THE SOUTH AFRICAN NUCLEAR ENERGY CORPORATION (NECSA) INPUTS INTO SOUTH AFRICA'S IRP 2010 DEVELOPMENT PROCESS

By:

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02 December 2010

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Why Should South Africa Consider Nuclear Energy?

- Nuclear energy supports South Africa's need for relatively low electricity tariffs over the long-term
- Job creation, from low-end skills to high-end technical skills
- The nuclear energy industry is one of the most regulated industries globally and boasts an excellent safety record
- A nuclear energy expansion programme will enable beneficiation of South Africa's uranium resources to ensure a sustained security of electricity supply

Why Should South Africa Consider Nuclear Energy?

- Nuclear energy enables attainment of South Africa's climate change mitigation ambitions
- Nuclear energy is a proven technology which can further enhance the reliability of baseload electricity supply in support of Government's economic and social goals
- Geographic factors in Western Cape & Eastern Cape rule out local coal or hydro
- Retrievable spent fuel repositories are geologically feasible in SA

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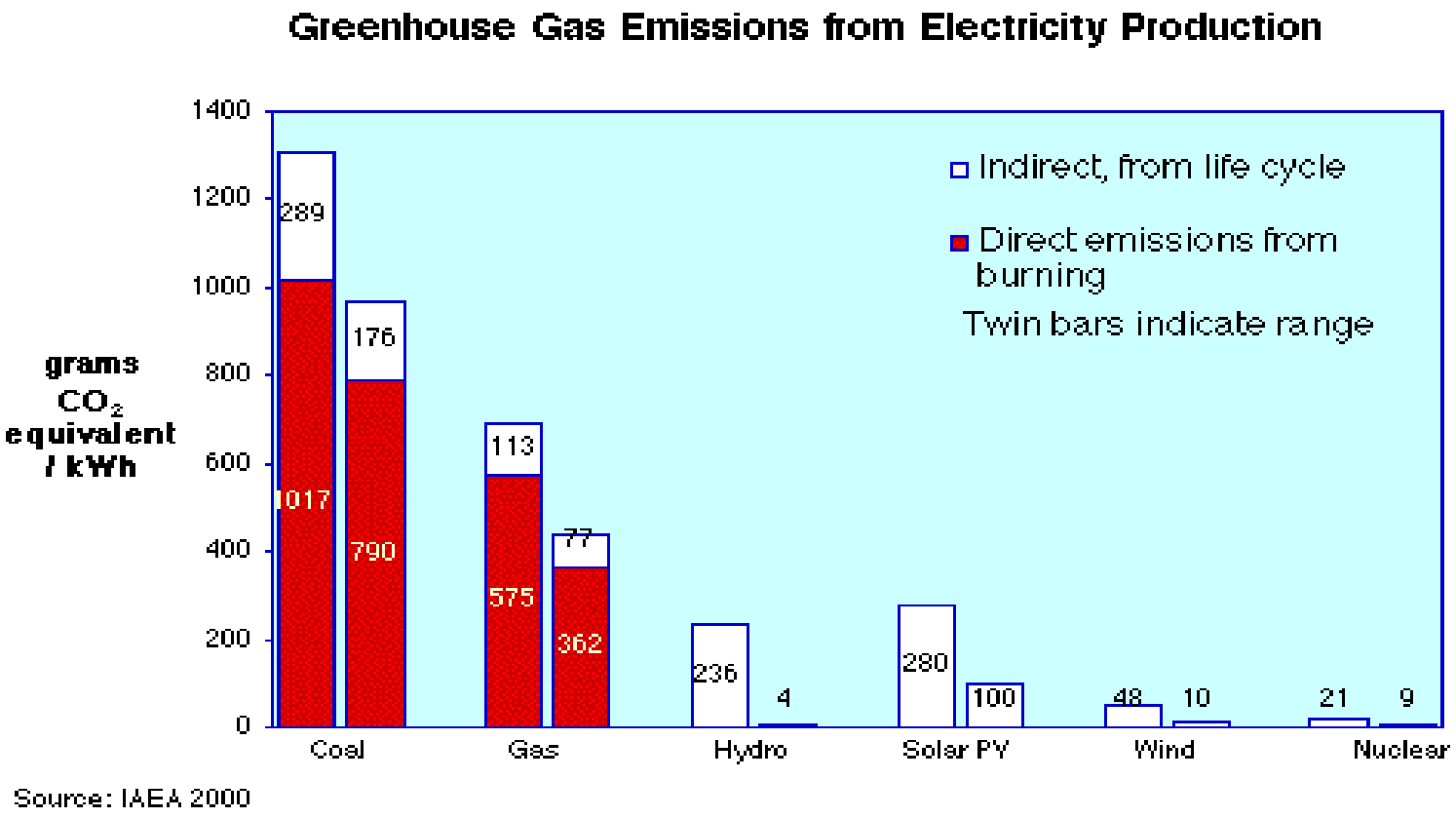
Why Nuclear in a Carbon Constrained Future?



Source: IAEA, 2000

Comparative CO_2 Intensity Per GDP (IEA)

Country	kg CO_2 per $ PPP (2003)	% nuclear in electricity supply
World	0.52	16
Australia	0.62	0
France	0.24	78.5
India	0.37	2.8
Japan	0.37	29.3
South Africa	0.84	5.5
South Korea	0.54	44.7
UK	0.33	19.9
USA	0.56	19.3

Necsa's View

- Necsa commends the DoE on the extensive modelling and other work to deliver the draft IRP 2010
- Necsa recognises the need for both nuclear energy and renewable technologies as a future low-carbon solution to our long-term electricity requirements
- The draft IRP 2010 provides an illustrative energy mix, but is built on too many assumptions for it to realistically reflect a true long-term electricity supply plan for SA . Implementation and financial realities of new generating capacity may lead to a different real end result.
- An indigenous nuclear fuel cycle which will only cost around 4% of the NPP fleet cost and give security of supply of fuel
- The SA economy could also procure substantial localisation benefits from equipment supply through a nuclear fleet construction programme

The Draft IRP 2010

- **Necsa broadly agrees with the stated intent of the Draft IRP 2010. We wish to highlight certain critical issues:**

  - The reliance on electricity imports and the certainty thereof needs to be questioned in light of our neighbours striving to meet their MDG goals and their own economic growth and development ambitions

  - The ability of our national electricity grid to manage the variability inherent with large scale intermittent supplies remains an important consideration; as coupled with the lack of flexibility associated with our reliance on potential imports (we do not have the advantages offered by an integrated European grid and market system)

The Draft IRP 2010

- The variable nature of wind power, in contrast to conventional dispatchable (such as coal, hydro, nuclear) technologies, requires flexible operating reserves to be on hand for when the resource is not available. This means a higher overall capital injection (infrastructure redundancy) required for SA's long-term electricity generation capacity investment.

- If one considers an "effective" capital cost comparison (i.e. Overnight cost divided by availability factor) than it can clearly seen that wind comes at a price (**Wind – R49,810/kW versus nuclear at R28,885/kW**)

- The draft IRP 2010 acknowledges nuclear as highly competitive on a levelised cost of electricity (LCOE) basis. This is further qualified by other international studies as shown overleaf

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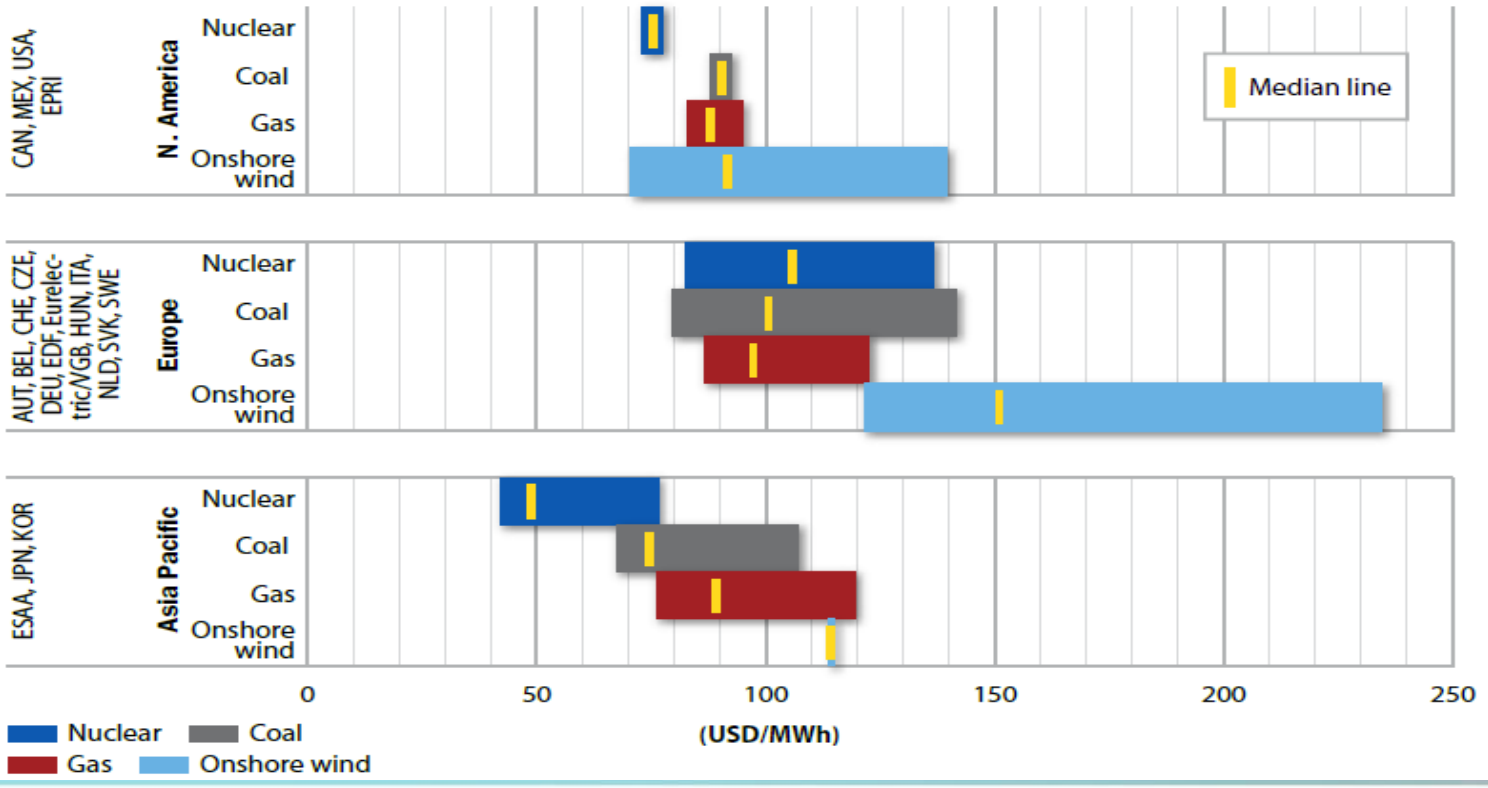
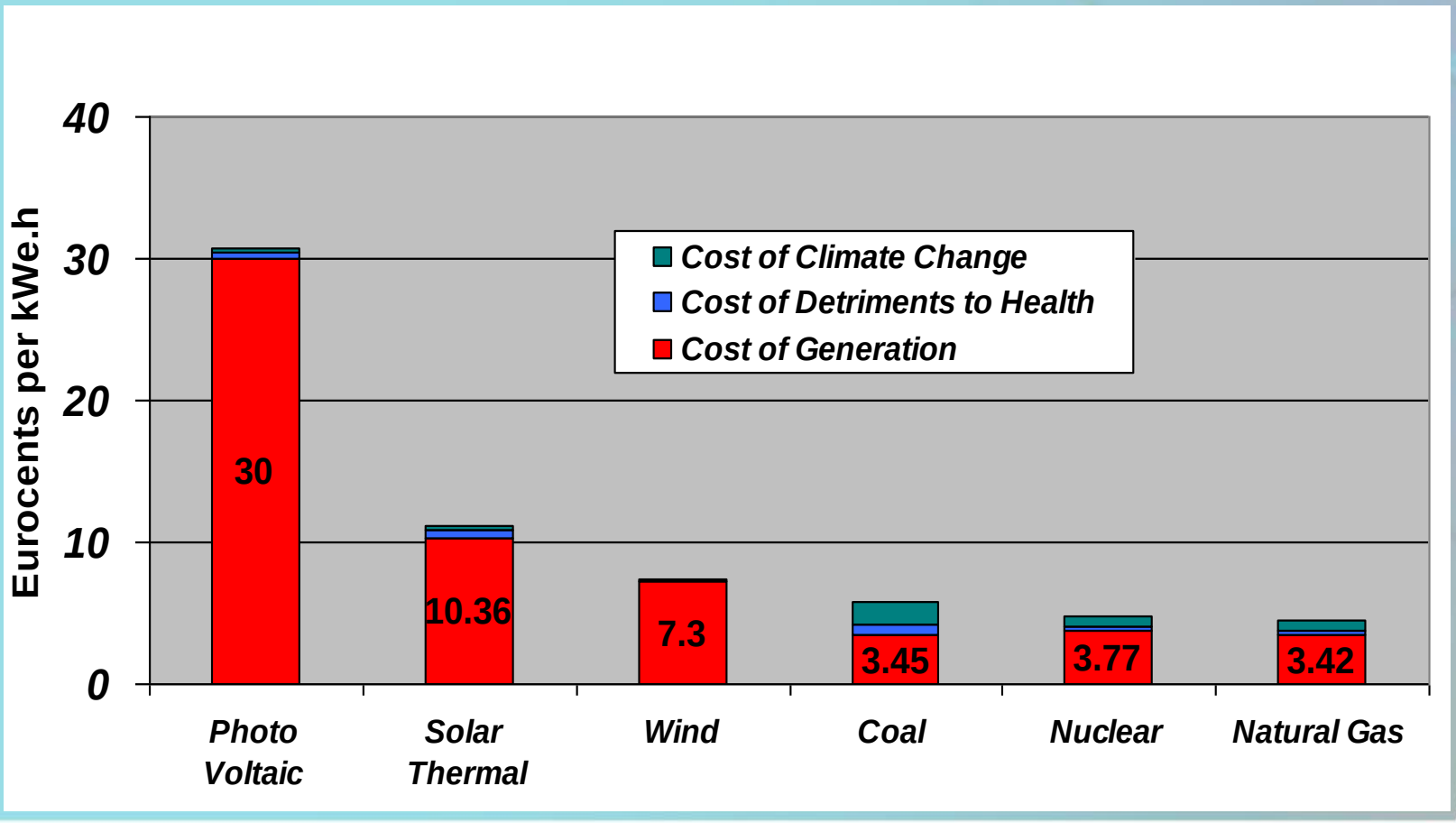
LCOE Comparators

Figure ES.2: Regional ranges of LCOE for nuclear, coal, gas and onshore wind power plants
(at 10% discount rate)



Source: "Projected Costs of Generating Electricity" , 2010 Edition by the OECD NEA

Cost of Producing Electricity from New Power Stations



(European Union estimate, 2008)

The Draft IRP 2010

- Denmark is a case in point – West Denmark uses Norwegian hydro and East Denmark uses French nuclear via Germany when there is a deficit, when the wind blows too much, power is sold to the grid at spot price, which is sometimes zero. Not a single coal-fired power station in Denmark has been de-commissioned due to the introduction of wind power
- Nuclear power plants offer the added advantage of, at the least, a 60-year lifespan with the possibility of re-licensing for longer operational life (as is currently the case)

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Funding and Finance

- Recent global trends have seen the initiation of new innovative financing structures involving the private sector (e.g. Van Eck's Market Vectors Nuclear Energy Exchange-Traded Fund; Global Nuclear Energy Index; Standard and Poor Global Energy Index, etc.)
- Expeditious consideration needs to be given to market changes necessary to stimulate private sector investment in SA electricity generation projects
- Consideration needs to be given to 'nuclear' IPP's
- Government should leverage international funding as per the Copenhagen Accord
- Export credit financing of nuclear programme should be considered

Nuclear is Affordable!

- Recent international tenders (UAE) indicate overnight costs of R27,000/kW ($20.4 billion for 5.6 GWe; KEPCO) for new nuclear plant (minimum 60-year operating lifespan)
- ESKOM's Medupi construction equates to R26,000/kW (R125 billion CAPEX) (minimum 40-year operating lifespan)
- The sensitivity analysis of any potential increase in nuclear capital costs (as per the draft IRP 2010) clearly indicates that even significant increases in capital costs (40%) of nuclear plant have small impacts (<5%) on nuclear generated electricity tariffs

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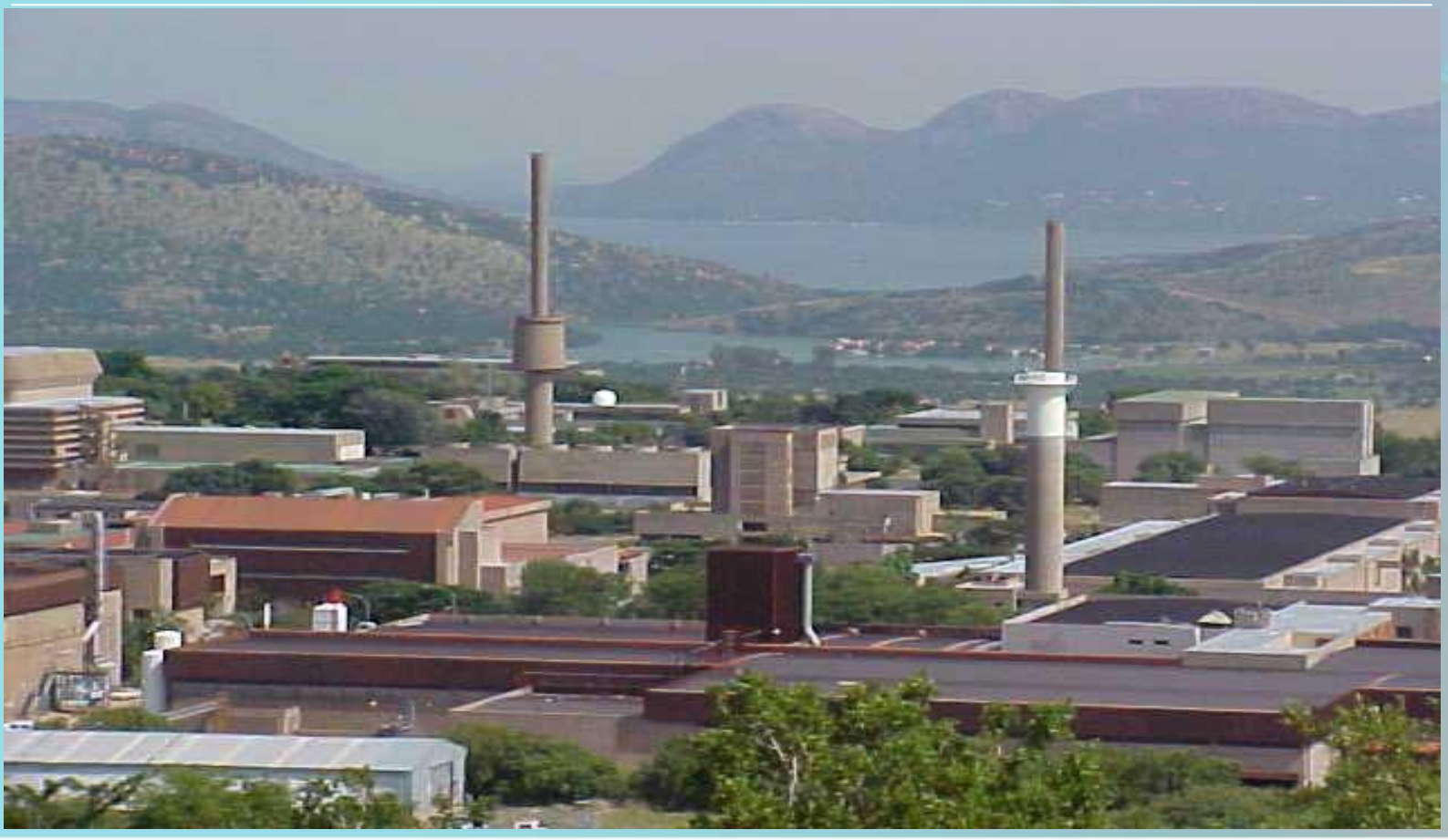
Recommendations

Necsa recommends that:

- Government expedite finalisation of SA's nuclear energy policy implementation strategy
- The in-principle decision to expand nuclear energy is taken as soon as possible
- Given the long-term sustainable advantages offered by nuclear energy (low carbon **baseload** supply; cheap long-range certain tariffs; long plant life; lower likelihood of associated additional grid infrastructure investment), the energy mix in the draft IRP 2010 be revisited and cater for larger scale low carbon nuclear **baseload** electricity

Recommendations

- SA's nuclear energy expansion programme be brought forward in the IRP 2010 timeline
- While the draft IRP 2010 utilises capital costs determined by an EPRI study which, for nuclear, only considers 2 vendors; this should be extended to include other potential vendors costs



Thank You!!!