# Wholesale Power Markets:
## Enabling a Low-Cost, Clean Energy Transition

## Background

Nearly 70% of the nation's electricity moves through organized wholesale power markets, where electricity is bought and sold among generators, utilities and traders before reaching end-use customers. These markets are operated by Regional Transmission Organizations (RTOs) and Independent System Operators (ISOs) and regulated by the Federal Energy Regulatory Commission. RTO/ISOs shift control of power plant dispatch and transmission operations from traditional, vertically integrated utilities and toward the free market, which optimizes operations for cost.[1]

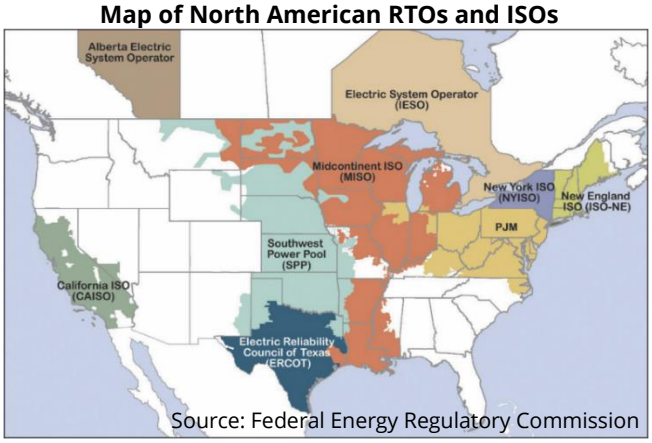
While no two RTO/ISOs have identical rules, all provide open access to their transmission networks, utilize bid-based markets to arrive at economic outcomes and plan new transmission to accommodate future grid needs. The third of the country outside RTO/ISOs falls largely in the Southeast and West.[2]

## Benefits from Wholesale Power Markets

Power markets have reliably and cost-effectively integrated gigawatts of renewable energy since their inception over 20 years ago. A larger market reach allows diverse, variable resources to complement each other, supporting reliability and enabling higher levels of renewable energy penetration.

States within RTO/ISOs now outpace others for renewable energy deployment and reach new highs daily. Renewable energy now supplies more than 70% of power demand at various points in SPP and CAISO on any given day. At the same time, economies of scale from market access have helped lower the levelized cost of electricity from onshore wind by approximately 70% and photovoltaic solar by approximately 90% over the past decade.

**Map of North American RTOs and ISOs**




Source: Federal Energy Regulatory Commission

## Efficient Markets are Flexible, Fair, Far and Free

A **flexible** power system should be able to respond and adapt to changes in uncontrollable or non-dispatchable factors such as load, generator output deviations, forced generation outages and transmission disruptions.[3] Grid response capabilities need to be faster and cover more megawatts than in the past. Modern computing, communications and control technology, including the fast controls of inverter-based resources, allow much faster response than was previously possible.

A **fair** market will treat all customers and resources evenly and allow all the opportunity to succeed. Such a market will be designed around service requirements and performance capabilities and be fuel-neutral and technology-agnostic, and have an independently-selected board to ensure no particular customer or resources are inappropriately advantaged or penalized. It will compensate based on objectively metered services delivered, rather than subjectively determined resource capabilities or attributes.

A **far** market will have a broad geographic span to maximize the efficiency benefits of supply and demand diversity, reducing the variability of resources by netting them out against each other. It will expand deliverability options between resources and customers.

A **free** market facilitates customer choice and does not raise barriers to market entry and exit. It should also support customers' and states' ability to act on choices about how to balance between goals such as least-cost, distributed versus centralized, environmental impact, in-state development and other priorities.

Though the standard structure of RTO/ISOs is generally consistent with these important principles, further refinement and optimization of individual market rules is still needed, as highlighted by the chart on the next page.

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[1] RTO/ISO markets are independently monitored for manipulation and abuse of power. RTO/ISOs also procure a number of ancillary services necessary to maintain grid reliability, including frequency regulation and operating reserves. RTO/ISOs additionally manage transmission to ensure there is no conflict of interest between owners of transmission and the customers who use it.

[2] Some utilities outside RTO/ISOs are part of energy imbalance markets (EIMs), which are run by RTO/ISOs and allow non-RTO/ISO utilities limited real-time trading with RTO/ISO members and other EIM participants overseen by a market monitor. Under this system, the RTO/ISO handles market operations, but the utility retains control over transmission systems and ultimate authority over energy dispatch.

[3] For more information, see our November 2019 report, *Customer Focused and Clean: Power Markets for the Future*, available at https://acore.org/customer-focused-and-clean-power-markets-for-the-future/.

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# Wholesale Power Markets:
## Comparison of Market Design Features

| *Features* | Traditional Utility Operations | Energy Imbalance Markets | RTO/ISO Markets | Ideal Market for Clean Energy |
|---|---|---|---|---|
| **Meets national reliability standards**<br>*Ensures the lights stay on* | ✓ | ✓ | ✓ | ✓ |
| **Centralized, competitive energy market**<br>*Achieves the lowest costs for consumers* | ✗ | ✓ | ✓ | ✓ |
| **Adheres to state generation policies**<br>*Protects state clean energy policies from federal mitigation* | ✓ | ✗ | ✗ | ✓ |
| **Independent entities provide open access to transmission**<br>*Prevents conflicts of interest between owners and customers of transmission* | ✗ | ✗ | ✓ | ✓ |
| **Independent entity plans transmission growth with competitive procurement**<br>*Realizes the most efficient outcome to accommodate future grid needs* | ✗ | ✗ | ✓ | ✓ |
| **Transparent stakeholder process**<br>*Allows the public to verify best practices* | ✗ | ✓ | ✓ | ✓ |
| **Independent entity administers trading platform**<br>*Ensures a non-biased outcome* | ✗ | ✗ | ✓ | ✓ |
| **Independent entity monitors market**<br>*Prevents market manipulation and abuse of power* | ✗ | ✓ | ✓ | ✓ |
| **Non-discriminatory market access to independent power producers, new technologies, and consumers of any size**<br>*Allows all competitive power producers a fair opportunity to connect* | ✗ | ✗ | ✓ | ✓ |
| **5-minute market dispatch frequency**<br>*Reduces consumer costs through frequent sales* | ✗ | ✗ | Not required but usually present | ✓ |
| **Real-time and day-ahead energy market**<br>*Integrates renewable energy most effectively* | ✗ | ✗ | Not required but usually present | ✓ |

**American Council on Renewable Energy**
1150 Connecticut Ave NW, Suite 401 · Washington, DC 20036 · www.acore.org