

Rio+20: Towards sustainable development  
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# The Australian energy system: Is it moving towards sustainability? Can it move faster?

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Adjunct Professor,

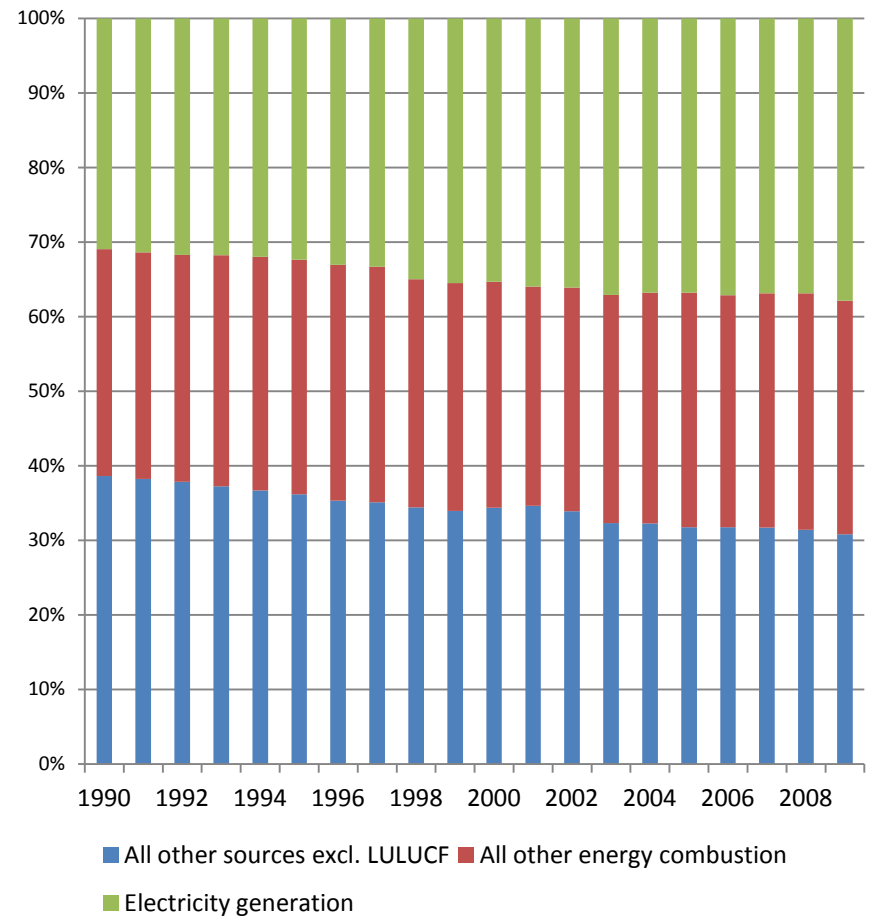
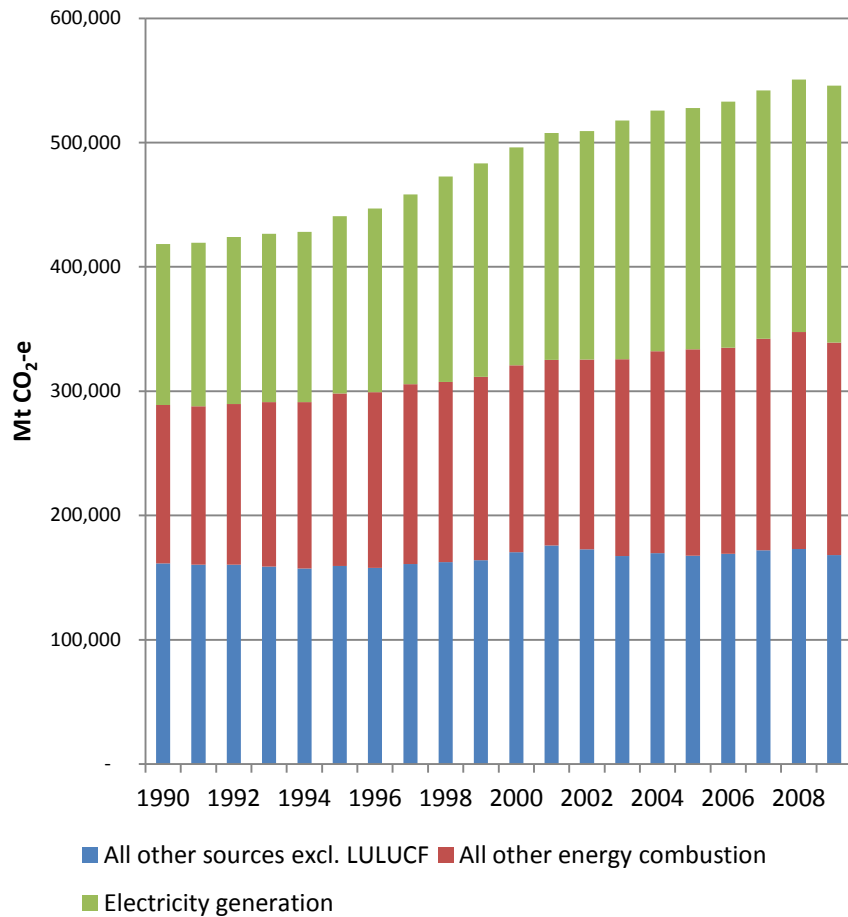
Crawford School of Economics and Government and Fenner School  
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# Defining the energy system

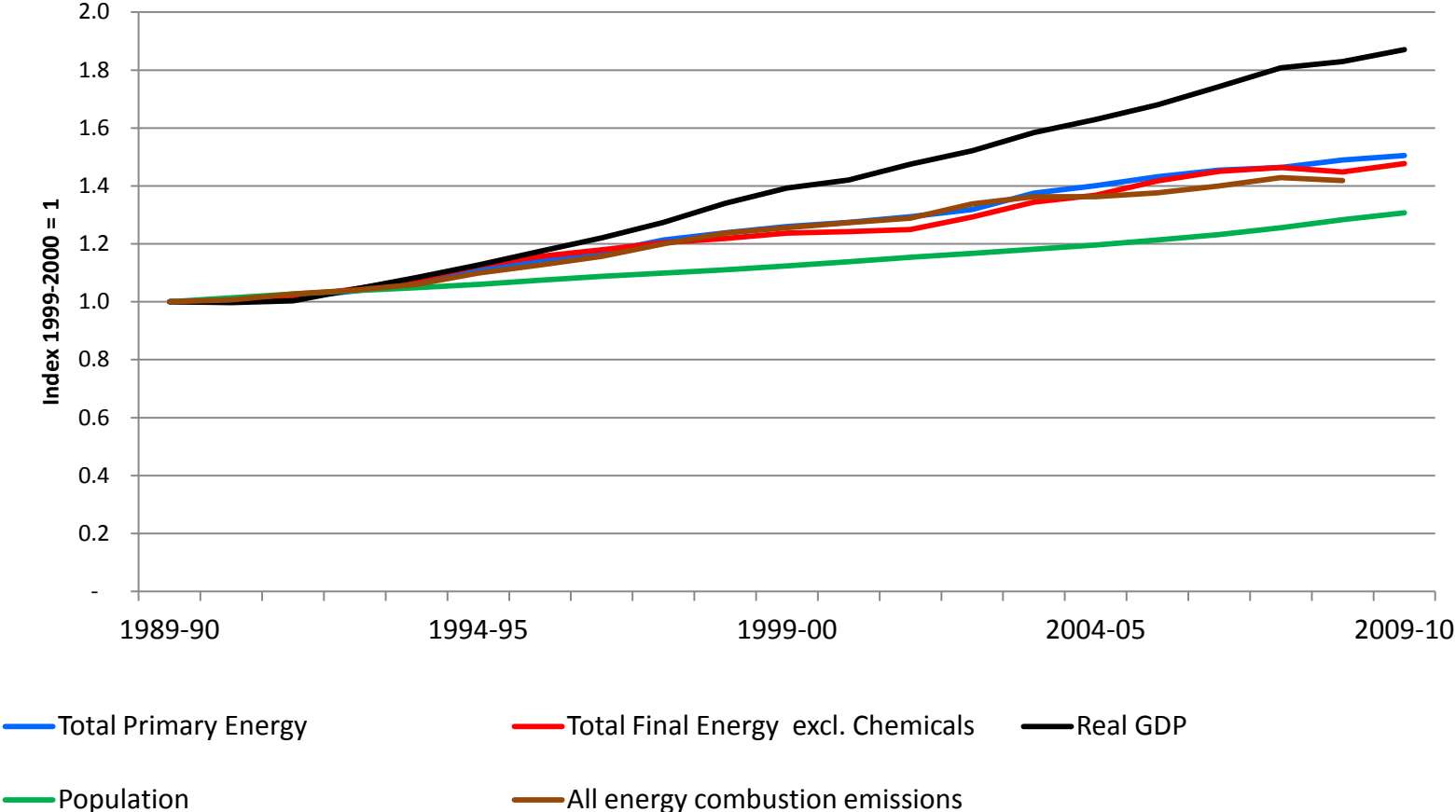
- The energy system is the totality of physical and institutional structures and arrangements by which energy is extracted, processed, supplied and used to meet the requirements of the Australian people and the Australian economy.
- Extracting and processing fossil fuel mineral commodities for export is part of the mining and minerals processing industry, not part of the energy system, defined as above.
- However, at the margin, some inputs of fossil fuel commodities can be switched between the domestic energy system and export markets. Extraction and processing fossil fuel commodities for export is also a significant source of energy consumption and greenhouse gas emissions, thereby imposing demands on the energy system.

# Graphs showing trends in the Australian energy system, 1990-2010

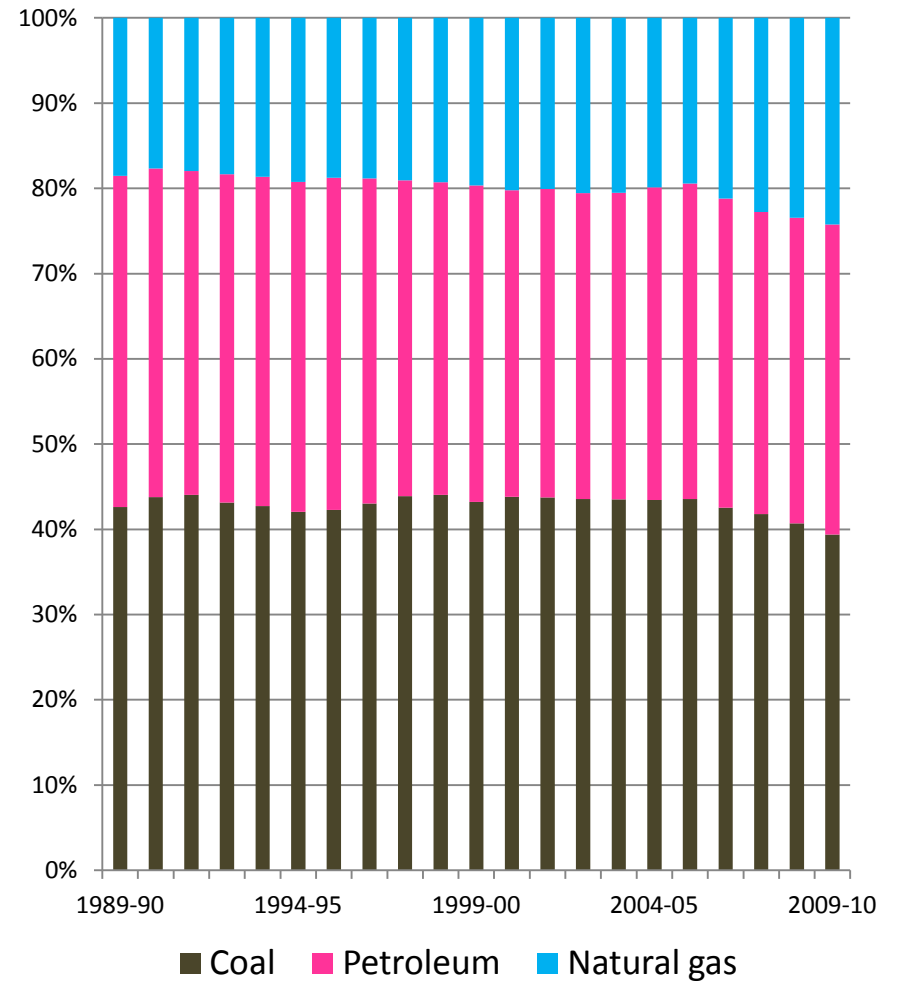
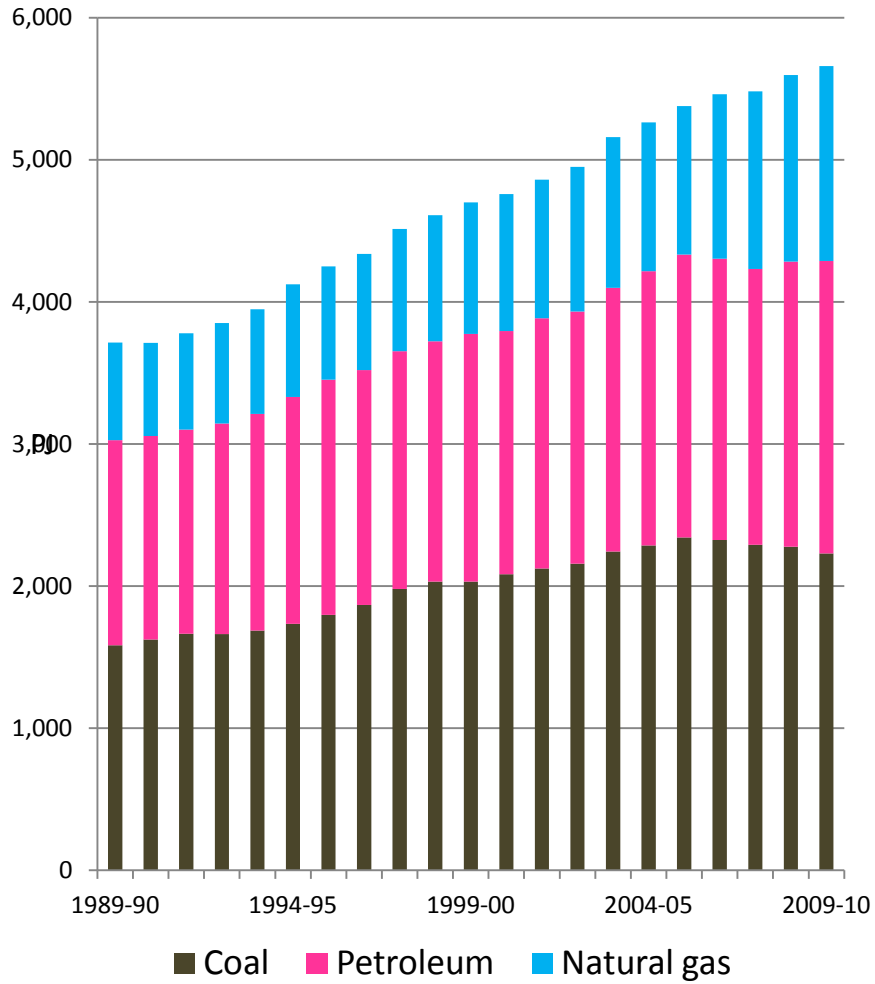
# Graph 1: Australia's national greenhouse gas emissions: driven by the energy sector



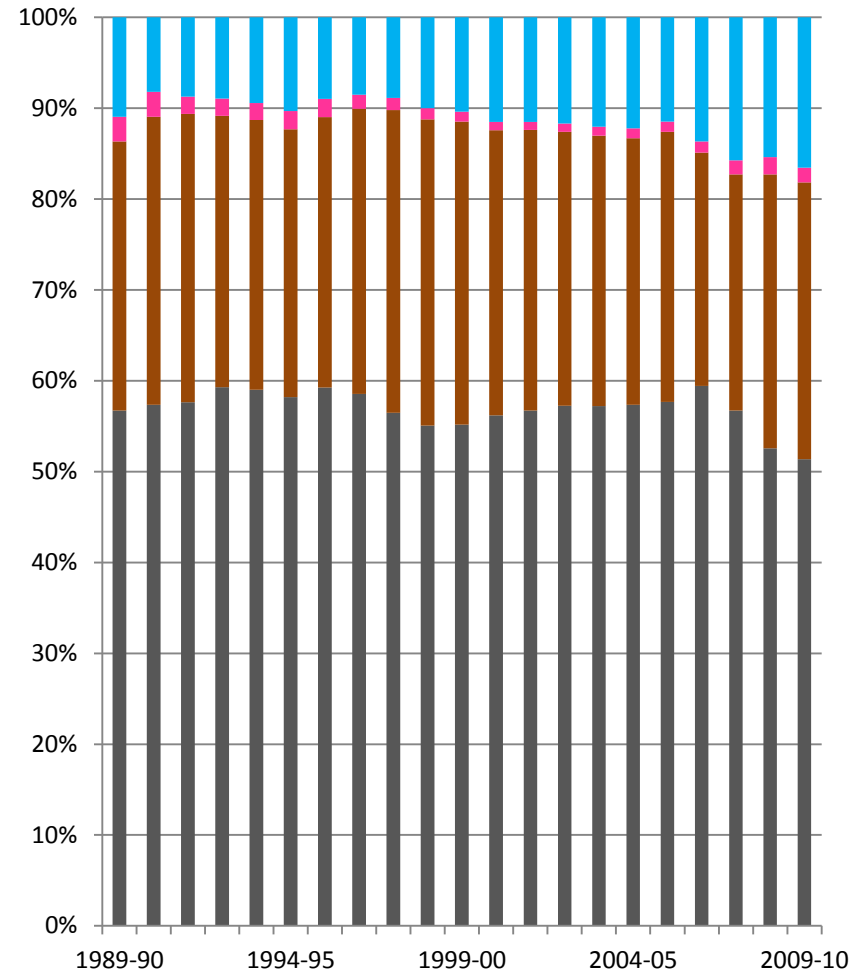
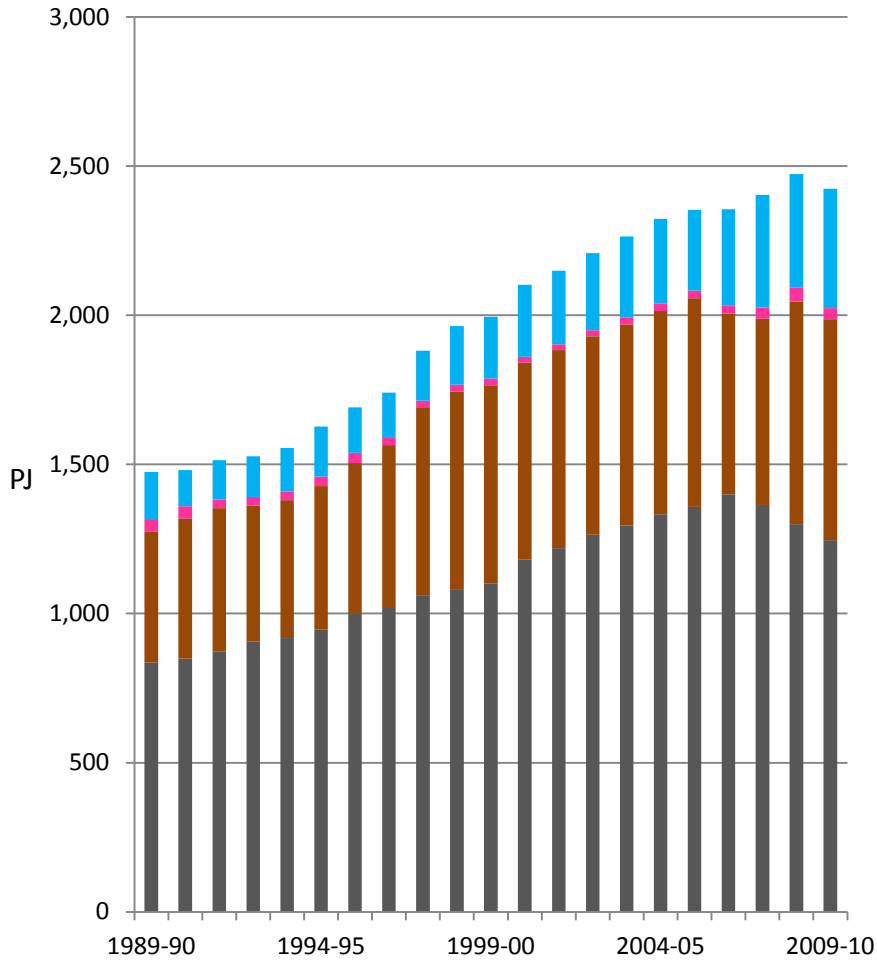
# Graph 2: Primary energy, final energy, emissions, the economy, and population



# Graph 3: Australian consumption of primary fossil fuels



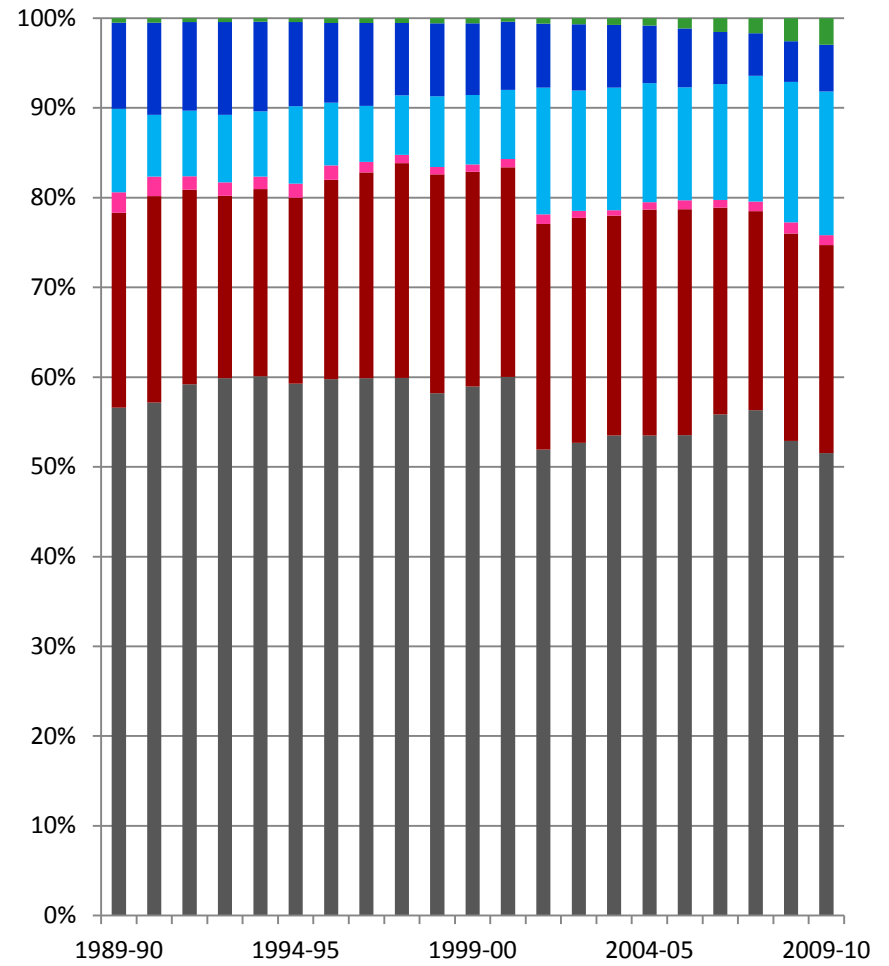
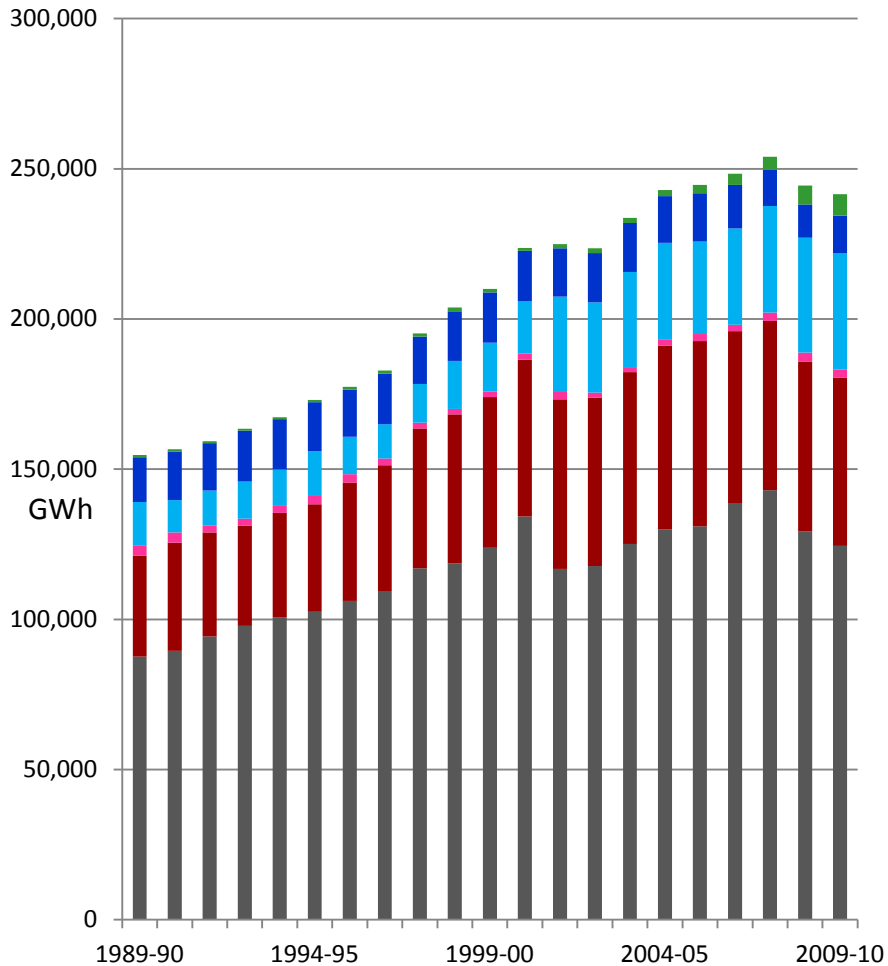
# Graph 4: Fossil fuel inputs to electricity generation



Black coal
  Brown coal  
 Petroleum products
  Natural gas

Black coal
  Brown coal  
 Petroleum products
  Natural gas

# Graph 5: Electricity generation by fuel source

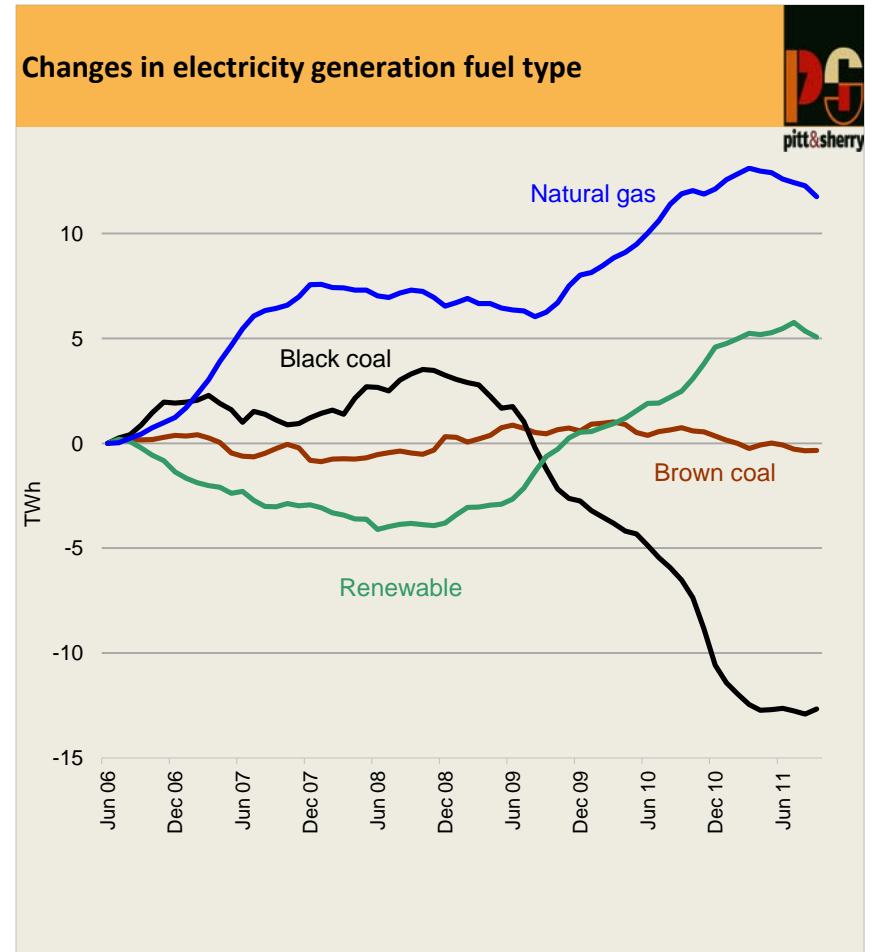
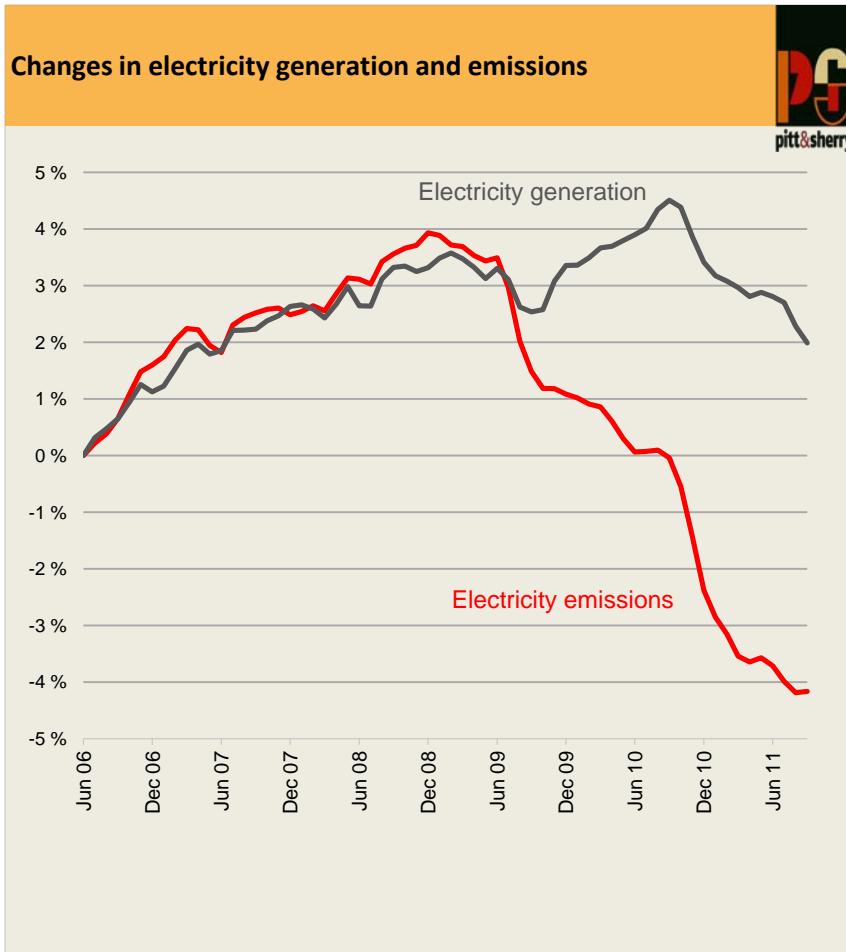


Black coal  
 Brown coal  
 Petroleum products  
 Natural gas  
 Hydro  
 Non-hydro renewables

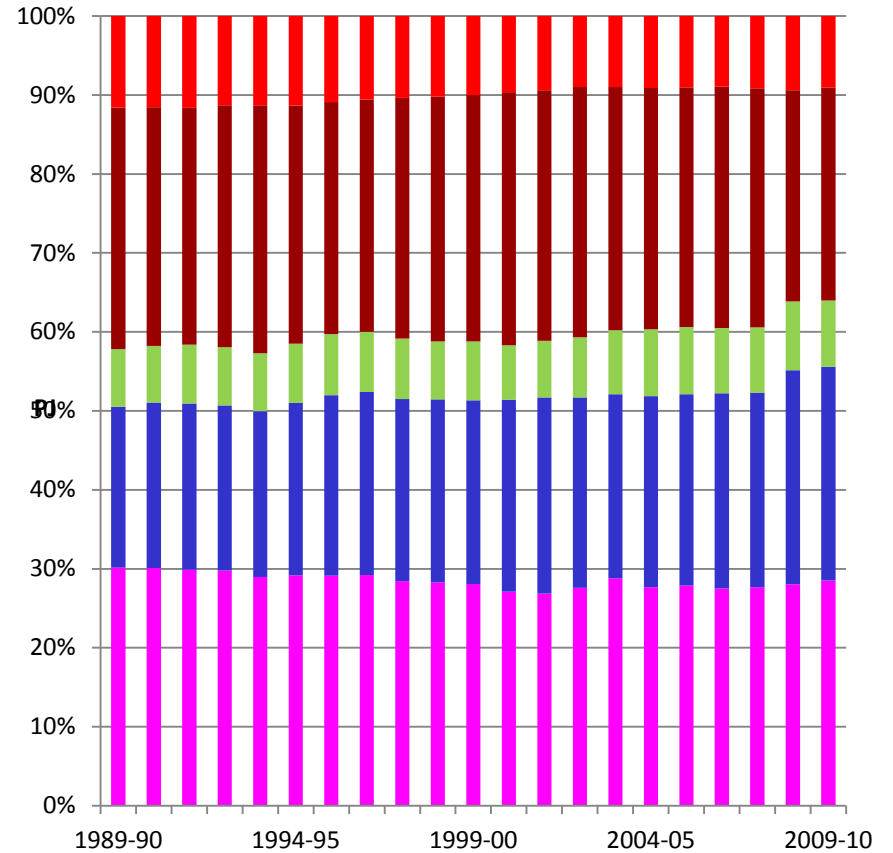
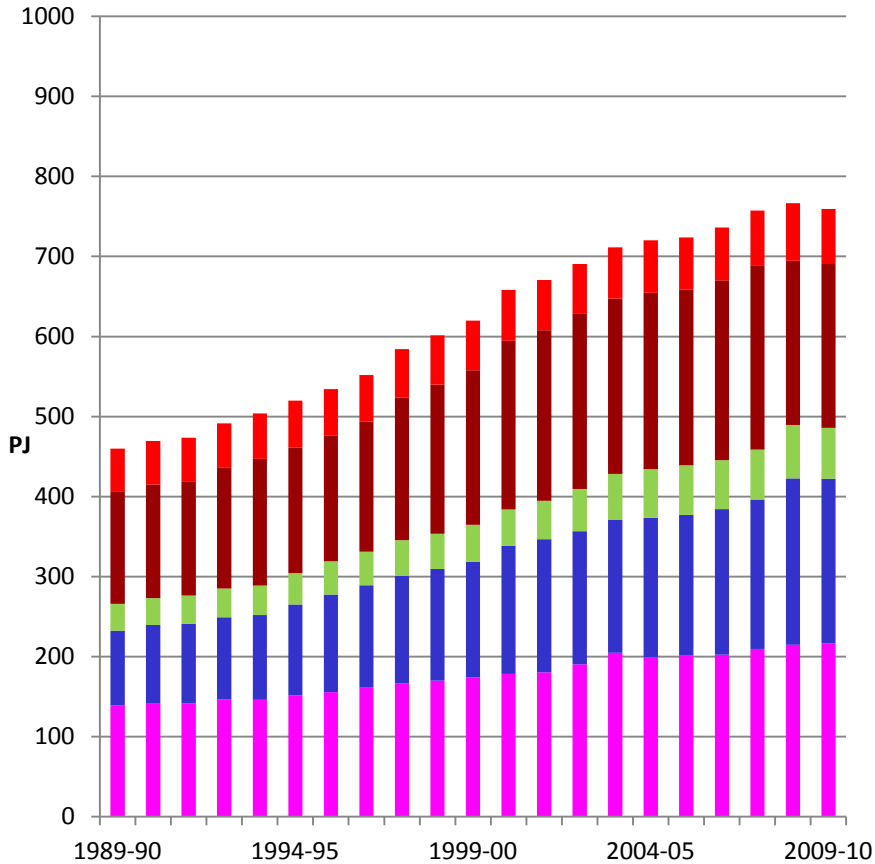
Black coal  
 Brown coal  
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# Graph 6: Recent generation trends in the National Electricity Market



# Graph 7: End uses of electricity

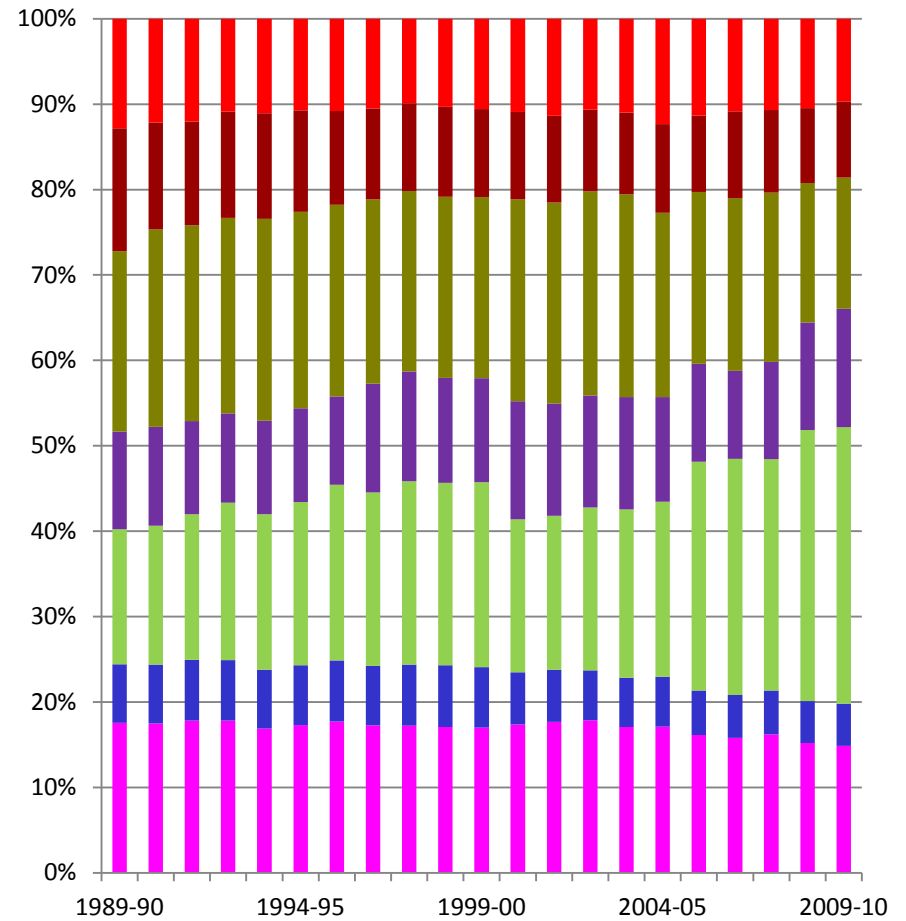
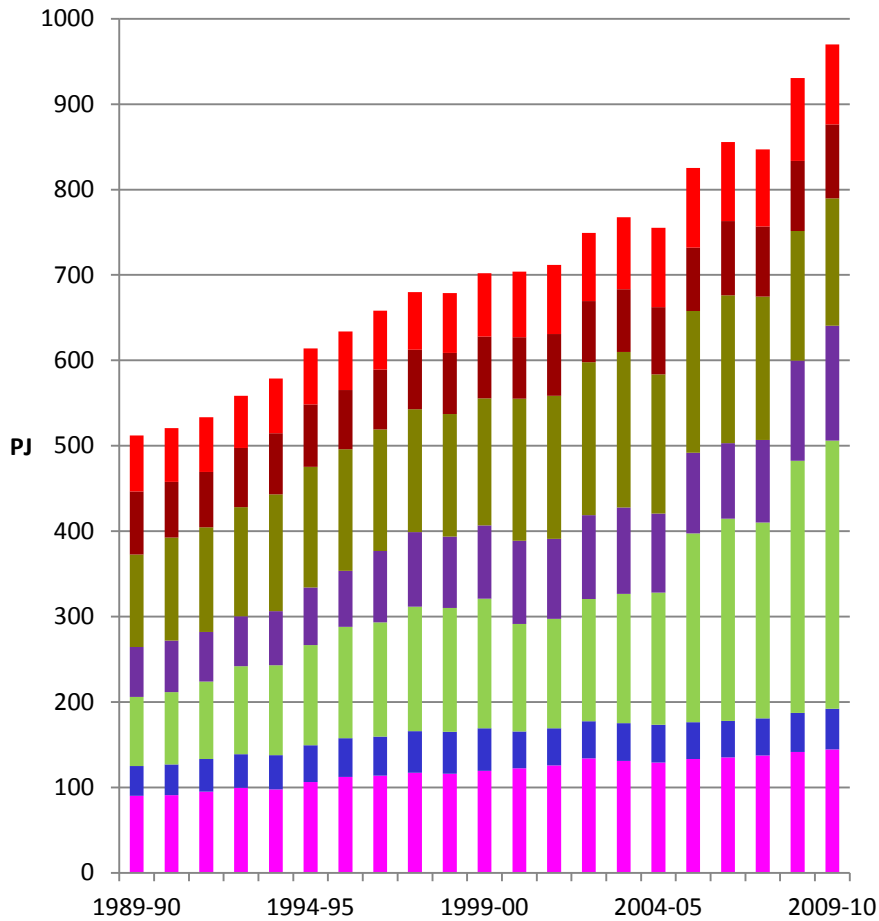


■ Residential  
■ Mining  
■ All other industries

■ Commercial and services  
■ Mineral processing & other process industries

■ Residential  
■ Commercial and services  
■ Mining  
■ Mineral processing & other process industries  
■ All other industries

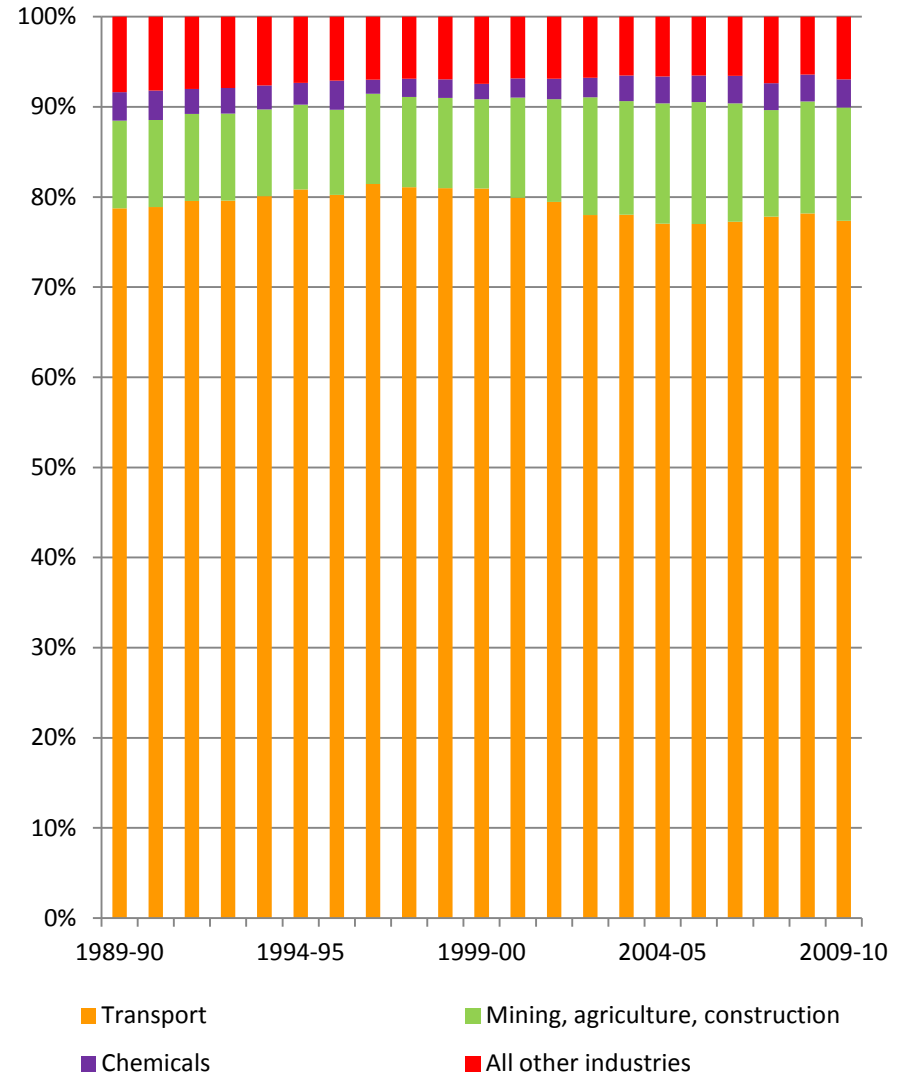
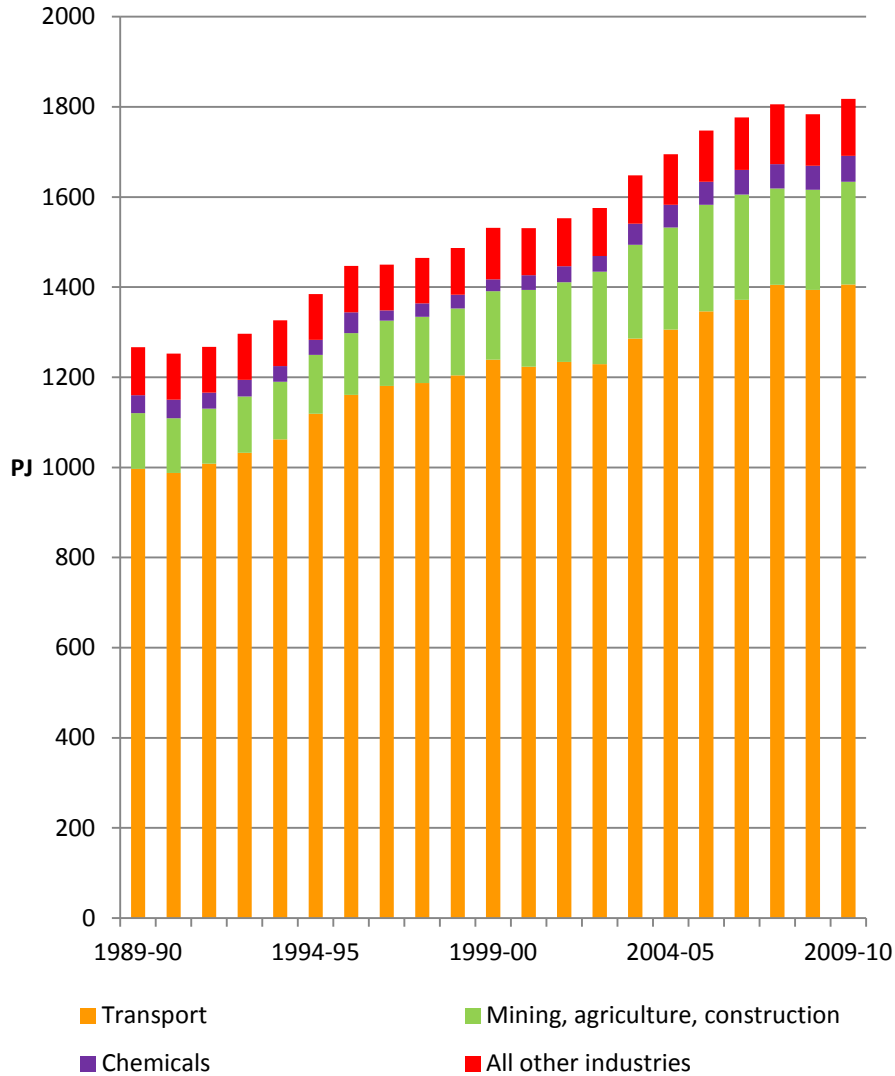
# Graph 8: End uses of natural gas



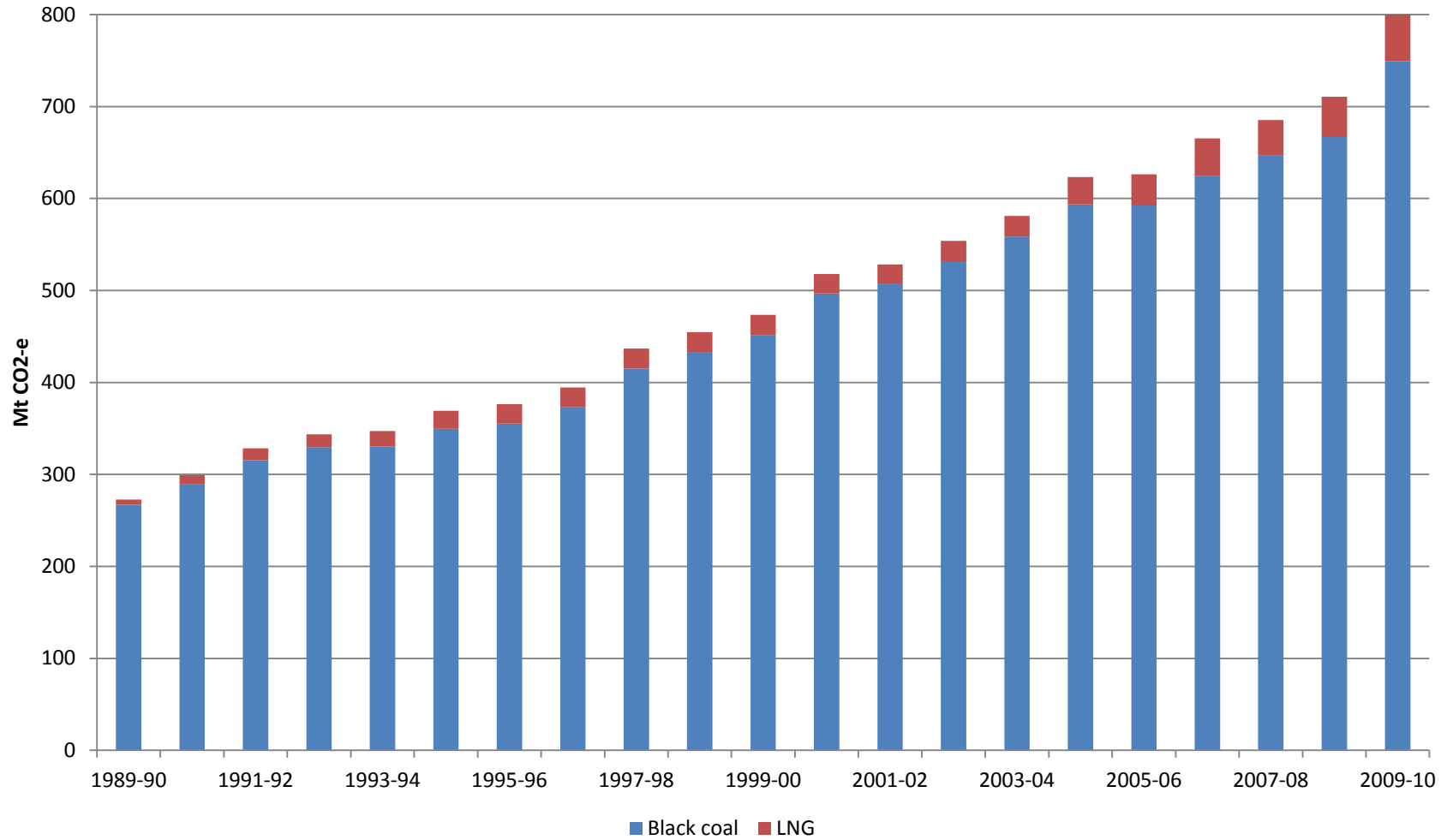
- Residential
- Mining
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- Chemicals
- Other process industries

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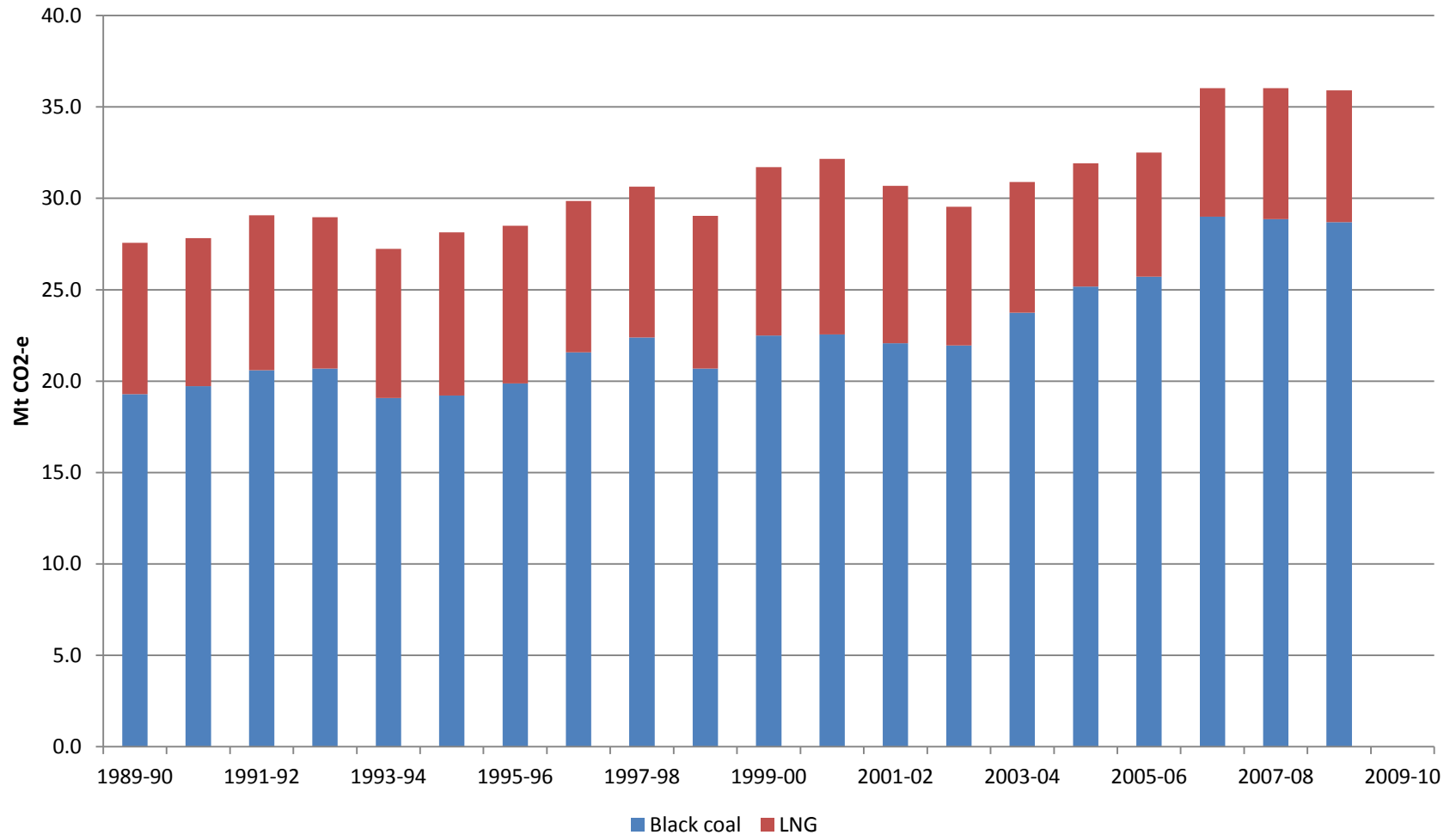
# Graph 9: End uses of petroleum products



# Graph 10: Emissions from exported fossil fuel commodities



# Graph 11: Fugitive emissions from coal and natural gas production



# Sources

- Graphs 1, 2, 3, 4, 5, 7, 8, 9:  
Constructed from data contained in Australian Bureau of Agricultural and Resource Economics and Sciences, 2011, *Energy Update 2011*, <http://www.bree.gov.au/data/energy/AES-2011.html> ,  
Australian Bureau of Statistics, *Australian National Accounts: National Income, Expenditure and Product*, Cat. No. 5206.0, and  
Australian Bureau of Statistics, *Australian Demographic Statistics*, Cat. No. 3101.0.
- Graph 6:  
pitt&sherry CEDEX<sup>®</sup> *Carbon Emissions Index, November 2011 issue (on data to September)*, forthcoming.
- Graphs 10 and 11:  
constructed from data contained in Department of Climate Change and Energy Efficiency, *Australian Greenhouse Emissions Inventory System*, <http://ageis.climatechange.gov.au/> .