



The Republic of the Government of the Union of Myanmar
Ministry of Electricity and Energy

Best Practices in Planning of New Transmission Systems

Date – 13rd, May 2026

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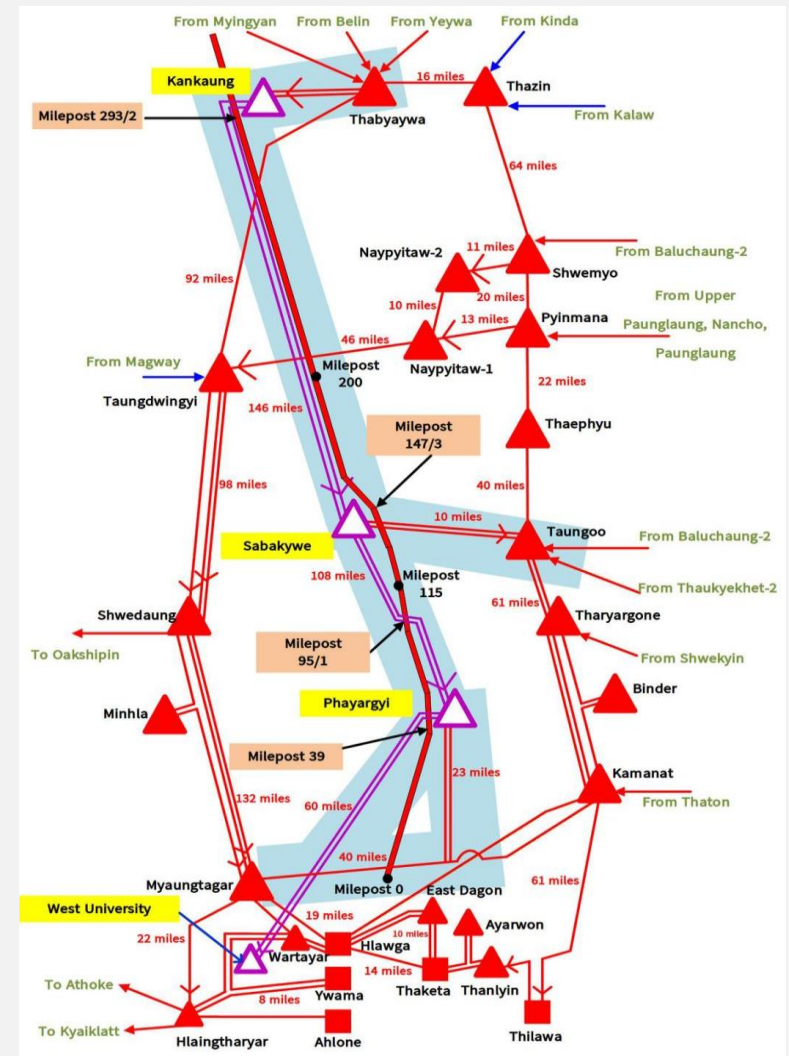
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POWER SECTOR OVERVIEW

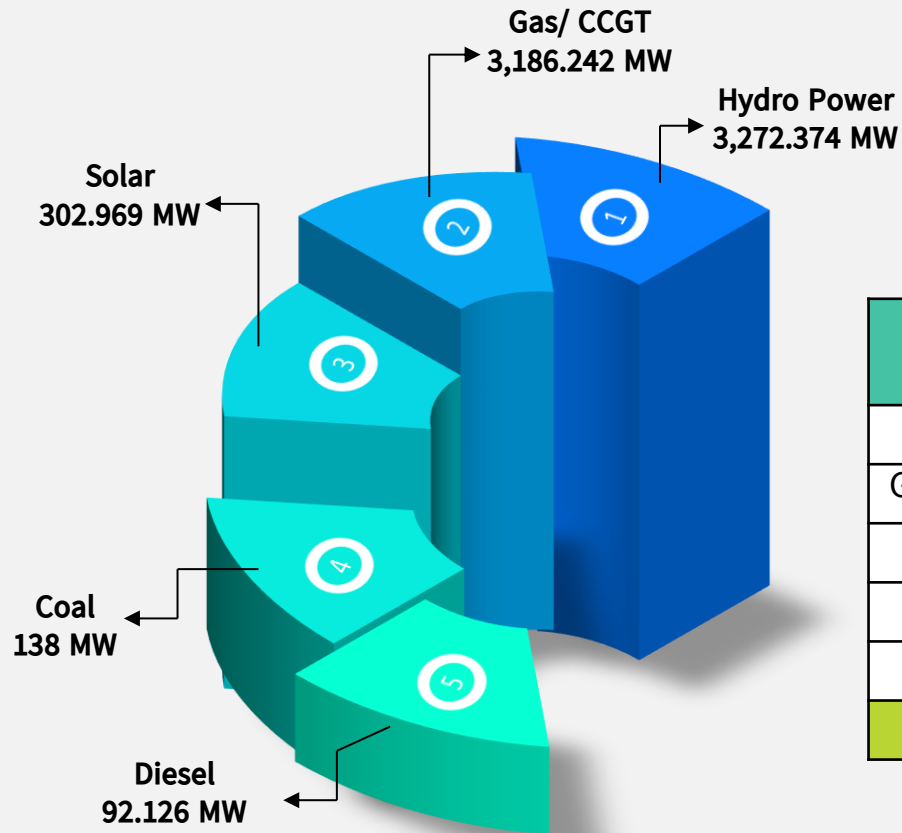
POWER SECTOR OVERVIEW

System Capacity & Generation Mix

- **Generation Mix:** Dominated by Hydropower, Natural Gas, Coal and Renewable Energy.
- **Transmission Backbone:** Primarily 230 kV network with expansion to 500 kV North-South backbone.
- **Load Centers:** Heavy concentration in Yangon(South).



POWER SECTOR OVERVIEW

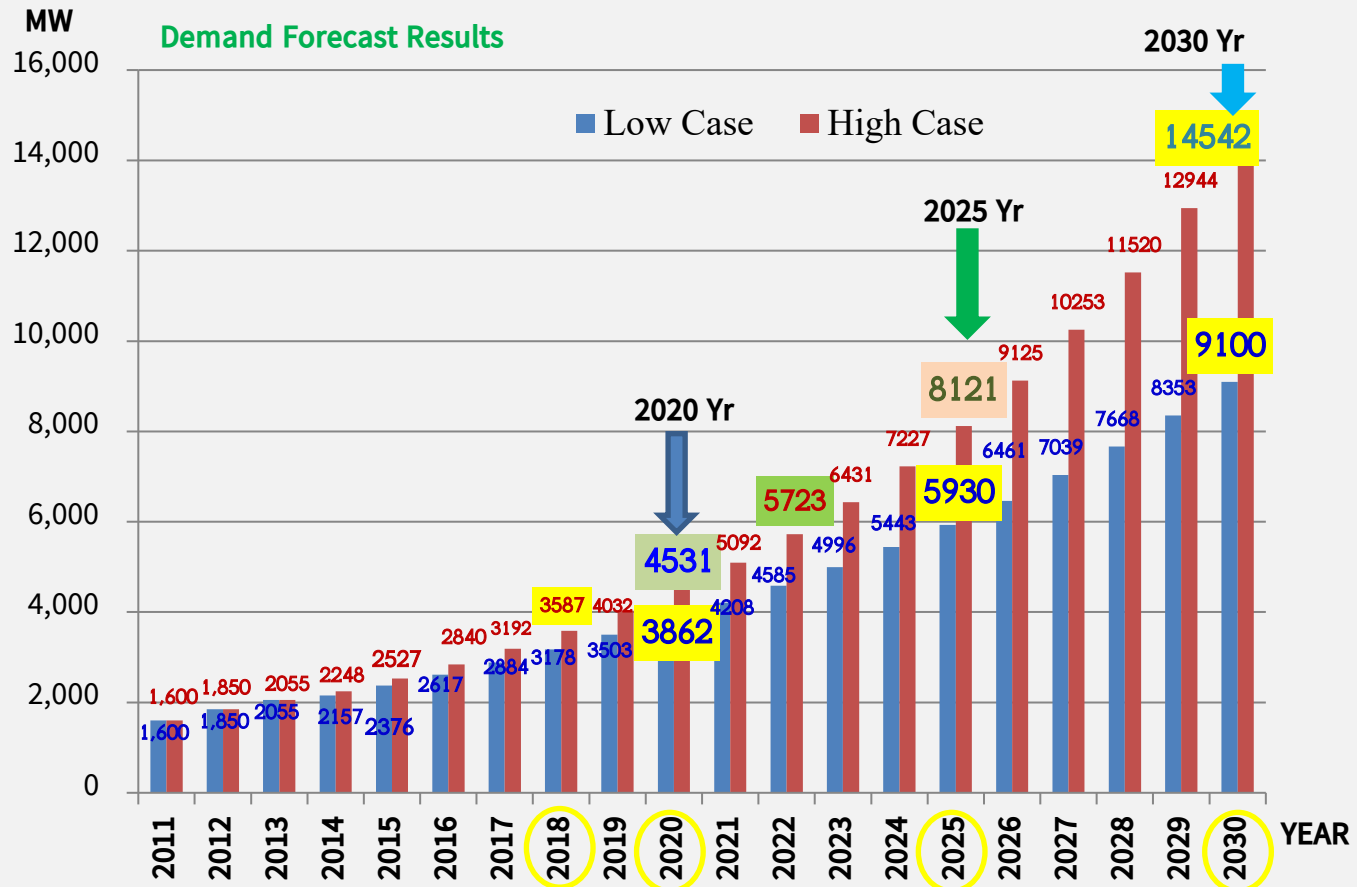


Energy Source	National Grid	Off Grid	Total(MW)
Hydro	3,243.2	29.174	3,272.374
Gas/ CCGT	3,166.942	19.4	3186.242
Coal	138	-	138
Solar	301.8	1.169	302.969
Diesel	-	92.126	92.126
Total	6,849.942	141.769	6,991.711

POWER SECTOR OVERVIEW

Demand Forecasting

Power Demand forecast approached with macro economic method, base on National Economic growth

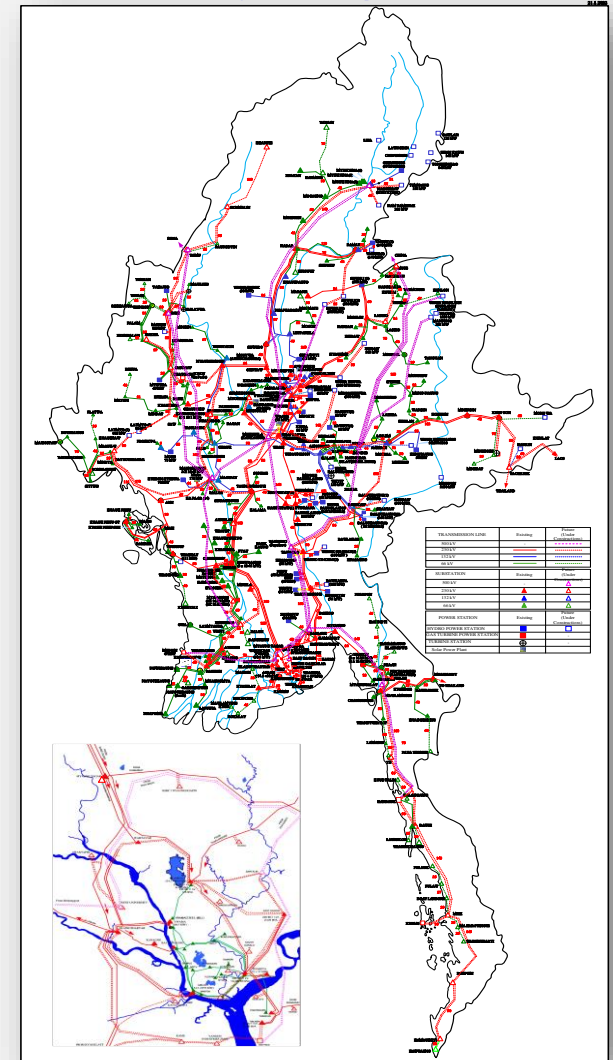


POWER SECTOR OVERVIEW

Power Transmission Infrastructure in Myanmar

500 kV Substations	=	4 Nos. (3,000 MVA)
230 kV Substations	=	55 Nos. (10,841.5 MVA)
132 kV Substations	=	21 Nos. (2,131.0 MVA)
Total	=	80 Nos. (15,972.5 MVA)

500 kV Transmission Lines	=	2 Nos. (254.19 miles)
230 kV Transmission Lines	=	84 Nos. (3,512.21 miles)
132 kV Transmission Lines	=	42 Nos. (1,442.10 miles)
66 kV Transmission Lines	=	333 Nos. (5,167.16 miles)
Total	=	461 Nos. (10,375.66 miles)



POWER SECTOR OVERVIEW

THE 500 kV NORTH-SOUTH BACKBONE

500 kV projects connecting northern hydropower resources to southern load centers (Yangon).

- Meikhtila to Taungoo
- Taungoo to Phayargyi
- Phayargyi to Hlaingtharyar
- **Capacity:** Massive increase in power transfer capability between regions
- **Reduction:** Minimizes system losses and improves voltage profiles

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CORE PLANNING METHODOLOGY

CORE PLANNING METHODOLOGY

Demand Analysis

Load forecasting using econometric models and bottom-up electrification data across all regions

Network Expansion

Optimization of least-cost generation expansion integrated with N-1 contingency criteria.

Technical Review

Power flow, short circuit, and dynamic stability studies to ensure grid resilience

- To strengthen and enhance the reliability of the power system
- To connect and transmit power from newly constructed power plants to the grid
- To distribute electricity from the power system to areas that have not yet received electricity

CORE PLANNING METHODOLOGY

- **Addressing Demand Growth:** To stay ahead of increasing energy consumption driven by industrial expansion and urbanization.
- **Bridging the Geographical Gap:** To transmit bulk power from remote generation sources (Hydropower in the North) to major load centre (Yangon).
- **Infrastructure Modernization:** To replace aging assets and upgrade existing lines to high-voltage standards (500 kV) for long-distance efficiency.
- **System Constraint Mitigation:** To eliminate “bottlenecks” that prevent the full dispatch of available generation.

CORE PLANNING METHODOLOGY

POWER SYSTEM SIMULATION (NEPLAN)

Technical Verification

Standardized tools for rigorous grid analysis to ensure reliability before investment.

- **Tool:** NEPLAN
- **Analysis:** Steady-state load flow and N-1 contingency studies.
- **Stability:** Dynamic and transient stability
- **Short Circuit:** Sizing of protection equipment and circuit breakers.

CORE PLANNING METHODOLOGY

REAL-TIME DIGITAL CONTROL

SCADA & EMS Implementation (IEC 60870-5-104)

Implementation of SCADA/EMS systems at our Control Centre allows for real-time monitoring of every substation in the grid.

- Remote Switching operations
- Data acquisition for performance analytics
- Automated load shedding protocols

CORE PLANNING METHODOLOGY

Frequency Control

Maintaining 50 Hz frequency through automatic generation control (AGC) and primary governor response.

The Transmission System shall be nominally 50 Hz and shall be controlled within the limits of 49.5 – 50 Hz.

The System Frequency could rise to 52 Hz or fall to 47 Hz in exceptional circumstances.

Frequency Range:	Duration
51.5 Hz – 52 Hz	Operation for a period of at least 15 minutes is required each time
51.0 Hz - 51.5 Hz	Operation for a period of at least 90 minutes is required each time
49.0 Hz – 51.0 Hz	Continuous operation is required.
47.5 Hz – 49.0 Hz	Operation for a period of at least 90 minutes is required each time
47.0 Hz – 47.5 Hz	Operation for a period of at least 20 seconds is required each time

CORE PLANNING METHODOLOGY

Voltage Stability

Ensuring voltage remains within $\pm 5\%$ of nominal value during normal operation and $\pm 10\%$ during contingencies.

Voltage Level:	Nominal Range	Abnormal condition but not longer than 30-minutes
500 kV	$\pm 5\%$ (525 – 475 kV)	$\pm 10\%$ (550 – 450 kV)
230 kV	$\pm 5\%$ (241.5 – 218.5 kV)	$\pm 10\%$ (253 – 207 kV)
132 kV	$\pm 5\%$ (138.6 – 125.4 kV)	$\pm 10\%$ (145.2 – 118.8 kV)

CORE PLANNING METHODOLOGY

Criteria for Selecting Interconnection Voltage Level

- Based on generation capacity (MW) and grid strength
- Distance to nearest substation and loss minimization
- Compatibility with existing grid voltage levels
- Short circuit level and system stability limits
- Future load growth and regional interconnection
- Compliance with IEC / IEEE standards and Other Equivalent Standards

CORE PLANNING METHODOLOGY

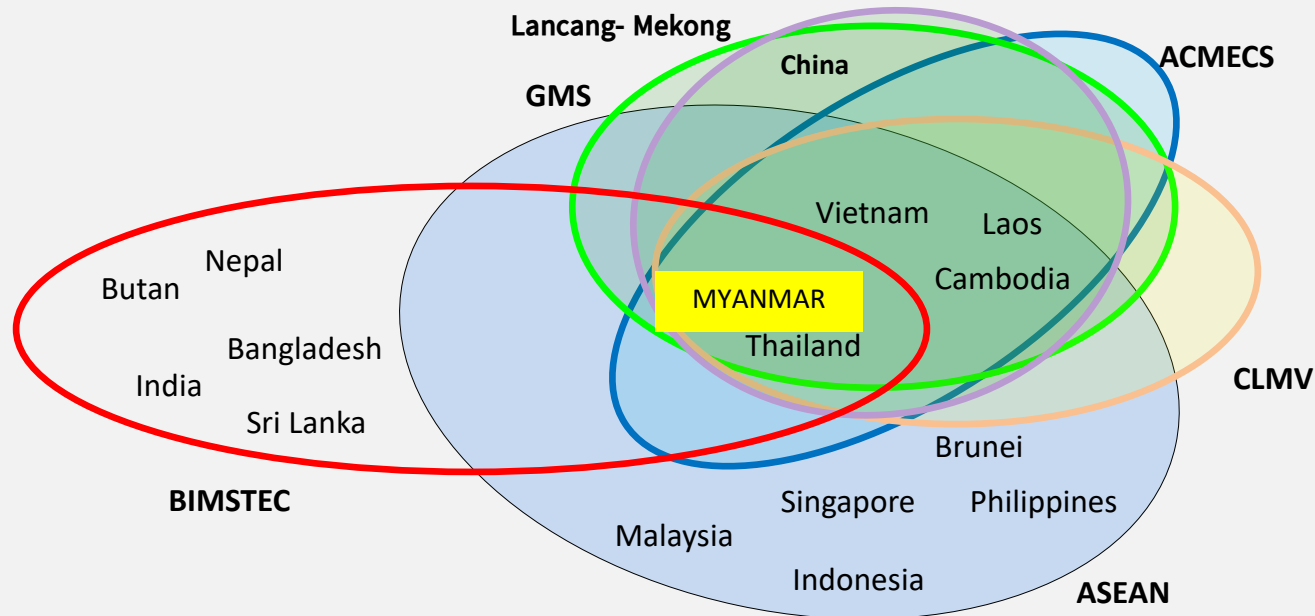
Criteria for Transformer & Substation Capacity Selection

- Transformer sizing based on generation capacity (N-1 reliability)
- Load demand forecast and future expansion margin (20-30%)
- Thermal limits and voltage regulation requirements
- Fault level withstand and protection coordination
- Substation configuration (Single / Double bus, GIS / AIS)

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REGIONAL COOPERATION AND INTERCONNECTION

REGIONAL COOPERATION AND INTERCONNECTION



- BIMSTEC** : Bay of Bengal Initiative for Multi Sectorial Technical and Economic Cooperation
- GMS** : Greater Mekong Sub-region
- ACMECS** : Ayeyarwady-Chao Phraya-Mekong Economic Cooperation Strategy
- ASEAN** : Association of South East Asia Nations
- Lancang- Mekong** : China, Cambodia, Laos, Myanmar, Thailand, Vietnam
- CLMV** : Cambodia, Laos, Myanmar and Vietnam

REGIONAL COOPERATION AND INTERCONNECTION

Power Sector Infrastructure with Neighboring Countries



REGIONAL COOPERATION AND INTERCONNECTION

Interconnection Project with Neighboring Countries

No.	Project Name	MW	Progress
India			
1	400 kV Moreh-Tamu-Kalay Transmission Line Project	250 250	250 MW for first phase 250 MW for second phase
The People's Republic of China			
2	(a) 230 kV Hannong-Muse Transmission Line Project (b) 230 kV Muse – Lashio Transmission Line Project	100 300	100 MW for first phase 300 MW for second phase
Laos			
3	230 kV M-Long-Kenglatt- Tachileik-Kengton-Namsan-Kankaung Transmission Line Project	600	Feasibility Study Report (FSR) Preparation
Thailand			
4	230 kV Maesot- Myawaddy Transmission Line Project	600	The JWG and JWC between two ministries are being discussed for electricity trading
Total		2100	

REGIONAL COOPERATION AND INTERCONNECTION

India-Myanmar Interconnection Projects

India Side

- ❑ 400 kV Imphal- India/Myanmar (Border) Transmission Line (95 km)
- ❑ Extension of 400 kV Two Switch bay in Imphal Substation

Myanmar Side

- ❑ 400 kV India/ Myanmar Border – Tamu Transmission Line (5 km)
- ❑ 400/ 230 kV, 500 MVA, Back to Back Substation Project in Tamu
- ❑ 400 kV Tamu - Kalay Transmission Line (155 km)
- ❑ 400/ 230 kV Substation Project in Kalay

REGIONAL COOPERATION AND INTERCONNECTION

Strategic Western Link

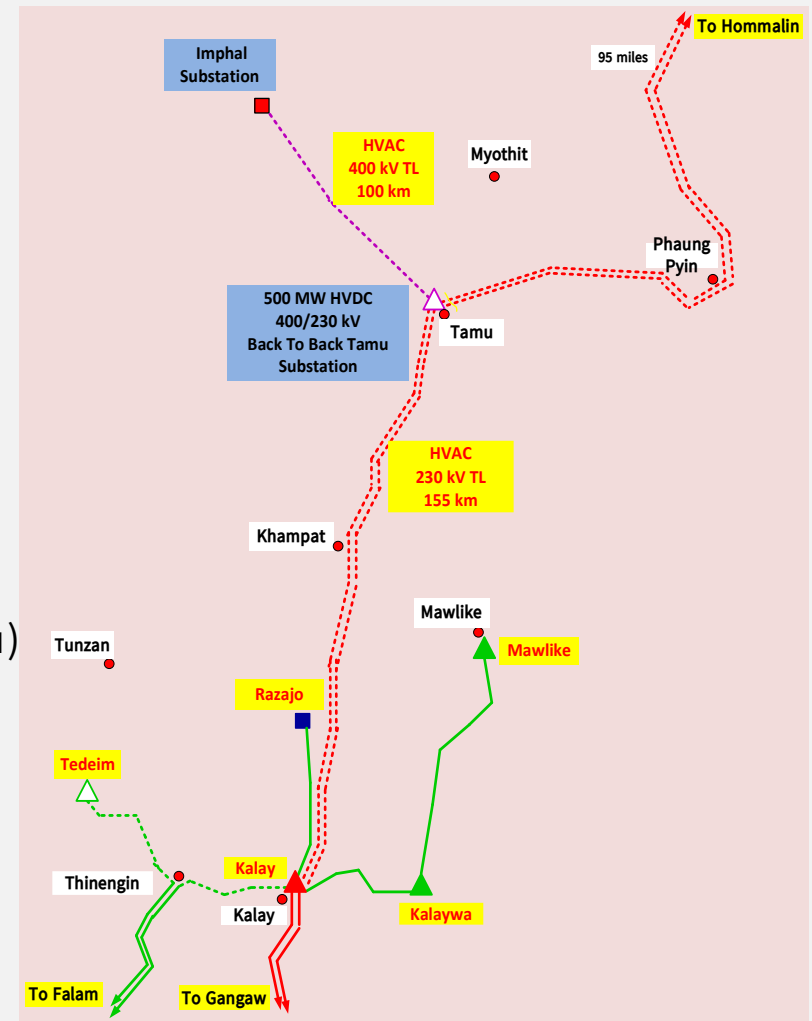
Developing robust connectivity with the Indian grid to enable power exchange and seasonal balancing.

Existing: Low voltage 11 kV link (Tamu – Manipur)

Proposed: High-capacity 400 kV link (Inphal – Tamu)

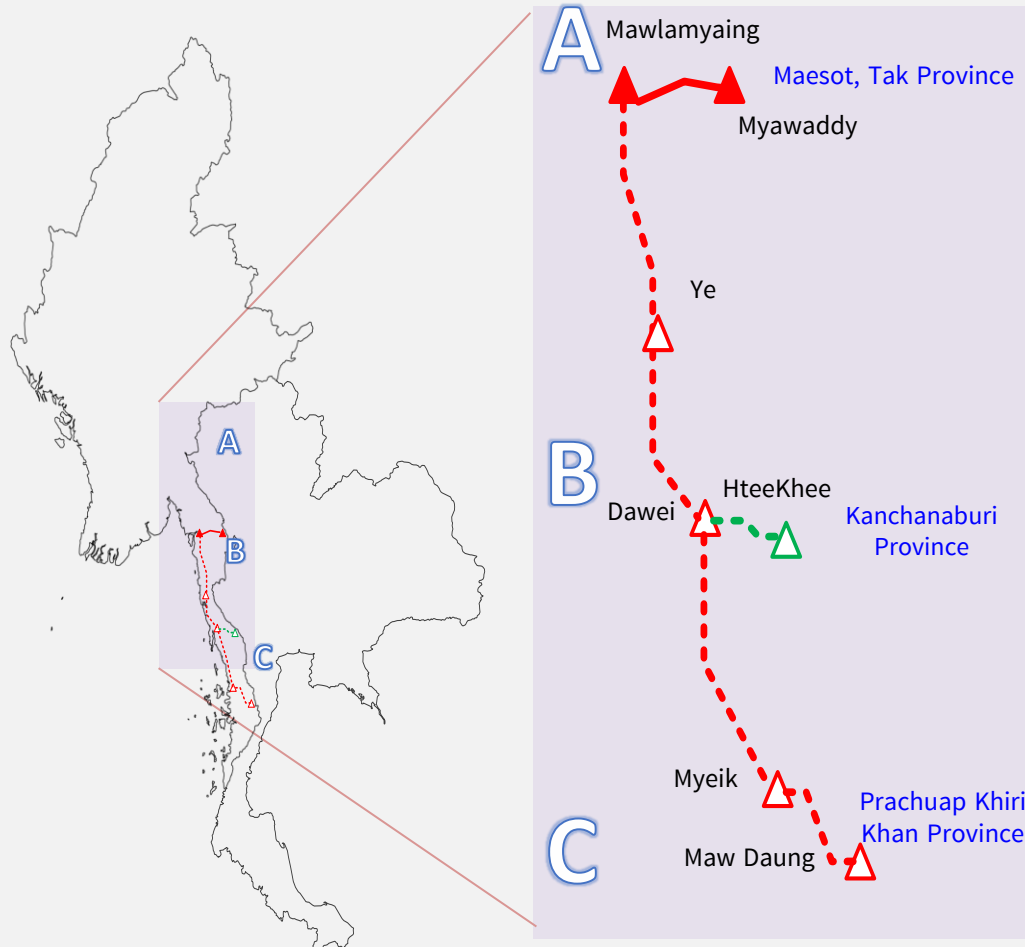
230 kV (Tamu – Kaley)

Benefits: Access to Indian power market



REGIONAL COOPERATION AND INTERCONNECTION

Thailand – Myanmar Interconnection Project



From	To
Maesot, Tak Province	Myawaddy, Kayin State
	Mawlamyaing, Mon State

From	To
Kanchanaburi Province	HteeKhee, Tanintharyi Region
HteeKhee, Tanintharyi Region	Dawei, Tanintharyi Region

From	To
Prachuap Khiri Khan Province	Mawdaung, Tanintharyi Region
Mawdaung, Tanintharyi Region	Myeik, Tanintharyi Region

REGIONAL COOPERATION AND INTERCONNECTION

THAILAND – MYANMAR INTERCONNECTION

GMS Power Bridge

Leveraging Myanmar's geographic position as a power hub between South and Southeast Asia.

- **Project Focus:** Mawlamyine (Myanmar) to Mae Sot (Thailand).
- **Voltage Level:** 230 kV AC Interconnection.
- **Economic Impact:** Revenue from power exports and grid stability from imports.
- **Regional Integration:** Key component of the ASEAN Power Grid (APG) initiative.

PRIORITY PROJECTS & FUND ALLOCATION

Sr. No	Project Name	Funding Source	Priority
1	500 kV System	International Loan/ Deferred	High
2	230 kV System	International Loan/ Deferred / Government Fund	High
3	Renewable Energy Integration	Government Fund	Medium

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KEY CHALLENGES AND CONSTRAINTS

Key Challenges & Constraints

- ❖ **High Capital Intensity:** Transmission projects (especially 500 kV) require massive upfront investment with long payback periods.
- ❖ **Funding Gaps:** Challenges in securing long-term financing and international loans for large-scale grid expansion.
- ❖ **Social Impact:** Negotiating with local communities and managing compensation for land and crops.
- ❖ **Geographical Obstacles:** Constructing lines through difficult terrains, mountains, and dense forests increases costs and project duration.
- ❖ **High System Losses:** Technical losses remain a major concern, impacting the overall efficiency of the national grid.
- ❖ **Reactive Power Management:** Maintaining voltage stability across long-distance transmission lines from North to South.
- ❖ **Grid Resilience:** Protecting physical assets and ensuring the safety of personnel during construction and maintenance in sensitive areas.

Thank you for your attention