Renewable Energy Standards: a strategy to transition rapidly away from the use of coal, oil, and natural gas to clean, safe, and affordable renewable energy

This policy brief is one in an upcoming series on Policy Priorities for Climate, Health, and Equity. Each brief provides information on a policy identified in the U.S. Call to Action on Climate, Health and Equity: A Policy Action Agenda. The briefs can help health professionals and others (1) determine whether policymakers or candidates are taking positions that advance action on climate, health and equity, (2) ask questions to hold leaders accountable, and (3) increase collaboration with community-based organizations and advocacy groups. This brief should be useful for anyone interested in learning more about equitable energy and climate policy.

Key Messages

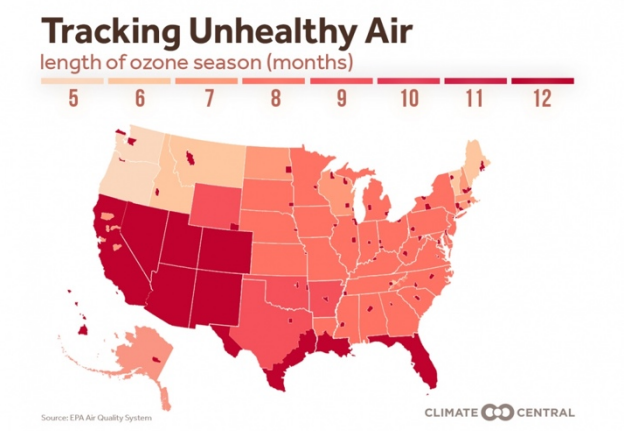
- Generating electricity from fossil fuels produces 1/4 of U.S. carbon dioxide emissions, causes air pollution associated with asthma, heart disease, adverse pregnancy outcomes, thousands of premature deaths annually, and disproportionately impacts communities of color and low-income communities.
- Renewable energy standards – often called Renewable Portfolio Standards – are important in hastening the transition from fossil fuels to renewable and low-carbon energy sources, slowing climate change and bringing immediate health benefits to communities.
- Renewable energy standards can differ substantially in their composition, and thus can have varying benefits for climate and health. Key components of a strong RES include: clear definitions of renewable energy that exclude fossil fuels; mandatory and enforceable targets; ambitious targets and timeline; and prioritization of benefits to frontline and low-income communities and workers.

Why is a renewable energy standard important?

- In 2019, about one quarter of the United States' carbon dioxide emissions came from the electric power sector.[1] Most of those emissions came from burning coal and natural gas. Oil and gas production also produce and leak methane, a potent greenhouse gas that can trap 25-80 times as much heat as carbon dioxide. Studies suggest that the leakage of methane from natural gas facilities may be negating the carbon reductions that have come from reduced coal use in recent decades.[2]
- Reducing emissions from electricity generation is essential for keeping global warming below 1.5 degrees Celsius (the Paris Agreement goal). In the middle range of scenarios identified by the Intergovernmental Panel on Climate Change (IPCC) for achieving this goal, renewables provide between 70-85% of global electricity by 2050.[3]
- A rapid transition to renewable energy is also key to achieving maximum benefit from electrification to decarbonize the building and transportation sectors. Electrification is the process of converting vehicles and appliances (e.g. stoves and furnaces) from fossil fuel-powered to electric-powered. Electrification is considered one of the primary pathways of reaching deep decarbonization across the U.S. economy, and relies on a clean grid to be successful.[4] Energy usage related to residential and commercial buildings is responsible for about one-third of U.S. greenhouse gas emissions, a key driver for improved energy efficiency and electrification measures.[5]

How do renewable energy standards impact health?

- Climate change is already having – and will continue to have – a profound impact on public health, contributing to hundreds of thousands of additional deaths and millions of additional illnesses per year globally.[6] These range from the immediate health impacts of air pollution and the increasing spread of vector-borne diseases, to the worsening impacts from extreme events like hurricanes and wildfires that are amplified by a changing climate. Increasing renewable energy usage will decrease air pollution and greenhouse gas emissions ("climate pollution"), and thus help to mitigate or avoid some of the worst health impacts of climate change.
- Switching from fossil fuel-based electricity to renewable energy will result in significant and immediate health benefits, reducing illness and death associated with air and water pollution from each phase of the fossil fuel life cycle. Electricity generation from fossil fuels causes air pollution, including sulfur dioxide, nitrogen dioxide, carbon monoxide, particulate matter, and heavy metals, and water pollution, such as from coal ash stored in retention ponds.[7] These pollutants cause and aggravate health problems, including asthma, lung cancer, heart disease, respiratory infections, stroke, neurological disease, and chronic obstructive pulmonary disease.[8] Several recent studies have documented adverse pregnancy outcomes for women exposed to these pollutants during their pregnancy[9] and adverse impacts to children's cognitive development from air pollution.[10] One study found that particulate matter from electricity generation with fossil fuel in 2014 led to 16,000 premature deaths in the United States.[11]



- While natural gas generation releases less carbon dioxide than coal, oil and gas facilities produce volatile organic compounds (VOCs), methane, formaldehyde, and other pollutants that create smog and directly harm communities. One report found that smog from natural gas facilities is associated with 750,000 summertime asthma attacks in children, and over one million Black Americans live within a half mile of natural gas facilities and disproportionately "face a cancer risk above EPA's level of concern" (i.e., EPA's standard for carcinogenic exposure).[12]
- Renewable energy standards can improve health by replacing polluting fossil fuels with sources that do not emit or release air and water pollution. A 2019 study found that existing renewable energy standards in just ten states would create $4.7 billion in health benefits by 2030 solely by decreasing particulate matter pollution; the same study found that doubling the standards in those states would increase health benefits to $20 billion over the same ten-year period.[13]
- The health impacts of fossil fuel electricity generation disproportionately impact communities of color and low-income communities, due largely to the proximity of fossil fuel facilities.[14] Switching to clean renewable energy and replacing dirty fossil fuel drilling, refining, and generation facilities will quickly reduce health-harming air pollution in these communities and reduce health disparities from chronic conditions like asthma and heart disease.

What is a renewable energy standard, and how does it work?

- A "renewable energy standard" (RES), often passed into law as a "renewable portfolio standard" (RPS), sets a minimum percentage of electricity that energy suppliers must provide using renewable sources.[15]
- An RES usually has a specific date or deadline by which goals must be achieved. For example, "20% renewables by 2025," or "100% renewables by 2030." Often one standard will set multiple target dates and goals that increase over time, such as 30% by 2030 and 100% by 2050.
- The specifics of an RES – who it applies to, how the relevant terms are defined, and how it is enforced – can vary (see below).
- Thirty states, Washington, D.C., and three territories currently have mandatory renewable energy standards; seven states and one territory have voluntary clean energy goals,[16] and over 200 cities and counties have 100% renewable energy goals. One-third of Americans live in communities with these targets.[17] Fourteen states and D.C. have established 100% "carbon-free electricity" goals, whether achieved through an RES or another policy mechanism.[18] More than half of state standards have been strengthened since 2015, such as adopting a more ambitious timeline or adding new components like an energy storage target.[19] There is currently no federal RES, though a bill was introduced in the Senate in 2019.[20] About half of states also have energy efficiency targets which are either included in an RES or are codified as a state Energy Efficiency Resource Standard (EERS).[21]

What elements of a renewable energy standard determine its effectiveness?

A state or federal renewable energy standard can operate in many ways. To evaluate the likely effectiveness of an RES, consider:

How ambitious are the renewable energy goals in the standard?

- Existing state renewable energy standards vary in their scope and speed. For example, Vermont set a requirement of 75% by 2032;[22] Washington, D.C. set a requirement of 100% by 2032;[23] California set a requirement of 100% by 2045;[24] and Virginia recently passed a standard requiring 100% by 2050.[25] Voluntary goals, like North Dakota's 2007 standard of 10% by 2015 and Kansas' 2009 standard of 20% by 2020, represent strong moves in the right direction with opportunity for future progress.[26] Nearer-term goals like those of Vermont are likely important in driving more immediate emissions reductions.
- An ambitious federal standard is supported by many experts and can help drive state progress. One large study demonstrated that a federal clean energy standard of 90% clean power by 2035 is not only technically and operationally feasible, but also suggest it would not raise consumer bills, would generate $1.7 billion in clean energy investments, would support 500,000 new jobs annually, and would nearly eliminate harmful air pollution from the power sector, which disproportionately affects communities of color. They estimate 85,000 premature deaths would be avoided through 2050, with more than $1.2 trillion in health and environmental costs avoided.[27]
- More ambitious goals often reflect agreement about the urgency of action on climate change.

> ***"In 1.5°C pathways…renewables are projected to supply 70-80% of electricity in 2050"*** –IPCC, 2018

What does the standard define as "renewable"?

- Terms such as "renewable energy standard," "clean energy standard," and "renewable portfolio standard" are often used interchangeably, so it is important to understand how a proposed standard defines the term. Most definitions of "renewable" include solar and wind energy; beyond that, definitions vary widely.[28]
- For example, many state standards include hydroelectric and biomass power, but set limits on the kinds of facilities that fall within the definition. Most states do not include nuclear energy, but a few do, such as Ohio and Indiana.
- A few states, such as Illinois and Indiana, have standards that include "clean coal" (or even natural gas, in Indiana). Many experts have stated that no additional fossil fuel infrastructure can be built if we intend to limit warming to 1.5°C.[29] Studies suggest that customers are already paying more than necessary to keep certain coal plants operating and that converting coal facilities to cheaper renewables would provide immediate cost-savings to customers.[30]
- Some nuclear energy advocates and others prefer to use the term "clean energy standard," because while nuclear energy is not a "renewable" resource, it may be considered low-carbon or carbon-free.[31] Critics of nuclear energy cite significant concerns about cost, safety, waste, and the carbon-intensive mining for necessary fuel inputs like uranium.[32] Many existing nuclear plants may remain operational to help certain states meet their clean energy goals; several states currently rely on nuclear for 20-50% of their electricity generation.[33]

Who does the proposed standard apply to?

- Some states only apply their renewable energy standards to certain large, investor-owned utilities; others apply them to all electricity providers (typically utilities) in the state. *The more entities an RES standard applies to, the more emissions reductions that standard can achieve.*

How does the proposed standard work?

- Most renewable energy standards function similarly – a percentage requirement and a date to achieve it by. But different state standards achieve that goal in different ways. For example, many state standards include a renewable energy credit ("REC") system, whereby energy producers get "credits" for producing renewable energy and can trade or sell those credits to other producers who have not met their goals.[34] Some utilities rely significantly on these electricity markets to help meet their RES goals, a reason why advocates often label an RES a "market-based" policy.[35] Many standards are mandatory for utilities, while some are voluntary goals.
- Some states establish "carve-outs" or "multipliers" that specifically require or incentivize a certain energy source, usually rooftop solar photovoltaic (PV) energy.[36] Fourteen states and D.C. have a solar carve-out included in the RPS, ranging from requiring 0.3% to 10% of electricity to be generated from solar by the target date. Similarly, some standards like Arizona's RES require a certain percentage of the goal to be met by "distributed generation." Distributed generation (DG) typically refers to more localized generation on-site at a residence or business, such as rooftop solar, small wind turbines, or combined heat and power.[37] "Utility-scale" solar refers to large–scale solar installations that are often owned by large utilities or companies. Distributed renewable energy often provides more market competition and resilience in facing grid outages, while utility-scale renewable energy often competes best on cost and scale to drive down emissions.

Examples of Carve-outs

State	Solar Carve-out	Target Year
New Mexico	4%	2020
New Jersey	5.1%	2021
Maryland	3%	2025
Washington, D.C.	10%	2041

- Renewable energy standards are enforced in different ways. One common option is an "alternative compliance payment," whereby utilities must pay a per kilowatt-hour fee for the difference between their actual and required renewable production when they fall short.[38] Other states impose outright penalties. States differ as to whether or not utilities may recover the costs of these compliance payments through the rates charged to customers. Varying compliance and reporting mechanisms lead to more or less stringent standards in practice. Compliance is often monitored by public utility commissions or state regulatory agencies.
- Additional evaluation of the effectiveness of various approaches is needed, but in the meantime it's important to find out whether and how an RES is designed to be enforceable.

Several policies that can complement renewable energy standards are also important.[39] For example, tax incentives are one potentially bipartisan area of focus that are popular with the public.[40] The Investment Tax Credit (ITC) and Production Tax Credit drove renewables growth over the last decade, but are currently phasing out.[41] These incentivize businesses and homeowners to install wind or solar by offering a tax credit based upon either the cost of installing a renewable energy system or the kilowatt hours of renewable energy produced – ultimately reducing the total cost of installation.[42] Other policies and programs – such as net metering, feed-in tariffs, energy efficiency standards, carbon pricing, community solar, building standards, and solar group buys – can be used alongside a renewable energy standard to encourage the clean energy transition.[43] An RES does not always lead to the phasing out or shutting down of the highest polluting facilities (e.g. coal), so working with state and local regulators is also important to reduce pollution in the near-term.

Equity and Renewable Energy Standards

Equity-oriented policies can concentrate the health and economic benefits of renewable energy in the communities most exposed to the negative health impacts of fossil fuel-powered electricity generation.[44]

- A renewable energy standard may incorporate equity provisions directly. For example, the recent Virginia standard took a step in this direction by requiring state agencies to regularly "determine whether implementation of this act imposes a disproportionate burden on historically economically disadvantaged communities," and to "consider whether and how . . . [energy] facilities and programs benefit local workers, historically economically disadvantaged communities."[45] However, critics note that there is still a need for much stronger environmental justice legislation in Virginia.[46]
- Wind and solar technician and installation jobs are among the fastest growing in the U.S. Laws and policies which ensure that jobs pay living wages, provide benefits, and allow upward mobility, career pathways, and the ability to participate in a union have been associated with better economic and health outcomes for workers.[47] Some legislation supports job training and job creation in impacted communities, such as the Illinois Future Energy Jobs Act.[48] Further support for federal and state programs that improve wind and solar training and employment can help ensure equitable employment.[49]
- Home energy efficiency and weatherization programs can directly reduce exposure to local air pollution while lowering energy bills.[50] The Low-Income Home Energy Assistance Program (LIHEAP) and Weatherization Assistance Program (WAP) can be expanded to electrification and better funded to reduce the energy burden and health impacts to low-income families, especially children.[51] On average, low-income households spend 6% more of their income on electricity compared to all Americans.
- Community solar or community choice policies, which allow renters and others to co-own or purchase solar energy from a utility or local energy company, can include explicit requirements for providing access to low-income residents and improve equitable access to renewable energy.[52] Other initiatives like Washington D.C.'s Solar for All program provide a dedicated stream of funding for installing solar PV on low-income households and multi-family housing. Low-interest loan programs like New York's can reduce barriers for low-income families who are homeowners.[53]

GRID Alternatives installs solar on multi-family housing and engages in education and policy advocacy

- Community "microgrids" – small free-standing grids that utilize renewable energy – can localize economic benefits, improve resilience to climate impacts, and further democratize energy by shifting ownership to communities rather than large electrical utilities that can raise energy bills.[54]
- A renewable energy program may coexist with other provisions designed to achieve equity. For example, when California extended its "cap-and-trade" program (allowing electricity producers to trade emissions allowances) in 2017, it also passed a law focused on achieving air quality improvements specifically in the communities most exposed to pollution.[55] Other complementary equity policies include subsidies to ensure access to rooftop solar for low-income households and prioritization of phasing out fossil fuel infrastructure or dirty power plants in or near frontline communities.[56] New Jersey recently passed environmental justice legislation that would deny permits for new polluting facilities in "overburdened communities."[57]
- "Equity mapping" – a process to document and assess various co-occurring vulnerabilities in communities – can also help states and the federal government determine where to prioritize investments to promote environmental justice.[58]
- To assess the equity implications of proposed or existing policies, the Network for Public Health Law has developed a **framework.**

Community engagement is vital to ensuring equitable energy policy. Assess whether the development of an RES is informed by engagement with leaders and members of communities that are most affected by air and water pollution generated by fossil fuels. For example, New York state's recent climate bill, which included an ambitious RES, established a climate justice working group and a just transition working group to ensure greater community engagement in implementation.[59]

Renewable energy standards provide a vital strategy in hastening the transition away from the use of coal, oil, and natural gas to clean, safe, and affordable renewable energy. When thoughtfully devised and implemented, these standards can simultaneously reduce climate pollution and promote health and equity.

For additional policy resources, visit **docsforclimate.org/voter-resources/**

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Medical Society Consortium on Climate and Health

The mission of the Consortium is to organize, empower and amplify the voice of America's doctors to convey how climate change is harming our health and how climate solutions will improve it. The Consortium consists of 31 member societies that represent over 60% of all U.S. physicians, more than 600,000 doctors.

Network for Public Health Law

The Network for Public Health Law helps health professionals, policymakers, advocates, and community members understand, navigate, and use law and policy to transform communities. The Network helps individuals and organizations understand regulations, access laws, develop policy and make sound, evidence-based decisions in order to significantly and positively impact the health of their communities and advance health equity. The Network's legal and policy initiatives include emergency preparedness; environment, climate and health; health data sharing; healthy housing; mental health promotion; drug overdose prevention; and vaccination requirements.

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