
PLMA
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Identifying DER Opportunities for
Non-Wires Solutions
Wednesday, November 11th 10-10:45

Today's panel:



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Identifying DER Opportunities for Non-Wires Solutions

During the next :45 minutes we'll share:

- PSE's perspective and challenges as we approach NWS
- The modeling framework we've developed
- How we're identifying priority NWS locations
- Examples of how we're putting the framework into practice
- Lessons learned to date and the challenges we see ahead

From DER programs to Energy Orchestration

- PSE is transitioning from managing individual DER programs to managing **orchestrated DER portfolios** as grid resources.
- DERs should no longer be evaluated as standalone technologies.
- Our focus is shifting to how portfolios of batteries, EVs, thermostats, solar, and other resources work together to meet system needs.
- Value must be created for both customers and the grid, to unlock this we need to understand more about DERs and our system and our customers
- DERs are becoming an integrated planning resource, not just individual customer programs.
- Our challenge is identifying where DERs create enough value to matter

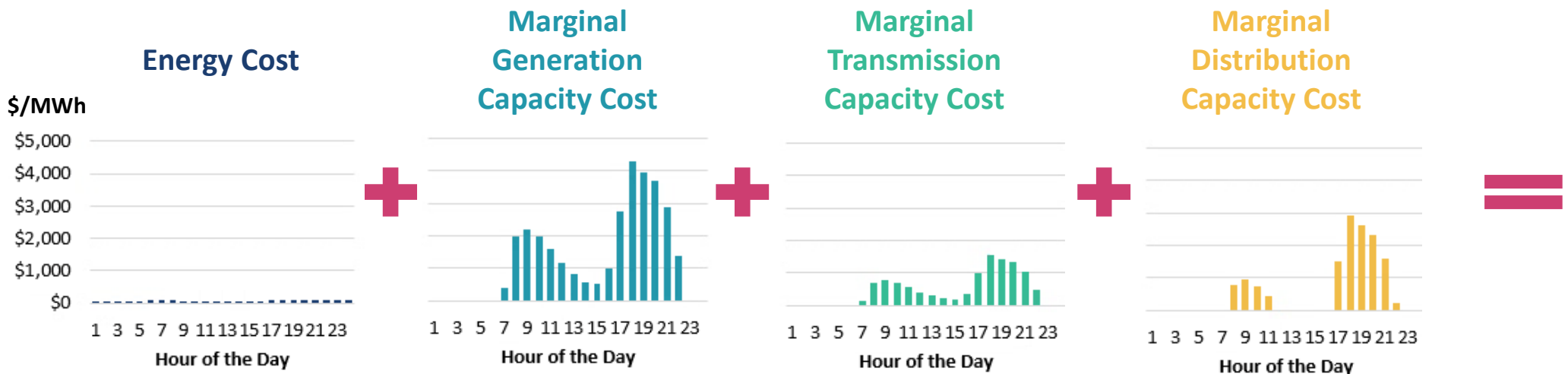
Building the analytical framework

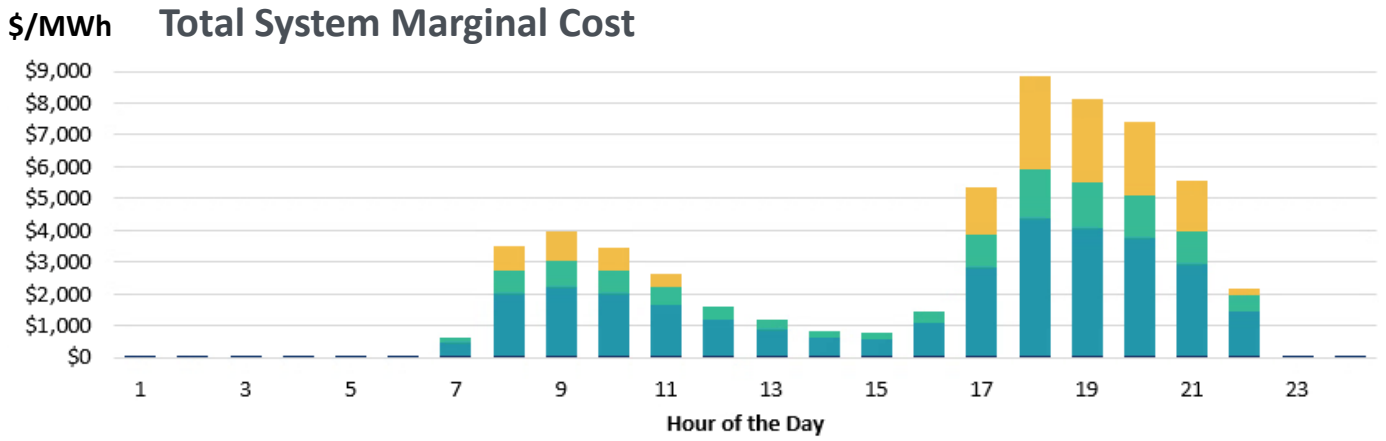
Akhilesh Ramakrishnan

DER Valuation and Optimization Framework to Support Planning and Program Design

	QUESTION	TOOL SET	DECISIONS SUPPORTED
1	How can we screen for the distribution system value of DERs?	Locational Value Tool	• **Locations to target** for deeper study of DER solutions and procurement • **Locational incentive levels** for geographically targeted programs/rates
2	What are DERs worth to the whole system?	DER Valuation Tool	• **Prioritization and BCAs** informed by full tech-specific value • **Incentive levels and program design** informed by hourly system value
3	Which DER programs are beneficial for ratepayers?	Benefit-Cost Analysis Module	**Identification of cost-effectiveness programs** based on accounting of costs and benefits
4	How do we design a DER portfolio to meet a specific grid needs?	DER Solution Planning Tool	**Deployment timeline and composition of a DER portfolio** that can solve a grid constraint

DER Valuation Tool calibrates to PSE's marginal system costs

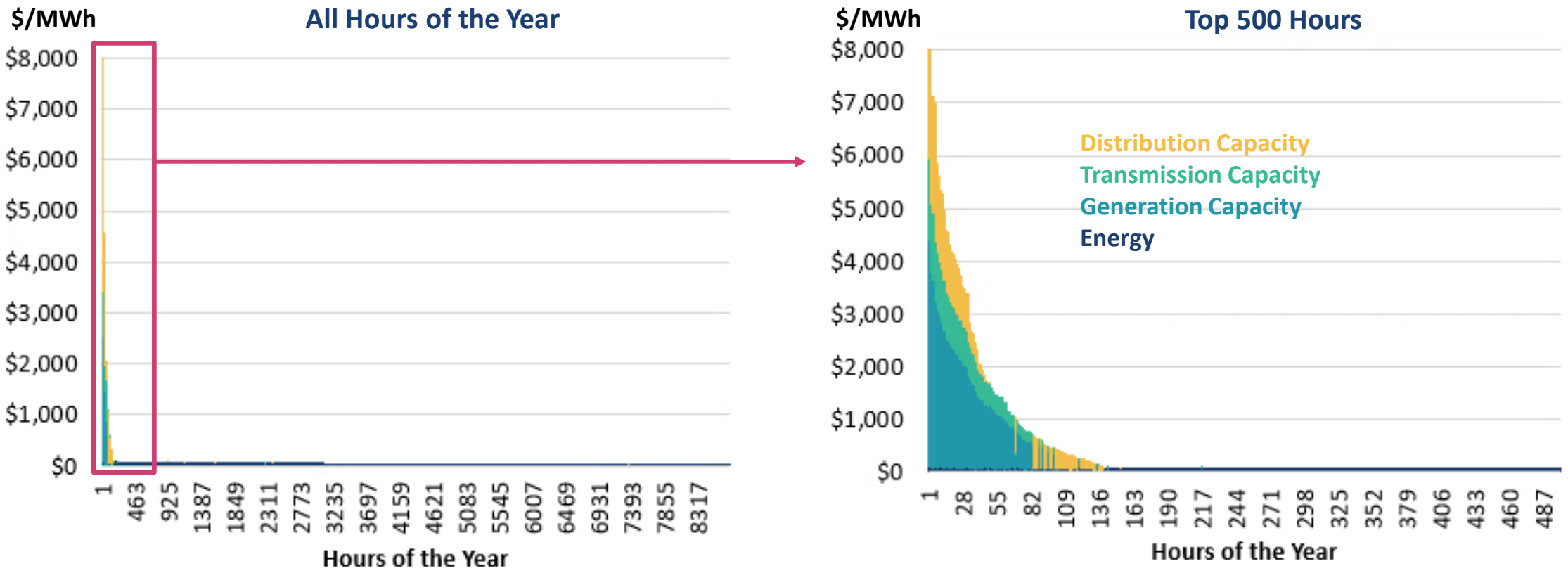




The value of a DER depends on the extent to which it can operate at the most valuable times, given its availability and dispatch characteristics.

Valuation tool identifies when and how often DERs would need to operate to provide system value

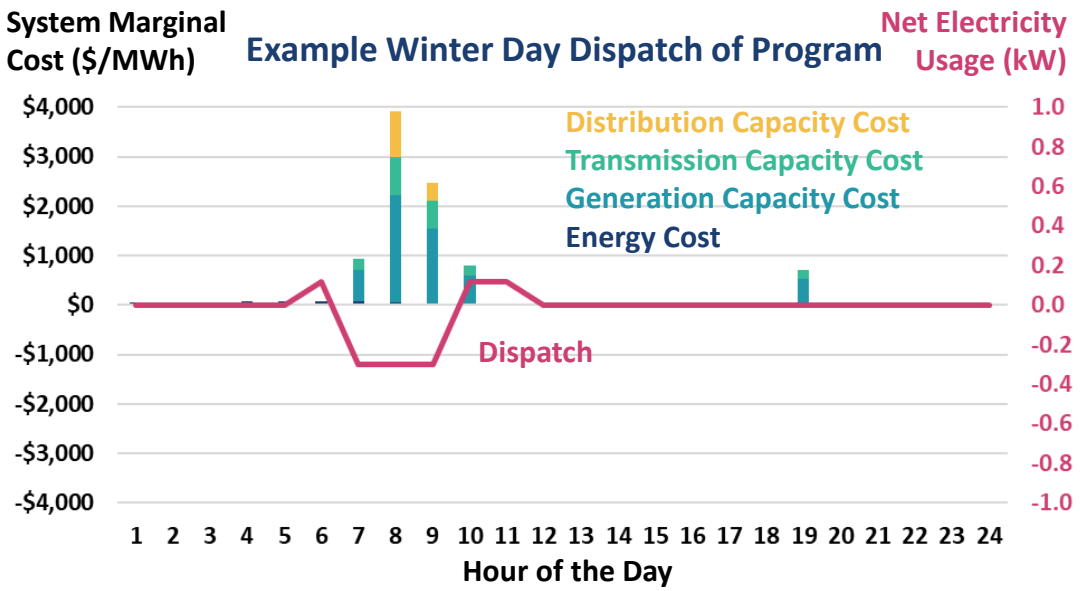
Price Duration Curve for Total System Costs in 2026



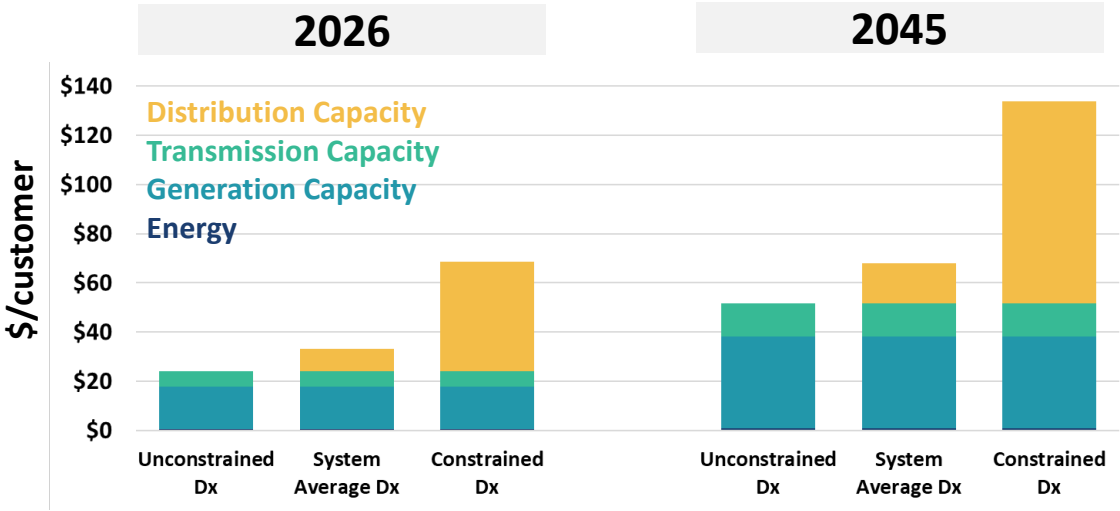
Example DER Value Results: Smart Thermostat - Heating

Smart Thermostat Heating: Event-based program where the utility controls the participant's electric heating during the event

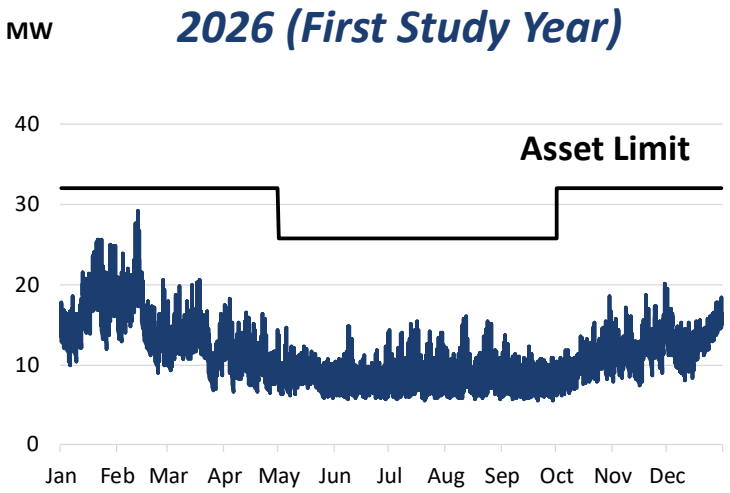
- 15 events per year
- 0.3 kW/customer impact per event
- Maximum of 1 event per day
- Rebound load equal to 50% of load shifted out during event (occurs during 1 hour prior to event and 2 hours after event)

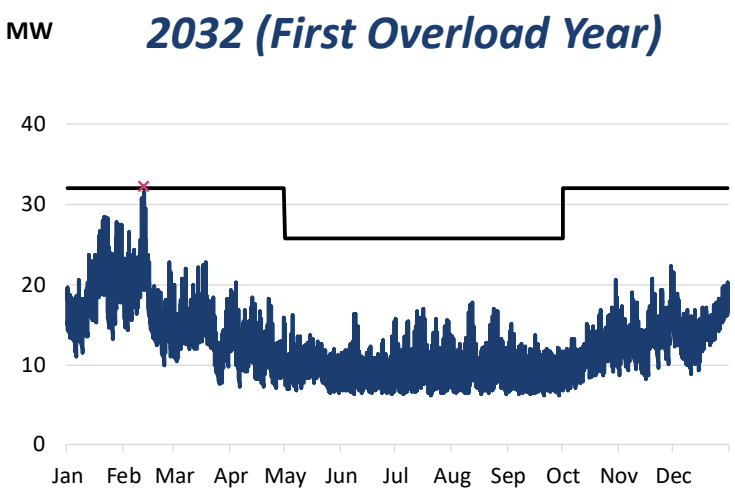


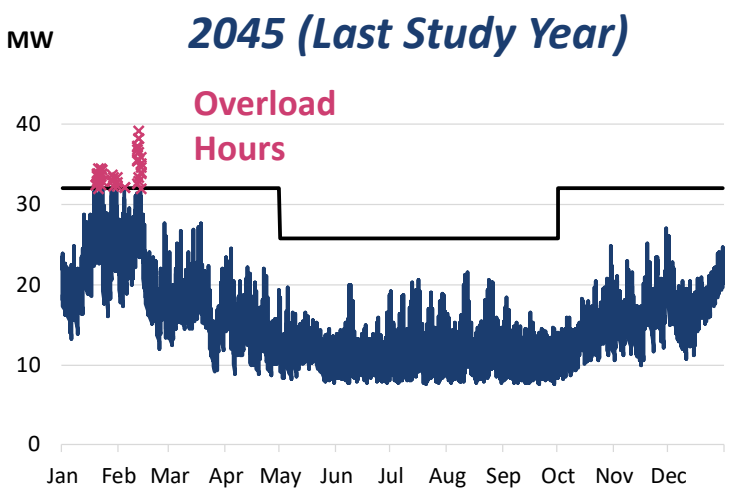
Annual Value of Smart Thermostat Heating Program



DER solution planning tool can be used when a specific constraint is forecasted – Substation A example







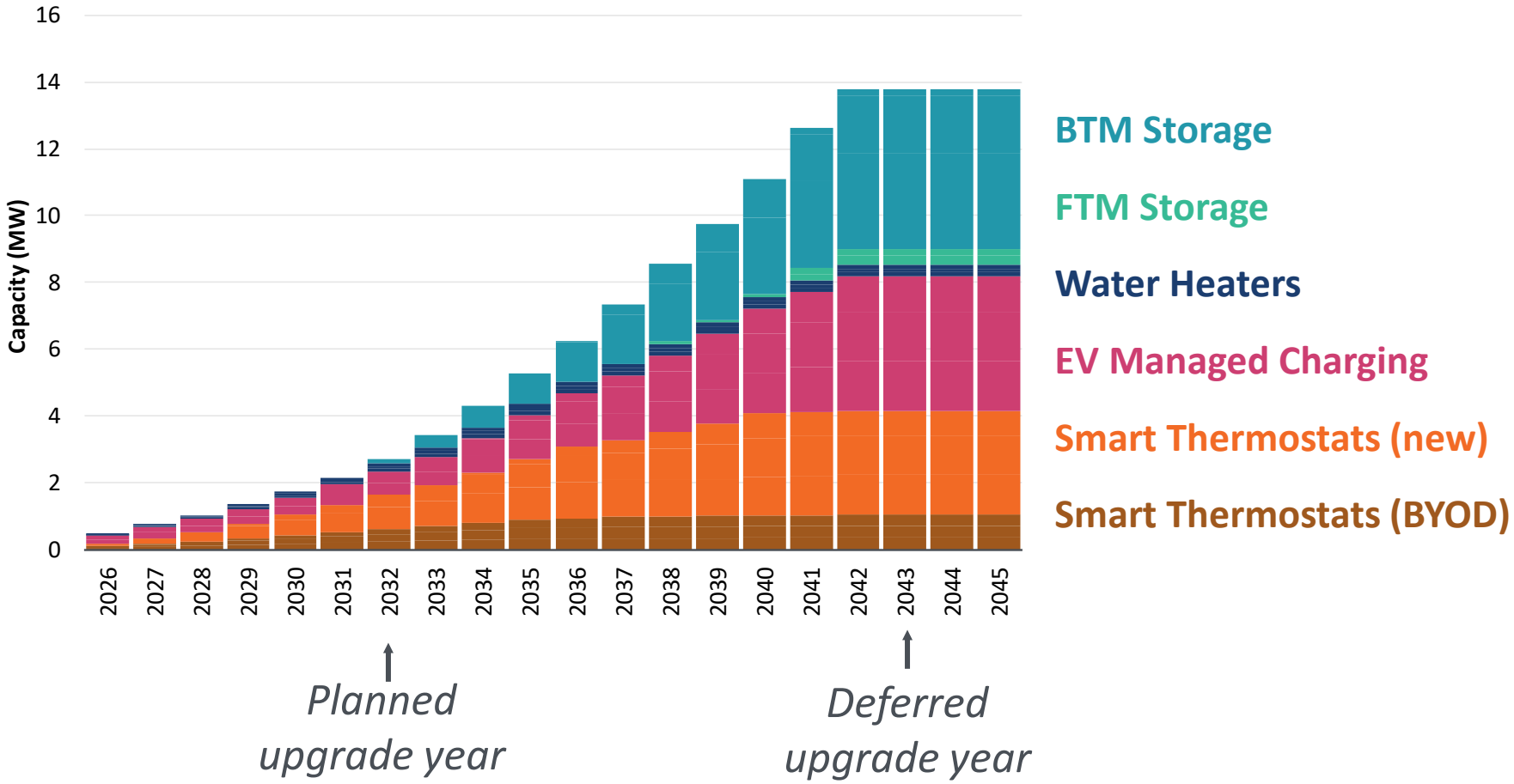
Load Relief Needed	2031 (First Year of Overload)	2045 (End of Study Period)
Max. Magnitude (kW)	0.3 MW	4.2 MW
Max. Duration (hours)	1	7
Frequency (events/yr)	1	12
Season	Winter	Winter
Time of Day	Morning	Morning

- Can a DER solution defer this constraint and for how long?
- When does the traditional upgrade become more cost-effective than the DER solution?

Example result: optimized DER portfolio can cost-effectively defer a substation upgrade by 11 years

Substation A

Composition of a DER portfolio that can cost-effectively defer the upgrade by 11 years



Tools are only helpful when integrated into a decision-support process

	QUESTION	TOOL SET	DECISIONS SUPPORTED
1	How can we screen for the distribution system value of DERs?	Locational Value Tool	• Target locations for deeper study of DER solutions and procurement • Set locational incentive levels for geographically targeted programs/rates
2	What are DERs worth to the whole system?	DER Valuation Tool	• Set incentive levels and design programs based on technology-specific hourly system value
3	Which DER programs are beneficial for ratepayers?	Benefit-Cost Analysis Module	• Identify and prioritize cost-effective programs • Inform the regulatory process
4	How do we design a DER portfolio to meet a specific grid needs?	DER Optimization Tool	• When and where DERs are a feasible, cost-effective solution • Which DERs to procure to meet the grid need • When to build the traditional upgrade

Finding the right locations

Yaochiem Chao

Starting challenges

- NWA Workstream launched with a wide range of unresolved questions
  - Where are our capacity vs reliability problems?
  - Is our data good enough?
  - How do NWAs integrate with our planning process today?
  - Who drives decisions and executes solutions?
- Result: High ambiguity, difficult to find a starting point
- Goal: Create clarity, structure, and forward momentum

Strategic Pivot – Anchor to Something

- Selected a specific NWS to model:
  - Distributed, front-of-the-meter, residentially-sited batteries
- Researched available market to understand:
  - Equipment sizing
  - Operability assumptions
  - High-level cost estimates
- Final scoping decision:
  - **Capacity needs only**
    - Trusted and cleaned loading data



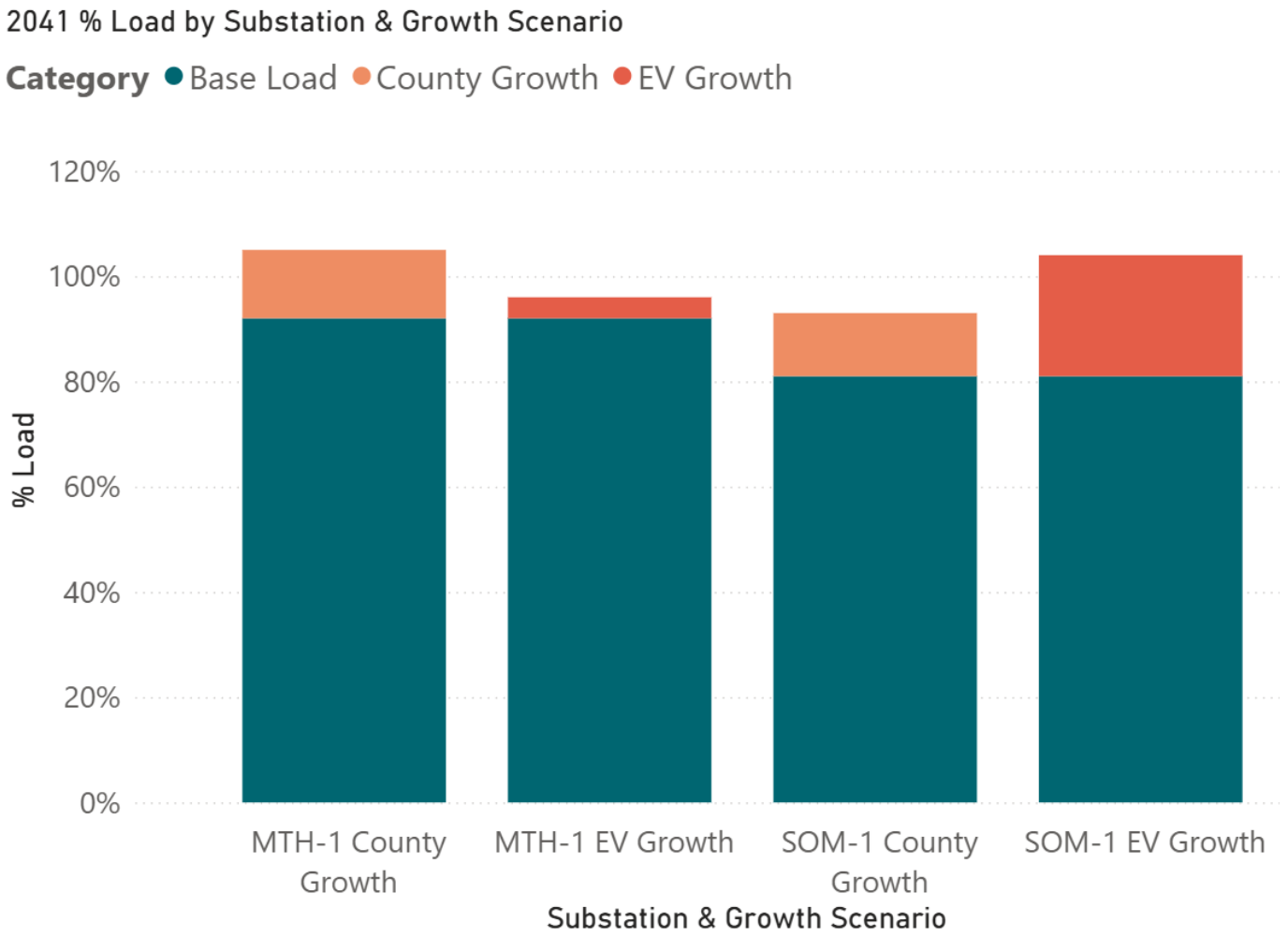
Establish the Planning Foundations

- Choose an asset to solution: Substation
- Create threshold criteria:
  - Nail down baseline for substation loading: nameplate
  - >75% utilization factor today
  - <110% utilization factor in 15 years
- Identify top 20 eligible substations
  - Through the process, the UTC release their 2026 EV Policy Statement

EV-Centric Forecast Methodology

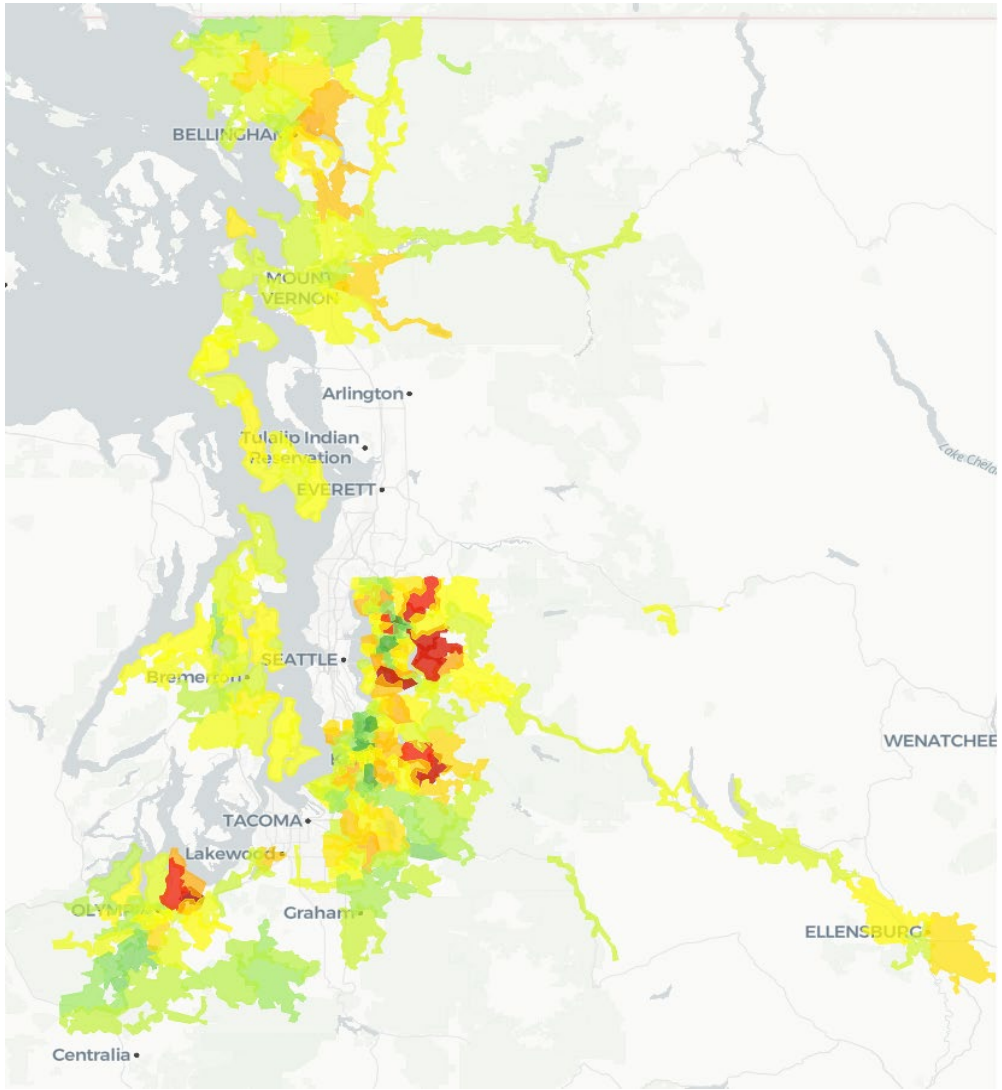
Side-quest

- More granular yearly growth using Load Forecasting's EV projections
- Total system growth remains constant
- Biggest substation changes were about +/- 10% load (2.5 MVA)



EV-Centric % Change Heatmap (vs. Baseline)

Side-quest



123	172
Banks w/ Increase	Banks w/ Decrease
+12.0%	-10.5%
Max Change	Min Change

Top 5 Highest Increases

HAW-1: +12.0%
SOM-1: +10.7%
FCR-1: +10.1%
SAH-1: +9.3%
AVO-1: +9.2%

Top 5 Highest Decreases

NOB-1: -10.5%
SAM-1: -9.5%
VIC-1: -9.4%
MTH-1: -9.1%
HAR-2: -8.8%

Load Change Legend

Highest Decrease: -10.5% to -4.9% (30 banks)

Moderate Decrease: -4.9% to +0.8% (178 banks)

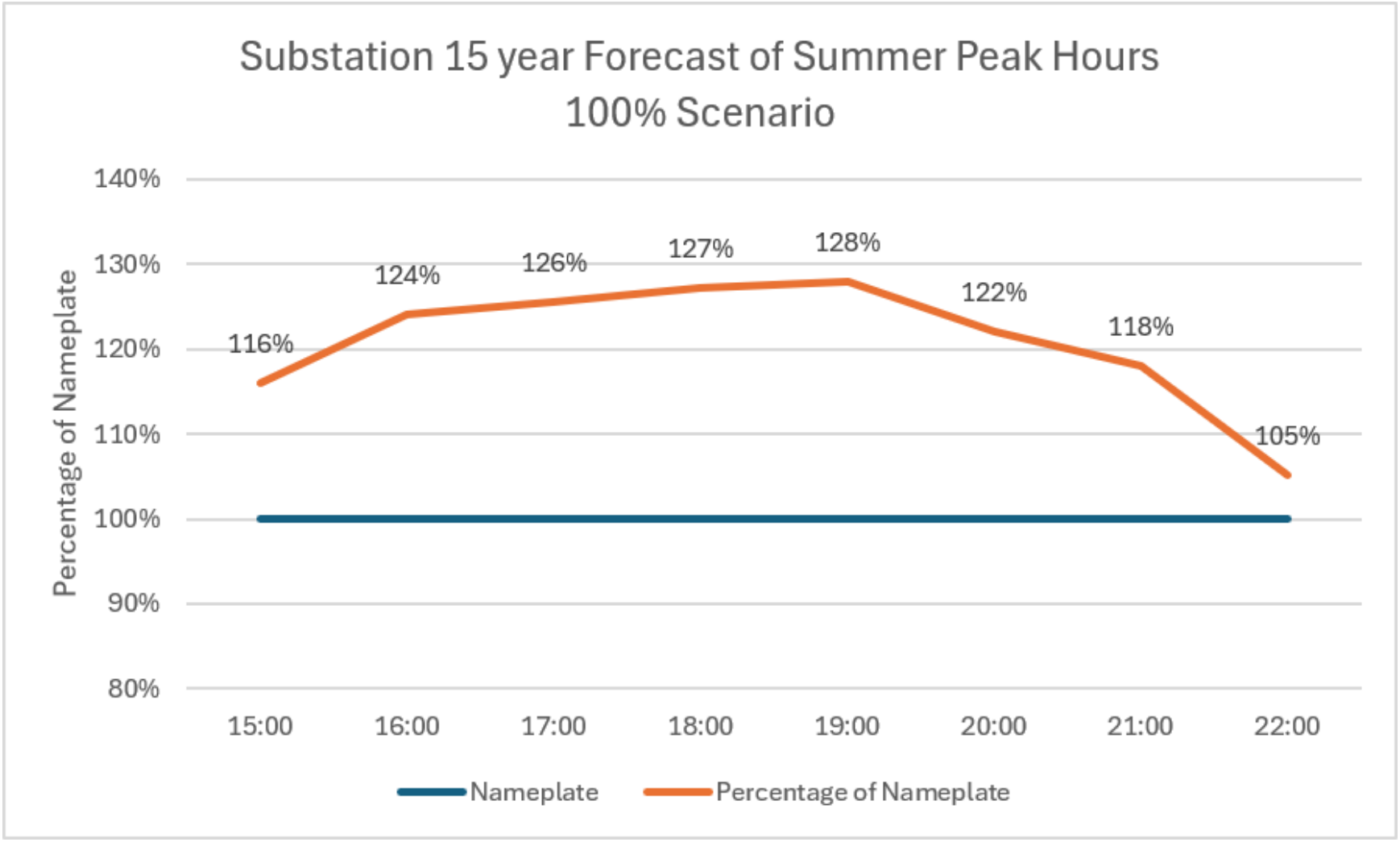
Moderate Increase: +0.8% to +6.4% (77 banks)

Highest Increase: +6.4% to +12.0% (11 banks)

Getting to the Top 20

- Create threshold criteria:
  - Nail down baseline for substation loading: nameplate
  - >75% utilization factor today
  - <110% utilization factor in 15 years
- Apply EV-centric forecast
- Consider known features of each substation:
  - Reliability performance, including CMI and long-term rankings
  - Equity considerations, including HIC and vulnerable populations
  - Presence of planned wired projects as a final screen

Forecast Energy Analysis Methodology



What this work enabled

- Clearer path for evaluating NWA locations using consistent criteria
- Forecasting improvements supporting both NWA and traditional planning
- Standardized methodology for capacity-focused NWA modeling
- Early alignments across System Planning, Grid Analytics, Load Forecasting and DER Analytics
- The ability to move from theoretical to actionable analysis

Applying the framework in practice

An anonymized DSS RFP case

Graham Marmion

Step 1 | The existing evaluation could miss the value being procured

A location-specific acquisition need was being tested with a generalized distribution value

TARGETED PROCUREMENT

The 2025 DSS RFP sought storage in two defined local areas.

The value proposition depended on relieving a specific distribution need.

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MISMATCH

GENERALIZED EVALUATION

$98.43

Prior generalized combined T&D input

A system-average assumption could make locally valuable bids appear less cost-effective than they were.

ANALYTICAL ACTION

Replace the generalized input with site-specific value before comparing bids.

Decision risk: a generalized input might understate the economics of resources procured for a specific local need.

Step 2 | Candidate configurations are screened

The same local need was tested through three viable deployment options

SITE A

5.73 MW battery

Individual bid

SITE B

3.00 MW battery

Individual bid

COMBINED A + B

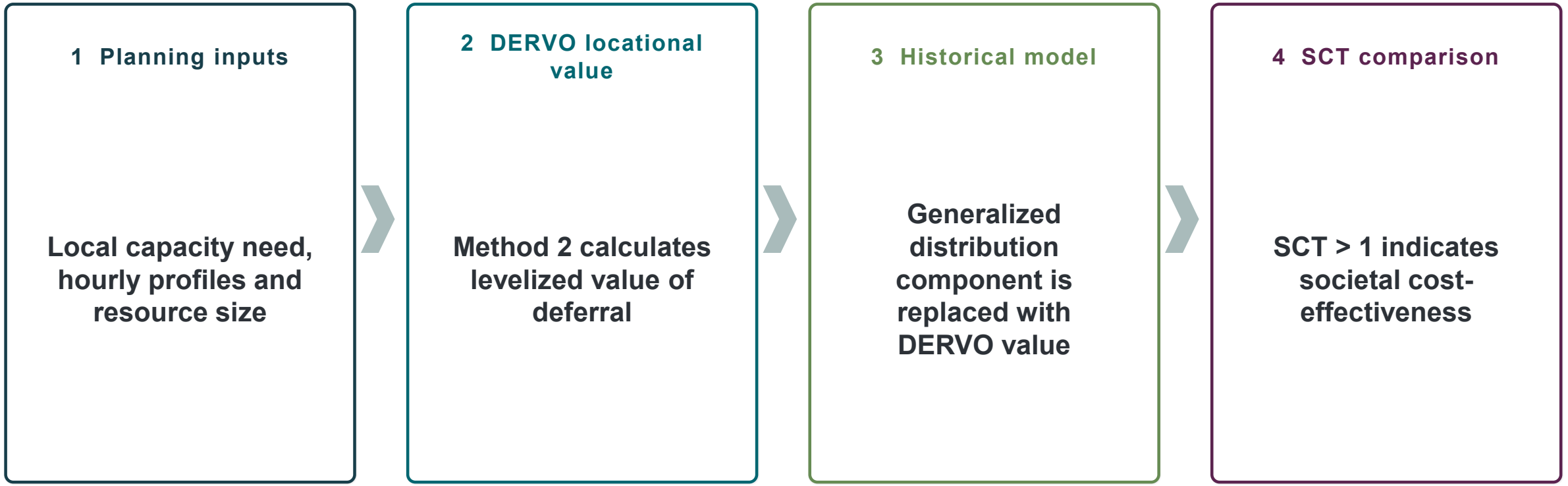
8.73 MW portfolio

Both bids together

Evaluation question: what are the economics after each viable configuration receives a location-specific distribution value?

Step 3 | The framework updates the economic inputs

Local distribution value is calculated, recombined with transmission value, and evaluated in the historical model



The framework standardizes the updated evaluation. It does not isolate the SCT uplift unless the prior-input case is also retained.

Step 4 | Updated inputs produced cost-effective results

The evidence shows the updated evaluation

CONFIGURATION	UPDATED SCT	DERVO DISTRIBUTION	UPDATED COMBINED T&D	INTERPRETATION
Site A	1.273	$209.43	$226.85	Highest updated SCT
Site B	1.203	$140.35	$157.77	Cost-effective
Combined A + B	1.147	$133.18	$150.60	Passes; lowest updated SCT

WHAT THE RESULTS SHOW

Updated combined T&D inputs were 53%–130% above the prior $98.43/kW-year input, and all three updated cases had SCT > 1.

Step 5 | The model supports the decision; it does not make it

The updated SCT ranking did not automatically determine the preferred acquisition path

MODEL EVIDENCE

All three updated evaluations had SCT > 1.

Site A ranked highest under the updated inputs.

The prior-input SCT comparison was not reported.

DECISION CONTEXT

Acquisition of both projects was increasingly likely.

Both projects were cost-effective.

Bringing more battery capacity online supported the broader objective.

SUPPORTED ACTION

Focus on the combined Site A + B configuration.

The analysis supported approval to negotiate.

Final action remained subject to negotiation and commercial terms.

Decision principle: use the model to clarify tradeoffs and establish cost-effectiveness, then combine it with acquisition strategy, feasibility and judgment.

What must also exist to turn modeled value into real value

Scaling the framework requires connected planning, acquisition, operational and governance capabilities

1

Forecasting

Define local need, timing, magnitude and duration; keep the need current as forecasts change.

2

Customers + acquisition

Structure scalable solicitations, screen many bids and translate resource offers into comparable portfolios.

3

DERMS + operations

Specify telemetry, dispatch, availability and performance measurement needed to realize local value.

4

Cross-functional alignment

Connect Planning, Analytics, Acquisition, Operations, Finance and governance around one decision record.

The model shows which updated options clear the threshold. The organization interprets the evidence, addresses its limits, and determines what can be acquired and operated.

Questions & Answers

Thank you!



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