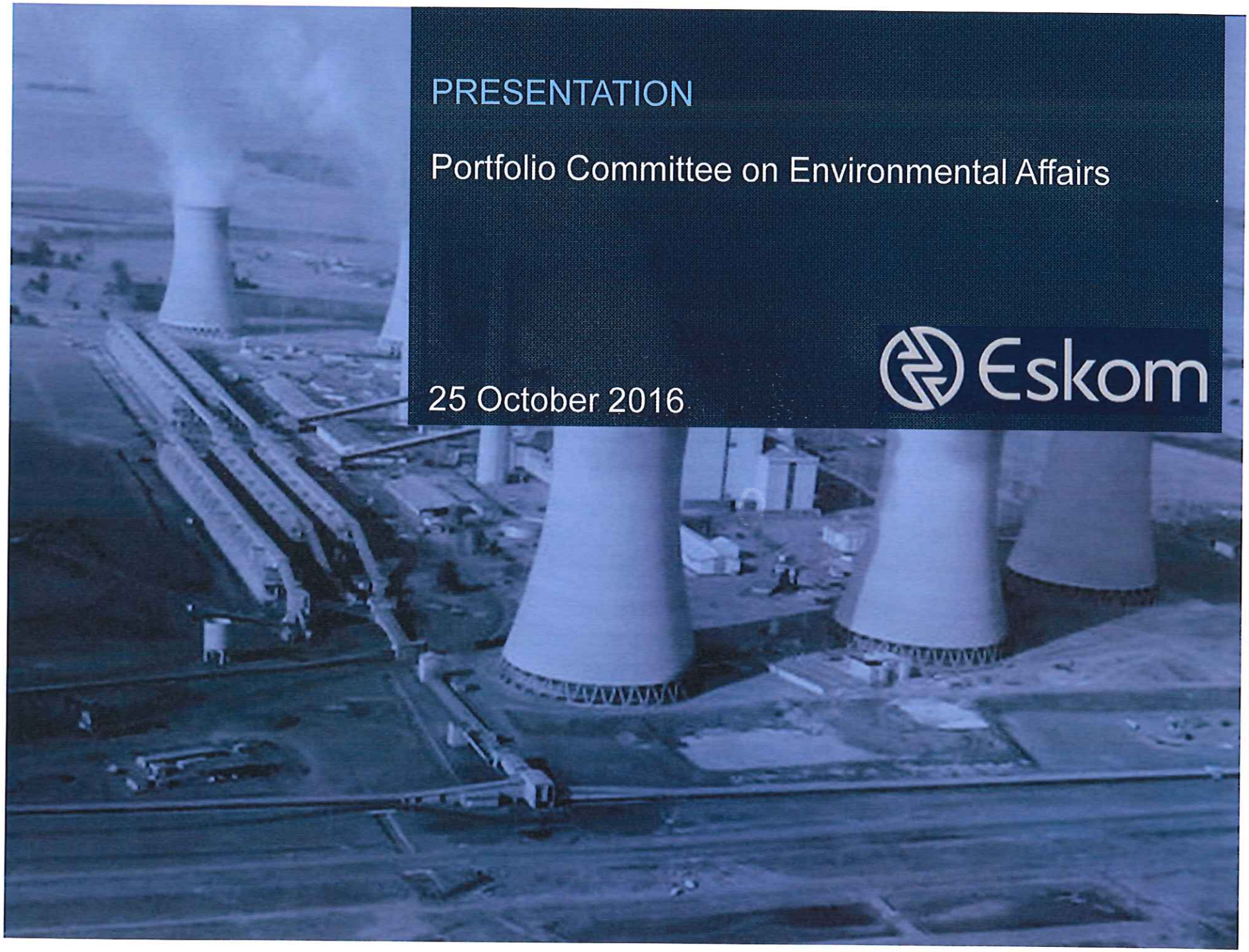
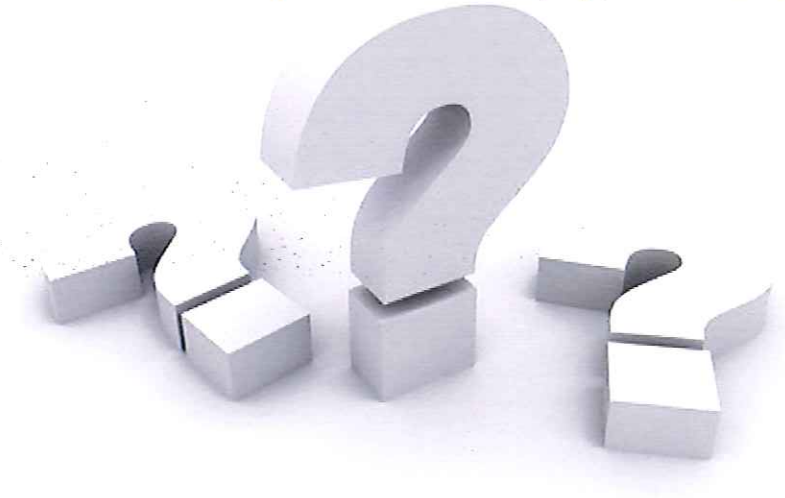


Objective of the presentation

- Renewable Energy Independent Power Producer (REIPP) Programme contribution to reduce carbon emissions
- Eskom's current status and efforts to reduce carbon emissions
- South Africa's ability and options to be adopted to comply with the Paris agreement



South Africa's Climate Change Commitment

Eskom

	Description
COP 21 Commitments	• At COP 21 in 2015, 180 countries committed to the legally binding[1] **Paris Agreement** to reduce greenhouse gas emissions

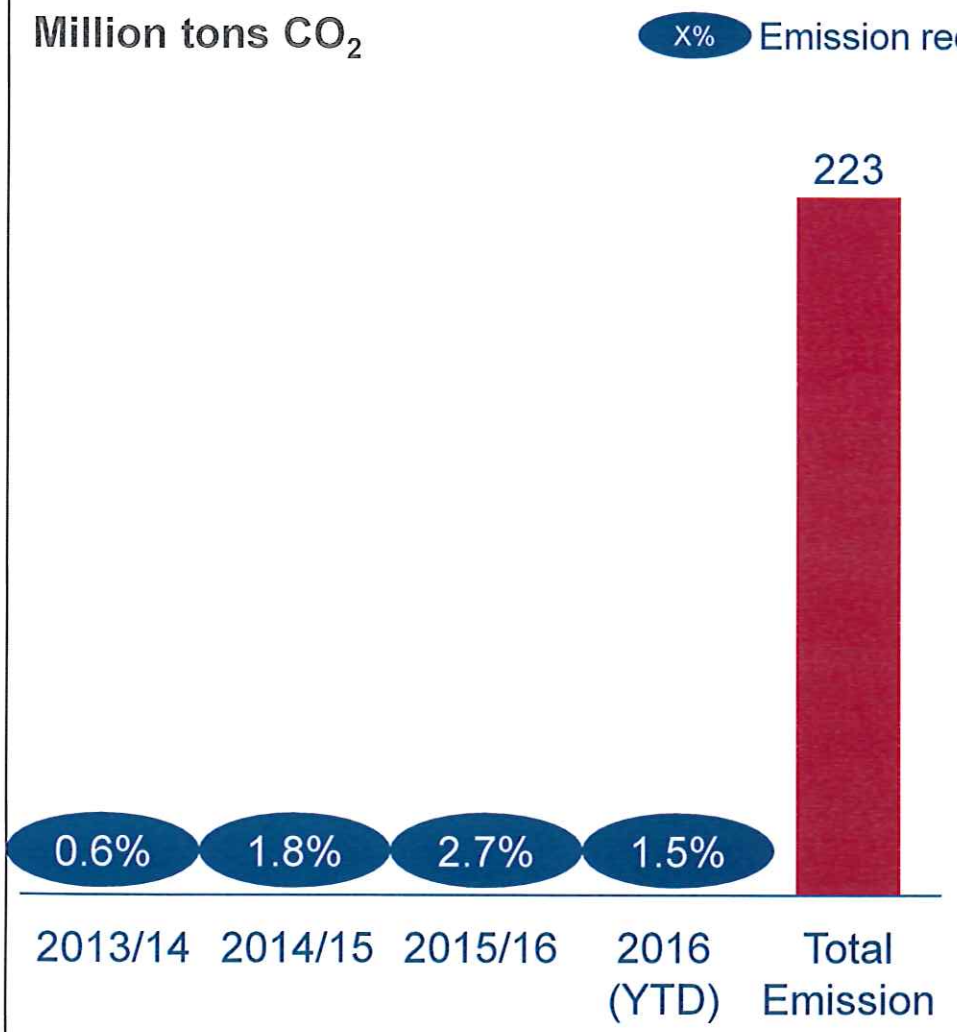
Emission reduction strategy	• South Africa committed to **peak**, **plateau** and **decline** emissions
	  • **Peak 2025** - higher limit 614 Million tons (Mt) CO_2 and a lower limit of 398 Mt CO_2
	  • **Plateau 2025 – 2035** (i.e. at Peak limit)
	  • **Decline 2036** onwards
	• Current **country** emissions are 518 Mt CO_2 per year

1 – once ratified by Parliament

Renewables Contribution to Emissions Avoidance

Eskom

Emissions avoided due to capacity from renewable energy sources



Insights 2013 to 2016 YTD:

- Emissions from electricity generation **~ 669 Mt** (223 Mt CO_2 in one year)
- REIPP emissions avoided **- 11.4 Mt**
- Eskom's Renewable Energy emissions avoided **- 3.4 Mt**
- Renewables contribution to emissions avoidance is small with a big price tag – **R1.1 trillion** (Eskom capital cost R 28 billion)
- This does not include the cost of base load required to back-up Renewables

Eskom's cost of compliance is also significant

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These costs are included in the latter part of Eskom's 10 year plan

	Cost (nominal)	Description
Current budget for emission upgrades (to 2025)	R63 billion	FGD at Medupi
		Low NOx burners at 3 stations
		FFP at 2.5 stations
		ESP upgrades at 4.5 stations
Full compliance including refitting of stations near end of technical life	>R300 billion	FGD at all power stations
		Low NOx burners 11 stations
		FFP at 3.5 stations
		ESP upgrades at 4.5 stations

FGD plant - results in an increase in carbon emissions due to efficiency losses

South Africa's commitment: Peak and Plateau within a range 398 – 614 $MtCO_2$ and Decline from 2035

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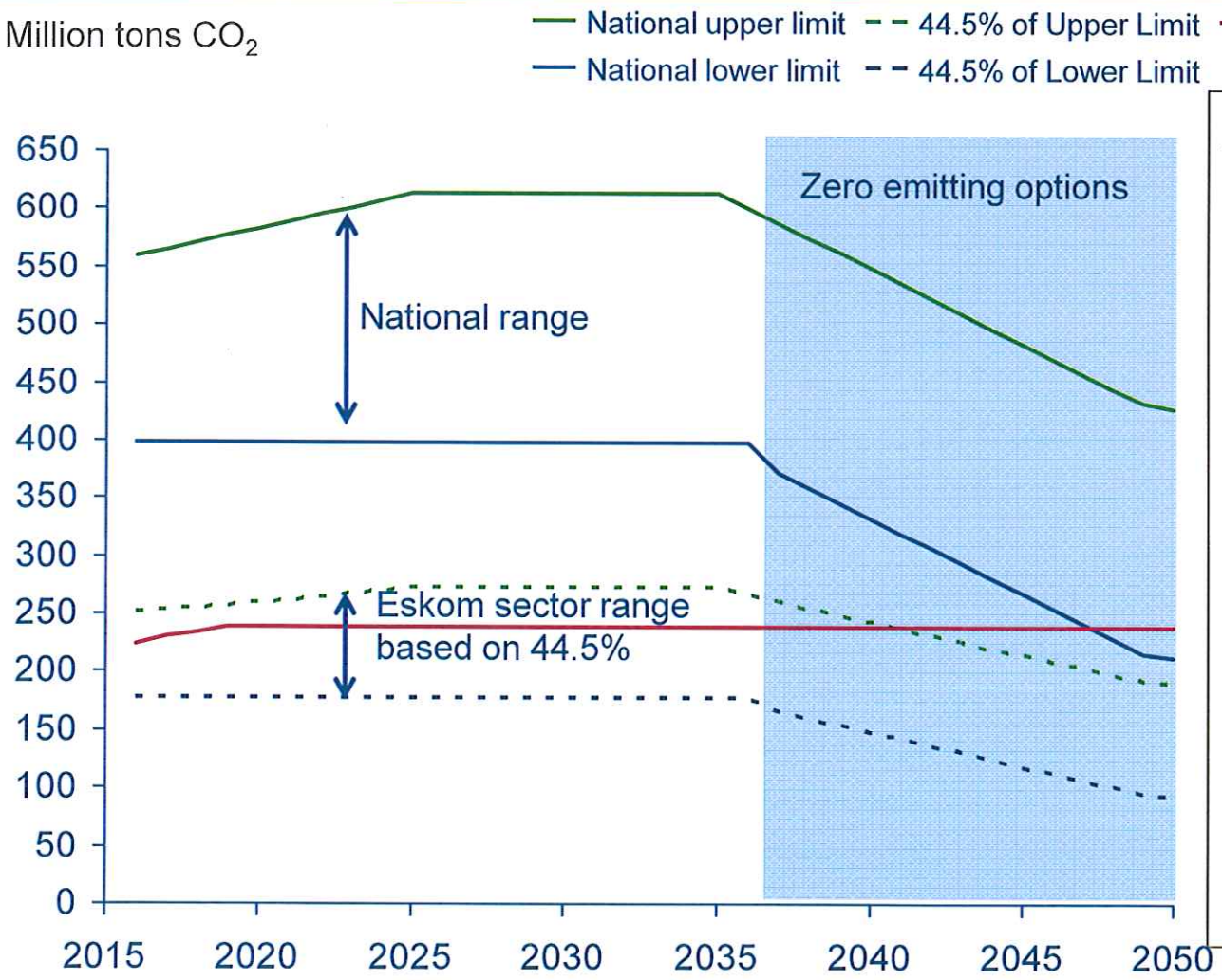
Forecasted Emissions



Insights

- The range was based on high and low economic growth forecasts
- Eskom contributes ± 44.5% to the national GHG emissions
- Eskom is currently compliant
- In order for Eskom to be compliant in the future, Eskom needs to identify zero emitting energy options
- This has an added benefit of decoupling emission growth from economic growth

South Africa's Climate Change Commitment *cont*

Eskom

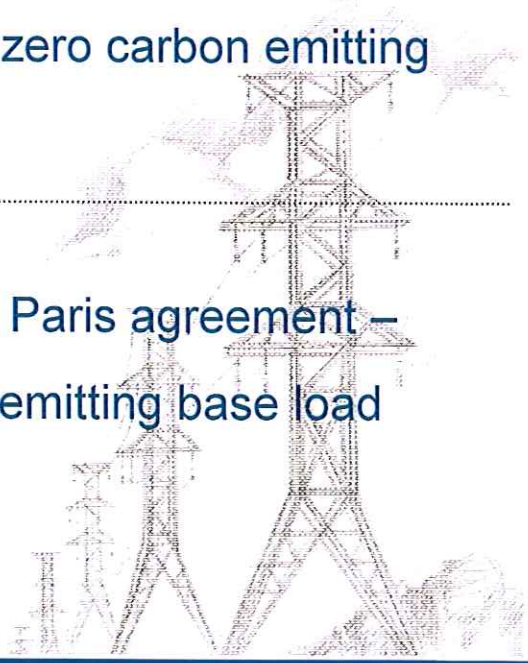
	Description
South Africa's climate	• South Africa's commitment emphasised the country's vulnerability to extreme weather e.g. drought • South Africa's commitment is cognisant of economic growth and poverty eradication
Energy mix selection	• Electricity generation technology choice is an important consideration (e.g. nuclear) • Coastal sited nuclear has the added benefit of using seawater for cooling – reduces the need for scarce freshwater • Waste heat from nuclear plant can be used for freshwater augmentation (desalination)
Conditions of commitment	• South Africa's commitment was also conditional to Funding support • Provides an opportunity to diversify South Africa's energy mix

Future Eskom Initiatives on Carbon Emissions

	Description
Lower emissions technologies	• Conversion of open cycle gas turbines to combined cycle gas turbines • Cross border Gas • Underground Coal Gasification • Microgrids (PV based) • Smart grids (less line losses)
Zero emissions technologies	• Nuclear New Build • Cross border hydro (Inga, Mphanda Nkuwa)

Conclusion

- Eskom is currently compliant with respect to CO_2 emissions
- The Renewable Energy Independent Power Producer (REIPP) Programme had minimal impact in reducing emissions at a significant cost to the economy
- Minimal impact of the REIPP programme means a zero carbon emitting base load option is required



- Eskom will support Government's ratification of the Paris agreement – but is dependent on South Africa moving to a zero emitting base load option

Eskom supports the ratification of the Paris Agreement by Government