

Re: Supplements of transmission grid projects
to the power development plan

Hanoi, March 27th 2020

Respectfully to: The Prime Minister

In implementing the stewardship at Document No. 7619/VPCP-CN dated 25 August 2019 by the Office of Government on the report of additional solutions ensuring the power supply to 2025 (Document No. 7619/VPCP-CN).

In association with the amendments of and supplements to the urgent transmission grid works to ensure the power supply to 2025, the Ministry of Industry and Trade (MOIT) would like to report to the Prime Minister (PM) the following contents:

I. Contents of the proposal of the Electricity of Vietnam (EVN)

At the Submission Document No. 95/EVN-KH dated 7 January 2020 of the EVN sent to the MOIT, the EVN requested the national Power Development Plan (PDP) to be adjusted and supplemented with transmission grid works, including:

1. Grid works which are not in the portfolio of the national PDP but have already been approved by the PM to be included in the portfolio of the EVN's five-year investment and development plan (Decision No. 219/QD-TTg dated 13 February 2018):

- 220 kV substation of Nghi Son Economic Zone (2x250MVA).
- 220 kV substation for power generation in 500 kV Pho Noi substation (2x250MVA).
- Improving the capacity of 220kV Phu Ly substation (125+250→2x250MVA).
- Improving the capacity of 220kV Hung Dong substation (125+250→2x250MVA).
- 220 kV Rach Gia 2 - Kien Binh second circuit line (2x74km).
- Improving the capacity of 220kV Soc Trang substation (125+250→2x250MVA).
- Improving the capacity of 220kV Ngu Hanh Son substation (125+250→2x250MVA).
- Improving the capacity of 220kV Hue substation (125+250→2x250MVA).

2. Grid works which are not in the portfolio of the national PDP but have already been included in the provincial PDPs in the period 2016-2025, with a vision to 2035 approved by the MOIT:

(i) *Synchronized evacuation and connection works for power sources:*

- 220kV Ham Thuan Nam substation and connection lines (2x250MVA; 4x3.5km).

- Hanging 220 kV Cao Bang - Bac Kan second circuit line (1x71km).
- 220kV Krong Pa substation and connection lines (125MVA; 2x60km).
- 220kV An Khe substation and connection lines (250MVA; 2x3km).
- Improving 220kV Cau Mau - Ca Mau thermal power plan (2x5.4km).
- 220kV Song Cau substation and connection lines (250MVA; 4x5km).
- Adding 220kV feeder connected behind 500kV Quang Tri substation (4x1.1km).

(ii) Works for power generation for loads

- Centralized loads of Hanoi and the North

- 220kV Thanh Xuan substation and 220kV West Hanoi – Thanh Xuan lines (2x250MVA; 4x16km)
- 220kV Dai Mo (My Dinh) substation and connection lines (2x250MVA; 4x2km).
- 220kV Van Dien and connection lines (2x250MVA; 4x4km).
- 220kV Hoa Lac substation and 220kV Hoa Lac – West Hanoi line (2x250MVA; 2x14km).
- Improving the capacity of 220kV Xuan Mai substation (125+250→2x250MVA).
- Installing the 3rd 220kV transformer of 220kV Long Bien substation (250MVA).
- Installing the 2nd 220kV transformer of 220kV Ba Thien substation (250MVA).
- 220kV Nam Hoa substation and 220kV Yen Hung – Nam Hoa line (1x250MVA; 2x18km).
- 220kV Cat Hai substation and 220kV Dinh Vu – Cat Hai line (250MVA; 2x8km)
- Improving to raise the load capacity of Ha Dong – Thuong Tin line (2x16km).
- 220kV Bac Ninh 4 substation and 220kV Bac Ninh 4 – 500kV Dong Anh substation line (2x250MVA; 2x18km).
- Improving the capacity of 220kV Do Luong substation (125+250→2x250MVA).
- Improving the capacity of 220kV Bim Son substation (125+250→2x250MVA).
- Major loads of Ho Chi Minh City and the South
- Branch of 220kV Tan Son Nhat substation (220kV Tan Son Nhat line – Hoc Mon – Thu Duc branch): 2x7km.
- 220kV Nam Hiep Phuoc substation and connection lines (2x250MVA; 4x2km).

- 220kV Vinh Loc (Ba Queo) substation and 220kV Dam Sen – Ba Queo and 220kV Ba Queo – Tan Son Nhat lines (2x250MVA; 2x10km).

- Installing the 3rd transformer of 220kV Nha Be substation (240MVA).

- 220kV An Thanh substation (2x250MVA; 4x2km): renamed from 220kV VSIP substation.

• *Loads in the Central*

- 220kV Hai Chau line – Ngu Hanh Son – Da Nang branch (2x14km): 220kV Ngu Hanh Son substation does not have any spare land to develop 2 feeders on Hai Chau section. Therefore, the substation is tentatively connected in a transitional manner to 1 circuit of 220kV Ngu Hanh Son – Da Nang line.

3. Urgent connection/capacity evacuation works for power sources

a. *500kV grid connected to Dung Quat power center*

The EVN requests to add to the plan the following works:

- 500kV Dung Quat power center substation (900MVA).

- 500kV Dung Quat power center – Doc Soi line (2x8km).

b. *Hydro and renewable energy power absorption works*

(i) Renewable energy power in Ninh Thuan and Binh Thuan provinces:

- 500kV Hong Phong substation and connection lines (3x900MVA+2x250MVA; 500kV line: 4x10km; 220kV line: 4x10km).

- 500 kV Hong Phong – Son My thermal power plant line (2x150km).

- Improving 220kV Da Nhim – Duc Trong – Di Linh line to a dual circuit one (2x88km).

- Improving the capacity of 500kV Song May substation (2x600→2x900MVA).

(ii) Hydropower sources in the Central and Central Highlands region

- Improving the capacity of 220kV Son Ha substation from 2x125MVA→2x250MVA (Quang Ngai People's Committee made petitions at Document No. 5493/UBND-CNXD dated 7 October 2019).

- Improving the capacity of 500kV Dak Nong substation (2x450→2x900MVA).

- Improving the capacity of 500kV Pleiku 2 substation (2x900MVA)

II. Reflections of the MOIT

Based on the review of investments in power source and grid projects in accordance with the national PDP in the period 2011-2020, with a vision to 2030 (the revised PDP VII), the provincial PDPs in the period 2016-2025, with a vision to 2035 and the 2016-2020 5-year plan of the EVN approved by the PM on the lists of transmission grids at the EVN's petitions, the MOIT would like to have some following reflections:

1. For works approved by the PM to be included in the EVN's 5-year development investment plan, the MOIT agrees with the EVN's petitions and shall add transmission grid works in the Decision 219/QD-TTg to the national PDP.

2. For the grid works which are not in the portfolio of the national PDP but have already been included in the provincial PDPs in the period 2016-2025, with a vision to 2035 approved by the MOIT:

Provincial PDPs in the period 2016-2025, with a vision to 2035 (the Component of 110kV power system development plan) were formulated by provinces and approved by the MOIT for implementation. The objective of the above projects is to put the 110kV grid system into the planning to ensure the power supply for loads in provinces by each period, synchronized with the orientations of transmission power grid and source development in compliance with the revised PDP VII.

In the process of formulation, appraisal and approval of transmission grid works, their development has been calculated and oriented to ensure the power supply as well as effective exploitation of local energy sources in line with the socio-economic development of provinces. Specifically, some provincial PDPs are requested and proposed to be amended and/or supplemented with some 220kV line and substation projects in comparison to the revised PDP VII. After some reviews, the MOIT has agreed to include them in the Decision on approving the provincial PDPs. However, the MOIT has also noted that *"during the implementation of works, it is a must to report to the PM for supplements to the national PDP"* because the authority to decide on the supplements of such transmission grid projects to the national PDP is in the hand of the PM.

Therefore, the MOIT recommends the PM to make amendments and supplements to the PDP VII revising transmission grid projects which have already been included in the list of Decisions on the approval of provincial PDPs in the period 2016-2025, with a vision to 2035 (See the detailed information by lists of projects in the attached appendix).

3. For urgent works for power connection/capacity evacuation:

a) 500kV grid connected to Dung Quat power center

The MOIT issued Decision No. 2612/QD-BCT dated 25 July 2018 approving the revisions of construction location planning for the Central electricity center – Dung Quat power center (Decision No. 2612/QD-BCT) with the inclusion of Dung Quat III combined cycle gas turbine power plant (750MW), as while approving the plan for the connections to Dung Quat I power plant at the voltage of 220kV, and Dung Quat II and Dung Quat III power plants at the voltage of 500kV.

According to calculations of the EVN, to ensure the absorption of Dung Quat power center capacity (3x750MW) in compliance with the approval at Decision No. 2612/QĐ-BCT, apart from grid works for the connections to Dung Quat power center at the voltage of 220kV approved in the revised PDP VII, it is necessary to add 2 500kV works:

- 500kV Dung Quat power center – Doc Soi line (2x8km): connecting Dung Quat II and Dung Quat III power plants.

- 500kV Dung Quat power center substation (900MVA): increasing the flexibility in the operation and prevention modes in case of surging regional loads.

Therefore, the MOIT requests the PM to add 500kV grid projects into the revised PDP VII in accordance with the EVN's proposal.

b) Works for the evacuation of renewable energy power in Ninh Thuan and Binh Thuan:

Transmission grid works approved by the PM to be included in the national PDP at Document No. 1891/TTg-CN dated 27 December 2018 only take into consideration the power sources approved to be included in the PDP by the end of August 2018. Based on the review of plans approved up until now, the EVN would like to make petitions with regard to the inclusion of the works: elevating 220kV Da Nhim – Duc Trong – Di Linh line to a dual circuit one and improving the capacity of 500kV Song May substation are necessary to ensure the capacity absorption of power sources in Ninh Thuan province, Binh Thuan province and surrounding areas.

However, with the proposal for constructing 500kV Hong Phong substation and 500kV Hong Phong – Son My thermal power plant line, the reasoning for their necessity is not clear and it is needed to consider the combination of capacity evacuation of Ke Ga wind project (Thang Long Wind) (which is being proposed to be added to the PDP) and a matching 500kV connection line. Therefore, the MOIT temporarily refuses to add such projects to the PDP. After having further calculations and research, the MOIT shall report to the PM or put them in the potential list for the PDP VIII.

c) Works for the evacuation of renewable energy power in the Central and Central Highlands region

The EVN proposes the inclusion of the following capacity improvement works in the PDP: 220kV Son Ha substation (2x125→2x250MVA), 500kV Dak Nong substation (2x450→2x900MVA) and 500kV Pleiku 2 substation (2x900MVA) to ensure the capacity absorption of power sources in the Central and Central Highlands region. Through reviews, the MOIT would like to have some following reflections:

- For 220kV Son Ha substation, the PM issued Document No. 210/TTg-CN dated 7 February 2020 approving the adjustment of its capacity and construction progress.

- 500kV Dak Nong substation (current capacity: 2x450MVA) and Pleiku 2 500kV substation (current capacity: 2x450MVA) are responsible for absorbing capacities of power

sources in the region at present and in the future. According to the calculations of the Institute of Energy (IOE), to evacuate capacities of solar and wind power sources in the Central Highlands which have been proposed to be included in the PDP, it is necessary to improve the capacities of 500kV Dak Nong and Pleiku 2 substations to 2x900MVA.

d) Inclusion of transmission grids to absorb power sources in the Southwestern region

According to calculations of the IOE, to evacuate the capacities of some wind power sources in the Southwestern region, it is necessary to add/speed up transmission grid works as follows:

- Adding 220kV dual circuit line (5 km) connecting 220kV Bac Lieu substation with 220kV Ca Mau thermal power plant – Soc Trang line.

- Speeding up 220kV Binh Dai substation and the dual circuit line from 220kV Binh Dai – Ben Tre substation (250 MVA; 2x50 km) and rescheduling them from the period 2031 – 2035 to 2021 – 2025.

III. Proposals and petitions

Through reviews and considerations, works for capacity absorption of power sources calculated and proposed by the EVN are quite appropriate and can ensure the synchronized connections to and capacity evacuation of power sources, especially important ones such as Dung Quat power center and renewable energy ones in Ninh Thuan province, Binh Thuan province and the Central Highlands. In addition, it is necessary to include transmission grid works to absorb capacities of renewable energy power sources in the Southwestern region.

The MOIT agrees with the EVN's proposals and petition the PM to amend and supplement transmission grid works to the revised PDP VII as in the list of the attached Appendix.

The MOIT would like to report the above points to the PM for your consideration and decision./.

Recipients:

- As above;
- Deputy Prime Minister Trinh Dinh Dung (for report);
- Office of Government;
- Vice Minister Hoang Quoc Vuong
- The Electricity of Vietnam
- Archive: Document Servicing Department, ERAV.

MINISTER

Tran Tuan Anh

Appendix 1

Projects in the portfolio of the EVN's 5-year plan approved by the Prime Minister at Decision No. 219/QĐ-TTg dated 13 February 2018

No	Project name	Size	Schedule	Note
1	220 kV substation of Nghi Son Economic Zone and connection lines	2x250MVA	2021-2025	Already included in the 5-year plan
2	220/110 kV substation for power generation in 500 kV Pho Noi substation	2x250MVA	2021-2025	Already included in the 5-year plan
3	Improving the capacity of 220kV Phu Ly substation	125+250→2x250MVA	2021-2025	Already included in the 5-year plan
4	Improving the capacity of 220kV Vinh substation	125+250→2x250MVA	2021-2025	Already included in the 5-year plan
5	220 kV Rach Gia 2 - Kien Binh second circuit line	2x74km	2021-2025	Already included in the 5-year plan
6	Improving the capacity of 220kV Soc Trang substation	125+250→2x250MVA	2021-2025	Already included in the 5-year plan
7	Improving the capacity of 220kV Ngu Hanh Son substation	250→2x250MVA	2021-2025	Already included in the 5-year plan
8	Improving the capacity of 220kV Hue substation	125+250→2x250MVA	2021-2025	Already included in the 5-year plan

Appendix 2

220kV grid projects in the portfolio of local PDPs

STT	Project name	Size	Progress	Note
I	Synchronized evacuation and connection works for power sources			
1	220kV Ham Thuan Nam substation and connection lines	2x250MVA; 4x3.5km	2021-2025	Already included in the provincial PDP
2	220 kV Cao Bang - Bac Kan second circuit line	1x71km	2021-2025	Already included in the provincial PDP
3	220kV Krong Pa substation and connection lines	125MVA; 2x60km	2021-2025	Already included in the provincial PDP
4	220kV An Khe substation and connection lines	250MVA; 2x3km	2021-2025	Already included in the provincial PDP
5	Improving 220kV Cau Mau - Ca Mau thermal power plan	2x5.4km	2021-2025	Already included in the provincial PDP and sped up with the progress from the period 2026-2030 to the period 2021-2025
6	220kV Song Cau substation and connection lines	250MVA; 4x5km	2021-2025	Already included in the provincial PDP and sped up with the progress from the period 2026-2030 to the period 2021-2025 and increased with the size from 2x125MVA to 2x250MVA
7	500kV Quang Tri substation and connection lines (Added with 220kV feeder and	2x900MVA; 220kV: 4x1.1km	2021-2025	Adjusted with the size of 500kV substation (220kV feeder is in the provincial PDP)
8	220kV Hoa Binh substation and connection lines (Bac Lieu province)	2x250MVA; 2x17km	2021-2025	Already included in the PDP of Bac Lieu province

II	Urgent power transmission projects to supply power to loads			
a	Centralized loads of Hanoi and the North			
No.	Project name	Size	Schedule	Note
1	220kV Thanh Xuan substation and 220kV West Hanoi – Thanh Xuan line	3x250MVA; 4x16km	2021-2025	Already included in the provincial PDP
2	220kV Dai Mo (My Dinh) substation and connection lines	3x250MVA; 4x2km	2021-2025	
3	220kV Van Dien and connection lines	3x250MVA; 4x4km	2021-2025	
4	220kV Hoa Lac substation and 220kV Hoa Lac – West Hanoi line	2x250MVA; 2x14km	2021-2025	
5	Improving the capacity of 220kV Xuan Mai substation	125+250→2x250MVA	2021-2025	
6	Installing the 3 rd 220kV transformer of 220kV Long Bien substation	250MVA	2021-2025	
7	Installing the 2 nd 220kV transformer of 220kV Ba Thien substation	250MVA	2021-2025	Already included in the provincial PDP
8	220kV Nam Hoa substation and 220kV Yen Hung – Nam Hoa line	2x250MVA; 2x18km	2021-2025	Already included in the provincial PDP
9	220kV Cat Hai substation and 220kV Dinh Vu – Cat Hai line	250MVA; 2x8km	2021-2025	Already included in the provincial PDP

10	Improving to raise the load capacity of Ha Dong – Thuong Tin line	2x16km	2021-2025	Already included in the provincial PDP
11	220kV Bac Ninh 4 substation and 220kV Bac Ninh 4 – 500kV Dong Anh substation line	3x250MVA; 2x18km	2021-2025	Already included in the provincial PDP
12	Improving the capacity of 220kV Do Luong substation	125+250→2x250MVA	2021-2025	Already included in the provincial PDP and sped up with the progress from the period 2026-2030 to the period 2021-2025
13	Improving the capacity of 220kV Bim Son substation	125+250→2x250MVA	2021-2025	Already included in the provincial PDP
b	<i>Major loads of Ho Chi Minh City and the South</i>			
No.	Project name	Size	Schedule	Note
14	Branch of 220kV Tan Son Nhat substation (220kV Hiep Binh Phuoc – Tan Son Nhat line)	2x7km	2021-2025	Adjusted with the connection plan to match the provincial PDP
15	220kV Nam Hiep Phuoc substation and connection lines	2x250MVA; 4x2km	2021-2025	Already included in the provincial PDP and sped up with the progress from the period 2026-2030 to the period 2021-2025
16	220kV Vinh Loc (Ba Queo) substation and 220kV Dam Sen – Ba Queo and 220kV Ba Queo – Tan Son Nhat lines	2x250MVA; 2x10km	2021-2025	Adjusted with the connection plan to match the provincial PDP
17	Installing the 3 rd transformer of 220kV Nha Be substation	250MVA	2021-2025	Already included in the provincial PDP
18	220kV An Thanh (VSIP) substation and connection lines	2x250MVA; 4x2km	2021-2025	Renamed to align the revised PDP VII with the provincial PDP

<i>c</i>	<i>Loads in the Central</i>			
19	220kV Hai Chau line – Ngu Hanh Son – Da Nang branch	2x14km	2021-2025	Adjusted with the connection plan due to the inability to connect to 220kV Ngu Hanh Son substation

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Appendix 3

Works for the connections to power sources

No.	Project name	Size	Schedule	Note
I	Central and Dung Quat gas turbine cluster			
1	500kV Dung Quat gas turbine – Doc Soi line	2x8km	2021-2025	
2	500kV Dung Quat gas turbine substation	900MVA	2021-2025	
II	Evacuation of renewable energy power sources			
<i>a</i>	<i>Ninh Thuan province, Binh Thuan province and surrounding areas</i>			
1	Elevating 220kV Da Nhim – Duc Trong – Di Linh line	2x88km	2021-2025	
2	Improving the capacity of 500kV Song May substation	1800MVA	2021-2025	
<i>b</i>	<i>The Central and Central Highlands region</i>			
1	Improving the capacity of 500kV Dak Nong substation	1800MVA	2021-2025	500kV substation is full and overloaded
2	Improving the capacity of 500kV Pleiku 2 substation	1800MVA	2021-2025	
<i>c</i>	<i>The Southwestern region</i>			

1	220kV dual circuit line connecting 220kV Bac Lieu substation with 220kV Ca Mau thermal power plant – Soc Trang line	2x5km	2021-2025	Absorbing the renewable energy in the Southwestern region
2	220kV Binh Dai substation and the dual circuit line from 220kV Binh Dai – Ben Tre substation	250 MVA; 2x50 km	2021-2025	Absorbing the renewable energy in the Southwestern region (the provincial PDP in the period 2026-2035)

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