



Comments on the NPC Discussion Paper on Energy

Pretoria, 13th February 2017



**national planning
commission**

Department of Planning, Monitoring and Evaluation
REPUBLIC OF SOUTH AFRICA

Peter Terbrugge

Dave Collins

National Development Plan energy objectives

The 2030 National Development Plan seeks a South African energy sector that promotes:

- **Economic growth and development** through adequate investment in energy infrastructure. The sector should provide reliable and efficient energy service at competitive rates, while supporting economic growth through job creation.
- **Social equity** through expanded access to energy at affordable tariffs and through targeted, sustainable subsidies for needy households
- **Environmental sustainability** through efforts to reduce pollution and mitigate the effects of climate change





Purpose of this presentation

The NPC discussion paper identifies challenges in South Africa's energy sector, and seeks comment on the key priority areas to be addressed.

The Fossil Fuel Foundation notes particularly (2.4) "the urgent need for co-ordinated government action to facilitate a transparent decision-making process on the future of coal in South Africa and the need to transition away from coal in the medium- to long-term".

The FFF will focus on some key issues related to the use of coal in South Africa.

The Fossil Fuel Foundation

The Fossil Fuel Foundation is an independent, world-class, knowledge-based institution serving the techno-intellectual needs of the multidisciplinary fossil fuel and energy communities in southern Africa. Its focus is on coal.

It achieves this through communication, information sharing, coordination, education, promotion and networking.

It is comprised of a Board of Trustees and an association of professional members from a wide range of disciplines, sectors and organisations, locally and internationally, including government, parastatals, industry and academia.

It has a circulation base of over 3 500 people in Africa and abroad.



SA Coal Roadmap (2013)

The FFF managed the South African Coal Roadmap process in 2011 – 2013. This drew upon a wide range of stakeholders in the coal industry:



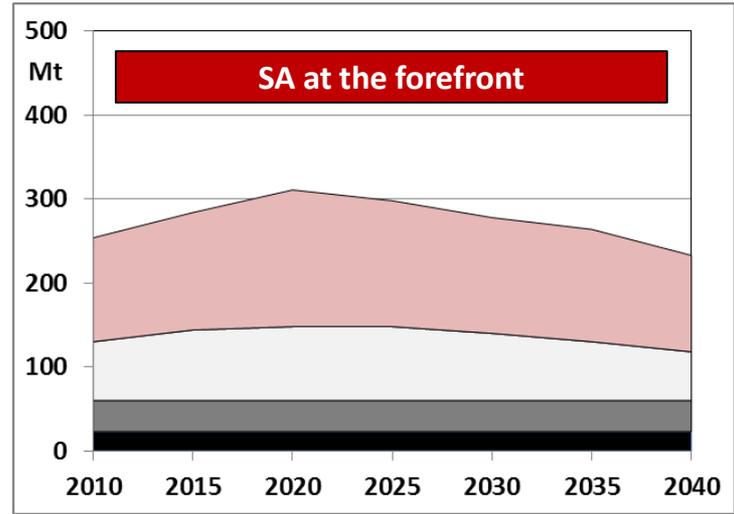
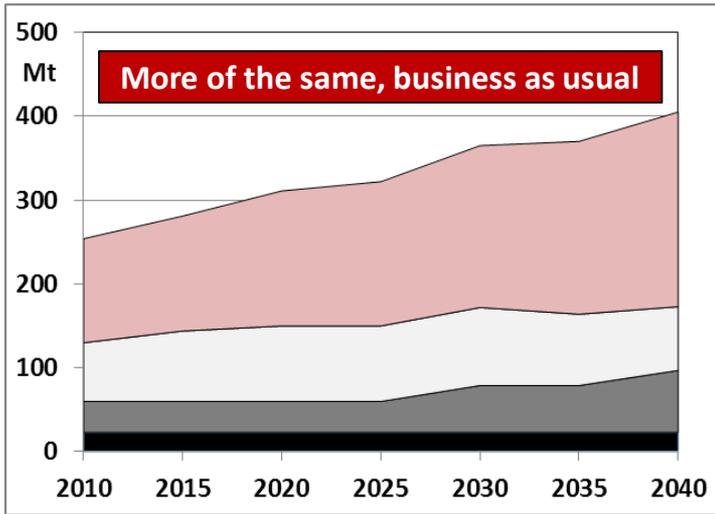
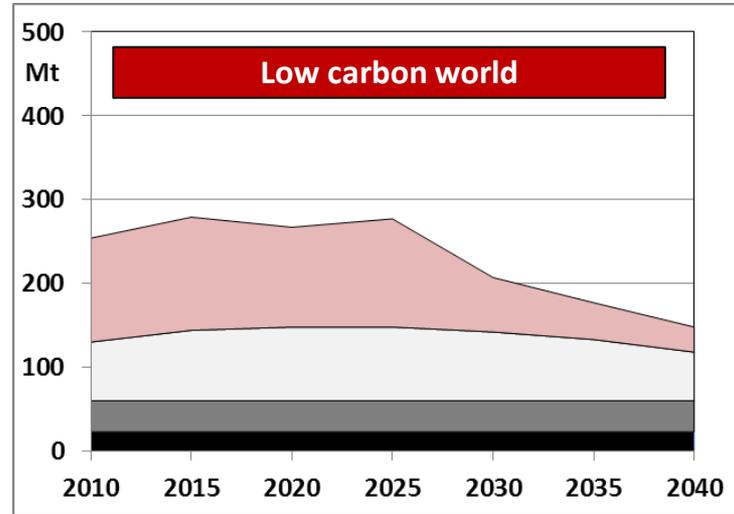
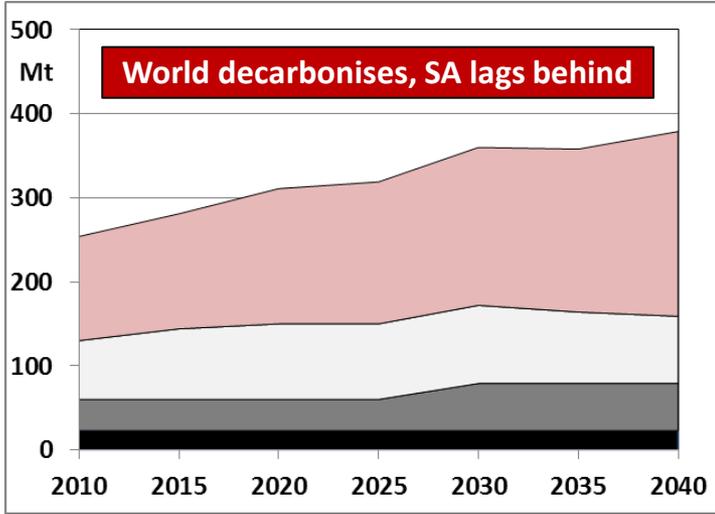
Four scenarios for the future of the SA coal industry were generated and published in 2013.

This was the last major investigation carried out.

SA Coal Roadmap (2013): 4 scenarios

Low South Africa climate change response **High**

High
Global climate change response
Low



- Electricity
- Exports
- CTL
- Other



Coal Industry

Importance to the South African Economy

Coal provides:

- **>93% of SA's energy production**, and 81% of the regions' energy
- **>98% of carbon reductants** in the metallurgical industry - iron, steel, ferrochrome
- **>30% of the national petrol, diesel** and other fuel requirements
- **>200 major chemicals and over 7 000 carbon-based products** (including paints, plastics, fertilisers, explosives, food and many other C-based products)
- **Effective storage of energy**, given its energy density and ease of extraction when required for use.

In many cases, coal is not only a source of energy, but also a source of carbon.



Coal Industry

Diversity of downstream users

Local markets are extremely diverse - Eskom, Sasol, metallurgical, export, local industries dependent on coal (\pm 6,000 local users – including brick and tile, pulp and paper, sugar, cement, hospitals, mines, transport, food, textile chemicals and other product manufacturers).

Advanced products derived from coal include paint, plastic, explosives, petrol, diesel, carbon materials (coke, char, semi-coke, anthracite) for smelters (metallurgical industry across the board).

Failure to mine coal will result in the need to import some products currently being derived from coal or produced from coal-based processes – the overall value could rise to as high as R500 billion.



Coal Industry

Eskom and exports

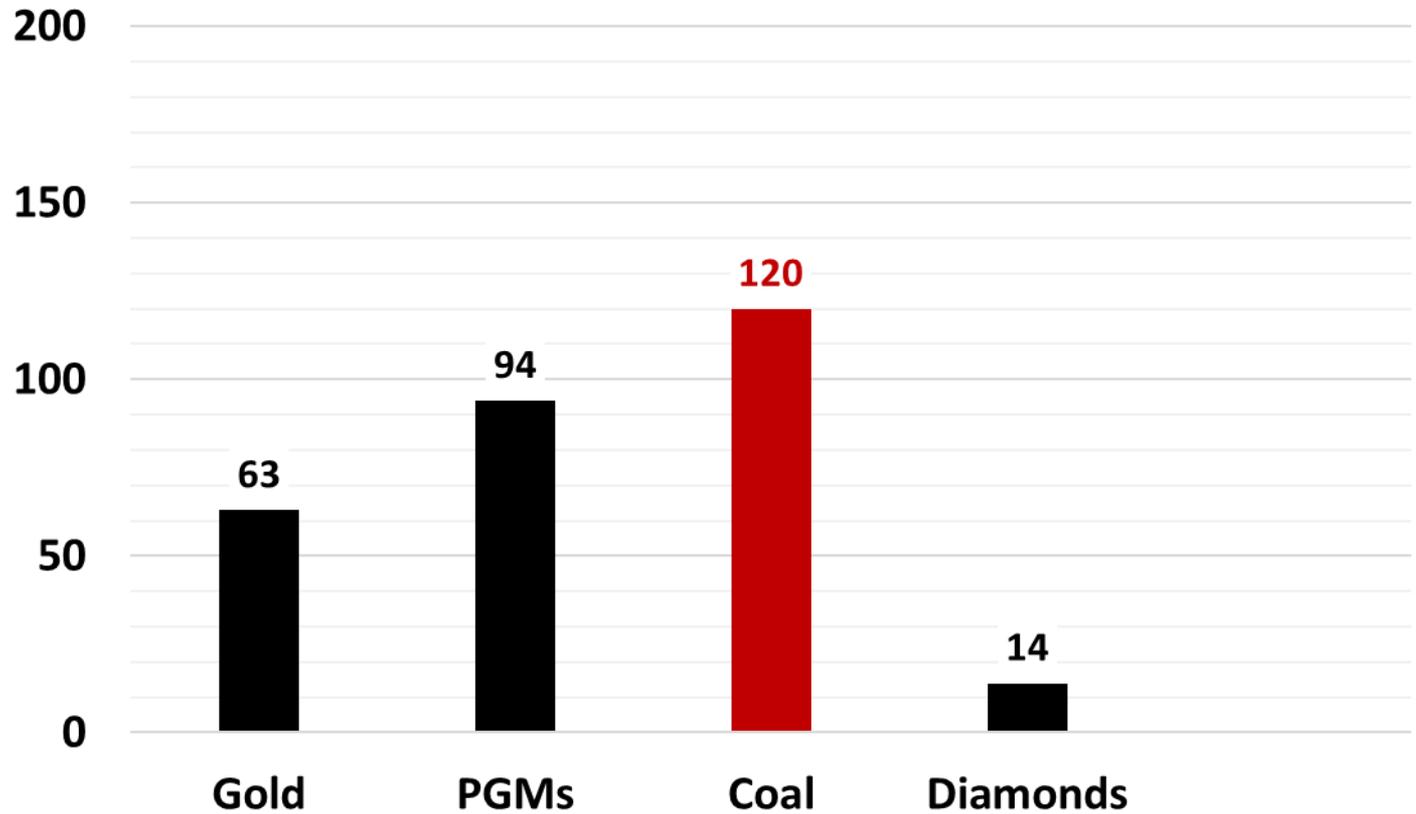
Export of SA coal is financially vital for the SA economy but this requires beneficiation which leads to the production of secondary (lower grade) products for power station use.

Export of coal can generally not happen without a power station for take-off use of the secondary products - this synergistic balance is essential.

Coal Industry

Importance to the South African Economy

Revenue, billion Rand (2016)

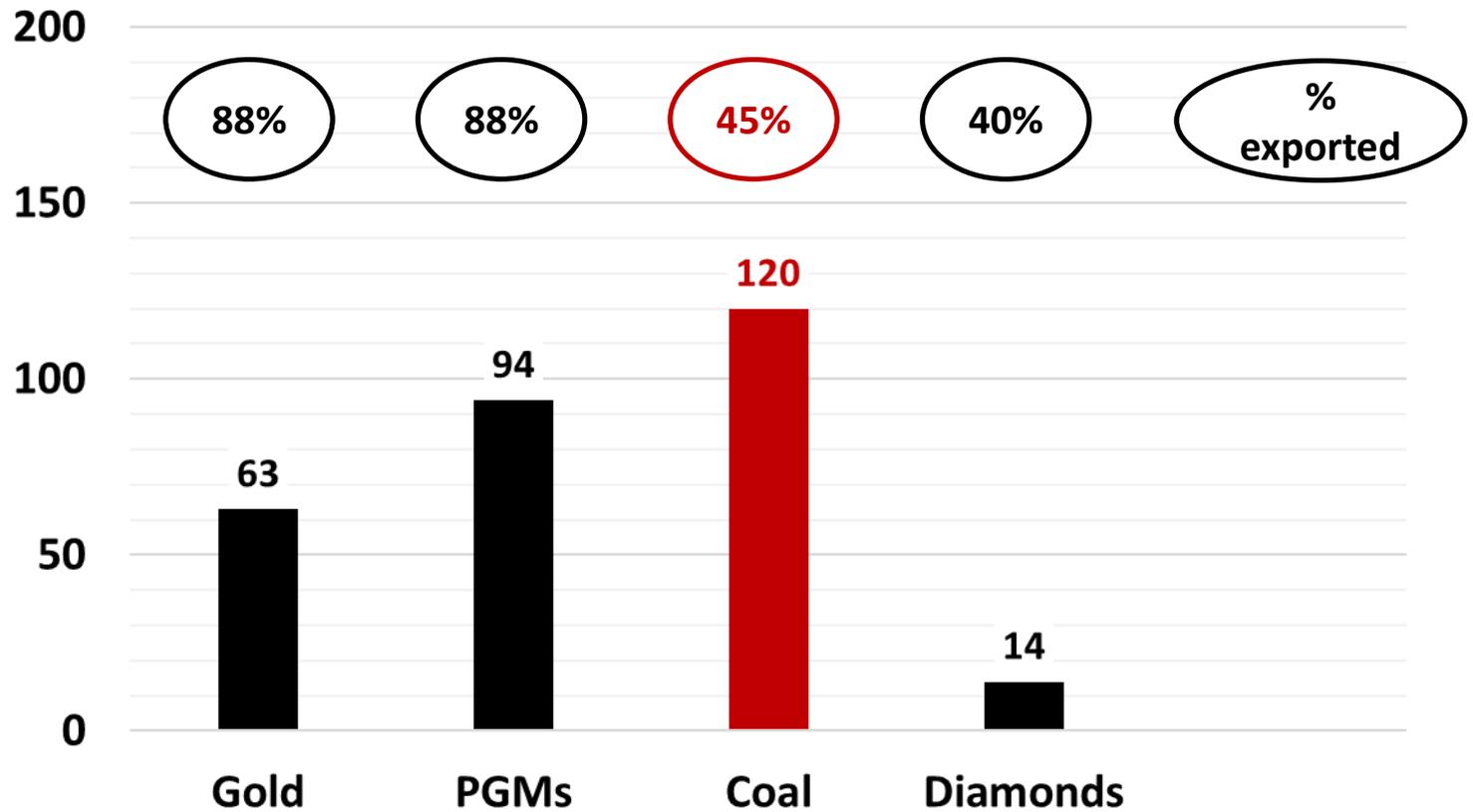


Reference: Chamber of Mines

Coal Industry

Importance to the South African Economy

Revenue, billion Rand (2016)

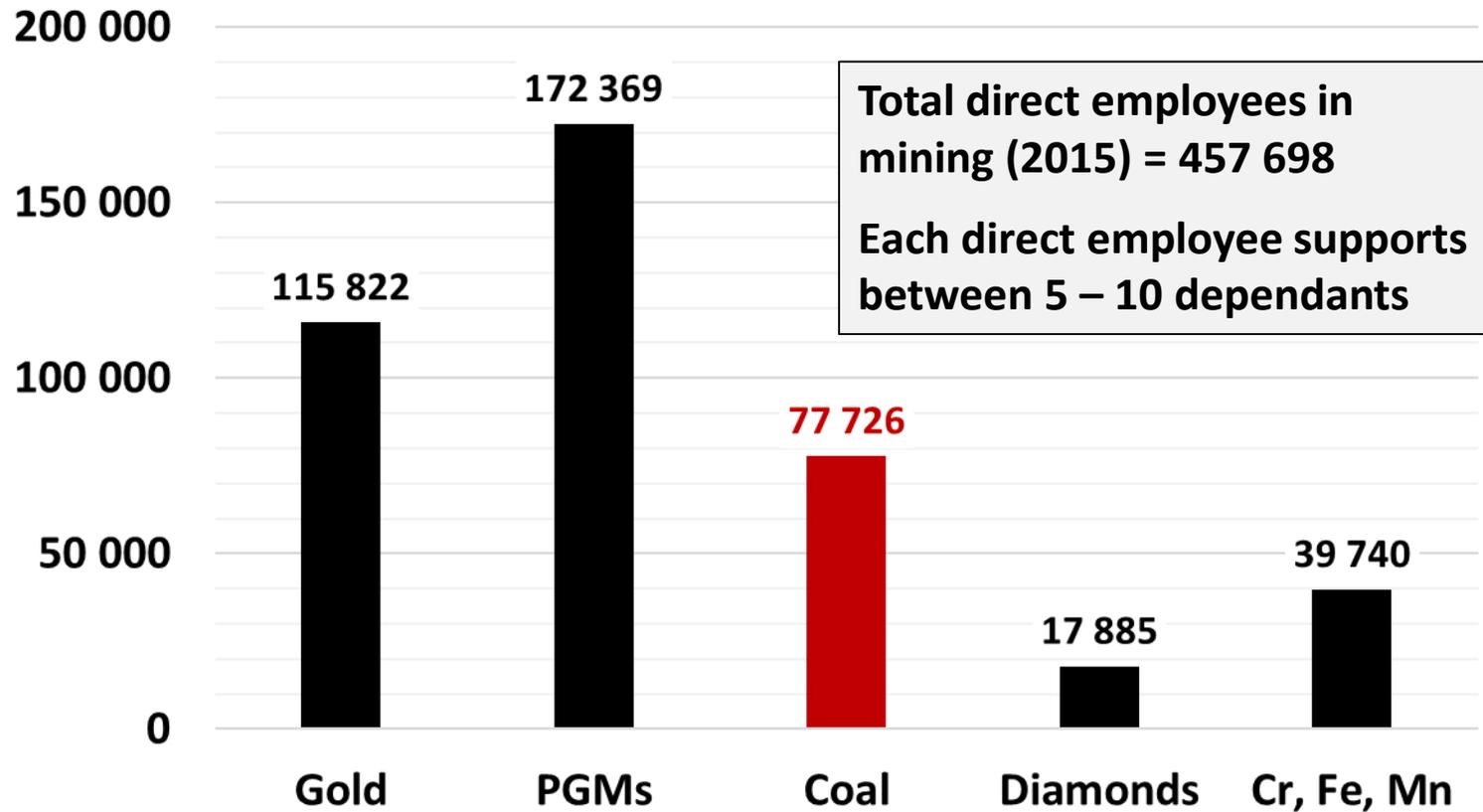


Reference: Chamber of Mines

Coal Industry

Importance to the South African Economy

Direct employment, jobs (2016)

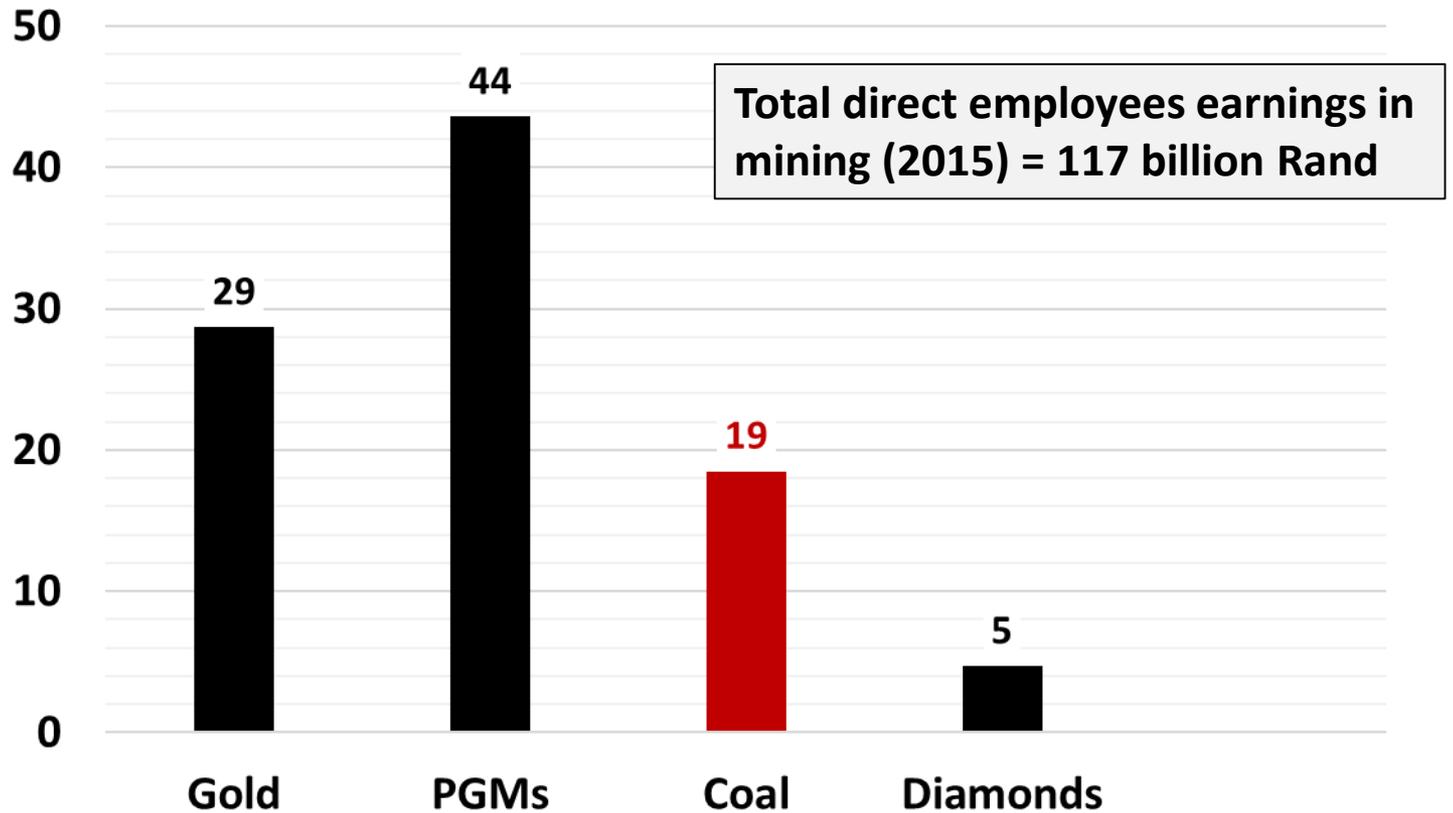


Reference: Chamber of Mines

Coal Industry

Importance to the South African Economy

Employee earnings, billion Rand (2016)



Reference: Chamber of Mines



Coal Industry

Socio-economic aspects in South Africa

Coal provides considerable value in terms of its footprint in society and in the economy:

Employment:

- 78 000 direct jobs
 - Supporting 390 000 – 780 000 dependants (ratio of 5 – 10)
- Further indirect jobs, including engineering, scientific and technical users, consultants, equipment and service providers, health officials, Transnet, road transport, environmentalists

Local economy:

- Coal mining companies support towns, schools, hospitals, clinics, health programmes and infrastructure



Coal for electricity

Options that need to be considered

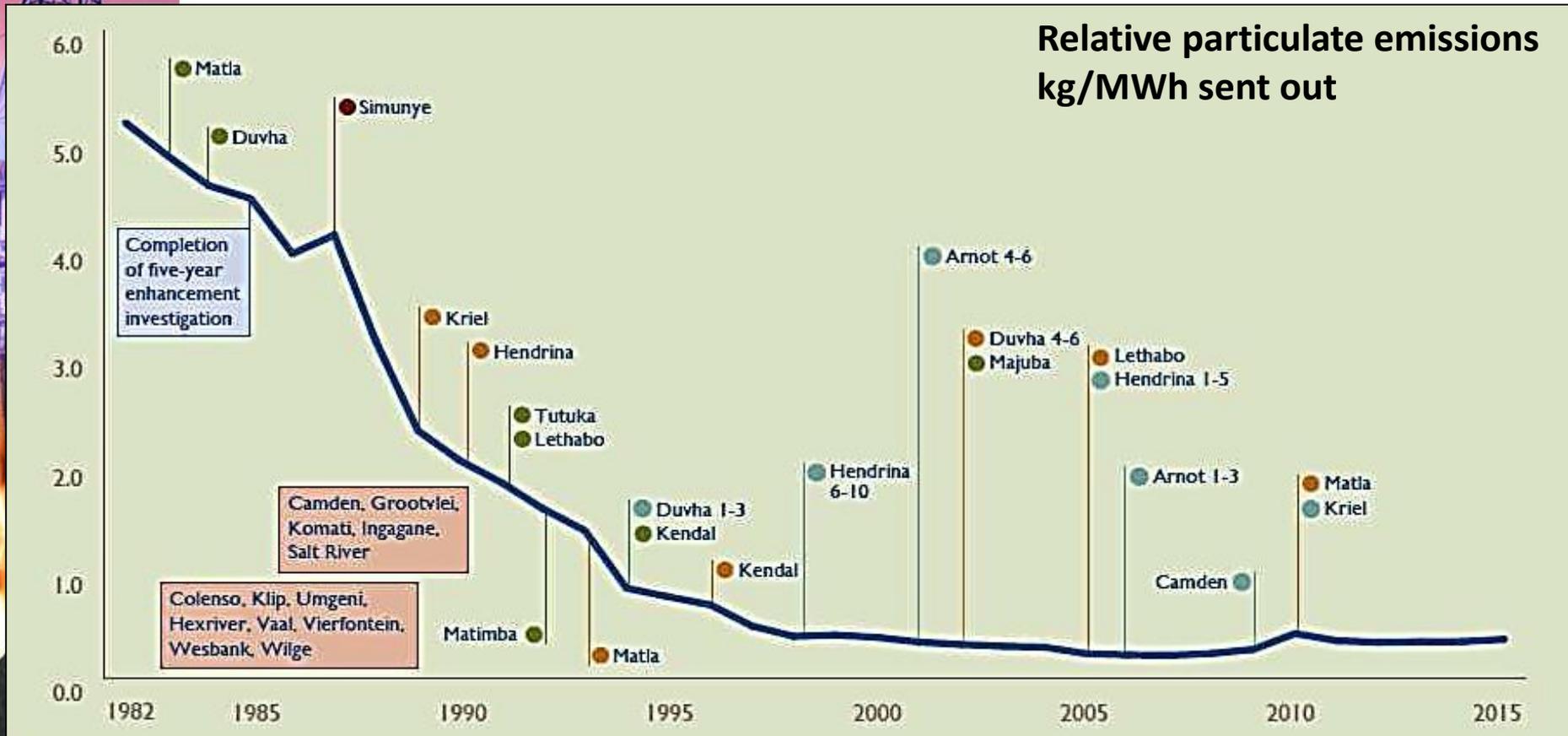
Refurbishment of older power stations

- These are due to be phased out when life of plant reaches 40 years
- But many assets can be re-used - existing infrastructure, storage capacity, licences
- Upgrades of current stations can include new technology which:
 - Will reduce or eliminate SO_x, NO_x and particulate emissions: the relative particulate emissions from Eskom's coal-fired power stations have been reduced by more than 90% over the past 35 years (see next slides)
 - Will reduce GHG emissions per unit of electricity by 1/3 (see next slides)

Coal for electricity

Particulate emissions reduction

The relative particulate emissions from Eskom's coal-fired power stations have been reduced by more than 90% over the past 35 years



Reference: Eskom



Coal for electricity

Reduction of SO_x and NO_x

Fluidised bed boilers can be used to eliminate:

- SO_x: using dolomite within the combustion bed (hence not requiring FGD* with high water needs)
- NO_x (by burning at lower temperatures).

Reduction of GHG emissions

Eskom's oldest plants produce emissions of 1.10 – 1.25 t CO₂e/MWh.

New super-critical technology will produce emissions of just under 0.80 t CO₂e/MWh, a reduction of 1/3.

* Flue-gas desulphurisation

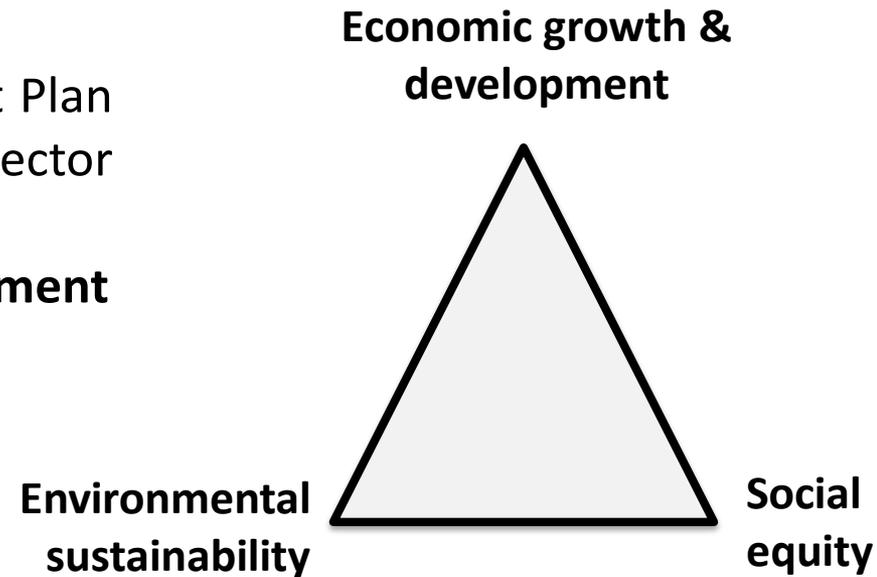


Energy sources for South Africa

The balance that is required

The 2030 National Development Plan seeks a South African energy sector that promotes and balances:

- **Economic growth & development**
- **Social equity**
- **Environmental sustainability**



In making the choice of sources and technologies, many factors need to be considered, including:

- Socio-economic impacts
- In the case of electricity
 - Transmission costs
 - Grid stability issues
 - Coal plant life extension
 - Forex risks for imported hardware and imported energy
 - Health effects



Recommendations to the NPC

1. A comprehensive socio-economic analysis of the impacts of the various energy source and technology options is required. It appears that only some aspects, such as job requirements, have been analysed in the past.
2. An economy-wide analysis of the impact of a move away from coal is required, with reference to the use of coal as a source of energy and of carbon.
3. An analysis of the option of life extension for existing older coal power plants is required. It is understood that Eskom may have done this, but the outcomes are not publicly available.



Comments on the NPC Discussion Paper on Energy

Pretoria, 13th February 2017



**national planning
commission**

Department of Planning, Monitoring and Evaluation
REPUBLIC OF SOUTH AFRICA

Peter Terbrugge: Chair, FFF Board of Trustees pterbrugge@srk.co.za

Dave Collins: Vice-President, FFF davec@macgroup.co.za