TESCO METERING

Increasing Energy Demands and the Impact on Meter Services

Tom Lawton
TESCO Metering

North Carolina Meter School Management
Tuesday, June 10, 2025
11:15 AM

Where Do We Start?

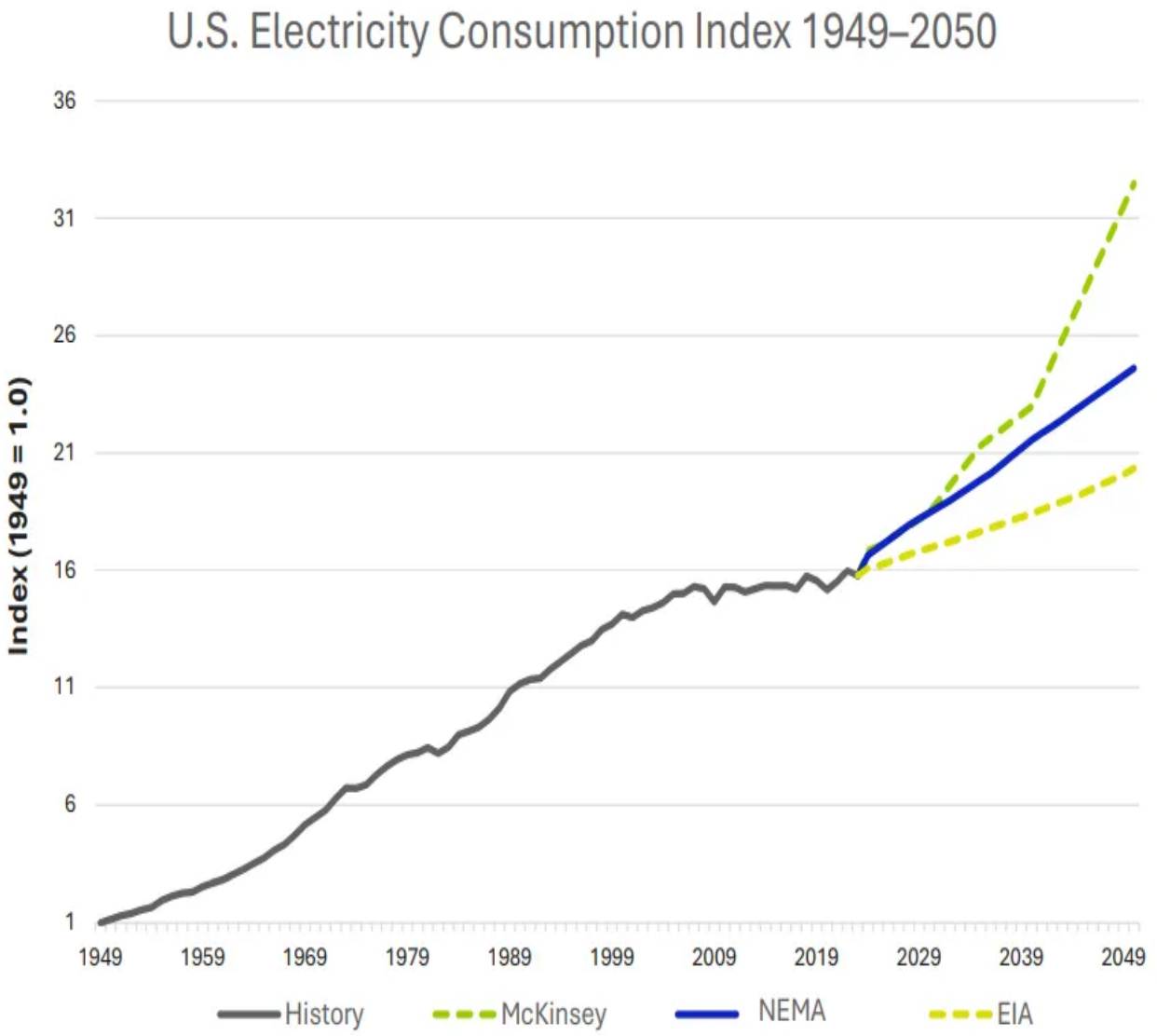
To understand the drivers to this increased growth

How much growth we are looking at

To understand the impact on meter services

Surging Demand

- U.S. Energy Demand Stagnation: Remained flat for nearly 15 years, beginning just before the 2007 Great Recession.
- Renewed Growth: Energy demand is rising again.
- Growth Rate: Increasing at 2% per year, matching historical trends.
- Projection: Expected to grow 50% by 2050.



Largest Driver of This Growth

Data Centers

- AI growth is accelerating and transforming daily work routines.
- Demand for AI-driven technology continues to grow rapidly.
- Supporting this growth requires an increasing number of data centers.
- Power generation must scale quickly to meet demand.
- Current regulations and manufacturing limitations (especially for transformers) are too slow to support this growth trajectory.

Additional Drivers of This Growth

Electric Vehicles

- Electric Vehicles: Initially drove increased demand, shifting from flat demand since 2005.
- Sales Growth: Approached 10% of U.S. new car sales in Q1 2025.
- Future Projection: Over 50% of new car sales expected to be electric by 2030, fueled by new features, manufacturers, and lower costs.
- Energy Impact: By 2030, over 10% of U.S. electricity usage expected to power electric vehicles.

Additional Drivers of This Growth

Industrial Growth

- Rapid Industrial Expansion: New manufacturing facilities are being established in the U.S. at an unprecedented rate, unseen in decades.
- Reshoring Key Industries: Industries like semiconductors and batteries are leading the trend of bringing production back to the U.S.
- Broadening Manufacturing Scope: Increasingly, a wide range of products and processes are being produced domestically.
- Surging Demand: The reshoring trend is driving significant demand for industrial capacity and resources in the U.S.

And the Electrification of Virtually Everything

Electrification Trend

- Electrification Trend: A broad movement toward electrifying buildings, residences, industrial processes, and appliances is underway.
- Residential Electrification: Homes are increasingly adopting electrification, with services upgrading to 320 amp capacities.
- Industrial and Commercial Growth: Electrification is driving rising demand in commercial and industrial sectors.
- Comprehensive Shift: Virtually all aspects of daily life, from appliances to controls, are becoming electrified.

TESCO METERING

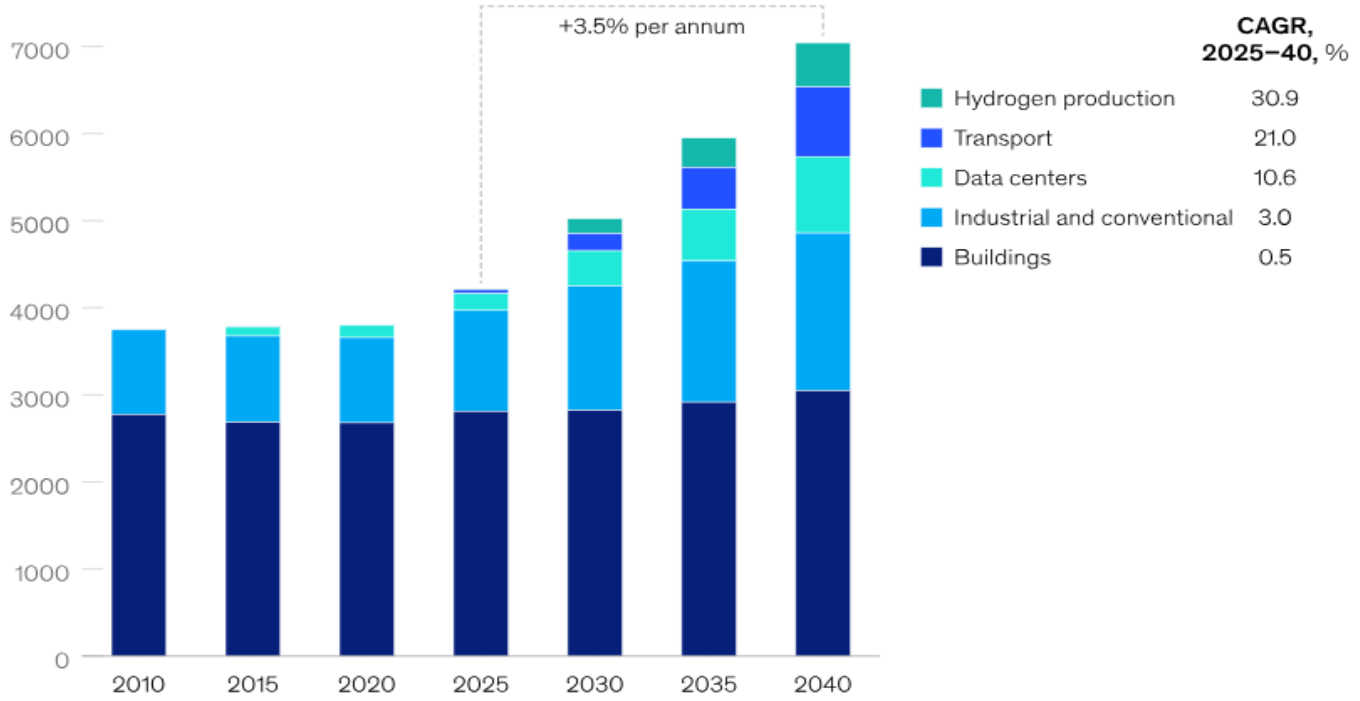
Surging Demand

Rising Electric Power Demand and Its Implications

- Rising Demand: Growing power use, with peak over 6,000 units, shows increased electricity reliance.
- Diverse Sources: Segmented data highlights varied consumption from multiple sectors.
- Economic Impact: Upward trend may boost energy investment and policy changes.

US power demand is expected to increase up to 3.5 percent annually through 2040.

US power demand, by sector, current trajectory scenario,[1] terawatt-hours



[1]Volumetric power demand load is total downstream sales, comparable to data that operators are required to provide on the US Energy Information Administration's Form EIA-861. It represents the gross of distributed generation, behind-the-meter systems, and transmission and distribution losses.
Source: McKinsey Power Model

McKinsey & Company

How Does This Impact Our Industry in General?

Industry Impacts

- Resource Shortage: Coal/gas retirement outpaces new generation, risking growth needs.
- Extreme Weather: More impact from weather spikes due to less cushion and vulnerable renewables.
- Affordability Concerns: Electricity bills up 6% yearly since 2020, complicating rate approvals.
- Supply Chain Delays: Transformers and turbines face 5+ year lead times, distribution up 400% since 2019.
- Permitting Hurdles: Cumbersome processes, worsened by special interests, hinder generation growth.
- Labor Shortage: Slight trade interest rise, but retirements still outnumber new entrants.

What Does This Mean to Meter Service Departments?

Let's take these one at a time…

- New generation is on the way but is taking longer than we will need.
    - This means that more and more customers will add generation behind the meter.
    - The most efficient place for this back up generation conventional or renewable will be at the metering point.
    - This real estate is becoming more and more valuable and more and more third parties are trying to get into the space between the meter and the customer's box.
    - Utilities will want to control this space as much as possible as this is the most litigious interface there is and adding a third party here will become increasingly problematic.
    - DER's are here and they will continue to arrive in more and different sizes and shapes and will not even meet the conventional definition of a DER. There will simply be more and more generation capability behind the meter and we will each need to have an effective and efficient way of addressing this at the metering end point.

This one is big for all meter service departments

Additional Generation Continued

Industry Impacts

- Mixed Generation: Some conventional, much renewable; renewables less reliable, causing more outages.
- AMI Benefits: Outage management improves with AMI; need to expand tools for widespread outages and DER management.
- Grid Weaknesses: Iberian events highlight grid vulnerabilities from past generation choices, impacting distribution.
- AMI Data Role: Real-time AMI data grows vital for tackling distribution challenges.

Extreme weather

Weather Risks and Real-Time Solutions in Energy Generation

- Weather Impact: Thermal, wind, and solar generation may falter due to extreme heat, cold, winds, or ice.
- New Challenge: Industry unaccustomed to generation loss alongside weather-driven demand spikes.
- DER Vulnerability: Emergency reserve DERs, often renewables, may fail in extreme weather, risking critical sites like hospitals.
- AMI Importance: Real-time AMI data crucial for managing and restoring large-scale outages.

Energy Costs

Tackling Line Loss with Advanced Metering

- Reduce Line Loss: Better metering key; physics predicts losses, but actual losses exceed theory.
- Metering Issue: High losses due to poor metering.
- Improvement Needed: Across-the-board metering upgrades required.
- AMI Solution: AMI tools identify and help address excessive line loss.
- Causes for loss:
  - Theft
  - Harmonics
  - Non-Blondel metering – the largest offender is 2S metering
  - Loose connections
  - Failing equipment
  - Over sized transformers
  - Mis-managed metering – no billing; billing the wrong accounts; poor bi-directional metering or no bi-directional metering; flat rate billing

Energy Supply Chain Issues

Leveraging AI to Optimize Line Loss and Distribution

- Rising Need: Line loss reduction urgency grows as utilities gain effective tools.
- AI Role: AI, trained by meter engineers, will analyze data behind firewalls, boosting response and understanding.
- Utility Advantage: Early adopters excelling with AI will enhance distribution, sharing insights for broader improvement.
- Supply-Demand Gap: AI may ease demand pressure, though supply chain lags persist, narrowing over time.

Permitting Processes

Addressing Permitting Delays for Timely Energy Solutions

- Political Challenge: Permitting delays are a political issue affecting new generation buildout.
- Efficiency Focus: Optimize distribution operations to alleviate pressure on the system.
- Policy Impact: Aim for smarter permitting decisions to ensure public safety while speeding up construction.
- Urgency: Prevent critical electricity shortages by timely generation expansion.

Labor Availability

Addressing the Meter Tech Shortage

- Long-standing Issue: Industry faces a 20+ year shortage of new entrants, with more experienced meter techs retiring than joining.
- Emerging Hope: 18-25-year-olds are beginning to see trades as viable, potentially outpacing non-technical degrees.
- Industry Role: Creating attractive jobs and clear career paths, aided by AMI, AI, and new equipment, is crucial to retain talent.
- Training Priority: Enhanced internal and school-based training will support new entrants and industry growth.
- Critical Opportunity: The future hinges on leveraging this interest to build a sustainable workforce.

Summary

Energy Demand

Growth in energy demand was a way of life for our industry for over a one hundred years. For the fifteen years this growth flattened and we stopped expecting this type of growth as a part of our daily life and long term planning.

This growth is back and this is our new norm. We have gone back to the future.

Industry Impacts

- We have been doing the right things. AMI is key to our even having a chang=ce to keep up with and begin to outstrip the demands being placed on our generation and our distribution system.
- We need to leverage this tool with new tools like AI
- We need to be actively measuring, addressing and reducing line loss by addressing and eliminating bad metering – including 2S meters.
- We need to embrace and figure out the best ways to handle DER's and other types of generation behind the meter
- We need to continue to attract new talent into metering and operations. We need to train them and demonstrate a clear career path. The careers in metering continue to evolve. We need to acknowledge this and change many of our job titles and perceived career paths.

Questions and Discussion

Tom Lawton

TESCO Metering *Bristol, PA*

215.228.0500

This presentation can also be found under Meter Conferences and Schools on the TESCO website: tescometering.com

ISO 9001:2015 Certified Quality Company
ISO 17025:2017 Accredited Laboratory