

EVALUATING C&I DR EVALUATION

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SUMMARY OF STUDY



Batteries



Thermal
storage



Manual
curtailment



Controls/
BMS

DISPATCH STRATEGIES

1

Daily

2

Event (triggered by utility)

3

Custom (to forecast ICAP hour and/or mitigate facility peak demand)

SUMMARY OF SCOPE

Metric	Vendor 1	Vendor 2	Vendor 3	Vendor 4	Vendor 5	Vendor 6
Technology	Manual curtailment	BMS controls	Thermal storage	Thermal storage	Battery	Battery
Targeted customer type	Large	Large	Cold storage	W/packageged HVAC units	Large	Medium and large
Target count for year 1	17	18	2	9	3	1
Achieved count for year 1	18	0	1	1	1	1

RESEARCH OBJECTIVES

- ✓ Successful customers
- ✓ Value streams
- ✓ Degree of automation
- ✓ Barriers

IMPACT

Magnitude of reductions

Net-energy impacts

Complementarity with other strategies

M&V strategy

Cost-effectiveness

PROCESS

Customer recruitment

Motivations

Satisfaction

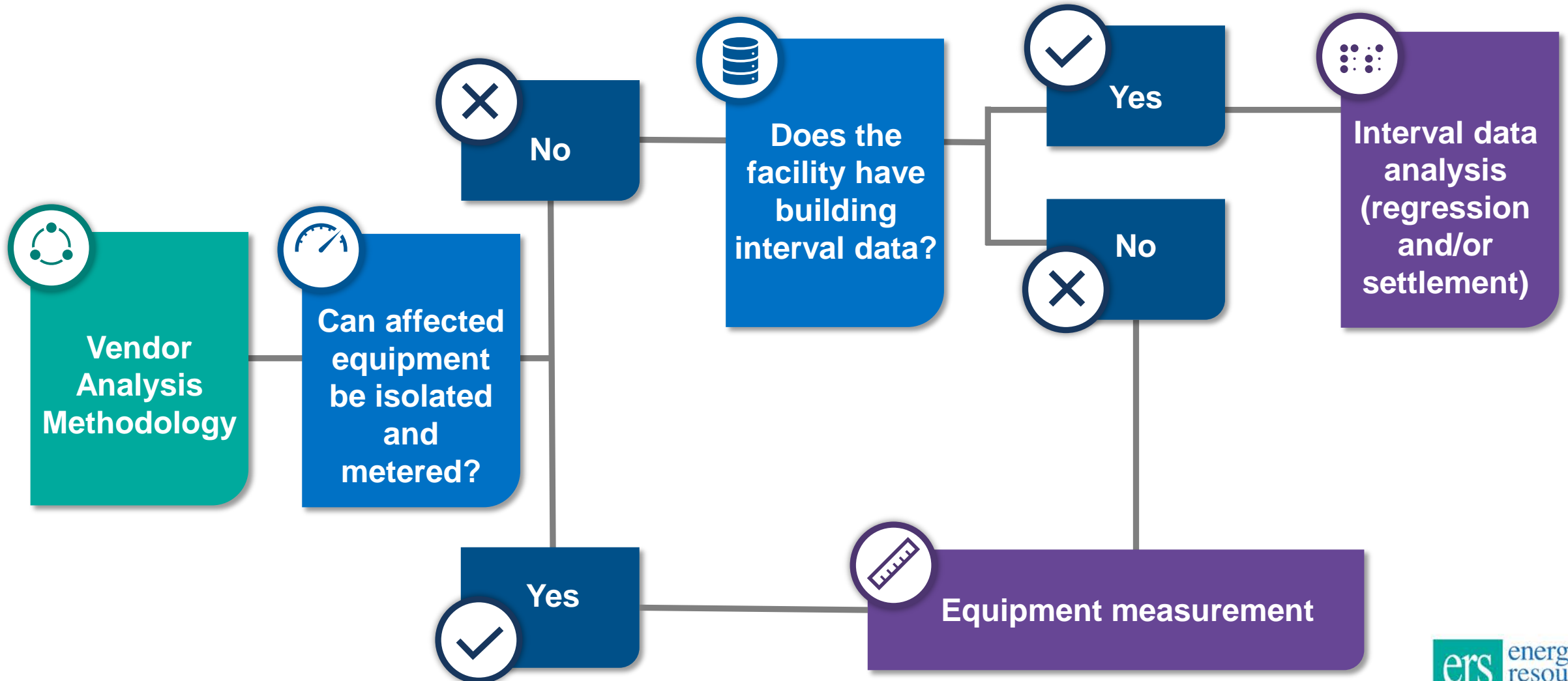
Non-energy benefits

PA satisfaction

DISPATCH STRATEGIES

		Vendor					
Season	Strategy	Manual Curtailment	BMS/Controls	Thermal Storage 1	Thermal Storage 2	Battery 1	Battery 2
Summer	Daily			X	X	X	
	Utility-triggered event	X					X
	Vendor-forecasted ICAP	X	X				X
	Facility peak		X				X
Winter	Utility-triggered event	X				X	X
	Facility peak						X

SELECTION OF IMPACT EVALUATION METHOD



SUMMARY OF EVALUATION METHODS

Vendor	Technology	Evaluation Method
Manual Curtailment	Curtailment	Utility interval data analysis
BMS/Controls	Software	Utility interval data analysis
Thermal Storage 1	Refrig. thermal storage	Refrig. equipment measurement
Thermal Storage 2	HVAC thermal storage	HVAC equipment measurement
Battery 1	Battery	Battery measurement
Battery 2	Battery	Battery measurement

PROCESS METHOD (ALL)

Utility staff and vendor interviews, participant surveys

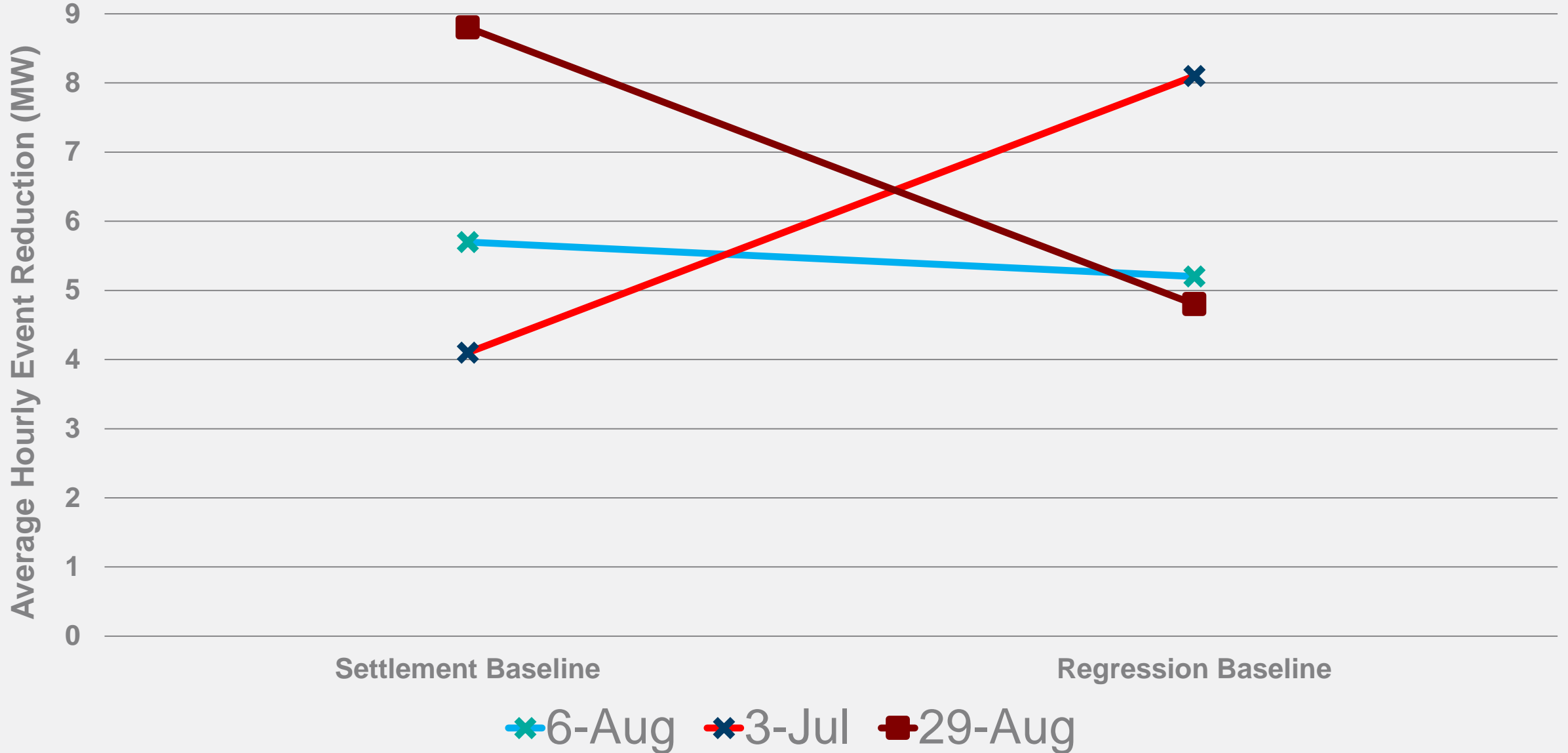
Settlement baseline

- ISO NE methodology, used to verify compliance with program requirements
- 10 non-event, non-holiday weekdays leading up to event day
- Adjusted for same-day load prior to the event

Regression baseline

- Uses data from the entire season
- Regression with weather and other applicable variables to calculate baseline event-day load

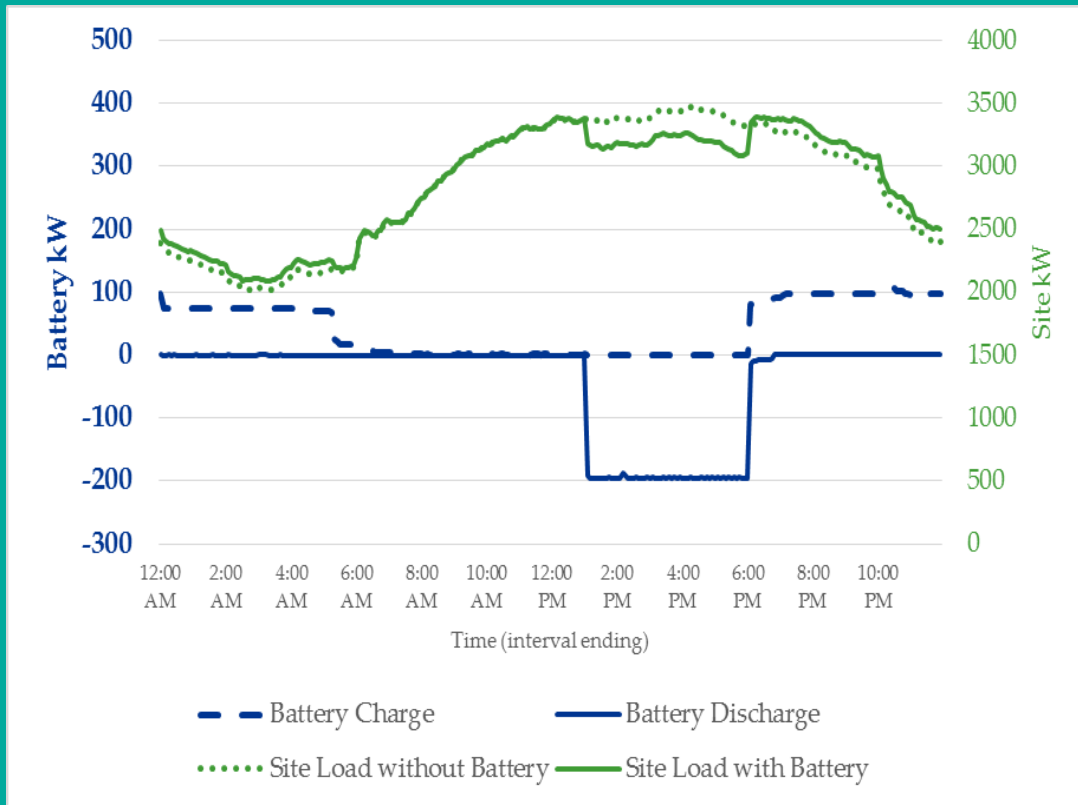
SETTLEMENT AND REGRESSION BASELINES FOR MANUAL CURTAILMENT



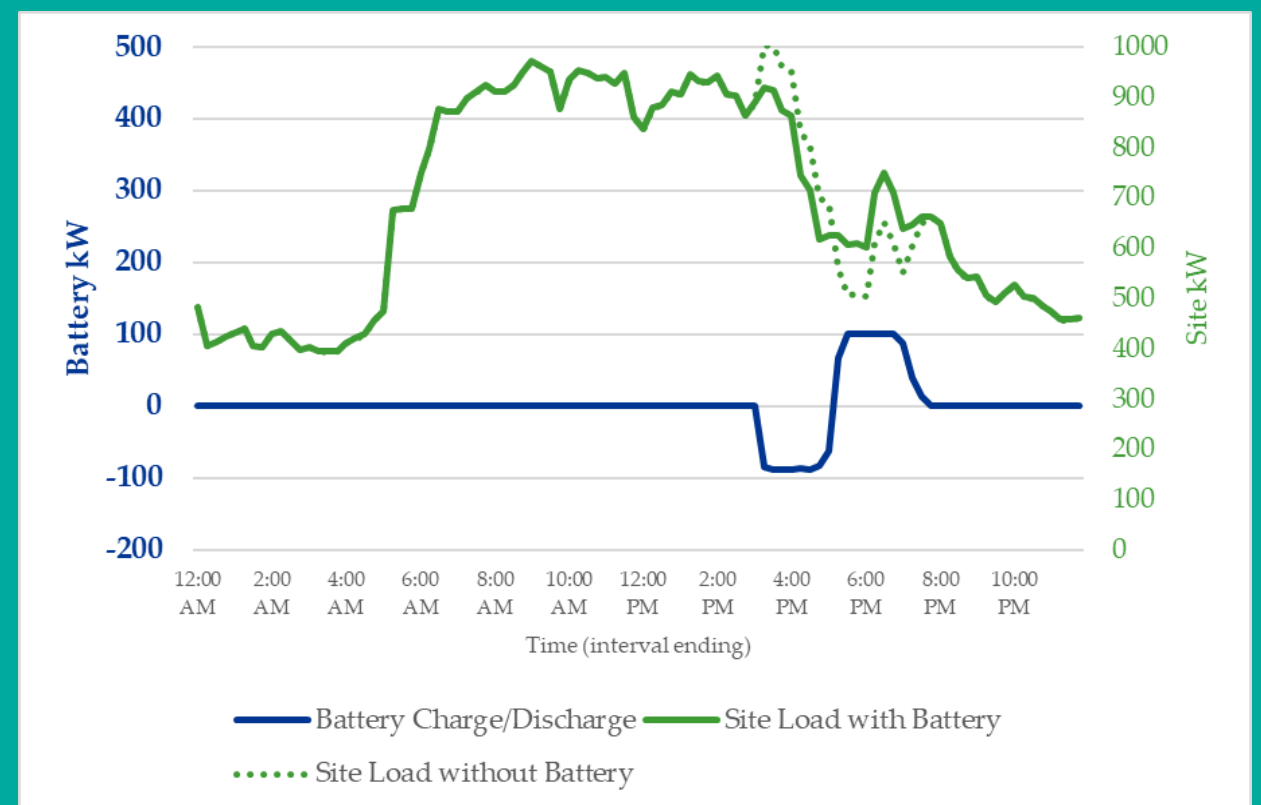
BATTERY PERFORMANCE

DAILY AND TARGETED

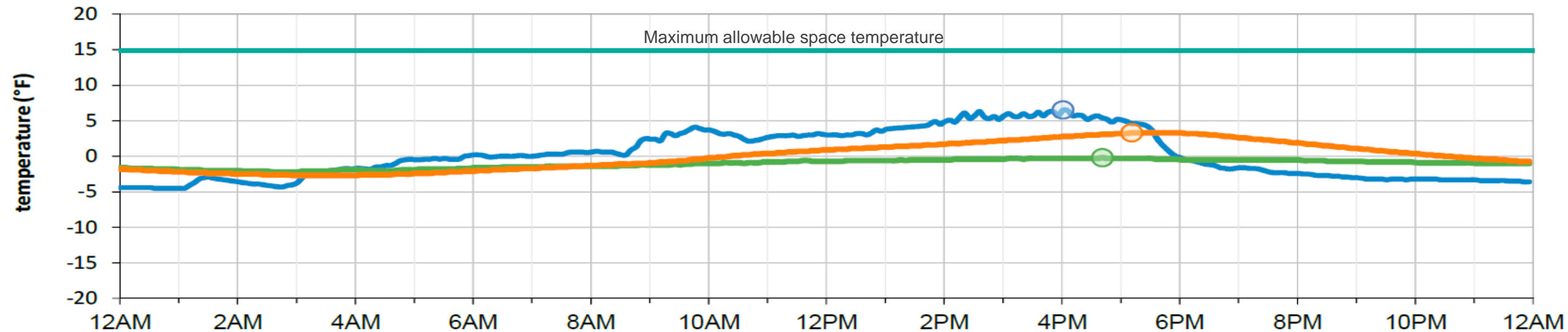
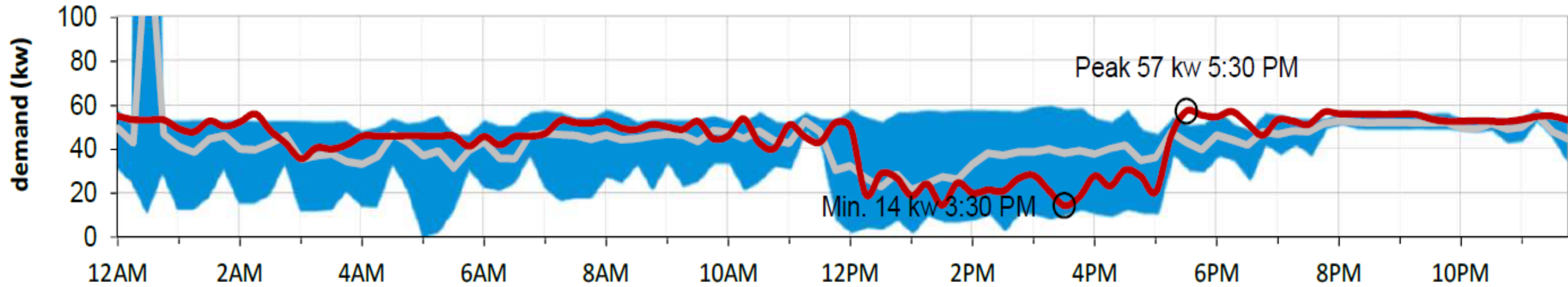
DAILY




TARGETED




REFRIGERATION THERMAL STORAGE PERFORMANCE




FINDINGS



The batteries and manual curtailment solutions reduced load as reported.



The thermal storage solutions' performance was as reported for one vendor and will need to be re-evaluated for the second vendor.



Settlement and regression baselines are both required to sufficiently characterize the impact of manual curtailment offerings.



FINDINGS (CONTINUED)



Recruiting approaches ranged from almost entirely vendor-driven to almost entirely utility account executive (AE)-driven.



Customer education is a critical step in the recruitment process.



Participating customers were highly satisfied.

EVALUATION-ORIENTED RECOMMENDATIONS



Employ two baselines to sufficiently evaluate manual curtailment offerings



Direct-equipment measurement is appropriate for energy storage evaluations



Standardize reporting requirements for all participating vendors.



Involve the M&V contractors during the DR tests to minimize customer burn-out.



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ERS is an energy engineering firm providing services in energy efficiency customer engagement, implementation, evaluation, pre- and post-installation M&V, and distributed and renewable generation assessment.

