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MOIT's Latest Proposals on Vietnam Wind Power Master Plans

On 19 March 2020, the Ministry of Industry and Trade (**MOIT**) submitted Report No. 1931/BCT-DL (**Report 1931**) to the Prime Minister of Vietnam (**Prime Minister**) for consideration of supplementing wind power projects (**WPPs**) to Vietnam's power development plan (**PDP**).

In Report 1931, MOIT highlights numerous issues as set out below.

1 Criteria for supplementation of WPPs to the PDP

Based upon the support mechanisms for WPPs, the MOIT has identified the following main criteria to appraise and approve the supplementation of WPPs to the PDP:

- advantages of the connection plan for the national electricity system;
- wind potential at the proposed area;
- suitability with the PDP and local land use plan;
- effective land use; and
- financial capacity and experience of investors.

2 Updates on supplementation of WPPs to the PDP

(1) So far, the total capacity of WPPs that have already been supplemented to the PDP has reached 4,800MW, with the expected operation date by 2021. The majority of those projects are in Southwest and South Central of Vietnam. However, only 9 WPPs have come into operation with a capacity of 350MW.

(2) Until 2025, according to the revised Master Plan VII, the capacity of wind power needed to supplement to the PDP is expected to be:

- base case: 6,030MW; and
- high case:[1] 11,630MW.

As 4,800MW has been added to the PDP, a further of approximately 1,230MW and 6,830MW will need to have been added to the PDP for a base case and a high case, respectively, by 2025.

(3) In light of the priority given to wind and solar power under the Politburo's Resolution No. 55-NQ/TW on Vietnam's strategic orientations for energy development through 2030 with a vision to 2045, MOIT urges to stimulate the growth of wind power.

Furthermore, there exists the risk of temporary electricity shortage (from 2021 to 2024), together with the fact that significant power sources continue to be behind schedule or have their schedules undetermined, loads may increase, and climatic conditions may be unfavourable. Hence, MOIT proposes to adopt the high-case plan for wind power development.

(4) By 15 March 2020, MOIT had received proposals by provincial people's committees to add 250 WPPs with a total capacity of 45,000MW in five geographical areas. For further details, please see Appendix 1.

3 Regional grid responsiveness

According to calculations made by the Institute of Energy in February 2020, the responsiveness of power grid in different Vietnamese regions until 2025 is as follows:

(1) North Central

(a) In general, the electricity system in this area has basically met the need to relieve the capacity of local power sources in normal operation mode.

(b) The total capacity of wind power that can be supplemented to the PDP in this region is 941 MW.

(c) A list of the projects capable of relieving capacity is set out in Appendix 2 below.

[1] High-case plan is the management plan to develop sufficient backup power sources in case of high load, adverse climatic conditions or other sources of electricity delay.

(2) South Central

(a) Binh Dinh and Phu Yen are unlikely to be able to supplement the capacity of WPPs due to the regions' relatively weak 220kV grid.

(b) For Ninh Thuan, the regional grid can only absorb about 340 MW of wind power source and Trung Nam solar power plant (Thuan Nam) (in normal operating mode).

(c) A list of the projects capable of relieving capacity is set out in Appendix 3 below.

(3) Central Highlands

(a) A total scale of 11,733.8 MW of wind power is being submitted for supplemented to PDP.

(b) In case of harsh conditions, it is calculated that the 500 kV Pleiku 2 (2x450MVA) and 500 kV Dak Nong (2x450MVA) substations will be fully loaded, potentially risky for operation.

(c) To consider adding wind power capacity to the region, by 2021, the MOIT proposes the following options:

- Option 1: To increase the capacity of the 500 kV Pleiku 2 and Dak Nong substations to (2x900MVA) in 2021, adding 1,150 MW of wind power to the PDP.
- Option 2: To increase the capacity of the 500 kV Pleiku 2 and Dak Nong substations to (2x900MVA) and to build a new 220 kV Chu Se – Pleiku 2 of 41 km in length, adding 1,400 MW of wind power to the PDP using the 229kV grid.

(d) A list of the projects capable of relieving capacity is set out in Appendix 4 below.

(4) Southwest

(a) The total scale of wind power in the area that can be relieved is about 2,300 MW.

(b) In case of investing more 110 kV lines, this area can relieve another 755 MW (concentrated in Ben Tre).

(c) In case of supplementing a new 220 kV grid work to the PDP, this area can relieve an additional 200 MW from grid connection on the 220 kV Gia Rai - Bac Lieu line.

(d) A list of the projects capable of relieving capacity is set out in Appendix 5.

(5) Southeast

(a) In this area, only Ba Ria Vung Tau has proposed adding 2 WPPs, which are (i) HBRE Ba Ria Vung Tau of 500 MW (offshore); (ii) Cong Ly Ba Ria - Vung Tau with a capacity of 102.6 MW (nearshore).

(b) A list of the projects capable of relieving capacity is set out in Appendix 6 below.

(6) Summary: The capacity of the power grid until 2021 can absorb about 7,000 MW (in normal operating mode). This capacity is consistent with the increased wind power capacity of the high-level plan.

4 Proposal to supplement/accelerate transmission grid works to enable WPPs

(1) Increasing the capacity of 500kV Dak Nong substation from 2x450MVA to 2x900MVA.

(2) Increasing the capacity of 500kV Pleiku 2 substation from 2x450MVA to 2x900MVA.

(3) Building a new 220kV Bac Lieu - Turn Ca Mau Thermal Power Plant - Soc Trang with a length of 5km.

(4) Accelerating the progress of 220kV Binh Dai substation and double circuit 220kV transmission line from 220kV Binh Dai - Ben Tre substation (250 MVA; 2x50 km) from 2031-2035 to 2021-2025.

5 MOIT's proposals to the Prime Minister

(1) To adjust the wind power development target to 2025 with a capacity of 11,630 MW.

(2) To consider the decision to supplement WPPs to the PDP with the connection plan and the conditions for capacity relief under the list set out in Appendixes 2-6 below.

(3) To consider the decision to supplement/accelerate the progress of synchronous transmission grid works to relieve WPPs' capacity in the proposed list.

(4) To maintain considering, studying, and appraising the supplementation of WPPs to the PDP.

Key contacts

If you have any questions or would like to know how this might affect your business, please contact these key contacts.

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Appendix 1

Total capacity of WPPs proposed for supplementation to the PDP by region, province and municipalities

Table 1. The total capacity of WPPs proposed for supplementation to the PDP by region

No.	Region	Quantity	Capacity (MW)
1.	North Central	51	2,918.8
2.	South Central	2	602.6
3.	Central Highlands	10	4,193.1
4.	Southwest	94	25,540.9
5.	Southeast	91	11,733.8
	Total	**248**	**44,989.1**

Table 2. The total capacity of WPPs proposed for supplementation to the PDP by province and municipality

No.	Region	Quantity	Capacity (MW)
1.	Ba Ria - Vung Tau	2	602.6
2.	Bac Lieu	19	4,608.6
3.	Ben Tre	23	12,063.0
4.	Binh Dinh	3	225.0
5.	Binh Thuan	1	3,400.0
6.	Ca Mau	16	4,249.0
7.	Dak Lak	23	2,683.4
8.	Dak Nong	6	460.0
9.	Gia Lai	59	8,368.0
10.	Ha Tinh	1	120.0

11.	Hau Giang	1	100.0
12.	Kon Tum	2	153.5
13.	Lam Dong	1	68.9
14.	Ninh Thuan	5	462.1
15.	Phu Yen	1	106.0
16.	Quang Binh	1	252.0
17.	Quang Tri	49	2,546.8
18.	Soc Trang	19	1,748.8
19.	Tien Giang	2	685.5
20.	Tra Vinh	14	2,068.0
	Total	**248**	**44,989.1**

Appendix 2
List of WPPs proposed for supplementation to PDP in North Central region

STT	Name of SPPs	Capacity (MW)	District	Province	Connection method	Conditions for capacity relief
1.	Huong Linh 5	30	Huong Hoa	Quang Tri	Connect to the 22 kV busbar of 22/110 kV substation of Huong Linh 4 WPP	In normal operation mode (N-0)
2.	Huong Hiep 2	30	Huong Hoa	Quang Tri	Connect to the 110 kV busbar of 110/220 kV substation of Huong Linh (capacity gathering station in Huong Linh area and adjacent areas), then transmit it through the 220 kV line to the 220 kV busbar of 220 kV substation of Lam Bao	
3.	Huong Hiep 3	30	Huong Hoa	Quang Tri	Connect to the 22 kV busbar of 22/110 kV substation of Huong Hiep 2 WPP, then transmit the power on the 110 kV line to the 110 kV busbar of 10/220 kV substation of Huong Linh (capacity gathering station in Huong Linh area)	
4.	TNC Quang Tri 1	50	Huong Hoa	Quang Tri	Connect 220kV from 220 kV substation of Huong Tan single circuit, 300 mm2 wire, 7 km long	
5.	TNC Quang Tri 2	50	Huong Hoa	Quang Tri		
6.	Huong Linh 7	30	Huong Hoa	Quang Tri	Connect to the 22/110 kV busbar of Gelex 3 WPP	
7.	Huong Linh 8	25.2	Huong Hoa	Quang Tri	Connect to the 22/110 kV busbar of Gelex 3 WPP	
8.	AMACCAO Quang Tri 1	50	Huong Hoa	Quang Tri	Connect to the 110 kV busbar of 220 kV substation of Lam Bao	
9.	Tan Hop	38	Huong Hoa	Quang Tri	Connect to the 110 kV busbar of 220 kV substation of Lam Bao	
10.	LIG Huong Hoa 1	48	Huong Hoa	Quang Tri	Connect LIG Huong Hoa 1 WPP	

11.	LIG Huong Hoa 2	48	Huong Hoa	Quang Tri	through 220 kV voltage to the 220 kV busbar of 220 kV substation of Lam Bao, ACSR300 conductor, about 3.5 km long. To expand and invest in building a 220 kV outgoing service compartment at 220 kV substation of Lam Bao	
12.	Hai Anh	40	Lao Bao	Quang Tri	Connect the 110 kV single circuit line to the 110 kV busbar of 220 kV substation of Lam Bao, 240 mm2 wire, 2 km long	
13.	Tai Tam	50	Huong Hoa	Quang Tri	Connect by 220 kV line to the 220 kV substation of Lam Bao	
14.	Hoang Hai	50	Huong Hoa	Quang Tri	Build 22/220 kV substation to connect to the 220 kV busbar of 220 kV substation of Lam Bao	
15.	HBRE Ha Tinh	120	Ky Anh district and Ha Tinh town	Ha Tinh	Transit on 110 kV line of Ky Anh – Ha Tinh	
16.	B&T	252	Quang Ninh; Le Thuy	Quang Binh	Transit connection to the 220 kV line of Dong Hoi - Dong Ha through two 220 kV step-up stations	
17.	**Total**	**941.2**				

Appendix 3
List of WPPs proposed for supplementation to PDP in South Central region

STT	Name of SPPs	Capacity (MW)	District	Province	Connection method	Conditions for capacity relief
1.	7A wind power	50	Thuan Nam	Ninh Thuan	Connect the 110 kV double circuit line to 110 kV busbar of 220 kV substation of Ninh Phuong, AC300 conductor, 12 km long	- In normal operation mode (N-0) - After the grid works have been relieved and renewable energy has been supplemented to the PDP, especially the 500 kV substation of Thuan Nam and the 500 kV Thuan Nam – Vinh Tan line. - Operate to separate the 220kV Di Linh – Duc Trong line
2.	Dam Nai 4	27.6	Thuan Bac	Ninh Thuan	Connect to the 110 kV busbar of 220 kV substation of Thap Cham, AC300 conductor, 2km long	
3.	Loi Hai 2	28.9	Thuan Bac	Ninh Thuan	Transiting connection on Thap Cham – Cam Thinh Dong line, 25m long double circuit, section AC240	
4.	Dam Nai 3	39.4	Thuan Bac	Ninh Thuan	Connect to 110 kV busbar of substation of Dam Nai 4 Wind Power, AC240 conductor, 1,8km long	
5.	Ninh Thuan No. 5	46.2	Ninh Phuoc	Ninh Thuan	Connect the 220 kV single circuit line to 220 kV busbar of 220 kV substation of Ninh Phuoc, AC330 conductor, 2km long	
6.	Cong Hai 1 phase 2	25	Thuan Bac	Ninh Thuan	Transit 110 kV Ninh Hai – Nam Cam Ranh through the 800m long double circuit line, 2xAC240 phase line	
7.	Phuoc Huu - Duyen Hai 1	30	Ninh Phuoc	Ninh Thuan	Transit on circuit 2 of Thap Cham – Ninh Phuoc	
8.	Vietnam Power No. 1	30	Thuan Nam	Ninh Thuan	Connect to 7A WP	
9.	BIM	88	Thuan Nam	Ninh Thuan	Connect to the 220 kV busbar of 500 kV substation of Vinh Tan through the 220 kV single circuit line, 2xACSR300 conductor, 22km long	

	Total	**336.2**				

Appendix 4
List of WPPs proposed for supplementation to PDP in Central Highlands

STT	Name of SPPs	Capacity (MW)	District	Province	Connection method	Conditions for capacity relief
1.	Ea H'leo 1,2	57	Ea H'leo	Dak Lak	Connect the 110 kV single circuit to 110 kV substation of Ea H'leo; AC240; 13km long	- In normal operation mode (N-0). - Raise the capacity of 500 kV Dak Nong substation and 500 kV Pleiku2 substation to (2x900) MVA in 2021.
2.	Ea Nam	400	Ea H'leo	Dak Lak	Build a new 500kV - 450MVA substation for transitional connection on the 500kV Pleiku - Di Linh line	
3.	Dak Hoa	50	Dak Song	Dak Nong	Transit connection of 220 kV line on the 220 kV line of Dak Nong – Buon Kuop, AC2x330, 2km long	
4.	Cuu An	46.2	An Khe	Gia Lai	Build a 110 kV step-up station and 110 kV transmission line with AC185 conductor, Transiting connection on An Khe – Kbang line, 0,5km long	
5.	Song An	46.2	An Khe	Gia Lai	110 kV substation of Song An WP 2x52MVA transit of one circuit of 110kV An Khe - K'Bang	
6.	Cho Long WP	155	Kong Chro	Gia Lai	Build a 220 kV step-up station placed at Yang Trung WPP; Transit connection on the 220 kV Pleiku 2 – An Khe Hydropower line (co-invest with Yang Trung wind power)	- In normal operation mode (N-0). - 220 kV Doc Soi – Quang Ngai Circuit line No.2 operates synchronously with these wind power sources.
7.	Yang Trung WP	145	Kong Chro	Gia Lai	35/220 kV Yang Trung wind power for transit connection of one circuit of the 220 kV An Khe Hydropower – 500 kV Pleiku 2 line	
8.	Hung Hai Gia Lai	100	Kong Chro	Gia Lai	Transit connection on the 220 kV Pleiku 2 - An Khe Hydropower line (switch connection to Phuoc An)	

						- Raise the capacity of 500kV Dak Nong substation and 500kV Pleiku2 substation to (2x900) MVA in 2021.
9.	Cu Ne 1	50	Krong Buk	Dak Lak	Gathering capacity of Cu Ne 1,2 + Krong Buk 1,2 WPPs to the 22/220 kV step-up station of Krong Buk WPP with 2x125MVA, transit connection on 220kV Krong Buk - Pleiku 2 line	- In normal operation mode (N-0). - Circuit line No.2 of 220kV Pleiku2 is in operation. - Raise the capacity of 500kV Dak Nong substation and 500 kV Pleiku2 substation to (2x900) MVA in 2021.
10.	Cu Ne 2	50	Krong Buk	Dak Lak		
11.	Krong Buk 1	50	Krong Buk	Dak Lak		
12.	Krong Buk 2	50	Krong Buk	Dak Lak		
13.	Ia Le WP	100	Chu Puh	Gia Lai	Build a 220 kV step-up station with a capacity of 2x125MVA and double circuit line of AC500 and 6km long to the 220 kV Chu Se substation	
14.	Nhon Hoa 1,2	100	Chu Puh	Gia Lai	35/220 kV substation of Nhon Hoa 1 for transit connection to one circuit of the 220kv Krong Buk – 500 kV Pleiku 2 line	
15.	Asia Dak Song 1	50	Dak Song	Dak Nong	110 kV double circuit line for transit connection on 110 kV Dak Mil – Dak Song line; AC240 conductor; 0,5km long	- In normal operation mode (N-0).
16.	Tay Nguyen	50	Chu Prong	Gia Lai	Connect 22kV to the Mountainous	

					area development WP	- Raise the capacity of 500kV Dak Nong substation and 500 kV Pleiku2 substation to (2x900) MVA in 2021.
17.	Mountainous area development	50	Chu Prong	Gia Lai	Transit connection on the 110 kV Dien Hong – Chu Se line; 2xAC185 phase line; 5,2km long	
18.	Ia Pech	50	Ia Grai	Gia Lai	Transit on the 110 kV Ia Grai – Pleiku line, 4km long	
19.	Ia Pech 2	50	Ia Grai	Gia Lai		
20.	Ia Pet Dak Doa	200	Dak Doa	Gia Lai	Separate 500 kV transformer; connect to the 500 kV Pleiku2 substation	
21.	Kon Plong	103.5	Kon Plong	Kon Tum	220 kV step-up station of Kon Plong with a capacity of 150MVA-35/220kV; connect through 220 kV double circuit line, ACSR330 conductor, 19km long for transit on the 220kV Thuong Kon Tum – Quang Ngai Hydropower	
22.	Tan Tan Nhat	50	Dak Glei	Kon Tum	Connect to the 110 kV Bo Y substation	
23.	Dak ND'rung 1	100	Dak Song	Dak Nong	Connect to the 220 kV busbar of 220 kV Dak Nong substation	
24.	Dak ND'rung 2	100		Dak Nong		
25.	Dak ND'rung 3	100		Dak Nong		
26.	Nam Binh 1	30	Dak Song	Dak Nong	Connect 110 kV to the gathering station of 220 kV Dak Hoa wind power, transit connection on the 220kV Buon Kuop - Aluminum Electrolysis line	
27.	Ia Bang 1	50	Chu Prong	Gia Lai	Connect to 110kV Dien Hong substation through 110kV single circuit line, 30 km long	
28.	Ia Boong - Chu Prong	50	Chu Prong	Gia Lai	Connect through the 220 kV line to 500kV Pleiku2 substation	
	Total	**2432.9**				

Appendix 5
List of WPPs proposed for supplementation to PDP in Southwest

STT	Name of SPPs	Capacity (MW)	District	Province	Connection method	Conditions for capacity relief
1.	Dong Hai 1 phase 2	50	Dong Hai	Bac Lieu	Gather 220 kV ECOTECH Dong Hai substation for connection to 220 kV busbar of 500 kV substation Duyen Hai through 220 kV double circuit line	The connection method depends on the schedule of the 110 kV Hoa Binh switching station. The operation schedule of 110 kV Hoa Binh switching stations must be ensured for synchronizing power sources.
2.	Hoa Binh 1 phase 2	50	Hoa Binh	Bac Lieu	Connect at Hoa Binh 1 phase 1 WP (connect to 110 kV Hoa Binh substation through 110kV double circuit line)	In normal operation mode (N-0).
3.	Hoa Binh 2	50	Hoa Binh	Bac Lieu	Connect to the 110 kV Hoa Binh switching station (at 220 kV Hoa Binh substation area) through 110 kV double circuit line	The connection method depends on the schedule of the 110 kV Hoa Binh switching station. The operation schedule of 110 kV Hoa Binh switching station must be ensured for synchronizing power sources.
4.	Hoa Binh 5	120	Hoa Binh district	Bac Lieu	220 kV double circuit line used together with HCG Bac Lieu WPP	There is a need to speed up the schedule of

					cluster - Turn 220 kV Gia Rai - Bac Lieu 2 line	building new 220kV double circuit line connected to 220kV Bac Lieu substation for transit on 220kV line of Ca Mau – Soc Trang thermal power (planning: 2026-2030)
5.	Sunpro	30	Binh Dai	Ben Tre	Connect to 110 kV Binh Dai substation through 110 kV double circuit line	Separation in operation is needed for 110kV Ben Tre 220kV - Ben Tre line.
6.	Thien Phu	30	Thanh Phu	Ben Tre	Gather to 110kV switching station and connect to 110 kV Binh Thanh substation through 110 kV double circuit line	Separation in operation is needed for 110kV Ben Tre 220kV - Ben Tre line.
7.	Thien Phu 2	30	Thanh Phu	Ben Tre		
8.	Ben Tre No. 5	90	Thanh Phu	Ben Tre	Include WP No. 5 – Thanh Hai 1, 2, 3, 4: 3x30+20 MW; Phase 1: Thanh Hai 1 No. 5 WP (V1-2:30 MW) connected together with V1-1 to 110kV Thanh Phu (Binh Thanh) substation through 110kV double circuit line of AC240	Renovate 110k Mo Cay 220kV – Binh Thanh line or build a new 110kV Ba Tri – Binh Thanh line
9.	Hai Phong	200	Thanh Phu	Ben Tre	35/220kV substation: 2x250 MVA; 220 kV line to 220 kV Mo Cay substation, 2x50km long, ACSR-2x500	A quite long 220kV line (50km) is needed for operation and reduce electricity generation of about 200 MW. Renovate 220kV Ben Tre – My Tho line into superheat wire.
10.	Thanh Phu	120	Thanh Phu	Ben Tre	Connect to 110kV Binh Thanh substation through 110kV single circuit line	- Build a circuit for two lines of 110kV

11.	Nexif Ben Tre phase 2, 3	50	Thanh Phu	Ben Tre	Build a new 22/110kV substation: 63 MVA to 110 kV substation of Nexif Ben Tra phase 1 (V1-1-30MW) having been approved; connect together with V1-1 to 110kV Binh Thanh substation	Ben Tre 220kV – Ben Tre, 0,24km long, ACSR-2x240. - Build a circuit for two lines of 110kV Ba Tri – Giong Trom, 16km long, ACSR-2x185. - Build a 110kV double circuit line from 220kV Ben Tre substation to 220kV My Tho substation, 15km long, ACSR-2x240. (These works have not been supplemented to the PDP). - Speed up the schedule of 220kV Binh Dai substation and 220kV double circuit line from 220kV Binh Dai – Ben Tre substation (250 MVA; 2x50 km) from 2031-2035 period to 2021-2025 period.
12.	Bao Thanh	50	Ba Tri	Ben Tre	22/110 kV substation: 63 MVA; 110kV single circuit line, 10km long, AC240 to 110kV Ba Tri substation	
13.	Ben Tre No. 19	50	Thua Duc	Ben Tre	Transmit through 35kV single circuit line to 35kV busbar of 35/220 kV substation of Ben Tre No. 20 WP	
14.	Ben Tre No. 20	50	Thua Duc	Ben Tre	35/220 kV substation: 2x63 MVA; 220 kV single circuit line to 220kV Ben Tre substation for capacity transmission of wind power No.19 and 20	
15.	VPL Ben Tre phase 2	30	Binh Dai	Ben Tre	Gather WPPs of VPL Ben Tre phase 1 and 2, Binh Dai, Binh Dai 2, Binh Dai	Build new and renovate the 110 grids of Ben Tre
16.	Binh Dai 2	49	Binh Dai	Ben Tre		

17.	Binh Dai 3	49	Binh Dai	Ben Tre	3 to 110 kV busbar; then connect to 110 kV Binh Dai substation through 110kV double circuit line, 15km long, ACSR-2x240	province: - Build a circuit of two lines of 110kV Ben Tre 220kV – Ben Tre, 0,24km long, ACSR-2x240. - Build a circuit of two lines of 110kV Ba Tri – Giong Trom, 16km long, ACSR-2x.185. - Build a 110kV double circuit line from 220kV Ben Tre substation to 220kV My Tho substation, 15km long, ACSR-2x240. - Build a circuit of two lines of 110kV Giong Trom – Ben Tre, 24km long, ACSR-2x185 (These works have not been supplemented to the PDP). - Speed up the schedule of 220kV Binh Dai substation and 220kV double circuit line from

						220kV Binh Dai – Ben Tre substation (250 MVA; 2x50 km) from 2031-2035 period to 2021-2025 period.
18.	Khai Phong phase 2	100	Ngoc Hien	Ca Mau	Gather to 110kV substation of Khai Long WP (connection area of Khai Phong phase 1 WP)	220kV Nam Can substation and 220-110kV line for connection to the substation.
19.	Khai Phong phase 3	100	Ngoc Hien	Ca Mau		
20.	Long My 1	100	Long My	Hau Giang	22/220kV substation: 250 MVA; 220kV line for transit connection on one circuit of 220kV line of Ca Mau – O Mon thermal power, 2x1km long, ACSR400	In normal operation mode (N-0).
21.	Soc Trang 4	350	Vinh Chau town	Soc Trang	Connect to 220kV Vinh Chau substation through 220kV double circuit line	220 kV Vinh Chau substation to operate before October 2021; speed up the schedule of building new 220kV double circuit line connected to 220kV Bac Lieu substation for transit on 220kV line of Ca Mau – Soc Trang thermal power; operation synchronously with these wind power sources.
22.	Phu Cuong Soc Trang 1A and 1B	200	Vinh Chau	Soc Trang	Connect to 220kV Vinh Chau substation through 220kV double circuit line	
23.	Soc Trang 16	40	Vinh Chau town	Soc Trang	Connect to 110kV busbar of 220kV Soc Trang substation	
24.	Soc Trang phase 2 No. 7	90	Vinh Chau	Soc Trang	Make use of connection infrastructure	220kV Vinh Chau

					for WP No. 7 phase 1 – 30 MW (V1-3); build two new MVA 22/110KV: 2x63 MVA	substation; 110kV Vinh Chau – Bac Lieu 220kV double circuit line
25.	Soc Trang 11	100.8	Cu Lao Dung	Soc Trang	Connect to 110kV Tran De substation	- In normal operation mode (N-0).
26.	Hoa Dong 2	72	Vinh Chau	Soc Trang	Transit connection on one circuit of 220kV Vinh Chau – Soc Trang line through double circuit line, about 1km long	
27.	BCG Soc Trang 1	50	Vinh Chau	Soc Trang	22/110kV substation – 63 MVA; 110kV single circuit line to 220kV Vinh Chau substation, 8km long. ACSR185	
28.	Tran De	50	Tran De	Soc Trang	110kV single circuit line to 110kV Tran De switching station, 4km long, ACSR185	
29.	Song Hau	50	Long Phu; Tran De	Soc Trang	110kV single circuit line to 110kV Tran De switching station, 4km long, ACSR185	
30.	Nexif Energy	40		Soc Trang	110kV double circuit line to 110kV Tran De substation, 2x18km long, ACSR240	
31.	Lac Hoa 2	130	Vinh Chau	Soc Trang	Build a new 220kV line for connection to 220kV substation of Hoa Dong 2 WPP through 220kV single circuit line, 6km long, ACSR240. (Transit connection of Hoa Dong 2 WP on 220kV Vinh Chau – Long Phu line)	
32.	Dong Thanh 1	80	Duyen Hai	Tra Vinh	Gather at 220kV Dong Thanh substation for transit connection on one circuit of 220kV ECOTECH Dong Hai – 500kV Duyen Hai	
33.	Dong Thanh 2	120	Duyen Hai	Tra Vinh		
34.	Dong Hai 1	100	Duyen Hai	Tra Vinh	Gather at 220kV ECOTECH Dong Hai substation, then connect to 220kV	Build new and renovate 110kV grid of Ben Tre

					busbar of 500kV Duyen Hai substation through 220kV double circuit line, 9km long, ACSR-2x330	province (4 grid works as proposed with Ben Tre province).
35.	Thang Long	96		Tra Vinh	Build a new 220 single circuit line to connect to 220kV busbar of 500kV Duyen Hai substation, 12km long, ACSR-400	
36.	Tan Phu Dong	150	Go Cong Dong	Tien Giang	Connect to 110kV Go Cong substation available through double circuit line, 23km long, ACSR185	110kV My Tho 220kV – Go Cong – Can Duoc – Can Duoc 220kV double circuit line (suspending one circuit line), 65km long, ACSR-2x240, must go into operation (SPC plans to energize this project by the end of 2020)
37.	Vien An	50	Ngoc Hien	Ca Mau	Connect to 220kV Nam Can substation through 220kV single circuit line, 17km, ACSR400	In normal operation mode (N-0).
	Total	**3166.8**				

Appendix 6
List of WPPs proposed for supplementation to PDP in Southeast

STT	Name of SPPs	Capacity (MW)	District	Province	Connection method	Conditions for capacity relief
1.	Cong Ly Ba Ria - Vung Tau	102.6	Xuyen Moc	Ba Ria - Vung Tau	110 kV double circuit line connected to 110kV Xuyen Moc substation, 21,5km long	- In normal operation mode (N-0).