

# Initial comments on IRP and IEP

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**ERC**

ENERGY RESEARCH CENTRE  
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# The global context - 2016 is not “BAU”

- Rapid, disruptive changes in technologies and associated markets and institutions globally
- Energy supply – unprecedented falls in the cost of wind, solar globally; unprecedented investment rates in RE / on-site generation
- Energy storage – equally rapid advances in storage technology and investment
- Transport – CNG and EVs – there are ALREADY 200 million electric scooters in China
- Information technology and Big Data are having a dramatic impact on the energy sector
- Institutional changes are happening rapidly – how markets are structured, how utilities are structured, how services are delivered, who delivers what service.
- Climate change

# The national context – not BAU either

- Electricity demand has remained static for around a decade – demand is at least partly a function of other policy, not given by God
- Electricity prices have increased dramatically over the same period – we still know very little re the elasticity of demand
- Refineries are ageing, multiple challenges
- Significant changes to the coal market
- Extraordinary success of REIPPPP, and appeal of investment in on-site PV
- Challenges of low-carbon development
- Unprecedented potential for complex cross-sectoral interactions in the energy sector

# Preliminary comments on the IRP “assumptions, base case results and observations” (more detail in written submission)

## ‘IRP 2016’

DoE (Department of Energy) 2016. Integrated resource plan update: Assumptions, base case results and observations. October.

Government Gazette no 40455, notice no 1431, 25 November 2016

Pretoria. [http://www.gov.za/sites/www.gov.za/files/40445\\_gon1431.pdf](http://www.gov.za/sites/www.gov.za/files/40445_gon1431.pdf)  
[and www.gpwonline.co.za](http://www.gpwonline.co.za)

# Overview

- Difficult to comment in detail because of a lack of detail in many areas regarding the assumptions and the modelling methodology
- Indicators (demand, technology costs, etc.) are not precisely defined
- The scope is unclear – will the IRP tell us what we want to know? (key policy-relevant indicators etc.)
- Demand – lack of detail on how the demand forecast was arrived at; would be more appropriate to use a range to cope with increased uncertainty
- Specific technologies – much missing information, but specific issues with nuclear and RE
- Emissions constraint – no clear basis for this
- Externalities?

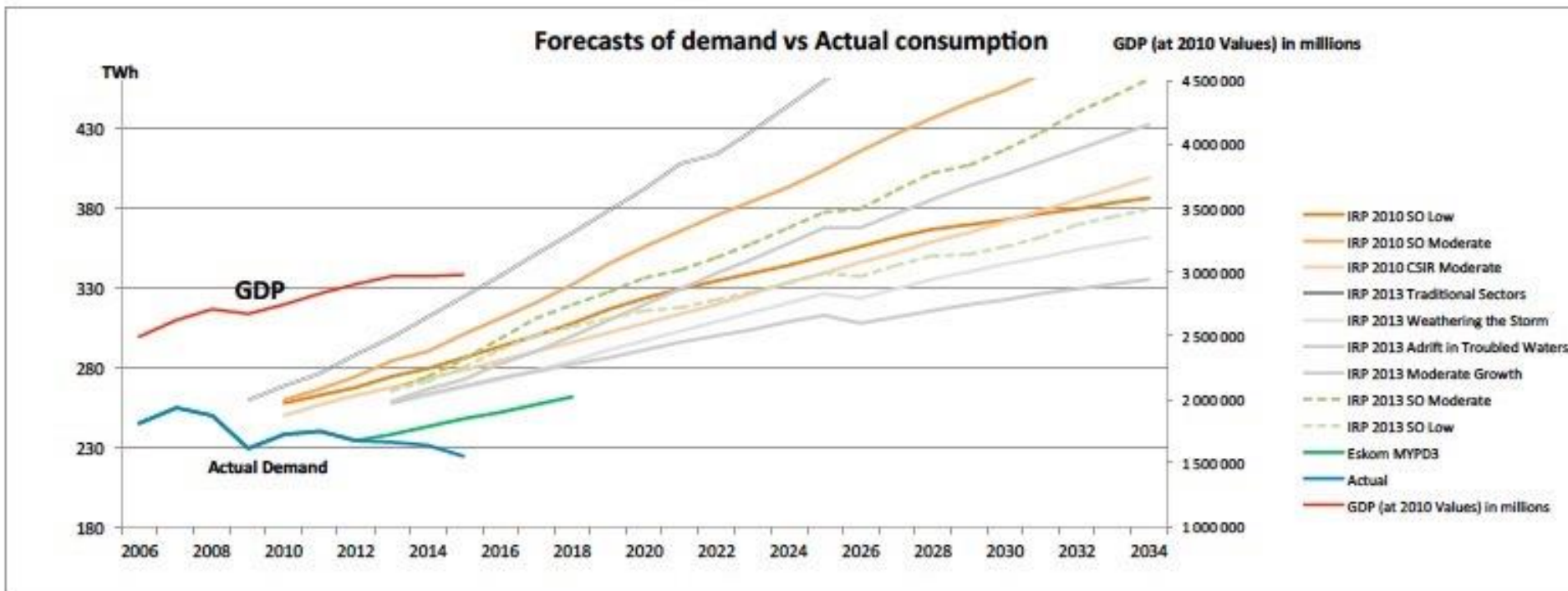
# Methodology and scope

- Does not seem to be designed around key questions which policymakers need to address, including employment, economic costs/benefits, development benefits etc.
- Needs to be replicable and transparent to have credibility – not enough information for this.
- Base case – “BAU” is perhaps not a useful concept anymore - “usual” is becoming unusual.
- “Integrated” is missing – demand-side / energy efficiency / energy intensity.
- Costing approach is very unclear – are we comparing apples with apples?
- Needs to properly and transparently address challenges to and opportunities for the electricity system posed by nuclear/RE/gas/on-site generation

# Demand forecast

- Perhaps the most difficult point in the last century to forecast demand – recent attempts have been completely off. “Forecast” for a 35-year plan is inappropriate – perhaps “demand scenarios”?
- This is not true of South Africa only – this is a global problem faced by utilities, complicated by grid defection / on-site generation.
- Several shortcomings of the CSIR / IRP demand forecast:
  - No obvious justification for using the “high” forecast in the IRP
  - It is not clear how DSM /energy efficiency and energy intensity interact
  - Inherent assumption that the stasis in electricity demand over the last decade is an aberration

# The pitfalls of BAU forecasting

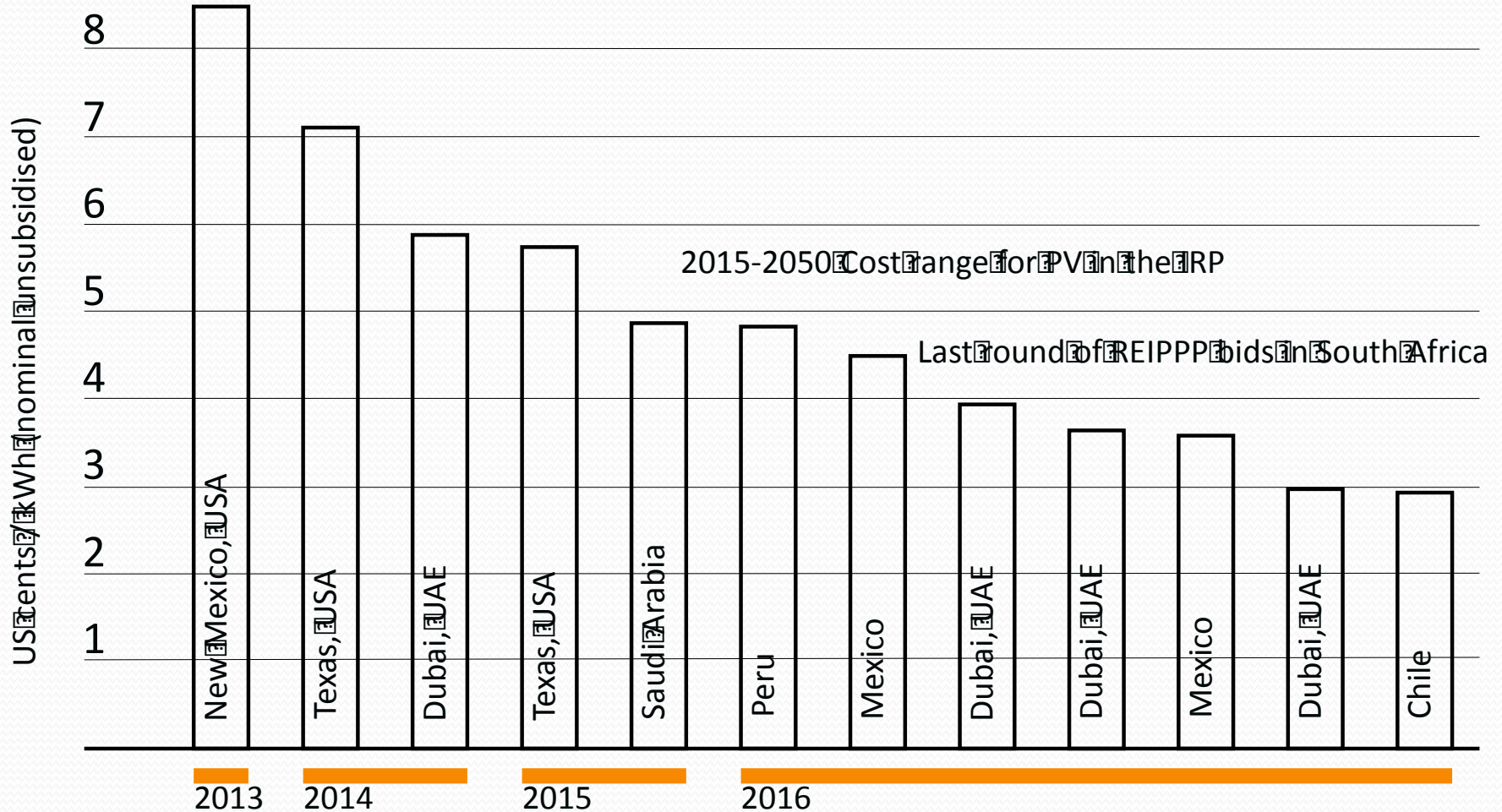


Source: Rolfe Eberhard / CSP

# Technology characteristics

- There is obviously an annual limit on RE investment, which seems to be driving the results – what is the limit, what it is based on, and why was it set at that level?
- There does not seem to be a similar limit on annual nuclear investment?
- Technology learning estimates are seriously flawed
- Costs:
  - Not really possible to comment on nuclear costs, since it's not clear where they came from;
  - Wind and solar costs don't seem to relate to actual prices in REIPPPP bids, even though they are apparently derived from them?
  - Nuclear power projects almost always have cost and time overruns, which increases the cost of projects dramatically – need a sensitivity analysis for this, and for the actual cost itself

# Record-breaking bids for Solar PV: 2013 to 2016



Source: [cleantechnica.com](http://cleantechnica.com) 2016

# GHG emissions constraint

- Unclear as to whether this is intended to apply ONLY to the base case, or to other scenarios as well
- Given developments of the last few years, and international and local analysis, the electricity sector is the most effective sector to mitigate in; therefore allocating the same share of national emissions to electricity in 2050 as in 2010 will impose a significant additional burden on the rest of the economy
- The electricity sector should lead the way – this would not allow much emissions space for additional coal plants, which are more expensive anyway

# Preliminary comments on the Integrated Energy Plan (more detail in written submission)

'IEP 2016'

DoE (Department of Energy) 2016. Integrated Energy Plan.  
Government Gazette no 40455, notice no 1430, 25 November 2016  
Pretoria. [http://www.energy.gov.za/files/iep\\_2016.html](http://www.energy.gov.za/files/iep_2016.html) and  
[www.gpwonline.co.za](http://www.gpwonline.co.za)

# Ideally, an IEP is..

- A recognition that energy is an important area for government involvement – policy, regulation, incentives, technology development, industrial strategies, trade, etc etc.
- A great tool to think about cross-sector interactions / substitutions – for instance gas, electric vehicles / liquid fuel supply, etc etc.
- A great way of analysing cross-sectoral challenges such as air pollution, energy poverty and GHG emissions
- Integrating key government agencies in energy policy decision-making and implementation, at all levels of government
- A process, rather than a product
- An opportunity to think outside the box

# Overview

- Impressive amounts of detail in one place, both technically and also on policy. Great attempt to synthesize the key priorities for and challenges to the energy sector
- Draft report highlights the massive challenges posed by energy data in South Africa – many problems with detail
- Scenario structure – innovative but does not distinguish between external conditions and modelled policies and measures, which make it very difficult to draw conclusions from model results re policy
- Some key factors driving the results are not clearly defined

# Methodology

- Scenarios – distinguish between endogenous and exogenous elements – need to test policies against the SAME external conditions (for instance externalities)
- Demand – this seems to be projected for each fuel, but it then seems unclear how fuel-switching takes place? Where do structural shifts take place?
- Very conservative approach to almost everything – especially decentralised generation / CHP / cogen / trigen etc; electric vehicles, CNG for transport, etc
- GHG emissions – need a more nuanced approach
- Employment etc. – need a more sophisticated indicator – more jobs does not necessarily mean better, since inefficient investment creates jobs, but probably less than the capex would have elsewhere in the economy
- Result are not clearly related to the actual analytical work

# Technology characteristics and constraints

- Nuclear – it's not clear why the 9.6 GW is forced into the model on a fixed timetable, or even a fixed point for the first reactor – this renders the process of energy planning pointless
- RE – underutilised, outdated sources (for instance Diab's wind atlas rather than the most recent data)
- Electric mobility – very limited in the analysis – more ambitious scenarios should be considered, especially in the light of looming decisions on investing in new refinery capacity

# Relationship to the IRP

- The IRP is framed as being the “electricity section” of the IEP – but there seem to be some critical areas in which these are not aligned – this may not be a bad thing in the light of the different functions the IRP and IEP perform?
- It’s not clear how the demand forecasts etc. are connected – different processes, methodologies, and some different numbers.
- Different technology assumptions.

# Thank you

(we will make more detailed written comments)



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