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ENVIRONMENTAL JUSTICE AND THE CLEAN POWER PLAN: THE CASE OF ENERGY EFFICIENCY

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ENVIRONMENTAL JUSTICE AND THE CLEAN POWER PLAN:

The Case of Energy Efficiency

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Introduction

The U.S. Environmental Protection Agency (EPA) issued the Clean Power Plan (CPP) in August 2015, and is the first major federal regulation to address climate change. The CPP is characterized as a landmark rule, setting carbon dioxide (CO2) standards on existing power plants[1] in the U.S. The promise of the CPP is that it will produce a 32% reduction in CO2 from 2005 levels in 2030 (U.S. Environmental Protection Agency, 2015, p. 64665). This reduction, EPA calculates, will result in combined climate and health benefits of $34 to $54 billion in 2030 (based on a 3% discount rate) (U.S. EPA, 2015, pg. 64679).[2]

On the other hand, the health and economic costs associated with climate change impacts continues to mount. Globally, the Munich Re insurance group estimates that worldwide weather-related losses and damages have increased from an annual average of about $50 billion in the 1980s to close to $200 billion over the last decade (World Bank, 2013). According to the National Oceanic and Atmospheric Administration (NOAA), weather-related crop and property damages in the U.S. totaled $4.9 billion in 2015. These calculations refer only to weather-related disasters, which constitutes just a partial set of climate-related health and economic costs. From a purely economic standpoint, it is clear why general support for climate policy and continues to increase.[3]

In spite of the projected health and economic threats to communities and the environment that are on the horizon if there is no climate mitigation, the CPP has drawn considerable controversy and

[1] The Clean Power Plan applies to fossil fuel-fired electric steam generating units and natural gas fired combined cycle generating units capable of selling greater than 25 MW to a utility distribution system, and that commenced construction as of January 8, 2014

[2] Rate based approaches are estimated at $34 to $54 billion in 2030; Mass-based approach is estimated at $32 to $48 billion in 2030. These figures do not include costs associated with compliance.

[3] According to the Pew Research Center, support for limiting greenhouse gas emissions is divided across partisan lines: 82% of Democrats; 72% of Independents and 5% of Republicans favor GHG limits. Accessed March 24, 2016 at http://www.pewglobal.org/2015/11/05/global-concern-about-climate-change-broad-support-for-limiting-emissions/climate-change-report-27/

criticism since its release. In their legal battle against the EPA, numerous states[4] and a range of energy and business interests argue that key components of the CPP represent an over-reach of the agency's authority under the Clean Air Act. On the other side, the CPPs firmest supporters are mainstream environmentalists and others who support carbon reduction, in many cases to the exclusion of other social concerns. It is this latter qualification that gives rise to the complexities of the CPP with respect to environmental justice.

The purpose of this paper is to provide an outline of environmental justice (EJ) issues of the CPP, specifically with respect to energy efficiency.   It is one of a complement of papers sponsored by the Milano School of International Sustainability at the New School that are intended to provide an EJ review of the CPP as a foundation for understanding the opportunities and challenges for integrating equity and justice in climate policy. The catalyst for this set of papers exemplifies one of the problematic issues of climate policy in the U.S. as it has developed over the last several years. While various policy mechanisms have been extensively analyzed in terms of economic efficiency, flexibility and costs of compliance, these stand in stark contrast to only a handful of research efforts that focus on equity impacts of domestic climate mitigation policy. Our goal here is to provide a summary of the major justice/equity issues associated with the CPP specifically, and mainstream climate and energy policy generally. As such, it is not intended to be an in-depth analysis, but rather a starting point for further policy research which we hope to continue.

Why is Environmental Justice Still an Enigma to the Environmental Movement?

Mainstream environmental and other advocates for climate policy and a clean energy transition are frequently mystified by EJ positions on climate policy, and the CPP is no different. This is because EJ

[4] West Virginia, Texas, Alabama, Arizona, Arkansas, Colorado, Georgia, Florida, Indiana, Kansas, Kentucky, Louisiana, Mississippi, Michigan, Montana, Missouri, New Jersey, North Dakota, Ohio, Oklahoma, South Carolina, South Dakota, Wisconsin, Utah, Wyoming, North Carolina, Nevada, Nebraska

advocates continue to raise concerns, and in some cases, opposition, to some elements of climate mitigation policies and regulations that present real and potential negative impacts on EJ communities. These EJ concerns are not new. The EJ community has consistently and persistently shared their issues to the mainstream environmental movement and to policy makers. Even as climate and energy federal legislation was being developed and proposed, most notably the Lieberman-Warner (Climate Security Act 2007 and 2008) and Waxman-Markey bills (American Clean Energy and Securities Act of 2009), environmental justice advocates called for a need to address the equity and justice implications of these legislative proposals. Yet, despite their efforts, EJ perspectives and concerns continue to be relegated to a marginalized position in climate and energy policy development, usually as issues to be considered de facto. Essentially equity and justice enter into consideration only *after the policy or regulation* is developed and implemented. Even then, most equity analyses are predominantly focused almost exclusively on rate-impact analyses which assess whether low and moderate income rate-payers experience an increase or decrease in their energy bills as a result of the policy.

Rate impact analyses, from an EJ perspective, constitute a narrow scoping of environmental justice and equity, and therefore while important, are inadequate for evaluating the full scope of environmental justice in climate and energy policy. This paper focuses on identifying salient points of EJ concern in the CPP, specifically the energy efficiency component, and to articulate *why* they are of concern so that future policies and programs can be more effective in addressing the needs of all communities. The reasons for this marginalization is beyond the scope of this paper, but should be addressed in other climate policy development and analyses.

The Two Justice Categories and the CPP: Substantive and Procedural

There are two overlapping but distinct areas of environmental justice that often get conflated in the advocacy and policy world: procedural justice and distributive justice. **Procedural justice** refers to the fairness of decision making. Procedural justice is "based on a democratic fundament in which all affected people have the possibility to be informed, express their opinions and influence decisions" (Svarstad, et al., 2010, pg. 6). In the case of the CPP, procedural environmental justice issues can be summarized as the following:

- The process of meaningful and involved consultation in the development of the proposed rule;
    - What was the level of engagement with environmental justice organizations, groups and communities? How does this level of engagement compare to other "stakeholders" (i.e., utilities, mainstream environmental organizations, etc.).
- The process of meaningful and involved consultation and engagement required in State Implementation Plans (SIPs) in the final rule;
    - What is the level of engagement with environmental justice organizations, groups and communities? How does this level of engagement compare to other "stakeholders" (i.e., utilities, mainstream environmental organizations, business interests, etc.).
- The process of meaningful consultation and engagement in the development of the voluntary Clean Energy Incentive Program (CEIP);
- Implementation of internal EPA and state-level processes for addressing environmental justice concerns in rulemaking which includes environmental justice analyses of alternative rule options;

Essentially, procedural justice is the stakeholder and community engagement requirements for the CPP.

Distributive justice on the other hand refers to the distribution of benefits and burdens that result from policy or regulatory implementation. Ideally, an equity impact analysis to assess the costs and benefits across populations and communities due to the implementation of the rule would be conducted. Absent such an equity analysis there is virtually no information or data that assesses the *distributional impacts* of the CPP as a regulatory action. The EPA deferred equity impact assessments, and instead encouraged states to conduct such analyses in the development and implementation of their State Implementation Plans (SIPs). The result is that at this time, there is no national-scale analysis of the distributive impacts of the CPP. It is understandable that adding an equity analysis adds complexity to the rulemaking process. However, the fact that such analyses are yet to be conducted demonstrates the marginalized position of environmental justice. In its Technical Guidance for Assessing Environmental Justice in Regulatory analysis (just released in June, 2016, after the release of the CPP), the EPA guidance states that rulemakers should address these three questions: 1) Are there potential EJ concerns associated with environmental stressors affected by the regulatory action for population groups of concern in the baseline?; 2) Are there potential EJ concerns associated with environmental stressors affected by the regulatory action or population groups of concern for the regulatory option(s) under consideration?; and 3) For the regulatory option(s) under consideration, are potential EJ concerns created or mitigated compared of the baseline? (2016a, pg. 11)

A sample of the analytic questions (drawing from EPA's guidelines for economic analysis) that form an equity impact analysis are (EPA, 2014):

- Identify and define the personal and demographic characteristics (e.g., race, age) of concern. In this step, all expected distributional effects should be identified and prioritized.
- Measure distributional impacts using a range of assumptions to characterize the possible distributions of expected impacts.
    - What is the baseline distribution of health and environmental outcomes across EJ communities (population groups of concern) for pollutants affected by the CPP? That is, to what extent, what is the best assessment of any differences across populations that exist without the rule, i.e., the CPP
    - What is the distribution of health and environmental outcomes for the options under consideration for the CPP? That is, what are the differences in health and environmental outcomes for EJ communities in comparison to non-EJ communities as a result of the different rule options?
    - Under the options being considered, how do the health and environmental outcomes change for population groups of concern? That is, how do different rule options affect or change the health and environmental outcomes for EJ communities (populations of concern)?
- Determine whether distributional impacts exist within the scope of the analysis,
- Examine distributional impacts over time because some impacts may be a direct result of markets adjusting to regulatory requirements and may change over time. An equity analysis is beyond the scope of this paper. However, in outlining the problem associated with energy efficiency programs as currently implemented, the hope is that this will be the subject of future research. The next section outlines the role of energy efficiency in the CPP

Energy Efficiency in the Clean Power Plan

In contrast to the proposed rule which was released in 2014, energy efficiency was not used in EPA calculations to determine the performance standards of Electric Generating Units (EGUs) in the final rule.[5] Energy efficiency, however, can still be used to attain state compliance. It is one of a suite of mechanisms (including renewable energy, shifting to natural gas, etc.) that is identified in the CPP as a viable option for states to meet their emissions targets. Any program or measure that reduces electricity use or reduces carbon-based electricity generation can be used for compliance (U.S. Environmental Protection Agency, 2015). In its signature effort to provide maximum flexibility for compliance, the EPA allows energy efficiency to be utilized in a number of ways. If states select a mass-based plan (total metric tons of CO2), energy efficiency activities will effectively reduce the demand for energy that is generated by fossil fuels, and will therefore result in a reduction in their total CO2 emissions. Under a mass-based plan, power plants must obtain allowances, which are essentially permits to emit CO2 (one allowance equals one metric ton of CO2 emissions) and can be traded. If states adopt a rate-based approach (pounds of CO2 per MWh of generated electricity) energy efficiency (the amount of fossil-fuel energy saved) can count as zero-carbon generated electricity, and therefore helps states meet their emissions target rate by reducing the amount of CO2 per MWh of electricity generated in the state. In the rate-based approach, each 'quantifiable and verifiable' MWh of energy saved is eligible for an emission rate credit (ERC).[6] States can either apply ERCs to their annual emission rate, and/or ERCS can be traded such that an ERC generated in one state, if traded, may be applied to another state's CO2 emission rate.

In another component of the CPP, EPA offers the states an opportunity to voluntarily enlist in the Clean Energy Incentive Program (CEIP), which incentivizes both energy efficiency and renewable energy for CO2 reductions before the compliance period is set to begin in 2022 (again based on the CPP

[5] In the proposed rule, energy efficiency was included as a Building Block in determining the Best System of Emission Reduction (BSER) for fossil-fuel generating units. In the final rule, energy efficiency was not used in determining the BSER.

[6] Energy efficiency and renewable energy projects for low-income communities that commence operation on or after September 6, 2018 qualify for incentive credits. In the proposed rule, the CEIP period remains for years 2020 and 2021

as is, not considering any delays or modifications due to the litigation). This "early launch program" is in partnership with the Department of Energy (DOE) and includes a specific incentive for energy efficiency implemented in low-income communities. EPA outlined the major elements of the CEIP in the CPP and the specific rule was released for comment on June 16, 2016.[7] The CEIP will be finalized at a later date and EPA continues to affirm its commitment to this program.

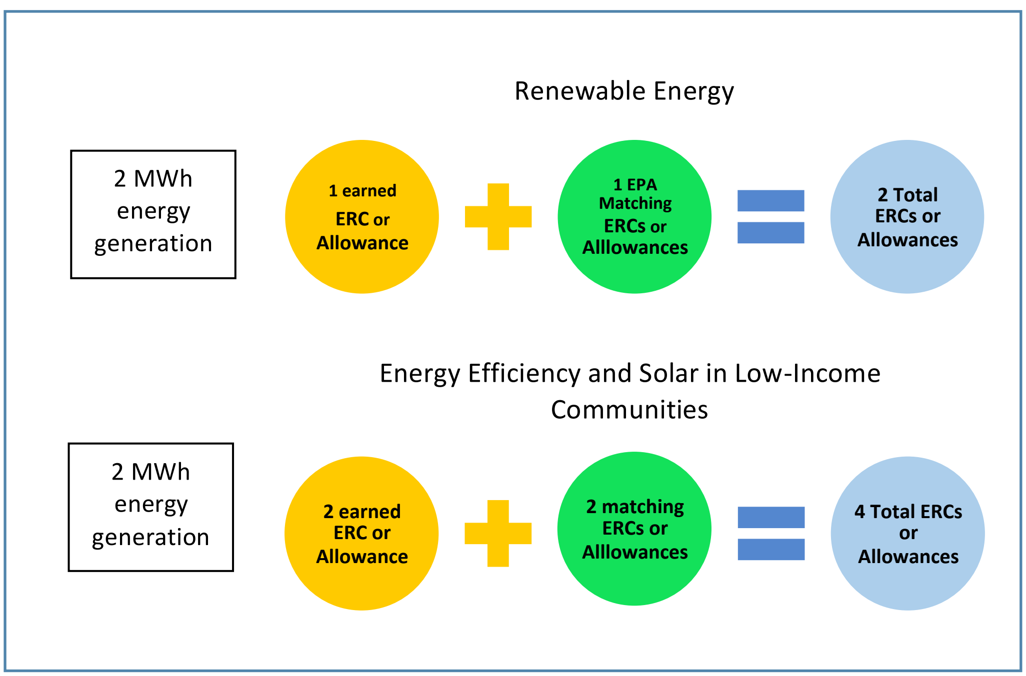
It should be noted that the CEIP, a *voluntary* two-year program, is the only component that explicitly addresses equity or justice considerations in the CPP. Even so the CEIP presents two shortcomings from an EJ perspective: 1) only a part of the programmatic elements of the CEIP focuses on addressing EJ community needs; and 2) energy efficiency and solar incentives are targeted to low-income communities, but the CEIP is mute on the needs and concerns of Native and communities of color. In other words, the CEIP offers an income-based incentive, but does not address disparities based on race. Moreover, there is no requirement that low income communities be a part of a state's participation in the CEIP. States can select to implement renewable energy and energy efficiency projects in non low-income communities if they choose, the only consequence is the incentive is lowered in that they would receive a one-to-one match of tradable carbon units, rather than the two-to-one match.

The intent of the CEIP as outlined in the CPP is to encourage states to engage in early actions that reduce emissions by implementing energy efficiency and renewable energy projects before 2022 when the formal compliance period begins. If states choose to participate in the program, they can count emissions reductions toward their state target. EPA incentivizes this early action by providing matching allowances (if states use a mass-based approach) or ERCs (if states use a rate-based approach) for CO2 reductions achieved through the program up to a program maximum of 300 million tons of CO2.

[7] EPA released the proposed CEIP for comment on June 16, 2016. There is a 60 day public comment period. Because of timing, this paper does not delve into the specifics of the CEIP.

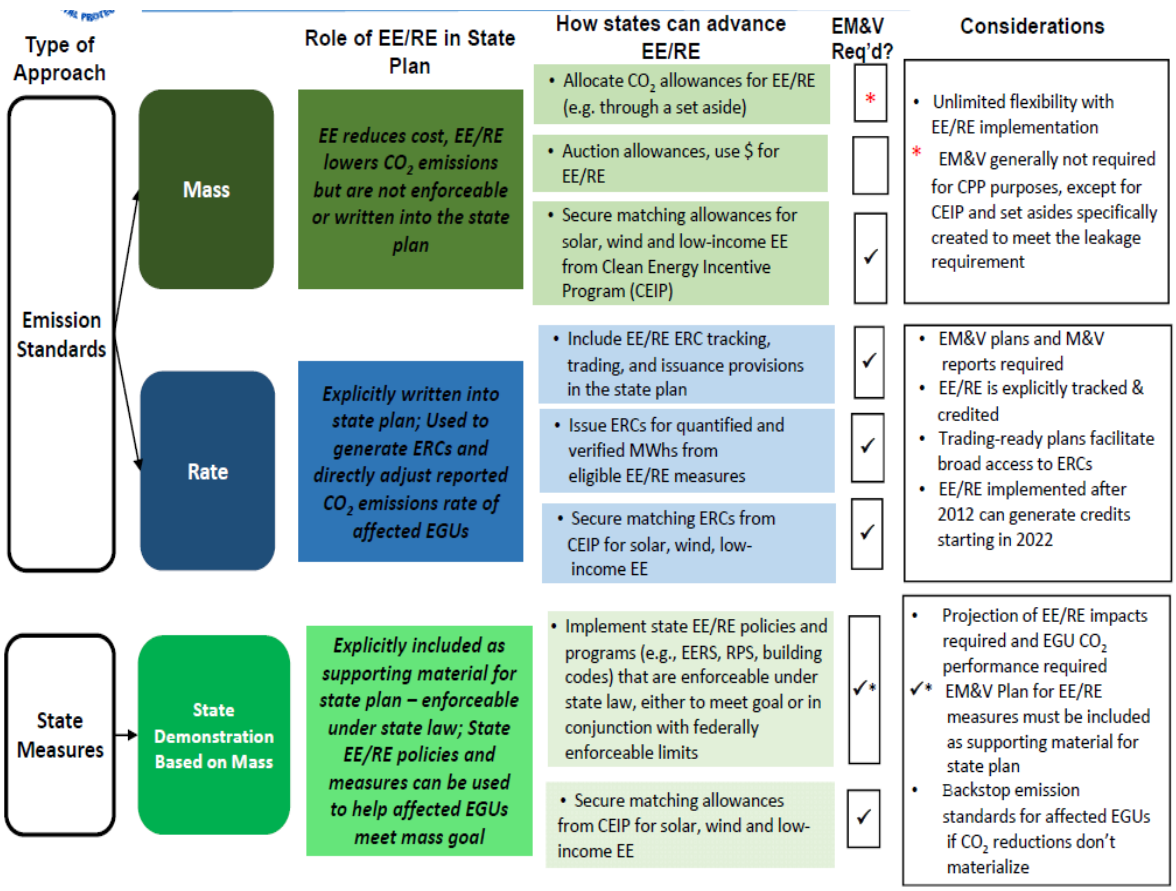
This matching pool of 300 million tons, it is proposed, will be apportioned pro rata among participating states based on the amount of reductions (state targets) each state is required to achieve (EPA 2016a, pg. 20). Half the pool is dedicated to renewable energy projects (solar, wind, geothermal, and/or hydropower) and half the pool is dedicated to solar projects and energy efficiency in low-income communities. If implemented in low-income communities both solar and energy efficiency are incentivized with a two-to-one match. EPA indicates that their “analysis do not support the need for a reserve for low income community projects larger than 150 million allowances/187.5 million ERCS in order to meet demand during the CEIP period, even with the two-to-one award for such projects” (EPA, 2016a, pg. 66).

Figure 1. Energy Efficiency and Renewable Energy CEIP Matches



In the proposed CEIP, EPA refers to this as the “low-income community reserve” and has expanded “flexibility of projects” to include residences, non-profit commercial buildings, transmission and distribution projects that reduce electricity use on the customer side of the meter (EPA, 2016a, pg. 52). Allowances or ERCs earned through the CEIP can then either be applied to the state targets, or traded in the market (EPA, 2016a, pg. 59-60).[8 9] Figure 2 outlines the energy efficiency pathway toward compliance of the different approaches available to the states.

Figure 2. Energy Efficiency/Renewable Energy in the Clean Power Plan (US EPA)



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[8] Similarly, RE is incentivized with a one-to-one match, although there is no preference to equity (low income targets) in the RE incentives.

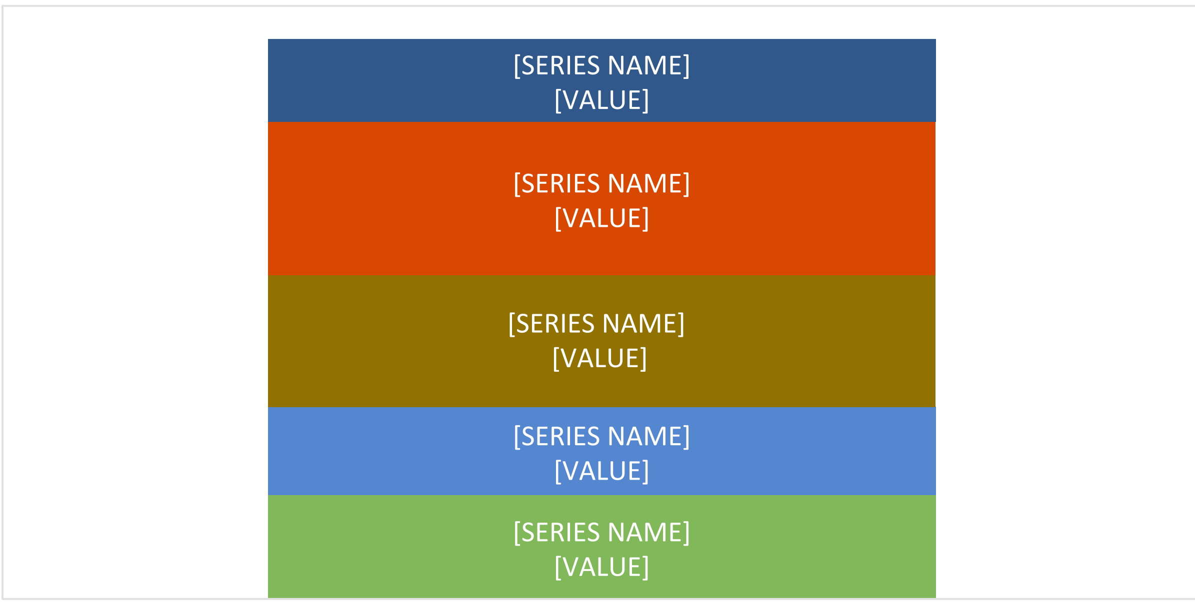
[9] If a state chooses a rate based plan, every verified MWh of zero-carbon electricity receives 1 ERC from the state, and 1 ERC from EPA. If a state chooses a mass-based plan, the project would be eligible to receive 0.8 allowances from the state and 0.8 allowances from the EPA.

History of Energy efficiency

In order to address the EJ issues with respect to energy efficiency in the CPP, it is necessary to understand the history and context of how this infrastructure has developed over the last 40 years. The origins of energy efficiency as a viable and accepted energy option can be traced back to the 1970s when the energy crisis brought on by the oil embargoes sent energy price shocks that reverberated throughout the economy. Fuel price increases directly affected all sectors including the electricity sector, and the dramatic need to reduce costs led to focused attention on developing "demand side" management and renewable energy. Demand side management is a term used to describe the process of managing or reducing the demand for electricity (which includes energy efficiency). This was the first serious effort to provide public support for energy efficiency and renewable energy.

Since then, the development of a variety of federal, state and local policies have been instrumental in building an energy efficiency and renewable energy infrastructure. In addition, both have been the beneficiaries of decades of research and development (R&D) investment, which made these technologies economically cost effective. In the early years between 1973 through 1977 the federal government spent about $2.5 billion (in constant FY2013 dollars) on renewable energy, $890 million on energy efficiency, and $180 million on electric systems R&D. The Department of Energy (DOE) was established in 1977 and its R&D spending between 2005 and 2014 totaled $7.87 billion for renewable energy and $6.7 billion for energy efficiency, for a combined total of $14.57 billion (Sissine, 2014, p. 6). While this is a quite substantial figure, it still represents roughly two-thirds of DOE R&D spending for fossil fuels and nuclear power, which continue to receive the bulk of public R&D support (See Figure 3). Nonetheless, the impact of both public and private energy efficiency and renewable energy R&D investments has been instrumental in the development and adoption of these technologies. It is also not surprising that energy efficiency programs which were initially developed to meet the needs of the utility sector during a time of substantially increasing fuel costs, continue to be embedded within the utility structure. This is important for a number of reasons that will be highlighted in the following sections of this paper.

Figure 3. Energy R&D Cumulative Funding Totals, 2005-2014 (billions of 2013 dollars)



(Source: Sissine, 2014)

Energy efficiency and Environmental Justice

Today, energy efficiency encompasses a wide range of incentives and programs administered or delivered at the local, state, and federal levels. Some examples include federal and state efficiency standards for appliances; state and local building energy codes; tax credits and other incentive programs for both energy producers and energy consumers; and labeling programs (e.g., ENERGY STAR ((Doris, Cochran, & Vorum, 2009). Still, despite the advancement of these programs, issues of environmental justice have not been central to energy efficiency planning and policy in the U.S. To do the degree it is addressed, equity research and analysis is almost exclusively focused on concerns about ratepayer impacts.[10] The concept of energy burden has developed as a way to describe and analyze the changes in the proportion of household income that is required to for energy costs and is tied to the larger issue of energy affordability. At this time, there is no standard threshold(s) to define an affordable level of household energy costs, as a standard for the affordable proportion of household income that should be directed for energy at the household level has not yet been developed (U.S. DOE, 2011). Energy burden simply refers to the percentage of household income required to pay for utility energy costs. Various studies have identified anywhere from 6 percent to 10 percent as an affordable level (Fisher, Sheehan and Colton) .

In the absence of standardized energy affordability thresholds, those concerned with the problem of energy cost impacts on families and communities have begun to address the issue. Fisher, Colton and Sheehan have developed a tool for assessing the gap between energy costs and what is affordable based on household income levels.[11] As shown in Table 1, when aggregated to a Census Region level, 6 of the 9 regions have experienced an *increased* gap in affordability since 2011. The East South Central and Pacific experienced the highest gap increases, and in only two regions, Middle Atlantic and New England, do we see a decrease.

Importantly, energy burdens and lack of affordability have an impact on family well-being in a number of ways. In a 2011 survey of low-income households, the National Energy Assistance Directors Association (NEADA) found that some of the coping options families resort to in attempting to deal with high energy costs have significant impacts on their well-being:

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[10] Energy burden refers to proportion of household income that is "burdened" by the cost of energy or the share of annual household income that is used to pay annual energy bills. Building on the concept of energy burden, there are also concepts such as energy affordability gap, household energy insecurity, and energy or fuel poverty. Studies that examine ratepayer impacts focus on the impact of electricity rates that may result because of environmental regulations, and whether such changes increase the burden on low income households.

[11] Fisher, Sheehan and Colton methodology for developing the energy affordability gap can be accessed at http://www.homeenergyaffordabilitygap.com/01_whatIsHEAG2.html

- 24% went without food for at least one day
- 37% went without medical or dental care.
- 34% did not fill a prescription or took less than the full dose
- 19% had someone become sick because their home was too cold

Table 1. Energy Affordability Gap by Census Region (2011, 2015)

Region	Home Energy Affordability Gap 2011	Home Energy Affordability Gap 2015	LIHEAP Allocation ($000,s)	Number of HH <150% FPL	Heating/Cooling Bills "Covered by LIHEAP	Home Energy Affordability Gap Index (2011 Baseline)
East North Central	$6,428,502,561	$6,395,164,500	$647,893	4,404,904	707,830	99.5
East South Central	$2,659,129,715	$3,768,338,720	$169,558	2,164,241	184,430	141.7
Middle Atlantic	$6,935,724,277	$4,829,121,822	$706,421	3,431,741	766,194	69.6
Mountain	$1,298,705,415	$1,364,899,634	$166,374	2,142,686	278,218	105.1
New England	$2,940,690,791	$2,721,575,756	$338,628	1,055,548	241,152	92.5
Pacific	$3,205,835,024	$4,182,227,526	$278,703	4,478,847	561,896	130.5
South Atlantic	$7,992,087,977	$9,593,468,217	$444,592	5,919,031	458,723	120
West North Central	$2,218,897,046	$2,686,137,856	$335,616	1,825,660	366,073	121.1
West South Central	$4,918,069,787	$5,594,500,370	$212,220	3,841,374	239,466	113.8

(Fisher, Colton and Sheehan)

The Center for Disease Control (CDC) also found that between 2006 and 2010, 10,649 deaths were due to weather-related causes. Excessive natural heat was either the underlying cause or a contributing cause of death for 3,332 (31%) of these deaths; exposure to excessive natural cold or hypothermia accounted for 6,660 (63%) of deaths; and the remaining 6% were attributed to floods, storms, or lightning (Berko, et al, 2014). How much of a contributing factor was the lack of energy affordability or access was not a part of the report. It is clear however, that while a great deal of attention is paid to disaster-related climate change impacts on communities, exposure to heat and cold is by far a deadlier problem.

The concepts of energy security/insecurity are being used as a way of addressing the impacts that result for families due to compromised access to affordable and sustainable energy services. Cook et al., define energy security as the “consistent access to enough of the kinds of energy needed for a healthy and safe life in the geographic area where a household is located (2008, pg. 3869)". This means that household members "are able to obtain the energy needed to heat/cool their home and operate lighting, refrigeration, and appliances while maintaining expenditures for other necessities (e.g., rent, food, clothing, transportation, child care, medical care) (Cook, 2008, pg e869)." Alternatively, energy insecurity occurs when a household "lacks consistent access to the amount or the kind of energy needed for a healthy and safe life for its members." (Cook, et al., 2008, p. e869). Hernandez et al., define energy insecurity as the "inability to adequately meet basic household heating, cooling, and energy needs. . . and is a pervasive and often-overlooked problem for low-income families with children." (Hernandez, Aratani, & Jiang, 2014, p. 3). In their study, Cook et al., found that energy insecurity is associated with "poor health status, life-time hospitalizations, and parents' report of developmental concerns among infants and toddlers" (Cook, et al., 2008, p. e874).

Interestingly, the release of the final CPP rule has resulted in a minor increase in interest in equity in energy planning. A handful of new reports that focus on equity have been released (Drehobl and Ross, 2016; Cluett, et al., 2016; Berelson, 2014). However, in comparison to the explosion of CPP analyses that focus on nearly every other aspect of the CPP, equity is by far the least analyzed. From an EJ perspective this is particularly troublesome. As energy efficiency/renewable energy become the pathways to a new energy economy, the implications for the distribution of the benefits and costs of these energy alternatives in terms of how they are produced and who has access are critical to future social and environmental sustainability. If justice and equity are not included as goals at the onset, there is no reason to believe that the new green economy can or will address the disparities that are present in the present fossil fuel-based economy.

It is this context which EJ assesses the role of energy efficiency in climate mitigation policy. CO2 reduction is obviously the target outcome for the energy efficiency strategy in the CPP. However, when

CO_2 is the sole measure of effectiveness, without integration of other social and economic concerns, implementation can reinforce inequality and unsustainability for EJ communities.

Structural Energy Efficiency Challenges to EJ in the CPP and Climate Policy

The CPP and other climate-related policies suffer from a critical lack of incorporation of environmental justice or equity in both their development and implementation. In this section, several points of EJ concern are identified with brief summaries about how they potentially increase disproportionate and unequal outcomes, even as states may successfully attain compliance. It is important to note that raising these concerns do not in any way diminish EJ support for real and effective climate mitigation regulations. In fact, polls show that people of color exhibit strong concern about climate change and support climate policy and legislation (Davenport, 2015; Leiserowitz and Akerlof, 2010). This is of significance because EJ concerns about the architecture of the CPP are sometimes construed as undermining effective climate policy and regulation. Yet, from an EJ perspective, it is quite the opposite – that is, addressing EJ concerns can result in more equitable, effective and sustainable climate policy in the long term.

Carbon Reductionism

The role of energy efficiency in the CPP is as a mechanism to reduce carbon emissions which states can utilize in their strategies for achieving compliance. From an EJ perspective, the use of energy efficiency is critical to addressing climate change, however, the institutional context in which energy efficiency is developed and implemented, and upon which the CPP relies, is problematic. In this case efficiency is almost exclusively valued for its carbon reduction role, regardless of other social, environmental and economic factors. This results in what some of called a condition of carbon reductionism, which is basically the "reduction of the complex problems of climate change to the single issue of net CO_2 emissions," and "has led to a conceptual focus on abstract carbon that excludes consideration of its wider context" (Moolna, 2012 p 2). The tension arises because, as Moolna notes, there “has been such a focus on carbon that it has become removed from its environmental and social (and even climate) context” (2012, pg. 1).

In the case of energy efficiency in the CPP, carbon reductionism manifests in several areas. First, the only equity-specific component of the CPP is in the voluntary CEIP. Given this, the CPP basically relegates equity to a voluntary, and relatively small and finite program in the climate mitigation rule. While it is true, that verifiable and quantifiable energy efficiency in Native, communities of color and low income communities can be used for state compliance, there is no other incentive or requirement within the CPP to target these EJ communities or to address other social, economic and environmental issues. As will be discussed below, this potentially reinforces inequity in that the existing energy efficiency infrastructure as it currently operates underserves EJ communities. The second EJ concern is that, the valuation of energy efficiency in the CPP is via carbon trading currencies (ERCs or Allowances). In effect, energy efficiency is valorized solely in terms of carbon reductions, exclusive of any other social, health, economic or distributive criterion. This means that carbon reductions achieved through energy efficiency is monetized through the carbon trading market, regardless of who benefits or how these benefits are distributed in the carbon market scheme. Moolna suggests that such actions have “been favored by politicians perhaps because it replaces the irreducible complexity of global climate dynamics with a digestible concept, and by business because it allows the commodification essential to making climate tradable” (2012, pg. 1).

EJ concerns about carbon trading are being articulated elsewhere, and is not the specific focus of this paper. But it is important to mention that these concerns center on the potential problem of creating pollution ‘hot spots.’ Hot spots, places which accumulate pollution-creating NIMBY facilities, are possible because of the differential costs associated with pollution control. If the costs of carbon reduction are higher in plants in EJ communities, carbon trading can lead to increased carbon and co-pollution in these communities, as lower cost reductions are pursued elsewhere. The result is that in aggregate there may be CO2 reductions, but some units may experience smaller decreases, and perhaps increases, while other units exhibit relatively higher decreases. The problem is that there is yet to be a determination as whether hot spots in EJ communities is expected. This is of significance because while carbon is a global pollutant, the other co-pollutants that are by-products of fossil-fuel combustion (PM, HAPs, VOCs) have local health impacts. Therefore, the potential of the CPP, through carbon trading to result in EJ hot spots is one of the major reasons there was an EJ call for an equity impact analysis of the CPP as the rule was developed (see also Sheats, 2016; Baptista, 2016).

Other EJ concerns include the following:

- Low hanging fruit bias
- Program costs for energy efficiency Implementation
- Household versus community-oriented energy efficiency implementation
- Equity programs dominated by rate-payer assistance
- Energy efficiency is Independent from Pollutant Reductions
- Racial analysis unaddressed

Communities and the Low-Hanging Fruit Bias

Over the last several years, the prevailing perspective that "[e]fficiency is the low-hanging fruit of the clean-energy revolution" (Oppenheim, Beinhocker, & Farrell, 2008). This iconic metaphor (of low-hanging fruit) has emerged as a way of describing the promise and potential of energy efficiency in the clean energy transition and in climate mitigation. The concept refers to the idea that numerous opportunities to reduce energy consumption exist and are ready to be exploited with low-cost, low investment, easy to implement measures, which also provide significant returns on investment. Energy efficiency as the low-hanging fruit of the energy transition is important – as President Obama has affirmed in his remarks before the signing of the Energy Efficiency Improvement Act in 2015, "I hope that we can use this to build even more progress in the future, because we've got a lot more work to do. There's a lot of *low-hanging fruit* -- this is the area where we can have the greatest environmental impact while making sure that we're creating good jobs and saving businesses and consumers money (italics added)" (Obama, 2009).

Vandenberg, Barkenbus and Gilligan identify five criteria that form the basis of energy efficiency as low-hanging fruit, and therefore serve as guideposts for energy efficiency investment. These are (2008, pg. 1709):

- **Magnitude**—the emissions reductions from the activity should be of a size that *justifies* expending time and money on the measures necessary to reduce the emissions (italics added);
- **National Economic Cost**—the economic cost of the energy efficiency measures should be equal to or less than that of other measures;
- **Out-of-Pocket Government Cost**—the out-of-pocket cost to the government should not exceed levels that are viable in the current or reasonably foreseeable future political climate;
- **Personal Economic Cost**—the economic benefits to individuals should equal or exceed the costs; and
- **Other Personal Barriers**—individuals should not face other barriers to reducing emissions, such as initial capital investment requirements, lack of necessary infrastructure, substantial time demands, or countervailing personal or social norm-based pressure.

In the residential sector, low-hanging fruit this translated into an informal designation of 'efficiency-ready' households. These are households in which energy efficiency can be implemented at relatively low cost. This essentially means that these homes must be in a condition to be able to cost effectively accept energy efficiency technologies and services; have the resources and capacity to share in the cost of implementing energy efficiency measures; can generate enough energy savings to justify energy efficiency investments; and whose residents can effectively utilize these energy efficiency technologies.

Using the above criteria, however, it is clear that energy efficiency in low-income communities do not easily meet these low-hanging fruit criteria, particularly when compared to their middle and upper income counterparts. The result, whether intentional or unintentional, is that by first targeting the low-hanging fruit, energy efficiency programs have increased capital investments for middle and upper income efficiency-ready housing and infrastructure that have lower energy efficiency implementation costs; greater ability to share the costs of implementation; and aggregate savings that are sufficient to offset the costs of implementing energy efficiency measures. Historic disinvestment in certain communities, i.e. EJ communities, has resulted in older and capital challenged community infrastructures, thereby excluding them as targets for low-hanging fruit programs.

The conditions of housing stock and infrastructure in EJ neighborhoods and communities still lag behind higher income communities due to a persistent pattern of disinvestment. In a Robert Woods Johnson issue brief notes that "[n]early one fifth of all Americans—about 52 million people—live in poor neighborhoods (i.e., neighborhoods in which at least 20 percent of residents are poor)" (2008, pg. 5). Moreover, racial segregation continues to be a fact of U.S. life, even when income is taken into account. The "uneven pattern of neighborhood disadvantage across racial or ethnic groups is not fully explained by differences in family income. Among families with similar incomes, blacks and Hispanics live in neighborhoods with higher concentrations of poverty than whites" (Robert Woods Johnson Foundation, 2008, p. 5). The result is that as energy efficiency programs and investment have evolved over the last 25 years, an inherent bias toward middle and upper income residential communities over low and moderate income communities has potentially widened the infrastructure gap. The role of energy efficiency programs in maintaining and reinforcing this biased investment pattern should be investigated.

Program Costs and Potential Impacts for Equitable Energy Efficiency Investment

In order to illustrate how energy efficiency as a carbon mitigation strategy based solely on carbon reduction and implementation cost criteria poses challenges to serving EJ communities, a review of the breakdown of program costs is required. Energy efficiency programs are devised to serve different sectors – industrial, commercial, agricultural, residential and low-income. Evaluations of these programs show that low-income programs have higher costs, and constitute a small proportion of energy savings when compared to the residential sector as a whole, and to the commercial, industrial and agricultural sectors. In an assessment of electric energy efficiency programs, Hoffman et al., found that program administration costs for low income programs are seven times higher than for general residential programs (2015). The reason for this is that participants in residential programs usually share the costs of energy efficiency measures,[12] whereas the capacity to share in these costs is obviously economically challenging for low-income families. The result is that nearly all costs for low-income programs are absorbed by the program or project. As Hoffman notes, the "cost contribution from participating low-income customers tends to be modest in these programs (~10 percent of project cost), with program administrators most often paying the full cost of comprehensive retrofits of older, lower-quality housing, in which basic repairs may be a prerequisite for efficiency improvements" (Hoffman et al, 2015, pg. 12)

Table 2 shows that the total cost of saved electricity for low income energy programs is approximately 14.2 cents per kWh, compared to only 3.3 cents per kWh for the residential sector. Low-income programs have over 4 times the program costs. One reason for this is that there is significant variability in the quality of existing housing stock. Not all housing is efficiency-ready, that is, in a condition that readily matches the services offered by energy efficiency programs. In their study, Cluett et al, explain that low income energy efficiency programs "commonly find some type of health, safety, moisture, durability, and/or structural issue that requires repair before energy efficiency improvements can be made … and are a challenge for implementing low-income weatherization services. While major issues can render households ineligible for weatherization altogether, more-minor issues can add up to

[12] For example, efficient appliance programs provide rebates, but the cost of purchasing the new appliance is borne by the customer; low-interest loans, similarly subsidize efficiency, however the customer is responsible for a significant portion of the capital needed for purchases

make the cost of energy efficiency improvements too high to meet cost–benefit tests" (Cluett, Amann, & Ou, 2016, pp. 13-14).

In addition to the overall higher costs of energy efficiency measures for low-income communities, there is the problem of who pays for these measures. The share of the cost of low-income energy efficiency delivery programs were almost entirely borne by the program itself, 13.4 cents per KWh and less than 1 cent per kWh is paid by the resident customers. In the residential sector the share of energy efficiency measures was almost evenly distributed between the program administrator and the residential customer, 1.9 cents/kWh and 1.4 cents/kWh respectively. Overall, the program administration cost of energy efficiency measures in the residential sector are 1.9 cents per kWh compared to 13.4 cents per kWh for low-income programs (Hoffman et al., 2015). The CPP's two-to-one match of ERCs and allowances through the CEIP are inadequate to address the program cost barriers for low-income energy efficiency programs. In fact, given that program administration costs are *seven times* greater than residential programs, the CEIP incentive is likely insufficient to effectively incentivize energy efficiency in low income communities unless the health and environmental co-benefits of energy efficiency are also included. Yet, as noted above energy efficiency in the CPP and CEIP only include carbon reductions in their accounting for incentives and compliance.

Table 2. Savings-weighted average total cost of saved electricity by sector

Sector	Total cost of Saved Electricity (2012 $/kWh)*	Program Administrator Cost of Saved Electricity (2012 $/kWh)	Participant Cost of Saved Electricity (2012 $/kWh)
All Sectors	$0.046	$0.023	$0.022
Residential	$0.033	$0.019	$0.014
Commercial, Industrial and Agricultural	$0.055	$0.025	$0.030
Low Income	$0.142	$0.134	$0.008

* Totals differ due to rounding; based on 2009-2013 data. (Source: Hoffman, et al., 2015)

An another bias element in energy efficiency as it is currently implemented, is the problem of qualitative distinctions in energy consumption. From a purely carbon and energy reduction standpoint all energy consumption is the same, regardless of its end use. Unlike in the international climate agenda where basic energy needs are understood to be a priority and a human right, there has been little to no attention to different energy needs in our domestic agenda. Any distinction between energy used for luxury amenities versus basic living needs is nonexistent. Yet, this has important equity and justice implications. As Schaffer and Reibling note, "high-income households use more energy because they can afford a more resourceful lifestyle" which includes among other factors, larger dwellings and a higher number of appliances and energy using amenities. Put simply, from a social equity standpoint, improving the efficiency of a swimming pool does not equate to improving the efficiency of a low-income heating cooling system. Consequently, a given amount of energy can produce very different levels of comfort, health and safety. Schaffr and Reibling conclude that given the disparities in the housing stock and urban infrastructure, "low-income households need more energy to produce a similar level of comfort. As a result, if we take differences in need factors (e.g. time spent at home, building conditions) into account, inequalities may be even larger than a mere descriptive comparison of energy use between income groups might suggest." The result, again, is that the current energy efficiency system which relies on purely quantitative calculations of emissions reductions (and costs), excluding social costs and benefits actually reinforces and promotes inequality.

From an EJ perspective, the current energy efficiency delivery infrastructure presents a contradiction. On the one hand, low-income energy efficiency offers real and viable opportunities to realize multiple social, economic and health co-benefits – that is, energy efficiency can result in health and economic improvements for families, as well as community revitalization in EJ communities. On the other hand, the existing energy efficiency delivery infrastructure and the costs associated with how low-income programs are delivered result in dis-incentivizing energy efficiency in low income communities.

Household versus Community-Oriented Energy efficiency

Very little research has focused on the issue of energy services using the community as the planning unit. Nearly all research and policy analyses on energy efficiency and energy issues have focused on the individual household and sector level (residential, industrial, commercial, etc.). While this is important, it neglects the reality of EJ community experiences. The foundation of the EJ framework is built on the fact that the health and well-being of community members is the result of the full set of cumulative risks, stressors, and assets that are present in their communities. The problem is that Native, communities of color and low income communities have experienced higher pollution risks and burdens, and simultaneously must also fight for sustainability or green investments in a manner that discourages gentrification and displacement.

Sustainable energy planning has for the most part lacked any attention to place-based strategy. Yet, in reality there is a wide range of interactions that make up daily energy consumption – schools; businesses; public buildings, libraries, community buildings such as community centers, and other supportive service buildings. All of these make up the infrastructure of a community, and collectively have an impact on residents' quality of life.

Place-based energy efficiency programs that target middle and upper income neighborhoods and communities have been in operation.[13] However, a comprehensive assessment of energy services for EJ neighborhoods has not entered into the energy efficiency agenda. EJ communities have a history of capital disinvestment both in the private housing stock, but in the community building infrastructure as well. Yet, programs targeting small and minority owned businesses; schools in EJ communities; and community buildings largely do not exist. The closest the energy sector has come is in prioritizing the

[13] In conversation with the director of an energy services provider in Minneapolis, MN and CEED staff, he stated that low-income neighborhoods were not a priority for efficiency services. Instead, middle and upper income households were encouraged to organize by residential blocks to more efficiently and cost-effectively provide energy efficiency services by the program administrator.

MUSH sector (municipalities, universities, schools, hospitals) for investment. However, the rational for targeting MUSH is due to the fact that these institutions represent very large energy consumers, and therefore energy efficiency services can result in larger savings. Equity and justice criteria are equally marginalized in MUSH programs, if they are addressed at all.

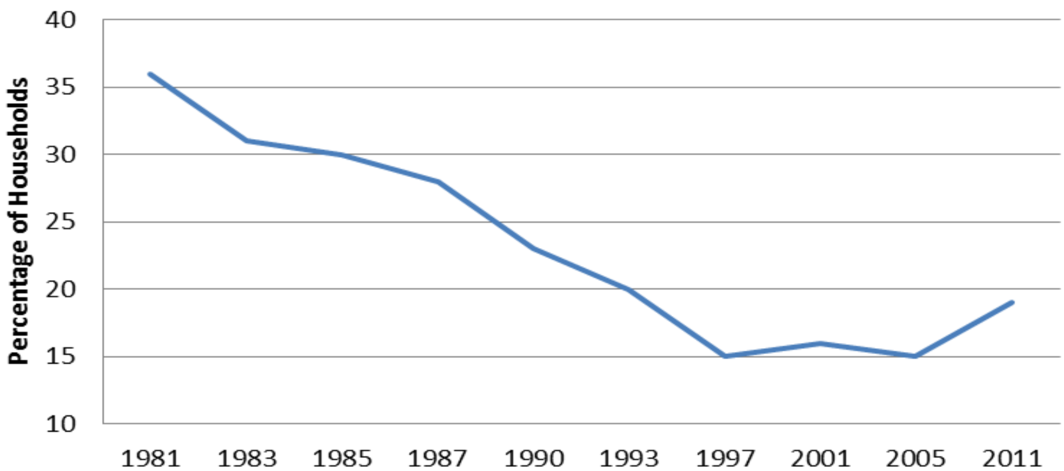
This is a critical shortcoming in the way energy efficiency service delivery is understood, and is reinforced by the methodologies used for research and data collection in energy and energy efficiency planning and analysis.

Low-income Energy Programs Dominated by Rate-Payer Assistance

There are two types of programs that currently serve low-income communities, weatherization (which includes services that reduce energy consumption from electricity, natural gas and other energy sources (energy efficiency), and rate-payer assistance programs. Funding for these programs are available from a variety of public and private sources. At the federal level the two major programs are the Low Income Home Energy Assistance Program (LIHEAP) and the Weatherization Assistance Program (WAP). LIHEAP is a block grant program for assistance to low-income households to meet their home energy costs, provides assistance for energy crisis situations, and low-cost residential weatherization and energy-related home repairs (up to 15 percent or 25 percent of the grant if a waiver is approved).

According to the LIHEAP Clearinghouse, rate-payer assistance constitutes *80 percent of total resources for low-income households*, with energy efficiency constituting only 20 percent (n.d.). WAP is a formula grant program to states for energy efficiency for low income households, and is administered by (DOE). While an important source of funding, LIHEAP actually exceeds WAP funding and both, these programs are vastly under-funded and are consistently unable to meet existing needs.

Figure 4. Percentage of Eligible Households Served by LIHEAP



(Source: LIHEAP Home Energy Notebook for Fiscal Year 2011; LIHEAP Clearinghouse Report, 2015)

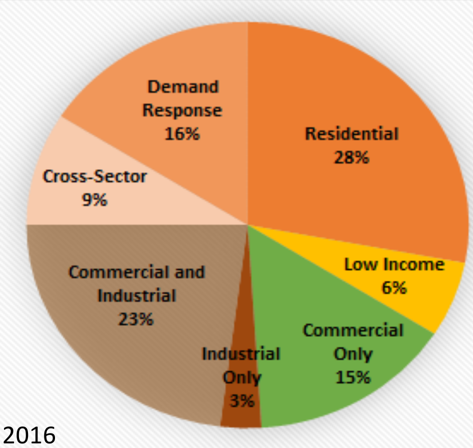
According to the National Energy Assistance Directors Association (NEADA), the number of households receiving energy assistance declined by 17 percent between 2010 and 2013 as funding declined. At its peak LIHEAP served 21% of households federally eligible (Perl, 2013), but in addition to underfunding, when energy prices increase, the purchasing power of LIHEAP assistance is compromised (Berelson, 2014). This is what occurred when between 2010 and 2013, when purchasing power of the average LIHEAP grant was reduced by more than $100 (Campaign for Home Energy Assistance, 2014, p. 4).

In addition to LIHEAP and WAP, there are a number of other federal programs that have an energy services component including HUD housing programs, the Temporary Assistance to Needy Families (TANF), and the Community Services Block Grant (CSBG). State funding sources include ratepayer funds (a surcharge on customers' utility bills), state general funds, and non-governmental support which includes private nonprofit and religious organizations (Landey & Rzad, 2014).

Although there is great variety of energy efficiency programs for all sectors, utilities continue to be the main supplier of energy efficiency services. The American Council for an Energy Efficient Economy (ACEEE) reports that in 2014, utility-based electric energy efficiency, which is largely funded through ratepayer charges, totaled $5.7 billion (Gilleo, et al., 2015). Similarly, according to the Consortium on Energy efficiency (CEE), an industry association, when combining ratepayer and non-ratepayer sources of funding, electric efficiency program budgets reached $6.7 billion in 2015. These ratepayer dollars comprised over 96 percent of funding for electric DSM [demand side management] programs in the U.S. (CEE, 2016, p. 25).[14]

Figure 5 shows program budgets by category between 2010 to 2014. Residential programs constitute a little under one-third of energy efficiency program budgets, and low-income program budgets were only about 6 percent of total budgets making it the lowest budgeted program. There are numerous reasons for this, including the fact that the industrial and commercial sectors are large energy users, thereby they also have a high energy reduction potential and are specifically targeted for energy efficiency.

Figure 5. Distribution of Energy Efficiency Program Budgets by Sector



Source: CEE, 2016

[14] The Regional Greenhouse Gas Initiative (RGGI) comprised 1.69 percent, and constituted seven percent of the total funding reported in RGGI states in 2015 (CEE, 2016, p. 25).

Ratepayer assistance is, of course, a much needed program in the context of the energy affordability gap that was discussed earlier. The benefits of this are critical, in that households with the least income capacity receive support to ensure they can meet their basic energy needs. In addition, states have various rules which limits disconnections for vulnerable families during times of critical energy conditions (cold weather, very high heat days, etc.). Even so, as noted earlier, current funding does not meet the needs of the most income vulnerable. A LIHEAP Clearinghouse report states that less that LIHEAP supports approximately 20 percent of the households eligible to receive energy assistance (2013).

The problem with these programs from an EJ perspective is that the bulk of energy assistance is essentially assistance for direct utility payments (nearly 76 percent), while approximately 24 percent are for programs to reduce inefficient energy consumption in low income households. Clearly a priority in federal policy is to ensure utility rate payments over improving the energy conditions of low-income households and communities. It is critical to examine, when energy programs claim low-income benefits to distinguish whether it is rate payer assistance or actual energy improvements in the household or community.

Race is an EJ Issue

Research on the issue of race-based disparities with respect to energy production and consumption is an area which continues to be underdeveloped. To the degree that equity and justice have been addressed in energy planning, the focus has almost been almost exclusively on income-based concerns. Yet, there has been documentation in various EJ studies that race is as significant a factor, and in some cases even more significant a factor, as income. In an evaluation of weatherization programs conducted by Oak Ridge National Laboratory, it was found that roughly half of those who had their homes weatherized are white; only 16 percent Black, 5 percent Latino and less than four percent

American Indian/Alaskan Native, Asian or Native Hawaiian/Pacific Islander (2008 data)[15] (Bensch, et al., 2014, pg. 84). Analyses on the racial distribution of energy costs and benefits is only now emerging, and is an area in much need of further research.

In the CPP, the CEIP provides modest incentives for energy efficiency in low-income communities, but does not address the problem or potentiality of race-based disparities. The question that will bear examining is, if the incentives provided by the CPP do result in greater energy efficiency programs across communities, will they be equitably distributed across race. In comments to the proposed rule, there were requests for equity analyses on the potential distribution of both the benefits and costs of CPP compliance – specifically identifying energy efficiency and renewable energy as benefits (CEED, 2014). Without referencing or incentivizing equitable delivery of energy efficiency services with respect to race, the potential for exacerbating racial disparities through energy efficiency investments especially in segregated areas becomes even more possible.

Conclusion and Recommendations

Climate mitigation policy is strongly supported by the environmental justice movement. Not only are EJ communities on the frontline of climate change, but also just as fundamentally from the EJ perspective, it is considered a moral obligation to act in a manner that is respectful to, and does not violate the environment. This paper is an effort to identify important issues of concern with regard to employing energy efficiency as a mitigation mechanism. The intent is not to discourage the use of energy efficiency. To the contrary, energy efficiency is critically important, and if designed and implemented with equity at the center, can be one of the most effective climate strategies that achieves both environmental and social sustainability. Herein lies the difficult, but not unsurmountable challenge. To the extent that energy and climate policy maintains a carbon reductionist orientation, the

[15] Based on available data. Data was not available for 22 percent of PY08 clients.

pathway to equitable energy efficiency investment and a future based on both social and environmental sustainability is undermined. In identifying equity concerns, the hope is that a pathway for creating innovative and inclusive energy efficiency policies and programs can be furthered. As noted, the research and analysis with respect to equity and climate mitigation is quite limited when compared to other compliance concerns. Moreover, most reports on the potential carbon reductions associated with energy efficiency are estimations based on a variety of assumptions. Evaluated, monitored and verified real reductions are another matter. Much of the discussion and research about energy efficiency are based on the former, and the implications of how energy efficiency programs operate on the ground are often not included. To be clear, it is not that these analyses are, in and of themselves, problematic. They do provide us with effective information and data from which to evaluate mitigation alternatives. However, they do not address the distributive (equity and justice) implementation issues. As one of the complement of papers addressing environmental justice sponsored by the Milan School, the goal of this paper is to provide some normative (principled) and practice-based questions that climate advocates and policy/regulatory actors should also consider.

Recommendations moving forward are:

1) **Improve "meaningful" participation and involvement of EJ and other equity/justice community members and organizations in energy planning.** Historically, equity/justice has not been included in energy planning. Public decision-making authorities such as the Public Utility Commissions, Public Service Commissions, and state energy agencies where important decisions are made regarding energy planning have not been a priority for EJ participation. The EJ community should be engaged in these processes, and these authorities should include plans for effective EJ community engagement.
2) **Develop community energy plans.** With interest and attention to renewable energy and energy efficiency, there has been an increase in the number of Energy Service Companies (ESCOs) and

renewable energy service providers. This is a positive trend for a clean energy transition. However, because EJ communities have largely not participated in energy planning processes, they are often subject to a top-down planning approach. It is important that EJ communities be able not only to engage in energy plannings, but to also develop energy plans that meet community energy needs. This can result in two outcomes: 1) the appropriate mix of energy technologies (solar, wind, geothermal, energy efficiency, etc.) are matched with community needs (which vary according to locality, climate, energy use, rural vs. urban, industrial/commercial/residential mix, etc.); and 2) the process of energy planning inherently intersects with other community planning concerns, including but not limited to housing, transportation, pollution reduction, food access, green spaces, and other community infrastructure development.

3) **Address racial concerns and disparities.** The role of the energy sector in either promoting or reducing racial disparities has yet to be addressed. In many respects, the energy sector today is where the housing and education sectors were in the 1950s with regard to assessing racial issues. The EJ community has consistently demanded for relief and remedy for any disproportionate pollution burdens that have occurred. Given that the energy sector is a substantial source of various pollutants, it is essential that energy alternatives are reviewed with respect to their impacts on Native, communities of color, and low-income communities.

4) **Utility programs should be required to adopt types of assessment that include benefits such as pollution reduction, health benefits, equity enhancement (i.e., reduction in energy disparities), etc.** This is one step toward institutionalizing a process for assessing future energy alternatives that include benefits beyond the sole use of carbon reductions. Many states use a social cost methodology, however, it is important to include equity impacts in the social cost calculation. Non-energy benefits are a social issue that should be addressed throughout the

energy planning system, and if energy policies and programs result in greater inequity, then a cost for this inequity should be attached.

5) **Energy efficiency and weatherization resources should, at minimum, match rate-payer assistance.** As noted, rate-payer assistance receives three-quarters of federal low-income resources, and yet meets only a fraction of the need. The root cause of the problem is an inefficient household infrastructure. While rate-payer assistance is indeed necessary (and it should in no way be construed that we are suggesting decreases in these programs), it does not address the underlying problem. As states develop their SIPs, and report on low-income benefits, energy efficiency should have at least the same level of investment as existing rate-payer assistance programs.

6) **Energy efficiency incentives should be divorced from carbon trading**. At this time there is insufficient research and analysis on the distributive (equity and justice) impacts of carbon trading. The CEIP and CPP incentives are solely based on carbon trading units. The implications are that EJ communities could simultaneously receive energy efficiency (and renewable energy) investments while experiencing no pollution reductions, and potentially increases in co-pollution emissions. In addition, the interdependent structure of the electric system, means that reductions due to energy efficiency have no impact on power plants in EJ communities. These outcomes are at cross-purposes.

7) **The level of incentive should match the actual costs of energy efficiency program implementation in low-income communities.** As noted, recent analysis on the total program costs for providing low-income energy efficiency programs is seven times that of the residential sector as whole. The 2-to1 match provided by EPA in the CEIP is inadequate to fully incentivize the program costs. The effects of this remain to be seen, however, at minimum an analysis of

the incentive required to reduce the marginal costs to achieve the desired level of low-income energy efficiency implementation should be conducted.

8) **The CEIP low-income section should not be diluted under the name of state flexibility to include sector wide benefits, which may not directly improve the condition of low-income communities.** The proposed CEIP released on June 16, 2016 proposed that renewable energy be included within the low-income allocation. In order to increase equity resources, renewable energy for low income communities should fall under the renewable energy allocation, which would essentially amount to a low-income carve out. Moreover, by including transmission and distribution projects that reduce electricity use on the customer side of the meter, general infrastructure improvements that benefit all customers can be included in the low-income allocation (presumably by simply determining the low-income proportion of customers). This in violates the principle of promoting equity/justice specific investment.

9) **Increase equity-based research and analysis.** Because there is a dearth of research on equity/justice in the energy sector, it is important to address this void. In order to reduce speculative research efforts, building the capacity of the EJ community to identify and support research is critical. Such community-based research has proved to be effective in the public health arena. This would avoid equity research that is purely funder-driven and motivated, and instead build the capacity of communities and researchers that are skilled in these issues.

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