*1) Comparison between MPCOPF and MPDOPF:* In this section, comparative analyses are carried out between MPCOPF and MPDOPF considering 5-hour time steps.

TABLE I: Comparative analyses between MPCOPF and MPDOPF

| Metric | MPCOPF | MPDOPF |
|---|---|---|
| Line loss (kW) | 75.99 | — |
| Substation real power (kW) | 4308.28 | — |
| Substation reactive power (kVAR) | 574.18 | — |
| PV reactive power (kVAR) | 116.92 | — |
| Substation power cost ($) | 576.31 | — |
| Number of Iterations | 1 | — |
| Total Simulation Time (s) | 521.25 | — |

Further, here the

TABLE II: ACOPF feasibility analyses

| Metric | MPDOPF | OpenDSS |
|---|---|---|
| Line loss (kW) | | |
| Substation real power (kW) | | |
| Substation reactive power (kVAR) | | |
| Max. voltage discrepancy (pu) | | |
| Max. line loss discrepancy (pu) | | |
| Max. substation power discrepancy (pu) | | |

Boundary Variable Plots are too tall, make them slightly shorter, like 25% of the page only.

*2) Scalability Analysis:*

*3) Comparison between MPCOPF and MPDOPF:* In this section, comparative analyses are carried out between MPCOPF and MPDOPF considering 10-hour time steps with 20% PV penetration and 30% battery penetration.

Do you want PV Real Power in the table too? (Not controllable, so nothing to compare)

TABLE III: Comparative analyses between MPCOPF and MPDOPF

| Metric | MPCOPF | MPDOPF |
|---|---|---|
| Line loss (kW) | 148.67 | 148.94 |
| Substation real power (kW) | 8544.28 | 8544.04 |
| Substation reactive power (kVAR) | 1092.39 | 1252.03 |
| PV reactive power (kVAR) | 222.59 | 139.81 |
| Substation power cost ($) | 1197.87 | 1197.87 |
| Number of Iterations | 1 | 5 |
| Total Simulation Time (s) | 4620.73 | 358.69 |

Further, here the

TABLE IV: ACOPF feasibility analyses

| Metric | MPDOPF | OpenDSS |
|---|---|---|
| Full horizon | | |
| Line loss (kW) | 148.94 | 148.87 |
| Substation real power (kW) | 8544.04 | 8544.40 |
| Substation reactive power (kVAR) | 1252.03 | 1243.36 |
| Max. all-time discrepancy | | |
| Voltage (pu) | 0.0002 | |
| Line loss (kW) | 0.0132 | |
| Substation power (kW) | 0.4002 | |

Provide a separate graph for PV, Load forecasts for T = 5 and 10

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(a) Real Power: Area 1 to Area 2     (b) Real Power: Area 1 to Area 3     (c) Real Power: Area 2 to Area 4

(d) Voltage: Area 1 to Area 2     (e) Voltage: Area 1 to Area 3     (f) Voltage: Area 2 to Area 4
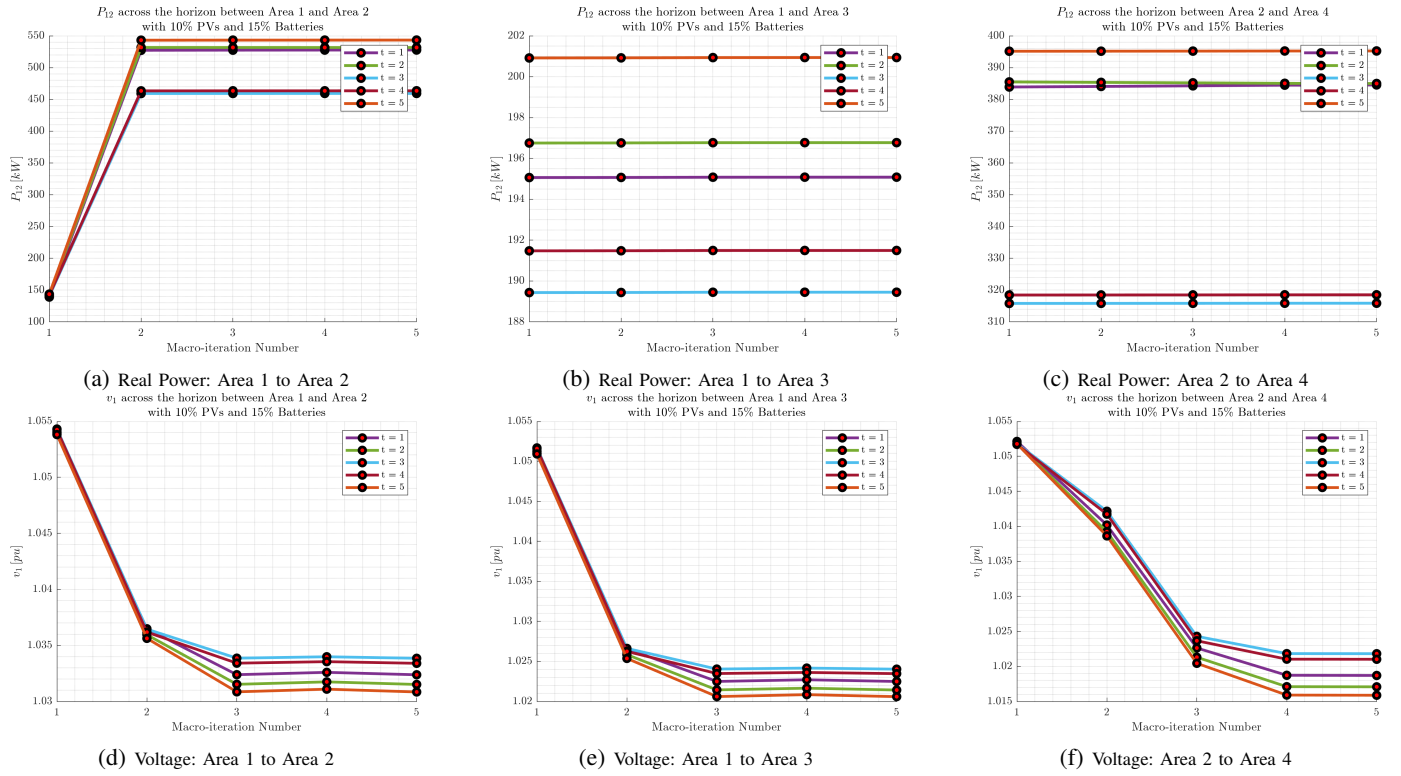
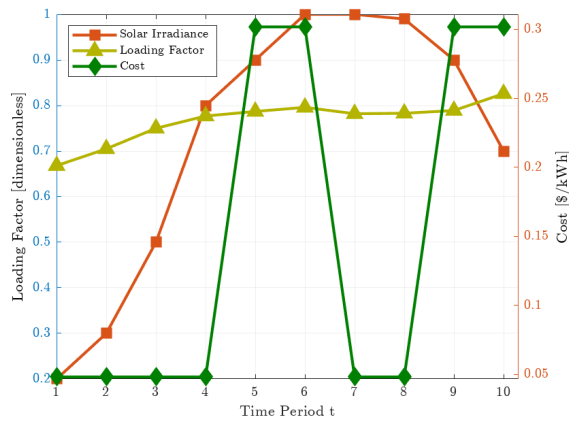Fig. 1: Boundary variables exchanged between pairs of areas during each iteration



Fig. 2: Time-series comparison for forecasts for Demand Power, Irradiance and Cost of Substation Power over a 10 Hour Horizon
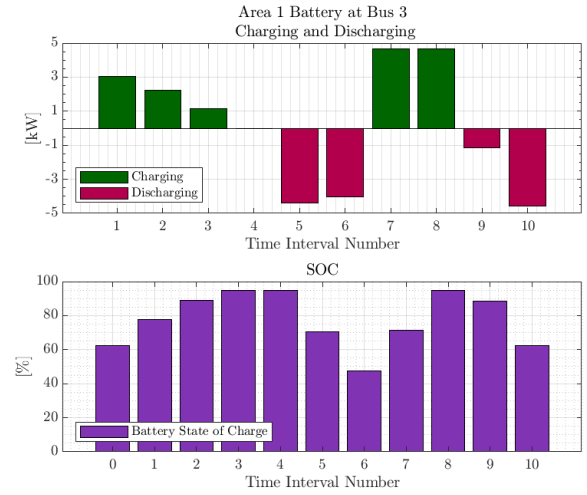


Fig. 3: Charging-Discharging and SOC graphs for Battery at Bus 3 located in Area 1 obtained via MultiPeriodENApp