
Beyond Counting Widgets: Evaluation of the Maturity of Grid Transformation Capabilities in the Tennessee Valley

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About TVA



One of the largest power producers in the US



Wholesale power to parts of seven states

80K
square miles of service area

38K+

MW power capacity

16K+

miles of transmission lines

10M

service area population

153

local power companies

3rd

largest nuclear owner

99.999%

reliability

THREE-PART MISSION



Affordable Energy



Environmental Stewardship



Economic Development

TVA SERVICE AREA

Current Energy Trends

Decentralization

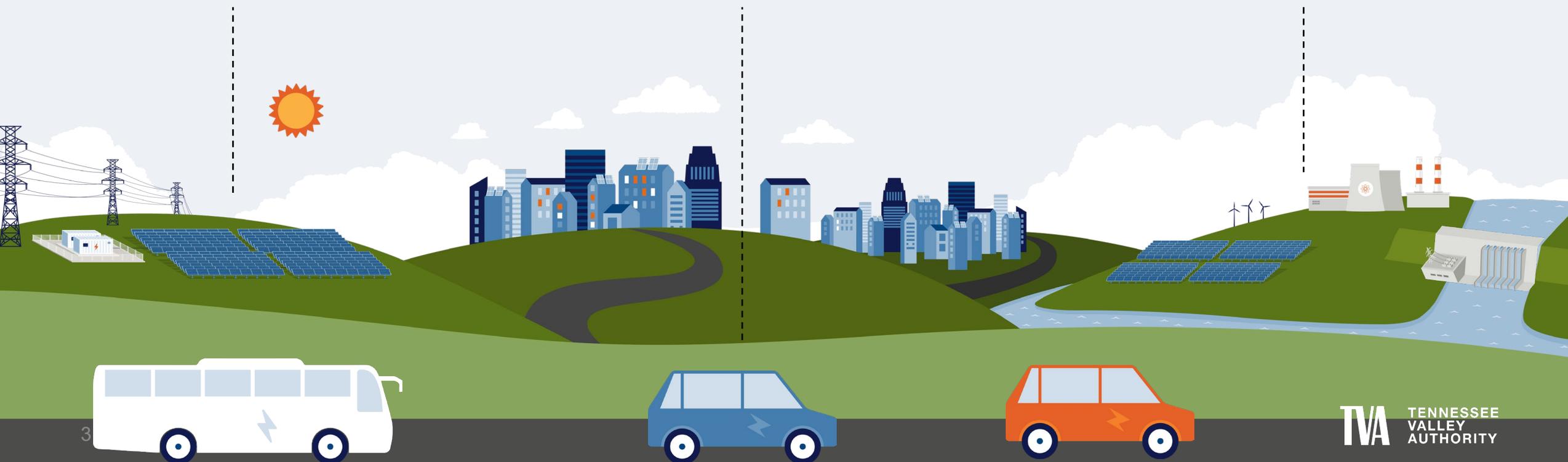
Increase in smaller and more sparsely located energy resources

Electrification

Increase in technologies that use electricity as opposed to fossil fuels is increasing load on the grid

Diversification

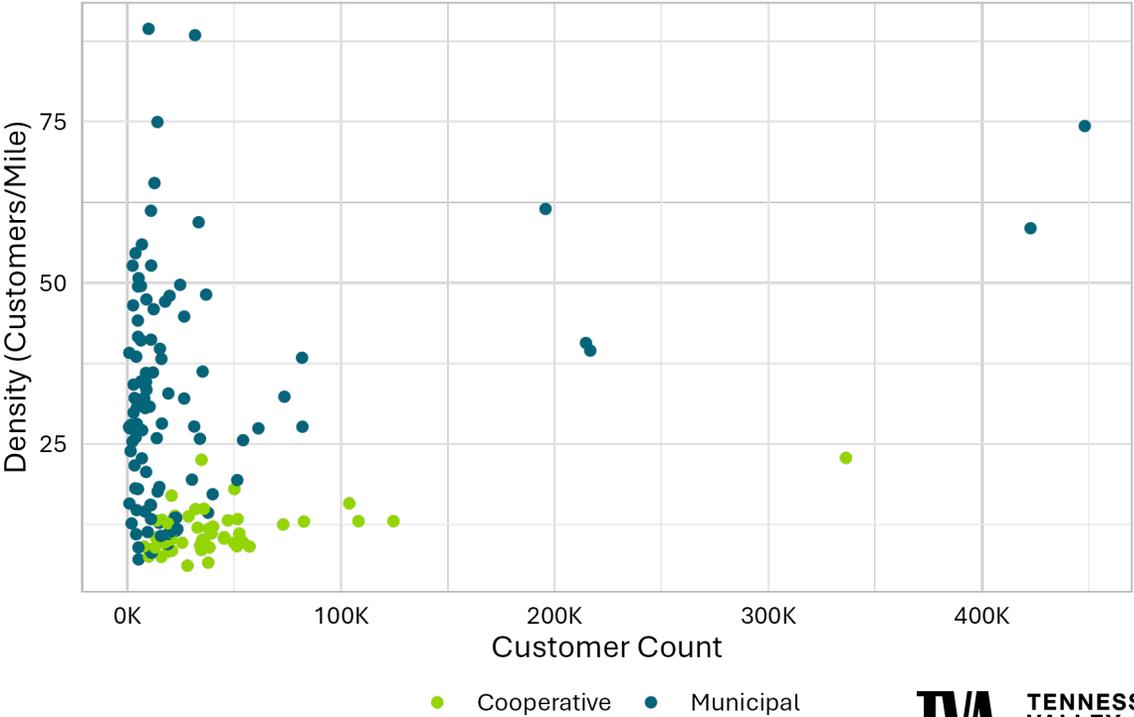
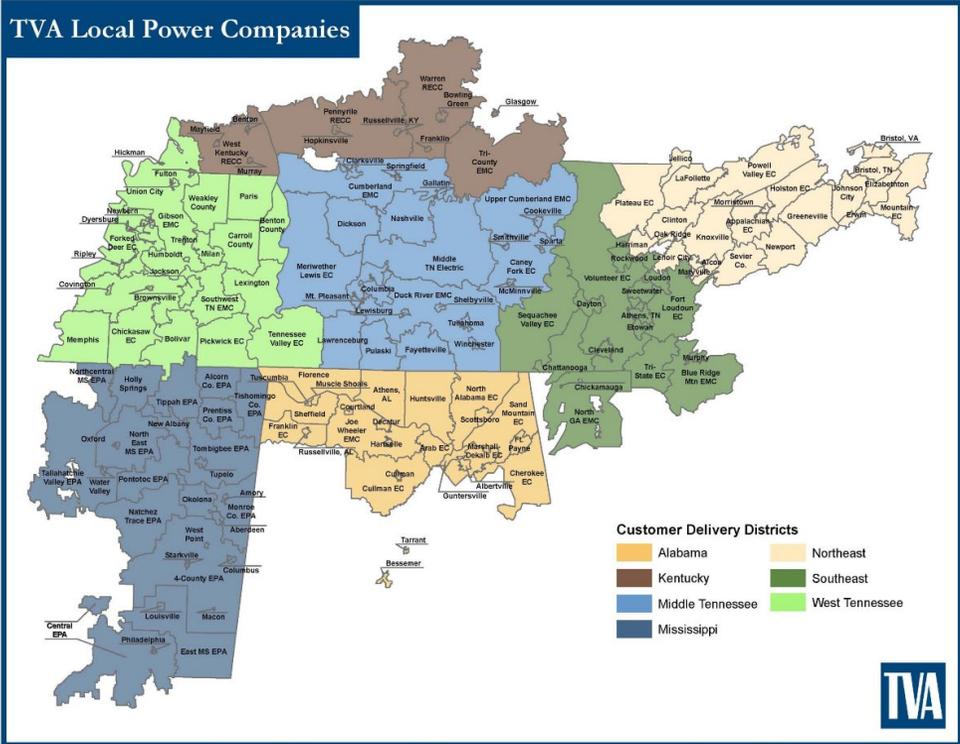
Increase in diversification of energy resources to improve grid resiliency



The Valley Vision team, comprising LPC leaders, TVPPA, and TVA, conducted the 2025 Local Power Company Assessment to update information on our shared electric grid collected in 2022



153 LPCs in the Tennessee Valley represent a mix of utility types and sizes, which drives diversity in their current state and future state objectives



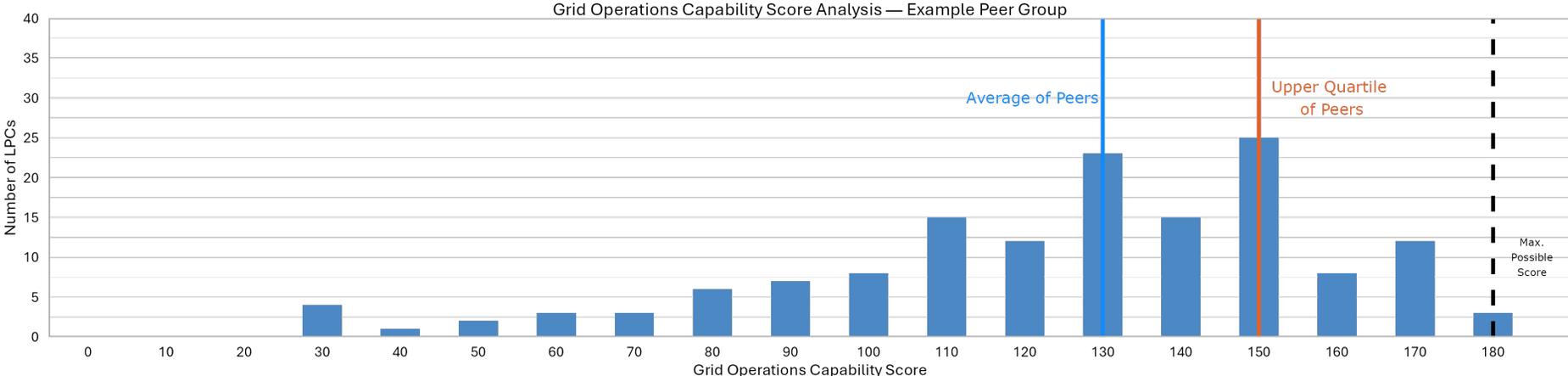
The 2022 LPC assessment revealed diverse maturity levels across the Valley, necessitating a tailored strategic approach to address the region's LPC landscape effectively



We found significant variation in technology and operational maturity among LPCs, not solely due to customer size or density



We must understand integrated system planning and operations as more demand response products, EVs, and DERs are deployed across the Valley to meet capacity needs and manage major storms and extreme weather events



The Valley-Wide Capability Progression Model

The **Capability Progression Model (CPM)** is a framework designed to help LPCs:

- ✓ Identify key capabilities for investment and enhanced future operations
- ✓ Self-assess progress and prioritize the most beneficial and impactful technologies
- ✓ Advance towards a modernized, transformed grid



Supports LPCs

in identifying gaps and assessing advancements over time



Allows a Flexible Investment Path

related to each capability area



Common Structure

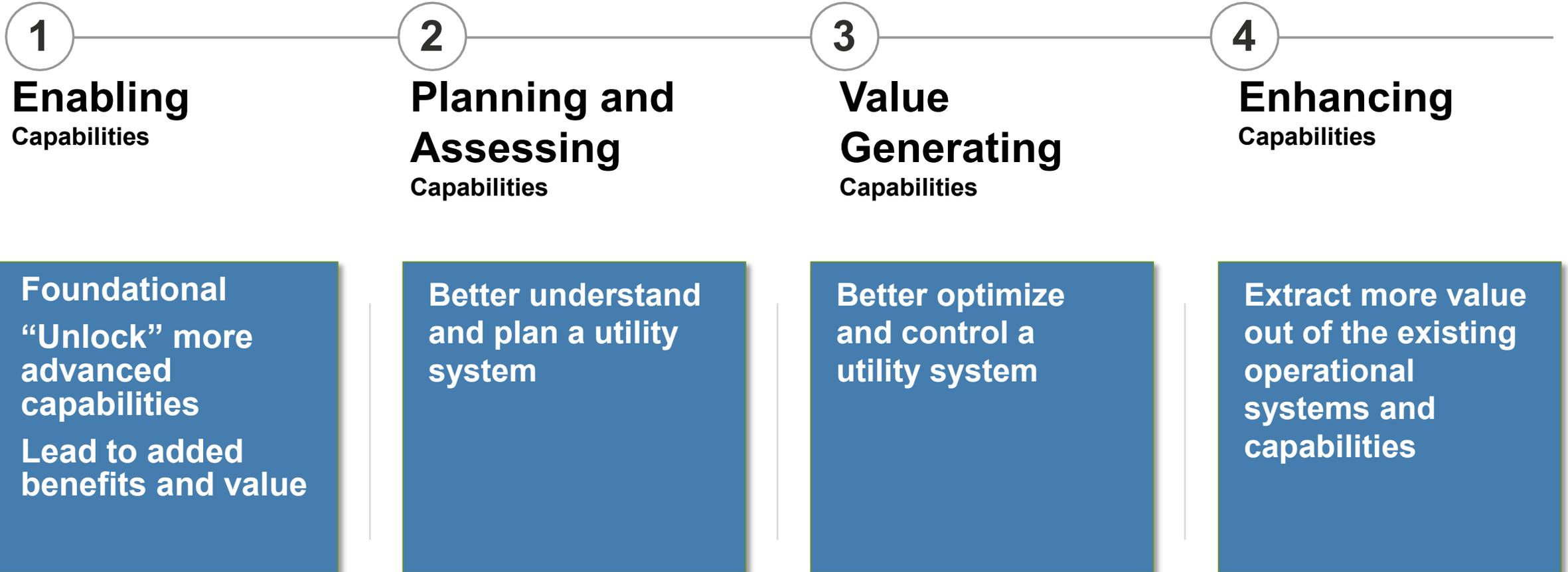
Provides a consistent way for LPCs to compare capability levels



Establishes Minimum Capability Levels

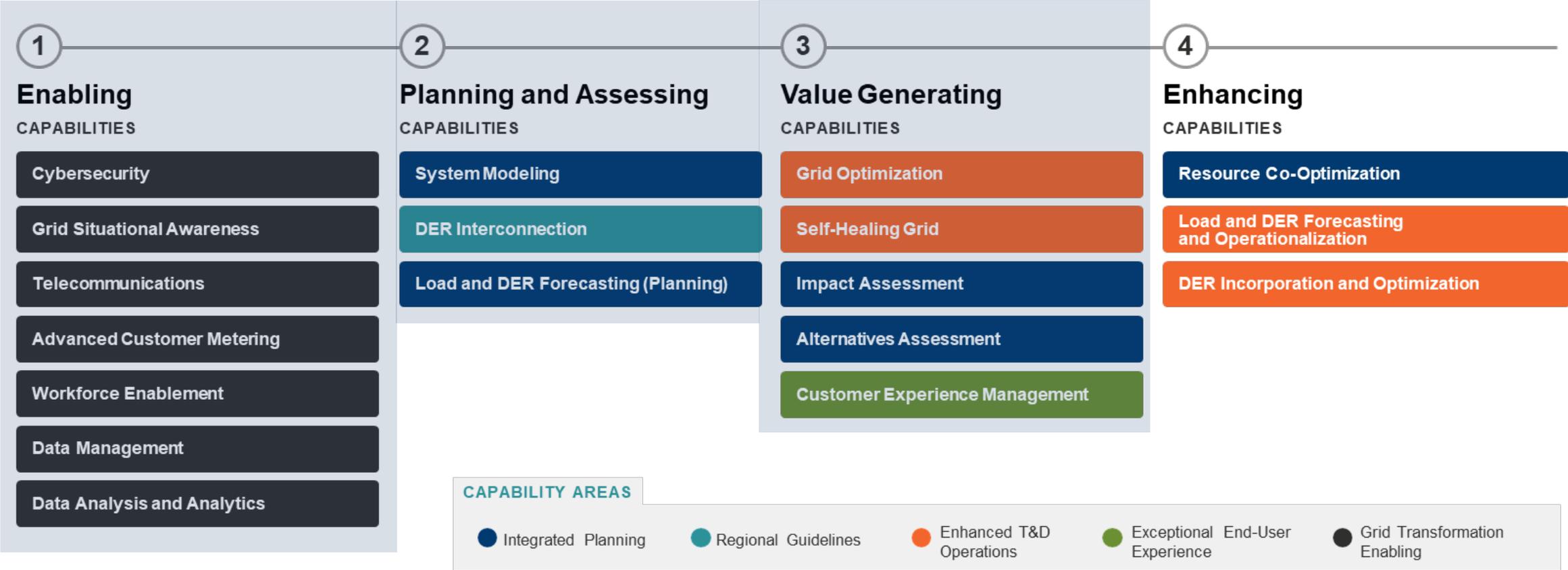
considered must-haves for all LPCs

The Four Stages of Grid Modernization Progression



CPM Capability Classification

Below are all 18 CPM Capabilities, sorted by the **five Capability Areas** and **four Stages of Grid Modernization**. The 2025 LPC Assessment covered the 15 capabilities included in the first three stages.



Standards for Maturing in a Capability

Level 1 (Ad-Hoc)	Level 2	Level 3	Level 4	Level 5 (World Class)
		Valley Standard (example)	Valley Transformational Level (example)	

- The CPM levels **help LPCs measure their maturity** and compare their progress with peers in the Valley
- The goal is for all LPCs to reach the **Valley Standard**, but not all will reach the **Transformational Level**
- **Each LPC’s journey is unique, starting from different levels** and progressing at **their own pace**



Valley Standard (VS)

Establishes a minimum recommended capability threshold that all LPCs should plan to reach



Valley Transformational Level (VTL)

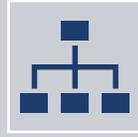
Establishes a higher level of capability, enabling more efficient operations and delivering additional value to stakeholders

ALL required elements listed under the maturity level must be in place before that level has been achieved

Valley-Wide Benefits of the LPC Assessment



Helps understand LPC grid capabilities and key investment needs



Guides LPCs and TVA in developing and operating a modern, integrated power system



Guides grid system investments, programs, and prioritizes future R&D work



Helps understand the region-wide electric system's adaptation for resiliency, planning, and future operational and customer needs

Individual LPC Benefits of the LPC Assessment

Individualized reports provided to LPCs that completed the assessment provide several key benefits



Valley-wide capability maps will be developed and shared with LPCs in their final reports to help LPCs identify and work with others who may have deployed more **advanced capabilities**



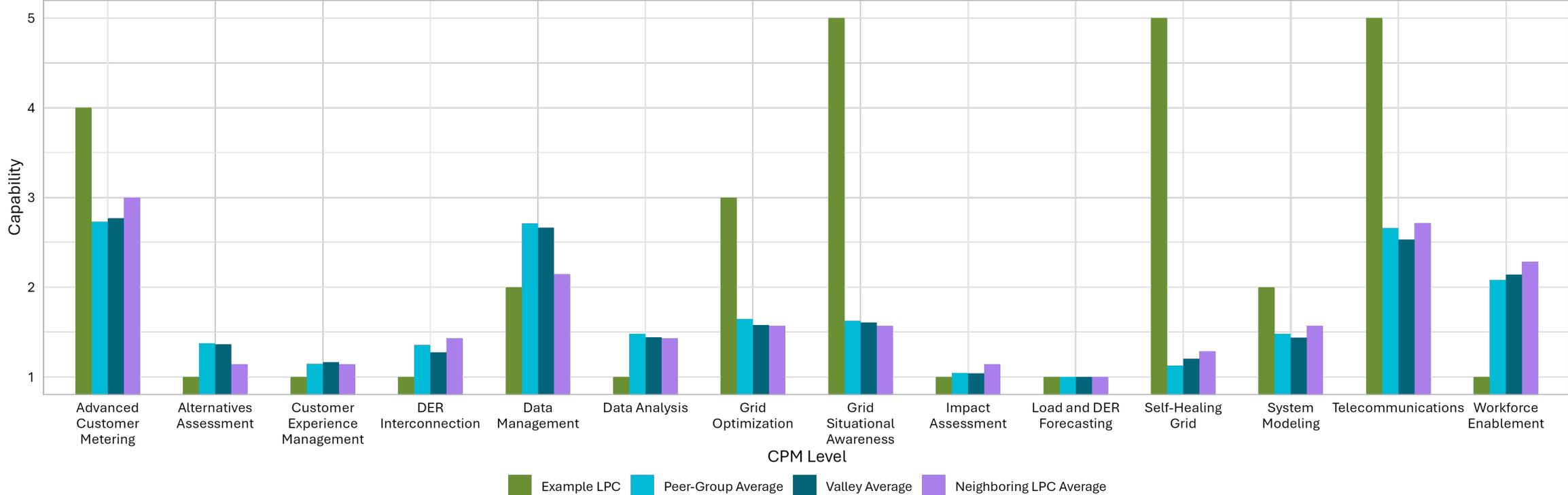
LPCs will receive a detailed report comparing their results to the **Valley average, similar sized LPC peers, and neighboring utilities**



Individualized reports list sub-capabilities needed by LPCs to achieve **Valley Standard or Valley Transformational Levels** for all assessed capabilities based on their current maturity progress

Example Individualized Report Output

The customized report output with level assignments from 1-5 will help LPCs identify areas of strengths and areas for future development to achieve Valley Standard or Valley Transformational Levels



Data on Capability Levels can Drive Decisions

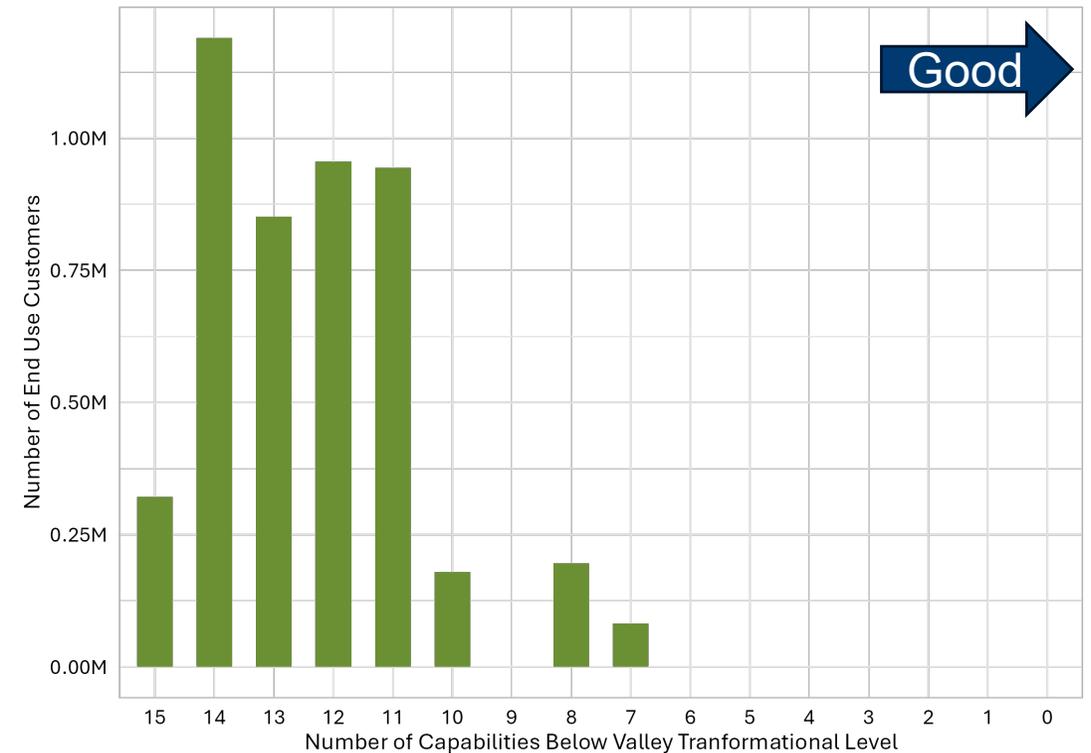
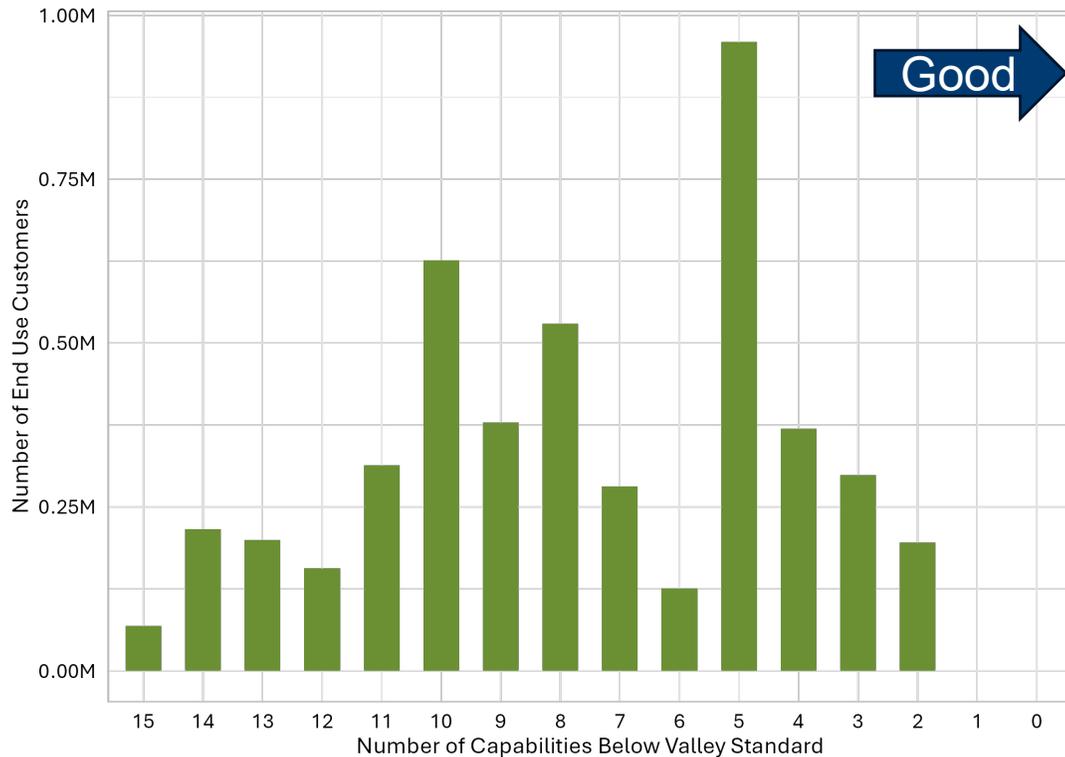
Analysis on the responses available to date is already informing programmatic planning initiatives

Valley Standard Level Insights

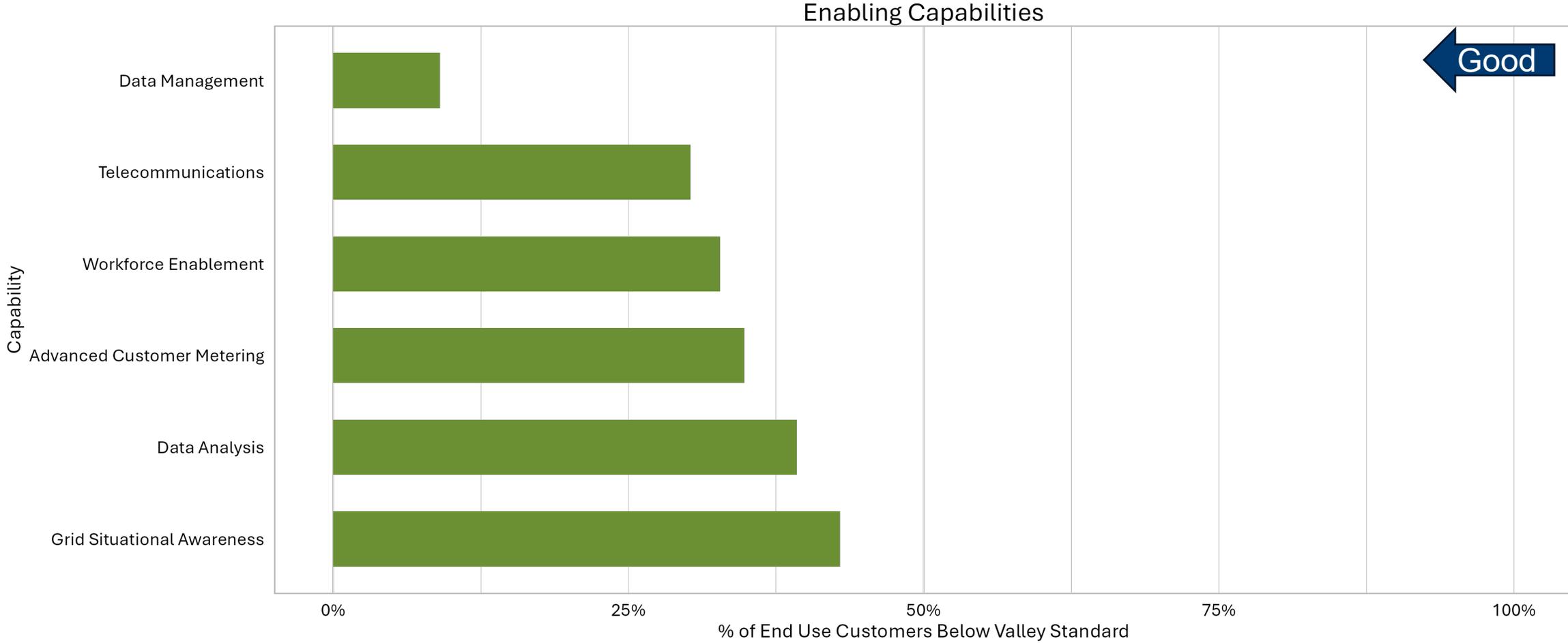
86% of end customers are served by LPCs below Valley Standard Level in < 75% of CPM capabilities

Valley Transformational Level Insights

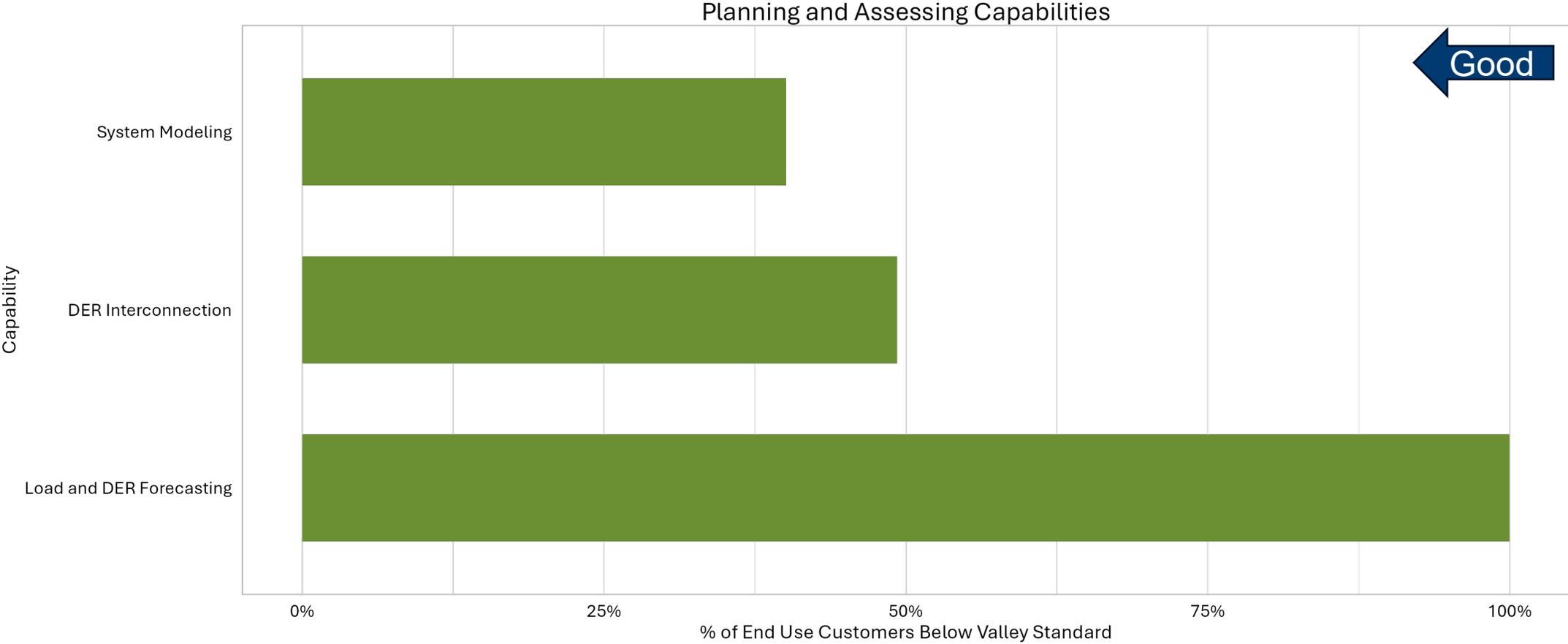
29% of end customers are served by LPCs below Valley Transformational Level in < 75% of CPM capabilities



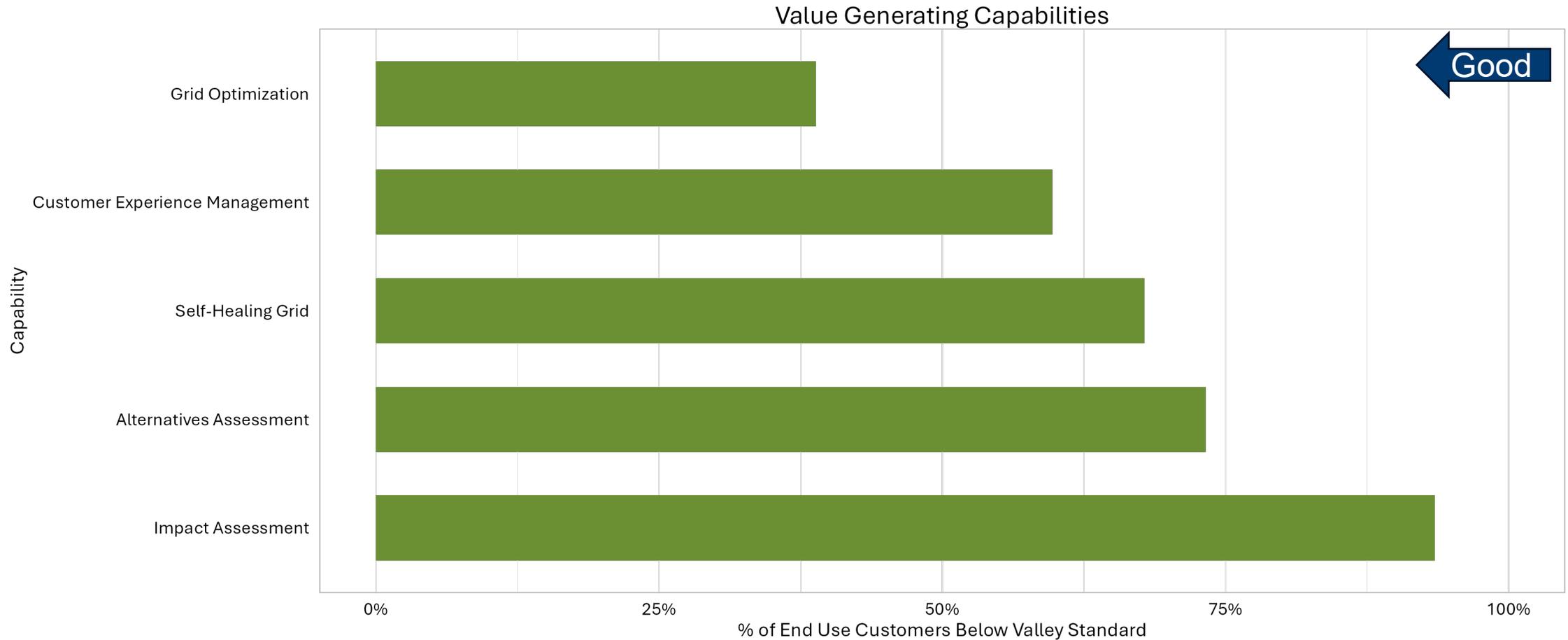
Enabling Capabilities - Percent of End Customers Served by LPCs Below Valley Standard



Planning and Assessing Capabilities - Percent of End Customers Served by LPCs Below Valley Standard



Value Generating Capabilities- Percent of End Customers Served by LPCs Below Valley Standard



Next Steps for Grid Transformation in the Valley



Engage LPCs with capability maturities below Valley Standard



Coordinate with LPCs to determine actions and investments needed to progress capability maturity (i.e., roadmaps)



Enable LPCs to implement investments through collaboration, tools, resourcing, etc.

