Supply Chain Speed & Scale

Steve Martz, Vice President – Integrated Planning, Xcel Energy

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Panel Introduction & Agenda

Topic	Presenter
Panel Introduction	Steve Martz – VP Integrated Planning, Xcel Energy
Supply Chain Setup	Steve Martz
Panel Presentations	
	Kevin Jacobs, Director – Supply Chain Consulting, Wood Mackenzie
	Damir Novosel, President, Quanta Technology
	John Francis, Partner, ScottMadden
Audience Q&A	All
Lightning Round – Q&A	Steve Martz & Panelists

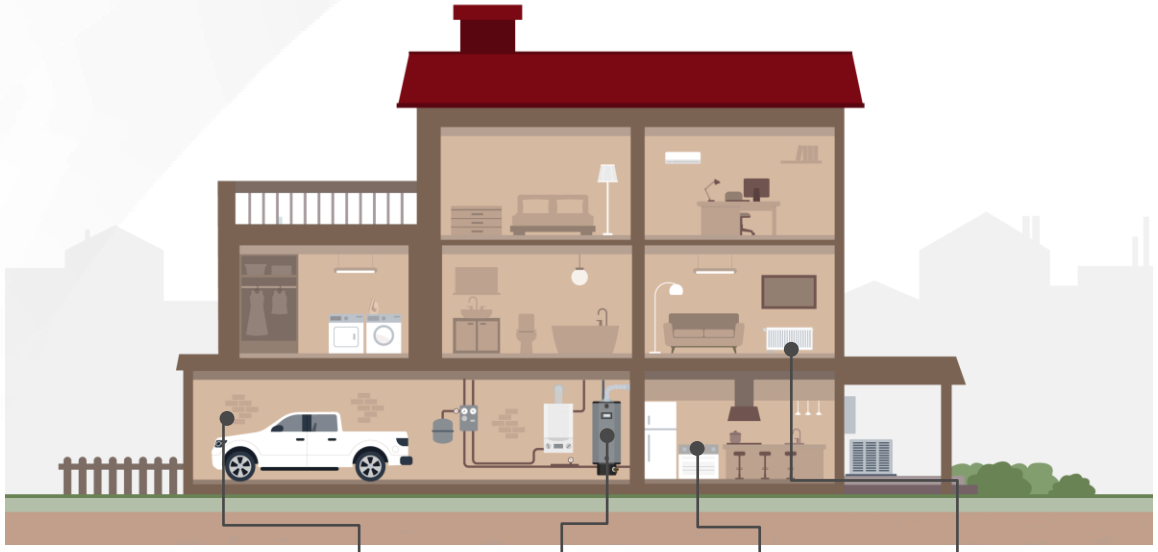
A Brief History: System Transitions

The electric system has been built out over the last century in tranches in response to various drivers

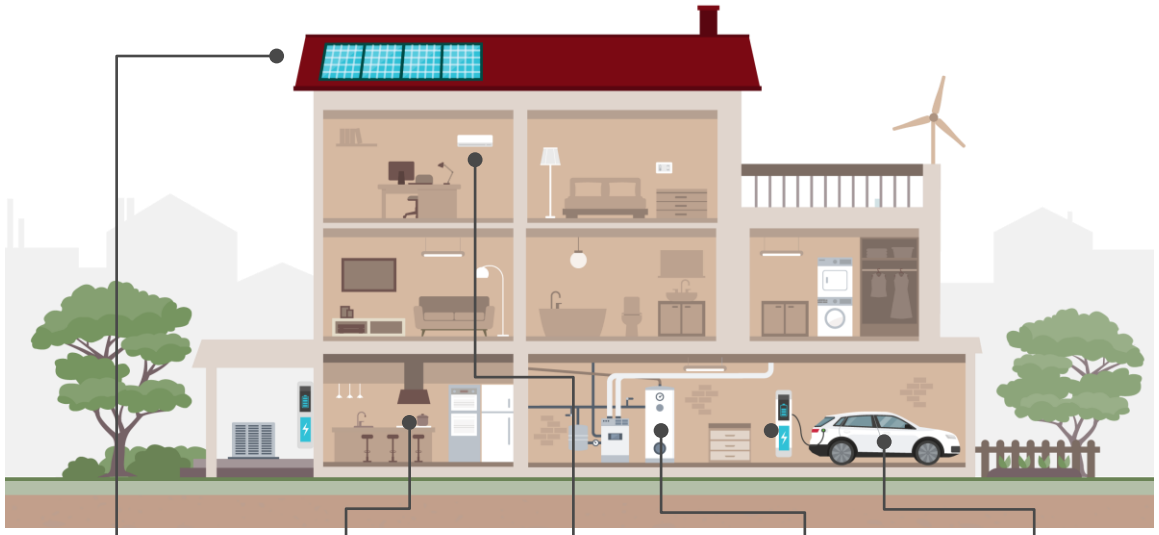
Infrastructure Buildout	Load Growth	Energy Crisis & Growth	Conservation & Efficiency	Power Sector Decarbonization	Economy-wide Decarb + Growth
1930s - 1960s	*1960s – 1970s*	*1970s – 1985*	*1985 - 2009*	*2010 - Today*	*Today & Beyond*
					
WHAT WAS HAPPENING					
Large investment in infrastructure development post Great Depression	U.S. households begin adopting air conditioning en masse	Energy crisis → more coal and nuclear	Focus on optimization, energy efficiency, volatile fuel costs	Utilities make significant progress in reducing emissions from the electric power generation	Climate change drives electrification to decarbonize multiple sectors of the economy
OUTCOMES					
~99% of the U.S. population has access to electricity	Large focus on investing for growth	Long generation capacity, high rates, long system capacity	Flat to declining sales, harvest mentality	Operational focus to optimize and decarbonize	Economy-wide decarbonization enabled by utilities

Electricity usage for ‘home of the future’ could jump ~84% by 2040

Residential customer today[3]



Residential customer of the future



Typical characteristics

- ICE Vehicle
- Gas Water Heater
- Gas Stovetop
- Gas Furnace

- Rooftop Solar — ~7kW
- Electric Stovetop — ~1.5kW
- Elec. Space Heating — ~8kW
- Elec. Water Heating — ~5kW
- 2 x EVs *(with 2 x L2 chargers)* — ~12kW

Avg. annual consumption (MWh)[1]

Base load[4]	Solar[2]	Base load	Electric Vehicles	Beneficial Electrification	Total
6.9	-4.7	6.9	5.7	4.8	**12.7**

Average power consumption can increase by ~84% if a premise has solar but can go up to ~150% without solar

1. Based on average 2023 residential customer consumption by household; Load Research; 2. Self-consumption only; 3. 2,171 sq. ft.; 4. Base load includes all appliances installed in the house (e.g., fridge, etc.)
Source: Xcel Energy; EIA

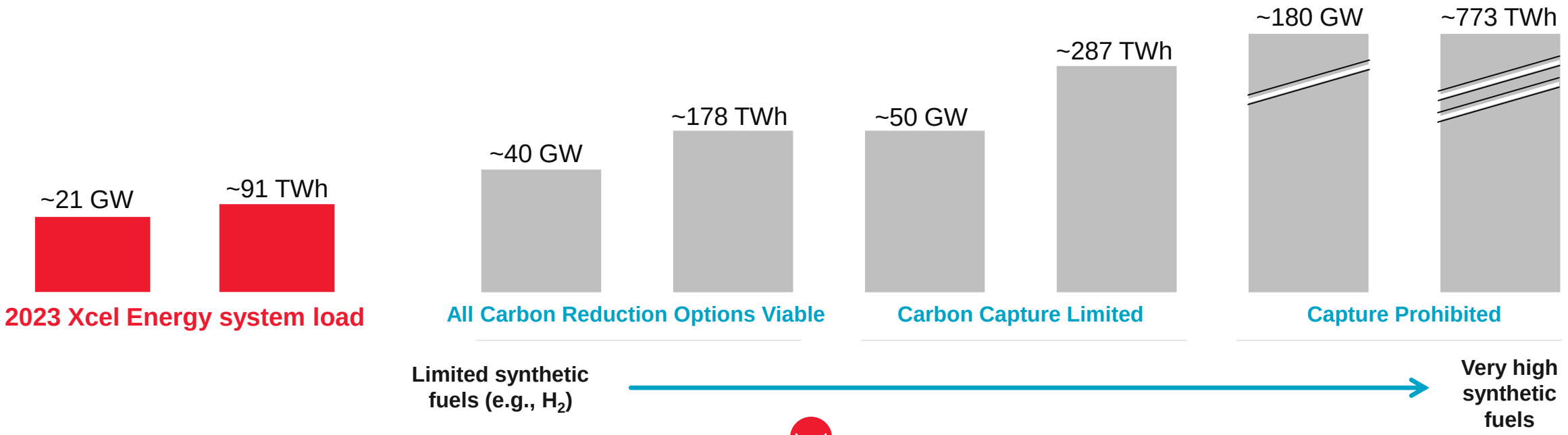
Projections show a wide range of possible future loads though all increase significantly

Xcel Energy load growth potential (GW)

Xcel Energy current internal projection process vs EPRI REGEN forecast for a 2050 total decarbonized economy

Current peak load (2023)

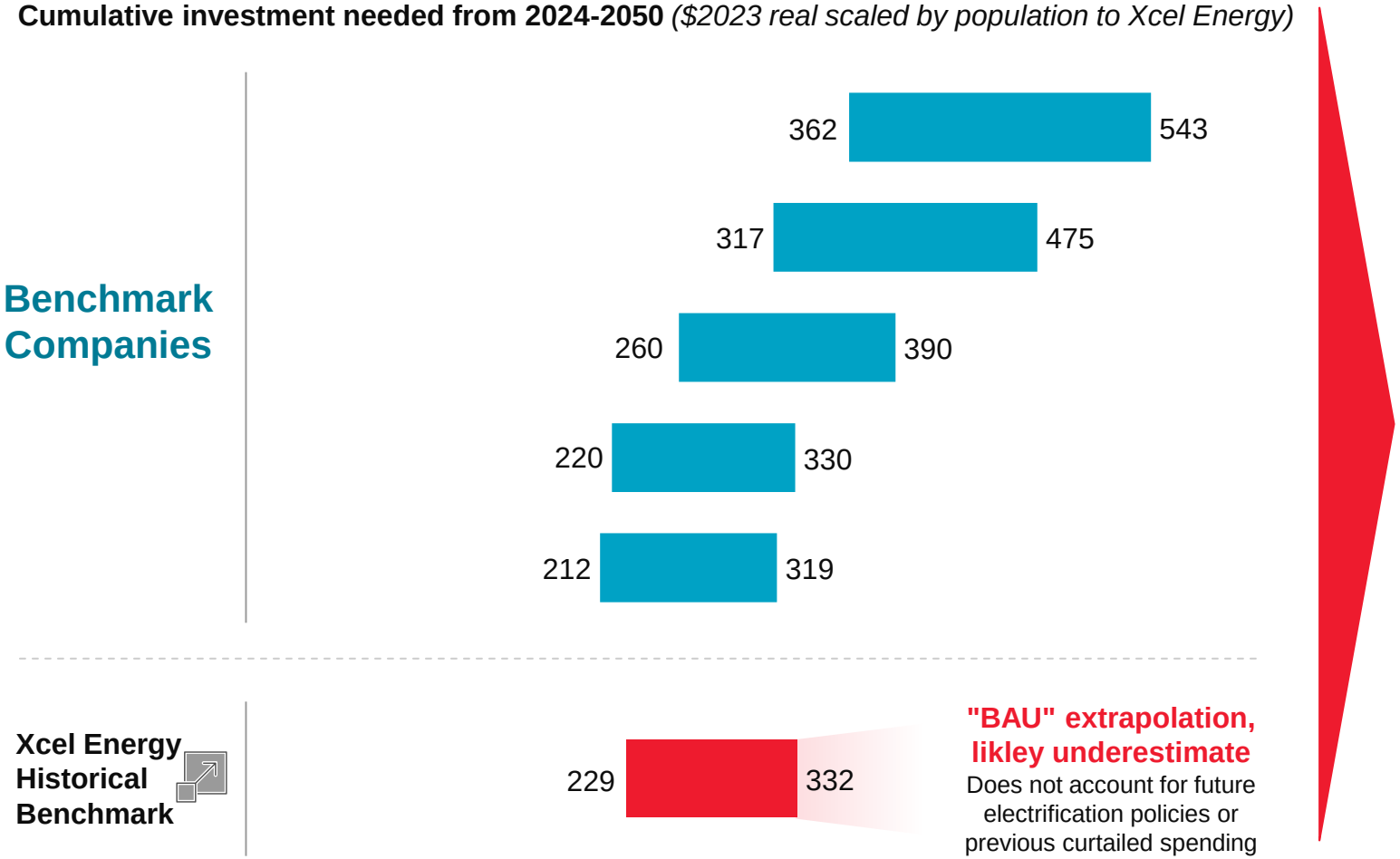
Potential 2050 peak loads scenarios – **EPRI REGEN** Analysis



EPRI REGEN looks at three different scenarios where the path to a total decarbonized economy either welcomes or restricts carbon capture. This lever dramatically changes the total energy needs due to how much energy it takes to create synthetic fuels. Regardless, the REGEN model shows higher forecasted system needs than our current process.

Benchmarks show $200-550B cumulative investment possible by 2050

Cumulative investment needed from 2024-2050 *($2023 real scaled by population to Xcel Energy)*



Estimates for capital for the energy transition, grid rebuild and meeting demand range but are increasing

~$5-10+ trillion

1. Peer benchmarks do not account for all cost categories, average cost per person for the given category (averaged from other peer estimates) used to fill in cost categories that are not covered 2. Low bound: Continued rate of spend from current 5 year capital plan. High bound: Historical cost of capacity benchmarks multiplied by faster-than-current future peaks growth to find spend beyond current rate. 3. +- 20% added to projections to indicate uncertainty

Xcel Energy – Colorado Only Estimates

		TODAY	2030	2050
Modernize and expand the grid for safety and resilience while meeting growing demand	**Strengthening And Enhancing Our Network**	152 Substations 278 Banks 809 Feeders	187 Substations 386 Banks 1,115 Feeders	259 Substations 509 Banks 2,193 Feeders
To support new sources of electric demand and Colorado's growing economy	**Heat Pumps & Water Heating**	5,000 Heat Pumps	300,000+ Heat Pumps	2,000,000 Heat Pumps
	Electric Vehicles	100,000 Vehicles	400,000+ Vehicles	3,000,000 Vehicles
	Commercial Demand	3,400 Megawatts	5,400 Megawatts	8,500 Megawatts
And integrate new sources of clean power	**Behind the Meter Solar**	700 Megawatts	1,500 Megawatts	5,000 Megawatts
	Community Solar Gardens	200 Megawatts	700 Megawatts	2,500 Megawatts

World War 2

$4 trillion (real USD)

65 million tons of steel

US Grid Needs

$10+ trillion (real USD)

163 million tons of steel