



TIPS Development Dialogue

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Oil Shock in South Africa: Vulnerabilities, Impacts & Mitigation Strategies

Dr Jeremy Wakeford

School of Public Leadership, Stellenbosch University
Association for the Study of Peak Oil South Africa

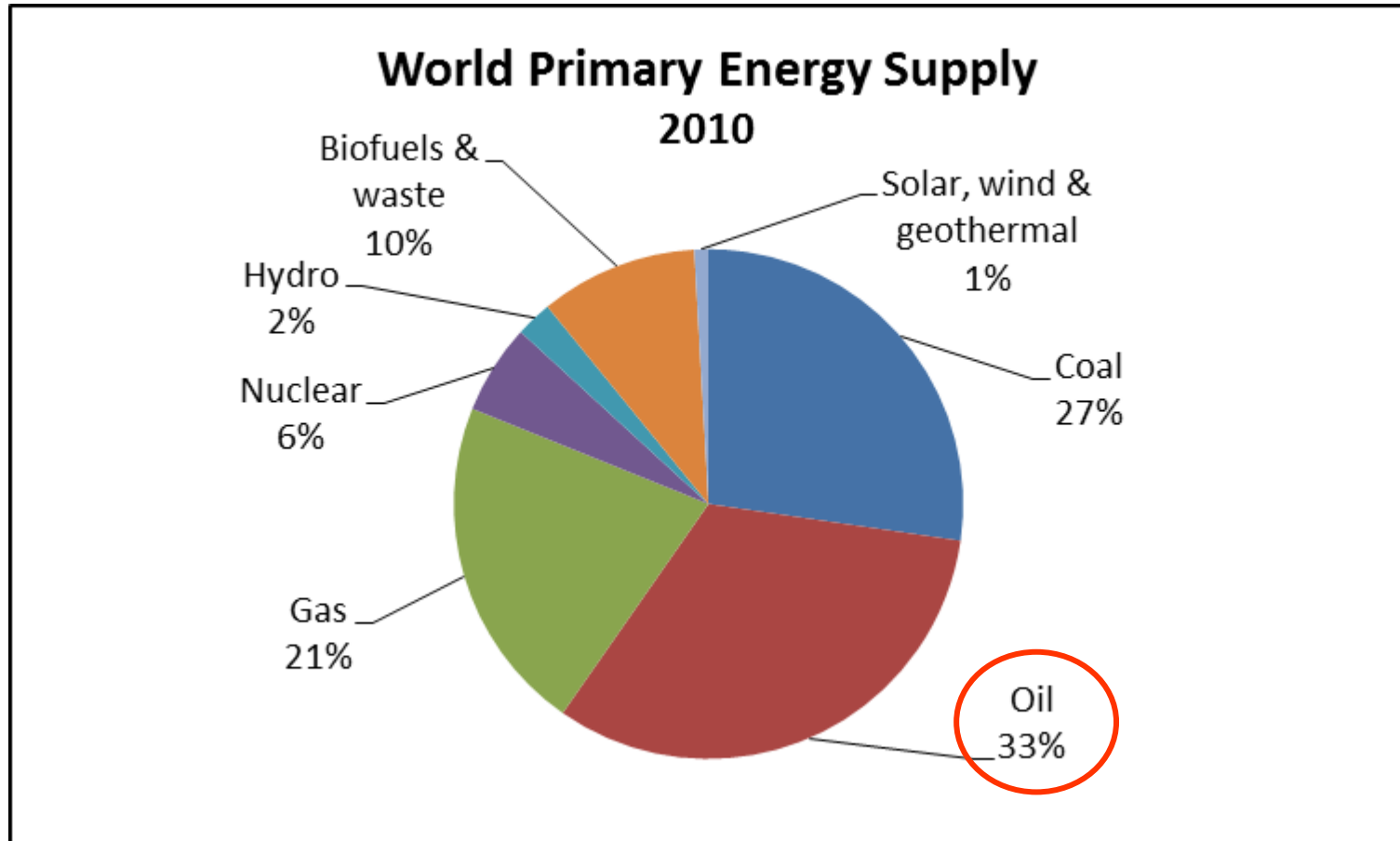
Outline

- Oil shocks & their drivers
- Vulnerabilities & impacts in SA
- Mitigation strategies
- Conclusions

Oil Shocks

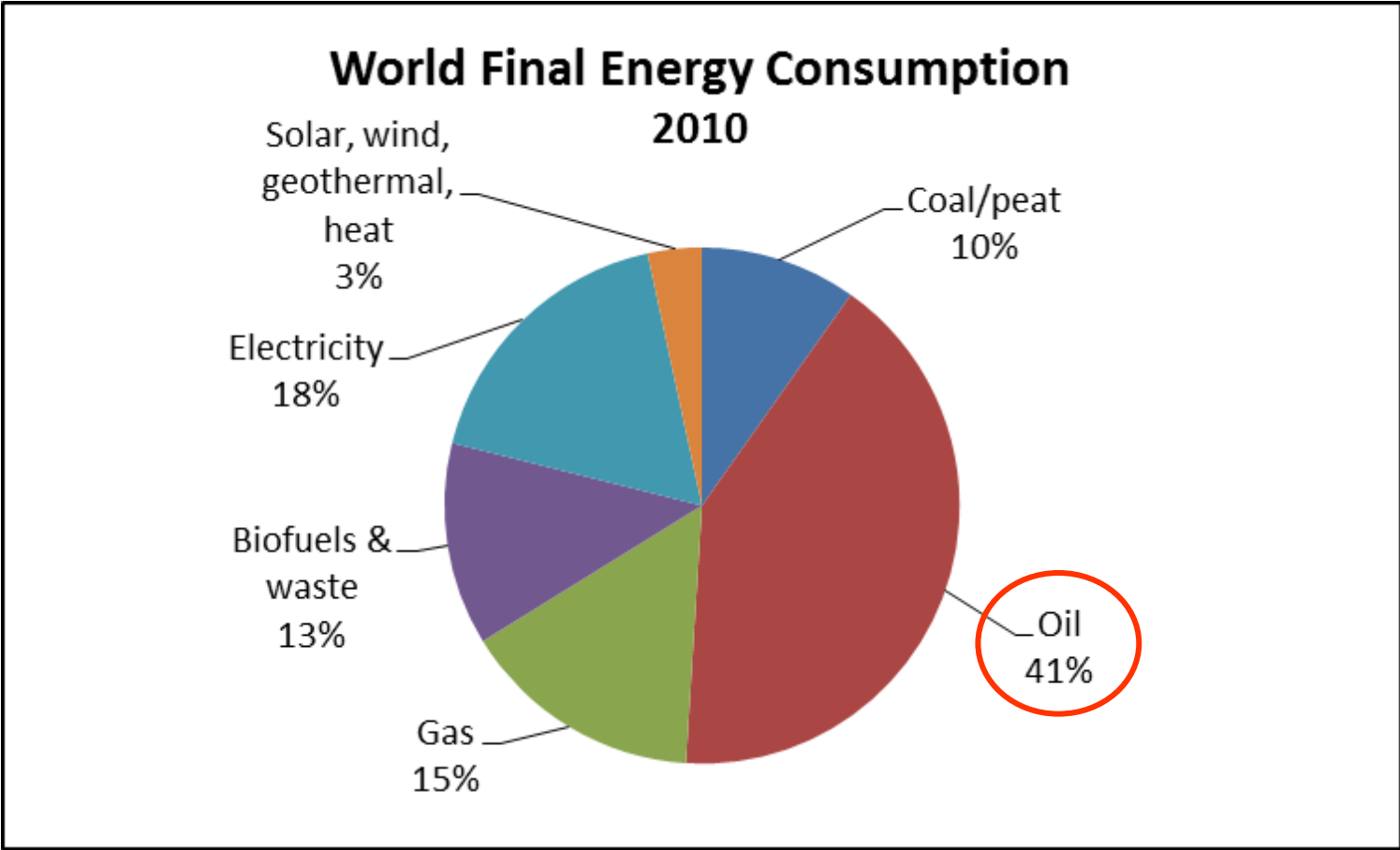


World Primary Energy Supply



Source: International Energy Agency

World Energy Consumption

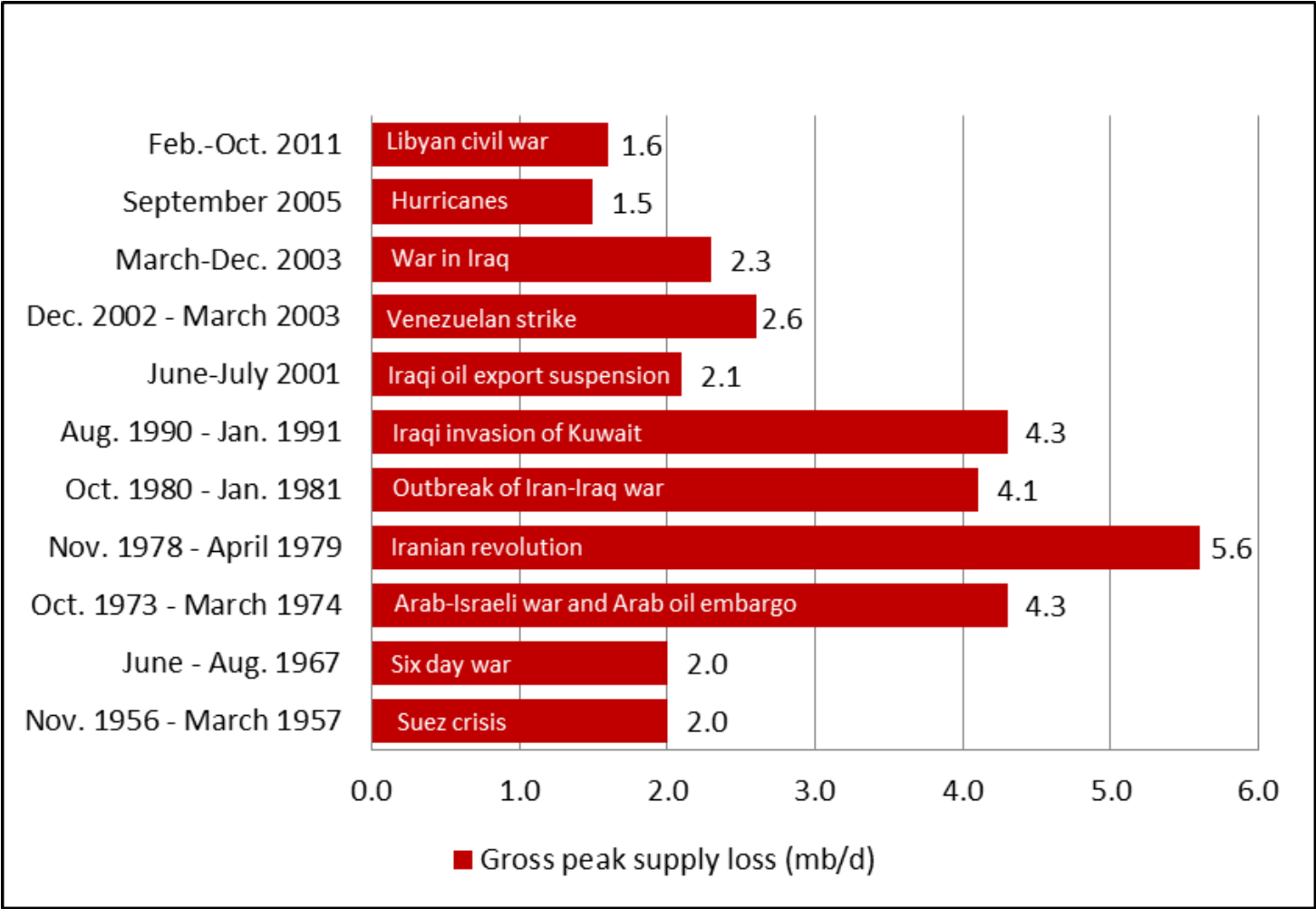


Source: International Energy Agency

Oil Shock Basics

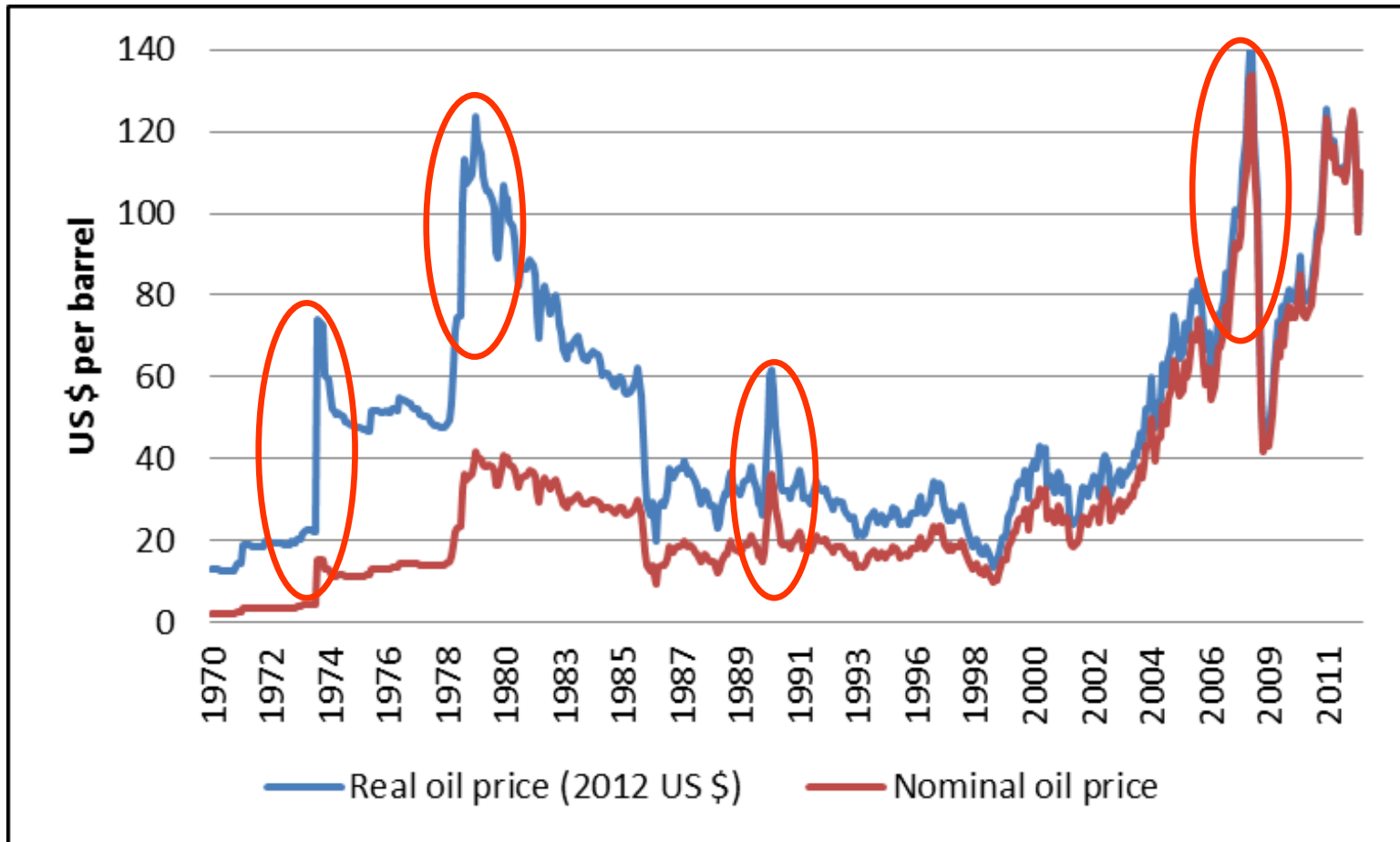
- Types of oil shocks:
 - price
 - quantity/supply
- Drivers:
 - geopolitical & civil conflicts
 - technical production problems
 - natural disasters, e.g. hurricanes
 - rapidly rising demand
 - speculation on oil futures markets

Historical Oil Supply Shocks



Source: Adapted from IEA

Historical Oil Price Shocks



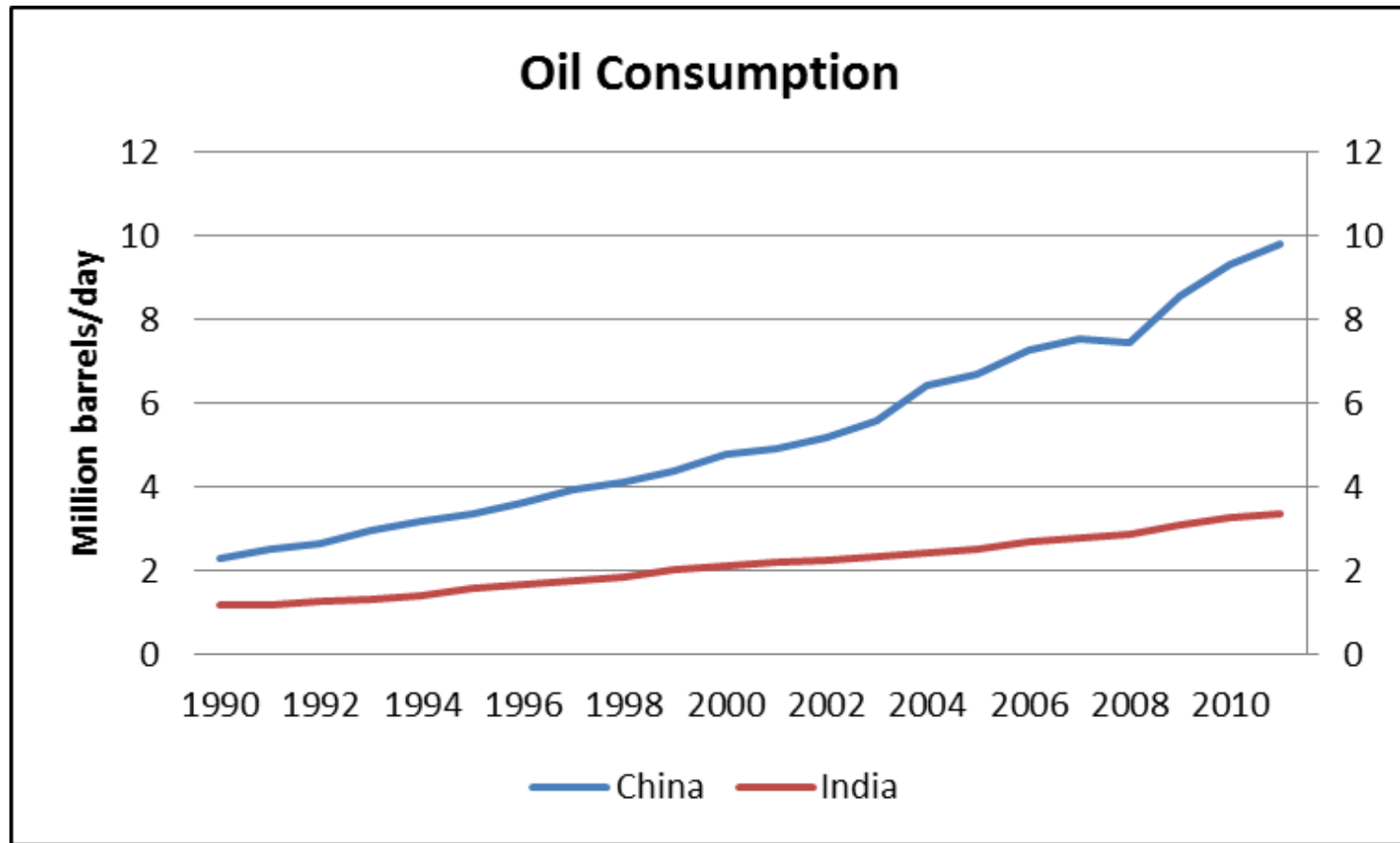
Source: IMF

MENA REGION

(MIDDLE EAST & NORTH AFRICA REGION)

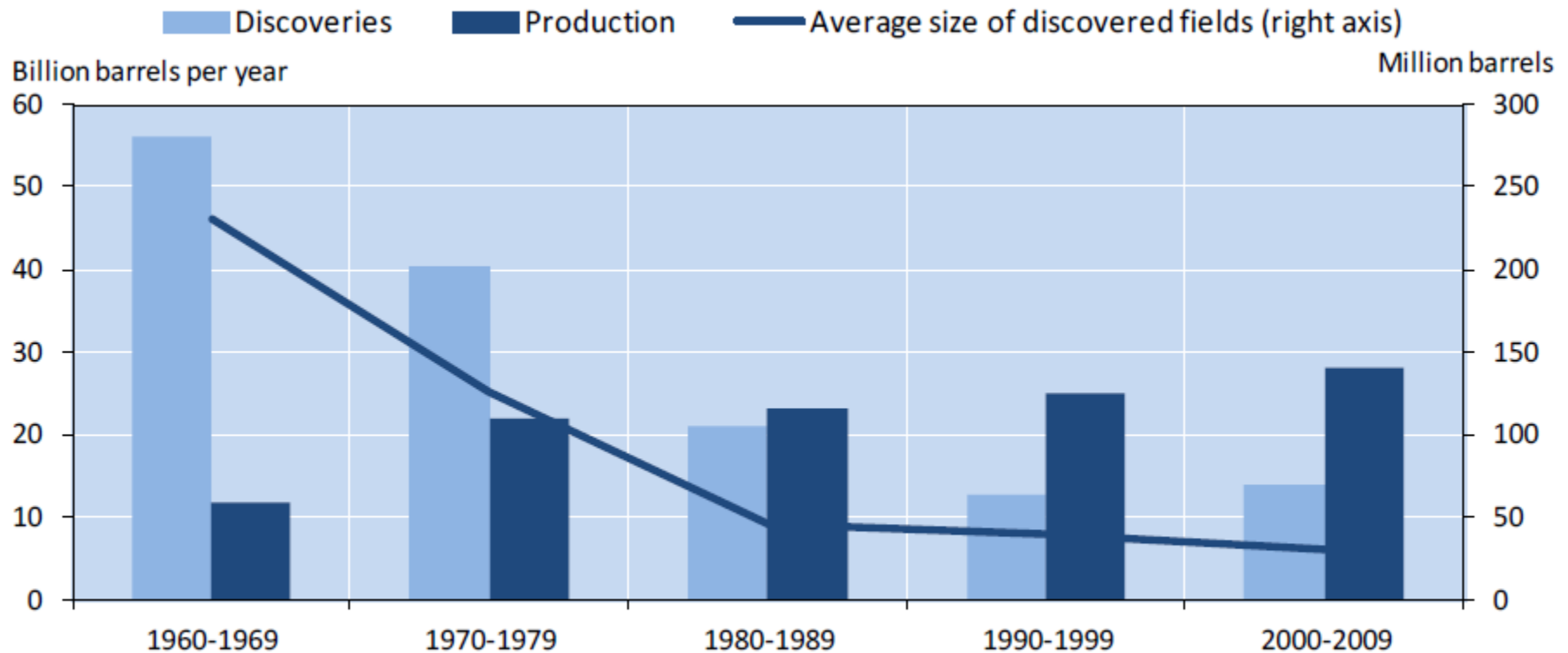


Surging Oil Demand in Asia



Source: U.S. Energy Information Administration

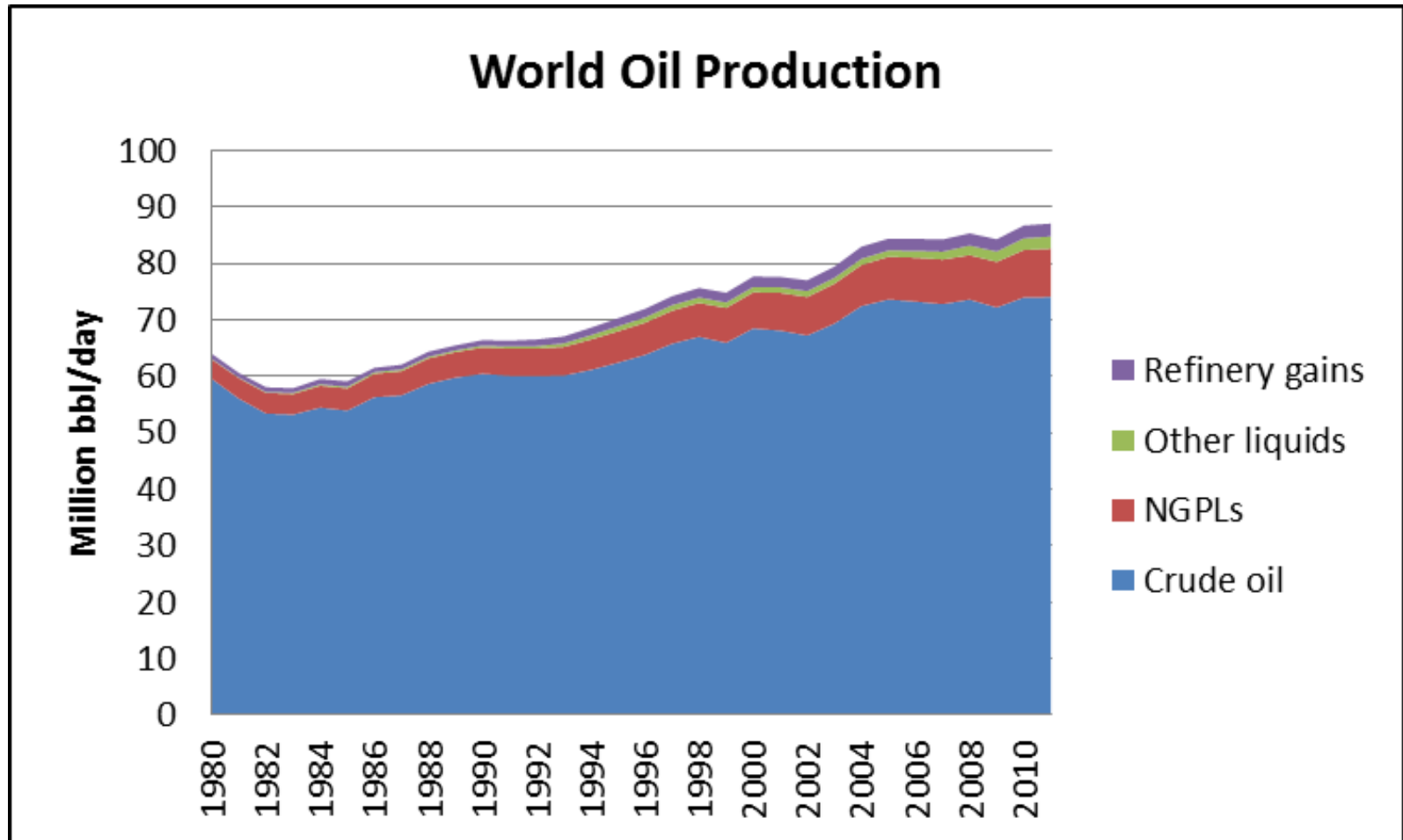
Falling Trend of Oil Discoveries



Source: IEA (2010), *World Energy Outlook 2010*, OECD/IEA, Paris.

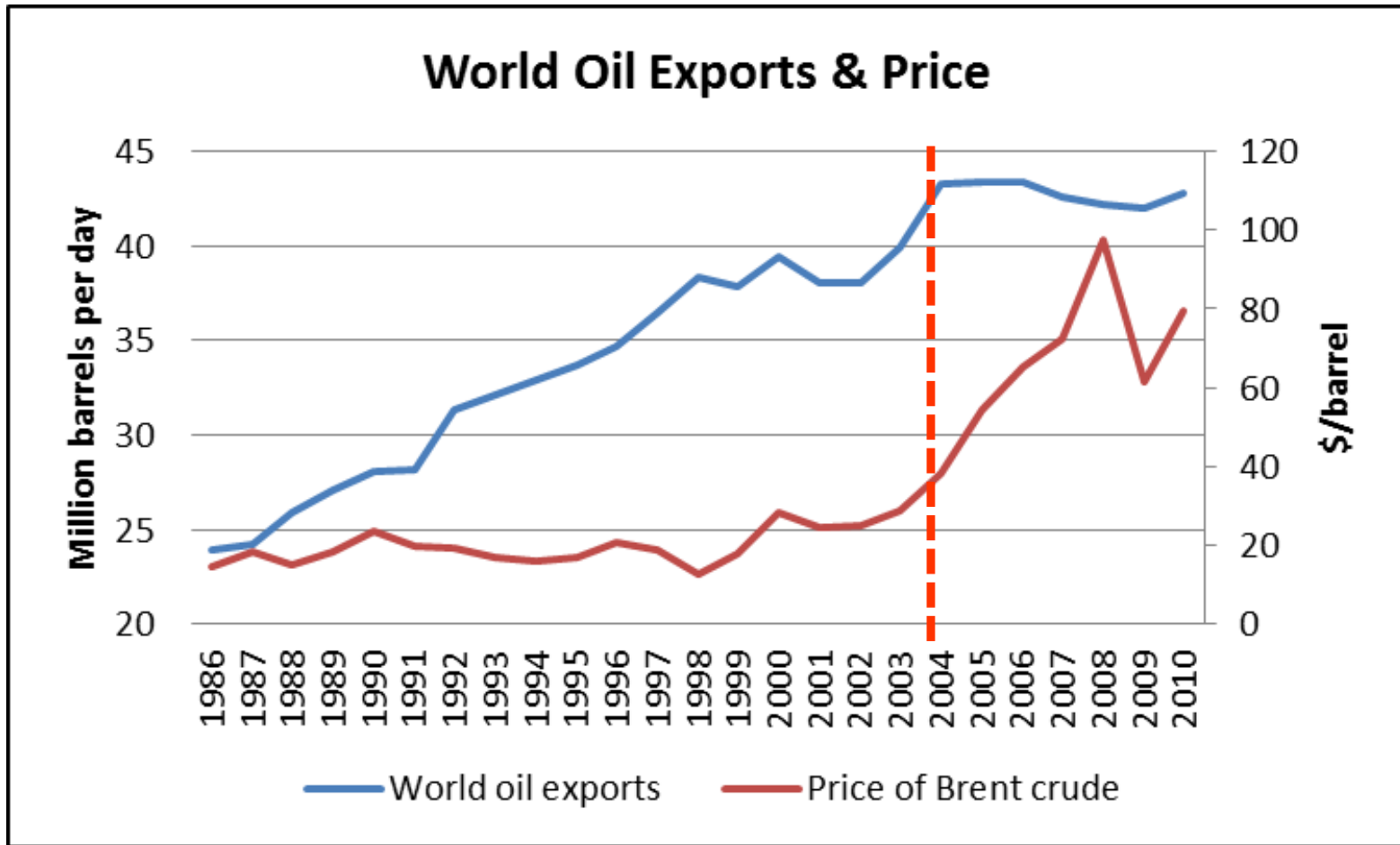
Source: Fournier et al. (2013)

Historical World Oil Production



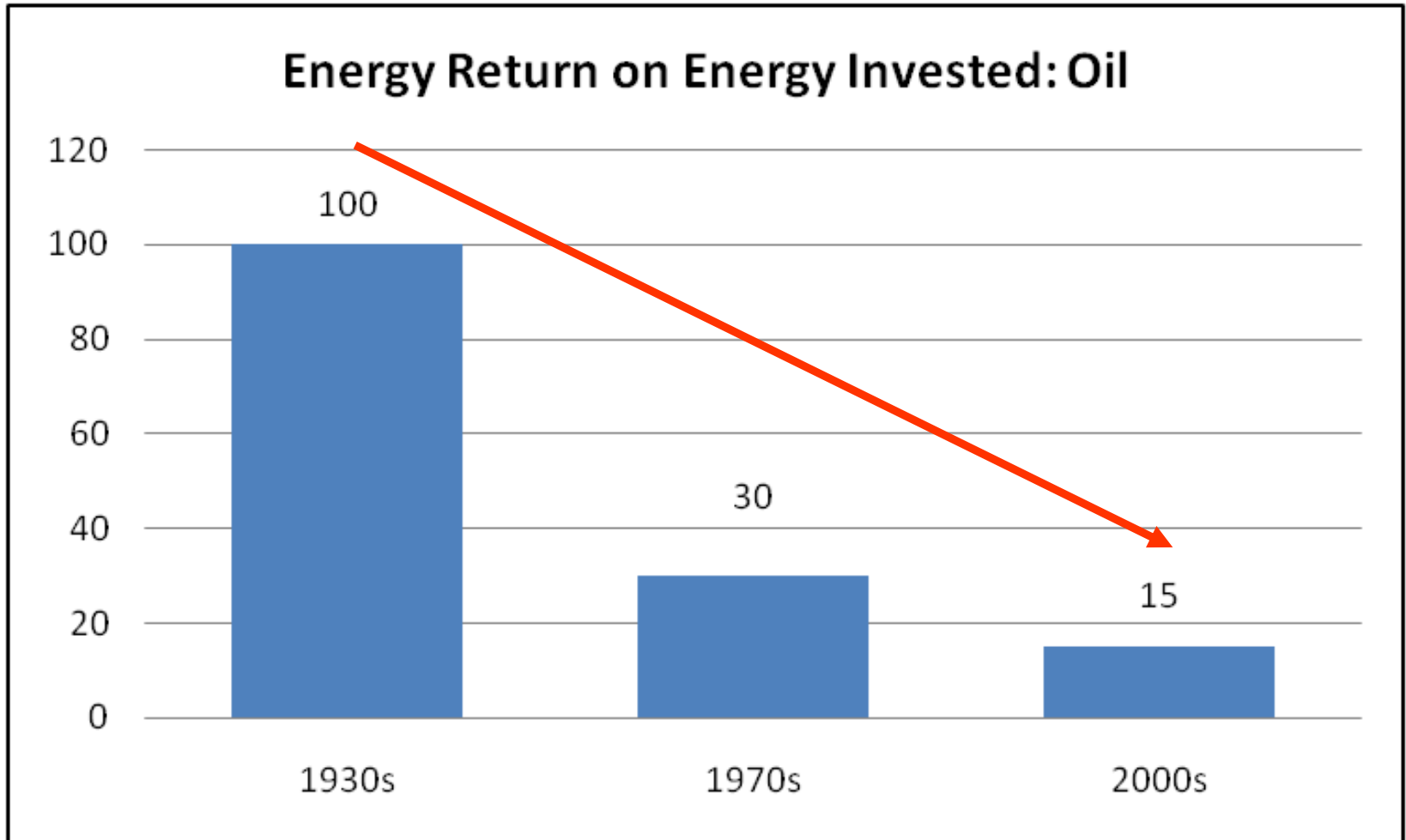
Source: US Energy Information
Administration (EIA)

Stagnant World Oil Exports



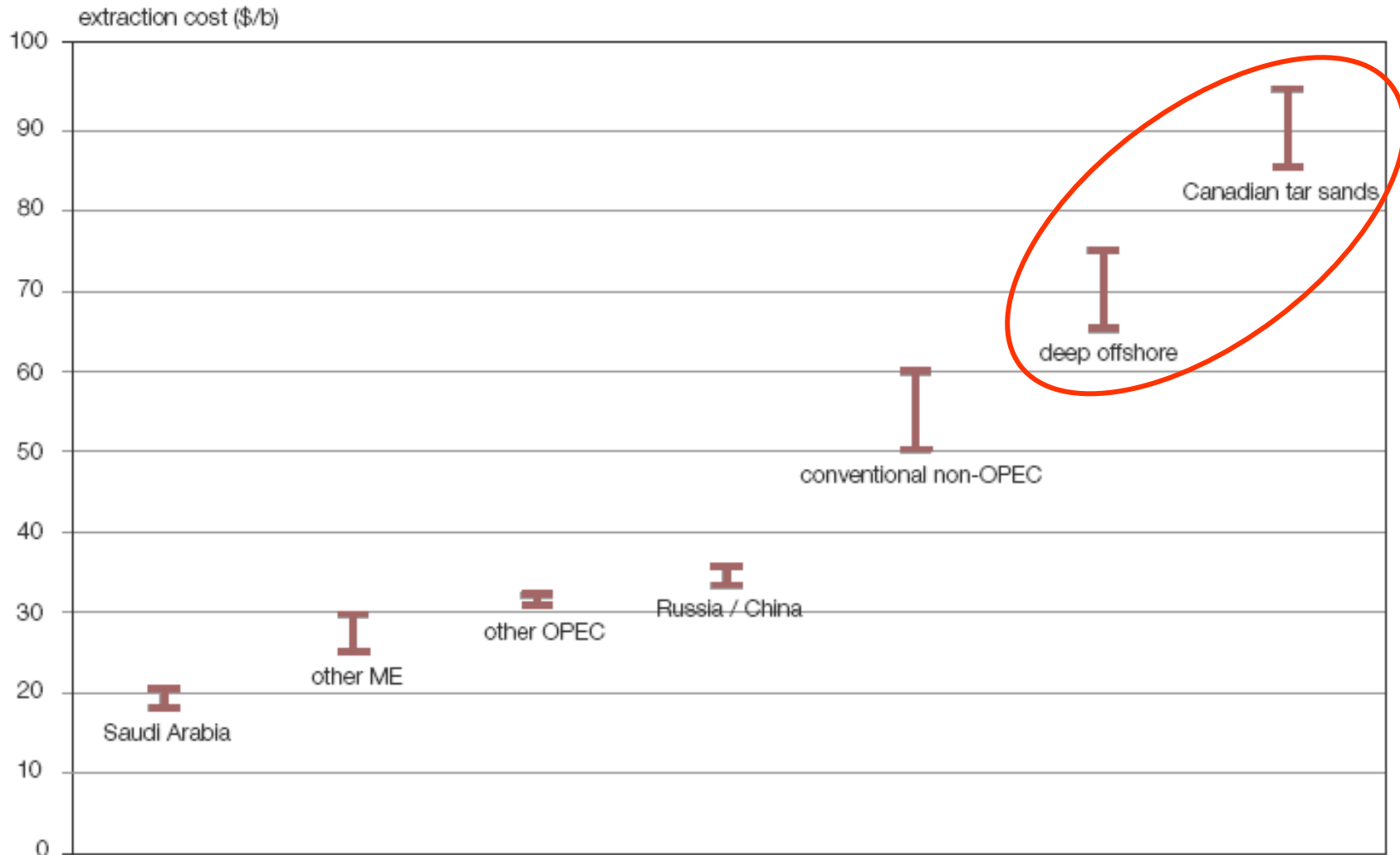
Source: US Energy Information Administration (EIA)

Falling Net Energy Return



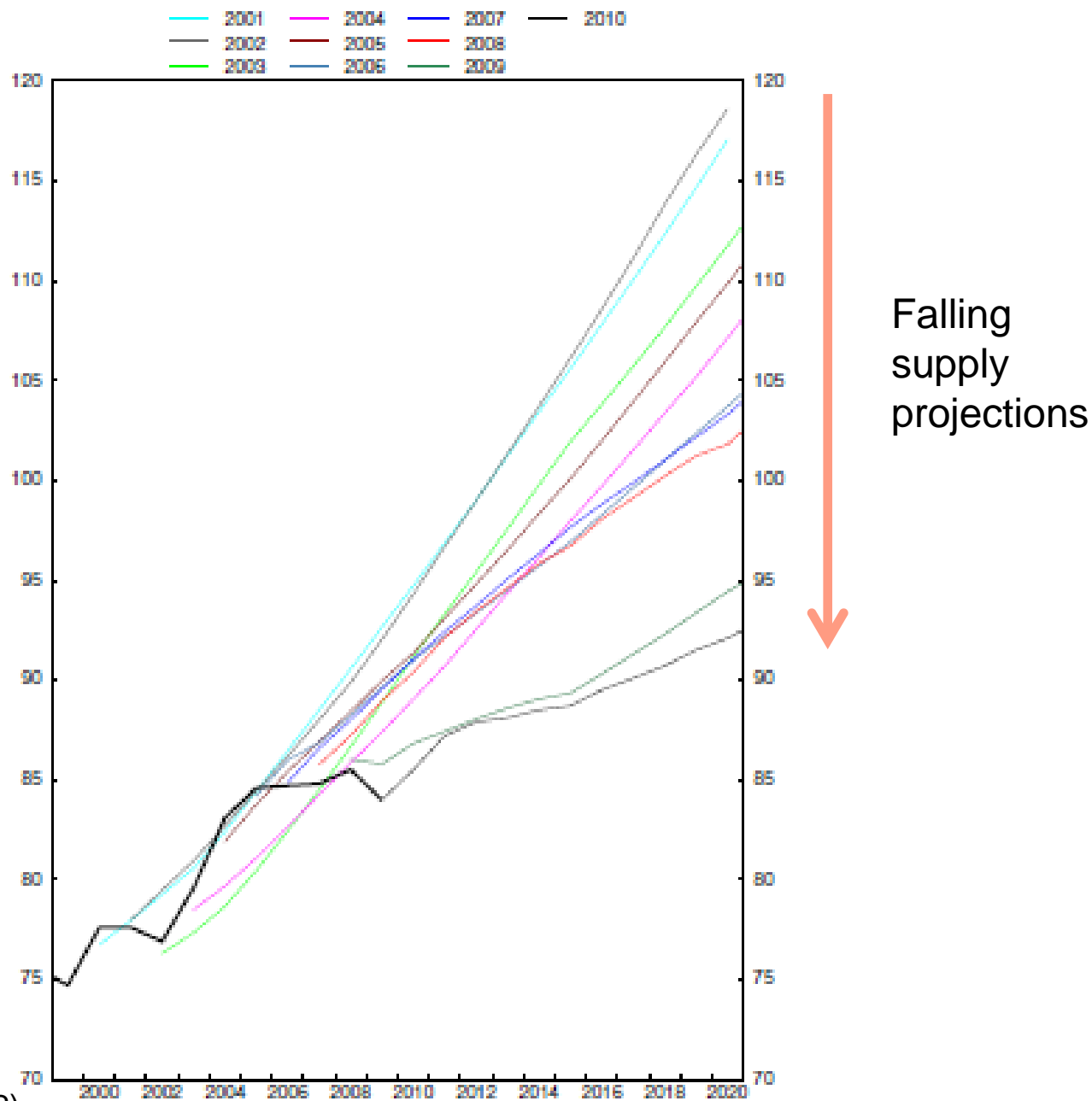
Source: Murphy & Hall (2010)

Rising Cost of Oil Extraction



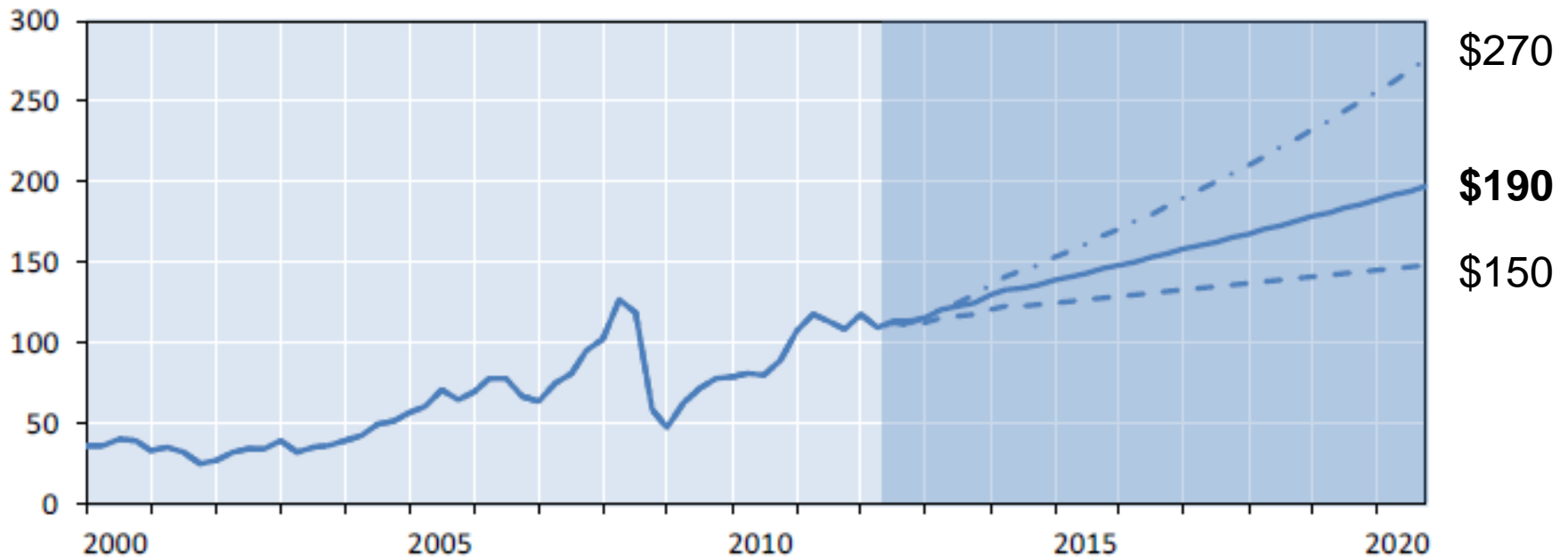
Source: UK ITPOES (2010)

EIA Forecasts 2001-2010 (EIA Definition of World Total Oil Supply, in Mbd)



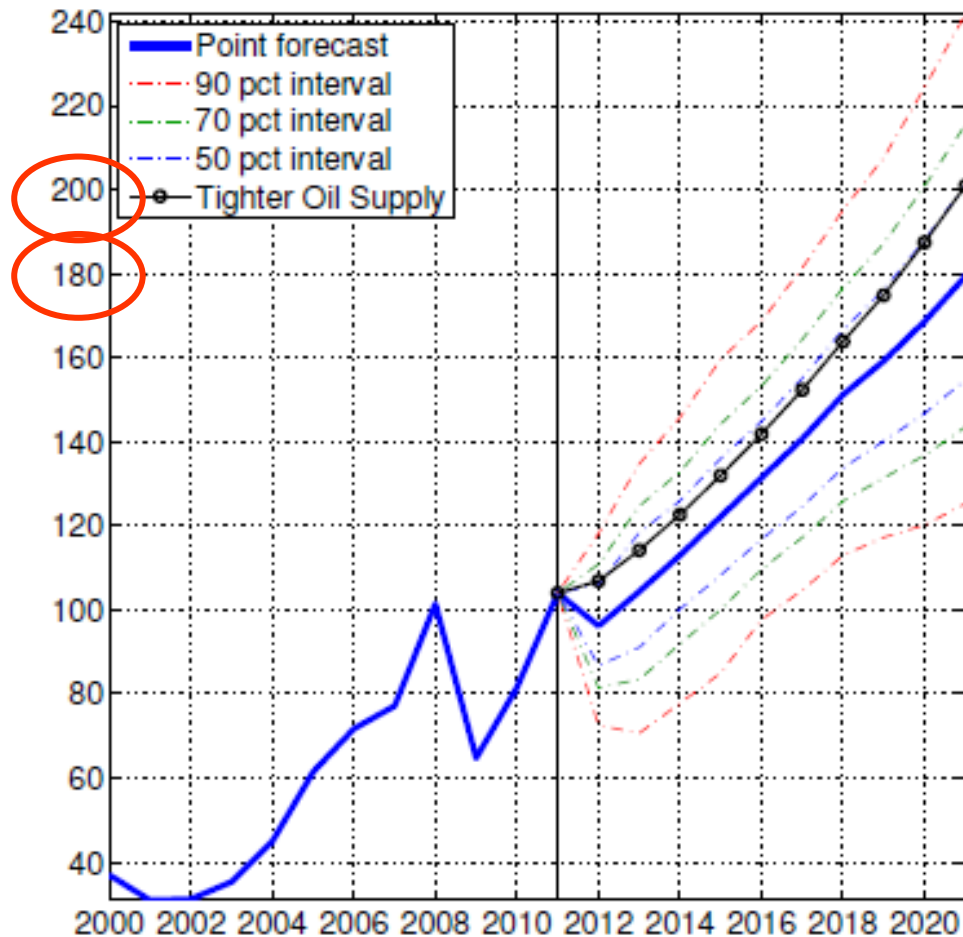
Oil Price Forecasts - OECD

Panel A. Price of crude oil in 2011 USD



- assumes supply rises to 104 mbpd
- assumes oil intensity of GDP falls 20%

Oil Price Forecasts - IMF



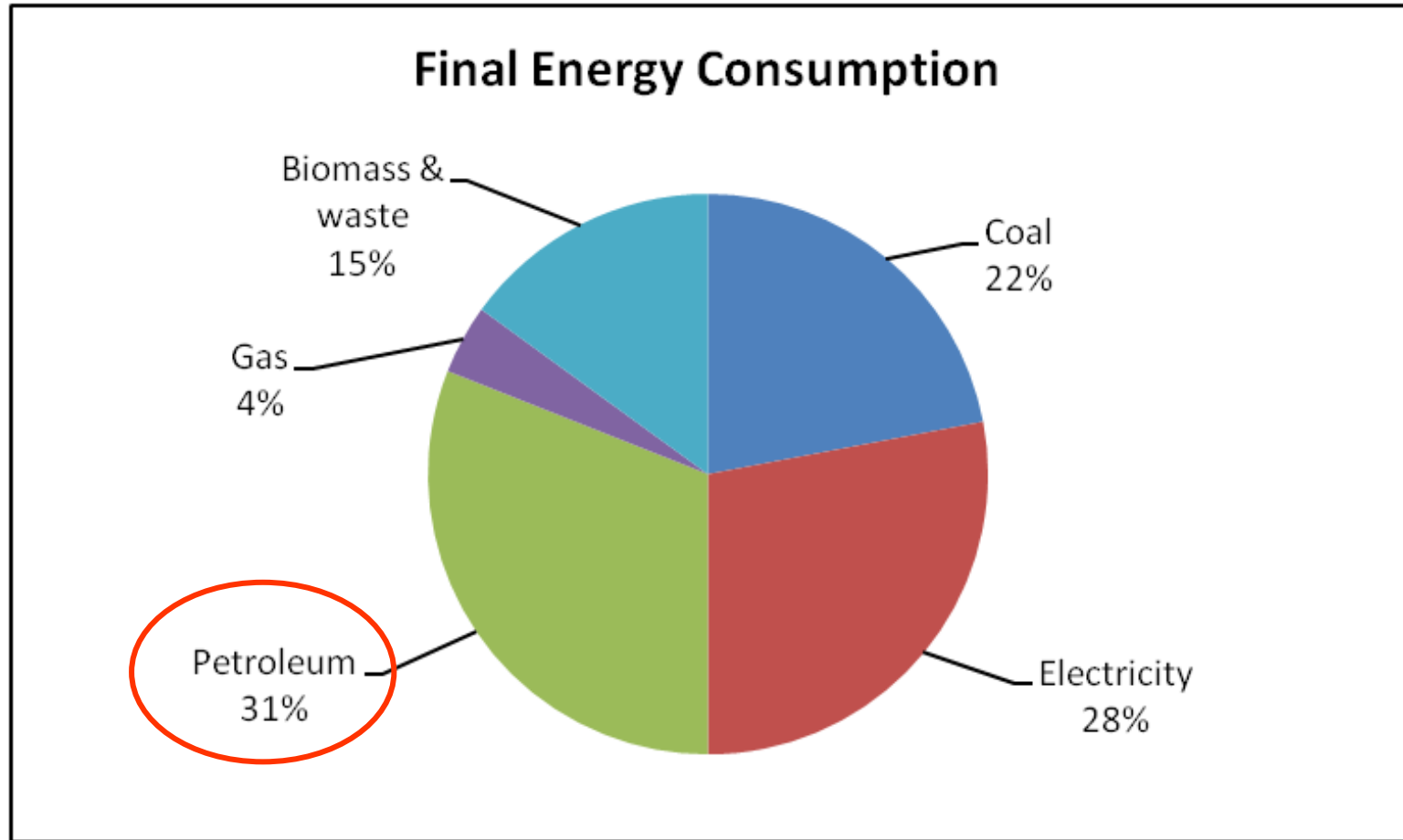
0.5% p.a. supply growth

0.9% p.a. supply growth

Vulnerabilities & Impacts in SA

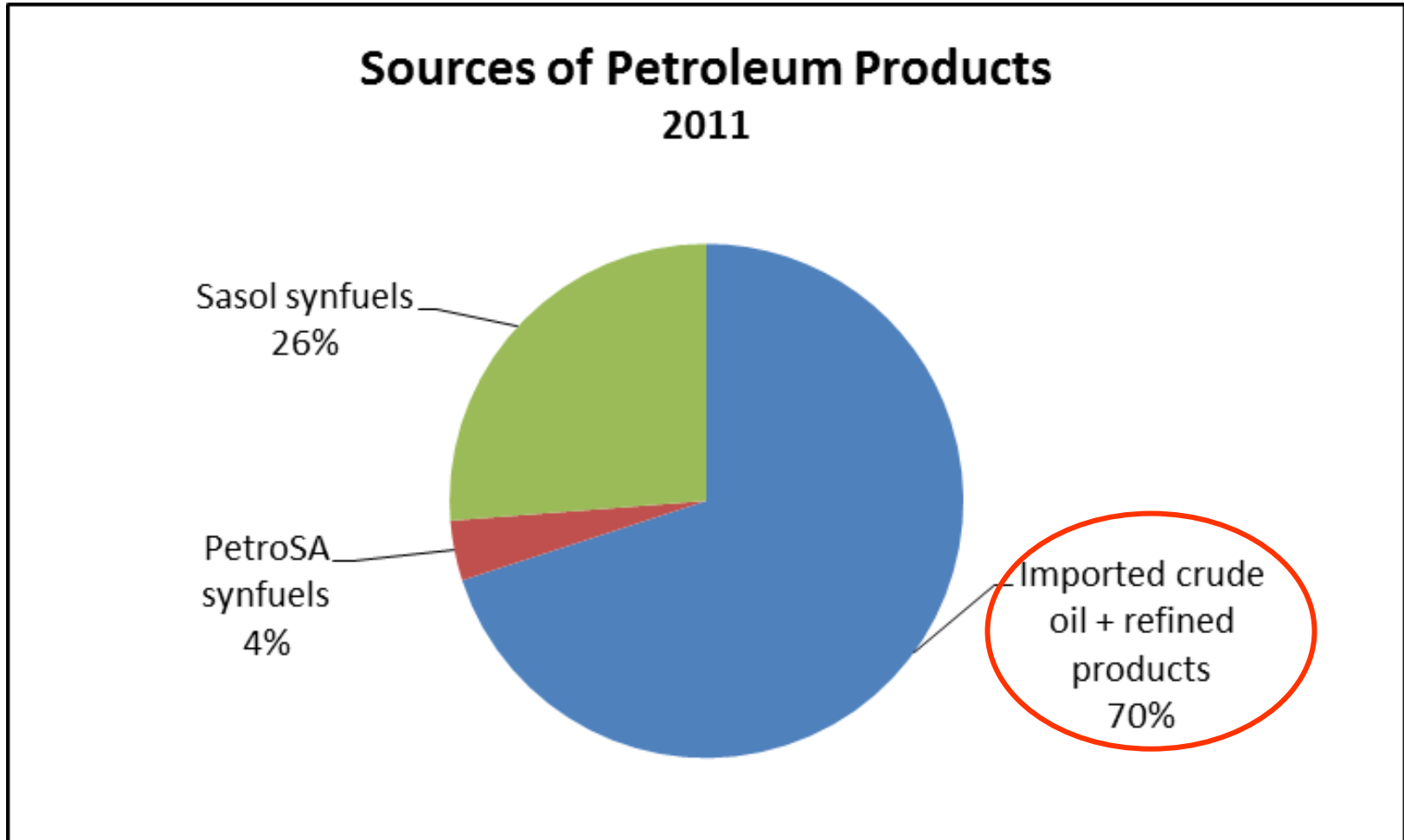


SA Final Energy Consumption



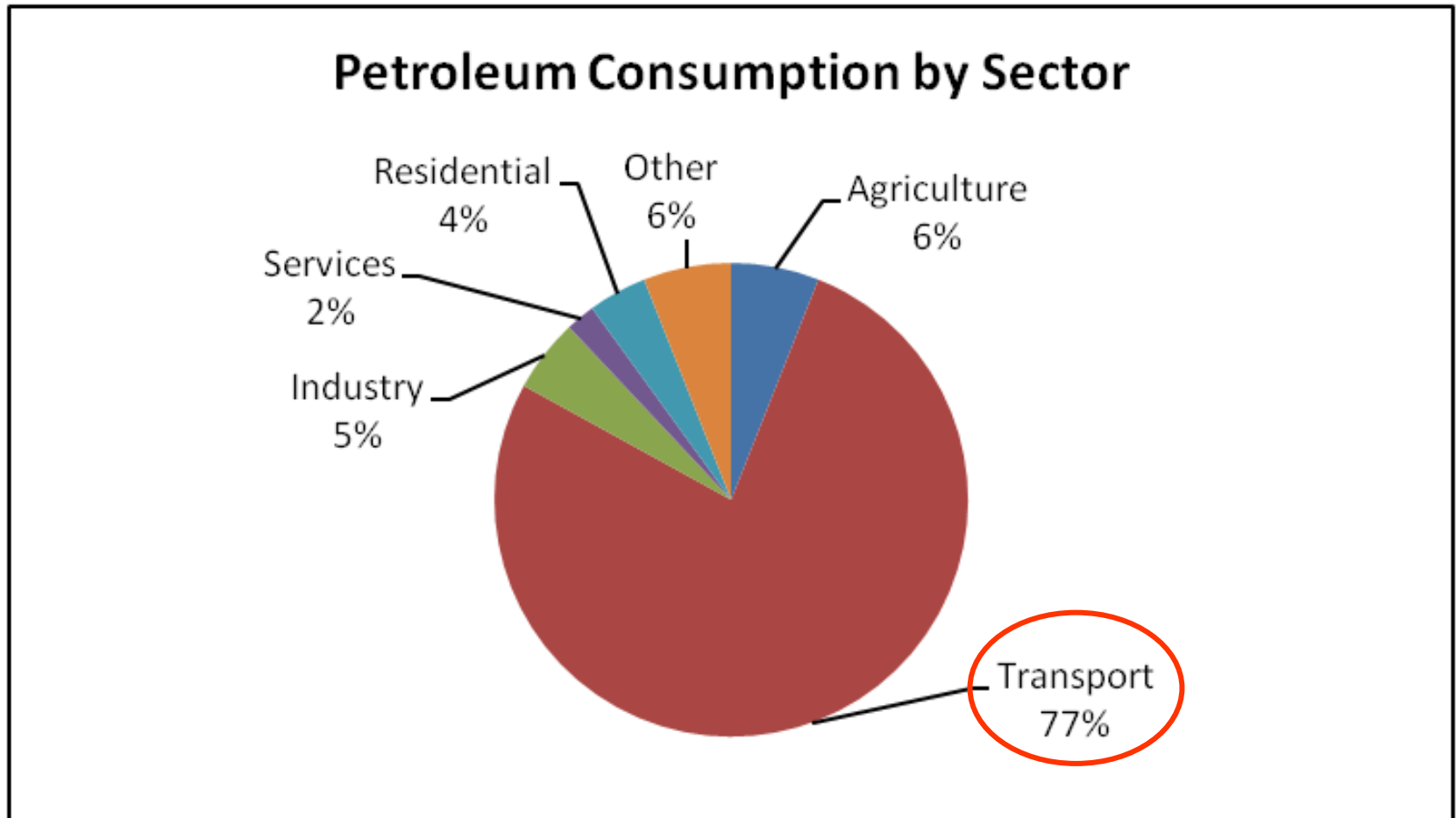
Source: IEA

Petroleum Supply



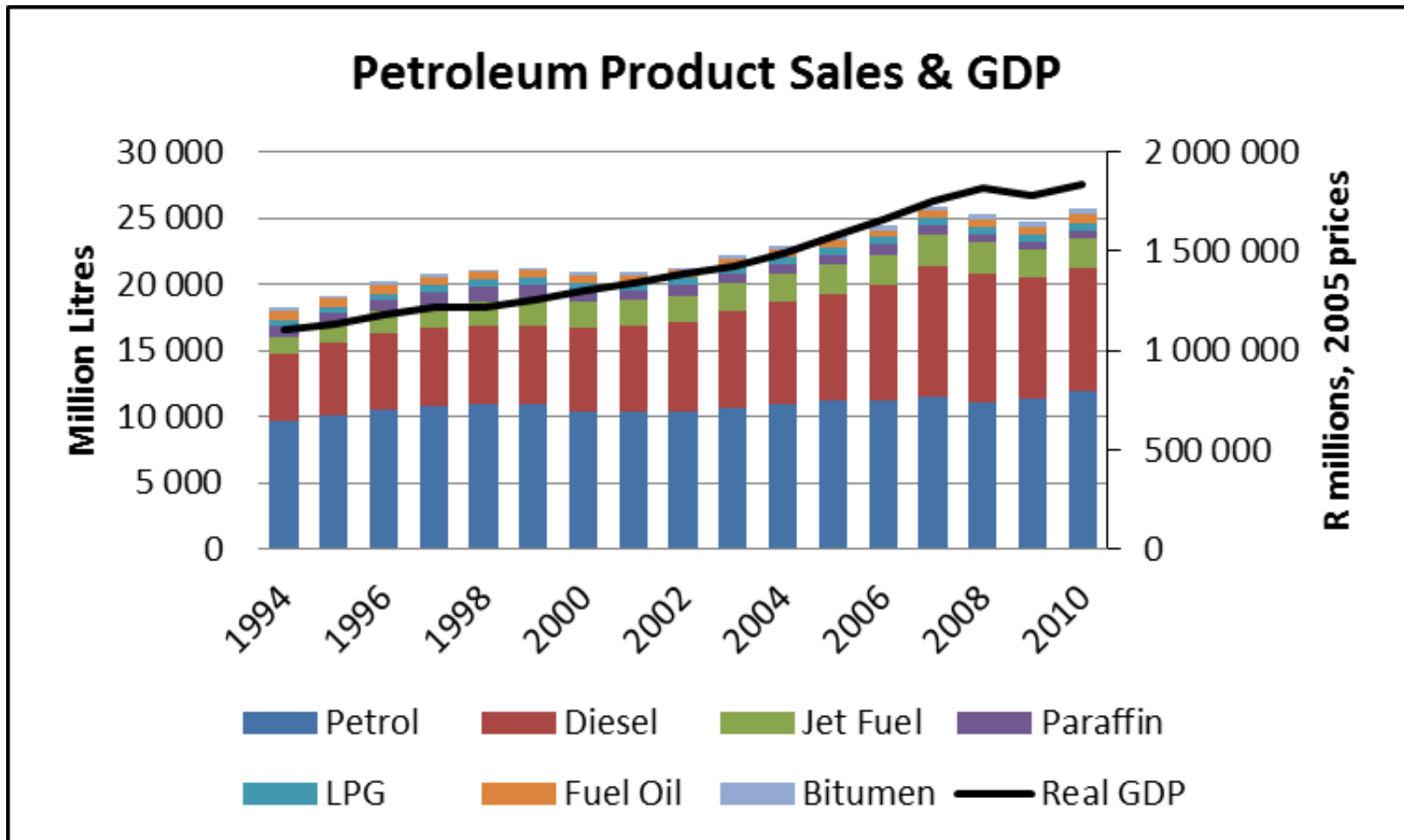
Source: BP, Sasol, PetroSA

Petroleum Consumption

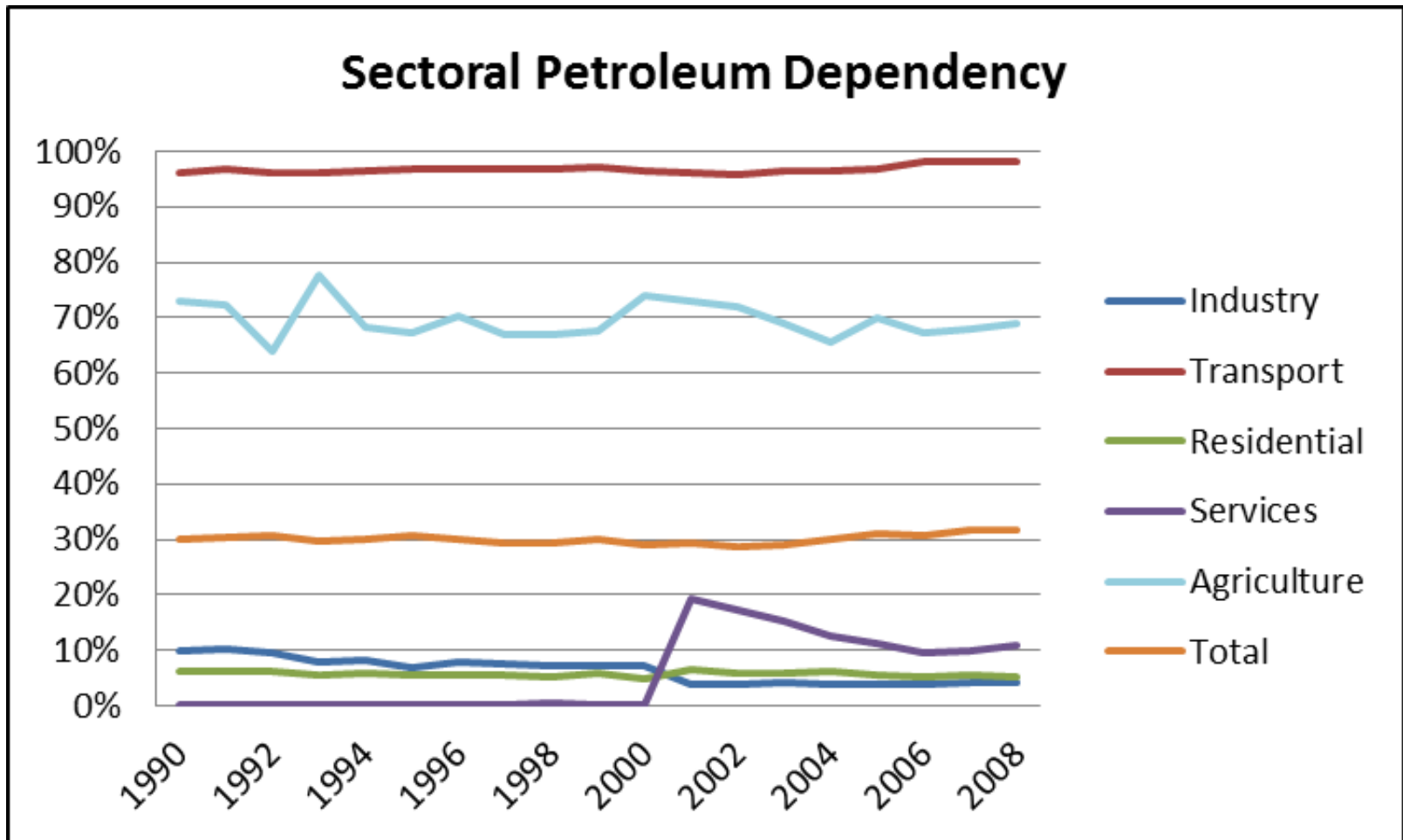


Source: IEA

Oil Demand is Coupled to GDP

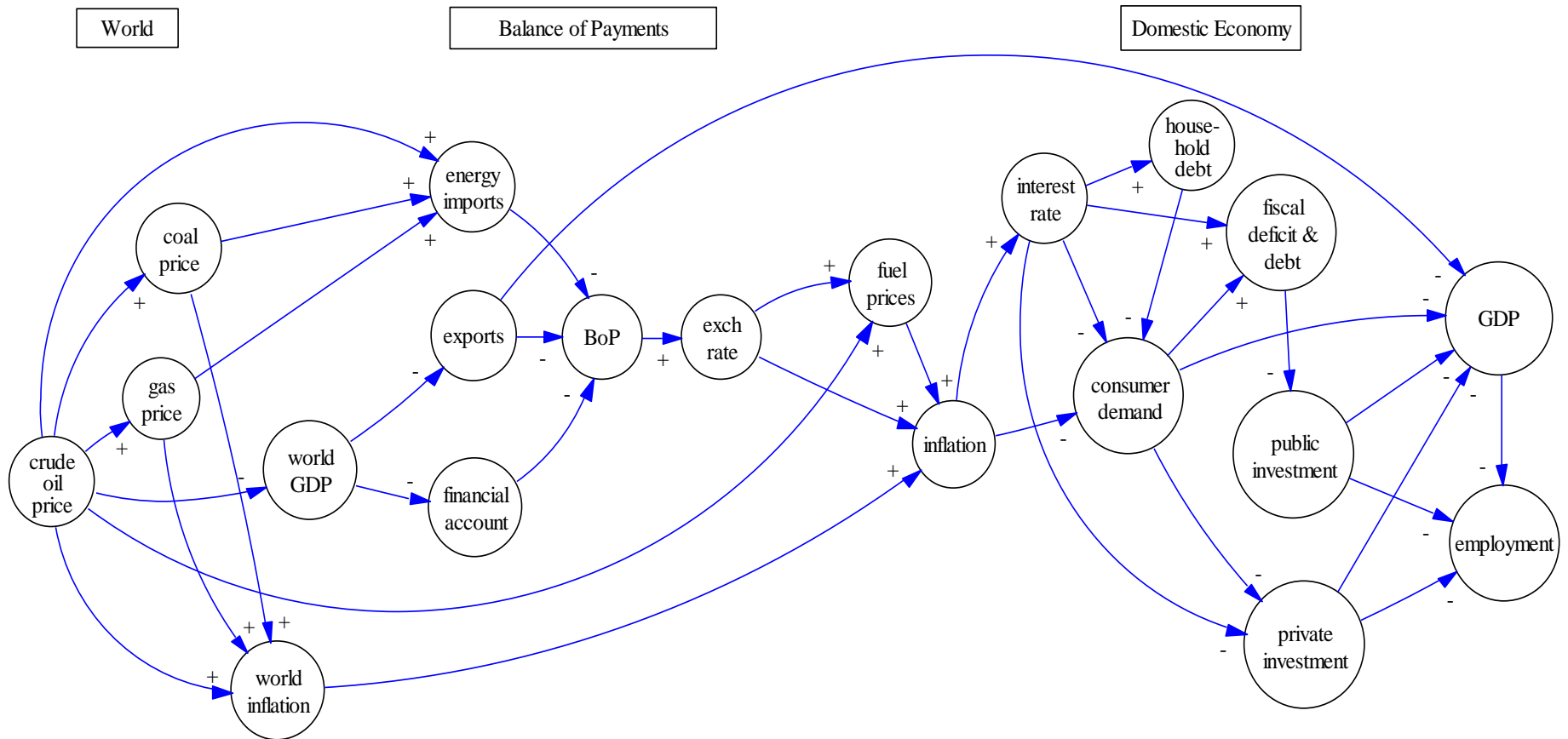


Petroleum Dependency

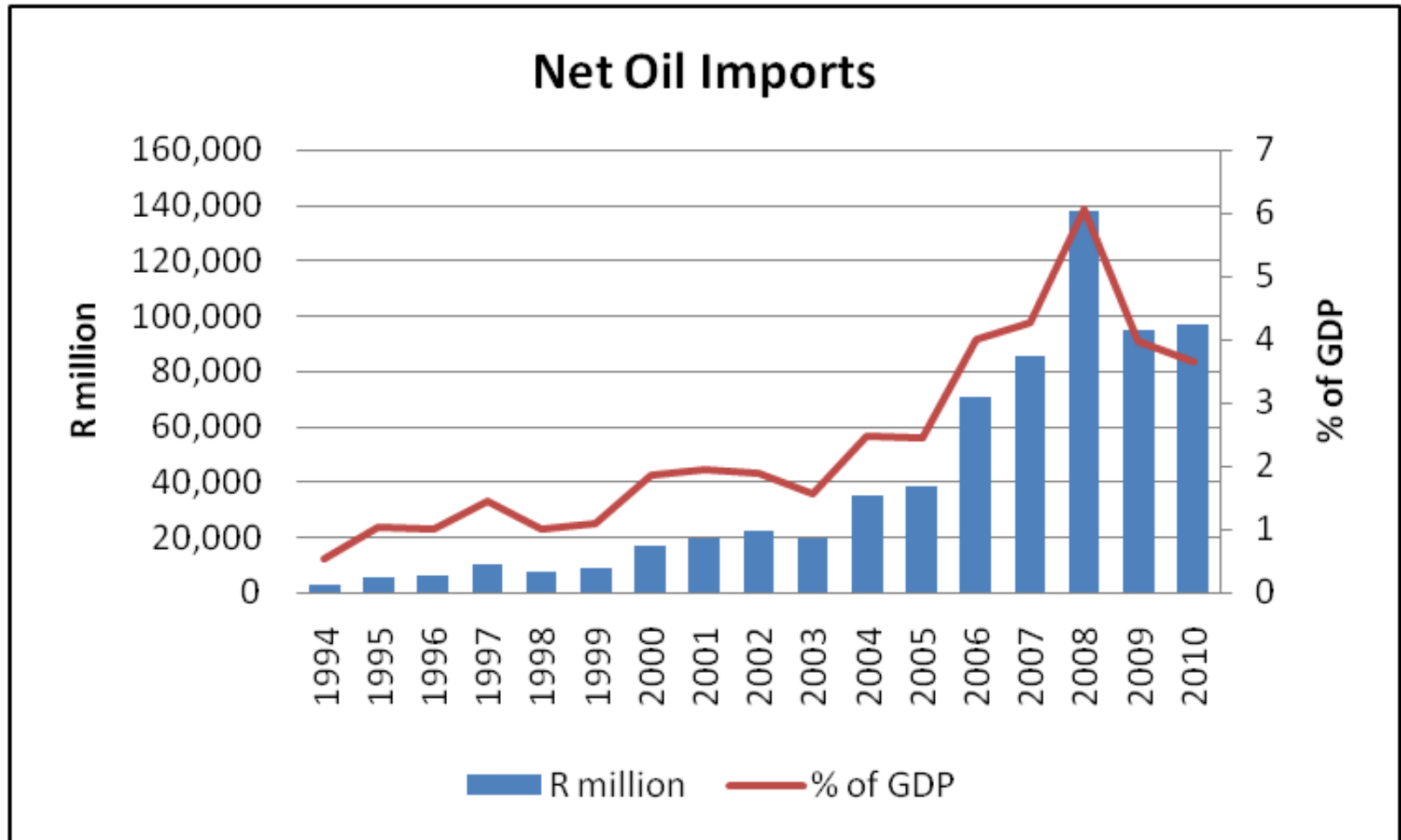


Source: IEA

Oil Shock Transmission

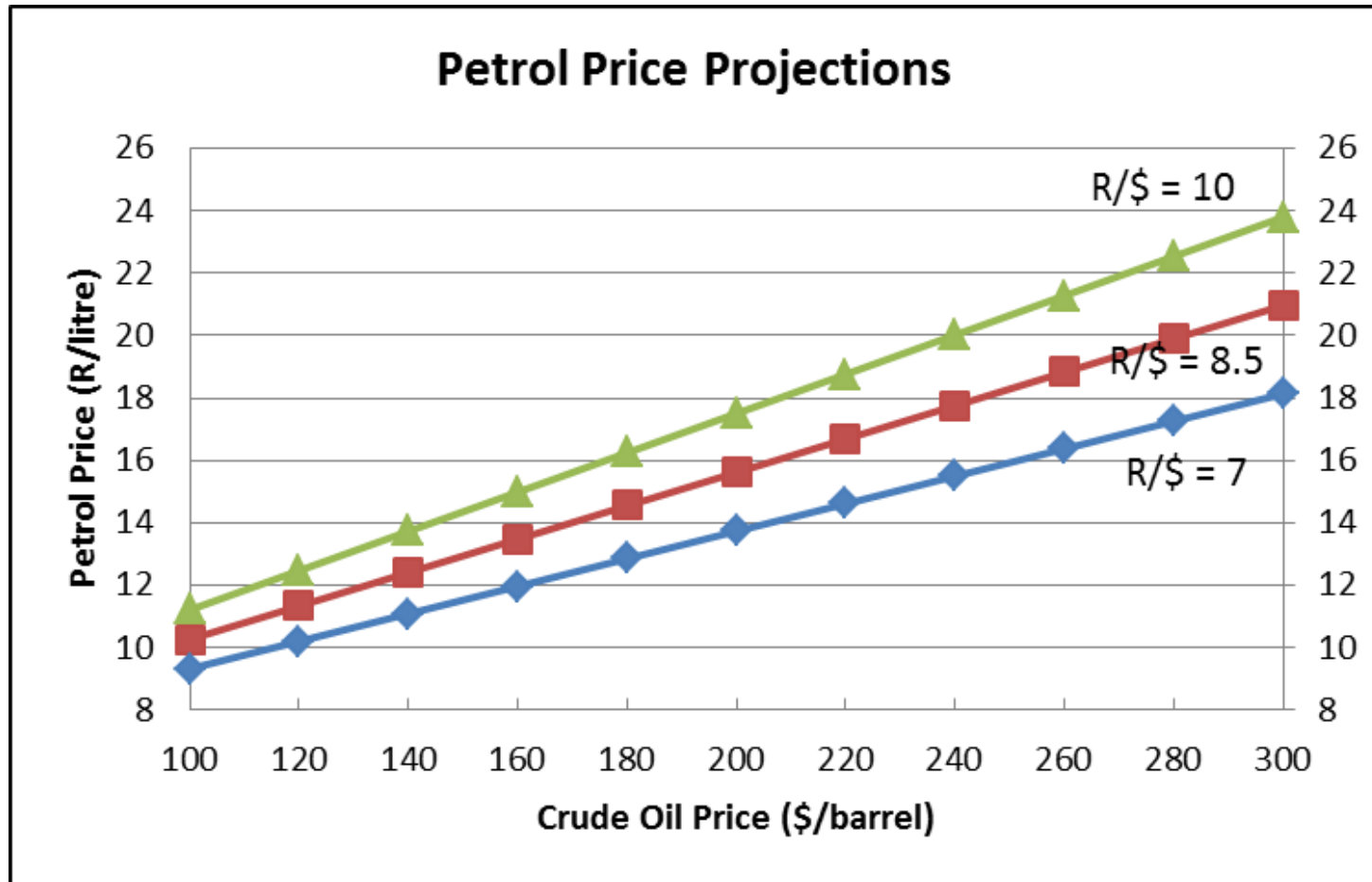


Rising Oil Import Bill

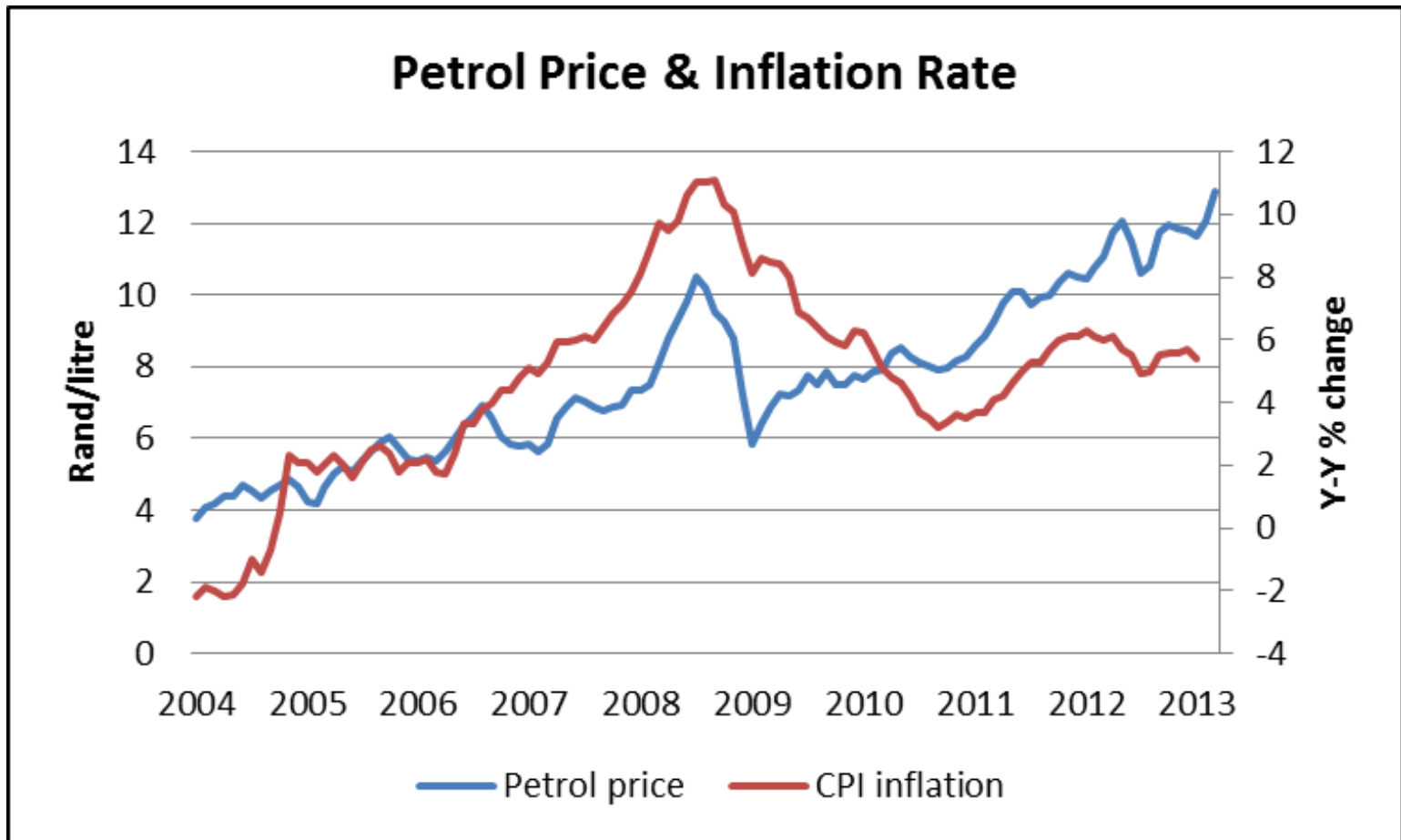


Source: dti, SARB

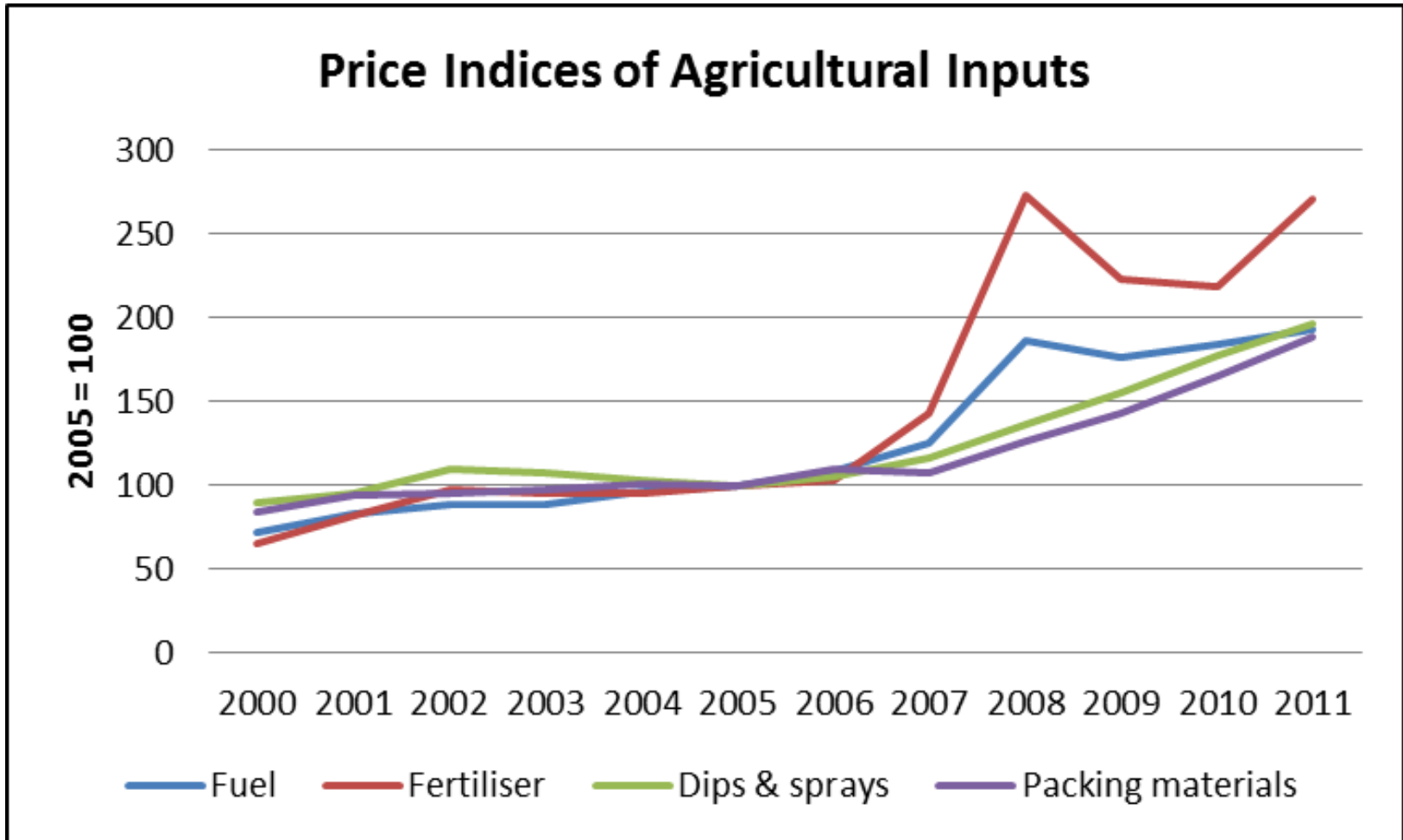
Petrol Price Projections



Inflationary Impact

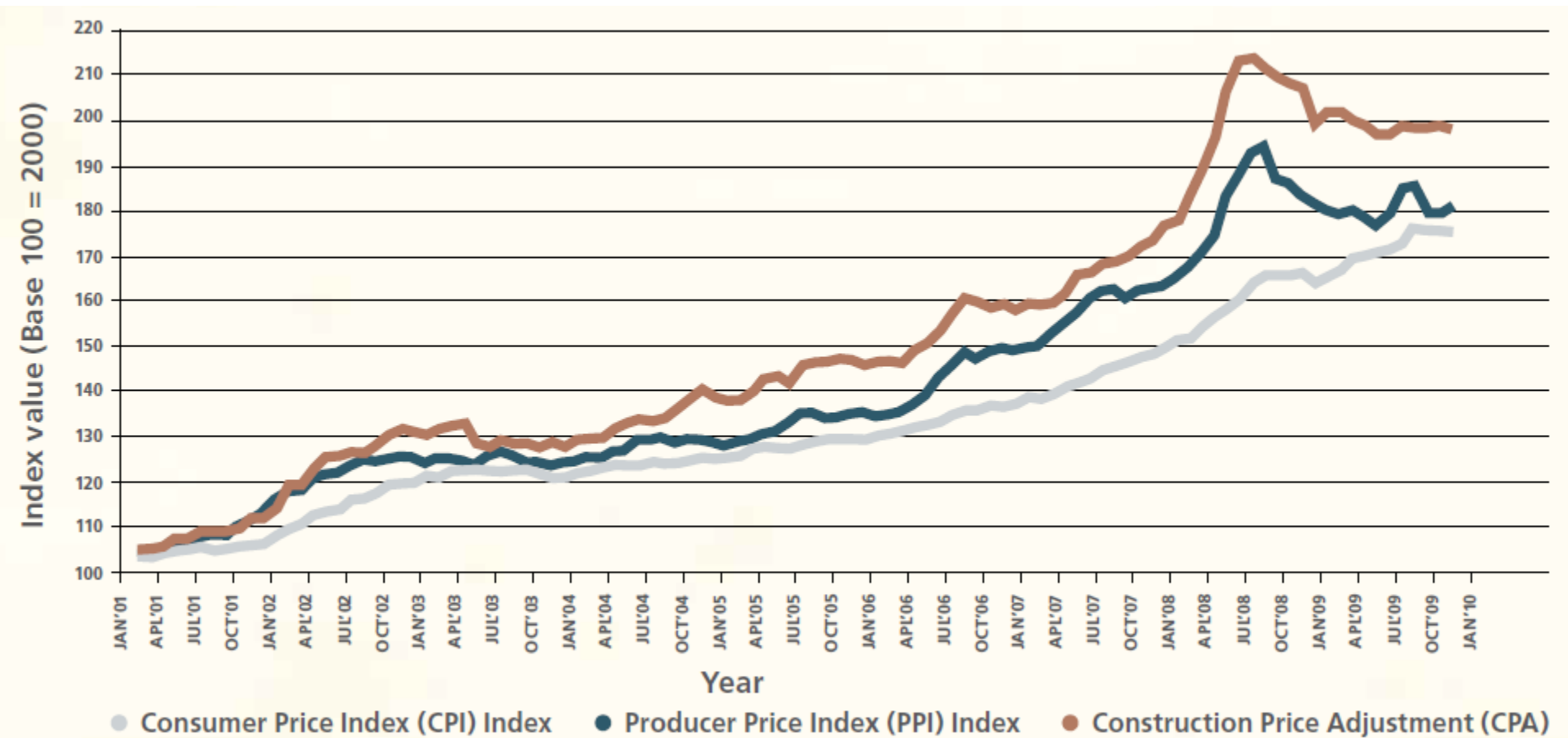


Oil & Agricultural Input Costs



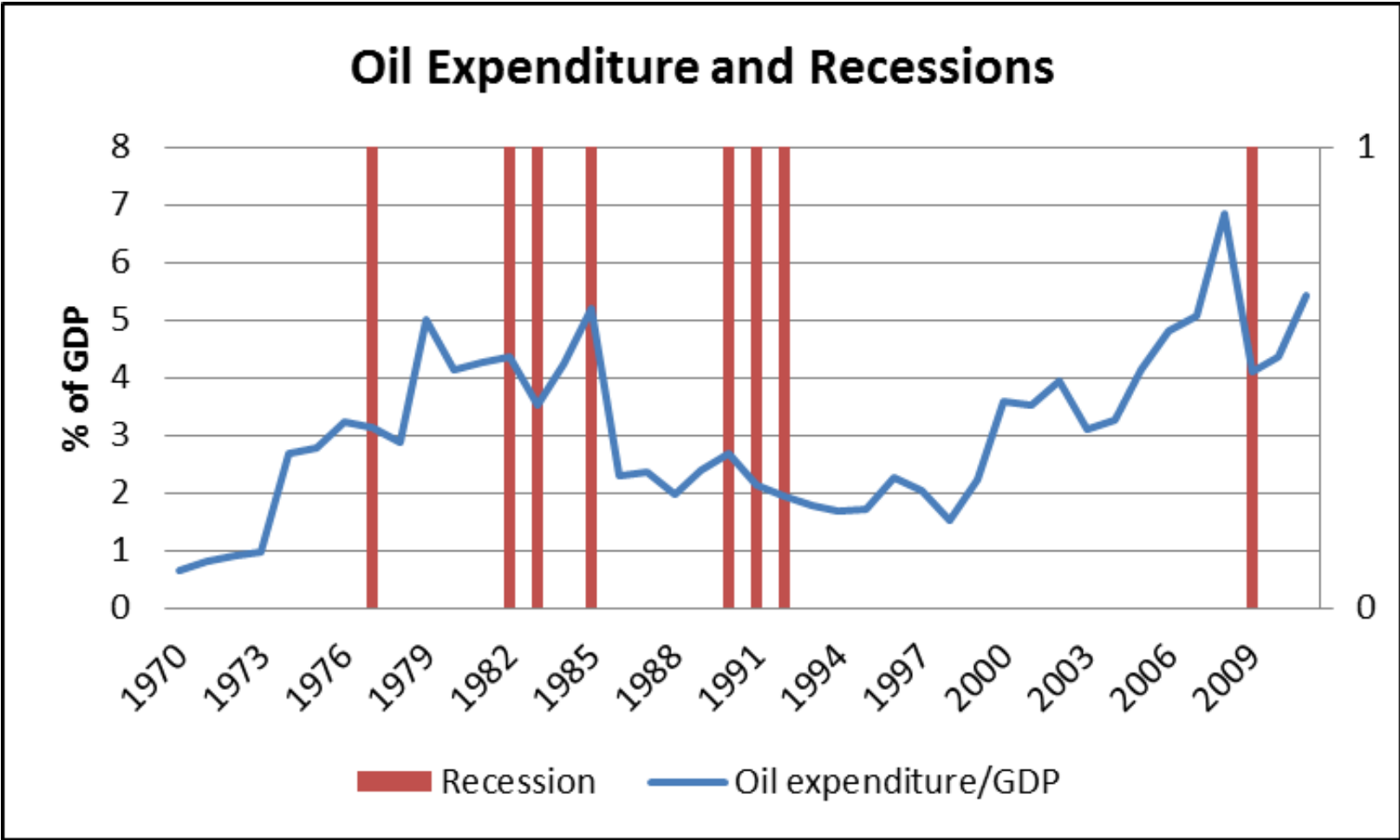
Source: DAFF

Rising Road Construction Costs



Source: SANRAL

Oil Shocks and Recessions



Source: Based on BP (2012), SARB (2012), IMF (2012)

Mitigation Strategies



Energy:

Short Term Responses

- Increase strategic petroleum reserves
 - DoE recently gazetted changes to stock requirements:
 - Govt to hold 60 days of net oil imports
 - Industry to hold 14 days of refined products
- Diversify sources of oil imports
- Petroleum price smoothing
 - Fuel price stabilisation fund

Energy:

Liquid Fuel Alternatives

- Coal-to-liquids
 - competition with Eskom & exports
 - water constraints, CO2 emissions
- Gas-to-liquids
 - shale gas?
 - gas imports from neighbours?
- Biofuels
 - water, arable land & food security constraints



Transport:

Short Term Fuel Conservation

- Eco-driving awareness campaign
- Traffic management
 - reduce road speed limits
- Car-pooling
- Telecommuting & flexible work schedules
- Selective driving bans
- Fuel rationing

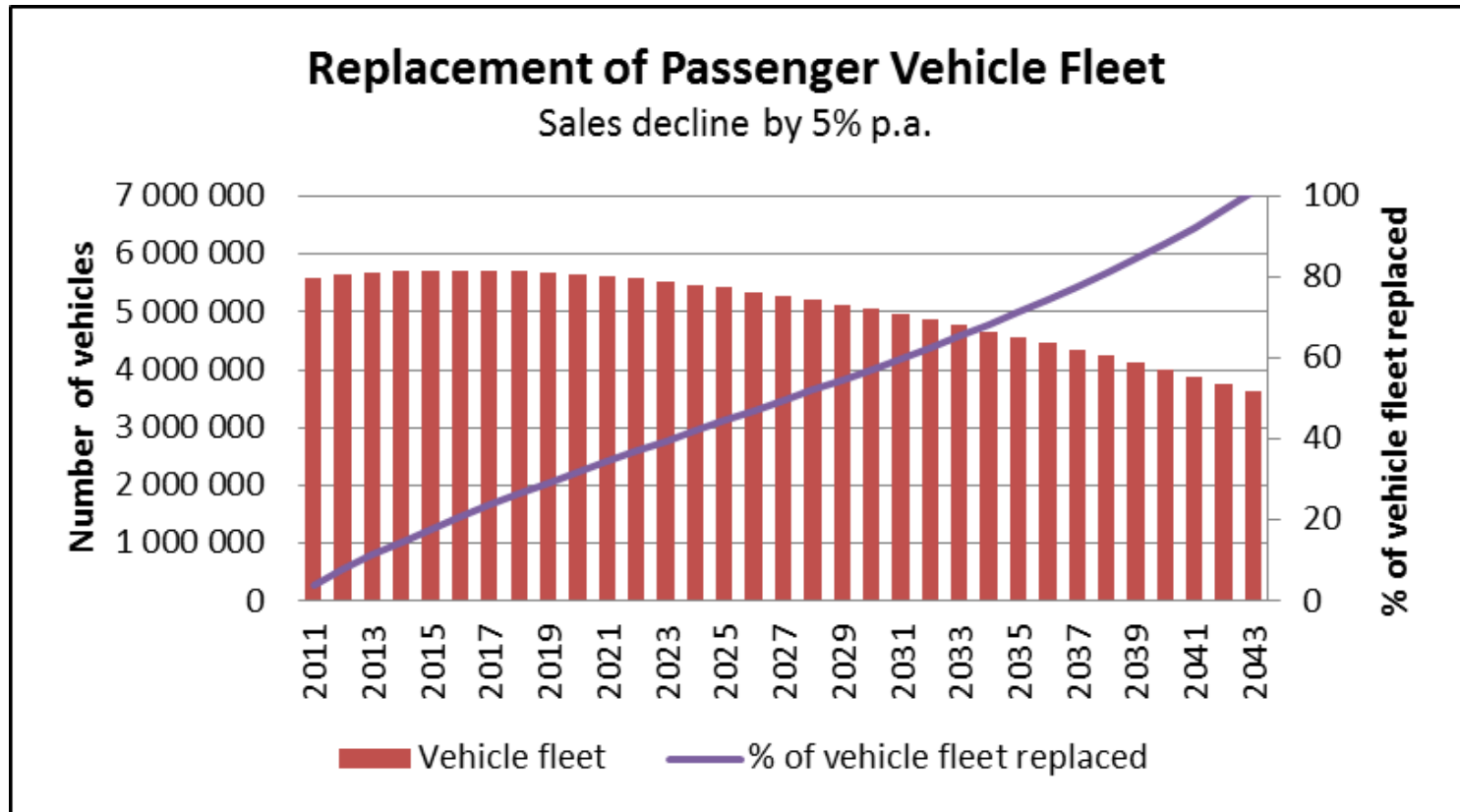
Transport:

Long-term Oil Independence

- Vehicle efficiency
 - improved design, smaller & lighter vehicles
- Alternative propulsion mechanisms
 - electric vehicles, plug-in hybrids, scooters
 - 'feebate' system, carbon tax
- Modal shifts
 - passenger: bus rapid transit, rail
 - freight: rail (main corridors)
 - cities: pedestrian & cyclist friendly



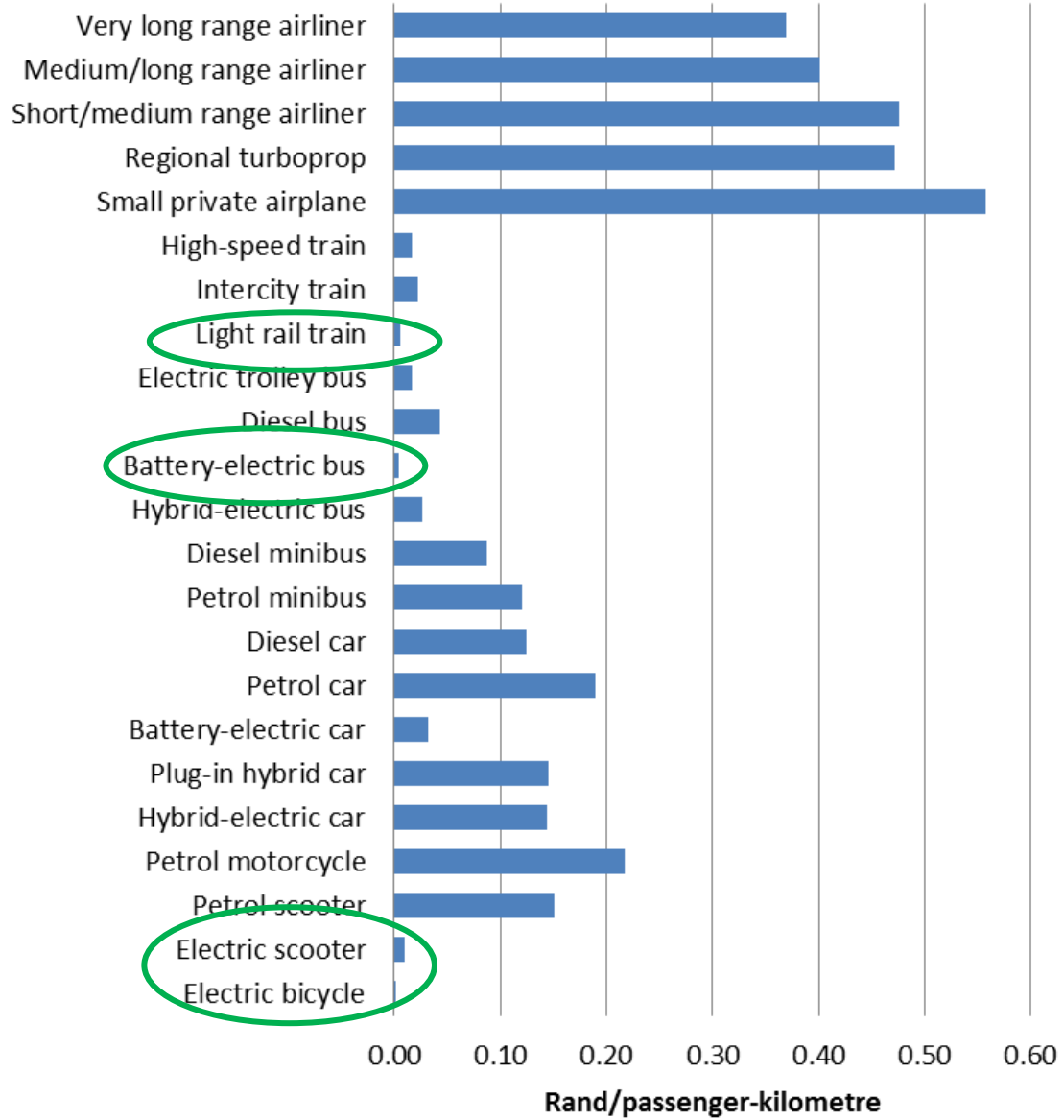
Vehicle Fleet Replacement



- takes time and is costly

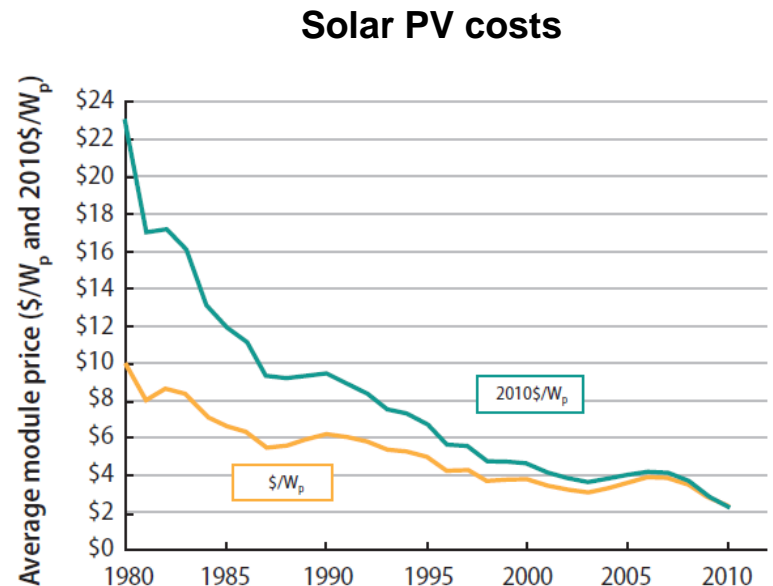
Energy Cost of Passenger Transport Modes

(maximum loading)



Electricity Supply

- Improve energy **efficiency** throughout economy
- **Renewables** can be implemented quickly, but have intermittency problems
- Integrated **smart grids**
- Electricity **storage**
 - e.g. plug-in vehicles



Agriculture

- Short term:
 - support for farmers to protect food security?
 - prioritise fuel allocation for food production & distribution
- Long term:
 - **agroecological** farming and conservation agriculture to reduce oil use
 - knowledge & training required
 - **localising** food systems
 - e.g. urban agriculture

Macro-economy

- Short term resilience:
 - increase foreign exchange reserves
 - reduce public & foreign debt
 - avoid sudden large interest rate hikes
- Long term:
 - policy framework to decouple economic growth from oil consumption
 - expenditure switching
 - e.g. from roads & airports → railways & BRT
 - promote economic localisation

Conclusions

- Risk of major **oil shocks** is increasing
- Socio-economic **impacts** under business-as-usual could be severe
 - rising inflation, recession, unemployment
- Mitigation strategies:
 - enhance short-term **resilience** to shocks
 - plan long-term **transition**:
 - **decouple** growth from oil consumption
 - electrify the transport system