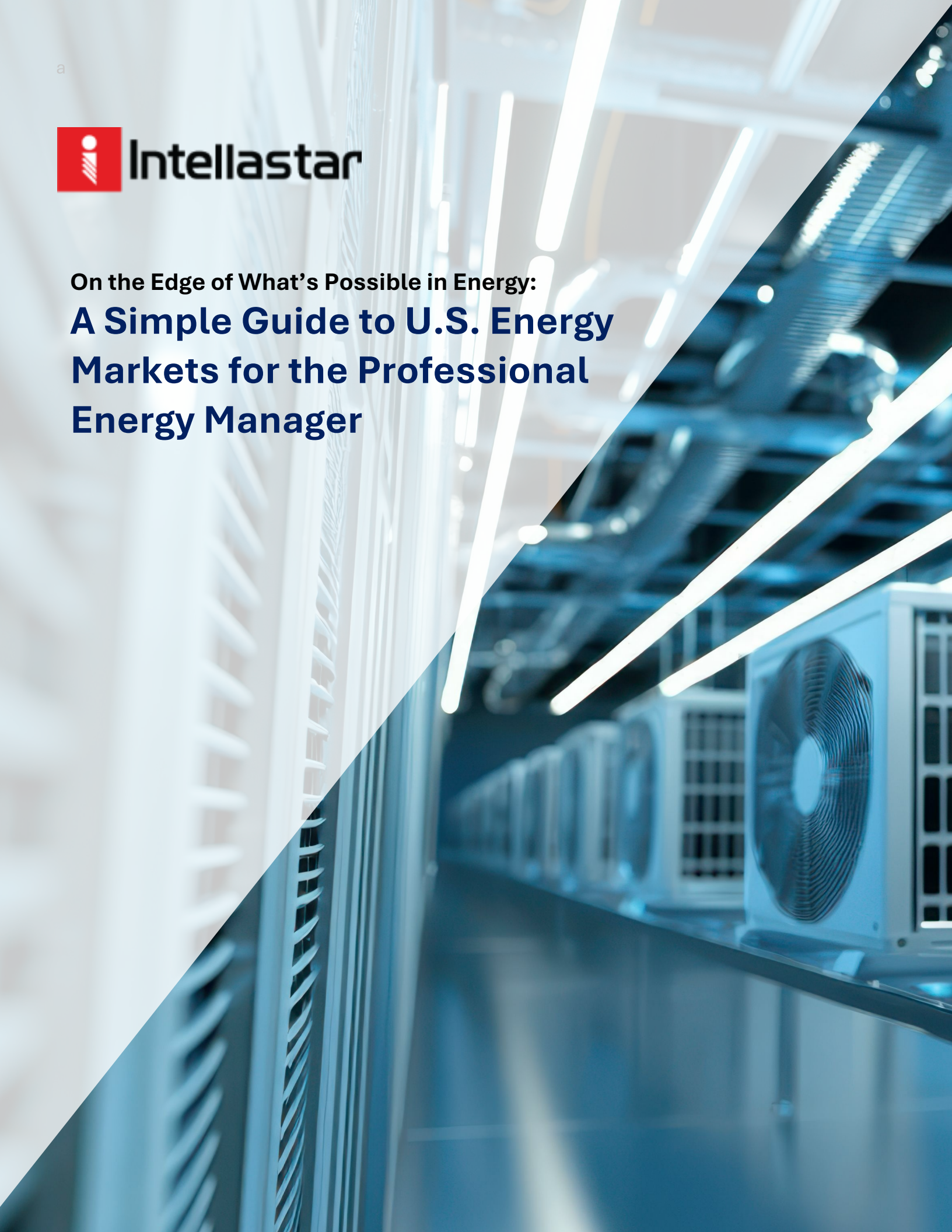




**On the Edge of What's Possible in Energy:
A Simple Guide to U.S. Energy
Markets for the Professional
Energy Manager**



INTRODUCTION

Why Energy Management Needs a Fresh Perspective

Energy managers today are navigating a dramatically different landscape than even a few years ago. Grid instability, dynamic pricing, decarbonization goals, and an explosion of data from devices, meters, controllers and dashboards have reshaped what's expected—and what's possible.

The **On the Edge of What's Possible in Energy** series of guides are designed to help you meet that moment. Whether you're just getting started, validating your current strategy, or expanding your capabilities, these guides break down complex topics into approachable, actionable insights.

This isn't about becoming an expert overnight. It's about getting the fundamentals right so you can build smart, scalable, future-proof energy strategies.

In this guide, we'll cover the basics of **U.S. Energy Markets for the Professional Manager**. We'll focus on the basics every modern energy manager needs to understand:

- **Governing Bodies:** Who the key players, market operators, and regulators are.
- **Key Terms & Concepts:** The language of energy markets decoded.
- **Deregulated Markets:** Why choice matters, and how it impacts your strategy.
- **Strategies:** How to optimize costs and even generate revenue from your energy assets.

Each section gives you the tools to evaluate where you are today and where you can go next with or without a full-scale retrofit.

Let's get started.



10 Years +
IoT experience



1 million +
Real-time data points



15,000 +
Edge devices deployed

ABOUT INTELLASTAR

At Intellastar, we don't claim to know more about your building than you do—or to have all the answers in an ever-changing industry or niche market. Instead, we empower energy managers, operators, and sustainability leaders to make smarter, faster energy decisions—without the complexity.

Our mission is simple: unlock the full value of your energy data through edge intelligence, real-time insights, and seamless connectivity. From predictive analytics to automated energy responses, we equip organizations to reduce costs, boost resilience, and meet evolving regulatory and sustainability goals.

Our Solution Includes:

ENERGY ANALYST:

A next-generation energy management platform that combines real-time KPIs, day-ahead pricing, and predictive modeling. Energy Analyst automates demand response, tracks energy-saving initiatives, and turns data into decisions across single sites or entire portfolios.

T-STAR EDGE PLATFORM:

A rugged, certified edge device built to connect legacy systems and modern infrastructure alike. With support for BACnet, Modbus, cellular connectivity, and advanced security protocols, it delivers reliable control and insight at the edge—even in mission-critical environments.

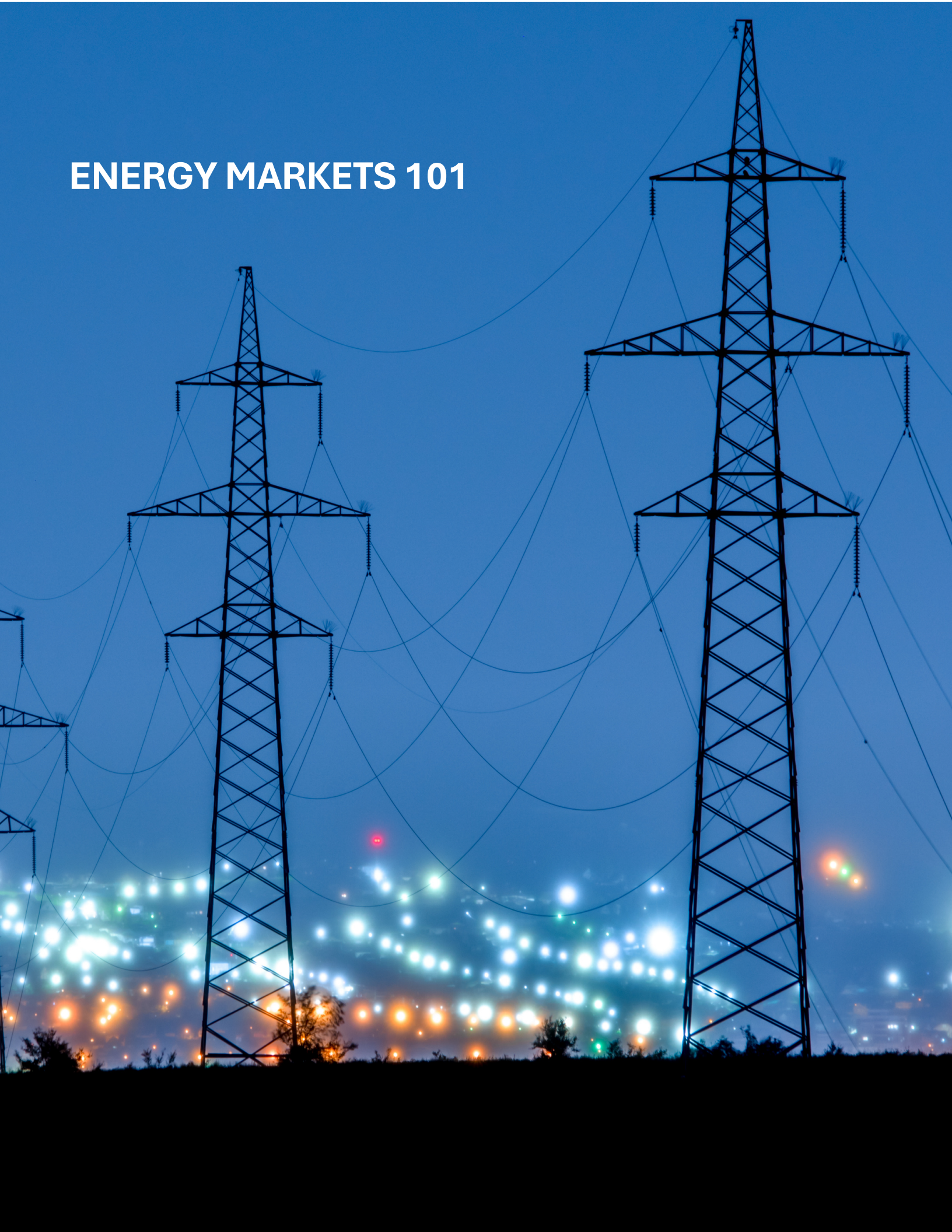
PROFESSIONAL SERVICES:

From Haystack tagging and Xeto modeling to integration planning and compliance support, our team ensures your systems are not only connected—but configured for meaningful results.

Whether you're optimizing energy assets, building a virtual power plant, or just starting your digital energy journey, Intellastar helps you move from reactive to predictive—with confidence.

Learn more at [Intellastar.com](https://intellastar.com).

ENERGY MARKETS 101



ENERGY MARKETS 101

Energy markets are platforms where electricity is bought and sold, facilitating the balance between supply and demand. In the United States, these markets are often managed by Independent System Operators (ISOs) and Regional Transmission Organizations (RTOs), which oversee the transmission grid and ensure reliable electricity delivery.

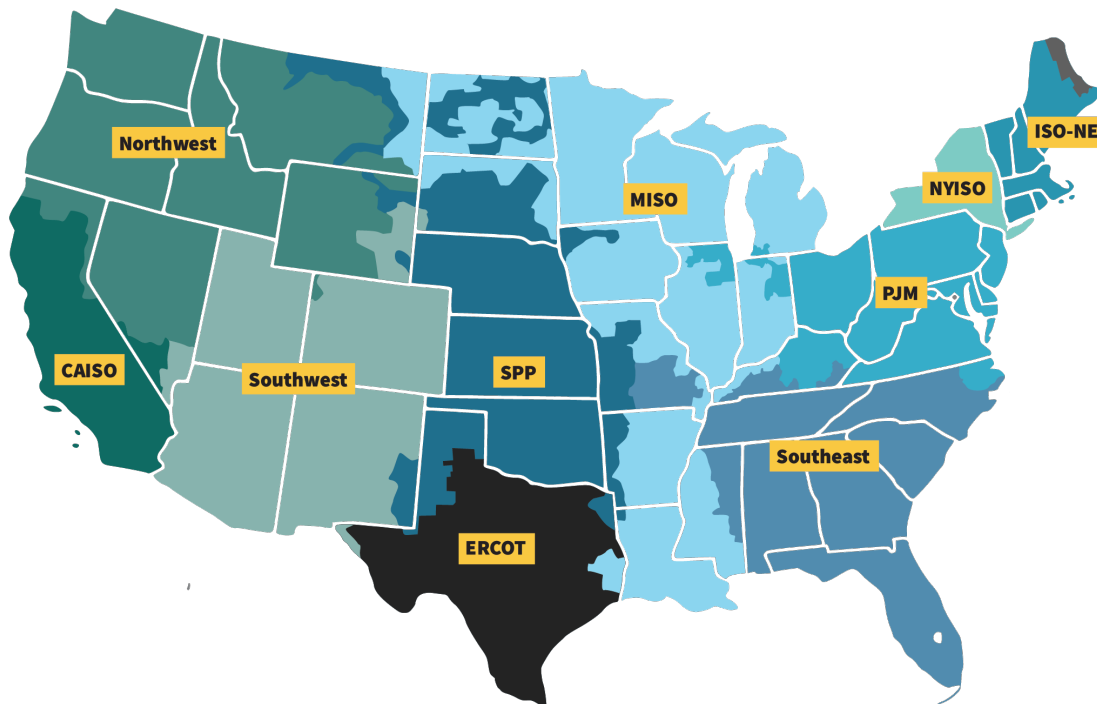
ROLES AND RESPONSIBILITIES

ISOs and RTOs are responsible for coordinating, controlling, and monitoring the operation of the electrical power system within a specific region. They ensure non-discriminatory access to the transmission network and maintain system reliability. While both entities perform similar functions, RTOs typically operate over larger, multi-state areas and have greater regulatory oversight.¹

SERVICE AREAS AND SIZE

Here's a table summarizing some of the key ISOs and RTOs, along with the areas they serve and their peak demand figures:

Entity (ISO / RTO)	Areas Served	Approximate Peak Demand	Approximate Customers
PJM Interconnection (PJM)	Mid-Atlantic and Midwest	165,492 MW	65 million
Midcontinent ISO (MISO)	Midwest and Southern U.S.	127,125 MW	42 million
California ISO (CAISO)	California	50,270 MW	32 million
New York ISO (NYISO)	New York State	32,076 MW	19.8 million
ISO New England (ISO-NE)	New England states	28,130 MW	14.8 million
Electric Reliability Council of Texas (ERCOT)	Most of Texas	80,200 MW	26 million
Southwest Power Pool (SPP)	Central U.S.	51,000 MW	18 million



KEY CONCEPTS IN ENERGY MARKETS

Day-Ahead Markets: In the day-ahead market, electricity is traded one day before it is actually consumed. Market participants submit bids and offers based on their projected supply and demand for the following day. This market helps in scheduling generation and securing commitments, thereby enhancing reliability and price stability.

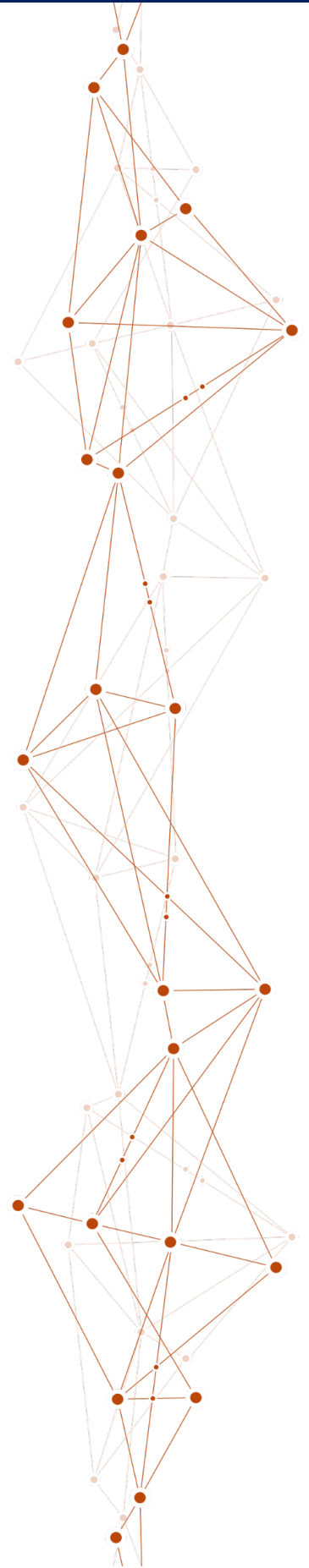
Real-Time Markets: The real-time market addresses the differences between the day-ahead scheduled commitments and the actual real-time demand and supply. It operates on a much shorter interval, typically every five to fifteen minutes, to ensure continuous balance and address unforeseen fluctuations in demand or supply.

Capacity Markets: Capacity markets are designed to ensure that there is sufficient generation capacity available to meet peak demand in the future. Generators are compensated for being available to produce electricity, even if they are not called upon to generate during certain periods. This mechanism provides financial incentives for maintaining and investing in generation resources to ensure long-term reliability.

Locational Marginal Pricing (LMP): LMP is a pricing mechanism that reflects the value of energy at different locations, considering the cost of delivering electricity, transmission congestion, and losses. Prices can vary across locations due to these factors, signaling where investments in infrastructure or generation may be needed.

MARKET VOLATILITY

Energy prices can fluctuate rapidly due to shifts in supply, demand, grid congestion, and unexpected events like extreme weather. Wholesale electricity prices typically range from \$30 to \$50 per megawatt-hour (MWh), but during extreme conditions, they can spike dramatically. During Winter Storm Uri in February 2021, prices in ERCOT (Texas) soared to \$9,000/MWh, the market's price cap at the time. To put this in perspective, a typical household uses around 1 MWh per month—meaning electricity that would normally cost \$40 instead surged to \$9,000. Some Texas residents on wholesale pricing plans received electric bills higher than their mortgage payment in just a few days. On the other hand, prices can turn negative, meaning generators pay consumers to take excess electricity. This often occurs in markets like CAISO and ERCOT when renewable energy output is high but demand is low, such as sunny afternoons with surplus solar power. This extreme volatility underscores the importance of energy storage, demand response, and flexible grid management to stabilize prices and improve system reliability.



DEREGULATED MARKETS

Energy deregulation allows businesses and consumers to choose their electricity and natural gas suppliers, introducing competition into markets traditionally controlled by utilities. While this can create opportunities for cost savings, contract flexibility, and renewable energy procurement, it also brings risks such as price volatility, supplier reliability concerns, and regulatory uncertainty. Energy managers operating in deregulated markets must navigate these factors strategically to optimize their energy procurement and risk management strategies.

BENEFITS OF DEREGULATION

Deregulated energy markets drive down costs by forcing suppliers to compete, leading to lower rates and custom contracts. Businesses in Texas, Illinois, New York, and Pennsylvania have saved millions through smart procurement.

Deregulation can also expand access to renewables. Many corporations leverage Power Purchase Agreements (PPAs) to lock in stable pricing for green energy, while demand response programs in deregulated states offer greater flexibility and competitive incentives through third-party providers.

However, savings aren't automatic. **Energy managers must understand market conditions and contract structures to avoid overpaying**—your neighbor might be getting a better deal simply because they negotiated smarter.

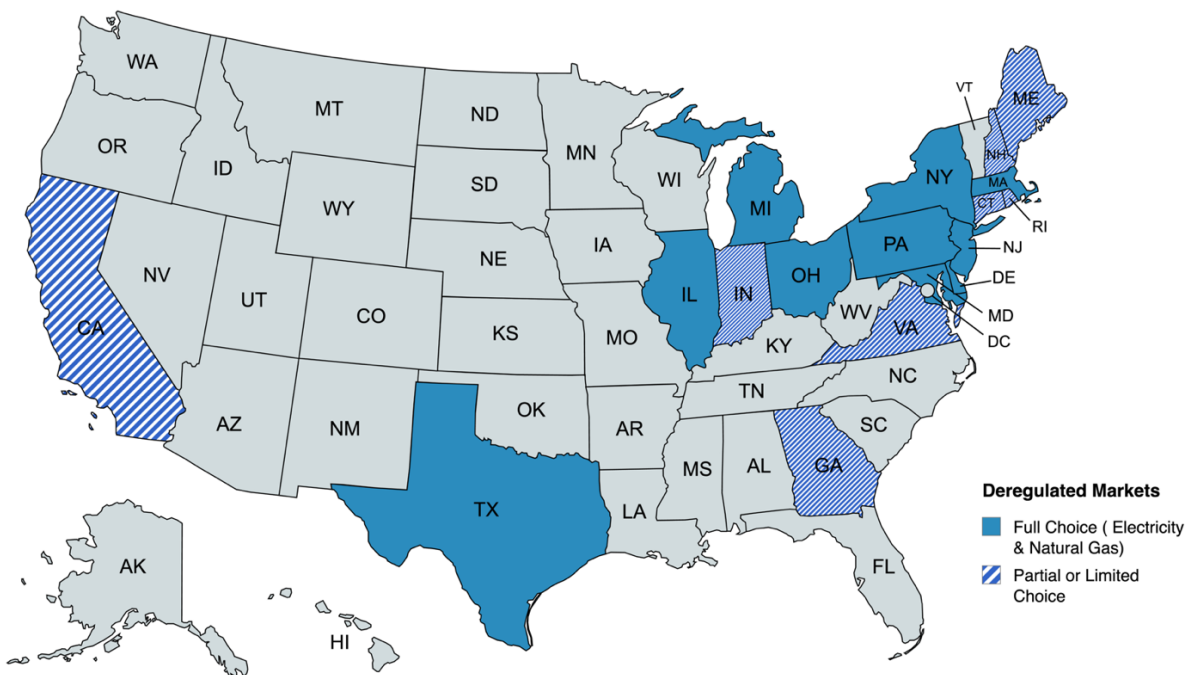
CONTROVERSIES AND CHALLENGES

Market volatility is a real risk. Severe weather and natural disasters can send prices soaring, leaving businesses with massive bills. California's early deregulation in the 2000s led to blackouts and market manipulation, forcing the state to roll back parts of its system.

All suppliers buy from the same wholesale markets, but pricing and procurement strategies vary. Some rely on aggressive marketing and risky trading, while others focus on price stability and renewables. Not all suppliers play fair—some lure customers with teaser rates, then hike prices, as seen in Ohio and New Jersey. Others bury costly fees in fine print. West Virginia re-regulated in 2015, and Nevada rejected deregulation in 2018 over stability concerns.

Energy managers must stay informed. Variable pricing, demand charges, and hidden costs can lead to bad deals while competitors lock in better rates.

Energy Choice Map in the US (2025):



STRATEGIES

Once foundational knowledge of energy markets, tariffs, and grid structures is in place, Energy Managers must move from understanding to execution. The strategies outlined in this section represent actionable paths to reduce costs, manage capacity, and capture value from market participation.

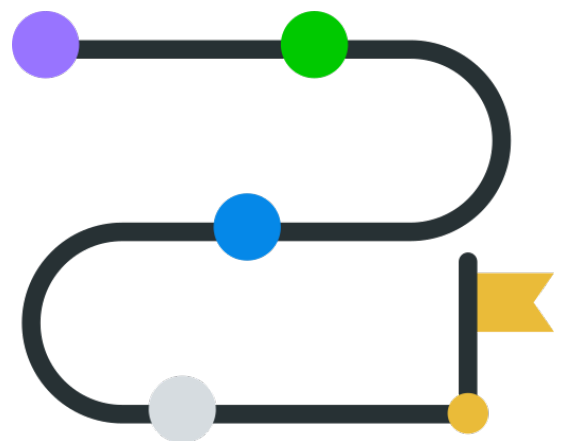
That said, this is a broad overview. Every region has unique regulatory frameworks, incentive structures, and pricing mechanisms. Some facilities may operate within ISO zones with access to programs like 5CP/4CP capacity management, while others may be governed by municipal utilities or state-run programs with different opportunities and constraints.

Strategy	Objective	Common Use Case
Day-Ahead Market Optimization	Reduce procurement costs by buying in advance	Facilities with energy procurement flexibility
Real-Time Price Response	Adjust load in response to 5–15 min price updates	High-load facilities with automation systems
Capacity Management (ICAP/5CP/4CP)	Reduce future year capacity obligations during peak intervals	Predictive load shedding during peak forecasts
Demand Response (Emergency/Economic)	Earn revenue or savings by curtailing load during grid stress	Industrial or commercial buildings with curtailable load
Load Shifting via TOU Tariffs	Shift usage from on-peak to off-peak periods	Manufacturing or HVAC load optimization
Participation in Deregulated Markets	Negotiate better contracts, reduce risk	Large buyers in deregulated states
Renewable & Storage Dispatch	Maximize use of DERs to avoid grid purchases	Sites with solar PV, battery storage, or EV infrastructure
Virtual Power Plant Aggregation	Monetize DER coordination through market participation	Multi-site portfolios or large campuses with DERs

It's essential for Energy Managers to know **what tools and programs are available locally**, and to be equipped to:

- **Research** local market rules, tariff structures, and available programs
- **Deploy** tailored strategies that align with site capabilities and goals
- **Measure** performance using real-time data, KPIs, and predictive models
- **Manage** outcomes and adapt to shifting market conditions

Intellastar provides these capabilities—offering Energy Managers a unified platform to integrate market signals, automate load responses, and verify results across portfolios. With the right tools, even complex strategies become repeatable, scalable, and impactful.



A FINAL WORD

Most energy managers face the pressure of reacting to unpredictable market signals, rising capacity costs, or compliance mandates—often with fragmented tools or outdated systems. But navigating today’s complex energy landscape doesn’t require perfection. It requires the right support and a smart place to start.

At Intellastar, we believe that with real-time insight and automated control, every energy manager can drive meaningful change—whether you’re optimizing a single building or managing a portfolio of buildings.

INTELLASTAR HELPS YOU LEAD WITH RIGHT TOOLS

With solutions like **Energy Analyst** and the **T-Star platform**, Intellastar equips you to make smarter choices across your entire energy ecosystem. Whether you’re managing demand, analyzing trends, or preparing for tomorrow’s challenges—we’ve got your back.

Here’s what you can do starting today:

- **See** your energy use, costs, and emissions in real time
- **Control** load, storage, and generation with edge automation
- **Predict** peaks and pricing before they hit your budget
- **Verify** energy-saving measures with built-in M&V tools
- **Thrive** under changing regulations with future-ready tech

Start small, scale fast—and stay ahead of what’s next.

Let’s build the future of energy together.

QUESTIONS?



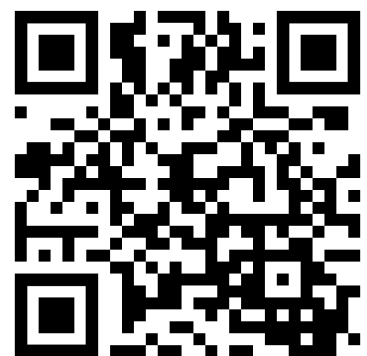
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