SOUTH AFRICA

ROAD TRANSPORTATION

Make road transport a solid pillar in combatting greenhouses gas emissions

THIS COUNTRY PROFILE IS AN EXTRACT FROM THE ANNUAL REPORT OF THE GLOBAL OBSERVATORY ON NON-STATE CLIMATE ACTION

→ DOWNLOAD THE COMPLETE REPORT ON **WWW.CLIMATE-CHANCE.ORG**

CLIMATE CHANCE

Make road transport a solid pillar in combatting greenhouses gas emissions

Following the example of the international community in response to the climate challenge, the South African government aims to reduce national carbon dioxide (CO_2) emissions by 34% in 2020 and 42% by 2030. The transport sector, one of the main contributors to atmospheric pollution and the 2nd emitter of CO_2, is one of the key sectors of this fight. In road transport in particular, which includes freight and passenger transportation, the technologies currently used and the modes of operation are not in line with these objectives and must be reconsidered.
In this regard, the state and municipal authorities have taken various initiatives to meet the targets set. The materials used and the modes of operation are constantly being re-examined. Indeed, support for the renewable energy sector through investment programmes and substantial subsidies is expected to make compelling contributions to reducing greenhouse gas (GHG) emissions in the South African road transport sector. This paper presents the evolution of emissions in the road transport sub-sector in South Africa, the explanatory factors for the trends observed and the mitigation actions being carried out.

Head editor • **ALIOUNE THIAM** • *Transport and Urban Mobility Expert, Eco-Access*

CONTENTS

1 • THE ROAD TRANSPORT SUB-SECTOR IS A KEY CONTRIBUTOR OF EMISSIONS IN THE SECTOR

• THE EMISSIONS OF THE ROAD TRANSPORT SUB-SECTOR ARE STRONGLY CORRELATED WITH DIESEL CONSUMPTION • The changing trend in emissions from the road sub-sector is relatively similar to that of the transport sector taken overall. This is hardly surprising since it represents over 99% of the emissions of the sector. Their respective evolutions over the 2002-2017 period are very close: 3.02% for road transport compared to 3.21% for the transport sector.

From year to year, a slight progression can be observed, except in 2016 when reductions were recorded for both the transport sector in its entirety (-4.43% in comparison to 2015) and the road transport sub-sector (-5.11% relative to 2015).

The evolution of road transport emissions follows the same rhythm as emissions from fossil fuels, notably diesel. This is the case for the 2002-2017 period where an increase of over 6.59% in diesel emissions was observed. The recent reductions recorded were made possible by a steep reduction of $_2$ from the combustion of diesel, i.e., a fall of 2.59% between 2014 and 2015, and 10.66% between 2015 and 2016 (Enerdata, 2018).

		2002	2006	2010	2012	2014	2015	2016	2017
Transport (fuel consumption)	Quantity (in Mt)	36.97	44.45	48.14	51.20	52.93	53.73	51.36	54.80
	Evolution average/ year	-	5.06%	2.08%	3.17%	1.69%	1.53%	-4.43%	6.70%
	Evolution 2002-2017	3.21%							
Road transport	Quantity (in Mt)	34.29	41.28	45.02	47.69	49.43	50.12	47.56	49.80
	Evolution average/ year	-	5.10%	2.26%	2.96%	1.82%	1.40%	-5.11%	4.71%
	Evolution 2002-2017	3.02%							
Petrol consumption	Quantity (in Mt)	22.51	24.54	24.85	26.02	24.15	25.50	25.47	26.25
	Evolution average/ year	-	2.27%	0.31%	2.35%	-3.58%	5.57%	-0.12%	3.06%
	Evolution 2002-2017	1.11%							
Diesel Consumption	Quantity (in Mt)	11.76	16.71	20.16	21.66	25.25	24.60	21.97	23.38
	Evolution average/ year	-	10.52%	5.17%	3.72%	8.28%	-2.59%	-10.66%	6,41%
	Evolution 2002-2017	6.59%							
GPL Consumption	Quantity (in Mt)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Gas consumption	Quantity (in Mt)	0.0000	0.0000	0.0000	0,0004	0.0004	0.0004	0.0004	0.0004

FIGURE 1. EVOLUTION OF CO_2 EMISSIONS FOR TRANSPORT, 2002-2017

Source: ENERDATA

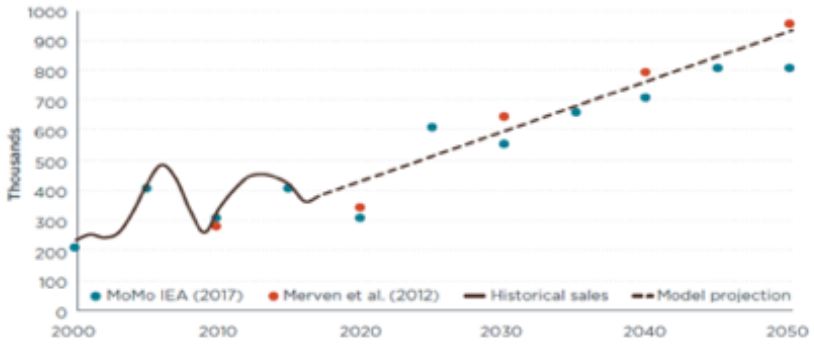
Fossil fuel emissions from the road sector represent on average 99.89%, with a contribution of 44.79% for gasoline and 55.11% for diesel. Thus, the near-constant, slight and progressive rise noted over the 2012-2017 period is primarily the result of a variation in emissions of these two sources of transport energy (diesel and gasoline) at a time when alternative energies (electric, biofuels and compressed natural gas) have made only a very timid market appearance since 2012 (Enerdata, 2018).

• THE REASON: URBAN FORMS AND MODES OF TRAVEL • Economic success naturally leads to perceptible social changes in ways of life, behaviour and actions. South Africa, the biggest economy on the continent, is no exception to this rule. **A high rate of motorization has hit the country not only because population income levels are rising, but also due to the strong presence of the automobile industry (Volkswagen, Toyota, etc.)**. Competition in the domestic automobile market has made cars easily accessible to individuals.

Evolution of the car fleet

In 2015, manufacturers sold over 400,000 cars on the South African market and exported over 300,000 units. One of the two largest industries on the market, Toyota, is well positioned in the production of small and medium-sized cars as well as sports utility vehicles (SUV). These types of vehicles, preferred by South Africans, produce 43% of the CO_2 emissions of the fleet. The high emissions for SUVs is explained by the fact that 62% of these vehicles run on diesel (Posada, 2018). In 2015, the share of petrol/diesel consumed by the transport sector was 43.8% (GIZ, 2017).

In line with the International Energy Agency's Mobility Model (MoMo), the projections for 2050 predict a rise in sales of new vehicles of 600,000 to 800,000 units. Equally, estimations by the University of Cape Town show a rise in sales of between 640,000 and 950,000 units from 2030 to 2050. Based on these two projections, the fleet is set to rise by 4% in 2020 then fall by 2.1% until 2050 (Posada, 2018).



MODÈLE ICCT: PROJECTION DE CROISSANCE DU PARC AUTOMOBILE PARTICULIER

TEXT BOX 1

Moreover, the urban form of South African cities characterised by non-dense residential zones and urban sprawl is also an explanatory factor of the rise in motorization rates. The apartheid had very negative effects, especially on the transport sector. **Indeed, public transport development was constrained by the problem of population cohabitation, meaning that the services provided were aimed at a fixed group of customers**. This meant that individual modes of transport became preferable and their growth has made a large impact on environmental pollution levels through the amount of greenhouse gases produced.

2 • THE STATE'S INTENTIONS ARE STILL RATHER TIMID

The South African authorities have long claimed to have real ambitions to combat climate change through programmes and policies to reduce greenhouse gas (GHG) emissions at a national level. However, beyond the few legislative and regulatory measures, meaningful actions are late arriving.

• ADHERENCE TO INTERNATIONAL AGREEMENTS AND A FOCUS ON THE MOST POLLUTING SECTORS • In its Defined National Contribution (DNC), the State claims to be pressing hard on the "Transport" lever to contribute effectively to the global effort to reduce GHG emissions across the world. It is now committed to **mobilizing financial means to invest in the promotion of sustainable transport systems that respect the environment.**

Since the Copenhagen negotiations in 2009, the option of **a reduction in domestic emission of greenhouse gases of 34% in 2020 and 42% by 2025** (GIZ, 2017) was adopted by the South African government, through its DNC.

• PARTICULAR ATTENTION PAID TO THE TRANSPORT SECTOR, ESPECIALLY ROAD TRANSPORT, THROUGH INNOVATIVE MECHANISMS • Through the "National Climate Change Response Paper (NCCR)", South Africa intends to **improve the energy efficiency of its vehicle fleet, thus encouraging green technologies such as electric and hybrid vehicles.** The goal set by the state authorities is to put **3 million electric cars into circulation by 2050 and make an investment programme worth 6.5 million Rands available to green technology industries** (GTS, 2016-2021).

One of the key battles planned by South Africa is **the introduction of environmental taxation which will make it one of the first countries in Africa to implement such a reform.** This taxation system aims, among other things, to reduce the use of fossil fuels such as petrol, diesel and gasoline in the energy production and transport sectors (Letter on Environmental Taxation Reform Policy, in 2006). **The law is currently being considered by the National Assembly, and the Government plans to implement this reform at the beginning of 2019.** These fiscal measures promote the development of renewable energy sources (electric, biofuel, biogas, ethanol, etc.) which could be used in the road transport sub-sector with the view to achieving an energy transition.

Beyond the legislative and regulatory measures, the public authorities have put in place **programmes aimed at developing renewable energy sources for use in the road transport sector.**

For example, the decarbonisation initiatives in the goods transport domain. **The introduction of a system of road tolls** by the South African government is another example. Across the whole network, **16% of roads are equipped with toll booths**. The reduction of traffic on these roads resulting from the cost of the toll would result in a gain for the country in terms of reducing CO_2 emissions in the road sub-sector (SANRAL, 2013).

3 • REMARKABLE CONTRIBUTIONS FROM PRIVATE ACTORS

Although road transport emissions continue to dominate the transport sector overall, we should note that the quantity of CO_2 it generates has remained stable in the last few years with slight, and occasionally negative, variations. This situation is in many ways down to private initiatives.

• HIGH PARTICIPATION OF NON-STATE ACTORS • This stability is mainly the result of a **high participation by non-governmental organizations, local authorities and private firms in supporting the South African government in meeting its environmental objectives.**
In this sense, the actions of **transport and logistics companies** can be cited as an example, notably **their participation in the process of decarbonizing freight road transport**. Many of the South African leaders in transport logistics have invested in the country's environmental policy. **The TIMBER programme (Technology, Infrastructure, Market Changes, Behaviour, Energy and Regulation),** launched in 2011 with the aim of reducing carbon emissions in goods transportation, benefits from the participation of many private sector firms**.**

Some initiatives by private companies

In 2014, Barloworld introduced the "Green Trailer" in its fleet. This technology operates at a constant speed of 70 to 80km/h, thus saving 11% in fuel for the firm and reducing CO_2 emissions by 66.8 tonnes over a period of 10 months (Henderson, 2014).

In the forestry and wood industry, the use of "Smart Trucks" is growing. These trucks are generally long and have more capacity to transport heavy loads than any other vehicle. The use of this type of equipment will reduce the amount of freight traffic and, at the same time, increase the productivity of the sub-sector. In environmental terms, South Africa will benefit from a significant reduction in its carbon emissions and avoid wear on its roads.

With a futuristic design, they possess in particular improved safety systems and simulation and assessment tools (analysis of the impact on road wear; GeoTrack to simulate the manoeuvrability of vehicles at low speeds, etc.).

The transportation and logistics operators (Unitrans, Barloworld, Buhle Betfu and AB InBev) have noted a reduction of 39% in accidents and an average decrease of 12% in fuel consumption thanks to increased payload efficacy enabling a reduction of over 84,000 trips per year (Infrastructure Naws, September 2018). South Africa today has over 300,000 registered heavy goods vehicles, of which 270 are intelligent.

Since 2014, Imperial Logistics has been running the "Extra Distance" campaign: the title refers to the difference between the number of kilometres driven by the vehicles and the number of kilometres required in optimal planning conditions. "The first indications are that eliminating the extra distance in their Gauteng and Cape Town fleet could lead to a reduction in costs of 29 million rands" (De Swardt, 2014).

ECO_2Fleet is a data collection and reporting service on the management of vehicle fleets based on the internet. Its purpose is to measure carbon emissions and provide emissions declaration data in conformity with the international norms. Nearly 500 companies (40,000 vehicles) are currently subscribing to this product. "A client reports that by using this data, the average fuel consumption per vehicle for the 900 vehicles of the firm has fallen below an average of 10 litres/100km for the first time, an improvement that could reach 30% for some vehicle categories" (De Swardt, 2014).

TEXT BOX 2

The congestion of the main traffic arteries in the large South African cities is the result of a sharp rise in vehicle numbers. Truck commercial speeds have fallen as a consequence, resulting in an excessive fuel consumption, and in parallel, an accumulation of greenhouse effects in the atmosphere. An estimation of the costs induced by this situation shows an extra 4 billion rands (or 10%) are added to the total costs of domestic externalities (Tom Tom, 2014).

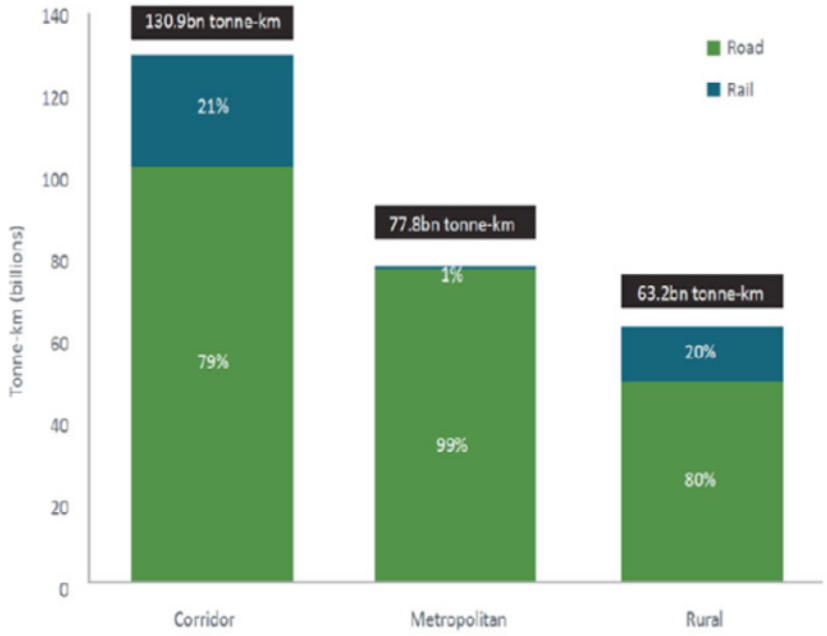


FIGURE 2. DISTRIBUTION OF THE GENERAL DEMAND FOR FREIGHT IN SOUTH AFRICA IN 2014

Source: Havenga, JH, et al. (2016), Logistics Barometer South Africa 2016, Stellenbosch University

In 2013, according to WWF, 45% of national freight emissions came from the use of two key corridors (Johannesburg-Durban and Johannesburg-Cape Town).

An intermodal terminal project in the cities with high freight activity was then implemented for a better interconnection of logistics hubs through strong incentives to shift part of the road freight over to rail. Road traffic benefits in this case from improved fluidity and the decarbonisation initiatives in goods transportation in the country are thus advanced.

As such, in 2012 **Transnet** introduced a new generation of locomotives in the rail freight sub-sector ("**Rail freight**"). The deployment of this new technology across the **Transnet** network demonstrates the firm's ambitions to be more respectful of the environment in its operations. With this initiative, the rail sector will be well equipped with modern technologies to fulfil its role in the context of a modal shift from road freight to rail.

A desire to promote intermodality

"The construction of three intermodal terminals to connect the three main industry centres - Gauteng, Durban and Cape Town - through an intermodal solution could reduce the transport costs of the 22.9 million tonnes of intermodal freight identified on the two key corridors generating externalities, leading to savings of 1.2 million tonnes of CO_2". Havenga et al. (2015)

TEXT BOX 3

Today, the actors **in transport logistics, particularly private firms, are particularly invested in the idea of intermodality**. This vision was taken into consideration in the **Annual Shareholders Agreement between the National Department of Public Firms (the shareholders) and the national railroad operators. Moreover, the signing in 2013 of a protocol agreement between the largest South African logistics service providers (Imperial Logistics, Barloworld Logistics and Transnet)** further promotes this desire to integrate the different modes.

Finally, the actions outlined above demonstrate an emerging awareness among non-state actors in South Africa for the need to combat climate change. **In the road transport sector, the involvement of several transport and logistics operators has led to an increased coherence between their programmes and those enacted by the government. However, so far we are seeing more intention than action for the latter, the measures aimed at the private sector provide little incentive to participate fully in the challenge to reduce national greenhouse gas emissions.**

However, the actions of these private firms are strengthened by the initiatives of local authorities involved in implementing sustainable urban mobility policies.

4 • STRATEGIES OF LOCAL PUBLIC ACTORS

In 2015, South Africa had 55 million inhabitants, or 0.8% of the global population. The country is the most urbanised in Africa, with 64.8% of its inhabitants living in urban zones in 2015, and over 2/3 in 2017 (GIZ, 2017). The urban structure is characterised by low population densities in the cities (Johannesburg: 2,894 habitants/km²; Cape Town: 1,560 habitants/km², in 2016) and a sprawling urban growth over large distances making urban mobility an important issue for individuals.

• COORDINATING THE TOWN PLANNING AND TRANSPORT POLICIES TO REDUCE THE NUMBER OF JOURNEYS • The urban sprawl is a legacy of the Apartheid regime, which encourages residents to use private cars. In the large agglomerations both in the north and south of the country, an effort to develop inland connections and mobility followed by a harmonious expansion of the peripheries and the creation of more or less complete centralities, has had the effect of bringing economic activities and households geographically closer. Thus, the urban morphology has undergone significant transformations in which transport and mobility have played a major role (Vermeulin and Kahn, 2010).

Overview of CO_2 emissions by transport mode: a great potential for reduction remains untapped

The contribution of cars to carbon dioxide emissions in urban passenger transport is very high in South Africa. In 2014, Gauteng recorded 68.8% of CO_2 emissions from the use of private cars (PCs), 22.8% of emissions by taxis, 3.2% of emissions by buses and 0.1% by BRT (Bus Rapid Transit). For Cape Town, 86% of emissions came from PCs, 7% from minibus taxis, 4% from buses and 1% from motorcycles (WWF, 2016).

In 2014, the number of passenger kms by mode was distributed at 45% for private cars (PCs), 50% for buses and 5% for rail (GIZ, 2017). In view of this modal distribution and the contribution potential of each mode (Cf. figure 3), it is evident that the GHG reduction potential remains significant.

TEXT BOX 4

3 - https://www.acare4europe.org/sites/acare4europe.org/files/document/volume1.pdf
4 - https://www.acare4europe.org/documents/delivering-europe%E2%80%99s-vision-aviation-sria-2017-update
5 - L'ICSA est composée de l'Aviation Environment Federation (AEF), Carbon Market Watch, EDF Environmental Defense Fund, the International Council on Clean Transportation (ICCT), Transport & Environment, et le WWF.

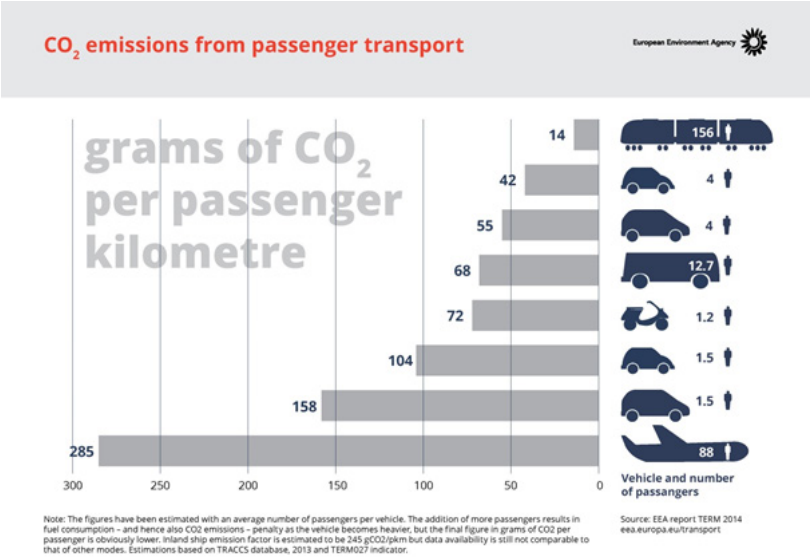


FIGURE 3. COMPARISON OF EMISSIONS PER MODE

Source: European Environment Agency (http://www.consumovehicular.cl/)

• PARADIGM CHANGE FOLLOWING THE URBAN PUBLIC TRANSPORT CRISIS: TOWARDS SUSTAINABLE MOBILITY • The issue of sustainable development is a national priority and should be addressed at all levels of the territory. **At a local level, the municipalities, whose powers were expanded in 1995, integrate sustainability in all of their urban planning and development actions.**

However, this has not always been the case. During the Apartheid era, high levels of discrimination in favour of the "whites" and to the detriment of the "non-whites" was a feature of public transport on the central and pericentral routes. Indeed, black, mixed-raced and Indian workers would travel on networks often managed by illegitimate authorities with few resources, such as the Bantustans. Following this, to fill the gap left by these companies, small private operators of buses and taxis-minibuses began to appear in the townships. Their number grew rapidly and their network spread in the neighbourhoods.

This artisanal, informal and sometimes very turbulent sector spread across all the South African cities when the Apartheid regime fell. The African National Congress (ANC), who came to power in 1994, had no choice but to accept the major role this informal sector played in urban passenger transport, and was forced to delay addressing the sensitive issue of regulating the sector (Vermeulin and Kahn, 2010). In this atmosphere of public transport deregulation and disorganization, the use of non-sustainable transport modes grew, as did their negative impacts on people's lives.

Today, urban mobility governance is a pressing topic in South African towns. Many municipalities have opted to create a local regulating authority for urban transport. (Vermeulin and Kahn, 2010)

As such, in 2003, **the municipality of Thekwini in Durban was the first to introduce an Urban Transport Organizing Authority (UTOA)**, an independent body under local government supervision where local elected representatives make up the governing board. The municipality then became an "arbitrator" of the urban transport sector and was thus obliged to let go of its own bus company (Bellangère et al., 2004).

This phase of introducing the UTOA was followed by the privatization and externalization of public transport services. However, apart from the transport authorities, the municipalities benefit from a relative control over use of lines since they can attribute national subsidies to operators of their choosing. **Today, with their agendas integrating the environmental aspect, the municipalities are all involved in setting up a sustainable transport system.**

The football World Cup held in South Africa in 2010 helped to accelerate the development of sustainable transport infrastructures in South African cities. The increase in the number of Bus Rapid Transit (BRT) lines and the exploitation of Metrorail and Gautrain buses has provided the

municipalities with a modern image of urban transport. Since then, local authorities have been taking ever more interest in sharing infrastructures and in economic modes that are more respectful of the environment. **In line with this, the town halls have often relied on the support of non-governmental organizations (NGOs) acting to raise awareness, provide advice and strengthen capacity, alongside their financial support.**

• INNOVATIONS IN THE PUBLIC TRANSPORT SECTOR • In all South African cities, taxi-minibuses are the most widely used mode of public transport, while buses and trains are gaining low market shares. **Sustainable urban transport theory stands in opposition to systems dominated by ad-hoc small businesses, which perform badly in terms of accessibility, comfort, reliability, regularity, punctuality and safety. Additionally, the prices charged are not attractive for poor people. Moreover, their vehicle fleets do not conform to new environmental norms that require more energy-saving and less polluting modes of transport.** The age of their fleet increases road danger and atmospheric pollution is harmful to the health of populations living in urban spaces.

South African cities are showing their commitment to "greening" their municipal vehicle fleets. In Gauteng, for example, the use of compressed natural gas (CNG) as a fuel for buses and minibus taxis is already on the rise. This ambition of the South African municipalities thus appears feasible as long as the projected municipal demand for new buses is sufficient to sustain the local manufacture of green buses. Also, the cities are currently engaged in introducing a centralised supply mechanism that could provide bus manufacturers with the necessary guarantees to justify such an investment. One of their concerns is the need to adapt to the different technical requirements in each city as well as to each local political authority (SACN, 2015).

In Johannesburg, Metrobus, as a public urban transport supplier owned by the municipality, committed in 2015 to transforming some of its diesel buses by equipping them with bi-modal fuel tanks, fuel - duel-fuel (DDF), in addition to new acquisitions. It also acquired Euro-5 DDF buses, which are better for the environment in terms of carbon emissions. In all, 150 buses running on compressed natural gas (CNG) are available (50 transformed; 100 new acquisitions). This project required an investment of over 355 million USD for the buses. The supply contract was awarded to Sandown Motor Holdings (Pty) Ltd, a dealer in Mercedes-Benz utility vehicles in South Africa. Moreover, a sum of around 1.67 million USD has been set aside to supply and deliver a compressed natural gas (CNG) service station; this bid was won by NGV Gas (Pty) Ltd.

Compressed biogas and other sources of energy such as electric energy and biofuels should also be adopted to make a significant impact on city pollution. **Many South African municipalities are promoting these types of energy. They are not only better for the environment than gasoline and diesel but also allow for the recycling of household and industrial waste in cities. (SACN, 2015).**

Compressed natural gas (CNG) and biofuels, an important step towards sustainable urban transport

• Compressed natural gas (CNG) channels

Compressed natural gas (CNG) has been used as a vehicle fuel since at least the 1930s. It has recently become profitable on a large scale and it is widely used today. A mix of gas (mainly methane) is extracted, either from dedicated gas wells or alongside petroleum, and is then treated, compressed and consumed in a specially designed engine.

CNG could potentially reduce public transport emissions in South Africa, which would be an important step towards sustainability. **In Gauteng, CNG is already being used as a fuel for buses and public transport (TMS).**

In March 2014, the first public CNG service station in South Africa was ope-

ned in Langlaagte Johannesburg, and other service stations are planned for the near future. Like other substitution fuels, CNG requires a substantial infrastructure: depots must be converted and staff retrained to man and maintain the CNG buses (SACN, 2015).

• Biofuel Channels

Biofuels come in various types such as biogas, listed below, bioethanol and biodiesel. These energies are biological combustibles that have no major impact on the environment. They are part of a class of renewable energy sources that are cleaner than classic fuels. However, although biofuels can be produced through waste treatment, they are generally made from crops with high carbohydrate levels such as sugar cane, sugar beet and starches. This production leads to a reduction in land used for food production and thus leads to food insecurity and sovereignty issues (SACN, 2015)

Recently, South Africa put in place an industrial strategy for biofuels seeking to attenuate the potential impacts on food security by excluding some biofuel crops. It aims to reach a penetration of 2% of biofuels in the national supply of liquid combustibles in the short term. This could be accomplished by using around 1.4% of the arable land of South Africa, of which approximately 14% is currently under-used - mainly in the former homelands (DME, 2007). In practice, this objective has been shown to be hard to attain. (SACN, 2015).

• Biogas Industries

To produce biogas, organic waste is placed in an anaerobic digester containing a specific mix of bacteria (rather than taken to landfill). Over a period of around two weeks and with a minimum of additional inputs, these bacteria decompose the waste into methane and CO_2 in a process similar to that of a landfill site. However, in an anaerobic digester, the process is controlled, faster and allows the gas to be captured, purified, compressed and used. The same process can be used to treat both agricultural and sewer waste. This process used to be standard in many waste treatment plants in South Africa, but many of the digesters used are now in a state of disrepair. A recent study suggested that South Africa could produce around three million cubic metres of raw biogas per day near to urban centres, with municipal solid waste making the largest contributions (EcoMetrix, 2015; SACN, 2015).

The municipality of Thekwini has several projects underway to identify clean development mechanisms that produce biogas from landfill sites, waste water and agricultural effluents. Long term viability is even more important than short term gains and these biogas infrastructures will remain important in the treatment of waste and production of energy. In contrast to all other sources of energy, biogas increases with the population, which is important since not only will population and economic growth lead to a rise in energy demand, but it will also contribute to producing waste and to the pressure on waste water (Greben et al. 2009: 1).

South Africa will benefit from international and national support for biogas. Finland, Austria and the United Kingdom have been the main donors to biogas projects in South Africa, while the World Bank and the Development Bank of Southern Africa (DBSA) have also been closely involved in biogas initiatives. The DBSA wishes to provide financial support to pertinent biogas propositions that will take independent power producers (IPP) in South Africa to a bankable stage. The Energy Department possesses the necessary information on the potential of biogas, the legislative landscape and the intentions of

the decisions-makers. Through SANEDI, it carried out research that suggests there are sufficient numbers of potential biomass sources for the production of biogas at a level required for transport. (SACN, 2015.)

TEXT BOX 5

• A GROWING AWARENESS IN CIVIL SOCIETY AND IN THE GENERAL PUBLIC IN FAVOUR OF HYBRID AND ELECTRIC VEHICLES • The use of hybrid and electric vehicles in South Africa, despite the newness of the fleet, demonstrates a rising awareness in civil society and, more generally, of populations experiencing the inconveniences of non-economic and non-environmentally friendly modes of transport such as private vehicles running on petrol or diesel which are still very common.

In 2018, the analysis group Lightstone revealed that only 375 electric vehicles have been sold in South Africa since 2013 (the year electric vehicles were introduced in the national fleet) which represents 0.2% of new registrations over this period. It thus appears that "South Africa is not an early adopter of electric vehicles", compared to Norway, the current world leader with 6.6% of electric vehicles, or 135,000 (Business Tech, 2018).

• LOCAL INITIATIVES WITH STRONG SUPPORT FROM NGOS • The actions of NGOs such as S**ustainable Energy Africa - SEA, World Wildlife Fund - WWF, South Africa Cities Networks – SACN, Greencities, African Association of Public Transport – UATP** and its parent company, **the International Association of Public Transport - UITP, are remarkable in South Africa.** These organizations often take the **role of catalysts in the implementation of sustainable mobility strategies in South African cities.** "*There also exists an emerging non-governmental sector focusing on transport, climate change and the related problems linked to urban design and accessibility, as proven by the* ***Low Carbon Programme on Transport by WWF and the Africa Sustainable Energy Project adopted in many African municipalities all characterised by their desire to promote lower carbon transport systems***" (Cape Town Briefing Paper).

Overview of co-operations between local authorities and NGOs

World Wildlife Fund (WWF) aims to help South Africa transition to a low carbon economy through innovations and transformations. By educating and supporting the South African government, the organization has set an objective to transform the country and ensure that renewable energies are used at 100% by 2050. In its last report published in 2016, an analysis based on two studies ("Attenuation in the Long Term" and "Analysis of Attenuation Potential") allowed the WWF to make the following recommendations to reduce GHG emission in South Africa: (1) increase the use of rail transportation for goods, (2) transfer private car passengers to public transport, (3) increase the occupation rate of vehicles, (4) increase the number of hybrid vehicles on the roads, (5) introduce electric vehicles, (6) improve the efficiency of tourist vehicles, (7) increase the number of private diesel vehicles (which produce less CO_2 than petrol vehicles), (8) progressively substitute petrol and diesel for biofuels.

Sustainable Energy Africa (SEA) is also very active in South Africa. Through various studies, the organization provides guidance to the South African state to support the goal of sustainably reducing GHG emissions. Based on the observation that 18 metropolitan areas and secondary towns in South Africa consume 37% of the country's energy, it recommends introducing concrete actions at a local level to promote reductions in national emissions, especially in the transport sector which is characterised by inefficiency, road congestion and a high reliance on private cars (SEA, 2015).

The African Association of Public Transport (UATP): in Africa, and particularly in South Africa, the UATP is currently playing an important role in promoting public transport. Through forums, conferences and meetings of

decision-makers in the urban transport domain, the UATP makes pertinent recommendations for the introduction of effective urban public transport networks. As an example, we can cite the third congress and exhibition on African public transport held in South Africa in 2014 in collaboration with the road and transport department of Gauteng and the Management Agency of Gautrain. On the theme of "The growth of Africa through an efficient public transport system", over 300 local and international participants, delegates and exhibitors shared their diverse experiences on this subject. In 2015, the 7th AFRICITES summit in Johannesburg allowed the **UATP and African Water Association - AFWA** to produce guidance on the challenges and sustainable solutions for transport, energy, water and sanitation for emerging African cities.

TEXT BOX 6

CONCLUSION

The stabilization of CO_2 emissions from the road transport sub-sector in Africa in the last few years is the result of rising environmental awareness in the central State and local authorities, with the strong support of non-state actors.

However, for all the encouragement it provides, this drive from the state requires more commitments and concrete actions on the challenges faced in terms of reducing greenhouse gases generated by road transport, which is the greatest polluter in the transport sector.

Indeed, the emissions levels of the road transport sub-sector remain high and the potential for reduction is significant.

Also, the question should be raised as to whether, at the current rate of energy transition in the road transport sector and also in terms of individual and collective awareness of the issue, the objective of using 100% renewable energy in the transport sub-sector at the 2050 horizon is in fact feasible.

PLEASE DO NOT HESITATE TO RESPOND TO THIS DOCUMENT, OR TO SUGGEST ANY RELEVANT ADDITIONAL REPORTS OR DATA BY WRITING TO THE FOLLOWING ADDRESS: CONTRIBUTION@CLIMATE-CHANCE.ORG

REFERENCES

DATABASE:

• Knoema, Atlas mondial de données, Afrique du Sud, Transport

• Perspective monde, Afrique du Sud

• STATS SA, Statistics South Africa

• CAIT Climate Data Explorer (WRI), South Africa

• OCDE, Données sur l'Afrique du Sud

• CEIC Data, South Africa Motor vehicule sales: Passenger Cars

• C40 data profie on Johannesburg

• C40 data profile on Cape Town

• ENERDATA (Données jusqu'en 2017)

• CCNUCC, Greenhouse Gas Inventory Data (Données jusqu'en 2015)

• Agence Internationale de l'Energie (AIE), Emission data service, CO_2 Emissions from Fuel Combustion (Données jusqu'en 2015 mais éléments 2016)

• Global Carbon Projects Carbone Dioxide Information Analysis Center (CDIAC) ; (Données 2016)

• Knoema

• Perspective Monde, Statistiques Energie, (Données jusqu'en 2015)

• CAIT Climate Data Explorer (WRI) - Climatewatchdata.org

• l'Organisation de Coopération et de Développement Éconoiques (OCDE), Economic Instrument Database & Statistics

• La Banque Mondiale

PRESS ARTICLES, REPORTS AND REVIEWS:

• UNEP (2017), The Emissions Gap Report 2017, United Nations Environment Programme (UNEP), Nairobi, p.116

• Global Carbon Project (2017), Global Carbon Budget 2017, Copernicus Publications, p.44

• Global Carbon Project (2017), (Données 2016)

• CCNUCC (2017), Yearbook of Global Climate Action 2017, Marrakech Partnership, p.61.

• International Institute for Sustainable Development

• GIZ, Publications database

• African Centre for Technology Studies

• ClimDev Africa

• The Overseas Development Institute

• ITF, Transport Outlook, 2017

• Sustainable Mobility for All, Global Mobility Report 2017: Tracking Sector Performance, 2017, Washington DC, p. 107

• PPMC, Macro-feuille de route mondiale pour un transport décarboné et résilient: une dynamique de transformation, Novembre 2017

• Edina Löhr, Daniel Bongardt and al, Transport in Nationally Determined Contributions (NDCs), Lessons learnt from case studies of rapidly motorising countries, Ricardo Energy & Environment, Bonn, 2017.

• Vieweg, Marion; Bongardt, Daniel; Dalkmann, Holger; Hochfeld, Christian; Jung, Alexander; Scherer, Elena (2017): Towards Decarbonising Transport – Taking Stock of G20 Sectoral Ambition. Report on behalf of Agora Verkehrswende and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ).

• ICCT, Official fuel efficiency and CO_2 emission data sources.

• IEA, Global EV Outlook, 2017

• CDP, Which car makers are driving into trouble? , 2016

• CDP, Which automotive companies will seize the opportunities in a low-carbon economy?

• Executive Summary, 2018

• CCAC, Global Strategy to Introduce Low Sulfur Fuels and Cleaner Diesel Vehicles, 2016

• ICCT, European Vehicle Market Statistics, Pocketbook, 2017/2018

• EDC, CDC Climat, Ieta, South Africa: An Emissions Trading Case Study, 2015.

• Havenga Jane et al., The Decarbonization of Transport Logistics: A South African Case Study, Stellenbosch University, South Africa, 2015

• Henseler, C et al., Green Logistic Indicators for Gauteng, South Africa, Nexus et Insitute for Cooperation Management and Interdisciplinary Research, Janvier 2017

• Kane Lisa, Understanding how people move in Cape Town, Septembre 2016

• M Suleman, M Gaylard, S Tshaka and C Snyman (2015). Accelerating the Transition to Green Transport: Towards a South African Cities Network Green Transport Programme. Green Economy Research Report No. 1, Green Fund, Development Bank of Southern Africa, Midran

• Republic of South Africa, Department of Transport, Green Transport Strategy 2016-2021, 2014

• S E A, Sustainable energy solutions for South African local

• government: a practical guide, Cape Town: Sustainable Energy Africa, 2017

• ICCT, South Africa's new passenger vehicle CO_2 emissions baseline analysis, Juin 2017

• Romano Del Mistro et al., Mitigating the impact of the expected increase n the population, economy and urban footprint in Cities of the South on greenhouse gas emissions: The case of Cape Town, Transportation Research Procedia 25 (2017) 3511–3528.

• Vosper, S.J., & Mercure, J.-F.. (2016). Assessing the effectiveness of South Africa's emissions-based purchase tax for private passenger vehicles: A consumer choice modelling approach. Journal of Energy in Southern Africa, 27(4), 25-37. https://dx.doi.org/10.17159/2413-3051/2016/v27i4a1436

• WWF, Transport Emission in South Africa, 2016

• WWF, Greenhouse gas emissions from passenger transport in Gauteng, 2016

• WWF, Greenhouse gas emissions mitigation opportunities and measures in passenger transport, 2016

• Brand South Africa, South Africa's transport, 28 Jun 2017

• Climate Neutral Group, Is South Africa ready for electric cars ?, 23 octobre 2017

• Quartz Africa, The chaos of South Africa's taxi system is being tackled with open data, 11 février 2017

• World Bank's blog "Transport and Development", 5 articles

• IATA, Air transport supports 490,000 jobs and contributes US$12bn in GDP for South Africa, 21 June 2017

• Brand South Africa, Search for transport answers, 02 Nov 2016

• SNCF, Nouvelle étape dans la coopération entre SNCF et PRASA, 04 Juin 2018