

# System Reliability in Renewables-driven Power Systems

## **The political economy of cheap renewables in South Africa**

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# Background to the South African power system

- South Africa's national power utility, Eskom, is predominantly coal based comprising 82% of total capacity as at March 2017 (Eskom Integrated report 2017).
- Eskom is currently constructing Medupi 4 764 MW and
- Kusile 4 800 MW coal fired power stations.
- New IPP capacity is procured by Government run reverse auctions in terms of the integrated resource plan (IRP)
  - IRP is an optimised “least cost” plan, but “policy optimised”.
  - The assumptions and constraints used have controversially favoured coal and nuclear, but
  - Renewables nevertheless dominate the IPP programme, but
  - Two coal-based IPPs are also in the pipeline.
- End-user tariffs are regulated by the National Energy Regulator of South Africa (NERSA)

# The South African renewable energy IPP programme (REIPPP) started with regular auctions and Eskom as off-taker

	2011		2012				2013				2014				2015				2016	2017	
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q4	Q4	
<b>Bid Window 1</b>	August																				
Submission date	→ November																				
Bidders announced	December																				
Signing of IPPs			June																		
Financial close			June	→ November																	
Actual operation										June	→ December										
<b>Bid Window 2</b>		November																			
Submission date		→ March																			
Bidders announced			May																		
Signing of IPPs				December																	
Financial close				December	→ May																
Actual operation																				End 2016	
<b>Bid Window 3</b>																					
Submission date							May	→ August													
Bidders announced								October													
Signing of IPPs									July												
Financial close									July	→ December											
Operation date																					End 2017

Source: Various, Authors compilation (2018)

# The REIPPP was derailed for approximately 3.5 years, with Eskom refusing to sign the PPAs

	2014				2015				2016	2017	2018				2019	2020	2021
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q4	Q4	Q1	Q2	Q3	Q4			
<b>Bid Window 4 (a)</b>		May															
Submission date			August														
Bidders announced					April												
Signing of IPPs						July					April						
Financial close											June (estimate)						
Predicted operation date																	2021
<b>Bid Window 4 (b)</b>		May															
Submission date			August														
Bidders announced					June												
Signing of IPPs						July					April						
Financial close											June (estimate)						
Predicted operation date																	2021
<b>Bid Window 4 Expedited</b>					June												
Submission date						November											
Bidders announced																	
Signing of IPPs																	
Financial close																	
Predicted operation date																	
											<b>OUTSTANDING</b>						

Source: Various, Authors compilation (2018)

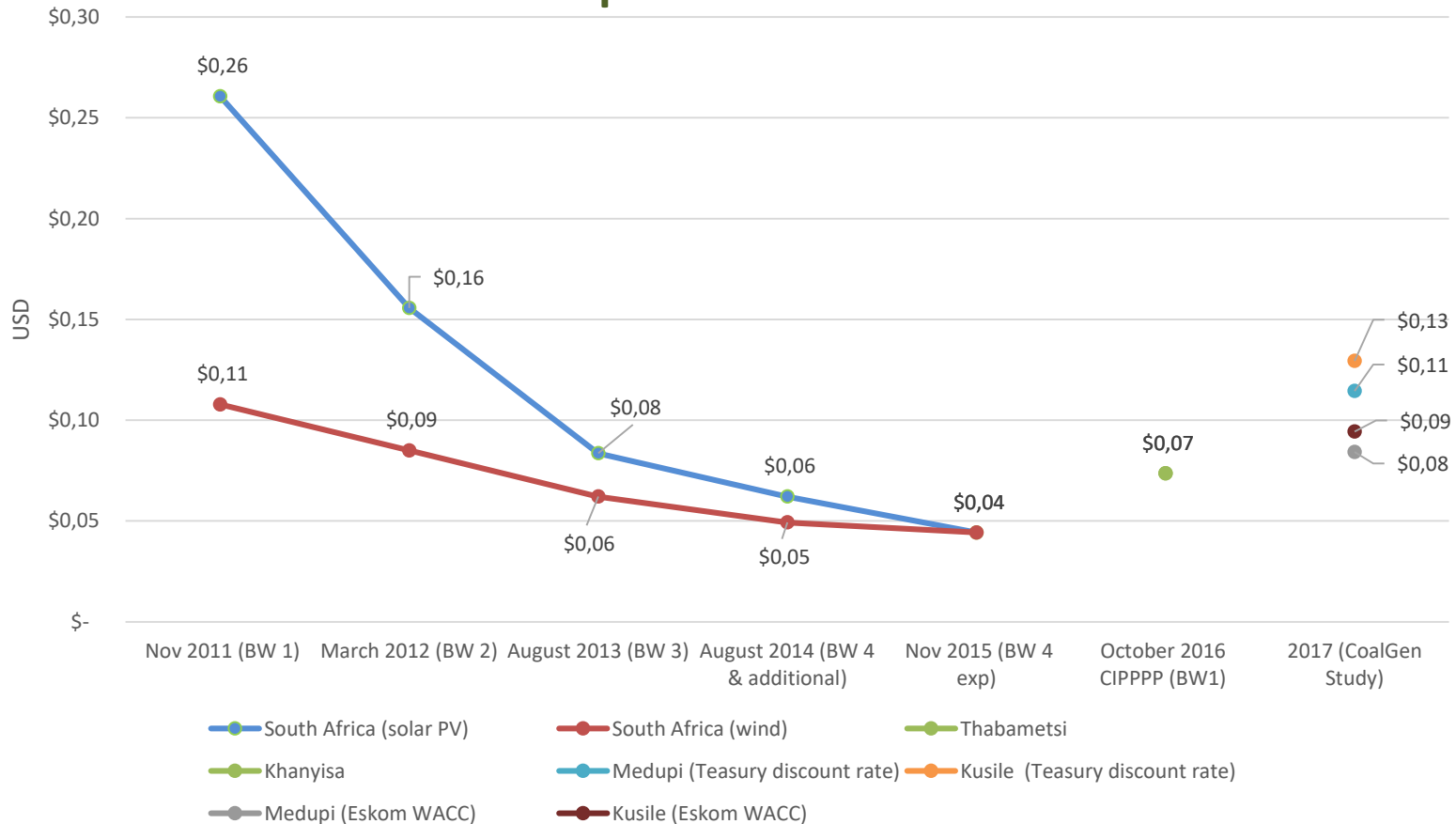
After the election of our new president in February this year the agreements for Bid Windows 3.5 and 4 was signed on 4 April 2018.

# Project capacity by bid round

		Wind	Solar	CSP
<b>Bid Window 1</b>	Capacity Offered (MW)	1,850	1,450	200
	Capacity Awarded (MW)	649	627	150
	No. of Projects awarded	8	18	2
<b>Bid Window 2</b>	Capacity Offered (MW)	650	450	50
	Capacity Awarded (MW)	559	417	50
	No. of Projects awarded	7	9	1
<b>Bid Window 3</b>	Capacity Offered (MW)	654	401	200
	Capacity Awarded (MW)	787	435	200
	No. of Projects awarded	7	6	2
<b>Bid Window 3.5</b>	Capacity Offered (MW)			200
	Capacity Awarded (MW)			200
	No. of Projects awarded			2
<b>Bid Window 4</b>	Capacity Offered (MW)	590	400	0
	Capacity Awarded (MW)	676	415	0
	No. of Projects awarded	5	6	0
<b>Bid Window 4 (additional)</b>	Capacity Offered (MW)	650	520	450
	Capacity Awarded (MW)	686	398	0
	No. of Projects awarded	7	6	0

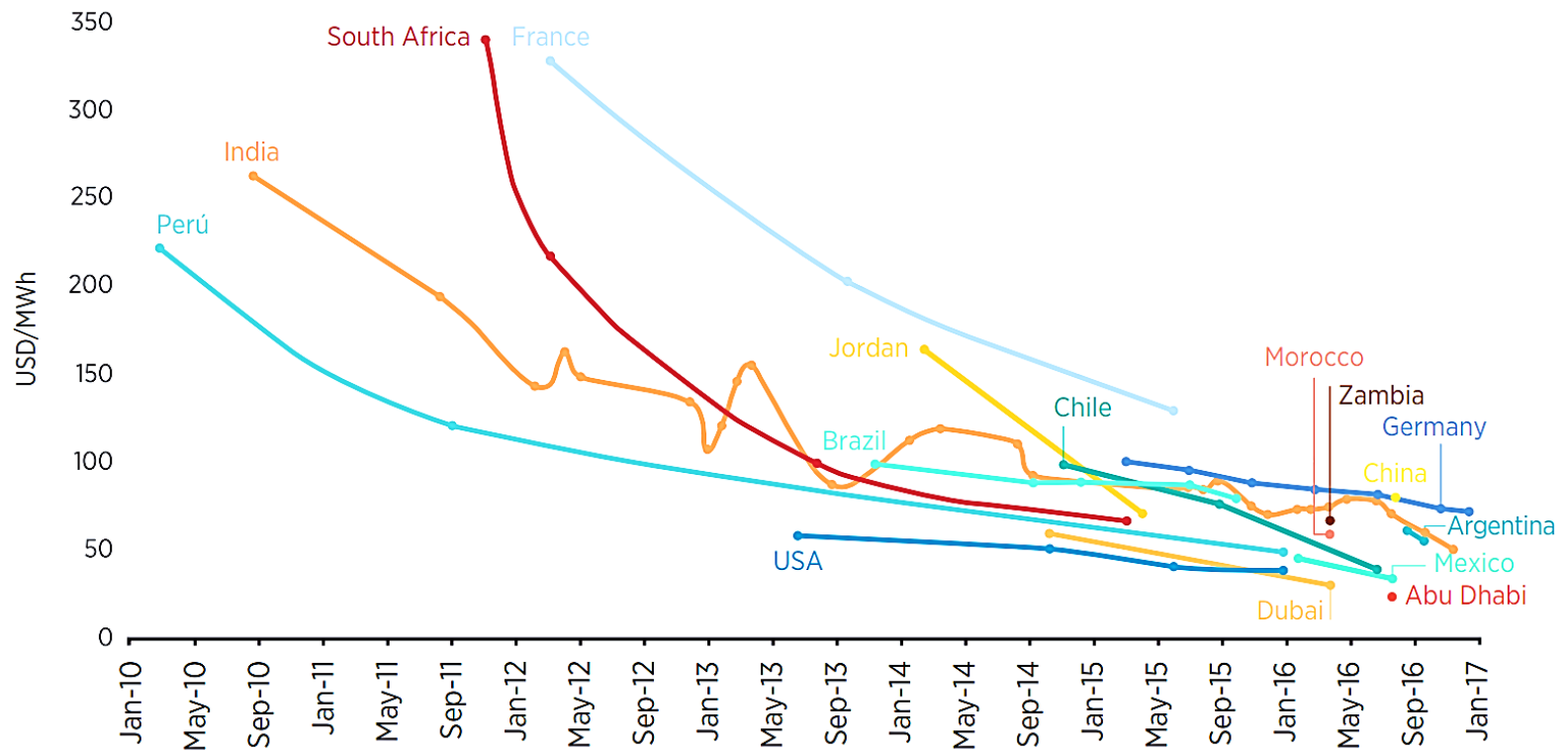
Source: Eberhard, A. & Naude, R. (2017)

# Starting from a high base South African realised drastic price reductions as programme proceeded



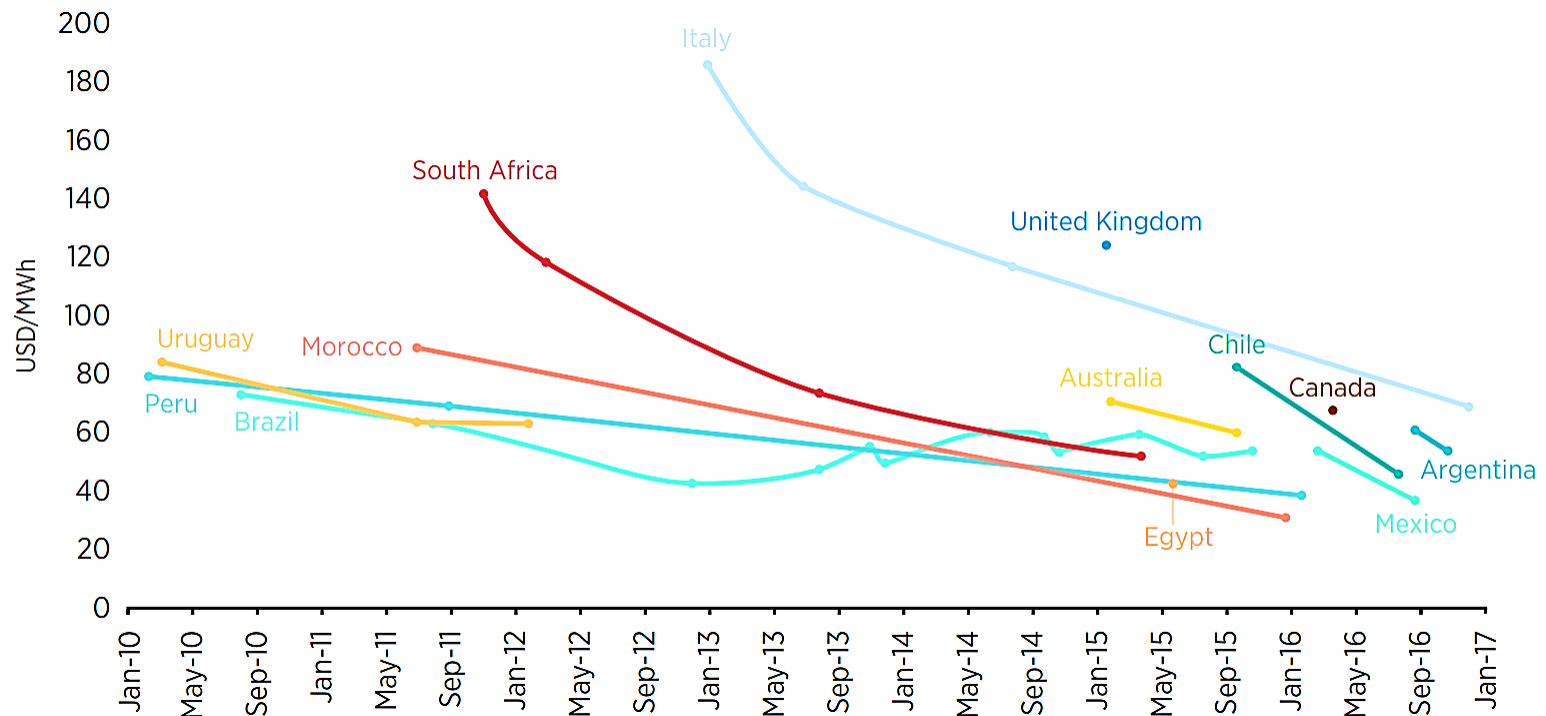
Source: National Planning Commission (2018), Meridian Economics (2017) (converted to 2016 USD, at 1USD:14ZAR)

# Average auction prices for solar PV for a range of countries between 2010 - 2016



Source: IRENA, Renewable Energy Auctions, 2017

# Average auction prices for wind for a range of countries between 2010 - 2016



Source: IRENA, Renewable Energy Auctions, 2017



# Eskom's resistance to the REIPPP programme

- From power failures to surplus generation capacity
  - Stagnant demand for 11 years
  - 9563MW of coal fired capacity coming online
- Financial problems
  - Long construction delays and cost overruns
  - Large coal cost increases
  - Large salary cost increases
  - Eskom needed huge tariff increases with more to come.
- The influence of coal mining and transporting interests

# Renewed optimism about RE prospects under the new administration, but:

- Coal interests are mobilising and litigating
- The need for a just transition for coal mining and power station communities remains unresolved
- IRP uncertainty
  - Current 2010 completely out of date
  - Newer updates have never been finalised under the Zuma administration.
  - Finalisation is expected some time this year.
- Urgent need for restructuring Eskom to create an independent transmission operator.