Implications of Recent Federal Legislation for State Clean Electricity Standards

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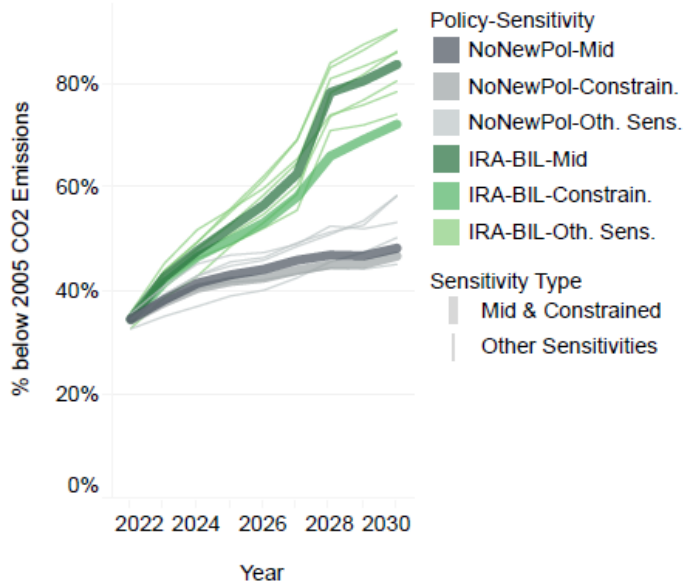
The Complementary Role of State RPS and CES Policies

- IRA and BIL represent an unprecedented level of federal policy support for clean electricity deployment
- State RPS and CES policies can continue to play a key complementary role
  - Backstop source of demand given persistent non-economic barriers
  - Forum for addressing barriers to achieving high levels of RE deployment
  - Spur further deployment required for full power sector decarbonization

Projected Power-Sector CO2 Emission Reductions under IRA-BIL Relative to 2005 Baseline



Source: Steinburg et al. (2023)

State Implications of IRA & BIL

- IRA and BIL may entail a wide range of roles and actions for states; e.g.:
  - Implementing federally funded programs
  - Developing programs to support local workforce & manufacturing
  - Coordinating across state & regional entities
  - New demand-side programs and rate designs
- As a subset of those broader implications, states with aggressive RPS/CES policies may need to consider specific issues and interactions with IRA & BIL
- Goal of this white paper is to identify those specific implications and potential actions states may consider in response

Opportunities for State RPS and CES Policies Prompted by IRA/BIL

IRA & BIL provide an impetus and opportunity for states with existing RPS and CES policies to:

1. Elevate their ambitions
2. Sync up provisions
3. Update planning and procurement
4. Ensure that federal incentives reduce CES/RPS rate impacts
5. Leverage federal opportunities to solve 100% challenges

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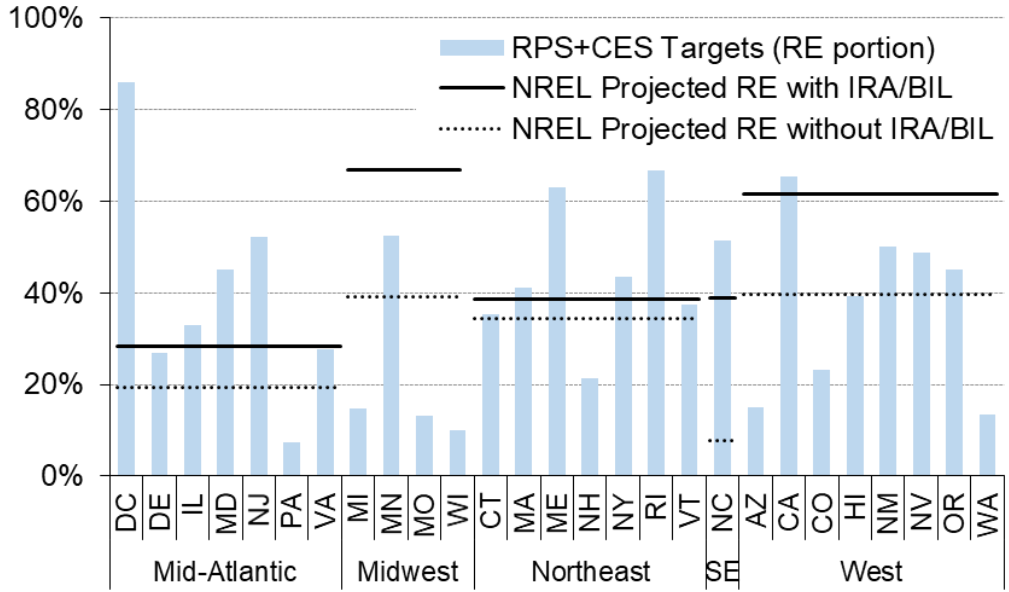
Elevating States' Ambitions

- IRA and BIL enhance the economics of clean electricity resources
- Provides rationale for adopting more ambitious RPS/CES policies
- Strategies may include:
  A. Adopting higher targets, particularly over the next decade
  B. Accelerating longer term targets
  C. Creating clear implementation & enforcement of CES targets
  D. Expanding RPS and CES applicability

Elevating States' Ambitions: *Higher targets*

- In several regions (Midwest, West), projected 2030 non-hydro RE under IRA & BIL is above individual state RPS and CES targets
- And in all regions, IRA and BIL increase economic RE deployment, reducing the effective potency of state RPS/CES targets

Non-Hydro Renewables in 2030
(% of total generation)



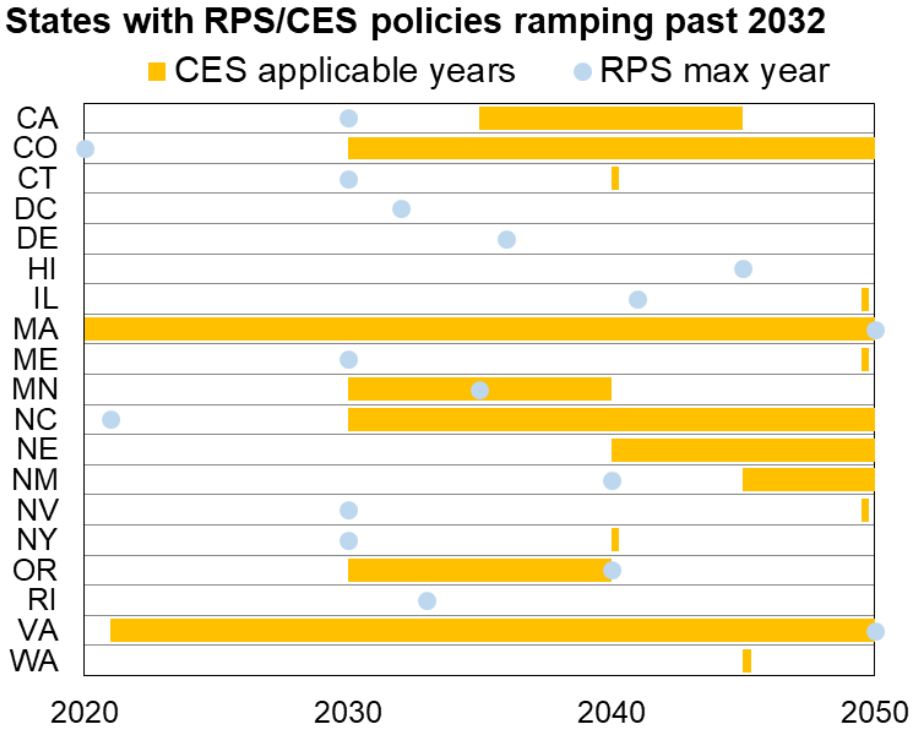
NREL projections based on Steinburg et al. (2023) and represent Mid-Case

Elevating States' Ambitions: *Accelerated targets*

Many CES policies

- Commence after 2030
- Lack any defined ramp up to the final target
- Don't reach 100% until 2050

In all of these situations, states may wish to consider front-loading their targets to coincide with IRA tax credit timing



Elevating States' Ambitions: *Creating binding CES provisions*

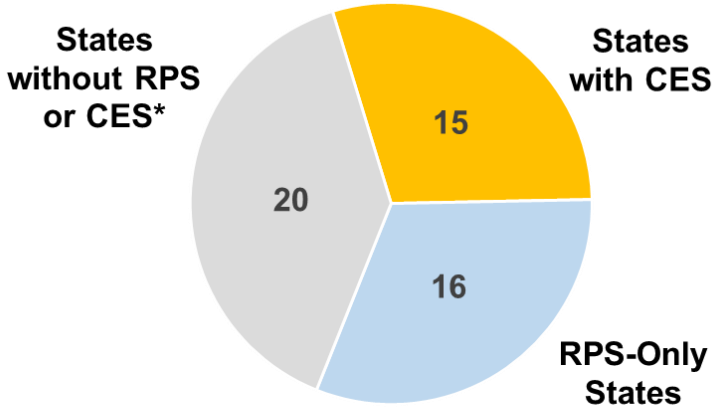
- CES targets often lack any defined enforcement mechanism
- Symptomatic of long-term, distant targets
- In many states, enforcement may be accomplished *provisionally* through the utility IRP process
- But in states without IRP, there may not currently be any mechanism to enforce CES achievement, beyond the RPS portion

CES Enforcement Mechanism
(beyond RPS compliance)

CA	Utility IRP
CO	Utility IRP
CT	None
IL	None
MA	CES compliance filings
ME	None
MN	Utility IRP
NC	Utility IRP
NE	Utility IRP
NM	Utility IRP
NV	Utility IRP
NY	CES compliance report
OR	Utility IRP
VA	Utility IRP
WA	Utility IRP

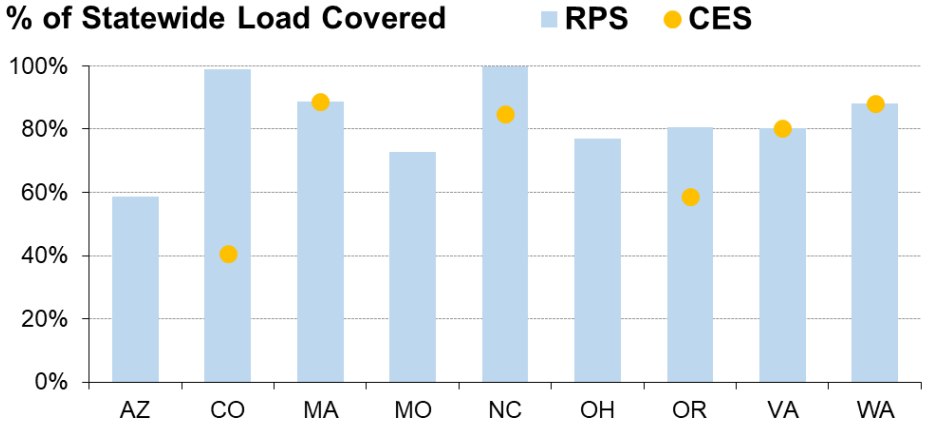
Elevating States' Ambitions: *Expanded CES and RPS policies*

Expanding CES or RPS policies to additional states



** Includes states with goals established only through executive order or with economy-wide goals but no electric sector targets*

Expanding existing CES and RPS applicability to broader set of LSEs



States with existing CES or RPS covering <90% of load

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Syncing Up Provisions

- States may wish to evaluate options for syncing up provisions between their RPS/CES programs and IRA/BIL in order to:
  - amplify impact of federal programs or stretch state dollars further
  - reduce market confusion
  - streamline administration

- Same principle applies more generally to state clean energy programs

Syncing Up Provisions: *Technology eligibility rules*

IRA incentivizes new forms of clean/zero-carbon generation, and states will need to grapple with eligibility rules surrounding these technologies, for example:

- *Hydrogen*
- *Carbon capture*
- *Direct air capture and other offsets*

Across all of these techs, states may wish to rely, where possible, on definitions and standards established by the IRS for the relevant tax credit (45Q and 45V)

Syncing Up Provisions: *Carve-outs, tiers, and multipliers*

Many RPS programs include carve-outs, tiers, credit multipliers, and special procurement programs for particular types of technologies or applications, and may wish to re-evaluate and/or refine those mechanisms given new federal incentives

- *Incentives to support existing nuclear*
- *Solar carve-outs*
- *Low-income definitions*

Syncing Up Provisions: *Incentives and ACPs*

Given the dramatic overhaul in the federal incentive landscape, and the relative long-term availability of those incentives, states may wish to re-assess the level of financial support provided through their RPS/CES and associated procurement programs:

- *ACP rates*: Are current ACPs aligned with the long-term revenue required for development of new clean energy resources?
- *Low income provisions and procurement programs*: States may wish to consider graduated or differentiated levels of state support depending on the level of bonus credit received

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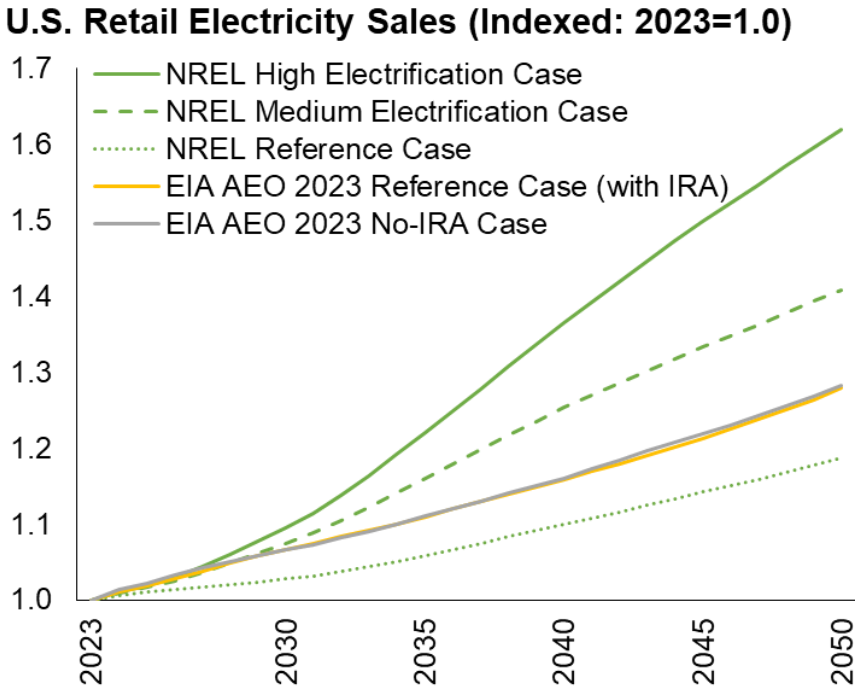
Changing Market Conditions

- IRA & BIL may induce and accelerate changes in the broader market environment surrounding state RPS/CES policies, including:
  - Increased load growth
  - Shifting relative economics of clean energy resources
  - Potentially amplified grid integration challenges
  - But also new opportunities to manage those challenges
- These changes, in turn, may impact RPS/CES planning, procurement, and program design in varied ways

Changing Market Conditions: *Load forecasts*

- EIA projects modest impacts of IRA on load growth
- But IRA incentives could spur more transformational changes
- Load growth from NREL's *Electrifications Futures Study* translates to roughly 20-30% more clean energy required to reach 100% than with limited electrification, over the long-term



Source: Mai et al. (2018)

Changing Market Conditions: *Resource economics*

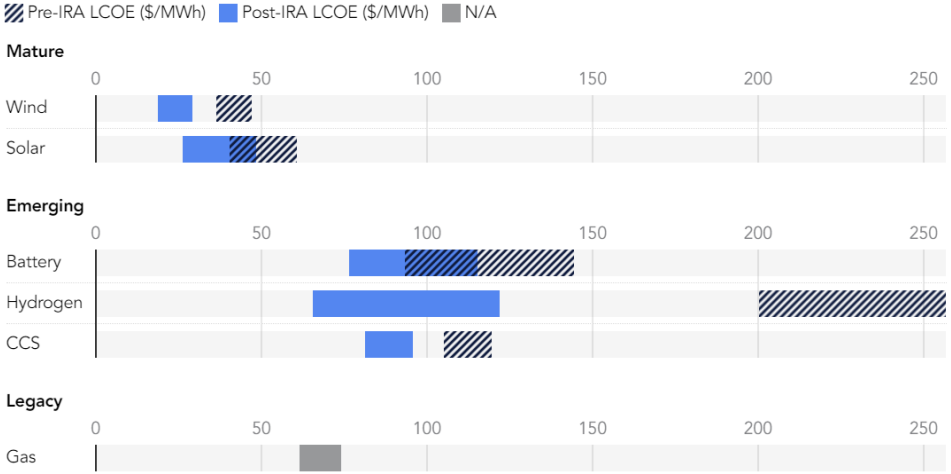
Wind and solar have gotten even cheaper

Other emerging clean electricity resources may become economically viable

Potential state implications

- Ensure broad and robust assessment of resource options in future planning and procurement
- Consider rebidding recently signed contracts

Impact of IRA on Levelized Cost of Energy (LCOE) in 2030



Source: ICF
https://www.icf.com/insights/energy/clean-energy-economic-benefits-us-climate-law

Changing Market Conditions: *Grid integration challenges*

- IRA and BIL will accelerate RE growth across the board, which may amplify grid integration challenges, esp. in states with aggressive RPS/CES targets
- IRA and BIL support for new transmission expansion may help to alleviate those pressures, as will tax credits for grid-scale storage
- IRA and BIL incentives for flexible demand-side resources could provide another key resource base for managing renewable grid integration issues
- ***Requires that states take a pro-active role in developing tariffs and programs that incentivize the use of those technologies for renewables grid integration***

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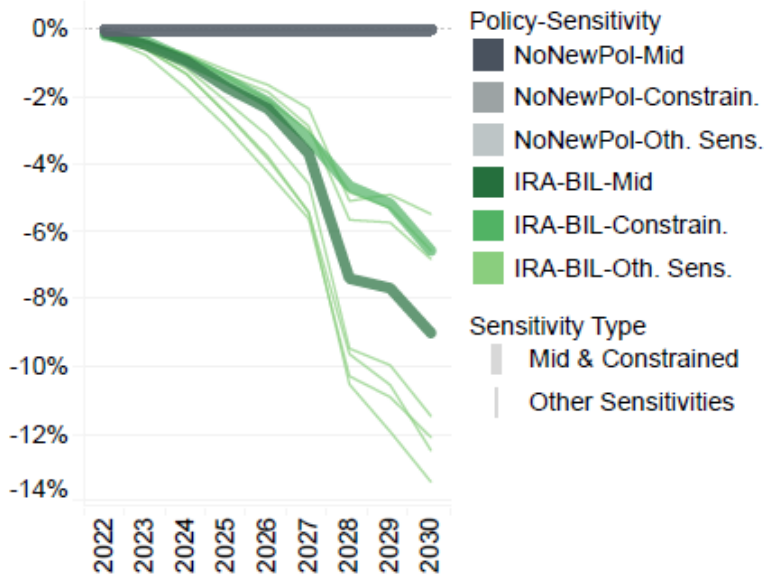
Impact of IRA and BIL on RPS/CES Compliance Costs and Rate Impacts

- IRA incentives will reduce the power-system costs, including those associated with state CES/RPS targets
- Whether and how those power-system cost reductions flow through to end use customers depends on RPS rules and procurement models

Percent Change in Annualized Bulk Power System Costs from the No-IRA/BIL Mid-Case



Source: Steinburg et al. (2023)

Leveraging IRA/BIL for RPS/CES Compliance Cost Savings

States may consider various strategies for reducing the costs customers bear in meeting aggressive RPS/CES targets

- *Maximize tax credit bonus opportunities*: For example by streamlining permitting and interconnection in energy communities, low-income communities, and tribal areas; support LMI multi-family and community solar
- *Leverage other federal incentives for RPS/CES qualifying resources*: E.g., the GHG Reduction Fund and other programs that buy-down the cost of CES/RPS-qualifying resources, particularly those for customer-owned resources
- *Consider greater reliance on competitive procurement via long-term contracts*, in order to pass tax credits and other federal incentives on to consumers
- As mentioned previously: reducing ACPs and rebidding contracts

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100% CES Challenges

- States with 100% CESs face unique challenges, in particular, as they expand past 80% clean energy
- Key challenges include:
  - Siting and Permitting Delays
  - Expanding Transmission
  - Need for Increased Storage (Long-Duration)
  - Supply Chain Constraints
  - Ensuring an Equitable Transition
- In this section we summarize these challenges, examples of how states have addressed them on their own, where possible, and the state role in accessing federal provisions that address these challenges.

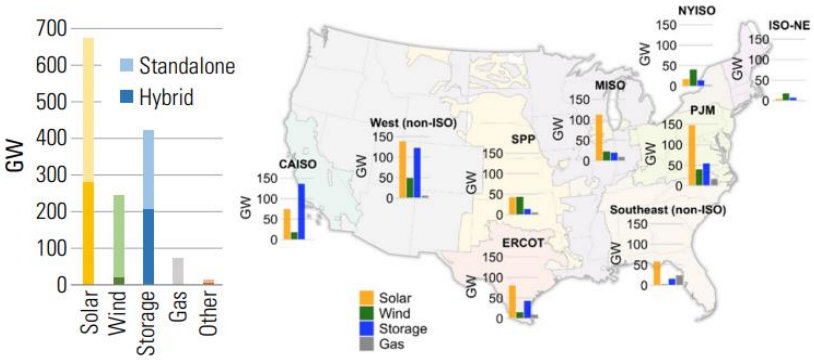
Challenge 1: Siting & Permitting Delays

- States have authority in some siting and permitting processes[1]
  - State-level: AK, CT, KS, LA, ME, MD, NJ, OR, VT, & WI: Sole authority can have delays and backlash
  - Hybrid: 19 states with state oversight for larger projects. Needs guidance from state leaders to meet targets but can add to bureaucracy.
- Federal provisions:
  - Transmission Siting and Economic Development Grants Program: Grants to siting authorities for analysis and examination of alternative siting corridors and other measures to reduce time in siting and permitting.
- States have begun addressing siting and permitting challenges. For example:
  - Washington's HB 1812: Separates energy siting commission from PUC; adds additional requirements
  - California's AB 205: Changes to clean energy permitting
  - New York's A9508-B: Created Office of Renewable Energy Siting (ORES)
  - States can also be direct recipients of the Transmission Siting and Economic Development Grants Program

Challenge 2: Expanding Transmission

- Transmission expansion is needed to unlock full IRA benefits
  - Recent expansion rate ~ 1%/yr; over 80% of emission reductions from IRA by 2030 are lost[2];
  - Need to more than double to reach 2030 goals
- Federal provisions (BIL & IRA)
  - Transmission Facilitation Program : Construction of transmission lines
  - Transmission Facility Financing: Construction/modification of transmission facilities designated to be in national interest
- States' role
  - Coordination among key stakeholders: Regional planning organizations, grid operators, utilities, states, non-governmental organizations, and the private sector

Figure 1. Power Plants Seeking Transmission Connection by Type (left) and Mapped to Region (right)



Notes: (1) Hybrid plants are those paired with one or more other type of generation or storage. (2) Data for Alaska and Hawaii were not collected. Represents queues as of the end of 2021.

Rand et al. 2022. "Queued Up: Characteristics of Power Plants Seeking Transmission Interconnection As of the End of 2021." Berkeley Lab.

Challenge 3: Need for Increased Storage (Long-Duration)

- Storage capacity will need to increase dramatically
  - Current: Over 30 GWh of battery technologies across the globe; 160 GW of long-duration energy storage provided by hydropower (Pumped storage)
  - Need to grow to ~**2,500 GWh** in under a decade to reach 2050 net-zero emissions goal
- Federal provisions (BIL & IRA)
  - Long Duration Energy storage for Everyone, Everywhere Initiative: Lowering costs and increasing the duration of energy storage resource.
  - Clean Energy Financing: Critical minerals processing
  - Energy Infrastructure Reinvestment Financing: For retooling, repurposing, or replacing energy infrastructure
- States' role
  - Clean Energy Financing when combined with financial support from state energy financing institution (SEFI) are exempt from innovation requirements

Challenge 4: Supply Chain

- Supply chain constraints exist already
  - Pandemic-related disruptions have increased cost of materials and energy
  - As strong as the weakest link
- Federal provisions: IRA
  - Production Tax Credits
- States' role
  - Investing in domestic manufacturing
  - Help build resilient supply chains

Challenge 5: Ensuring an Equitable Transition

- Energy Justice
  - Disproportionate impacts of clean energy plans[3] : Recognition, distributive and procedural justice
- Federal provisions (IRA)
  - Several categories: Access to clean energy, EVs, Financing GHG reductions, environmental and climate justice block grants, etc.
- States' role
  - States have addressed equitable transitions, for example: Maine identifies higher energy burden for low-income households and North Carolina- addresses the barriers to adoption of clean energy by LMI households.
  - States can combine IRA provisions for both direct and indirect benefits to use toward achieving equity

Equitable Policy Design	Highlights and Priorities
1. Ensure equitable access to economic benefits and opportunity by empowering communities.	Support participatory processes, direct funding, removal of barriers to autonomy and independence and greater access to processes and decisions.
2. Ensure universal and equitable access to affordable remote service options.	Efforts must be expanded to develop affordable, quality broadband, including in rural and under-resourced areas.
3. Center program design on reduction of energy cost burdens.	Reduce home energy and transportation costs for highly impacted populations by focusing on cost burden as a metric in planning.
4. Incorporate health disparity metrics into energy planning.	Improve health and safety, safeguard against health and safety risks and improve access to the physical, service and social conditions linked to health and well-being by operationalizing a health disparity metric in energy planning.[23]
5. Increase resilience and energy sovereignty for Tribes and energy independence for vulnerable communities.	Support the efforts of communities especially prone to instability from climate change and other natural disasters, such as communities located in the Cascadia Subduction Zone and wildfire prone areas and communities impacted by fossil fuels.[24]
6. Address procedural inequities in program design and prioritize equitable development.	Perhaps the most significant combined equity-and-energy gains can be made through planning. The state has an opportunity to help guide clean and equitable development of programs and funding that support development.
7. Address nexus issues of affordable housing, livable communities and displacement in energy policy.	Work with housing policy experts to address unhoused and displaced communities through energy policy design, especially focusing on cost burdens.

Source: Washington State Department of Commerce

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- How is your state refining its RPS or CES in response to new federal policy?
- Does our framework capture activities happening in your state?
- What new technologies are under consideration in your state? E.g. green hydrogen, long-duration storage.
- What challenges to 100% CES is your state best prepared to address currently? How will BIL and IRA help?
- What other support from DOE or the Federal government would be helpful as your state moves forward with its 100% CES?