Supplementary Materials for

Utilizing noncoincident needs to site data centers with solar+storage at existing gas plants

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The PDF file includes:

Supplementary Figures

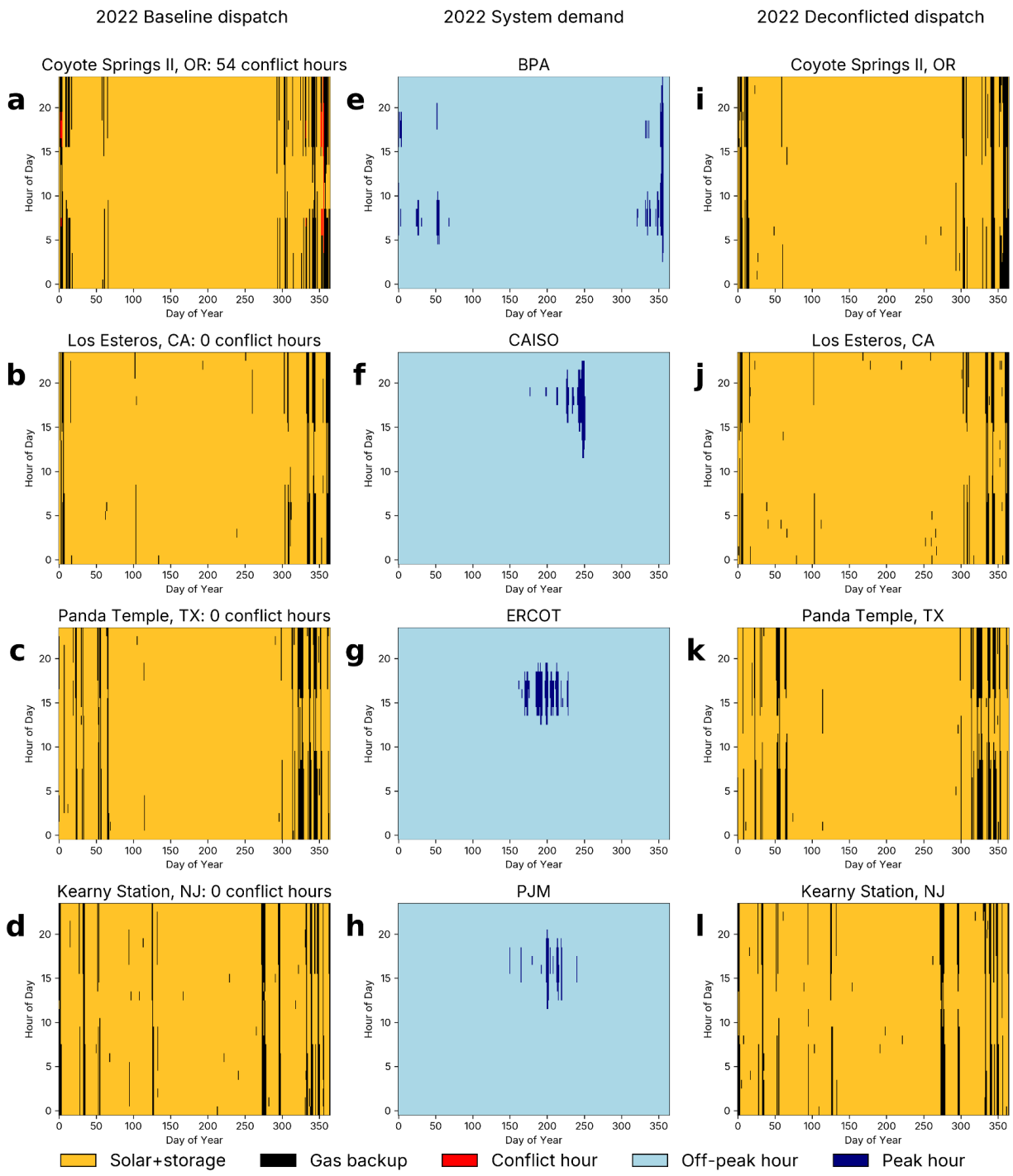

Figure S1. Heatmaps for BPA, CAISO, ERCOT, and PJM for 2022 with the top 1% of peak demand hours restricted for the local load.

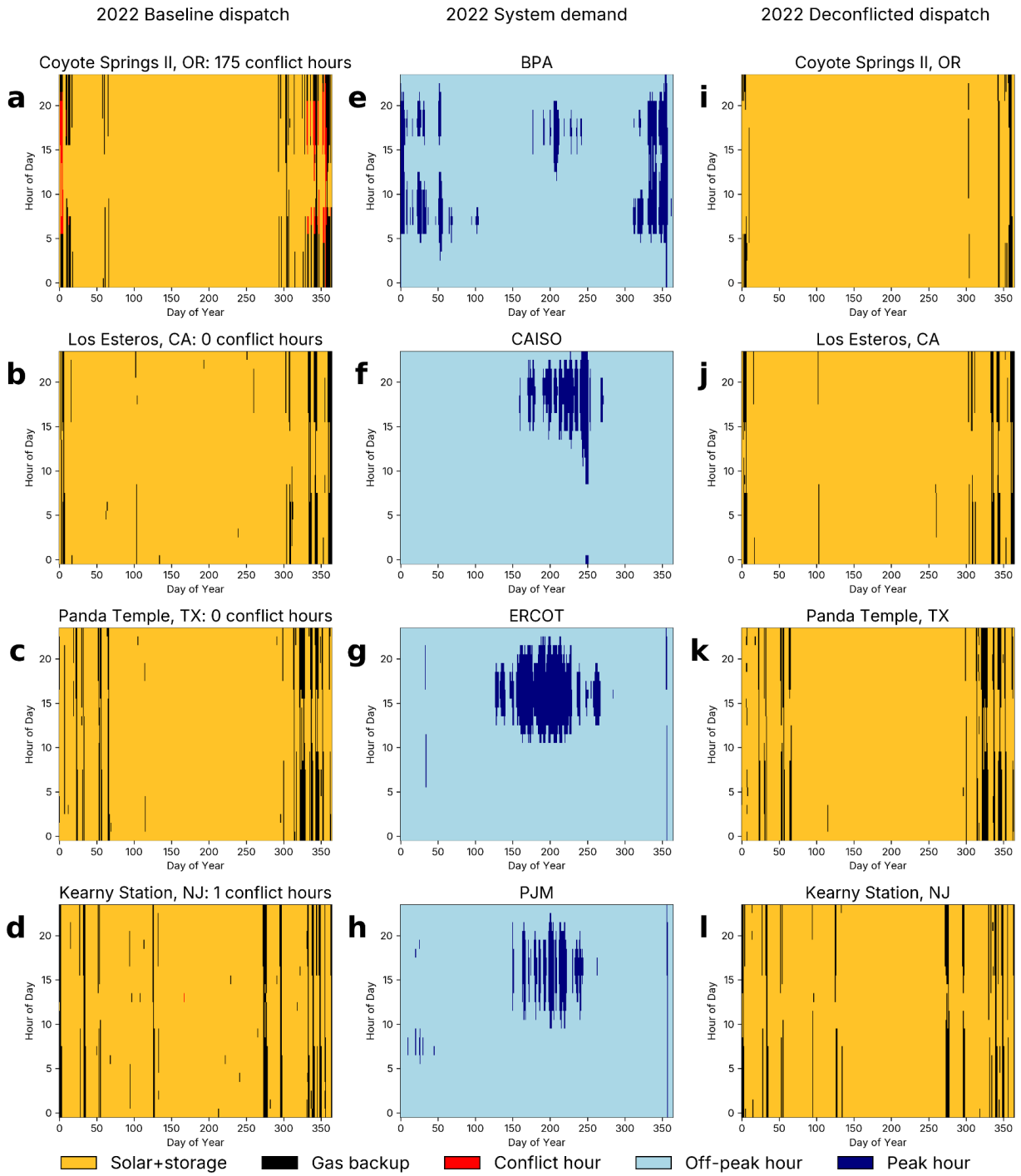

Figure S2. Heatmaps for BPA, CAISO, ERCOT, and PJM for 2022 with the top 5% of peak demand hours restricted for the local load.

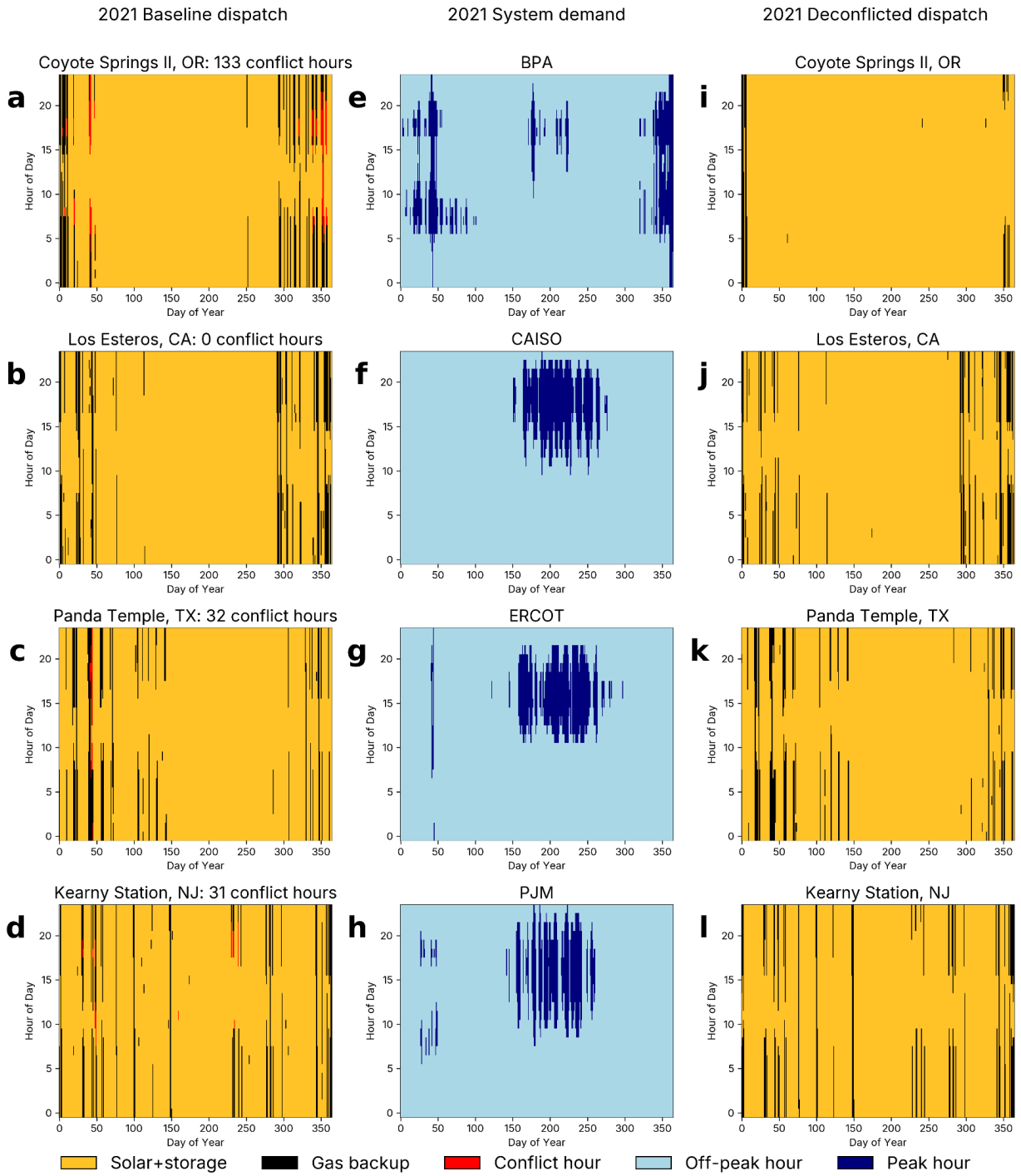

Figure S3. Heatmaps for BPA, CAISO, ERCOT, and PJM for 2021 with the top 10% of peak demand hours restricted for the local load.

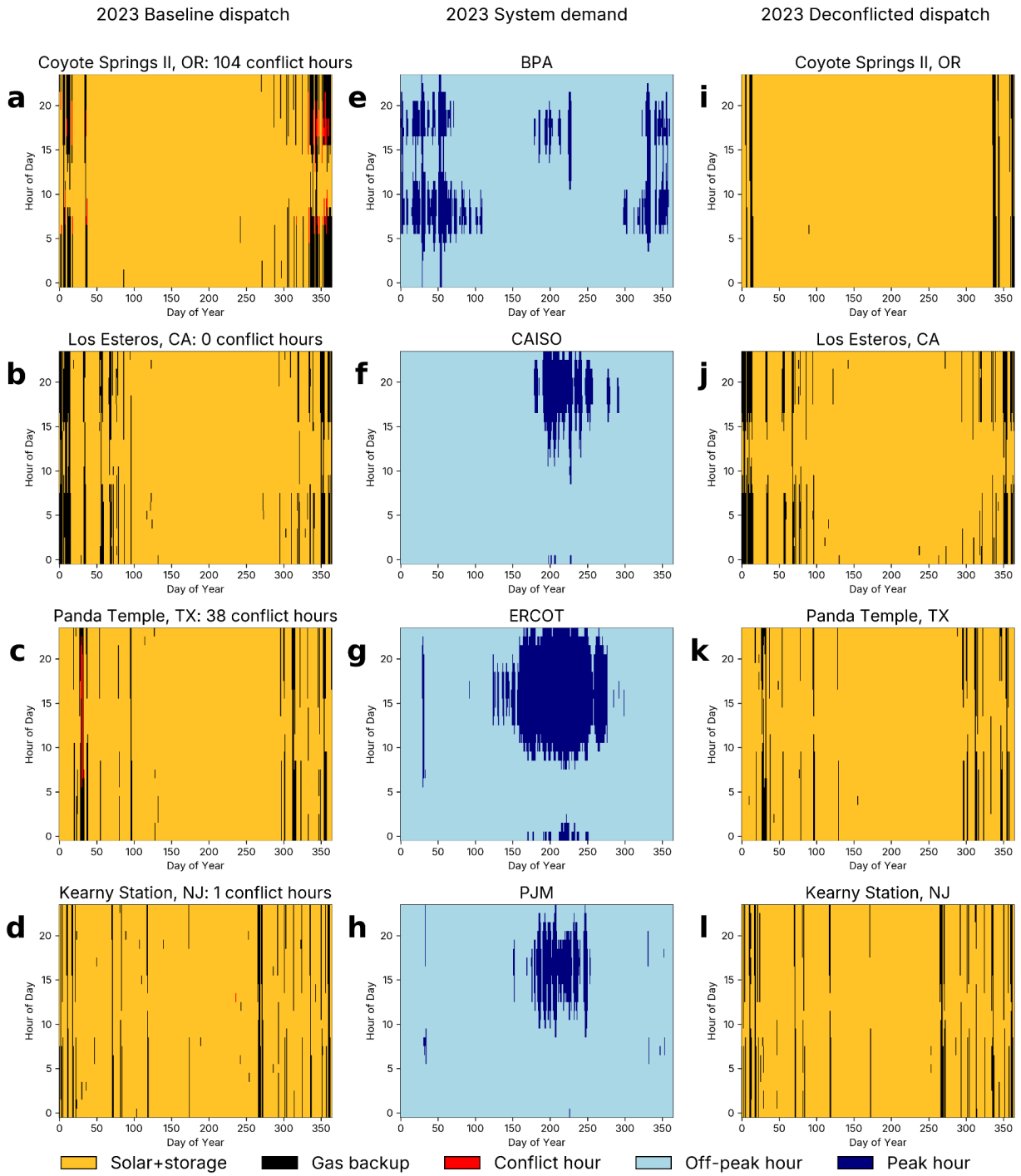

Figure S4. Heatmaps for BPA, CAISO, ERCOT, and PJM for 2023 with the top 10% of peak demand hours restricted for the local load.

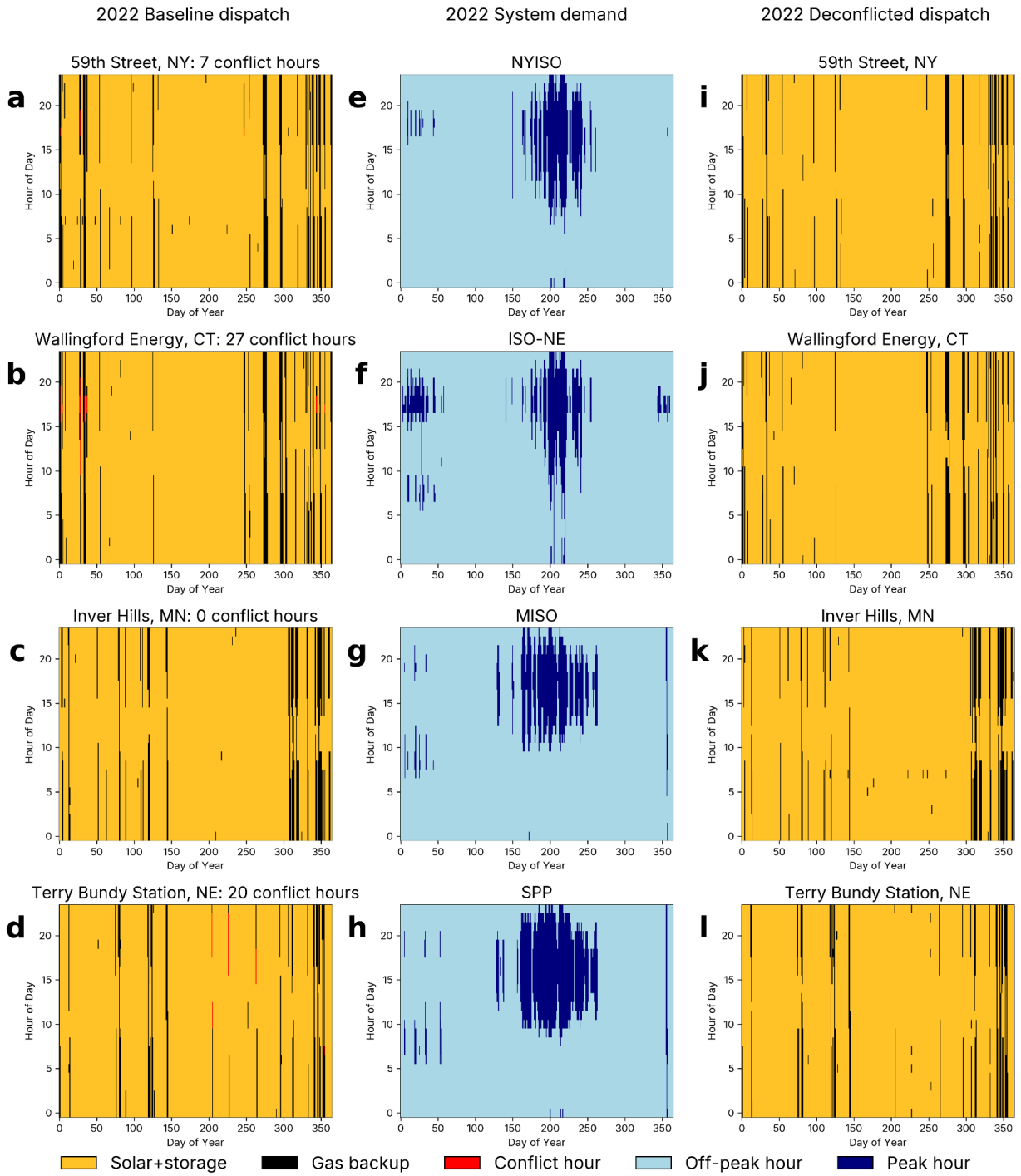

Figure S5. Heatmaps for NYISO, ISO-NE, MISO, and SPP for 2022 with the top 10% of peak demand hours restricted for the local load.

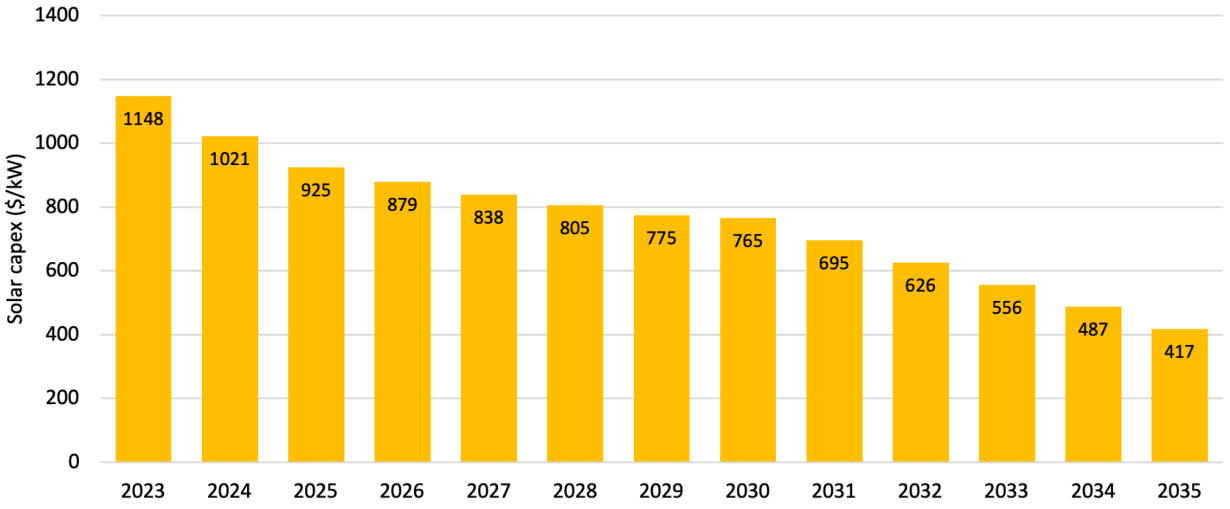

Figure S6. Progression of solar capital costs [1].

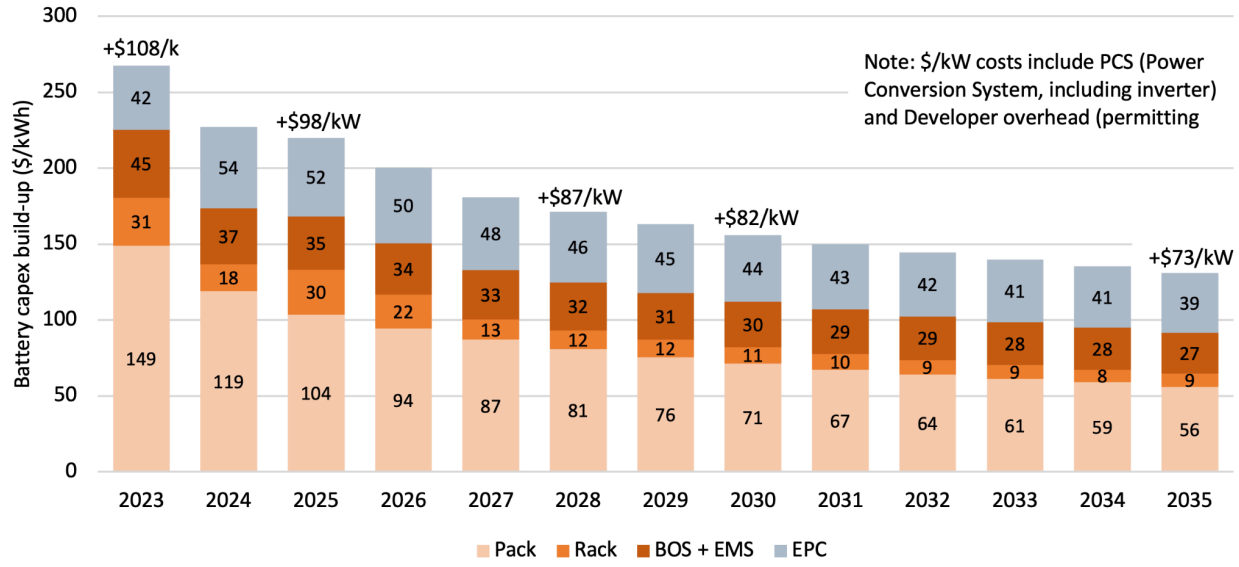

Figure S7. Progression and build-up of battery storage capital costs [1].

Table S1. Gas operational constraints [2-5].

Year	Gas CT	Gas CCGT
Ramp rate	100% of capacity/hr	60% of capacity/hr
Minimum run rate	20% of capacity	40% of capacity
Startup cost	$10/MW	$40/MW
Shutdown cost	$5/MW	$10/MW

Table S2. Demand region to LBNL Balancing Area [6] mapping and solar energy values used for calculation of the curtailment revenue.

Demand Region	LBNL Balancing Area	2023 Solar Energy Value (2025 US$)
NYISO	NYISO	32.26
ISO-NE	ISONE	31.93
CAISO	CAISO	23.11
ERCOT	ERCOT	71.46
PJM	PJM	33.5
MISO	MISO	34.7
BPA	BPAT	45.32
WAPA Rocky Mountain Region	WACM	22.78
Duke Energy Carolinas LLC	DUK	33.3
PacifiCorp East	PACE	32.53
Duke Energy Florida Inc	FPC	23.6
Southern Co Services Inc	SOCO	31.29
Florida Municipal Power Pool	FPL	32.88
El Paso Electric	ERCOT	71.46
Arizona Public Service Co	AZPS	27.92
Southwest Power Pool (Balancing Authority)	SPP	35.42
Nevada Power Co	NEVP	29.1

Table S3. Plant to demand region mapping.

plant_name	state	demand_region
59th Street	NY	NYISO
A L Pierce	CT	ISO-NE
Agnews Power Plant	CA	CAISO
Alameda	CA	CAISO
Arthur Von Rosenberg	TX	ERCOT
Aurora	IL	PJM
Bergen Generating St	NJ	PJM
Big Cajun 1	LA	MISO
Bluegrass Generating	KY	PJM
Carty Generating Sta	OR	BPA
Chesterfield	VA	PJM
Cleveland Cnty Gener	NC	Duke Carolinas
Coyote Springs	OR	BPA
Coyote Springs II	OR	BPA
Decker Creek	TX	ERCOT
Donald Von Raesfeld	CA	CAISO
Doswell Energy Cente	VA	PJM
Fort Pierce Generati	UT	PacifiCorp East
Gianera	CA	CAISO
Gilroy Peaking Energ	CA	CAISO
Gilroy Power Plant	CA	CAISO
Gravel Neck	VA	PJM
Hermiston Generating	OR	BPA
Hermiston Power Part	OR	BPA
Hines Energy Complex	FL	Duke Florida
Hopewell Cogeneratio	VA	PJM
Inver Hills	MN	MISO
Kings Mountain Energ	NC	Duke Carolinas
Ladysmith	VA	PJM
Lamar Power Project	TX	ERCOT
Los Esteros Critical	CA	CAISO
Mariposa Energy Proj	CA	CAISO
Marsh Run Generation	VA	PJM
Metcalf Energy Cente	CA	CAISO
Midlothian Energy Fa	TX	ERCOT
Millcreek Power Gene	UT	PacifiCorp East
Minnesota River	MN	MISO
Morgan Creek	TX	ERCOT
Moxie Freedom Genera	PA	PJM
Mulberry Cogeneratio	FL	FMPP
Murray Turbine	UT	PacifiCorp East
Ocotillo	AZ	Arizona PSC
Orange Cogeneration	FL	FMPP
Panda Temple Power S	TX	ERCOT
Paris (WI)	WI	MISO
Paris Energy Center	TX	ERCOT
Potomac Energy Cente	VA	PJM
Remington	VA	PJM
St Joseph Energy Cen	IN	MISO
T H Wharton	TX	ERCOT
TVA Southaven Combin	MS	MISO
Tenaska Frontier Gen	TX	ERCOT
Tiger Bay	FL	Duke Florida
V H Braunig	TX	ERCOT
Victoria	TX	ERCOT
Victoria City Power	TX	ERCOT
Wallingford Energy	CT	ISO-NE

References

[1] “LCOE Data Viewer”. Bloomberg New Energy Finance (BNEF), 2024.

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[3] “Gas turbine portfolio”. Siemens, 2019. https://assets.new.siemens.com/siemens/assets/api/uuid:ab8578bf-d86f-45d9-a26b-7ac7a274fadd/siemens-gas-turbine-portfolio.pdf

[4] J. Ingham and M. Adhikari. “Aeroderivative gas turbines”. GE, 2019. https://www.gevernova.com/content/dam/gepower-microsites/global/en_US/documents/avr/GEA34130%20AeroderivativeGT_Whitepaper_R5.pdf

[5] A. Bagga et al. “Impact of Detailed Parameter Modeling of Open-Cycle Gas Turbines on Production Cost Simulation”. NREL, 2023. https://docs.nrel.gov/docs/fy24osti/87554.pdf

[6] J. Seel et al. “Utility-Scale Solar, 2024 Edition: Empirical Trends in Deployment, Technology, Cost, Performance, PPA Pricing, and Value in the United States”. Lawrence Berkeley National Laboratory (LBNL), 2024. https://emp.lbl.gov/publications/utility-scale-solar-2024-edition