Westinghouse Electric South Africa

Submission on the Integrated Resource Plan for Electricity 2010

Version 8, 8 Oct 2010 Rev2

November/December 2010

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Westinghouse Position

- Westinghouse supports the development and deployment of the IRP 2010 energy plan, and its bi-annual review, based on real performance of the proposed technologies and demand trends.
- Westinghouse supports a balanced generation pool, based on clean energy, of which nuclear forms a key part.
- Westinghouse supports the construction and operation of Generation III/III+ Nuclear Plants.
  - These reactors have the most advanced safety features available and in industry safety must always be a high priority.
  - This will align SA with the global trend and prepare local industry for future global participation in the wider nuclear industry.

Comment 1: A Balanced View on Risks

- **Consideration of Mitigation Actions for IRP Plan**
  - Table 5 (p21) proposes no mitigating plans should wind or solar options be delayed or fail.
  - In general, long lead-times make it difficult for alternative construction.
  - The IRP should propose bringing forward some alternative construction planning, to accelerate alternate construction if required.
- **There is a focused uncertainty on nuclear costs which is not reflected to a similar extent in the alternatives** (Table 37)
  - Costs of nuclear energy well supported by data from existing plants.
  - Global energy construction is happening, with real vendor commitments.
  - New nuclear plants were designed to be competitive with coal/gas on total cost. (Capital and operational costs included)

Comment 2: New Nuclear Technology's Impact on IRP Goals (1)

- **Lower Water Consumption**
  - Nuclear can be built along coast, close to where power needed – Salt water cooling => small impact on water resources.
  - Guaranteed water availability is not essential with some modern nuclear designs => Greater site flexibility.
- **Localisation Potential**
  - Adopting technology that is globally accepted means our local suppliers can compete to supply globally - WNA estimates >500GW$_e$ by 2030. All current USA NRC applications are for late generation PWRs or ABWRs.
  - Fleet: SA needs sufficient plants to maintain a skilled nuclear industry.

Comment 2: New Nuclear Technology's Impact on IRP Goals (2)

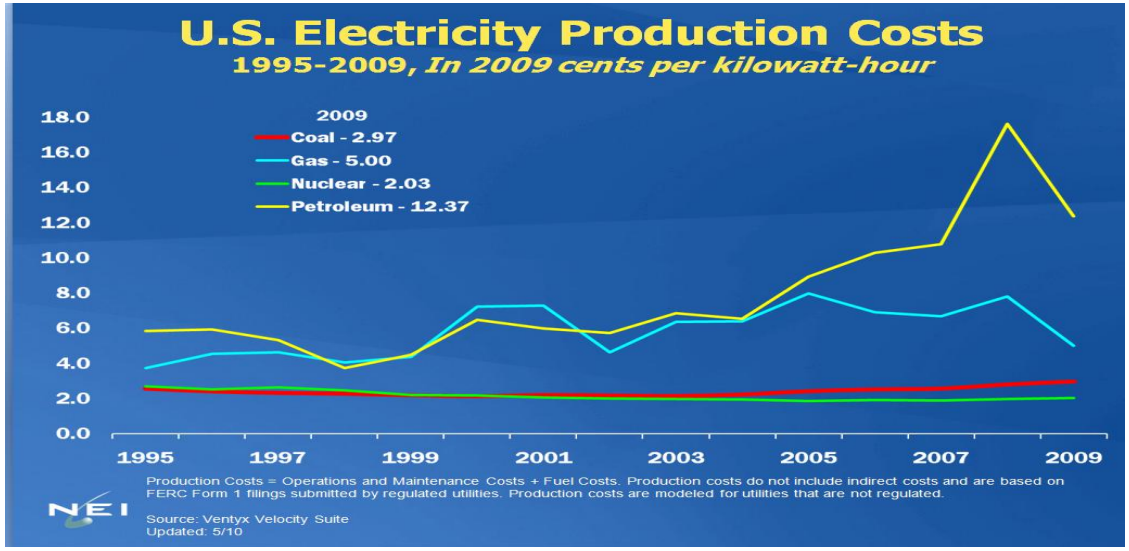
- **Regional Development Potential**
  - Modern technology supports modular construction.
  - Modular construction requires sub-modules and components that are rail/road transportable.
  - Manufacture sites can therefore be decentralized.
  - Viability of Regional Manufacturing Sites require a consistent build and maintenance programme (operating fleet) or alternate business:
    - Nuclear Manufacture <=> high quality manufacture. Establishes the skills that allow supply to other industries.

Comment 3: Uncertainty linked to Nuclear in IRP2010 (1)

- **Least cost to the consumer**
  - Current production costs are based on existing plants.
  - New designs have higher reliability
    - Design with operability objectives; Inputs from Utility User Groups.
    - More maintenance possible outside outage time, lower support cost.
- **Lower Risk & Uncertainty**
  - All the major vendors busy with construction => Vendor chosen in 2015.
  - By 2015 nuclear vendors will have completed plants – Cost & Risk will be known at time of order commitment. (Vendor's risk thereafter)
  - Supply chain will increase capacity/diversity => Greater stability.

Comment 3: Uncertainty linked to Nuclear in IRP2010 (2)

Stability of Nuclear Electricity Production Cost over Time



Comparison for Sweden $/MWh		
Hydro	58.5	(ref)
Nuclear, without gov guarantees	63.1	(+8%)
Nuclear, with loan guarantees	44.2	(-24%)
Wind	96.7	(+65%)

Competitive?

"Nuclear power could be the lowest-cost option for new electricity generating capacity in Sweden, according to a study by PricewaterhouseCoopers conducted for an electricity-intensive industry group" – WNN, reporting on a Independent Consumer (SKGS) Report, Oct 2010

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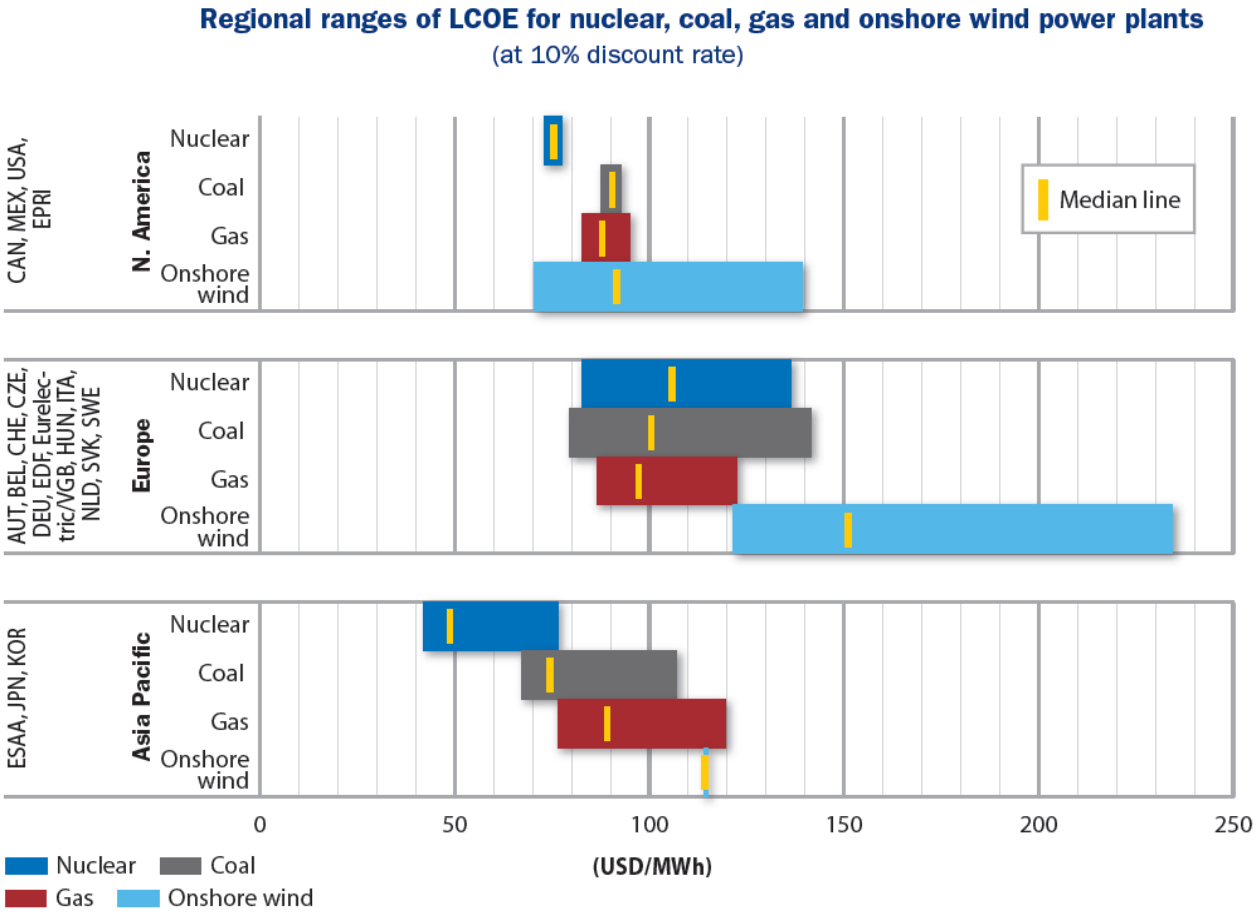
Comment 4: Transportability of Data Global Investment Comparison



Key Report Observations

- Moving the construction location changes the cost, irrespective of vendor or the technology
- A high discount rate disadvantages technologies with high early investment
- Nuclear Power remains competitive over a wide range of scenarios - fuel cost, discount rate, carbon tax/cost
- Renewable energy has a very wide cost-spread on country, and even location

Source: Projected Cost of Generating Electricity – 2010 Edition, NEA

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In Closing
Why 'Modern' Nuclear?

An order of magnitude safer. What does it mean?

	Core Damage Frequency**	For 500 plants in the world	Lifetime experience
Generation I	1E-4 (once in 10 000 years)	One event in the world every 20 years	3 global events in a person's lifetime
Generation II	1 to 5E-5 (once in 20 000 years)	One event in the world every 40 to 200 years	One global event every 2 to 10 generations
Generation III/III+	2E-7 to 1E-7 (once in 5 to10 million years)	One event every 10 000 to 20 000 years	10 000 years ago humans globally were hunter-gatherers. It was the dawn of agriculture.

** Core Damage Frequency is not the same as a radioactive release. It is still an event internal to the power station, not threatening the public. Reactors have additional protection to contain releases.

Modern technology ensures inherently safer plants.
Nuclear acceptability requires public education.

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Smart Approach - Choose the technology in each energy group as early as feasible. An actual Vendor/EPC contract can follow, but with technology selection comes greater certainty on project scope, costs, infrastructure, training, regulatory resources and licensing procedures, siting, environment, etc. – and a greater willingness to invest.

Thank You

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