> <p>Reported as Plan Budget of 45 crore under Outcome Budget of MOP (2012-13)</p> <p>Reported as Plan Budget of 10.30 crore under Outcome Budget of MOP (2012-13)</p> <p>Reported as Plan Budget of 20 crore under Outcome Budget of MOP (2012-13).</p>
<p>Ministry of Power (MOP)</p> <p>Bureau of Energy Efficiency – Standards & Labeling Programme</p> <p>Bureau of Energy Efficiency - State Designated Agency (SDA) Strengthening Programme</p> <p>Bureau of Energy Efficiency - HRD activities</p> <p>Energy Conservation</p>	<p>To reduce end use consumption by applying standards / labeling for equipment / appliances. It also covers mandatory labeling.</p> <p>To empower the SDAs as partners of BEE as state level to implement Energy Conservation (EC) Act 2001 like publicity awareness in states; Organizing workshops / training programmes; Creating awareness through electronic media and print media.</p> <p>Capacity building of various stakeholders and to enable energy sector professionals to undertake various activities related to energy efficiency and energy conservation.</p> <p>The funds under this programme would be utilised for carrying out the Energy Conservation related activities i.e. National level awareness campaign, National Energy Conservation Awards and National level Painting Competition for children.</p>	

Ministry of Railways Electrification of the Rail Projects	The electrification project of the Ministry of Railways can be considered as fully low carbon measures. Since 1990s, it has doubled up electrifications of lines and more significantly in the Eleventh Five Year Plan (2007-2012)	The budget for railways electrifications is reflected in the Capital expenditure of the Railways Budget.
Ministry of New and Renewable Energy (MNRE) Research, Design and Development in New and Renewable Energy	Under this programme, Ministry is promoting new technologies like Hydrogen Energy, Fuel Cells, Electric and Hybrid electric Vehicles, Geothermal Energy are the emerging technologies that are relevant to transport and power generation sectors. <i>(Outcome Budget, MNRE)</i>	<ul style="list-style-type: none"> • Grant-in-aid General • Administrative Expenses • Professional services <i>(Detailed Demands for Grants, MNRE)</i>
Ministry of Heavy Industries and Public Enterprises Grant to Development Council for Automobile and Allied Industries (DCAAI) since	A provision has been kept in the form of grant to Development Council for Automobile and Allied Industry for the completion of electric mobility project and for the new & ongoing Research and Development projects related to setting up facilities for testing the vehicles as per changing safety and emission standards at the research institutes i.e. ARAI, Pune, VRDE, Ahmednagar and CIRT, Pune and other R&D institutes in the country. <i>(Detailed Demand for Grants, MoHI&PE)</i>	Budget of MoHI&PE
Ministry of Heavy Industries and Public Enterprises National Automotive Testing and R&D Infrastructure Project since 2010	NATRIP project is a combined initiative of government of India and number of state governments to set up automotive testing facilities across the country that will be competent for testing proposed safety and emission regulations.	Budget of MoHI&PE
Ministry of Heavy Industries and Public Enterprises Scheme in Automotive Sector - Testing Infrastructure and R&D Projects for Electric Vehicles since 2015	Through this scheme, Department has taken initiative for introducing Electric/Hybrid transportation in the country under National Electric Mobility Mission Plan (NEMMP) Scheme 2020 to provide clean mobility solutions to the people while reducing the country's dependence on fossil fuel. A provision has been kept for the implementation of this Scheme.	Budget of MoHI&PE

Annexure 5: Budgetary Allocation for various Programs and Schemes relevant to A-S-I Framework

Category	Union Government Ministry	Name of Scheme/ Program	2009-10			2010-11			2011-12			2012-13			2013-14			2014-15 (RE)			2015-16 (BE)		
			Plan	Non-Plan	-Plan	Plan	Non-Plan	-Plan	Plan	Non-Plan	-Plan	Plan	Non-Plan	-Plan	Plan	Non-Plan	-Plan	Plan	Non-Plan	-Plan	Plan	Non-Plan	-Plan
Avoid	Ministry of Urban Development	Sub-Mission for Urban Infrastructure and Governance (UIG) under JNNURM	3776.5	...	...	1480.2	...	...	4113.7	...	...	2105.3	...	...	2381.0	...	...	580.0	...	...	14.0	...	...
Avoid	Ministry of Urban Development	New Mission including development of 100 smart cities	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	240.1	...	...	2002.0	...	...
Avoid	Ministry of Urban Development	Urban Infrastructure Development for Small and Medium Towns (UIDSMT) under JNNURM	275.9	...	...	1223.4	...	...	1134.6	...	...	1314.8	...	...	2921.3	...	...	82.0	...	...	100.0	...	...
Avoid	Ministry of Urban Development	Urban Transport Planning	13.0	...	...	...	...	...	18.9	...	...	14.1	...	...	6.8	...	...	13.6	...	...	7.3	...	...
Avoid	Ministry of Urban Development	Capacity building under Urban Transport	113.8	107.0	100.0	91.6	125.0	125.0

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Improve	Ministry of Petroleum and Natural Gas	Society for Petroleum Laboratory	...	1.7	...	1.6	...	1.6	...	1.5	...	1.4	...	2.0	2.1
Improve	Ministry of Petroleum and Natural Gas	Supply of Piped Natural Gas (PNG) and Compressed Natural Gas (CNG); Reduction of pollution levels	250.0	...	...	...	150.0	...	249.0	...	40.0	...	157.0	...	...	...	274.0
Improve	Ministry of Petroleum and Natural Gas	Supply of Piped Natural Gas (PNG) and Compressed Natural Gas (CNG) & Auto LPG ; Reduction of pollution levels in the city of Hyderabad	...	...	...	...	...	...	208.0	...	26.5	...	...	...	...	...	...
Improve	Ministry of Petroleum and Natural Gas	To build-up the capabilities in the areas of refining technology, pipelines, biofuels and alternate sources of energy	70.0	158.0	...	130.0	...	230.0	...	220.0	...	198.9

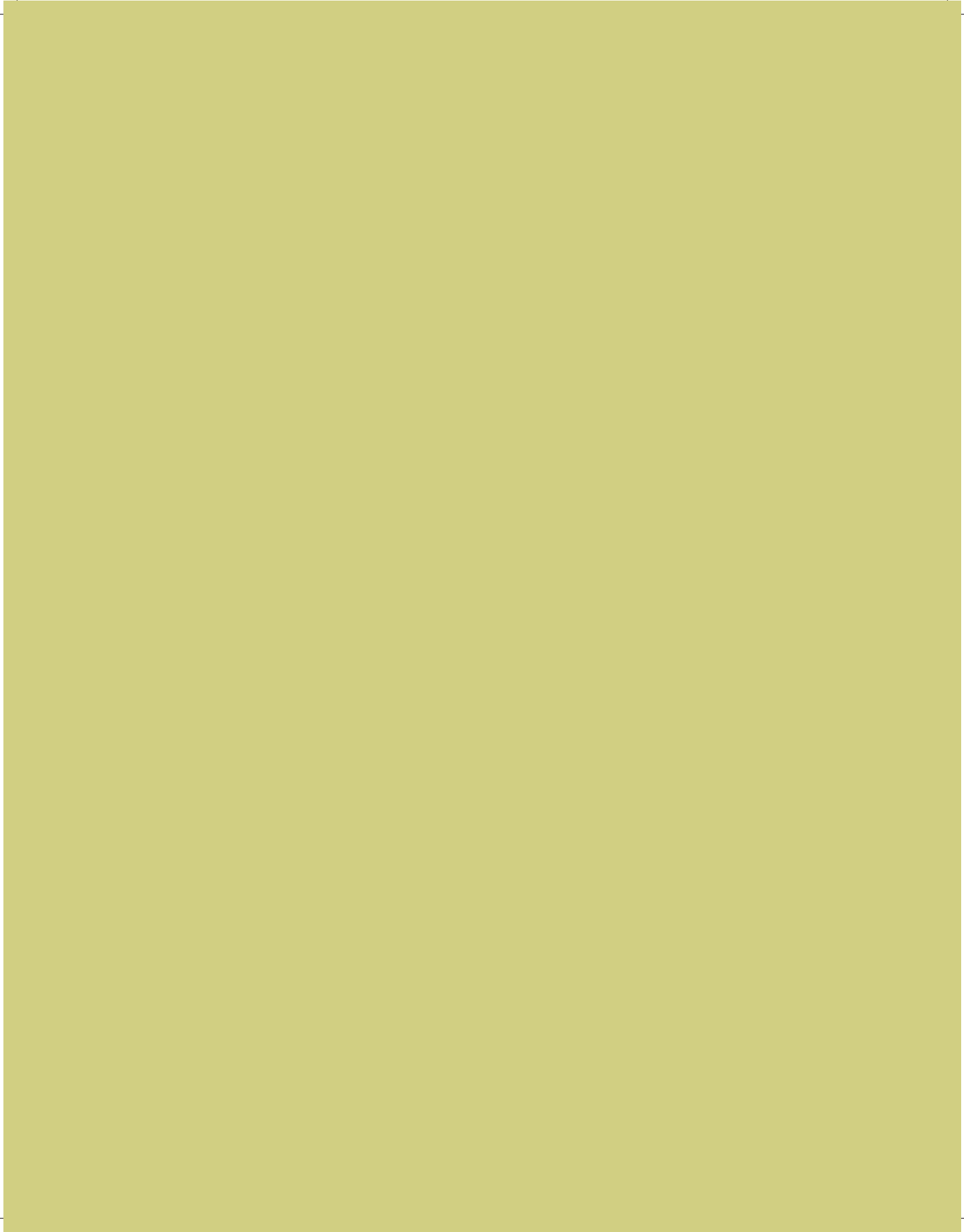
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Improve	Ministry of Petroleum and Natural Gas	BPCL - Capacity expansion cum modernization Project – Phase II in Kochi Refinery	0.2	150.0	...	31.8	...	20.0	...	49.6
Improve	Ministry of Petroleum and Natural Gas	BPCL- Marketing – Investment in JVC; Maharashtra Natural Gas Ltd	2.5	...	...	...	...	...	...	0.1	...	0.1	...	0.1	...	0.1	...
Improve	Ministry of Petroleum and Natural Gas	BPCL- Marketing – Investment in JVC; Central UP Gas Ltd	0.1	...	...	...	...	0.1	...	0.1	...	0.1	...	0.1	...	0.1	...
Improve	Ministry of Petroleum and Natural Gas	BPCL – Marketing – Investment in JVC for City gas project in Karnataka and Kerala	5.0	...	...	...	...	0.1	...	0.2	...	0.1	...	10.0	...	10.0	...
Improve	Ministry of Petroleum and Natural Gas	BPCL- Marketing – Investment in JVC for City gas project in Sabarmati Gas Ltd	0.1	...	...	...	...	0.2	...	0.1	...	...	...	0.1	...	0.1	...

Improve	Ministry of Petroleum and Natural Gas	BPCL - Investment in JVC – Bharat Renewable Energy Ltd	0.1	...	...	...	...	3.0	...	0.5	...	0.7	...	0.5	...
Improve	Ministry of Petroleum and Natural Gas	MIRPL- Refinery up-gradation com expansion Phase III and Polypropylene Unit	...	...	...	...	...	4615.0	...	4393.7	...	1865.4	...	1748.5	...
Improve	Ministry of Petroleum and Natural Gas	Chennai Petroleum Corporation Limited (CPCL): Revamp of CDU / VDU of Ref II – to increase the capacity of refinery –II	5.0	...	...	...	...	92.6	...	92.3	...	9.1	...	...	...
Improve	Ministry of Power	Bureau of Energy Efficiency – Standards & Labeling Programme	...	...	9.0	...	...	39.5	...	20.0	...	33.0	...	3.3	...
Improve	Ministry of Power	Bureau of Energy Efficiency (BEE) - State Designated Agency (SDA) Strengthening Programme	...	...	12.0	...	...	8.9	...	45.0	...	...	...	10.2	...

Shift	Ministry of Urban Development	Investment through Public Enterprises to promote Metro rail in the country particularly in Delhi, Chennai, Bangalore, Kolkata, and other cities	6362.7	...	7480.6	...	7668.2	...	5483.2	...	8248.2	...	9815.3	...	11555.7	...
Shift	Ministry of Shipping	Inland Water Transport (A Centrally Sponsored Scheme)	127.7	...	134.1	41.1	112.8	28.1	144.1	28.0	128.9	177.2	77.0	31.4	206.7	43.3

Source: Various Budget Documents mentioned in Annexures 1-4





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