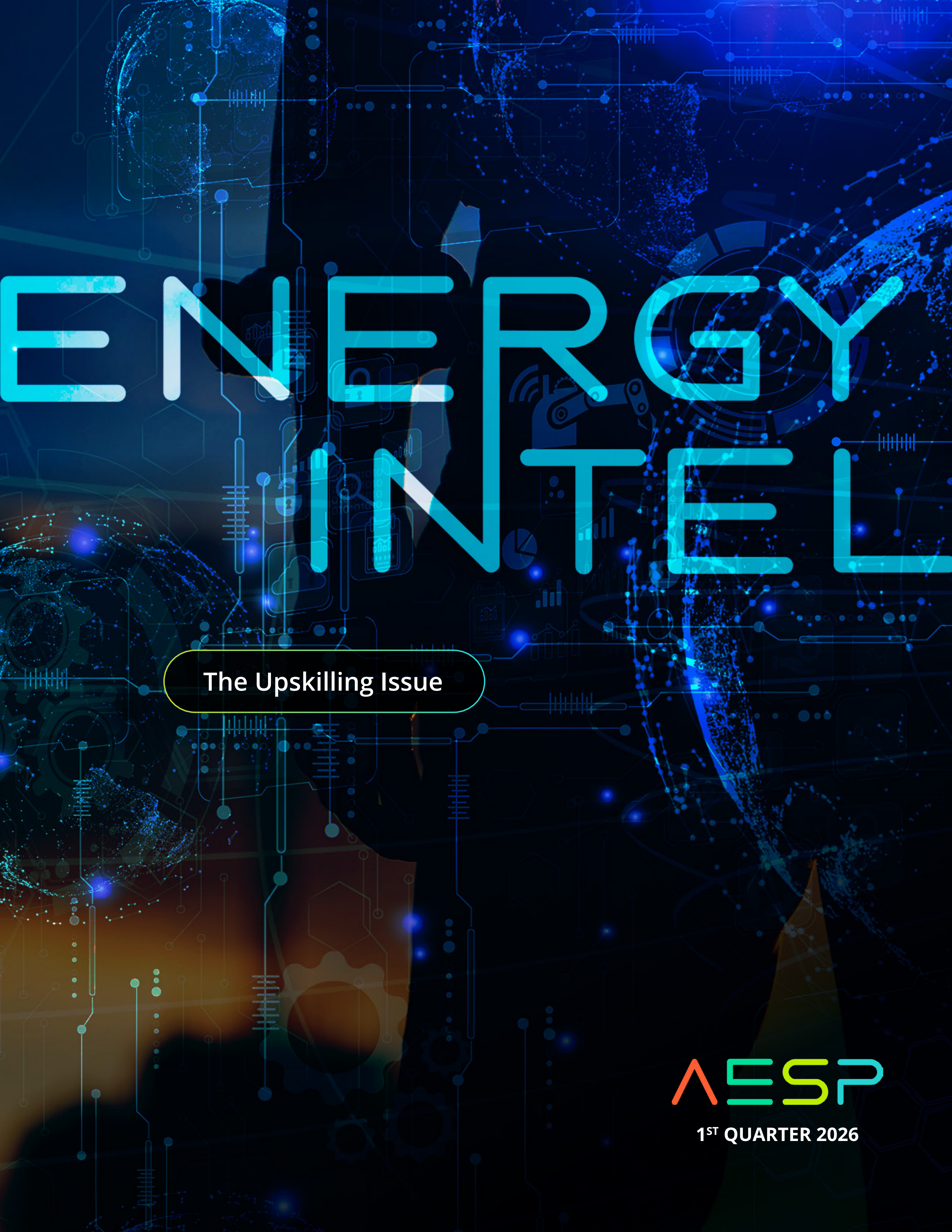

ENERGY INTEL

The Upskilling Issue

AESP

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A Letter from the Board Chair

As I step into my role as Board Chair of AESP, I am reminded how quickly our industry continues to evolve and how fortunate we are to be part of a community that not only responds to change, but actively shapes it.

In my own work across energy efficiency and demand-side programs, I see every day that progress in our industry rarely comes from technology alone. It comes from the people and partnerships that turn ideas into real outcomes for customers and communities.

Building the Energy Workforce of the Future

One of the strongest themes in this edition is the future of the energy workforce. As demand for clean energy solutions grows, our industry must expand not only the number of people entering energy careers, but also the ways we define and support those roles.

Several articles explore how to strengthen workforce pipelines and create clearer pathways into the industry. Alex Varricchio's article on building the energy workforce before recruitment begins reminds us that attracting talent starts with helping people understand what energy careers actually look like and why they matter.

Similarly, Christi Hodgson's exploration of Strategic Energy Management programs highlights how early-career professionals can succeed in energy leadership roles when the right structures and support systems are in place. These examples reinforce that energy leadership often depends as much on communication, collaboration, and organizational influence as it does on technical expertise.

Equally important is ensuring the workforce reflects and connects with the communities we serve. Diana De Pierola's article on bilingual engagement highlights how language access can strengthen program participation and build trust with customers. It also demonstrates that communication skills are becoming just as essential as technical expertise in today's energy programs.

Demand Flexibility and Grid Resilience

Another key theme throughout this issue is demand flexibility and grid resilience. As electrification accelerates and renewable generation grows, demand-side solutions are becoming increasingly important for maintaining reliability.

The examples featured in this issue illustrate how a range of strategies can support grid stability. From thermal energy storage solutions that enable operational flexibility to large-scale thermostat programs that deliver measurable peak demand reductions, customers, buildings, and distributed technologies are becoming active participants in the energy system.

These examples remind us that demand flexibility works best when technology, operations, and customer engagement strategies are designed together.

Turning Data Into Action

Utilities are also exploring how to better use the vast amount of data generated across their systems. Articles in this issue examining artificial intelligence and data strategy highlight both the opportunities and the challenges of translating data into actionable insights that improve reliability, affordability, and customer experience.

As these capabilities evolve, utilities and program implementers will need to balance innovation with thoughtful program design and strong data governance.

Collaboration at the Center

Taken together, the articles in this issue reinforce an important truth: the energy transition willnot be driven by any single innovation. It will be built through layered solutions that combine technology, workforce development, program design, and collaboration across the energy ecosystem.

That collaborative spirit is what defines the AESP community. AESP plays an important role in bringing together the professionals who design, implement, and evaluate the programs that move our industry forward. Through shared learning, dialogue, and partnership, our community helps translate ideas into action across utilities and markets.

I hope the insights in this issue of Energy Intel spark new ideas and conversations across our industry and encourage continued collaboration as we work together to shape the future of energy.

Liz Haworth
Board Chair, AESP

Liz Haworth, VP of Marketing, Michaels Energy
Liz serves as Board Chair of AESP and is Vice President of Marketing at Michaels Energy. She brings a background in marketing, brand development, and stakeholder engagement across multiple industries, including energy efficiency and financial services. In her role at Michaels Energy, Liz leads marketing strategy and industry engagement efforts that expand awareness of demand-side energy solutions, strengthen the company's brand, and connect utilities, partners, and customers across the energy ecosystem. Earlier in her career, she led and grew a startup nonprofit foundation within the credit union industry focused on advancing financial literacy and creating pathways to homeownership for underserved members of the community. She has also served as an adjunct professor of marketing, teaching both undergraduate and graduate courses.

Demand Flexibility: Layering Assets and Behaviors for Greater Grid Value

by Stan Nabozny

INTRODUCTION:

Why Demand Flexibility Needs a Layered Approach

Demand flexibility is often treated as a single capability, but in practice it reflects how energy is used, when it is used, and how reliably that use can be adjusted in response to grid needs. At its core, demand flexibility is the ability to change customer load in ways that provide value to the electric system—by reducing peak demand, shifting energy use to lower-cost periods, or responding to grid events. [1,2]

Many demand flexibility efforts underdeliver because they rely too heavily on a single strategy. Technology-only approaches can provide measurable load reductions but often underperform when layered on top of inefficient or poorly managed operations. Conversely, behavior-based or operational programs can reduce waste and improve awareness but frequently struggle to deliver predictable, dispatchable grid value during critical peak periods. [3]

A more effective approach is to intentionally layer complementary strategies. This means combining asset-based flexibility, which relies on physical infrastructure such as storage and controllable equipment, with operational and behavioral flexibility, which focuses on how facilities are managed, scheduled, and monitored. When these strategies are designed and implemented together, the layers reinforce one another: efficient operations create a stable foundation, while physical assets provide dependable, repeatable load flexibility. [1]

This article explores that layered approach through two real-world examples. At a nonprofit food distribution organization, thermal energy storage was deployed as an asset-based solution to shift refrigeration load away from peak periods with minimal operational burden. At a food manufacturing facility in Iowa, a Strategic Energy Management (SEM) approach focused on employee engagement while performance tracking reduced baseline energy use and improved load stability. Together, these examples illustrate how demand flexibility delivers the greatest grid value when assets and behaviors are treated as complementary parts of the same system.

A Simple Framework for Demand Flexibility

A practical way to understand demand flexibility is as a system built from two interdependent layers: asset-based strategies and operational and behavioral strategies. Each contributes different forms of grid value, and neither is sufficient on its own in all circumstances. [1,3]

Asset-based strategies rely on physical infrastructure to modify load shape. Examples include thermal energy storage, battery storage, flexible electrified loads, and advanced controls that reliably adjust equipment operation. These assets are particularly valuable because they deliver predictable and dispatchable load reductions, allowing utilities to forecast available capacity with confidence and rely on it during periods of system stress. [2,4]

Operational and behavioral strategies focus on how energy is used day to day. Strategic Energy Management programs, improved scheduling, production-normalized performance metrics, and employee engagement all fall into this category. These approaches reduce waste, improve persistence, and stabilize load profiles over time. [5] While they may not always provide precise, event-based load reductions, they create a cleaner baseline from which additional flexibility can be delivered.

Each layer addresses a different need for the grid. Asset-based strategies excel at predictability, while operational strategies enhance persistence. Together, they improve responsiveness, enabling facilities to adapt to changing grid conditions without sacrificing reliability. [1,6] Critically, these approaches should not be viewed as sequential or competing; demand flexibility is most effective when both layers are intentionally designed to work together.

CASE EXAMPLE:

Kids Food Basket — Asset-Based Demand Flexibility Through Thermal Energy Storage

Kids Food Basket is a nonprofit organization supporting food distribution and meal programs for children and families. Its operations rely on refrigerated and frozen storage to preserve food quality and safety, while staffing and capital resources remain limited. Reliability, simplicity, and low operational burden are therefore critical considerations for any energy-related intervention.

From an energy perspective, refrigeration loads at the facility are largely fixed by food safety requirements and storage temperatures. Unlike industrial facilities, there is limited flexibility to manually adjust operating schedules or shift activities. This makes Kids Food Basket representative of a broader class of customers for whom traditional, behavior-driven demand response strategies are difficult to implement, despite operating electrically intensive, grid-relevant loads. [4,7]

Refrigeration demand is strongly correlated with ambient conditions, meaning peak cooling loads often coincide with utility system peaks. For facilities such as Kids Food Basket, this creates a structural challenge: cooling demand is highest precisely when the grid is most constrained, yet curtailing refrigeration is not an option without risking product integrity. [7]

To address these constraints, thermal energy storage was deployed as an asset-based demand flexibility solution using modular, freezer-integrated storage units. Cooling energy is stored in the form of thermal energy during off-peak periods and stored in Michaels Energy's IceRack™ medium. During peak periods or grid events, stored thermal energy maintains refrigeration temperatures while active mechanical cooling is suspended. During a load-shedding event, evaporator operation is paused, and cooling is provided by stored thermal energy rather than active refrigeration, allowing demand reductions without changes to setpoints, product handling, or staff workflows. [4,7]

At the Kids Food Basket facility, this operating mode enabled two discrete load-shedding events per day of approximately five hours each, during which compressors and evaporators were fully shut off while refrigeration temperatures remained within acceptable limits. Across these shed periods, the facility observed energy reductions exceeding 20 percent relative to baseline operation during comparable time windows.

This approach decouples cooling production from cooling demand without altering setpoints, product handling, or workflows. Once charged, the system responds automatically to facility conditions, reducing reliance on real-time operator actions. Because the load reduction is tied to a physical asset rather than discretionary behavior, the resulting demand flexibility is highly predictable, enhancing its value for utility planning and dispatch. [2,6]

The Kids Food Basket case illustrates how asset-based demand flexibility can expand grid participation to facilities where operational or behavioral strategies alone are insufficient.

CASE EXAMPLE:

Grain Millers — Building Demand Flexibility Through Operational and Behavioral Strategies

Grain Millers is a leading agricultural food business specializing in whole-grain manufacturing, with energy use driven by production throughput and process equipment. At the St. Ansgar, Iowa facility, energy had historically been treated as a fixed cost rather than a controllable operational variable, limiting visibility into how consumption varied with production.

Grain Millers partnered with Alliant Energy and Michaels Energy to reduce waste through a Strategic Energy Management approach. The objective was not event-based load shedding, but to establish the organizational and analytical foundation needed to manage energy intentionally. [5]

Operational improvements included refined operating practices, improved energy visibility through routine performance tracking, employee feedback mechanisms, and integration of energy considerations into maintenance processes.

A production-normalized KPI based on energy use per ton of output was introduced to distinguish efficiency gains from throughput changes.

Over nine months, these strategies reduced electricity consumption by approximately 6.3 percent and stabilized the facility's load profile. Reduced variability and improved accountability increased readiness for future demand flexibility programs, demonstrating how operational strategies can prepare facilities for effective asset-based flexibility. [3,5]

Why Layering Works Better

Viewed independently, asset-based and operational strategies each have limitations. Physical assets can deliver predictable load reductions, but their performance depends on the quality of underlying operations. Behavioral strategies improve persistence but often lack the precision required for dispatchable grid services. [6]

When layered intentionally, these approaches reinforce one another. Operational improvements create a cleaner, more stable baseline that enhances asset performance, while physical assets provide firm, time-specific load reductions. Together, they create a demand flexibility resource that is more predictable, persistent, and responsive than either approach in isolation. [1,2]

Implications for Utilities

These examples suggest that utilities may benefit from designing demand flexibility programs that treat asset-based and operational strategies as complementary rather than separate tracks. Both approaches are scalable across customer classes and utility territories, making them suitable not only for pilot programs but for portfolio-level deployment. Valuing predictability and persistence alongside magnitude can improve planning confidence and system performance. [2,6]

Layered approaches also expand participation by accommodating a wider range of customer types, from mission-driven nonprofits to industrial manufacturers. Programs that allow these strategies to coexist and evolve over time can improve participation and long-term results.

CONCLUSION:

Demand Flexibility as a System

As electric systems face increasing constraints from electrification, variable generation, and peak demand growth, demand flexibility will play a critical role in maintaining reliability. The most effective strategies, however, are not built around a single technology or program model.

The examples presented here show that demand flexibility works best as a layered system. Operational strategies reduce waste and stabilize energy use, while asset-based strategies provide dependable, dispatchable load flexibility. Designed together, these layers deliver greater value to customers and the grid alike. [1,2]

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Stan Nabozny is Director of Energy Solutions at Michaels Energy, where he leads the development and deployment of thermal energy storage (TES) and demand flexibility solutions for commercial and industrial facilities. With more than 15 years in the energy industry, he specializes in cold storage, food processing, manufacturing, and large commercial facilities, with a focus on behind-the-meter load flexibility, demand response, capacity markets, monitoring-based commissioning, and cold chain decarbonization. Stan holds multiple TES patents and has designed, sourced, and implemented TES solutions across the United States, Mexico, Latin America, and Japan. A recognized speaker and author, he has presented at AESP and written for Energy Intel on thermal energy storage, refrigeration load flexibility, demand flexibility, grid resilience, and decarbonization.

Within ASHRAE, he has presented at multiple conferences, co-authored a proposed standard on TES in refrigeration systems, has a chapter submission under review for the ASHRAE Handbook—Refrigeration, serves as Secretary of TC 6.9 (Thermal Storage), and participates in the DOE Stor4Build TES Adoption Task Group. Outside of work, Stan loves the outdoors and is an avid fisherman. He has been recognized for his various accomplishments in salt water fly fishing by the IGFA where he has broken over 160 world records and counting.