



EVN***NPT***

TỔNG CÔNG TY TRUYỀN TẢI ĐIỆN QUỐC GIA

Transmission Network Investment **in period 2021 – 2030**

Ha Noi, Jun-2024

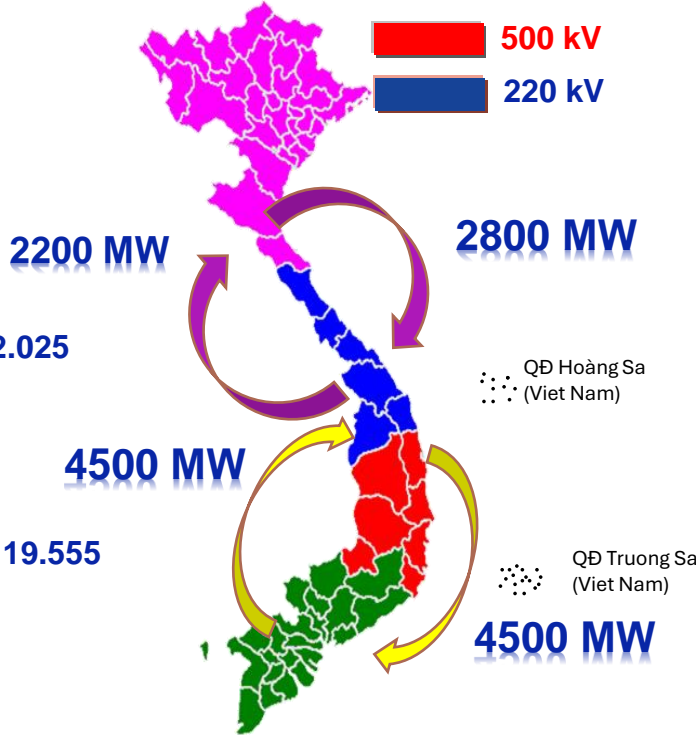


Overview



- **Current Transmission Network**
- **Transmission Network Interconnection**
- **Transmission Network's Business Indicators**
- **Transmission Network Investment 2020 – 2023**
- **Transmission Network Investment in period 2021 – 2030 (PDP8)**
- **Investment and Operational Challenges**
- **Prospects for regional power grid connection**

Current Transmission Network



Transmission Network Interconnection

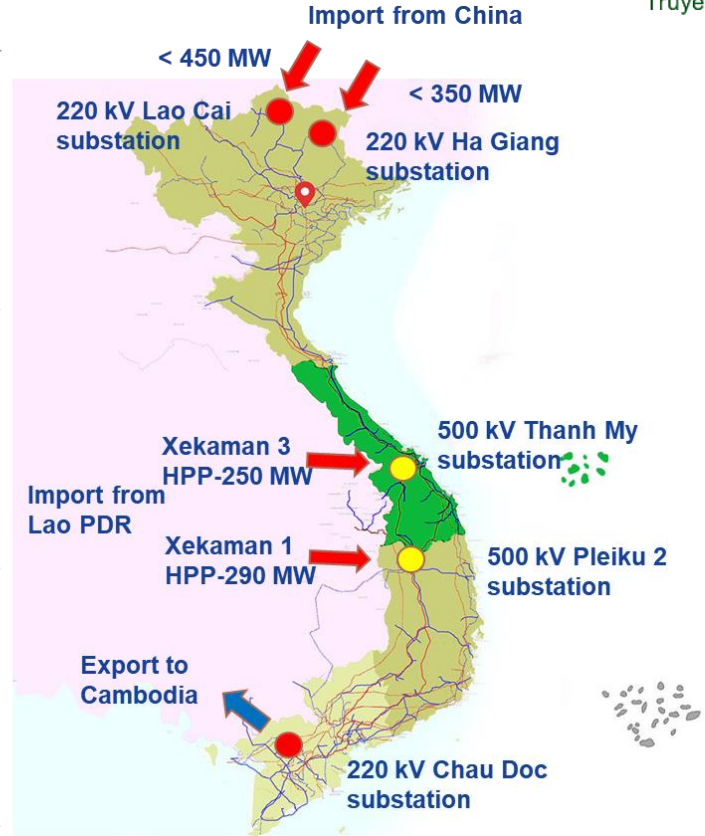
Interconnection

China: Network separation in Vietnam

with
neighboring
countries

Laos: Network separation in Laos

Cambodia: Network connection



Transmission Network's Business Indicators

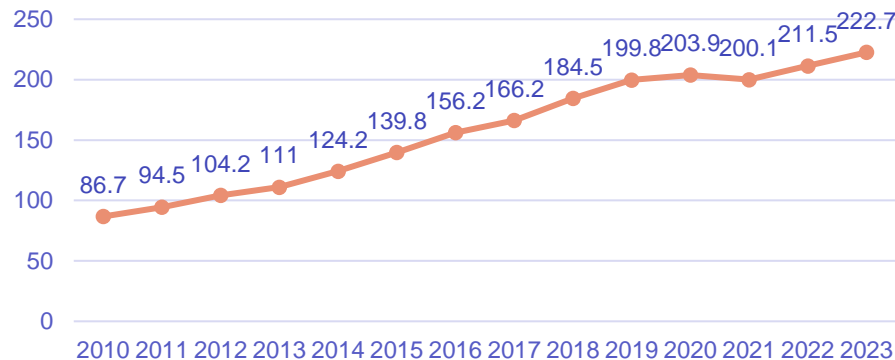


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Truyền niềm tin



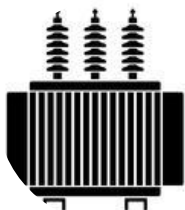
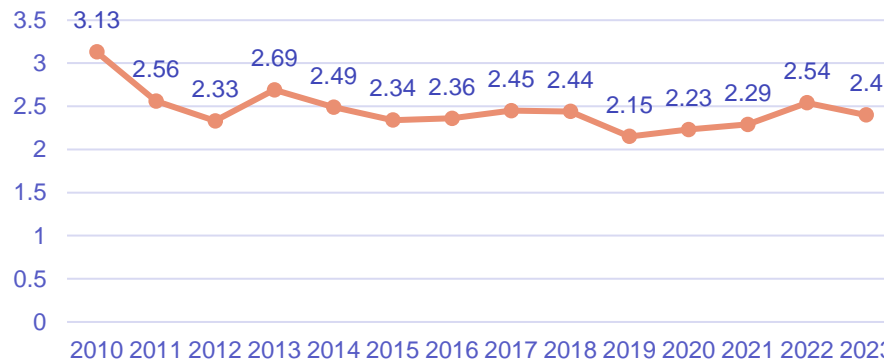
Average annual growth rate of delivered energy from 2010 to 2023 is 11,2%

Delivered Energy (bil. kWh)



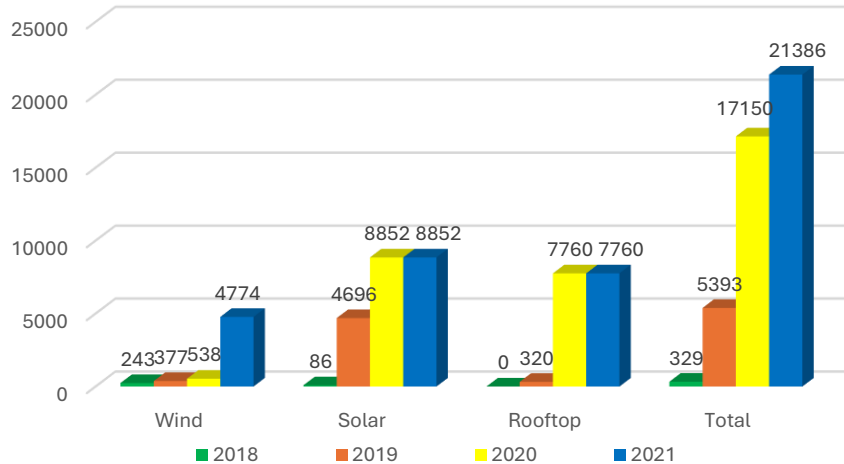
Delivered energy in 2023
~222,7 bil. kWh

Losses (%)



Losses in 2023
~2,4 %

Transmission Network Investment 2020 - 2023



➤ In 2010 - 2023 period:

- Invested and completed ~ 600 Transmission Projects
- Total Investment Capital: 237.000 bill. VND (approx 10 bill USD/13 year period. Approx 800 mill USD/year).

➤ In 2019 - 2022 period (period of high and rapid development of Renewable Power Projects)

- Completed 156 Transmission Projects. In which, 33 projects for increasing transmission capability of the transmission network and for transmitting the energy of renewable power projects.
- Total Investment Capital: 73.016 bill. VND (approx. 3.3 bill. USD/4 years period. 800 mill. USD/year).





Transmission Network Investment until 2030

According to PDP 8

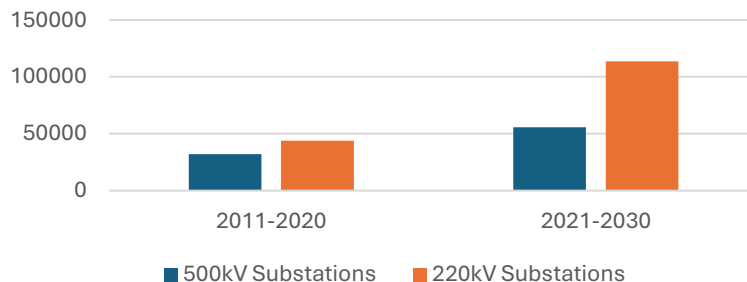
Categories		Unit	2021 - 2030
500 kV Substations	New	MVA	21.900
	Upgrade	MVA	33.700
220 kV Substations	New	MVA	78.525
	Upgrade	MVA	34.997
500 kV Lines	New	Km	12.300
	Upgrade	Km	1.324
220 kV Lines	New	Km	16.285
	Upgrade	Km	6.484

Investment Capital:

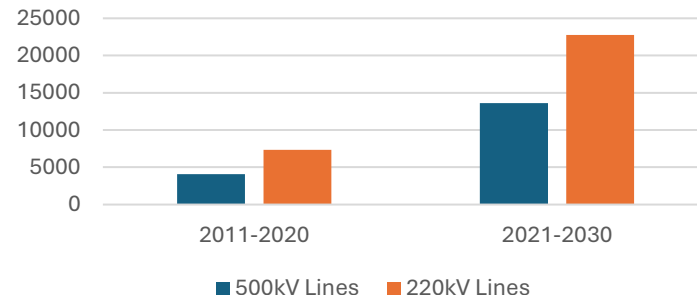
14,9 bill US\$. Appox **1,5** bill US\$/year

Investment for 500-220 kV transmission grid in 2021-2030 shall be the biggest challenges for energy sector: Investment amount is approximately double the current amount

Investment in Transformer Capacity



Investment in Transmission Lines



Transmission Network Investment until 2030



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According to PDP 8

TT	Danh mục	Tổng số dự án	Số lượng dự án theo giai đoạn vận hành		Số lượng dự án nhà nước đầu tư (tỷ lệ)	Số lượng dự án xem xét xã hội hóa (tỷ lệ)
			2023-2025	2025-2030		
I	TBA 500kV	96	31	65	76 (79%)	20 (21%)
1	Miền Bắc	38	11	27	32	06
2	Miền Trung	19	07	12	15	04
3	Miền Nam	38	12	26	29	10
II	ĐD 500kV	105	31	74	95 (90%)	10 (10%)
1	Miền Bắc	43	15	28	40	03
2	Miền Trung	24	06	18	22	02
3	Miền Nam	38	10	28	33	05
III	TBA 220kV	351	145	206	308 (88%)	43 (12%)
1	Miền Bắc	166	60	106	149	17
2	Miền Trung	65	25	40	57	08
3	Miền Nam	120	60	60	102	18
IV	ĐD 220kV	488	209	279	403 (83%)	85 (17%)
1	Miền Bắc	209	73	136	189	20
2	Miền Trung	101	51	50	70	31
3	Miền Nam	178	85	93	144	34
V	Tổng số dự án (I+II+III+IV)	1040	416	624	882 (85%)	158 (15%)

Investment and Operational Challenges



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Truyền niềm tin



HIGH RATE OF PEAK DEMAND



- **The volume of investment in substations and transmission line is very large.**
- **Difficult in synchronizing power source and grid projects.**
- **High short circuit current.**

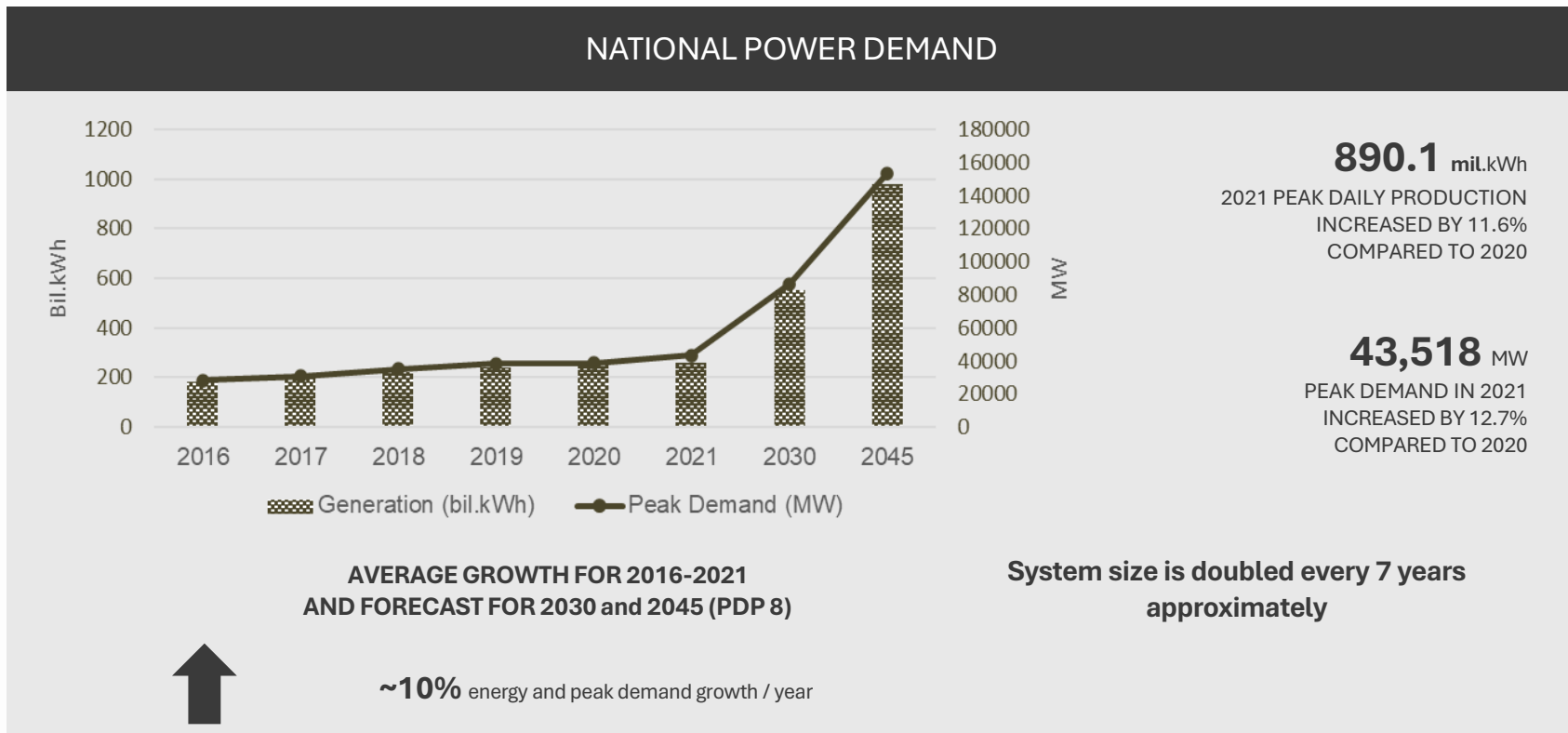


HIGH PENETRATION OF RES

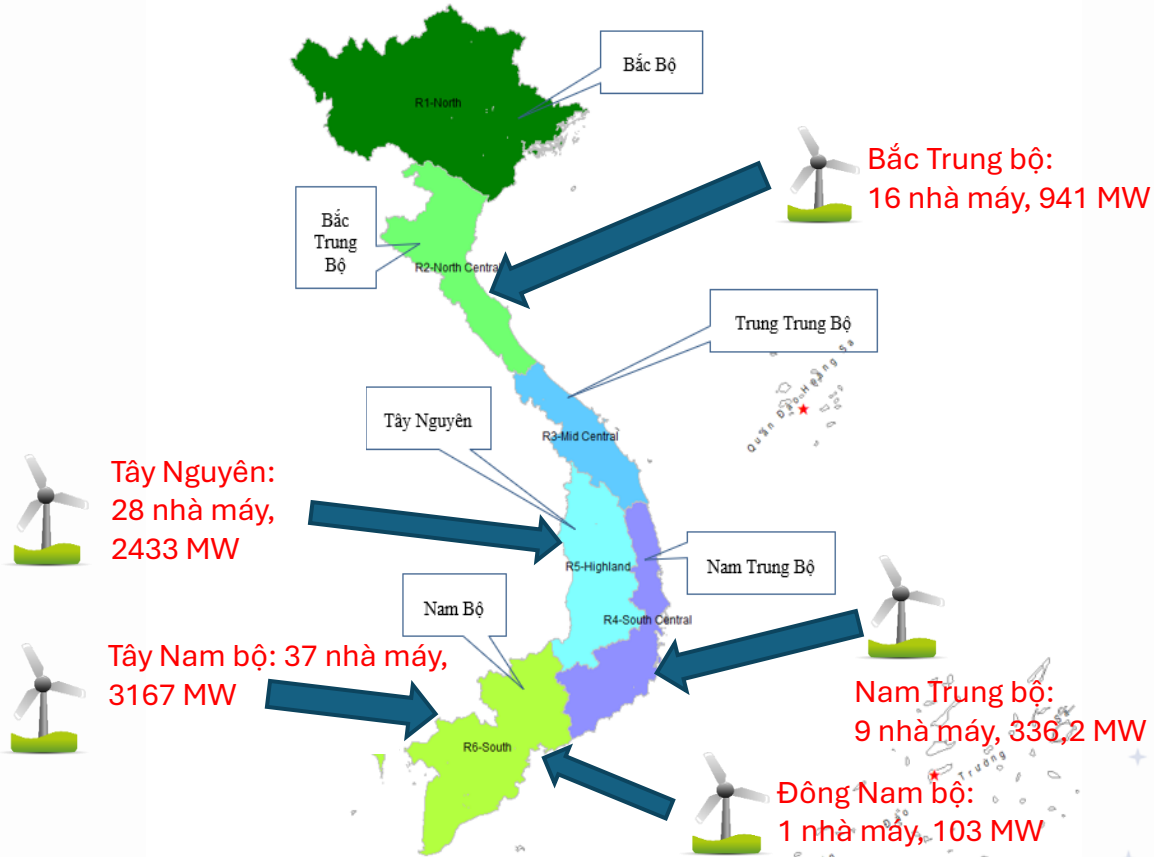


- **Congestion: overload 220 kV lines/transformers; 500kV regional transmission**
- **System stability.**

HIGH RATE OF PEAK DEMAND



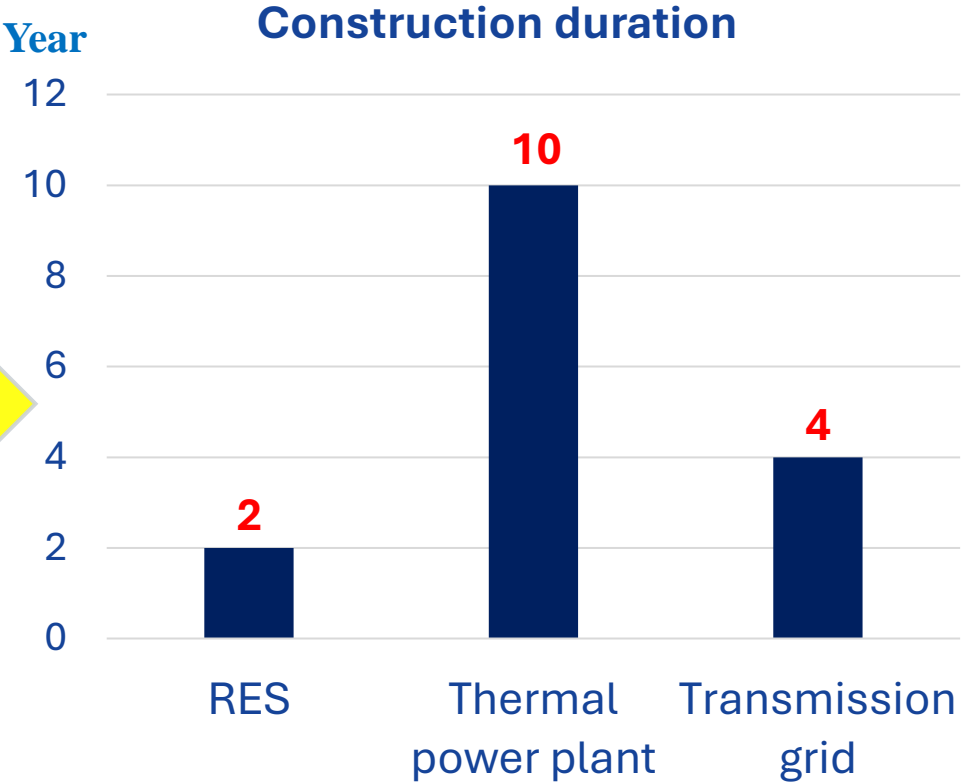
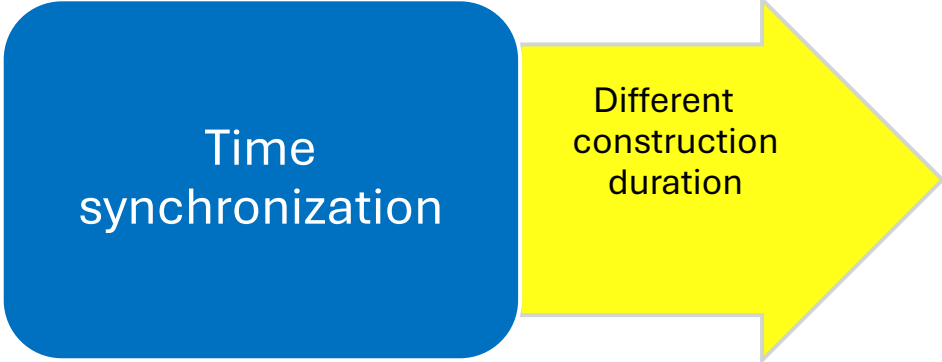
HIGH PENETRATION OF RES



Investment and Operational Challenges



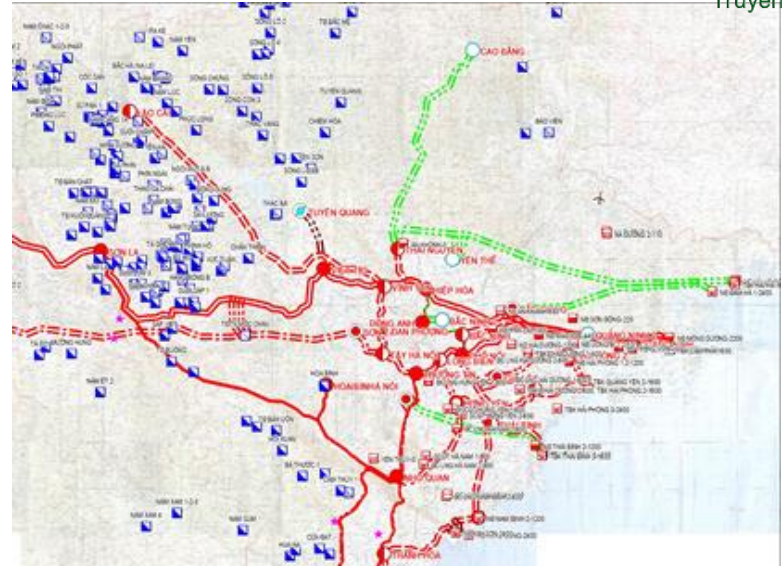
CHALLENGES: INVESTMENT TIME SYNCHRONIZATION



Prospects for regional power grid connection



Connections between Northern Vietnam and Northern Laos



Buy 3000MW more from China to Vinh Yen 500kV station (HVDC)

Prospects for regional power grid connection



Connect power grids with Mekong sub-region countries and ASEAN countries at voltage levels of 500 kV and 220 kV to enhance system connectivity, power exchange, and take advantage of the countries' resource strengths

Connect the power grid with Laos using 500 kV and 220 kV lines to import electricity from power plants in Laos according to the memorandum of cooperation signed between the two Governments.

Prospects for regional power grid connection



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500kV Sam Nuea – Hòa Bình 2 ~1 GW

220kV Nam Sum – Nông Công 0,5 GW

220kV Nam Mo – Tương Dương 0,3 GW



500kV Xebanghieng – Hưong Hoa 1,6GW

220 kV Nam Emoun – Đăk Ooc 0,4GW

500kV Monsoon – Thạnh Mỹ 0,6GW

500kV Hatxan – Kon Tum ~1GW

220kV Nam Kong – Bờ Y 0,1GW

