

# The role of cities in climate change mitigation: A South African perspective

Tirusha Thambiran

# Outline

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- The role of cities in climate change mitigation
  - examples of local actions to reduce emissions
  - quantification of emissions at a local level
- Gaps, opportunities and challenges for cities in South Africa

# Introduction

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- Climate change mitigation challenge
  - to reduce greenhouse gas (GHG) emissions
  - difficulties in finding consensus and commitment from nations to reduce their GHG emissions
- Local governments in many cities around the world have begun to plan and implement measures to reduce their GHG emissions
- Cities have demonstrated the ability to influence GHG emissions
  - as a co-benefit to other policies and strategies
  - alternatively mitigation policies have significant co-benefits for other sectors
    - especially relevant from a developing world context

# City initiatives to reduce GHG emissions

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- Canadian and German cities
  - green infrastructure
  - design of walkways in city centres
- European cities
  - congestion charging in London
  - the development of ‘environmental (low carbon) zone’ on Prague
    - restrictions on freight vehicles entering the city
- China
  - local government mitigation is legislated in national climate policy
  - The development of the Chongming Dongtan Eco-city
    - green buildings
    - solar energy
    - aims to be carbon neutral

# Masdar city



- To be powered by the sun...
- "The quality of air will be better than any other street in the Gulf and in the world, and that alone will bring you safety, health and happiness."

# Low carbon cities

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- Increasingly the concept of ‘low carbon city’ is used
- A low carbon city is typically described as a city that is
  - actively and significantly lowering carbon emissions, even as its economy is growing (low carbon economy)
  - has low emissions and low pollution
  - prioritises green spaces and green jobs
- Each city has unique characteristics which influence GHG emissions and the potential to mitigate
  - natural resources, climate, gateway status, socio-economic structure
- GHG emissions inventory
  - at the core of characterising these emissions and understanding the potential for mitigation is a suitable baseline

# GHG emissions uncertainties

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- Significant challenges to establishing suitable local GHG emission baselines
  - typically GHG emissions are determined at a national level – enables international comparison of emissions
  - reporting requirements for non-annex 1 countries has possibly inhibited innovation in the characterisation of pollution sources in these countries
    - data availability and reliability at a local level is often poor
  - issues around defining activity boundaries and assigning responsibility for emissions
    - each city is unique
    - use of different methodologies as there is no standard protocol
    - accounting for lifecycle of emissions and production/consumption
      - how do we fairly allocate emissions ?

## Total GHG Emissions, Including End-Use, Life Cycle, and within City Measures

	emissions within city tCO <sub>2</sub> /cap	emissions from end-use activities tCO <sub>2</sub> /cap	end-use emissions including life-cycle emissions tCO <sub>2</sub> /cap
Barcelona	2.4	4.2	4.6
<b>Cape Town</b>	not determined	<b>7.6</b>	not determined
<b>Durban</b>	not determined	<b>7.3</b>	not determined
Denver	not determined	21.5	24.3
Geneva	7.4	7.8	8.7
London	not determined	9.6	10.5
Los Angeles	not determined	13	15.5
New York City	not determined	10.5	12.2
Prague	4.3	9.4	10.1
Toronto	8.2	11.6	14.4



# GHG emissions in South African cities

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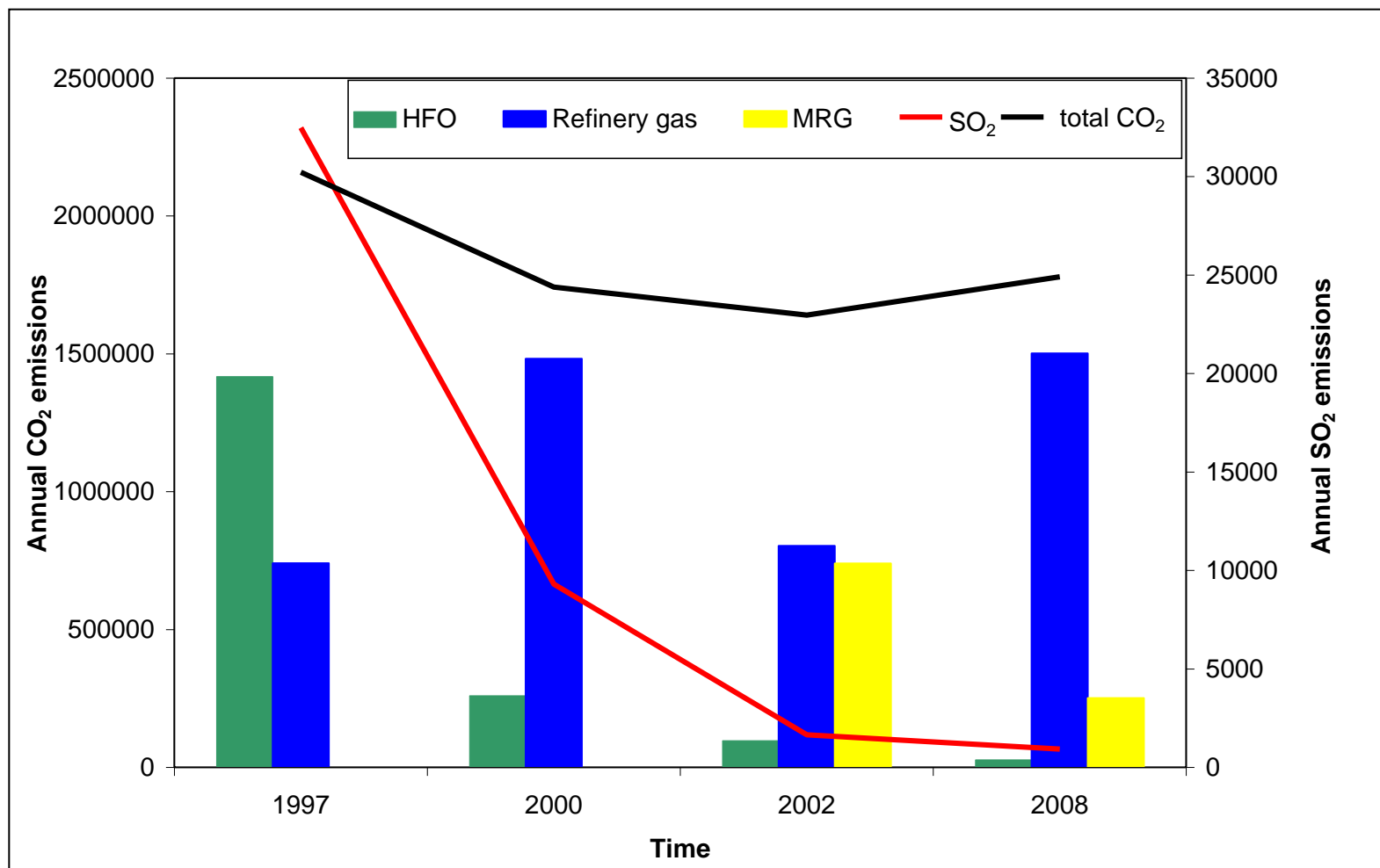
- The White Paper Climate Change response
  - targets for GHG emissions at a national level
  - local governments are not legislated to reduce GHG emissions
- Very few municipalities have updated GHG emissions inventories
  - state of energy reports
    - poor understanding of the non-energy consumption sources
  - characterise emissions from government operations
- South African cities have the ability to influence GHG emissions
  - generally well capacitated with authority over key polluting sectors
    - air quality, waste management, transport planning
- Potential for co-benefits is not always realised
  - lack of awareness or willingness to act

# Industrial Sector co-benefits in SA cities

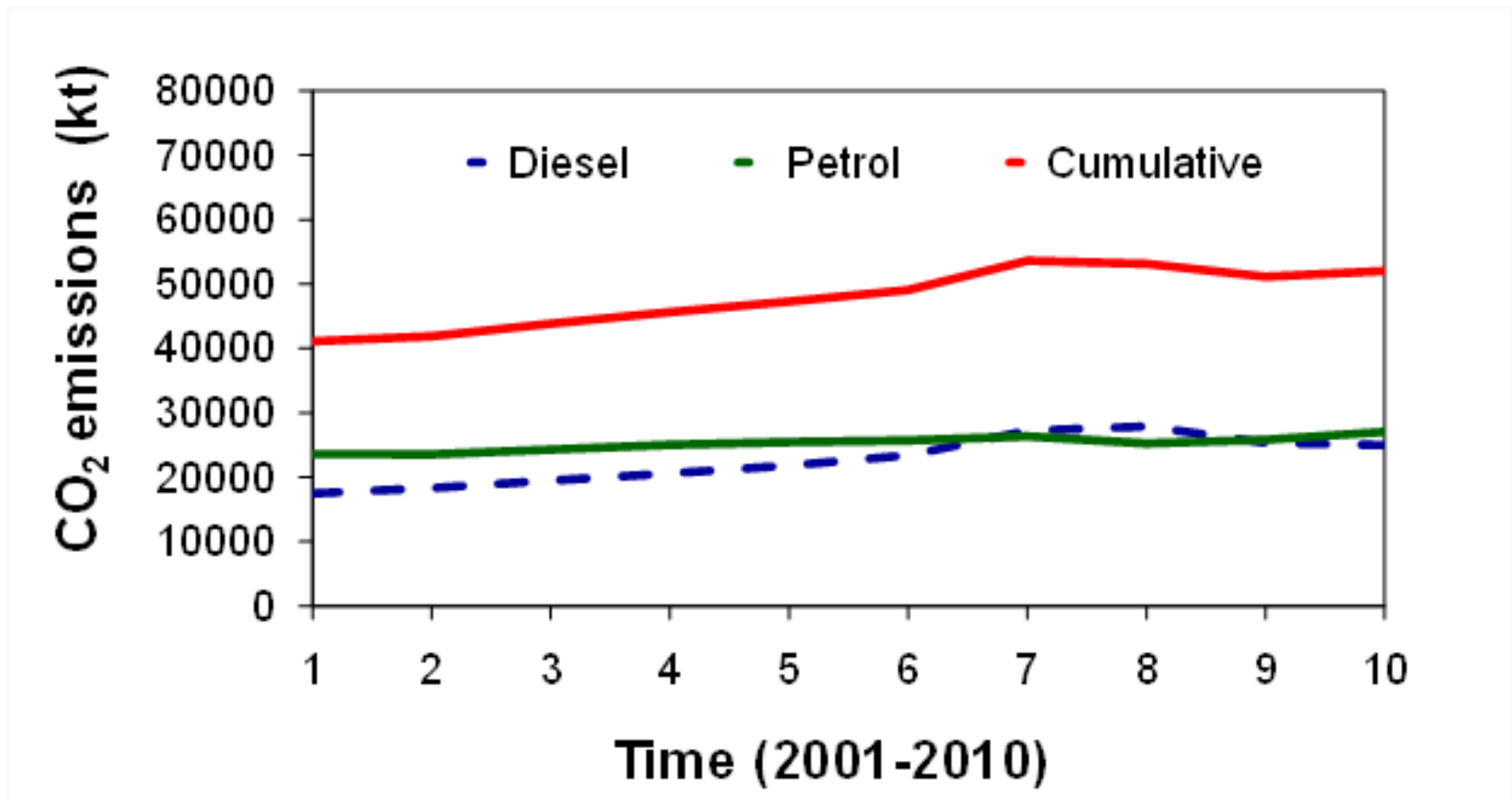
Industry measure	Emissions ↑	Emissions ↓	Impact on fossil fuel use
Installing/modifying cleaning devices	CO <sub>2</sub> N <sub>2</sub> O	SO <sub>2</sub> , NO <sub>x</sub> , PM (depends on type of device used)	↑
High sulphur coal to low sulphur coal	--	SO <sub>2</sub>	--
Change in fuel toward cleaner, more efficient fuels	--	Reduces all related emissions from original fossil fuel source	↓
Energy efficiency	--	Reduces all related emissions from fossil fuel source	↓

# South Durban Multipoint Plan impact for GHGs

## *Change in fuel at petroleum refineries*



# National road transport emissions



Padayachi, Y. and Thambiran, T. (2012). Geared for change ? CO<sub>2</sub> emissions from road transport in South Africa. Proceedings of the Annual National Conference on Air Quality. 1-2 November, 2012, Rustenburg, South Africa.



# Road transport sector co-benefits in SA cities

Transport measure	Impact on emissions	Impact on fossil fuel use	Impact on road safety
Fleet renewal	<p>↓ PM, NO<sub>x</sub>( diesel)</p> <p>↓ CO (petrol)</p> <p>VKT impt for CO<sub>2</sub></p>	<p>↓ due to improved fuel efficiency of new vehicles</p> <p>↑ newer vehicles increase VKT</p>	Dependent on VKT and other factors
Reduce congestion	↓ all emissions due to lower VKT	↓	Benefits
Increase efficiency of freight transport	↓ all emissions due to lower VKT	↓	Benefits

# Conclusion

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- Given the potential for co-benefits and opportunities to participate in the carbon market, South African cities need to properly account for GHG emissions
- Using a co-benefits approach may have limited impact in the long run
  - short-term solution and will still need specific GHG mitigation targets for cities
- Need for the development of a South African low carbon framework
  - guidelines for estimation of GHG emissions
  - criteria for selection of low carbon indicators
    - macro-level indicators with may not be ideal
      - » disaggregated local emissions and activity data
      - » to understand where the inefficiencies occur and how to mitigate

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