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EXI



# **Energy Market Design and the Southeast United States**

*Prepared by the American Council on Renewable Energy, in coordination with the American Clean Power Association and the Solar Energy Industries Association* 

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#### **Executive Summary**

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. The nation's electric grid, now well over a century old, predates these markets, which have largely sprung up since the turn of the millennium. Their rapid growth has accompanied consumer savings and growing levels of renewable energy. The Southeast United States is not part of a wholesale power market, and regional utilities are looking to fill the void with a bilateral contracting framework known as the Southeast Energy Exchange Market (SEEM). Absent many traditional market benefits, SEEM is not necessarily a step toward a wholesale power market, but its introduction provides a helpful lens through which to assess energy market design and the Southeast.

#### I. Introduction

Seventeen Southeastern utilities are seeking regulatory approval to formalize and expand a bilateral contracting framework they intend to name the Southeast Energy Exchange Market (SEEM).<sup>1</sup> While most of the country is covered by Regional Transmission Organizations (RTOs) and Independent System Operators (ISOs), in which least-cost resources compete to provide electrons to distribution utilities, the Southeast is one of the nation's last regions of vertically-integrated monopoly utility operations, whereby the same entity generates and distributes electricity without a centralized wholesale market.<sup>2</sup> SEEM does not propose to establish a real-time wholesale energy market in the Southeast, as exists in other parts of the country. However, SEEM provides an opportunity to examine the benefits of markets, and what a real-time market would mean for this region.

<sup>&</sup>lt;sup>2</sup> U.S. Federal Energy Regulatory Commission. "RTOs and ISOs." Accessed February 9, 2021 from <u>https://www.ferc.gov/industries-</u> <u>data/electric/power-sales-and-markets/rtos-and-isos</u>.



<sup>&</sup>lt;sup>1</sup> As listed in the Southern Company Services, Inc. filing to FERC titled "Southeast Energy Exchange Market Agreement." Accession No. 20210212-5033. February 12, 2021., the participating SEEM entities are Alabama Power, Associated Electric Cooperative, Dalton Utilities, Dominion Energy South Carolina, Duke Energy Carolinas, Duke Energy Progress, Georgia Power, Georgia System Operations Corporation, Georgia Transmission Corporation, Kentucky Utilities Company, Louisville Gas and Electric Company, MEAG Power, Mississippi Power, North Carolina Electric Membership Corporation, North Carolina Municipal Power Agency No. 1, Oglethorpe Power Corporation, PowerSouth Energy Cooperative, Santee Cooper, and Tennessee Valley Authority.

### II. Real-Time Markets and Their Forms

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 RTOs and ISOs and regulated by the Federal Energy Regulatory Commission (FERC). RTO/ISOs shift control of power plant dispatch and transmission operations from traditional, vertically integrated utilities to the free market, which optimizes operations for cost.<sup>3</sup> These competitive markets set the wholesale price of electricity in real time, matching supply and demand to maintain electric reliability at all hours of the day, 365 days a year.<sup>4</sup>

ISO New England (ISO-NE), New York ISO (NYISO), PJM Interconnection (PJM), Midcontinent ISO (MISO), Southwest Power Pool (SPP), Electric Reliability Council of Texas (ERCOT) and California ISO (CAISO) are the nation's seven RTO/ISOs, although ERCOT is largely outside of FERC's jurisdiction for various legal and historical reasons.<sup>5</sup>



#### Figure 1: Map of North American RTOs and ISOs

Source: Federal Energy Regulatory Commission

<sup>&</sup>lt;sup>3</sup> RTO/ISOs also assure grid reliability through Security Constrained Unit Commitment and Economic Dispatch and by procuring a number of ancillary services, including frequency regulation and operating reserves. Additionally, vertically integrated utilities often participate in bilateral energy trading, which can serve to reduce consumer cost.

<sup>&</sup>lt;sup>4</sup> All extant RTO/ISOs set prices every five minutes, though this particular interval is not a legal requirement of RTO/ISO formation. <sup>5</sup> Federal Energy Regulatory Commission. "ERCOT." Accessed February 8, 2021 from <u>https://www.ferc.gov/industries-data/electric/electric-power-markets/ercot</u>.

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. About onethird of the electricity demand in the country is served outside RTO/ISOs and falls largely in the Southeast and West.

Some utilities outside RTO/ISOs are part of energy imbalance markets (EIMs), which allow non-RTO/ISO utilities limited real-time trading with other EIM participants overseen by a market monitor. Under this system, an RTO/ISO handles market operations, but the utilities retain control over transmission systems and ultimate authority over energy dispatch. The Western EIM and Western Energy Imbalance Service (EIS) market are the nation's two operational EIMs.





Source: California ISO





Figure 3: Map of SPP (Red) the Western Energy Imbalance Service Market (Blue)

Source: Southwest Power Pool

RTO/ISOs, EIMs and traditional utility operations all must meet national reliability standards, which ensures the lights stay on.<sup>6</sup> An independent entity manages open access to transmission in RTO/ISOs, which prevents conflicts of interest between owners and customers of transmission, while EIMs and traditional utility operations have no such requirement. RTO/ISOs uniquely plan regional transmission growth with competitive procurement for regional transmission, which realizes the most efficient outcome to accommodate future grid needs under the current federal policy landscape. They also uniquely administer energy trading on an independent platform with the aim of ensuring a least-cost outcome. Critically, RTO/ISOs provide non-discriminatory market access to independent power producers, new technologies and customers of widely varying size, which, in theory, allows all competitive power producers a fair opportunity to connect. RTO/ISOs and EIMs both have relatively transparent, regulated stakeholder processes as well as an independent market monitor to protect against market manipulation and abuse of power.<sup>7</sup> Though not required by law, all RTO/ISOs have a five-minute energy trading interval, which reduces customer costs through

<sup>&</sup>lt;sup>6</sup> Electric reliability standards are implemented by the North American Electric Reliability Corporation (NERC), under FERC jurisdiction. For more information, see <u>https://www.nerc.com/pa/Stand/Pages/default.aspx</u>.

<sup>&</sup>lt;sup>7</sup> FERC attempts to directly police market manipulation and abuse of power outside real-time market regions, but there is no third-party market monitor in these regions.

frequent alignment of supply and demand, as well as real-time and day-ahead energy markets, which help effectively integrate renewable energy.<sup>8</sup>

Some of today's wholesale power markets can trace their lineage back decades. PJM started as a power sharing pool among interconnected utilities in 1927; ERCOT and SPP formed as similar pools in 1941; and NYISO began as the New York Power Pool in 1966.<sup>9</sup> The federal Energy Policy Act of 1992 empowered FERC to order transmission operators to sell their services to unaffiliated generators and purchasers of wholesale power, a move that enabled FERC to issue Order No. 888 four years later, which pushed public utilities to provide open access to transmission service on a comparable basis to the transmission service they provide themselves.<sup>10</sup> In 1999, FERC issued Order No. 2000, which guided the establishment of RTOs, forming the basis for today's wholesale power market framework.<sup>11</sup>

The Western EIM and Western EIS followed unique paths, forming organically eastward from CAISO, which operates the Western EIM, and westward from SPP, which operates the Western EIS. These EIMs allow participants to trade power to balance electric demand in their territories but do not place all wholesale power needs into the hands of an independent, competitive market.

<sup>&</sup>lt;sup>8</sup> FERC. "Energy Primer: A Handbook of Energy Market Basics." April 2020. <u>https://www.ferc.gov/sites/default/files/2020-06/energy-primer-2020.pdf</u>.

<sup>&</sup>lt;sup>9</sup> Id. <sup>10</sup> Id.

<sup>&</sup>lt;sup>10</sup> Id. <sup>11</sup> Id.

#### **III. Benefits Associated with Real-Time Markets**

Real-time markets benefit consumers through cost savings on their electric bills, accommodating consumer preferences for cleaner resources, allowing the participation of new technologies and maintaining electric reliability.

#### **Consumer Savings**

Real-time markets benefit from competition as the driving force of construction and use of least-cost resources. As price signals govern generator investment and dispatch decisions, the grid's resource mix will continue to change as the lower-cost resources clear auctions to bid another day while more expensive resources retire. Real-world experience across the RTO/ISOs has demonstrated the benefits of this competition.

The ISO-NE 2020 Regional Electricity Outlook, noting that less costly resources have displaced more costly ones, reported, "After plummeting almost 50% a decade ago, average wholesale energy prices have remained consistently low since then."<sup>12</sup> Similarly, a survey from Duke University's Nicholas Institute for Environmental Policy Solutions of RTOs' self-reported consumer savings in comparison to non-market scenarios found that "PJM estimates that its services produce annual savings of \$3.2-\$4 billion...MISO estimates that its services produced savings in 2019 of \$3.2-\$4 billion compared to standard industry practice without an RTO...[and]...SPP estimates that for 2018, its services provided \$2.2 billion in annual net benefits with a benefit-to-cost ratio of 14:1."<sup>13</sup> MISO's latest 2020 value proposition study identified \$3.1-\$3.9 billion in annual regional benefits, continuing the trend.<sup>14</sup> CAISO estimates over \$1.18 billion in similar benefits in the Western EIM since 2014.<sup>15</sup>

When electrons move across a utility footprint, the transmitting utility adds a charge for the service. When those electrons flow to an additional utility, that additional utility adds its own charge. These charges stack and can thus raise consumer costs significantly above the actual cost of providing service through a practice known as "rate pancaking." Real-time markets such as RTO/ISOs and EIMs

<sup>13</sup> Chen, Jennifer. "Evaluating Options for Advancing Wholesale Market Competition and Implications for the Southeastern United States."
 P9. Nicholas Institute for Environmental Policy Solutions. March 2020. Accessed February 8, 2021 from

https://www.entergynewsroom.com/news/entergy-utility-customers-realize-significant-benefits-after-5-years-as-miso-member <sup>15</sup> California ISO. "Western Energy Imbalance Market." Accessed February 9, 2021, from https://www.westerneim.com/Pages/About/QuarterlyBenefits.aspx.



<sup>&</sup>lt;sup>12</sup> ISO New England. "2020 Regional Electricity Outlook", P10. Accessed February 8, 2021 from <u>https://www.iso-ne.com/static-assets/documents/2020/02/2020\_reo.pdf</u>.

https://nicholasinstitute.duke.edu/sites/default/files/publications/Evaluating%20Options%20for%20Enhancing-Wholesale-Competition-and-Implications-for-the-Southeastern-United-States-Final\_0.pdf.

<sup>&</sup>lt;sup>14</sup> Cook, Amanda Durish. "MISO Touts \$3.5B in 2020 Savings for Members." RTO Insider. February 22, 2021. Accessed March 3, 2021 from <u>https://rtoinsider.com/rto/miso-touts-2020-savings-for-members-192786/</u> Though it is a single MISO member, midwestern utility Entergy estimated that \$1.3 billion in consumer cost savings from 2014 to 2018 from MISO membership. *See* Entergy. "Entergy Utility Customers Realize Significant Benefits After 5 Years as MISO Member." December 16, 2019. Accessed February 8, 2021 from

eliminate the imposition of multiple transmission charges for one transaction, solving the rate pancaking problem.

#### **Effective Integration of Renewable Energy**

Real-time markets have reliably and cost-effectively integrated well over 100 gigawatts of renewable energy since their inception over 20 years ago. While renewables have seen growing deployment in both market and non-market regions, wind and solar resources have been disproportionately deployed in RTO areas relative to non-RTO areas.<sup>16</sup> Larger markets allow diverse resources to complement each other, supporting reliability and also enabling higher levels of renewable energy. Improvements in technology, state renewable energy standards and 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.<sup>17</sup> Former FERC Commissioner Bill Massey, whose service at the Commission spanned the pivotal market-forming time of the late 1990s and early 2000s, said succinctly:

"Organized regional markets are one of the surest and lowest cost paths to achieving a clean energy future in the U.S. They have the large geographic scope, encompassing an entire state or several states, to handle the variability of renewable resources such as wind and solar, and because clean energy is increasingly the lowest-cost option, it tends to compete effectively in these markets."<sup>18</sup>

<sup>&</sup>lt;sup>18</sup> Massey, William. "Organized regional power markets: A rich source of benefits." January 28, 2021. Accessed February 9, 2021 from <u>https://www.utilitydive.com/news/organized-regional-power-markets-a-rich-source-of-benefits/594080/</u>.



<sup>&</sup>lt;sup>16</sup> The availability of long-term contracting options for new generation resources in real-time markets is particularly important for encouraging the lowest-cost energy production, such as from wind and solar energy. Low-cost renewable energy has thrived in markets where long-term contracts are available from creditworthy buyers. For a full discussion of this topic *see* Wind Solar Alliance and Grid Strategies. "Who's the Buyer? Retail Electric Structure Reforms in Support of Resource Adequacy and Clean Energy Deployment." P6-8 and P16. March 2020. Accessed May 18, 2021 from <u>https://gridprogress.files.wordpress.com/2020/03/whos-the-buyer.pdf</u>.

<sup>&</sup>lt;sup>17</sup> Our World in Data. "Why Did Renewables Become So Cheap So Fast? And What Can We Do to Use This Global Opportunity for Green Growth?" December 1, 2020. Accessed February 8, 2021 from <u>https://ourworldindata.org/cheap-renewables-growth/</u>.



Figure 4: Graph of Western Energy Imbalance Market Curtailment over Time

A comparison of the likely future of renewable energy integration by grid region also provides a stark contrast. Over the past half decade, proposed natural gas generating capacity has declined across most of the country while proposed renewable generating capacity has dramatically accelerated past proposed fossil additions. The Southeast, one of only two non-real-time market regions in the continental U.S.,<sup>19</sup> has bucked this trend with a record of nearly 40 GW of natural gas capacity waiting in grid interconnection queues as of 2020.<sup>20</sup> Similarly, an April 2021 survey of leading renewable energy project developers found the non-market Southeast to be the least attractive of the nine grid regions in the continental U.S. for project development.<sup>21</sup> The top three most attractive regions for renewable development were the market regions of PJM, CAISO and NYISO, respectively.

Source: California ISO

<sup>&</sup>lt;sup>19</sup> The other non-real-time market region is the West outside of California.

<sup>&</sup>lt;sup>20</sup> Rand, Joseph et al. "Queued Up: Characteristics of Power Plants Seeking Transmission Interconnection As of the End of 2020." Electricity Markets & Policy Group, Lawrence Berkeley National Laboratory. May 2021. Accessed May 27, 2021 from <u>https://eta-</u> publications.lbl.gov/sites/default/files/queued\_up\_may\_2021.pdf.

<sup>&</sup>lt;sup>21</sup> American Council on Renewable Energy. "Expectations for Renewable Energy Finance in 2021-2024. June 2021. Accessed June 15, 2021. https://acore.org/wp-content/uploads/2021/06/Expectations-for-Renewable-Energy-Finance-in-2021-2024-ACORE.pdf.



#### Figure 5: Graph of Interconnection Queues by Grid Region

Source: Lawrence Berkeley National Laboratory

#### **Environmental Benefits**

By reducing curtailment of renewable energy resources, wholesale energy markets enable the grid to use renewable energy more efficiently. Reduced renewable curtailment results in less frequent operation of older, more polluting resources. As a result, reduced curtailment typically enables a less-polluting grid with fewer greenhouse gas emissions. While other factors may also contribute, carbon dioxide emissions have fallen five percentage points more from a 2013 baseline in market regions than in non-market regions.<sup>22</sup> The Western EIM's incremental embrace of market benefits has already resulted in reduced renewable energy curtailment and yielded 586,553 equivalent tons of carbon dioxide reduction since 2015.<sup>23</sup>

Emissions within market regions should keep falling as markets continue to assist in the integration of emission-free, renewable energy resources and the retirement of uneconomic emitting resources. Wind and solar energy are now often the least-cost new resources, further assisting this trend.<sup>24</sup>

<sup>&</sup>lt;sup>22</sup> Id. For source data, *see* U.S. Energy Information Administration. "Emissions by plant and by region." October 22, 2020. Accessed February 8, 2021 from <u>https://www.eia.gov/electricity/data/emissions/</u>.

<sup>&</sup>lt;sup>23</sup> California ISO, "Western Benefits Report, Fourth Quarter 2020." January 29, 2021. Accessed April 13, 2021 from <a href="https://www.westerneim.com/Documents/ISO-EIM-Benefits-Report-Q4-2020.pdf">https://www.westerneim.com/Documents/ISO-EIM-Benefits-Report-Q4-2020.pdf</a>.

<sup>&</sup>lt;sup>24</sup> Lazard. "Levelized Cost of Energy Analysis, Version 14.0." Accessed March 24, 2021 from https://www.lazard.com/perspective/lcoe2020.

### **IV. Explaining the Southeast Energy Exchange Market (SEEM)**

Stretching across 12 states and among 17 power providers, SEEM proposes to cover a region of the grid providing electricity to approximately 50 million people.<sup>25</sup> Vertically-integrated utilities in this region have long shared power across their service territories using bilateral agreements, but SEEM proposes to formalize and expand this arrangement using a system of supply and demand matchmaking that augments utility-self supply and power purchase agreements through trading excess power over underutilized transmission capacity. Traditional requirements to balance generation and load will remain under the purview of the utilities, and access to the SEEM platform by independent power producers seeking to develop projects within the SEEM footprint is not guaranteed.<sup>26</sup>





Source: Southeast Energy Exchange Market Participating Entities

<sup>&</sup>lt;sup>25</sup> From Southern Company Services, Inc. filing to FERC titled "Southeast Energy Exchange Market Agreement." Accession No. 20210212-5033. February 12, 2021.

<sup>&</sup>lt;sup>26</sup> There is no language in the SEEM filing that proposes to alter existing balancing practices or provide open transmission access to independent power producers.

Bids and offers are proposed to match every 15 minutes, three times less frequently than the interval of the 5-minute RTO/ISO standard.<sup>27</sup> Variable energy resources, such as solar and wind energy, may not fulfill 15-minute offers as readily as slower-ramping resources, like nuclear and coal-fired power units. In contrast to RTO/ISO regions, which have locational marginal clearing prices, a transaction's clearing price will be calculated using a "split savings" method that splits the difference between bids and offers, which would be brought together by an electronic trading platform.<sup>28</sup>

The trading platform would be governed by the SEEM participants, each participant having a vote weighted according to its load. This proposal provides de facto control of the framework to its largest utilities. The SEEM utilities propose to engage a "Market Auditor" to regularly examine SEEM's functioning, though this entity would be hired by and reporting to the very participants it would be assigned to audit.<sup>29</sup>

The SEEM utilities contracted consulting firms Guidehouse and Charles River Associates (CRA) to model effects of the SEEM proposal.<sup>30</sup> The consultants found that, before accounting for any start-up costs, consumer cost savings within the footprint would, at a minimum, realize \$47 million in net benefits. Applied across all consumers in the footprint, this figure may represent only a few cents on each monthly electric bill. Guidehouse and CRA did not model SEEM against potential cost savings from an RTO/ISO or EIM across the same footprint. However, the RTO/ISO value proposition studies discussed above have found consumer benefits in the billions of dollars per year, dozens of times larger than the estimated benefits of SEEM.

<sup>&</sup>lt;sup>30</sup> Guidehouse and Charles River Associates, supra n. 24.



<sup>&</sup>lt;sup>27</sup> From Southern Company Services, Inc. filing to FERC titled "Southeast Energy Exchange Market Agreement." P8. Accession No. 20210212-5033. February 12, 2021.

<sup>&</sup>lt;sup>28</sup> Guidehouse and Charles River Associates. "Southeast Energy Exchange Market: Market Benefits and Non-Centralized Costs Evaluation." P5. November 18, 2020. Accessed February 9, 2021 from <u>https://media.crai.com/wp-content/uploads/2020/12/23104641/CRA-SEEM-Report Public-SNL.pdf</u>.

<sup>&</sup>lt;sup>29</sup> Southern Company Services, Inc. filing, supra n. 23. P199.

#### Table 1: Comparison of Market Design Features

Features	Traditional Utility Operations	Southeast Energy Exchange Market	Energy Imbalance Markets	RTO/ISO Markets	Ideal Market for Clean Energy
Meets national reliability standards Ensures the lights stay on (Note: Reliability requirements on utilities participating in SEEM are unimpacted by the SEEM proposal)	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$
<b>Centralized, competitive</b> <b>energy market</b> Achieves the lowest costs for consumers	×	X	$\checkmark$	$\checkmark$	$\checkmark$
Adheres to state generation policies Protects state clean energy policies from federal mitigation	$\checkmark$	$\checkmark$	×	X	$\checkmark$
Independent entities oversee open access to transmission Prevents conflicts of interest between owners and customers of transmission	×	X	×	$\checkmark$	$\checkmark$
Independent entity plans transmission growth with competitive procurement Realizes the most efficient outcome to accommodate future grid needs	×	×	×	$\checkmark$	$\checkmark$
<b>Transparent, federally</b> <b>regulated stakeholder process</b> Allows the public to verify best practices	×	X	$\checkmark$	$\checkmark$	$\checkmark$
Independent entity administers trading platform Ensures a non-biased outcome	X	Not required	Not required	$\checkmark$	$\checkmark$
Independent entity monitors market Prevents market manipulation and abuse of power	×	X	$\checkmark$	$\checkmark$	$\checkmark$
Non-discriminatory market access to independent power producers, new technologies and consumers of any size Allows all competitive power producers a fair opportunity to connect	×	X	×	$\checkmark$	$\checkmark$
5-minute market dispatch frequency Reduces consumer costs through frequent sales	×	X	×	Not required but usually present	$\checkmark$
Real-time and day-ahead energy market Integrates renewable energy most effectively	x	X	x	Not required but usually present	$\checkmark$

Source: ACORE



The Federal Power Act obligates FERC to approve freely negotiated wholesale transactions unless they "seriously harm the public interest."<sup>31</sup> In May 2021, FERC sent the SEEM utilities a letter seeking further information on their proposal including, but not limited to, clarification regarding price formation, non-utility participation and the transparency of their platform.<sup>32</sup> The so-called 'deficiency letter' indicates a high level of FERC scrutiny over the proposal and the potential for any FERC-accepted construct to be different than originally proposed. The SEEM utilities responded in June 2021, offering more frequent market data submissions to FERC, greater policymaker and SEEM participant access to the Market Auditor, a pledge that future SEEM rule changes would be subject to FERC's more rigorous but not otherwise required "just and reasonable" adjudication standard and various other clarifications.<sup>33</sup> They requested FERC approval by August 6, 2021, though FERC is not beholden to that timeline.

SEEM offers little in the way of the benefits provided by centralized wholesale energy markets relative to traditional utility operations. As such, it is not necessarily a step toward the development of those markets. The lack of centralized clearing prices, a transparent stakeholder process and an independent market monitor are all readily apparent when contrasted with an EIM, which itself is only a light form of a real-time market. SEEM also lacks effective means for planning and paying for transmission on a regional basis, which helps ensure competitive electricity markets. Without a transparent market readily accessible to the nation's lowest-cost generation, increasingly renewable energy projects developed by independent power producers, SEEM consumers will likely miss the benefits seen in wholesale energy market footprints.

<sup>&</sup>lt;sup>33</sup> Southeast Energy Exchange Market Members' filing to FERC titled "Response to Deficiency Letter." Accession No. 20210607-5164. June 7, 2021.



<sup>&</sup>lt;sup>31</sup> See, e.g. Morgan Stanley Capital Group Inc. v. Public Util. Dist. No. 1 of Snohomish Cty., 554 U. S. 527 (2008).

<sup>&</sup>lt;sup>32</sup> Federal Energy Regulatory Commission. Letter informing Alabama Power Company et al. that the 02/12/2021 filing is deficient and request additional information within 45 days under ER21-1118 et al. Accession No. 20210504-3015. May 4, 2021.

### V. How a Real-Time Market in the SEEM Footprint Might Lower Consumer Costs

Many of the power providers in the SEEM footprint have significant commitments to reducing emissions. These commitments are, in many cases, most cost-effectively fulfilled today and in the future by zero-emission renewable energy.<sup>34</sup> For example, Southern Company, Duke Energy, Dominion Energy and the North Carolina Electric Membership Corporation have emissions reduction goals.<sup>35</sup> Tennessee Valley Authority aims to cut emissions 80% by 2035, and Louisville Gas & Electric and Kentucky Utilities aim to cut emissions 80% by 2050.<sup>36</sup> With carbon capture projects not yet economically competitive and only two new nuclear units in the SEEM footprint planned to come online in the foreseeable future, renewable energy will need to play a significant role in meeting these emissions reduction commitments.

Businesses and households within the SEEM footprint currently pay some of the nation's highest retail electric bills.<sup>37</sup> Electricity rates themselves are low in the Southeast, but high consumer energy demand generates high retail electric bills. This consumer burden means that it is particularly important to keep rates, and the bills they form, low now and in the future. Competitive, real-time wholesale energy markets that encourage the lowestcost resources are critical to ensuring that happens, particularly as the costs of renewable energy and energy storage are expected to continue to decline.

#### Table 2: Retail Electric Bills by SEEM State

State	Average Monthly Bill	National Rank
Alabama	\$150.45	3
South Carolina	\$144.73	4
Mississippi	\$135.87	5
Virginia	\$135.46	6
Tennessee	\$132.33	8
Georgia	\$131.84	9
North Carolina	\$123.25	15
Missouri	\$117.82	24
SEEM Footprint Average	\$133.97	
National Average	\$115.49	

Source: U.S. Energy Information Administration

LG&E and KU. "Reducing Air Emissions." Accessed February 8, 2021 from <u>https://lge-ku.com/environment/reducing-air-emissions</u>. <sup>37</sup> U.S. Energy Information Administration. "2019 Average Monthly Bill- Residential." October 6, 2020. Accessed March 24, 2021 from <u>https://www.eia.gov/electricity/sales\_revenue\_price/pdf/table5\_a.pdf</u>.



<sup>&</sup>lt;sup>34</sup> The University of Texas at Austin. "Levelized Cost of Electricity." Accessed March 30, 2021 from <u>https://calculators.energy.utexas.edu/lcoe\_map/#/county/tech</u> (select "availability zones").

<sup>&</sup>lt;sup>35</sup> St. John, J. "The 5 Biggest US Utilities Committing to Zero Carbon Emissions by 2050". Greentech Media. September 16, 2020. Accessed February 8, 2021 from <u>https://www.greentechmedia.com/articles/read/the-5-biggest-u.s-utilities-committing-to-zero-carbon-emissions-by-mid-century</u>.

NC Electric Cooperatives. "NC's Electric Cooperatives Announce Efforts to Build a Brighter Future for Rural North Carolina. Accessed February 8, 2021 from <u>https://www.ncelectriccooperatives.com/who-we-are/spotlight/ncs-electric-cooperatives-announce-efforts-to-build-a-brighter-future-for-rural-north-carolina/</u>.

<sup>&</sup>lt;sup>36</sup> Tennessee Valley Authority. "Choose Savings, Not Rate Increases." Accessed February 8, 2021 from <u>https://www.tva.com/newsroom/articles/choose-savings-not-rate-increases</u>.

At the same time, new-build renewable energy has become cost-competitive with not only the cost of building new conventional generation, but also the marginal cost of continuing to operate existing thermal energy sources.<sup>38</sup> In particular, solar generation is now highly competitive with conventional generation resources in the Southeast.



#### Figure 7: Renewable Energy New-Build Cost vs Thermal Energy Marginal Cost

Source: Lazard's Levelized Cost of Energy Analysis, Version 14.0, 2020

<sup>&</sup>lt;sup>38</sup> Lazard. "Levelized Cost of Energy Analysis, Version 14.0." Accessed March 24, 2021 from <u>https://www.lazard.com/perspective/lcoe2020</u>.



### VI. How a Real-Time Market in the SEEM Footprint Might Enhance Low-Cost Renewable Energy Deployment

RTO/ISOs are regularly reaching new highs for reliable renewable energy usage. Renewable energy has supplied more than 80% of power demand in SPP and CAISO at various points in time.<sup>39</sup> Although wholesale power markets cover about 60% of the country, 80% of the non-hydro renewable energy deployed thus far is located in these market regions.<sup>40</sup>

In 2014, the National Renewable Energy Laboratory (NREL) conducted a comprehensive study on the effects of aggregating renewable energy across the West. NREL found that broadening the balancing areas in the West would significantly reduce wind and solar energy curtailment.<sup>41</sup> Another NREL analysis found that an EIM would greatly reduce operating reserve needs across the West by using geographic diversity in renewable output and load patterns to cancel out local fluctuations.<sup>42</sup> The following year, CAISO confirmed these benefits of the Western EIM, noting that specific utilities will see their renewable generation curtailed, electricity costs increased and emissions heightened across the EIM footprint in the absence of a power-sharing arrangement.<sup>43</sup> In 2019, CAISO mapped out efficiencies in the EIM over the previous four years, finding that cumulative avoided curtailment broke 900 GWh, or enough energy to power over 75,000 homes a year on average.<sup>44</sup> CAISO has also found that operating reserve needs have been reduced by nearly half due to geographic diversity across the EIM footprint.

While broader organized markets and certain parts of the SEEM footprint have historically succeeded in integrating renewable energy, SEEM's unusual 15-minute transaction interval and the lack of an independent entity overseeing open access to transmission service by independent power producers whose new development is predominantly renewable energy may stymie similar growth in the full SEEM footprint. Furthermore, to the extent the SEEM footprint extends the load-serving capability of otherwise uneconomic existing generation located within a single utility's generation fleet and helps

<sup>43</sup> California ISO. "2015 Q1 Report: Benefits for Participating in EIM." Accessed February 8, 2021 from https://www.caiso.com/Documents/PacifiCorp\_ISO\_EIMBenefitsReportQ1\_2015.pdf.

<sup>&</sup>lt;sup>44</sup> Western Energy Imbalance Market. "Briefing on Western Energy Imbalance Market and Benefits." Accessed February 8, 2021 from https://www.westerneim.com/Documents/BriefingonWesternEnergyImbalanceMarketandBenefits-Presentation-Aug2019.pdf.



<sup>&</sup>lt;sup>39</sup> Stoff, Tyler. "How Southwest Power Pool Sets Renewable Records Daily." American Council on Renewable Energy. April 8, 2021. Accessed April 12, 2021 from <u>https://acore.org/how-southwest-power-pool-sets-renewable-records-daily/</u>. California ISO. "Monthly Stats: April 2020." Accessed April 12, 2021 from <u>http://www.caiso.com/Documents/MonthlyStats-Apr2020.pdf</u>.

<sup>&</sup>lt;sup>40</sup> U.S Department of Energy. "2018 Renewable Energy Grid Integration Data Book." Accessed February 8, 2021 from <u>https://www.nrel.gov/docs/fy20osti/74823.pdf</u>.

<sup>&</sup>lt;sup>41</sup> National Renewable Energy Laboratory. "Realizing Clean Energy's Potential: Lessons Learned in the U.S. West." May 2014. Accessed February 8, 2021 from <u>https://www.nrel.gov/docs/fy14osti/62008.pdf</u>.

<sup>&</sup>lt;sup>42</sup> National Renewable Energy Laboratory. "Examination of Potential Benefits of an Energy Imbalance Market in the Western Interconnection." March 2013. Accessed April 12, 2021 from <u>https://www.nrel.gov/docs/fy13osti/57115.pdf</u>.

insulate the inflexibility of those resources, those resources may see a longer service life than would otherwise be economic relative to available lower-cost alternatives. The competition provided by a full wholesale market is the most effective way to provide all resources with the level playing field that ensures large consumer and environmental benefits.

### VII. Conclusion

Real-time energy markets alone do not solve every issue facing a grid increasingly challenged by concerns around climate change, security and cost, but they are an important step towards a reliable, resilient and reduced-carbon electricity system. SEEM offers novel coordination for a region of the country that has traditionally lacked a formal market structure, but the framework offers negligible benefits over traditional utility operations and few of the benefits associated with real-time energy markets.



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#### **About ACORE**

The American Council on Renewable Energy (ACORE) is a national nonprofit organization that unites finance, policy and technology to accelerate the transition to a renewable energy economy. Founded in 2001, ACORE is the focal point for collaborative advocacy across the renewable energy sector, supported by members spanning renewable energy technologies and constituencies.

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