



**2024 ENGINEERING INSTITUTION OF ZAMBIA
SYMPOSIUM**

**Viabie Pathways for Electrification of the Transport
Sector in Zambia**

PRESENTER : Hector Sindano

DATE : Friday 21st April 2024

**Avani Victoria Falls Resort, Livingstone,
Zambia**

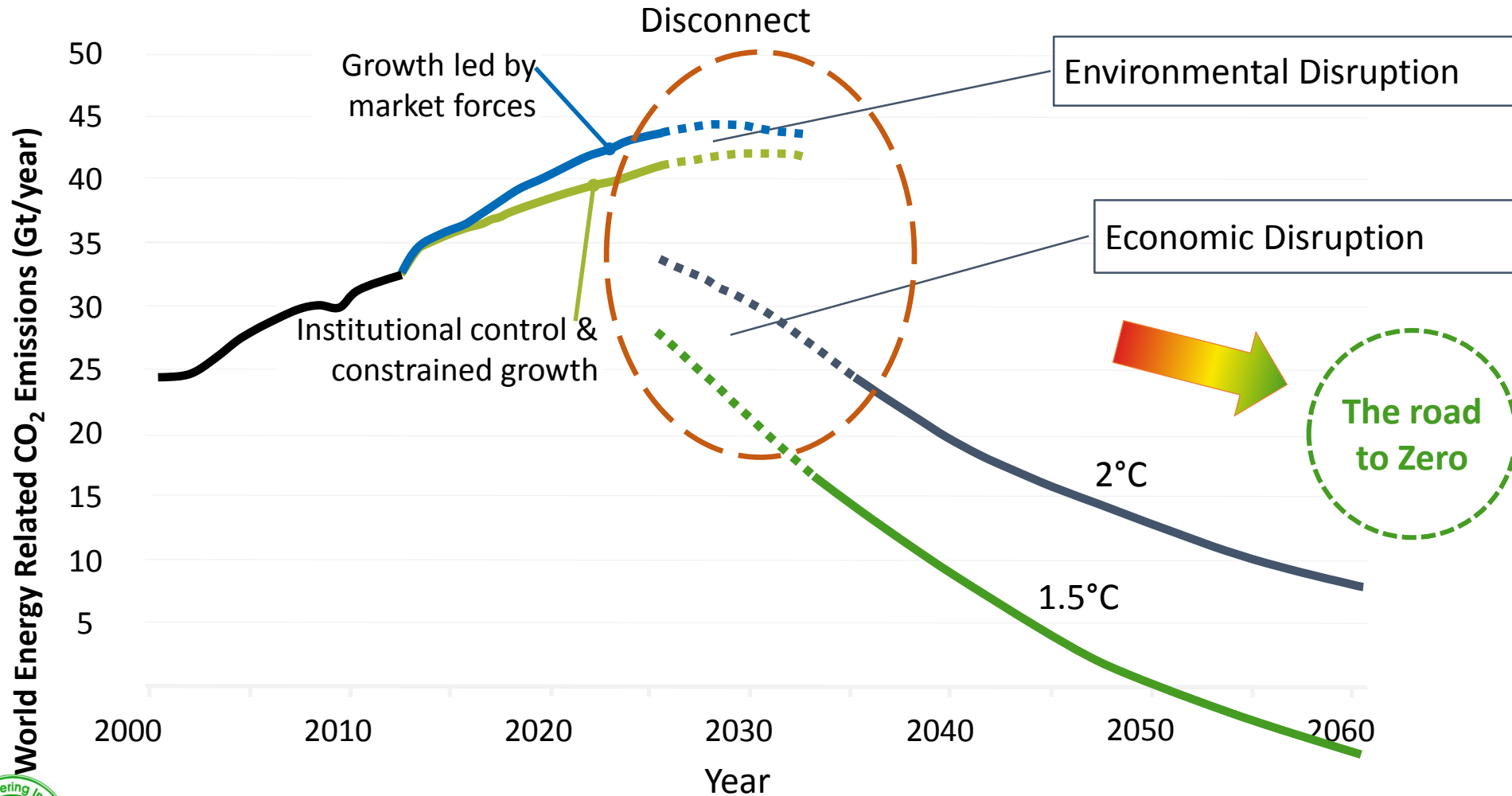


Introduction

- Given the time we have – I propose to focus on the main thrust of my paper rather than go through it page by page as it were
- So I start by setting the scene for what is driving much of the global shift from fossil fuels to zero carbon alternatives
- Mitigating climate change is a significant global challenge which will require significant technology disruption.
- Shell have presented various scenarios on how the policy option we take will affect the ability to meet the global commitment to reach net-zero carbon by 2050



Energy/Climate Challenge and Projected Future Energy Scenarios



- Policymakers increasingly focused on “Zero” emissions for road transport
- Reducing carbon intensity in other sectors perceived to be more difficult

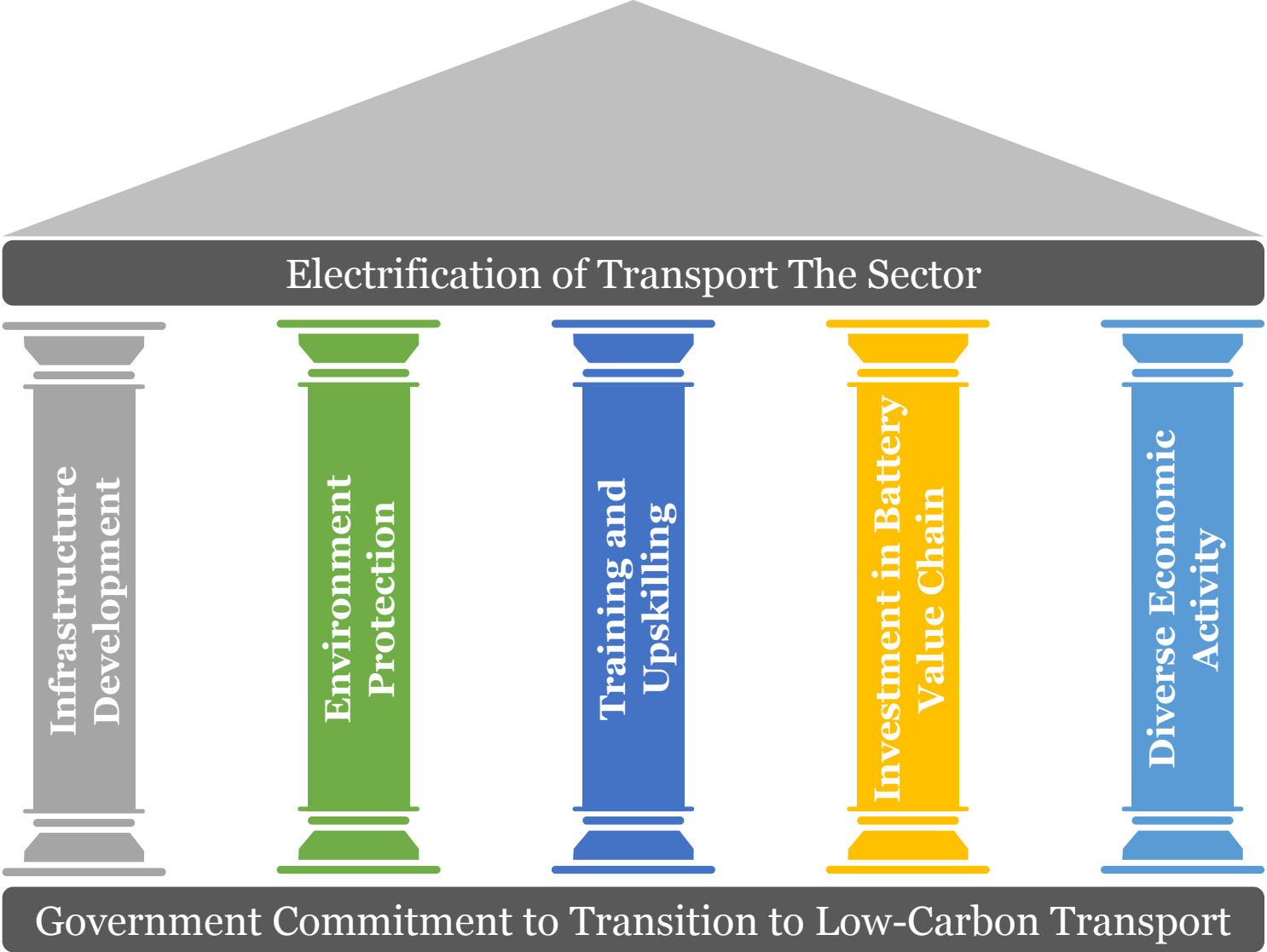


Contextualising the Global Situation to Local conditions

- In most major markets legislation is in place to ensure the shift is completed by 2050 (a significant part of the transition will be delivered over the next 10 to 20 years).
- The primary objective of this presentation is to explore some ideas which will form the framework for policy makers in Zambia to draw up a strategic plan for transitioning the transport sector in the country from fossil fuels to EVs in the most systematic and economically effective way
- Zambia needs to set a timeline that is achievable, consistent with the country's unique circumstances – while taking into account the global timeline
- I do this by focusing on 5 pillars that should form the basis of any policy formulations to effect a transition of the transport sector



Five Pillars of Transport Sector Electrification

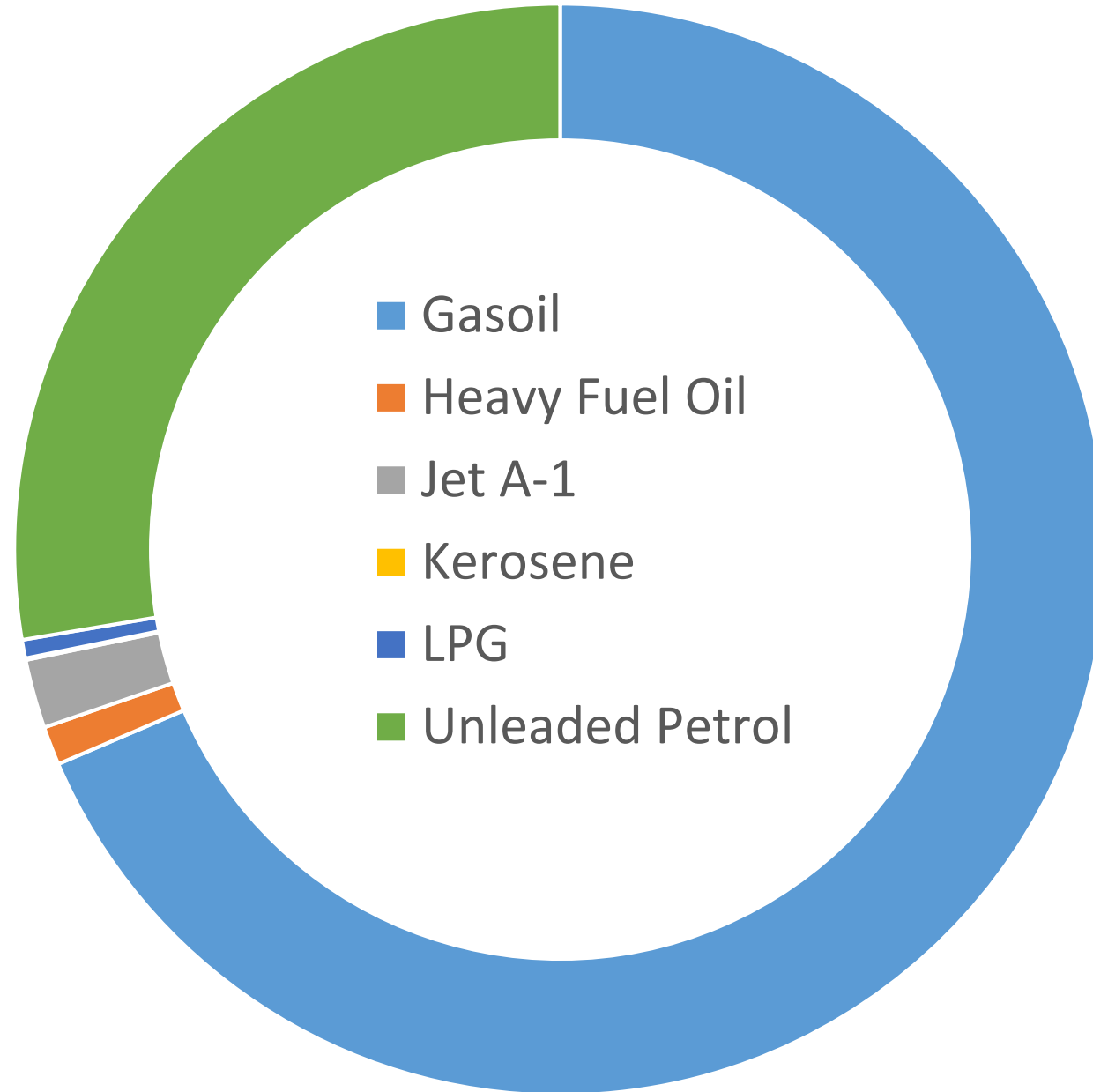


Electricity Generation and Consumption - 2022

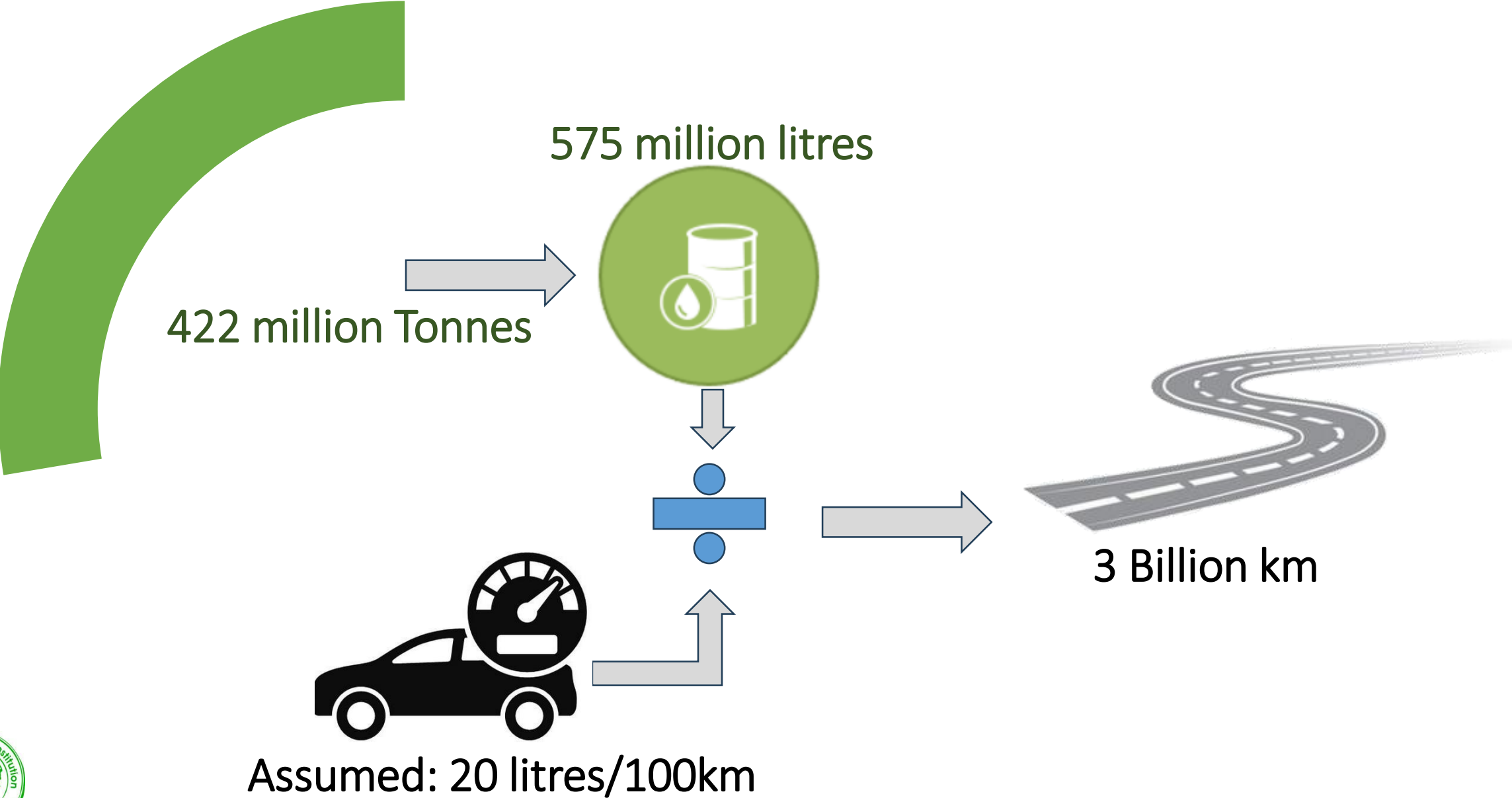
- In 2022, electricity generation stood at 19,400 GWh of which about 70% was consumed locally and the remainder exported
- That is 13,800 GWh was consumed locally and 3,073 GWh was exported
- Electricity imports stood at 17.8 GWh
- The balance is lost through what is referred to as “Technical Losses”



Total Consumption of Petroleum Products - 2022



Estimating Vehicle Kilometres Travelled (VKT) – PC & LDV



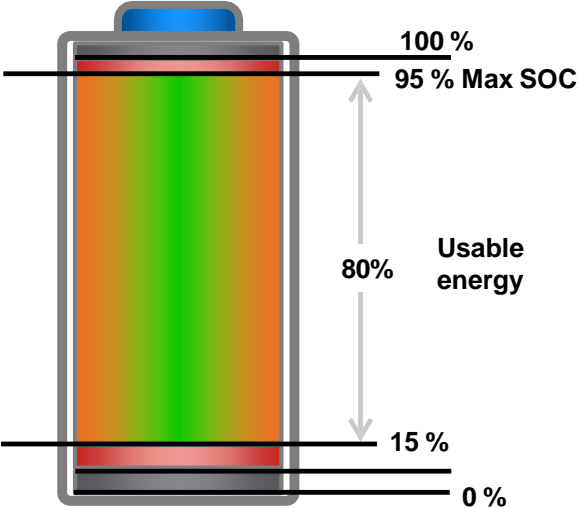
Estimating Electric Energy Required to Transition to EV



Average battery capacity of an electric car is around 40 kWh, but some cars now have up to a 100 kWh capacity.



A typical range for an EV is 300km. We take the worst case scenario that a 100kWh battery capacity is required to achieve a 300km range



10 Million Battery Charges



1000 GWh

3 Billion km



IRP Forecast for Energy Demand to 2050

- The Integrated Resource Plan for the Power Sector in Zambia (IRP) – released in October 2023 also predicts an increase in transport sector energy demand to about 1000GWh by 2050 (aligns with estimate here – where I refer to 30% of the 3000GWh that is exported being used to power the transport sector).
- However the IRP arrives at this figure without consideration of significant change in EV-led electricity demand.
- To that extent it would appear that the IRP understates the demand by at least 100%
 - Unless Zambia takes a passive role in promoting EV uptake

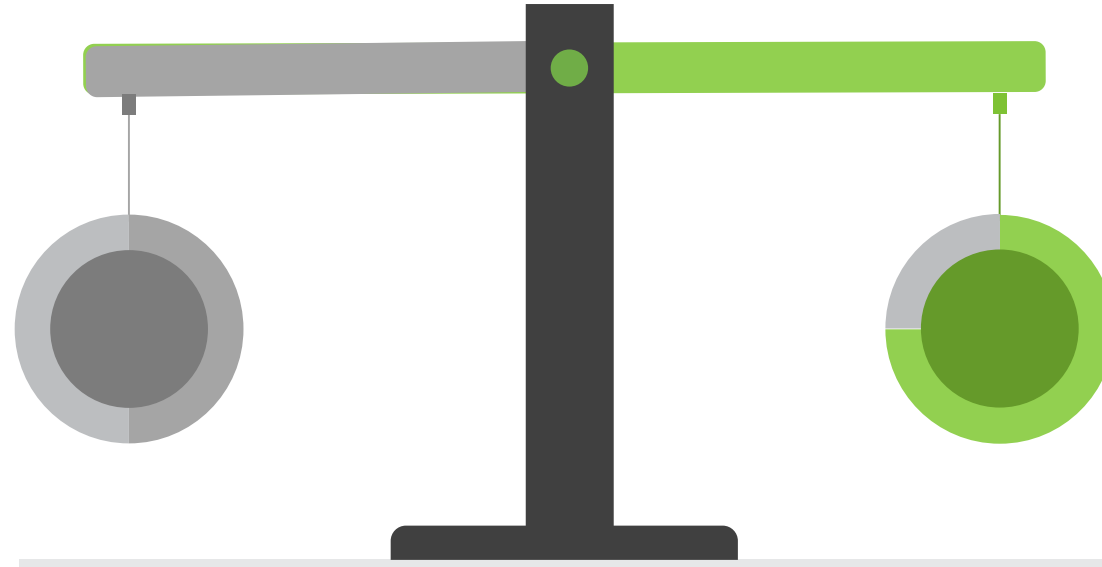


Economic Cost / Benefit Balance

Cost

Lost forex revenue from reduction in export of electricity

Increased expenditure on infrastructure



Benefit

Reduced forex expenditure due to **~30% reduction** in oil import

Increased mining activity

Diversification in economic activity

Upskilling our local industries

Meeting our commitment to environmental protection

Concluding Summary

- Transitioning to EVs will significantly increase electricity demand. The exact amount of redirected electricity will depend on various factors, including the extent of the transition and the availability of charging infrastructure.
- The transition to EVs in Zambia will present opportunities for diversification of economic activity, particularly in battery repair, repurposing, and ultimately recycling.
- The mining sector is expected to experience a boost due to increased demand for raw materials used in EV batteries, such as lithium, nickel, and cobalt. However, geopolitical influences and the search for cheaper substitutes will limit the extent to which the boost will directly benefit the local economy.



Thank you

