

Africa

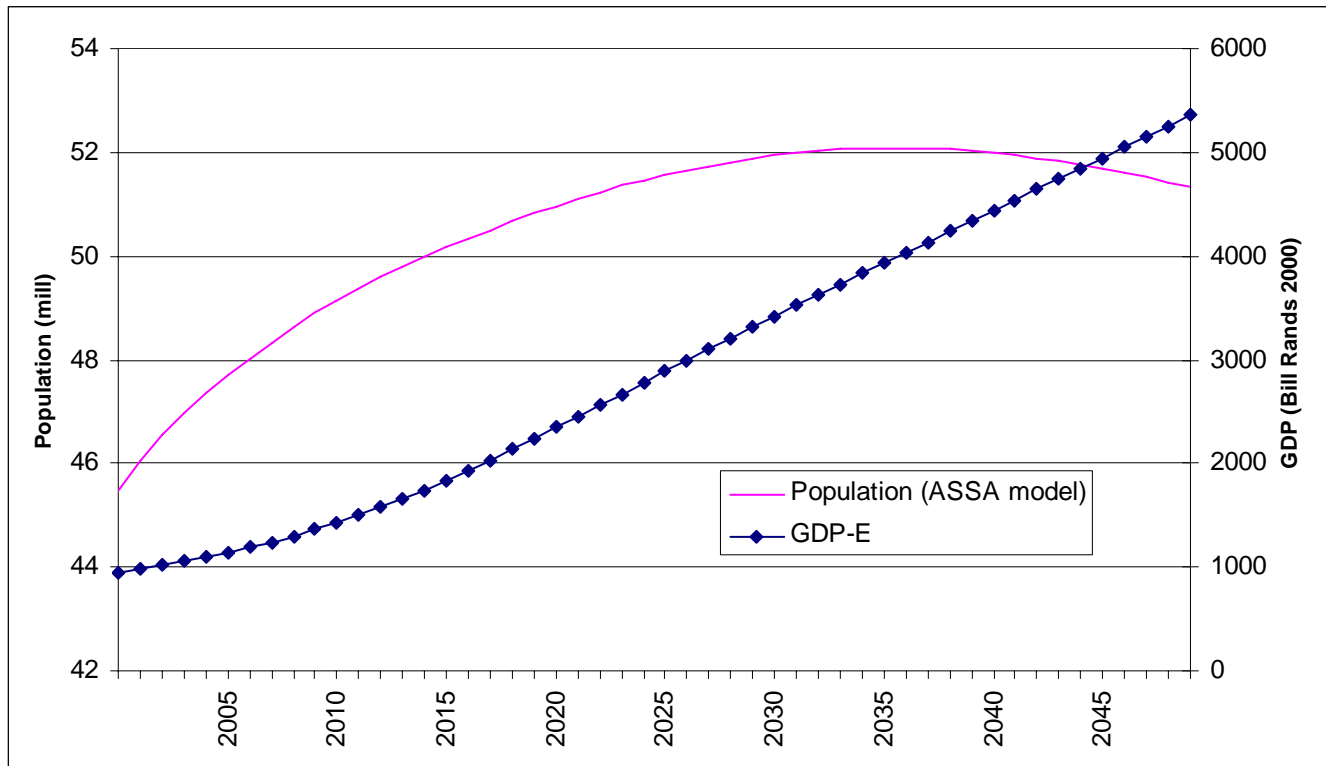


802129 (547147) 3-93

South Africa

Alison Hughes
Energy Research Centre
University of Cape Town
www.erc.uct.ac.za

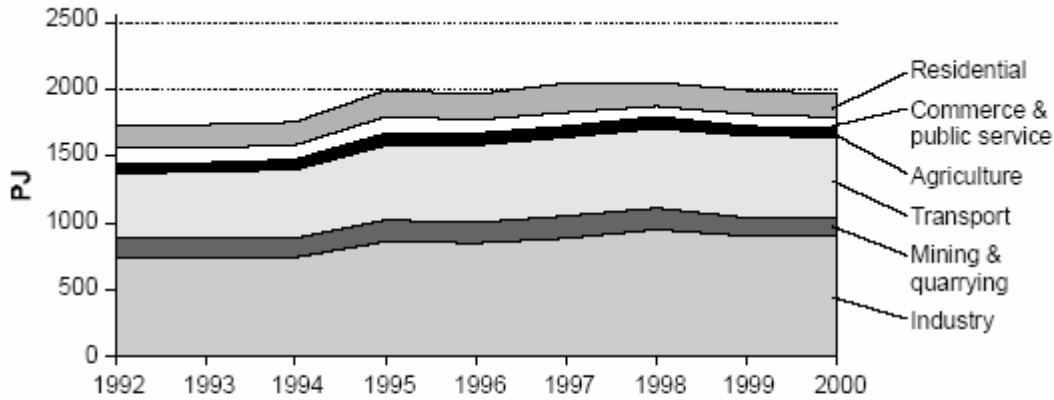
Major drivers : population and GDP



ASSA model: www.assa.org.za

GDP growth: 4%+ 2005 – 2010
 5%-5.2% 2011 – 2020
 5% -2.5% 2021 to end of scenario

Final energy demand by sector



Note: does not include consumption of renewables and waste. due to uncertainties in biomass data

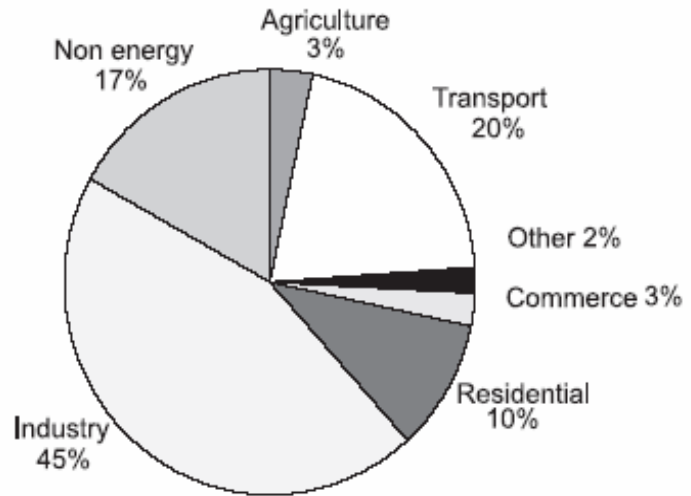


Figure 3.2: Share of final energy consumption in South Africa, 2000

Source: Based on SANEA (2003)

Electricity generation

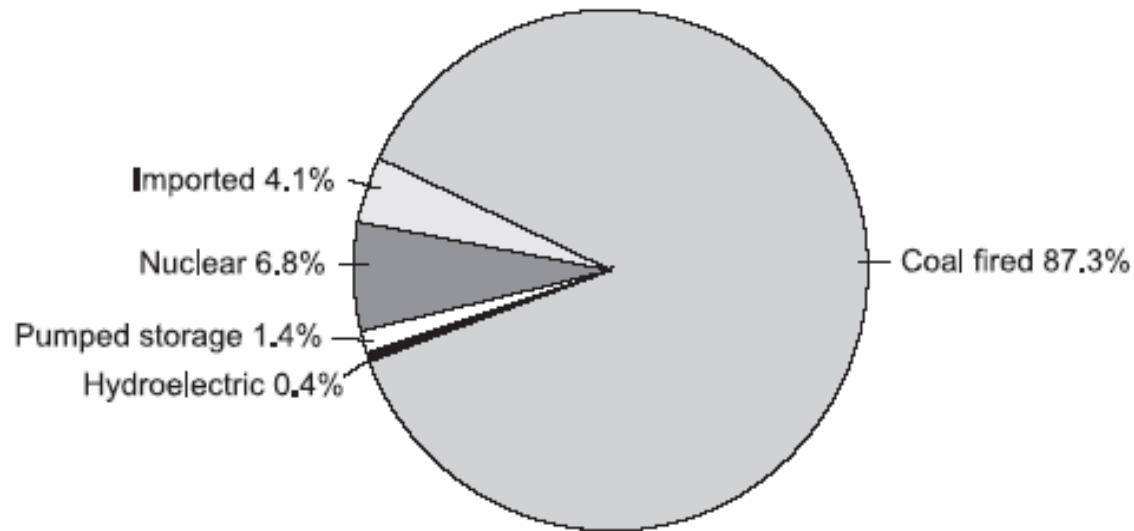
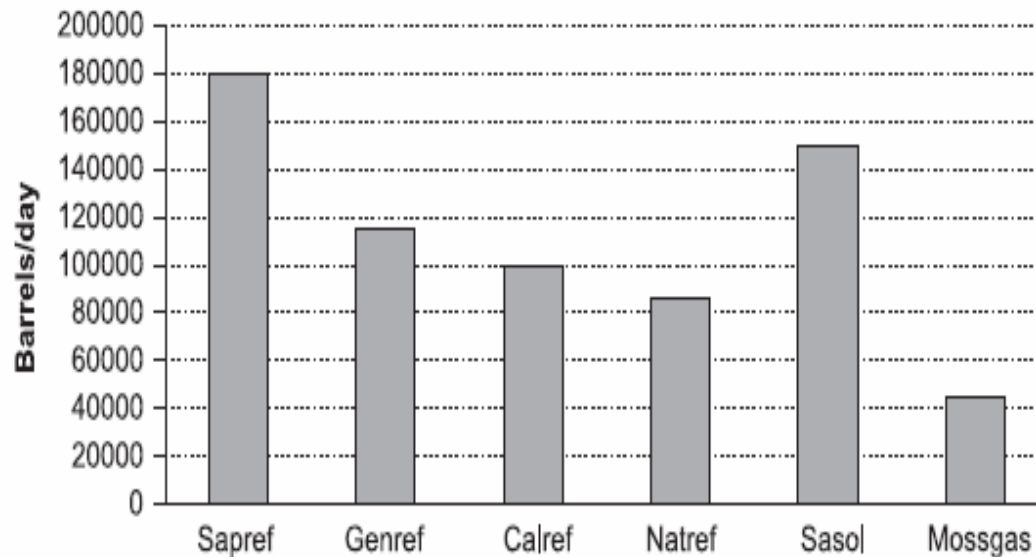


Figure 4.9: Eskom's generation mix by energy source

Eskom produces 93.5% of electricity

Liquid fuels



Note: The units of production in this figure are given as barrels of crude oil equivalent per day. For the synfuel plants, fuel production is converted into production that would have come from a conventional refinery using crude oil.

Figure 4.11: Capacities of South African liquid fuel production plants

Source: SAPIA (2003)

Share of final energy demand by fuel

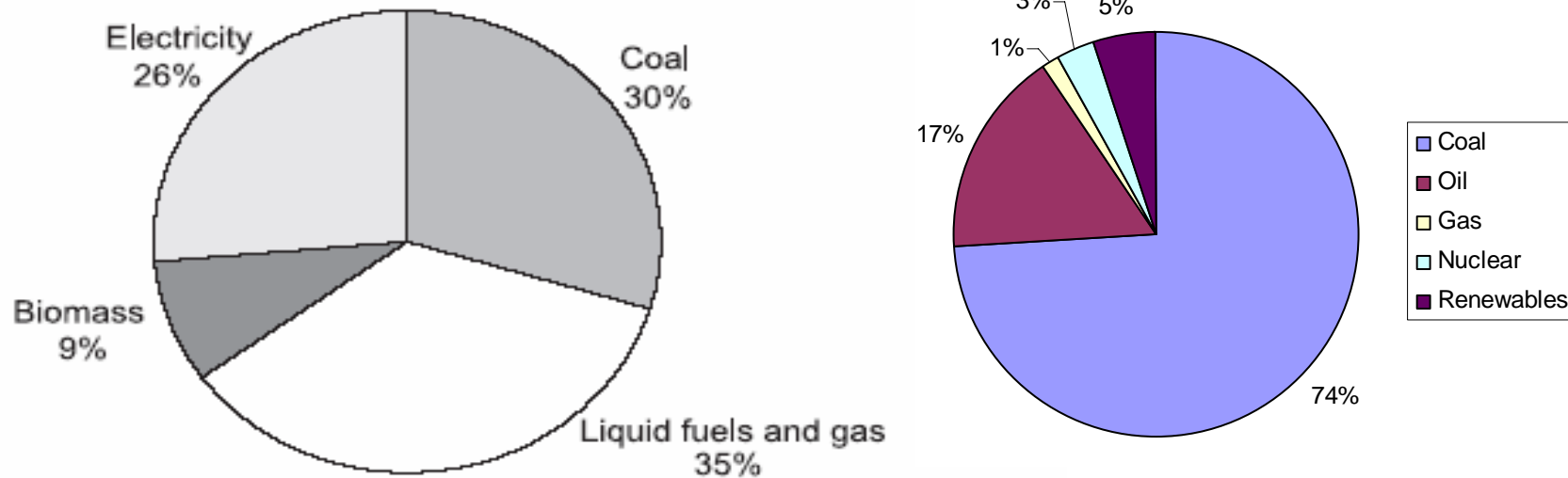
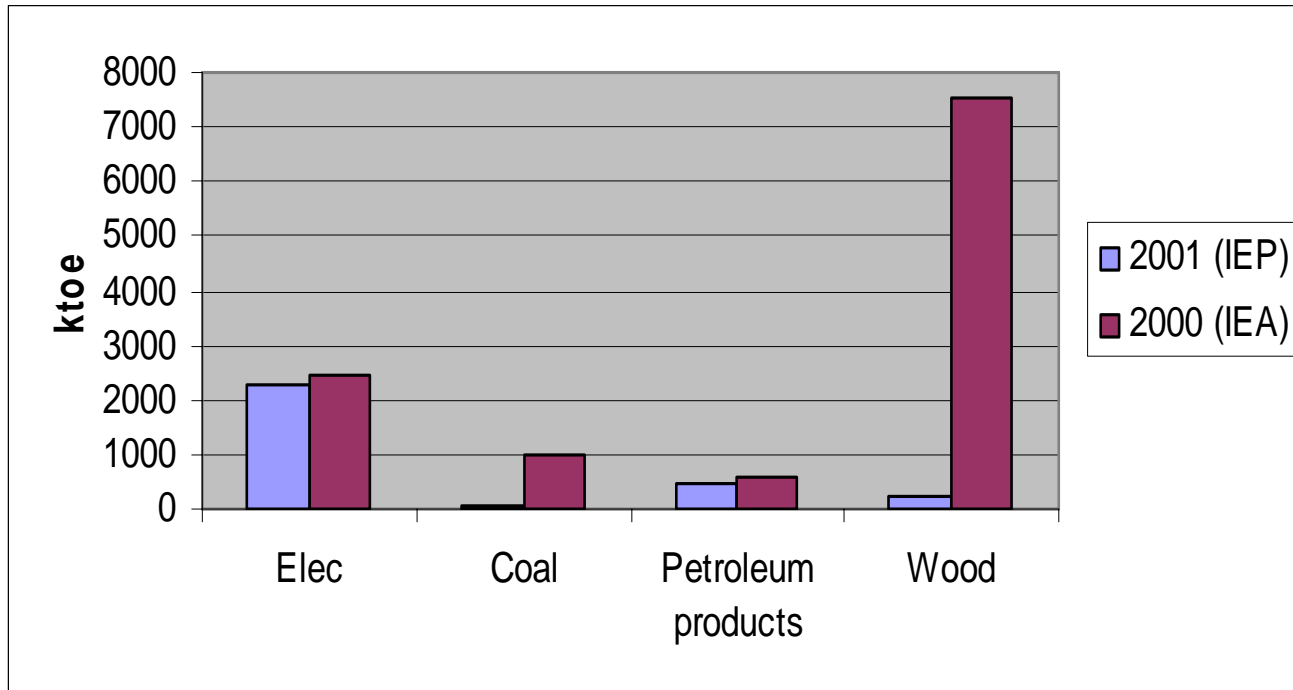


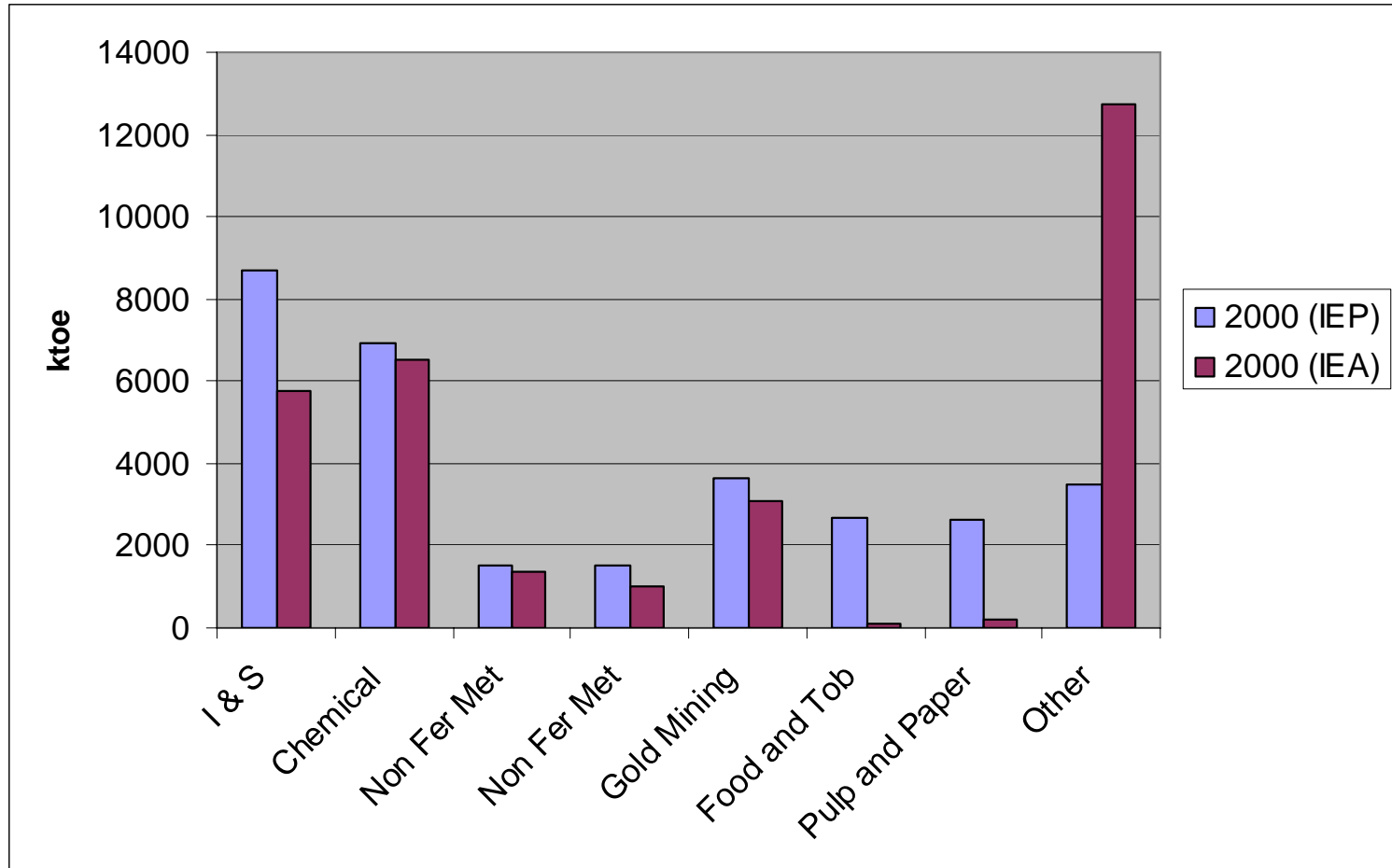
Figure 3.4: Share of final energy demand by energy carrier
Source: Based on data from DME (2002a)

2000

Residential sector



Industrial sector



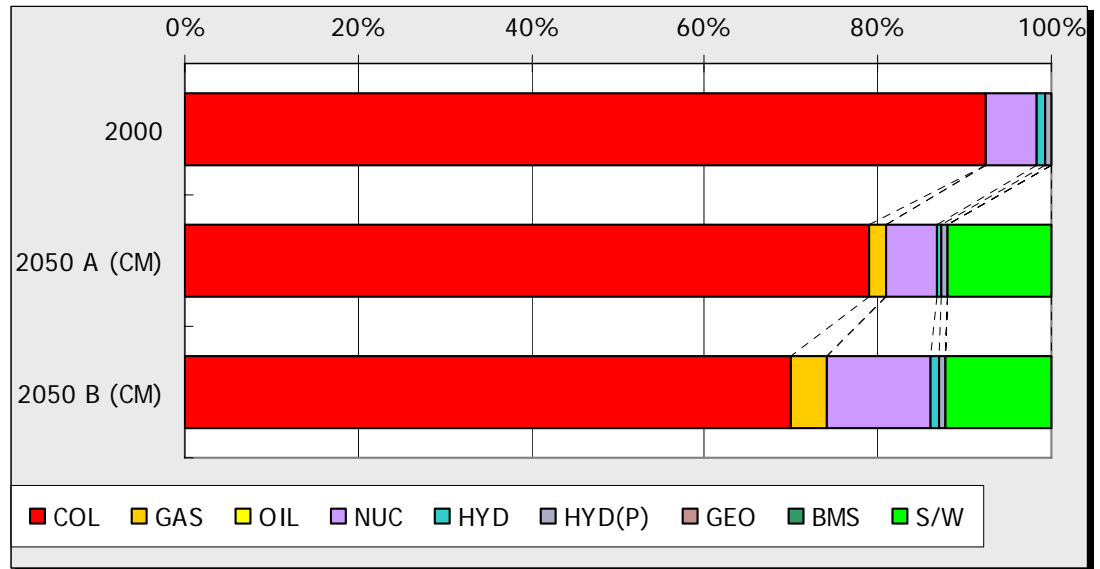
Scenarios

- Scenario A:
 - Business as usual BUT
 - meet all government targets for improvements in energy efficiency and
 - renewable contribution to electricity supply
- Scenario B:
 - More aggressive implementation of energy efficiency and
 - higher share of Nuclear in electricity generation,
 - very aggressive policy to move towards public transport

Generation

Share of elec gen

| | 2000 | A | B |
|--------|--------|-----|-----|
| COL | 92.51% | 91% | 70% |
| GAS | 0.00% | 2% | 4% |
| OIL | 0.00% | 0% | 0% |
| NUC | 5.73% | 6% | 12% |
| HYD | 1.01% | 1% | 1% |
| HYD(P) | 0.75% | 1% | 1% |
| GEO | 0.00% | 0% | 0% |
| BMS | 0.00% | 0% | 0% |
| S/W | 0.00% | 12% | 12% |



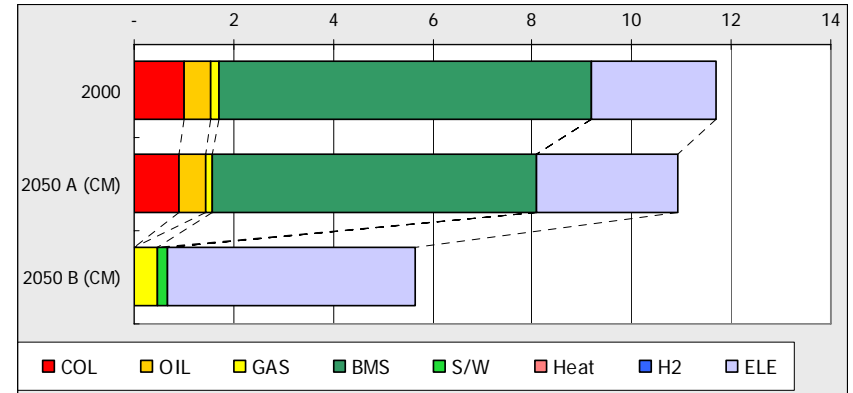
PBMR

Renewable

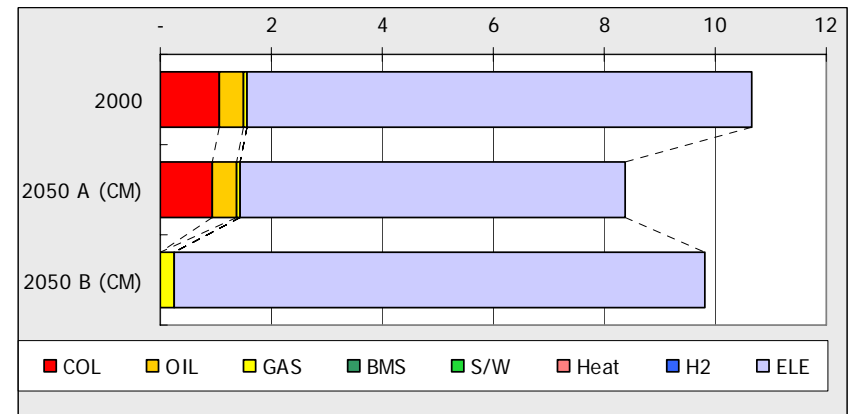
Residential

Assumptions

| | 2000 | A | B |
|-----------------------------|------|------|----------------------------------|
| Rural HH | 40% | 30% | 30% |
| Mid to High income HH | 50% | 66% | 66% |
| Electrified households | 70% | 99% | 99% |
| Number of households (mill) | 11.3 | 14.1 | 14.1 |
| Efficiency improvement | | 20% | 30% |
| Fuel use mix | | | No paraffin, no biomass, no coal |



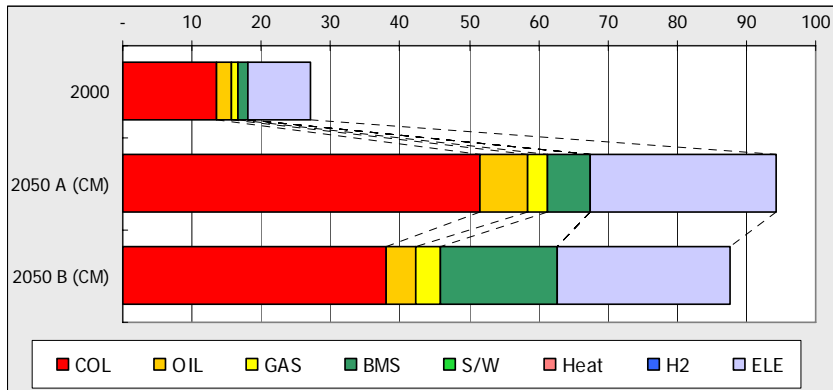
Demand



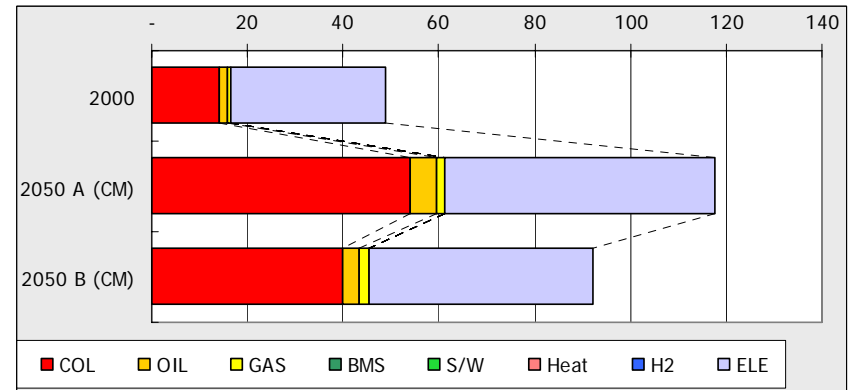
CO2

Industrial

| | | 2000 | A | B |
|-------------------------|-----------|------|------------------|---|
| Growth in output (Mtoe) | Mining | 1 | 2 | 2 |
| | NFM | 1 | 3.3 | 3.3 |
| | ALL other | 1 | 4 to 5 | 4 to 5 |
| Energy efficiency | | | 20% improvement | 30 % improvement |
| Fuel mix | | | Remains the same | Gas replaces 10% of electricity Double biomass use |



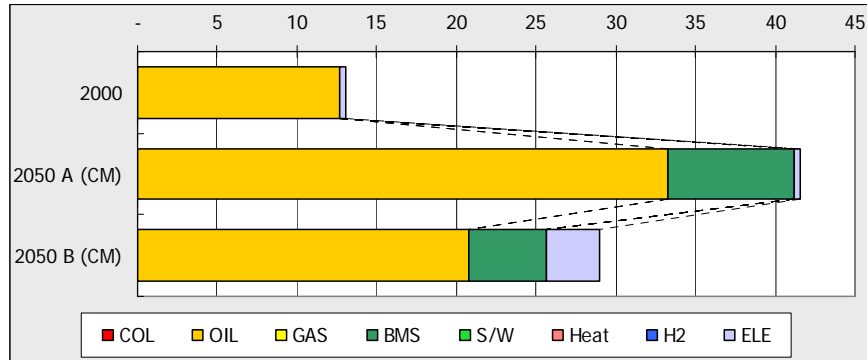
Demand



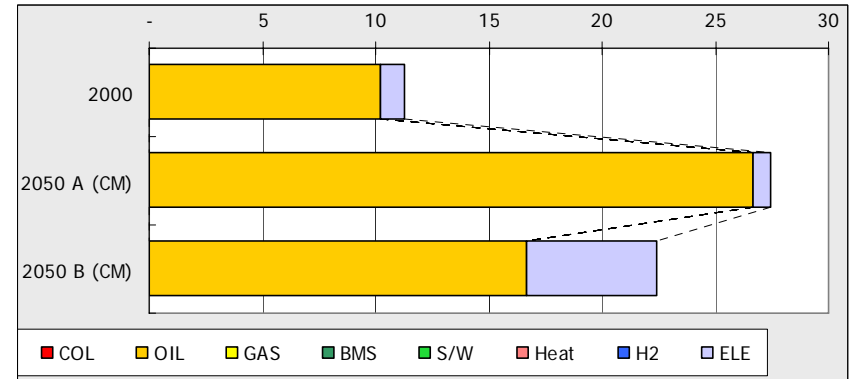
CO2

Transport

| | | 2000 | A | B |
|------------------------|---------------------|-------------------|-----------------------------------|---|
| Passenger | Public (bill p-km) | 150 | 424 | 882 |
| | Private (bill p-km) | 150 | 960 | 502 |
| Freight | Road (bill t-km) | 290 | 1,464 | 878 |
| | Rail (bill t-km) | 100 | 198 | 783(rail share makes up half of all t-km) |
| Fuel share | Biofuel | 0% | 20% | 20% |
| | Rail | 40% Oil, 60% elec | Same as 2000 | 100 % elec |
| Efficiency improvement | | | All cars/trucks 50% Trains 30% | All cars/trucks 50% Trains 30 % |

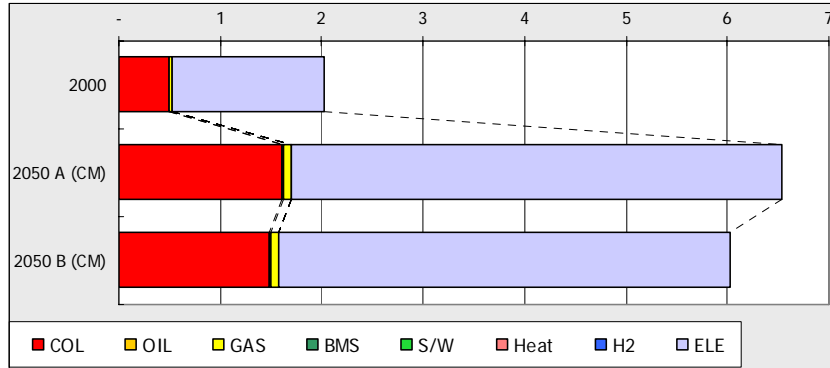


Demand

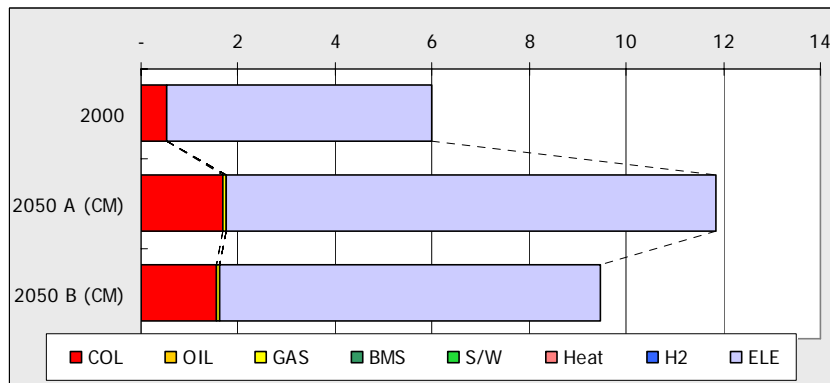


CO2

Commercial sector



Demand



CO2