

Fusing Electricity and Carbon Markets in the American West Can Organized Electricity Markets Bolster Cap-and-Trade?

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Efforts to “link” together several state or provincial GHG cap-and-trade programs to form a regional cap-and-trade initiative in western North America began in the early 2000s but never realized their aims. Now, emerging organized electricity markets in western states, including the Energy Imbalance Market, offer the possibility of integrating these markets with a regional cap-and-trade program to cut emissions at a low cost. This Note explains how a regional cap-and-trade program could be incorporated into the West’s nascent organized electricity markets. It then argues that doing so could cost-effectively reduce power sector emissions, guide clean energy development, and alleviate inconsistencies between varying state climate regulations. However, because of a phenomenon called “resource shuffling,” these benefits would not materialize unless all or most western states participate in the cap-and-trade program. To realize the climate benefits of integrating organized markets with cap-and-trade, climate-concerned advocates and policymakers should therefore continue to aspire to a national cap-and-trade program or a regional program that attracts broad participation.

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I. INTRODUCTION

This Note explores the interaction between emerging organized electricity markets in the American West and a still aspirational movement to form a regional cap-and-trade initiative for greenhouse gases (GHGs). Both developments aim to use markets to spur desired activities at the lowest cost—the generation of electricity and the reduction of GHG emissions, respectively. The sections that follow address how organized markets could be integrated with cap-and-trade to cost-effectively generate electricity and cut emissions, the challenges and shortcomings of doing so, and recommendations for maximizing the potential climate benefits of such an approach.

Cap-and-trade (CAT) programs control pollution by requiring emitters to obtain permits for each unit of pollutant they emit, capping the number of permits in circulation, and enabling emitters to buy and sell permits. In a program with large geographic boundaries and broad coverage across the economy, the buying and selling of permits between emitters should naturally channel the bulk of reductions to sectors or locales that are cheapest to depollute.¹ Consequently, the idea of “linking” several state or provincial CAT programs together to establish a broad, multi-jurisdictional CAT region has a long history in the West.² In 2021, that vision came a step closer to reality when Washington enacted legislation authorizing a CAT program that could be linked with California’s existing program.³ At the federal level, efforts to enact CAT nationally came to a head in 2009, when the American Clean Energy and Security Act—dubbed Waxman-Markey—passed in the House.⁴ But after the bill failed to attract sufficient support in the Senate,⁵ no major federal CAT legislation has been introduced since.

Still, there remains durable interest in using carbon pricing programs like CAT to reduce GHG emissions from the electricity sector. The Federal Energy Regulatory Commission (FERC) recently showcased how carbon pricing could be integrated with organized wholesale electricity markets—markets that algorithmically select the

¹ W. CLIMATE INITIATIVE, DESIGN FOR THE WCI REGIONAL PROGRAM 5-6 (2010).

² See *infra* Part II(D)(ii).

³ See *infra* Part II(D)(ii)(c).

⁴ See American Clean Energy and Security Act of 2009, H.R. 2454, 111th Cong. (2009).

⁵ See Bryan Walsh, *Why the Climate Bill Died*, TIME (July 26, 2010), <https://science.time.com/2010/07/26/why-the-climate-bill-died/> [<https://perma.cc/XH84-D8VB>].

lowest-cost mix of power generators to run at a given moment—to cost-effectively reduce GHGs.⁶ The possibility of integrating CAT and organized markets to cut emissions at the lowest cost is a reason for federal and state lawmakers to look at CAT again—as some are already doing.⁷

This Note argues that incorporating CAT into the American West’s nascent organized electricity markets could generate substantial climate benefits. But these benefits will only be realized if the CAT program includes all or most states in the region—an outcome that would likely require federal legislation. In Part II, this Note introduces the basic landscape of electricity markets and climate policy in the West, including the physical grid and existing markets; the concept of organized electricity markets and their regional history; and the patchwork of emerging state climate policies that bear on electric power. Part II also reviews California’s efforts to incorporate CAT into its organized markets and introduces a problem called “resource shuffling” that has plagued those efforts. Part III explains how integrating CAT into organized markets would work, using California’s experience as an example. Part III also explains how several state CAT programs could be linked together to form a regional CAT initiative—again, focusing on linkage with California’s CAT program. Part IV describes how incorporating regional CAT into organized electricity markets could cost-effectively reduce the sector’s GHG emissions, guide clean energy development, and alleviate inconsistencies that result from different types of state climate regulations. However, Part IV argues that a CAT initiative that includes only a handful of western states would fail to achieve these benefits due in large part to resource shuffling. This Note concludes by suggesting that climate-concerned policymakers and advocates continue to aspire to a national CAT program—or at least one spanning the entire West—given the substantial benefits that could result from integrating such a program with organized electricity markets in the West. In the meantime, states should continue strengthening non-CAT climate programs and expanding organized markets—driving emissions down in the near term and laying the foundation for market-integrated regional CAT in the future.

II. REGIONAL MARKETS AND CLIMATE POLICY IN THE WEST: STITCHING

⁶ See Carbon Pricing in Organized Wholesale Electricity Markets, 173 FERC ¶ 61,062 (2020) (notice of proposed policy statement).

⁷ See, e.g., S.B. 5126, 67th Leg., Reg. Sess. (Wash. 2021); S.B. 1530, 80th Leg., Reg. Sess. (Or. 2020).

TOGETHER THE GRID OVER A PATCHWORK OF POLICY

Electric power in the West is increasingly regionally integrated. Growing volumes of electricity are generated for out-of-state consumption, and more aspects of the grid are managed through interstate cooperation. This interconnectedness creates opportunities for addressing power sector GHG emissions on a regional basis as well as serious challenges for the prospect of agreeing on and implementing a common approach. This Part introduces the evolving wholesale electricity landscape in the West—including the development of organized wholesale electricity markets and how they work—and describes several approaches western states have taken to address power sector GHG emissions. It then turns to the question animating this Note—how CAT can be incorporated into organized markets—by reviewing California’s effort to graft its CAT program onto the largest existing organized electricity markets in the West. The last section of this Part introduces the problem of resource shuffling, which threatens to greatly curtail the effectiveness of regional CAT if the program’s coverage does not extend to high-emitting power plants in states that have historically resisted strong environmental regulation.

A. The Configuration of the Grid and Wholesale Markets in the West

The physical network of transmission lines covering roughly the western third of North America, called the Western Interconnection, spans the region between the Great Plains and the Pacific coast, reaching from Alberta and British Columbia in the north, to Arizona, New Mexico, and the northernmost tip of Baja California in the south.⁸ In contrast with other parts of North America’s grid, where a handful of entities—described further below—called Regional Transmission Organizations (RTOs) or Independent System Operators (ISOs) manage swaths of the bulk power system spanning most of a state or more, the Western Interconnection is divided into thirty-eight Balancing Authority Areas (BAAs).⁹ Like energy fiefdoms, grid operations within these BAAs are controlled by balancing authorities responsible for,

⁸ U.S. DEP’T OF ENERGY, UNITED STATES ELECTRICITY INDUSTRY PRIMER 11 (2015) <https://www.energy.gov/sites/prod/files/2015/12/f28/united-states-electricity-industry-primer.pdf> [<https://perma.cc/JJT2-5CHY>].

⁹ *Electric Power Markets*, FED. ENERGY REGUL. COMM’N (last updated Oct. 23, 2020), <https://www.ferc.gov/industries-data/market-assessments/electric-power-markets> [<https://perma.cc/39Y2-GWVV>].

among other things, dispatching power generation within the BAA and managing transfers to and from other BAAs.¹⁰

A range of entities serve as balancing authorities, including investor-owned utilities, municipal utilities, electric power cooperatives, and federal power marketing administrations such as the Bonneville Power Administration.¹¹ BAAs may be contiguous with the service territory of retail electric utilities¹² or may contain multiple retail utilities or portions of a utility's service territory.¹³

Mirroring the balkanized nature of grid management in the West, wholesale power markets, with the exception of California, are not centrally organized by an RTO or ISO. Rather, wholesale trade—besides that occurring entirely within California—is conducted mainly through bilateral contracts between retail utilities and generation owners.¹⁴ The patchwork arrangement of BAAs complicates bilateral transactions because transmission access must be arranged with every BAA through which the electricity travels.¹⁵ Besides purchasing wholesale electricity on the bilateral market, many retail utilities in the West are fully vertically integrated, meaning they own their own generation and transmission assets. These vertically integrated utilities generate power to serve their customers and

¹⁰ N. AM. ELECTRIC RELIABILITY CORP., GLOSSARY OF TERMS USED IN NERC RELIABILITY STANDARDS 4 (2021) (defining “Balancing Authority Area” as “[t]he collection of generation, transmission, and loads within the metered boundaries of the Balancing Authority. The Balancing Authority maintains load-resource balance within this area.”), https://www.nerc.com/files/glossary_of_terms.pdf [<https://perma.cc/VXW3-AMQ6>].

¹¹ See W. ELECTRICITY COORDINATING COUNCIL, WESTERN INTERCONNECTION BALANCING AUTHORITIES (2017),

https://www.wecc.org/Administrative/Balancing_Authorities_JAN17.pdf [<https://perma.cc/QYS5-5GHC>].

¹² Entities that purchase electricity and transmission service to serve the electricity demands of end-use customers are referred to formally as “load-serving entities.” N. AM. ELECTRIC RELIABILITY CORP., *supra* note 10, at 16. For simplicity, this Note refers to these entities as simply “retail utilities.”

¹³ Compare *id.*, with WASH. UTIL. & TRANSP. COMM’N, ELECTRIC UTILITY SERVICE TERRITORIES, <https://www.utc.wa.gov/sites/default/files/2021-02/Electric%20Utility%20Service%20Territories.pdf> [<https://perma.cc/47AC-2926>] (last viewed Ma7 11, 2022).

¹⁴ Stephanie Lenhart et al., *Electricity Governance and the Western Energy Imbalance Market in the United States: The Necessity of Interorganizational Collaboration*, 19 ENERGY RSCH. & SOC. SCI. 94, 95 (2016).

¹⁵ JOSEPH CAVICCHI & TODD SCHATZKI, ANALYSIS GRP., ACHIEVING WESTERN STATES GREENHOUSE GAS (GHG) REDUCTION OBJECTIVES: LEAST-COST COMPLIANCE IN A CONSTANTLY EVOLVING POLICY ENVIRONMENT 11 (2020).

participate in the bilateral market to sell excess power or procure additional long- or short-term supply.¹⁶

B. How Organized Markets Work

In contrast to the complex overlay of BAAs and bilateral transactions found in much of the West, RTOs or ISOs—which dominate most of the eastern grid—balance supply and demand through “organized markets” that select and dispatch the most cost-effective resources available across a region based on the price of electricity at locations within their systems.¹⁷ Although organized markets remain somewhat peripheral in the West, they are poised—as we will see in the next section—to play a larger role in the region’s electricity trade. To understand the implications of this development and, ultimately, how organized markets and CAT could be integrated, this section introduces what organized markets are and how they work. But first, because organized markets usually—though not necessarily—are operated by RTOs or ISOs, we should understand what those are.

RTOs and ISOs are generally structured as non-profit organizations that operate, but do not own, the physical transmission grid (which their member utilities own) within a region or large state.¹⁸ Typically, RTOs and ISOs run both day-ahead and real-time markets, allowing buyers to procure commitments from generators a day in advance of dispatch and then correct for differences between their day-ahead forecast and actual demand by transacting in the real-time market.¹⁹

¹⁶ See PUGET SOUND ENERGY, 2017 PSE INTEGRATED RESOURCE PLAN ch. 1, at 14–15 (2017) (explaining that PSE owns sufficient generation resources to meet load but nonetheless procures energy in the wholesale market when cost-effective).

¹⁷ Strictly speaking, the primary function of ISO/RTO “markets” is to coordinate reliability by matching supply with demand. Because these systems operate by selecting the least-cost resources to meet demand, they resemble and have the practical effect of markets. Whether they are precisely characterized as markets depends upon whether the participating utilities are subject to cost-of-service regulation or are deregulated. James Bushnell, Univ. of Cal. Davis, Presentation at EIM Regional Issues Forum Carbon Workshop, YOUTUBE, 3:37-5:06 (June 18, 2019), <https://www.youtube.com/watch?v=KhZ-QP0AluU&feature=youtu.be> [https://perma.cc/3TKK-8SUH].

¹⁸ See *PJM History*, PJM, <https://www.pjm.com/about-pjm/who-we-are/pjm-history> [https://perma.cc/F9MZ-Y6EY] (last visited Mar. 4, 2021); *ISO History*, CAL. INDEP. SYS. OPERATOR, <http://www.aiso.com/about/Pages/OurBusiness/ISO-history.aspx> [https://perma.cc/4RB6-HYJL] (last visited Mar. 4, 2021); *About Us*, SW. POWER POOL, <https://spp.org/about-us/> [https://perma.cc/SCL9-8NRZ] (last visited May 11, 2022).

¹⁹ *Wholesale Electricity Markets and Regional Transmission Organizations*, AM. PUB. POWER ASS’N, <https://www.publicpower.org/policy/wholesale-electricity-markets-and-regional-transmission-organizations> [https://perma.cc/9W3Q-NYU2] (last viewed May 11, 2022).

Both day-ahead and real-time markets are forms of organized markets. And although organized markets are generally contained within an RTO or ISO, this need not be the case. In the West, an organized market called the Energy Imbalance Market—which currently accounts for a relatively small portion of the West’s wholesale trade—is operated by the California ISO, but includes participating areas across the region that are not ISO members.²⁰ Another western organized market that is still in the design process, called the Extended Day-Ahead Market, will follow roughly the same model.²¹ Because organized markets in the U.S. are generally operated by RTOs or ISOs, this Note will refer to them accordingly.

The basic operation of organized markets resembles a large and complex automated auction that generates a price of electricity at many different locations within the market’s footprint.²² In both day-ahead and real-time markets, power generators submit “supply bids” reflecting the amount of electricity they can produce and the price per megawatt-hour (MWh) at which they are willing to do so over an increment of time.²³ The organized market then determines demand at locations across the grid and selects the least expensive configuration of resources to meet that demand based on the bids submitted and other system constraints.²⁴ The highest bid among all resources selected to be dispatched at each node, or set of nodes, becomes the “market clearing price,” which becomes part of the total price earned by all generators selected to be dispatched at that location.²⁵ In

²⁰ See *infra* Part II(C)(i).

²¹ See *infra* Part II(C)(iii).

²² See *How Resources Are Selected and Prices Are Set in the Wholesale Energy Markets*, INDEP. SYS. OPERATOR OF NEW ENGLAND, <https://www.iso-ne.com/about/what-we-do/in-depth/how-resources-are-selected-and-prices-are-set> [https://perma.cc/EX55-EC9F] (last viewed May 11, 2022), for an exceptionally clear explanation, with diagrams, of RTO/ISO market operations, including unit dispatch and marginal pricing. See also FRANCISCO FLORES-ESPINO ET AL., NAT’L RENEWABLE ENERGY LAB’Y, *COMPETITIVE ELECTRICITY MARKET REGULATION IN THE UNITED STATES: A PRIMER* 12-14 (2016), <https://www.nrel.gov/docs/fy17osti/67106.pdf> [https://perma.cc/U32K-544K], for another helpful overview of RTO/ISO market operations, including locational marginal pricing.

²³ For example, a generator could offer to supply 40 MW of capacity for one hour for \$40 at a particular time. See CYNTHIA HINMAN, CAISO, *DAY-AHEAD MARKET OVERVIEW 20* (Dec. 2, 2019), <http://www.caiso.com/Documents/Presentation-Existing-Day-Ahead-Market-Overview.pdf> [https://perma.cc/D5EE-C5MU]. Energy is generally bought or sold in one-hour increments in the day-ahead market and fifteen- or five-minute increments in the real-time market. FLORES-ESPINO, *supra* note 22, at 13.

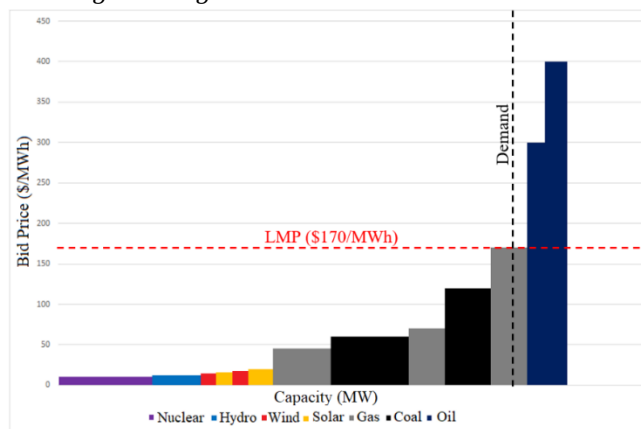
²⁴ INDEP. SYS. OPERATOR OF NEW ENGLAND, *supra* note 22; FLORES-ESPINO, *supra* note 22, at 13.

²⁵ INDEP. SYS. OPERATOR OF NEW ENGLAND, *supra* note 22; FLORES-ESPINO, *supra* note 22, at 13. Importantly, resources that are selected to be dispatched earn the market clearing price, not the price they actually bid (unless their bid becomes the market clearing price). Thus, if the most

addition to the market clearing price, costs associated with transmission congestion and line loss are added to calculate the total price of electricity at each location on the grid.²⁶ This price, called the locational marginal price (LMP), plays an important role in guiding investment in energy development because it reflects the value of energy at particular locations on the grid.²⁷ The promise of earning a high LMP for the electricity they produce encourages developers to build energy resources in locations where high demand, congestion, or line loss are driving the LMP upward. Notably, organized markets do not match particular buyers of electricity with particular generators.²⁸ Instead, they dispatch sufficient generation in the aggregate to balance supply and demand across the whole system,²⁹ a concept we will revisit in a later section.³⁰

Figure 1 depicts a simplified market outcome, called a “resource stack.” All resources that bid into the market are arranged left to right from cheapest to most expensive, with the thickness of each bar representing the amount of capacity the generator offers to produce. The market selects the least expensive mix of resources adequate to meet demand, and pays all selected resources the bid price of the most expensive generator to clear the market (plus additional charges—line loss and congestion—that go into LMP). Keep the concepts of supply bids and LMP in mind, as they will be the key

Figure 1 Organized Market Resource Stack



expensive resource to be dispatched bid \$40/MWh, a resource that bid \$0/MWh would also earn the market clearing price of \$40/MWh. FLORES-ESPINO, *supra* note 22, at 13.

²⁶ FLORES-ESPINO, *supra* note 22, at 13.

²⁷ Joseph Wadsworth, Energy Trading Inst., Remarks at the Federal Energy Regulatory Commission Technical Conference Regarding Carbon Pricing in Organized Wholesale Electricity Markets 218:21-25 (Sept. 30, 2020), <https://www.ferc.gov/sites/default/files/2020-11/AD20-14-000-Transcript.pdf> [<https://perma.cc/QW34-JKLN>].

²⁸ James Bushnell, Univ. of Cal. Davis, Presentation at EIM Regional Issues Forum Carbon Workshop, *supra* note 17, at 5:06-6:05 (“[ISOs] are not bilaterally matching one seller to one buyer, . . . everyone is . . . pouring their power in and we are valuing it based on when and where they are doing so and they are taking the power out based on when and where they are doing so . . .”).

²⁹ *Id.*

³⁰ See *infra* Part II.F.

mechanisms through which a regional CAT program might be incorporated into organized markets in the West (or elsewhere).³¹

The only RTO or ISO in the Western Interconnection is the California ISO (CAISO), which also serves as the balancing authority for most of California and a sliver of Nevada.³² CAISO operates both a day-ahead and real-time market.³³ The day-ahead market, which currently operates only within CAISO's footprint, accounts for 75 to 90 percent of the electricity used to serve consumers in CAISO, while the real-time market, which has been expanded to include BAAs outside CAISO, facilitates approximately 5 percent of transactions in its footprint.³⁴

C. The Development of Organized Wholesale Markets in the West

Among the key developments affecting the electricity sector in the West has been the gradual emergence of voluntary organized markets that perform some of the functions of RTOs or ISOs without consolidating all BAAs into a single RTO or ISO. This section reviews the status of these organized markets and their implications, a foundation that later sections will build upon in describing how these markets might be integrated with a regional CAT program.

While efforts to organize a multi-state RTO or ISO have stalled,³⁵ an increasing volume of wholesale electricity is traded through a

³¹ See *infra* Parts II.D, III.A.

³² *The ISO Grid*, CAL. INDEP. SYS. OPERATOR, <http://www.caiso.com/about/Pages/Our-Business/The-ISO-grid.aspx> [<https://perma.cc/9LU9-Q3KR>] (last visited Mar. 4, 2021). All RTOs/ISOs also serve as the BA for a BAA with a similar or identical footprint to that of the RTO/ISO. See *U.S. Electric System is Made up of Interconnections and Balancing Authorities*, U.S. ENERGY INFO. ADMIN. (July 20, 2016) ("All of the regional transmission organizations in the United States also function as balancing authorities."), <https://www.eia.gov/todayinenergy/detail.php?id=27152> [<https://perma.cc/7JPS-YQAC>]; compare N. AM. ELECTRIC RELIABILITY CORP., BALANCING AUTHORITY AREAS AS OF OCTOBER 2019 (2019), <https://www.nerc.com/AboutNERC/keyplayers/PublishingImages/BA%20Bubble%20Map%2020191106.tif> (showing boundaries of BAAs), with FED. ENERGY REGUL. COMM'N, REGIONAL TRANSMISSION ORGANIZATIONS (2015), <https://www.ferc.gov/sites/default/files/2020-05/elec-ovr-rto-map.pdf> [<https://perma.cc/JYH4-TTSS>] (showing similar or identical boundaries of RTOs/ISOs).

³³ *Market Processes and Products*, CAL. INDEP. SYS. OPERATOR, <http://www.caiso.com/market/Pages/MarketProcesses.aspx> [<https://perma.cc/GYF4-S83A>] (last visited Mar. 4, 2021). CAISO also operates markets for ancillary services and facilitates the use of congestion revenue rights. *Id.*

³⁴ W. AREA POWER ADMIN., COMMENTS ON EXTENDED DAY-AHEAD MARKET - BUNDLE 1 STRAW PROPOSAL (Nov. 12, 2020), <https://stakeholdercenter.caiso.com/Comments/AllComments/45a5a15c-c5c9-407a-9f59-4e7ce97a8544> [<https://perma.cc/NE8Q-UTTE>].

³⁵ See *infra* Part II(C)(ii).

voluntary real-time market known as the Energy Imbalance Market,³⁶ and an effort to expand CAISO's day-ahead market to participants outside California would dramatically elevate the prominence of organized markets in the region.³⁷ In addition to improving on the inefficiencies of the bilateral market, the development of organized wholesale markets in the West could make it possible to merge these new market structures with a regional CAT program.³⁸

i. The Western Energy Imbalance Market

The extension of CAISO's real-time market, now called the Energy Imbalance Market (EIM), to include participating BAAs outside the ISO was a major step toward integrating the western grid via a single organized market. EIM's development began in 2013, when CAISO and PacifiCorp—a power company with retail utility operations in several western states—agreed to negotiate the terms of an expanded real-time market that would include PacifiCorp's two BAAs.³⁹ While the volume of trade in EIM remains relatively modest, twenty-two BAAs that together serve 71% of load in the Western Interconnection have either joined or committed to joining EIM.⁴⁰

EIM has largely been viewed as a success in delivering economic and environmental benefits to participating BAAs.⁴¹ By automating and optimizing real-time energy trades, participants can save money by trading with their neighbors through EIM instead of procuring reserve resources needed to ensure reliability. Moreover, EIM enables participants to economically integrate more renewables into

³⁶ See *infra* Part II(C)(i).

³⁷ See *infra* Part II(C)(iii).

³⁸ See *infra* Part III.

³⁹ See generally Energy Imbalance Market Memorandum of Understanding between CAISO and PacifiCorp (Feb. 12, 2013) https://www.westerneim.com/Documents/ISO-PacifiCorpMOU_Effective20130212.pdf [<https://perma.cc/T6YP-5QLH>].

⁴⁰ EIM ENTITIES, EXTENDED DAY-AHEAD MARKET: FEASIBILITY ASSESSMENT UPDATE FROM EIM ENTITIES 4 (2019), <http://www.caiso.com/InitiativeDocuments/Presentation-ExtendedDay-AheadMarketFeasibilityAssessmentUpdate-EIMEntities-Oct3-2019.pdf> [<https://perma.cc/6ESF-5NNF>].

⁴¹ See, e.g., A RENEWABLE AM., THE GROWING WESTERN EIM (2017), <https://acore.org/wp-content/uploads/2020/04/ARA-The-Growing-Western-EIM.pdf> [<https://perma.cc/JF8L-5LZ5>]; Carl Zichella, *Energy Imbalance Market Progress and Why It Matters*, NAT. RES. DEF. COUNCIL (May 18, 2017), <https://www.nrdc.org/experts/carl-zichella/energy-imbalance-market-progress-and-why-it-matters> [<https://perma.cc/97LL-F4FQ>]; Aaron Larson, *Minutes Matter in the Energy Imbalance Market*, POWER MAG. (July 1, 2020), <https://www.powermag.com/minutes-matter-in-the-energy-imbalance-market/>; Doug Karpa & Craig Lewis, *Expanding the Energy Imbalance Market Is the Right Way to Regionalize California's Grid*, GREENTECH MEDIA (Mar. 13, 2018), <https://www.greentechmedia.com/articles/read/expanding-energy-imbalance-market-right-way-to-regionalize-california> [<https://perma.cc/D6VP-G2Z3>].

their system by offering access to a flexible market in which they can sell excess wind and solar energy. The availability of a market in which to sell excess electricity from variable resources—those that depend on conditions outside human control like wind or solar rays—improves the economies of those resources by avoiding the need to “curtail” generation when conditions produce more electricity than can be consumed.⁴² At the time of this writing, EIM’s most recent publication of quarterly benefits reports \$1.72 billion in gross economic benefits and reductions of 655,683 metric tons of CO₂ equivalent (CO₂e) from avoided curtailment of renewable generation since EIM was officially launched in 2014.⁴³

ii. The Effort to Regionalize the California ISO

Efforts to stitch together the West’s BAAs into a multi-state RTO or ISO have proceeded in fits and starts. Advocates of an integrated western ISO have viewed integration as a means to lower consumer costs, improve reliability, and expand renewable energy penetration region-wide by reducing curtailments and taking advantage of geographic diversity in weather conditions.⁴⁴ In 2015, California’s passage of S.B. 350 kicked off the most recent of these endeavors by authorizing CAISO to study the impacts of regional expansion and begin the process of designing a regional ISO.⁴⁵ Although the process that followed generated a framework governance proposal,⁴⁶ the effort

⁴² CAL. ISO, IMPACTS OF RENEWABLE ENERGY ON GRID OPERATIONS (2017), <https://www.caiso.com/documents/curtailmentfastfacts.pdf> [<https://perma.cc/5YAF-YCL8>].

⁴³ CAL. INDEP. SYS. OPERATOR, WESTERN EIM BENEFITS REPORT: THIRD QUARTER 2021 3, 22-23 (Oct. 29, 2021), <https://www.westerneim.com/Documents/ISO-EIM-Benefits-Report-Q3-2021.pdf> [<https://perma.cc/5Q8G-NQUL>]. EIM’s estimate of CO₂ reductions assumes that avoided curtailments replace generation resources at the default emissions rate for unspecified system power under California’s Mandatory Greenhouse Gas Reporting Regulation. *Id.* at 22; *see also*, Cal. Code Regs., tit. 17, § 95111(b)(1) (2021) (providing default emissions factor for unspecified electricity imports of 0.428 MT of CO₂e/MWh).

⁴⁴ *See, e.g.*, Samuel Garrett-Pate & Rachele Huennekens, *California Groups Call on State Leaders to Support Integration of Western Power Grid*, SECURE CAL. ENERGY FUTURE (Mar. 28, 2017), <https://www.securecaenergyfuture.org/news/california-groups-call-state-leaders-support-integration-western-power-grid/> [<https://perma.cc/VE6V-GXD6>]; Ralph Cavanagh, *Why We Need an Integrated Western Power Grid*, NAT. RES. DEF. COUNCIL (Mar. 28, 2017), <https://www.nrdc.org/experts/ralph-cavanagh/why-we-need-integrated-western-power-grid> [<https://perma.cc/7E7Q-3MBE>].

⁴⁵ Cal. Pub. Util. Code § 359.5(a), (d), (e)(1) (West 2021).

⁴⁶ CAL. INDEP. SYS. OPERATOR, SECOND REVISED PROPOSAL: PRINCIPLES FOR GOVERNANCE OF A REGIONAL ISO (2017). The final proposal envisioned, among other things, a Western States Committee organized separately from the ISO and comprised of representatives from participating states that would have had primary authority over matters of particular state concern, including transmission cost allocation and resource adequacy. *Id.* § 6. The proposal also required the ISO’s

failed when California's legislature rejected legislation requested by Governor Jerry Brown and CAISO⁴⁷ that would have authorized the next phase of governance design and implementation. In addition to a host of other criticisms, the measure failed to overcome concerns that a regional ISO would be less accountable to California's political leaders.⁴⁸

iii. The Effort to Expand the California ISO's Day-Ahead Market

Shortly after California's legislature rejected Governor Brown's plan, CAISO and EIM stakeholders shifted their focus to a more modest regionalization initiative—expanding CAISO's day-ahead market to permit voluntary participation by BAAs outside the ISO.⁴⁹ If enacted, the new market, called the Extended Day Ahead Market (EDAM), would likely account for the majority of energy transactions within its footprint, promising improved cost- and carbon-efficiency

governing documents to preserve state authority over procurement policy, resource planning, retail rate making, certifications of public convenience and necessity for regulated utilities, and generation and transmission siting. *Id.* § 1.

⁴⁷ Assemb. B. 813, 2017-2018 Leg., Reg. Sess. (Cal. 2018). Assembly Bill 813 would have authorized CAISO to seat a transitional committee to finalize a governance plan and to regionalize the ISO upon approval of the plan by the California Energy Commission and the Governor. *Id.* § 4. Opposition to A.B. 813 coalesced around a number of concerns, including that a regional ISO would not be accountable to California's political structure, renewable energy jobs would migrate out of California, out-of-state fossil fuel interests could challenge the ISO's policies at FERC, and the ISO could be subjected to Trump administration initiatives to subsidize coal-fired generation through the wholesale markets. See Letter from Matthew Freedman, The Util. Reform Network et al., to Christopher Holden, Chair, Assemb. Comm. on Utils. and Energy (June 4, 2017), https://www.sierraclub.org/sites/www.sierraclub.org/files/sce/sierra-club-california/PDFs/Jointoppose_AB813_TURN.pdf [<https://perma.cc/1942-4E2E>]. A.B. 813 garnered support from clean energy interests, chambers of commerce, the Natural Resources Defense Fund, and the Environmental Defense Fund, while a broad coalition of environmental groups, including the Sierra Club and Earthjustice, as well as labor organizations, many California cities, consumer advocates, and others opposed the Bill. S. COMM. ON ENERGY, UTILS., AND COMM'NS, A.B. 813 ANALYSIS 13-15 (2018), https://leginfo.legislature.ca.gov/faces/billAnalysisClient.xhtml?bill_id=201720180AB813# [<https://perma.cc/A4ZD-B8FU>].

⁴⁸ Iulia Gheorghiu, *California Approves Bill to Limit Utility Liability for Wildfires, but not CAISO Expansion*, UTIL. DIVE (Sept. 4, 2018), <https://www.utilitydive.com/news/california-approves-bill-to-limit-utility-liability-for-wildfires-but-not/531483/> [<https://perma.cc/L26Z-BM8M>]. CAISO is currently governed by a five-member board appointed by the Governor of California and confirmed by the state senate. Cal. Pub. Util. Code § 337(a) (West 2021).

⁴⁹ Herman K. Trabish, *Western Regionalization Plan B: Utilities Take an Interim Step to Expand the Grid*, UTIL. DIVE (Oct. 30, 2018), <https://www.utilitydive.com/news/western-regionalization-plan-b-utilities-take-an-interim-step-to-expand-th/540765/> [<https://perma.cc/Q74H-5VB4>].

to participating BAAs.⁵⁰ These potential benefits were substantiated in a feasibility study undertaken by EIM participants that modeled between \$119 and \$227 million in annual cost savings from EDAM due to more efficient day-ahead energy procurement across the Western Interconnection.⁵¹

The feasibility study also highlighted the potential environmental benefits of avoiding curtailment of wind and solar resources through EDAM.⁵² A later study by Energy Strategies agreed, modeling that, as compared to a scenario in which EDAM is not expanded, expanding EDAM to include current and committed EIM participants would avoid 17 million metric tons of CO₂ emissions.⁵³ The Energy Strategies study also found that, in the no-expansion scenario, clean energy penetration would only reach 49% by 2035⁵⁴—well below the targets set by several western states.⁵⁵

EDAM has largely been welcomed by both opponents and supporters of CAISO regionalization as a way to achieve regional efficiencies without establishing a full-blown regional ISO.⁵⁶ Nonetheless, several issues remain to be resolved before EDAM can go live, including governance, transmission charges, resource adequacy, and tracking GHG emissions in the market.⁵⁷ A stakeholder process aimed at resolving

⁵⁰ EIM ENTITIES, EXTENDED DAY-AHEAD MARKET PRINCIPLES AND ELEMENTS OF THE EIM ENTITIES 1, 7 (Sept. 16, 2019), <http://www.caiso.com/InitiativeDocuments/PublicCommentLetter-EIMEntities-EDAM-Sep16-2019.pdf> [<https://perma.cc/ZKN8-MPYL>].

⁵¹ EIM ENTITIES, *supra* note 40, at 18. The feasibility assessment assumed, among other things, that all balancing authorities currently participating in EIM would participate in an expanded day-ahead market. *Id.*

⁵² *Id.* at 5.

⁵³ BEN BROWNLEE ET AL., ENERGY STRATEGIES, WESTERN FLEXIBILITY ASSESSMENT FINAL REPORT 13 tbl. 2, 17 tbl. 3 (2019) (Table 2 shows that the “Limited Coordination” scenario assumed no expansion of EDAM and some other transmission limits, while the “Baseline” scenario shared the same assumptions except it assumed expanded day-ahead market coordination. Table 3 shows 151 million metric tons of CO₂ emissions resulting in the Limited Coordination scenario compared to 134 million metric tons in the Baseline Scenario.).

⁵⁴ *Id.* at 17 tbl. 3. In comparison, the Baseline scenario achieved 52% renewable penetration and the Integrated Strategies scenario, which assumed additional grid flexibility measures, achieved 69%. *Id.*

⁵⁵ See, e.g., CAL. PUB. UTIL. CODE §§ 399.11(a), .30(c)(2) (West 2021) (setting a goal of 60% renewable electricity by 2030); WASH. REV. CODE §§ 19.405.040(1) (2020) (setting a goal of GHG neutral retail electricity sales by 2030).

⁵⁶ See Herman K. Trabish, *Western Regionalization Plan B: Utilities Take an Interim Step to Expand the Grid*, UTIL. DIVE (Oct. 30, 2018), <https://www.utilitydive.com/news/western-regionalization-plan-b-utilities-take-an-interim-step-to-expand-th/540765/> [<https://perma.cc/65JEXENM>] (quoting Matthew Freedman, The Utility Reform Network) (“[EDAM] would offer benefits of regionalization without requiring the governance change that could allow interference by [FERC] or out-of-state fossil fuel generators”); Letter from Matthew Freedman, *supra* note 47, at 12.

⁵⁷ EIM ENTITIES, *supra* note 50 at 1.

these and other outstanding issues is underway.⁵⁸ CAISO hopes to roll out EDAM in 2022.⁵⁹

iv. Implications of Organized Wholesale Market Development in the West

The expansion of EIM and EDAM has the potential to reduce energy costs, guide energy resource development,⁶⁰ reduce the curtailment of renewable energy,⁶¹ and create forums for further regional integration in the West.⁶² Currently, the majority of resource commitment decisions and short-term energy transactions are made on a day ahead basis in the bilateral market.⁶³ EIM participants predict that a substantial amount of this activity will shift to EDAM if the market is successfully implemented.⁶⁴ As we will see in Part III, the expansion of organized markets may also facilitate the integration of carbon pricing regimes, such as a CAT, into the market's dispatch mechanism.

D. State Climate and Clean Energy Policies

As organized electricity markets take shape in the region, western states have been implementing a host of climate and clean energy policies. This raft of legislation and executive action reflects converging resolve among states to mitigate the threat of climate change and benefit from clean energy development. Two programs central to these efforts—renewable portfolio standards (RPS) and cap-and-trade

⁵⁸ DON TRETHERWAY, CAL. INDEP. SYS. OPERATOR, EXTENDED DAY-AHEAD MARKET ISSUE PAPER 7 (2019), <http://www.caiso.com/InitiativeDocuments/Presentation-ExtendedDay-AheadMarketEnhancements-Oct17-2019.pdf> [<https://perma.cc/6SAB-Y83Y>].

⁵⁹ *Id.*

⁶⁰ For instance, centralized markets have the potential to improve the clarity of price signals through the use of LMP, which provides utilities and merchant generators more accurate information about where to site and build new generation.

⁶¹ Reducing the cost of transacting across a large region can also enable utilities to incorporate more renewables into their energy mix by taking greater advantage of geographic diversity in the timing of wind and solar production and peak load. *See* Letter from Mary Nichols, Cal. Air Res. Bd., and Robert B. Weisenmiller, Cal. Energy Comm'n, to Cheryl A. LaFleur, Chairman, Fed. Energy Regul. Comm'n (Mar. 26, 2014), <https://elibrary.ferc.gov/eLibrary/search> (enter "ER14-1386" in field titled "Enter Docket Number"); MARY WIENCKE, PACIFICORP, INTERSECTIONS BETWEEN WHOLESALE ENERGY MARKETS AND STATE CARBON POLICIES (June 18, 2019). Timing variations of this sort are greatest along the east-west meridian due to time differences, making integration between the Pacific Coast and Rocky Mountain states particularly valuable. *See id.*

⁶² The trust developed between participants in the process of designing mutually beneficial market designs could form the basis of future cooperation, including transmission planning, expanded market offerings, and future efforts to organize a regional ISO.

⁶³ EIM Entities, *supra* note 50, at 1.

⁶⁴ *Id.* at 7.

(CAT) programs—are the focus of this Note because of their bearing on organized electricity markets.

RPS programs—and their close cousin, clean energy standards (CES)—require retail utilities to procure a portion of their electricity mix from generation resources that are renewable (in the case of RPS) or non-emitting (in the case of CES).⁶⁵ The share of renewable or non-emitting energy a utility must procure is usually expressed in terms of a percentage of its retail sales and may escalate over time.⁶⁶ For simplicity, this Note will refer to both renewable portfolio and clean energy standards as RPS.

CAT programs, on the other hand, set a cap on emissions for all sectors covered by the program and require covered entities to turn in “emissions allowances” for each metric ton of CO₂e they emit.⁶⁷ Periodically, the government agency administering the program either freely distributes or auctions allowances in an amount equal to the cap, creating a fixed pool of allowances.⁶⁸ Allowances may then be bought and sold by covered entities, enabling entities that can reduce their emissions to earn revenue by selling unneeded allowances to others. Gradually, the number of allowances in circulation is reduced, forcing the covered sectors as a whole to lower their emissions.⁶⁹ CAT is a type of carbon pricing regime because the auctioning and trading of emissions allowances generates a going price equal to one metric ton of CO₂e emissions.⁷⁰

i. Renewable Portfolio and Clean Energy Standards

Currently, every state in the Western Interconnection except Idaho and Wyoming has some form of RPS program.⁷¹ While these programs broadly share the goal of increasing renewable or zero-

⁶⁵ *Renewable Energy Explained: Portfolio Standards*, U.S. ENERGY INFO. ADMIN., <https://www.eia.gov/energyexplained/renewable-sources/portfolio-standards.php> [https://perma.cc/2MTJ-BYSM] (last viewed May 11, 2022).

⁶⁶ *Id.*

⁶⁷ See Danny Cullenward, *How California's Carbon Markets Really Work*, 70(5) BULL. OF THE ATOMIC SCIENTISTS 35, 36 (2014) for a succinct explanation of the basic CAT program construct.

⁶⁸ *Id.*

⁶⁹ *Id.*

⁷⁰ Carbon Pricing in Organized Wholesale Electricity Markets, 173 FERC ¶ 61,062, 2, 2 n.5 (2020) (notice of proposed policy statement).

⁷¹ DSIRE, RENEWABLE & CLEAN ENERGY STANDARDS (2020), <http://ncsolarcen-prod.s3.amazonaws.com/wp-content/uploads/2020/09/RPS-CES-Sept2020.pdf> [https://perma.cc/2JBD-GXX5].

emitting energy production, they vary significantly in the timing and stringency of their targets, the types of resources that qualify as renewable or clean, their methods of verifying compliance, and other programmatic details.⁷²

California enacted The 100 Percent Clean Energy Act, or S.B. 100, in 2018, which required that 60% of load be served with renewable energy by 2030⁷³ and set a goal of achieving 100% zero-carbon energy by 2045.⁷⁴ In order to flexibly accommodate future technologies and reduce the cost of ensuring reliability, S.B. 100 distinguished between renewable energy—which includes wind, solar, geothermal, biomass, and a few other technologies⁷⁵—and zero-emission energy, which was left undefined in the statute but might include hydroelectric, nuclear, and, in theory, fossil fuel generation outfitted with 100% carbon capture and sequestration.⁷⁶

In 2019, Washington State enacted the Clean Energy Transformation Act (CETA), which mandated that retail electricity sales be “greenhouse gas neutral” by 2030 and use 100% clean energy by 2045.⁷⁷ The distinction between the two standards is that “greenhouse gas neutral” allows utilities to meet 20% of their compliance obligation with “alternative compliance options” while “100% clean energy” does not.⁷⁸ These alternative compliance options include turning in unbundled renewable energy certificates (RECs)⁷⁹ to the

⁷² *Renewable Energy Explained: Portfolio Standards*, U.S. ENERGY INFO. ADMIN., <https://www.eia.gov/energyexplained/renewable-sources/portfolio-standards.php> [<https://perma.cc/F5CL-QSLE>] (last updated June 29, 2021).

⁷³ S.B. 100 also created interim targets of 50% renewable energy by 2026 for investor-owned utilities and 52% renewable energy by 2027 for publicly owned utilities. CAL. PUB. UTIL. CODE §§ 399.11(a), .30(c)(2) (West 2021).

⁷⁴ CAL. PUB. UTIL. CODE § 454.53 (West 2021). California passed its first RPS in 2002, mandating that 20% of each retail utility’s sales be procured from renewable energy by 2017. S.B. 1078, 2001-2002 Leg., Reg. Sess. § 3 (Cal. 2002). That target was supplemented and updated in 2015 with the passage of S.B. 350. S.B. 350, 2015-2016 Leg., Reg. Sess. § 20 (Cal. 2015).

⁷⁵ CAL. PUB. RES. CODE § 25741(a) (West 2021).

⁷⁶ LIZ GILL ET AL., CAL. ENERGY COMM’N, 2021 SB 100 JOINT AGENCY REPORT 7, 7 tbl. 2, 8 tbl. 3 (2021) (interpreting “zero-carbon resources” to include those that generate only de minimis GHG emissions on site, and characterizing new in-state nuclear and natural gas and coal generation with carbon capture and sequestration as potential zero-carbon resources with “other barriers to development”).

⁷⁷ WASH. REV. CODE §§ 19.405.040(1), .050(1) (2020). Washington’s first RPS, the Energy Independence Act, or I-937, was adopted by initiative in 2006 and required large utilities to procure renewable energy or renewable energy certificates equal to 15% of their retail load by 2020, with interim targets. *Id.* § 19.285.040 (2020). I-937 also required large utilities to identify all achievable cost-effective conservation potential and meet conservation procurement targets. *Id.*

⁷⁸ WASH. REV. CODE §§ 19.405.040(1), .050(1) (2020).

⁷⁹ Unbundled RECs are certificates representing the nonpower attributes of renewable energy—such as their renewable quality—that are purchased *separately from* the underlying energy. *Id.*

administering agency (a process called “retiring” the RECs), paying a fee, or investing in “energy transformation projects” intended to reduce emissions associated with the use of energy in the State.⁸⁰ Utilities must verify compliance with the remaining 80% of their “greenhouse gas neutral” obligation by either retiring (bundled⁸¹) RECs—which are certificates used to track the procurement of renewable energy—or otherwise documenting their ownership of the nonpower attributes⁸² of clean energy they use.⁸³

Oregon’s S.B. 1574B amended the State’s existing RPS program⁸⁴ to mandate that large utilities procure 50% of their retail sales from renewable energy by 2040 and meet interim targets.⁸⁵ Much like Washington’s program, Oregon offers an alternative compliance option for utilities to satisfy up to 20% their RPS obligation by procuring unbundled RECs.⁸⁶ In 2021, the state legislature supplemented the state’s RPS program by passing H.B. 2021, which requires Oregon retail

§ 16.405.020(31), (38) (2020). In contrast, a “bundled” REC—or simply a REC—is an instrument demonstrating the procurement of an actual MWh of renewable energy including the renewable and other nonpower attributes of that energy. *Id.* § 16.405.020(31).

⁸⁰ *Id.* § 19.405.040(2).

⁸¹ See *supra* note 79.

⁸² The term “nonpower attributes” refers to environmental or other characteristics of electricity other than its energy content. For example, the renewable or non-emitting characteristic of electricity is a nonpower attribute. Nonpower attributes can be owned separately from the underlying electricity, as when companies purchase the renewable characteristic of electricity, but not the physical energy, to market their products as made with “100% renewable energy.” Nonpower attributes are generally represented and traded using renewable energy certificates, or RECs. *Renewable Energy Certificates (RECs)*, U.S. ENV’T PROT. AGENCY, https://19january2017snapshot.epa.gov/greenpower/renewable-energy-certificates-recs_.html [https://perma.cc/RS3Y-TY8K] (last visited Jan. 1, 2022).

⁸³ WASH. REV. CODE § 19.405.040(1)(c), (f) (2020).

⁸⁴ S.B. 838, Oregon’s original RPS, set mandates of 5, 10, or 25 percent by 2025 for utilities depending on their size, with interim targets. S.B. 838, 74th Leg., Reg. Sess. §§ 6, 7 (Or. 2007).

⁸⁵ OR. REV. STAT. § 469A.052(1) (2020). Large consumer-owned utilities are mandated to procure 25% of their retail sales from renewable energy by 2025. *Id.* § 469A.052(1)(d).

⁸⁶ Compare OR. REV. STAT. § 469A.145(1) (2020), with WASH. REV. CODE § 19.405.040(1)(b). Unbundled RECs may be retired to meet more than 20% of a utility’s compliance obligation if they are associated with certain in-state net-metering or independent cogeneration or small renewable energy facilities. OR. REV. STAT. § 469A.145(2), (3) (2020). The 20% limit also does not apply to competitive retail service suppliers before 2021. *Id.* § 469A.145(4). Oregon further requires that the remainder of a utility’s compliance obligation, which may be verified using bundled RECs, be met with qualifying renewable energy that is actually delivered to the utility’s system or a location from which it can be transmitted to the utility’s customers. *Id.* § 469A.135(1).

utilities to eliminate emissions associated with serving consumers by 2040 and meet several interim GHG reduction targets.⁸⁷

In addition to the Pacific Coast states, Arizona,⁸⁸ Colorado,⁸⁹ Montana,⁹⁰ Nevada,⁹¹ New Mexico,⁹² and Utah⁹³ have RPS programs that mandate or set voluntary targets for the procurement of renewable or clean energy in amounts ranging from 15 to 100 percent.

ii. Cap-and-Trade

Efforts to establish a regional CAT initiative in the West began well before RPS programs were widely adopted. This section reviews the history of these efforts as it pertains to the present CAT landscape in the West and the potential for states to adopt CAT in the near future. As we will see in Part IV, the efficacy of incorporating a regional CAT program into emerging organized markets in the West will depend in large part on the number of states that adopt, or are otherwise subject to, CAT.

a. The Western Climate Initiative

The Western Climate Initiative (WCI) was an effort beginning in 2007 by jurisdictions in the western United States, Canada, and Mexico to design a regional CAT program.⁹⁴ To achieve this, WCI developed a framework CAT policy that could be adopted by individual

⁸⁷ H.B. 2021, 81st Leg., Reg. Sess. § 3 (Or. 2021). H.B. 2021's approach is novel in that it prescribes escalating GHG reduction targets for retail utilities rather than renewable or clean energy acquisition targets.

⁸⁸ Arizona requires certain utilities to procure 15% of their retail sales from renewable energy by 2025. ARIZ. ADMIN. CODE § 14-2-1804 (2021).

⁸⁹ Colorado requires investor-owned utilities to achieve 30% renewable energy by 2020 and cooperatives and large municipal utilities to achieve 20 or 10 percent renewable energy by 2020 depending on their size. COLO. REV. STAT. § 40-2-124 (2018).

⁹⁰ Montana requires investor-owned utilities and certain competitive electricity suppliers to procure 15% of their retail sales from renewable energy by 2015. MONT. CODE ANN. § 69-3-2004 (2021).

⁹¹ In 2020 Nevada voters approved Question 6 for the second time, meeting the State's requirement to add a new state constitutional article requiring utilities to procure 50% of their retail sales from renewable energy by 2030. NEV. CONST. Art. 4, § 39. Earlier in 2020, the Governor signed legislation imposing a similar standard. NEV. REV. STAT. § 704.7821 (2020).

⁹² New Mexico requires certain utilities to achieve 80% renewable energy by 2047, or by 2040 if compliance does not require displacing zero carbon resources. In any event, 100% clean energy is to be achieved by 2045. N.M. STAT. ANN. § 62-16-4 (2021).

⁹³ Utah requires utilities to procure 20% of their retail sales from renewable energy by 2020, but only if "cost-effective." UTAH CODE ANN. § 54-17-602 (West 2020).

⁹⁴ See generally Sonja Klinsky, *Bottom-up Policy Lessons Emerging from the Western Climate Initiative's Development*, 13 CLIMATE POL'Y 143 (Sept. 10, 2012) for an excellent discussion and analysis of WCI's development and disintegration.

states or provinces and “linked” together, meaning that allowances would be mutually recognized and transferable in all participating jurisdictions.⁹⁵ Because the price of allowances in linked jurisdictions would converge through interjurisdictional trade, program linkage would result in a uniform carbon price for covered entities across all participating states or provinces.⁹⁶ WCI participants envisioned a program with a broad geographic footprint and near economy-wide coverage.⁹⁷ Broad coverage was understood to reduce compliance costs by allowing the bulk of emissions reductions to come from sectors that were cheap to decarbonize.⁹⁸ Broad coverage would also minimize “emissions leakage,” which occurs when the CAT program causes GHG emissions to increase outside the CAT region, as when emitting activities relocate to avoid regulation.⁹⁹

The WCI included eleven members at its peak: five founding states—Arizona, California, Oregon, New Mexico, and Washington—as well as Montana, Utah, British Columbia, Manitoba, Ontario, and Québec. Of these, only California and Québec adopted CAT programs following the WCI framework that remain linked today.¹⁰⁰ Ontario joined WCI in 2008 and established a CAT program linked with California and Québec,¹⁰¹ but formally withdrew in 2018 after passing the

⁹⁵ *Id.*

⁹⁶ See W. CLIMATE INITIATIVE, *supra* note 1, at 6 fig. 2 (2010) (explaining that WCI would create a “regional allowance market” through mutual recognition of compliance instruments and that emissions allowances issued by each jurisdiction would be useable throughout all WCI jurisdictions).

⁹⁷ *Id.* at 5-6. WCI produced a set of uniform design features that member jurisdictions could adopt in their CAT regulations, including the method of setting emissions caps, the scope of program coverage, reporting requirements, the requirements for compliance-eligible carbon offsets, the treatment of imported electricity, policies for linking CAT programs, and the coordination of administrative functions between jurisdictions. *Id.* at 8-25. While individual jurisdictions would be free to design and administer their particular CAT program, consistency with WCI’s design principles was a prerequisite to linking with other members because the recommendations were drafted to ensure each program’s integrity. *Id.* at 22.

⁹⁸ *Id.* at 5-6.

⁹⁹ *Id.*; MEREDITH FOWLIE & DANNY CULLENWARD, INDEPENDENT EMISSIONS MARKET ADVISORY COMMITTEE REPORT ON EMISSIONS LEAKAGE AND RESOURCE SHUFFLING 1 (2018) (defining “emissions leakage” as “any change in emissions from sources not covered by the GHG policy or program that is caused by the GHG emissions policy or program”), https://calepa.ca.gov/wp-content/uploads/sites/6/2018/09/6e.-IEMAC_Meeting_Materials_9-21-18_Fowlie_and_Cullenward_Report_on_Emissions_Leakage.pdf.

¹⁰⁰ Klinsky, *supra* note 95, at 145. See generally Jean-Yves Benoit & Claude Côté, *Essay by The Québec Government on Its Cap-and-Trade System and the Western Climate Initiative Regional Carbon Market*, 33 UCLA J. OF ENV’T L. & POL’Y 42 (2015) for an historical overview and positive assessment of Québec’s CAT program.

¹⁰¹ Klinsky, *supra* note 95, at 146 fig. 1.

Cap and Trade Cancellation Act.¹⁰² Every U.S. state except California withdrew from WCI in 2011.¹⁰³ Washington recently passed legislation authorizing a CAT program that could be linked with other jurisdictions, but is still in the process of implementing it and has not yet signed any linkage agreements or rejoined WCI.¹⁰⁴ Oregon is also in the process of implementing a CAT program pursuant to an executive order by Governor Kate Brown, which will not apply to electric power generation.¹⁰⁵ Nova Scotia continues to use WCI, Inc.—a nonprofit that was created to provide administrative and technical support to WCI members—for services related to its own CAT program, but is not linked with California or Québec.¹⁰⁶

b. California's Cap-and-Trade Program

California's CAT program was the first among western states and remains the most developed. The program arose out of California's Global Warming Solutions Act of 2006,¹⁰⁷ which authorized the California Air Resources Board (CARB) to establish programs to achieve GHG reduction targets.¹⁰⁸ The program covers approximately 85% of California's emissions across multiple sectors¹⁰⁹ and targets GHG reductions of 40% below 1990 levels by 2030 and 80% below 1990 levels by 2050.¹¹⁰ Covered entities must report emissions to CARB annually and retire an amount of allowances, a portion of which may be substituted with carbon offsets, equal to their emissions for each compliance period.¹¹¹

¹⁰² Bill 4, 42d Leg., 1st Sess. (Ont. 2018), https://www.ola.org/sites/default/files/node-files/bill/document/pdf/2018/2018-10/b004ra_e.pdf [<https://perma.cc/C6BB-GGM9>].

¹⁰³ Geoffrey Craig, *Six US States Leave the Western Climate Initiative*, S&P GLOB. PLATTS (Nov. 18, 2011), <https://www.spglobal.com/platts/en/market-insights/latest-news/electric-power/111811-six-us-states-leave-the-western-climate-initiative> [<https://perma.cc/24VF-E5ZH>].

¹⁰⁴ See *infra* Part II.D.ii.c.

¹⁰⁵ *Id.*

¹⁰⁶ News Release, Nova Scotia, Nova Scotia Joins Western Climate Initiative Inc. (May 14, 2018), <https://novascotia.ca/news/release/?id=20180514001> [<https://perma.cc/6T8Z-T4YF>].

¹⁰⁷ California Global Warming Solutions Act of 2006, CAL. PUB. HEALTH CODE §§ 38500–38599.

¹⁰⁸ CAL. AIR RES. BD., OVERVIEW OF ARB EMISSIONS TRADING PROGRAM 1 (2015), https://ww2.arb.ca.gov/sites/default/files/classic/cc/capandtrade/guidance/cap_trade_overview.pdf [<https://perma.cc/UZ2C-2JW9>].

¹⁰⁹ *Id.*

¹¹⁰ These are California's GHG reduction targets for 2030 and 2050. Cal. Health & Safety Code § 38566 (2018); State of Cal. Office of the Governor, Executive Order No. B-30-15 (2015), <https://www.library.ca.gov/Content/pdf/GovernmentPublications/executive-order-proclamation/39-B-30-15.pdf> [<https://perma.cc/A6GX-4QX7>].

¹¹¹ *Id.* at 2.

Consistent with WCI design recommendations, California's CAT covers GHG emissions from electricity imported into the state as well as in-state generation.¹¹² This design component is understood as critical to the program's environmental integrity because it mitigates the effect of emitting generators migrating out of state and selling electricity back into California.¹¹³ The compliance obligation for electricity imports—that is, the obligation to retire allowances commensurate with reported emissions—falls on entities that deliver electricity to the first point on California's grid¹¹⁴ or, in WCI terminology, the “first jurisdictional deliverer.”¹¹⁵ California's CAT regulations label these entities “electricity importers.”¹¹⁶ For imports to California through EIM, the electricity importer is the “scheduling coordinator” for the generation resource, which will either be the generation owner itself, or an entity the generation owner designates to bid the resource into EIM on its behalf.¹¹⁷

c. Cap-and-Trade in Oregon and Washington

After several false starts, both Oregon and Washington are now in the process of implementing CAT programs. Only Washington's program is designed to regulate electric power generation and therefore has the potential to be incorporated into organized electricity markets.

In Oregon, Republican lawmakers have twice blocked bills creating a linkable WCI-modeled CAT program by walking out of the statehouse to prevent a quorum.¹¹⁸ Without a quorum, neither bill

¹¹² See Cal. Code Regs., tit. 17, § 95811(b)(2) (2021); W. CLIMATE INITIATIVE, *supra* note 1, at 15.

¹¹³ See Danny Cullenward, *The Limits of Administrative Law as Regulatory Oversight in Linked Carbon Markets*, 33 UCLA J. OF ENV'T L. & POL'Y 1, 10-13 (2015) (discussing the importance of regulating electricity imports under California's CAT program given its status as a net importer of electricity).

¹¹⁴ Cal. Code Regs., tit. 17, §§ 95802(a), 95811(b) (2021) (defining “electricity importer” and specifying that electricity importers are covered entities).

¹¹⁵ This is consistent with WCI design recommendations which term this point of regulation the “first jurisdictional deliverer” approach. W. CLIMATE INITIATIVE, *supra* note 1, at 15.

¹¹⁶ Cal. Code Regs., tit. 17, § 95811(b)(2) (2021).

¹¹⁷ *Id.* § 95802(a) (“For electricity that is imported into California through the CAISO Energy Imbalance Market, the electricity importer is identified as the EIM Participating Resource Scheduling Coordinator serving the EIM market whose transactions result in electricity imports into California”); CAL. INDEP. SYS. OPERATOR, FIFTH REPLACEMENT FERC ELECTRIC TARIFF, App. A (2014) (defining “EIM Participating Resource Scheduling Coordinator” as “[t]he EIM Participating Resource, or a third party designated by the EIM Participating Resource” to schedule the resource on its behalf).

¹¹⁸ In 2019, Republican lawmakers walked-out of the statehouse to prevent the passage of HB 2020 and left the state after the Oregon State Police were dispatched to return them to the

could be brought for a vote despite support for the measure by a three-fifths majority, the threshold required to enact revenue-raising legislation.¹¹⁹

In 2020, Governor Kate Brown responded by ordering the state's Department of Environmental Quality (DEQ) and its rulemaking board to implement a "cap and reduce program" using existing authority under state air pollution statutes.¹²⁰ DEQ determined that it had sufficient statutory authority to impose a deescalating cap on emissions from in-state large stationary sources, transportation fuels, and liquid and gaseous fuels, and to authorize trading of emissions allowances between covered entities.¹²¹ However, DEQ concluded it lacked authority to regulate emissions that occur outside the state—including emissions associated with electricity imports—or to sell or auction allowances for more than the administrative cost of issuing them.¹²² In December 2021, DEQ adopted a CAT program called the Climate Protection Plan, which covers transportation fuels, natural gas, and other fossil fuels, but not electric power generators.¹²³ The program's rules do not provide for linking Oregon's program with other jurisdictions, such as California or Washington.

Washington has also seen several attempts to adopt CAT or other carbon pricing programs.¹²⁴ In May of 2021, the state adopted the

capitol. See Ian Lovett, *Where Are Oregon's Senate Republicans? Check Idaho*, WALL ST. J. (June 24, 2019), <https://www.wsj.com/articles/where-are-oregons-senate-republicans-check-idaho-11561408161>. The next year, Republicans walked-out again to prevent the passage of S.B. 1530, a similar CAT bill. Dirk VanderHart, *As Cap-And-Trade Bill Moves Forward, Republicans Head for Exits*, OR. PUB. BROAD. (Feb. 24, 2020), <https://www.opb.org/news/article/oregon-republican-senator-walkout-cap-and-trade-bill/> [<https://perma.cc/AF4Y-4FZH>].

¹¹⁹ CONST. OF OR., art. IV, § 25(2).

¹²⁰ See STATE OF OR. OFFICE OF THE GOVERNOR, EXECUTIVE ORDER No. 20-04 6 (Mar. 10, 2020), https://www.oregon.gov/gov/Documents/executive_orders/eo_20-04.pdf [<https://perma.cc/Y3QW-FB8G>].

¹²¹ OR. DEP'T OF ENV'T QUALITY, PROGRAM OPTIONS TO CAP AND REDUCE GREENHOUSE GAS EMISSIONS 7-8 (2020), https://www.oregon.gov/gov/Documents/2020%20DEQ%20CapandReduce_FinalReport.pdf [<https://perma.cc/JE88-C2DM>].

¹²² *Id.* at 7, 9.

¹²³ OR. ADMIN. R. 340-271-0110 (2021); *id.* 340-271-0020(14).

¹²⁴ For example, in 2019, S.B. 5981, colloquially known as "cap and invest," would have created a CAT program covering, among other sources, electricity imports that could be linked with compatible CAT programs. S.B. 5981, 66th Leg., Reg. Sess. (Wash. 2019); see also THE LOW CARBON PROSPERITY INST., WASHINGTON STATE CAP & INVEST BILL SUMMARY (2019), <https://www.lowcarbonprosperity.org/cap-invest/cap-invest-bill-summary/> [<https://perma.cc/YWY6-6EGK>]. The bill failed to advance out of committee in 2020. WASH. PUB. PORTS ASS'N, LEGISLATIVE REPORT, WEEK OF MARCH 7 - MARCH 13, 2020 3-4 (2020), <https://static1.squarespace.com/static/5a8499e518b27dc83c2403ce/t/5e6c1a7373af576a4f4c6e9e/1584142964275/WPPA+2020+Legislative+Report+-+Mar+7-Mar+13%2C+2020.pdf> [<https://perma.cc/V6QS-6A69>].

Washington Climate Commitment Act, which authorizes a CAT program covering sources of GHG emissions across the economy that exceed statutory limits, including power plants and electricity importers.¹²⁵ The program is set to take effect on January 1, 2023,¹²⁶ and aims for total emissions reductions of ninety-five percent below 1990 levels by 2050, with several interim targets.¹²⁷ It also directs Washington’s Department of Ecology to pursue linkage with other programs in furtherance of the Act’s emissions reduction goals, so long as the other programs meets criteria for environmental justice, stringency, and compatibility.¹²⁸

Washington’s Climate Commitment Act could very well expand the existing California– Québec linkage agreement to a third state. According to one of the bill’s sponsors, Senator Reuven Carlyle, the Act is intended to facilitate linkage with California in order to “creat[e] the foundation for a broad, competitive exchange.”¹²⁹ This purpose is reflected in the linkage provisions as well as the structure of the legislation, which mirrors, in many ways, California’s program.¹³⁰ Washington’s Department of Ecology is currently designing the program, and it remains to be seen how it evolves in relation to other CAT programs and emerging organized electricity markets in the region.

E. Incorporating California’s Cap-and-Trade into EIM

California already has several years of experience incorporating its CAT program into EIM, CAISO’s real-time market, which has now been expanded to parts of ten states and the province of British Columbia.¹³¹ Its experience offers both a model for how a broader CAT program could be integrated with organized markets, and a cautionary example of how resource shuffling—a problem explored in the next section—can cut into the climate benefits of such a program.

¹²⁵ See S.B. 5126, 67th Leg., Reg. Sess. (Wash. 2021).

¹²⁶ WASH. REV. CODE § 70A.65.070 (2021).

¹²⁷ *Id.* §§ 70A.65.060(1), 70A.45.020.

¹²⁸ *Id.* § 70A.65.210.

¹²⁹ Levi Pulkkinen, *Washington Passed its Cap-and-Trade Climate Legislation. Now What?*, U.S. NEWS & WORLD REPS. (May 10, 2021), <https://www.usnews.com/news/best-states/articles/2021-05-10/washington-passed-its-cap-and-trade-climate-legislation-now-what>.

¹³⁰ For example, the Washington and California programs both cover a similar set of industries, provide for auctions of compliance instruments that include a price floor and ceiling, and authorize limited use of carbon offsets to meet CAT obligations. Compare WASH. REV. CODE §§ 70A.65.080, 70A.65.150, 70A.65.160, 70A.65.170 (2021), with CAL. CODE REGS. §§ 95811, 95911(b), 95915, 95854 (2021).

¹³¹ See *supra* Part II(C)(i).

Because importers of electricity into California via the EIM incur a CAT obligation, CAISO had to develop a mechanism for identifying out-of-state EIM resources that deliver electricity to California.¹³² Designing such a mechanism runs up against a fundamental feature of organized electricity markets that limits their ability to accommodate divergent state policies within their footprint. Organized markets, including EIM, operate on a “pool” paradigm, in which participating resources contribute to a single “pool” of undifferentiated electricity from which market buyers draw.¹³³ The market has no ability to match particular buyers with particular generators of electricity.¹³⁴ Instead, the market balances supply and demand over the whole system.¹³⁵ As a result, enforcing California’s CAT regulations required CAISO to develop a novel design feature to identify which out-of-state generators were dispatched through EIM to serve California consumers.

The solution CAISO developed approximates those emissions associated with serving consumers in California by “deeming” certain EIM resources delivered to California.¹³⁶ The mechanism works by permitting each participating out-of-state generator¹³⁷ to submit a “GHG adder” along with its supply bid that reflects the generator’s cost of complying with the CAT program, were it obligated to do so.¹³⁸ EIM then selects the least-cost mix of resources to serve California load based on both supply bids and GHG adders, while simultaneously selecting the least-cost mix of resources to serve load outside California based on supply bids only.¹³⁹ Resources that are selected based on their supply bid and GHG adder are “deemed delivered” to California

¹³² See Cal. Indep. Sys. Operator, 147 FERC ¶ 61231, 62413 (2014) (conditionally approving CAISO’s tariff revision to establish the EIM and implement a mechanism for identifying resources that import electricity to California).

¹³³ James Bushnell, Univ. of Cal. Davis, Presentation at EIM Regional Issues Forum Carbon Workshop, *supra* note 17, at 5:06–6:05 (describing the pool-based paradigm: “[ISOs] are not bilaterally matching one seller to one buyer, . . . everyone is . . . pouring their power in and we are valuing it based on when and where they are doing so and they are taking the power out based on when and where they are doing so . . .”).

¹³⁴ *Id.*

¹³⁵ *Id.*

¹³⁶ See Cal. Indep. Sys. Operator, 147 FERC ¶ 61231, 62413 (2014); see also CAL. CODE REGS. § 95802(a) (2021) (defining “imported electricity” to include “[EIM] dispatches designated by the CAISO’s optimization model and reported by the CAISO to EIM Participating Resource Scheduling Coordinators as electricity imported to serve retail customers load that is located within the State of California”).

¹³⁷ In-state resources do not submit GHG adders because they incur a CAT compliance obligation regardless of where they are deemed dispatched. Cal. Code Regs. § 95811(b)(1) (2021).

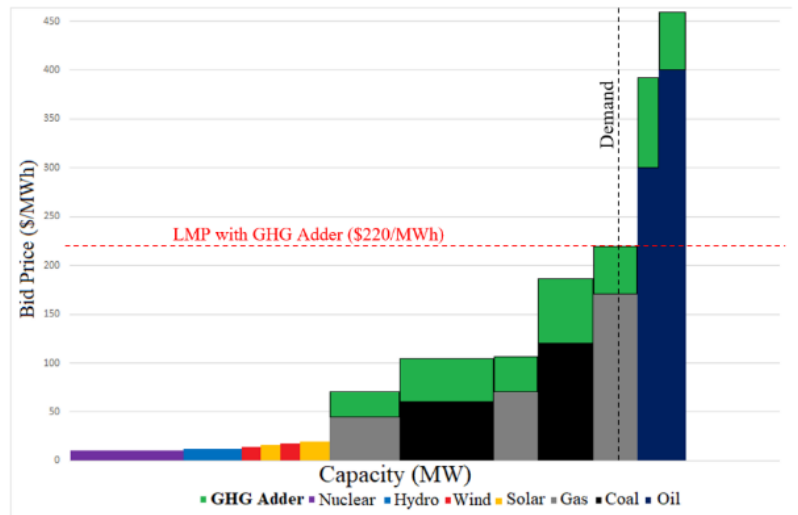
¹³⁸ CAL. INDEP. SYS. OPERATOR, FIFTH REPLACEMENT FERC ELECTRIC TARIFF § 29.32(a)(2)(A) (2019).

¹³⁹ *Id.* § 29.32(b)(1).

and, as a result, incur a CAT compliance obligation.¹⁴⁰ Generators that do not wish to be subjected to California’s CAT rules may make themselves ineligible by declining to submit a GHG adder.¹⁴¹ Figure 2 depicts a simplified market outcome incorporating a GHG adder. Non-emitting resources like wind and nuclear might submit a nominal GHG adder but, for simplicity, are depicted here as having a GHG adder of zero.

EIM’s GHG adder mechanism *Figure 2 Resource Stack with a GHG Adder*

optimizes dispatch for GHG emissions as well as cost within California.¹⁴² Anytime an emitting generator is deemed delivered to California and sets the market clearing price at some location on the grid, the LMP¹⁴³ at that location will include a premium reflecting that generator’s cost of compliance, as reported in its GHG adder.¹⁴⁴ All other generators that clear the market at that location will earn the GHG-premium LMP. As a result, the market theoretically incentivizes developers to build low-emitting resources—which have low CAT compliance costs—at the dirtiest locations on the grid, replacing older, high-emitting resources. Clean energy developers



¹⁴⁰ See *id.* § 29.32(d) (describing when CAISO will inform EIM Participating Resource Scheduling Coordinators that an EIM dispatch has been deemed imported to California); CAL. CODE REGS. § 95802(a) (2021) (defining “imported electricity” to include “[EIM] dispatches designated by the CAISO’s optimization model and reported by the CAISO to EIM Participating Resource Scheduling Coordinators as electricity imported to serve retail customers load that is located within the State of California”).

¹⁴¹ CAL. INDEP. SYS. OPERATOR, FIFTH REPLACEMENT FERC ELECTRIC TARIFF § 29.32(b)(3) (2019).

¹⁴² See *id.* § 29.32(b)(1) (explaining that GHG adders are considered by the unit commitment and dispatch systems for selecting out-of-state resources for delivery into California).

¹⁴³ As explained *supra* Part II(B), “LMP” refers to the locational marginal price of electricity generated through an organized market.

¹⁴⁴ CAL. INDEP. SYS. OPERATOR, EIM GREENHOUSE GAS ENHANCEMENTS, 3RD REVISED DRAFT FINAL PROPOSAL 2 (2018) (explaining that, within the CAISO BAA, locational marginal prices include GHG adders); see also CAL. INDEP. SYS. OPERATOR, FIFTH REPLACEMENT FERC ELECTRIC TARIFF app. C § B (2020) (providing that “[f]or each [pricing node] within an EIM Entity Balancing Authority Area, the LMP shall include . . . the EIM Bid Adder component”).

motivated to earn the highest GHG-premium will be drawn to locations where existing high-emitting generators are bidding high GHG adders into EIM.

F. The Problem: Resource Shuffling

Although mechanisms like EIM's GHG adder can theoretically support state climate goals at a low cost by integrating CAT and organized markets, EIM's experience highlights a major limitation of CAT programs that only apply to a single state or set of states. This limitation would not impede a national CAT program where generation emissions are uniformly regulated regardless of their state of origin.

The problem is a phenomenon called "resource shuffling" or "secondary dispatch." It occurs when the market's dispatch algorithm deems low-emitting resources delivered to the GHG control area (which, in the case of EIM, currently includes only California) while "backfilling" out-of-jurisdiction load with higher-emitting resources.¹⁴⁵ In their 2018 report to the California Independent Emissions Market Advisory Committee, Meredith Fowlie and Danny Cullenward explain the concept by imagining a hypothetical utility before and after a CAT program is enacted:

[s]uppose a utility once imported power from carbon-intensive coal plants prior to the cap-and-trade program's existence. In response to the new carbon price, the utility might decide to divest its contract with the coal plant and replace it with natural gas-fired electricity. While this swap will reduce the carbon intensity of the utility's imports, and therefore reduce its compliance obligations under the cap-and-trade program, it may not reduce net greenhouse gas emissions if the divested coal-fired electricity is purchased by a utility outside of the cap-and-trade program.¹⁴⁶

In the EIM context, they continue:

¹⁴⁵ See MEREDITH FOWLIE & DANNY CULLENWARD, INDEPENDENT EMISSIONS MARKET ADVISORY COMMITTEE REPORT ON EMISSIONS LEAKAGE AND RESOURCE SHUFFLING 4-5, 7-8 (2018), [https://calepa.ca.gov/wp-content/uploads/sites/6/2018/09/6e-IEMAC_Meeting_Materials_9-21-](https://calepa.ca.gov/wp-content/uploads/sites/6/2018/09/6e-IEMAC_Meeting_Materials_9-21-18_Fowlie_and_Cullenward_Report_on_Emissions_Leakage.pdf)

18_Fowlie_and_Cullenward_Report_on_Emissions_Leakage.pdf for a helpful explanation of resource shuffling and its occurrence in EIM. See also CAL. CODE REGS. tit. 17, § 95802(a) (2021) (defining "resource shuffling" as "any plan, scheme, or artifice undertaken by a First Deliverer of Electricity to substitute electricity deliveries from sources with relatively lower emissions for electricity deliveries from sources with relatively higher emissions to reduce its emissions compliance obligation.").

¹⁴⁶ FOWLIE & CULLENWARD, *supra* note 145, at 5.

[t]he issues [of resource shuffling] arise[] because low- and zero-carbon resources outside of California have an incentive to opt in the EIM to serve CAISO load. However, if these relatively clean out-of-state resources are preferentially dispatched to serve California load, higher-carbon resources may be reallocated to serve non-California EIM load. The dispatch of higher-carbon resources to serve non-California EIM load is sometimes called “backfilling” or “secondary dispatch.”¹⁴⁷

When resource shuffling occurs, GHG emissions are “reshuffled” to somewhere outside of the CAT jurisdiction, creating the illusion that jurisdictional emissions have gone down. As some observers have noted, resource shuffling is unavoidable in any CAT program that covers only part of the relevant market because reallocating delivery from emitting resources is a rational response to the price signal generated by the program.¹⁴⁸ As discussed in Part IV, the distribution of coal-fired generation in the West makes resource shuffling a particularly serious concern given the opportunity for coal plants to escape regulation without reducing their output.¹⁴⁹

While California’s CAT regulations generally prohibit resource shuffling,¹⁵⁰ transactions in EIM and the day-ahead market are exempt.¹⁵¹ Nonetheless, after CAISO implemented the GHG adder, CARB raised concerns that resource shuffling was preventing EIM from identifying all emissions associated with out-of-state generation serving California load.¹⁵² In response, CAISO amended its GHG adder rules in 2018 to address the issue;¹⁵³ but the solution it implemented is incomplete. In implementing its resource shuffling fix, CAISO took advantage of an

¹⁴⁷ *Id.* at 7.

¹⁴⁸ See Clare Breidenich, W. Power Trading F., Remarks at the Federal Energy Regulatory Commission Technical Conference Regarding Carbon Pricing in Organized Wholesale Electricity Markets, *supra* note 27, at 239:12–24 (describing resource shuffling as “a rational economic response to a carbon price signal” and explaining “if you have carbon pricing in one region and not in others, the carbon pricing region is going to have the effect of pulling clean resources into its footprint.”).

¹⁴⁹ See *infra* Part IV.

¹⁵⁰ CAL. CODE REGS. § 95852(b)(2) (2021).

¹⁵¹ *Id.* § 95852(b)(2)(A)(10).

¹⁵² See Cal. Indep. Sys. Operator Transmittal Letter to Hon. Kimberly B. Bose, Fed. Energy Regul. Comm’n 5 (Aug. 29, 2018), <https://elibrary.ferc.gov/eLibrary/search> (enter “ER18-2341-000” in field titled “Enter Docket Number”); CAL. AIR RES. BD., WESTERN EIM REGIONAL ISSUES FORUM CARBON WORKSHOP 9 (2019) (discussing CARB’s concern that EIM’s design failed to “account for the full GHG emissions experienced by the atmosphere from electricity imported to California under EIM, and result[ed] in emissions leakage”), <https://www.westerneim.com/Documents/Presentation-CapandTrade-CaliforniaAirResourcesBoard.pdf> [<https://perma.cc/QD6K-Q62T>].

¹⁵³ See Cal. Indep. Sys. Operator Corp., 165 FERC ¶ 61050 (2018).

existing feature of EIM called “base schedules,” which are hourly reports submitted by resource scheduling coordinators that indicate how much of the resource’s output is committed to obligations other than EIM over the next hour.¹⁵⁴ In other words, base schedules indicate how much a resource would run regardless of whether it participates in EIM. The details of the amended rule are complex,¹⁵⁵ but its effect is to prevent generation output that is already scheduled to serve load elsewhere from being deemed delivered to California.¹⁵⁶ This reduces the amount of clean energy shuffled to serve California load and, as a result, also reduces backfilling from higher-emitting resources.¹⁵⁷

While the amended GHG adder rules alleviate resource shuffling, they do not eliminate it.¹⁵⁸ In fact, market designs are unlikely to ever eliminate the problem because resource shuffling arises from the fundamental limits of any CAT program to reduce emissions from sources *outside* the program’s jurisdiction. Any geographically incomplete—or “sub-regional”—CAT program can only regulate emissions in non-participating jurisdictions when those emissions are associated with products imported into the CAT jurisdiction. But out-of-jurisdiction producers, including electricity generators, can be expected to avoid regulation by simply delivering their product elsewhere, if doing so is cost-effective.¹⁵⁹ Additionally, combatting resource shuffling with additional layers of design complexity may impose administrative costs on organized market participants and hamper the market’s ability to

¹⁵⁴ CAL. INDEP. SYS. OPERATOR, FIFTH REPLACEMENT FERC ELECTRIC TARIFF app. A (2020) (defining “EIM Base Schedule” as “[a]n hourly forward Energy Schedule that does not take into account Dispatches from the Real-Time Market and is submitted by an EIM Entity Scheduling Coordinator or EIM Participating Resource Scheduling Coordinator for use in the Real-Time Market”).

¹⁵⁵ CAISO’s partial-fix limits the portion of a resource’s output for which participants can submit a GHG adder to the difference between the resource’s effective maximum output and its base schedule. *Id.* § 29.32(b)(2). Because electricity may only be deemed delivered to California if it is submitted with a GHG adder, this limits the portion of a resource’s output that EIM can deem delivered to California to the amount it has not already committed for other purposes. Cal. Indep. Sys. Operator Corp., 165 FERC ¶ 61050, at ¶ 7 (2018).

¹⁵⁶ *See id.* (explaining that CAISO’s tariff amendment would “limit the amount of a resource’s output that can be designated as supporting a transfer into CAISO when the resource has already been scheduled to serve load outside of CAISO”).

¹⁵⁷ Cal. Indep. Sys. Operator, *supra* note 152, at 6.

¹⁵⁸ CAL. AIR RES. BD., *supra* note 152, at 9 (“CAISO’s new deeming mechanism is expected to improve the accuracy of GHG emissions accounting, but not fully eliminate the leakage issue”).

¹⁵⁹ *See* Clare Breidenich, *supra* note 148, at 239:12–24 (describing resource shuffling as “a rational economic response to a carbon price signal” and explaining “if you have carbon pricing in one region and not in others, the carbon pricing region is going to have the effect of pulling clean resources into its footprint.”).

integrate greater amounts of renewable energy.¹⁶⁰ Regardless of design tweaks, resource shuffling will therefore continue to dampen the benefits of any CAT (or other carbon pricing) program that covers less than the entire footprint of the relevant market—which, for our purposes, is the physically interconnected grid.¹⁶¹

III. STRUCTURE AND IMPLEMENTATION OF REGIONAL CAP-AND-TRADE

As electricity markets become more regional and states become more active in addressing climate change across the West, regional CAT could offer a market-based climate solution that could be readily integrated into the region’s emerging organized wholesale electricity markets.¹⁶² Following California’s example, this Part outlines how organized markets could incorporate a regional CAT program and how such a program might work. In particular, it outlines the design features that would make a state CAT program compatible with organized markets and linkable with other programs, especially California’s.

A. Incorporating Regional Cap-and-Trade into Organized Market Rules

Incorporating a set of fully linked CAT programs that produce a single carbon price into organized markets would be relatively straightforward.¹⁶³ Fully linked programs with similar design components would generate a functionally equivalent cost of compliance that could be incorporated into EIM and other markets using a similar

¹⁶⁰ JAMES BUSHNELL, GOING WITH THE FLOW, REGIONAL POWER MARKETS AND CARBON REGULATION 26 (2019), <https://www.westerneim.com/Documents/Presentation-CentralizedMarketsandRenewables-Bushnell.pdf> [<https://perma.cc/7C57-8NM3>].

¹⁶¹ See J. Arnold Quinn, *Vistra Energy, Remarks at the Federal Energy Regulatory Commission Technical Conference Regarding Carbon Pricing in Organized Wholesale Electricity Markets*, *supra* note 27, at 212:19-213:1 (“Most efforts to address internal leakage are likely to be only partially successful because they rely on [s]peaking of the ISO/RTO footprint as subdivided into a carbon pricing region and a non-carbon pricing region. And then trying to determine when a resource in one of those regions should be needed to serve load in the other region. That determination is inherently a fiction because the ISO dispatches all generation to serve all load.”).

¹⁶² See *Carbon Pricing in Organized Wholesale Electricity Markets*, 173 FERC ¶ 61,062, at P 14 (2020) (notice of proposed policy statement) (describing stakeholder comments that integrating carbon pricing into organized markets is an “efficient market-based tool that incorporates state public policies into RTO/ISO markets”).

¹⁶³ Mark Rothleder, *Cal. Indep. Sys. Operator, Presentation at EIM Regional Issues Forum Carbon Workshop*, *supra* note 17, at 50:13-52:27 (June 18, 2019) (“If we can link [GHG regulating jurisdictions] together we can basically have two areas: a GHG compliance area and a non-GHG area. And then all we have to do is . . . track what’s going in between . . .”).

mechanism to EIM's existing GHG adder.¹⁶⁴ Just as EIM's GHG adder currently distinguishes resources dispatched to serve California load, an organized market's dispatch algorithm could select resources to be dispatched to a single CAT region containing multiple linked programs based on GHG adders submitted along with supply bids.

However, incorporating several non-linkable CAT programs with varying design components could burden the market with additional complexity (as well as costs) and might be technically infeasible.¹⁶⁵ Because each program would generate a different price per allowance, integrating each program into the market would require multiple GHG adders or some other novel sorting mechanism for dispatching generation across distinct CAT and non-CAT states. The complexity required to achieve this could interfere with the market's ability to optimize least-cost dispatch.¹⁶⁶ If non-linkable state CAT programs also have different points of regulation—for example some states regulate electricity imports while others only regulate in-state sources—one CAISO official has suggested that integrating each program into the market might not be technically possible.¹⁶⁷

The benefits of linkage and uniformity of design when it comes to incorporating multiple CAT programs into organized markets like EIM makes it all the more important that Washington and future CAT-adopters design their programs to be linkable with California (and possibly Québec). This would functionally expand the existing carbon pricing region without interfering with the dispatch mechanism of EIM or other future organized markets, such as EDAM. The next section will first review California's requirements for linking its CAT program with other programs and then discuss specific issues that may arise in connection with a California-Washington linkage agreement.

B. California's Requirements for Linkage with Cap-and-Trade Programs in Other Jurisdictions

California law requires the State's governor to make several findings regarding the sufficiency of a partner jurisdiction's CAT regime

¹⁶⁴ *Id.* at 50:13-52:27.

¹⁶⁵ *Id.* at 52:27-54:00, 2:07:36-08:50 (“[If the difference between non-linkable state GHG regulations] was just price differentials and everything else was source-based, I think theoretically you could achieve it from a technological perspective Where it starts breaking down further for me is when you start having [differences in] the point of regulation, . . . that is where it gets really cloudy for me how you achieve it.”).

¹⁶⁶ *Id.*

¹⁶⁷ *Id.* at 2:07:36-08:50.

before the State may execute a linkage agreement.¹⁶⁸ The required findings are that (1) the partner program’s GHG reduction requirements “are equivalent to or stricter than” California’s, (2) the linkage preserves California’s jurisdiction to the maximum extent permitted by law, (3) the partner program’s enforcement powers “are equivalent to or stricter than” California’s, and (4) the linkage will “not impose any significant liability on” California.¹⁶⁹

The factors cited by California’s Governor and Department of Justice¹⁷⁰ in approving linkage agreements with Québec and Ontario illustrate the standards a potential partner-program would need to meet. In support of the first finding, the Governor and Department of Justice noted that both provinces’ programs had more ambitious emissions reduction goals than California, were consistent with and derivative of WCI design recommendations, and had similar reporting requirements, offset regulations, and economy-wide coverage of emissions.¹⁷¹ The second and fourth findings were supported by the facts that linkage did not impose new limitations on California’s jurisdiction and the use of WCI, Inc. infrastructure would alleviate security risks, respectively.¹⁷² Finally, the availability of civil, criminal, and

¹⁶⁸ Cal. Gov. Code § 12894(f) (2018).

¹⁶⁹ *Id.* The requirement is procedural in that the findings themselves are not subject to judicial review. *Id.* § 12894(g).

¹⁷⁰ The California Attorney General reviews the proposed linkage for consistency with applicable laws and makes a recommendation to the governor. *Id.* § (a)(1), (g).

¹⁷¹ Letter from Governor Edmund Brown to Mary Nichols, Cal. Air Res. Bd. 1–2 (Apr. 8, 2013), https://www.ca.gov/archive/gov39/wp-content/uploads/2017/09/Request_for_SB_1018_Findings.pdf [<https://perma.cc/M9TZ-9RPQ>]; Letter from Christopher Crook, Deputy Att’y Gen., to Cliff Rechtschaffen, Senior Advisor to the Governor 2–4 (Mar. 5, 2013), https://www.ca.gov/archive/gov39/wp-content/uploads/2017/09/AG_Letter_SB_1018.pdf [<https://perma.cc/TL3K-F5ET>]; Letter from Governor Edmund Brown to Mary Nichols, Cal. Air Res. Bd. 1–3 (Mar. 16, 2017), https://ww2.arb.ca.gov/sites/default/files/classic/cc/capandtrade/linkage/response_to_sb_1018_request.pdf [<https://perma.cc/RZ9U-GYT5>]; Letter from Robert Byrne, Senior Assistant Att’y Gen., to Peter Krause, Legal Affs. Sec’y, Cal. Office of the Governor 2–6 (Mar. 16, 2017), https://ww2.arb.ca.gov/sites/default/files/classic/cc/capandtrade/linkage/ag_letter_sb_1018.pdf [<https://perma.cc/FW6S-2R86>].

¹⁷² Letter from Governor Edmund Brown to Mary Nichols, Cal. Air Res. Bd. 2–3 (Apr. 8, 2013), https://www.ca.gov/archive/gov39/wp-content/uploads/2017/09/Request_for_SB_1018_Findings.pdf [<https://perma.cc/M9TZ-9RPQ>]; Letter from Christopher Crook, Deputy Att’y Gen., to Cliff Rechtschaffen, Senior Advisor to the Governor 4–7 (Mar. 5, 2013), https://www.ca.gov/archive/gov39/wp-content/uploads/2017/09/AG_Letter_SB_1018.pdf [<https://perma.cc/TL3K-F5ET>]; Letter from Governor Edmund Brown to Mary Nichols, Cal. Air Res. Bd. 1–3 (Mar. 16, 2017), https://ww2.arb.ca.gov/sites/default/files/classic/cc/capandtrade/linkage/response_to_sb_1018_request.pdf [<https://perma.cc/RZ9U-GYT5>]; Letter from Robert Byrne, Senior Assistant Att’y Gen., to Peter Krause, Legal Affs. Sec’y, Cal. Office of the Governor 2–3 (Mar.

administrative penalties for program noncompliance was sufficient to support the third finding.¹⁷³

Determining the compatibility of Washington's CAT program with California's will involve a technical review of Washington's CAT regulations after they are issued. As a preliminary matter, the Climate Commitment Act is consistent with several of California's criteria. For example, it aims for reductions in GHG emissions of 45% below 1990 levels by 2030 and 95% by 2050.¹⁷⁴ These are more stringent than California's targets of 40% reductions below 1990 levels by 2030 and 80% by 2050.¹⁷⁵ Moreover, Washington and California both authorize the limited use of offsets, while regulating them to ensure they actually produce the emissions reductions they claim.¹⁷⁶ And both programs provide for enforcement authorities.¹⁷⁷

Washington's Climate Commitment Act contains its own requirements for linking with other jurisdictions, including environmental justice criteria that potential partner jurisdictions must satisfy. Specifically, the Act requires that all linkage agreements "[e]nsure that the linking jurisdiction has provisions to ensure the distribution of benefits from the program to vulnerable populations and overburdened communities."¹⁷⁸ Linkage agreements must also not "yield net adverse impacts to either jurisdiction's highly impacted communities or analogous communities in the aggregate."¹⁷⁹ These provisions could raise issues when it comes to linking with California's program,

16, 2017), https://ww2.arb.ca.gov/sites/default/files/classic/cc/capandtrade/linkage/ag_letter_sb_1018.pdf [<https://perma.cc/FW6S-2R86>].

¹⁷³ Letter from Governor Edmund Brown to Mary Nichols, Cal. Air Res. Bd. 2-3 (Apr. 8, 2013), https://www.ca.gov/archive/gov39/wp-content/uploads/2017/09/Request_for_SB_1018_Findings.pdf [<https://perma.cc/WPB7-K6BG>]; Letter from Christopher Crook, Deputy Att'y Gen., to Cliff Rechtschaffen, Senior Advisor to the Governor 5 (Mar. 5, 2013), https://www.ca.gov/archive/gov39/wp-content/uploads/2017/09/AG_Letter_SB_1018.pdf [<https://perma.cc/2RKJ-JCMP>]; Letter from Governor Edmund Brown to Mary Nichols, Cal. Air Res. Bd. 3-4 (Mar. 16, 2017), https://ww2.arb.ca.gov/sites/default/files/classic/cc/capandtrade/linkage/response_to_sb_1018_request.pdf [<https://perma.cc/6MCF-2V5Y>]; Letter from Robert Byrne, Senior Assistant Att'y Gen., to Peter Krause, Legal Affs. Sec'y, Cal. Office of the Governor 8 (Mar. 16, 2017), https://ww2.arb.ca.gov/sites/default/files/classic/cc/capandtrade/linkage/ag_letter_sb_1018.pdf [<https://perma.cc/PN86-8JWH>].

¹⁷⁴ WASH. REV. CODE §§ 70A.65.060(1), 70A.45.020 (2021).

¹⁷⁵ Cal. Health & Safety Code § 38566 (2018); STATE OF CAL. OFFICE OF THE GOVERNOR, EXECUTIVE ORDER No. B-30-15 (2015), <https://www.library.ca.gov/Content/pdf/GovernmentPublications/executive-order-proclamation/39-B-30-15.pdf> [<https://perma.cc/MT84-2M45>].

¹⁷⁶ Compare WASH. REV. CODE § 70A.65.170 (2021), with Cal. Code Regs. § 95854 (2021).

¹⁷⁷ Compare WASH. REV. CODE § 70A.65.200, with Cal. Code Regs. §§ 96010-96014.

¹⁷⁸ WASH. REV. CODE § 70A.65.210(3)(c).

¹⁷⁹ *Id.* § 70A.65.210(3)(d).

which has been dogged for years by claims that it concentrates emissions in overburdened communities.¹⁸⁰

IV. ASSESSING REGIONAL CAP-AND-TRADE IN THE CONTEXT OF EXPANDED ORGANIZED MARKETS

With EDAM expected to go live in 2022, new CAT legislation being implemented in Washington, and rulemakings underway to implement RPS programs in California, Washington, and elsewhere, the West is at a critical juncture in determining its energy future. If compatibly designed, CAT programs enacted separately in several states could be linked together to form a regional (or sub-regional) CAT initiative. That program could then be incorporated into organized markets using a similar design to EIM's GHG adder. Unfortunately, were this to happen, resource shuffling would continue to severely dampen the initiative's emissions benefits because several states with high-emitting resources cannot be expected to join. As a result, organized markets like EIM that incorporate a sub-regional CAT program would end up "deeming" large amounts of clean energy delivered inside the CAT region, while allowing emitting power plants outside the region to backfill, producing little or no net reduction in GHG emissions. This difficulty illustrates how expanding CAT to an entire region—or, preferably, nationwide—would not only increase the number of entities covered by the program, but also amplify the effectiveness of each state's program by preventing emissions from "leaking" or "shuffling" to non-participating states.

This Part presents two arguments for why expanding CAT to new jurisdictions and building the program into organized markets would advance climate policy goals. First, pricing carbon into organized markets would provide clear price signals to developers about where to build clean energy while also co-optimizing dispatch (which power plants get selected to run) for GHG emissions and cost. Second, expanding CAT to new jurisdictions would alleviate inconsistency in accounting for GHG emissions between so-called load- and source-based emissions programs. However, given the interconnected nature of the grid, each argument is made weaker in a scenario where only a handful of states in the region participate in the CAT initiative. This Part addresses how a partial, or sub-regional, CAT initiative would fail to

¹⁸⁰ Curt Barry, *'Tricky' Path Seen For Washington Link To California GHG Trading Program*, INSIDEEPA (June 10, 2021), <https://insideepa.com/daily-news/tricky-path-seen-washington-link-california-ghg-trading-program> [<https://perma.cc/4QJM-DKEU>].

realize the full benefits of a grid-wide, market-integrated CAT program. It concludes by suggesting that climate advocates continue to aspire to a national CAT program, which would achieve the considerable benefits of integrating CAT and western organized markets.

A. Greenhouse Gas Optimized Dispatch and Efficient Price Signals

Incorporating a carbon price into organized markets would co-optimize resource dispatch for GHG emissions as well as cost, prioritizing low-emitting resources over high-emitting resources whenever cost-effective.¹⁸¹ Consequently, integrating a carbon price into the market's dispatch algorithm will efficiently guide the development of clean energy resources by signaling where on the grid low-emitting energy is most needed to replace dirtier generation.¹⁸²

When a carbon price is incorporated into a market's dispatch algorithm, the carbon price becomes an additional component of the locational marginal price (LMP) whenever an emitting resource sets the market clearing price—meaning it is the most expensive resource dispatched at a particular location.¹⁸³ In that case, all resources that clear the market at that location will also earn the LMP including the carbon

¹⁸¹ See, e.g., Joseph Bowring, Indep. Mkt. Monitor, PJM, Remarks at the Fed. Energy Regulatory Commission Technical Conference Regarding Carbon Pricing in Organized Wholesale Electricity Markets 85:17-21 (Sept. 30, 2020) ("Implementation of a carbon price is a market approach which would let market participants respond in efficient and innovative ways to the price signal rather than relying on planners to identify specific technologies or resources to be subsidized."), <https://www.ferc.gov/sites/default/files/2020-11/AD20-14-000-Transcript.pdf> [<https://perma.cc/ZBP8-KET9>]; Mark Rothleder, Cal. Indep. Sys. Operator, Remarks at the Federal Energy Regulatory Commission Technical Conference Regarding Carbon Pricing in Organized Wholesale Electricity Markets, *supra* note 27, at 172:14-20 ("carbon pricing does provide a competitive signal to resources. . . . And it allows you to efficiently dispatch and invest in those resources that have the capabilities that you need.").

[<https://perma.cc/ZBP8-KET9>]; Mark Rothleder, Cal. Indep. Sys. Operator, Remarks at the Federal Energy Regulatory Commission Technical Conference Regarding Carbon Pricing in Organized Wholesale Electricity Markets, *supra* note 27, at 172:14-20 ("carbon pricing does provide a competitive signal to resources. . . . And it allows you to efficiently dispatch and invest in those resources that have the capabilities that you need.").

¹⁸² See, e.g., Matthew White, Indep. Sys. Operator of New England, Remarks at the Federal Energy Regulatory Commission Technical Conference Regarding Carbon Pricing in Organized Wholesale Electricity Markets, *supra* note 27, at 171:1-10 ("[S]table transparent prices facilitate investment in competitive markets. . . . Our transparent carbon price not only facilitates investment from non-emitting resources, obviously they would stand to gain financially from it, but also from emitting resources."); Joseph Wadsworth, *supra* note 27, at 262:1-5 ("[F]or those of us that are involved in making these long-term capital intensive investments in energy infrastructure, having this mechanism that can provide long-term price signals for investment would be hugely valuable.").

¹⁸³ See EXELON, USING A CARBON PRICE TO COST EFFECTIVELY MEET CLEAN GENERATION GOALS IN NEW ENGLAND – UPDATE 1 (2016), https://nepool.com/uploads/IMAPP_20160914_Presentation_Carbon_Pricing_Update.pdf [<https://perma.cc/AMF9-HGXG>]; MARK ROTHLEDER, CAL. INDEP. SYS. OPERATOR, CURRENT GHG ACCOUNTING APPROACHES 3 (2019), <https://www.westerneim.com/Documents/Presentation-GHGAccounting-CAISO.pdf> [<https://perma.cc/YP4Y-FXCC>].

pricing premium.¹⁸⁴ This encourages developers to build low-emitting resources where the LMP's carbon pricing premium is highest—meaning that existing generation is dirty—in order to earn the highest return.¹⁸⁵ Consequently, LMP with a carbon pricing component directs clean energy development to locations on the grid where it will replace the dirtiest existing resources.

Unfortunately, in a scenario in which many states in the market do not adopt a linkable CAT program, the net emissions benefits of both GHG optimized dispatch and efficient carbon price signals are doubtful given the effect of resource shuffling. Although the proliferation of climate and clean energy policies in western states indicates a growing consensus on the need for climate action, it remains highly unlikely that all states currently participating in EIM would adopt compatible carbon pricing programs. For example, Utah has opposed carbon pricing in wholesale markets.¹⁸⁶ In fact, it has signaled that it considers California's CAT program unconstitutional as implemented in EIM.¹⁸⁷

Accurately measuring the adverse effects of resource shuffling in the West would require modelling a hypothetical dispatch that would occur in the absence of California's CAT regulations and then comparing it to actual EIM outcomes.¹⁸⁸ However, there are several indications that significant resource shuffling is already occurring.

¹⁸⁴ See CYNTHIA HINMAN, CAL. INDEP. SYS. OPERATOR, EXISTING DAY-AHEAD MARKET OVERVIEW 61 (2019) (explaining that resources are paid the nodal price), <http://www.caiso.com/Documents/Presentation-Existing-Day-Ahead-Market-Overview.pdf> [<https://perma.cc/MJT9-225U>].

¹⁸⁵ Joseph Wadsworth, Energy Trading Inst., Testimony of Joseph Wadsworth on Behalf of the Energy Trading Institute 1 (2020), <https://www.ferc.gov/media/panel-3-group-2-joseph-wadsworth-vitol-energy-trading-institute> [<https://perma.cc/TUX3-SNC6>] (“If a sustainable, robust carbon price is implemented in the energy markets, the spot market will reflect this value in LMP, prioritize clean energy resources for dispatch, and reward those resources for their clean output. The transparent, locational price signal will alert market participants of a clean energy opportunity by producing the most carbon-intensive price at nodes with high-emitting resources, exactly the reason for utilizing LMP.”); Carbon Pricing in Organized Wholesale Electricity Markets, 173 FERC ¶ 61,062, at P 14 (2020) (notice of proposed policy statement).

¹⁸⁶ CHRIS PARKER, UTAH DEP'T OF COMMERCE, CHRIS PARKER'S OPENING STATEMENT (2020), <https://www.ferc.gov/media/closing-panel-chris-parker-utah-department-commerce> [<https://perma.cc/CS6D-Q5VS>].

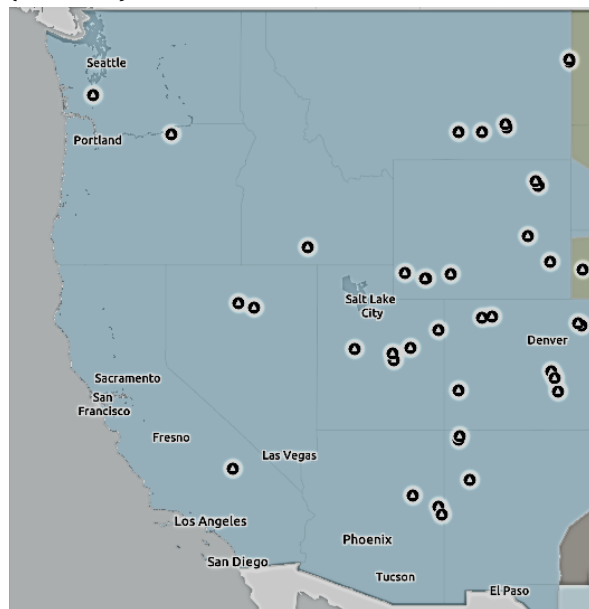
¹⁸⁷ *Id.* In his opening statement in FERC's carbon pricing technical conference, the Executive Director of Utah's Department of Commerce indicated that Utah has chosen not to challenge EIM's GHG adder mechanism due to the modest amount of energy currently traded in EIM and its own resource constraints. *Id.*

¹⁸⁸ FOWLIE & CULLENWARD, *supra* note 145, at 6.

Several studies of existing CAT programs bear this conclusion out. For example, one study found that a CAT program covering only California resources would have almost no effect on regional emissions due to leakage, while a program that also regulates electricity imports into California would perform only marginally better due to the ability of non-jurisdictional resources to shuffle or relabel energy to “unspecified,” earning a lower default emissions rate.¹⁸⁹ A separate study reviewing the Regional Greenhouse Gas Initiative (RGGI)—an electric-power-only CAT program comprised of eleven Northeastern states—found that resource shuffling negated just over half of the initiative’s emissions reductions.¹⁹⁰ As discussed in the next paragraph, the effects of resource shuffling would likely be even worse in the West than in RGGI because fewer coal-fired power plants are located in states that might be likely to adopt CAT. Finally, a 2017 study of market data from CAISO’s day-ahead market concluded that, as a result of resource shuffling, California’s CAT program is unlikely to significantly cut regional electricity sector emissions unless expanded to cover the entire Western Interconnection.¹⁹¹

Resource shuffling poses an especially large challenge for cutting power sector emissions in the West because, as shown in Figure 3, the states most likely to be first-adopters of linkable CAT programs—California, Oregon,

Figure 3. Coal Plants in the Western Electric Coordinating Council, Source: U.S. Energy Information Administration (Mar. 2021)



¹⁸⁹ James Bushnell et al., *Downstream Regulation of CO₂ Emissions in California’s Electricity Sector*, 64 ENERGY POL’Y 313, 320-21 (2014).

¹⁹⁰ Harrison Fell & Peter Maniloff, *Leakage in Regional Environmental Policy, the Case of the Regional Greenhouse Gas Initiative*, 87 J. OF ENV’T ECON. AND MGMT. 1, 3 (2018); *Welcome, THE REG’L GREENHOUSE GAS INITIATIVE* (last accessed Mar. 8, 2021), <https://www.rggi.org/> [https://perma.cc/7Z45-47WS].

¹⁹¹ C.K. Woo et al., *Electricity Price Behavior and Carbon Trading: New Evidence from California*, 204 APPLIED ENERGY 531, 541 (2017).

and Washington¹⁹²—have little coal-fired generation relative to their neighbors to the east.¹⁹³ The inability of these probable first-adopters to directly regulate most of the region’s coal plants¹⁹⁴ aggravates the potential for resource shuffling because electricity from these high-emitting plants can be easily reallocated to consumers outside the CAT jurisdiction who might otherwise have received clean electricity.

A national CAT program or truly regional initiative including most western states would avoid the predicament of resource shuffling by directly regulating all or most of these coal-fired generators. This could significantly impact the economics of coal power across the West as it would obligate these plants to purchase many more allowances per megawatt hour than cleaner alternative resources.

B. Alleviating Inconsistency in Greenhouse Gas Accounting

The interaction between California’s CAT program and the use of RECs for compliance with RPS programs in other states has generated controversy that would be partially alleviated by the expansion of California’s CAT program to states like Oregon and Washington. The issue arises when renewable energy is imported or deemed delivered inside California, but the REC produced by the renewable generator is sold separately and used outside California to comply with another state’s RPS program.

RECs are unique representations of the non-power attributes—including environmental, social, and economic benefits—of one MWh of renewable energy.¹⁹⁵ Many states with RPS programs accept RECs to demonstrate compliance with at least a portion of an entity’s RPS

¹⁹² See EIM ENTITIES, *supra* note 40, at 16 (showing that CAISO’s EDAM feasibility assessment assumed that Washington and Oregon, as well as the Canadian provinces of Alberta and British Columbia, would join California in a GHG pricing region).

¹⁹³ The Western Electric Coordinating Council oversees bulk power system reliability and security in the Western Interconnection, and is indicated by the blue area in Figure 1. *About WECC*, W. Area Coordinating Council (last accessed Mar. 8, 2021), <https://www.wecc.org/Pages/AboutWECC.aspx> [<https://perma.cc/Y7N6-3FVX>]. See also James Bushnell, Univ. of Cal. Davis, Presentation at EIM Regional Issues Forum Carbon Workshop, *supra* note 17, at 23:43-24:15 (June 18, 2019) (“If we want to regulate the carbon emissions from the power sector and we are California, Washington, or Oregon, there just isn’t that much carbon in the state. Even though we are responsible for a lot more carbon by consuming a lot more electricity, we don’t have direct reach over a lot of sources in the state.”).

¹⁹⁴ States that adopt CAT could only regulate emitting resources in non-participating states *indirectly* by regulating deliverers of electricity produced by those resources and imported into the CAT state or region.

¹⁹⁵ See, e.g., WASH. ADMIN. CODE § 480-109-060(24) (2021); OR. ADMIN. R. 330-160-0015 (2021).

obligations.¹⁹⁶ In some cases, RPS programs may permit covered entities to demonstrate compliance by retiring “unbundled RECs,” which are RECs sold separately from the underlying energy.¹⁹⁷ For example, in Oregon and Washington, covered entities can, for the most part, satisfy up to 20% of their RPS compliance obligations with unbundled RECs.¹⁹⁸

When renewable energy is imported or deemed delivered to California and specified as renewable energy, California’s Mandatory Reporting Regulation (MRR) will assign an emissions attribute of zero to it without requiring that a REC be retired on its behalf.¹⁹⁹ Consequently, the electricity importer will not be required to retire allowances under California’s CAT program as a result of the import. The REC associated with the underlying renewable energy could then still be retired elsewhere as an unbundled REC to demonstrate compliance with an RPS program outside California.

There is lively debate within the sector as to whether this result constitutes double-counting of the zero-emissions attribute of the renewable energy.²⁰⁰ Those who view it as double-counting argue that California’s regulation of electricity imports is a load-based program—meaning it regulates the emissions content of electricity *delivered to consumers* rather than emissions produced at a source—and is therefore incompatible with other load-based programs, particularly RPS.²⁰¹ Those who believe there is no double-counting between RPS programs and California’s CAT maintain that California’s regulation of electricity imports is, in fact, source-based because the compliance obligation falls on electricity importers, not retail utilities.²⁰² Both sides of the debate agree that source- and load-based regulations

¹⁹⁶ See, e.g., CAL. PUB. UTIL. CODE § 399.21 (West 2021); WASH. REV. CODE § 19.405.040(1)(c) (2020); OR. REV. STAT. § 469A.070 (2020).

¹⁹⁷ See, e.g., OR. REV. STAT. § 469A.145 (2020); WASH. REV. CODE § 19.405.040(1)(b)(ii) (2020).

¹⁹⁸ OR. REV. STAT. § 469A.145 (2020); WASH. REV. CODE § 19.405.040(1)(b)(ii) (2020). Entities in Washington will no longer be able to use unbundled RECs for compliance after December 31, 2044. WASH. REV. CODE § 19.405.040(1)(b).

¹⁹⁹ See Cal. Code Regs., tit. 17, § 95111(a)(4) (2021) (requiring electric power entities to report emissions associated with imported electricity, but not requiring REC retirement).

²⁰⁰ Compare Letter from Todd Jones, Ctr. for Res. Solutions, to Dallas Burtraw, Chair, Indep. Emissions Mkt. Advisory Comm. 4–5 (Oct. 5, 2018) (arguing that there is a double-counting problem), <https://resource-solutions.org/wp-content/uploads/2019/01/CRS-Comments-for-IEMAC-10-5-2018.pdf> [<https://perma.cc/TM76-287D>], with OR. DEP’T OF ENERGY, *supra* note 200, at 45–49 (Comments of Clare Breidenich, W. Power Trading Forum) (arguing that there is no double-counting).

²⁰¹ See Jones, *supra* note 200, at 2–3.

²⁰² OR. DEP’T OF ENERGY, *supra* note 200, at 46 (Comments of Clare Breidenich, W. Power Trading Forum).

can operate concurrently—it is not double-counting to regulate emissions at their source while *also* limiting the procurement of emitting generation by retail utilities. An additional assertion against the double-counting view is that California’s CAT program regulates direct GHG emissions while RPS programs regulate the procurement of renewable generation—two related but distinct objectives.²⁰³

Regulators and stakeholders in Washington and Oregon have convened conferences to consider how RECs associated with renewable electricity imported to California should be treated under each state’s RPS program.²⁰⁴ At the time of this writing, Oregon’s Department of Energy has not taken further action to clarify the eligibility of RECs associated with renewable energy delivered to California,²⁰⁵ and Washington’s Department of Commerce is still in the process of drafting CETA implementing regulations.²⁰⁶ However, at least one EIM participant reports having changed its EIM practices in response to statements by state officials that using RECs associated with California electricity imports to demonstrate RPS compliance would be double-counting.²⁰⁷

²⁰³ *Id.* at 47.

²⁰⁴ See OR. DEP’T OF ENERGY, REQUEST FOR STAKEHOLDER COMMENTS (2017), <https://www.oregon.gov/energy/energy-oregon/Documents/2017-06-23-Public-Comment-Request-RECS-RPS-and-CA-EIM.pdf> [<https://perma.cc/VPS6-NURJ>]; CETA MKT. WORKGROUP, WORKSHOP #4 DRAFT AGENDA (Aug. 28, 2020), <https://www.utc.wa.gov/docs/Pages/DocketLookup.aspx?FilingID=190760>. (select docket icon, navigate to “Documents” tab, and select “Draft Agenda, Market Workgroup, Workgroup #4, on behalf of Pacific Power & Light Company d/b/a PacifiCorp, from Jessica Zahnow. (via email)”). The issue of how to treat RECs associated with specified renewable electricity imported to California came to the fore when the Western Renewable Energy Generation Information System (WREGIS), which is currently used by every state with an RPS in the western interconnection except Arizona to track RECs, issued a draft memo stating its determination that an assignment of zero-emissions by California regulators was a claim on a REC that required it to be retired. Draft Memorandum from W. Renewable Energy Generation Info. Sys. to WREGIS Account Holders (Apr. 17, 2017) (on file with author). WREGIS found that, because RECs cannot be split, a claim that the zero-emissions attribute of renewable energy was delivered to California would prevent the REC from being used to claim the delivery of emissions attributes or other environmental qualities elsewhere. *Id.*

²⁰⁵ *Renewable Energy Certificates: Stakeholder Meetings*, OR. DEP’T OF ENERGY (last visited Mar. 2021), <https://www.oregon.gov/energy/energy-oregon/Pages/RECS-EIM-Stakeholder-Meetings.aspx> [<https://perma.cc/KBQ5-BKVK>].

²⁰⁶ STATE OF WASH. DEP’T OF COMMERCE, IMPLEMENTATION PLAN – CLEAN ENERGY TRANSFORMATION ACT RULEMAKING (2019), <http://www.commerce.wa.gov/wp-content/uploads/2019/08/CETA-Implementation-Plan-2019-08-27.pdf> [<https://perma.cc/7EFT-2RDJ>].

²⁰⁷ See California ISO, *Jun 18, 2019 - (Part 2) EIM Regional Issues Forum Carbon Workshop*, YOUTUBE 2:18:46-19:30 (June 20, 2019) (presentation by Mary Wiencke, PacifiCorp: “PacifiCorp’s wind resources are not allowed to be deemed delivered to California in the EIM because [of the possibility that state officials would consider the use of an associate REC double-counting.] And we would more so agree . . . that it is not a double count, but in conversations with our

If states determine that RECs associated with renewable energy delivered to California are ineligible for their RPS programs, participation in the wholesale market could be severely curtailed.²⁰⁸ Regulated public utilities that construct renewable resources for the benefit of their ratepayers may need to prevent the electricity those resources produce from being deemed delivered to California by, for example, not bidding a GHG adder.²⁰⁹ Consequently, the market will have fewer resources from which to select the optimal dispatch configuration, frustrating the market's ability to minimize costs.²¹⁰

On the other hand, some argue that permitting double-counting will undermine the environmental integrity of both RPS programs and California's CAT by adversely affecting REC markets and inaccurately accounting for emissions associated with California imports.²¹¹ For example, programs that certify the integrity of RECs in the voluntary REC market—a market comprised of organizations seeking to improve their green credentials by purchasing renewable energy attributes—will not certify RECs that have been double-counted or are missing attributes, which may include the direct GHG emissions that are assigned to electricity imports under California's MRR.²¹²

state policymakers, we decided that they probably would think that.”), <https://www.youtube.com/watch?v=KhZ-QP0AluU&feature=youtu.be>.

²⁰⁸ *See id.* (“It is not a positive thing for PacifiCorp’s resources not to be fully engaged and not to be fully participating in the market because of this issue.”); MARY WIENCKE, PACIFICORP, RENEWABLE ENERGY CERTIFICATES ASSOCIATED WITH ENERGY IMPORTED INTO CALIFORNIA VIA THE ENERGY IMBALANCE MARKET 4 (2017), <https://www.westerneim.com/Documents/PacifiCorpPresentation-EnergyImportedIntoCaliforniaViaEIM.pdf> [<https://perma.cc/B3F6-L29W>]; OR. DEP’T OF ENERGY, *supra* note 200, at 13 (Comments of Andrew Ulmer, Cal. Indep. Sys. Operator) (“If Oregon decides that renewable EIM participating resources serving ISO load must retire RECs associated with their output, this restriction may cause resources to elect not to participate in the EIM or elect not to make their output available to serve ISO load.”).

²⁰⁹ WIENCKE, *supra* note 208, at 4 (2017) (“RECs generated from PacifiCorp resources are allocated to each of PacifiCorp six states—PacifiCorp cannot unilaterally render RECs unusable without compensation to customers. . . . Because PacifiCorp does not know beforehand which resources will be deemed

delivered to California, [it] cannot evaluate [the] financial benefit of allowing resources to be imported into California versus retaining the RECs.”).

²¹⁰ OR. DEP’T OF ENERGY, *supra* note 200, at 13 (Comments of Andrew Ulmer, Cal. Indep. Sys. Operator) (“[R]estrictions limiting the flexibility of resources to participate in the EIM will reduce overall market benefits to customers in the EIM area.”).

²¹¹ Letter from Todd Jones, Ctr. for Res. Solutions, to Dallas Burtraw, Chair, Indep. Emissions Mkt. Advisory Comm. 3 (Oct. 5, 2018), <https://resource-solutions.org/wp-content/uploads/2019/01/CRS-Comments-for-IEMAC-10-5-2018.pdf> [<https://perma.cc/U7RU-B9L4>].

²¹² TODD JONES, CTR. FOR RES. SOLUTIONS, REC AND GHG TREATMENT IN THE EIM 16 (2017) (stating that “[d]ouble counted RECs and RECs missing certain attributes are not allowed in Green-e,” a REC and carbon offset certifier for the voluntary market), <https://www.westerneim.com/Documents/CRSPresentation-REC-GHGTreatmentinEIM.pdf> [<https://perma.cc/EC8V-BAR4>].

If states with RPS regimes formed a regional CAT initiative by adopting CAT programs and linking them with California's program, the doubling-counting issue—to the extent one considers it a problem—would be partially alleviated. This is because renewable resources located anywhere inside the CAT region would be covered by CAT at the source, rather than at the point of import into the CAT jurisdiction, as California's program currently operates. In this situation, neither side of the debate would view the outcome as double-counting because both agree that emissions can be consistently regulated at both the source (via CAT) and again at the load (via RPS).

However, so long as some states that participate in the wholesale market do not adopt linkable CAT programs—an overwhelmingly likely outcome—the debate will continue as to RECs associated with electricity imported into CAT states from non-participating states. The increasing number of ambitious RPS programs in states like New Mexico and Nevada will not only expand the market for RECs, but also increase the potential for double-counting the emissions of electricity imported into a CAT jurisdiction.

Additionally, more modest solutions can remedy actual or perceived double-counting. First, CARB could clarify that the attribution of emissions associated with imported electricity by MRR does not constitute a claim that zero-emissions energy was delivered to serve California load. This would alleviate the conflict between California's CAT program and the rights of REC owners in the voluntary market by clearly distinguishing CARB's regulation of electricity imports from the load-based attribute tracking reflected in RECs. Second, states with RPS programs could only accept RECs associated with electricity imported to California if the electricity was sold as unspecified power—meaning that it would be assigned a default emissions factor by California's MRR rather than a zero-emissions attribute. Finally, some parties have proposed exploring design modifications that could facilitate the sale of RECs along with non-emitting energy in EIM.²¹³ It is unclear if such a design would be feasible as it would likely require the market to trace sources to load to a greater extent than is currently possible.

A national CAT program would also eliminate any possible double-counting by regulating all electricity sector emissions at the source. If power plants in all states were subject to CAT, no state would need to regulate imported electricity at its border. As a result, CAT regulations applicable to the generation of electricity would unambiguously

²¹³ *Id.*

be source-based and would not conflict with load-based RPS programs or the voluntary REC market.

V. CONCLUSION

Climate policy and emerging organized markets are increasingly shaping the future of electricity in the West. Both developments are key to achieving economy-wide decarbonization because the efficiencies of organized markets will support states' ambitious renewable energy targets at the lowest cost. Organized markets support climate policy, not only by reducing curtailment of intermittent wind and solar resources, but also by keeping electricity bills down. As we transition to a decarbonized economy, controlling costs will both encourage electrification in other sectors and buoy political support for climate programs.

Weaving a market-based climate program like CAT into the rules governing organized markets has the potential to harmonize these two major developments. Done correctly, this approach could put the power of organized markets to work cutting carbon at the lowest cost by co-optimizing dispatch for GHG emissions and cost and signaling to developers where clean energy is needed most. Expanding CAT to more jurisdictions might also alleviate knotty inconsistencies that can arise when CAT (a mostly source-based regulation) and RPS programs (a load-based regulation) intersect.

Unfortunately, these benefits largely evaporate when only a handful of states in an interconnected grid participate in the CAT program. A fully linked sub-regional CAT regime could be incorporated into organized markets using a mechanism like the EIM GHG adder,²¹⁴ but the effect of resource shuffling would largely erase any emissions reductions such a program might achieve. This is particularly true in the West, where coal-fired generators are disproportionately located in states that are unlikely to participate in a regional CAT initiative.²¹⁵ Moreover, future regional markets like EDAM will not have base schedules from which the market's dispatch could distinguish marginal dispatches to serve the CAT region from existing unit commitments,²¹⁶ foreclosing even the partial fix that has been implemented in EIM.

²¹⁴ See *supra* Part III.A.

²¹⁵ See *supra* Fig. 1 and accompanying text.

²¹⁶ MARK ROTHLEDER, CAL. INDEP. SYS. OPERATOR, PREPARED STATEMENT OF MARK ROTHLEDER ON BEHALF OF THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION 6 (2020).

Achieving either a national CAT program or a regional CAT initiative that attracts more western states with coal-fired generation should therefore continue to be a priority of climate-concerned advocates and policymakers.²¹⁷ Admittedly, the possibility that Congress will pass national CAT legislation soon is vanishingly small given its narrow Democratic majority and inconsistent track record on bipartisan climate action. In the near term, state CAT programs are likely to have less effect on electricity sector emissions than programs like RPS, energy efficiency standards, or prohibitions on coal-fired electricity.

Until political momentum for a national or comprehensively regional CAT program materializes, policymakers in the West can focus on buttressing their flagship electric power decarbonization programs—such as RPS—and expanding organized regional markets. For example, in Washington, stakeholders and regulators are discussing how CETA’s mandate that all retail utilities use 100% GHG-neutral electricity by 2030 can be flexibly implemented so that utilities can participate in EIM and other markets without compromising CETA’s objectives.²¹⁸ Meanwhile, CAISO is continuing to work with stakeholders across the region to design and implement EDAM.²¹⁹ Strengthening non-CAT decarbonization programs will drive emissions reductions in the electricity sector in the short term. Expanding

<https://www.ferc.gov/media/panel-3-group-1-mark-rothleder-california-iso>
[<https://perma.cc/V2FH-85UH>].

²¹⁷ See Anthony Giacconi, PJM, Remarks at the Federal Energy Regulatory Commission Technical Conference Regarding Carbon Pricing in Organized Wholesale Electricity Markets, *supra* note 27, at 180:25-181:2 (explaining study finding that, compared to a carbon price that applied to only part of the PJM RTO, “RTO wide programs are by far the most cost-effective in effectively reducing emissions.”); J. Arnold Quinn, Vistra Energy, Remarks at the Federal Energy Regulatory Commission Technical Conference Regarding Carbon Pricing in Organized Wholesale Electricity Markets, *supra* note 27, at 212:5-213:1 (stating support for “regional carbon pricing regimes as a step in the right direction” but acknowledging that “[w]here the regional carbon price does not apply uniformly across an ISO/RTO footprint, the concerns about leakage occur because internal ISO/RTO dispatch is very good about optimizing” the effects of resource shuffling).

²¹⁸ See Memorandum from Amanda Goodin, Earth Justice, to Wendy Gerlitz, Regarding the Legal interpretation of the Clean Energy Transformation Act (Aug. 10, 2020), <https://www.utc.wa.gov/documents-and-proceedings/dockets> (enter “191023” in field titled “Search docket # or keyword,” select “191023” under “Docket,” select “Documents,” and open “191023-Earthjustice CETA memo-FINAL-8-10-20.pdf” filed on Aug. 11, 2020); Memorandum from Elizabeth Thomas & Christina Elles, K&L Gates LLP, and Jason Kuzma, Perkins Coie LLP Regarding Compliance with the Washington Clean Energy Transformation Act (July 31, 2020), <https://www.utc.wa.gov/documents-and-proceedings/dockets> (follow the instructions for the immediately preceding citation, but open “UE-191023-UE-190837-Joint-Appendix-B-(08-04-2020).pdf” filed Aug. 4, 2020).

²¹⁹ *Initiative: Extended Day-Ahead Market*, CAISO (Oct. 3, 2019), <https://stakeholder-center.caiso.com/StakeholderInitiatives/Extended-day-ahead-market>
[<https://perma.cc/AXW3-MZKY>].

organized markets such as EDAM will generate economic and climate benefits right away, while laying the groundwork for one day integrating the markets with a broader national or regional CAT program that could generate the substantial benefits discussed in this Note.