



Status & Opportunities for Solar Energy Development in South Africa

ATA Insights Webinar

By: Christopher Ahlfeldt
Chris@BlueHorizon.energy

August 28th, 2018

Blue Horizon ECS focuses on management consulting services and research for the renewables and energy sector.

- My background:
 - B.S. in Energy Systems Engineering from Stanford University
 - Over 11 years experience consulting in the international energy industry
 - Moved from US to South Africa and founded Blue Horizon ECS in 2010
- Blue Horizon ECS advises electric utilities, government, and private companies in the clean energy sector
- Key Services:
 - Expertise in renewables, efficiency, storage, and utility sectors
 - Strategy development for private and public energy firms
 - Market research, tariff and data analytics
 - Policy development, energy market restructuring, and impact investing



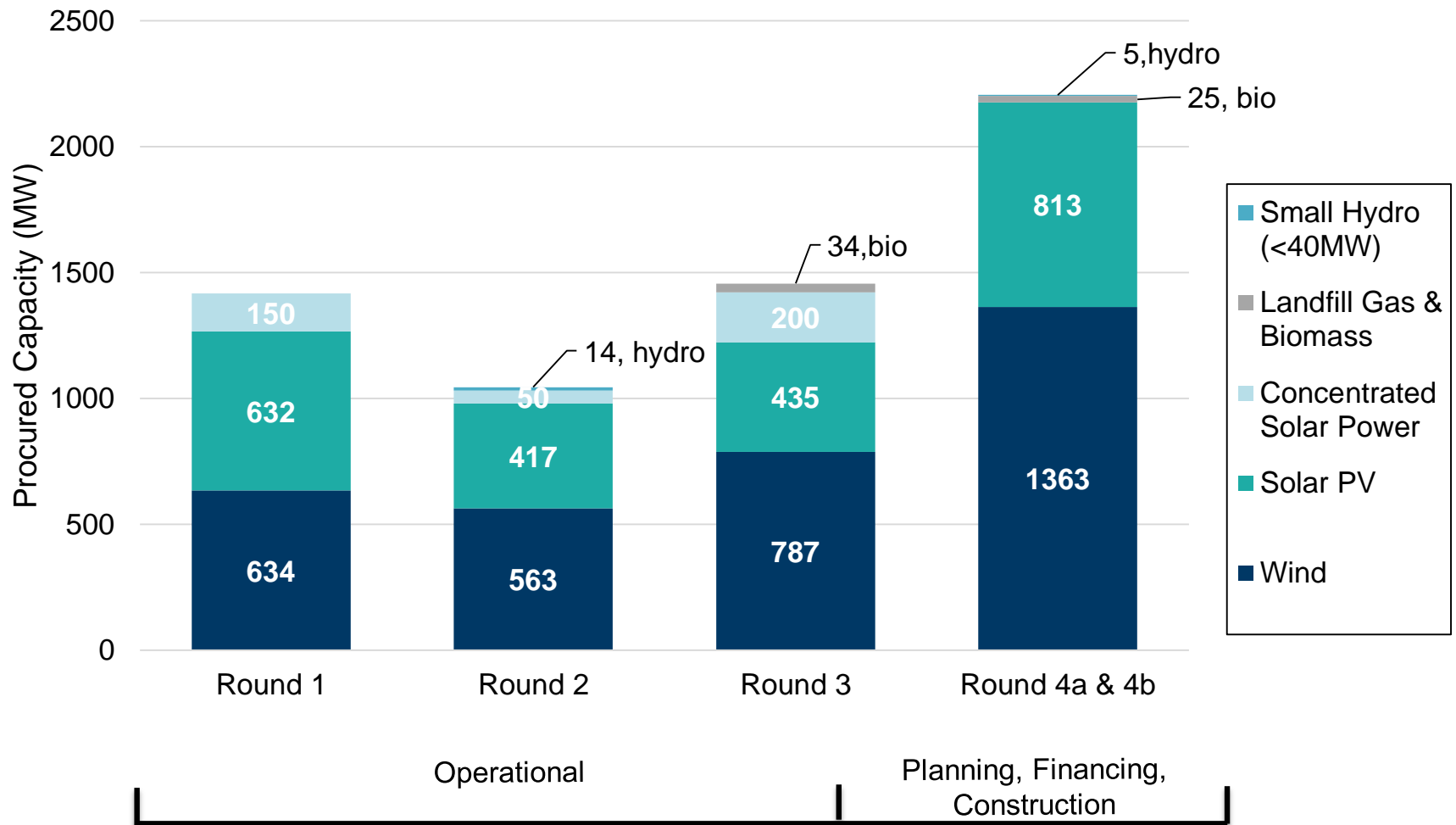
Presentation Outline

Utility-Scale

Industrial, Commercial, & Residential

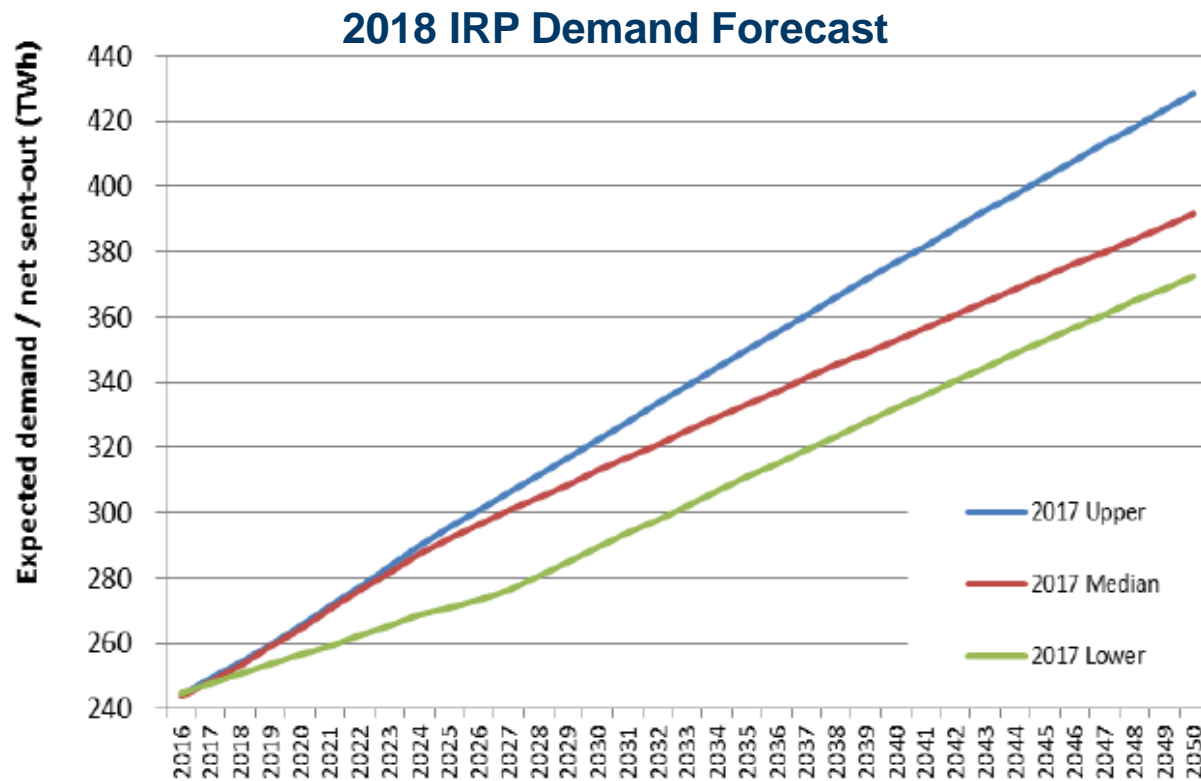
Off-Grid

Since 2011, South Africa procured >6GW from 92 utility-scale renewable energy IPPs of mostly wind (55%) and solar PV (38%)



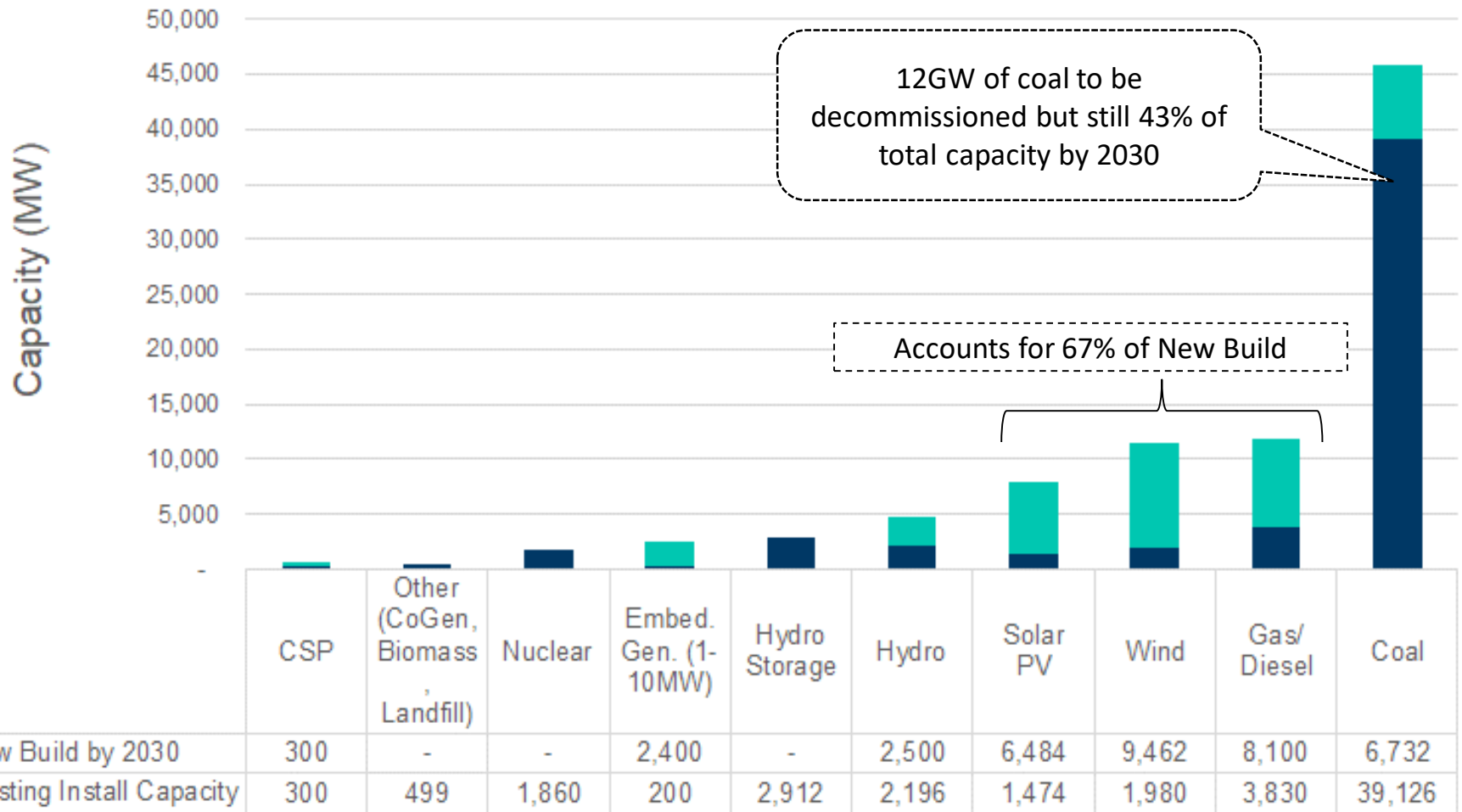
Draft Integrated Resource Plan (IRP) 2018 published this week provides insight into the amount of large-scale solar PV to be built by 2030.

- National electricity demand has decreased since 2007
- Eskom's plant performance has been lower than expected (<80%)
- A number of scenarios were modelled (e.g. least-cost, policy adjusted, carbon constrained, varying demand, and varying fuel prices)



Draft IRP suggests wind, gas, and solar PV will make-up the majority of new projects built by 2030 in South Africa

Supply Capacity increases to 78GW with >36GW of new build by 2030



A number of issues still need to be resolved and/or clarified with draft IRP

- Cost assumptions need to be clarified as high costs assumed for solar PV with learning rates (e.g. US\$1/watt by 2050)
- Annual build limits placed on renewable energy in IRP create gap in procurement of new utility-scale projects
- Smaller-scale projects are also accounted for in the draft IRP and create opportunity outside the national procurement program
 - It's unclear how the cap of 200MW per year for projects ranging in size from 1-10MW was decided



energy

Department:
Energy
REPUBLIC OF SOUTH AFRICA

IRP currently accepting public comments, so planned energy mix may change

Presentation Outline

Utility-Scale

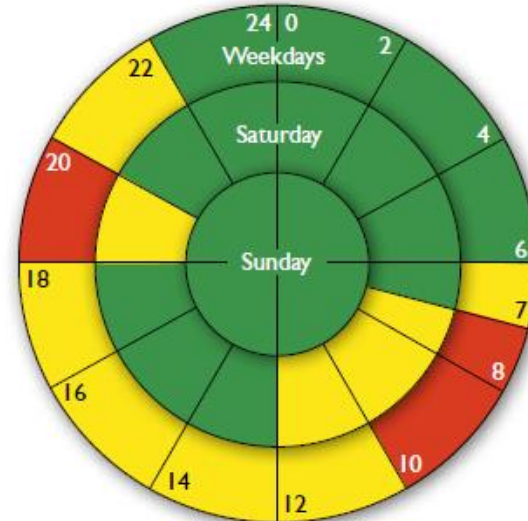
Industrial, Commercial, & Residential

Off-Grid

Customer tariff amounts and structure vary substantially among municipalities across South Africa

- South Africa has over 200 municipalities with unique tariff categories and charges
- Municipalities procure most electricity via Eskom and apply a mark-up that varies by region and customer
- Solar PV is already cheaper for some customers, but financial case depends on customer category, solar resource, municipal mark-up, demand pattern, and project size.

Eskom Megaflex Low Demand Season Energy Charge¹ 2018/2019



TOU Period	Winter High Season Jun-Aug (US\$/kWh)	Low Season Sep-May (US\$/kWh)
Peak	0.19-0.21	0.06-0.07
Standard	0.06-0.07	0.04-0.05
Off-Peak	0.03-0.04	0.03

¹Note: High demand season peak period starts and ends 1 hour earlier; Energy charge does not include T&D network, VAT, demand, reliability, subsidy, and other service charges; Assumes ~14 Rand/USD exchange rate

Presentation Outline

Utility-scale

Industrial, Commercial, & Residential

Off-grid

Larger market for off-grid solar PV solutions exist outside of South Africa

1. Microgrids: small grid system electrifying a number of users (e.g. rural village)



Examples include:



2. Standalone Solar Systems: electrification system for individual users/applications



Examples include:



A number of opportunities for growth and new projects expected in the solar PV industry in South Africa

- New utility-scale solar PV projects to be built by 2030 will likely exceed 6.5GW by 2030 (~13% already committed)
- Additional opportunity exists in the embedded generation and roof-top solar PV market as Eskom's tariffs continue to increase
- Some off-grid opportunities in South Africa, but larger unelectrified market exists outside of the country

Private sector needs to work alongside government to inform enabling policy planning and regulations

THANK YOU

Contact: CHRIS M. AHLFELDT
web bluehorizon.energy | **e** chris@bluehorizon.energy | **t** +27 71 839 7154

Proposed IRP Plan in Megawatts for the Period Ending 2030

	Coal	Nuclear	Hydro	Storage (Pumped Storage)	PV	Wind	CSP	Gas / Diesel	Other (CoGen, Biomass, Landfill)	Embedded Generation
2018	39 126	1 860	2 196	2 912	1 474	1 980	300	3 830	499	Unknown
2019	2 155					244	300			200
2020	1 433				114	300				200
2021	1 433				300	818				200
2022	711				400					200
2023	500									200
2024	500									200
2025					670	200				200
2026					1 000	1 500		2 250		200
2027					1 000	1 600		1 200		200
2028					1 000	1 600		1 800		200
2029					1 000	1 600		2 850		200
2030			2 500		1 000	1 600				200
TOTAL INSTALLED	33 847	1 860	4 696	2 912	7 958	11 442	600	11 930	499	2600
Installed Capacity Mix (%)	44.6	2.5	6.2	3.8	10.5	15.1	0.9	15.7	0.7	
<p> Installed Capacity Committed / Already Contracted Capacity New Additional Capacity (IRP Update) Embedded Generation Capacity (Generation for own use allocation) </p>										