Base Data for "A Decentralized Energy Management for Networked Microgrids in Future Distribution System"

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***Abstract*—This material presents some base data of modified IEEE 33-bus system in the paper "A Decentralized Energy Management for Networked Microgrids in Future Distribution System".**

A modified IEEE 33-bus system with three MGs is used to verify the proposed method in this paper. The topological data of DS and MGs can be obtained from [1].

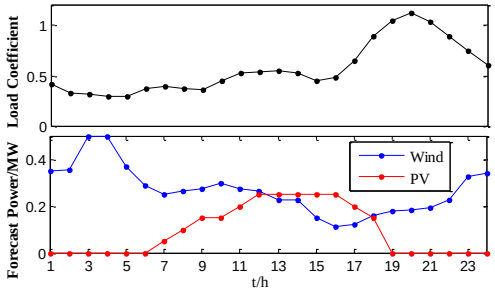

Fig. 1. Load variation coefficient and forecast renewable power in each bus.

The penalty parameter is set to ρ =10. The uncertainty budget Γ_e in each entity is 30. The electricity price and DG location in DS are obtained from [2]. The forecast data of wind power and PV power are assumed to be the same in each bus. The base load data in each bus for DS and three MGs are from [1]. Also the load variation coefficient shown in Fig. 1 is used to extend the base load to multi-time periods. The voltage bound in each bus is [0.94, 1.06] p.u. The CCG and second-order relaxation convergence tolerance are both 0.01. Convergence tolerance of the residues of the ADMM is 0.001. The penalty price of wind power and PV power curtailed is 500$/MWh. Moreover, parameters of ESSs and CLs are shown in Table I and Table II, respectively. Some other parameters for CL, ESS, MTG, WTG, and PVG for those three MGs are shown in Table III, where the numbers outside the parentheses are the nodes or branches, and those inside the parentheses are the types.

TABLE I

PARAMETERS OF ESS

Types	$\overline{E}_j^{\mathrm{ESS}}$ MWh	$\underline{E}_j^{\mathrm{ESS}}$ MWh	$\overline{P}^{\mathrm{ESS}}$ MW	α^{charge}	$\alpha^{\mathrm{discharge}}$
1	1.5	0.15	0.3	0.9	1.11
2	0.5	0.05	0.1	0.9	1.11

TABLE II

PARAMETERS OF CL

Types	$\underline{\beta}_j^{\mathrm{CL}}$	$\overline{\beta}_j^{\mathrm{CL}}$	$\beta_j^{\mathrm{CL,IN}}$	$\beta_j^{\mathrm{CL,DE}}$	$c_j^{\mathrm{CL,IN}}$ / $c_j^{\mathrm{CL,DE}}$ $/MW
1	-0.2	0.2	0.3	0.3	5
2	-0.1	0.1	0.3	0.3	10
3	-0.05	0.05	0.3	0.3	15

TABLE III

DATA FOR SOME NEW ELEMENTS IN THREE MGS

Types	MG1	MG2	MG3
CL	35(1),38(2),41(1),44(1),48(2)	49(1),51(2),54(3)	58(1),60(2)
ESS	34(1),44(1)	49(2)	58(1)
MTG	39	53	56
WTG	37,46	50	60
PVG	40	55	57

REFERENCES

[1] Z. Wang, B. Chen, and J. Kim, "Decentralized energy management system for networked microgrids in grid-connected and islanded modes," IEEE Trans. Smart Grid, vol. 7, no. 2, pp. 1097–1105, Mar. 2016.

[2] H. Gao, J. Liu, "Coordinated Planning Considering Different Types of DG and Load in Active Distribution Network," *Proceedings of the CSEE*, vol. 36, no. 18, pp. 4911–4922, Sep. 2016.