



Curtailment Issue of Renewable Electricity in Jeju Island

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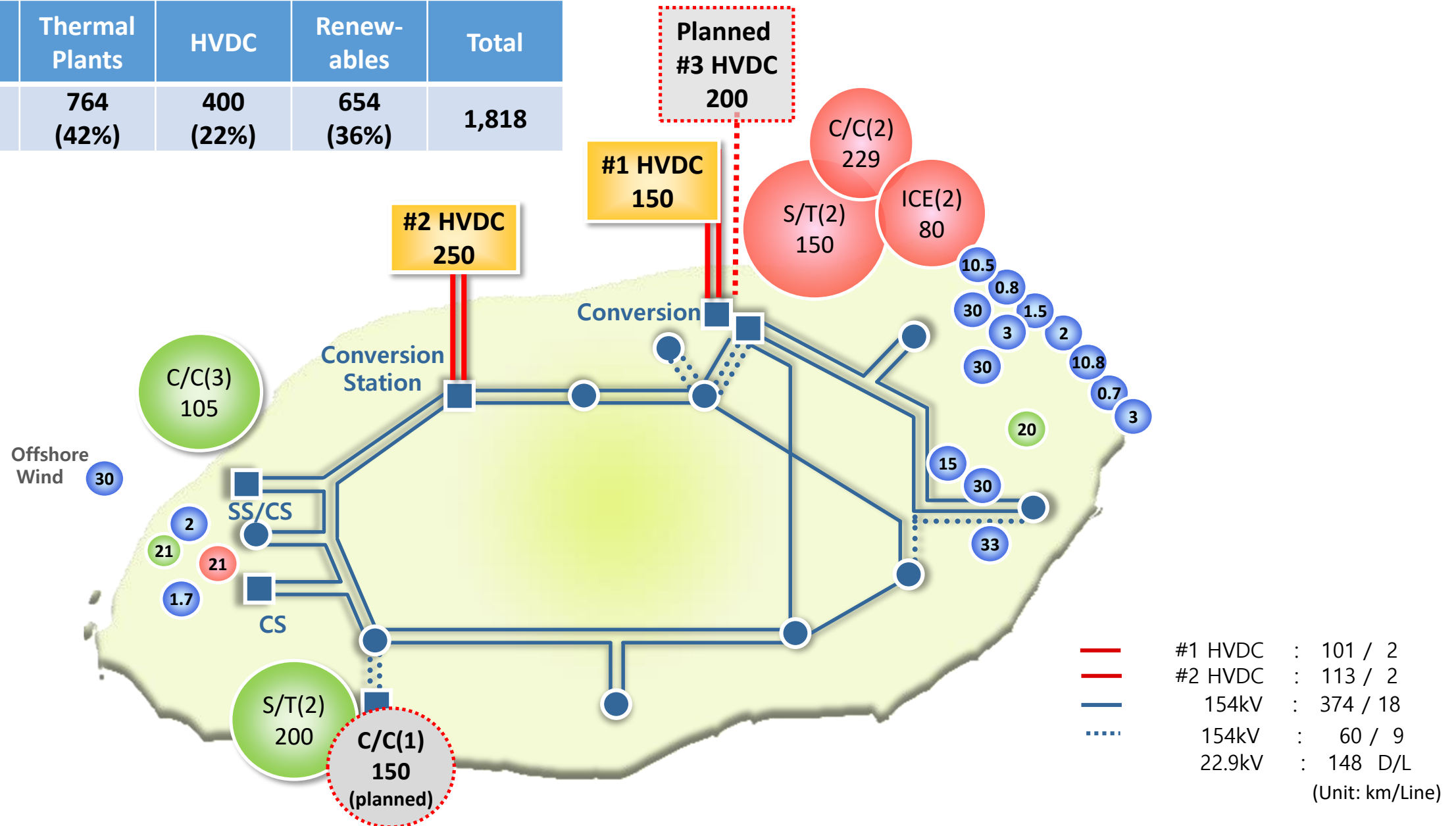
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Electricity Installations

	Thermal Plants	HVDC	Renewables	Total
Capacity (MW)	764 (42%)	400 (22%)	654 (36%)	1,818



▶ Electricity systems in the Island

➤ Generation capacity: 1,818MW

- ✓ Thermal plants 764MW(42%), HVDC from mainland 400MW(22%), renewables 653(36%) (wind 292MW)

➤ Generation(2019): 5,720 GWh

- ✓ Thermal plants 54%, HVDC 31.7%, renewables 14.3% (wind 9.6%)

➤ Load: peak 965 MW, minimum 450 MW, average 653 MW

▶ Problem: curtailments are increasing due to the expansion of intermittent small-sized PV

➤ About 90% of wind turbines are subject to be curtailed, mostly in daytime

- ✓ No. of curtailments: 3(2015), 6(2016), 14(2017), 15(2018), 46(2019), 40(as the end of June 2020)
- ✓ Amount of curtailments(GWh): 0.05%(2016), 0.24%(2017), 0.25%(2018), 1.66%(2019), 4.44%(2020)

➤ In 2020, low electricity demand due to COVID-19 (decrease from last year) aggravated the situation

▶ Issue

➤ How to minimize curtailment?

Measures to minimize curtailment

▶ Operation of must-run generators and inflow from HVDC at minimum possible

➤ Most of ST and CC generators are to be operated at minimum level in case of curtailment

✓ 4 ST: 350 MW → 154 MW, 2 CC: 229MW → 140 MW, the others: stop

➤ Inflow from HVDC is to be operated at minimum: capacity: 400 MW → minimum operation: 100MW

▶ Revision of the market operation rules and the codes for T&D line connection

➤ Control of generation and provision of real time information for renewable electricity more than 100 kW

▶ Other measures

➤ Utilization of ESS: until next year, 90 MW of ESS for power reliability will be installed

➤ Use of DR: for example, merit for the charge of electric vehicle when curtailment

➤ More HVDC: 2-way flow for #2 HVDC, installation of #3 HVDC(all time 2-way flow) in 2023

➤ Introduction of new technologies in the long run: V2G, P2G, VPP, etc

▶ Electricity (wholesale) market reform is under study

➤ Now: day-ahead market → studying the introduction of daily market and real time market