

# Global Vehicle Emissions Inventories

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# Reconciling the Diesel Engine With the Environment: A Comprehensive Approach

## Highway



Tier 2  
Light-duty  
(1999)



2007/2010  
Heavy-duty  
(2001)

## Common Aspects--

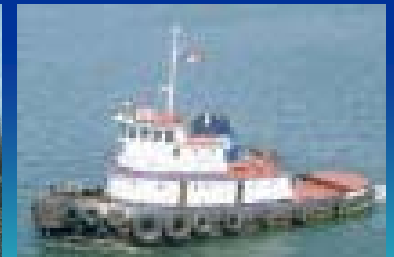
- Systems approach— fuel change enables clean technologies
- Large environmental benefits
- Responsive to needs of States to meet air quality goals
- Collaborative process

## Nonroad



Tier 4 diesel (2004)

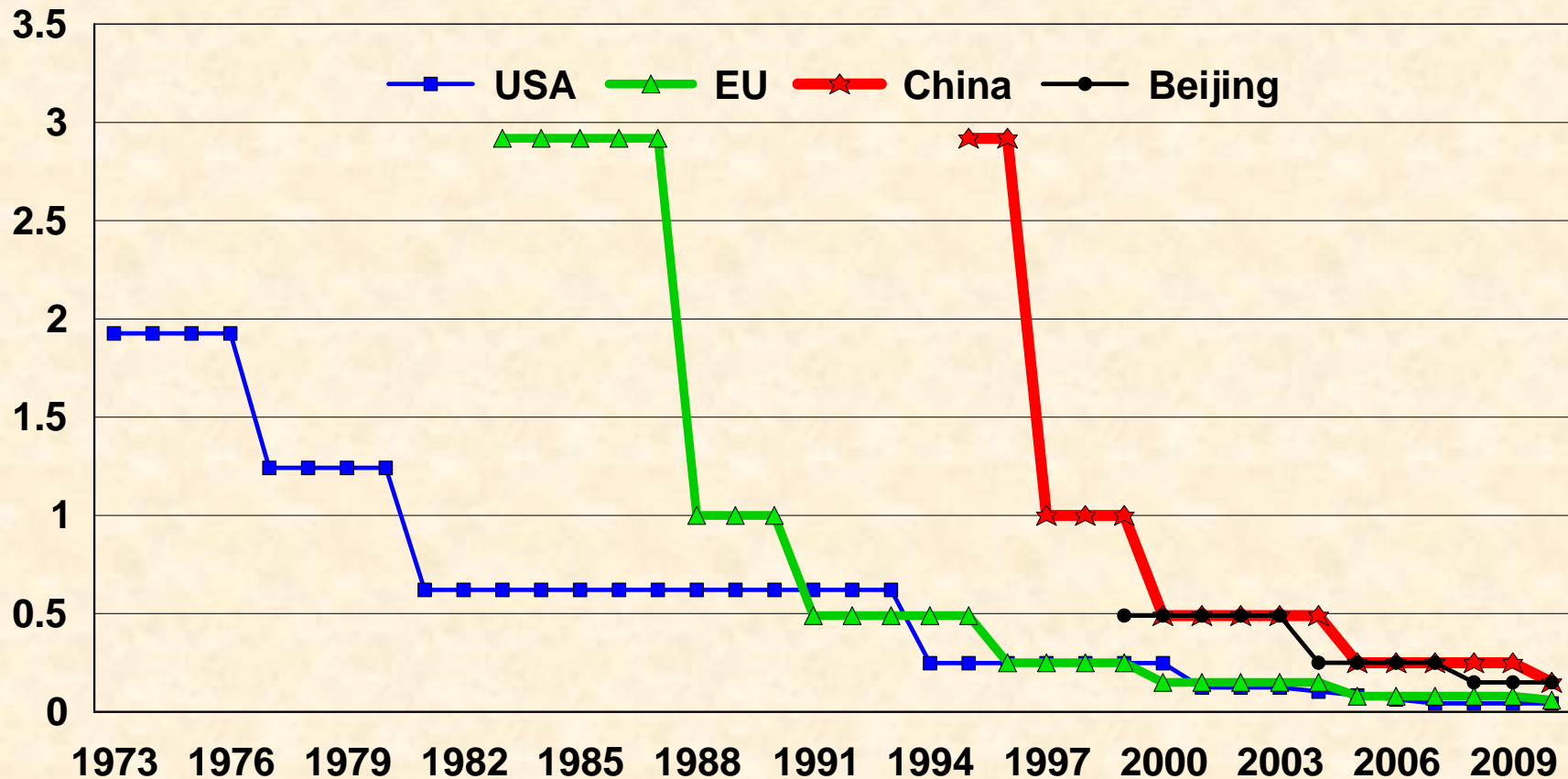
## Locomotive/Marine



# Trends in Passenger Car Exhaust Emissions Standards

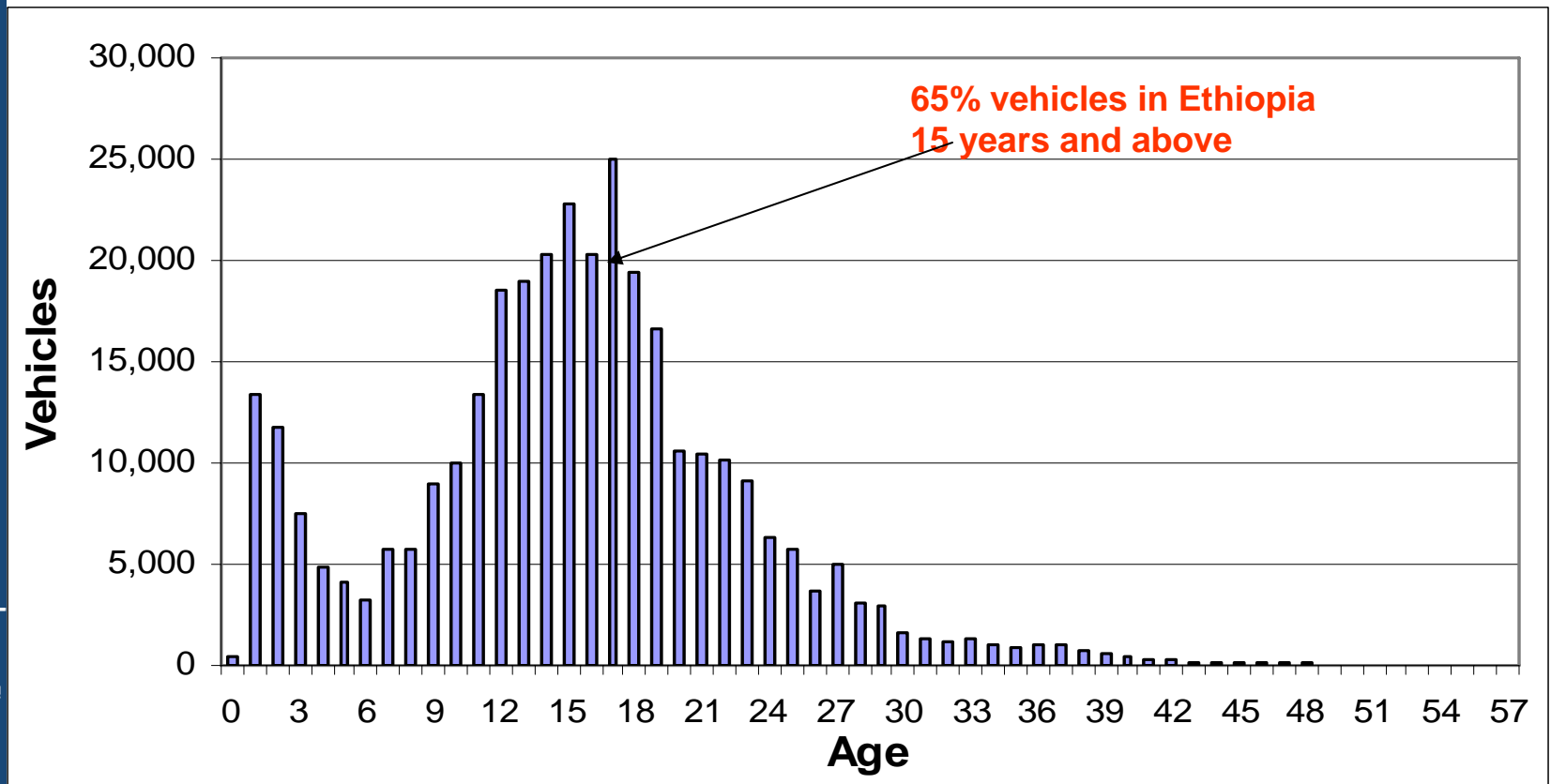
## NOx Emissions Standards

Grams/Kilometer





# Vehicle Age: Tanzania Example



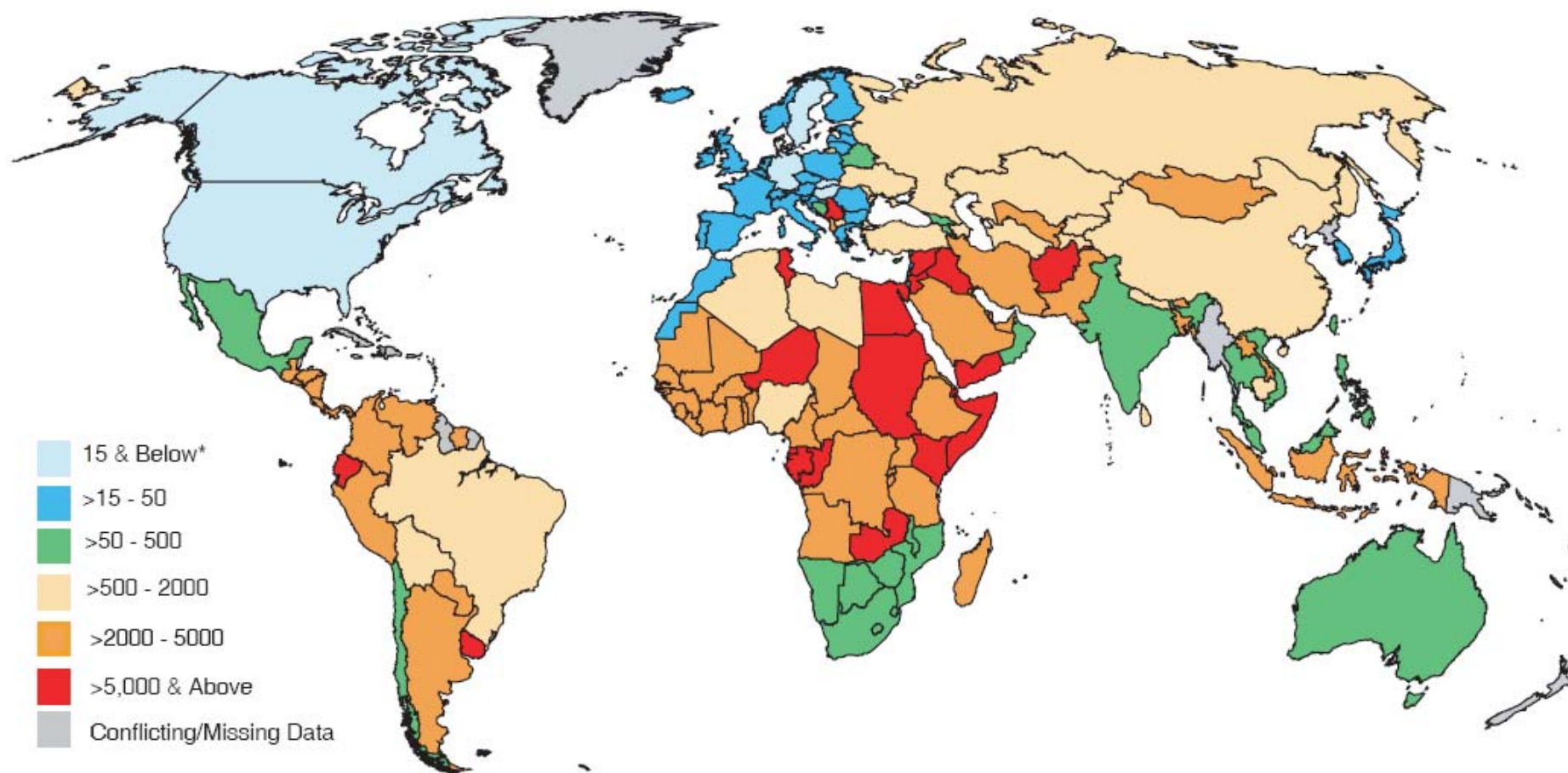
Vehicle age distribution in Tanzania.  
Source: Tanzania Revenue Authority





## Diesel Fuel Sulphur Levels: Global Status

February 2009

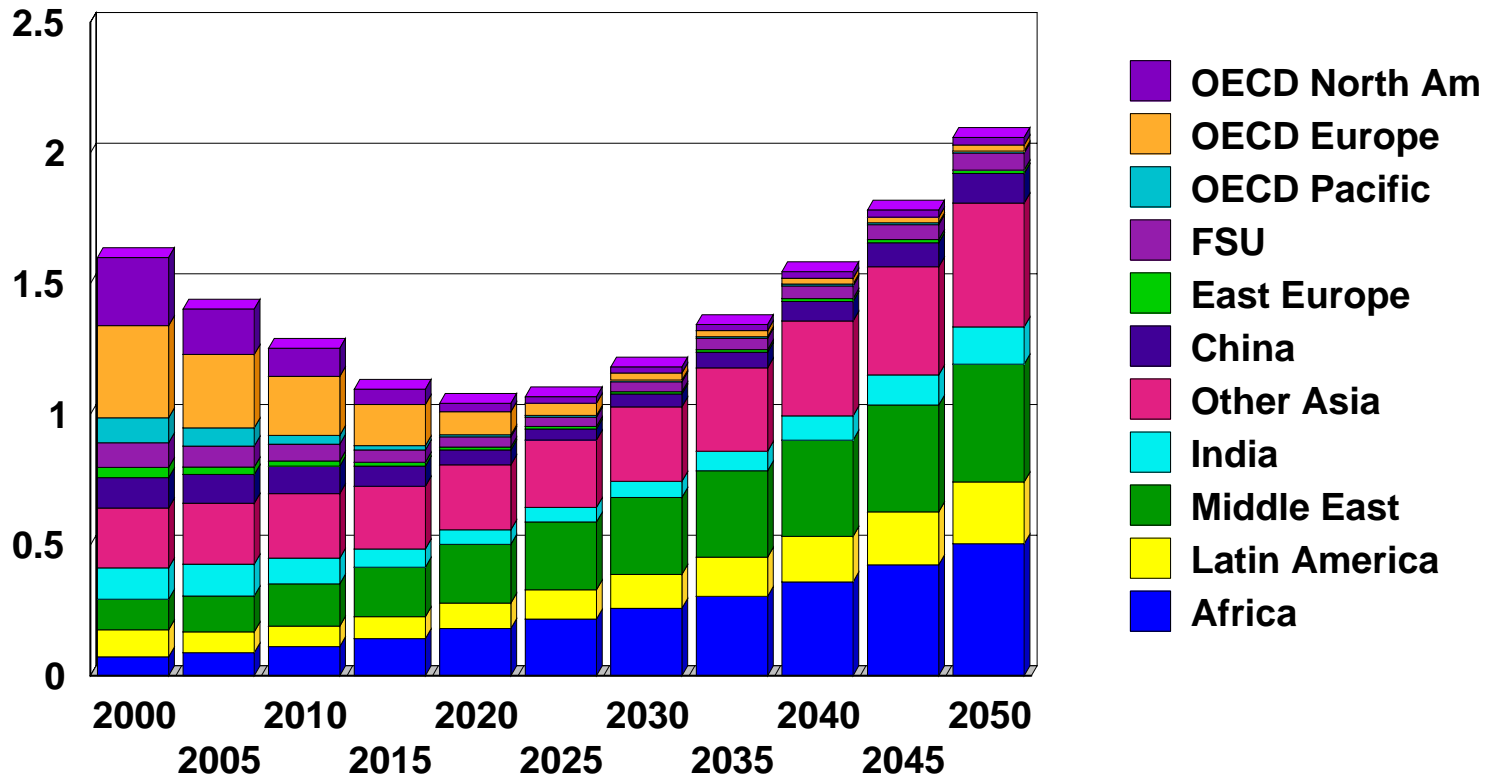


# Road Vehicle Emissions By Country

## Particulate Matter

### Base Case

Million Metric Tons

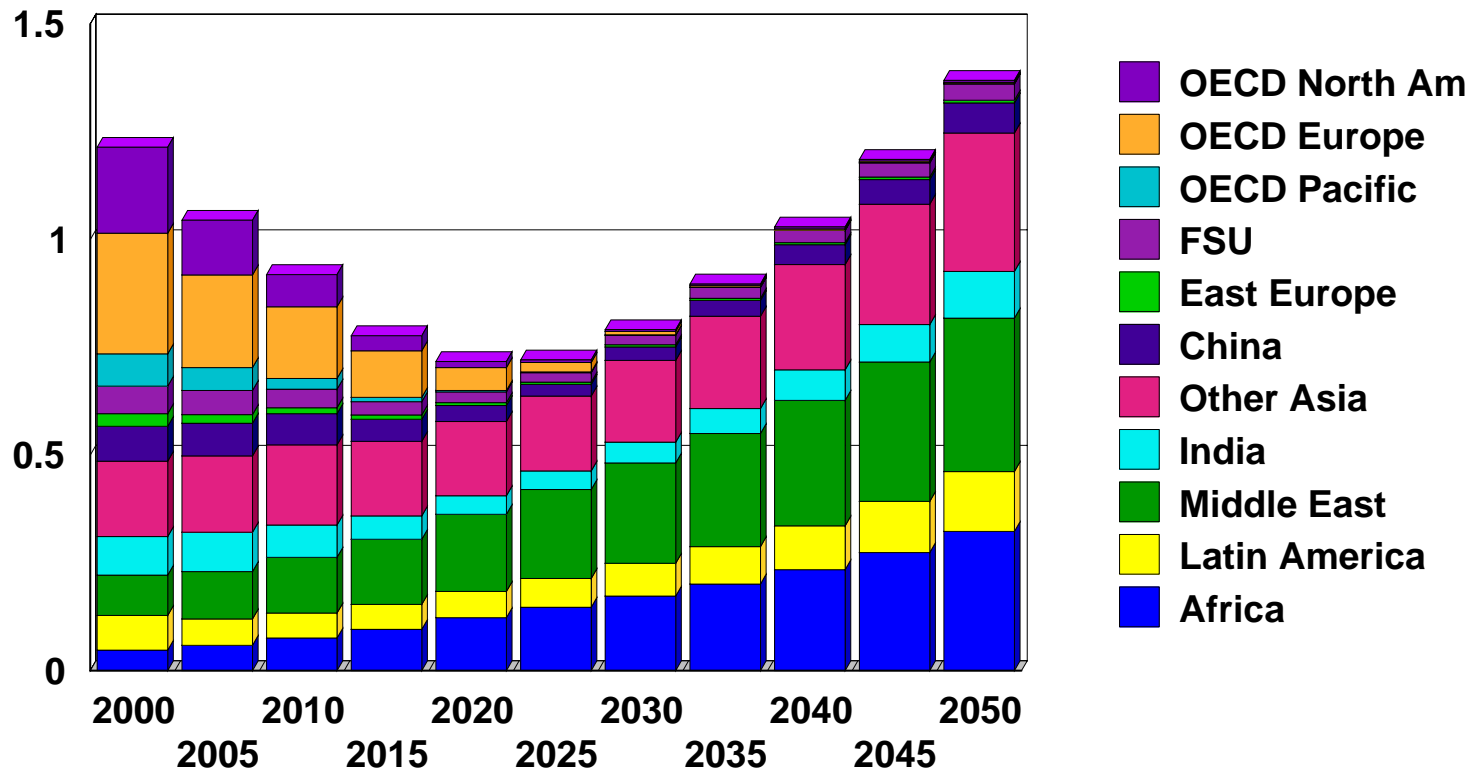


# Road Vehicle Emissions By Country

## Black Carbon

### Base Case

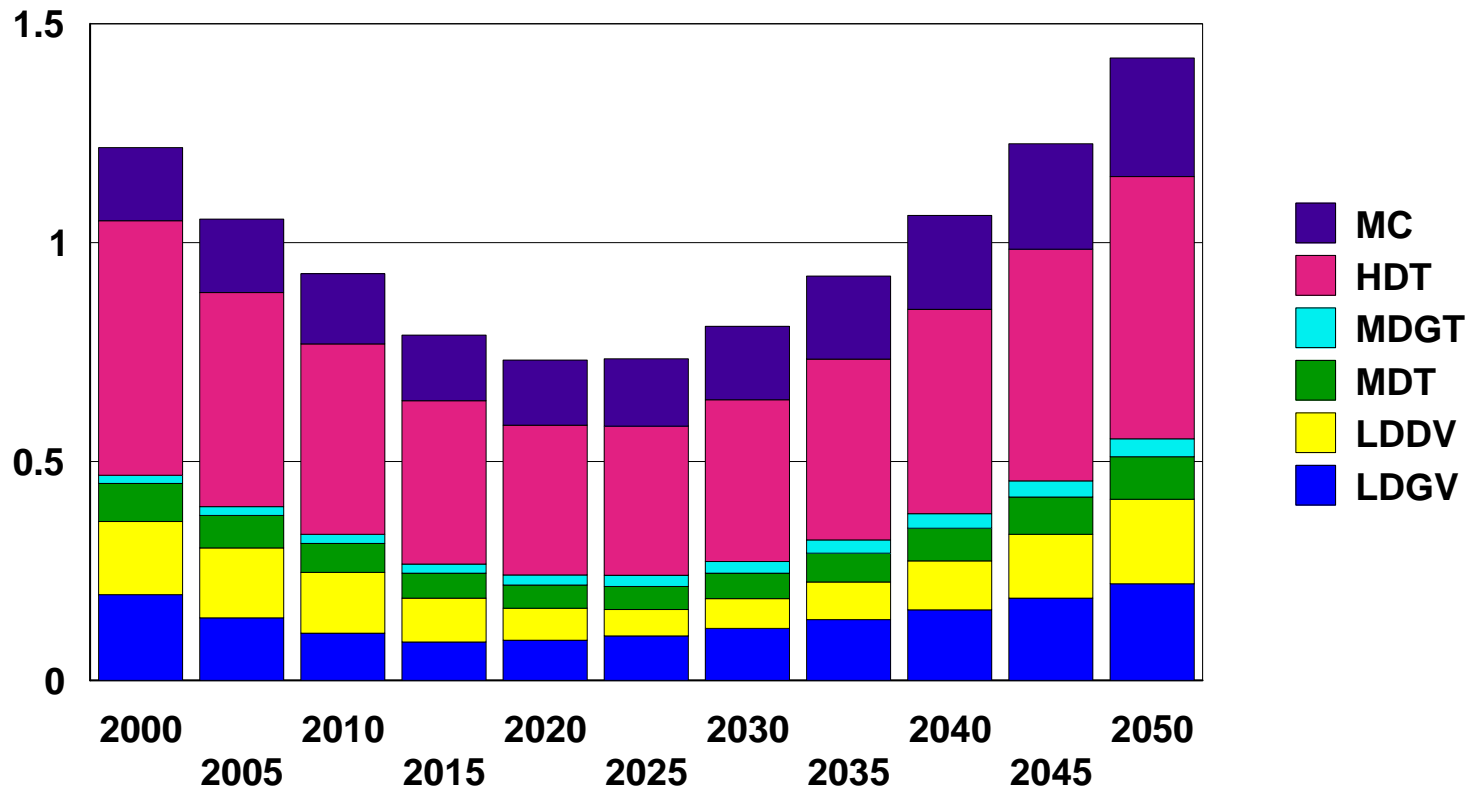
Million Metric Tons



# Black Carbon Emissions By Road Vehicle Type

Base Case

Million Metric Tons



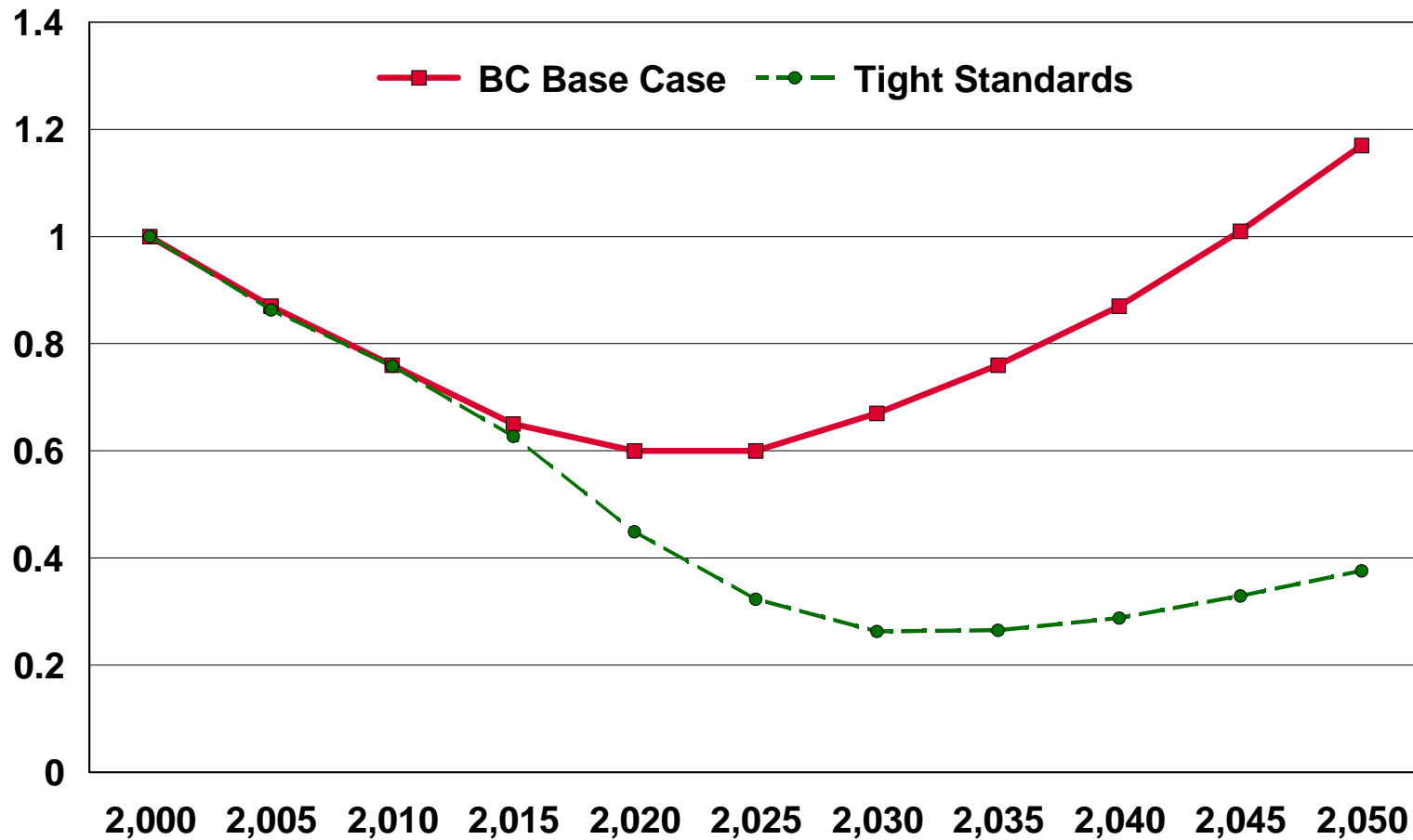


# Targets of Opportunity

- China 2015 Euro 6 & Euro VI
- India 2015 Euro 6 & Euro VI
- Brazil 2015 Euro 6 & Euro VI
- Africa 2015 Euro 4 & Euro IV, MC Euro 3
- Middle East 2015 Euro 4 & Euro IV, MC Euro 3
- Latin America 2015 MC Euro 3

# Global Trends in On Road Vehicle Black Carbon Emissions

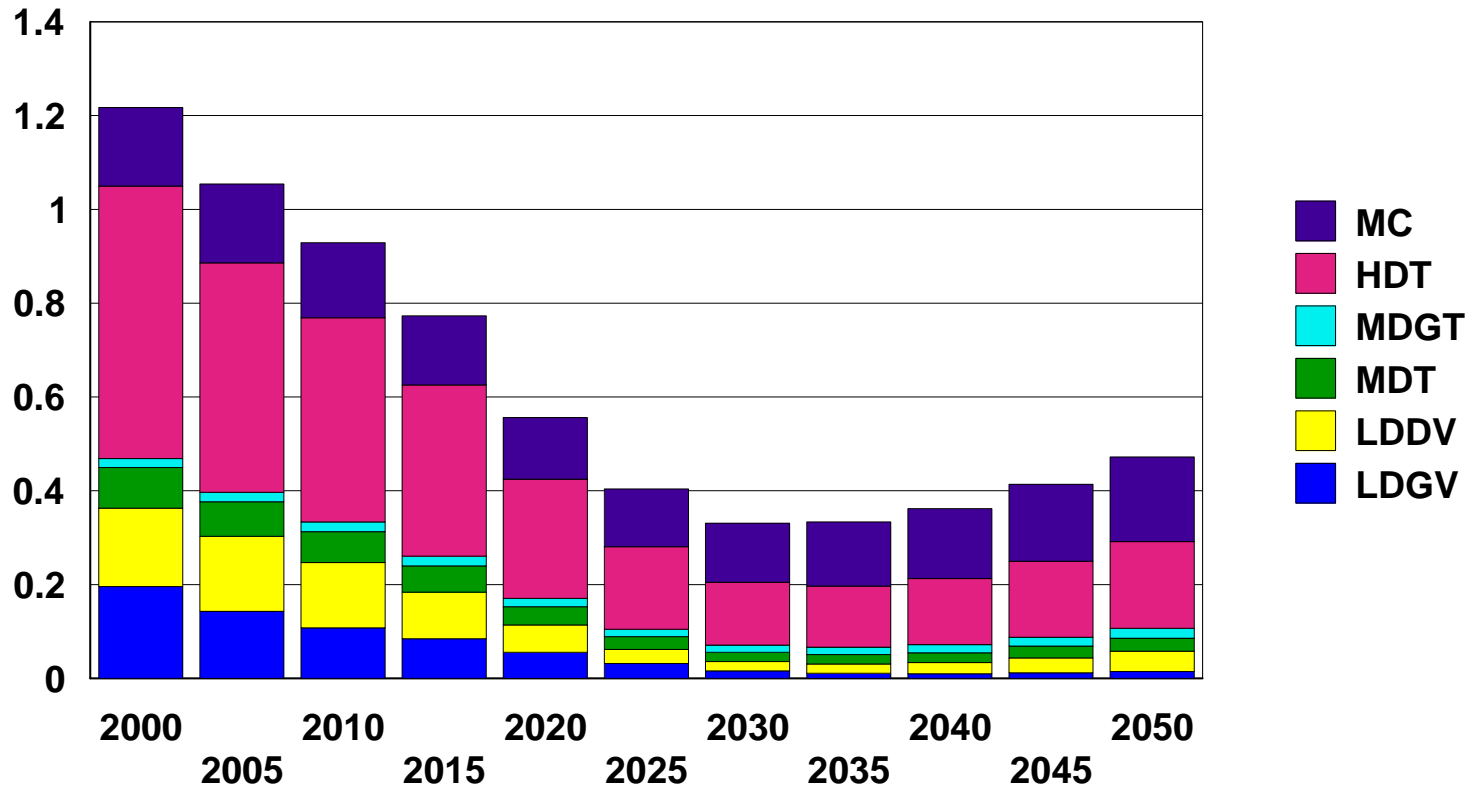
Normalized to 2000



# Black Carbon Emissions By Road Vehicle Type

Tight Standards Case

Million Metric Tons

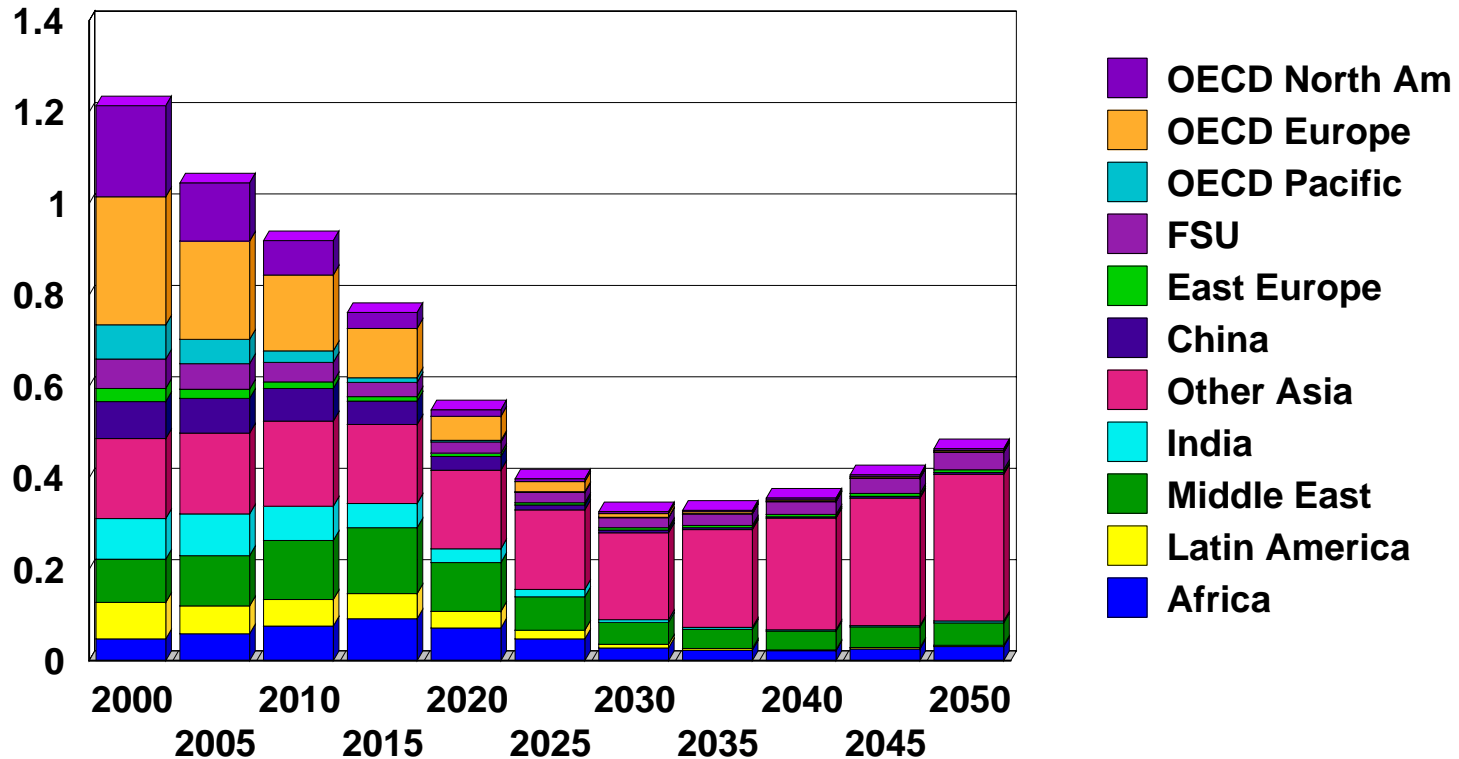


# Road Vehicle Emissions By Country

## Black Carbon

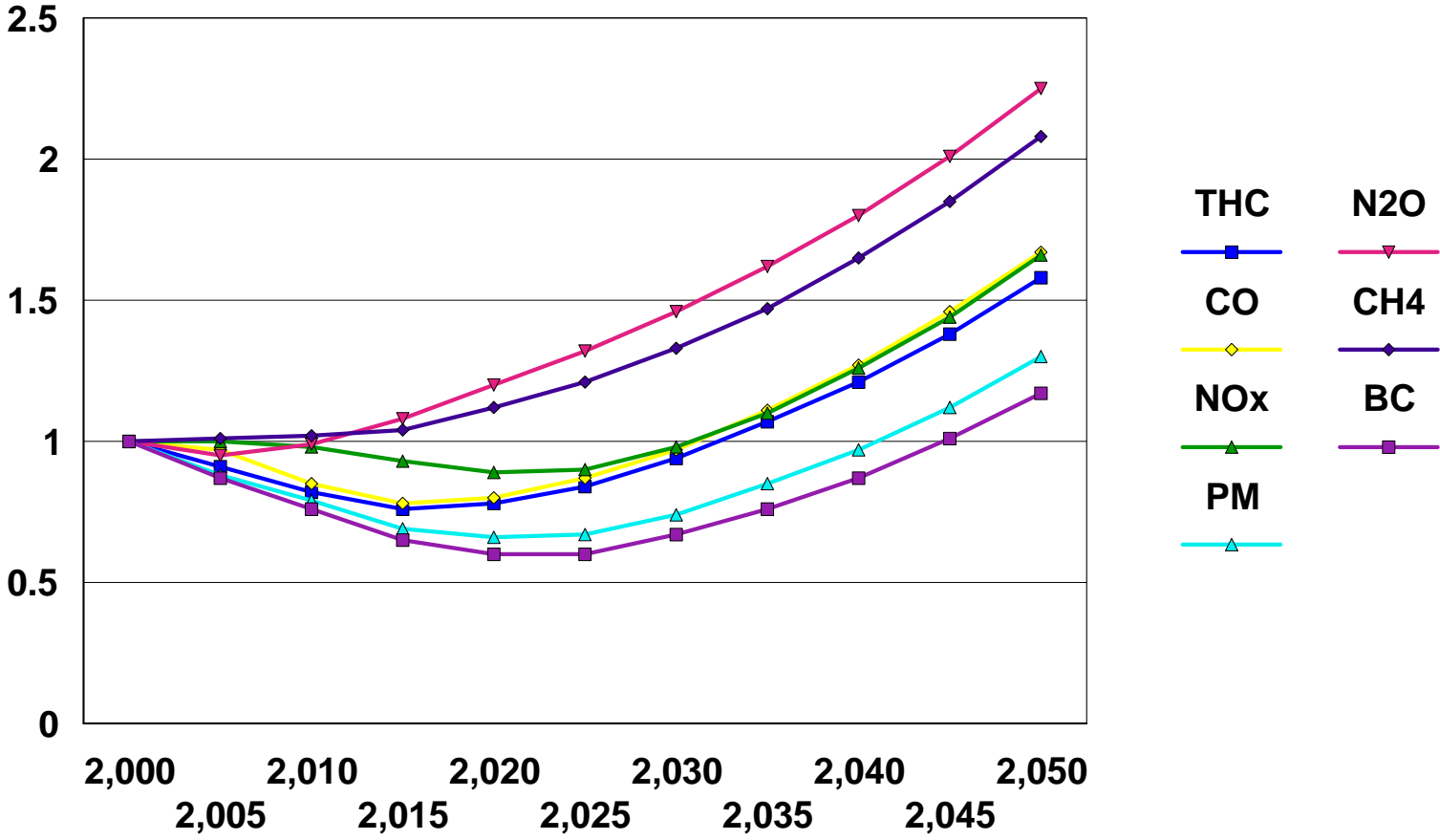
### Tight Standards Case

Million Metric Tons



# Global Trends in On Road Vehicle Emissions

Normalized to 2000





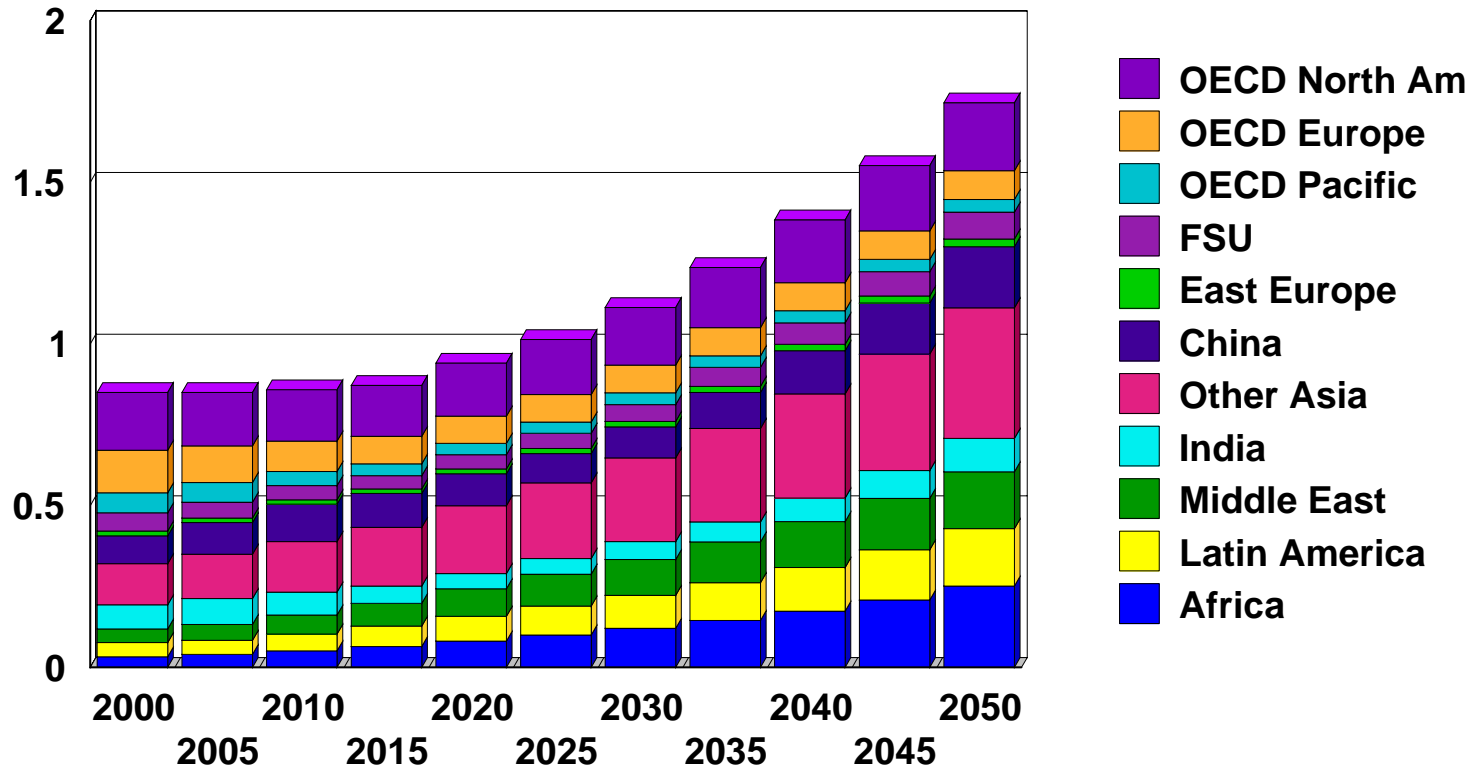


# Road Vehicle Emissions By Country

## Methane

Base Case

Million Metric Tons





# Road Vehicle Emissions By Country

## Total Hydrocarbons

Base Case

Million Metric Tons

