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BETTER TOGETHER.

INPUTS ON THE DRAFT IEP AND IRP 2016: *PRESENTATION TO DOE CONSULTATIVE WORKSHOP*

13 December 2016
Cape Town, CTICC

Table of Contents

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Process on Commenting on Draft IEP & IRP

- Draft IEP and IRP released for public comment on 25 November 2016
  - The Draft IEP is 457 pages (incl Annexures)
  - The Draft IRP is 319 pages (incl Annexures)

- Public Consultations are scheduled for 7-14 December 2016
  - Little time to do a rigorous assessment of both documents and their underlying assumptions

- This presentation is a **preliminary** input by the WCG
  - Detailed written comments to be submitted by 15 February 2017

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1. Overall Comments on the Two Plans

1. Overall Comments (1)

- Draft **IEP** intended to be the overarching framework to which sector plans align
  - Draft IEP lacks rigour and is outdated eg demand forecasts have not been updated from the IEP 2012 version
  - Sector plans like the Draft IRP may not be credible if they are based on a framework that lacks depth and credibility

- The current development pathway as outlined in the IEP:
  - Does not take into account rapidly changing energy landscape – shouldn't lock into technologies that do not allow us to respond to innovation and price movements
  - Continues to entrench Eskom's monopoly and existing models of energy delivery

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1. Overall Comments (2)

- The Draft **IRP** provides insufficient data and information
  - Considerable confusion caused by the Gazetted version of October 2016 and Revision 1 of November 2016
    - This makes it difficult to engage with the Draft IRP – unclear as to which version should be commented on
    - The two versions have differing information eg although both versions have a base case of nuclear coming on line in 2037, Revision 1 mentions a carbon budget scenario where nuclear comes on line by 2026

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1.1 Lack of Alignment between Draft IEP and Draft IRP (1)

- The Draft IRP is the electricity plan emanating from the draft IEP
  - **These two documents must complement each other and make use of the same references and data**

- However, significant differences between the two have been noted (outlined in next slide)
  - These differences have significant implications for decisions on our energy future

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1.1 Lack of Alignment between Draft IEP and Draft IRP (2)

Draft IEP	Draft IRP
Technology Options and Costs	
Costs are from the unpublished IEP 2013 & REIPPPP Bid Windows 1 and 2	Utilises EPRI 2015 figures & REIPPPP Bid Window 4 costs
Demand Forecasting	
Uses the forecast from IEP 2012. Provides sector demand breakdown not discussed in IRP.	Updated based on CSIR demand forecast
Economic Parameters	
Discount rate of 8.4%	Discount rate of 8.2%
Base Case New Generation Mix	
Mix is given as 12GW Coal, 23GW Gas, 29GW Nuclear, 25GW Solar PV, 25GW Solar CSP, 24GW Wind, 1GW Biomass and 15GW Electricity imports	Mix is given as 15GW Coal, 34GW Gas, 20GW Nuclear, 18GW PV, 37GW Wind and 2,5GW imported hydro
New Nuclear	
On line by 2030, with the decision needing to be made now	On line by 2037 (Gazetted version base case) or 2026 (Revision 1: carbon budget scenario)

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Emissions Trajectory and Carbon Mitigation

- SA ratified the Paris Agreement in November 2016
  - South Africa has committed to a carbon budget of between 3.98 and 6.08 Gt between 2020 and 2030.
  - IRP notes that DEA has proposed the carbon budget approach be utilised, but IRP provides no details as to how this will be achieved
- Energy sector is responsible for ±80% of all GHGs: **any energy planning document needs to define how it is going to respond to our mitigation commitments**

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2. Comments on the Draft IEP

2.1 Methodology and Assumptions

- DoE reports its internal quantitative analyses to great numerical precision when the underlying uncertainty is greater than 100% from the mean value
  - This suggests that the Draft IEP is not engaging with uncertainty
- The Plan does not mention regional collaboration on gas or hydro
- Natural gas is predicated on a shale gas future and gas and crude oil prices remain coupled (this has been disproved). No justification is provided for either.
- The need for crude oil refining capacity is taken as a given
  - There is a perception that SA is more vulnerable to refined product imports than crude oil imports, with no justification
  - There is a hard constraint that a new 200 000 bbl/day refinery will be built in Coega - globally plants are generally 3-5 times that size to ensure economies of scale

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2.2 Nuclear Energy

- Nuclear is the only energy source entrenched across all scenarios for new power generation, without any reasons provided

- Nuclear is proffered as the only option to ensure SA meets its climate change mitigation commitments
  - No justification for this
  - The carbon foot print of the uranium fuel cycle suggests otherwise

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2.3 Transport Sector

- Transport sector will continue to have highest energy demand, especially with road freight haulage.
  - IEP Solutions: reduce cost and improve energy mix
    - Very little on reducing use!
  - A core strategic objective for the WCG is modal shift from road based freight to rail
- Concrete national plans to address demand factors are critical
  - For passenger and freight transport, the role of Transnet, Metrorail and Prasa are vital
  - If wish to shift from road to rail and from cars to public transport, alternatives need to be fully functional, affordable, safe, reliable and efficient
- Very little is mentioned about disruptive technologies: Electric Vehicles are largely dismissed
- Given the critical role of SOCs in transport, there should be a review of their roles, structure, and governance
  - Decentralisation of responsibilities to metros (e.g. with metro rail services) would improve accountability and efficiency

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2.4 Life Cycle Cost Considerations

- Environmental arguments about energy choices are selective and ignore life cycle costing
  - Coal-processing – water quality and acid-mine drainage are not taken into account
  - Nuclear power – decommissioning and waste management are not factored in. Document states that "there are currently no long-term storage solutions for this (nuclear) waste anywhere in the world," yet this is not included as an environmental externality

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2.5 Water Resource Implications

- The base case scenario promotes increased employment opportunities, increased access to energy, and cost efficiency, but does not promote the decreased use of water resources

- Given our current and expected water scarcity owing to climate change, water resources should play a prominent role in the choice of energy mix

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2.6 Macroeconomic Assumptions

- The assumptions and economic data in Annexure B are outdated or incorrect:
  - Economic growth rates are significantly overstated
  - Green Shoots scenario shows GDP growth of about 30% from 2014 to 2020, which is highly unlikely
  - Russia is stated as being one of the fastest growing BRICS economies and India one of the slowest, when the opposite it true
  - Oil price data are outdated and assumptions about the future price of crude oil are incorrect

- None of the policy decisions in the IEP are explicitly supported by information in Annexure B, and in many cases much of the information is incorrect

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3. Comments on the Draft IRP

3.1 Base Case and Scenarios (1)

- The results of the base case are flawed
  - They include constraints which should be modelled in the scenarios (including build constraints, CO2 constraints and externalities)
    - Base case maintains a build constraint on PV and wind (1000MW of PV and 1600MW of wind per year)
    - **Base case should rather reflect lowest costs without restrictions, with the renewable energy constraint as one of the scenarios**

- **No justification for maintaining the renewable energy constraints**
  - A more reasonable restriction would be on limiting any build with a lead time over 5 yrs – uncertainty in future demand is a more relevant challenge than integration of renewable energy

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3.1 Base Case and Scenarios (2)

- Unclear why Ministerial gas determinations are not included in the base case – the IPP office has commenced the procurement process, with build expected to be completed by 2021.

- Multiple scenarios should not be grouped together without showing each separately.
  - The only unconstrained renewable energy includes carbon budgeting, which seems to be included to force nuclear into the plan

- The Update Process does not outline how the scenarios were selected and which discretionary factors were inputted

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3.2 Assumptions and Input Parameters (1)

- Costing of technologies:
  - Serious shortcomings in the price of wind and solar PV, which are significantly higher than actual prices of Bid Window 4.5
  - The LNG price cannot be based on the IRP 2010 as the US shale gas revolution has caused gas prices to plummet and to be decoupled from the oil price
  - The hybrid cost for nuclear is based on DoE's study of Asian project prices – much lower than the American and Russian technologies and not a realistic measure. Also, must factor in cost and time overruns.
  - The methodology for comparing technologies seems only to account for capital costs without considering life cycle costs (transmission and de-commissioning, for example)
  - The exchange rate is given as an outdated R11.55/USD (January 2015) but it has averaged R13.40 over the past year. No reason given for the use of this figure.

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3.2 Assumptions and Input Parameters (2)

- Assumptions about the procurement methodology should be consistent
  - Depending on the procurement route, prices can change significantly
  - In scenarios where Eskom is 100% owner, the fiscus carries all the risk
- Eskom Plant Performance
  - The IRP indicates Eskom is currently operating at low performance, but Revision 1 base case assumes Eskom performance level at both moderate and low.
    - Base case should only use one performance level, namely actual (low) level
    - If moderate performance is to be used, evidence should be provided to show Eskom can function at this level into the future
  - It is not clear how air quality retrofits were modelled with respect to the impact on the Energy Availability Factor and efficiency of the fleet, or whether any costs for extension of life to existing plants have been considered

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3.3 Implications of Climate Change on Energy Planning

- IRP needs to consider the potential impacts and risks of climate change on infrastructure
  - Projected increase in extreme events, extreme temperatures and reduced rainfall will impact water supplies and can impact the energy sector and associated infrastructure
  - Risks and associated costs must be included in energy planning
- The IEP outlines the details of the proposed carbon tax to be introduced in 2017, however its implications are not discussed in the IRP

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4. The Case for Reform in the Electricity Generation and Transmission Business

4. The Case for Reform

- Optimal decision-making regarding SA's energy mix requires a reform of the electricity industry
  - Generation and transmission should be split to ensure no conflicts of interest: Eskom automatically favours its own generation projects
  - The split would facilitate a proper comparison between gas, renewables, and nuclear energy generation, as the transmission company would be incentivised to purchase the least-cost energy mix and the generation company would be incentivised to match this with appropriate technology decisions
  - Liberalisation of the energy market and allowing Eskom generation to compete with the private sector across all technologies is the only way to ensure that rational least-cost decisions are made by Eskom

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5. Summary of Key Points

5. Summary of Key Points

- The two Draft Plans are at times contradictory
  - It is critical the two Plans complement each other and make use of the same methodologies and (recent) data
- The Base Case in the IRP is flawed – it should rather reflect the lowest costs without restrictions
  - Artificial constraints should not be placed on renewable energy in the base case
- The Transport section of the IEP should focus on reducing use, not just reducing cost
- Lifetime cost considerations in the IEP need to be included as part of technology costing
- The IEP and IRP should both reflect on the practicalities of how South Africa will meet its Paris Agreement obligations
- The electricity industry in South Africa will only become efficient in its choice of technologies if the generation and transmission businesses of Eskom are separated

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Thank you