www.energyinnovation.org
98 Battery Street, Suite 202
San Francisco, CA 94111
power@energyinnovation.org

WHOLESALE ELECTRICITY MARKET DESIGN FOR RAPID DECARBONIZATION: **A DECENTRALIZED MARKETS APPROACH**

BY ROB GRAMLICH[1] AND MICHAEL HOGAN[2] ● JUNE 2019

TABLE OF CONTENTS

"What wholesale market design would provide the best framework for integrating reliably and at least cost the new, clean resources that will be needed to de-carbonize the power system?"

This common question includes what model best provides clean sources with fair access, what model best drives timely retirement of the fossil generation these clean resources are meant to replace, and what role the wholesale market should play in enabling new "smart" resources at the distribution/retail level. The question also includes both market structure (which entities perform which functions) and market design (what are the trading, bidding, and price-setting rules).[3] The pace and scale of new investment in clean resources will be determined in part exogenously, by environmental legislation or regulations. Such public policy instruments, including zero-carbon portfolio standards or carbon cap-and-trade, should be designed to address the market externalities of greenhouse gas emissions in a way that complements rather than substitutes for the role of the market in driving investment.

The question above is often motivated by three concerns regarding the standard spot electricity market design that shaped most current organized wholesale energy markets:

---

[1] Grid Strategies LLC https://gridstrategiesllc.com/

[2] Regulatory Assistance Project https://www.raponline.org/

[3] The question does not address the substantial transmission infrastructure needs for a de-carbonized grid; this is a more difficult challenge that also must be addressed and involves a significant role for traditional planning.

1. *Adequate investment (especially in new clean resources) might be compromised by investors being reluctant to rely simply on short-term energy pricing.*
2. *The risks in investing based on short-term energy prices could raise the cost of the transition by raising the cost of capital for new investment.*
3. *Current markets rely on production costs to set prices and may not function with a grid dominated by very low or zero marginal production cost resources.*

These concerns are unfounded. A market structure with a central spot market and active de-centralized forward procurement between wholesale buyers and sellers (including exchange-based trading) will lead to sufficient investment to achieve resource adequacy, will facilitate a sufficiently rapid decarbonization, and will do so at the lowest reasonable cost to consumers.

A CENTRALIZED SPOT MARKET WITH DECENTRALIZED FORWARD PROCUREMENT IS THE BEST OPTION FOR DECARBONIZATION AT REASONABLE COSTS

The bedrock of our proposed structure is *bid-based, security-constrained economic dispatch with locational marginal pricing* (explained below) for short-term efficiency. To achieve adequate investment for long-term efficiency, the model relies on electricity buyers procuring power through a range of long-term undertakings that can support financing of new resources. To accelerate new, clean investment beyond what would be adequate to meet demand for reliable electric service, the model relies on complementary, external public policy instruments that internalize to the market the externalities of greenhouse gas emissions rather than replace the role of the market in driving new investment.[4] The central spot market and de-centralized bilateral and traded market are described in more detail below.

THE CENTRALIZED REGIONAL ROBUST SPOT MARKET FOR EFFICIENT DISPATCH AND PRICE FORMATION

Along with an active decentralized voluntary bilateral market, this market model includes a geographically large regional spot market operated by an independent entity, herein referred to as a Regional Transmission Organization ("RTO"). The RTO's market design would feature:

- Economic dispatch based on market bids and reflecting the impact of reliability-driven security constraints on the marginal cost and price of energy, as detailed below;
- Locational marginal prices;
- Tradeable financial transmission rights with trading hubs;
- Scarcity pricing based on the value of reliable service (or Value of Lost Load—VOLL), including co-optimization of energy and reserves and administrative reserve shortage mechanisms;

[4] We note there are some categories of investment, such as cost-effective energy efficiency, that suffer from multiple market failures and should continue to be targeted by complementary out-of-market policy support.

- Fast dispatch intervals with resource commitments made close to real time;
- Consolidation of real-time balancing authority over the largest practicable footprint and portfolio of system assets;
- Technology-neutral reliability service procurement using market mechanisms where possible;
- A Universal Participation Model[5] where all resources can offer their capabilities (ramp speed, capacity, etc.) and constraints (minimum/maximum output, startup time, etc.);
- Reliability services based strictly on engineering needs, which may evolve over time but will follow NERC's general categories of Essential Reliability Services;
- Optimization and participation of Demand Management and other Distributed Energy Resources directly or through a Transmission-Distribution interface;
- Transparent energy prices with minimal side payments paid by the RTO;
- Multi-settlement between forward and real-time markets to incent accurate forecasting;
- Market power monitoring and mitigation bidding rules, using structural (pivotal supplier) and/or conduct and impact methods;[6] and
- Customers' option to make their own decisions about how much electricity to buy when based on energy prices that reflect the true value.

Prices determined in this centralized short-term market lay the foundation for decentralized long-term contracting of services, which is discussed next.

DECENTRALIZED BILATERAL PROCUREMENT MARKETS TO MANAGE PRICE RISK

New investment will be needed both in variable renewable sources and in short-term and seasonal balancing resources to achieve long-run efficiency. It is possible to finance power plants and demand resources on a pure merchant basis, but the cost of capital can be lowered by access to long-term options to hedge risks. Such risk-hedging options include Power Purchase Agreements (PPAs) and other forms of forward risk management (which are not just possible, but common, in existing wholesale power markets).[7] This model includes active voluntary bilateral energy market trading of PPAs and various other types of hedging arrangements. Wholesale buyers, the counterparties to investors for such arrangements, can include utilities, competitive retail suppliers, or end-users with direct access to the market.

Establishing a well-designed and well-implemented spot market lays the foundation for this activity. Whereas generators are motivated to mitigate the risk of over-supply and sustained low energy prices, wholesale buyers will be motivated to procure their supplies in advance to avoid the risk of very high prices at times when power is scarce. This basic market dynamic—mutually

---

[5] See Ahlstrom, Mark, https://www.esig.energy/blog-the-universal-market-participation-model/ .

[6] See, e.g., Brattle Group, Review of PJM's Market Power Mitigation Practices in Comparison to Other Organized Electricity Markets.

[7] See Jay Bartlett, Reducing Merchant Risk in Wind and Solar Projects Through Financial Hedges. https://www.rff.org/publications/working-papers/reducing-risk-merchant-wind-and-solar-projects-through-financial-hedges/ .

beneficial forward trading to mitigate risk efficiently—is enhanced rather than supplanted by good public policy that internalizes the externality costs of greenhouse gas emissions. This can include establishing a price for carbon emissions, which augments the risks of contracting with carbon-intensive resources, or by establishing portfolio purchase standards, which introduce the risk of being able to procure enough of certain types of energy at a reasonable price. Such policies efficiently accelerate the de-centralized procurement of desired resources (and, critically, facilitate the corresponding retirement of existing resources) rather than relying on centralized administrative procurement.

Buyers can be expected to manage these risks in a variety of ways to maximize their competitiveness and sustain their commercial viability, as long as they are in a financial position to do so. One market failure to guard against is when retail competitive suppliers are licensed to operate without sufficient assurance that they have the financial wherewithal to manage the risk of procuring the power needed to serve their contracted load. Failing to mitigate this risk can lead to bankruptcies for retailers when power prices rise. This is a type of "principal-agent" market failure. The result is that generation does not get financed and customers are left unserved.

In the U.S., state regulators are responsible for ensuring that any entity serving retail customers is financially equipped to manage the risks associated with their supply obligations. If state regulators are not willing to let customers go unserved, they should monitor and enforce credit requirements on retail suppliers. Such credit requirements, along with energy prices that reflect true value, will ensure buyers have both the incentive and the ability to appropriately hedge. Fixing this market failure will lead to more credit-worthy buyers signing contracts that help finance new generation.

To maximize competition, all suppliers should have fair access to long-term risk hedging options or handle peak loads with backup generation if they choose to do that rather than always procuring bulk power supply sources. Load-Serving Entities can secure adequate resources under state oversight in states that choose to oversee hedging for some or all customers. States may wish to perform Integrated Resource Planning for the entity that serves the mass retail market, which could include all customers except those more sophisticated and less risk-averse entities willing to take on more responsibility for their own resource portfolio.

As we discuss in the following section, a market structure with a large regional spot market with active decentralized forward procurement between buyers and sellers provides a framework for facilitating a decarbonized electricity supply that is more effective and more efficient than reliance on centrally planned, ratepayer-guaranteed long-term contracting.

EVALUATION CRITERIA

To compare our structure objectively against others, we propose the following set of common public policy criteria, or objectives:

- Facilitate sufficiently rapid decarbonization;

- Promote short-run efficiency, including generation and load dispatch;
- Promote long-run efficiency, including efficient entry and exit by the widest practical range of actors, under conditions of significant uncertainty;
- Provide short-run reliability through power system balancing and congestion management;
- Support the right amount and kind of investment needed to provide consumers with the level of long-term reliability they knowingly would be willing to pay for;
- Minimize the exercise of market power and manipulation;
- Enable efficient financing of investment with equitable and appropriate risk allocation;
- Respect social values;
- Promote innovation;
- Minimize vulnerability to political interference;
- Be readily implementable; and
- Adjust to changing circumstances, technology, politics, and culture.

This is a demanding list. It is very unlikely that any one market construct can claim to satisfy all of these criteria completely. Each market design will be better at meeting some of these challenges than others; it is important to consider alternatives in a consistent manner:

EVALUATION OF PROPOSED MARKET STRUCTURE

Below, the proposed market structure is evaluated against these criteria.

Facilitate rapid decarbonization

This model relies on exogenously set public policy to boost the market's ability to achieve a sufficiently rapid rate of decarbonization of the electricity sources. These policies could be some combination of a carbon price, carbon regulation, or carbon-free energy targets.[8] Maximizing market-driven bilateral contracting for low-carbon resources will reduce the financial and political pressures that inevitably come to weigh on policy-driven investment, making sufficiently rapid decarbonization more likely by optimizing the balance between the role of market participants and the role of public policy.

The proposed model also best facilitates the accelerated retirement of existing fossil generation, which is essential for rapid de-carbonization, in three ways: First, consolidated balancing areas and shortened dispatch intervals reduce the amount of generation needed to meet reliability standards, especially in a system with high shares of renewables and/or nuclear. Second, as policy drives more clean investment and as clean alternatives (including demand response and energy efficiency) become more competitive, a market with free exit, left to its own devices, will inexorably crowd out existing, less competitive sources. Third, by decentralizing the provision of resource adequacy and eliminating centrally administered forward procurement of capacity, the proposed model eliminates a principal source of support for existing generation surplus to what is needed to provide consumers with the level of reliability they want and value. Surplus existing fossil capacity can seem deceptively cheap to keep around despite being outrageously expensive

[8] In the U.S., such policies would be propagated by state and/or federal legislation or environmental regulations.

per kilowatt-hour (kWh) of energy, and the temptation for central administrators with the tacit approval of regulators, to use forward capacity mechanisms to steadily, stealthily over-engineer the system and socialize the cost has in practice proved to be irresistible.

Promote short-run efficiency, including generation and load dispatch

The proposed market design has been demonstrated to dispatch resources and manage congestion efficiently in serving two-thirds of U.S. electric load. This market construct features an independent system operator ("ISO") using security-constrained economic dispatch and locational marginal pricing.

When the pool covers a wide region, it can net the output of resources in different time zones with different wind regimes and cloud cover, reducing overall variability and improving access to reserves. A misconception is that as variable renewables, with their very low or zero short-run production costs, become the dominant resources in the merit order, the marginal cost of energy should be flat at zero or near zero for most hours of the year, eliminating the mechanism used by this market construct to organize economic dispatch.

In fact, dispatch is managed efficiently in many regions today despite having large tranches of the merit order offering little or no differentiation in short-run production costs. Combined demand for energy and ancillary services needed to maintain stability will likely rise at times without plentiful wind and sun, buffering average prices. New and highly flexible demands such as electrified transport and heating can provide sloped demand curves that can be expected to set the price at times of scarce energy or scarce ramping supply, at levels above the short-run operating cost of the marginal generator in the merit order.[9] A surplus of available zero-production-cost energy has implications for grid congestion and the related locational marginal costs of energy.

When these aspects of the proposed model are considered and properly reflected, the combined effect is marginal costs (and prices) dictated less by the short-run production costs of the next resource in the merit order, and more by other cost drivers arising as a consequence. This market model will continue to support efficient economic dispatch, and indeed it will be crucial for efficient dispatch of *both* supply- *and* demand-side resources.[10]

Promote long-run efficiency, including efficient entry and exit

This market structure supports long-run efficiency by promoting the investment needed—and only the investment needed—to meet the level of reliability consumers actually want and are

---

[9] Smart demand can mitigate the high-priced end of the price duration curve (driven by demands for more and new types of ancillary services) by shifting to periods of surplus, thus also boosting the low-priced end of the curve.

[10] See, e.g., *The Beginning of the End* (D. Schlissel, Institute for Energy Economics and Financial Analysis, Sept. 2016) at http://ieefa.org/ieefa-texas-beginning-end-coal-fired-electricity-%E2%80%A8/, which shows that the addition of new firm capacity has been sufficient to keep up with increased demand, thus crowding fewer competitive coal-fired plants off the system. Reserve margins have declined since 2016 with unexpected high growth in oil-and-gas industry activity principally in the Permian Basin, but ERCOT's December 2018 Capacity, Demand and Reserves Report identifies planned, permitted capacity additions sufficient to more than make up for that new load growth.

willing to pay for. It supports that investment principally by incentivizing wholesale market actors on both the supply side and the demand side to manage efficiently allocated risks through bilateral contracts, exchange-based trading, and other risk mitigation options.

In the first instance, energy prices fully reflecting demand for energy and reliability give rise to risks on the supply side of surpluses and low prices during periods of over-investment, and on the demand side of shortages and high prices during periods of resource scarcity. In addition, in a market complemented by appropriate public policy instruments the risks faced by market actors can include those arising from such instruments. As in any healthy commodity market, buyers and sellers exposed to such risks seek to manage them efficiently through various types of bilateral or exchange-based trading. This decentralized support for needed capital investment creates investor-imposed discipline on generation investment decisions and mitigates the opportunities for central administrators to force consumers to pay for unneeded new investment. Minimizing centralized decisions over how much and what kind of resources consumers must pay to retain promotes free exit of older, uncompetitive generation, especially as appropriate public policy supports the entry of new resources, an essential condition for rapid decarbonization. Free entry is promoted by ensuring the price signal available to the widest possible set of stakeholders—the energy price—fully reflects the true marginal cost of energy, including demand for both energy and reliability services, eliminating the price suppression effect that in practice follows over-reliance on centralized forward capacity procurement mechanisms. It also promotes free entry by mitigating the in-built design and institutional bias in such mechanisms toward conventional supply-side resources.

Forward bilateral contracting and trading would efficiently and equitably provide investors with the revenue stability they seek compared to reliance simply on the short-term spot energy market. This includes investors in clean energy resources, which may be at even less risk than conventional resources since they bear no fuel price risk and earn infra-marginal rent at virtually any market price. As the market design pays for energy and services well defined by universal engineering principles, the rules would be more stable over time. In contrast, central procurement involving subjective factors would be vulnerable to continuous meddling.

Some observers point to limited liquidity in long-term bilateral and exchange-based trades in many organized market regions as evidence that this cannot be relied upon for needed new investment. In reality it is evidence of something much more straightforward: the regions in question have excess capacity, leaving buyers with little price or volume risk to manage and therefore with little need to engage in new long-term contracts. In the few regions where supply is better matched to demand (e.g., ERCOT) and/or where the all-in cost of new clean investment is below the cost to retain existing generation, new entry supported by bilateral and exchange-based traded contracting has been quite healthy.

A limited set of creditworthy counterparties is sometimes cited as another limitation on this construct, but this is a structural industry issue that to the extent it exists, can be corrected as described above, through state oversight of the creditworthiness of retail suppliers.

Finally, regarding cost of capital and cost of the transition, in contrast to centralized procurement, this structure does not transfer and socialize investment costs and risks to consumers and/or taxpayers who have far less understanding of, or ability to manage, the risks of long-term investment choices. Furthermore, as already noted, centralized procurement generally leads to over-procurement. As a result, the societal cost can far exceed any savings resulting from lower cost of capital for investors, even assuming the benefits of such lower costs are passed on to consumers.

Provide short-run reliability through power system balancing and congestion management

This market construct features an ISO using security-constrained economic dispatch and locational marginal pricing. This construct has ensured generation and load are efficiently in balance at all times at all nodes on the system while respecting transmission constraints. It has now been employed by each of the seven U.S. ISOs/RTOs successfully for many years, the most recent adoption being the ERCOT market in December 2010. Based on that sustained record of success, the multi-settlement, nodal market structure is being adopted by the Independent Electricity System Operator in Ontario to address longstanding challenges Ontario's market has faced.

Provide long-run reliable service at the level customers want and are willing to pay for

The role of decentralized provision of resource adequacy has already been described. The market must deliver reliability for the benefit of consumers, not for the benefit of investors, system administrators, regulators, or elected officials. What constitutes "long-run reliable service" must be grounded in that principle. What consumers want is energy, not "capacity," and system operators ensure consumers can rely upon supply *to an agreed-upon standard* every hour of every day by positioning the reserves and other services in real time needed to comply with that standard.

This market model ensures the price of energy reflects the true resulting marginal cost of energy, every hour of every day. This creates the right level of incentives (i) for market players to support new investment when new investment is needed, (ii) to support investment in the kinds of resources operationally best suited to the needs of the system, and (iii) for market players to shed surplus, uncompetitive resources. Voluntary, pre-arranged load shedding would still be an important tool to keep generation and load in balance, as it has been for decades, but a decarbonized power system will place great value in a more dynamic response to uncontrollable changes in primary energy supply from one dispatch interval to the next. This market structure, combined with new technology and services becoming widely available, will make it increasingly possible for consumers to play a role by making their own choices about an increasing range of electricity-based energy services and long-term lock-in of poor investment choices. As a result, the societal cost can far exceed any savings resulting from lower cost of capital for investors, even assuming the benefits of such lower costs are passed on to consumers.

Minimize the exercise of market power and manipulation

In real life, even an optimized power grid will experience congestion from time to time, since some solutions to congestion will cost more than the congestion itself. When markets narrow geographically, market power tends to increase. Thus, the risk of market power exercise exists with all energy market models, and no approach to preventing such behavior will be 100 percent effective. RTOs and their market monitors and regulators, operating in markets employing versions of the proposed market construct, have developed a set of techniques to prevent economic withholding by pivotal suppliers and other forms of market power and market manipulation.

Our survey of annual independent market monitor reports suggests that for the most part these mechanisms have been successful in keeping the exercise of market power to a very low level. In fact, in most cases concerns about market power are far greater in the centralized procurement mechanisms than they are in the energy markets. The potential for greater penetration of demand management will become an increasingly important means for the market itself to prevent market power from being exercised. This proposed market structure, where the value of responsive distributed energy resources is fully visible through energy prices, offers the most reliable means of ensuring that the technology and services needed to facilitate efficient response are developed and deployed. Demand response is the most potent antidote to seller market power.

Enable affordable financing of needed resources with appropriate allocation of risk

By encouraging long-term contracting by electricity buyers, the proposed market construct reduces the financing cost of new resources. Where the market indicates a need for investment, this model incentivizes wholesale buyers and sellers to allocate investment risks efficiently to those best able to assess and manage those risks. Given the rate of investment needed in new clean resources compared to the rate of load growth and natural retirements, public policy instruments will be needed to create high levels of demand for such new investment. Appropriately structured, such instruments will enhance rather than circumvent decentralized procurement by giving rise to new volume and price risks that market buyers and sellers will want to manage. This model offers the best chance that the financing of new resources will allocate those risks efficiently and at a reasonable cost to consumers. Participation of financial participants can increase liquidity, but regulators would have a critical role in monitoring financial participants for excessive risk taking and retail providers for adequate credit to serve their contractual obligations.

Respect social values

As differentiated reliability opportunities spread, some basic levels of electricity service should be ensured. For example, the social value of access to adequate heating and cooling should be respected. At the same time, consumers should not be forced to pay for the illusion of zero-risk of supply interruption due to generation supply shortages when they regularly experience supply interruptions from distribution system and other causes. The standard for firm load interruptions should be high, and it should be uniform regardless of the root cause. Ideally regulators would ensure that each dollar spent on consumers' behalf results in comparable and cost-effective improvements in reliability. Costs can be exorbitant to meet unjustifiable reserve margin targets for "adequacy" in a decarbonized power system. "Never" is neither an affordable nor an achievable standard when it comes to selective firm load-shedding. Selective firm load-shedding due to a shortage of available generation within the limits implied by prevailing standards is neither immoral nor unacceptable. It is not a failure of a reliable power system; it is a *feature* of a reliable power system—a perfectly legitimate tool long employed by prudent system operators as a last-resort measure to keep the system running.

In reality, consumers have long been accustomed to *uncontrolled* firm load-shedding due to incidents on the transmission and distribution system at rates many times more frequent than what is implied by the current standard for generation adequacy. From a consumer's perspective one loss of load looks like any other, regardless of its cause. It is far more equitable and economic to give those consumers willing and able to shift some loads the opportunity to do so than it is to charge all consumers the cost of adding or retaining more costly generation. The proposed market construct sets the foundation for this more equitable and economic approach. States should engage in public conversations about expectations and trade-offs between "reliability at all costs" and this alternative approach to protecting critical and vulnerable loads.

Promote innovation

In this market-based system, privileged positions granted by centralized forward procurement mechanisms are kept to a practical minimum. All market participants must compete to provide what consumers want—energy at the lowest reasonable cost and to a desired standard of reliability. Free entry provides innovative companies and technologies a fair shot at out-competing established players and resources and access to energy pricing that can reward them commensurate with the value they're providing.

Minimize risk of political intervention

Political intervention in an industry as central to modern life as electricity is an ever-present threat. Some RTO stakeholders have advocated recently for higher compensation for "baseload" or "fuel secure" resources. Even the U.S. Secretary of Energy has asserted the need to change market rules[11] to do so. These efforts usually target centralized capacity markets. The RTOs that operate centralized capacity markets are also intervening to mitigate state clean energy policies. The mechanism is in the centralized capacity markets, using a Minimum Offer Price Rule.

As these examples illustrate, the more centralized and complex market constructs become, the more opportunities arise for politically convenient intervention or capricious withdrawal of political support. The market model proposed here allows most decisions to be made on a decentralized basis by informed wholesale market participants. Wholesale buyers and sellers

[11] https://www.energy.gov/sites/prod/files/2017/09/f37/Notice%20of%20Proposed%20Rulemaking%20.pdf

choose their willingness to buy or sell. Retail energy providers stand between retail consumers and the wholesale market. They can be relied upon or required to provide consumers with a sufficiently diverse range of service choices representing, among other things, a range of risk and reward opportunities. This system does not rely on a central bureaucracy to make resource choices that can be captured by incumbent or political interests.

Readily implementable approach

This approach involves an improvement on the existing market structure in most market regions. In the case of U.S. market regions, the required improvements are largely incremental though not insignificant. From an implementation perspective this represents a far less daunting challenge than throwing out the existing market construct altogether and starting over. It also benefits from the facts that the implementation challenges are largely known as a result of decades of experience in different regions, and that good examples exist of what improved implementation might look like (most notably, in the ERCOT market region). It requires no change in federal law and little change in federal regulations.

Where no independent system operation has been established, utilities would need to be encouraged to join ISOs/RTOs, and there is value in encouraging those organizations to encompass the largest practicable regions. However, where no ISO/RTO is in place today, any alternative market construct would require that states agree to submit system operation and resource decisions to newly created market institutions. States would need to significantly improve their retail regulation to ensure there are credit-worthy buyers who know it is their job to secure long-term sources of energy, and to activate demand side resources. These are significant challenges today in many market regions, but in the time frame of this scenario they are very manageable.

Adjust to changing circumstances, technology, politics, and culture

The model is flexible and allows changing circumstances to be quickly and transparently communicated through wholesale prices and appropriate retail tariffs to participants who are willing and able to adjust their behavior in response. It has minimal reliance on bureaucratic rules and political compromises, including the all-important question of what existing generation to retain versus what to retire. It achieves a practical balance between the role of public policy and the role of a competitive wholesale market in facilitating a sufficiently rapid decarbonization of the power system. Uncertainty has always been a challenge in the electricity industry, but uncertainty may now be at an all-time high on both sides of the supply-demand divide. This makes over-reliance on centralized procurement needlessly rigid, it makes the risk of long-term lock-in to the costs and operational consequences of poor decisions especially acute, and it dramatically increases the importance of giving consumers access to transparent real-time information about the value of distributed energy resources. It will be critical for the market model to be flexible and to evolve as technology and energy services undergo rapid transformations. No market structure does everything well, but flexibility and ready adaptability is a particular strength of the proposed market structure.

CONCLUSION

A robust central spot with decentralized contracts model supports decarbonization, short- and long-run efficiency, and reliability. It puts grid operators in the role they should be in—reliably and efficiently operating the grid. It puts load-serving entities in the role they should be in—determining and implementing their resource and risk management objectives. It avoids the political wrangling of the centralized model and the over-capacity and stranded costs to which that model often leads. It maximizes competition, innovation, and flexibility, especially in the critical sectors of responsive demand and distributed resources, which will tend to bring costs down over the long term. The principal challenge is building up sufficient credit-worthy buyers. We suggest a strategy to solve that challenge involving state regulatory oversight.