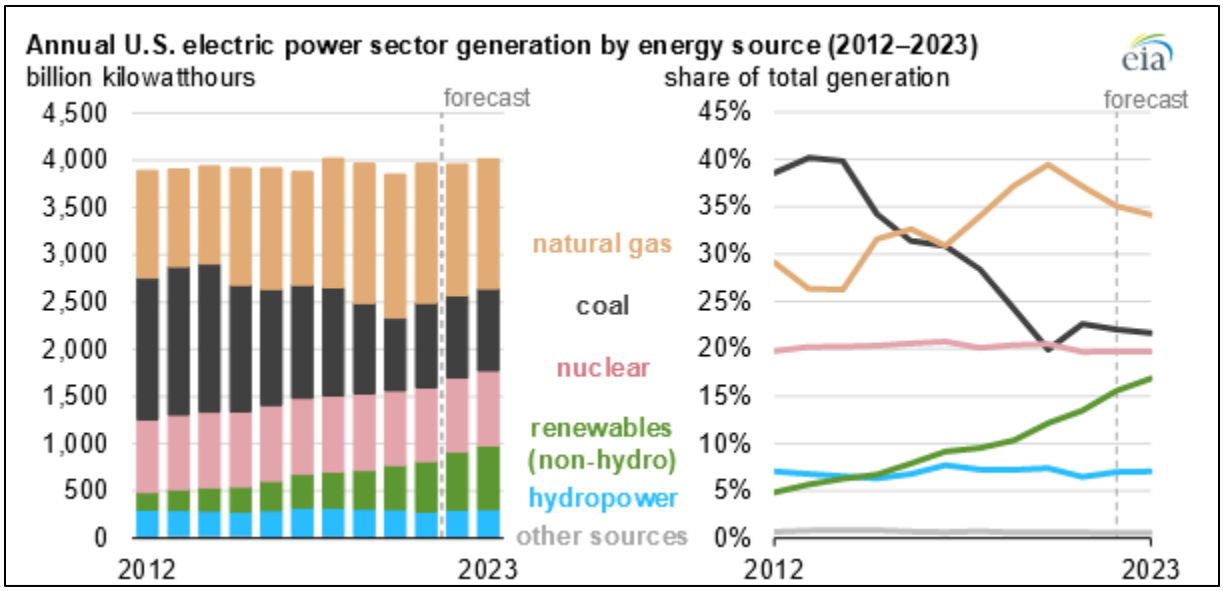
Mainstreaming Renewables

Description:

The cost declines and subsequent expansion of renewable energy has been one of the most consequential shifts in U.S. electricity generation in the last decade. The U.S. Energy Information Administration (EIA) predicts that the share of U.S. generation from utility-scale solar and wind will increase from 16% in 2023 to 18% in 2024. According to the EIA, solar and wind resources have expanded rapidly: "The amount of solar power generating capacity operated by the U.S. electric power sector at the end of 2021 is 20 times more than it was at the end of 2011, and U.S. wind power capacity is more than twice what it was 10 years ago" (U.S. EIA, Today in Energy, January 18, 2022). Meanwhile, due in large part to pressure from cleaner resources, coal-fired generation has declined rapidly, down to about 20% of total generation in 2022. As of 2021, there were more than 450,000 jobs in the wind and solar industry, compared to approximately 70,000 coal jobs.



Source: EIA

In 2022, the U.S. passed the Inflation Reduction Act (IRA), which included subsidies for clean energy technologies that make them cost-competitive with incumbent coal and even some gas generation. These subsidies last through 2032, and as a result wind, solar, and battery deployment are forecasted to grow dramatically over the next decade. With increased deployment, utilities are learning more about how to integrate renewables effectively and investors are becoming more comfortable with the technologies. For these reasons, it is in the interest of policymakers to ensure that their states are well positioned to benefit from the transition to clean and sustainable energy resources.

Discussion:

To reduce barriers to the adoption of renewable energy technologies, policymakers might consider several options.

Customer-Oriented Policies

1. **Interconnection** – Interconnection is the process of plugging energy systems into the grid. Interconnection standards apply to both customer-sited systems like rooftop solar and utility-scale power plants; however,

interconnecting customer-owned systems is the area most in need of policymaker attention. Today, most utilities still require customers who want to generate their own power and sell it back to the grid to undergo an opaque, bespoke interconnection request process that can lead to unnecessary delays, expenses, and often rejection of the project. States like California and Hawaii have model policies that their utilities had to adopt to achieve nation-leading levels of rooftop solar penetration. States might consider adopting the Interstate Renewable Energy Council (IREC)'s model interconnection procedures. In addition, policies to require or incentivize reasonable interconnection timelines can save developers and customers money. This will require that utilities track and share data on their own performance as it relates to these timelines.

Outdated interconnection policies can also create barriers to grid integration of energy storage. IREC's BATRIES (Building a Technically Reliable Interconnection Evolution for Storage) initiative aims to address this through education and training for state policymakers, utility staff, and other interested parties. The U.S. Department of Energy (DOE) launched a new interconnection initiative in October 2022, the Interconnection Innovation e-Xchange (i2X), which is designed to help clean energy resources more easily connect to the grid. The i2X program will boost engagement, data gathering and analysis, planning, and technical assistance in order to encourage reliability, security, and resiliency in the grid.

2. **Net Energy Metering (NEM)** – NEM has been one of the most important policy tools for supporting distributed generation (DG), as it incentivizes electricity generation near the user. NEM allows customers to produce electricity onsite and sell excess generation to the utility at a set credit per kilowatt hour (kWh), which creates an incentive for private investment in DG like rooftop solar panels. With NEM, power customers are billed only for the net power consumed over their generation while they are credited for excess electricity delivered to the grid. NEM arrangements not only allow the grid to operate like a battery for the customer, but also contribute clean generation to the electricity mix. A key provision of NEM is that the customer is not paid for power but credited against their use of electricity. This is important for tax purposes, as revenue to a customer is taxable, while crediting for power is not. NEM policies can apply only to generation that is produced on the customer-side of a single meter (for example, a solar panel); however, for customers like agricultural facilities, there may be multiple meters serving multiple loads and systems generating electricity at multiple sites. For these customers, aggregate net metering policies allow credit to be applied across multiple meters. It is important as NEM participation increases that regulators pay attention to how rates are designed; many have argued that NEM creates a cost shift to customers that don't have rooftop solar, though whether this is true depends on the specific rates and policies of each state.

3. **Streamlined Permitting** – Installing distributed renewable energy systems often requires interconnection to the grid and professional engineering and installation of electrical components. As a result, there are important permitting steps that need to be followed to ensure safety. For DG, these "soft costs," including permitting expenses, can drive up project costs for consumers. As the industry has matured, some standard processes have become established. These enable a streamlined permitting process, which can create cost and time savings for consumers. States might consider establishing either statewide standards for streamlined permitting processes, or resources to support local governments that voluntarily implement a streamlined program. States and communities interested in developing streamlined processes should consult utilities and other interested parties to ensure that appropriate safety standards will continue to be met. State financial incentives, including tax credits or loans, can be linked to designated streamlined permitting jurisdictions.

   From 2020 to 2021, the National Renewable Energy Laboratory (NREL) piloted their free, web-based, instant permitting software, SolarAPP+ (Solar Automated Permit Processing), for local governments. This software automates a permitting process that otherwise can be administratively burdensome for local governments, delaying residential solar development. The pilot study found that projects using SolarAPP+ were installed and inspected an average of 12 business days faster than those not using the process. SolarAPP+ is fully active in several cities in California and Arizona, and the program continues to be piloted in other cities with more jurisdictions planning to adopt the program in the future. NREL also offers the SolarTRACE data viewer, which looks at timelines for residential solar permitting, inspection, and interconnection.

4. **Shared Renewables** – Due to building and property attributes, building ownership issues, income level and/or low credit ratings, many customers are unable to install renewable energy technologies where they live or work. Allowing shared, or community, renewable energy projects can help address this. Shared projects have multiple owners, or subscribers, who pay for a portion of the project, or the generation provided by the system. Shared renewable programs rely on "virtual net metering" where shared systems are located off-site from the customer, but the customer receives credits from the shared system as if it were on site. Virtual net metering is different from a power purchase agreement (PPA), which pays the customer for the power they produce. Because virtual net metering is treated as a credit on the customer's bill, the customer can avoid the tax implications of being paid directly for their power. Shared renewable programs like community solar create a two-fold benefit: they create community ownership of an asset and take advantage of the economies of scale of solar power.

5. **Supportive Policies for LMI Consumers** – Low credit ratings can prevent participation in renewable energy markets, and in turn can affect low- and moderate-income (LMI) households' adoption of renewable energy solutions. Supportive policies for shared renewables can be designed to enable participation by LMI households, which can increase adoption of renewable technologies and reduce energy burden. LMI inclusion can be supported either through a carve-out — a percentage mandate for the overall annual contracted capacity of a shared system, or by offering a higher rate of payment for the portion of shared capacity attributed to LMI customers. In 2021, New York launched an Inclusive Community Solar Adder (ICSA) program targeted toward community DG solar projects that serve LMI households, affordable housing, and other facilities that serve disadvantaged communities, with a goal of adding 2,000 megawatts (MW) of new community DG. In 2022, the New York PSC ordered that the ICSA program be expanded due to its success and newly available federal funding. States that have a shared renewable program may want to coordinate their program with implementation of the federal Weatherization Assistance Program (WAP) to provide recipients of assistance access to a shared renewable system.

   Further, there are several additional policies states can adopt to support LMI customers.

   Adapt Existing Energy Assistance Programs – Programs such as the Low-Income Home Energy Assistance Program (LIHEAP) and WAP provide assistance for paying utility bills and reducing household energy costs. Including distributed energy resources as eligible for funding under these programs can reduce energy costs and increase energy security for those LMI families who are able to benefit from WAP and LIHEAP. Colorado, for example, enables households who receive government assistance, such as the Supplemental Nutrition Assistance Program (SNAP), to be automatically eligible for WAP and includes rooftop solar in their WAP program. To include solar in WAP, a state must show that the investment would be cost-effective—achieving a Savings to Investment Ratio (SIR) of 1.0 or more. For guidance on the state approval process see WAP Memorandum 024 (2017), the Solar Template for Incorporating Solar Photovoltaics into WAP, and the Preliminary Assessment Guide for Integrating Renewable Energy into Weatherization (2019).

   Fund DG for Community Organizations – Organizations or groups that provide support services for LMI communities can be provided funding to install solar or other distributed energy resources. Sites such as homeless shelters, food banks, clinics, and community centers often have enough rooftop area for solar installations. After installation, these resources can reduce an organization's utility bills, freeing up funds for other activities that support the community. The IRA currently allows non-profits and other tax exempt entities to take advantage of the Investment Tax Credit (ITC) through a direct pay option. The ITC is set at 30% of project cost with an additional 20% credit available for projects built to benefit affordable housing projects or LMI households. States could develop a state-wide tax credit to couple with the ITC, specifically for community organizations.

   On-Bill Financing/Pay as You Save (PAYS) – On-bill Financing and Repayment programs enable consumers to invest in energy upgrades with no upfront payment. The utility or a third party will pay the initial costs to install the upgrade with the cost of that upgrade recovered through the utility bill. Because repayment includes consideration of the cost savings resulting from the energy upgrade, customers see monetary benefits almost immediately. Once equipment costs are recovered, the equipment belongs to the

customer. State policies that reduce lending risk by creating a loan loss reserve and/or a credit enhancement fund can encourage lending to customers that might otherwise not qualify for a loan and can keep interest rates low.

6. **Corporate Procurement** – Many Fortune 100 and 500 companies have established either climate goals or commitments to purchase renewable energy and are signing large renewable energy contracts with utilities and other suppliers to meet these targets. Corporate procurement led to the addition of over 11 GW of clean energy in 2021, and accounts for 37% of clean energy added to the grid since 2014. Nearly 19 GW of commercial solar has been installed, with half of that being developed since 2020. The Corporate Renewable Energy Buyers' Principles, a list of principles developed by 70 corporate signatories, provides a framework for what multinational companies need when buying renewable energy from the grid. States can require the inclusion of corporate renewable purchase commitments in integrated resource or other long-term plans that utilities submit to regulators to plan for resource needs over multiple decades. By integrating these renewable purchase commitments into the planning process, regulators can avoid over-building resources and stranding generation assets. States can also direct utility regulators to allow customers above a certain size to directly procure clean energy projects, removing the electric utility as a barrier to customer-led clean energy procurement.

Utility-Oriented Policies

1. **Accelerating and Amending Renewable Portfolio Standards** – One of the oldest and most successful advanced energy policy tools, renewable portfolio standards (RPSs), usually set a target for a specific percentage of renewable electric generation to be achieved by a specific date (for example, 50% renewable energy by 2030). The RPS was designed to build the market for renewable energy, which, at the time when most states were adopting these standards, was more expensive than conventional electricity sources. Today, states and utilities are in a much different situation for most land-based, utility-scale renewable energy resources (primarily wind and solar). These technologies are increasingly economical on a direct kilowatt hour (kWh) cost and are being aggressively pursued by most utilities for this reason. In general, RPSs require utilities to procure the lowest-cost qualifying resources and cap expenses under the program, which has helped deployment of more mature wind and solar technologies. However, this does not automatically promote resource diversity necessary to enhance system resilience and invest in emerging but promising clean energy technologies of the future like offshore wind, storage, and others.

   18 states, D.C., and Puerto Rico have set legislative targets of 100% carbon-free electricity, with several more states committing to the same via executive order. These policies function similarly to RPSs, but are technology-neutral, requiring only that electricity sector emissions reach zero by a certain date.[1] These policies are crucial to avoid investments in new fossil infrastructure that may be incompatible with the long-term policy vision for the state. Even within clean energy standards, it is possible to include an RPS, or specific technology carve-outs to achieve other policy objectives like job growth, equity, and resource diversity. The technologies that are still delivering system, economic, and environmental benefits that are not reflected in their higher kWh cost include DG and offshore renewable systems. Accordingly, state policy is evolving to incorporate these technologies while utility system requirements are focusing increasingly on greenhouse gas (GHG) emissions reductions.

   States can update existing RPSs to increase targets and/or accelerate target dates to continue to spur the development of renewable resources and save ratepayers money. States might add one or more carve-outs to incentivize the development of DG and offshore resources. Embedding an RPS within a broader clean electricity or emissions standard can allow technological flexibility. For example, many 100% clean energy standards lack specific interim goals, leaving a great deal of flexibility to monopoly utilities. Because of the relative affordability of wind, solar, and storage, states can confidently accelerate near-term procurement of these resources by, for example, requiring utilities to meet an 80 percent clean electricity standard by 2030-2035, depending on the

[1] The policies focused on GHGs are considered "emissions standards" and focus on the outputs of the electric system rather than the inputs. This creates a greater pool for economic competition than the standard utility-scale wind and solar market – and includes such technologies as energy efficiency, demand reduction, and energy storage.

current clean energy mix. States can also establish more regular compliance periods that ensure utilities are on track from the beginning.

2. **Transmission Development Policies** – Renewable energy resources rely heavily on robust transmission networks that connect generation to cities and factories, and also to help improve the resilience of the electricity system. However, some states sit within Regional Transmission Organizations (RTOs) that dictate regional transmission policy, and are subject to regulation by the Federal Energy Regulatory Commission (the Midwest, Mid-Atlantic, and Northeast), while others manage their transmission systems utility-by-utility (the West and Southeast). For states within RTOs, state governments can fund PUC and energy office engagement in RTO processes, and generally support transmission build-out through these channels that supports cost-saving clean electricity projects. In non-RTO states or single-state RTOs like New York and California, one successful model has been the creation of a state transmission authority, which handles state transmission planning in cooperation with incumbent utilities. New Mexico's Renewable Energy Transmission Authority provides an instructive example – it informs transmission investments and the renewable resource choices available to New Mexico's utilities to push forward key transmission projects that achieve the state's clean energy goals cost-effectively.

3. **Competitive Procurement Requirements** – In most states, consumers have little choice about where their electricity comes from. As utilities see that renewable energy is now the cheapest electricity source, they have to decide how much they should buy and when. States can overcome reluctance to renewable energy by requiring utility procurement decisions to undergo a competitive process, revealing the lowest cost alternatives to the utility's existing contracts and fleet of power plants. With assistance from the IRA, a faster clean energy transition that provides lower costs for consumers is possible. Without injecting competition, utilities have little incentive to reveal to regulators and others potential cheaper options. Several utilities, including those in Georgia and California, must undergo competitive procurement, but a best practice is "all-source procurement," a process that allows all resources to compete to fill a system need identified by the utility.

   States can start by requiring PUCs to begin a participative planning process that links planning outcomes to procurement decisions and ensures that state policy objectives are included in system planning. For some states, this might mean setting up a planning process. For others it might mean requiring utility commission approval of utility plans or requiring consideration of affected party participation or comments. Or it might involve revisiting planning and procurement rules and asking whether the current process results in policy-aligned procurement.

Addressing the Renewable Energy Workforce Gap

The energy sector added nearly 3.1 million net-zero aligned jobs in 2021, comprising roughly 41% of total energy jobs. Though renewable energy capacity continues to expand, a lack of qualified candidates across occupations and education levels constrains faster growth. To help meet industry demands for an expanding sector, states can implement various policies to educate and train qualified candidates, simultaneously enhancing industry employment and providing economic opportunity to individuals and local communities. States have explored ways to remediate the workforce gap through:

- developing training programs that administer financial resources to organizations and institutions that educate or retrain students in needed STEM and trades professions;
- providing incentives for state colleges and universities to create new STEM and trades programs to help meet workforce needs, and/or;
- creating a dedicated government office to engage with communities in transition to help workers interested in pursuing work in renewables or adjacent industries receive training opportunities.

Example Programs:

States, local governments, and electric utilities offer a variety of incentives to support renewable energy.

- Community Solar in Colorado: https://energyoffice.colorado.gov/community-solar-0
- Net Energy Metering in California: https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/demand-side-management/net-energy-metering/nem-revisit/net-billing-tariff-fact-sheet
- On-Bill Financing in Hawaii: https://gems.hawaii.gov/participate-now/for-homeowners/
- On-Bill Financing in South Carolina: https://tri-countyelectric.net/help-my-house
- New York State's Accelerated Renewable Energy Growth and Community Benefit Act: https://ores.ny.gov/system/files/documents/2020/07/accelerated-renewables-fact-sheet.pdf
- Rhode Island's Renewable Energy Standard: http://webserver.rilin.state.ri.us/BillText/BillText22/HouseText22/H7277A.pdf
- Streamlined Permitting: https://solarapp.nrel.gov & https://solsmart.org/

More Information:

- Cleveland Owns, Cooperative Energy Futures, and the Institute for Local Self-Reliance: Equitable Community Solar: Policy and Program Guidance for Community Solar Programs that Promote Racial and Economic Equity: https://ilsr.org/wp-content/uploads/2020/02/Equitable-Community-Solar-Report.pdf
- Corporate Renewable Energy Procurement: https://www.weforum.org/agenda/2021/10/corporate-renewable-energy-purchasing-how-it-is-changing/
- Energy Storage Association, Clean Peak Standards: https://energystorage.org/wp/wp-content/uploads/2020/01/What-is-the-Clean-Peak-Standard-2pg.pdf
- Environmental and Energy Study Institute (EESI): Clean Energy Tax Credits Get a Boost in New Climate Law: https://www.eesi.org/articles/view/clean-energy-tax-credits-get-a-boost-in-new-climate-law
- U.S. Environmental Protection Agency (EPA): State Energy and Environment Guide to Action: Interconnection and Net Metering: https://www.epa.gov/system/files/documents/2022-08/Interconnection%20and%20Net%20Metering_508.pdf
- Interstate Renewable Energy Council (IREC): https://irecusa.org/
- Lawrence Berkeley National Laboratory, Renewables Portfolio Standards 2021: https://eta-publications.lbl.gov/sites/default/files/rps_status_update-2021_early_release.pdf
- Local Government Renewables Action Tracker: https://cityrenewables.org/local-government-renewables-action-tracker/
- National Renewable Energy Laboratory (NREL): Equitable Access to Community Solar: Program Design and Subscription Considerations: https://www.nrel.gov/docs/fy21osti/79548.pdf