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MINISTERS STATEMENT

South Africa is committed to providing a world class transportation system for our citizens that reduces both the cost of transportation and the quantity of Green House Gases (GHG) and other pollutants that are emitted by the sector. According to the Greenhouse Inventory for South Africa covering the period 2000 to 2010, GHG emissions from transport increased by 32% from 36 016 Gg CO₂ eq in 2000 to 47 607 Gg CO₂ eq in 2010. Road transport was responsible for 91.2% of GHG emissions from the sector during this period. According to the 2014 Mitigation Report prepared by the Department of Environmental Affairs with the support of GIZ, should these trends continue in the absence of mitigating legislation and policies, the transport sector is projected to emit a total of 136 Gg CO₂ eq by the year 2050, as estimated in the Mitigation Report prepared by the Department of Environmental Affairs.

Our determination to improve the environment on behalf of our nation is enumerated in the Nationally Determined Contribution (NDC) committed to by the government in Copenhagen at COP15 and reaffirmed in September 2015 at COP21 in Paris. The government targets a 34% reduction in GHGs by 2020 and a 42% reduction by 2025. In 2010, the transport sector was responsible for 10.8 percent of energy related emissions which in turn are responsible for 89% of our total emissions nationally. The sector is therefore an extremely significant contributor to South Africa’s GHG emissions and the Department of Transport is therefore committed to making a significant impact in reducing GHG emissions and contributing to the reduction of South Africa’s total GHG emissions.

These targets are very ambitious and require bold steps to be undertaken in terms of the Department’s National Climate Change Response Flagship Implementation Programme. These steps will include achieving modal shifts from private transport to public transport and shifting freight transport from road to rail, switching to cleaner fuels and adopting new technologies such as electric vehicles while making our cities and towns friendlier places for cyclists and pedestrians. The transformations that are required in the transport sector are challenging, but the benefits include a more efficient, less congested road network and improved air quality and public health. I have every confidence in my team at the Department of Transport to implement the bold Green Transport Strategy that this document lays out.

Dipuo Peters

Minister of Transport
EXECUTIVE SUMMARY

Transport and the need for transport has become an integral part of the daily lives of South Africans. The movement of goods and services in time and space defines and influences, and is impacted upon by economic activity. Demands for transport shape the urban landscape, and influence the spatial choices that the citizenry makes in relation to social and economic services such as place of residence, education and work. Business, in similar ways, makes locational choices based on market proximity and size, as well as considerations for ease of temporal and spatial mobility of labour, goods and services. These choices contribute to the well-being of individuals, households and businesses, or lack thereof. (National Household Travel Survey, 2013:1).

Emissions from the transport sector in South Africa account for 13% of the country’s total GHG emissions, of which 86% is from the combustion of liquid fossil fuels. In addition to these direct emissions arising from the combustion of fuels, indirect emissions arise from the production, refining and transport of transport fuels.

To address the significant contribution of transport to national GHG emissions, the Department of Transport (DoT) has undertaken to develop a 5 year Green Transport Strategy (GTS) which aims to minimise the adverse impact of transport on the environment while addressing current and future transport demands based on sustainable development principles. The strategy will promote green mobility to ensure that the transport sector supports the achievement of economic growth targets while providing greater safety to citizens and commuters alike, meeting social needs, and protecting the environment.

The objectives of the GTS include:

1. Enabling the transport sector to contribute its fair share to the national effort to combat climate change in a balanced fashion, taking into account the DOT and the sector’s primary responsibility of promoting socio-economic development,
2. Promoting sustainable and cleaner mobility development; and
3. Facilitating the sector’s just transition to a climate-resilient and low-carbon economy and society.

The transport sector has to confront the legacy of apartheid spatial planning which has resulted in displaced urban development and distorted, fragmented, unequal and inefficient human settlement patterns that result in the movement of people across long distances from home to work. These travel patterns have a substantial impact on air quality, climate change and ozone layer depletion. It is clear that over time transport is likely to have an increasing impact on land resources, water quality, air quality and biodiversity.

Road transport is the primary source of transport-related CO₂ emissions in South Africa, with road transport having been estimated as contributing to 91,2% of total transport GHG emissions in 2010 (DEA, 2014). These figures emphasise the strong need for immediate intervention within the road sector. The heavy reliance of the sector on fossil fuels contributes significantly to total GHG emissions in...
South Africa. This justifies a focus on immediate and targeted interventions around road transport to result in the highest impacts in the reduction of emissions in the transport sector as a whole. Therefore one of the main focuses of the DoT is facilitating a modal shift from road to rail and from private vehicle usage to public transport.

However, analysis of the incremental costs of mitigation actions indicates that significant long term finance and investment will be required. Further work is needed to prepare detailed business plans for finance and investment in transport-related mitigation. It is also important to recognise that mitigation actions taken within the transport sector will have co-benefits, such as improved access to employment opportunities for poor communities due to an improvements in public transport and public health benefits associated with improved air quality. Similarly, improvements in transport efficiency will have positive knock-on effects for all economic sectors that make use of transport.

The challenge of developing transport policies for sustainable development is to orient the sector towards a compromise that maximises the economic and social benefits of transport and minimises associated environmental, social and economic costs. Many of the measures required to achieve this balance are not new, the main difficulty is effective implementation. The approach to achieving sustainable development of the transport sector requires a combination of regulatory instruments (particularly for vehicle emissions), restructuring of charges and taxes on the basis of marginal costs to provide incentives to reduce external costs to optimal levels, infrastructure development and education and awareness to drive behavioural change. It will require improvement of the quality of transport, especially rail services (ensuring reliability and complete logistic services) and promotion of inter-modal services to achieve an integrated transit system.

South Africa is committed to cooperative efforts to adapt to and mitigate the unavoidable adverse impacts of climate change. With regard to an ultimate solution to the global challenge of climate change, South Africa is firmly committed to working with global partners to ensure temperature rises are kept below 2°C above pre-industrial levels, which could include a further revision of the temperature goal to below 1.5°C in light of emerging scientific evidence, noting that a global average temperature increase of 2°C translates to up to 4°C for South Africa by the end of the century (Reference). Appropriate and timely mitigation will relate to fewer unavoidable impacts reducing the need for adaptation actions and investment.

The final GTS seeks to address and limit the negative environmental impacts of the transport sector in South Africa, by providing a clear and distinct route of environmental policy directives and a mapping of climate change initiatives for the sector that includes joint ventures with other spheres of government and the private sector.
1 Problem Statement

Emissions from the transport sector in South Africa account for 13% of the country’s total greenhouse gas (GHG) emissions, of which 86% is from the combustion of liquid fossil fuels. While this places the transport sector second only to the energy sector in terms of emissions volume, these figures represent direct emissions only, principally comprised of tailpipe emissions. If indirect GHG emissions associated with the transport sector were to be included, such as GHG emissions associated with fuel refineries and electricity generation for transport, these figures would be substantially higher.

Transport activity levels are strongly related to socio-economic drivers, in particular growth in population and GDP – effective and accessible transport is an important enabling factor for economic growth. These drivers, in turn, influence social factors such as levels of vehicle ownership and the nature and frequency of journeys made (Mitigation Report, 2014). Research shows that car ownership and the demand for transport are increasing steadily in South Africa (GIZ, 2015). Private car ownership remains a key symbol of economic success and an important aspiration for many South Africans.

Transport is a critical factor in urban spatial planning and the historical focus on the provision and maintenance of infrastructure to support the private car has led to unsustainable and inequitable outcomes. The spatial footprint of the private car is many times greater than that of public or non-motorised transport and results in the inefficient allocation of scarce urban space. In some ways, our cars are better provided for spatially than the urban poor.

As a result of continued growth within the sector, transport is likely to have an increasing impact on land resources, water quality, air quality and biodiversity. In urban centers transport is a major contributor to air quality issues and emissions include nitrous oxides and particulates which contribute to the brown haze evident over many of South Africa’s main cities. These pollutants have a significant impact on human health, causing increases risks of respiratory diseases, heart disease, lung cancer, and low birth

GHG emissions and Climate Change

The overwhelming consensus of scientific opinion, as reflected in the International Panel on the Climate Change, is that climate change in the form of global warming is real and driven by emissions of greenhouse gases caused by human activity. The single most important GHG is carbon dioxide (CO₂) and the most important source of CO₂ emissions is the production and consumption of fossil fuels.

Mitigating the extent and managing the impact of climate change is a global priority. As a water scarce country, South Africa is particularly vulnerable to the risks of increased average temperatures, drought and rainfall variability associated with global warming. At the same time, as a developing country with a historical dependence on its extensive coal deposits for energy, South Africa faces particular challenges in reorienting to a low carbon economy.
weight (amongst others) – with children and the elderly particularly vulnerable – and burden the health care system with substantial medical costs.

Road transport is the primary source of transport-related CO₂ emissions in South Africa, with road transport having been estimated as contributing 91.2% of total transport GHG emissions in 2010 (DEA, 2014). These figures emphasise the strong need for immediate intervention within the road sector and the need to shift from road to rail and private to public transport.

The transport sector has to confront the legacy of apartheid spatial planning which has resulted in fragmented, unequal and inefficient transport systems that require the poor to commute long distances to reach their place of work. These travel patterns have a substantial impact on air quality and climate change. Interventions to transform the transport sector should therefore include reducing movement of goods and people; shifting to low-carbon modes of transport and improving energy and fuel efficiency.

1.1 Policy and Legislative Mandate

The mandate of the Department of Transport is

- to lead the development of integrated efficient transport systems by creating a framework of sustainable policies, regulations and implementable models to support government strategies for economic, social and international development.
- To maximize the contribution of transport to the economic and social development goals of our country by providing fully integrated transport operations and infrastructure.

The main roles of the Department of Transport and its public entities in relation to the transport sector are:

- policy and strategy formulation in all functional areas;
- substantive regulation in functional areas where the DoT has legislative competence;
- implementation in functional areas where the DoT has exclusive legislative competence;
- leadership, coordination and liaison in all functional areas;
- capacity building in all functional areas;
- monitoring, evaluation and oversight in all functional areas; and
- stimulate investment and development across all modes.

The functional and modal areas are:

- Civil Aviation
- Maritime Transport
- Public Transport
- Road Transport
- Rail Transport
- Pipeline Transport
The following section of the constitution guides the mandate of the Department:

Schedule 4 (Functional Areas of Concurrent National and Provincial Legislative Competence), Section A of the Constitution, Act 108 of 1996 with specific reference to the following areas:

- Airports other than international and national;
- Public Transport;
- Road Traffic Regulation;
- Vehicle Licencing.

Development within the transport sector, and in the context of environmental sustainability, are informed by a number of national policies, strategies and legislation, as well as international agreements to which South Africa is a signatory. Of particular importance in relation to the GTS is the National Climate Change Response Policy, which mandates the DoT to lead a Transport Flagship Programme:

“As part of the Transport Flagship Programme, the Department of Transport will facilitate the development of an enhanced public transport programme to promote lower-carbon mobility in five metros and in ten smaller cities and create an Efficient Vehicles Programme with interventions that result in measurable improvements in the average efficiency of the South African vehicle fleet by 2020.

Furthermore, the planned rail re-capitalisation programme is considered an important component of this Flagship Programme in so far as it will facilitate both passenger modal shifts and the shift of freight from road to rail.

Initially led by the Department of Transport, the programme will also include a Government Vehicle Efficiency Programme that will measurably improve the efficiency of the government vehicle fleet by 2020. It will encourage new efficient-vehicle technologies, such as electric vehicles, by setting procurement objectives for acquiring such vehicles.”

Other relevant documents and agreements are referenced below.

1. UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE (UNFCCC), 1992
   The United Nations Framework Convention on Climate Change (UNFCCC) is an international environmental treaty (also known as a multilateral environmental agreement) that was opened for signature at the Earth Summit held in Rio de Janeiro in 1992 and came into force in 1994.

2. COPENHAGEN ACCORD, 2009
   The Copenhagen Accord, a political agreement struck by world leaders at the 2009 U.N. Climate Change Conference in Copenhagen, calls on participating countries to pledge specific actions they will undertake to mitigate greenhouse gas emissions. The South African Government pledged to reduce GHG emissions by 34% by 2012 and 42% by 2025.

3. CONFERENCE OF THE PARTIES 21, 2015
The 2015 United Nations Climate Change Conference, COP 21 was held in Paris, France, from 30 November to 12 December 2015. The conference negotiated the Paris Agreement, a global agreement on the reduction of climate change. In the adopted version of the Paris Agreement, the parties agreed to "pursue efforts to" limit the global temperature increase to 1.5 °C.

4. SOUTH AFRICA’S NATIONALLY DETERMINED CONTRIBUTIONS TO UNFCCC, 2015

In accordance with the decision of the Conference of the Parties to the United Nations Framework on Climate Change, South Africa submitted its intended nationally determined contribution (INDC) on adaptation, mitigation as well as finance and investment requirements for both.


Section 24 of the Constitution of the Republic of South Africa states that:

“Everyone has the right to an environment that is not harmful to their health or well-being; and to have the environment protected for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation, promote conservation, and secure ecologically sustainable development and use of natural resources, while promoting justifiable economic and social development.”

6. NATIONAL DEVELOPMENT PLAN VISION 2030

The National Development Plan emphasizes that by 2030 investments in the transport sector will ensure that it serves as a key driver in empowering South Africa and its people by enabling and improving the access to economic opportunities, social spaces and services, by bringing geographic distances closer in an affordable, reliable and safe manner.

7. WHITE PAPER ON NATIONAL CLIMATE CHANGE RESPONSE POLICY, 2011

The National Climate Change Response (NCCR) White Paper presents the South African Government’s vision for an effective climate change response and the long-term, just transition to a climate-resilient and low-carbon economy and society. The NCCR also outlines a National Climate Change Response Flagship Programme for the transport sector.

8. WHITE PAPER ON ENERGY POLICY, 1998

The White Paper on Energy Policy sets out five policy objectives: increasing access to affordable energy services; improving energy governance; stimulating economic development; managing energy-related environmental and health impacts; and securing supply through diversity.

9. WHITE PAPER ON RENEWABLE ENERGY, 2003
The transport sector is an important energy sector to focus the introduction and implementation of renewable energy sources and technologies.

10. THE WHITE PAPER ON NATIONAL TRANSPORT, 1996

The National Transport Policy states the vision for the South African transport sector is a system which will "Provide safe, reliable, effective, efficient, and fully integrated transport operations and infrastructure which will best meet the needs of freight and passenger customers at improving levels of service and cost in a fashion which supports government strategies for economic and social development whilst being environmentally and economically sustainable".

11. NATIONAL RAIL POLICY GREEN PAPER, 2015

The National Rail Policy provides policy guidelines to drive development and the revitalization of the existing rail industry to perform optimally, compete effectively, satisfy stakeholder needs, and contribute positively to the economic and social development of South Africa.

12. NON-MOTORISED TRANSPORT (NMT) POLICY, 2013

The Non-Motorised Transport Policy intends to increase the role of NMT as one of the key transport modes, integrate NMT as an essential element of public transport, provide a safe NMT infrastructure, and allocate adequate and sustainable funding for the development and promotion of NMT. The vision of the policy is “towards a sustainable and stimulant mode of transport for social and economic development within an integrated public transit system”.

13. NATIONAL STRATEGY FOR SUSTAINABLE DEVELOPMENT AND ACTION PLAN (NSSD 1) 2011–2014

One of the key implementation plans towards a green economy focuses on “Sustainable transport and infrastructure”. The aim of this intervention is to reduce the transport sector’s carbon footprint

14. PUBLIC TRANSPORT STRATEGY, 2007

The Public Transport Strategy has two key focus areas, namely Accelerated Modal Upgrading and Integrated Rapid Public Transport Networks. The Public Transport Strategy is a key driver of other strategies developed within the transport sector.

15. ENERGY EFFICIENCY STRATEGY, 2005

This was the first consolidated government document geared towards the development and implementation of energy efficiency practices in the country. The strategy takes its mandate from the White Paper on Energy Policy, 1998, and links energy sector development with national socio-economic development plans. This document included voluntary targets set up to 2015 with limited reporting on implementation. To date there has been no revision taken of this document.

The strategy sets out a road map for government, the oil industry and the vehicle manufacturing industry to achieve improved air quality through the control of vehicle emissions.

17. THE BIOFUELS INDUSTRIAL STRATEGY OF THE REPUBLIC OF SOUTH AFRICA, 2007

The strategy promotes the blending of petrol and diesel with biofuels as the country moves to encourage investment in its biofuels sector and reduce its reliance on importing fuels.

18. THE NATIONAL FREIGHT LOGISTICS STRATEGY, 2005

The National Freight Logistics Strategy sets the strategic framework for institutional reform and industrial structuring to ensure a more efficient freight system allowing improved system access to marginalized service providers and cargo owners, while applying downward pressure on prices and transit times.

19. NATIONAL ENVIRONMENTAL MANAGEMENT ACT 107 OF 1998 (NEMA)

The National Environmental Management Act (NEMA) seeks to promote the protection of the environment and its resources for the benefit of present and future generations through reasonable legislative and other measures that prevent pollution and ecological degradation, promote conservation, and secure ecologically sustainable development and use of natural resources, while promoting justifiable economic and social development as stated in Section 24 of the Constitution.

20. AIR QUALITY ACT 39 OF 2004

The Air Quality Act is intended to set norms and standards which aim to achieve the protection, restoration and enhancement of air quality in South Africa, increased public participation in the protection of air quality, improved public access to relevant and meaningful information about air quality, and the reduction of risks to human health and the prevention of the degradation of air quality.

21. NATIONAL ENERGY ACT, 2008

According to chapter 3, section 6(3) (a) The Integrated Energy Plan must take account of plans relating to transport, among other sectors, and inform and be informed by plans from all supply, production and demand sectors whose plans impact on or are impacted by the Integrated Energy Plan.

22. NATIONAL LAND TRANSPORT ACT, 2009
The National Land Transport Act prescribes that any measures relating to public transport must promote the efficient use of energy resources and limit adverse environmental impacts in relation to land transport.

23. NATIONAL RAILWAY SAFETY REGULATOR ACT 16 OF 2002

The National Railway Safety Regulator Act provides safety standards within the rail industry for passenger and freight.

24. ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS, 2015

Environmental Impact Assessments, or EIAs, are a key tool in effective environmental management. Section 24 of the Constitution of the Republic of South Africa, 1996, calls on the State to secure everyone the right to an environment that is not harmful to health or well-being. The types of activities relevant to the transport sector for which an EIA would be required would fall transport infrastructure such as the construction or expansion of roads and railways and bridges. This would however be dependent on the type of project undertaken by the DoT. For further information on EIA transport sector guidelines please follow this link: EIA Sector Guidelines.

25. SOUTH AFRICA’S LONG TERM MITIGATION SCENARIOS (LTMS), 2007

The Long Term Mitigation Scenarios (LTMS) process took place in South Africa between 2005 and 2008. This was a Cabinet-mandated process led by the Department of Environmental Affairs and Tourism. The LTMS arose out of the realisation that South Africa would need to contribute its fair share to mitigation.

27. THE INDUSTRIAL POLICY ACTION PLAN/S (IPAPS)

The IPAP 2013/14-2015/16 is informed by the vision set out for South Africa’s development provided by the National Development Plan (NDP). The overriding goal of the IPAP is to prevent industrial decline and support the growth and diversification of South Africa’s manufacturing sector.

28. STRATEGIC INTEGRATED PROJECTS (SIPS) – SIP2, 3, 4, 7 & 8

There are 18 Strategic Integrated Projects (SIPs) which cover social and economic infrastructure across all nine provinces (with an emphasis on lagging regions). The SIPs include catalytic projects that can fast-track development and growth. SIPS 2, 3, 4, 7 and 8 are relevant to the transport sector.

29. THE SPATIAL PLANNING AND LAND USE MANAGEMENT ACT 16 OF 2013 (SPLUMA)
SPLUMA provides a new framework to govern planning permissions and approvals. It sets parameters for new development and lawful land uses in South Africa. SPLUMA is a framework law, which means that the law stipulates processes and provides broad principles spatial planning decisions by local and provincial authorities.

1.2 Methodology

The methodology undertaken to develop the Green Transport Strategy included both primary and secondary research. Primary research included gathering and collating information and input from an Expert Reference Groups and an intra-governmental stakeholder workshop. Secondary research consisted of desktop research and literature reviews of current national and international literature and studies which have been conducted.

The overarching approach has been to identify a short term (five year) raft of GHG mitigation interventions that are most cost effective, practical, and deliver the best social and economic returns, based on a survey of international best practice and domestic research, including South Africa’s Greenhouse Gas Mitigation Potential Analysis (the Mitigation Report) undertaken by the Department of Environmental Affairs. In particular, Appendix E of the Mitigation Report contains detailed estimates of the impact and costs of a range of potential mitigation measures in the transport sector.

All interventions or measures identified in the strategy have been designed to be:

- **Specific** – the scope of the proposed activities should be clear.
- **Measurable** – the benefits and outcomes of the proposed activities should be quantifiable.
- **Achievable and Realistic** – given the practical constraints of capacity, available technology and resources.
- **Timely** – the proposed interventions must provide measurable outcomes within a 5-year time-frame.

At the same time as providing a 5-year implementation plan, the Department’s approach has been informed by the need to avoid overinvestment of resources in technologies that are likely to be redundant in a future low carbon economy and the need to plan for the potential of new technologies that may result in disruptive, transformative change.

1.3 Purpose of the Green Transport Strategy

The DoT, in collaboration with relevant stakeholders, intends to make targeted climate change mitigation interventions in the transport sector by developing and implementing the Green Transport Strategy (GTS), which will be inclusive of an Implementation Plan (IP) and comprise a basket of climate change mitigation measures which will be flexible enough to accommodate the peculiarities of each transport sub-sector. At the same time, the GTS seeks to address the spatial and economic distortions that are a legacy of apartheid and have had a disproportionate impact on the access of the poor, unemployed, women and youth to safe and affordable transport and economic opportunities.
2 **Situational Analysis**

Climate change, linked with energy consumption and security of supply, is considered one of the most serious and pressing threats to sustainable development, with adverse impacts expected on human health, food security, economic activity, natural resources, physical infrastructure and the environment. The international political response to climate change began with the adoption of the United Nations Framework Convention on Climate Change (UNFCCC) in 1992, and South Africa has committed to take concrete measures to mitigate climate change, through economy-wide measures that include the transport sector.

At COP 15 in Copenhagen in 2009, South Africa pledged a greenhouse gas (GHG) emissions reduction target of 34% by 2020 and 42% by 2025 below the business as usual trend. This target has been carried through in the National Climate Change Response Policy and the National Development Plan. In line with this pledge, South Africa’s Intended Nationally Determined Contribution (INDC) announced at COP21 in Paris in 2015 commits the country to limiting its GHG emissions to peak at a range between 398 and 614 Mt CO$_2$eq over the period 2025-2030. This pledge is ambitious and will require a concerted effort to achieve, and is dependant on the financial, technical and capacity support from the international community.

![Graph of South Africa's INDC](https://example.com/graph.png)

*Figure 1: Analysis of South Africa’s pledge to emission reduction targets. (Source: Climatetacker.org, based on the Department of Environmental Affairs figures for historical and projected GHG emissions.)*

As can be seen from the above graphical representation of the DEA’s projections for GHG emissions based on existing measures, without new measures to curb GHG emissions South Africa will significantly exceed the emissions targets outlined in our INDC.

South Africa’s INDC includes the following estimates of incremental costs associated with mitigation actions in the transport sector in order to achieve the specified targets:

- Hybrid electric vehicles: 20% by 2030 - US$488 billion
2.1 Overview of the transport sector

Transport systems form the backbone of South Africa’s socio-economic activities through enabling the movement of people and products. Apartheid planning and marginalization of communities has left a legacy of transport networks that are poorly integrated, resulting in the majority of citizens living far from work with inadequate transport infrastructure. Many people do not have access to convenient, safe and affordable transport. Furthermore, South Africa is a developing country experiencing rapid urbanization, which is intensifying the need for access to reliable transport systems.

Demand for transport is derived from other economic activities and directly related to social levels of wealth within a country’s population. Work done by GIZ (Design of Modules for the Sustainable Urban Transport NAMA of the Department of Transport, 2015) for the DoT looked at societal prosperity within South Africa using the Living Standards Measure (LSM). This indicator indicates the propensity of households to acquire food, household goods, and services. The research shows that a steady increase in household consumption has directly translated into increased demand for transport (GIZ, 2015). Higher LSM levels are also positively correlated with higher private vehicle ownership and use. This indicates that South Africa is a country with increasing travel needs which, if not planned for, will result in increased travel-related GHG emissions. Similarly, rising GDP drives the demand for freight transport. Supply interruptions are costly to the economy and careful long-term planning is required to ensure that there is sufficient infrastructure to support the efficient functioning and growth of the transport sector in the future.

Notwithstanding growing demand for transport, the sector has a critical role to play in achieving South Africa’s GHG reduction targets and the DoT will need to focus all resources available to meeting these ambitious targets.

![SOURCE CONTRIBUTION OF GHG EMISSIONS (CO₂E)](image)

*Figure 2: Transport sector emissions according to 2000-2010 National Greenhouse Gas Inventory*
As can be seen from figure 2, the overwhelming majority of direct emissions from transport are derived from road transportation, which consist primarily of tailpipe emissions from the burning of petrol and diesel in motor vehicles.

SA’s total GHG emissions as committed to a COP21 must range between 212 and 428 mtCO₂ equivalent by 2050, which would imply at least an 8% reduction in transport related emissions from current levels by 2050. The figure below illustrates GHG emissions from the transport sector between 2000 and 2050 taking into account existing and currently planned policies. On the basis of this projection, it is therefore apparent that a radical shift within the transport sector is required.

![Figure 3: GHG emissions from the transport sector with existing measures. (Source: South Africa’s GHG Mitigation potential Analysis, DEA)](image)

Table 1 also represents a projection of GHG emissions taking into account existing and planned policies. It is clear from this table the expected increase in GHG emissions from 2000 to 2050 (GHG Mitigation Report, 2014).

Table 1. Projection for the transport sector: total of all GHG’s with existing and planned measures

<table>
<thead>
<tr>
<th>CO₂ (Gg/yr) equivalents</th>
<th>2000</th>
<th>2010</th>
<th>2020</th>
<th>2030</th>
<th>2040</th>
<th>2050</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road Transport</td>
<td>33</td>
<td>44</td>
<td>54</td>
<td>71</td>
<td>92</td>
<td>116</td>
</tr>
<tr>
<td>Rail</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Aviation *</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>35</td>
<td>48</td>
<td>60</td>
<td>78</td>
<td>101</td>
<td>126</td>
</tr>
<tr>
<td>Indirect emissions (all modes)</td>
<td>25</td>
<td>33</td>
<td>42</td>
<td>55</td>
<td>71</td>
<td>90</td>
</tr>
</tbody>
</table>
*as described in Table 1 the emissions projection for the aviation sector assumes only the partial implementation of the target implied by the voluntary sectoral agreement to reduce net CO₂ emissions from the aviation sector. Source: GIZ mitigation potential analysis

In accordance with UNFCCC agreements, in September 2015 South Africa submitted its Intended Nationally Determined Contribution’s (INDC) on adaptation, mitigation as well as finance and investment requirements. These have now been confirmed as South Africa’s Nationally Determined Contributions (NDCs).

As part of the mitigation efforts for the reduction of emissions, the concept of Nationally Appropriate Mitigation Actions (NAMAs) was introduced under the UNFCCC and is seen as a useful instrument for mitigation action in developing countries (GIZ, 2014). NAMAs are voluntary measures that are taken by developing countries and reported by national governments to the UNFCCC. A NAMA is defined as “any action that reduces emissions in developing countries and is prepared under the umbrella of a national governmental initiative with the aim of achieving a reduction in emissions relative to ‘business as usual’ emissions by 2020 (GIZ, 2014).

The Department of Transport has committed to a NAMA’s programme. The following NAMA’s in the table below are a representation of the ‘scope of work’ that has been identified and will be further elaborated on and finalised as a result of further work done by the DOT, GIZ’s TRANSfer project, and stakeholder engagement.

<table>
<thead>
<tr>
<th>Ready-to-go-NAMAs:</th>
<th>“Mid-Term NAMAs”:</th>
<th>“Long-Term NAMAs”:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Bus Rapid Transit (BRT) System in SA</td>
<td>1. Fuel Economy</td>
<td>1. Integrated urban planning</td>
</tr>
<tr>
<td>2. Gautrain</td>
<td>2. Fuel Switch</td>
<td>2. Integrated Public Transport Network</td>
</tr>
</tbody>
</table>

Table: 2 Proposed NAMA’s List for Transport (Source: DOT)

The Gautrain NAMA, (the first Transport NAMA) was initiated with the aim of measuring the emissions reductions achieved on the 68km stretch of road on the N1 directly parallel to the Gautrain route. The study has been completed and is ready to be registered in the UNFCCC for recognition. This represents the first step for the transport sector in an effort to implement the NCCRP.

According to South Africa’s Greenhouse Gas Mitigation Potential Analysis: Mitigation Report (DEA/GIZ, 2014) a range of potential mitigation measures have been identified for implementation within the transport sector to deliver emissions reductions and contribute towards South Africa’s GHG reduction targets by 2050. These were discussed and agreed upon with the transport task team.
The list of mitigation opportunities were categorised into the following:

- Modal shift;
- Demand reduction measures;
- More efficient vehicle technologies;
- More efficient operations; and
- Alternative lower-carbon fuels

2.1.1 Road

Road infrastructure in South Africa is generally poorly maintained with 78% of the national road network thought to be older than its original design life, while 30% of the infrastructure is rated as being in either ‘poor’ or ‘very poor’ condition. Of particular concern is the state of provincial gravel roads, 50% of which are rated as being ‘poor’ or ‘very poor’ and particular municipalities, some of which contain settlements in which virtually all roads are either in a ‘poor’ or ‘very poor’ condition. Such conditions cannot easily be expected to improve in the short term (National Road Policy).

The following desired outcomes are identified in the National Road Policy to which the Green Transport Strategy will align:

- A well-resourced road network that provides sustainable employment opportunities for the maintenance and expansion of paved and unpaved road infrastructure nationally.
- The minimisation of waste, water, heat and energy requirements and the sourcing of materials, resources and labour locally to reduce costs and life cycle emissions in the construction and maintenance of road infrastructure.
- The utilisation of recycled construction materials to minimise usage of virgin resources wherever possible.
- The construction of low-carbon climate resilient (LCR) road infrastructure\(^1\), including bus lanes, railways and non-motorised transport infrastructure.
- The careful consideration of road network expansion so as to conserve and promote natural habitats, ecological corridors and water systems, and prevent erosion and flooding.
- Substantial investments in renewable, sustainable fuel and power sources for private vehicles (e.g. electricity, biogas).
- Promotion of motor vehicle manufacturing and assembly in South Africa to mitigate life cycle CO\(_2\) emissions of imported vehicles.
- Promotion of non-motorised transport infrastructure to promote sustainable, carbon neutral modes of transport (e.g. cycling, walking).
- Legislative frameworks and smart incentives to promote uptake of sustainable transport modes and infrastructure.

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\(^1\) Low-carbon resilient infrastructure refers to infrastructure required to tackle climate change, both in terms of meeting greenhouse gas (GHG) emission targets and in terms of adapting to inevitable consequences of increasing temperatures (Global Green Growth Institute, 2015)
Table 1 above indicates that road contributes the most significant amount to total GHG emissions from the transport sector in South Africa and the road sector will therefore be the focus of the Green Transport Strategy as this allows the greatest opportunity for reductions. The modal shifts from private car usage to public transport (particularly rail) and non-motorised transport have been identified as essential actions to reduce energy consumption and GHG emissions.

The Public Transport Strategy also plans to integrate rail, taxi and bus services in co-operation with private operators, both operationally and through ownership. Johannesburg’s successes with the Bus Rapid Transport System (BRT) has led to it being adapted and implemented in other South African cities, including Cape Town, Nelson Mandela Bay, Rustenburg, Ekurhuleni, Johannesburg and Tshwane. Tshwane is the first African city to operate a fleet of Clean fuel BRT buses in Africa. Approximately 67% of the South African population use mini bus taxis as their prime mode of transportation. The South African government has introduced compulsory safety standards and a taxi recapitalisation programme which aims to replace old and unsafe taxis with newer, more efficient taxi vehicles. In addition, the government has started engaging with the taxi industry on introducing green initiatives into the minibus taxi industry by promoting the use and the uptake of cleaner fuels as a transportation fuel for the taxi industry.

The road sector in South Africa contributes 86% of the transport sector’s total emissions. It is therefore evident that this sub-sector can offer the highest mitigation potential benefits.

2.1.2 Rail

The events that have marked South Africa’s history have impacted significantly on the development of the rail sector and, together with other external factors have resulted in a railway industry that now faces several major challenges. Current challenges include the aging, deteriorating or obsolete state of much of the rail infrastructure and rolling stock, a capital investment backlog and a need for investment funds, and a preference by logistic transport service providers to transport freight by road rather than rail. There also exists the preference by long distance passengers to travel by road rather by train, poor rail security for both passenger and freight, inefficient rail operations and a shortage of technical skills and experience within the rail sector (National Rail Policy, 2015).

After many years of overloading and under-maintaining rail infrastructure, the condition of the heritage commuter rolling stock had deteriorated to crisis levels, and was unable to satisfy passenger demands. Similarly, the network infrastructure was not able to meet the demands of a rapidly changing society. To consolidate passenger rail, that is Metrorail and Shosholoza Meyl, the Passenger Rail Agency of South Africa (PRASA) was established in 2009.

Regarding freight rail, most branch line traffic was lost to predatory competition from road haulers during the 1980s. Deregulation of road freight in 1988 resulted in substantial volumes of high-value low-density freight on the core network shifting from rail to road during the 1990s. During the 2000’s, continued lack of competitiveness and investment by Transnet Freight Rail (TFR) resulted in road haulers deploying side tipper interlinks to encroach on the last bastion of freight rail, long distance haulage of...
heavy bulk commodities such as coal, grain, and ore. Overall, railways in South Africa had deteriorated to a stage where the need to adapt to rail’s global renaissance had become patently obvious to most stakeholders (National Rail Policy, 2015). However, since 2012 TRANSNET has invested R108.6 billion in rail infrastructure and new locomotives.

By contrast, two important positive steps were the establishment of the Railway Safety Regulator by Act of Parliament in 2002, and the development of the Gautrain Rapid Rail Link as a public private partnership in terms of a concession agreement between the Gauteng Provincial Government and the Bombela Concession Company. Gautrain opened for service in May 2010, in time for the FIFA Soccer World Cup.

The South African National Infrastructure Plan, which includes both economic and social infrastructure, is coordinated by the Presidential Infrastructure Coordinating Commission (PICC). The PICC is mandated to oversee the implementation of eighteen Strategic Infrastructure Projects (SIP’s) that will stimulate social and economic growth. The SIPs are aimed at addressing South Africa’s infrastructure deficit to boost economic growth and create much needed jobs. These include, among others, the construction of roads, power stations, pipelines and, in the present context, rail. Six of the SIPs address rail issues such as branch lines, capacity, corridors, densification, infrastructure, investment, logistics, road-to-rail-shift, and upgrading.

Improving the country’s 20 247km rail network is a top government priority, with projects aiming to address maintenance backlogs, to increase freight rail volumes, increase market share of container traffic, and to procure new fleet for both the passenger and freight sectors.

The Department of Transport is responsible for the passenger rail system which is being overhauled with a 20-year fleet renewal programme in place to procure more than 7 200 new trains. The passenger rail network is managed and implemented by the Passenger Rail Agency of South Africa (PRASA), which focuses on revitalising the local industry through the local manufacturing of components. The existing rail network for both passenger and rail is being upgraded to take advantage of the new technological features and modernizing rolling stock.

Around 2.2-million people travel by train every day in South Africa, and the Metrorail commuter services can be found in Cape Town, the Eastern Cape Province, Durban, and greater Johannesburg and Pretoria, and although the services focuses mainly on poorer South Africans for now, the intention is to expand the rail services and their accessibility to the bigger emergent middle class, who are showing more aptitude and appetite to use an integrated but safe network.

As discussed previously, the Gautrain, Africa’s only rapid rail train, was opened just days before the start of the World Cup in 2010, travelling at speeds of 160 km/h, enabling commuters to make the trip from Johannesburg to Pretoria in less than 40 minutes, and servicing Johannesburg, Pretoria and OR Tambo International Airport, it is supported by a network of feeder buses. Approximately 40 000 people use the service daily, and plans to extend the network are being investigated by the province.
Government’s National Climate Change Response White Paper, 2011 identifies a modal shift from road-to-rail as a key activity under the Transport Flagship Programme for South Africa. As the owner and operator of the country’s rail freight network, Transnet has undertaken to increase its rail market share to 35% by 2018/19. According to the Transnet 30-Year Long-term Planning Framework, Transnet is planning to expand and modernise infrastructure so as to encourage the switch of freight from road to rail. Transnet is modernising operations and investing in infrastructure to encourage a modal shift from road to rail in rail transportable cargo. Transnet aims to capture 80% market share of long haul (rail friendly) transportation. Transnet is in its fourth year of implementing the Market Demand Strategy (MDS). R124 billion has been invested since 2012 and the commitment is to invest R340-R380 billion in railway, port and pipeline freight capacity in the next 10 years. This will increase rail volumes and lower carbon emissions in the transport sector.

2.1.3 Aviation

Currently aviation has a small contribution to GHG emissions at only 8% of the total GHG emissions of the transport sector (GHG Mitigation Report, 2014)

South African Airlines currently sit with an aging fleet and lack funds for retrofitting their current fleet or for renewal. There is some work being done around investigating the switch to biofuels, for example, a project in Limpopo, Solaris, being done by South African Airways (SAA), American aeroplane maker, Boeing and in partnership with SkyNRG and Sunchem SA, is looking at using a high energy tobacco hybrid for biofuel production for aviation.

Recently Airports Company South Africa (ACSA) launched its first 200 square meter solar power plant at George Airport demonstrating its commitment to clean energy generation and sustainability. George airport is South Africa’s first and currently the only regional airport to be powered through solar energy. ACSA is planning on introducing an energy mix into all its airports and over the next 18 months they are rolling out similar plants at all their smaller airports – Kimberley, Upington, Port Elizabeth, East London and Bloemfontein.

2.1.4 Maritime

Maritime transport is a very small contributor to transport sector emissions in South Africa, being less than 1% (GHG Mitigation Analysis Report, 2014). This is due to maritime transport operating mainly beyond South African boundaries. The international nature of maritime emissions is being discussed at the UNFCCC and under the relevant United Nations agency responsible for maritime safety and the prevention of pollution from shipping, the International Maritime Organisation (IMO). South Africa is a signatory to a number of multilateral conventions relating to pollution for which the IMO is responsible, and must ensure that it continue and expand its engagement with these multilateral processes which are responsible for setting important norms of standards for the sector, many of which relate to the environment.
This subsector offers a relatively small opportunity for significant actions of change and GHG emission reductions compared to the reductions and impacts that can be made within the road sub-sector.

2.2 Conclusions

The Situational Analysis demonstrates that while a strong and extensive legislative framework to guide the transport sector is in place, there has been a lack of focused strategy and policy in relation to cleaner mobility and green transportation to guide regulation of the transport sector.

Since the transport sector has been identified as a major contributor to total GHG emissions and air pollution in South Africa, the Green Transport Strategy (GTS) needs to make a significant contribution to South Africa’s governance of transport in the future. The GTS will be the cornerstone of policy development within the transport sector regarding the lowering of GHG emissions, the promotion of green mobility and the uptake of cleaner and more efficient technologies.

The GTS strongly recommends the strengthening and capacitating of national coordinating bodies such as the South African Local Government Association (SALGA) and the South African Cities Network (SACN) Transport Forum and the use of transversal public procurement mechanisms to guide and support the implementation of climate change mitigation measures within cities and metro’s. South Africa is an increasingly urbanized society, and the overwhelming majority of transport emissions are incurred in cities, where the majority of the country’s population resides. For this reason, the metros and secondary cities within South Africa will play a key role in bridging the gap between the different spheres of government and will be instrumental in the successful implementation of the GTS measures.
3 Strategic Focus

The Green Transport Strategy (GTS) serves as a guide to the DoT to implement mitigation and adaptation measures that will significantly reduce Green House Gas (GHG) emissions produced by the transport sector in South Africa, reduce the environmental and human health impacts associated with the transport sector, and result in a more resilient sector. Reducing transport GHG emissions will contribute significantly to the national effort to reduce emissions as agreed to by the South African government at COP21 in Paris through the Nationally Determined Contribution (NDC).

Research undertaken by GIZ, SANEDI and a host of other research organisations on behalf of the South African government clearly indicates the following core conclusions:

- Implementing measures that will reduce the need to travel and avoid unnecessary trips through walkable communities, integrated land use planning or “transit oriented development” and improving vehicle occupancy rates.
- Given that the road transport sub-sector is responsible for 86% of direct emissions from transport, shifting of passengers to public transport and freight to rail is a necessity.
- Biogas and solar powered electric mobility outstrip any other cleaner fossil fuel in terms of GHG reductions.

The GTS has identified and proposed key measures to facilitate the modal shift from road to freight and private to public transport. There also exists an important need to promote non-motorised transport and develop the associated infrastructure to support this.

Figure 4 below graphically compares full life-cycle GHG emissions (including the extraction and production of transport fuels and energy carriers) of a wide range of transport fuels, hydrogen fuel cell and electric vehicle technologies. Emissions of electric vehicles and hydrogen fuel cell vehicles are dependent on the emissions factors of the electricity source. The European Union power mix is used as reference point in Figure 3, and the emissions factor of the South African grid is substantially higher than this.
While analysis of the mitigation potential of available fuels and technologies suggests that South Africa should be focusing on adopting biogas (biomethane) as a transport fuel and electric vehicles (e-Mobility) as a technology, this should not preclude a determined effort to reduce the carbon profile of vehicles powered by fossil fuels since they represent the vast majority of vehicles on our roads and this is very unlikely to substantially change within the next five years.

In addition to implementing climate mitigation measures, the Department of Transport needs to identify and implement climate change adaptation measures as agreed to under the COP 21 agreement and as outlined in the National Climate Change Response and National Development Plan. Article 4 states that all parties shall establish the goal of enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change. COP 21 recognizes the need for adaptation regardless of the level of mitigation reached, however greater levels of mitigation can reduce the need for additional adaptation efforts.

While vehicle efficiency and low carbon fuels have an important role to play in reducing transport emissions, building a resilient low carbon transport system requires systemic changes in order to shift from the current situation of low density human settlements in which the private car is the primary form of transport. Integrated transport planning that actively addresses the spatial planning implications of land use decisions is best achieved through cooperation between all affected departments at all spheres of government.

3.1 Guiding Principles

The GTS is informed by the fundamental and substantive principles of sustainable development articulated in the National Strategy for Sustainable Development as approved by the Cabinet in 2011 (DEA, 2011):

The fundamental principles relate to the following fundamental human rights that are guaranteed in the Constitution of the Republic of South Africa:

- Human dignity and social equity
- Justice and fairness
- Democratic governance
- A healthy and safe environment

The substantive principles are based on the following sustainable development principles that are already enshrined in South African law and that underscore a systems approach to achieving sustainable development:

- Natural resources must be used sustainably.
Socio-economic systems are embedded in and are dependent on ecosystems. Basic human needs must be met to ensure that the resources that are necessary for long-term survival are not destroyed for short-term gain.

In the context of the GTS, this creates the following imperatives:

- To reduce environmentally harmful emissions from the transport sector.
- To reduce the impact of transport infrastructure on the environment.
- To ensure integrated transport systems provide equitable access to economic opportunities for all South Africans and support economic growth and development.

3.2 Mission

The GTS will support the contribution of the transport sector to the social and economic development of the country while transforming the sector to reduce harmful emissions and negative environmental impacts associated with transport systems.

3.3 Vision

The long term vision to 2050 of the GTS is for the emissions and environmental impact of the transport sector to be substantially lower in absolute terms than is currently the case, while at the same time all South Africans enjoy convenient, safe and affordable access to transport:

- By integrating transport into spatial planning of human settlements, South Africans from all walks of life will have access to affordable housing in close proximity to schools and economic opportunities, significantly reducing the length and duration of daily commutes.
- Most central business districts will be “no-car” zones, with walking and cycling being the preferred mode of transport, allowing significant areas of urban real estate currently used for parking to be repurposed for use in affordable inner-city housing and businesses.
- An extensive network of cycle lanes and pedestrian walkways will re-orient South Africa’s towns and cities away from cars and towards people. The investment in non-motorised transport infrastructure will yield a double dividend in terms of human health by both reducing harmful air pollution and promoting healthy exercise.
- Public transport will be convenient, safe and affordable with a variety of options to suit different needs and pockets, relegating the use of private vehicles primarily to occasional recreational travel.
- Long distance freight will be almost entirely restricted to rail, and private sector innovations will result in more economically efficient transport logistics that greatly reduce the number of commercial delivery vehicles on urban roads. Together with modal shifts in passenger transport this will greatly reduce road traffic and the costs of maintaining urban and national roads, allowing resources to be redirected to environmentally sensitive upgrades of rural road infrastructure.
• The replacement of fossil fuels by vehicle technologies with low or zero tailpipe emissions, such as electric and hydrogen fuel cell vehicles, will be far advanced and, coupled with significantly a lower national electricity grid emissions factor due to a large scale switch to renewable energy improvements this will lead to a dramatic reduction in the carbon intensity of motorised transport.

• All waste collection vehicles and a portion of municipal buses not already replaced by electric vehicles will be powered with a combination of biogas and biofuels produced from domestic, commercial and agricultural waste.

3.4 Strategic objectives

The GTS rests on 4 implementation themes and 8 strategic pillars:

Table 3: Strategic Pillars of the Green Transport Strategy

<table>
<thead>
<tr>
<th>Green Roads</th>
<th>1. Shift passengers from private to public transport, including rail</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2. Shift freight transport from road to rail</td>
</tr>
<tr>
<td></td>
<td>3. Provide infrastructure to promote non-motorised transport</td>
</tr>
<tr>
<td>Green Rail</td>
<td>4. Extend the rail network to provide reliable, safe and affordable high-speed transport</td>
</tr>
<tr>
<td>Green transport technologies</td>
<td>5. Reduce the carbon footprint of fossil fuels</td>
</tr>
<tr>
<td></td>
<td>6. Promote alternative fuels such as Compressed Natural Gas (CNG) or biogas, Liquefied Natural Gas (LNG), Fuel cell and liquid biofuels as transport fuels</td>
</tr>
<tr>
<td></td>
<td>7. Promote electric and hybrid-electric vehicles</td>
</tr>
<tr>
<td>Green Fuel Economy Standards</td>
<td>8. Provide norms, standards and regulations that promote fuel economy in vehicles and improve emission standards of fuel in South Africa</td>
</tr>
</tbody>
</table>

The GTS has the following near-term strategic objectives over the next five years:

1. To promote strategies and standards for delivering transport infrastructure and integrated transit planning that build climate resilience in urban and rural communities and minimize the environmental impact of transport infrastructure.

2. To convert 20% of the public sector fleet and 10% of the national fleet to electric and hybrid vehicles (ideally powered by renewable energy) and environmentally sustainable low carbon fuels by 2022, including the use of CNG, biogas and biofuels and the use of renewable energy to provide electricity for transport.

3. To reduce fossil-fuel related emissions in the transport sector by promoting norms and standards and putting in place regulations that promote improved efficiency in fossil-fuel powered vehicles and improved environmental performance of fossil fuels.
4. To achieve modal shifts in the transport sector that reduce GHG emissions and other harmful emissions, reduce transport congestion and improve temporal, spatial and economic efficiency in the transport sector - in particular, by 2022 achieving a 30% shift of freight transport from road to rail, and a 20% shift of passenger transport from private cars to public transport and non-motorised transport.

3.5 Values

In order to meet the county’s GHG emissions reduction targets within the relatively short time horizon, radical changes are required in the transport sector. At the same time, these changes cannot undermine transport’s contribution to meeting economic and social needs for connection and mobility. In particular, the GTS seeks to:

- Contribute to the prosperous functioning of a modern economy and cater for the transport needs of expanding human settlements
- Provide for a healthy environment and supportive ecosystem services while dismantling apartheid’s structural disconnection of poorer people from economic opportunity
- Reduce the cost and improve the convenience and safety of transport for the rural and urban poor.
4 STRATEGIC INITIATIVES

The implementation of the GTS requires the input and contribution of the following stakeholders who will be consulted in the rollout of this strategy. In particular, the following stakeholders are critical to the success of the GTS:

- Central government through the DoT
- Provincial government
- Department of Trade and Industry (DTI)
- Department of Environmental affairs (DEA)
- Department of Energy (DoE)
- National Treasury
- South African National Energy Development Institute (SANEDI)
- Department of Science and Technology (DST)
- Council for scientific and Industrial Research (CSIR)
- Department of Tourism
- South African Cities Network (SACN)
- SALGA
- South African National Roads Agency limited (SANRAL)
- Major cities
- Eskom
- Vehicle manufacturers
- Private green transport entrepreneurs
- Passenger Rail Agency of South Africa (PRASA)
- Transnet SOC Ltd

4.1 Green Transport Measures

The GTS focuses on the priority measures that will contribute most to a radical shift in South Africa’s transport emissions profile. The corollary effects of full implementation will be safer, more reliable and cheaper transport options for the majority of South Africans. All investments in the transport sector should be informed by the guiding principles, vision, and strategic objectives of the GTS.
4.1.1 Integrated Transit Systems

Fundamental to the greening of the transport sector is the integrated functioning of the transport system. These integration policies and strategies have been defined in all transport sector planning, policy and strategy documents. Integration is the key principle on which all transport strategy rests for successful execution and functioning.

In terms of the GTS, the modal shifts to rail and away from private vehicle use are premised on integrated transit and feeder systems that make far greater use of public transport and non-motorised transport.

The interaction of transport infrastructure with the property market can lead to outcomes that are neither socially nor environmentally desirable. For instance, the provision of transport infrastructure such as railway stations or bus terminals tends to result in an increase in the market value of nearby property, which can have unintended local consequences in terms of converting residential property to commercial property and reducing the availability of land for mixed and low cost housing. The DoT needs to develop best practice guidelines to ensure that integrated, climate friendly transport options are incorporated into land use and spatial planning at a national, provincial and local level. One option is for the Minister to prepare such guidelines in terms of the provisions of the Spatial Planning and Land-Use Management Act in order for them to inform planning decisions.

In addition, Intelligent Transport Systems have the potential to reduce GHG emissions and can be used through transport planning processes to provide signal timing, real time traveler information, and incident management etc. Transport planning and investment decisions can improve the operational efficiency of multi-modal transportation networks and integrated transportation and land use planning to reduce travel time.

The DoT will provide a national team of experts to consult to all spheres of government as infrastructure is expanded. The team of green transport integration experts will also consult to the Strategic Integrated Projects (SIPs) throughout their planning and execution.

4.1.2 Road

The road transport sector contributes approximately 86% of total transport GHG emissions. Therefore, the focus of the GTS must be on reducing emissions from the road sector. The primary strategy to achieve this is through achieving modal shifts in the transport of freight from road to rail and from private vehicle use to public transport and non-motorised transport for passenger transport.
Table 4 below, drawn from the DEA’s 2014 Mitigation Report, provides estimates of the potential CO₂ emissions reductions that can be achieved through modal shifts in the transport sector, and the estimated costs of achieving these reductions per ton of avoided CO₂ emissions. While the initial capital costs are high, by 2050 modal shifts in passenger transport represent a saving to the economy.

Table 4: Estimated mitigation potential and costs (which are likely to be borne by the public and private sector, as well as consumers) of modal shifts in the transport sector

<table>
<thead>
<tr>
<th>Modal shift</th>
<th>2020 ktCO₂</th>
<th>2020 R/tCO₂</th>
<th>2030 ktCO₂</th>
<th>2030 R/tCO₂</th>
<th>2050 ktCO₂</th>
<th>2050 R/tCO₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road – passengers, pvt vehicle to public transport</td>
<td>820</td>
<td>3,105</td>
<td>3,087</td>
<td>729</td>
<td>9,396</td>
<td>-1,128</td>
</tr>
<tr>
<td>Road – freight, road to rail</td>
<td>1,840</td>
<td>1,375</td>
<td>2,729</td>
<td>2,085</td>
<td>2,997</td>
<td>1,497</td>
</tr>
</tbody>
</table>

Source: GIZ mitigation potential analysis on behalf of DEA 2014

ktCO₂ - Kilotonne of Carbon dioxide
R/tCO₂ - Rand per tonne of Carbon dioxide

4.1.2.1 Passenger

The GTS aims to provide the policy, regulatory, norms and standards and fiscal instrument recommendations necessary to achieve a modal shift of passengers from private vehicle use to public transport, and particularly from road to rail.

In order to achieve these modal shifts significant investment needs to take place.

- **Bus rapid transit (BRT)** systems need to be significantly expanded throughout the large cities and the security, reliability and frequency of BRT systems improved.
- Infrastructure must be upgraded to allow the minibus taxi industry (or high occupancy vehicles such as car pooling initiatives) to utilize the BRT-only lanes. Cities will be engaged to allow this access. The taxi industry, a major component of the transport industry, needs to be engaged to develop their role as important feeders to the public transport system.
- **An intelligent transport system** must be developed where all public transport and the minibus industry can be monitored by metropolitan control centres through GPS. The intelligent transport system will provide information to the public in terms of congestion, available transport options and arrival/departure times throughout South Africa’s large urban cities.
- **A single ticketing system** will be developed where the public can utilize a smart card as the payment mechanism. The smart card will be swiped on entry and exit of the public transport system. The smart card may also be used in the minibus taxi industry. The smart card will be loaded with funds at the same distribution points used to buy mobile air time.
- **Non-motorised transport infrastructure**, namely the building of cycle lanes along key transport routes and improved pavements and sidewalks must be included in the maintenance mandates of SANRAL and local government where appropriate. These facilities require urgent expansion to provide for the majority of South Africans who utilize NMT as their primary mode of transport and to capitalize on the growing public desire for non-motorised ‘green’ transport.
• The planning and design of transport infrastructure expansion must consider future ecomobility developments – autonomous cars, connected cars and buildings, smart grid systems, smart city mobility and Futran track networks amongst many others. DoT will engage the thought leaders in the global and local ecomobility space to ensure preparedness for the future.

• **Vehicle energy efficiency programme** – the government will set an example for corporates and the general public and stimulate the market through procurement for the government vehicle fleet. DoT will engage with National Treasury and relevant national departments, as well as provincial and local government to set rolling targets for the procurement of **Electric Vehicles (EVs)**.

• The government will work with the private sector to expand on the current number of electric charging stations powered by photovoltaic panels (solar). These stations will also be accessible to the general public.

• A baseline analysis of the government fleet will be undertaken to use as data for the public communication of fleet emissions improvements. The analysis will include the following as a minimum:
  - basic specifications – engine size, curb weight, footprint etc,
  - utility – power, maximum speed
  - fuel consumption, CO₂ emissions
  - technology adoption – fuel type, transmission, air intake

• In addition, the government will only procure the top 3 most fuel efficient vehicle makes and models.

• DoT will engage with DTI to provide trade incentives to vehicle manufacturers who supply the government fleet with high energy efficient vehicles and EV’s.

• DoT will engage with the Department of Water Affairs and Forestry and conduct research into a tree planting initiative within and around major cities. Adding trees to urban areas is important given the trees’ close proximity to people as trees have a positive effect on air quality through the direct removal of air pollutants.

• DoT will develop a national green transport awareness campaign to be rolled out nationally. The awareness campaign will include behavior change initiatives such as eco-driving.

4.1.2.2 Freight

Rail transportable freight should ideally not be transported via the road network. Historically, rail was the preferred method of moving freight in South Africa, but following deregulation of the transport sector, the rail market share, and consequently also investment in rail transport infrastructure, has progressively decreased. There is a modal imbalance between road and rail movements, which leads to an unsustainable use of road infrastructure (Havenga & Pienaar 2012). This has led to strain being put on the national fiscus due to increased capital and maintenance costs of road infrastructure, as well as strain on the private sector the cost of road transport has increased (Freight shift from road to Rail, DEA).

Road infrastructure is affected by several factors, but most importantly environmental factors, the volume of vehicles and the weight of the vehicles on the road. All roads are built with a design life and
with the addition to the impact of the traffic load, the environment (heat, cold, rainfall etc) also causes deterioration.

South African roads are also placed under further pressure by increased freight and passenger transport within the SADC region. South Africa has the largest ports and provides important transit corridors to the SADC region. This is also compounded by the large movement of people coming to South Africa in search of employment and better opportunities.

The growing use of the road network for freight is causing a further increase in maintenance requirements and costs for the road network, adding to congestion and the growth in emissions and particulate matter in the air. Strategic action, including possible regulatory or fiscal measures is needed to encourage freight to be transported via the rail network. The increased use of rail will ease the environmental, health and congestion burdens.

Recommended road regulatory actions

DoT will prepare the following regulatory actions targeted at encouraging the modal shift from road to rail and from private vehicle use to public transport:

- In consultation with the cities, DoT will develop a regulatory and policy framework for levying a **congestion charge** on vehicles that enter central business hubs. International best practice with regard to congestion zone taxing will be taken into account. Congestion zone taxing will require supporting infrastructure – park and rides, integrated NMT facilities, bike and car share scheme development and the like.

- In consultation with stakeholders and the National Treasury, **review the current levels of the environmental levy on new motor vehicle CO₂ emissions and expand the tax to include commercial vehicles** in order to more effectively influence energy efficiency and the environmental performance of the country’s vehicle fleet.

- Develop a regulatory regime in consultation with National Treasury for the **annual taxing of vehicles based on their emission standards** through the annual car licensing renewal system.
  - Enhance the regulatory regime to include a **3 yearly test** on vehicles that covers roadworthiness and exhaust emissions. The test certificate with need to be produce ever 3rd year of car licensing renewal and the test scores will be used to adjudicate a price relative to safety and emissions performance. This regulatory regimes echoes that of the Ministry of Transport in the United Kingdom.

- The use of **vehicle fuel economy norms and standards** to **label vehicles** in terms of their fuel efficiency and emission standards will continue, and baseline studies on the **implementation of more stringent fuel economy standards** (such as Euro V) should lead to the adoption of appropriate greener standards within 5 years.

- In consultation with cities, DoT will develop regulations to ensure that **freight vehicles may only enter urban hubs during off peak hours**.

- Research will be conducted into the **staggering of school and work start times** to relieve congestion in cities.
Road freight permits will be re-introduced into South Africa with permit pricing reflecting the emissions for tonne cargo of freight vehicles.

The DoT will develop Green Standards and Guidelines for road construction, maintenance and upgrades. This will include standards and guidelines on climate change resilient materials.

4.1.3 Rail

The National Rail Policy sets out the levers for revitalizing rail in South Africa through investment in a small high performance new network that can set extra-urban railways on a renaissance trajectory and expanding funding sources through private sector participation. As can be seen from the table above, rail is far superior from a direct emission mitigation perspective than road transportation. Direct emission from the rail sector contribute 1% of all transport emissions. Note that this figure excludes the emission from electricity consumption. There are however significant investments costs required to actualize the modal shift required for achieving these reduction figures.

Rail provides the most immediate relief required to meet emission reduction targets in the limited time frame available. In order to achieve these target the GTS supports the National Rail Policy’s determination to grow targeted high speed intercity networks, heavy haul, double stacking and contemporary urban rail options.

In order to achieve the successful development and integration of the rail sector in South Africa, and to support the measures proposed in the Green Transport Strategy, the formation of a National Rail Regulatory body is recommended. This body would oversee and provide guidelines and standards for the integration of rail systems, infrastructure requirements, pricing guidelines, and facilitate and coordinate engagement between PRASA and TRANSNET.

Implementation and regulatory actions

4.1.3.1 Passenger

The DoT, through the GTS, supports the following existing National Rail Policy directives and additional proposed regulatory frameworks:

- Drawing on the lessons learned and experience of the Gautrain model, expand and upgrade rail networks into all urban areas.
- Invest in the improvement of PRASA infrastructure and services
- Support and invest in the development of PRASA infrastructure and services
- Increase frequency, reliability and safety levels for passengers.
- Restore rural branch network
- Secure local and global private sector participation in high speed networks.
- Design a pricing system that is competitive with road transportation.
- Conduct the research to appropriately tax the road transportation sector to reflect the maintenance cost of road. *Use mechanisms listed under road regulatory actions.
- Develop tax incentives related to corporate and private spend on rail transportation.
• Encourage PRASA to move towards fuel-cell and solar powered locomotives in a shift to using low carbon energy sources
• The DoT will develop Green Standards and Guidelines for rail infrastructure and construction, maintenance and upgrades. This will include standards and guidelines on climate change resilient materials.

4.1.3.2 Freight

• Increase frequency, reliability and safety levels for freight.
• Design a pricing system that is competitive with road transportation.
• Conduct the research to appropriately tax the road transportation sector to reflect the maintenance cost of road. *Use mechanisms listed under road regulatory actions.
• Develop tax incentives related to corporate and private spend on rail transportation.
• Encourage TRANSNET to move towards fuel-cell and solar powered locomotives in a shift to using low carbon energy sources
• The DoT will develop Green Standards and Guidelines for rail infrastructure and construction, maintenance and upgrades. This will include standards and guidelines on climate change resilient materials.

4.1.4 Aviation

Although emissions from domestic aviation have more than doubled (up about 140%) since 2010, reflecting the large growth in passenger demand over this period, as of 2010 aviation contributed less than 8% to total transport GHG emissions. However, this figure is likely to grow given the growth in passenger demand for air travel.

The International Civil Aviation Organization (ICAO) is a UN specialized agency, established by States in 1944 to manage the administration and governance of the Convention on International Civil Aviation (Chicago Convention). ICAO works with the Convention’s 191 Member States, of which South Africa is one, and industry groups to reach consensus on international civil aviation Standards and Recommended Practices (SARPs) and policies in support of a safe, efficient, secure, economically sustainable and environmentally responsible civil aviation sector. The South African aviation industry complies with the standards set in place.

The airline industry has also agreed to a voluntary sectoral agreement through the International Air Transport Association (IATA) whereby four pillars are used to reduce GHG emissions.

1. Technology – the IATA’s Technology Roadmap identifies future technologies that could reduce emission by 20% - 35% per aircraft. These technologies concentrate on engine and systems to reduce fuel burn through measure such as retrofitting winglets, the use of lightweight composite materials and laminar flow. Biofuels can be blended with jet fuels in increasing quantities as they become available. IATA’s concentration is on second or new generation biomass that can be produced sustainability to minimize impacts on food crops and fresh water usage. However, relative to the other steps being taken biofuel production is expensive.
2. Operations – improved operational practices, including reduced auxiliary power unit usage, more efficient flight procedures and weight reduction measures save fuel and carbon emissions.

3. Infrastructure – improvements in infrastructure present a major opportunity for emission reduction through cuts in route extension, reducing delays through next generation air traffic management systems and continuous decent arrival rather than the traditional stepped approach to landing.

4. Economic – utilizing emissions trading mechanisms, carbon offsets and the like as long as ‘carbon leakage’ where emissions transfer between countries or carriers leading to market distortions without reducing emission does not occur. *Source IATA: A global approach to reducing aviation emission.

The financial pressure currently being experience by South African Airways makes it extremely difficult to procure new, more efficient aircraft or invest in biofuel production. Hence effort should be concentrated on retrofitting technologies and improved operational efficiencies.

The Airports Company of South Africa (ACSA) has and continues to invest in infrastructural and operational upgrades. In addition, George Airport is the first airport in South Africa to install extensive solar technology and DoT should continue to encourage and support the Department of Public Enterprises in extending solar power generation throughout the country’s airport infrastructure.

4.1.5 Maritime

Insufficient information is available on the emissions associated with inland navigation, which are however believed to be negligible. In the Green House Gas Inventory (GHGI), energy use associated with inland navigation is assumed to be captured in other use categories. Overall, the emissions associated with this activity are considered small in comparison to other transport sectors. For example, Aurecon (2012) estimates that coastal and short-sea shipping represent less than 1% of total freight transport in South Africa. (Source: GIZ mitigation analysis potential)

With respect to shipping, the focus should be on enforcing existing environmental standards and regulations as reflected in regional and international shipping treaties to which South Africa is a signatory, and ensuring that environmental standards and greening opportunities arising from the management of our ports are adhered to. IMO (International Maritime Organisation) has adopted important guidelines aimed at supporting implementation of the mandatory measures to increase energy efficiency and reduce GHG emissions from international shipping. The expected growth of world trade represents a challenge to meeting a future target for emissions required to achieve stabilization in global temperatures and so IMO has begun consideration of further technical and operational measures to enhance the energy efficiency of ships.

Opportunities for LNG bunkering in the SA port system are being investigated by Transnet and will support IMO initiatives to encourage fuel switching in the shipping industry.
4.1.6 Pipeline transportation

In the GHGI the transport sector is defined in terms of road transport, railways, civil aviation and water borne navigation categories. However, transportation of certain products (for example primary fuels) can also be accomplished using pipelines. Within the GHGI the emissions associated with energy used in pipeline transportation and fugitives released are allocated to other sectors, and are therefore not relevant to discussion in the GTS. (Source: GIZ mitigation potential analysis)

4.1.7 Cleaner Fuels and Technologies

The production and burning of fossil fuels is the primary cause of global warming and therefore every effort needs to be made to reduce the impact of fossil fuels to preserve life on Earth. There are two options available:

1. Reduce the use of fossil fuels.
2. Produce cleaner fossil fuels.

In terms of reducing the use of fossil fuels, the DoT needs to actively promote and invest in the production of biogas, the use of CNG, LNG and solar powered EVs. In addition, there is currently no policy or regulatory framework that determines the requirements, norms and standards for cleaner fossil fuels in South Africa. There is also no policy that rewards users of cleaner fuels and cleaner fossil fuels. As mentioned below, the development of these regulatory and policy frameworks is an immediate priority. Transnet is planning for the development of LNG import facilities at the Ports of Richard's Bay, Ngqura and Saldanha. This will facilitate downstream security of future supply of natural gas for CNG demand.

The DoT also needs to promote the use of biofuels within South Africa as this renewable energy source presents the potential for numerous energy security and efficiency benefits to the South African economy. The biofuels industry also has the potential to contribute significantly to job creation in South Africa. The Biofuels Industrial Strategy of South Africa followed by the Position Paper in terms of the National Energy Act34 of 2008, published by the DoE on 15th January 2014 provides for a 2% (or 400 million litres per annum) penetration level of biofuels into the national liquid fuels supply. The deadline for the mandatory blending of biofuels with petroleum was set for the 1st October 2015 in an attempt to foster a regulatory environment to enable the production of biofuels through the full and proper implementation of the final Biofuels Strategy.

4.1.7.1 Biogas and biofuels

The production of biogas through growing biomass material can have negative effects on food production and water usage as a result of the hectares and water needed to produce the biomass. It is therefore not ideal. However, the production of biogas using existing waste material – sewerage, animal manure, landfills - directly at the site of the waste storage or production is financial feasible.

As with biogas, there is concern around the production of biomass for biofuel production regarding food security, water usage and the hectares in land required. For the stated purposes of food security and
environmental concern, the *Final Biofuels Strategy* proposes the production of specific crops for the production of bioethanol and biodiesel (Department of Energy, Draft Position Paper, 2014).

The DoT will establish a team to examine the cost and benefits of building biogas plants at large urban landfill sites and sewerage plants. This research will be extended to compiling a cost/benefit analysis of constructing smaller biogas plants at the sites of large buildings that house considerable amounts of people and therefore produce larger quantities of waste, for example the Charlotte Maxeke Johannesburg Hospital. These initiatives provide opportunities to produce biofuels that can be used to fuel waste trucks and emergency services vehicles. This research will be applicable to and should be shared with large private sector corporates, large apartment buildings and residential complexes.

**Biogas Regulatory actions:**

The team of experts will also investigate and draft regulations that:

- Compel government vehicles that are directly related to waste and have every day access to biogas to use biogas as a fuel.
- In conjunction with National Treasury, draft tax incentives for the use of biofuels in the private sector. Private sector tax incentives will encourage private sector investment in biogas production.
- Develop a system for centralizing animal manure collections at regional biogas plants.

4.1.7.2  *Compressed and Liquid Natural Gas (CNG/LNG):*

Natural Gas has begun to take a foothold in the South Africa market in both the minibus taxi industry and in the cities’ Metrobus systems. While not as GHG friendly as renewable energies or pure biogas, Natural Gas produces less emissions than fossil fuels, and serves as a potential transition fuel that could stimulate biogas production by developing a potential offtake market.

Cities that have converted a portion of their Metrobus fleets to run on both Natural Gas and petrol/diesel have unfortunately found that the operators of buses are loathe to refuel using CNG. They have in fact gone as far as damaging the gas pumps at depots in order not to refuel with biogas. There is some evidence to suggest that operators are motivated to damage gas pumps because they reduce the potential to syphon traditional fuels for private sale. Slippage of diesel/petrol in Johannesburg’s Metrobus fleet is approximately 12%. This compares unfavourably with slippage averaging 4% in private sector logistics companies (*Source: Unitrans*). The solution is to accelerate the conversion of Metrobus fleets into gas-only vehicles.

The DoT will capitalizing on the private sector’s initiative to grow the use of CNG in South Africa by working with the Development Bank of South Africa’s (DBSA) Green Fund, Department of Trade and Industry (DTI) and the Industrial Development Corporation (IDC) to make development and project finance available at attractive rates. The private sector has concentrated on providing gas-fired boiler systems and converting minibus taxis into dual-fuel vehicles.

Already there are significant moves in Gauteng involving negotiations with taxi associations and fuel stations to set up conversion workshops and retrofit existing fuel stations to accommodate CNG pumps.
These initiatives must be supported through a DoT negotiated process with the South African National Taxi Association (SANTACO) and other affected taxi associations. Following the lead of many countries such as India, DoT will investigate drafting regulations requiring all public and quasi-public transport vehicles to move to a dual-fuel system within 10 years. Failure to do so will result in fines and inability to renew vehicle licenses.

The key is the provision of attractive or concessionary finance rates to the private sector. The private sector should be encouraged to aggressively pursue this endeavour and aggressive communication is required from DoT to the minibus taxi industry to highlight the benefits and cost effectiveness of CNG relative to fossil fuels.

Security of supply of CNG is crucial. Currently South Africa has no CNG available other than via Sasol from Mozambique. In addition, the distribution network for gas is limited. The private sector is currently using road to transport gas the last mile from the large national and provincial pipelines.

DoT, with the support of Cabinet, DOE, and DEA, will enter into negotiation with Sasol to increase the amount of unrefined CNG available within South Africa. In addition, DoT, through the Department of International Relations will open negotiations with the Mozambican government for direct supply of CNG from Mozambique to the South Africa government. Additional domestic and regional supplies of CNG are currently being investigated, including off-shore natural gas reservoirs and “fracking”.

**CNG Regulatory Actions:**

The following initiative form the backbone of DoT’s efforts to promote the use of Natural Gas:

- In conjunction with cities, DoT will draft regulations requiring 10% of the Metrobus fleets to be converted to gas-only vehicles per year.
- DoT will lead the effort to make attractive finance available to the private sector for the conversion of minibus taxis to dual-fuel vehicles and retrofit filling stations.
- DoT will initiate discussions with the taxi industry to promote dual-fuel conversion.
- DoT will draft regulations requiring all public and quasi-public transportation vehicles to be converted to dual-fuel vehicles within 10 years.
- DoT will lead the process with assistance from DTI and International Relation to engage Sasol and Mozambique for the increased supply of CNG to South Africa.

**4.1.7.3 Cleaner fossil fuels:**

Fossil fuels are the single largest contributor to GHG emissions in the transport sector. In order to meet the government’s global commitments harsh cleaner fuel requirements will be imposed on the sector.

**Cleaner Fossil Fuel Regulatory actions:**

- The DoT, with the assistance of DTI and DEA, will draft regulations requiring refineries to produce fossil fuels that meet new standards and norms required with regard to emissions profiles. The methodology may be similar to the Air Quality Control Act.
4.1.7.4  Electric Vehicles (EVs)
Currently the market share of EVs in South Africa is tiny, with only approximately 300 EVs in the country. This number needs to grow exponentially to make a meaningful contribution to reaching GHG reduction targets. Given the fossil fuels associated with electricity production and the pressures on South Africa’s electrical power generation and distribution systems, EVs should be charged via renewable energy and in future may even assist as back-up power sources to households through their batteries. Solar power is responsible for very low GHG emissions (primarily associated with the manufacture of photovoltaic cells).

In addition, according to SANEDI, despite the higher up front cost of an EV, the lifetime cost of the EV is below that of a conventional car as a result of the inexpensive electrical (solar) refueling.

Electric Vehicle Actions:
In order to radically grow the uptake of EVs in South Africa DoT, in conjunction with DTI and National Treasury, will:

- Consider removing or relaxing import duties on electric vehicles, particularly the classification of electric vehicles as luxury imports, in order to stimulate the experience and local capacity development in relation to these technologies.
- Offer EV vehicle manufacturers trade incentives to both produce and sell affordable EVs in South Africa, for the local and export markets.
- Work with the CSIR and other local research institutions to manufacture EV batteries at a reduced cost.
- Work with national, provincial and local government departments and authorities and the automobile industry to set annual targets for the uptake of electric vehicles and hybrid electric vehicles in the government vehicle fleet.

4.1.8  Communications Strategy
Behavior change on the part of both consumers and service providers has a critical role to play in reducing the environmental impact of transport. Communications to support the GTS need to be based on evidence about consumer decision-making in relation to modal shifts in transport. For instance, consumers are more likely to investigate transport options when planning key life decisions around employment, education and moving home.

A further instance in which behavior change is important to both public and public transport is in relation to driver training. Appropriate driving techniques and vehicle maintenance can result in reduced transport emissions, and these need to be communicated to both service providers and consumers – for instance, through the system of licensing public and private drivers.

At the same time, consumers need to be informed of the importance of transport in relation to the environment and made aware of the benefits of public transport, particularly as public transport infrastructure and services are improved and expanded.
Strong public relations campaigns will need to be run in order to encourage the modal shift desired especially shifting the public to public transportation. Each regulatory action will also need to be fully communicated with stakeholders in order to drive buy-in and compliance. A high level government official needs to be developed into “the green transport champion”.

4.1.9 The Sustainable Urban Transport Programme

The programme envisions promoting the implementation of SUT measures (Avoid – Shift – Improve) at local level that align with national goals (e.g. National Climate Change Response White). The SUT programme will bridge the gap between the policy making at the national level and the implementation at the local level.

The Programme will be implemented in two phases. The first phase is to establish the national programme and the second phase will then focus on the implementation of direct mitigation measures on the local level.

During phase 1 the following outputs are foreseen. These activities can be summarised as supportive measures to enable the implementation of mitigation actions in urban areas in South Africa.

1. Establishment of a Technical Support Unit (TSU) for SUT Programme;
2. Organizing a knowledge-sharing platforms among all spheres of the Government on SUT;
3. Making improvement on the MRV capacity, aiming for a national harmonized approach;
4. Supporting Metropolitan municipalities and Cities during design and implementation of SUT measures;
5. Promoting the improvement of (national) legal framework in the context of SUT;
6. Creating and coordinating access to financial resources to support implementation of SUT measures; and

The national programme will support local governments in their actions towards an environmentally-friendly transport system. Therefore a comprehensive mechanism needs to be established to ensure the successful implementation of the measures and the coordination among all stakeholders. One key intervention of the Sustainable Urban Transport Programme of the DOT will be the coordination and distribution of lessons learnt and best practices among the cities/metros involved.
5 Implementation, Monitoring and Evaluation

Critical to the successful implementation of the GTS will be access to funding. This document outlines a number of regulatory action that will draw in funds. However, the quantum of funding required particularly for expansion and upgrading of public transportation and the rail network will require both international and private funding.

The DoT will facilitate the following actions:

- Arrange preferential funding through South Africa’s development finance institutions for the local private sector to participate in:
  - The conversion of minibus taxis into dual-fuel vehicles and retrofit existing filling stations or new builds to provide CNG.
  - The building of high speed inter and intra-city rail networks.
- South Africa’s commitment in terms of the NDC were made on the condition that South Africa receives global financial and technical support. Therefore, the DoT will compile documentation to support project specific funding requests to the Green Climate Fund, the World Bank and UNFCCC.
- DoT will develop an approach to USAID’s Development Credit Agency who have committed to providing the IDC and South Africa’s commercial banks with guarantee and insurance products for green projects.
5.1 Implementation Plan

The following table indicates the specific action required, details thereof, the person responsible and the timeline. *To be completed following stakeholder engagements.*

All interventions or measures need to be SMART (Specific, Measurable, Achievable, Realistic, Timely)

<table>
<thead>
<tr>
<th>Action</th>
<th>Details</th>
<th>Person/department responsible</th>
<th>Timeline</th>
<th>Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>National team of integrated transit specialists</td>
<td>To consult on all infrastructure expansion projects, green transport projects and SIPs</td>
<td>DoT, Autopax, SALGA, SACN, DPE, DEA, ReaVaya, MyCiti, National Transport Regulator, NCRS</td>
<td>5 Years</td>
<td>Feasibility studies to be conducted and costs determined</td>
</tr>
<tr>
<td>Expand BRT System</td>
<td><strong>Bus rapid transit (BRT) systems need to be significantly expanded throughout the large cities and the security, reliability and frequency of BRT systems improved</strong></td>
<td>DoT, SACN, Cities, Local Government,</td>
<td>3 Years (Progress review within 2 years in relation to integration into ITP’s and IPTN’s)</td>
<td>To be determined</td>
</tr>
<tr>
<td>NMT infrastructure and services</td>
<td>Planning regulations, standards and best practice guidelines</td>
<td>DoT, SACN, Cities, Local Government,</td>
<td>3 Years</td>
<td>To be determined</td>
</tr>
<tr>
<td>Expand NMT Infrastructure</td>
<td>Develop and expand NMT infrastructure</td>
<td>DoT, SACN, Cities, Local Government</td>
<td>5 Years</td>
<td>To be determined</td>
</tr>
<tr>
<td>Travel Demand Management</td>
<td>With cities develop a method and regulatory policy for levying a congestion</td>
<td>DoT, Government, Private Sector, Department of Education</td>
<td>3 Years (Data collection, feasibility study and)</td>
<td>Cost to be determined following research and</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Category</th>
<th>Action</th>
<th>Responsible Parties</th>
<th>Timeframe</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emission standards</td>
<td>Develop regulatory regime with NT for annual taxing of vehicles based on their emission standards through car licensing renewal system</td>
<td>DoT, NT, DOE, Private Sector, Local Government</td>
<td>5 Years</td>
<td>Research of the UK model needs to be conducted and cost determined</td>
</tr>
<tr>
<td>Road freight permits</td>
<td>Re-introduce road freight permits reflecting load capacity of freight vehicles</td>
<td>DoT, NT, Private Sector, SANRAL, Road Traffic Management corporation, Cross Border Road Transport Agency, Road Accident Fund, Traffic Infringement Agency, Provincial Government</td>
<td>1 Year</td>
<td>To be determined</td>
</tr>
<tr>
<td>Tree Planting Initiative</td>
<td>Conduct research and implement tree planting initiative in and around major cities</td>
<td>DWAF, DoT, Cities, SACN, SALGA</td>
<td>3 Years</td>
<td>To be determined following further research into locations and species selected</td>
</tr>
<tr>
<td>Green Road Infrastructure Standards</td>
<td>Develop Green Standards and Guidelines for road construction,</td>
<td>DoT, DOE, Government, SANRAL, Government, DTI,</td>
<td>2.5 Years</td>
<td></td>
</tr>
<tr>
<td><strong>Rail</strong></td>
<td><strong>Invest in improvement of PRASA services and infrastructure.</strong></td>
<td>PRASA, DoT, DPE, Metrorail, Railway Safety Regulator, NT</td>
<td>10 Years</td>
<td>To be determined following feasibility studies and extent of expansion</td>
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<tr>
<td><strong>Passenger Rail</strong></td>
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<tr>
<td><strong>Expand branch network</strong></td>
<td>Restore rural branch network</td>
<td>Transnet, Gautrain, NT, DoT, DPE, DTI</td>
<td>10+ Years</td>
<td>Research extent and location of rural network. Conduct feasibility studies to estimate cost</td>
</tr>
<tr>
<td><strong>Establish Rail Economic Regulator</strong></td>
<td>Rail Economic regulator will regulate rail prices (passenger and freight) and ensure competitiveness to road</td>
<td>DoT, PRASA, TRANSNET</td>
<td>2 Years</td>
<td></td>
</tr>
<tr>
<td><strong>Fiscal incentives for rail freight</strong></td>
<td>Develop tax incentives related to corporate and private spend on rail transportation</td>
<td>DoT, PRASA, TRANSNET, NT</td>
<td>2 Years</td>
<td></td>
</tr>
<tr>
<td><strong>Cleaner Technologies</strong></td>
<td>Encourage PRASA and TRANSNET to invest in the use of fuel-cell or solar powered locomotives</td>
<td>DoT, PRASA, TRANSNET, DEA, DOE</td>
<td>5 Years</td>
<td>To be determined with further research</td>
</tr>
<tr>
<td><strong>Rail Regulatory Body</strong></td>
<td>Regulate and oversee the rail sector</td>
<td>DoT, PRASA, TRANSNET, Government</td>
<td>1 Year</td>
<td></td>
</tr>
<tr>
<td><strong>Rail Infrastructure</strong></td>
<td>Develop Green</td>
<td>DoT, PRASA,</td>
<td>2 Years</td>
<td></td>
</tr>
<tr>
<td>Standards</td>
<td>Standards and Guidelines for rail infrastructure and construction, maintenance, upgrades and materials</td>
<td>Transnet, Metrorail, Gautrain, NT, DPE, DTI</td>
<td></td>
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</table>

**Maritime and Aviation**

**Biofuels**
- Expand on existing pilots for the use of biofuels in aviation, progressively strengthen regulatory requirements for biofuels mix for aviation fuel.
- **DoE, DoT**
- **5 years**
- Research and feasibility studies need to be undertaken

**Operations and Procedures (Energy Efficiency)**
- Review and update existing procedures
- **Portnet, ACSA, SAA**
- **2 years**
- Capital costs recovered through operational savings

**Infrastructure (Energy Efficiency and Renewable Energy)**
- Implement rooftop PV and EE retrofits of ports and airports
- **Portnet, ACSA**
- **5 years**
- Capital costs recovered through operational savings

**Carbon Offsets**
- Invest in the development of carbon offset programmes for transport consumers (business and private)
- **DEA, ACSA**
- **5 years**
- Likely to be self sustaining under carbon tax regime.

**Integrated Transport Systems**

**Taxi industry access**
- Upgrade BRT infrastructure to allow taxis access to BRT-only lanes
- **Taxi Industry, DoT, ReaVaya, Cities, SACN**
- **2 Years**

**Intelligent Transport System**
- Develop an intelligent transport system for central control, monitoring and information provision.
- **DoT, DTI, DPE, Public Sector, Government**
- **5 Years**
- Research required to determine cost

**Single ticketing system**
- Develop smart card enabled single ticketing system for
- **DoT, DTI, DPE, Public Sector, Government**
- **5 years**
- Research and feasibility
<table>
<thead>
<tr>
<th>Plan</th>
<th>Description</th>
<th>Details</th>
<th>Allocated Municipal Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revise ITP's</td>
<td>Revise minimum requirements in ITP's to facilitate integration between municipal transport systems</td>
<td>Provincial (enforcement) and Municipal (implementation)</td>
<td>Minimum requirements to be finalized in 2 years. Implementation 10-20- Years</td>
</tr>
<tr>
<td>National Green Transport Databank</td>
<td>Develop an online portal to aggregate transport data</td>
<td>National Government, Provincial Government, Local Government, Academics, Private Sector</td>
<td></td>
</tr>
<tr>
<td>Cleaner Fuels and Technology</td>
<td>Biogas transport fuel regulations</td>
<td>DoT, NT, Government, SANEDI, Provincial Government</td>
<td></td>
</tr>
<tr>
<td>Alternative fuels tax incentives</td>
<td>Draft tax incentives for private sector use of alternative fuels</td>
<td>NT, DoT, DOE,</td>
<td></td>
</tr>
<tr>
<td>Metrobus fleets</td>
<td>Draft regulations requiring 10% of Metrobus fleets converted to gas only vehicles per year.</td>
<td>DoT, Metrobus, ReaVaya, DOE, DEA, SANEDI, Local Government</td>
<td></td>
</tr>
<tr>
<td>Dual-fuel conversion</td>
<td>Secure attractive finance options or private sector conversion of taxis to dual fuel vehicles and retrofitting of filling stations</td>
<td>DoT, IDC, DEA, DOE, DPE, Taxi Associations</td>
<td></td>
</tr>
<tr>
<td>Dual-fuel regulations</td>
<td>Draft regulations requiring all public and quasi-public</td>
<td>DoT, IDC, DEA, DOE, DPE, Taxi Associations,</td>
<td></td>
</tr>
<tr>
<td>Area</td>
<td>Description</td>
<td>Stakeholders</td>
<td>Timeframe</td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>--------------------------------</td>
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</tr>
<tr>
<td>Transportation</td>
<td>To be converted to dual-fuel vehicles</td>
<td>SANEDI, CSIR</td>
<td></td>
</tr>
<tr>
<td>CNG Supply</td>
<td>Engage Sasol and Mozambique for increased supply of CNG to South Africa</td>
<td>DoT, DOE, National Government</td>
<td>2 Years</td>
</tr>
<tr>
<td>Fossil fuels</td>
<td>Draft regulations requiring refineries to meet new standards and norms for clean fossil fuels</td>
<td>SASOL, DTI, Government, DOE, DoT, SANEDI</td>
<td>5 Years</td>
</tr>
<tr>
<td>Fuel economy norms and standards</td>
<td>Develop vehicle fuel economy norms and standards used to label vehicles</td>
<td>DoT, DOE, DTI</td>
<td>3 Years</td>
</tr>
<tr>
<td>Baseline analysis</td>
<td>Undertake baseline analysis of government fleet to determine specifications including CO₂ emissions</td>
<td>Government (3 spheres), DoT, DOE, DEA</td>
<td>3 Years</td>
</tr>
<tr>
<td>Vehicle Energy Efficiency Programme</td>
<td>Government will procure EV's in incremental steps per annum</td>
<td>Government, DoT, NT</td>
<td>20 Years</td>
</tr>
<tr>
<td>Government fleet</td>
<td>Negotiation with government procurement to procure only top 3 makes and models of efficient vehicles</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Vehicle manufacturers</td>
<td>Engage with DTI to provide trade incentives to manufacturers who supply reduced cost, high energy efficient vehicles and EV's</td>
<td>DTI, DoT, NT, Government, DPE</td>
<td>2 Years</td>
</tr>
<tr>
<td>EV batteries</td>
<td>Engage with CSIR to manufacture EV batteries at a reduced cost</td>
<td>CSIR, DoT, DOE, SANEDI</td>
<td>2 Years</td>
</tr>
</tbody>
</table>
### Electric charging stations

Expand electric charging stations powered by photovoltaic panels by 10 per annum: accessible to general public

| DoT, DOE, SACN, SANEDI, NT | 10 Years |

#### Funding

<table>
<thead>
<tr>
<th>Preferential funding</th>
<th>Arrange preferential funding through development finance institutions or private sector participation in dual-fuel conversions and high speed rail networks</th>
<th>x</th>
<th>x</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global funding</td>
<td>Compile documentation for project specific funding requests to the green climate fund, world bank, UNFCCC, and USAID’s Development Credit Agency</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

### 5.2 Monitoring and Evaluation

The DoT will make use of NT’s project evaluation methodology in order to prioritise projects for funding and implementation.

Each project and the data produced needs to be measured, reported and verified in order to provide critical information for the future build out and expansion of projects.

Each project will require its own measuring, reporting and verification (MRV) framework which will be developed by the person and team responsible for implementing the project. This information is critical to securing both private sector and government or donor funding. DoT will work with DEA to implement DEA’s GHG MRV framework.
6 REFERENCES


South Africa’s Intended Nationally Determined Contribution, 2015.


Department of Transport. Strategic Plan: Revised 2011/12 – 2013/14.

Gauteng Province Department of Roads and Transport. 5-Year Transport Implementation Plan. 2012.


Department of Environmental Affairs. Freight Shift from Road to Rail: The Socio-Economic Impact of a Modal Shift of Freight from Road to Rail to Achieve Maximum Greenhouse Gas Mitigation in the Transport Sector. 2014, Pretoria.


