

Supplementary document

TABLE S1 gives the physical meanings and values of the constant meteorological parameters used in Section II.

TABLE S1

The constant meteorological parameters

Symbol	physical meaning	Value
l_e	The latent heat loss due to water evaporation	2263.8kJ/kg
l_f	The heat value released by unit mass of water during the condensation process	334.3kJ/kg
C_a	The specific heat capacity of air	1.006kJ/kg $^{\circ}$ C
C_w	The specific heat capacity of water	4.18kJ/kg $^{\circ}$ C
p_0	The static atmospheric pressure	101.3kPa
ε	The mass ratio of water vapor to dry air molecular	0.622

The topology of IEEE RTS-79 system is shown in Fig. S1. The area influenced by the ice disaster in each scenario has been marked by grey color. LGJQ-240 wires are used as the materials of transmission lines, and the voltage level of lines is 138 kV. TABLE S2 gives the parameters of transmission lines. The load transfer cost is set as \$50 /MWh. The generation cost of units U3, U4, U7, and U8 is modified to \$12 /MWh. The percentage of load participating in demand response for each node is $\pm 5\%$. The reactive power regulation devices are only installed on both ends of the ice-covered lines, and the adjustment range is -5Mvar to 5Mvar . In addition, the system load profile is provided in TABLE S3.

TABLE S2

Parameters of the transmission line

Wire Type	Outside Diameter (mm)	Aluminum/Steel Section (mm 2)	Resistance (Ω /km)
LGJQ-240	21.88	243/31.7	0.130

TABLE S3
System load profile

Period	1	2	3	4	5
Percentage of Peak Load	0.5197	0.4886	0.4654	0.4576	0.4576
Active Load (MW)	1481.0	1392.6	1326.3	1304.2	1304.2
Reactive Load (Mvar)	301.4	283.4	269.9	265.4	265.4

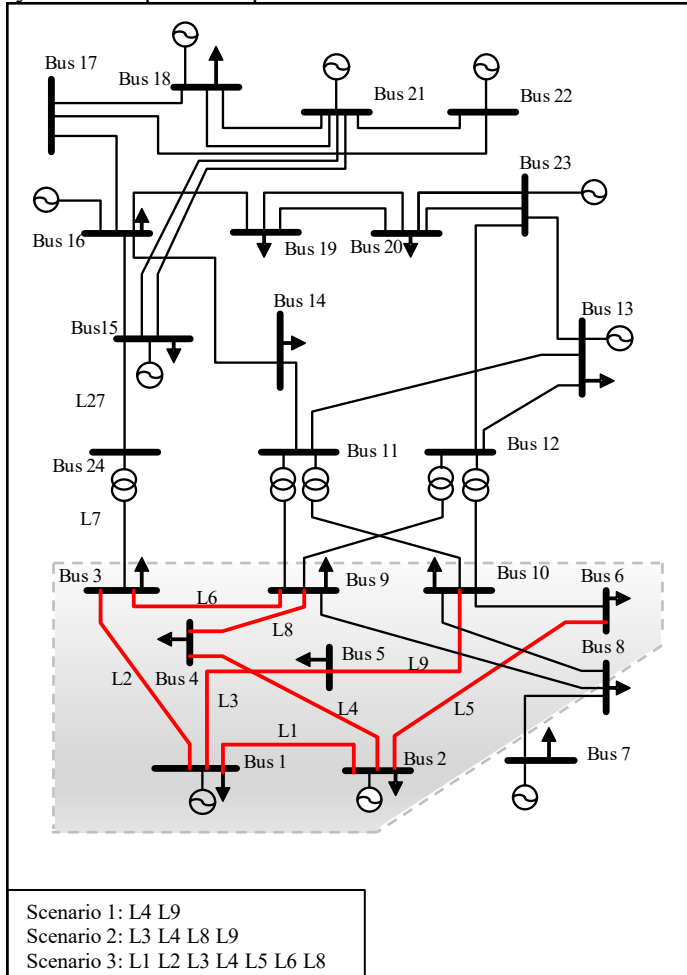


Fig. S1. The topology of IEEE RTS-79 system