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Public Hearings on the Integrated Resource Plan for Electricity 2010

Solafrica Comments

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Solafrica Standing and Interest

- Solafrica is a solar energy project development company
- Funded by private (Lereko/Metier) and public (IDC) resources
- Has committed time and funds to CSP project development
- Has a practical and realistic understanding of opportunities and constraints for CSP in South Africa
- In a position to provide renewable energy power on the grid by end 2013

Noting and Protecting IRP 2010 Advances

- The advances in the IRP2010 are significant and welcomed
  - Significant inclusion of renewable energy is a major advance and starts South Africa on important new energy path
  - Although flexibility is welcomed this path will only succeed if it provides a stable, long term minimum baseline for renewable energy allocations
- The 200MW of solar CSP by 2015 and potential further 600MW by 2019 is sufficient to:
  - Provide a demonstration of costs and performance of CSP locally
  - Improve the understanding of contracting and financing CSP projects in SA
  - Start the process of developing local supply chains
- This allocation is a minium to achieve these objectives and should not be reduced or in any way made less certain

IRP Limitations with respect to CSP and PV: Scale & Certainty

- Exclusion of PV until 2016
  - Although expensive PV can be installed more rapidly than any other technology
  - The technology is mature and bankable
  - Some allocation over and above the current RE allocations should be made from 2011
- Uncertainty over ratio between CSP and PV from 2016 to 2019
  - Will limit investment in project development considerably
  - Separate allocations should be provided as the technologies have very different characteristics and applications

IRP Limitations with respect to CSP and PV: Strategic Issues

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- Level of detail on CSP
  - CSP is not a homogenous technology and the IRP should provide detail and a strategic roadmap for developers, specifically:
    - Storage and increased capacity factors and despatchability should be encouraged explicitly in the IRP and in associated tariffs (REFIT and others)
    - CSP can be water efficient if dry- or hybrid-cooled. This should also be made explicit in the IRP and incentivised appropriately
- Misalignment with Solar Park and Industrial Policy Action Plan strategy
  - There is clear misalignment with other energy policy and industrial policy initiatives in developing a large scale local CSP industry. The IRP does not support these initiatives sufficiently
- Insufficient solar (CSP and PV) capacity to allow for the development of a local supply chain and industry
  - CSP has significant potential for local content
  - Development of a local industry requires certainty of demand
  - The fact that solar thermal power is commercially viable but is “relatively new and still evolving” is an argument FOR an increased local build programme rather than against one as it implies rapid cost reductions and technology advances and the potential for South Africa to become a leading industrial force in CSP with attendant localisation and export benefits

IRP Limitations with respect to CSP and PV: **Resource Base**

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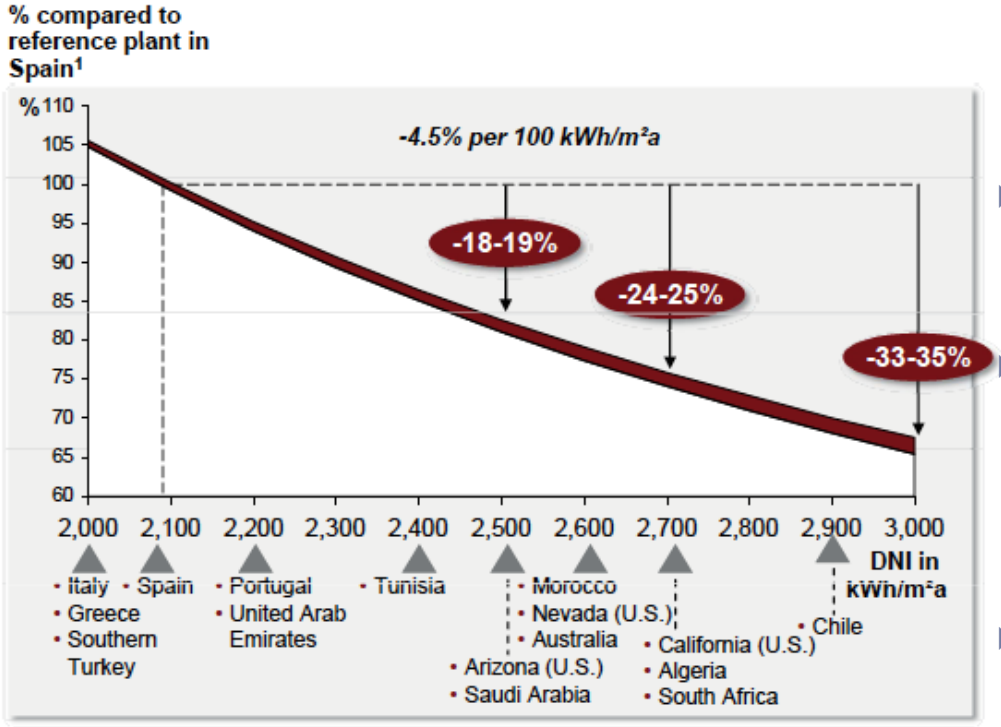
- Solar Resource
  - The scale and quality of the solar resource in South Africa is not recognised in the IRP as a decision factor
    - The IRP must take into account the fuel source as a factor
  - SA has enormous and reliable solar resources with limited marginal costs of new generation aside from transmission infrastructure
  - Wind and hydro, for example, typically have
    - Increasing marginal costs (as areas further from the grid or other infrastructure are sought), and
    - Declining benefits (as the best resources are used first)
  - Solar thermal is not subject to these constraints
  - This significant resource difference is not accounted for and is likely to be significant over time

Resource Base…

Figure 27: Tariff and levelized cost of energy development above direct normal insolation (DNI) level



Source: ATKearney, 2010: *Solar Thermal Electricity 2025*

- **CSP in South Africa will be 25% cheaper than in Spain due to our measured DNI levels**
- **Current on-site measurements show DNI of 2 800 kWh/m2.a (better than the Middle East and the only better resource is in Chile)**
- **Not accounted for in the IRP**

Specific Technical Concerns

- Exclusion of technology cost reduction curves
  - Learning rates for PV and CSP are the highest
  - Recent research suggests that the learning rates noted (but not used) in the IRP are themselves too low
    - see ATKearney, 2010: *Solar Thermal Electricity 2025*
  - Over a 20 year period the impacts are significant and should be included in the IRP
- Use of 3hrs storage for the evaluation of CSP appears to have been used although this is somewhat unclear in the documentation
  - REFIT allows for 6hrs storage (IRP should be consistent with REFIT)
  - >6hrs storage is now well proven in operating plants internationally
  - Use of >6hrs will improve the profile of CSP considerably in the modelling and is likely to reduce levelised costs significantly
  - The low capacity factor of CSP similarly appears incorrect and overly conservative and will also affect modelling outcomes especially given SA DNI levels
- Lack of clarity on the determination of weightings in the MCDF
  - This may affect the proportions of RE and solar in the generation mix
  - Scoring is subjective and not very transparent

Reasons for Increased Solar Thermal Allocations in the IRP

- Predictability and reliability of energy production
- Dispatchability due to proven and highly cost efficient storage and potential plant integrated back-up firing
  - Distinguishes solar thermal from most other RE technologies, especially wind, and will allow it to become mid-merit or baseload power in the near future
- Grid stability due to the inertial features of solar thermal power blocks
- Increasing cost competitiveness against other renewable energy sources due to faster learning curves (aside from PV)
- Large scale deployment is possible
  - SA has amongst the best and best located solar resource in the world
  - Land and other infrastructure is available in high DNI areas
  - Little conflict with other land uses and promotes regional development in some of the poorest areas of the country
- Long-term supply security and independence from oil and gas prices
- High share of local content possible
  - South African manufacturing base is well suited to re-tool for solar thermal technologies

Conclusion

- The IRP 2010 is a major advance in South Africa's energy sector development
- However, there is no point in leaping half-way over a chasm
- A bolder allocation of CSP in the IRP will give SA the best chance of getting over the chasm and meeting the objectives of
  - Cost effective, low-carbon, reliable energy
  - Majority local content
  - Creation of a local world class CSP manufacturing sector
- Let's not jump half-way

THANK YOU FOR THE OPPORTUNITY TO PRESENT