



CHANGE PATHWAYS
climate | energy | evaluation

The changing transport sector and liquid fuel production in South Africa

SA-TIED: Paving the path for South
Africa's Energy Transition

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Wright (Independent Liquid fuels expert)

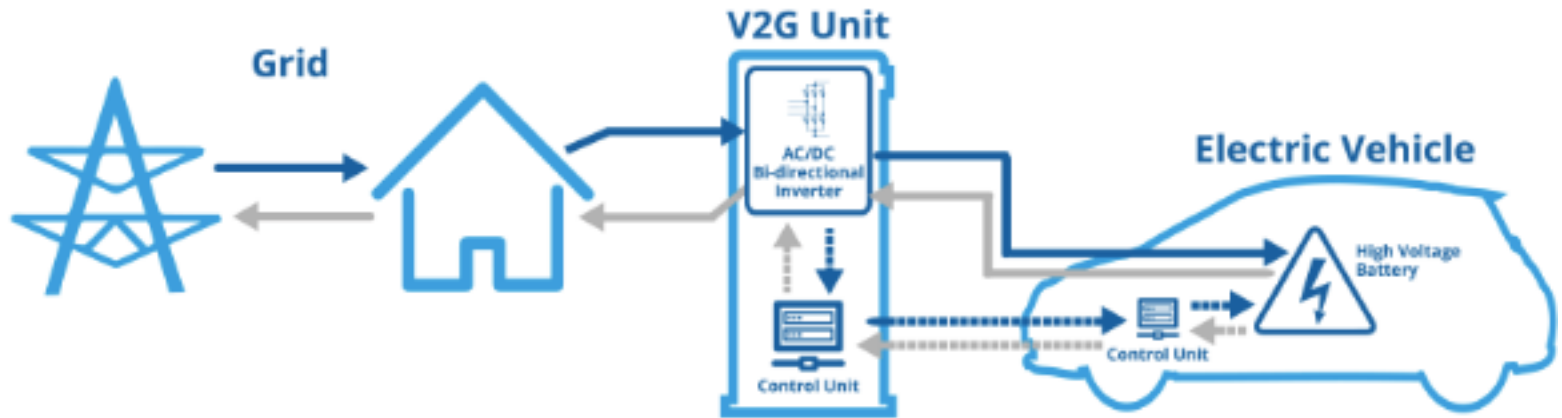
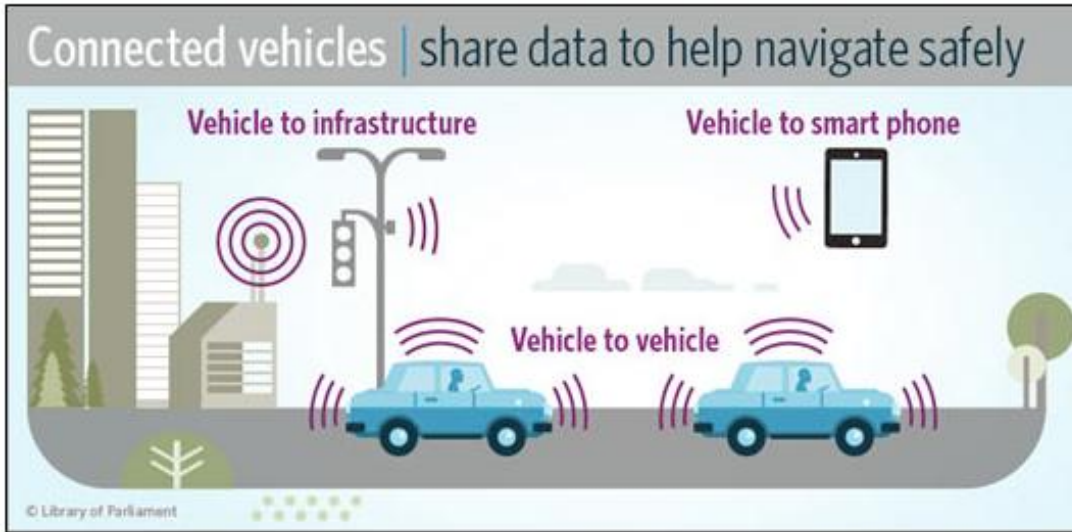


Despite High Hopes, Self-Driving Cars Are 'Way in the Future'

Ford and other companies say the industry overestimated the arrival of autonomous vehicles, which still struggle to anticipate what other drivers and pedestrians will do.



Transport trends: Connectivity

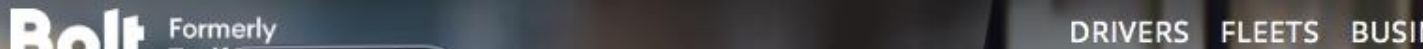
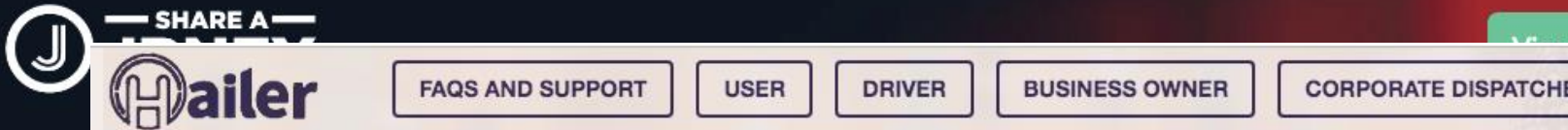


https://lop.parl.ca/sites/PublicWebsite/default/en_CA/ResearchPublications/201698E

<https://www.cenex.co.uk/energy/vehicle-to-grid/>



Transport trends: Ridesharing, MaaS & Urban Planning



UGoMYWAY

(2014 - 2018)

Transport trends: FCEVs & EVs



<https://www.chemistryworld.com/features/hydrogen-storage-gets-real/3010794.article;>

<https://www.bloomberg.com/opinion/articles/2018-08-31/electric-vehicles-in-california-their-day-will-come-suddenly>

Introduction

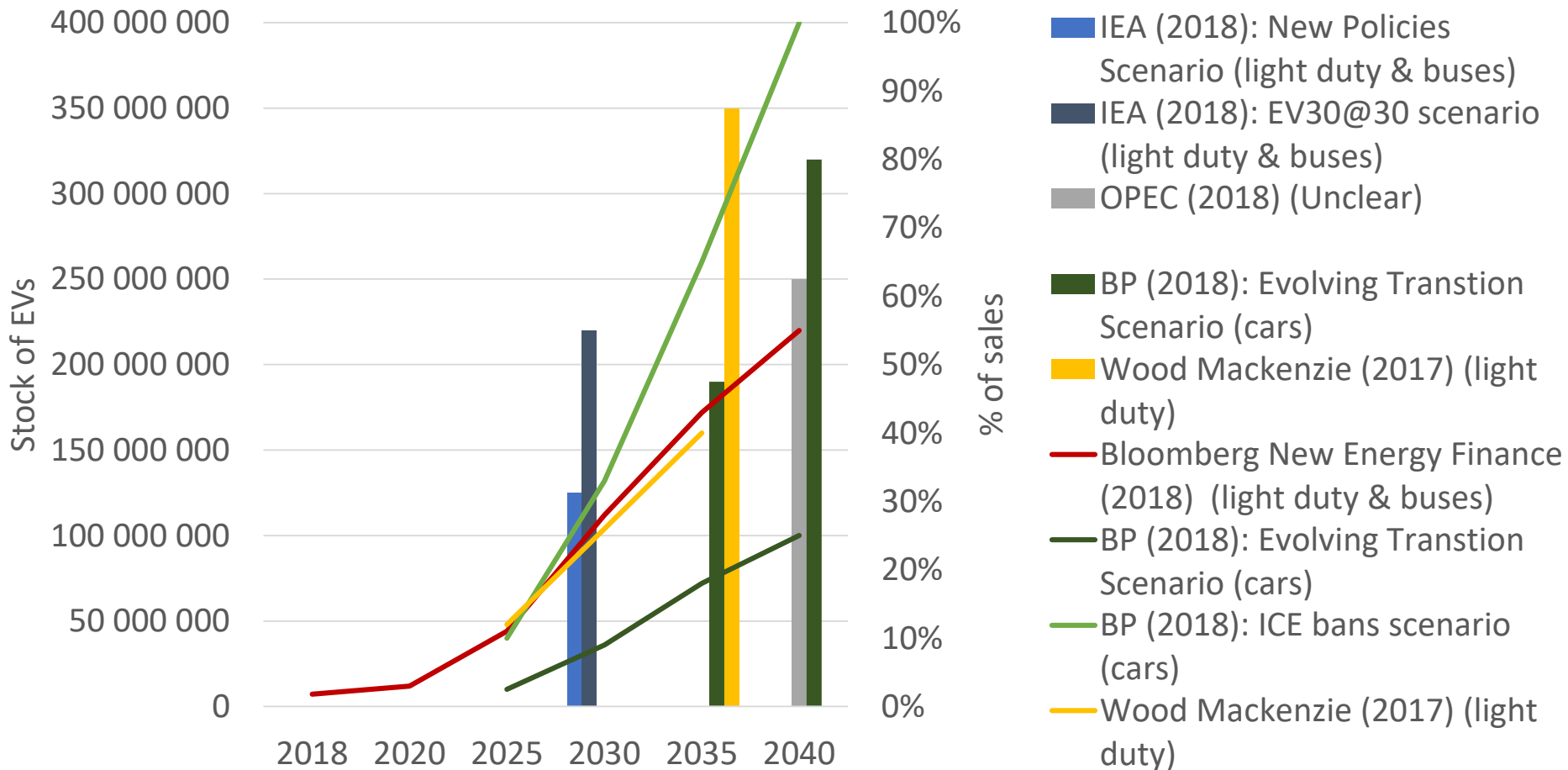
The world is moving towards EVs

- ▶ Many countries and regions have announced plans to phase-out fossil fuel vehicles and shift to e-mobility.
 - Norway:
 - all new light vehicles, city buses and light commercial vans to be EVs after 2025
 - all new heavy commercial vans, 75% of new long distance buses and 50% of new lorries to be EVs after 2030
 - Similar goals and ambitions in many countries (Netherlands, Ireland and Slovenia, Scotland, California, France, Portugal, Spain, Sri Lanka and UK) and cities (Seattle, New Delhi, HK, CT)
- ▶ **Companies are responding**
 - The majority of global car manufacturers are developing long-term EV targets

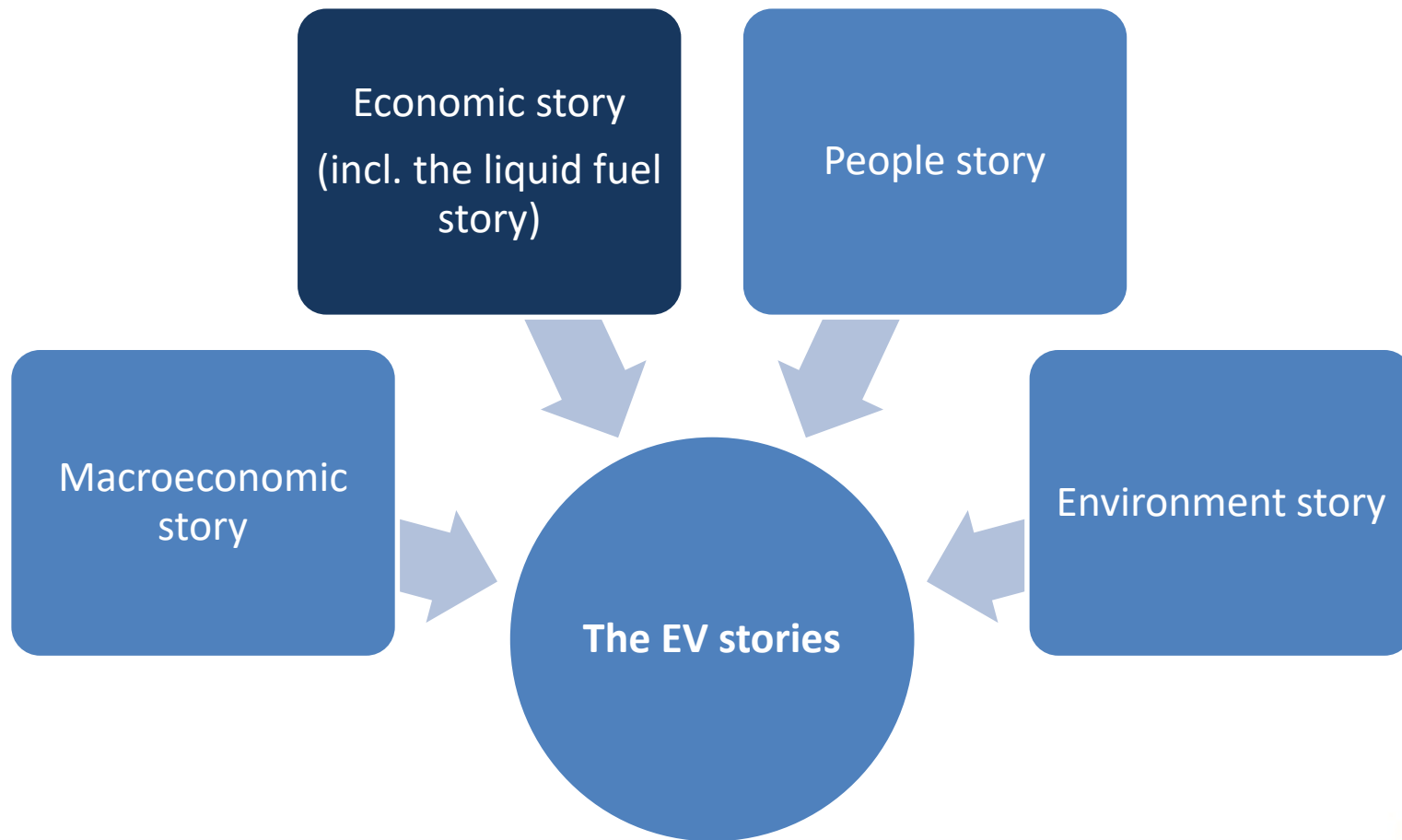


Introduction

Global EV market projections



Exploring the policy impacts on a transition to electric vehicles in South Africa

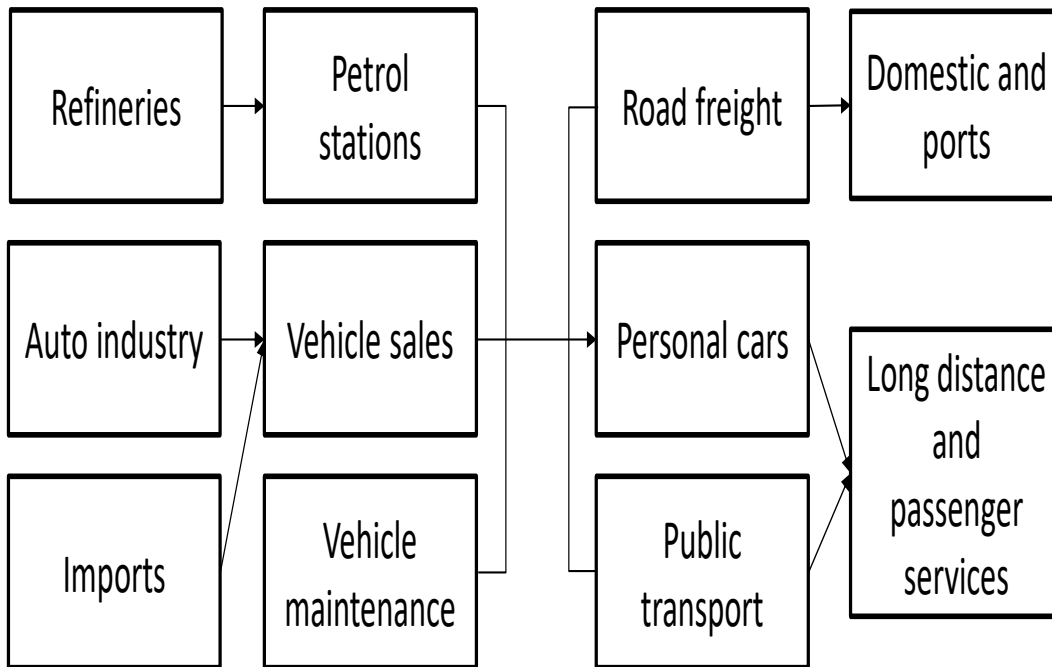


The liquid fuel sector story

The liquid fuels industry is a sunset industry, but it would not disappear suddenly.

- ▶ Different impacts in each sector of the value chain (manufacturing/refining, logistics and distribution as well as sales and marketing)

Value chain for petrol-based transport



- ▶ First response: **decrease the volume of imports** of petrol and diesel, as current petrol and diesel demand exceeds local production
- ▶ Second response: when local production starts exceeding demand, **excess product would need to be exported** by refineries



The liquid fuel sector story

Significant and expensive hardware upgrades required to produce CF2

- ▶ No clear framework to recover investment costs in the current regime
- ▶ May lead to early closure of refineries, even before displacement by EVs
- ▶ Secunda CTL facility: likely the last facility to shut down due to its contribution to the BoP, jobs and chemical industry

Implications of a new world-scale refinery?

- ▶ Would produce EU6 enabling fuel
- ▶ But not likely to be economically viable / possible stranded asset
- ▶ May accelerate the closure of existing refineries

Implication on logistics

- ▶ Port and import facilities as imports of non-road fuel products increases
- ▶ Possible reversal of pipeline flows in the long run

Sales and marketing:

- ▶ Reduced need for service stations, which accounts for most of the VA (except Sasol)



Summary stories

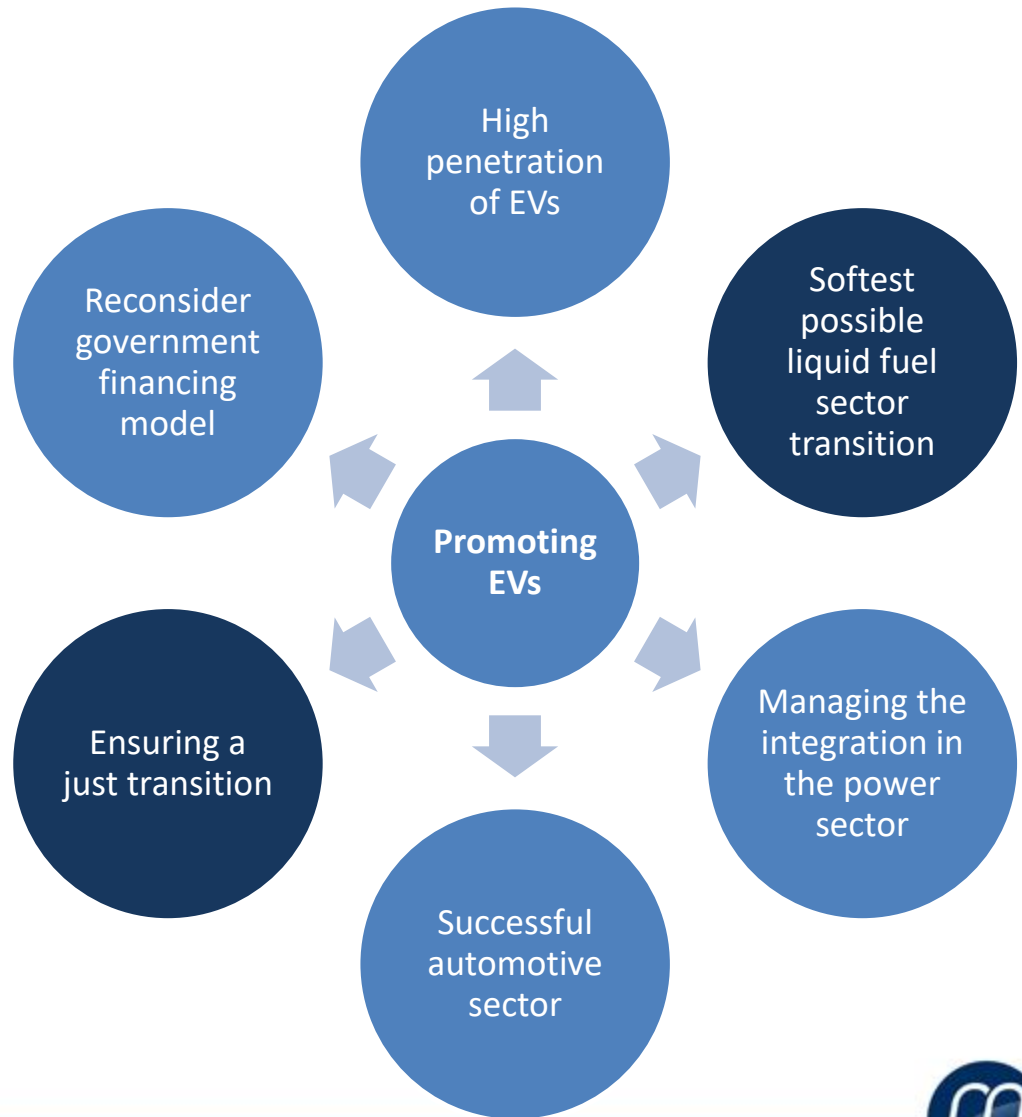
Benefits	Costs
<ul style="list-style-type: none"> • Reduced imports (petroleum = largest SA import – USD 11bn) • Reduced government expenditure – improved BOP, increased disposable income & improved health • Lower transport costs – 4 – 9% increase in disposable income, growth in transport intensive sectors • Increased electricity sales (7% increase in demand) & energy security • Reduced GHGs (34 – 67%) and improved air quality • Grid benefits (if managed) 	<ul style="list-style-type: none"> • Reduced government revenue (R71bn) • Automotive industry at risk - largest exporter of manufactured goods (R165bn of exports, 100 000 + 350 000 jobs) • Refinery & station closures – job & value add (R58bn) and job (50 000 & 130 000) losses • Pressure on the grid

Costs & benefits are unequally distributed



Promoting EVs

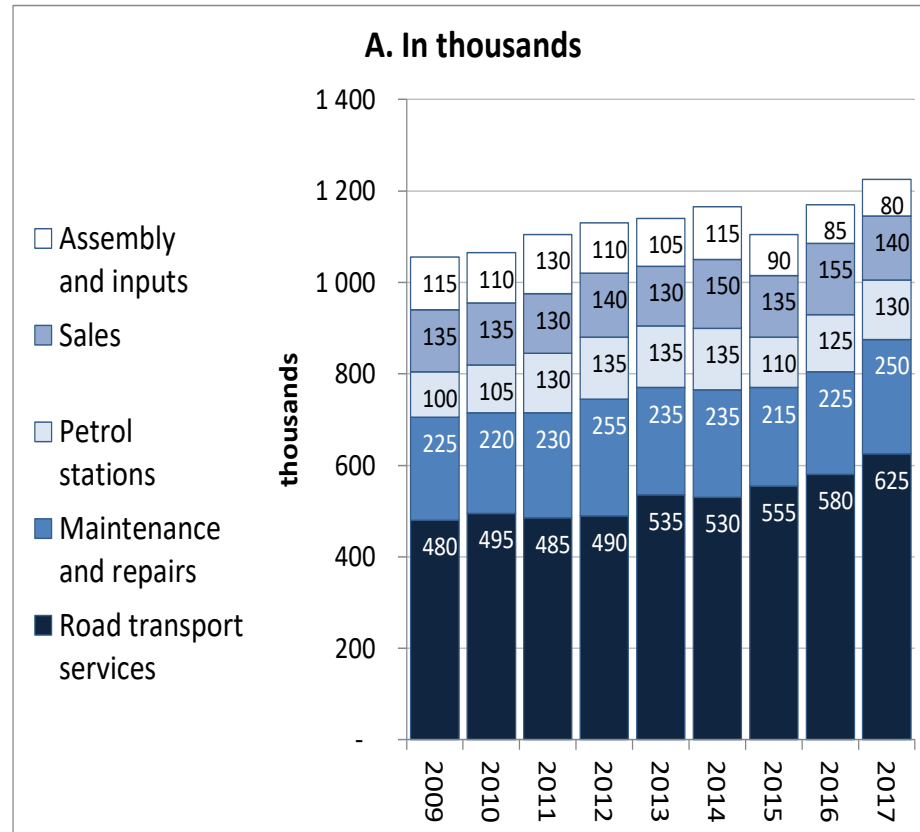
- ▶ SA needs a coherent policy framework to enable the rollout of EVs.
- ▶ **Proactive policy is necessary** to drive the EV transition in a particular direction.
- ▶ Left to the market, the benefits and costs of an inevitable transition would not be equitable
- ▶ **Requires a cross-cutting, integrated approach**



Managing the transition of the liquid fuel industry

- ▶ Refinery closures would be driven by market forces and economic viability,
- ▶ A transition plan for the liquid fuels industry is required to minimise the impact of its gradual demise.
 - ▶ minimising the job loss impact and
 - ▶ maintaining the liquid fuel and petrochemical feedstock supply.

Employment in the value chain



Managing the transition of the liquid fuel industry

No refinery, new refinery vs. upgrade refinery

- ▶ Is not upgrading refineries to CF2 more cost effective?
- ▶ To what extent will CF2 lead to early closures?
- ▶ Would a new modern refinery be able to meet the future, changing product slate?

Reconversion of assets

- ▶ Can existing service stations be converted to alternative uses?
- ▶ What about the logistics infrastructure?



Ensuring a just transition

A just transition is imperative to ensure inclusive development

- ▶ Ensuring that workers, small businesses and communities which could be negatively impacted are adequately supported
- ▶ Ensuring that the shift brings benefits to all layers of society and contributes to reducing inequalities.

Employment vulnerability assessment + resilience plans

- ▶ Resilience plans can assist vulnerable actors to adjust to the effects of the transition to EVs through a combination of
 - ▶ active labour market policies
 - ▶ spatial and industrial development strategies



Ensuring a just transition

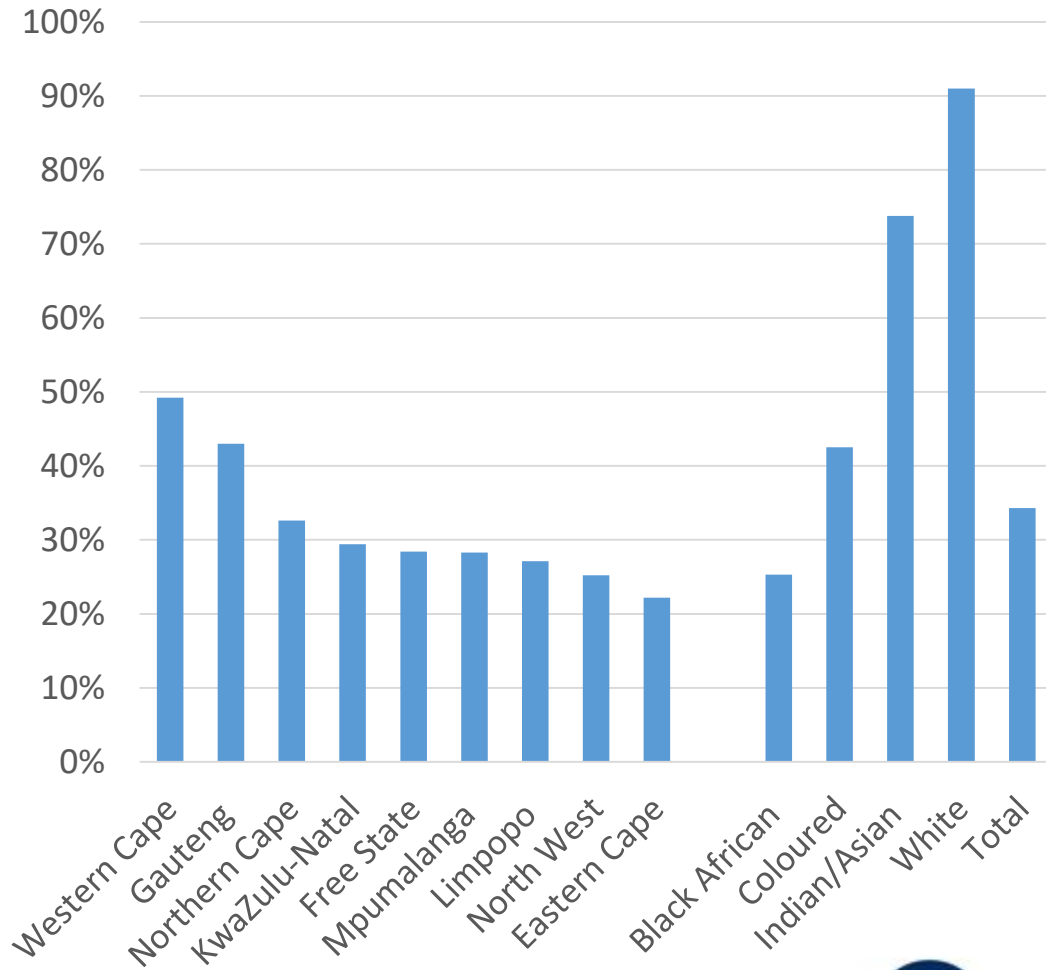
Ensuring that the shift brings benefits for the society at large.

- ▶ Car ownership in SA remains highly segregated.
- ▶ Focusing on car ownership would likely deepen inequalities.

Best to focus on

- ▶ **Public transportation**
- ▶ **New consumption models that do not rely on ownership, such as MaaS**

Car ownership in SA



Further considerations

Further work is required as not all economy-wide impacts have been considered or examined.

SA is at the start of the transition from ICE vehicles to EVs

Requires pro-active policy as the transition will happen regardless of any policy initiatives.

- ▶ The opportunity exists now to develop a proactive policy framework that would shape and drive a just transition for the benefit all South Africans in a balanced manner.
- ▶ This opportunity needs action now!



Thank you

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The macroeconomic story

Deep, multifaceted, macroeconomic implications for the SA economy.

- ▶ The net macroeconomic effect remains uncertain but cost bearers and beneficiaries would be largely distinct

First and main channel: supply and demand for ICE vehicles and petroleum products.

- ⇒ Reduction in government revenues (fuel levies, carbon tax)
- ⇒ Decrease in imports of petroleum products, with favourable impacts on forex reserves, the exchange rate and economic development

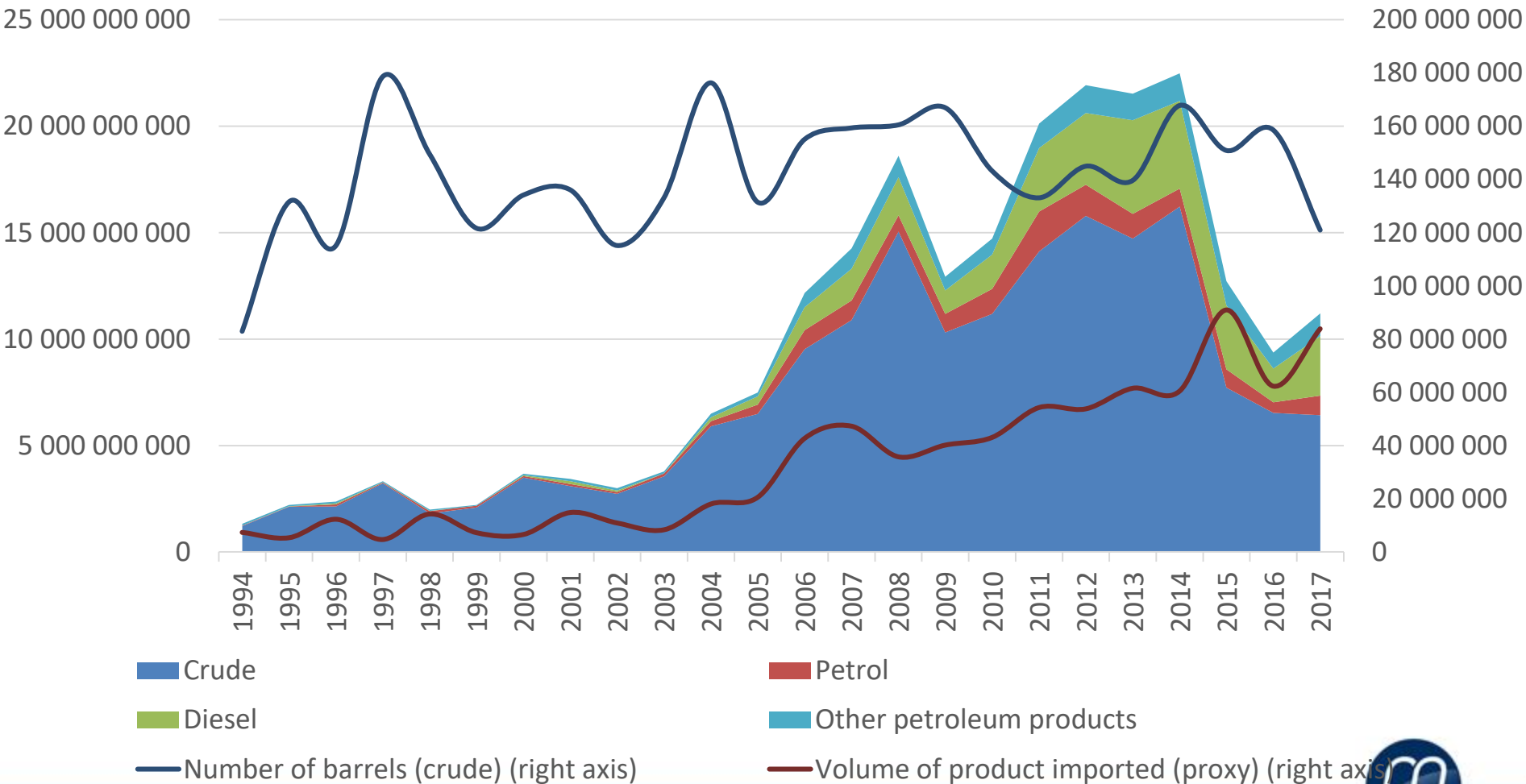
⇒ Reduction in health expenditure and increased productivity, with positive spillover impacts on the fiscus

- ▶ **Positive impact on households' and businesses' spending and indebtedness** and, ultimately, economic activity, with positive impact on fiscal revenues



The macroeconomic story

SA's import of petroleum products



The power sector story

- ▶ **Increased annual electricity demand** by up to 29GWh (7% of the 2050 demand projected in the Draft 2018 IRP)
 - ⇒ Increased VA from the power sector by up to 11%
- ▶ **No significant investment in additional electricity generation capacity**
- ▶ This can likely be managed through proper planning and system operations
 - ▶ Incentive to charge during off-peak periods
 - ▶ Co-benefits on the demand curve and network infrastructure
 - ▶ Other benefits: stimulating investment in SSEG, providing storage capacity that can help balance demand and enable greater integration of renewable energy in the system.



The automotive sector story

Disruptive trend for the automotive industry worldwide and SA is no exception.

- ▶ World-class SA automotive sector through state support and ongoing collaboration with OEMs

Changes in market structure

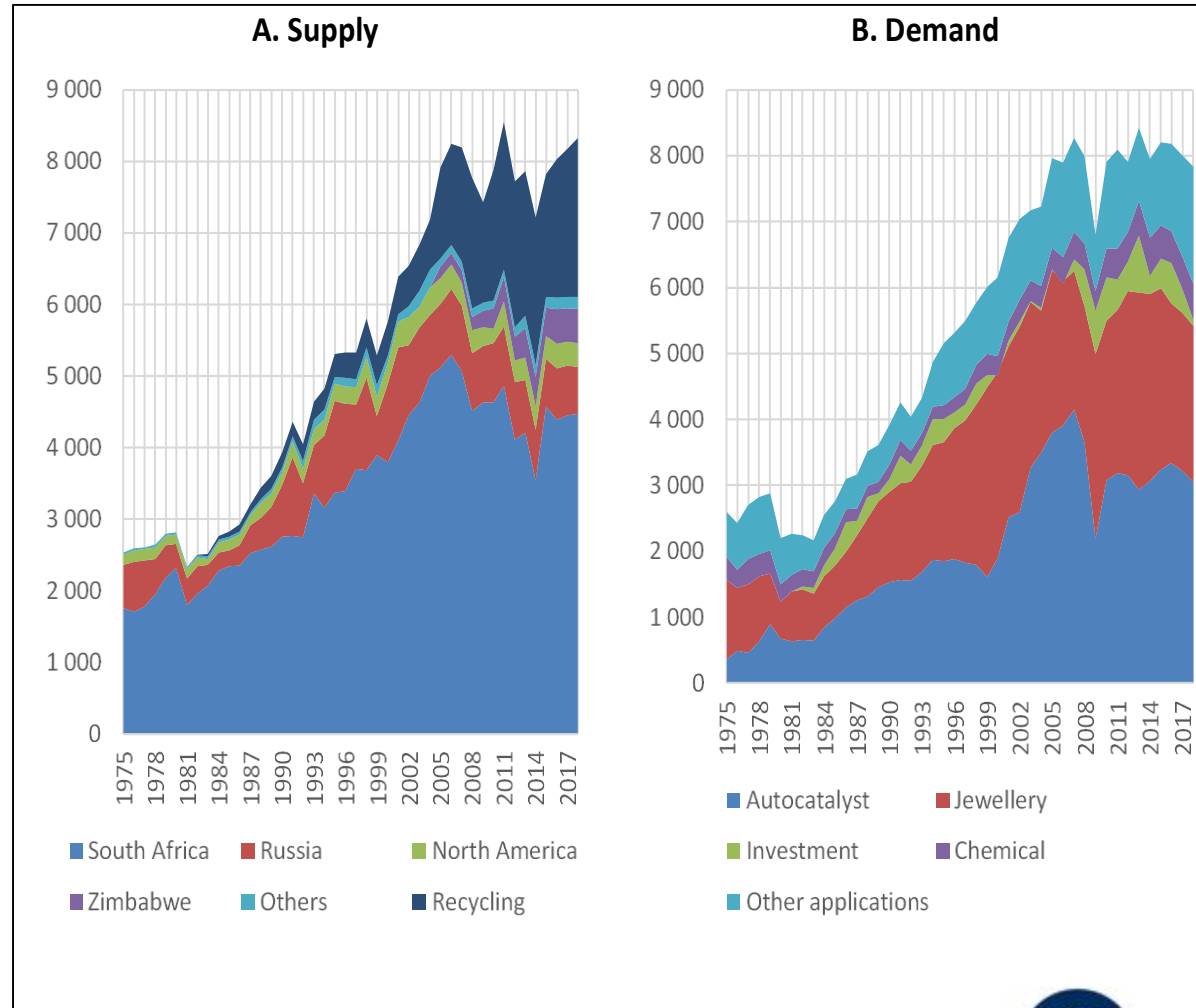
- ▶ No fully-electric vehicles manufactured in SA
- ▶ **Industry (in its existing form) likely to lose its principal markets, i.e. the EU and the USA**
- ▶ Stable **domestic and African export markets** for the foreseeable future.
- ▶ But **not viable markets in the long run:**
 - ▶ unlikely the industry could rely on local demand to sustain
 - ▶ Increasing African market for trucks and bakkies, but not a traditional market for SA-made cars.
 - ▶ Remaining ICE markets will face increased competition



The automotive sector story

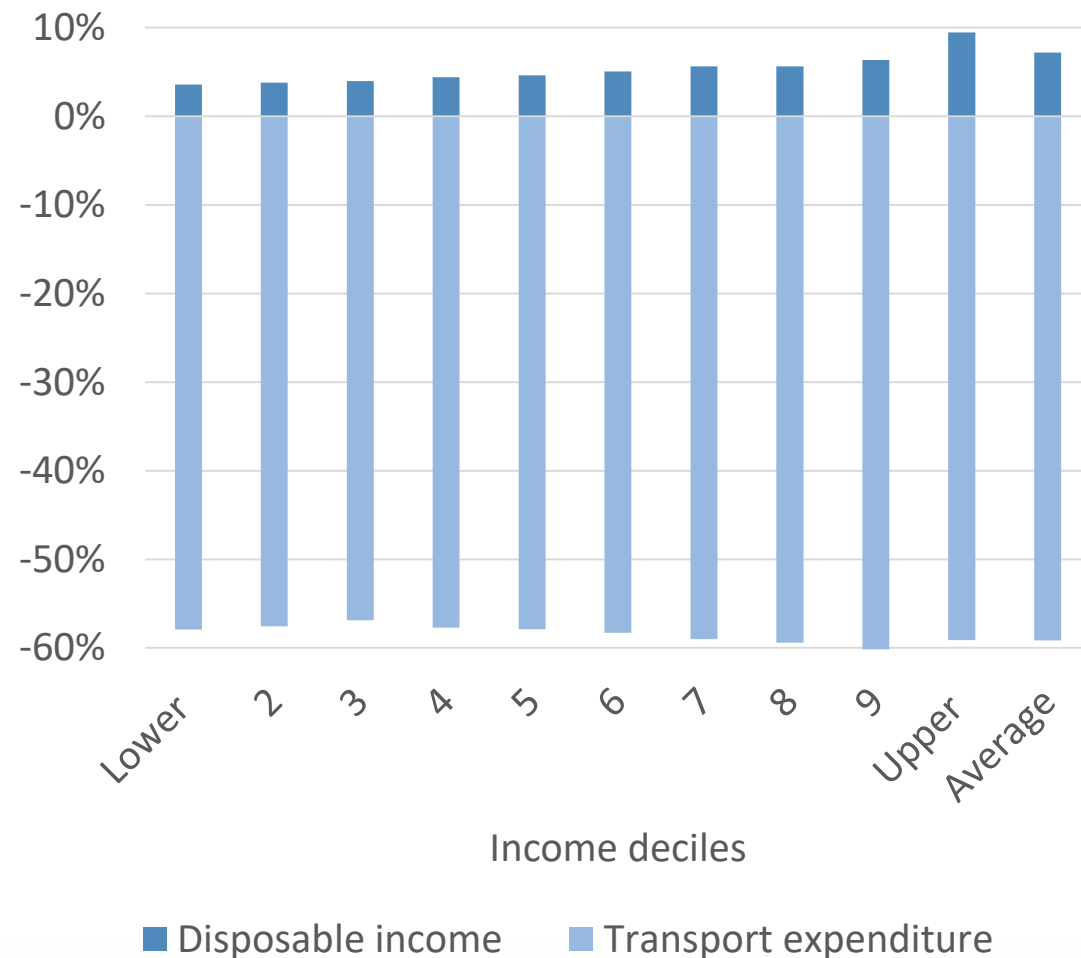
Platinum supply and demand (000 troy ounces)

- ▶ Structural impacts on the nature of the government incentives and the industry
- ▶ Catalytic converters, the highest component export could see drastic declines, with key implications for PGM mining



The people story

Change in income and expenditure due to the shift to EVs



▶ EVs will soon be competitive

- ▶ by 2024 on an unsubsidised basis
- ▶ reach parity due to lower battery prices by 2029.
- ▶ Parity will be reached sooner for buses than for private vehicles.

⇒ **Lower LCOT resulting in lower transport costs.**

▶ Benefits for:

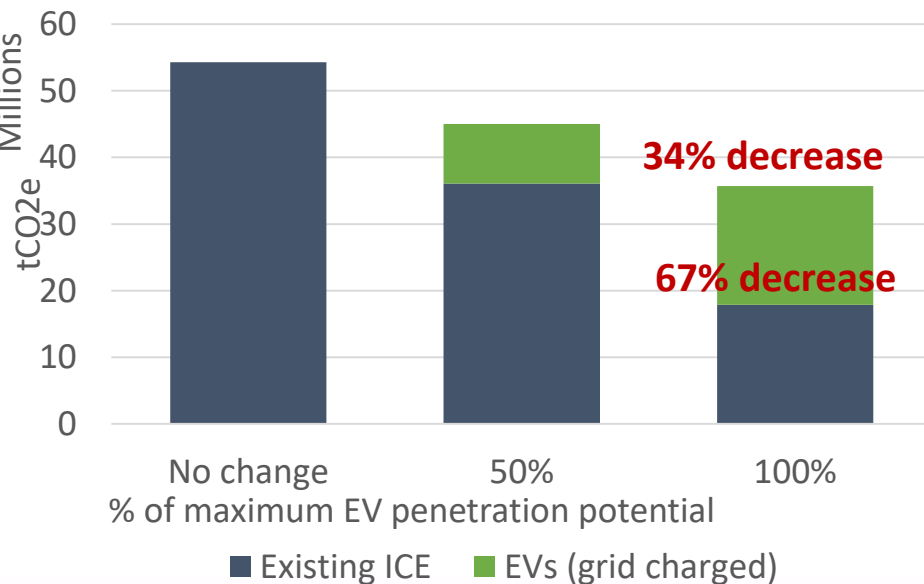
- ▶ transport-intensive sectors
- ▶ all South Africans (but regressive impact)



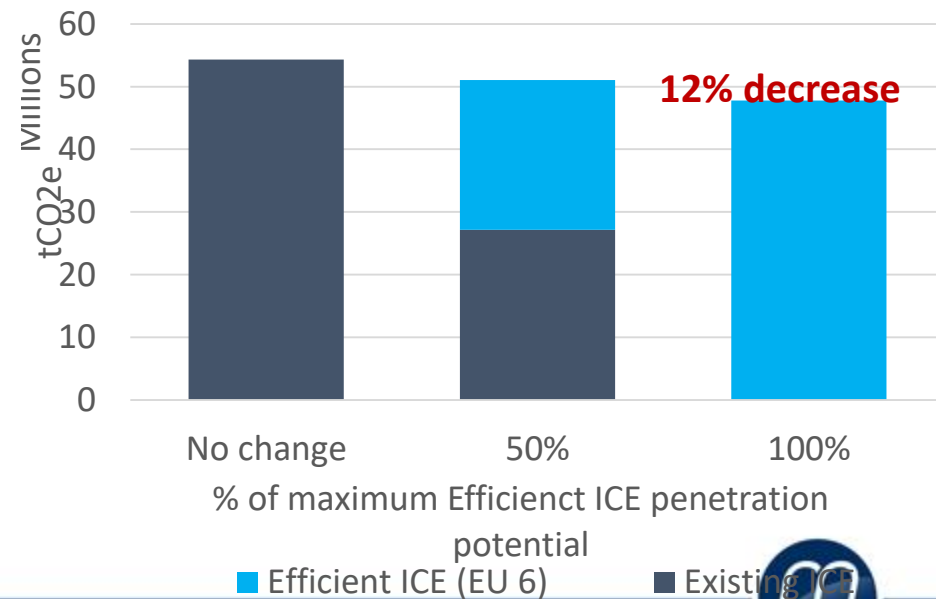
The environment story

- ▶ Due to greater energy efficiency, and in spite of SA's carbon-intensive electricity, **the benefits of grid-charged EVs over ICE vehicles are positive**
- ▶ Will be increasingly so as the grid is decarbonised
- ▶ Complex effect on air quality overall, but clear benefit in urban areas

GHG impact of transitioning from ICE to EVs



GHG impacts of transitioning from Eu2 to Eu6



Managing the transition of the power value chain

- ▶ **Incremental demand will allow for planning and iterative approach**
- ▶ But possible pressure on grid networks due to clustering and uniform charging
- ▶ **Need to be proactive to mitigate negative impacts**
 - ▶ Use electricity tariffs to manage uptake and charging behaviour.
 - ▶ Pilot studies and data collection to inform the evolving approach.

Possible interventions

- ▶ differentiated progressive tariffs
- ▶ ToU tariffs
- ▶ Load control
- ▶ appropriate standards for payment platforms, charging technology, access to user data and building codes;
- ▶ customer- centric offerings
- ▶ better understanding of charging behaviour



Maintain the competitiveness of the automotive industry

- ▶ **Requires significant investments by OEMs and their supply chains**
- ▶ While government has no direct control over the models manufactured by OEMs **proactive policy options are available**

As demand dwindles in SA's traditional markets, the industry could reposition itself to service low- and middle-income countries.

- ▶ But mostly for trucks and bakkies
- ▶ Will face increased competition

Transition to EVs imperative to remain sustainable in the long run.

Transition contingent on

- ▶ a **vibrant domestic market**
- ▶ an **enabling policy** framework
- ▶ a **renewed partnership** between the OEMs, the wider automotive industry and the Government.



Maintain the competitiveness of the automotive industry

While largely non-discriminatory, the policy framework in its current form penalises EVs

- ▶ Imported EVs from the EU fetch a higher tariff than ICE
- ▶ The Ad Valorem Excise Duty on imported vehicles is de facto harsher on EVs than ICE vehicles.
- ▶ The vehicle-specific nature of the APDP *de facto* penalises EVs.

Changes required to ensure a level playing field

- ▶ levelling of import duties,
- ▶ lowering of the production thresholds and
- ▶ introduction of non-specificity into the APDP

Further support to the industry to develop local capabilities in the manufacturing of EV-related systems, infrastructure and components



Reconsider government finance model

Major changes expected in the government financing model.

- ▶ Decrease in the revenue stream from the taxes on fuels
- ▶ Unlikely to be replaced by similar taxes on electricity
- ▶ But reduction in government expenses due to improved BoP, reduced transport costs and improved health.

Need to develop mechanisms to ensure the net financial position remains balanced

- ▶ Reductions in revenue and expenses are likely to occur in different sectors of government and society
- ▶ Redistribution mechanisms (between different spheres of government and society) are required
- ▶ Dedicated allocations to fund a just transition

