

Power Generation: Update, Challenges and Strategies for Sustainable Growth

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By

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Presentation Outline

- ❑ Introduction
- ❑ Status Update
- ❑ Challenges to Power Generation
- ❑ Strategies to Resolving the Challenges
- ❑ Conclusion

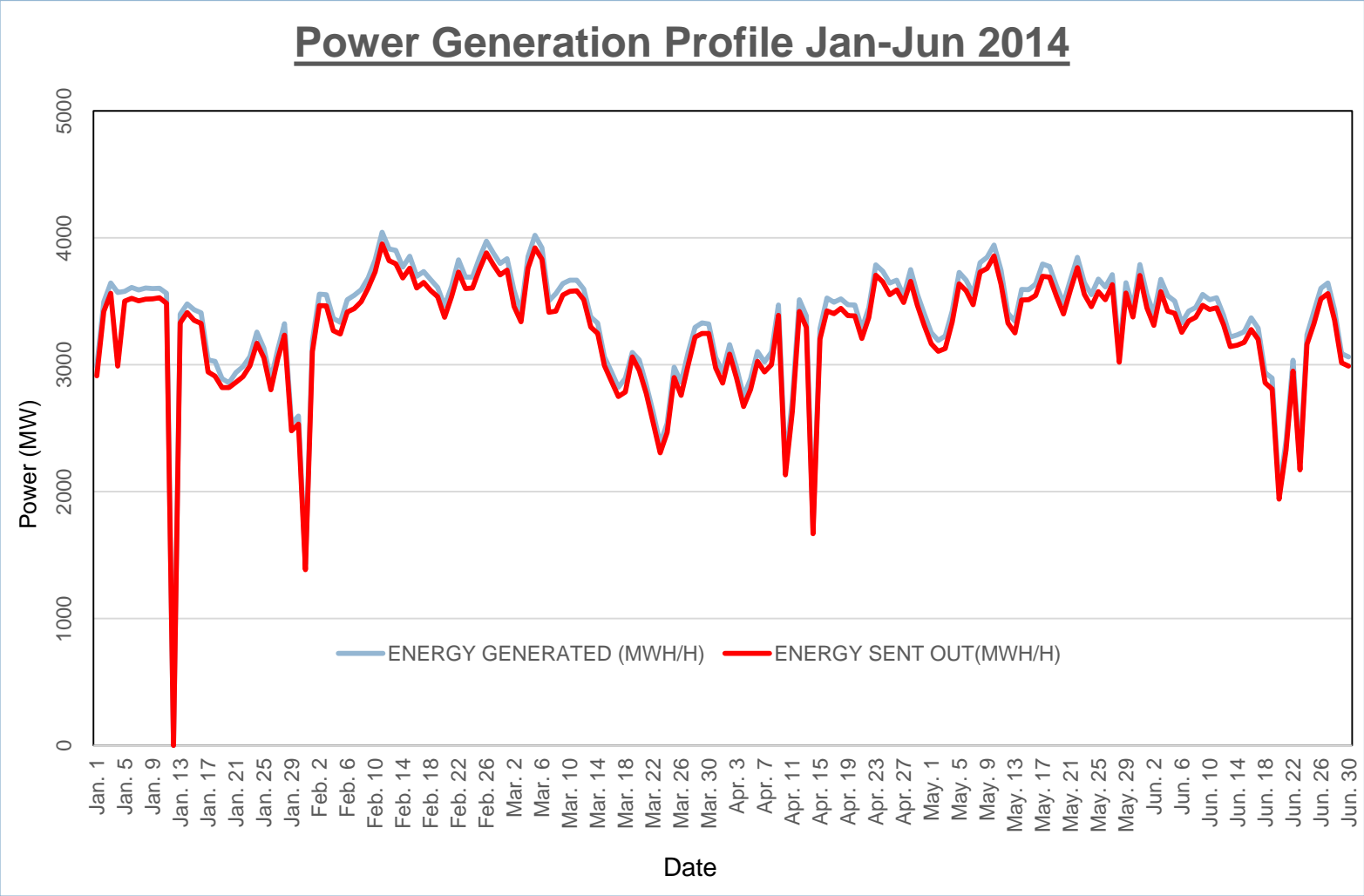
Generation - Introduction

The Nigerian Electricity Sector has witnessed dramatic changes over the last one year. PHCN successor companies except Kaduna Disco and Afam Genco have been privatised. TCN is now under a management contract with MHI of Canada. NIPP is undergoing privatisation of its power plants. NERC is in the process of a tariff adjustment and commencement of Transitional Electricity Market (TEM).

Therefore, the electricity sector is prepared for a boost through private sector involvement and further diversification of the primary fuel source. But the industry is faced with acute market liquidity and investment risks arisen out of it.

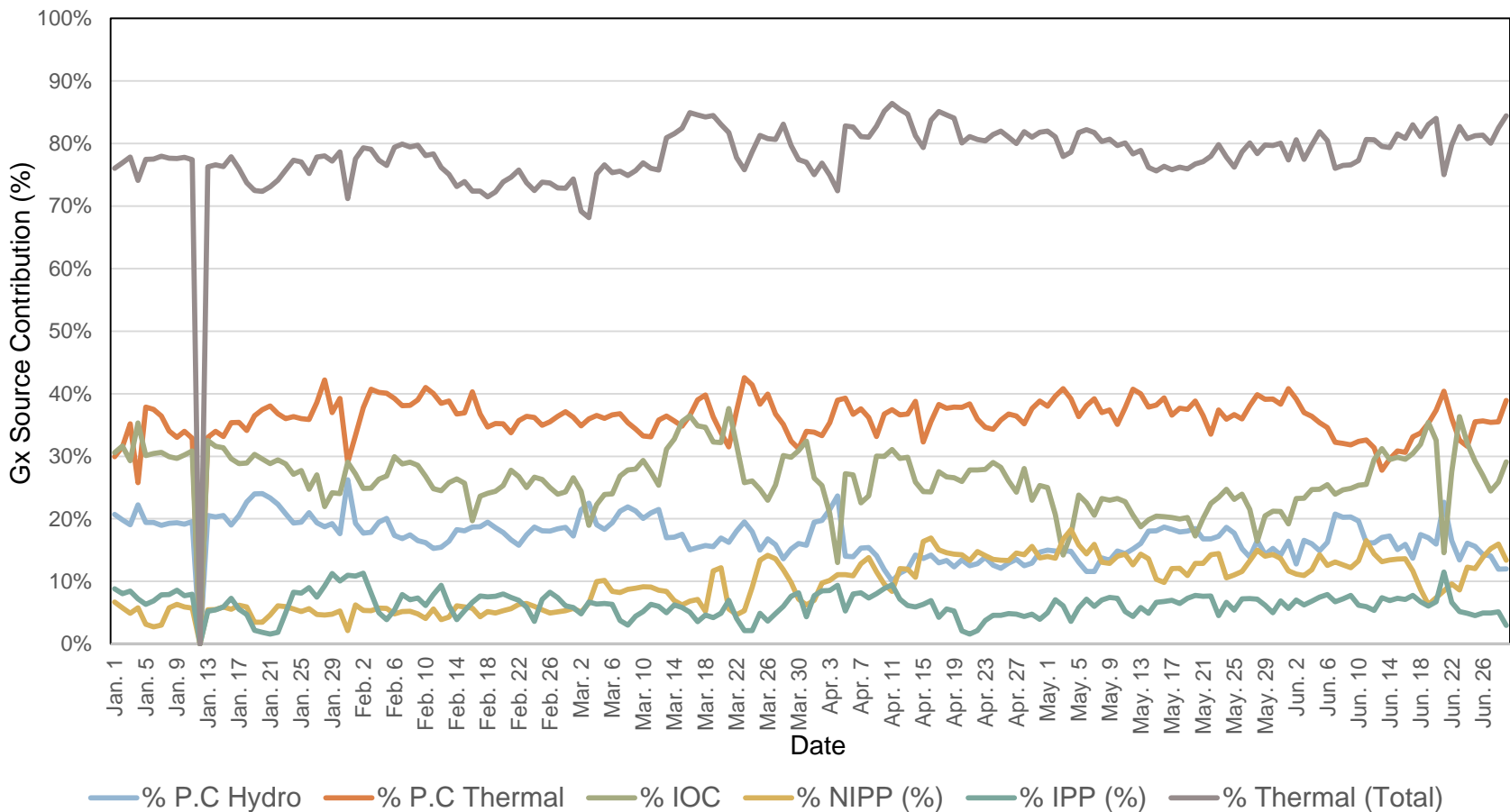
This presentation will review the current challenges as well as strategies to be adopted to achieve a sustainable growth in power generation.

Generation Update I: Jan – Jun 2014 Profile



Generation Update II: Jan – Jun 2014 Profile

GX Category % Input to the Grid Jan-Jun 2014



Generation Update III: Jul – Dec 2014 Projection

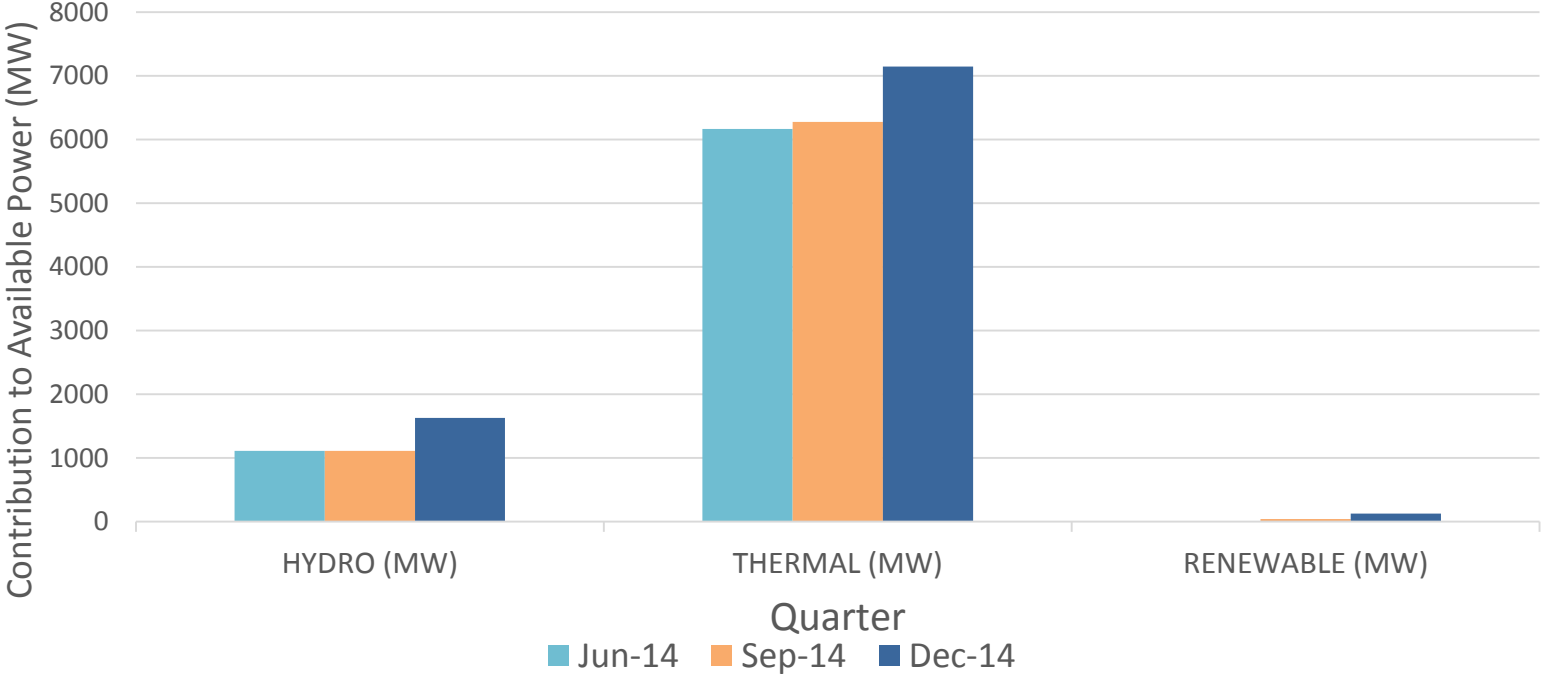
Category	Name of Plants	CAPACITY ADDITIONS (MW) FOR 2014		
		Jun-14	Sep-14	Dec-14
Hydros	Shiroro			150
	Jebba			
	Kainji	30		370
	Gurara II			
	Zungeru			
	Mambilla			
	Total PHCN Hydros	1110	1110	1630
	Capacity Deliverable	620	620	620
Privatised Thermals	Egbin		200	
	Afam IV & V		55	
	Sapele Steam + Gas			
	Delta (Ughelli)			90
	Geregu			
	Omotosho		30	30
	Olorunsogo		30	30
	Kaduna			
	Total PHCN Thermals	2207	2522	2672
	Capacity Deliverable	1545	1765	1870
	Total PHCN	3317	3632	4302
	Capacity Deliverable (PHCN)	2165	2385	2490
NIPP	Alaoji		0	112.5
	Olorunsogo			
	Sapele	113		
	Ihovbor			
	Calabar			113
	Gbarain			
	Geregu phase-2			
	Omotosho phase-2			
	Egbema			
	Omoku			
	Total NIPP	2234	2234	2459
	Capacity Deliverable (NIPP)	1564	1564	1721

Generation Update IV: Jul – Dec 2014 Projection

Category	Name of Plants	CAPACITY ADDITIONS (MW) FOR 2014		
		Jun-14	Sep-14	Dec-14
IPP-A	Ibom Power			
	Omoku			
	Trans-Amadi			
	AES			
	Total IPP-A	352.5	352.5	352.5
	Capacity Deliverable (IPP-A)	247	247	247
IPP-B	Geometric Power Aba	0	0	44
	Paras Energy			
	Notore Power			25
	Rivers State Govt. Afam I &II			
	Dangote Power (Obajana)			
	Total IPP-B	160	160	229
	Capacity Deliverable (IPP-B)	112	112	160
IOC	AGIP phase-1			
	Shell			
	Total IoC	1130	1130	1130
	Capacity Deliverable (IOC)	791	791	791
Renewables	Kashimbilla		40	
	Gurara I			30
	Kiri			20
	Dadinkowa (Mabon)			
	Katsina Wind Farm			
	Solar	0	0	40
	Total Renewables	0	40	130
	Deliverable Renewables	0	28	91
	Capacity Deliverable (Renewab	7,194	7,549	8,603
	Daily Cum. Available Capa	4,878	5,127	5,501

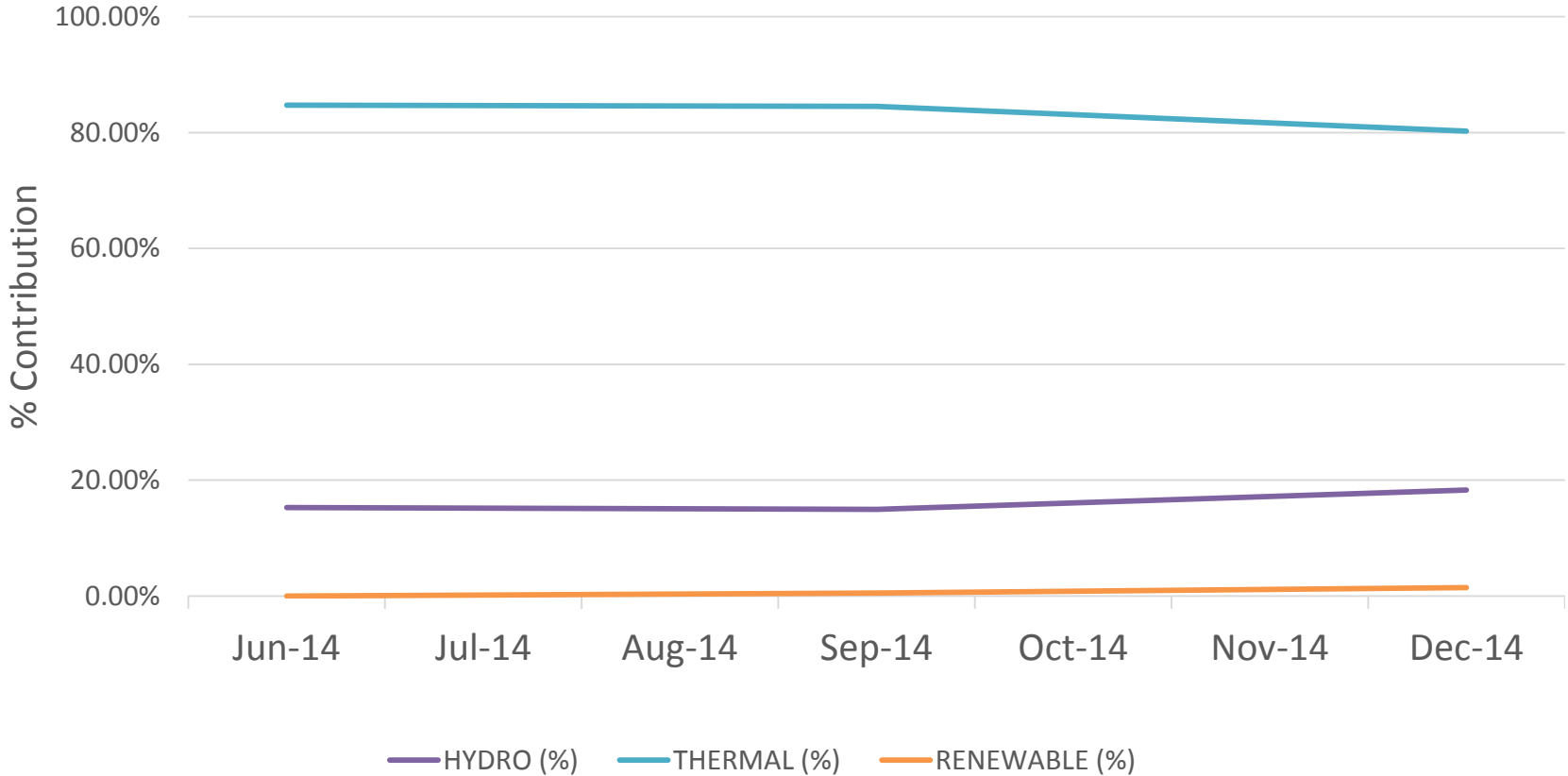
Generation Update V: Jul – Dec 2014 Projection Analysis

2014 Quarterly Generation Deliverable Capacity



Generation Update VI: Jul – Dec 2014 Projection Analysis

Contribution from Energy Sources (%)



Generation Update VII: 2015 – 2020 Projection

Category	Name of Plants	CAPACITY ADDITION SCHEDULE					
		2015	2016	2017	2018	2019	2020
FGN Sucessor Companies	Egbin - Kepco Energy	0					
	Afam IV & V	276					
	Sapele Steam + Gas	300					
	Delta	180					
	Gerugu	0					
	Omotosho	60					
	Olorunshogo	60					
	Kaduna	200					
	Shiroro	0					
	Jebba	0	90				
	Kainji	100					
	Gurara II	0			180	180	
	Zungeru	0				350	350
	Mambilla	0				1500	1550
NIPP	Alaoji	593.5					
	Olorunsogo	225					
	Sapele	0					
	Ihovbor	0					
	Calabar	450					
	Gbarain	225					
	Geregu phase-2	0					
	Omotosho phase-2	0					
	Egbema	337.5					
	Omoku	112.5					
IPP-A	Ibom Power	76					
	Omoku	50					
	Trans-Amadi	24					
	AES	0					

Generation Update VIII: 2015 – 2020 Projection

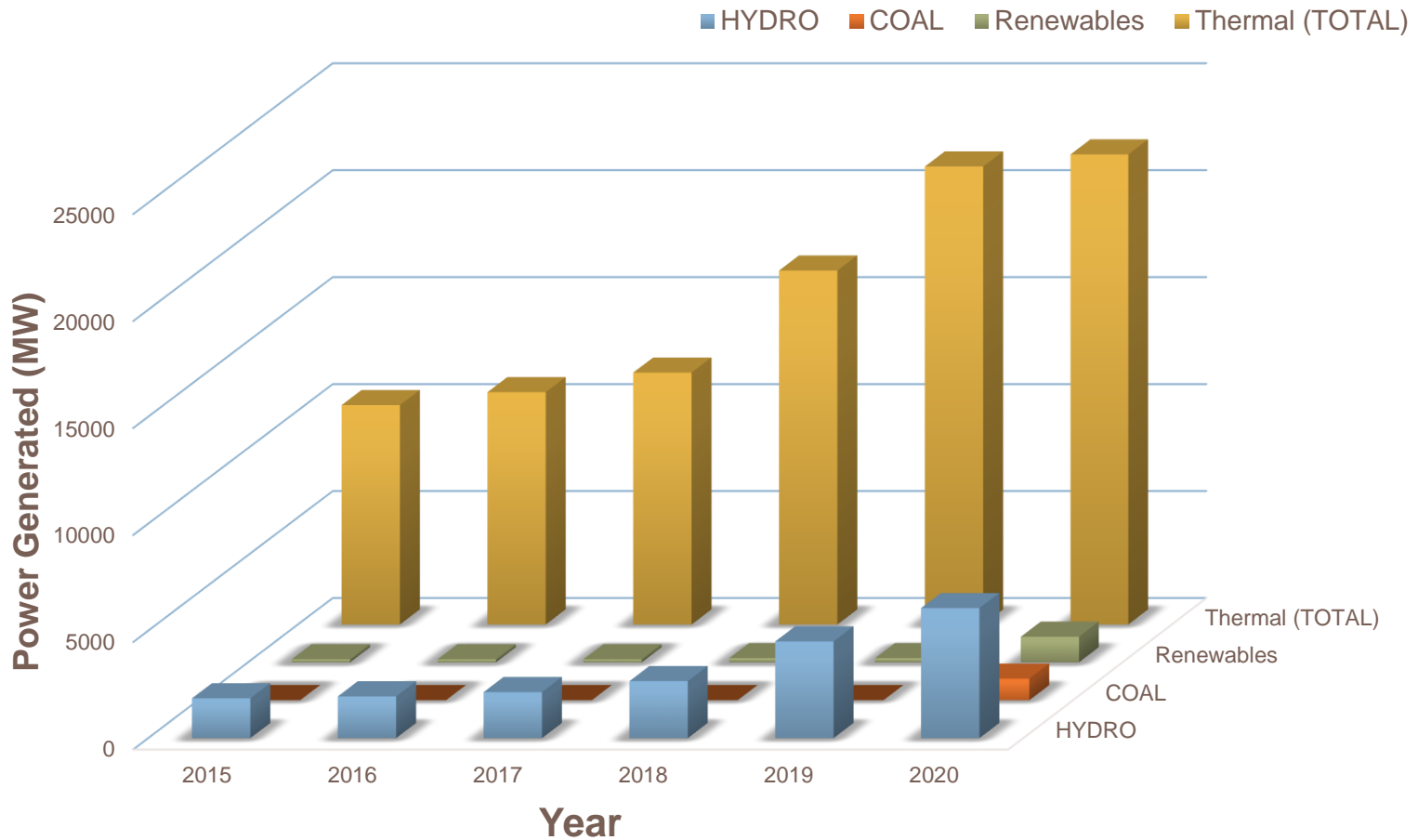
Category	Name of Plants	CAPACITY ADDITION SCHEDULE					
		2015	2016	2017	2018	2019	2020
IPP-B	WEMPCO				100	100	
	Essar Power (Calabar)					360	300
	AES (Expansion)		60				
	BCS Energy (Ajaokuta)				500	500	
	Century Power				250	250	
	Zuma Energy					200	200
	Ethiope Energy					500	500
	Bresson AS			90			
	Yellowstone				150	200	
	Fortune Power (Aqua Ibom)					350	350
	Knox J & L Energy				250	250	
	ICS Power					300	324
	Paras Energy	36	60				
	ENCON (Negriz)				100	150	
	Geometric Power Aba	132		250	250		
	JBS Windpower			100			
	Notore Power	0			250	250	
	MBH Power			100	200		
	Azura Power WA			225	225		
	SuperTek/Symbion Industries				100		
	Rivers State Govt Afam I & II		160				
	Fortune Power (Calabar)				250	250	
	Dangote Power (Obajana)						
Ikot Abasi Power			150	100			
Hudson Power				235	300		

Generation Update IX: 2015 – 2020 Projection

Category	Name of Plants	CAPACITY ADDITION SCHEDULE					
		2015	2016	2017	2018	2019	2020
	Chevron Nigeria Ltd - (Agura)				330	150	
	Total Fina				235	235	
IOC	AGIP phase-1						
	AGIP phase-2					240	240
	Shell						
	Mobil Nigeria Unlimited (QIT)				250	250	
	SUMMARY OF RENEWABLES						
	Other Renewables						1,000
	Katsina Wind farm	10					
	Synergent Power Share			50			
	Mabon (Dadinkowa)	40					
	Kashimbilla						
	Gurara I						
	Kiri						
	Zuma Energy						500
	Solar	20					
	Other Coal Energy						500
	Annual MW Additions to base year	3,508	370	965	3,955	6,865	5,814
		1,176	90	0	180	2,030	1,900
		1,944	0	0	0	0	0
		150	0	0	0	0	0
		168	280	915	2,960	3,960	1,674
		0	0	0	815	875	240
		70	0	50	0	0	2,000
	Total Annual Capacity	12,110	12,480	13,445	17,400	24,265	30,079

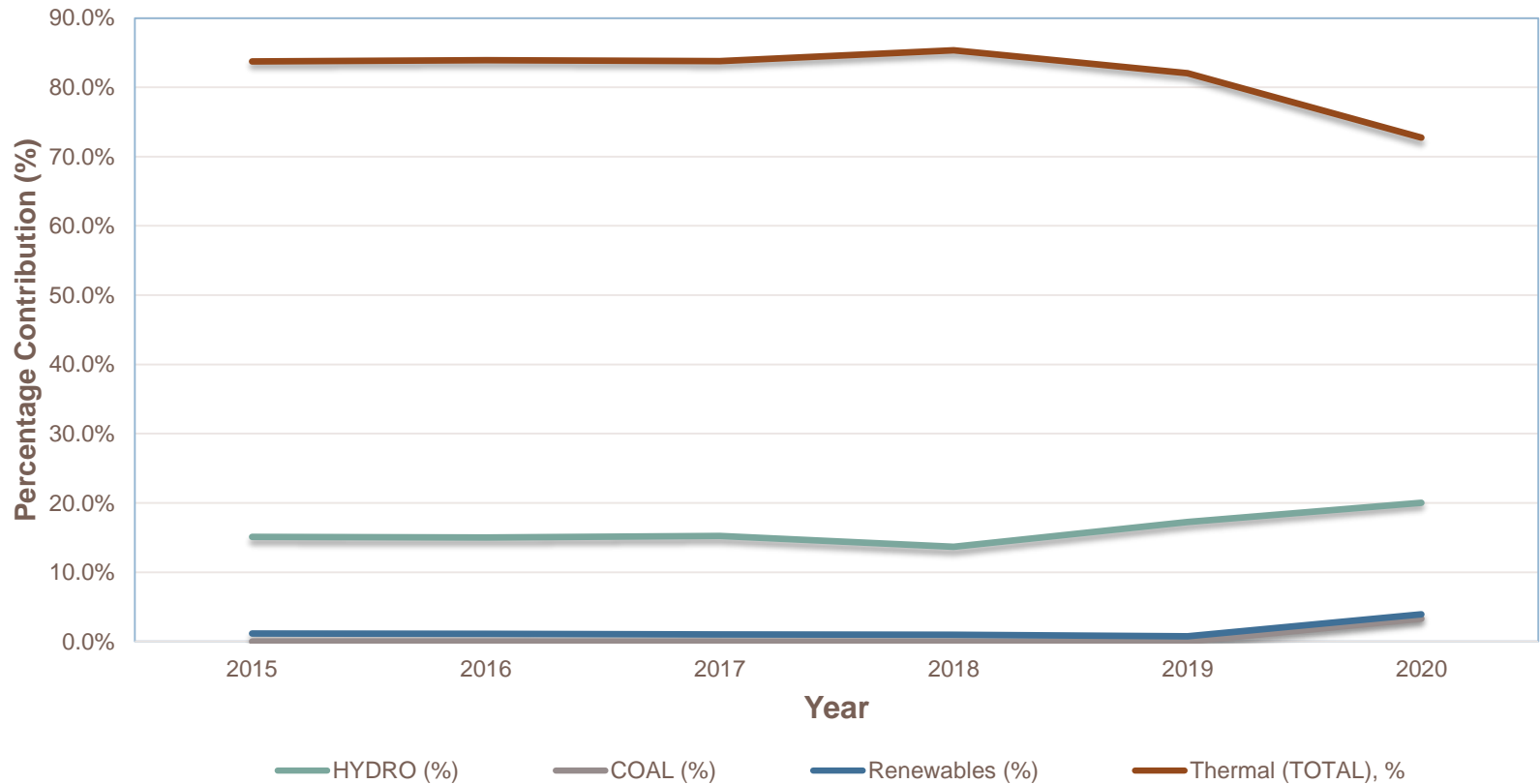
Generation Update X: Projections (2015 - 2020) Summary Graph

Projected Power Generation Sources 2015-2020



Generation Update XI: 2015 – 2020 Projection Analysis of Energy Sources (%)

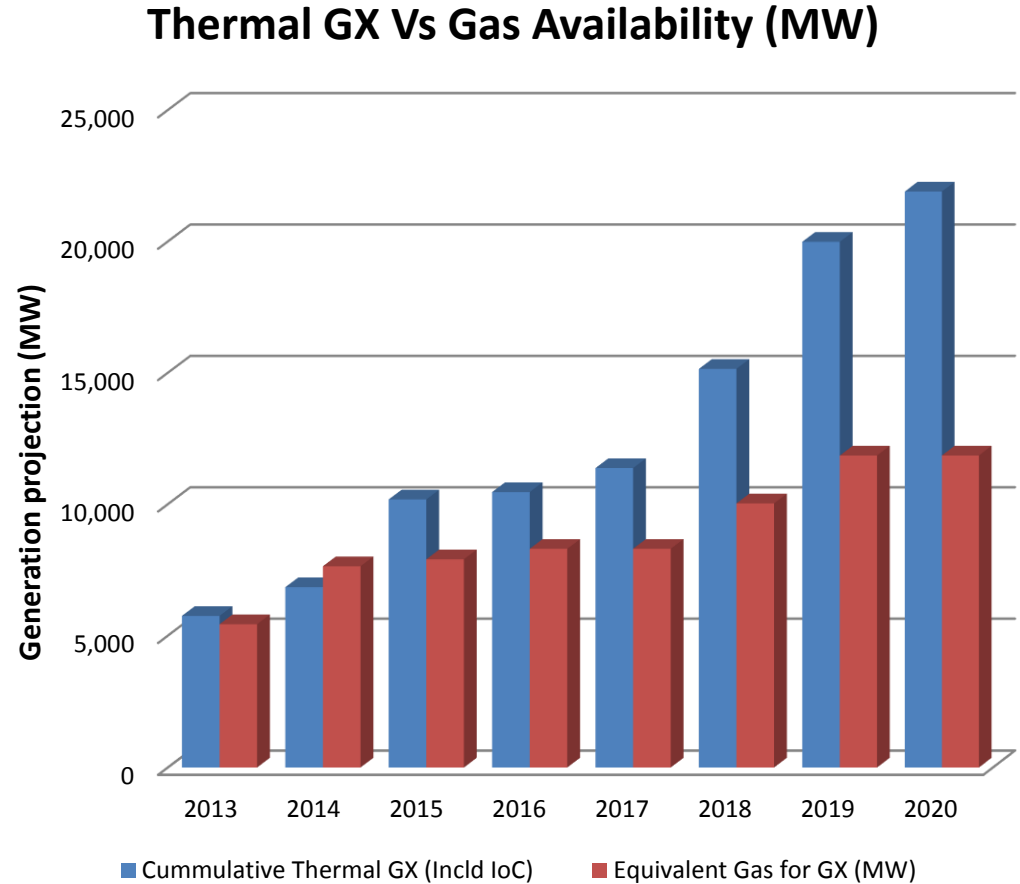
Percentage Contribution from Projected Power Sources



Challenges to Sustainable Growth in Power Generation - I

Gas:

- Inequality in gas availability across network and Imminent gross shortage in gas supply
- Security of infrastructure



*Source – PTFP forecast

Challenges to Sustainable Growth in Power Generation - II

Transmission:

	2014	2015	2016	2017	2018	2019	2020
TOTAL GENERATION CAPACITY (MW)	8,602	12,110	12,480	13,445	17,400	24,265	30,079
TRANSMISSION CAPACITY (MW)*	5,800	7,000	8,500	10,000	13,000	16,000	20,000

*Source – TCN forecast

- Generation should normally, significantly lag transmission
- Forecast of transmission for December 2014 said to be about 6,000MW
- Beyond, 2014 improvement in transmission capacity not clear hence analysis of gap fuzzy.
- Transmission challenges include:
 - Finance
 - Project management
 - Preventive Maintenance Practice
 - Right of way issues

Distribution:

- Distribution network improvements urgently required

Challenges to Sustainable Growth in Power Generation - III

Market Development:

- Bulk of projected power will come from new IPPs
- Ability to attract project capital will be seen from revenue stream impacted by tariff & market efficiency

Diversification of Fuel Sources:

Because most IPPs would be gas dependent impacted by fuel availability & security, implication of cost and financing of large plants -

- Consider more
 - Hydros (small and large)
 - Renewables especially solar and biomass + coal development

Regulatory Issues:

- Contract market - commencement of TEM and management strategy. Embedded generation and off-grid generation
- Tariff - cost reflective and market stimulating across primary fuels.

Manpower:

- Technical
- Commercial
- Legal

Strategies for Sustainable Growth in Power Generation - I

CHALLENGE	STRATEGY
GAS	<ul style="list-style-type: none">• Robust development plan from NNPC & Independent gas producers• Commercial gas rate to attract investment• Signing GSAs and GTAs• National policy on securing gas & Oil infrastructure• Some form of securitisation from the Federal govt.
TRANSMISSION	<ul style="list-style-type: none">• Clear network development plan with measurable milestones and KPIs• Bankable project manual to attract investment into TCN network development through adequate legal, regulatory, technical and commercial policy framework that will attract Tx financing• Increased government financial support in the early stages of the development b/c of time in concluding project financing• Review of policy on Right of Way• Institute best practice in procurement & project mgt of TCN development projects• Develop a robust preventive maintenance programme• Adequate skill improvement programme
DISTRIBUTION	<ul style="list-style-type: none">• Increased regulatory supervision on performance of the Disco milestones, KPIs for network improvement, integrity to minimise losses & improve stability

Strategies for Sustainable Growth in Power Generation - II

CHALLENGE	STRATEGY
MARKET DEVELOPMENT	<ul style="list-style-type: none">• NERC and NBET to develop adequate KPIs for the Discos to improve market revenue• NERC to establish cost reflective tariff that would guaranty market liquidity across the chain. This is for all primary fuel sources.• Increase securitisation with NBET to attract more IPPs• Govt. to, where possible, float a power fund with favourable interest rate to help operators sourcing capital improvement funds.
DIVERSIFICATION OF ENERGY SOURCES	<ul style="list-style-type: none">• Create enabling environment for growth of alternative fuel sources• Legal,, technical & commercial framework to drive growth of both standalone and utility scale renewable power plants• Develop a bankable coal-to-power study to minimise the risk in coal plant development• Carry out more feasibility to identify additional large hydro power plant projects; ease early development risk• For both coal and large hydro, develop a clear PPP framework that allows government support for these projects
FINANCING LARGE POWER PLANTS	<ul style="list-style-type: none">• Create power fund with favourable interest rate• Encourage state governments to take stake in IPPs to motivate private developers• Government backed securitisation either through NBET or MoFi.• Encourage development of small scale power plants as embedded generations which can be increased to evacuate through 132kV lines. This would require a change in grid code with 132kV ceded to Discos.

Strategies for Sustainable Growth in Power Generation - III

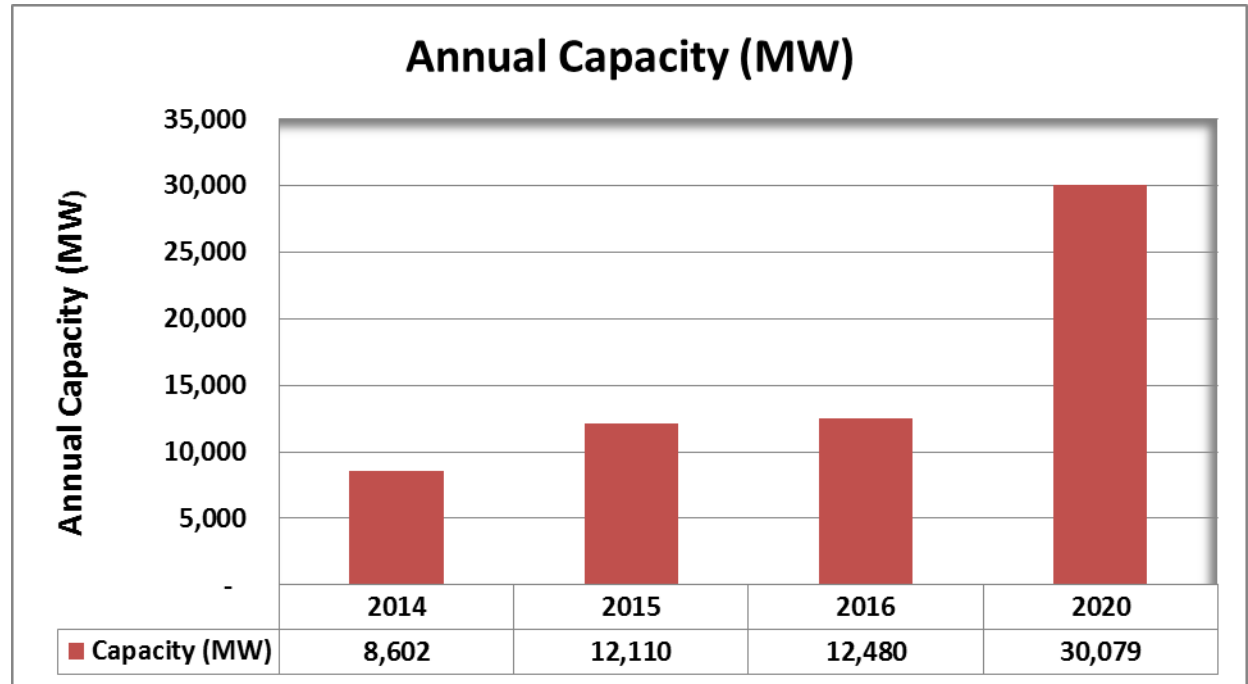
CHALLENGE	STRATEGY
REGULATORY	<ul style="list-style-type: none">• Commence TEM and manage• Review tariff as necessary for all fuel sources to enhance market liquidity• Enforcing consumer protection rights
MANPOWER	<ul style="list-style-type: none">• Expand NAPTIN to train higher level and expert personnel• Create a National Policy on technology transfer• Encourage addition of curriculum on power in the National Institutions and create synergy between industry and academia

Conclusion

To achieve sustainable generation targets, there must be:

- Sustained reform of the power industry
- Sustained project management and monitoring
- Sustained improvement in fuel supply, Tx and Dx improvements
- Adequate market liquidity

Year	Capacity (MW)
2014	8,602
2015	12,110
2016	12,480
2020	30,079



**Thank You
Any Questions?**

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