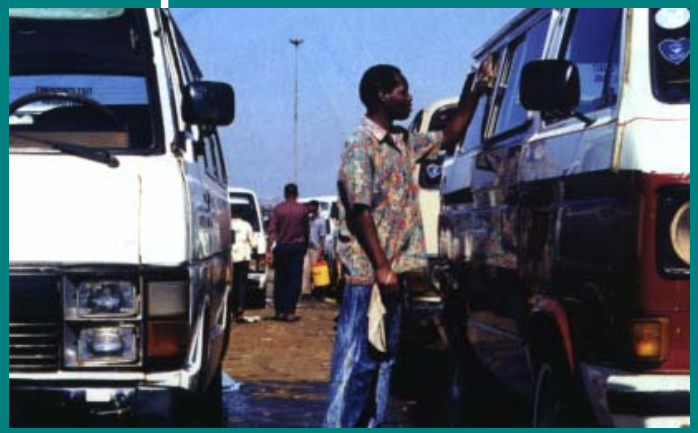
South Africa's Low Carbon Society

Energy Snapshot Tool - Residential and Transport Sectors



AIM Training Workshop,
Tsukuba October 2007

Outline of Presentation

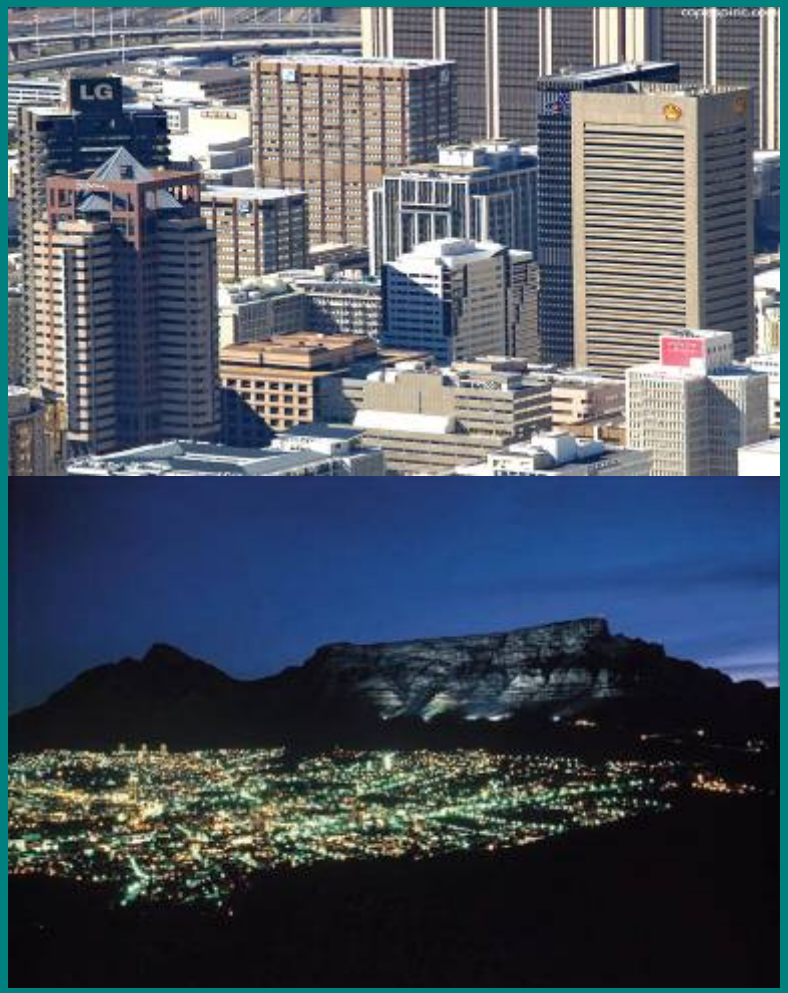
- Background
- Narrative of scenarios for South Africa
- Residential Sector
- Transportation Sector
- Presentation of Results
- Discussion and Questions

Background

- South Africa is a developing country, population approx 45 million with 40% unemployment.
- 60% urban, and 70% reliance on coal for energy. 70% homes are electrified and building standards are inefficient. One of the highest emissions per capita (7.9 tonnes)
- Cars and min-bus taxis are the desirable mode of transport in cities. Transport infrastructure is geared for motor transport. Migrant labour common.
- Strong need for sustainable development, particularly in household energy use and transport sector.
- How can the country's governance and technological capability best be used to foster sustainable development and a low carbon society?

NARRATIVE - Two Scenarios

Deregulated High Growth (DHG)



Regulated Moderate Growth (DMG)

NARRATIVE - Lifestyle & Mindset

DHG

- Capital-driven, individualist mindset
- Career oriented, high consumption lifestyles
- Malls and city/suburban lifestyle
- Small families, high-tech city-living, executive-living
- Migrant labourers travel to cities

RMG

- Socially-driven, collectivist mindset
- Subsistence-oriented, low-consumption lifestyles
- Outdoor lifestyle, with strong emphasis on community, tradition and culture
- Larger families and diversity of livelihoods and activities
- Reduced need to migrate for employment

NARRATIVE - Economy & Industry

DHG

- Economic status: Very high growth (7%), competitive markets and urban renewal.
- Industrial Structure: services and industry focus - sustainable industrialisation initiative to add value to primary resources. Focus on IT, telecoms, nanotec & services sector.
- Trade: Increase in exports and imports
- Education: Focus on specialist skills and business development
- Energy Policy: Nuclear, coal and some renewables.

RMG

- Economic status: Moderate growth (4%). Rural upliftment and agricultural incentives.
- Industrial Structure: agriculture and ecotourism focus. Adding value to primary resources. Small farmers
- Trade: Increased self-sufficiency, increase exports, co-operation with neighbouring countries
- Education: Diversified and publicly-funded, students encouraged to study arts and humanities
- Energy Policy: Strong focus on renewables and energy efficiency

NARRATIVE - Population & Households

DHG

- Total population: Slower increase
- Population structure: Ageing population
- Average family size: Smaller
- Number of households: Many more small households

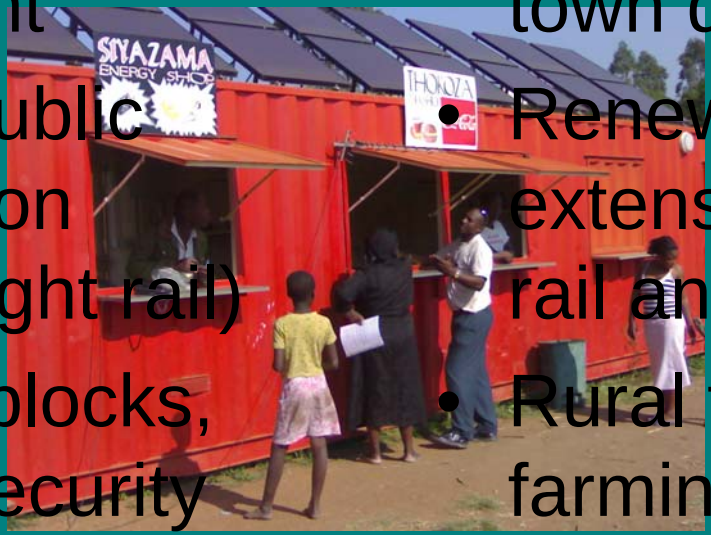
RMG

- Total population: Moderate increase
- Population structure: Younger population
- Average family size: Larger or the same as present
- Number of households: Fewer large households

NARRATIVE - Land use & Infrastructure

DHG

- Large-scale urban renewal and development
- Improved public transportation networks (light rail)
- Apartment blocks, suburban security estates
- Sustainable cities



RMG

- Large-scale rural upliftment and rural town development
- Renewal and extension of country rail and bus networks
- Rural towns serving farming communities
- R&D in agricultural sector

RESIDENTIAL SECTOR

Interventions common to both scenarios

1. Improved building design for energy efficiency (passive solar, insulation, solar water heaters)
2. Energy efficiency awareness campaigns
3. All new dwellings have solar water heaters
4. Increased use of LPG for cooking and heating
5. More efficient cooking appliances (particularly for biomass)

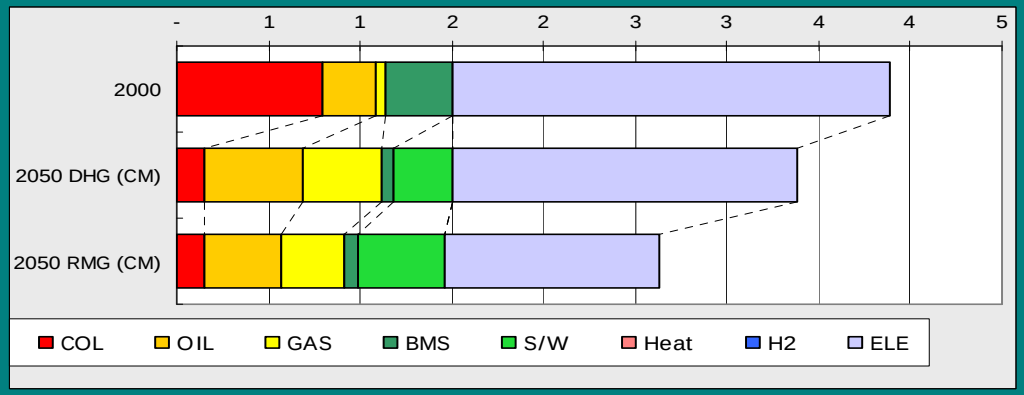
DHG Specific

1. Limited Solar Water Capability
2. Increased use of electrical appliances
3. Reduced Biomass

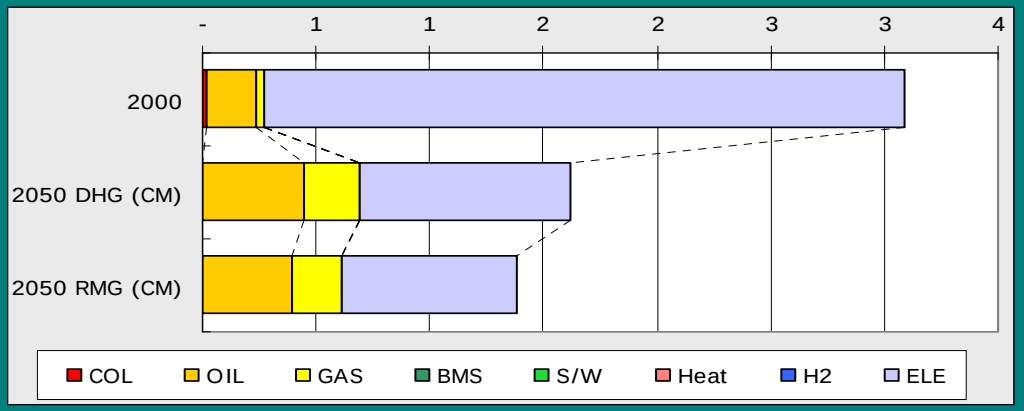
RMG Specific

1. Solar Home Systems and solar water heaters.
2. Fewer electrical appliances
3. Solar cookers and improved biomass appliances

RESIDENTIAL SECTOR



Energy consumption in residential sector



CO2 emission in residential sector with allocated emission from heat

TRANSPORTATION SECTOR - Passenger

Base Year	**2000**	
Population	**45.081**	**million**
Trip Generation Coefficient	**1.695**	**trip/capita/day**
Generated trip (Year)	**27890.4877**	**million trip**
Urban Population rate		

		Unit	Walk	Bicycle	Motorbike	Car	Bus	Railway
Total	**Modal Share**	**%**	**19%**	**1%**	**1%**	**45%**	**30%**	**4%**
	Trip Distance	**km/trip**	**1.00**	**5.00**	**14.33**	**15.73**	**20.00**	**26.63**
	Passenger trip	**passenger-km**	**5,373**	**1,269**	**3,303**	**197,468**	**167,343**	**29,708**

TRANSPORTATION SECTOR - Passenger

Targeted Year Settings	DHG	
Base Year	2050	
Population	45.081	million
Trip Generation Coefficient	1.8	trip/capita
Generated trip	29618.217	million trip
Urban Population rate		

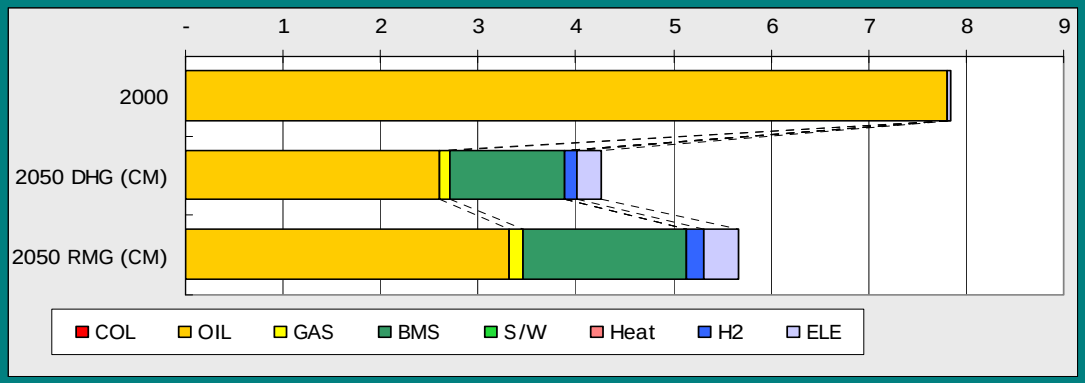
		Unit	Walk	Bicycle	Motorbike	Car	Bus	Railway
Total	Modal Share	%	5%	5%	10%	30%	35%	15%
	Trip Distance	km/trip	1.00	5.00	14.33	15.73	20.00	15.00
	Passenger trip	passenger-km	1481	7405	42457	139801	207328	66641

TRANSPORTATION SECTOR - Passenger

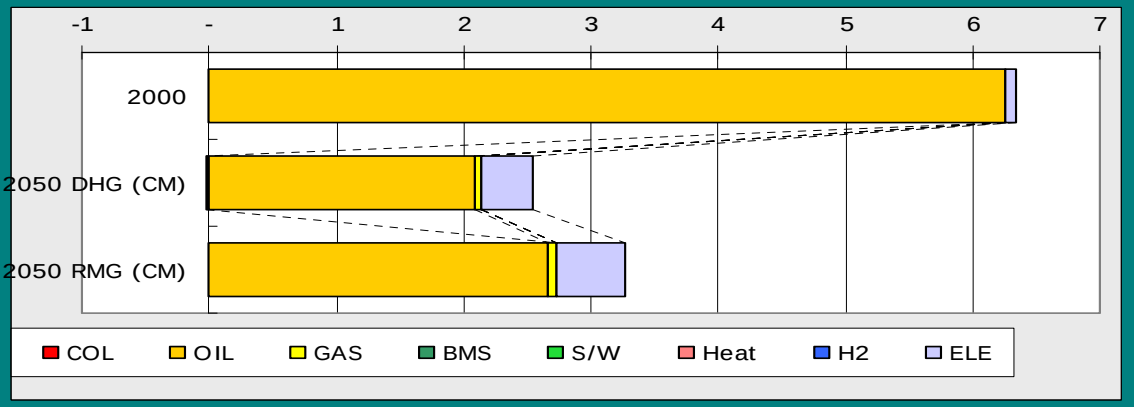
Targeted Year Settings	RMG	
Base Year	2050	
Population	51.332	million
Trip Generation Coefficient	1.8	trip/capita
Generated trip	33725.124	million trip
Urban Population rate		

		Unit	Walk	Bicycle	Motorbike	Car	Bus	Railway
Total	Modal Share	%	5%	10%	15%	30%	30%	10%
	Trip Distance	km/trip	1.00	5.00	14.33	20.00	25.00	30.00
	Passenger trip	passenger-km	1686	16863	72516	202351	252938	101175

TRANSPORTATION SECTOR - Passenger

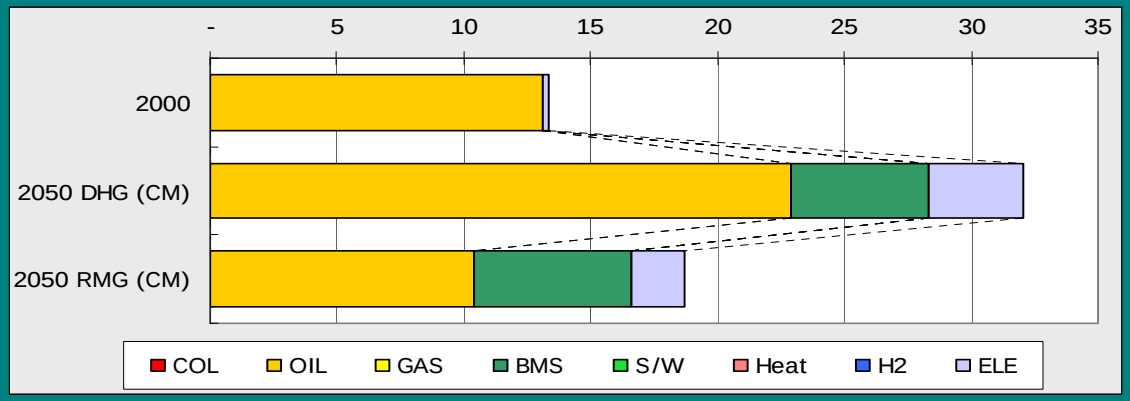


Energy consumption in passenger transportation sector

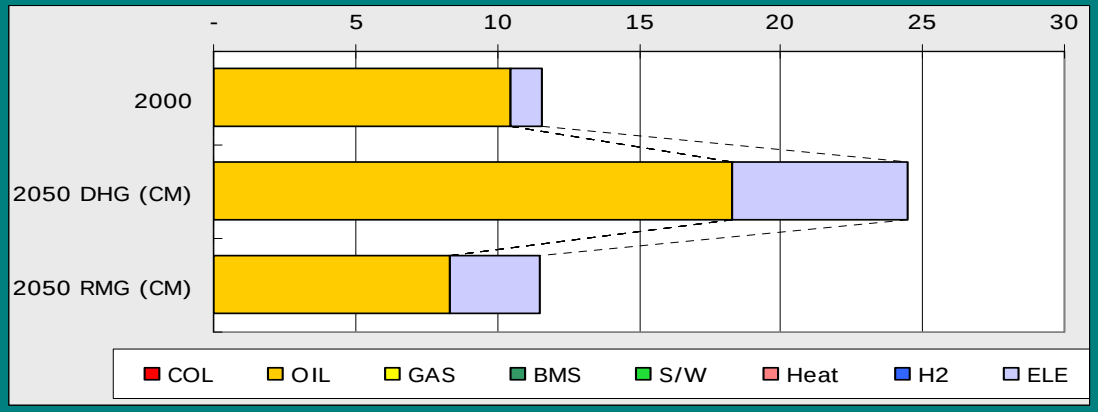


CO2 emission in passenger transportation sector with allocated emission from heat

TRANSPORTATION SECTOR - Freight



Energy consumption in passenger transportation sector



CO2 emission in freight transportation sector with allocated emission from heat