



## The Strategy of Energy Democracy and Sustainable Development: Policymakers and Instruments

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### ABSTRACT

Energy democracy policymakers pay attention to planning to the formation of energy markets and exchanges of energy regions, diversification of energy resources, especially renewable resources, and global challenges due to greenhouse gas emissions. Over the introduction of concepts related to sustainable development, energy planning at the international level finds its place and goals in the direction of sustainable development, i.e., economic, social, environmental, and institutional dimensions. Energy democracy designs equations of great powers over energy with the aims of Resist, Reclaim, Restructure. This research focuses on free governments and energy democracy and the integration of priorities and methods to improve energy policy and analysis. No one policy instrument in isolation significantly impacts the energy democracy agenda. Instead, all policies are essential for increasing this aim. They created new policy tools, supporting efforts to end fossil fuel dependence and connecting them to renewable energy. This research provides a starting point for improving the visibility of the energy democracy movement and constructing appropriate policies for different renewable energy transition options.

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### INTRODUCTION

Grassroots campaigners gradually use the idea of energy democracy in the United States, Europe, and other regions of the world to advocate for societal equality and sustainable energy transformations. Energy democracy is new in definition but can have defined a whole new social phenomenon because of its usefulness. The phrase propagates across the climate justice movements and has reached the state and national discussion levels. One of the essential characteristics of energy democracy is a heightened awareness of global anthropogenic climate change. Reliance on fossil fuels is retained despite a more pervasive understanding of the unsustainability and imbalance in carbon economies. This topic and the importance of transitioning to green energies have

become prevalent in politics and public discourse. The development of alternative fuels such as nuclear and renewables would be one of the most intensive policy and political issues during the next few decades. Initiatives to bring about this transformation of sociotechnical regimes would rely on a new understanding of energy politics. Instabilities in control are being promoted [1], bringing the past's alienation to an end [2], and poverty alleviation [3], as well as changes in market power dynamics [4] moving toward a renewable direction [5] to move the energies and power grids away from carbon-based. From the theoretical climate transition, the energy democracy movement illustrates de-alignment/alignment with ideals. a transformation that has notable players who have lost confidence in governmental institutions, modern ideologies and methods, as well as the rise of new and

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marginalized technology, has concentrated and non-regionally focused systems. It goes against the current patterns of governance in most places, so one must either resist it or go along with it purposefulness [6, 7]. De-alignment and realignment imply substantial and intractable complexities when combined. If both priorities cannot be reconciled, there would be legislative conflicts [8]. Recent scholarly thinking on sociotechnical reform says that it is essential to apply dynamic rule change instruments and promote complex adaptive policy frameworks to expedite regime decay while providing an atmosphere for disruptive innovations.

A detailed energy change agenda is needed with the country looking at the two sides of the energy issue concurrently [9, 10]. Even further focus has not yet been paid to broad goals for social and technological progress, as of course. It is also notable that resistance and competition policies have gained less coverage than potential new variations of these two [11]. If you connect movements to both benefit the old as well as a new constellation of the emerging alternatives; this broad as compared to approaches that see clean energy innovation as an independent issue, collaborative energy model, the social change solution could have a stronger long-term chance of success in effecting the transformation to a goal of combatting climate change [12, 13].

This paper aims to answer the question, "To what degree can presently formulate policy tools conform to the movement's overarching goals?" focused goals on diversity, equality, quality, and improved living conditions in a variety of settings, and accomplishes social objectives, such as improved socioeconomic opportunities for individuals, diversification, excellence, and societal progress. A mix policy mix also establishes a basis for thinking about individual policies and their influences on priorities and results through a survey of activists and scholarly research on democracy. We work to increase the movement's awareness, unearth the principal demands and strategies that activists call for, and provide insight on integrated models of democracy. In the following segment, we discuss our method for discovering energy democracy initiatives and achievements, which is focused on analyzing resources from various recently obtained sources. The analysis of objectives and policy instruments covers all in energy democracy, including goals and policy instruments. We synthesize and present the critical democratization issues and address the policy implications of the energy transition here. This is the findings of the energy democracy survey on priorities and policy tools. The reference library's perspectives go well with both ways: on the one hand, to address issues around social-technical structures innovation and on the other to build the energy democracy agenda. Thus, we propose a variety of measures that could serve to increase renewable energy transitions.

## CONCEPTUAL LENS AND METHODS

We are concerned with both under- or overinvestment in renewables, and we believe that different government policy instruments contribute to different means to the movement's overarching targets of either over- or underinvestment in certain energies. Before we could get this project off the ground, we first conducted a strategic study of social movement initiatives oriented toward an energy democracy. An operational definition of the word "energy democracy" is needed so that everyone understands exactly what it means [14]. Any of our general energy objectives was then broken down into a specific set of targets that permitted the testing of any piece of the program to see whether it conformed to each one.

It aims to advance the concepts of energy democracy by outlining a diverse policy mix, such as aims and methods that have evolved and progressed incrementally over time [15, 16]. However, here it emphasizes the general notions of aims as means to these desired ends as well as definitions of objectives. Nonetheless, we follow these individuals who attempt to be more explicit in their interpretation of the objectives and policies in statements for the sake of clarity [17]. The targeted here and now to the overall aim of this concept means we seek to increase the impact of this particular policy or bring about the target impact to this specific area [18]. Such as legislation, regulations, for solving the concrete challenges that appear on a society's agenda, as well as initiatives and initiatives used to solve the specific issues that appear on society's list [19]. Our various pieces of legislation in an evaluation of this initial assessment include a representation of the instrument mix and the collection of energy policy instruments, which is referred to as an instrument mix [20].

Ultimately, the aim is to be of being able to contribute to understanding the relations between aims and policy instruments. We look at the relationship between priorities and policy tools to assess the predictions for energy transition [21]. Although much of the policy literature focuses on the congruence of the priorities and the consistency of proposals, this focuses on the coalescence of already-proposed strategies with new ones. One of the most important results to be obtained from our present appraisal is to help build an energy democracy that serves the needs of current and future generations. It is to tackle new issues that have emerged as a pros. New energies, however, which seek to develop "deregulated" participation are outside the reach of this report [22, 23]. Germany is an active member of the International Energy Agency (IEA) provided regulation of energy provision; also brought together government ministers, industry chief executives and other high-ranking officials from around the world to share best practices and innovative ideas to help fully grasp the opportunities of wind and solar energy [9]. Additionally,

the causes of expanded energy access are too nuanced to evaluate within the scope of this research paper fully. Rather, it suggests that a large-the supposition is that-this one is made when a serious sociotechnical transformation of government is required, which calls for the combination of active and adequate policy instruments [24].

Beginning in October 2015, university libraries and famous search engines were made available in Canada and the United States publicly [25]. The search words that were used yielded an initial collection of roughly thirty English posts, blogs, publications, and recordings. These resources have been improved upon by the use of online advocacy groups, grassroots, events, and notable outlets, as well as references included in the documents often in the process of preparing for webinars and used in the research [26]. Data collection and coding were done first according to definitions and theoretical arguments, with additional findings and suggestions being offered [27]. The process was accompanied by keyword sorting for researchers to bring together searchable data related to topics such as energy use, ecological agents, ideologies, concepts, problems, and priorities, as well as usable and costly methods, topically relevant resources, occurred topics, guiding principles, and obstacles, in order to that process, and other results to be sought. the draft outline served as a framework in which the materials were laid out in order so that they could be used to help lead the study of energy democracy The concepts used study initially provided the basis for two additional lines of investigation, which subsequently led to two additional articles about the practice and philosophy of energy democracy [28–30]. In this article, the movement's aims and policy tools are examined across a variety of policy mixes, while more generally, the ideas of the movement are investigated in the context of theories about green energy's place in political theory.

In strategic compared to the three fundamental aims of resisting, reclaiming, and restructuring, the priorities included organizing a few of the goals to better correspond with the tools. A description of three distinct categories of outcomes was drawn from previous research on these topics and discussed next for ideas for that purpose [refined targets, identifying the focus, including information from key sources, and revisiting the categories identified and identified before refining approaches] categories of geographic regions, population types, stages of development, FiGoal here was to define a range of desirable outcomes at a high resolution, thus staying relevant across several spatial, age-based, and developmental tiers, and uses (e.g.: the United States). The idea was simple enough to explain but required careful monitoring and the 26 measures to follow along to be effective [31, 32]. These policy issues were noted to

be particularly salient from the analysis resulting in a growing support for a framework of energy democracy advocates' (in the United States and Europe), who noted 22 specific policy instruments that have been seen to be important in moving the goal forward [33, 34]. Instant develops to aid in the evaluation, policy instruments were subsequently divided into four groups, including financial policies, business arrangements, and alternative energy methods, and these were incorporated into policy to influence both economic conditions and production (based on Hoicka et al. [35]). The above-selected policies were written with primary source literature and supplemented with additional references to develop definition and examples where these sources lacked specific definitions.

Once the project had defined all of the energy policy instruments and the statements, each of the policies was then loaded into a spreadsheet, which allowed for an assessment of their comparative importance [36]. for each pair, whether or not the instrument might realistically be projected to achieve the targeted outcome Due to the uncertainties or complexity, the study results were estimated without any instruments intended to be provided, the findings were projected [37, 38]. For the purpose of establishing relationships between the energy democracy targets [39–41], the distinctions were made in three different ways: first, based on how each instrument impacted the goals modest or solid, and finally, on how they contribute to them An instrument chosen for a moderate connection to the target was required to be of relating at least half of its own outcomes; whereas an instrument that was assumed to be applicable to at least 80% of the goal's outcomes was seen as firmly attached to it. As in the above example, individual results were graded on the basis of the amount of supportive policies to find out which were given priority in order to them, this ended up determining the degree of emphasis each outcome was given in the overall strategy [42, 43]. Also aiming to understand the connections between specific policy decisions related to energy democracy and whether they embody the vision of renewable energy transitions, reviewing various policy strategies, set out; as Pesch [44] outlined their expectations of how those connections (whether policy decisions or policies contributed to the advancement of renewable energy movements were involved). The aims of the study were to assess whether each strategy brought the 3 benefits: preventive energy, protectively advocated for energy control so as part of the resist-reclaim-recycle-agenda of this study, and policy was enacted initiatives, for more environment consciousness of sustainability, putting forth assumptions about which strategy would offer three different gains: and hazards, and how each would help address those issues.

## REVIEW OF ENERGY DEMOCRACY ECOSYSTEM

### Democracy energy outlook

We looked at the literature on energy democracy and found that it consists of an overall agenda along with various specific results. New policies would be built from the material that was gained in this portion. A 100% renewable energy requires a drive to oppose fossil fuel business domination, social and public regulation over the energy market, and to encourage environmental justice, as well as well as conventional diversity. Energy democracy has its origins in the campaign to resist fossil fuel growth, seeking to fix the environment and economic crises, and making the transition to renewable energy. The idea of energy democracy has received much popularity in Europe and the United States in the last few years. Not to be confused with, the list of organizations includes: Community Power Network, Local Renewable Energy Coalition, Labor Unions for Progress, Berlin Energy Development Initiative, and Public Services Undertaking Luxemburg [That does not contain all of these organizations because they have been turned on]. The German environmental movement went through a process in 2016 by devising a variety of different organizations working on different aspects of the concept of climate justice. The same time, Cornell University's Energy Worker's Center initiated a new organization of labor unions from which emerged a new policy, Trade Unions for Energy Democracy [45]. The origins of the energy democracy movement can be traced back further, especially to earlier efforts against nuclear weapons and participation in local, democratic direct action [46]. Feed-in tariffs were a component of Germany's Greens, which opposed their country's decision to de-industrializing farming in the 1970s, and more specifically, the country's decision to abandon nuclear power generation in the '80s. Just beyond that, in many other countries, including the global South, the ideas of "climate justice" and "energy sovereignty" have taken root [47]. Advocates of energy democracy believe in the participation of diverse players and activists for more equal political and economic and social influence as well as well as broader social and collective ownership of energy, and the allocation of food, water, property, and control of land and food energy [48]. Since societal engagement is crucial to boost results, advocates and academics say that we all must be active in the process of energy transformation and accept democratic legitimacy [49]. For different groups that have different motives and interests can develop different energy systems [50, 51]. People and neighborhoods have much more ability to make choices when perceived as a member of a green collar workforce. The reforms of the energy sector are part of a larger project of expanding political participation [52] which aims to help people overcome apathy and engage them in democratic life again as active citizens [53]. Energy justice campaigners understand the value of including larger populations in

the energy game. This goal also aims to put traditionally neglected populations like low-income ethnic populations and immigrant communities into the conversation about energy futures. An energy democracy ensures that crucial energy choices are taken by a plurality of people, not a small few businesses. Regardless of who gets negatively affected by the new energy regime, meaningful concrete and direct benefits (e.g., work growth, assets being offered) would be targeted towards all desperately in need of these interventions [54].

A view of cities driven by 100% renewable energy, which uses decentralized power sources [55, 56] an ambitious campaign of energy recycling and biodiversity awareness. An ecological partnership must consider the threats to humans and the environment. There is an opinion that calls electricity a collective good or popular before an asset, and that is dependent on citizens working together to preserve and protect all the material resources of the group. In addition, it offers a new framework for the way of doing business in the energy market and for how to build new sectors [57]. A multibillion-dollar market renewable energy democratization helps keep these great opportunities in place by strengthening the connection between local energy production and local energy provision, potentially empowering marginalized regions. People who serve as community energy producers rather than promoting economic growth, which builds mutual prosperity and society [58]. A similar idea is energy democracy, which seeks to build jobs that are viable and at the same time. An energy democracy aims to uphold worker rights, which still makes the economy sustainable. In order to accomplish this goal, it is imperative that the workforce take the lead in the energy transition and that renewable jobs be primarily organized [59].

A central component of the energy democracy movement is shifting management of the energy market away from private and corporate ownership, and into the public and social sector. Energy democracy aims to transfer authority over all aspects of the energy market, from producing to delivering, financing, and applying new technologies and expertise. Diverse modes of ownership are required in order to ensure control, fiscal, social, and political problems are addressed, while also keeping in mind public or neighborhood needs, but public or community ownership may do the reverse. Involving choice-making, giving preference to local neighborhood principles in decision-making processes (e.g. cost-benefit analysis). Aesthetics for participation would be given to ensure widespread, significant, and valuable design. Because of that, small scale projects would better represent the interests of the neighborhood than large scale projects [60].

Focus, resist, reclaim, and restructure energy networks are the basic activities in implementing the energy democracy philosophy (Figure 1). In these conditions, this modern model, energy transformations

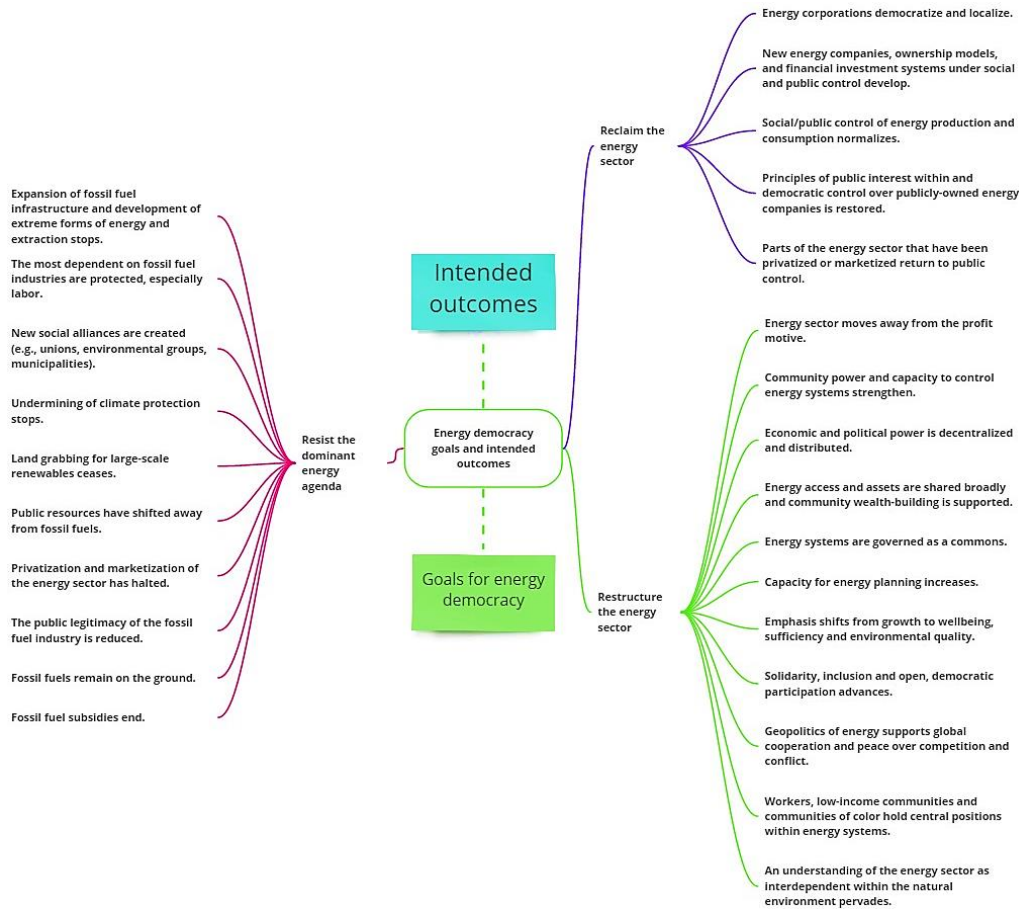


Figure 1. Resist, reclaim, and restructure energy mind map

reflect a systematic and structural strategy to a degree. Working within the limits of existing forms of political partnerships poses a major obstacle as well as an insubstantial one. A new approach to addressing this problem is known as “energy democracy”.

### Policy dimension

Several energy democracy policies with the ability to advance several targets are possible in our literature review. Although each of these policies is described below, the purpose is principally in the sense of the United States. To be fair, each policy proposal has positive and negative aspects, but together, they provide the opportunity to aid in an overall integrated energy democracy strategy. This subsection describes four policies based on these concepts: regulation, finance, business, energy and a new paradigm.

#### Regulatory context

The first step to establish a new trend in the energy system is to improve or adjust the regulatory context, which consists of policies grouped under these four broad headings: reforming the system, harmonizing regulatory

policies, balancing regional economic growth and energy provision, promoting efficiency, and promoting renewable energy.

- *Statutory priority for demand reduction and distributed generation*

The ‘climate democracy’ campaign aims to reduce overall energy consumption over time, while increasing the percentage of renewable energy for total energy delivery.

Two well-known contributors to the U.S. decentralized renewable energy movement have also say that reducing demand is critical to the success of renewable systems. In any case, the process of reducing demand lowers total costs while making the switch to renewable resources more gradual. It also refers to small-scale electricity generation that is distributed (or on-site), with the generation usually being in more intimate locations. Often these systems include technologies such as solar photovoltaics (PV), wind turbine load-modeling, machinery, and/controllers, as well as on-site storage space. More excellent distribution of generation will boost the degree of variability of the grid, so it’s

advantageous to adopt grid management practices alongside improved transmission and storage. Distributed generation can interface with the grid or run off-grid, which is suitable for locations where providing grid power is not feasible or where appropriate conditions for public health and safety cannot be met. In comparison to Federal Energy Regulatory Commissions, state and local governments have the advantage of being well-versed in regulating distributed generation, as they are more familiar with the application of PUC practices. The need for a centralized system is crucial, but this system prioritizes distributed energy supply for promoting overall population cutbacks.

- *Net metering and virtual net metering*

In general, sharing and community-based generation and ownership models are considered major policies for energy democracy, allowing other types of virtual (or group) net metering and smart metering, such as virtual group metering. A net metering system would enable on-site generators to draw power from the grid and will permit their owners to sell the energy back to the grid or to take credits from their electricity use. The virtual net metering systems allow individuals and groups to demand or part-in to the rights to facilities that are not on the premises, i.e. with the utility. Virtual net metering will offer renewable project benefits to those who do not have a suitable site for generators. Out of the sixteen states have virtual net metering rules, fifteen with total limits, but only fifteen states have the same limits with virtual net metering.

- *Renewable energy standards*

Renewable Energy Standard (RPS) forces a power supplier to purchase and sell specific levels of renewable power in the long term, usually within decades. Additionally, the RPS may set aside some of the renewable electricity that is generated in this manner, with these distributed generation techniques. Programmes such as these have traditionally have been introduced at the state level, but the federal government might establish a common set of progressive programs (on an unprogrammable scale). More than half of all renewable energy production was caused by regulations designed to meet the RPS requirements. Solar PV may either displace existing fossil fuel sources or incorporate new sources. The RPS has also caused changes in the balance of jobs, helping to move benefits from fossil fuels to renewable sectors. RPS systems have been introduced in 29 states and the District of Columbia so far, and demand is expected in 29 additional states and Washington D.C.

- *Participatory energy planning and deliberation*

Creative energy planning empowers citizens to act in ways that can set long-term, lasting precedents. Receptivity to new ideas or desires and ideas beyond the existing factions is generally accepted as helpful for putting

forward views other than the incumbents is expected to move political and institutional decisions on potential energy choices. Currently, efforts are focused on small initiatives and individual innovations, however, which means that they don't have a widespread impact [61]. Weaker levels of participation, for example, such as consumers as end users or basic supporters or opponents who are unable to contribute to the democratization of the energy system, fail to give weight to the process. People should have the means and ability to be able to be more actively involved in the generation, use, and share of energy, for example. For this to be possible, there must be a diverse mix of energy supply options that allows for long-term involvement, and citizens must be empowered to manage their resources. The success of a group renewable project is tied to participation at the beginning stages. Not only does it require getting involved, but it means doing research and assistance with the curriculum as well. A method of democratic deliberative practice can be used to better involve participants and encourage them to get to know relevant facts, other views, and their own perspectives. The values, priorities, and circumstances of energy governance are strongly specified, as is shown by the diversity of approaches to participatory community involvement across cultures. Planning processes therefore benefit from cooperation with communities, and thus require time and experience to improve, particularly if those communities do not already possess strong planning and participation capacity.

- *Community choice aggregation*

Aggregated less of the income level of government involvement, allowing municipalities to decide where they want to go concerning purchasing and generating electricity, Community Choice Energy Aggregation (CCA) systems provide communities with control over where they purchase and generate their electricity.

- *Community benefit agreements*

For example, a public agency like a municipality or county is named as the aggregator, and gets electricity for the rate payers while providing local service. CCA thus provides an incentive for community ownership of power, which has a parallel impact on civic engagement and privatization. Following the state's energy crisis of 2001, the state of California liberalized its utility CCA systems. In an attempt to regulate the use of energy, cities and counties were given the right to opt out of power procurement decisions on the basis of local law. There are eight CCAP programs forming right now, with the potential of several more to be established in the future. Besides, worries about costs and local control, it is possible to establish CCA (community choice energy) programs which will enable communities to accept renewable energy and push for an RPS (renewable portfolio standard) that aims for 50% by the year 2030.

### *Financial inclusion measures*

CBA is an initiative that distributes benefits in the society. Usually, renewable energy CBAs (such as PV and wind) are established as agreements between large developers and communities that state the concrete benefits that are provided to the project area. If a project receives public financial assistance, tax cuts, or grants, CBAs can be mandated for the paperwork. Many benefits can be specified in CBA agreements, including standards for compensation or employment for local residents, environmental impact management, direct payments to the community, or greenhouse gas mitigation initiatives. The state or community-based agencies will design specifications for acceptable contractors and hold them to their agreements. CBAs are better supported in a coalition between the group and the developer. If the contract terms are soundly negotiated, CBAs help reduce conflicts, increase engagement in democratic processes, and preserve the interests of taxpayers. CBAs are more commonly applied in large-scale projects in the US, but their use for renewable energy production is still largely underutilized. Meanwhile, the United Kingdom has experienced a large range of CBA policies explicitly tailored for renewable energy projects, and especially for the construction of wind turbines.

- *Feed-in tariffs*

Along with regulatory reform, policies provide financial incentives and resources for expanding and diversifying energy networks.

- *Green subsidies*

The most widely popular means of promoting and democratizing decentralized and renewable energy systems in other countries is a feed-in-tariff (FIT). As compared to short-term subsidized, long-term guaranteed fixed-price models, there are also viable market-price models such as PPMs (i.e., payment indexed models). There would be a benefit for the small community energy producers to engage in large-scale renewable energy production [62, 63]. Although FITs have been widely embraced, and proven to be an effective for advancing renewable energy and employment initiatives, they need good policy design, including adequate and consistent pricing, as well as proper implementation in order to carry them out these goals. FITs have been found to be regressive, especially additional burden on lower-income households but have benefited many higher-income consumers, accounting for nearly all the total sector. Other options include salary limits in Spain, as well as salary auctions. Gainesville was the first in the country to install a solar FIT, and now comprises six states, including California, Hawaii, Oregon, Vermont, and Washington.

- *On-bill financing and repayment programs*

among which are numerous subsidies that are usable at the state and local levels, for specific needs. A good long-term energy-efficiency and weatherization program reaches the most economical options for incorporating renewable energy. These grants are paid to those who normally can't afford renewable systems, particularly lower-income individuals and multifamily housing projects, which usually subsidize or cover installation costs in full. With funding for community-based groups such as churches and daycare centers, they will gain prominence, create a strong bond with the community, and encourage participation. Despite the political instability of green subsidies, they have become a critical component of an energy policy mix. Green subsidies have been offered in the U.S. for more than seven million low-income families since 1976, including The U.S. Department of Energy Weatherization Program that has delivered more than 3.5 billion dollars in support to approximately two million families. Recovery and on-bill services offer households with insufficient credit or investment capital the right to receive and fund renewable energy installations by charging [64]. Depending on the program, the public sector might be able to benefit. The upfront or third-party expenses are usually found on the same credit. Much as in case they pay their property taxes, local governments fund Property Assessed Clean Energy (PACE) projects by loaning the money to homeowners. When the utility takes care of the consumer bill, the most successful on-bill services are beneficial to both the customer and the utility. In partnership with the New York utilities, the New York State Energy Research and Development Authority established the On-Bill Program in 2020 and went after low- to moderate-income communities with the Green Jobs – New York [65] initiative.

- *Revolving loan funds*

It is important to think about the sources of renewable energy long-system financing, since they are intended to last for a long time instead of providing a one-time infusion. When loans are repaid, the entire repayment will go towards financing new ventures. In community-based financial institutions, including municipal banks and departments, such as technical support and additional funding from government. They also have lower interest rates and more flexible maturity schedules than commercial capital, with these financing intervals ending in 10 years. About 33 U.S. states have something called "Revolving Loan Schemes for Electricity and Clean Energy." This was created by the legislature in 1996 and is overseen by the Iowa Energy Center, with no interest loans available for a range of technologies, including hydro, wind, solar, and biomass, which can go as much as 50% of the cost.



- *Public bonds*

the utilization of public securities as an economic participation strategy is important even though they are rarely listed in the literature on that subject. Because of their prevalence among states and local governments in the United States, public bonds are also included in this study. Other members of the community may see government or utility loans as a way to invest in renewable energy because energy prices are dropping and the operating costs are low. Another instrument that has been used effectively for financing infrastructure programs for over a century is municipal bonds. Approximately \$3.7 trillion in U.S. municipal debt is owned by investors, although the bulk of bond investments is tax exempt for individuals. It is administered by the IRS, renewable bonds are sold to coops and gov'ts that collect tax credits rather than interest payments. In 2021, Portugal, issued a \$12 million bond which also funded the acquisition of a 7.4 MW hydroelectric facility and earlier bond commitments, providing for 100% renewable power use [66].

- *Carbon tax-and-invest*

Carbon fees are levied on the sources of fossil fuels according to the percentage of carbon they contain. Based on the polluter-bases-pays concept, a carbon tax is planned to be implemented to raise public revenue while cutting down on emissions of carbon dioxide. Carbon taxes can be enforced at any level of government with tax authority. That is, of course, the purpose of this form of tax: taxing fuel sources of emissions as far upstream as possible, such as the coal and oil extraction or oil wholesalers.

A gradual rise in the tax on fossil fuels is thought to resolve political opposition thus realizing an equivalent pollution reduction. It is likely that fuel producers and processors will continue to bear as much of the tax burden as fuel markets allow. According to opponents, people who reject carbon pricing, the poor spend a higher percentage of their income on electricity, it would affect them more than the rich. This problem can be resolved by a number of means, for example, through investments in education, healthcare, energy efficiency, and renewables. As well, one can achieve revenue neutrality through issuing dividends to tax payers, as well as adjusting the carbon tax to grant program amounts. Though the carbon tax does not explicitly target government spending, it has inflected overall demand for public spending in the province of British Columbia. Politicians are able to flexibly invest in these tax revenues, as the tax rate rises over time. Several states, including Washington, Massachusetts, have shown some interest in implementing carbon taxes as well.

- *Cap-and-dividend*

a cap restricts a given amount of usage or greenhouse gas emissions that diminishes over time. Emissions permits

are auctioned, but payments from the use of the allowances are returned in full, much like cap-and-trade. Since in this regard to public policy, the climate, everybody is equal owners. Those people who have greater pollution stand to profit the most when public authorities retain some of the revenue, dividend payments may also help mitigate the regressive effects of carbon cuts on lower-income groups. Current cap-and-trade policies may be used to build both capital-intensive and labor-intensive approaches. They seem to have once again gained favor after having been very popular in a number of states, this time cap-based systems included, as a consequence of recent carbon tax initiatives. If trading schemes are again become common, it will likely be cap-and-trade; if the necessary numbers of emissions are not lowered enough, a carbon tax will cease to be supported.

Creative financing encompasses a variety of funding methods, such as crowdfunding or public offerings, that enlist a variety of individual and community investors under the same roof. On the other hand, crowd-funding, such as Kickstarter, has been proposed as a way to provide customers with energy but also provide sources of capital for investors. Due to regulatory limits, payback or returns on investment are often offered. The specified non-term investor program has the duty to take advantage of benefit ventures to meet the needs of the community and to not steer it for private benefit. Among the country's largest such sites, Mosaic has donated millions of dollars to solar power ventures but crowdfunding has begun to take a backseat. Dollars are used to finance third-party investors who hold the majority stake in the project and to give them dollars in return for energy they supply to the rest of the world.

- *Cooperative financing*

Creative financing encompasses a variety of funding methods, such as crowdfunding or public offerings, that enlist a variety of individual and community investors under the same roof. On the other hand, crowd-funding, such as Kickstarter, has been proposed as a way to provide customers with energy but also provide sources of capital for investors. Due to regulatory limits, payback or returns on investment are often offered. The specified non-term investor program has the duty to take advantage of benefit ventures to meet the needs of the community and to not steer it for private benefit. Among the country's largest such sites, Mosaic has donated millions of dollars to solar power ventures but crowdfunding has begun to take a backseat. Dollars are used to finance third-party investors who hold the majority stake in the project and to give them dollars in return for energy they supply to the rest of the world.

*Economic institutions*

This type of policy toolkit calls for policies that can create economic opportunity and build new structures in the community.



- *Community energy*

in the United States, with more than 2,000 publicly-owned and operated power plants supplying more than 15% of the nation's total energy needs. A grassroots model, known as community renewable energy projects, encourage people who can't personally purchase renewable energy or who don't have enough of it to participate in a collective effort. People who invest in a share of the community-devised renewable energy have the energy benefit from that. A percentage of the project's energy is returned to the member. Due to the greater potential for generation provided by smaller systems, it yields economies of scale with single family installations. It is required by law that all shared solar installations must distribute at least 5% of their power to low-generating residents [for their mutual benefit].

- *Renewable energy cooperatives*

Non-consumer owned electric cooperatives, such as transmission and generation, serve customers that provide these services as well. The United States has more than 800 electric coops, supplying power to about 42 million consumers, and they come from a wide range of sources. Worker-owned cooperatives both offer jobs and clean energy to its customers, as well as many other value-added services. Since there are no other organizations like this, it, electric cooperatives do anything according to the seven principles of a coop, which include regulation by members, collaboration among coops, and mission emphasis [67]. The Energy Solidarity Foundation combines staff, customers, stakeholders, and owners and creates cooperatively-owned solar projects in low income and multicultural communities. The Evergreen Energy Solutions, LLC division was established in 2008 as a way to enhance the quality of life in low income Cleveland communities by linking renewable energy systems to job creation. recently appearing, cluster-consumers introduce prosumer-prosumer models of renewable energy, enabling island micro grids to share power and reliability.

- *Remunicipalization*

Since the 1980s, particularly in Europe and Latin America, public assets such as water, sanitation, and electricity systems have been returning to the hands of municipal governments, which face the risk of remunicipalization, which means canceling or not renewing existing private contracts, and setting up new municipal services instead. Usually, when someone has an issue with the effects of privatization they are looking for more transparency, improved environmental outcomes, and job standards, and often they prefer to reject it out of the assumption that they were able to achieve these objectives by re-municipalization. Activists and researchers concur that government-run programs produce equal or better results. More than one third of the voices of the current public sector, however, claim that public models, which include projects from the last

century, as well as the present public sector experimentation, are important to democracy in regards to energy. Realizing the weaknesses of public ownership, proponents of public remunicipalization must turn to economic democracy and public engagement. In addition to the municipal utilities, other public ownership models exist for joint enterprises such as cooperative, public-private, and public-to-private partnerships. The city of Boulder officially initiated a remunicipalization program in 2011 that is part of the wider effort to provide a replicable model for local governments to gain 100% renewable energy as well as soon as possible. to be the official transfer of properties, has recently obtained approval from the Colorado Public Utilities Commission to as part of a long-term plan to begin operations in 2017.

- *Green public service banks*

As government funds are used for community solar energy and neighborhood improvement programs, there is greater transparency to the people. Financing made available internationally but seldom goes back to the place of origin. Non-profit organizations and local ventures do not only receive money from commercial banks; however, the funding decisions are taken by the communities. There have been calls to mandate green public banks to provide credit to cooperatives and other community-based organizations. Using local and regional approaches to financing, you can then entice additional local and regional customers. The Connecticut General Assembly created the Bank in 2011 with its Green Banks Act, one of the most progressive pieces of legislation of legislation in the country. Following a successful start, the bank is now seen as the pioneer in the U.S. green-finance trend in renewable energy. opportunities for both public and private investors to engage in investment in projects that concentrate on energy conservation and renewable energy.

*New energy system institutions*

The fourth class of energy democracy policies involves policies that help direct organizations as they adjust their approaches to supplying energy.

- *Energy investment districts*

These strategies have been identified by the general names of "Just Transition Zones", "developmental-environment zones" and "reco-development districts," Energy Investment Districts" (EID), or "improvement districts." Additionally, designating an EID may be combined with a pledge to support under-served communities enhances its effectiveness. for example, the EID model targets the underserved populations and communities of color in particular for renewable energy production. One way to approach a community-based organization is to bring members of the community, some of whom will be appointed to the local energy trust, and local officials together to identify and carry out projects

that use democratic processes Various examples exist, for example, such as in Ohio, Connecticut, and Arkansas, where property owners are allowed to be members of energy investment communities; these models are known as PACE districts. to generate benefits beyond the property owners and then for specific communities necessitates changing the design of EID policy, particularly to include specific goals and community participation.

- *Micro grids and democratized grid management*

Where micro grids are concerned, the energy democracy movement sees centralized grids as a primary obstacle to democratization. Fair access for every time-sensitive creator is thought of as the “democratized electricity system’s systemic hub” [68]. The potential for decentralized renewable generation to join independent grids enables consumers to have access to an equitable allocation of resources under distributed ownership [69, 70]. An integrated micro grid, which links renewable energy, transmission, and distributed storage, and smart loads in clearly delineated geographical regions, electrical, and perhaps hydro systemic boundaries, will be owned and operated by those it serves [71].” The micro grids are responsive, diverse, reduce the need for transmission and distribution power, and enable them to be available or islanded as required. Therefore, to help standardize the micro grids achieve their secondary objectives, such as allowing grid access and equitable pricing, it is important to develop pricing standards for supply and demand modeling. Creative concurrence: The pacific gas and electric (PG&E) hunter’s point solar community micro grid Project was established in partnership with the non-profit clean coalition to bolster the Bayview and improve the climate while creating new economic opportunities in the city jobs and in the Bayview and carbon credits for the city of San Francisco.

- *Energy regions*

energy regions and associated organizations like the transmission cooperatives are all working together to expand the reach of renewable energy planning beyond the locality to the jurisdictional level While trying to respect the autonomy of local initiatives, these new governance structures promote an assembling of new regional networks. Another would be the deliberate creation of small local energy cooperatives on a regional scale to a larger cooperative model Co-op Power has established a collaboration of six Neighborhood Energy Cooperatives spanning the Southern States of Vermont and Massachusetts Dutch energy markets vary from those setups in the U.S. schemes, which are controlled by democratic and autonomous administrative processes. In addition, sustainability, or green energy, relies on revenues and finances, and information structures working together to help it along [58]. Since the 1990s,

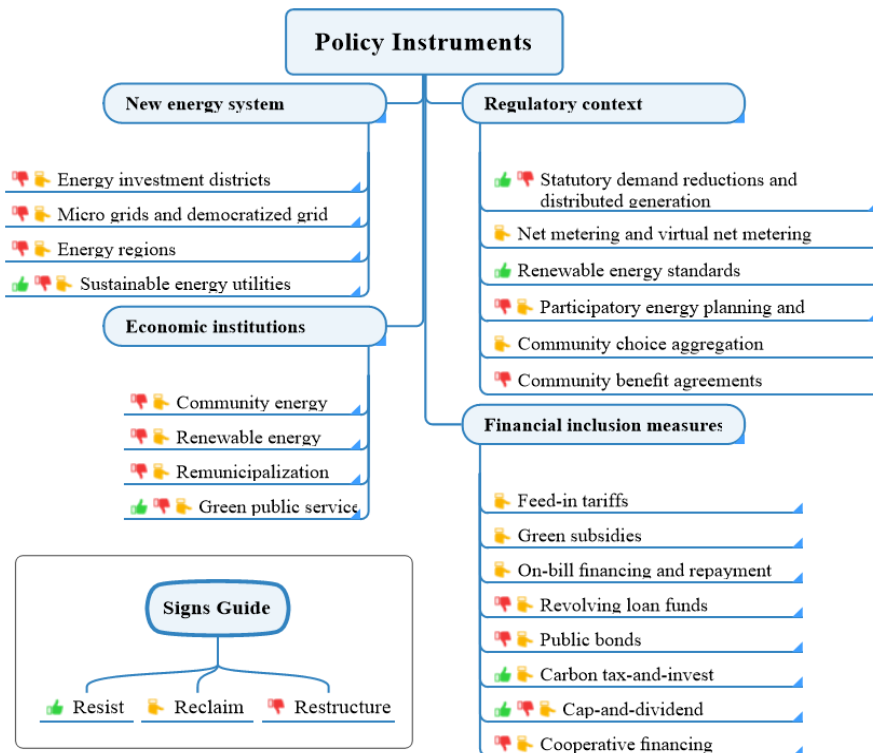
Austria has developed a framework for envisioning and evaluating energy alternatives using participatory processes [72]. a technological model created to enable a network of property owners and other stakeholder groups to participate in cooperative planning for local-to-regional transmission corridors.

- *Sustainable energy utilities (SEU)*

It is an independent, sustainable utility founded to provide energy efficiency, conservation, and renewable services. the SEU model can be built to serve almost any society [a population of between two and five thousand people] The concept has arisen due to the fact that most traditional utilities are built for the purpose of providing electricity sales, rather than for energy supply or energy management. An SEU serves all members of the society, from coast to coast and supplies all kinds of energy and resources. On the municipal or state level, SEU simplify mediates delivery of all energy needs by serving as the gateway to information and financial and subsidy resources, including energy efficiency and conservation, as well as renewable energy generation, connecting people and institutions to those resources, from the initial or secondary energy markets to those. At first, public bonds were used to finance this facility, but then it turned to self-sustainability by generating its own income from operations and by the ability to access a variety of financing resources. The SEU aspires to change the economy and shift away from centralized or commodity-based energy and to decentralized or commons-based sustainability that’s grounded in authentic, genuine needs and requirements. As one of the first SE models developed in the US, the Delaware Sustainable Utility has since been replicated around the world.

## **ENERGY DEMOCRACY PROGRAM WITH AND GOALS OF LEADING GOVERNMENTS**

The review’s goal is to shift the power in the political, challenging the dominant corporate energy agenda, reclaiming influence, and facilitating environmental, social, and public equity, as well as well as social justice, and preparing for a climate change. There are 26 concrete items that have been placed in order to achieve these three broad values of equality, sustainability, and equity. These reports have cited at least 22 policy instruments being introduced in the United States as well as in the EU and UK that support this agenda. Regulatory, socioeconomic, and infrastructures adjustments in the mix The results of the energy democracy objectives and instruments are reported in Figure 2. Sign Guide for Resist, Reclaim, Restructure Goals are marked in green, yellow, and red hand. We discover that the mix of instruments for renewable energy transitions, whether used to resist or structure, has the ability to assist it. While understanding that there are fewer instruments with more



**Figure 2.** Summary of goals and tools of energy policy and democracy (Sign Guide for Resist, Reclaim, Restructure Goals are marked in green, yellow, and red hand)

focus on reclaiming the sector and more on resisting dominant energy regimes, we emphasize that the overall instrument mix treats the main goal of this issue seriously.

Like the majority of political devices, policies tend to correspond to two or fewer objectives and therefore function only to modestly. Cap and trade, green banks, and renewable utilities also encompass the same three objectives: Reclaiming and re-and-structuring means at least one or all four instruments contribute to the target, and structural reforms have a stronger connection. we think the collection of energy policy resources found in this assessment is more likely to assist in a specific strategy, whereas other tools are a weak support for energy independence. Measures cluster around “The establishment of new social partnerships” while also aim to slow down the adoption of “land grabbing for large-scale renewables.” As a target, “Social/Public regulation of energy output and use” had the fewest conceptual connections. And, for reforming the energy market, the result was that “energy sovereignty” promotes economic and political rivalry. This include the following fields where energy democracy policy can make the biggest difference:

- Decentralization of authority means the power is divided and dispersal.

- A new social partnership is established (e.g., unions, environmental groups, municipalities).
  - If people learn to turn their control of social and public energy production and consumption over to society as a whole, it can contribute to social and public order.
  - energy and asset production are widely supported.
  - Under social and public ownership, a new, imaginative and financial investment structure has emerged.
  - more importantly, the community’s power and ability to regulate energy systems was reinforced
- Outcomes most outside the domain of energy democracy include:
- Land grabbing for large-scale solar and wind installations comes to a halt.
  - Instead of adding more fossil fuel infrastructure, developing increasingly extreme sources of energy, and expediting expansion of that, stops.
  - The end of fossil fuel subsidies”
  - Energy security promotes global cooperation and world peace over conflict.
  - There are already fossil fuels on the planet to be discovered.
  - We no longer need central energy monopolies because of advances in science and technology;

governments now all over the world democratize and localize.

- Considerable attention has been given to interdependence in the energy field with respect to the natural environment.
- Infringement of environmental protection
- It is damaged the public image of the fossil fuel industry.

Ultimately, this is argued, the policy-mix evaluation found that while it covers all three desired objectives, the energy democracy policy still does so unevenly. To all having some kind of relation, a small collection of instruments exists. The energy-coopting and energy-reformulation agendas are given equal consideration.

## DISCUSSION AND FUTURE

### Implications for energy democracy

This review explains the evolution of the energy democracy movement's priorities and policies. While some do call for energy democracy through the use of the concept, others focus on resisting the prevailing energy policy, restructuring the energy market, and fostering renewable energy deployment. Priority outcomes for an energy democracy agenda include: decentralizing energy and redistributing power; creating social alliances; reestablishing citizens' energy networks and peoples' ownership of political systems; and introducing new financial management models within those partnerships. Several energy policy frameworks may be at the center of the energy democracy system. Identifying some core policies: Simultaneously referring to three policies and linked to all three. Therefore, the currently available core instruments include: legislative demand reductions, distributed generation, and renewable cooperatives; credit cap-and-based fiscal tools and governance structures such as community energy savings, green municipal utilities, and sustainable utilities; public bond issuers, public renunciation, public micro grids, and democratized grid management is essential to create. In addition to these main instruments, other musical instruments can be considered to be a strong complement to this list. But transforming the nation to a large scale possibly requires strengthening of existing policies and the creation or implementation of new ones that weren't mentioned. According to this view, improving current strategies would necessitate new means of linking each instrument to new goals, thus moving from a humble intention to robust and effective involvement with the strategy aim of growing people's energy democracy. Capacity for collaborative planning and deliberation within the public sector, and communities of color and the low-income Opportunity to innovate strategies in order to resist incumbents Alternative, or non-to-obvious approaches may be established or implemented, for example,

controlling the fossil fuel trade, ending fossil fuel subsidies, or making private corporations into public utilities.

### Value of a policy mix approach

Of course, energy democracy can be supported by design and policy assessment. Using the policy mix lens requires advocates, groups, and other decision makers to focus on potential tools and their correlation to outcomes. Gathering information about where things can be achieved and where they are not covered and resolving any holes or inabilities that they have implies opportunities to change and enhance the energy mix as an additional means to generating a more efficient approach. One important result of the policy mix lens is that it encourages the use of different policies. Trading different energy resources for differentially to address the three overarching goals is a simple kind of trade offset, such as power savings in the short term versus long-term transition. In light of growing knowledge of climate change, it might be necessary to oppose fossil fuel production rather than deal with the long-freezing for several years. A complete rebuilding of the energy sector will likely take a long time, however, restructuring will shorten the time required. For the time being, it seems that the Energy sector is the key to getting policy back on track with regard to reclaiming lost ground in other areas. As this situation demonstrates, proponents of the energy democracy movement could be devoting different amounts of energy to the different goals. It could be initially appealing to some people in the United States because the arguments resonate with themes of freedom, local autonomy, and economic advantage. This assessment supports the contention that conflicts will exist among the various objectives of the movement, since it indicates that eventually energy democracy will be necessary to achieve all three of these. In a temporal extension, priorities for energy democracy should be taken into account as well as to help combat, retake, and structure current approaches. Energy governance opens the way for a long-term aim of energy democracy. It reframes energy as a common pool rather than as opposed to product and structured according to rules for how it is used.

The growing body of research on popular pool management has relevance for all issues relating to renewable energy and system transitions in general, including energy transition A long-enduring resource regime [73] is constructed using substantial research results from over several years to outline a useful strategy for communal resource usage (typically at the local and regional scale). Experiences like these may encourage a greater focus on permanence and/restoration. These corresponding policy instruments might deal with building community trust, identifying boundaries of common energy systems, and developing new techniques for managing scale are just a few of the procedures that

will be necessary. Information for the quest for a sociotechnical common could benefit from literature on socio-ecological structures. The SETS framework may enhance policy modeling by integrating non-technological systems as well as contextual factors.

### **Policy mixes and renewable energy transitions**

Reflecting their understanding of energy transformations in turn provides new ways of analyzing and designing government policies. In view of the arguments that ‘ideal’ policies combine policy instruments for both the development of new ideas and their overthrow of existing power structures, the energy democracy program does an excellent job of living up to the concept. An instrumental view suggests that instruments built to help dominate would theoretically oppose the dominant energy agenda, while those to assist and reform it provide the chance for innovation. a progressive political solution to energy democracy that empowers the masses while destroying the old power structures that stagnates the people Resistance to efforts to reshape energy models complicates these ideas as well as efforts to shift to renewable energy. Sometimes, the developments people have envisioned include concepts produced through the use of market processes, as well as those at the high-profile places of change. In contrast, the reclamation and restructuring of the energy sector places significant importance on social and structural changes like, though not limited to, new energy technologies like renewable energy. To reclaim and change old systems, you must also interact with old social structures, and aspire to build on them. Although in creative destruction, a firm attempt to add to or layer existing regimes, in this case, it is distinct from others because it allows for elimination as well as replacement Destruction and destabilization aren’t inherently part of the ideas of resistance. What strikes me about revolutions from past and present is how they act in the service of rebellion to powerful creative destruction. While they both resistance and destabilization both take aim at the DE legitimization of governments, resistance is much more concerned with halting rather than achieving it. Perhaps the contemporary energy democracy movement is an attempt to shield communities and the commons from currently threatening market forces can be viewed as a parallel effort to those who seek energy freedom from corporate control. Resistance can be regarded as a kind of regrouping when put in sense of creative destruction We therefore remain wary of the extent to which we portray destructive ideas as analogous to the challenges to reclaiming our energy democracy.

combining initiatives and policies to halt fossil energy production with a successful way to making a timely transition to renewable energy When you just concentrate on one aspect of your overall agenda, you can forget the other parts, and if you miss out on them, you’ll be less effective in achieving your objectives. Therefore, more

efforts are needed to bind such anti-fracking, divestment campaigns, and renewable energy coops. It is imperative that attention be provided to all three objectives, to all the possible consequences, and the associated policies as well as to their existing policies. Figure 3. shows the perspective and policy of moving a sample unit towards renewable energy.

### **Limitations and future work**

while gathering valuable information, we acknowledge the underpinnings of this research outcome statements and policy measures can be developed through a variety of methods. Although in other situations, the outcomes were gathered from different sources, they may not be applicable to the existing conceptions of an energy democracy agenda. Our methodology has another possible problem in that there could be several alternate paths that could result in achieving each energy democracy. We also understand that energy democracy cannot be homogeneous with all participants all embracing the expression “the energy revolution.” Though we agree that we have formulated and optimized our planned outcomes, the advent of a cohesive energy democracy agenda or set of goals was not expected. In other words, we accept the plurality of energy approaches for distinct locations and populations. an Under-Utilized Instrument Mix is expected for this instrument range. While these and other policies were regarded as favorably by the energy democracy campaign, divestment policies did not turn up. An omission in the instrument mixture of talents which show that there is a deficit in the analysis. Additionally, the use of targets and instruments here does not require the establishment of continuity and efficacy of various policies. It is important to include other aspects of an energy democracy plan (e.g., targets, plans). It is important to establish a more robust method of measurement if one wants to determine the specificity of any single instrument. Future research may be directed toward developing an index that uses third-party reviews and expert opinions to examine the strength of relationships. Assessing whether an instrument is likely to influence a result often necessitates making an assumption on whether it is meant to modify the current policy. This challenge is implicit in much of the progress toward renewable energy, and, as it is an endeavor that cannot take place without introducing new technologies. Replacement may have played a part in underestimating the movement’s potential Accurate, comprehensive, empirical work on the ability of individual energy policies to fill rather than supplement existing gaps in capability would be especially important in this case.

More needs to be done to realistically explain what democratic energy policy looks like. we must explore and environmental differentiation through cultures and regions to grasp the true value of instrument mixes in facilitating the idea of energy democracy. Future studies will take the knowledge gathered in this study and apply

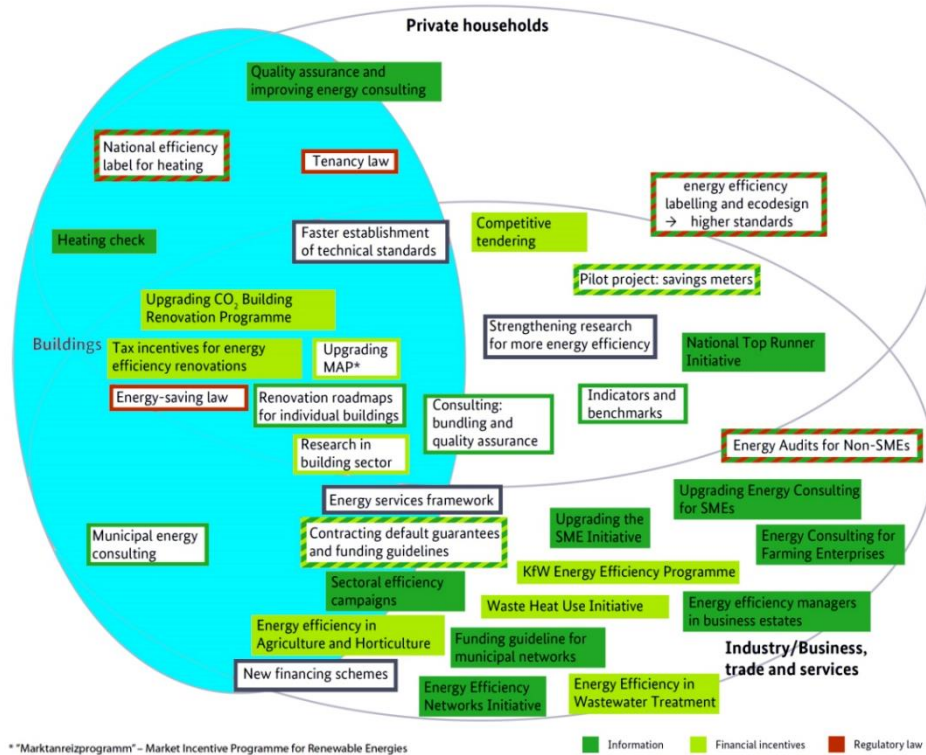


Figure 3. Energy efficiency policy roadmap for the building sector

it to the energy democracy movement by collaborating with people, activists, advocates, and organizations. truth, which would require identification (Figure 1 and Figure 2). This research will then serve as a framework for further ex-ante design and practice research, and allow for participatory planning and scoping. The three broad aims of the movement of the energy democracy framework support an evaluative framework for planning and administration, along with a definition of relevant plans and methods.

## CONCLUSIONS

The rapid change from fossil-fuel-based energy systems to renewable resources is an opportunity for innovation and realignment of social and technological systems. Energy democracy offers a suite of priorities and a collection of policy tools to resist the current energy regime while promoting an expansion of renewable energy, distribution, energy-sharing, and social participation. In the United States and elsewhere, energy democracy is advocated and brought about by organizations fighting for a set of policy initiatives that seek to defend, reclaim, and reform. Resistance can be described as both an expression of resistance and an act of innovation that follows an extended period of destruction. This is a multifaceted approach

for both theory and methods, which is important in characterizing present and potential energy transitions. An integration of priorities and methods to improve energy policy and analysis at no point does one policy instrument in isolation have a significant impact on the energy democracy agenda; rather, all policies are important for an increase in this aim. Creating new policy tools, supporting efforts to end fossil fuel dependence, and connecting those efforts to renewable energy. This paper provides a starting point for improving the visibility of the energy democracy movement and constructing appropriate policies for different renewable energy transition options. The strategy sets the following fields of action:

- Renewable energies as a cornerstone of future energy supply;
- Energy efficiency as the key factor;
- Nuclear power and fossil-fuel power plants;
- An efficient grid infrastructure for electricity and integration of renewables;
- Energy upgrades for buildings and energy-efficient new buildings;
- The mobility challenge;
- Energy research towards innovation and new technologies;
- Transparency and acceptance.

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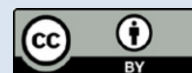
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#### Persian Abstract

#### چکیده

سیاست‌گذاران دموکراسی انرژی به برنامه‌ریزی برای تشکیل بازارهای انرژی و مبادلات مناطق انرژی، تنوع بخشی به منابع انرژی به ویژه منابع تجدیدپذیر و چالش‌های جهانی ناشی از انتشار گازهای گلخانه‌ای توجه دارند. با معرفی مفاهیم مرتبط با توسعه پایدار، برنامه‌ریزی انرژی در سطح بین‌المللی جایگاه و اهداف خود را در راستای توسعه پایدار یعنی ابعاد اقتصادی، اجتماعی، زیست محیطی و نهادی پیدا می‌کند. دموکراسی انرژی معادلات قدرت‌های بزرگ را بر انرژی با اهداف مقاومت، بازپس‌گیری، بازسازی طراحی می‌کند. این تحقیق بر دولت‌های آزاد و دموکراسی انرژی و ادغام اولویت‌ها و روش‌ها برای بهبود سیاست و تحلیل انرژی تمرکز دارد. هیچ یک از ابزارهای سیاستی به طور جداگانه به طور قابل توجهی بر دستور کار دموکراسی انرژی تأثیر نمی‌گذارد. در عوض، همه سیاست‌ها برای افزایش این هدف ضروری هستند. آن‌ها ابزارهای سیاست جدیدی ایجاد کردند و از تلاش‌ها برای پایان دادن به وابستگی به سوخت‌های فسیلی و اتصال آن‌ها به انرژی‌های تجدیدپذیر حمایت کردند. این تحقیق نقطه شروعی را برای بهبود دید جنبش دموکراسی انرژی و ایجاد سیاست‌های مناسب برای گزینه‌های مختلف انتقال انرژی‌های تجدیدپذیر فراهم می‌کند.