# U.S. State Renewables Portfolio & Clean Electricity Standards: 2023 Status Update

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June 2023

*Download report and supporting materials at: rps.lbl.gov*

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# Acronyms

**ACP**: Alternative compliance payment
**CCA:** Community choice aggregator
**CES:** Clean electricity standard
**DG**: Distributed generation
**DPU**: Department of Public Utilities
**EIA**: Energy Information Administration
**ESP:** Electricity service provider
**GW**: Gigawatt
**GWh**: Gigawatt-hour
**IOU**: Investor-owned utility
**LSE**: Load-serving entity
**MSW**: Municipal solid waste
**MW**: Megawatt
**MWh**: Megawatt-hour
**NEPOOL**: New England Power Pool
**OSW:** Offshore wind
**POU:** Publicly owned utility
**PPA**: Power purchase agreement
**PUC**: Public utilities commission
**RE**: Renewable electricity
**REC**: Renewable electricity certificate
**RPS**: Renewables portfolio standard
**SACP**: Solar alternative compliance payment
**SREC**: Solar renewable electricity certificate
**TWh**: Terawatt-hour

# Highlights

**Evolution of state RPS and CES programs:** States continue to refine and revise their RPS policies, often by adopting higher targets and/or broader CES policies. Among the 29 states plus DC with an RPS, 16 states have RPS targets of at least 50% of retail sales, and 17 states have a 100% CES or RPS target.

**Historical impacts on renewables development:** Roughly half of all growth in U.S. renewable electricity (RE) generation and capacity since 2000 is associated with state RPS requirements, though that percentage has declined in recent years, representing 30% of all U.S. RE capacity additions in 2022. However, within some regions, particularly the Northeast and Mid-Atlantic, RPS policies continue to play a central role in motivating RE growth.

**Future RPS and CES demand and incremental needs:** RPS and CES policies require roughly 300 TWh of additional clean electricity supply by 2030 and 800 TWh by 2050, requiring total U.S. non-hydro RE generation to reach 28% of electricity sales by 2050 (compared to 17% today). This amounts to roughly one-quarter of EIA's projected RE growth through 2050.

**RPS target achievement to-date:** States have generally met their interim RPS targets in recent years, with only a few exceptions reflecting unique, state-specific issues. Most CES targets are not yet in force.

**REC pricing trends:** Prices for NEPOOL Class I RECs remained at roughly $40/MWh over the past year, just below ACP rates in the larger state markets, while PJM Tier I REC prices continued to rise, reaching $30/MWh by year-end. Prices for solar RECs remained relatively stable, and continue to exhibit wide variation across states, with the highest prices ($200-450/MWh) in NJ, MA, and DC.

**RPS compliance costs:** RPS compliance costs average roughly 3.5% of retail electricity bills across RPS states, though vary widely from state to state, with the highest costs (8-12% of retail bills) in states with solar carve-outs and high SREC prices.

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- Compliance Costs
- Outlook


***Additional supporting data and documentation available at: [rps.lbl.gov](rps.lbl.gov)***

- RPS & CES annual percentage targets by state
- RPS & CES demand projection and underlying load forecasts

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# Evolution of State RPS and CES Programs

# The Scope of This Report

**This report covers U.S. state renewables portfolio standards (RPS) and clean electricity standards (CES)**

**Renewables Portfolio Standard (RPS):** A binding requirement on retail electric suppliers to procure a minimum percentage of generation from eligible sources of renewable electricity

**Clean Electricity Standard (CES):** Similar to an RPS, but target is based on a broader set of eligible technologies; may not (yet) have a defined implementation/enforcement mechanism

**Electric-Sector Emissions Standard:** Considered here to be a CES variant, but target is defined as a percentage reduction in emissions relative to a baseline

**The report does <u>not</u> cover:**

- Economy-wide carbon reduction targets without an electric sector-specific standard
- Targets adopted voluntarily by utilities or corporations, or targets established through executive order
- U.S. territories

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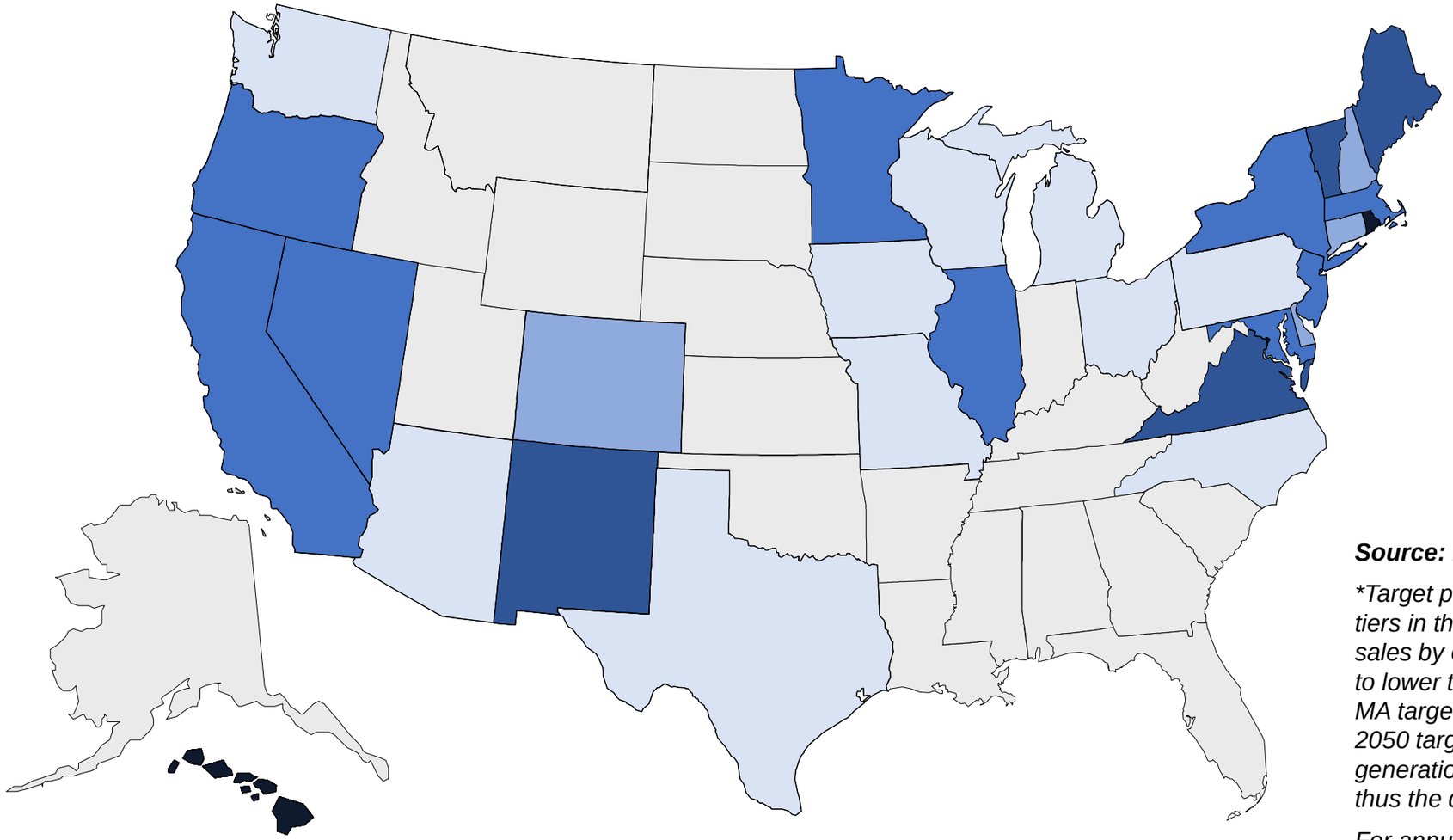
# RPS Policies Exist in 29 States and DC

## Apply to 58% of total U.S. retail electricity sales




***Source: Berkeley Lab*** *(June 2023)*

**Target percentages represent the sum total of all RPS resource tiers in the final target year, expressed as a percentage of retail sales by obligated LSEs. Some LSEs in each state may be subject to lower target percentages or exempt from the RPS altogether. The MA target escalates at 1% per year; the shading shown reflects the 2050 target level. The HI RPS is denominated as a percent of generation, and will ultimately rise to above 100% of retail sales; thus the darkest shade refers to 100%+.*

*For annual RPS targets by state, see [http://rps.lbl.gov](http://rps.lbl.gov)*

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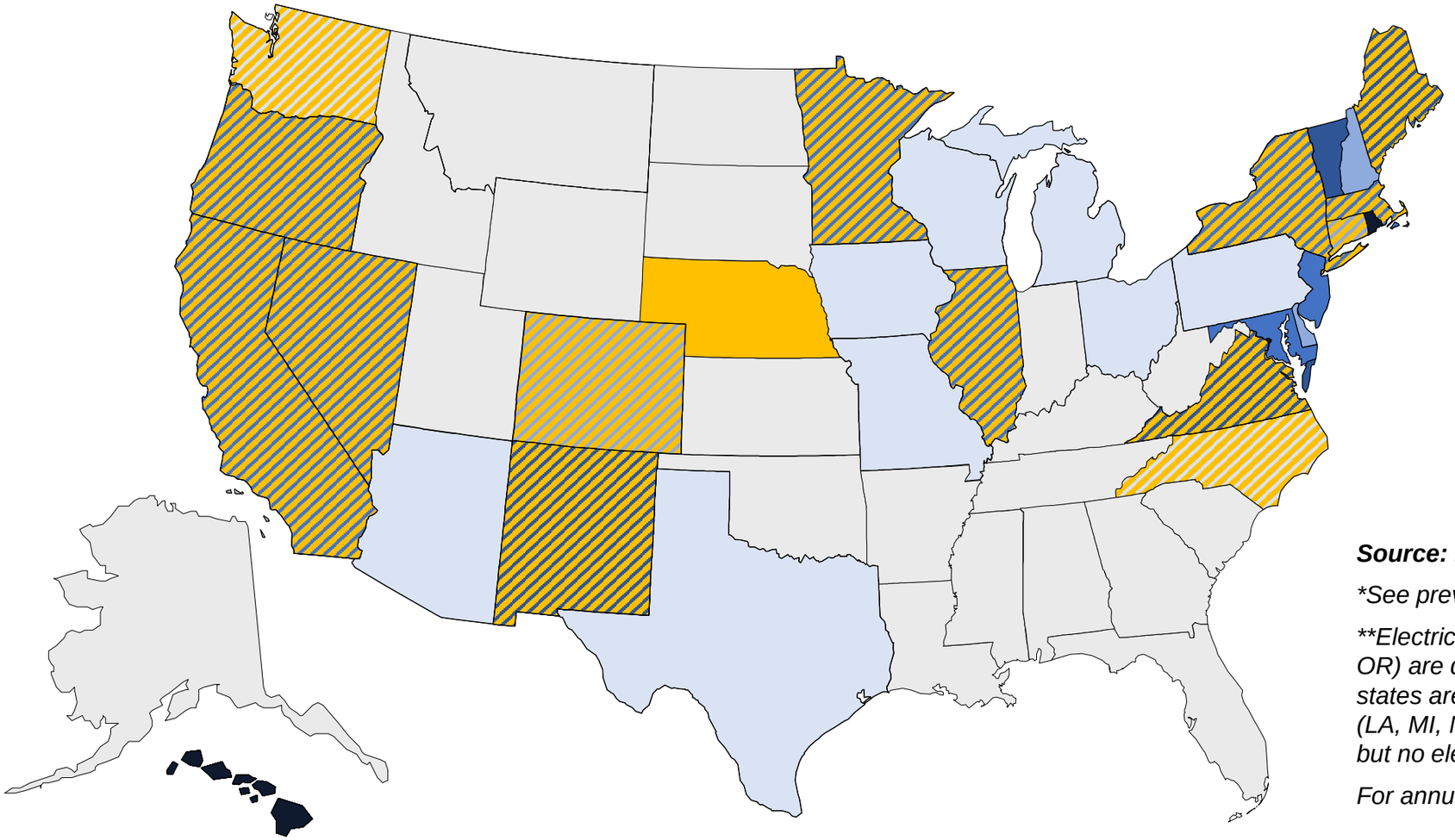
# 15 States Have Established a Broader 100% CES **

## Typically in combination with an RPS




***Source: Berkeley Lab*** *(June 2023)*

**See previous slide for notes on RPS targets*

***Electric sector emission standards in several states (CO, NC, NV, OR) are depicted here as a CES. Not included among the CES states are those that established a target only via executive order (LA, MI, NJ, WI) or with economy-wide emission reduction targets but no electric sector-specific targets (MD).*

*For annual RPS & CES targets by state, see [http://rps.lbl.gov](http://rps.lbl.gov)*

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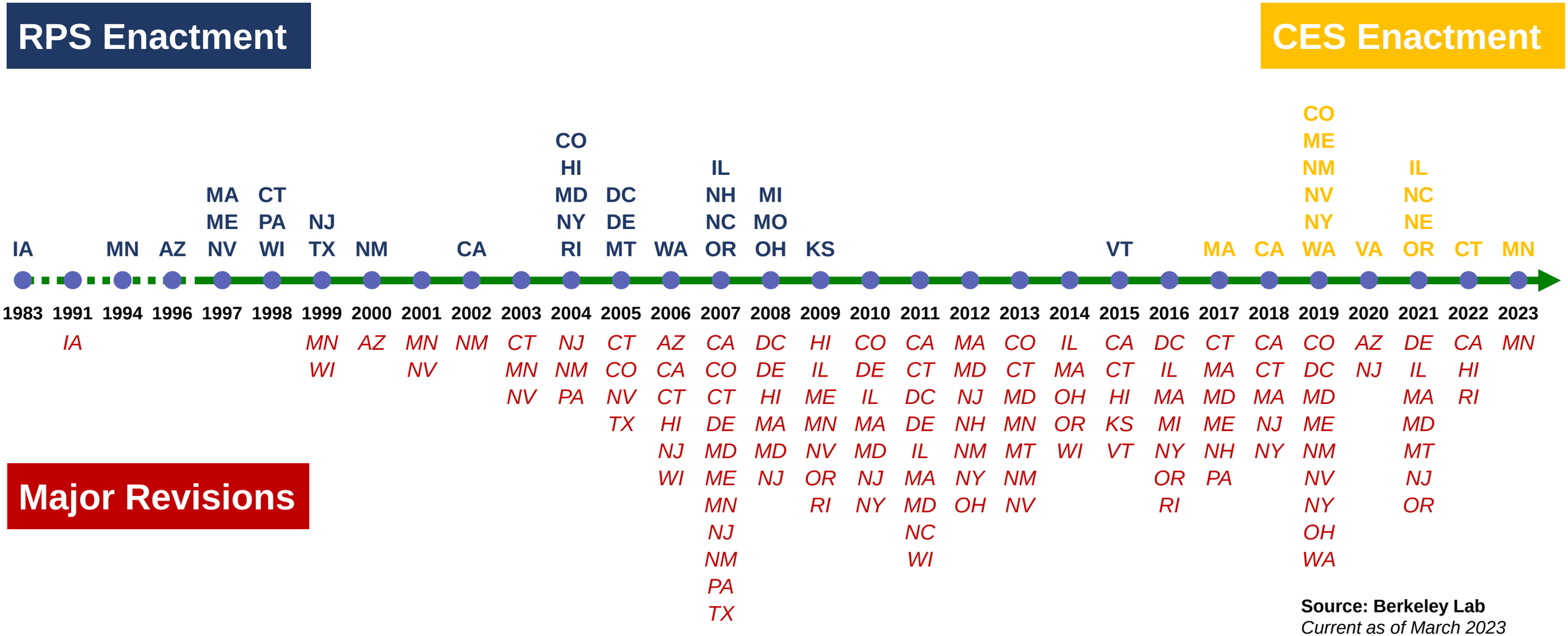
# Most RPS Policies Have Been on the Books for More Than a Decade

But states continue to make significant revisions & adopt new CES'




**Source: Berkeley Lab**
*Current as of March 2023*

# RPS and CES Legislation in 2022 and Q1 2023

## RPS & CES Related Bills since Jan. 2022

| | Strengthen | Weaken | Neutral | Total |
|---|---|---|---|---|
| **Introduced** | **63** | **32** | **55** | **150** |
| **Enacted** | **4** | **0** | **13** | **17** |

***Data Source:*** *EQ Research (March 22, 2023) and Berkeley Lab*
***Notes:*** *Companion bills counted as a single bill; table includes all revisions, whereas timeline chart on previous slide denotes only "major" revisions*

- Most proposals sought to strengthen or make neutral/technical changes to existing programs, a small fraction of which were ultimately enacted
- Among those bills signed into law are 3 states that either raised their RPS to 100% or created a new 100% CES (see text box to the right)
- Other enacted revisions were all relatively minor or only peripherally related to RPS/CES

## Major revisions enacted:

- **CT:** Created a new CES targeting 100% zero-carbon electricity by 2040
- **HI:** Revised RPS to be based on a percentage of total generation, rather than a percentage of retail sales (thus effectively raising the target)
- **MN:** Established new 100% CES by 2040 and increased RPS to 55% by 2035
- **RI:** Increased RPS to 100% by 2033

* *Focus here is on legislation involving RPS and CES; other types of policy revisions not included*

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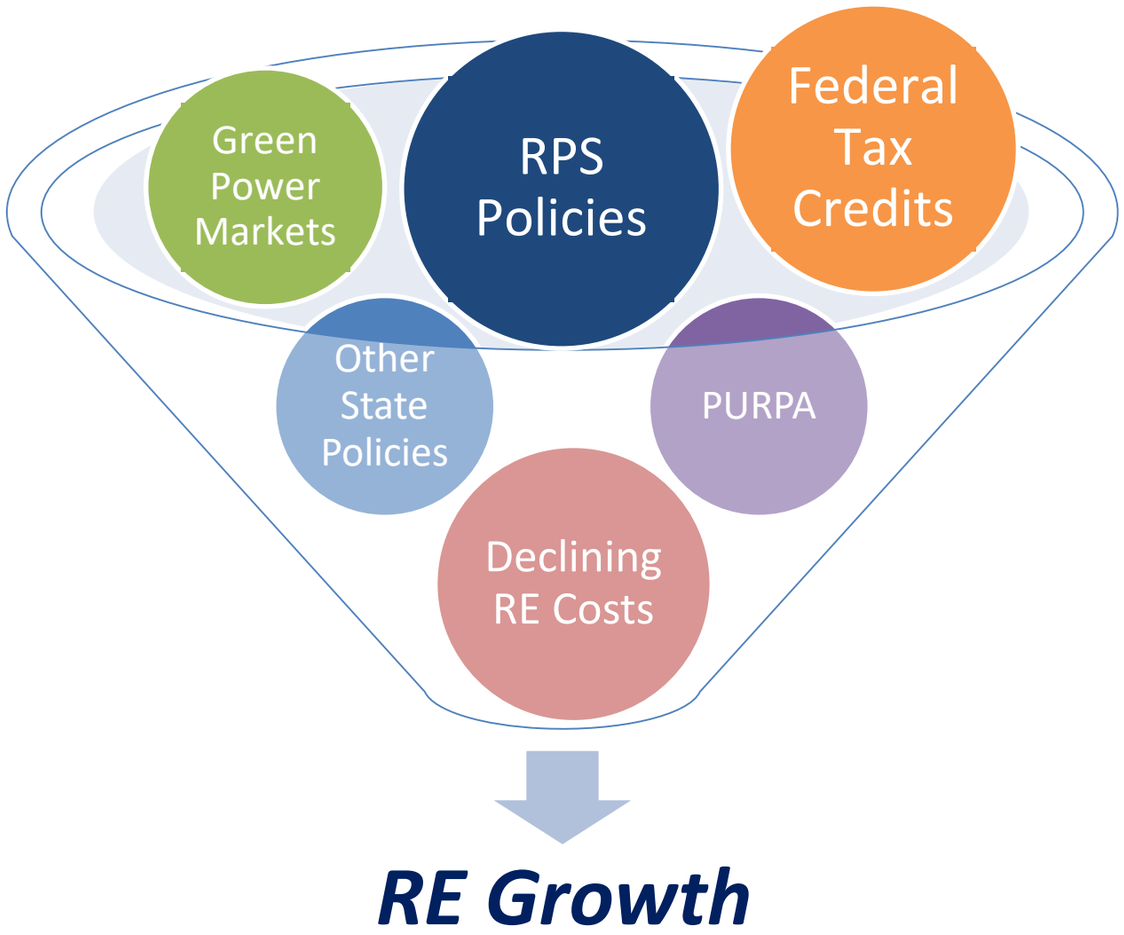
# Historical Impacts of State RPS and CES Policies on Renewables Development

# RPS Policies Exist amidst a Broader Array of Market and Policy Drivers for RE Growth



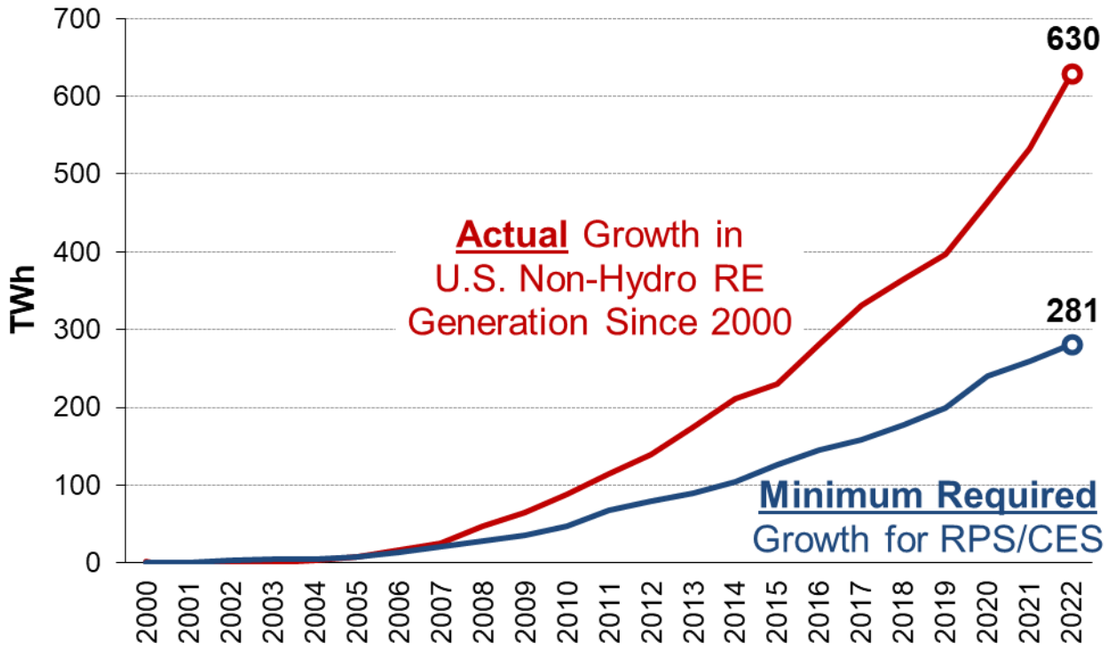

*Parsing out the incremental impact of individual drivers for RE growth is challenging, given the many overlaps and interactions*

**We present two simple approaches for gauging the impact of RPS policies on RE growth—*without claiming strict attribution*:**

1. Compare total historical RE growth to the minimum amount required to meet RPS demand
2. Quantify the portion of historical RE capacity additions directly serving entities with RPS obligations or certified for RPS eligibility

# RPS' & CES' Have Been One Key Driver for RE Generation Growth

## Growth in Non-Hydro Renewable Generation: 2000-2022




*Notes: Minimum Required Growth for RPS/CES excludes compliance contributions from pre-2000 vintage facilities, and from hydro, municipal solid waste, nuclear, and other non-RE technologies. This comparison focuses on non-hydro RE, because RPS rules typically allow only limited forms of hydro for compliance.*

- Total non-hydro RE generation in the U.S. has grown by 630 TWh since 2000
- RPS+CES policies required a 281 TWh increase over the same period (44% of total RE growth)
  - Some of that growth would have occurred without RPS+CES requirements
  - Conversely, RPS+CES policies may have also contributed to more RE growth than what is strictly required (e.g., progress toward distant CES targets, spillover effects)
- RE growth outside of RPS's associated with:
  - Voluntary utility procurement (e.g., IRP-driven)
  - Net-metered PV (often not counted towards RPS)
  - Voluntary green power markets (including corporate procurement, green power programs, etc.)

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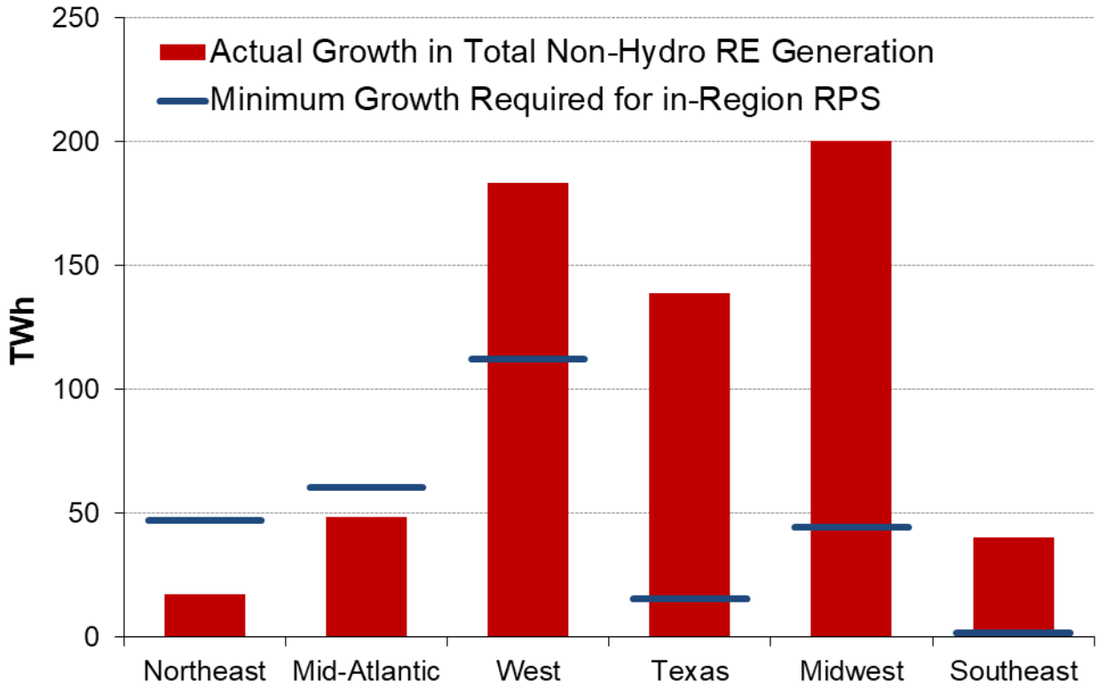
# RPS & CES Role in Driving RE Growth Varies by Region

Most critical in the Northeast and Mid-Atlantic; less so in other regions

## Growth in Non-Hydro Renewable Generation: 2000-2022




*Notes: Northeast consists of New England states plus New York. Mid-Atlantic consists of states that are primarily within PJM, in terms of load served. The comparisons shown here should be not interpreted as indicative of compliance levels; see later sections of the report for data on historical compliance levels by state.*

**Northeast and Mid-Atlantic:** RPS needs have outpaced actual in-region RE growth (deficit partly met by imports), suggesting that RPS demand has been a key driver of non-hydro RE growth

**West:** Actual RE growth has exceeded RPS requirements, partly due to net metered PV (33 TWh, most of which is not used for RPS)

**Texas and the Midwest:** RE growth has far outpaced RPS needs, driven by attractive wind energy economics

**Southeast:** Negligible regional RPS demand (NC), though some RE growth serves RPS demand in PJM

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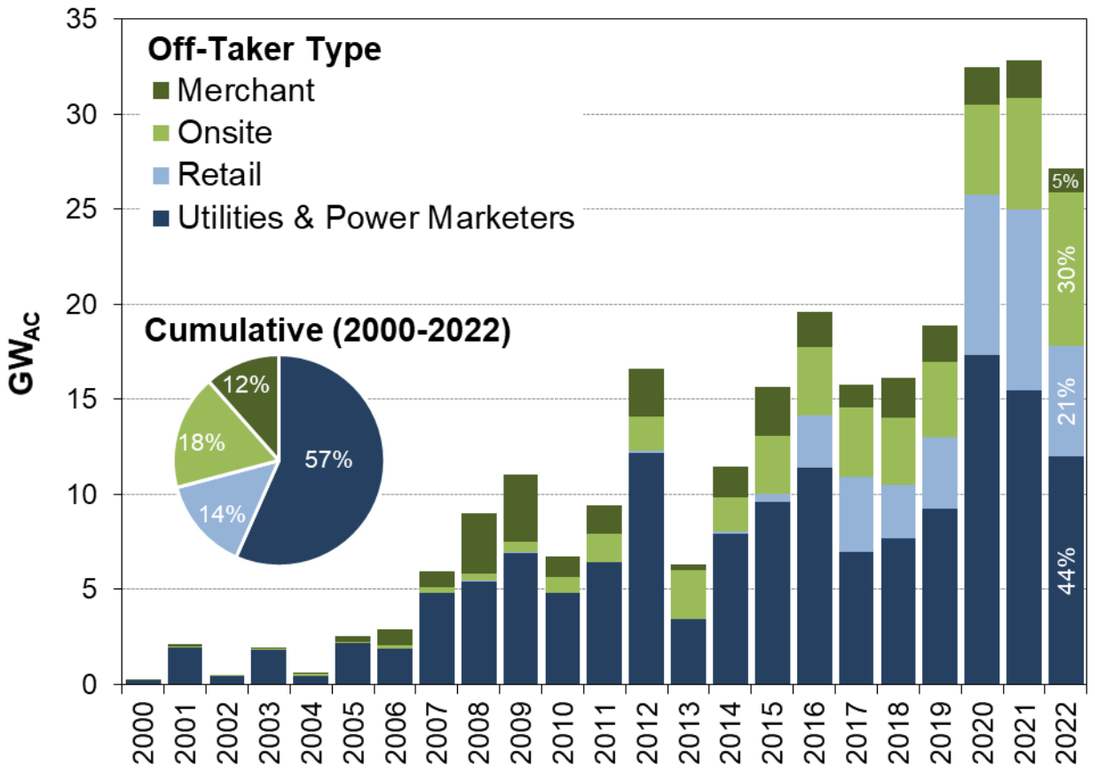
# Most Renewable Capacity is Sold to Utilities & Power Marketers, but Retail & Onsite Projects Are a Growing Share

## Annual Renewable Capacity Additions




*Sources: LBNL, ABB Ventyx, EIA, American Clean Power Association*

- Utilities and power marketers (load-serving entities) continue to represent the largest class of off-takers for new renewable capacity (44% in 2022, 57% cumulatively)
- Retail off-takers (corporate PPAs and community solar), have become more prominent in recent years, though their share dipped in 2022 to 21% of capacity additions
- Onsite projects have seen slow but steady growth in recent years, but surged to 30% of RE adds in 2022 (the only category that grew last year)
- Merchant sales have a long history but are presently a small share of new RE additions (5% in 2022)

*Definitions:* **Utilities & Power Marketer** projects are those where the power is sold to or owned by utilities or competitive retail electricity suppliers. **Retail** projects are those where the power is sold to specific end-use customers through either corporate PPAs or community solar arrangements. **Onsite** projects are those installed at customer facilities and used to directly serve onsite load (i.e., behind-the-meter). **Merchant** projects are those where the power is sold into wholesale spot markets.

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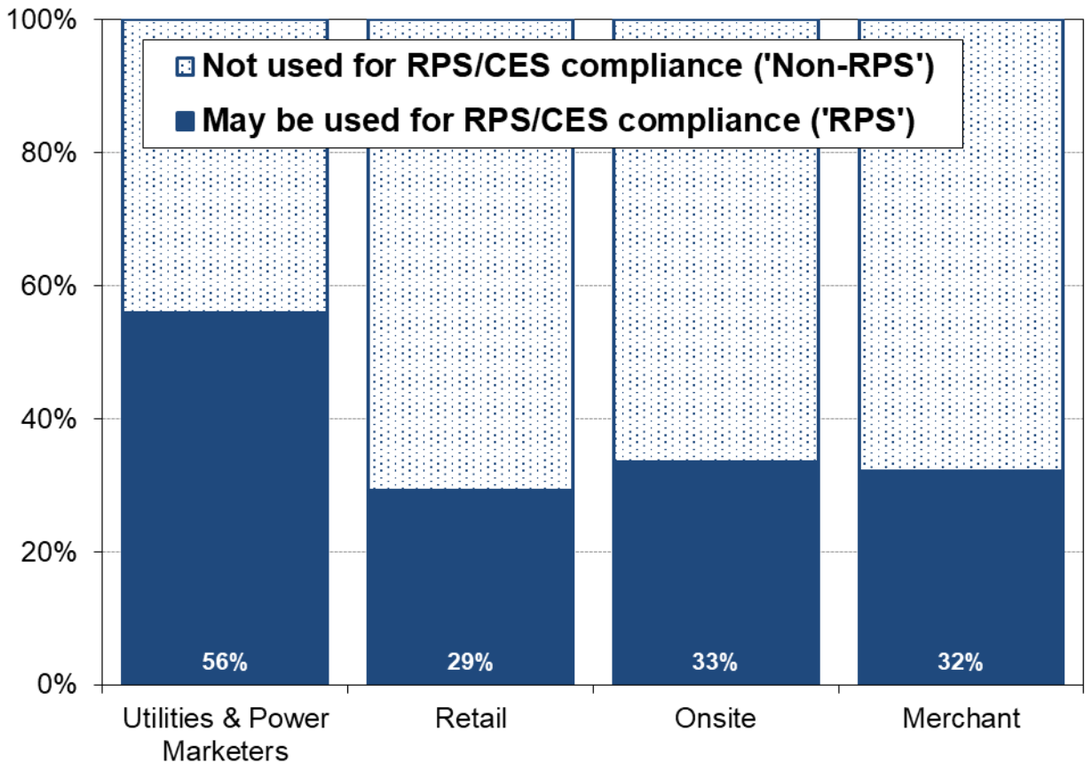
# Within Each Class of Off-takers, a Portion of RE Capacity Additions Is—or May Be—Used for RPS/CES Compliance

## Percent of Cumulative Renewable Capacity Additions by Off-Taker (2000-2022)




*Notes: Going forward, we use the shorthand "RPS" and "Non-RPS" to refer to the categorization shown here, based on the decision-rules explained to the right.*

The criteria for assessing whether a project may be used for RPS compliance depend on the off-taker type and region:

- **Utilities & Power Marketers:** Roughly **56%** of RE capacity additions since 2000 is owned by or contracted to load serving entities with active RPS or CES compliance obligations
- **Retail:** Roughly **29%** of capacity additions has been certified for RPS eligibility in one or more state, meaning that the RECs *could* be re-sold for RPS compliance (and potentially "swapped out" with cheaper voluntary-market RECs)
- **Onsite:** Roughly **33%** of capacity adds (almost all DG PV) is either being claimed by a utility for RPS compliance (typically through an incentive program) or is RPS-certified in one or more state and thus potentially selling its SRECs for RPS needs
- **Merchant:** Roughly **32%** of capacity additions has been certified for RPS compliance in PJM or ISO-NE, or was developed in Texas during the period when the state's RPS was binding

*These percentages represent upper bounds on the portion of new RE capacity actually being applied toward RPS compliance*

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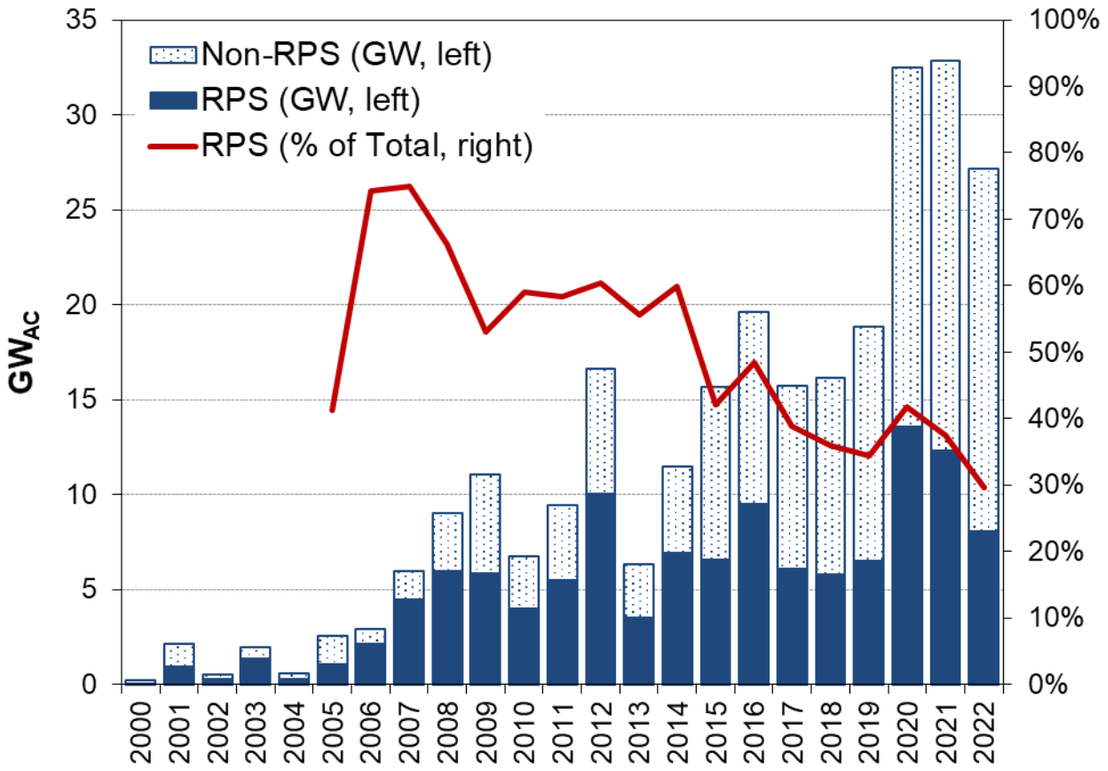
# RPS' Have Provided a Stable Source of Demand for RE New-Builds

Even if RPS *portion* of annual RE capacity additions has declined over time

## Annual Renewable Capacity Additions




*Notes: The criteria for assessing whether a project may be used for RPS compliance depend on the off-taker type and region. See previous slide for further details.*

- Cumulatively, 45% of all RE capacity additions since 2000 are in some form "RPS-related" (120 GW out of 265 GW)
- That share has declined over time, dropping to 30% of RE additions in 2022, compared to 60-70% in earlier years
- Despite the shrinking share, the absolute quantity of RPS-related RE capacity additions has grown over time
- However, RE capacity growth outside of RPS programs has simply been more rapid, consisting of:
  - Utility/power marketer procurement in non-RPS states (7 GW in 2022; mostly TX, Midwest, Southeast)
  - Onsite solar not used for RPS (6 GW in 2022; half from CA, FL, TX)
  - Corporate PPAs and community solar not certified for RPS eligibility (5 GW)

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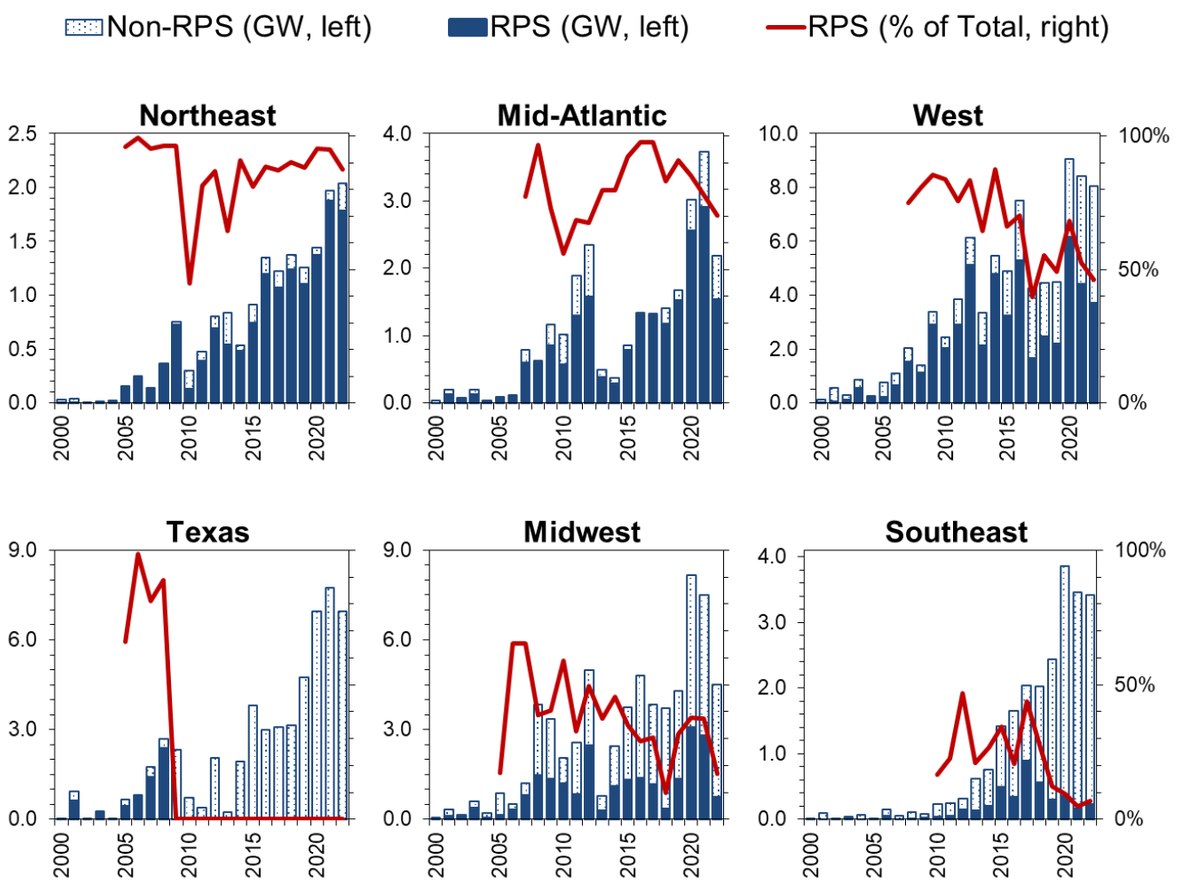
# RPS Policies Remain Central to RE Growth in Particular Regions

## Recent RE additions in Northeast and Mid-Atlantic primarily serve RPS demand




*Notes: See previous slide for regional definitions and further details on the criteria for sorting RE capacity additions into RPS and Non-RPS categories.*

### RPS policies have been a ***larger*** driver in…

- **Northeast:** Relatively small market, but almost all RE capacity additions serving RPS demand, consisting mostly of onsite and community solar in recent years
- **Mid-Atlantic:** Mostly solar carve-out capacity and corporate PPAs with RPS-certified projects potentially selling RECs into compliance markets
- **West:** RPS additions driven by aggressive long-term RPS and CES targets throughout the region; non-RPS additions are mostly onsite solar

### But have been a ***smaller*** driver in…

- **Texas:** Achieved its final RPS target in 2008 (7 years ahead of schedule); all growth since is Non-RPS
- **Midwest:** Lots of wind development throughout the region, some contracted to utilities with RPS needs
- **Southeast:** RE growth primarily driven by utility procurement and PURPA

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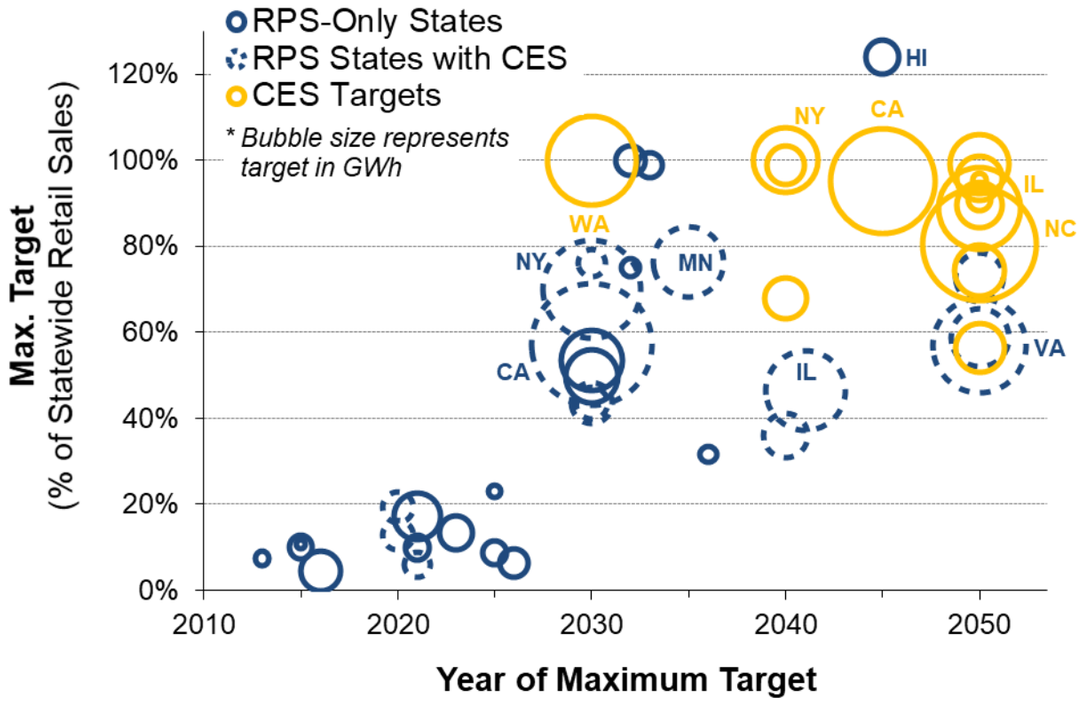
# Projected RPS & CES Demand and New Supply Needs

# Target Levels and Timeframes Vary Widely

## Max. RPS & CES Targets and Target Years




*Notes: The figure shows each state's maximum RPS and CES percentage target and the associated year when that target must be reached. Targets are shown here as the percentage of total statewide retail sales, which may differ from nominal targets if those apply to only a subset of LSEs in a state. The RPS target for HI is denominated as a percent of total statewide generation, and thus is greater than 100% of retail sales. Bubble sizes represents the target in GWh terms; in the case of the CES targets, bubble sizes reflects only the incremental GWh above and beyond the RPS.*

- Targets translated into a percentage of *statewide* retail sales (to provide comparability)
- RPS states can be grouped into three sets
  - Legacy RPS programs with final targets of roughly 15-25% by 2015-2025
  - A sizeable contingent of states with higher RPS targets (≥50%) in the 2030 timeframe
  - States with similarly high targets but longer timeframes (2040-2050)
- Most of the states in the latter two groups, with relatively high RPS targets, have also adopted even higher, longer-term CES targets

**Annual RPS & CES percentage targets by state available for download at: rps.lbl.gov**

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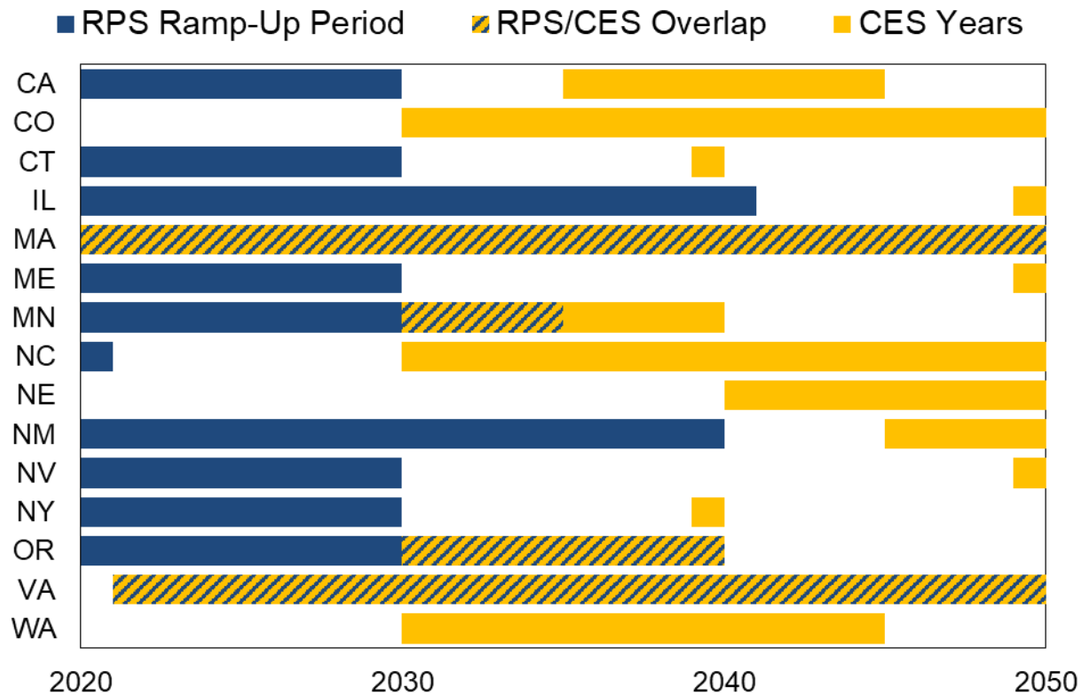
# Applicable CES Timelines

## RPS and CES Ramp-Up Periods (CES States Only)




*Notes: The figure shows the range of years (post-2020) over which RPS and CES targets ramp up in each state. States without any intermediate year CES targets are shown with a single-year target for the ultimate target year. CES ranges in some states reflect differing target years across applicable LSEs; in WA, the CES range reflects the phase-out in the allowance for unbundled RECs.*

- CES targets typically don't commence until after (in some cases many years after) ultimate RPS target year
  - First CES target year generally 2030 or beyond
- Unlike RPS policies, CES targets generally do not ramp up continuously over a period of time
  - Most CES policies consist of a bookend set of targets for the first and final years, but no defined ramp-up over the intervening years
  - Other CES policies consist of just a single distant-year target
- CES timelines in individual states sometimes vary across obligated entities (e.g., delayed timelines for smaller or publicly owned utilities)

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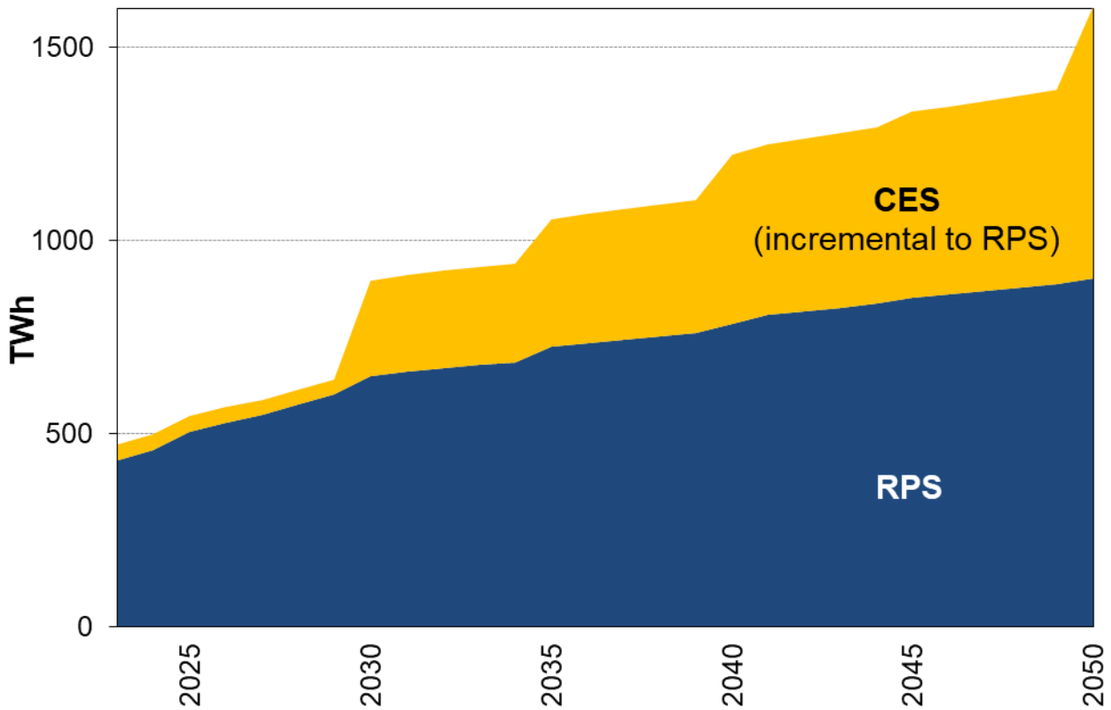
# Aggregate U.S. RPS and CES Requirements

## Grow over time with rising targets and load growth

**Projected RPS + CES Demand**




*Notes: Projected RPS+CES demand is estimated based on current targets, accounting for exempt load, likely use of credit multipliers, and other state-specific provisions. Underlying retail electricity sales forecasts are based on regional growth rates from the most-recent EIA Annual Energy Outlook reference case.*

- Aggregate RPS demand more than doubles from 400 TWh in 2023 to 900 TWh in 2050
- RPS demand growth tapers off after 2030, as most states pass their maximum percent target
- CES targets pick up that slack, adding more than 700 TWh of additional demand by 2050
  - Lumpy growth, reflecting staggered targets; corresponding supply growth likely smoother
  - CES targets may not be binding in the same manner as RPS policies
- Increase in demand does not directly equate to required increase in supply

**State-level RPS & CES demand projections through 2050 available for download at: rps.lbl.gov**

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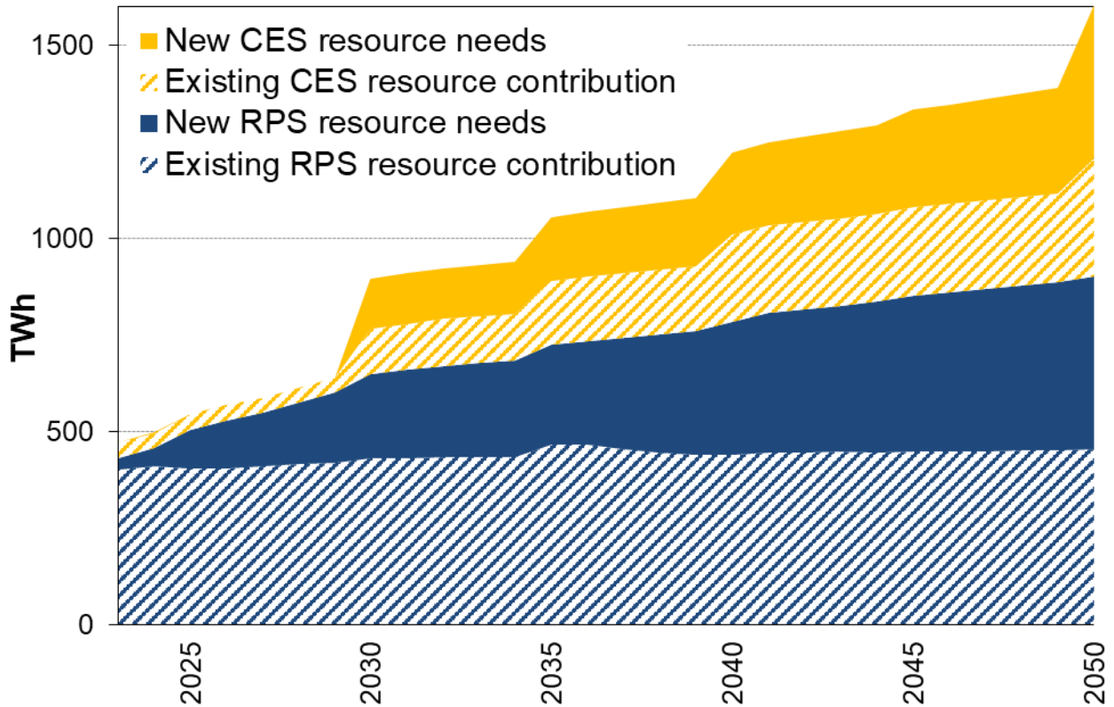
# New Resources Needed to Meet RPS+CES Demand Growth

Some of which will be met by resources already under development

## Existing vs. New Resource Contributions to RPS and CES Demand




*Notes: Existing RPS/CES resources represent the potential contribution to future RPS and CES demand from resources in operation as of year-end 2022, including banked RECs, but without considering future retirements. New resource needs represent the gap between total RPS/CES demand and existing resources.*

- Collectively, RPS and CES policies require roughly 300 TWh of new clean electricity supply by 2030 and 800 TWh by 2050
  - Though CES targets in some states may or may not be entirely binding
- Roughly half of 2050 CES demand (above RPS) can be met with existing resources, primarily nuclear and large hydro
  - Actual contribution will depend on re-licensing
- Two important factors not captured here:
  - Retirements of existing RPS and CES resources would increase new resource needs
  - New inter-regional transmission may reduce new resource needs for both RPS and CES

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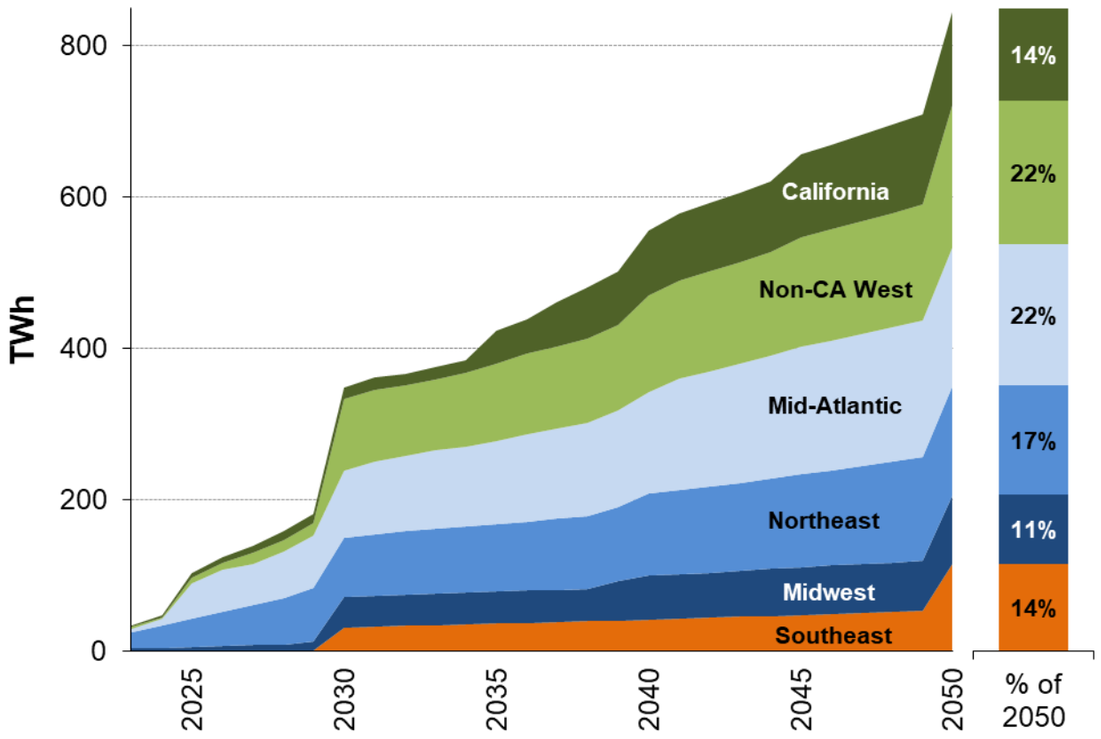
# Regional Roundup of New RPS+CES Resource Needs

## Varying needs reflect different target trajectories and current resource balance

### New RPS+CES Supply Needs




*Notes: See notes on earlier slides about regional definitions and about how new supply needs are determined and defined.*

**California:** Minimal new supply needs until the late 2030s, due to current surplus and REC banking; earlier needs could arise depending on how fully IOUs offload surplus to CCAs

**Non-CA West:** Near-term needs driven by 2030 CES targets in OR and WA; longer-term needs reflect rising CES/RPS targets throughout the region (including CO, NV, NM)

**Mid-Atlantic:** Resource needs driven principally by aggressive RPS targets in VA and IL (ComEd) and draw-down on banked RECs throughout the region

**Northeast:** Near-term needs mostly for NY RPS; longer-term needs also reflect rising RPS/CES targets in New England

**Midwest:** Resource needs primarily for MN RPS/CES and NE CES

**Southeast:** Consists solely of NC's 100% CES; a significant share of the U.S. 2050 total

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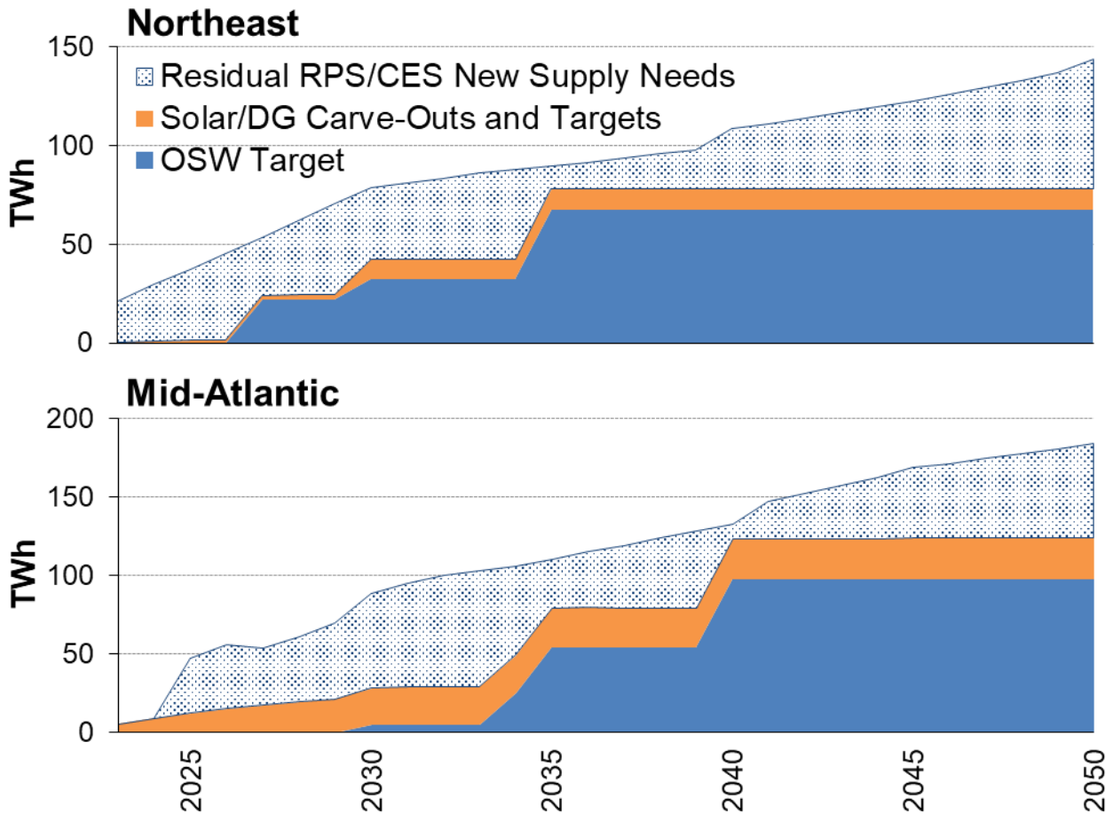
# OSW Targets and Solar Carve-Outs Comprise a Large Share of New Supply Needs in the Northeast and Mid-Atlantic

## OSW Target and Solar Carve-Out Contributions to New Supply Needs




*Notes: OSW targets translated to TWh assuming 45% capacity factor.*

- Numerous states in the Northeast and Mid-Atlantic have established procurement targets for Offshore Wind (OSW)
- Many also have solar and/or DG carve-outs or procurement targets
- A sizeable share of RPS/CES new supply needs may be met by these OSW and solar/DG targets
- Residual new supply need in any given year heavily dependent on the timing of when OSW projects come online
  - A slow pace in OSW deployment could create large near-term residual supply needs
  - Possibility of large periodic swings in over/under-supply, REC pricing volatility

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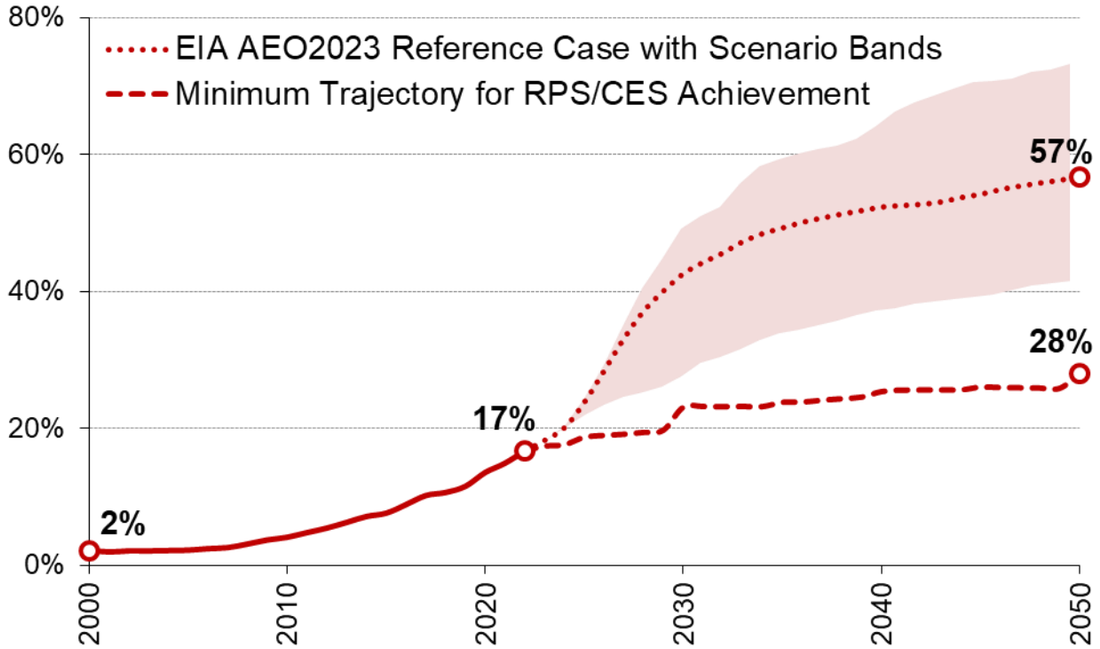
# Growth in Non-Hydro RE for RPS and CES Targets

## Represents about one-quarter of total projected growth in non-hydro RE

**Non-Hydro Renewable Generation**
(% of U.S. Generation Mix)




*Notes: The figure focuses on non-hydro RE, given the limited eligibility of hydro for state RPS obligations, and also ignores municipal solid waste, demand-side management, and non-RE technologies that may count towards RES or CES compliance in some states. The scenario band surrounding the EIA reference case projection reflects the min and max across all AEO2023 side cases excluding the "no IRA" case.*

- To meet future state RPS and CES targets, non-hydro renewables will need to grow from 17% of the U.S. generation mix today to 28% by 2050
  - Assumes all new RPS and CES supply consists of non-hydro RE; assumptions about contributions from existing resources described previously
- Represents roughly one-quarter of projected total growth in non-hydro RE from EIA's latest reference case, which includes the effects of IRA
  - Rapid growth during ITC/PTC availability through 2032, followed by slower growth out to 2050
  - Suggests a somewhat diminished role for state RPS and CES, though still significant in many regions
  - RPS/CES share of total RE growth higher in EIA side cases with high RE costs (one form of hedge-value)

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# RPS Target Achievement To-Date

# **Characterizing RPS Achievement:** Key Background Concepts

- RPS's typically consist of interim targets that ramp up each year
- Compliance demonstrated through the retirement of RECs
  - Individual LSEs may bank surplus RECs for compliance in future years (so REC or renewable energy procurement may exceed REC retirement)
  - Many states allow LSEs to submit alternative compliance payments (ACPs) in lieu of retiring RECs
  - In other cases, shortfalls must be granted a waiver, made up in future years, or (in rare cases) result in a penalty
- Compliance data typically reported via annual compliance filings by obligated LSEs and/or summary reports prepared by the state PUC
  - Usually a 6-month to 2-year lag in data availability after the end of a compliance year
- We characterize "RPS achievement" in terms of REC retirements relative to RPS obligations
  - Shortfalls for individual states indicate that one or more LSE retired fewer RECs than required; does not necessarily indicate that the state, as a whole, is under-supplied
  - Not equivalent to "compliance", per se, as ACPs are a form of compliance

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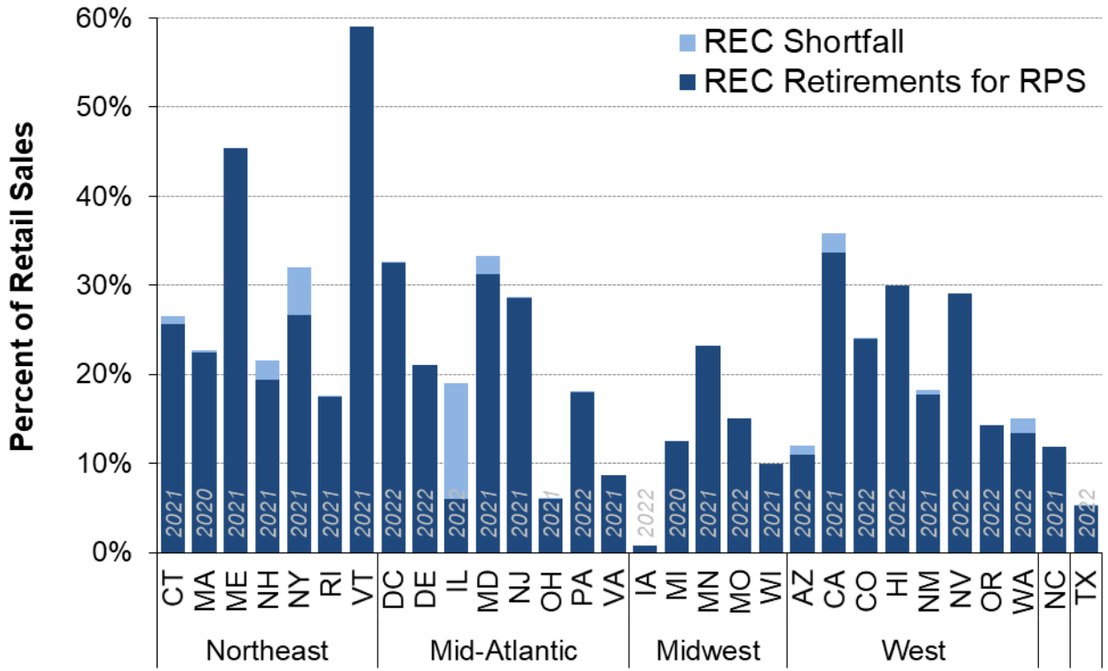
# Interim RPS Target Achievement

## Most states are on track with their overall RPS targets

**RPS REC Retirements and Shortfalls**
(most-recent compliance year data)




*Notes: The compliance year for each state is indicated by the years shown in grey. The height of the stacked bars represents the annual RPS compliance obligation for each state, as a percentage of retail sales for the obligated LSEs. REC shortfalls in Northeast and Mid-Atlantic states represent the portion of the target met with ACPs.*

- Current RPS targets vary widely, typically in the range of 10-30% of retail sales
  - High targets in ME and VT reflect expansive eligibility rules, including pre-existing large hydro
- Most states are hitting their targets
  - Small shortfalls are common, often associated with individual LSEs or with specific resource tiers/carve-outs
  - Large shortfall in IL partly reflects transitional issues associated with the 2021 RPS revisions
- Many states/utilities well ahead of schedule, while others have met interim targets by relying on stockpiles of banked RECs from prior years

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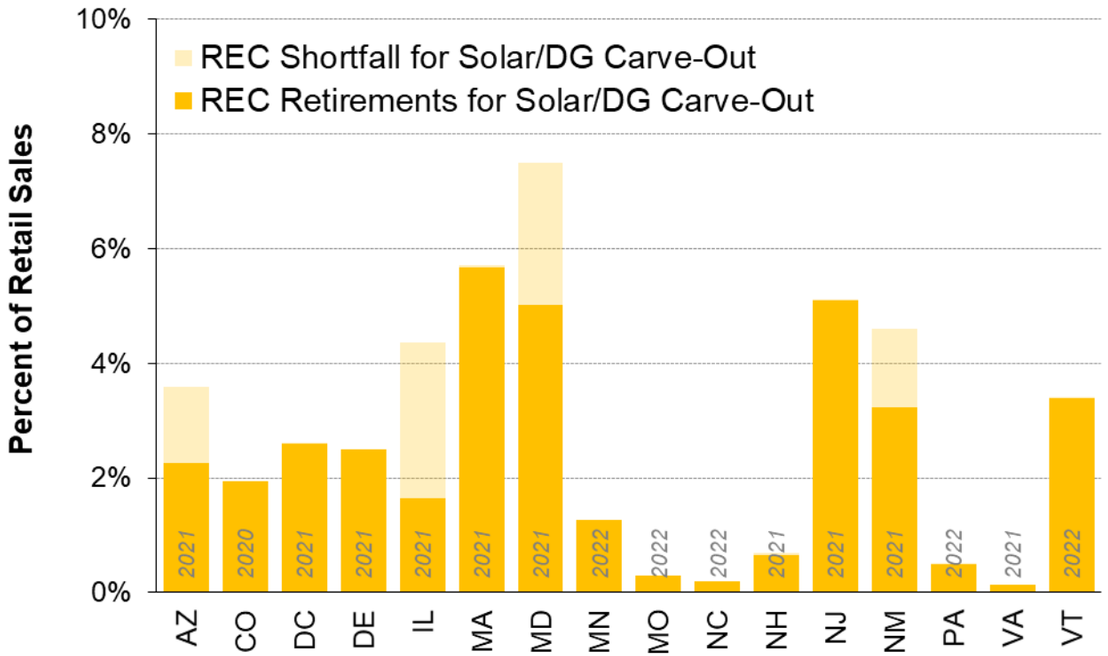
# Interim Solar or DG Carve-Out Achievement

States are generally meeting their carve-out targets

## RPS REC Retirements and Shortfalls (most-recent compliance year data)




*Notes: See previous slide for general notes on figure construction. CO data represent the retail DG requirement; IL data represent the new solar procurement requirement; MA data represent the SREC I and SREC II programs; MD data represent carve-out for IOUs and competitive retail suppliers; NM data represent the combined solar and DG diversity requirements; VA data represent Dominion's carve-out for <1 MW DG.*

- Current solar and/or DG carve-out targets are typically in the range of 1-5% of retail sales
- Most states have been able to meet these targets, though a few exceptions exist
  - AZ: Actual installed DG well exceeds target level, but non-incentive systems don't count toward the target
  - IL: Shortfalls reflect transitional issues, as noted previously
  - MD: Carve-out target rose significantly in 2021, leading to shortfall (target subsequently revised downward)
  - NM: One utility has received recurring waivers for the solar and DG diversity requirement
- In some cases, solar/DG carve-out shortfalls may be made-up with general RPS resources

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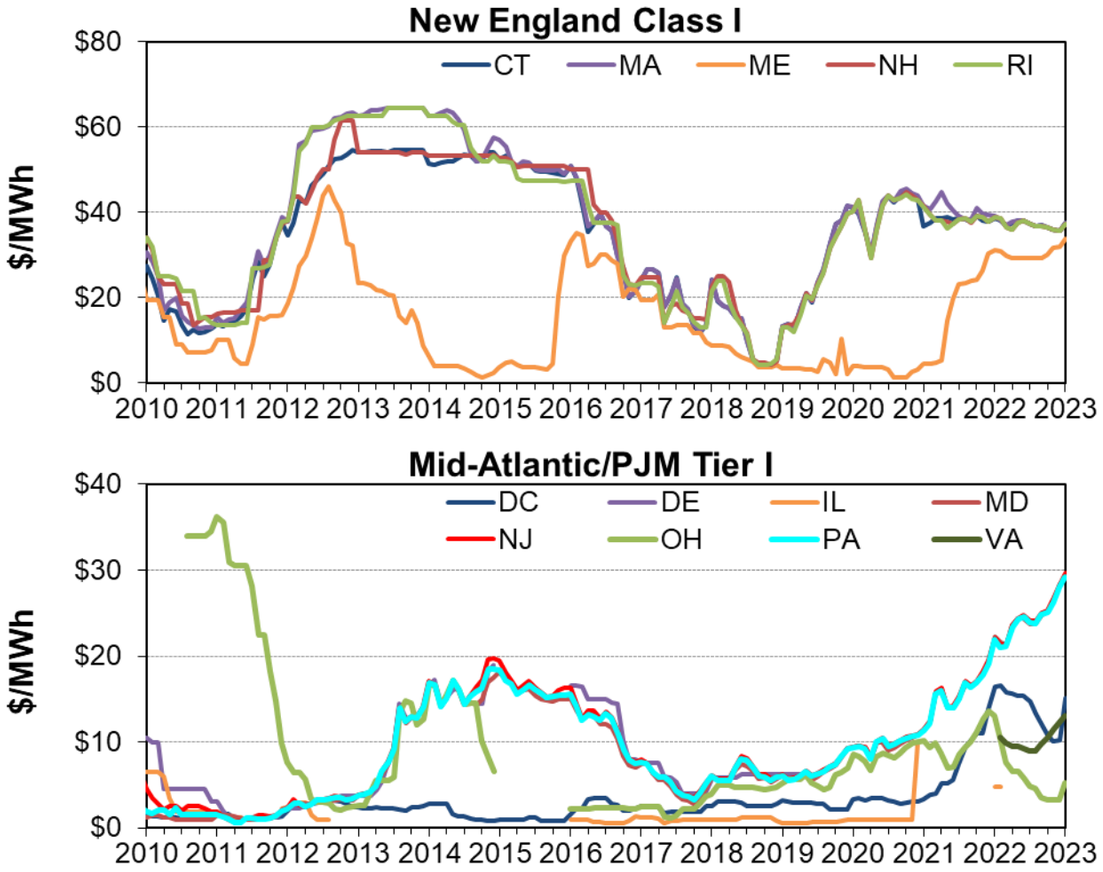
# REC Pricing and RPS Compliance Costs

# REC Pricing Fundamentals

- Spot-market prices a function of current and expected future supply-demand balance and ACP rates
  - Can be volatile and sensitive to changes in eligibility rules
- Regional markets (e.g., in New England and Mid-Atlantic) form based on common pools of eligible REC supplies
  - States in those regions with looser eligibility rules have lower prices
- Solar REC (SREC) pricing is highly state-specific due to *de facto* in-state requirements in most states
- The key driver for RPS compliance costs in states that rely heavily on unbundled RECs

# REC Pricing Trends for Primary Tier RPS Obligations

## Prices in 2022 have remained high in New England, continued rising in PJM




*Source: Marex Spectron. Plotted values are the mid-point of monthly average bid and offer prices for the current or nearest future compliance year traded in each month.*

**New England:**

- Pricing relatively stable over the past few years, hovering just below the current MA/CT ACP
- Maine prices were historically lower, due to broader biomass eligibility, but rising as new RE tier (Class IA) ramps up

**Mid-Atlantic/PJM:**

- Bifurcated market based on geographic eligibility rules (more restrictive rules & higher prices in NJ-PA-MD-DE)
- Prices rising steadily as regional RPS targets grow faster than new supply

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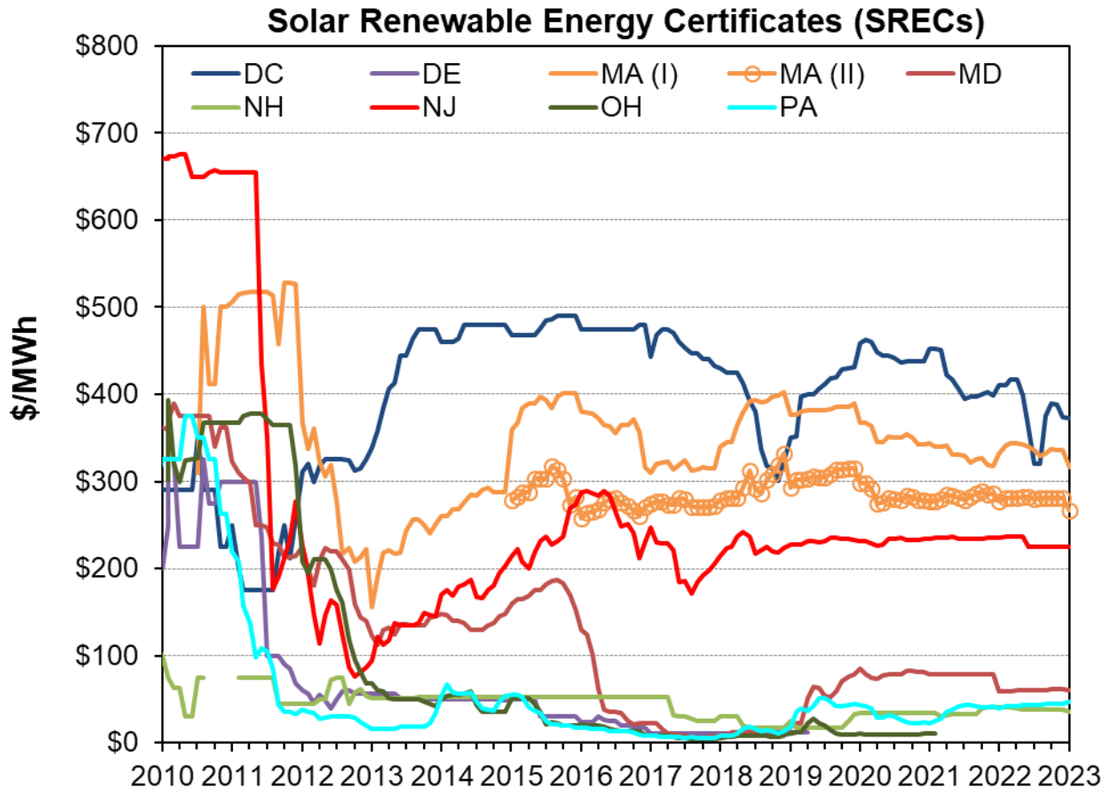
# SREC Pricing Trends for RPS Solar Carve-Outs

## Prices in most states remained flat through 2022




*Source: Marex Spectron. Plotted values are the mid-point of monthly average bid and offer prices for the current or nearest future compliance year traded in each month.*

- DC: Prices gradually falling as supply finally catches up with demand (though still quite high)
- MA: Price movements in legacy carve-out programs bounded by clearinghouse floor and ACP
- NJ: Pricing for legacy carve-out remained stable as state transitioned to successor program
- MD: Prices rose in 2019 after higher targets enacted, but are capped by low ACP ($60/MWh)
- DE and PA heavily oversupplied, in part due to eligibility of out-of-state projects
- NH: Low solar ACP (~$60/MWh)

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# RPS Compliance Costs

## Definition, data sources, and limitations

**RPS Compliance Costs:** Net cost to the load-serving entity (LSE), above and beyond what would have been incurred in the absence of RPS*

*Can be measured in terms of different metrics; we summarize costs primarily in terms of a percentage of average retail electricity bills in each RPS state*

### Retail Choice States

- RPS compliance primarily via unbundled RECs
- We estimate RPS compliance costs based on REC plus ACP expenditures
- Rely on PUC-published data on actual REC costs; otherwise use broker prices
- Account for procurement programs, contracts

### Vertically Integrated States

- RPS compliance primarily via bundled PPAs
- We synthesize available utility and PUC compliance cost estimates, which rely on varying methods
- PUCs/utilities impute compliance costs by comparing gross RPS procurement costs to a counterfactual (e.g., market prices or avoided cost projection)

***Key Limitation:** The underlying data and methods used here represent only a partial accounting of the full suite of costs and benefits associated with RPS policies, and are available for only a limited subset of vertically integrated states

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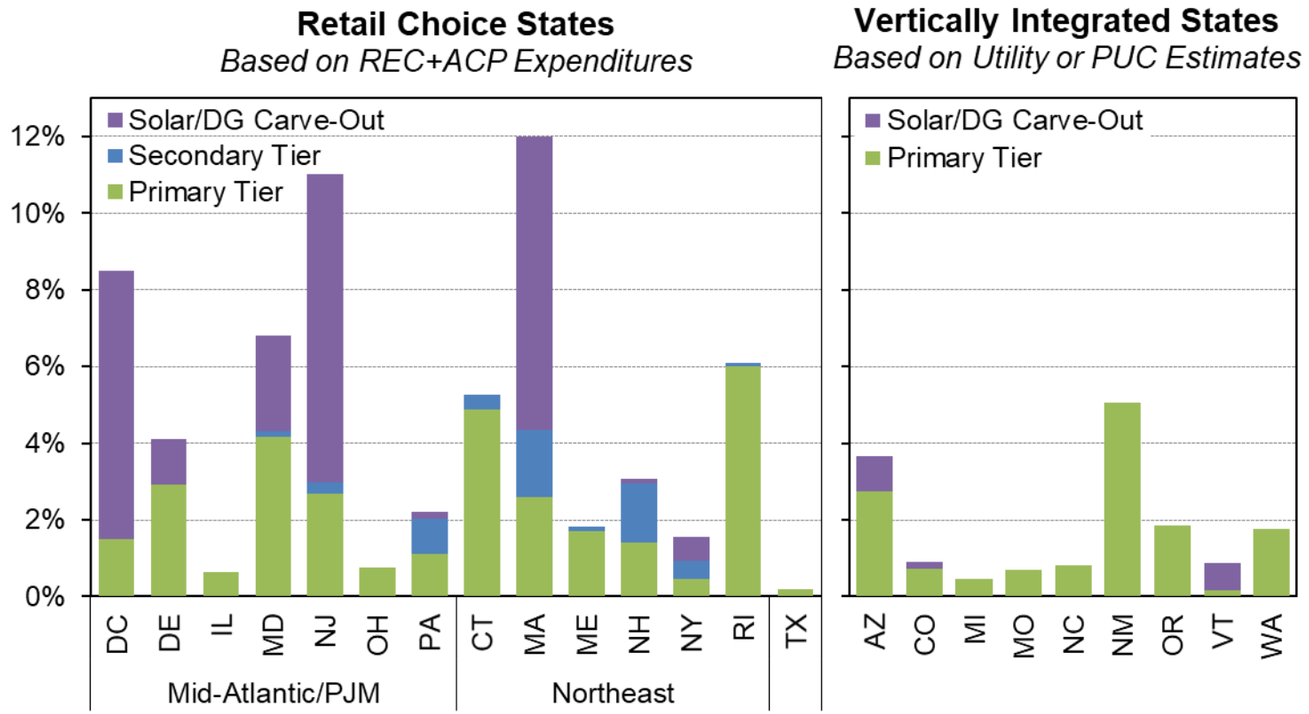
# RPS Compliance Costs

## Average ~3.5% of Customer Electricity Bills but Vary Widely

**RPS Compliance Costs for Most-Recent Available Year**
*(Percentage of Average Retail Electricity Bill)*




*Notes: See earlier slide for general explanation of compliance cost estimates. Data for most states are based on either the 2021 or 2022 compliance year. For MA, the solar carve-out includes SREC I and SREC II, and the Primary Tier includes the residual Class I requirement plus the CES. Solar/DG carve-out costs for IL, MO, NM, and OR are not available, but are embedded in Primary Tier costs.*

- RPS compliance costs vary across states reflecting differences in policy design, procurement structure, and RE economics
- Highest compliance costs are driven by solar carve-outs in states with high SREC prices
- Differences in primary tier costs in retail choice states largely driven by differences in target level and REC pricing
- Compliance costs in vertically integrated states are generally lower than in retail choice states, reflecting greater reliance on bundled PPAs
- Secondary-tier costs are generally a marginal contributor, due to low REC prices, though several states are seeing costs on the order of 1% of customer bills

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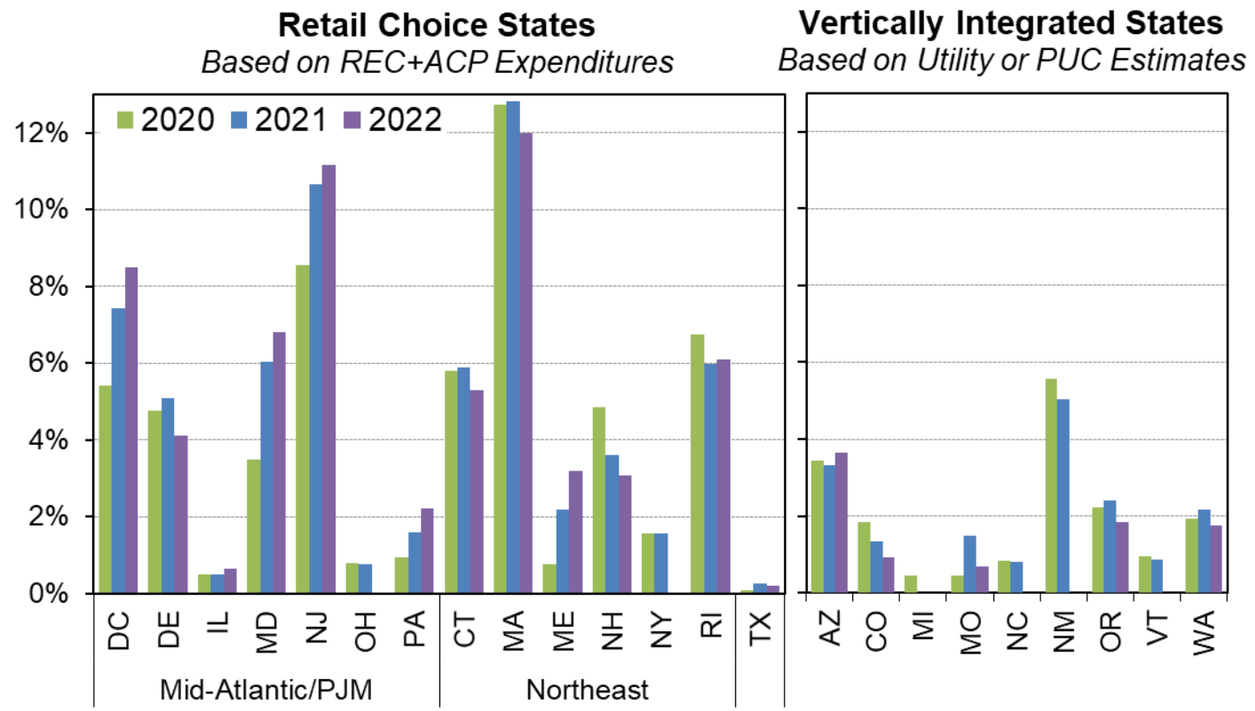
# RPS Compliance Cost Trends (2020-2022)

*Rising in some states while holding steady or declining in others*

**RPS Compliance Costs**
*(Percentage of Average Retail Electricity Bill)*




*Notes: See earlier slide for general explanation of compliance cost estimates. For NY, costs are based on NYSERDA expenditures for CES and NY-Sun. For other northeastern states, costs also account for long-term PPAs, where REC costs are imputed based on comparison to wholesale energy and capacity market prices, Compliance cost data are unavailable for states not shown.*

- Time trend driven by underlying trajectory for RPS targets and REC prices and/or PPA prices
- Greater reliance on long-term contracts in vertically integrated (and some retail choice) states mutes YoY changes in compliance costs
- Recent inflationary increases in retail electricity prices/bills (the denominator of the metric shown) has dampened RPS compliance costs on a relative basis

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# Outlook

# The Future Role & Impact of State RPS and CES Programs Will Depend On…

- Whether additional states decide to increase and extend RPS targets and/or adopt broader CES
- What kinds of implementation and enforcement mechanisms are ultimately established to meet longer-term CES targets
- Efficacy of IRA, BIL, and other federal policy in stimulating new clean electricity supplies and transmission
- Complementary efforts to address RE integration, permitting, transmission, and interconnection issues
- Other ongoing RPS policy refinements (e.g., long-term contracting programs, ACP rates, REC banking rules, eligibility rules, etc.)
- RE cost and REC price trajectories, and the attendant impacts on RPS compliance costs

## Contacts

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