

# IRP CONSULTATION WORKSHOP

How UCG (as gas and electricity producer) can support a **LEAST-COST, LOWER ENVIRONMENTAL FOOTPRINT** and **FLEXABLE** resource



**AFRICARY**  
**African Carbon Energy**

*Africary is proud to be a founding member of the SA UCG Association*

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13 December 2016  
Cape Town*

# General comments on draft IRP



- ❑ What about the locals? Domestic RE, Gas to Power? New clean coal technologies is ignored!
- ❑ More emphasis on local supply / social development required!
- ❑ “Path of least regret” & “flexibility” is available with UCG’s + IGCC clean coal implementation.
- ❑ Optimization of SA’s primary energy resource COAL with UCG is the most effective, efficient and clean power generation approach.
- ❑ UCG is modular and can be fast-tracked as 7 of the 9 provinces has coal suitable for UCG.
- ❑ UCG is independent from exchange rates and gas import pricing.
- ❑ UCG can fill the intermediate power demand requirement between 2020-2030!
- ❑ Lengthy approval process for “ready-to-implement” technologies in the range 10-300 MW scale...

# What is the future of CLEAN UCG?

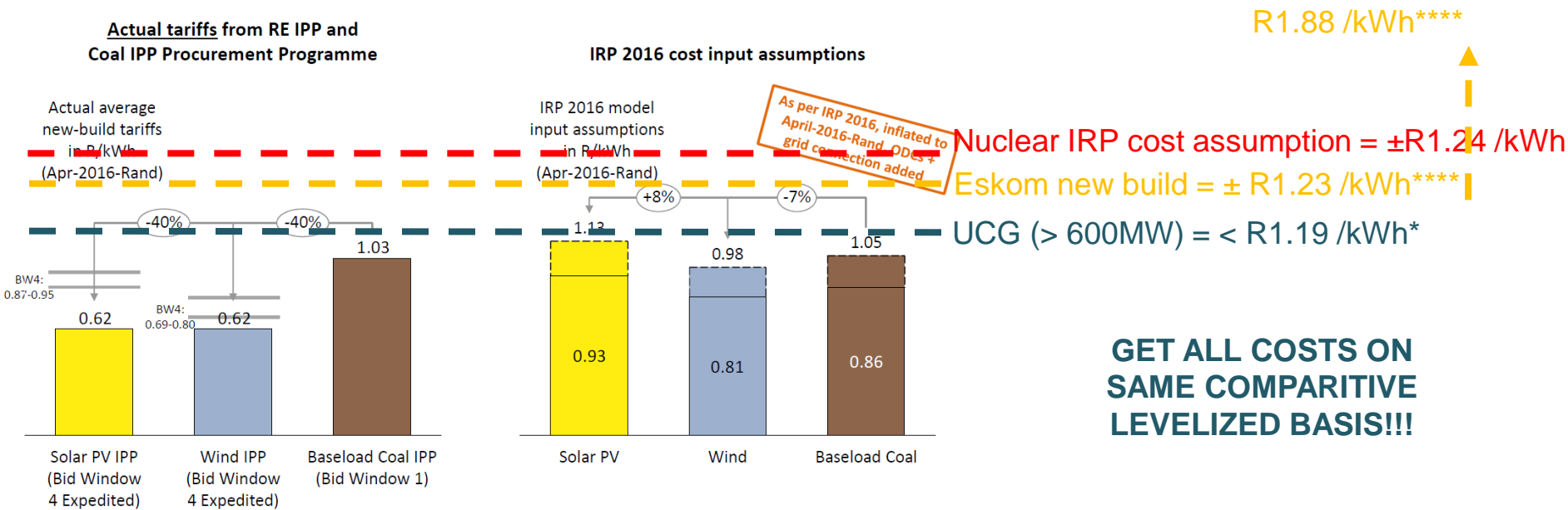


- ❑ Raising the global average efficiency of coal plants from 34% to 40% will save 2 Gt\* of CO<sub>2</sub> annually.
- ❑ UCG and IGCC allows for efficiencies higher than 55% and combined with UCG's lower water requirements & negation of discard and ash dumps, provides the most cost-effective clean power solution.
- ❑ UCG power generation is urgently required because: **it is our only low cost domestic gas supply option!**

DID THE IRP SIMULATIONS TAKE THIS INTO ACCOUNT?

\* IEA Report 2015

# Cost of Clean Coal Technology



**GET ALL COSTS ON SAME COMPARITIVE LEVELIZED BASIS!!!**

**Presented at IRP Workshop Gauteng, 7 December 2016**  
**Comments on the Integrated Resource Plan 2016 Draft**  
 South African Integrated Resource Plan 2016 public hearing  
 Ministerial Advisory Council on Energy (MACE)  
 Johannesburg, 7 December 2016  
**MACE IRP 2016 Working Group**  
 Mike Levington (Chair)  
 Prof Johan van Dyk  
 Prof Anton Eberhard  
 Dr Tobias Bischof-Niemz

**Capital costs:**  
 IGCC = US\$ 1,300 /kW (dry cooled)\*\*  
 Nuclear = US\$ 4,000 /kW\*\*\*

\* Syngas target price of 55 R/GJ  
 \*\* EIA Report 2014  
 \*\*\* NWU reference  
 \*\*\*\*<http://www.timeslive.co.za/local/2011/10/28/Kusile-power-station-to-cost-R60bn-a-year1>

# Africary's coal resource is equivalent to Karoo Shale



Area	SAMREC * Classification	Gross Coal Volumes (million tons)	Gross Syngas Volumes (PJ)	SPE Category**	Gross Gas Volumes (NG equivalent)
1 <sup>st</sup> UCG Project (100 ha)	Measured	3.7	72	1P Reserve (Proven)	72 bcf
Palmietkuil Farms (600 ha)	Measured + Indicated + Inferred	$3.7 + 3.3 + 20 = 27$	447	2P Reserve (Proven + Probable)	≈0.5 tcf
Theunissen Resource (300 000 ha)	Inferred	1,000	16,560	3P Reserve (Proven + Probable + Possible)	≈16.6 tcf

**TOTAL Karoo shale gas ≈20**

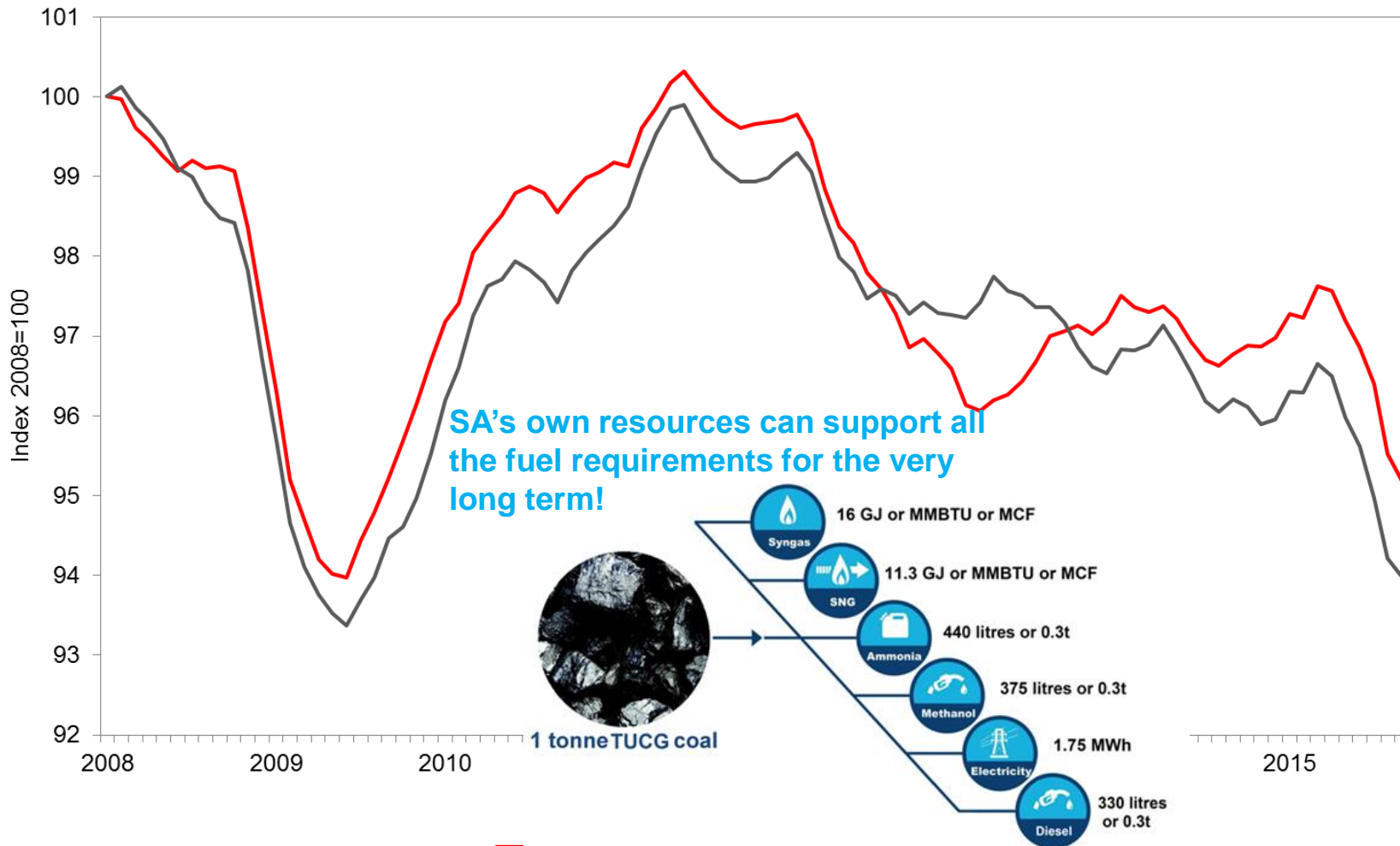
\* SAMREC classification as signed off by a Competent person.

\*\*SPE = Society of Petroleum Engineers category, but the values in the table are indicative only

# SA Electricity production down by 6%

## Do we require imported nuclear and gas?

Electricity Consumption vs Production Index 2008=100



Source : Statistics South Africa

# In summary

- ❑ **SA's LOCAL Resource utilization not fully integrated and utilized (unquantified restraints were applied to domestic RE and gas in IRP)**
- ❑ UCG is the lowest new build clean coal generation cost of electricity for SA
- ❑ Local expertise and developed technologies must also be utilized!
- ❑ UCG + IGCC clean coal power generation produces 25% less CO<sub>2</sub> per MWe and in large scale Combined Cycle mode can reach energy efficiencies of up to 55% compared to current 34%. Supporting the EIA target of >40%.
- ❑ **IRP Base Case model MUST as first priority take into account:**
  - ❑ Local resources. Local development. Domestic RE and Gas-from-coal.
  - ❑ Import and \$ cost base risk impact to consumer (tax-payer) and South-Africa.
  - ❑ Reduction on CO<sub>2</sub> and environmental impact from current boiler technology.
  - ❑ Short time implementation.
  - ❑ Clean coal credentials far exceeds current Eskom PF boiler technology.

