

IRP 2016 UPDATE

Comment by Meridian Economics

Dr Grové Steyn

Adam Roff

Available at: www.meridianeconomics.co.za

13 December 2016

Introduction

- About Meridian Economics
- We do not aim to comment comprehensively on the 2016 IRP draft;
- Will make a few specific points about the IRP assumptions that are staring us in the face and could have fundamental implications for the results.
- We strongly endorse the comments reported in the press that have been well made by many other stakeholders and expert such as:
 - Ministerial Advisory Council on Energy (MACE)
 - The CSIR Energy Centre
 - Chris Yelland from EE Publishers
 - The Energy Intensive Users Group (EIUG)
 - And many others...
- On key matters such as:
 - Structural changes in electricity demand
 - The need to use an unconstrained least cost base case;
 - The need to use actual and realistic pricing for generation resources;
 - The need to properly cost any “policy constraints” to enable rational decisions.
 - Etc.

Approach to our analysis

- Two key IRP assumptions:
 - 1) the existing older coal plant is taken as a given
 - 2) the current build programme is taken as a given
- We want to ask the question:

“What will happen if we revisit these assumptions?”
- And we illustrate why it might be critical to do so.

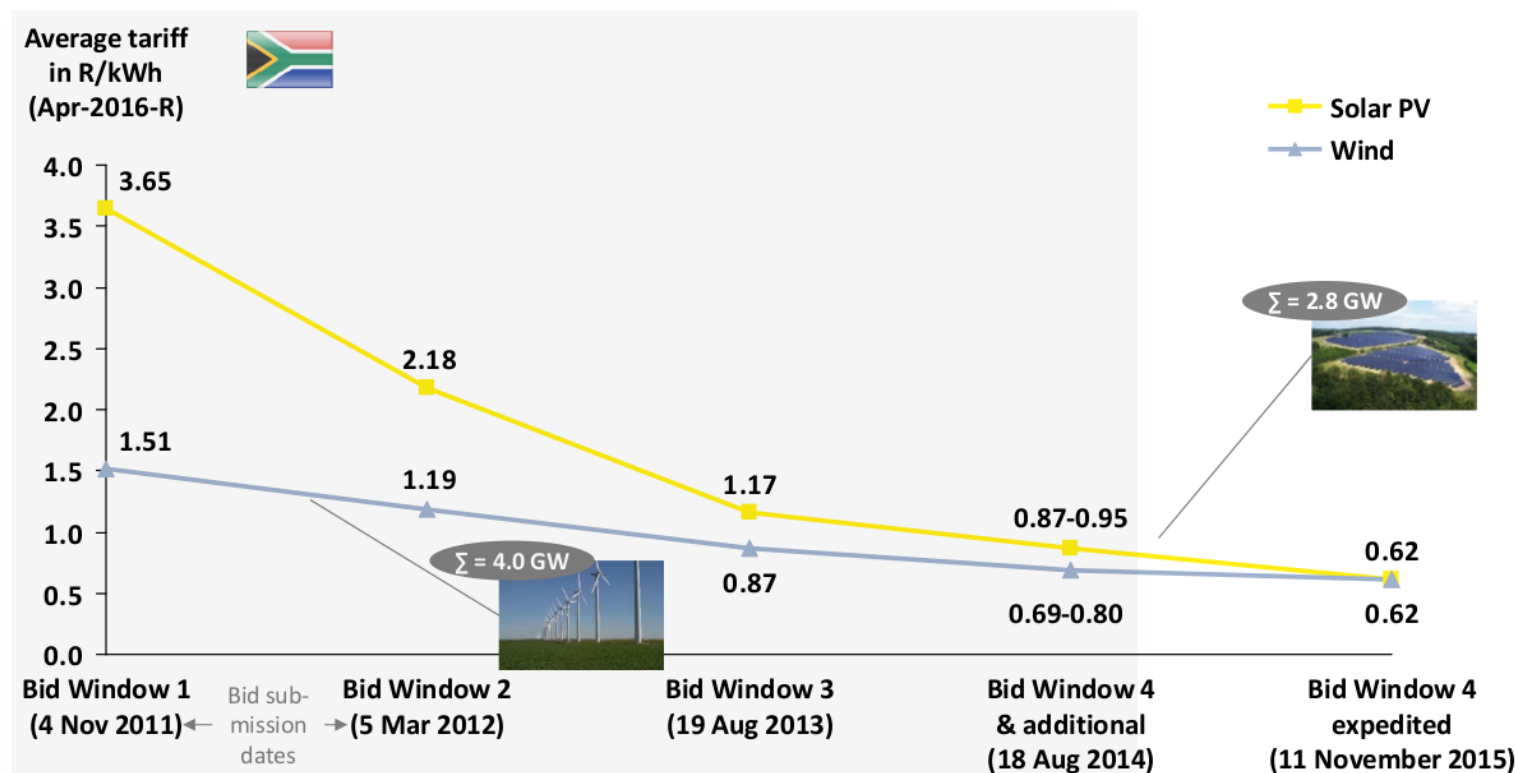
Challenges to containing the cost of operating the existing coal fleet

- Eskom has experienced rapid increases in its coal costs in recent years;
- Key drivers to increasing coal costs are:
 - Above inflation increases in the cost of mining;
 - Increasing coal volumes being purchased outside of long term coal contracts;
 - Depletion of older coal mines closer to power stations and greater use of expensive road and rail transport;
 - Impact of import parity prices on Eskom's bargaining power;
 - Inefficient procurement practices;
 - Alleged corruption, etc.
- Eskom's MYPD3 application assumed a 10% compound growth rate in coal prices (excl. transport).
- We know from Eskom's RCA clawback applications that its coal prices continued to increased by more than this.

Cost of coal supplied to individual power stations

- Eskom reports average coal costs and the IRP appears to use average figures.
- However, actual costs of coal delivered to each power station vary significantly around the average, with some costs being much higher than the average.
- This is just one of the factors that could mean that the cost of power from some of Eskom's stations will be much higher than the average figures.
- The current IRP modelling approach will not identify any of these effects.
- Not sufficient information in the public domain to calculate these figures accurately.

Costs of renewables have plummeted and will continue to decrease



Sources: South African Department of Energy IPP Office's publications on results of first four bidding windows <http://www.energy.gov.za/IPP/List-of-IPP-Preferred-Bidders-Window-three-04Nov2013.pdf>; http://www.energy.gov.za/IPP/Renewables_IPP_ProcurementProgram_WindowTwoAnnouncement_21May2012.pptx; <http://www.ipprenewables.co.za/gong/widget/file/download/id/279>; IPP Office on Bid Window 4 expedited; StatsSA on CPI; CSIR analysis

Source: CSIR

Examples of recent prices achieved elsewhere in 2016

Mexico: 47 c/kWh

Morocco: 42 c/kWh

Have we already reached the inflection point where some of the older more expensive coal stations are stranded?

- Starting with the cost of renewables one can calculate the maximum coal cost above which it will not be viable to continue operating some of the older more expensive coal stations.
- Some factors to consider
 - Incremental financial cost of renewables on the system include:
 - Price of new renewables;
 - Additional network and system costs to accommodate renewables;
 - Reduction in network energy losses due to being closer to demand, etc.
 - Incremental financial costs of coal power on the system include:
 - Refurbishment / Fleet renewal costs (Komati, Camden, Hendrina and Arnot)
 - Environmental levy
 - Operating and maintenance costs
 - Marginal costs of water, etc.
 - The difference is the cost of coal above which it will not be financially viable to continue operating some of the older more expensive coal stations.
 - Broader environmental and economic costs and benefits of the two options should also be considered.

Our first hypothesis:

- We estimate that the cost of delivered coal beyond which it will become economic to reduce the operation of older stations and procure renewables instead could be in the range of R650 – R900 / ton.
- From public domain information we know that a significant amount of coal delivered to Eskom falls in this range.
- Hypothesis:
 - *It will be cheaper in financial, economic and environmental terms to procure more renewables and reduce the use of the most expensive Eskom coal fired plant.*
- A reliable answer will require a complex calculation that depends on (amongst other factors):
 - accurate cost information assumptions;
 - Information about the coincidence of renewables capacity with the dispatch of more expensive coal plant; and
 - the use of a power system model such as the Plexos model used for the IRP and by the CSIR.
 - Etc.

Some practical implications if correct

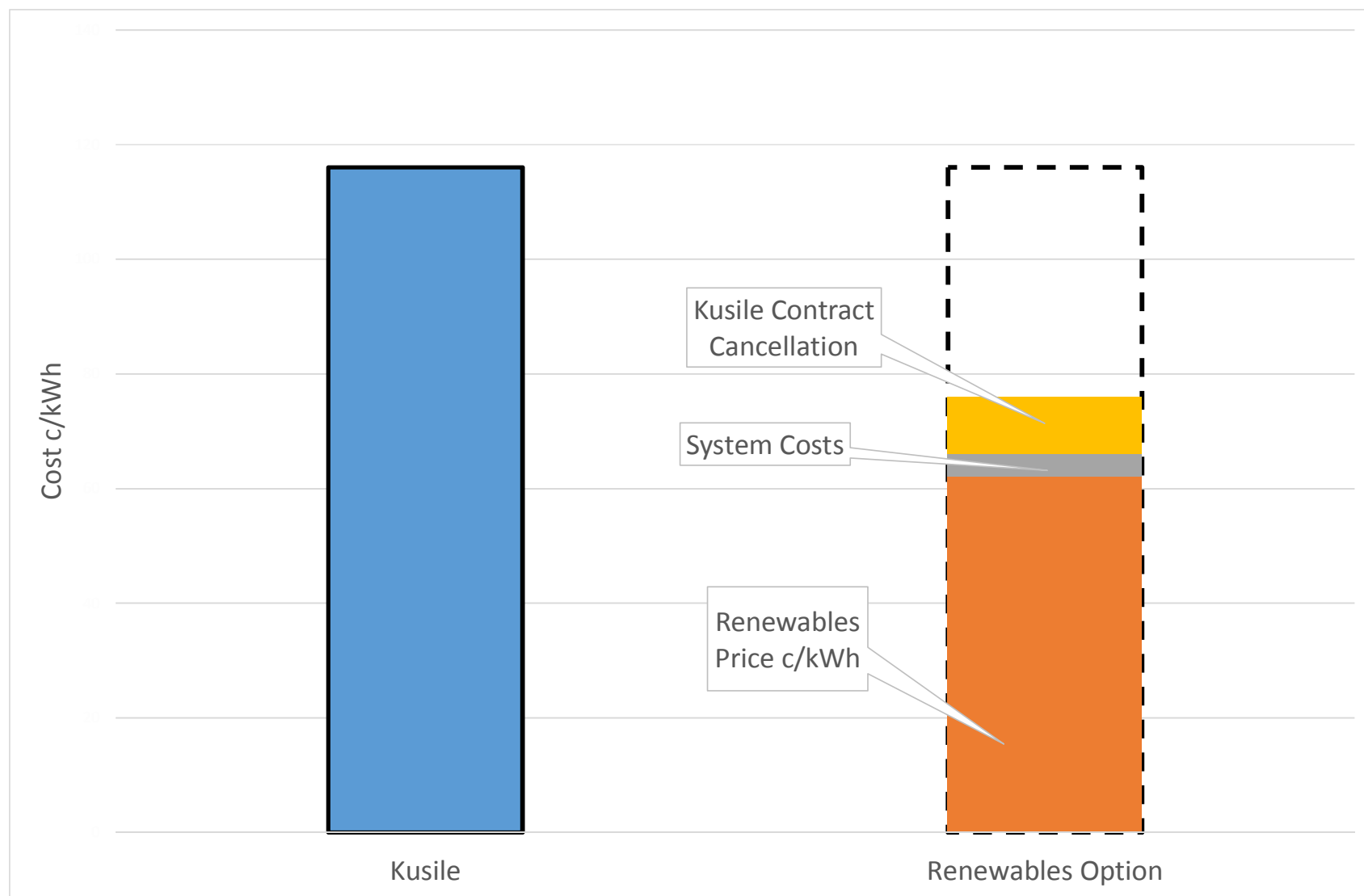
- Project selection and dispatch
 - Select new renewables projects that are most likely to coincide with the dispatch of the most expensive coal plant (most likely to be wind power located appropriately);
 - As renewable plant comes online Eskom will reduce the operation of the coal plant;
 - In time some older plant will be closed while others will run less
- Employment
 - Will possibly accelerate some employment shifts in Eskom where jobs will move from the older stations to Medupi and Kusile
 - Will stabilise the renewables industry and support further job creation there.
- Pricing and finances
 - These changes should only be implemented if they will reduce Eskom's costs and therefor reduce pressure on its finances and pricing.
- NB: The all-in cost of renewables will be cheaper than the incremental cost of running the most expensive coal power stations.

Challenges with the new build programme

- Eskom's build programme consists primarily of highly complex mega projects for which Eskom, and ultimately consumers, carries most of the risk.
- The projects have and will inevitably continue to suffer from on-going delays and cost over runs.
- South Africa has experienced an unprecedented decline in demand over the past 10 years.
 - The demand forecasts on which Medupi and Kusile were premised is now known to be completely wrong.
- Tariff increases have reached their highest levels in real terms in recorded history and there is very little room to implement further increases.
- Financing challenges
 - Eskom has been downgraded to a junk credit rating by most agencies,
 - partly because there is no credible plan for it to fund the completion of Medupi and Kusile.

Do we still need the entire build programme?

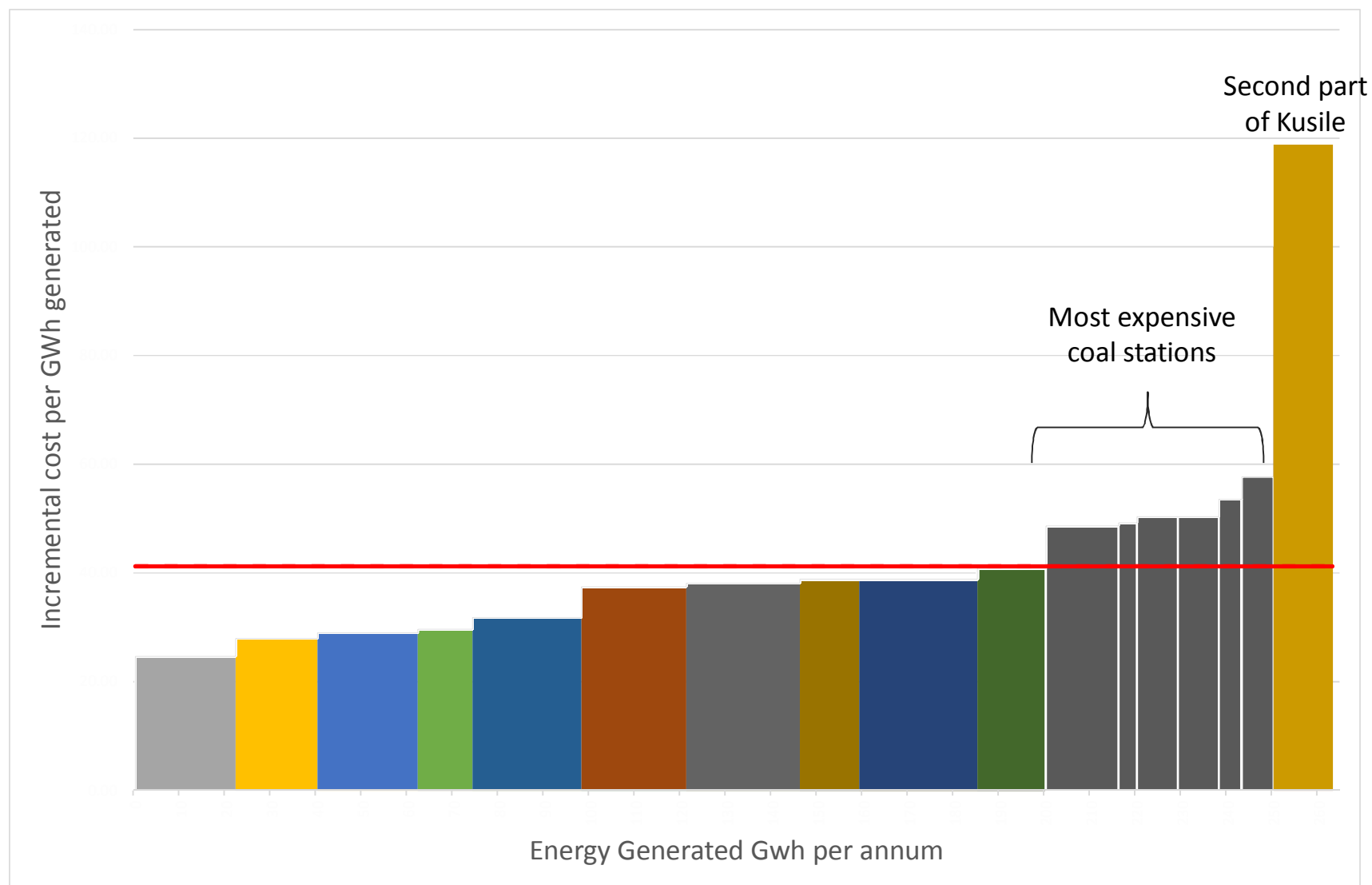
- The latest estimates for Kusile power suggest that it will ultimately cost well in excess of R1.16 / kWh (R130 – R160 c/kWh ?)
- While renewable energy with some gas power can provide baseload well below R1.00 / kWh (~80 c/kWh).
- Substantial part of the build programme is probably already irreversibly committed,
- but it is likely that at least the construction of the later units of Kusile can still be cancelled.
- This should be done if:
- The Renewables option
 - the cost of building new renewables (including any system costs),
 - some other plant (gas?) when required,
 - the cost of cancelling part of Kusile,
- Is cheaper than the Kusile Option.
 - the levelised incremental cost of power from the second half of Kusile;
 - Greater system losses (due to being further from demand); and
 - Environmental levy and other related costs (carbon tax?)

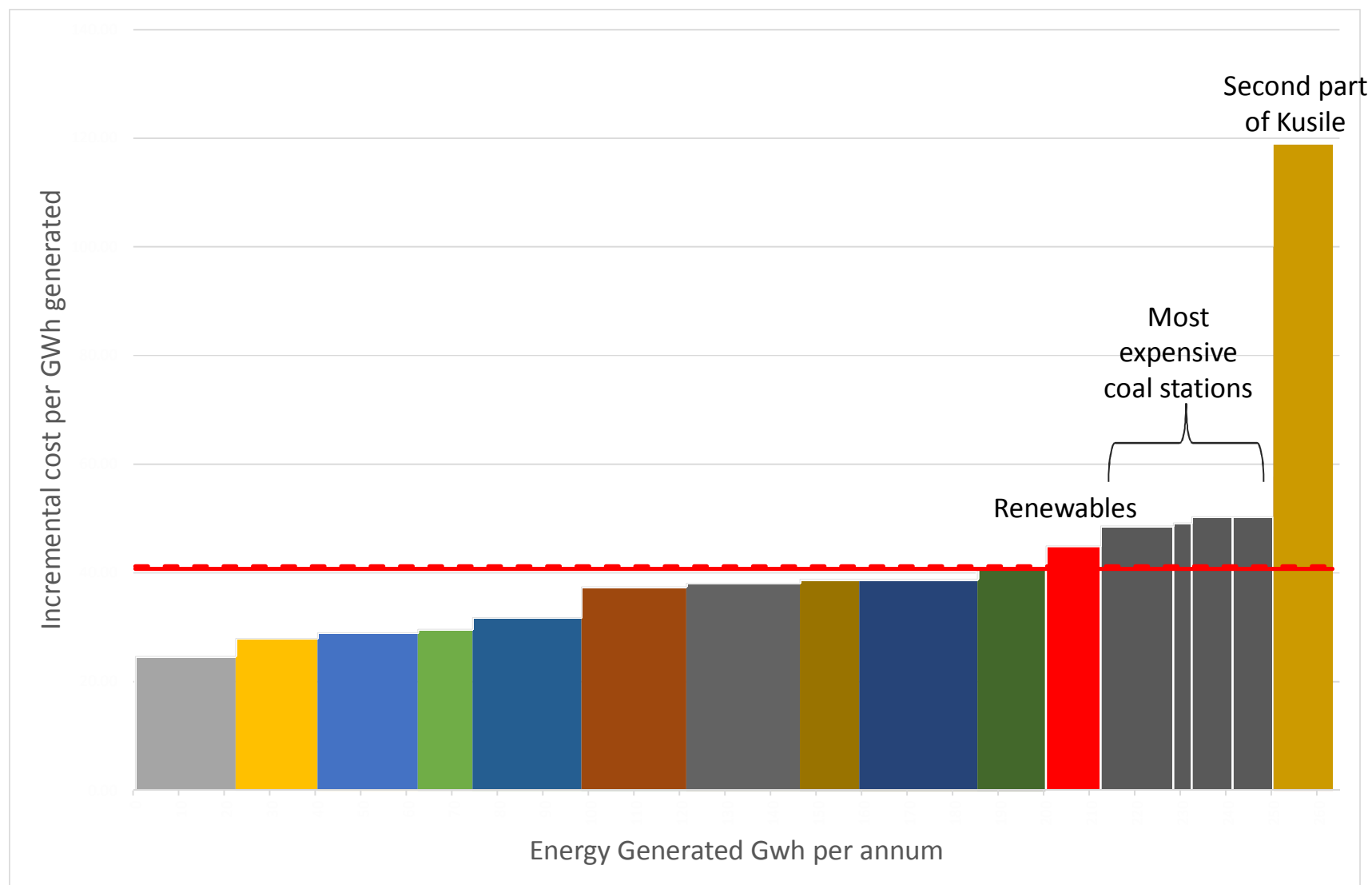


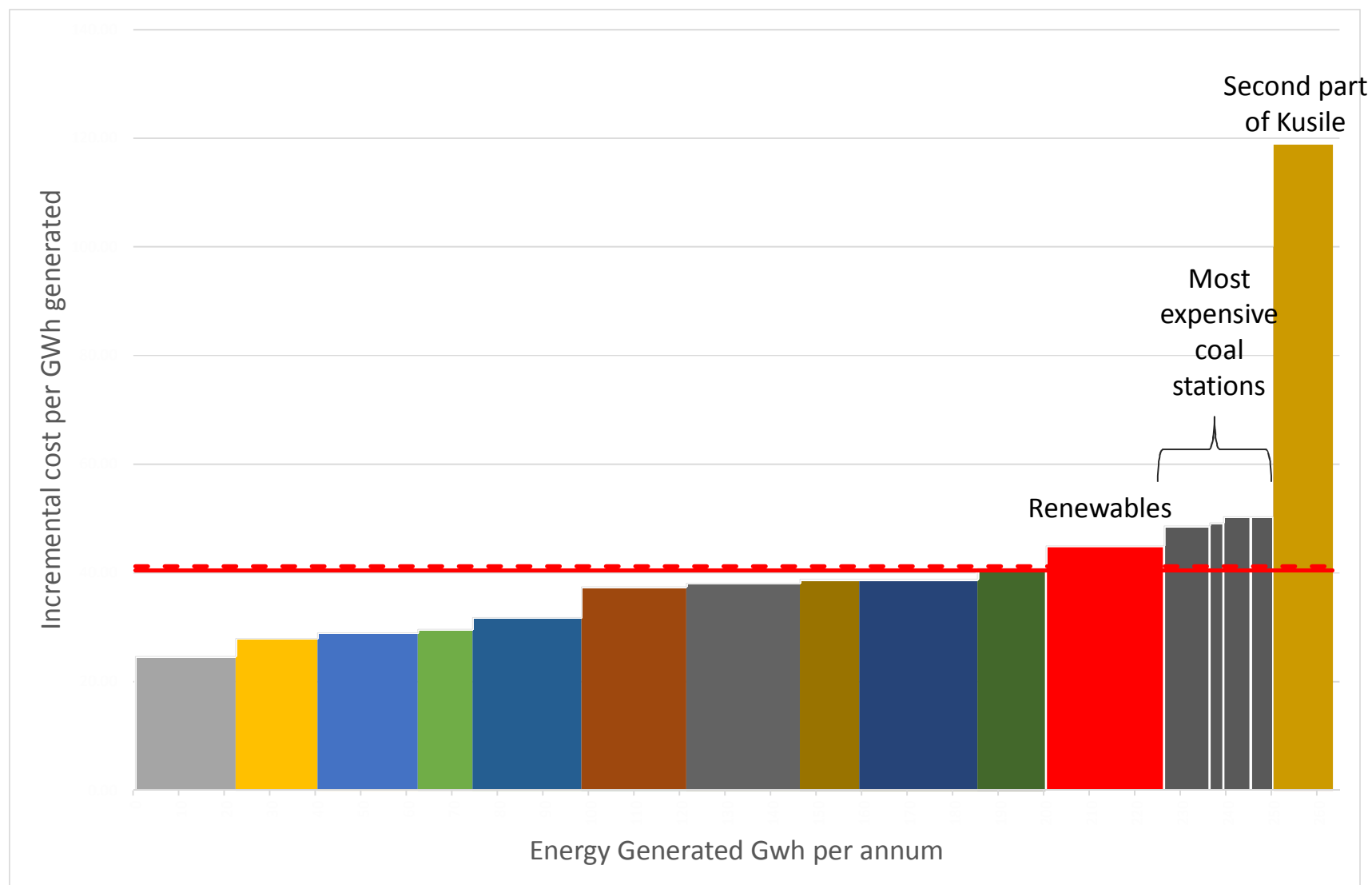
Our second hypothesis:

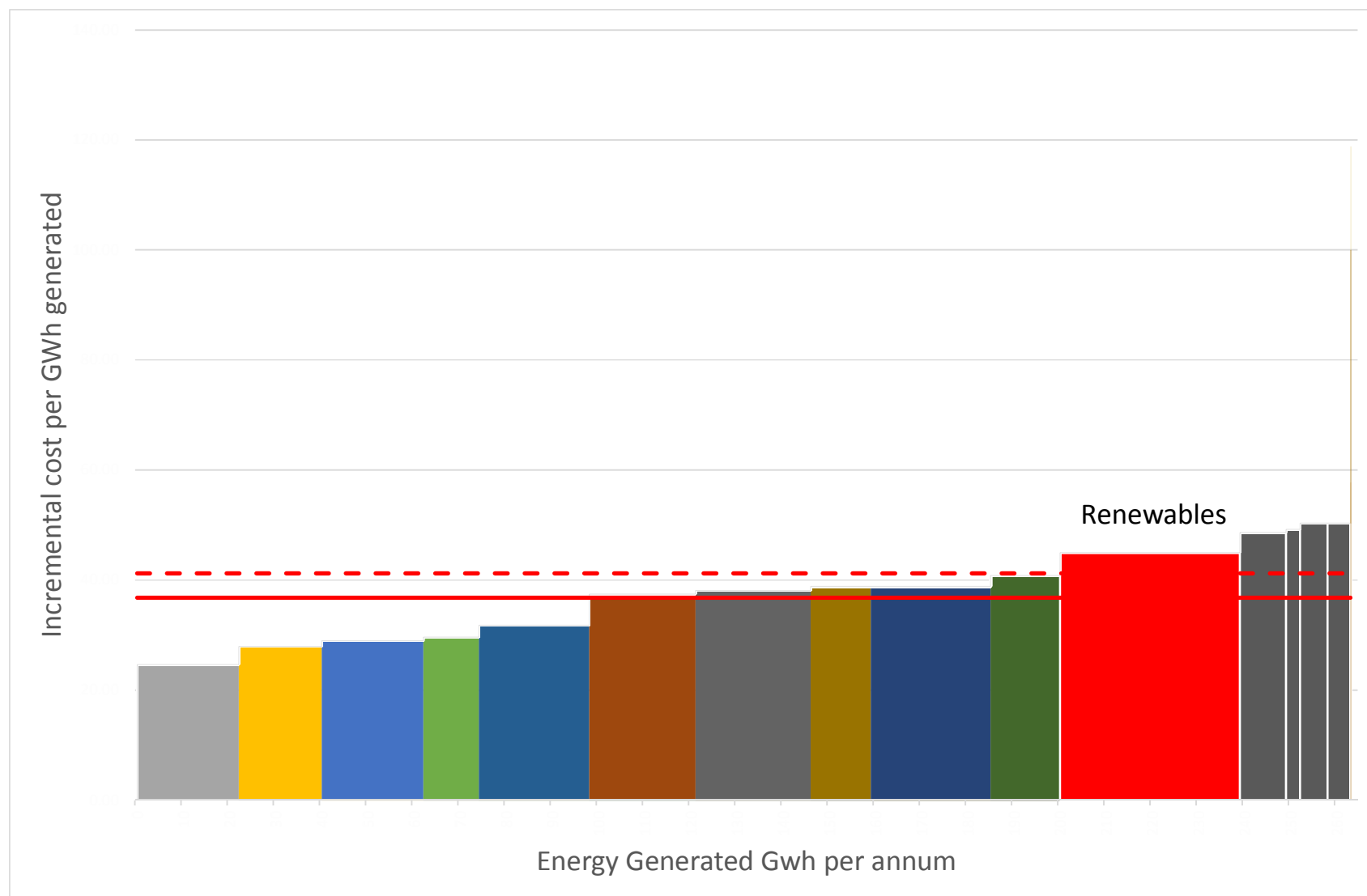
It will be cheaper in financial, economic and environmental terms to cancel the construction of part of Kusile and instead procure a combination of renewables and gas power if and when required.

- A reliable answer will require a complex calculation that depends on (amongst other factors);
- An investigation into the contracting and cost structure of Kusile; and
- the use of a power system model such as the Plexos used for the IRP and by the CSIR.
- Etc.









Summary of reasoning so far

- So far we have presented two hypotheses, in support of which we have provided high-level preliminary evidence:
- *South Africa might have reached the point where it will be cheaper in financial, economic and environmental terms to:*
 - 1) *Procure more renewables to reduce the use of the most expensive existing Eskom coal fired plant; and*
 - 2) *Cancel the construction of part of Kusile and instead procure a combination of renewables and gas power when required.*
- It is now imperative to undertake proper investigations to answer these two questions

How could these questions be properly investigated?

- These ideas are bound to be controversial and invoke strong objections.
- It is important that they are objectively assessed.
 - IRP analysis will have to be updated to test these hypotheses;
 - At Eskom's next MYPD tariff application NERSA might have to properly consider the suggestion that part of its operating plant and build programme has become uneconomic;
 - As a public utility Eskom itself should drive these investigations and take the public into its confidence by releasing the information necessary for independent researchers to verify its conclusions.
- Ultimately Eskom and the ESI exists not to serve their own interests, but the needs of electricity consumers.
- Consumer groups should ensure that their voices are heard:
 - Local government
 - Civic groups
 - EIUG
 - Other industry and business groupings

Possible implications for Eskom and country if hypotheses are correct

- Displacing old coal plant and part of the build programme will:
 - Reduce Eskom's capital expenditure, drastically reduce its financing obligations and de-risk its balance sheet;
 - Reverse the downward spiral in its credit ratings;
 - Reduce upwards pressure on tariffs;
 - Drastically accelerate the achievement of South Africa's climate change mitigation obligations.
- For decision makers:
 - The final IRP should be adjusted to reflect this reality;
 - Ministerial renewables and gas determinations should be accelerated to allow Eskom to reduce its cost base;
 - NERSA must, by law, set Eskom's tariffs to cover efficient costs; and
 - Eskom, rather than refusing to sign new renewable contracts and frustrating the renewables programme in other ways, should be working actively to promote the development of the renewables programme in order to improve its finances, reduce tariffs, protect the environment and grow the economy.



Thank you