



Illinois Power Agency Power Hour Webinar

Renewable Energy Credits- What Are They and
How Are They Used to Meet RPS Compliance?

Agenda



- **Introduction to the IPA Power Hour Webinars**
- **Basics of Renewable Energy Credits**
- **History of RPS and REC Sales in Illinois**
- **RECs and the Illinois RPS Today**
- **National Overview of RPS Policy and RECs**
- **What's on the Horizon?**
- **Q&A and Conclusion**

- **Introduction and Scope**
- Power Hour is a series of educational and informative presentations on a wide range of clean energy topics and emerging issues
- Today's Power Hour:
 - We'll discuss the concept of a "renewable energy credit," how RECs are generated and used in states across the country, and the role of RECs in the Illinois Renewable Portfolio Standard
- Future IPA Power Hour Webinars will cover other topics related to the clean energy economy in Illinois

Upcoming Webinars in 2022

IPA Power Hour Webinar 2: *What Does Consumer Protection Look Like in the Evolving Solar Market in Illinois?*

March 18, 2022, 12pm-1pm CDT

IPA Power Hour Webinar 3: *Net Metering Updates and Implications for Distributed Generation in Illinois*

April 29, 2022, 12pm-1pm CDT

- **Independent State Agency created in 2007**
- **Agency duties include**
 - Development and implementation of procurement plans for electricity supply for utility customers
 - Development and implementation of other renewable energy programs
 - Implementation of the Renewable Portfolio Standard
 - Development of Long-Term Renewable Resources Procurement Plan
 - Conduct competitive procurements for utility-scale projects
 - Manage programs for community solar and solar for homes and businesses

Basics of Renewable Energy Credits



Karbone At A Glance



A specialized financial services firm with a proven track record focused on renewable energy and decarbonization markets

\$1 billion +

of annual volume across all business units. Over the past decade+, Karbone has led clients in hedging programs, portfolio financing, asset acquisitions/sales, and long term revenue contracting, enhanced by some of the most widely respected market analytics in the industry.

5,000 +
Clients

since our inception. Karbone has worked alongside North America's leading IPPs, investors, developers, corporates, and utilities.

3 Cities

where Karbone has offices domestically and globally since the founding in 2008: New York, Boston, and London.

A dedicated team of experts delivering high-quality, award-winning services to our clients.



The Karbone team possesses extensive transactional and analytical experience associated with solar, wind, batteries, renewable fuels, and carbon offsets. Our services have been recognized and praised by publications/institutions such as Risk Magazine, Environmental Finance, and others since 2009.



Karbone Brokerage Services

Sourcing and execution of transactions for energy/environmental asset classes across primary and secondary markets

- Since its founding in 2008, Karbone Brokerage Group has focused on trading execution services for electricity, capacity, RECs, SRECs, carbon, and renewable fuel products
- Provides clients with analytical views on technical factors (liquidity, duration, buyer/seller preferences) and fundamentals in relevant markets
- Long-term hedging and monetization guidance allowing developers and investors to lock-in value for financing and risk purposes
- Daily REC, Carbon, and Renewable Fuels Pricing publication

Karbone Research Services

In-depth analysis of industry trends, supply/demand fundamentals, policy analysis, and custom research

- Since its first client research engagement in 2009, the Karbone Research team has provided subscription services, long-term pricing curves, valuation letters and reports, market research reports
- Granular knowledge of state RPS, community solar programs, and utility compliance requirements leading to expert in-depth market reports
- Policy Analysis and impacts studies on forward merchant curves
- Expertise in modeling, analyzing and supporting power, capacity, and REC pricing projections

Capital Markets

Solution-focused services for renewable energy developers and investors

- Sister-company affiliate Captona, focused on principal private equity investments across all renewable energy technologies, as well as legacy broker-dealer affiliate Karbone Capital Markets
- Expertise in raising capital, ranging from pre-construction project development capital and growth capital to tax equity
- Financial modeling and strategic advisory engagements
- Asset/portfolio valuation in pre-sale or solicitation stages
- Buy-side and sell-side engagements, including operating asset divestitures

The broad yet integrated approach with three specialized business units allows for Karbone to:



Act as a source of market insight around current and future value of renewable energy credit, power, and capacity markets



Provides clients with market-recognized analytics that support deal forecasts and minimize portfolio risk

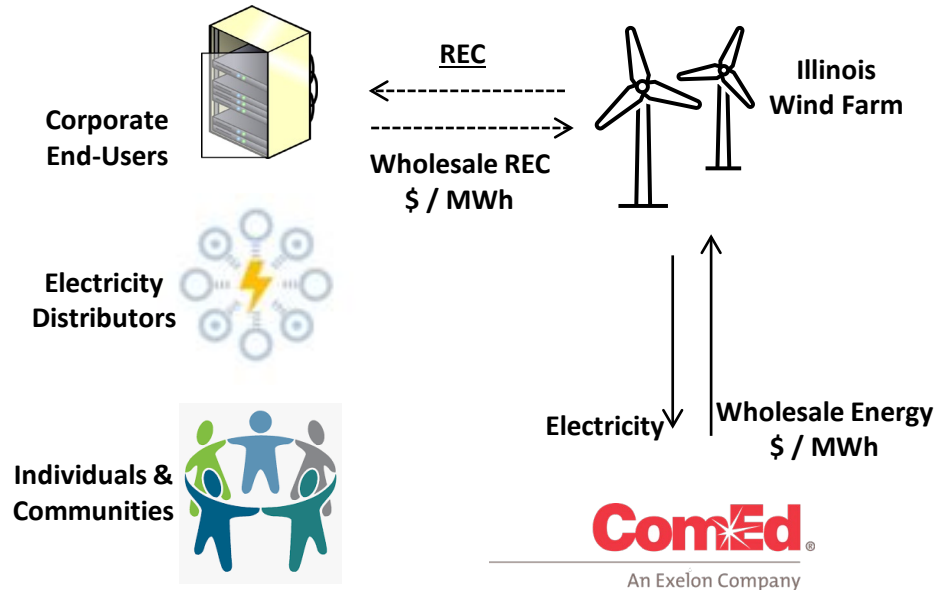


Fully assess, support and capitalize clients' financing objectives

What Is A REC?

Renewable Energy Credit (REC):

- A Renewable Energy Credit (REC) is a tradeable, market-based instrument that represents the legal property rights to the “renewable attribute” — i.e. the “green”, non-power aspect — of renewable electricity generation. Each REC equals 1 mega-watt hour (MWh) of renewable electricity generation.
- RECs are generated by solar, wind, hydro, geothermal, biogas, and biomass power generation projects. The REC is metered by the interconnecting utility alongside the electricity, and (usually) serialized in an online Tracking System platform for transfer and trading.
- Tracking Systems for RECs are all over the country, and roughly mirror the grid operators – PJM GATS, NEPOOL-GIS, NY-GATS, MRETS, etc.



Renewable Portfolio Standard:

- Renewable Portfolio Standards (RPS) are regulations that require retail electricity suppliers to procure a specific proportion of renewable energy
- To be compliant, retailers either generate renewable electricity themselves or purchase RECs from independent generators
- All state level RPS programs are unique and have different targets, timelines, non-compliance penalty rates (AC), and REC eligibility criteria (i.e. technology, geography, banking rules, etc.)

+60% US State Participation:

- 30 states + DC have RPS, 5 states have Clean Energy Standards
- 8 states have renewable portfolio goals, and 5 states have clean energy goals
- 14 States have RPS targets over 50% (and ~10 are 100% eventual targets!), meaning that electricity distributors must source half (or more) of their electricity from renewable sources

Voluntary Markets:

- Alongside the regulatory-driven “compliance” markets for renewable energy / RECs, voluntary markets operate throughout the US (and globally) for non-obligated parties that choose to improve their sustainability / carbon footprint by buying RECs
- The largest voluntary REC market in the US (and arguably the world) is the Green-e REC market, a program owned and operated by the non-profit NGO, the Center for Resource Solutions
- Eligibility to participate in the Green-e market has specific criteria around location, technology, commercial online date of projects, and competing “claims” on environmental impact

Background on the RPS and REC Procurements in Illinois (2008-2021)

- **Public Act 95-0481 established the Renewable Portfolio Standard in 2007**
 - Part of wider legislation that established the Illinois Power Agency, and also the energy efficiency portfolio standard
 - Previously Illinois had voluntary goals
- **RPS framework mirrored IPA's energy procurement**
 - **Targets and budgets based on “eligible retail customer” load**
 - Residential and small commercial customers who remained on utility supply service and had not switched to Alternative Retail Electric Suppliers or hourly pricing
 - Percentages started at 2% in 2008, with preference for 75% from wind
 - **Price-based competitive procurement process, same as used for electricity**

Initial Definitions (2007)

- **"Renewable energy credit"**
 - means a tradable credit that represents the environmental attributes of a certain amount of energy produced from a renewable energy resource.
- **"Renewable energy resources"**
 - includes energy and its associated renewable energy credit or credits from wind, solar thermal energy, photovoltaic cells and panels, biodiesel, crops and untreated and unadulterated organic waste biomass, trees and tree trimmings, hydropower that does not involve new construction or significant expansion of hydropower dams, **and other alternative sources of environmentally preferable energy.**
 - Includes landfill gas produced in the State.
 - Does not include the incineration, burning, or heating of tires, garbage, general household, institutional, and commercial waste, industrial lunchroom or office waste, landscape waste other than trees and tree trimmings, railroad crossties, utility poles, and construction or demolition debris, other than untreated and unadulterated waste wood.

- **Initial preferences**
 - Resources in Illinois, then could look to adjoining states, then “elsewhere”
- **Starting in 2011**
 - Preference for resources in Illinois or adjoining states, then “elsewhere”

How the RPS Worked

- **IPA conducted annual procurements of RECs**
 - Bids evaluated on price
 - Geographic preferences also sorted bids
 - Results approved by the ICC
 - Utilities signed contracts with winning suppliers
 - Suppliers would deliver RECs to the utilities over the subsequent delivery year and RECs would be retired by the utilities.
- **Geographic limitations in first years created price premium**
 - 2009-2010 REC prices \$15-\$18
 - 2010-2011 REC prices \$4-5
 - 2011-2012 REC prices < \$1
- **Were able to meet RPS goals in early years**
 - Decline in eligible retail load due to municipal aggregation led to no renewables procurements in 2013 and 2014

ARES Self-Compliance (2009-2017)

- **Public Act 96-0159 (2009) established RPS targets for ARES**
 - Also created the Renewable Energy Resources Fund and a 6% carveout for solar starting in 2015
- **Section 16-115D of the Public Utilities Act**
 - ARES would make alternative compliance payments (“ACP”) to cover half of their RPS obligation and had option to procure RECs or make additional ACP payments for other half of their obligation
 - Allowed resources in the US footprint of PJM or MISO
 - ARES could also self-supply renewable energy
 - ACP payments went into the Renewable Energy Resources Fund with the goal that the IPA could use that fund to leverage additional REC procurements
 - Sweeping of funds prevented this goal from being obtained.
- **Eligible RECs were generally less expensive than ACPs**
- **ARES RPS obligations were phased out over several years through Public Act 99-0906 (the Future Energy Jobs Act) starting in 2017**

- In response to concerns that IPA procurements were not incenting development of *new* projects, in 2009 proposals emerged for a procurement for 20-year contracts for RECs + energy from specific projects rather than just REC procurements based on geography or technology type
- Included in IPA's 2010 Procurement Plan and procurement conducted in December 2010
 - 10 wind projects and 2 solar projects
 - 1.8 million RECs annually
 - All projects were successfully developed

Solar Procurements

- **Competitive Procurements for Solar RECs started in 2015 to meet the 6% solar goal as well as distributed generation goals**
- **Supplemental Photovoltaic Procurements in 2015-16 also procured RECs from new solar projects**
- **Distributed Generation and Supplemental Photovoltaic Procurements featured 5-year contracts and were designed to incent new generation**

Limitations of the Initial RPS Design

- **Mostly limited to annual procurements of RECs due to varying budgets**
 - **Increase in municipal aggregation caused the number of eligible retail customers to plunge and led to budget crunch in 2013-2014**
- **RECs procured, but new generation not being developed other than 2010 LTPPAs, and the supplemental photovoltaic and distributed generation procurements**
- **Varying geographic standards minimized the link between RECs procured and energy consumption in Illinois**

Public Act 99-0906 (Future Energy Jobs Act)



- **Passed in late 2016, took effect June 1, 2017**
 - **Removed ARES compliance mechanism & consolidated RPS planning and funding into the Long-Term Renewable Resources Procurement Plan model**
 - **Clarified that the RPS was for the procurement of RECs rather than “renewable energy resources”**
 - Added quantitative REC targets in addition to percentage-based goals
 - Prioritized incentivizing new generation
 - **New administratively set REC prices for distributed generation and community solar (Adjustable Block and Illinois Solar for All programs)**
 - Cost-based REC pricing compared to market-based REC pricing
 - **Continued competitive procurement model utility-scale/brownfield RECs**
 - Project specific procurements
 - Projects in Illinois, or in adjacent states if they meet a public interest criteria
 - Fixed REC price model

- **Definitions matter**
 - Changes in geographic eligibility and resources types could create large swings in REC prices as supply and demand not always in sync
- **New generation benefits from REC price clarity**
 - Supplemental Photovoltaic Procurement and DG procurements featured competitive bidding which was difficult to coordinate with sales cycles for smaller projects
- **Utility-scale and behind the meter dynamics and economics are very different**
 - From a tracking system perspective all RECs are the same, but from a program and REC pricing perspective differences are significant

RECs and the IL RPS Today (February 2022)

Primary Purposes of RECs under IL RPS



1) REC sales provide revenue certainty back to renewable energy project developers for new project development

- Long-Term contracts (with variable payment terms)
- Prices set to ensure that projects are financeable
 - Administratively set in ABP and ILSFA
 - Competitively set in competitive procurements
- No energy sale, but accommodation for energy revenues
 - Indexed (floating) prices for large-scale projects
 - Net metering for distributed generation and community solar

2) REC purchases are how we keep score of renewable energy generation under RPS

- Annual deliveries as a percentage of load for “40% by 2030”
- Annual deliveries from new projects to meet “45 million by 2030 from new projects”
- Additional targets for specific programs, technologies, blocks, etc.

IL RPS REC Eligibility Requirements

- **ELIGIBLE GENERATING TECHNOLOGY**
 - What is “renewable”? See 20 ILCS 3855/1-10
 - Even if “renewable,” is there a procurement obligation?
 - Even if a qualifying technology, must lead to the development of new generation
- **GEOGRAPHIC REQUIREMENTS**
 - Only Illinois (in-state) or an adjacent state
 - Public Interest Criteria for adjacent state project qualification
 - See Long-Term Plan scoring system
 - Concentric circles into neighboring states
 - CEJA introduced HVDC transmission line converter station exception

IL RPS REC Eligibility Requirements

- **RATE-BASED PROJECT PROHIBITION**

- Prevents participation from RECs from projects featuring “costs...recovered through rates regulated by this State or any other state or states” - i.e., ratepayer-funded or utility-customer-funded
- Policy basis for prohibition

- **PROGRAM/PROCUREMENT-SPECIFIC REQUIREMENTS**

- Adjustable Block Program categories
- Competitive Procurement requirements
- Additional Illinois Solar for All requirements
- “New” project requirements (energized after June 1, 2017)

- **Programs/Procurements Proposed via Long-Term Plan**
 - REC delivery contracts awarded under programs and procurements proposed in Long-Term Plan, guided by state law
- **RECs sold to IL Utilities**
 - Utility funds collected from ratepayers
 - ILSFA exception with state as counterparty (RERF funding source)
 - Utility (or IPA for RERF-funded projects) then retires RECs, REC counts toward compliance requirement
 - Deliveries/payments generally monthly or quarterly
- **Retirements meet IL RPS goals & targets**
 - 20 ILCS 3855/1-75(c)(1)(B) percentage-based goals
 - 20 ILCS 3855/1-75(c)(1)(C) quantitative goals
- **IPA reports on progress through Long-Term Plan**

- **RECs used for “clean” or “renewable” retail supply offers**
 - Need not be IL-based generation
 - Need not be associated with the underlying energy
 - Not subject to other statutory prohibitions
 - Not counted toward state RPS progress
- **RECs used for other Buyer purposes**
 - Corporate sustainability plans
 - Other clean energy requirements/claims
 - Not counted toward state RPS progress

New RPS Self-Direct Program



Opt-out from certain RPS charges for large customers who meet at least 40% of their load through RECs from qualifying renewable energy projects

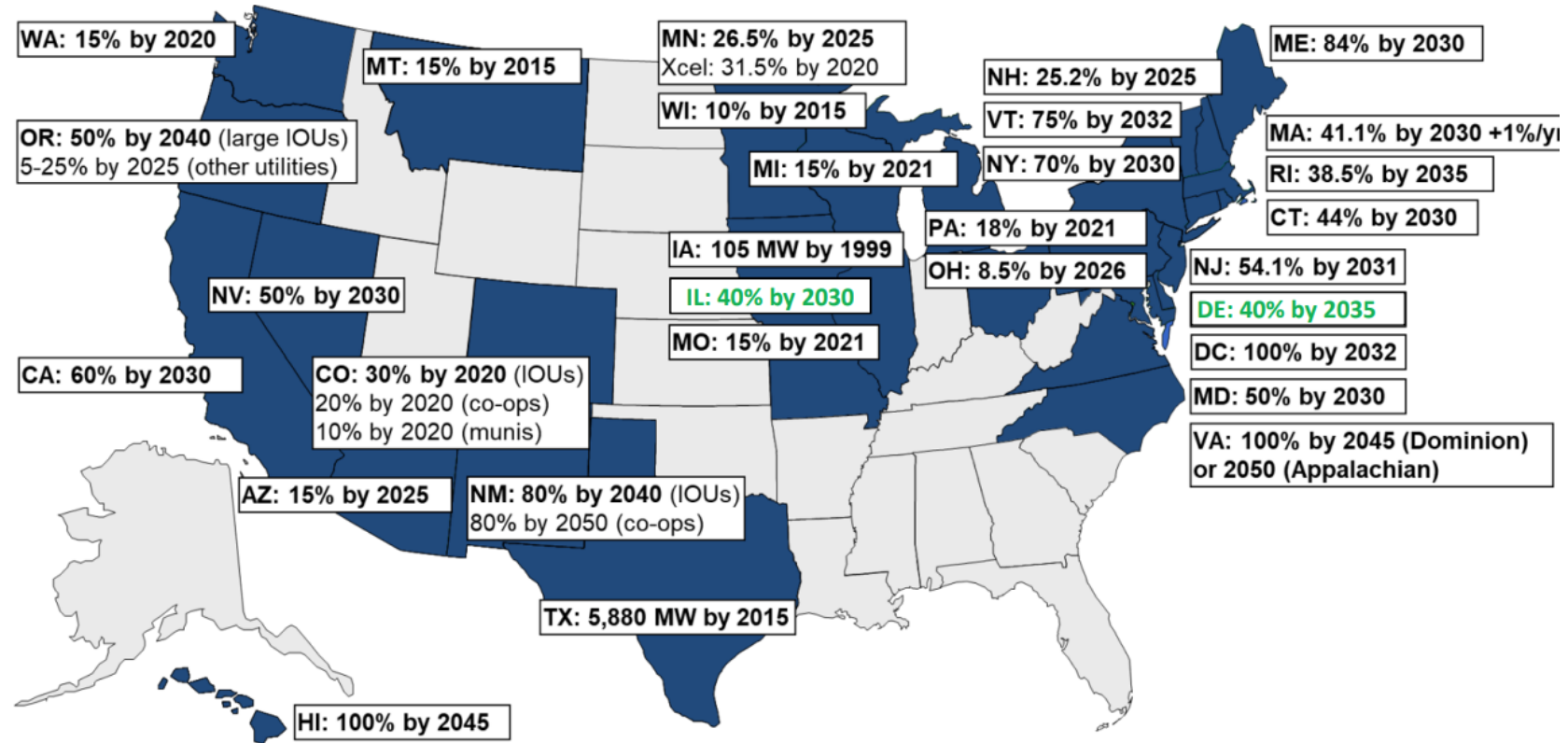
- **“Certain RPS charges”**
 - Utility-scale portion of RPS charges
 - Determine that balance via our Long-Term Plan
- **“Qualifying customers”**
 - Peak demand of more than 10,000 kilowatts
 - Can include multiple retail accounts under the same corporate parent
- **“Qualifying projects”**
 - New wind or solar projects
 - Meet RPS geographic requirements
 - Long-Term contracts (10 years)

Size of the self-direct program is determined through Plan

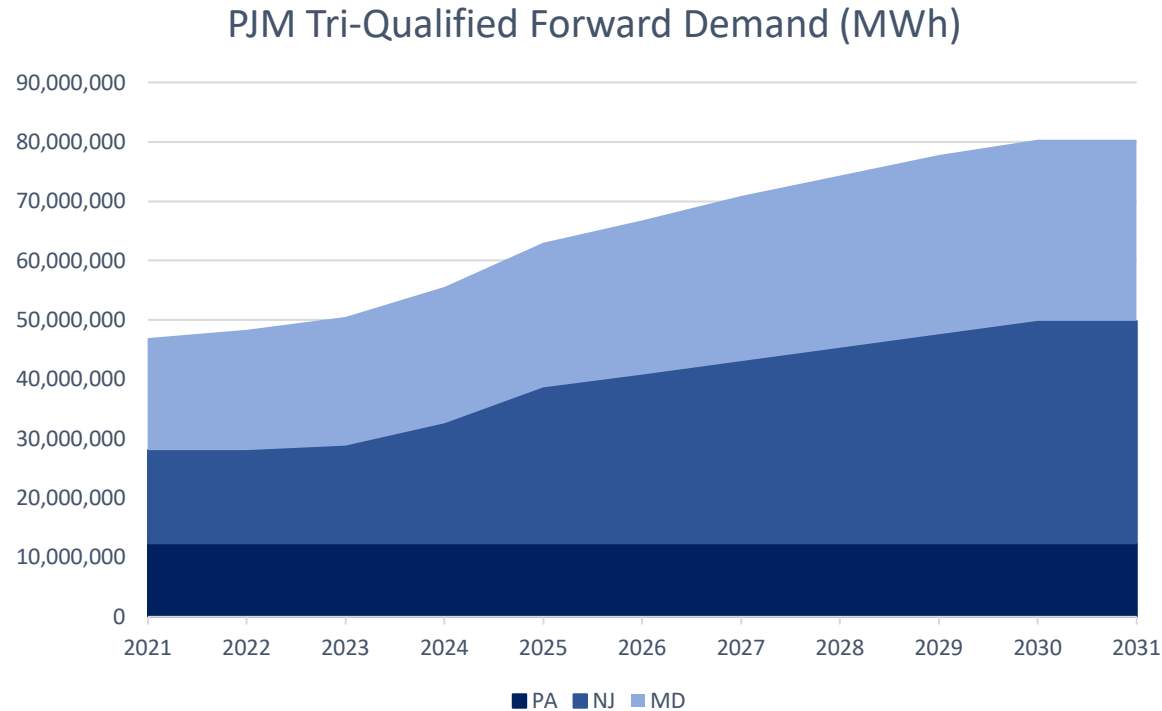
Backing out retail sales hours and RECs retired for IL RPS

National Overview of RPS Policies and RECs

RPS Programs Are Everywhere!



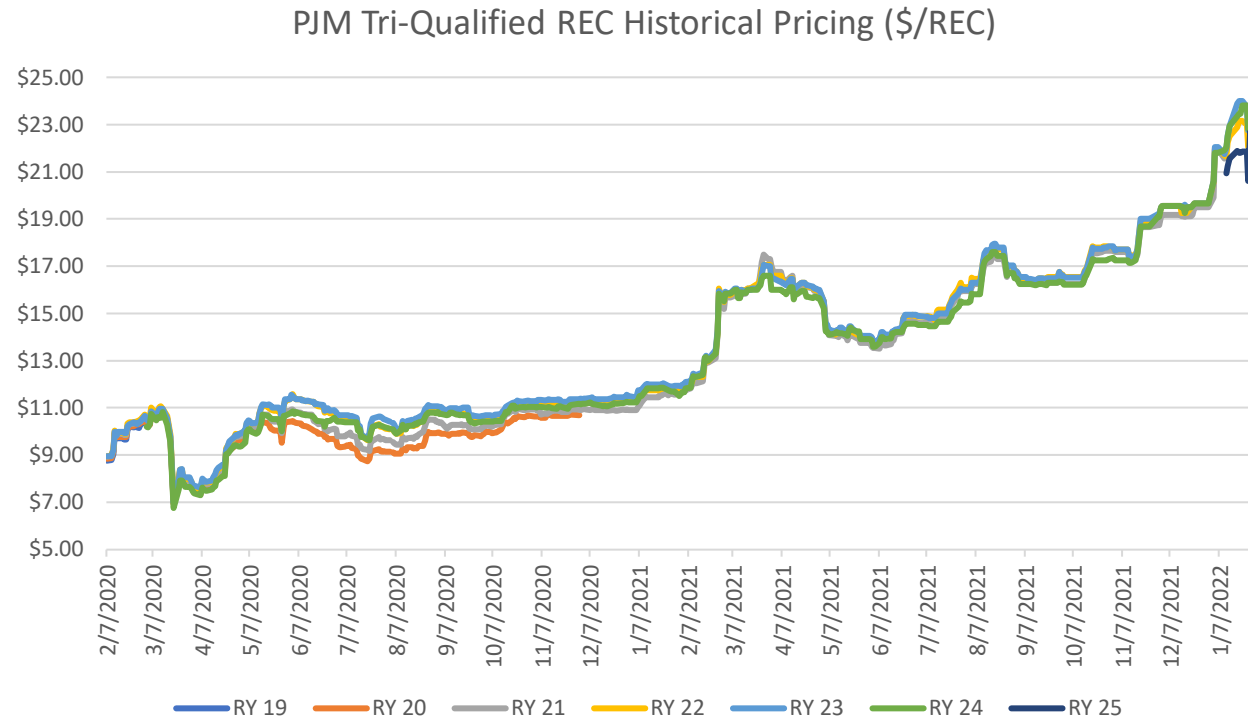
Karbhone, Berkeley Lab



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- Increasing targets and policy support (note earlier map updates)
- Interconnection queue and new-build delays
- Inflation! But really disruption and capacity dislocation

PJM: Lots of Headroom on Price

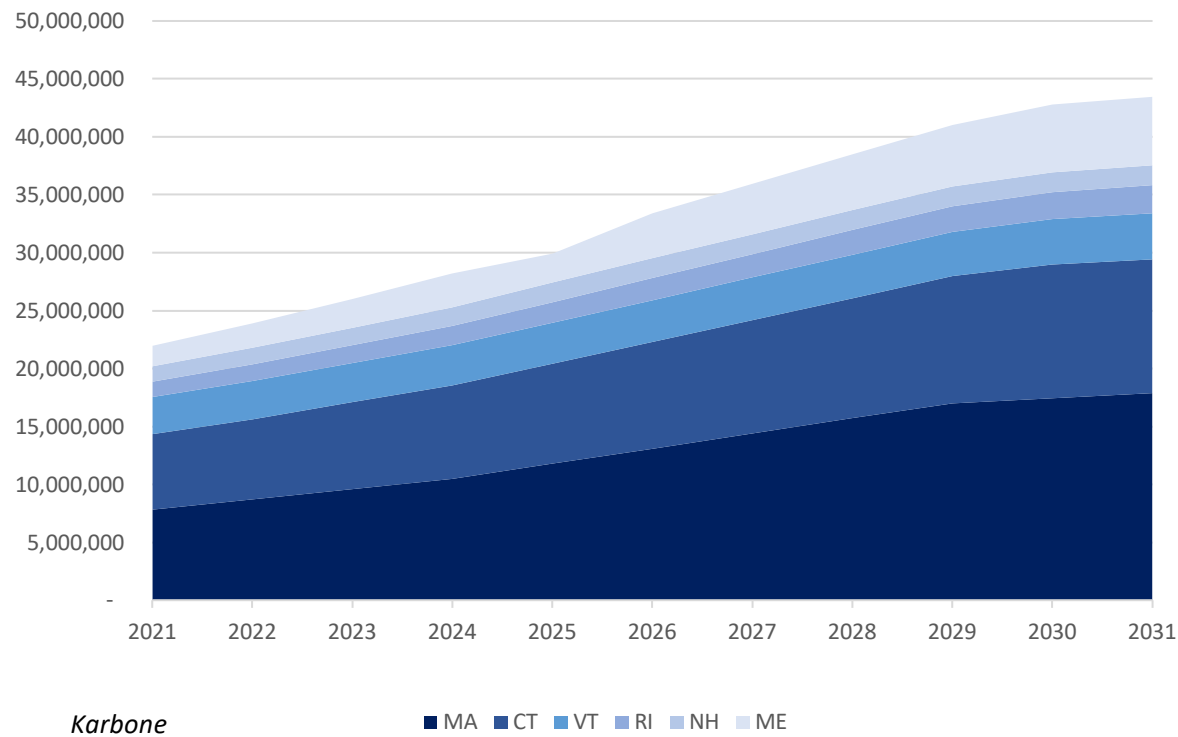


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- Big step up over past year, resistance at \$25
- ACP: \$30-50

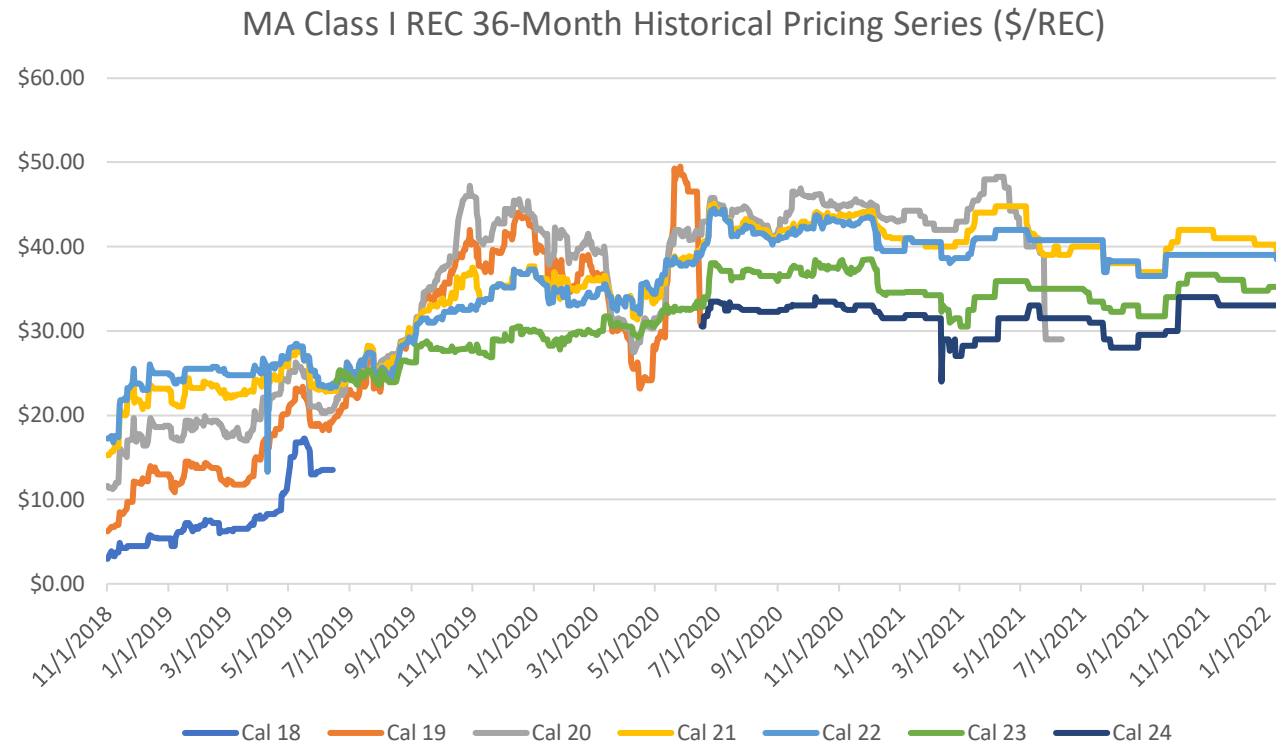
NEPOOL: Robust Demand, Impossible Onshore Supply

Current NEPOOL Class I REC Forward Demand (MWh)



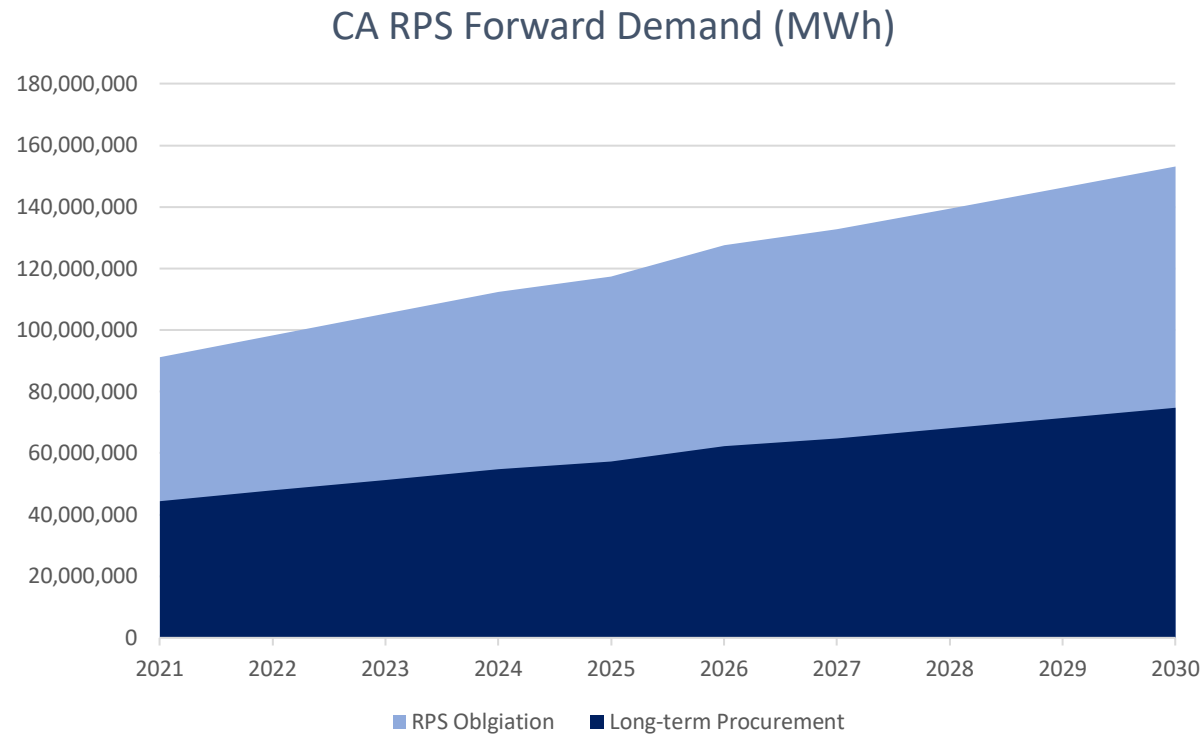
- Structurally undersupplied against rising targets, as usual
- Policy supportive and growing, as usual
- Keep an eye on offshore wind – theoretically bearish for other REC pricing

NEPOOL: Highest In The Country



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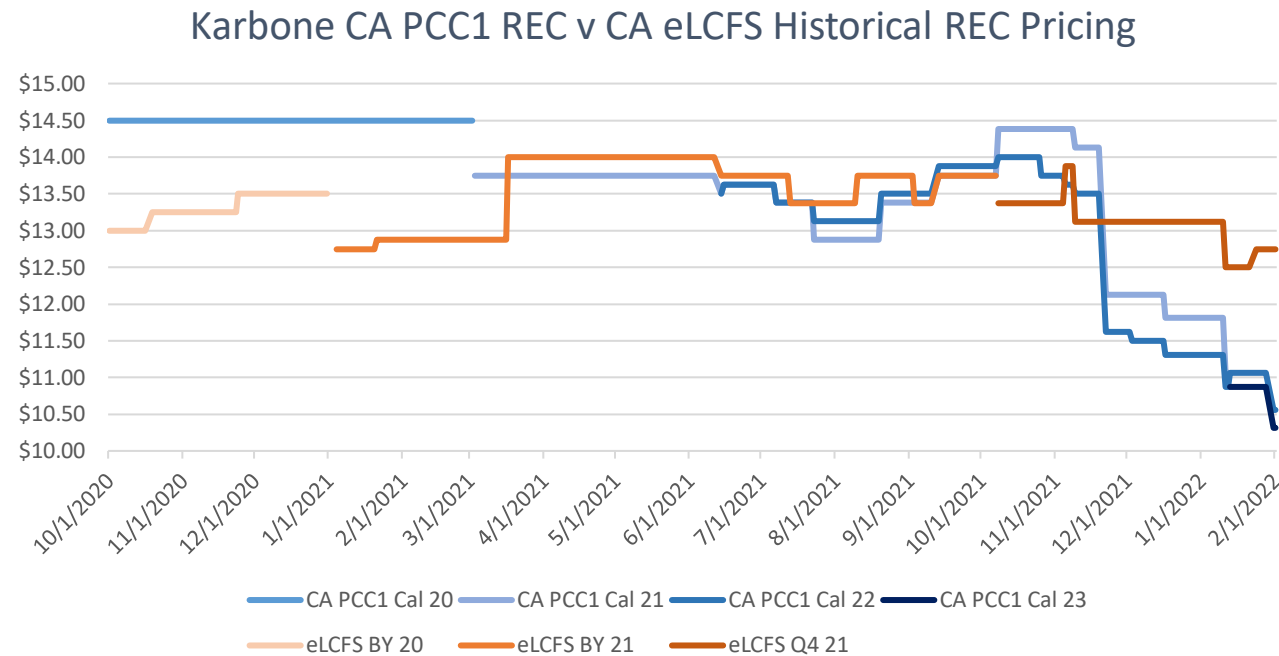
- Range-bound, really, and \$30-50 is a lot!
- ACP Change in MA: \$60, ramping down to \$40



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- A unique system that requires bundling electricity with RECs
- Load servers on Track for long-term...for now
- CPUC focused on a more reliable grid by 2026 & load servers prioritize Resource Adequacy, and/or longer-dated contracts

CAISO: Peaked Early, Stabilized Now?

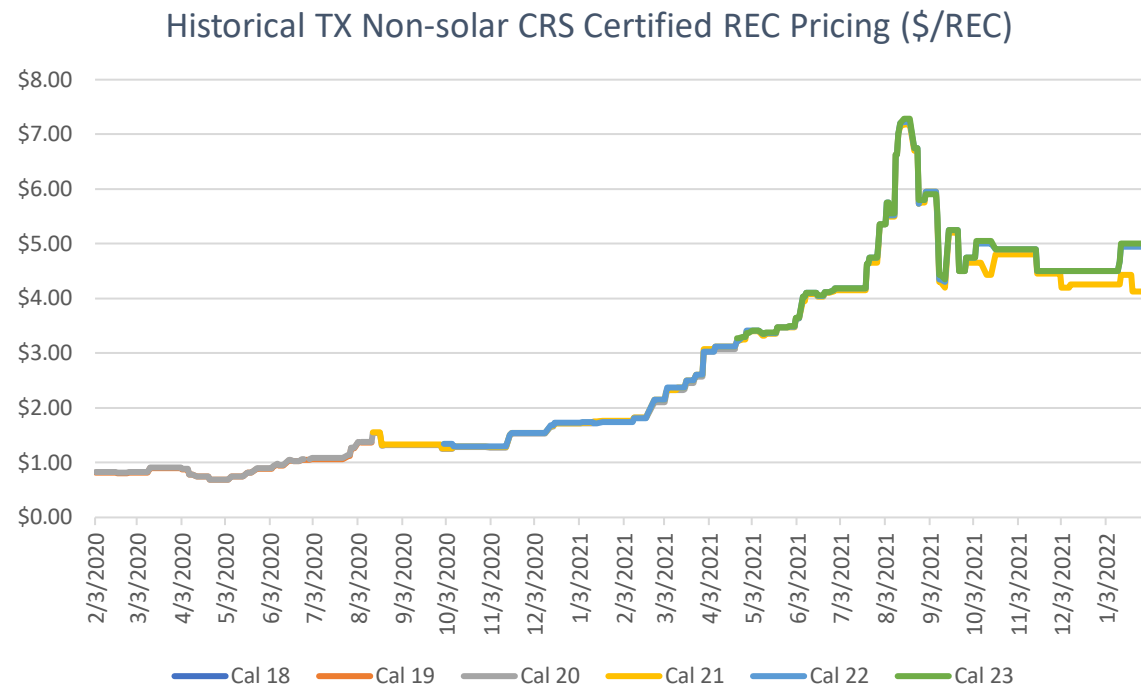


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- Mature market, range-bound pricing, relatively soft in RECs
- Bigger focus on reliability (RA), time of day hedging/shaping, and all things storage
- ACP: \$50

What's on the Horizon?

Voluntary: Signpost For Overall Market Direction



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- Historically prices held in \$0.50 - \$1.00 range, but rose 4x between Q1 2020 and Q3 2021
- July - August 2021 prices rose near 75% across all vintages peaking at ~\$7.00
- Convergence of regional pricing proven possible

- Always new programs and program changes on the horizon
- Tax credit changes via BBB or otherwise
- Offshore wind
- Battery integration
- New products (real-time RECs, etc.)
- Product/Program convergence (Grid reliability overlap, EV, hydrogen, carbon, etc.)

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Q&A

Thank You!