

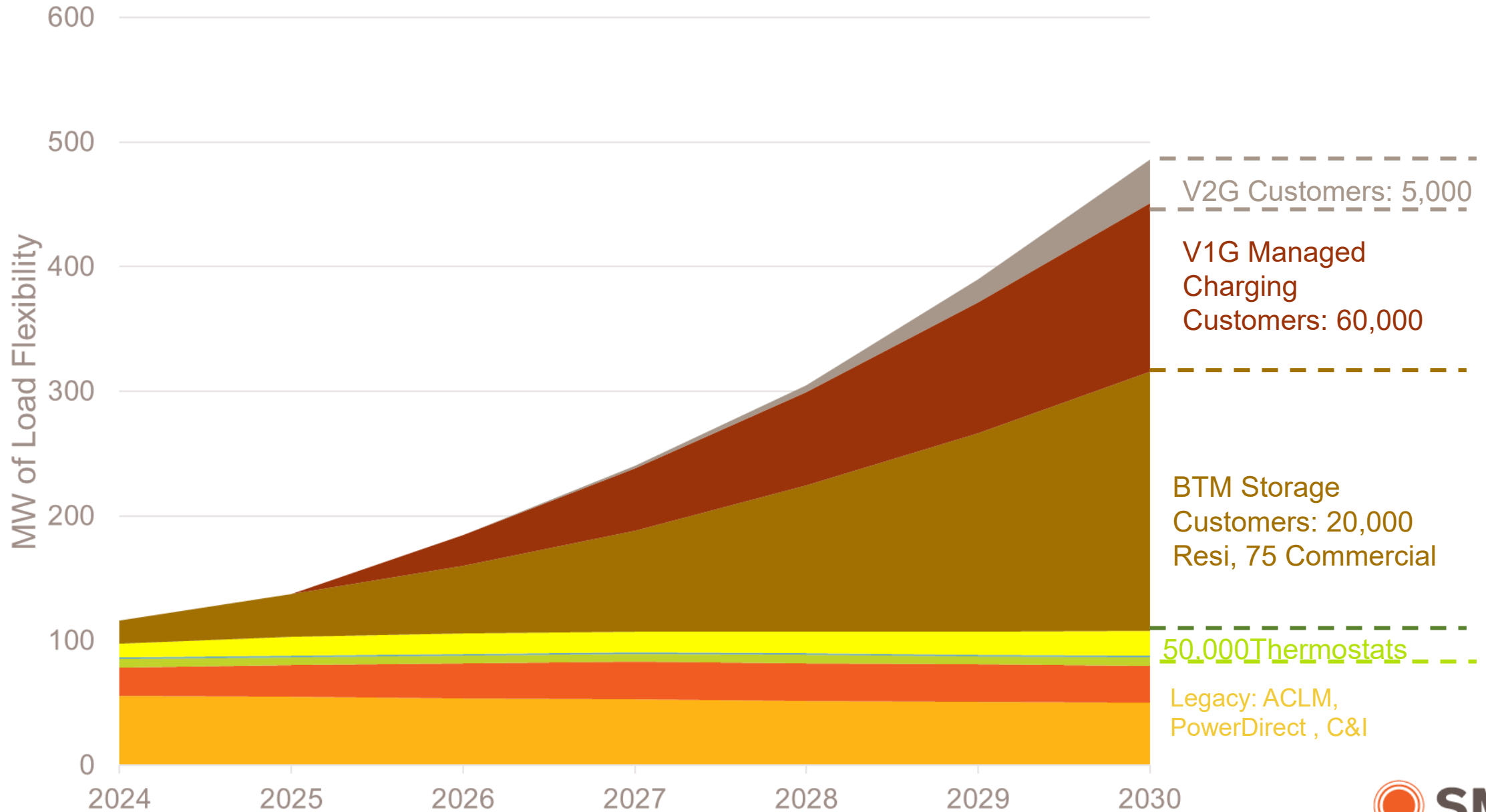
Integrating DERs into Distribution and Resource Planning

Obadiah Bartholomy
ESIG Fall Technical Workshop – October 2025

Powering forward.
Together.

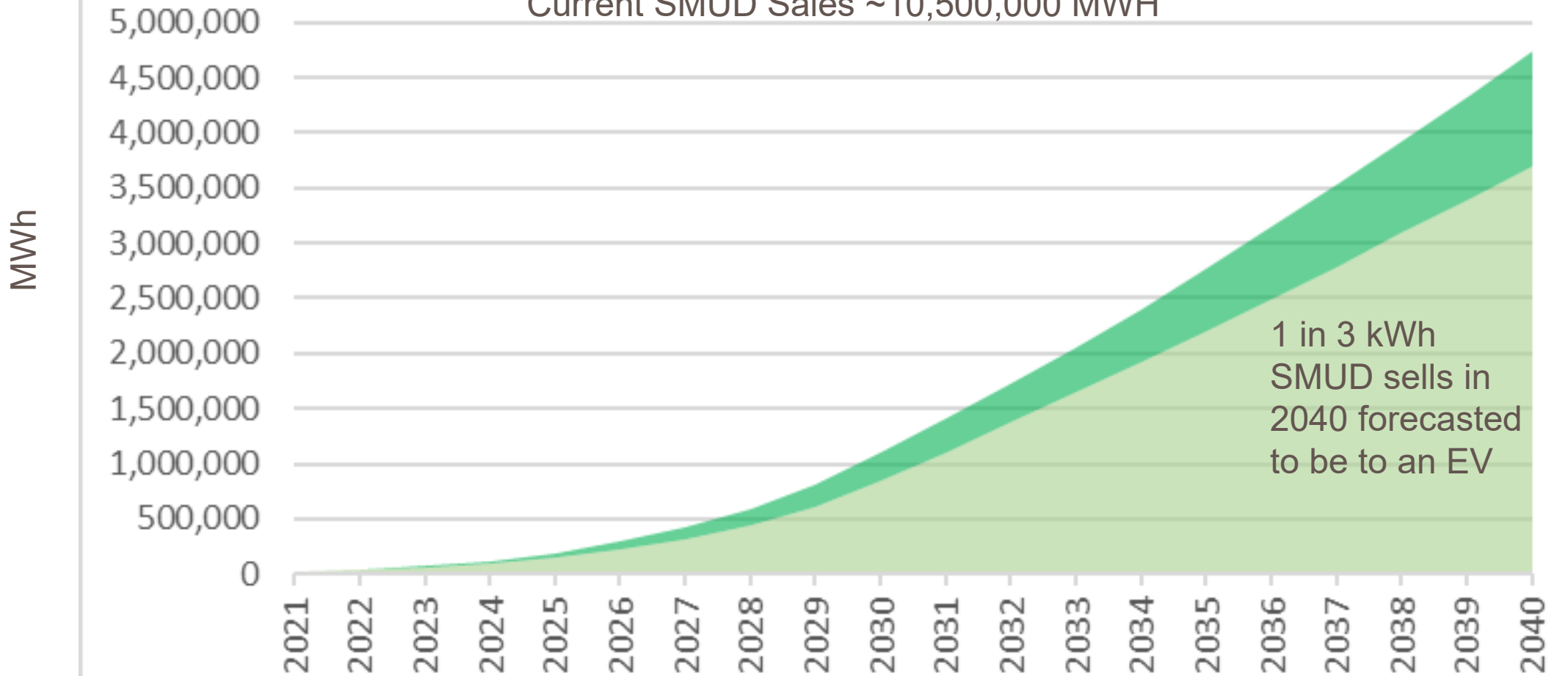


Forecasted MW of Load Flexibility out to 2030



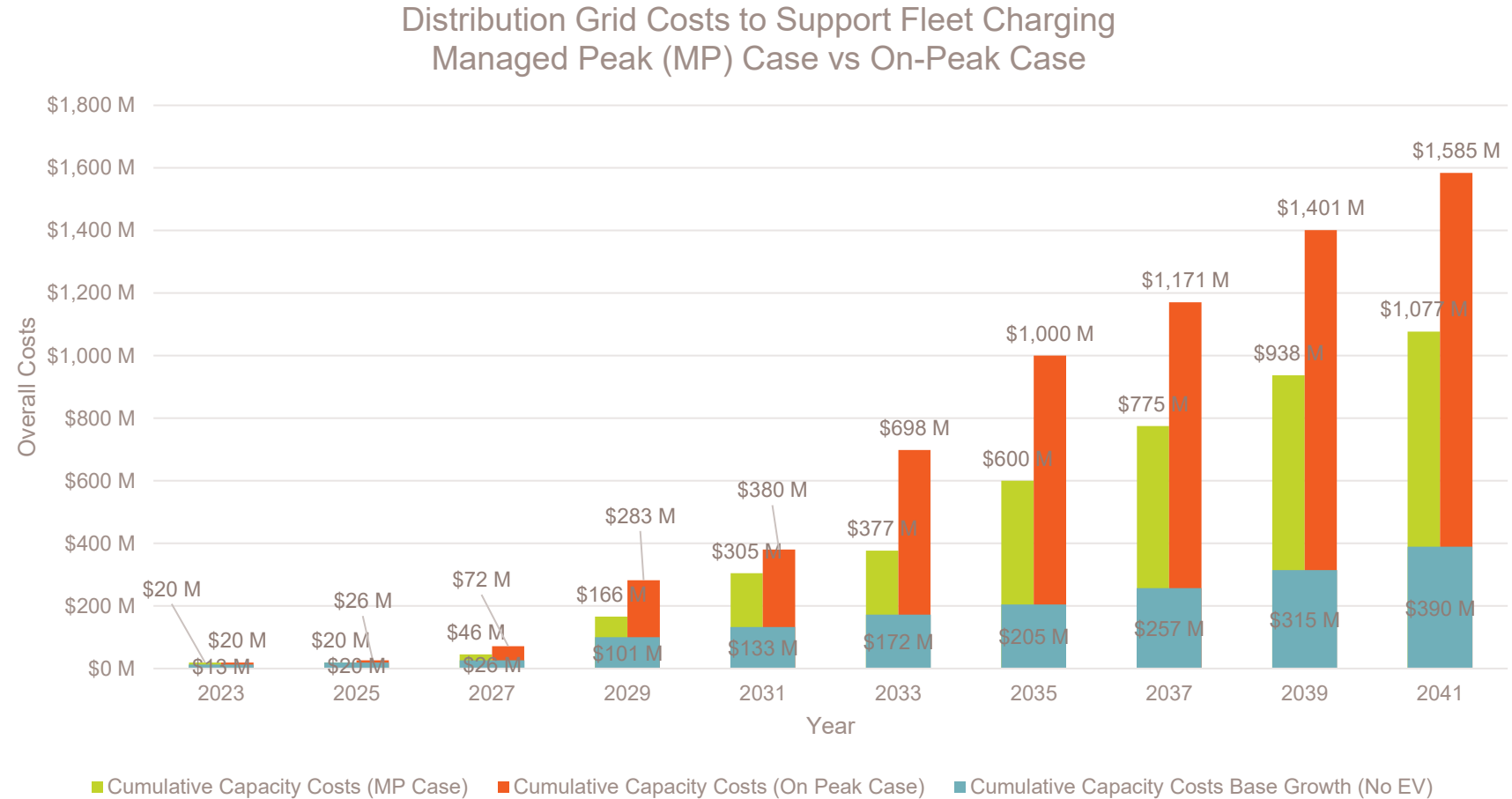
Light and Medium / Heavy Duty EV Load Growth to 2040

Current SMUD Sales ~10,500,000 MWh



Commercial Fleet Potential Grid Impacts

- 60-100 substation upgrades are anticipated to accommodate fleet expansion
- Projected cumulative grid costs of \$680M - \$1.2B, against ~\$200-250M/y in fleet revenue by 2041
- Additional work on managed charging and DER mitigation being examined as part of 2025 IDRPs



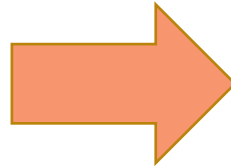
Potential for Battery Storage to Mitigate Substation Upgrades

2024 Assessment of 60 substations identified in MHD Study:

Approximately \$5M per substation opportunity if we can avoid upgrade

21 substations identified that storage would be well suited to avoid

Potential for \$50M in savings with right-sized storage instead of substation transformers



Commercial VPP program 2026 Pilot:

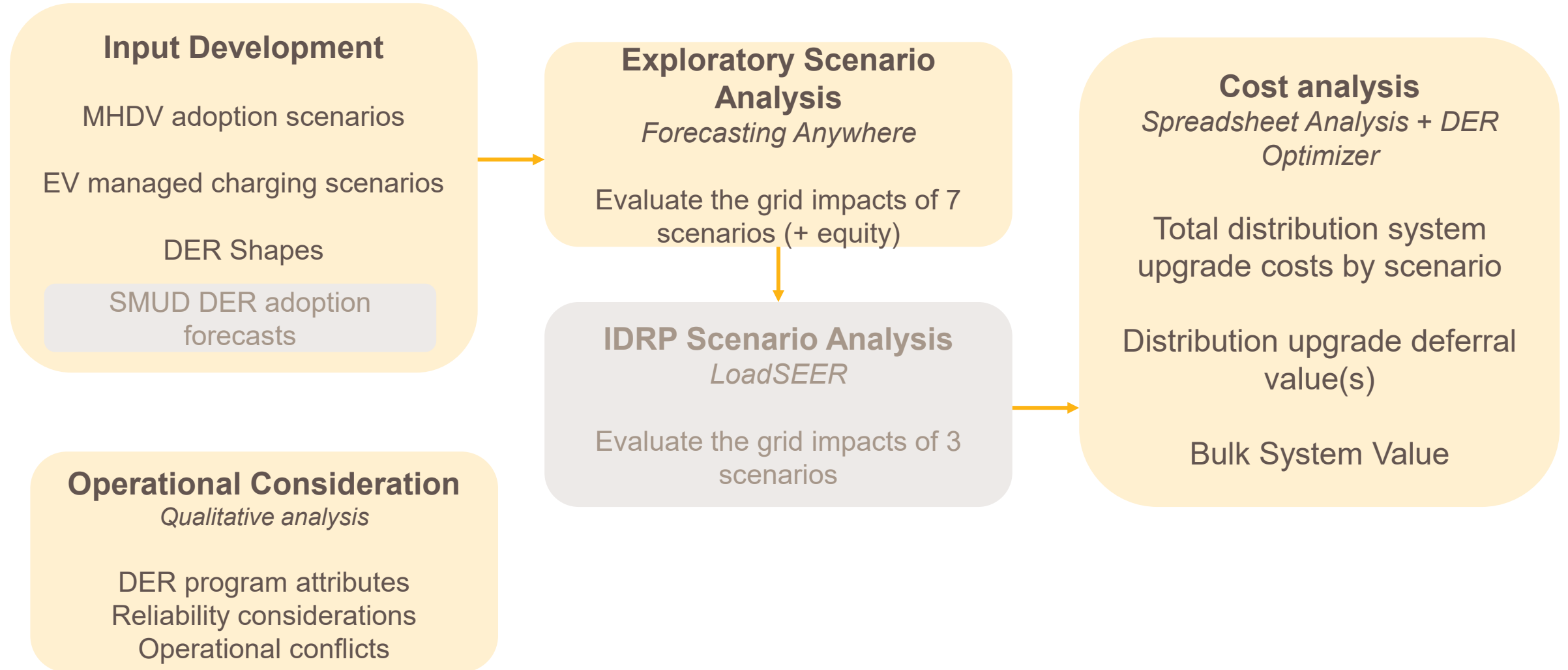
3rd party owned batteries, BTM at commercial customer sites ~1MW

Customer receives lease payment, offset by bill savings sharing with SMUD

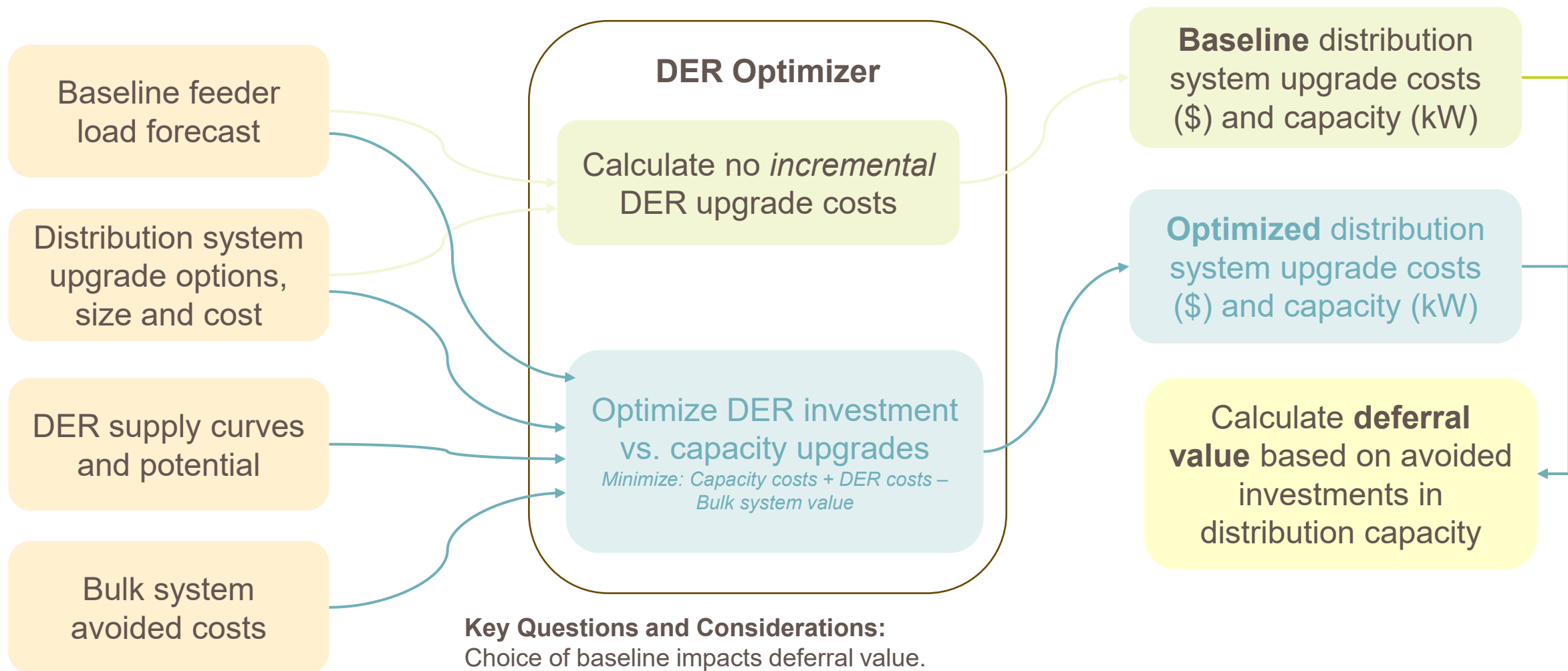
Customer receives resilience value

Customers targeted behind constrained substations

Overview of IDRP Scope of Work



DER Optimizer Deferral Value analysis



Key Questions and Considerations:

Choice of baseline impacts deferral value.

Baseline should include all DER adopted via customer tariffs and planned programs. Optimized DER should be incremental and mostly reflect potential utility-owned or contracted DERs.

IDRP Scenarios

Scenario	EV Charging Behavior	Expected Outcomes
Worst Case	100% Unmanaged	Significant growth in distribution peak load and load during critical hours for the bulk system
Reference	10% Unmanaged 50% Retail rate passive managed 20% Bulk system RT price 20% Retail rate V2G	Reflects the current trajectory of SMUD's programs. Passive management may create secondary peak issues
Active managed for bulk system needs	50% Bulk system RT price 25% Retail rate V2G 25% Retail rate passive managed	Managing EV load primarily for bulk system needs can produce localized challenges on the distribution system.
Active managed to flatten peak load	100% active managed to minimize charging load and on-peak charging	Avoiding charging during bulk system peak hours while flattening load provides greater distribution system benefits

Sensitivities explore greater reliance on workplace and public DCFC charging for light duty vehicle charging in the reference scenario for multifamily housing residents.

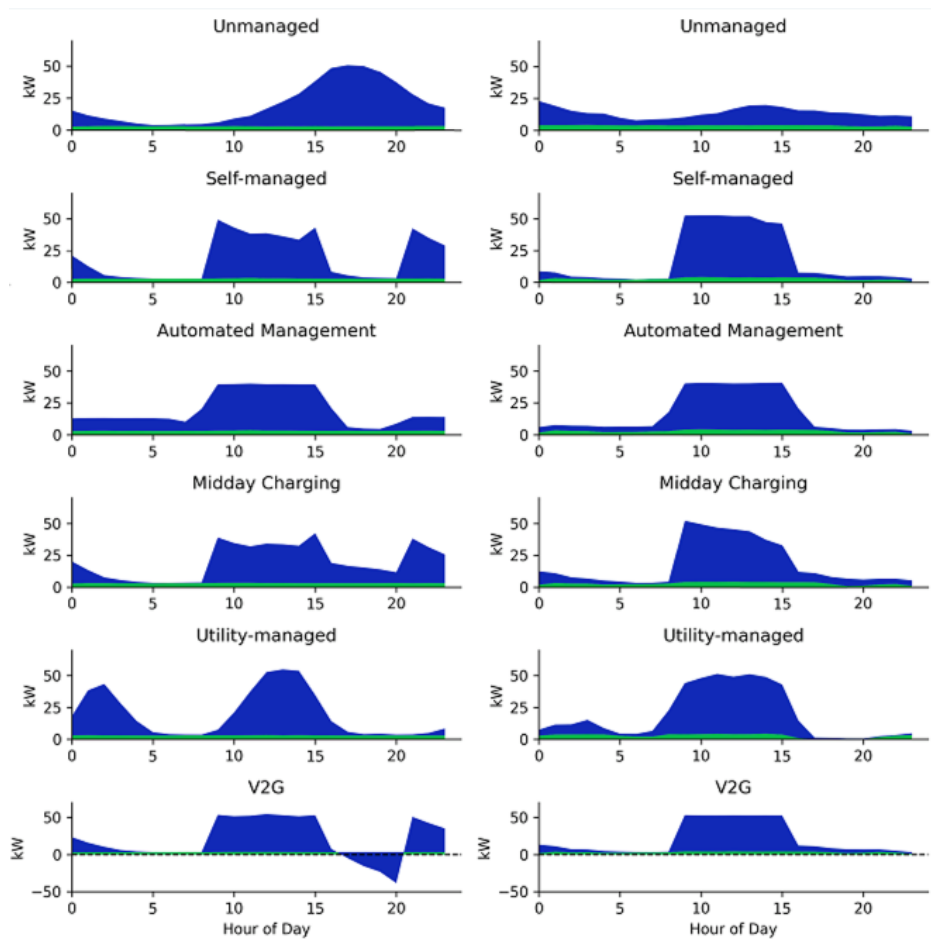
All Management Types – HDV Regional Home

WINTER

SUMMER

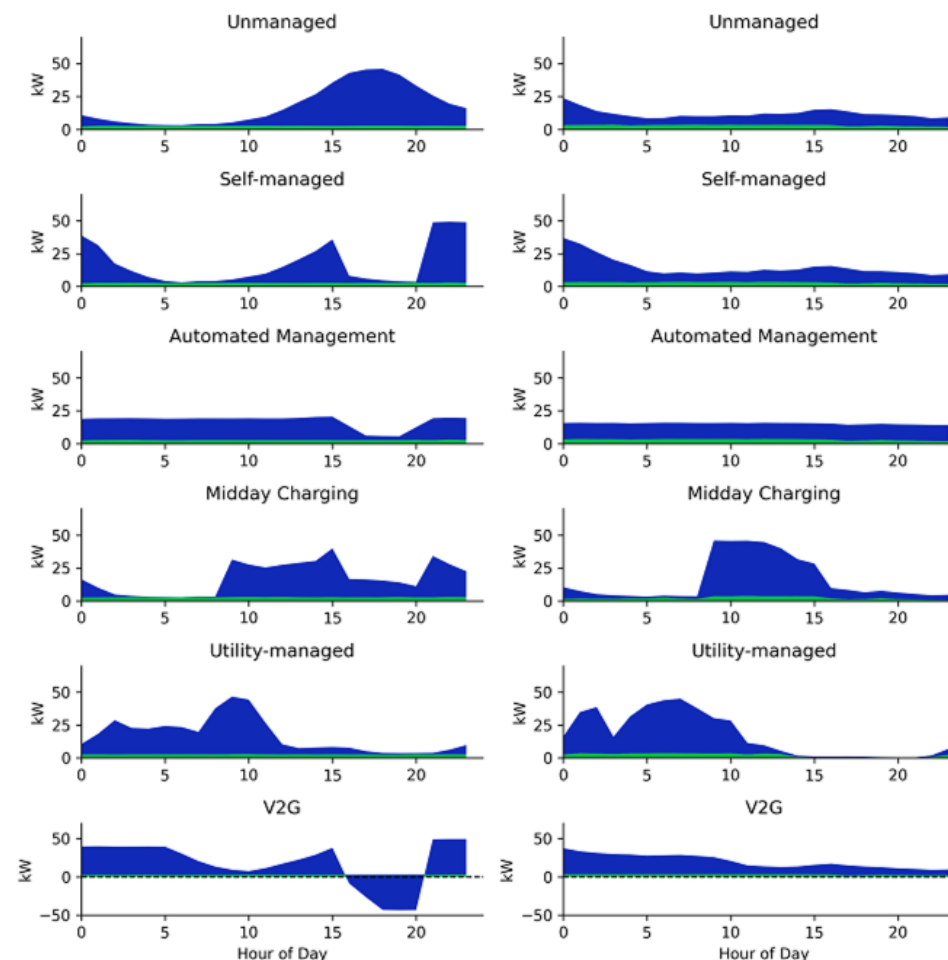
Weekday

Weekend

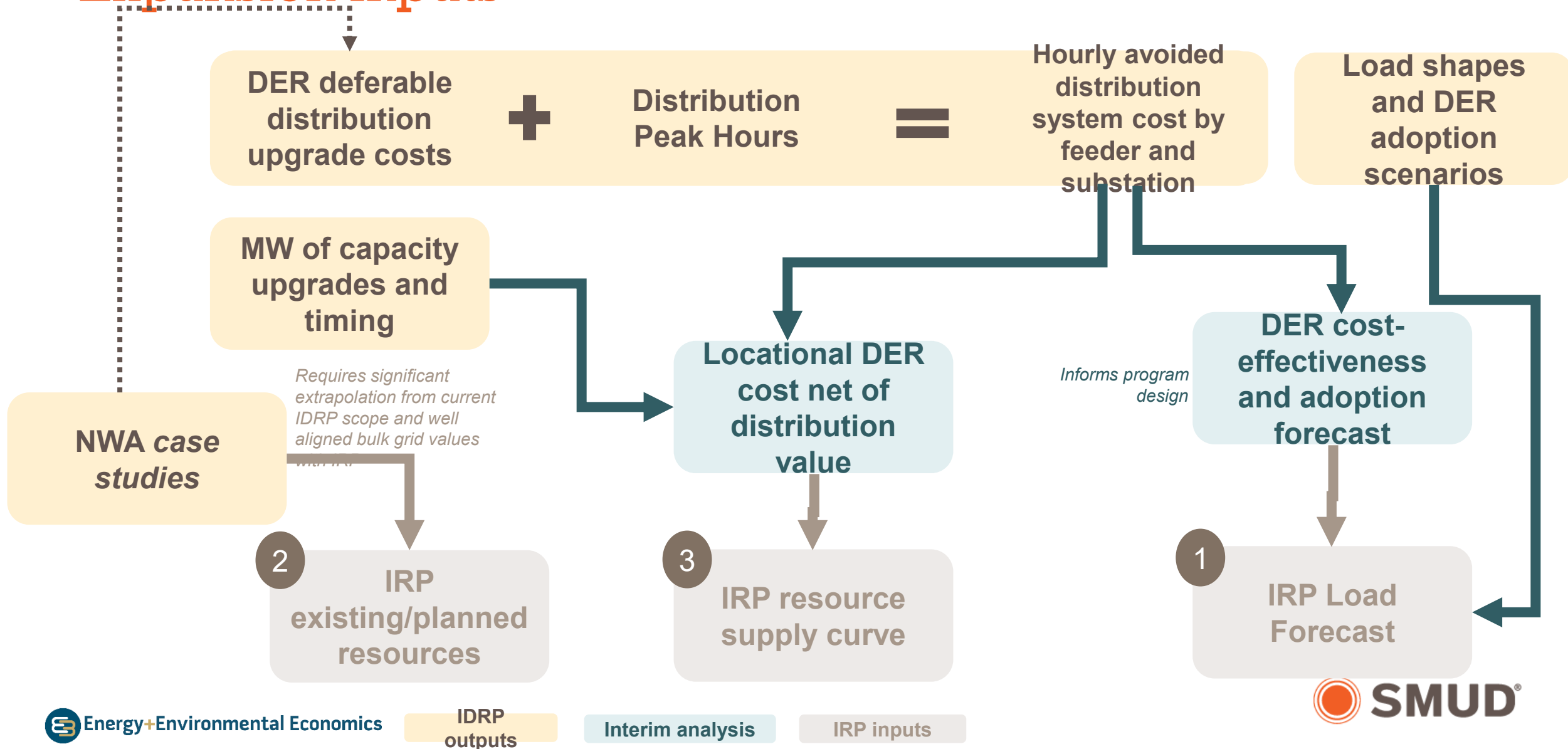


Weekday

Weekend



Three Options to Translate IDRPs Outputs to Capacity Expansion Inputs



Thank you!

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Bulk Substation "Station G"

