

Supplementary Material for “Coordinated Dispatch of Power and Transportation Systems Considering Hydrogen Storage Based on Heterogeneous Decomposition”

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In the supplementary material, we give detailed information on the numerical tests of two systems in the paper “Coordinated Dispatch of Power and Transportation Systems Considering Hydrogen Storage Based on Heterogeneous Decomposition”, including topologies of networks and related parameters.

I. P5T7 SYSTEM

P5T7 system consists of a 7-node electrified transportation network (ETN) with 12 links and a modified IEEE 5-bus electric power system (EPS). Two wireless charging lanes (WCLs) are located in the ETN, labeled by the same color at the coupled buses of the EPS.

Figure S1 (a) shows the topology of the IEEE 5-bus power system. Figure S1 (b) shows the topology of a 7-node transportation network.

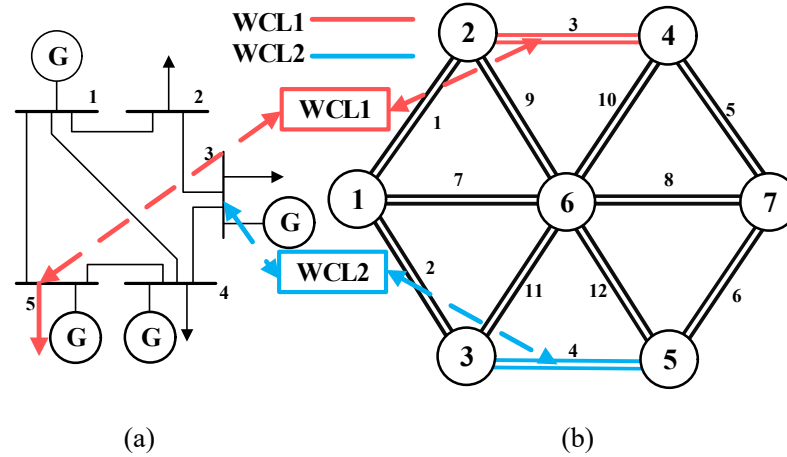
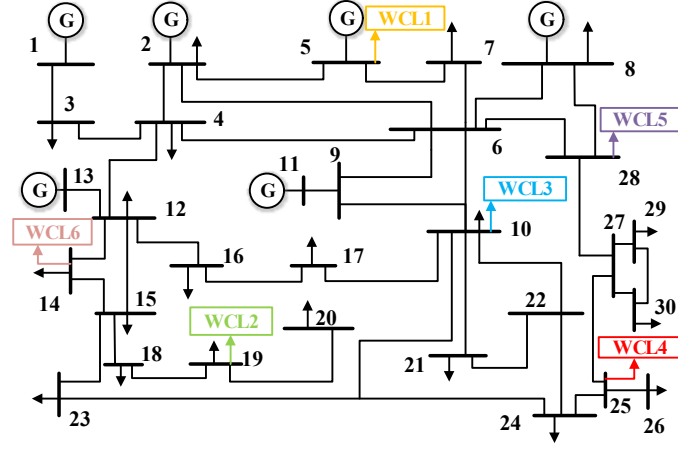


Fig. S1. (a) Topology of a 5-bus electric power system. (b) Topology of a 7-node electrified transportation network.

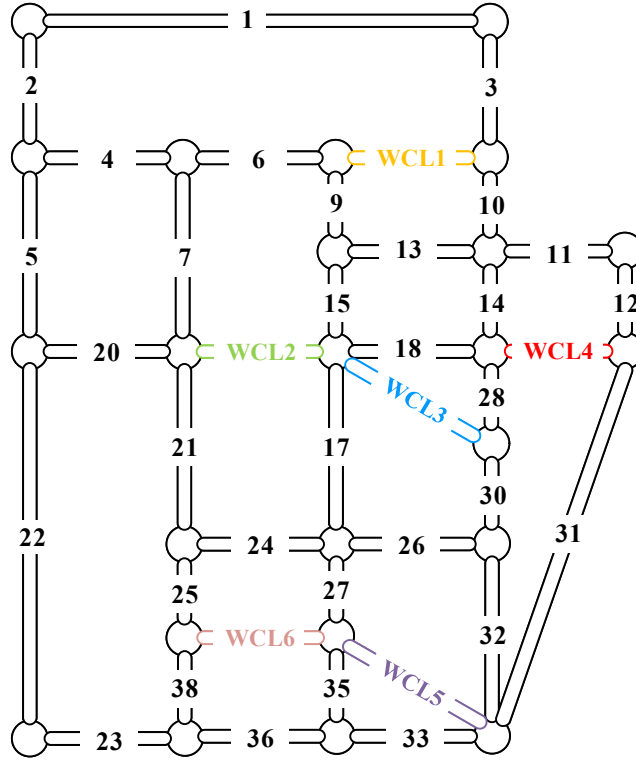
II. P30T24 SYSTEM

P30T24 system consists of the ETN model of Sioux Falls city in the US with 24 nodes and modified IEEE 30-bus EPS. Six wireless charging lanes are located in the electrified transportation network, labeled by the same color at the coupled buses of the electric power system.

Figure S2 (a) shows the topology of the IEEE 30-bus power system with a voltage of 12.66 kV. Figure S2 (b) shows the topology of Sioux Falls with 24 nodes in the US.



(a)



(b)

Fig. S2. (a) Topology of a 30-bus electric power system. (b) Topology of a 24-node electrified transportation network.

III. RELATED DATA

The traffic demand of each O-D pair and the wind power injected in the P30T24 system are shown in Fig. S3. There are two peaks of travel requests, which take place between 7:00 to 9:00 and 17:00 to 19:00, respectively. The wind power and traffic demand in P5T7 are two-fifths those of P30T24. The ratio of EVs to GVs is 5:4 and FCEVs account for 10% of all vehicles.

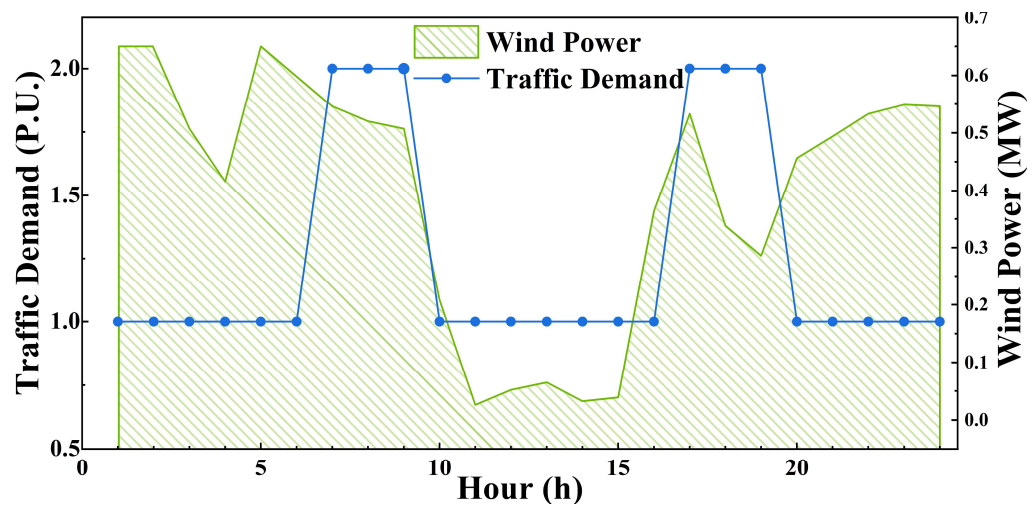


Fig. S3. Traffic demand (blue) and wind power data (green) in the P30T24 system