EXPANSION OF NATIONAL GRID IN MYANMAR AND PROSPECTS & TECHNICAL FEASIBILITY OF ON-GRID RENEWABLE ENERGY

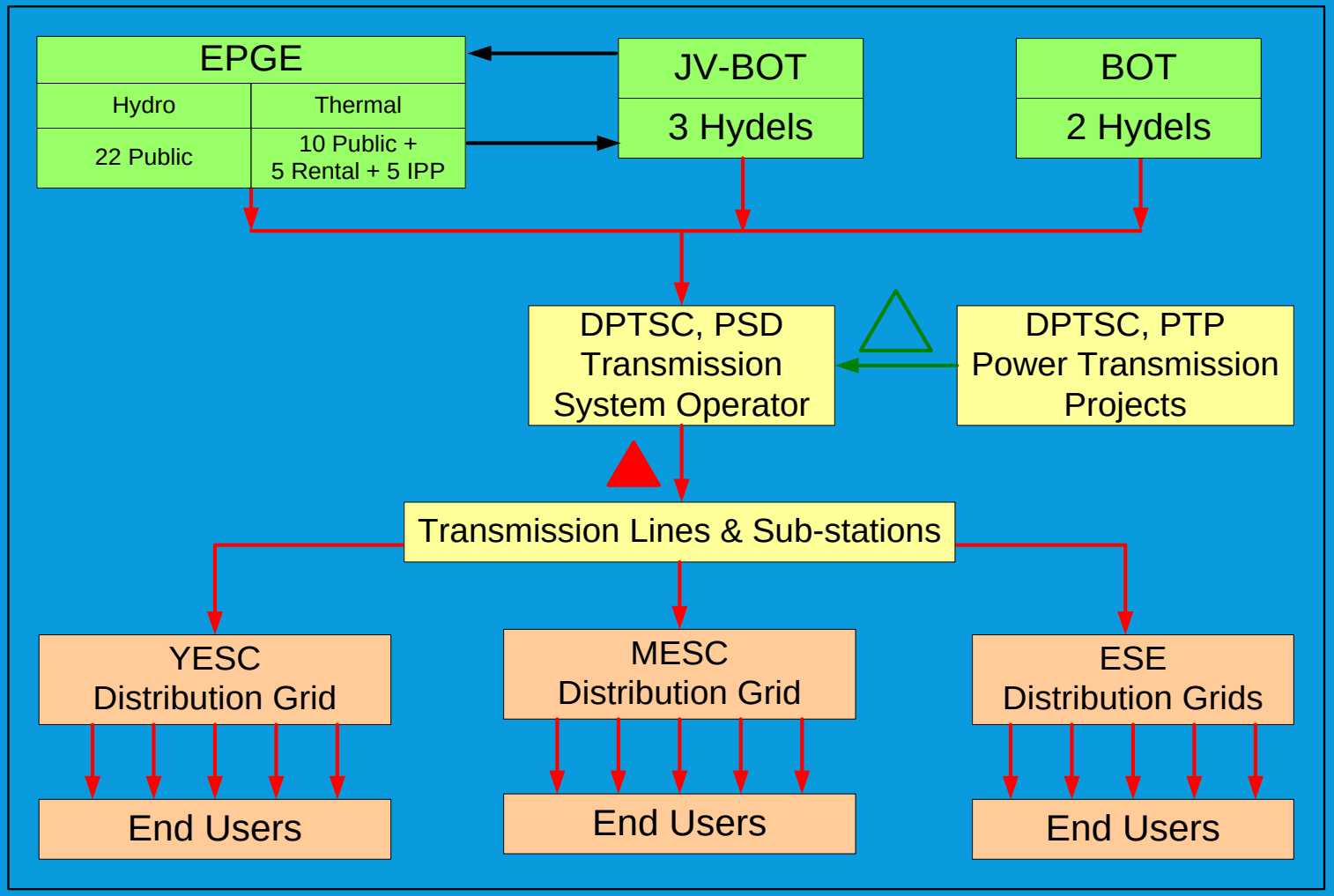
Department of Power Transmission and System Control

(12 July 2017, Naypyitaw)

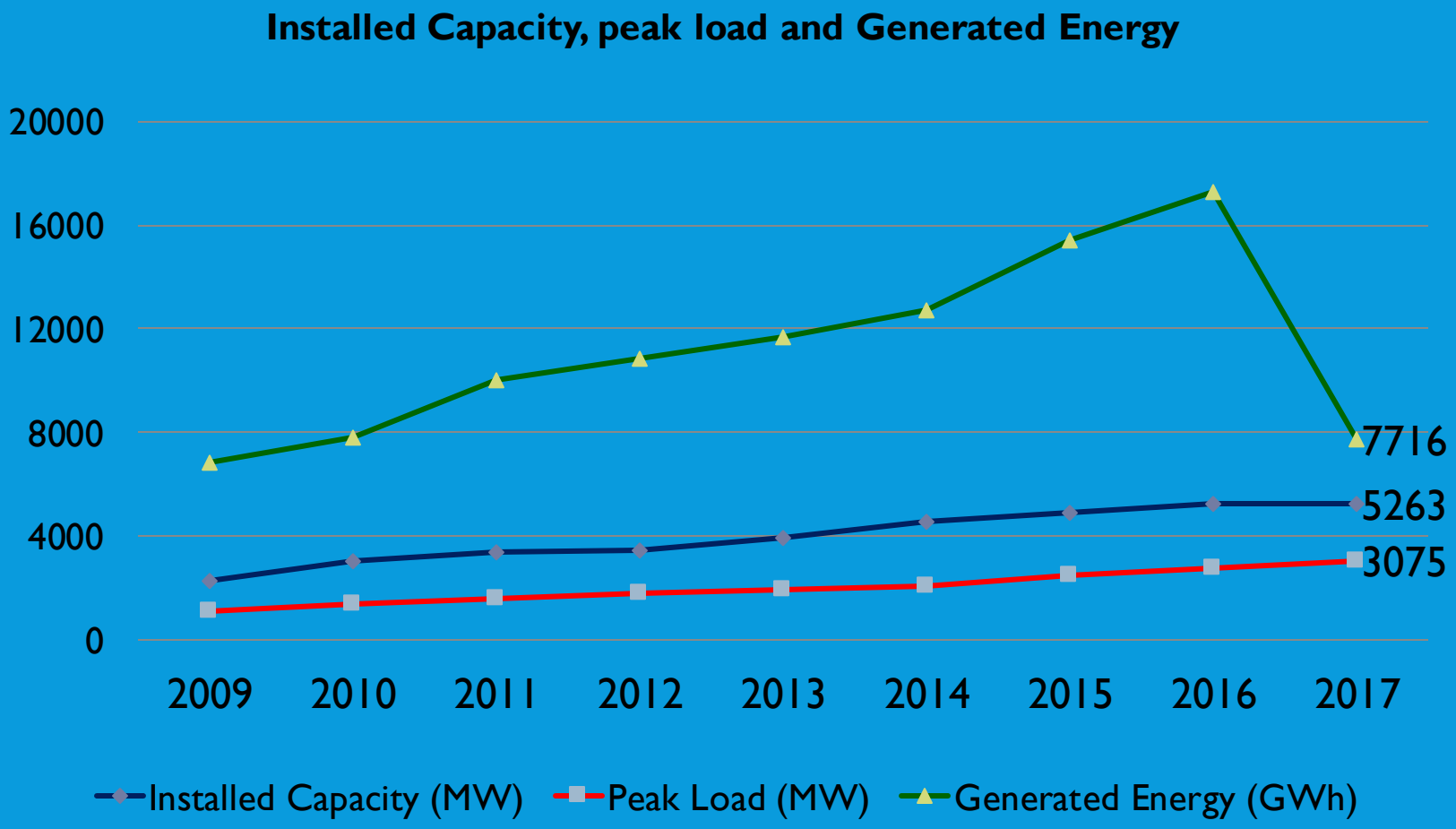
NATIONAL GRID AND ON-GRID RENEWABLE ENERGY

- National grid
  - Power system
  - Forecasting
  - Expansions
- On-grid renewable energy
  - Projections
  - Feasibility
  - Prospects

NATIONAL GRID
POWER SYSTEM - ORGANIZATIONS



NATIONAL GRID
POWER SYSTEM – PRESENT TREND



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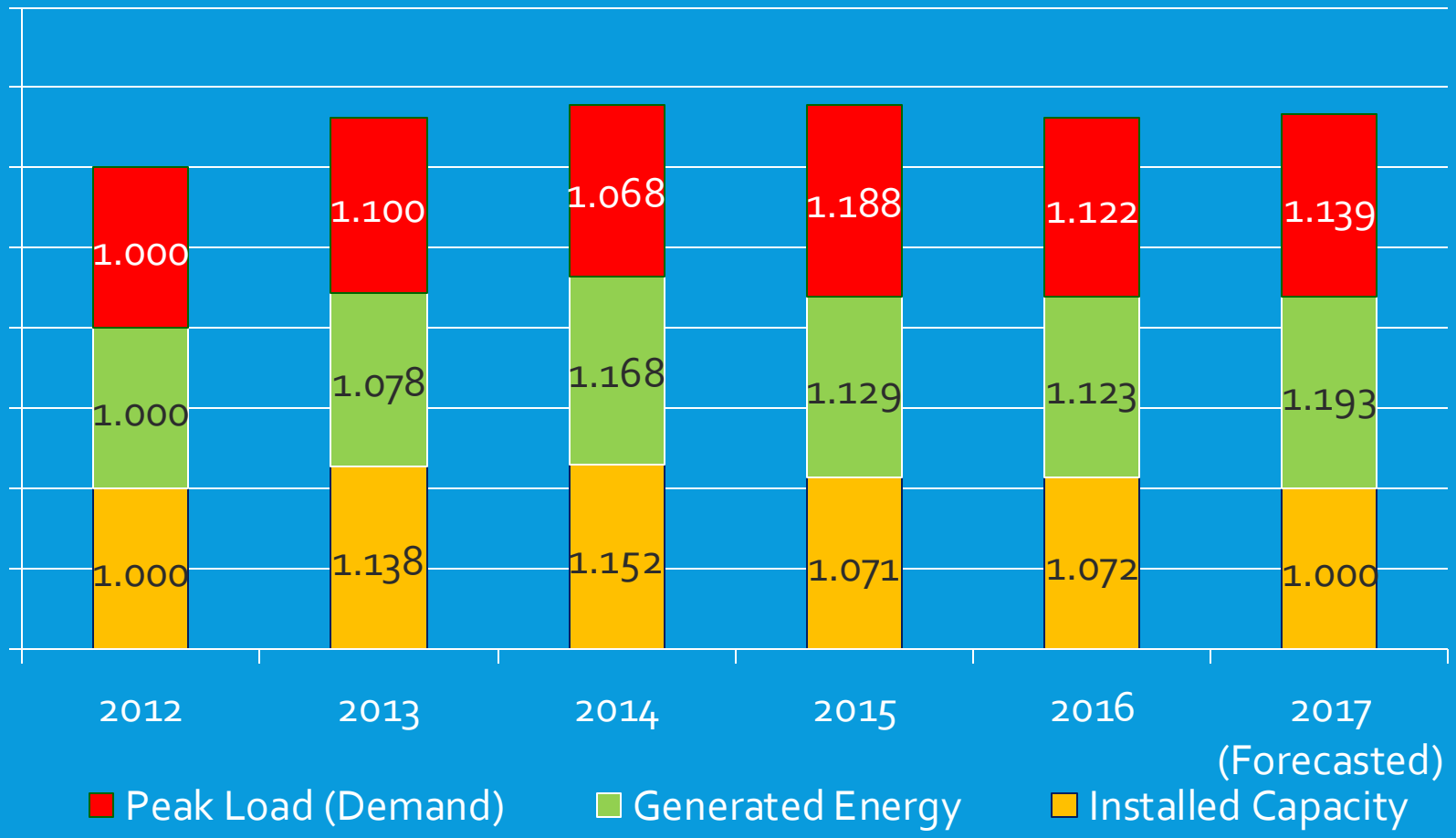
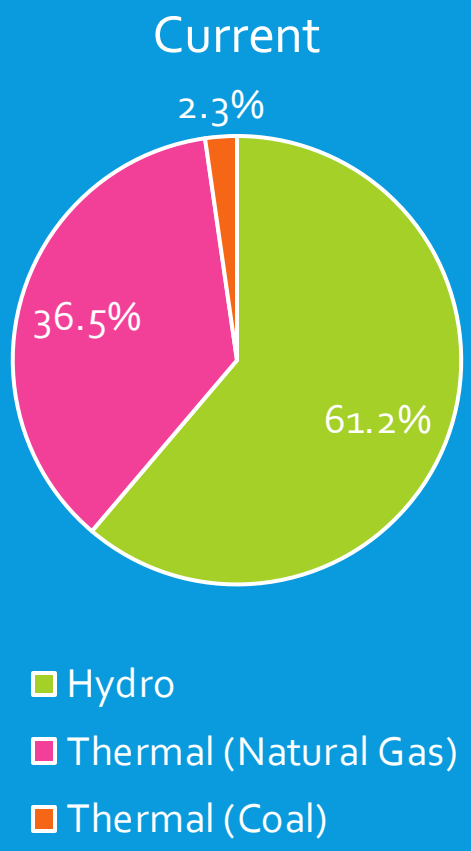
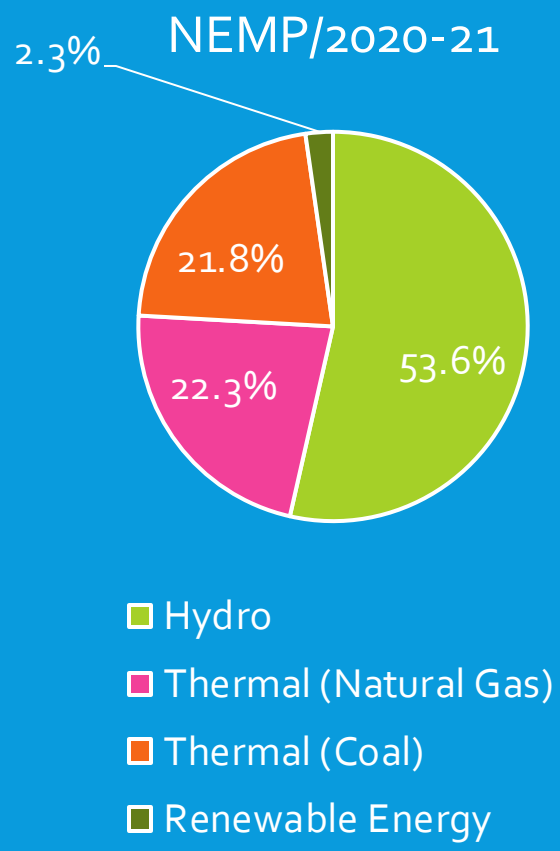
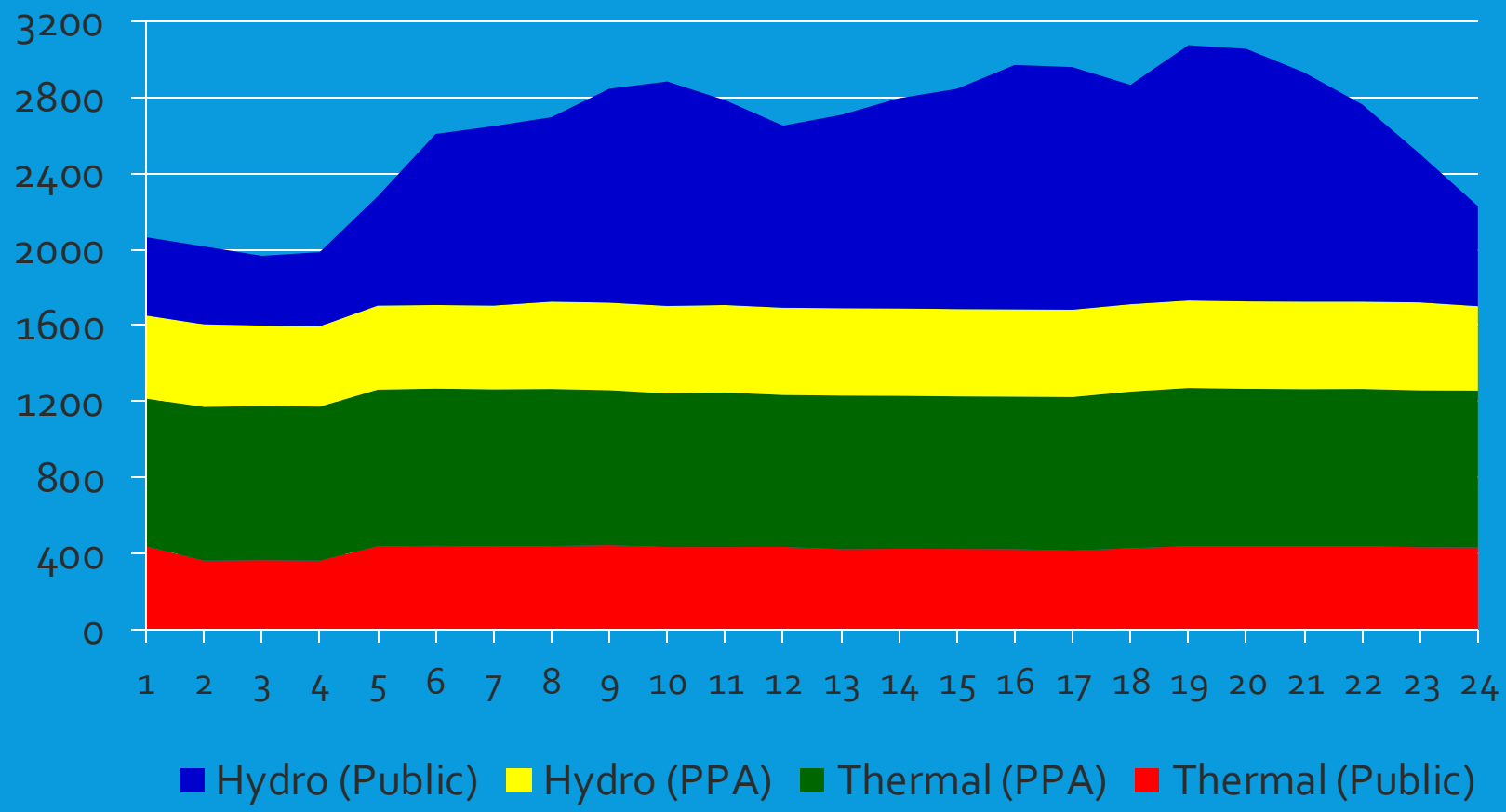


NATIONAL GRID
POWER SYSTEM - GRID INSTALLED CAPACITY MIX (CURRENT VS NEMP/2020-21)



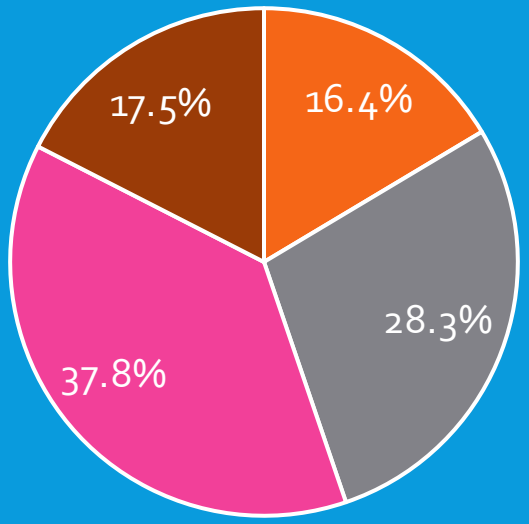


NATIONAL GRID
POWER SYSTEM - GENERATION MIX ON (HISTORICAL PEAK – 23-5-2017)



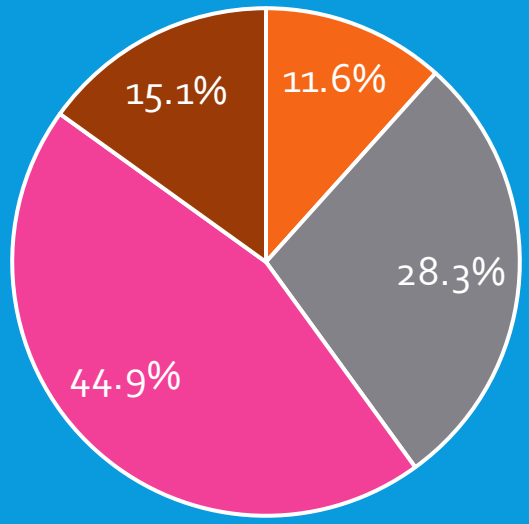
NATIONAL GRID
POWER SYSTEM – SEASONAL GENERATION MIX

May



Thermal (Public) Thermal (PPA)
Hydro (Public) Hydro (PPA)

July



Thermal (Public) Thermal (PPA)
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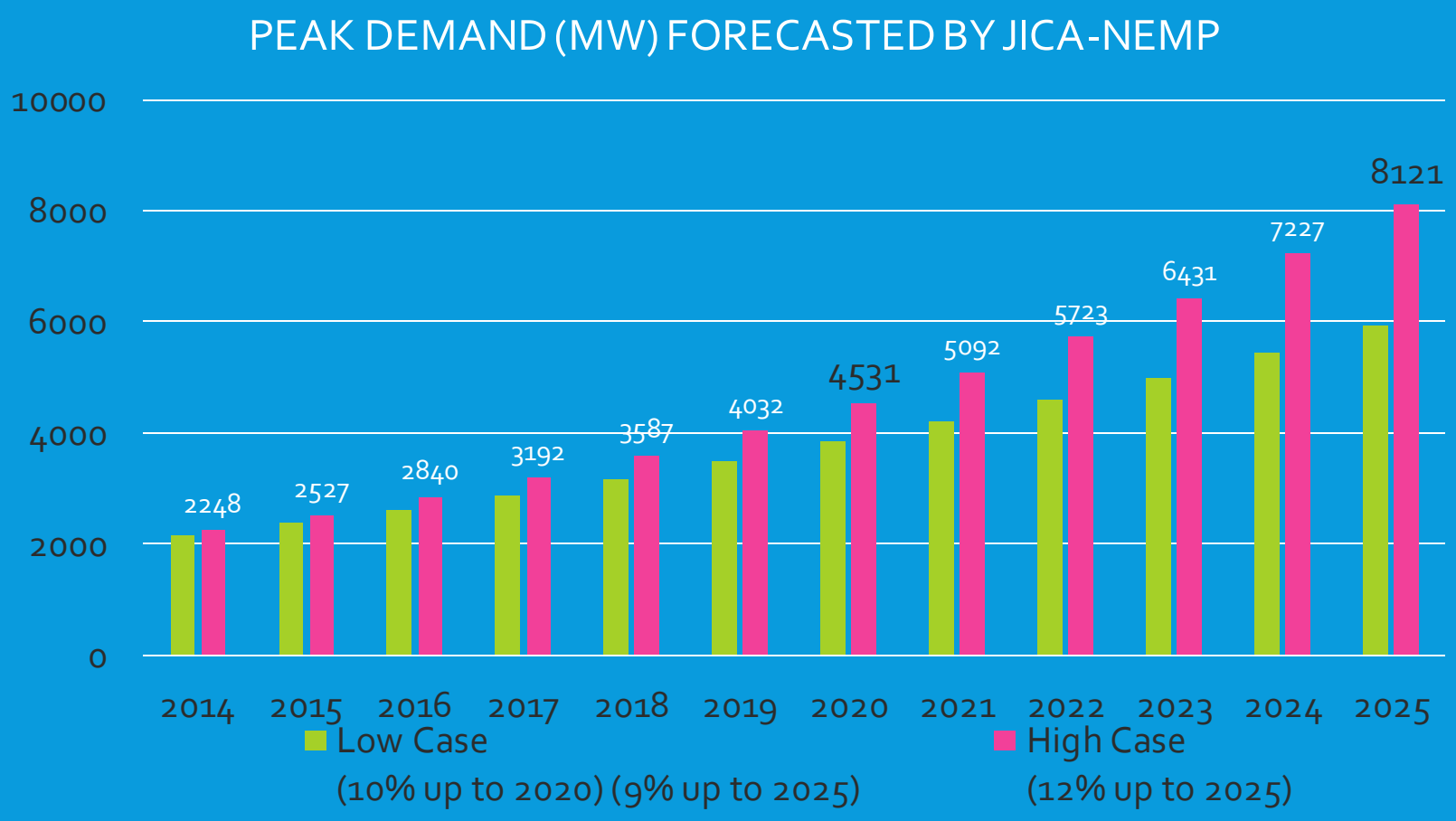
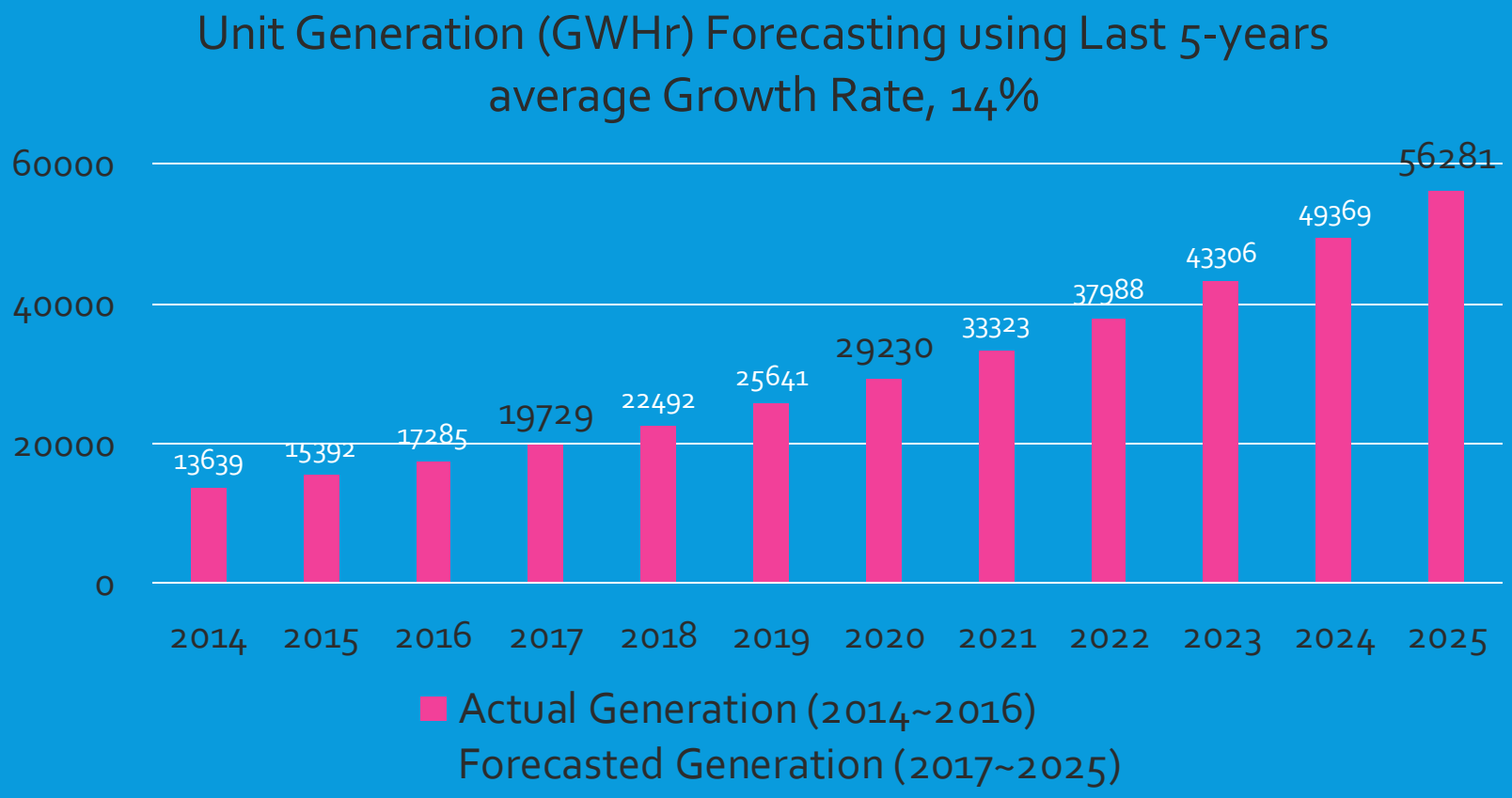
NATIONAL GRID FORECASTING



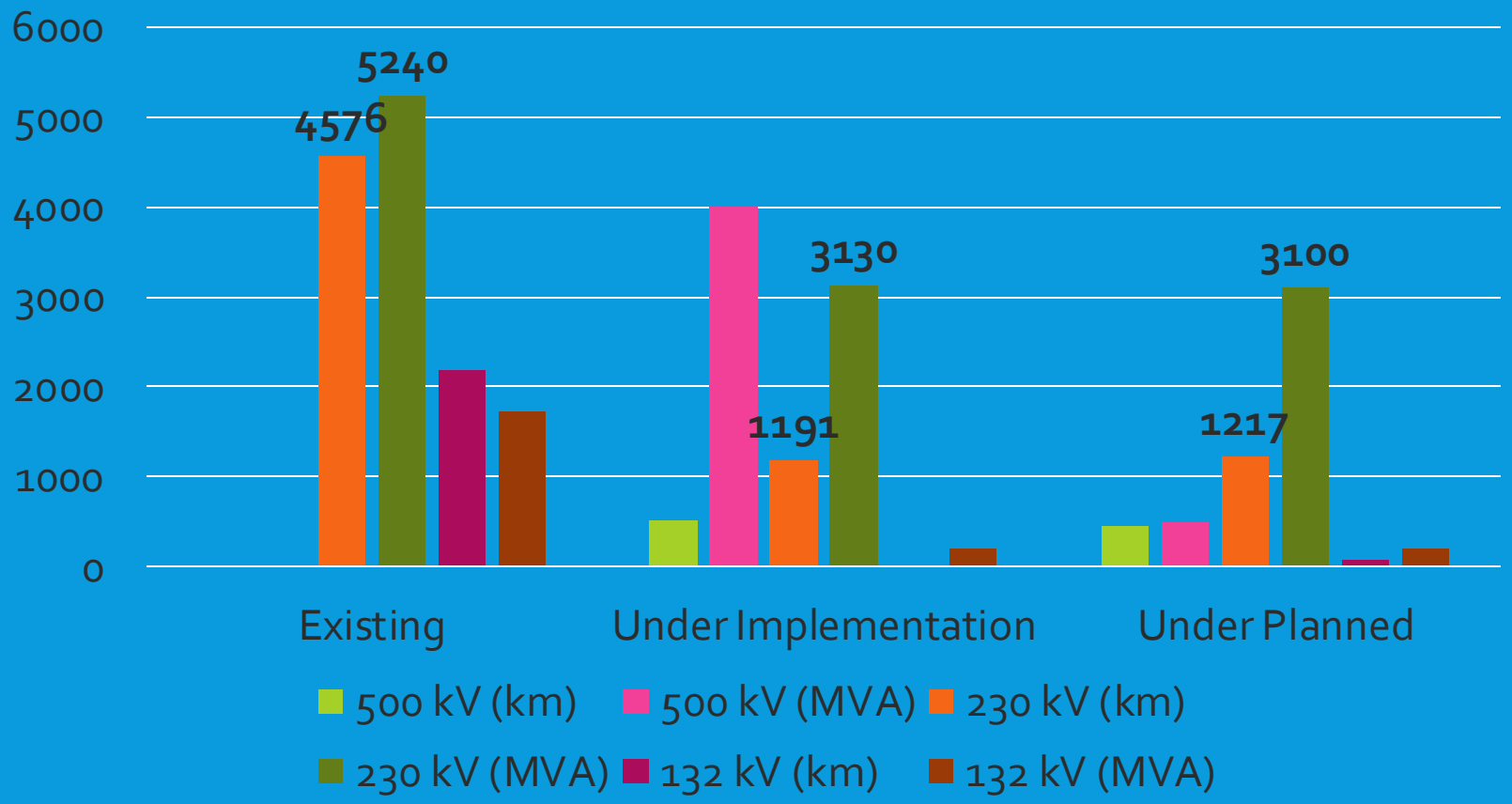
NATIONAL GRID FORECASTING



NATIONAL GRID EXPANSION – UNDER IMPLEMENTATION AND PLANNED

Description	Under implementation						Under planned					
	500		230		132		500		230		132	
	km	MVA	km	MVA	km	MVA	km	MVA	km	MVA	km	MVA
To transmit new generation			264	300			443		253	200	80	
To reinforce grid	520	4000	443	700		200		500	352	100		
To increase electrification			484	2130					612	2800		200
Total	**520**	**4000**	**1191**	**3130**		**200**	**443**	**500**	**1217**	**3100**	**80**	**200**

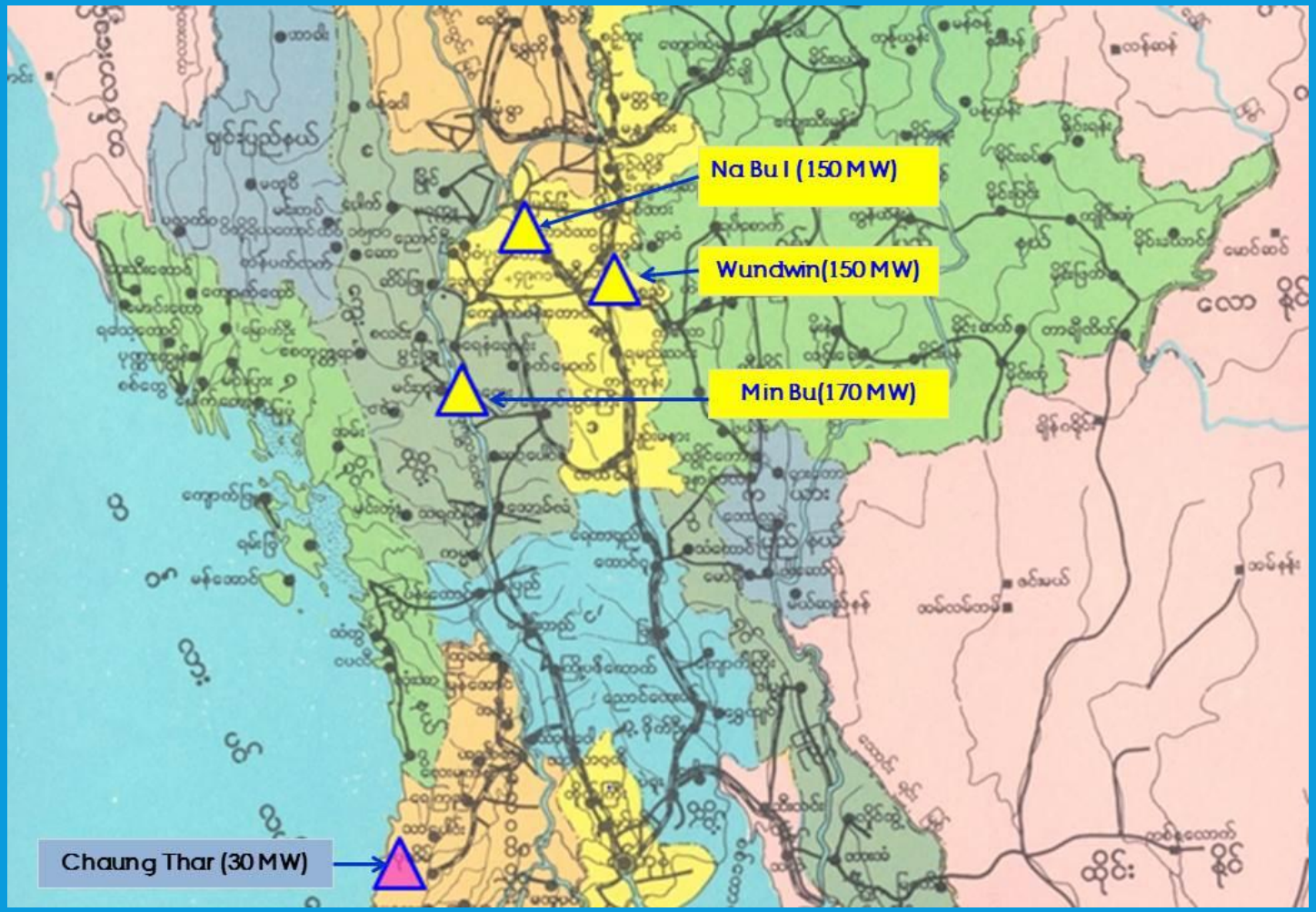
NATIONAL GRID EXPANSION – AND EXISTING



ON-GRID RENEWABLE ENERGY PROJECTIONS

Energy	MOU		MOA	
	Qty	MW	Qty	MW
Solar	3	990	3	470
Wind	3	2890	1	30

ON-GRID RENEWABLE ENERGY PROJECTIONS



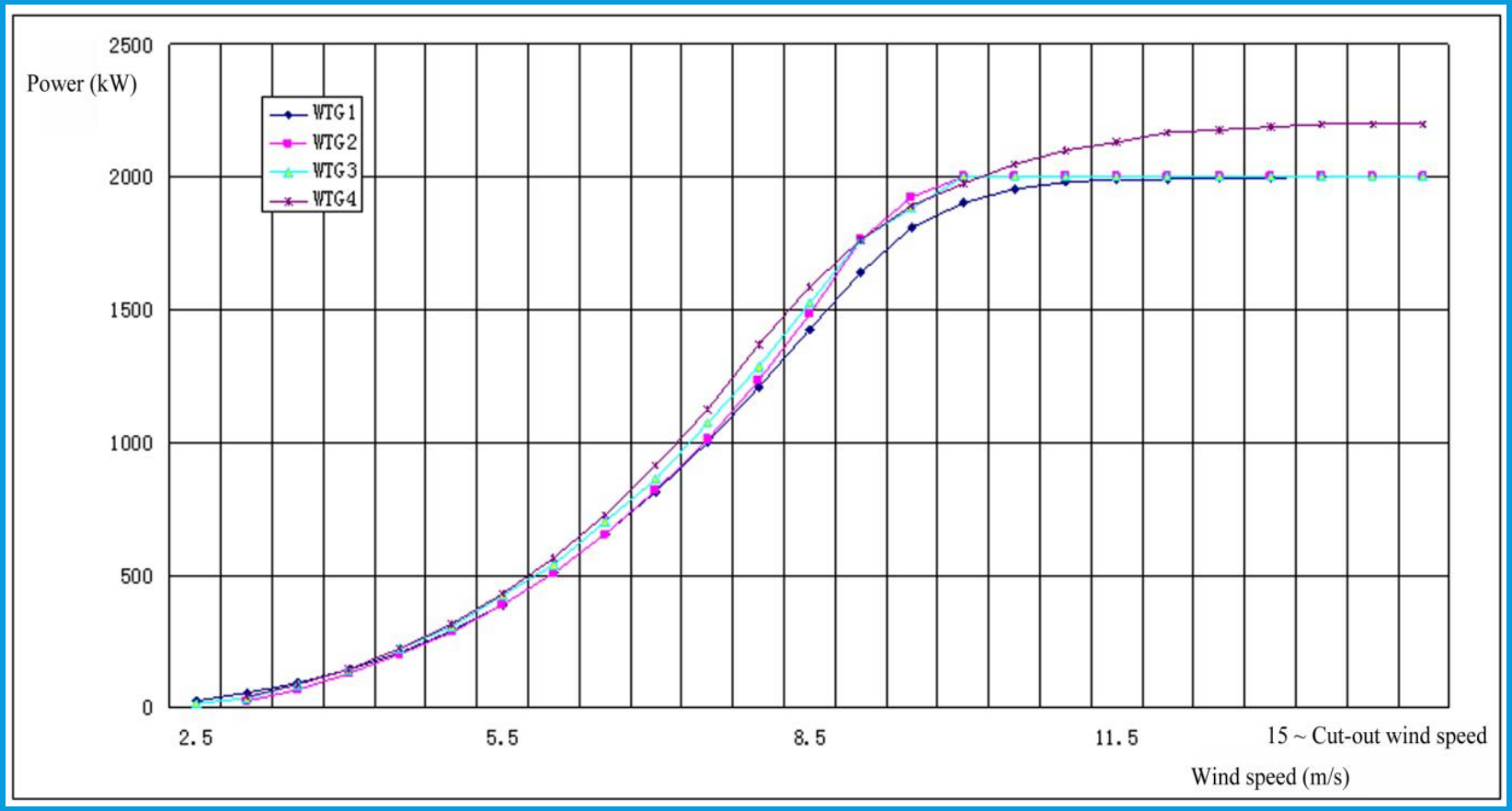
ON-GRID RENEWABLE ENERGY FEASIBILITY - SOLAR

FSR/DPR states	Minbu	Nabuaing	Wundwin
Horizontal global irradiation	1767 kWh/m2/yr	1971 kWh/m2/yr	1965 kWh/m2/yr
System production	323246 MWhr/yr	241881 MWhr/yr	237797 MWhr/yr
Specific production	1539 kWh/kWp/yr	1612 kWh/kWp/yr	1585 kWh/kWp/yr
Annual irradiation	6360 MJ/m2	6570 MJ/m2	6570 MJ/m2
Performance ratio	81.5%	76.3 %	75.7 %

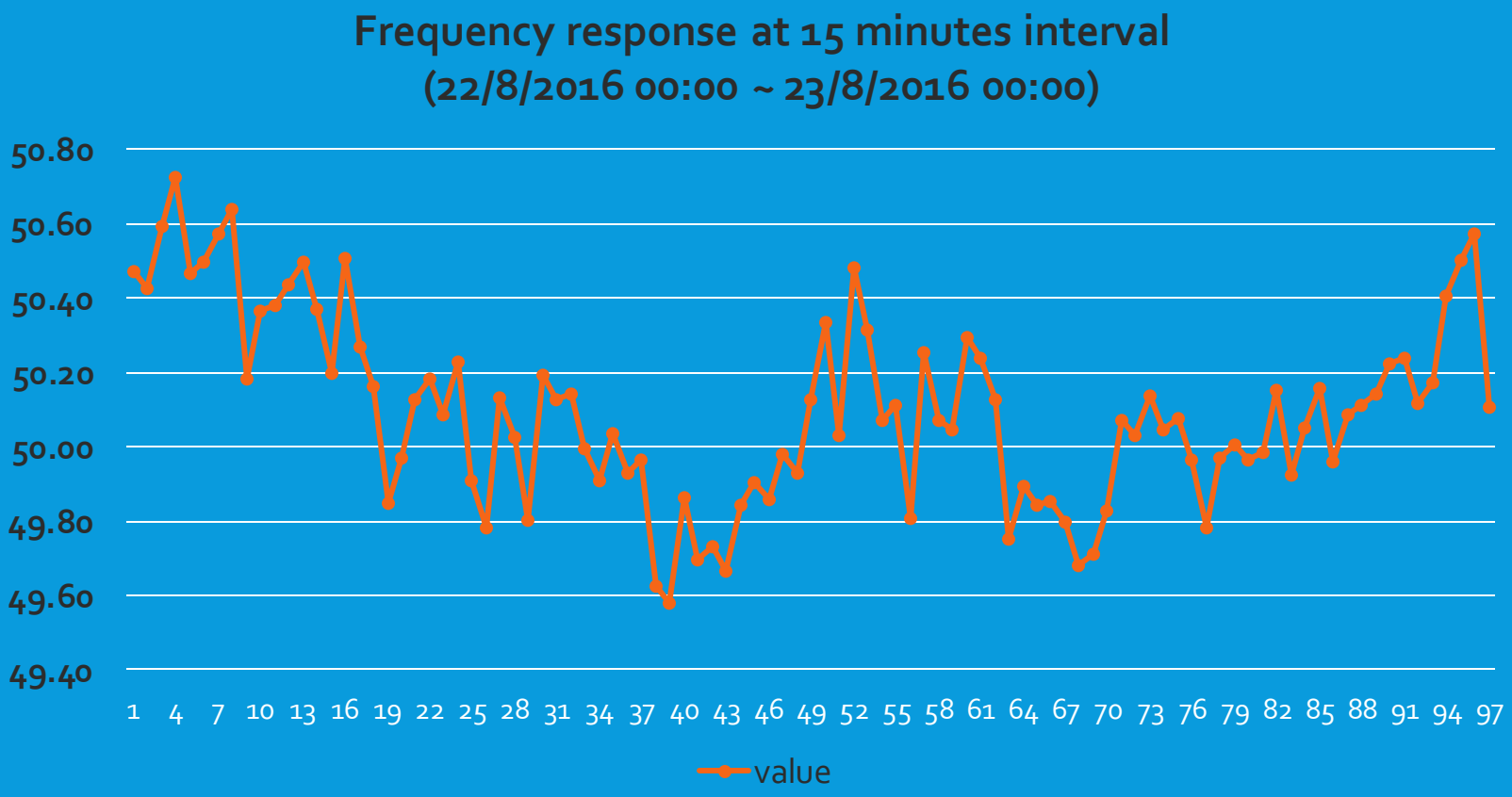
ON-GRID RENEWABLE ENERGY FEASIBILITY - WIND

Description	WTG1	WTG2	WTG3	WTG4
Rated power (kW)	2000	2000	2000	2200
Rated wind speed (m/sec)	10	10	9.5	9.5
Average velocity (m/sec)	5.3	5.3	5.3	5.3
At 5 m/sec (kW)	291	285	306	314
Theoretic generation (MWh)	72300	72910	74600	73860
Net energy to grid (MWh)	55980	56430	57740	56930

ON-GRID RENEWABLE ENERGY FEASIBILITY- WIND



ON-GRID RENEWABLE ENERGY PROSPECTS – SYNCHRONIZATION TO MYANMAR GRID



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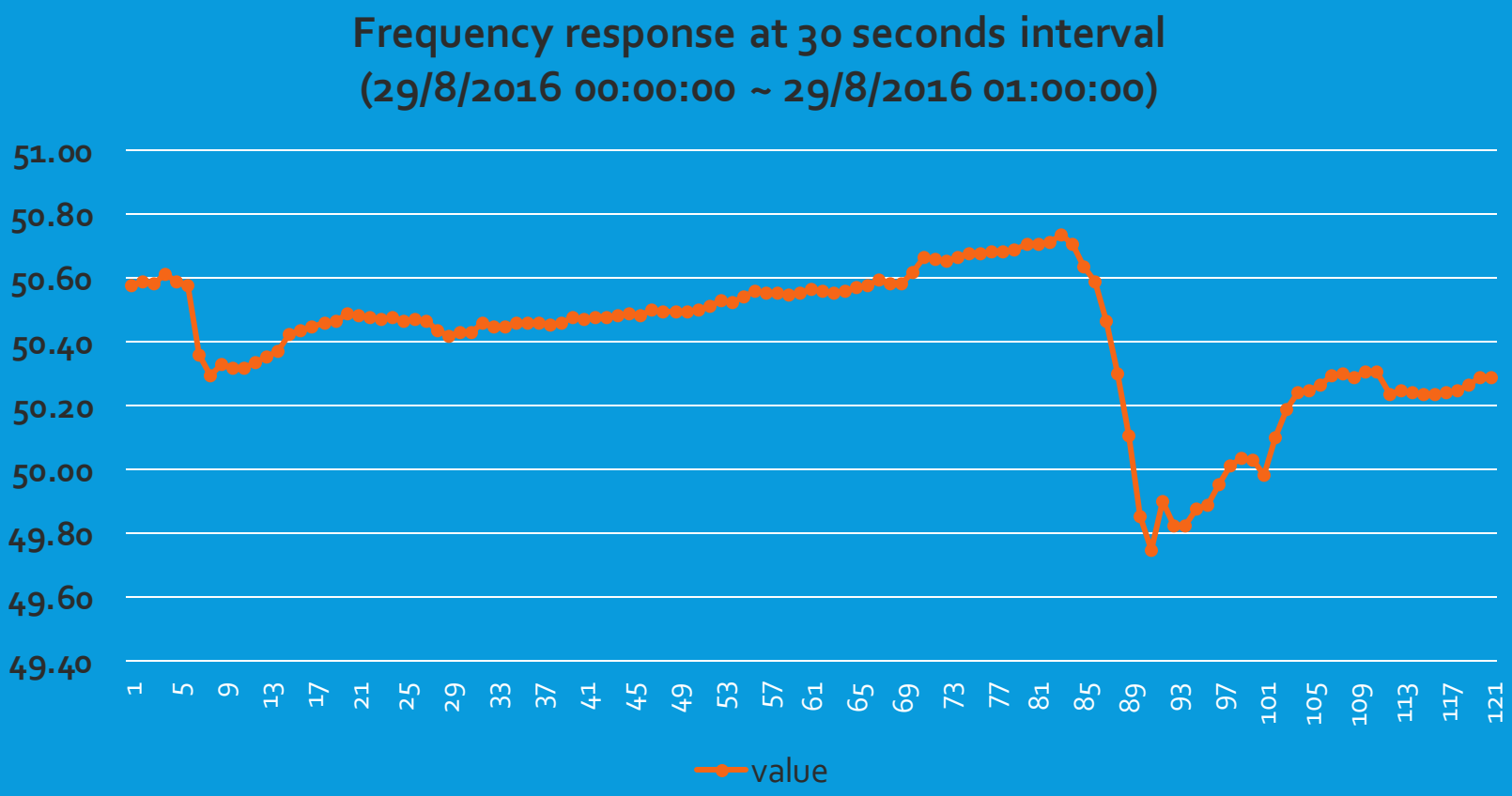


ON-GRID RENEWABLE ENERGY PROSPECTS – SYSTEM OPERATIONAL PERFORMANCE

Year	Frequency	System Continuous operation (Hours)	Collapsed period (Hours)	Apporx restoration period (Hours)
2015	8	8748.92	11.03	24
2016	17	8769.52	14.48	51
2017	1	2743.00	0.87	3

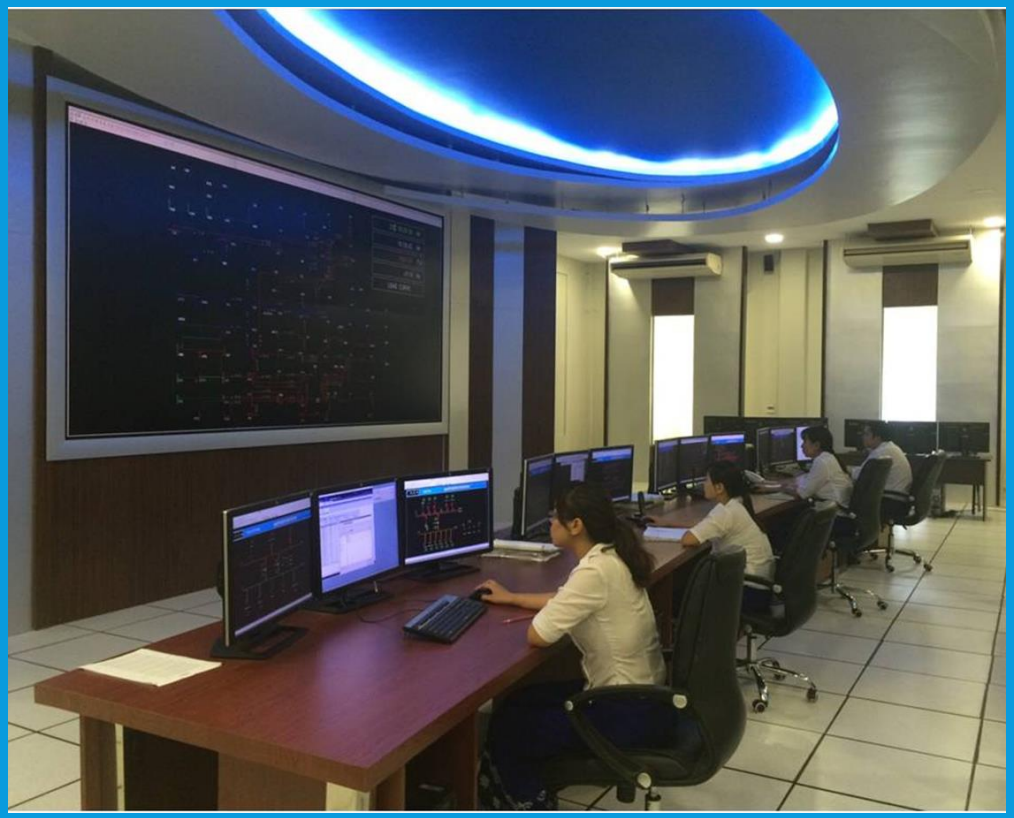
ON-GRID RENEWABLE ENERGY PROSPECTS – PLANNING FOR RE INTEGRATION

- Transmission development to lead RE generation
- Phased development of transmission in accordance to generation phasing
- Several load generation scenarios to be studied to take care of RE dispatches under various seasons
- Provisions of maintaining grid parameters using dynamic reactive compensation
- RE management centers equipped with RE forecasting, scheduling and monitoring systems

ON-GRID RENEWABLE ENERGY PROSPECTS – RE PENETRATION TO MYANMAR GRID

- Development of RE technology shall be encouraged to enable to extend in the market widely.
- Bringing opportunities to gain the cheaper tariff or to reduce the capital can expand home solar utilization and ease the entities' electrifying.
- Capacity utilization factor of RE farms is relatively low by unpredictable climate changes compared to conventional PPs.
- The RE penetration shall be inevitable solution for a long-term solution with the reliable conventional energy mix and strengthened National grid

THANK YOU FOR YOUR KIND ATTENTION



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DPTSC, MOEE