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California Energy Commission  
**DRAFT STAFF REPORT**

# California Clean Energy Equity Framework and Indicators

An Approach for Tracking Progress of Energy  
Efficiency and Renewables for Low-Income  
Customers and Small Business Contracting  
Opportunities in Disadvantaged Communities

California Energy Commission

Edmund G. Brown Jr., Governor

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# California Energy Commission

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## ABSTRACT

This paper presents a framework and indicators to measure low-income customers' access to energy efficiency, weatherization, and renewable energy investments in California. It also recommends indicators related to contracting with small businesses located in disadvantaged communities. Leveraging existing data and indicators, the framework and indicators were developed to track progress toward implementing recommendations in the California Energy Commission's December 2016 study mandated by Senate Bill 350 (De León, Chapter 547, Statutes of 2015): *Low-Income Barriers Study, Part A: Overcoming Barriers to Energy Efficiency and Renewables for Low-Income customers and Small Business Contracting Opportunities in Disadvantaged Communities*. Also, the indicators can help identify opportunities to improve benefits for low-income customers and disadvantaged communities from California clean energy programs.

**Keywords:** Equity, indicators, energy efficiency, weatherization, photovoltaic, solar, renewables, low-income, disadvantaged communities, small business, SB 350

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# EXECUTIVE SUMMARY

In December 2016, the California Energy Commission adopted the *Low-Income Barriers Study, Part A: Overcoming Barriers to Energy Efficiency and Renewables for Low-income customers and Small Business Contracting Opportunities in Disadvantaged Communities*. The study, mandated by Senate Bill 350 (De León, Chapter 547, Statutes of 2015), included 12 recommendations to address barriers to clean energy investment in California's low-income and disadvantaged communities. The 2016 Low-Income Barriers Study included a recommendation to:

Develop standardized energy equity indicators as metrics to ensure low-income customers are being served. The purpose of metrics is to set a statewide baseline, advance energy savings, and track performance.

Building on the 2016 Low-Income Barriers Study, this study recommends a framework and indicators for the Energy Commission and other state agencies to use to track progress of clean energy equity in California.

## **A Framework for Clean Energy Equity**

The California clean energy equity framework proposed in this report identifies objectives and a set of indicators to measure progress to achieve the objectives, taking local considerations into account.

The three objectives are to:

- Advance access to clean energy, including actions to increase product selection options, access to good jobs, expand small business contracting opportunities, and improve access to nondebt financing, such as tariffed on-bill financing.
- Increase clean energy investment in low-income and disadvantaged communities, including research demonstrations, infrastructure investments, emergency preparedness, and capacity building. Capacity building includes workforce development, small business development, outreach, and education for clean energy.
- Improve local energy-related resilience, defined as energy services to support the ability of local communities to recover from grid outages. Local energy resilience includes energy reliability, energy affordability, health, and safety.

## **California Clean Energy Equity Indicators**

The framework includes two types of indicators. The first type is geospatial indicators to measure local considerations related to the local economy, geography, demography, social engagement, public health, and environmental quality. These factors interact to affect local challenges and opportunities:

- G1. Regional economic dynamics (local economic drivers, income inequality)

- G2. Climate zones (physical stressors and risks related to climate change)
- G3. Population density (multifamily housing, urban versus rural)
- G4. Local resources, including engagement (local government resources, community based organizations), utility programs, and energy infrastructure characteristics
- G5. Public health indicators (air quality, water quality, and so forth)
- G6. CalEnviroScreen score (disadvantaged communities)

This framework also includes the following performance indicators. In selecting these indicators, Energy Commission staff leveraged existing data collection and indicator development efforts. Staff reviewed reports and consulted with staff at state agencies, the U.S. Department of Energy, and the Los Angeles Department of Water and Power. Energy Commission staff proposes the following set of clean energy equity indicators:

- P1. Energy savings (megawatt-hours [MWh] or therms saved)
- P2. Number of households and small businesses served
- P3. Renewable energy MWh generated/MW installed
- P4. Proportion of low-income communities and disadvantaged communities with clean energy small business contracts by utility
- P5. Amount invested
- P6. Workforce and small business development
- P7. Number and quality of jobs
- P8. Access to jobs
- P9. System Average Interruption Duration Index (SAIDI)
- P10. Electricity bill as a proportion of income
- P11. Number of household health and safety issues abated
- P12. Proportion of critical facilities with resilient on-site generation and storage

## **Next Steps**

Staff will present this draft framework and proposed indicators at a public workshop on May 16, 2017. At the workshop, staff will seek input to improve the draft, including responses to the following questions:

- 1. How should these indicators be revised to improve measurement of clean energy access, investment, and resilience for California's low-income communities and disadvantaged communities?
- 2. How can these indicators best leverage existing equity indicators and data?
- 3. Which agency, organization, or program administrator(s) should take the lead for each indicator?
- 4. How can local priorities be most effectively integrated into these indicators?

Comments from the workshop will inform further development of this framework and indicators and preparation of a Tracking Progress summary of implementation of recommendations in the SB 350 Low-Income Barriers Study. In late 2017, staff expects to make the summary available online at [http://www.energy.ca.gov/renewables/tracking\\_progress/](http://www.energy.ca.gov/renewables/tracking_progress/).



# CHAPTER 1:

## Energy Challenges and Opportunities

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### Changing Times

California is leading by example to reduce greenhouse gas emissions to slow the rate and scale of climate change while preparing for climate change impacts that have already been set in motion. In 2012, California generated 1 percent of global greenhouse gas emissions.<sup>1</sup> By working together with other states, provinces, and communities, California can amplify the benefits of its climate change mitigation efforts. As of May 2017, 170 subnational governments, representing more than one-third of the global economy, have joined the Subnational Global Climate Leadership Memorandum of Understanding, or the *Under 2 MOU*, launched by Governor Edmund G. Brown Jr. in 2015. Members of the Under 2 MOU commit to reduce 2050 greenhouse gas emissions within their jurisdiction to 80 to 95 percent below 1990 levels, or 2 annual metric tons of carbon dioxide-equivalent per capita.

Climate change is projected to have the largest impact on low-income, people of color because they have fewer resources to avoid, withstand, or recover from extreme weather, sea level rise, and related challenges.<sup>2</sup>

Efforts to increase low-income customers' access to clean energy alternatives and expand investment in disadvantaged communities can provide new opportunities for economic growth and strengthen resilience in California.

Senate Bill 350 (De León, Chapter 547, Statutes of 2015) included ambitious goals to help California reduce greenhouse gas emissions, including doubling energy efficiency savings and procuring at least 50 percent renewable energy by 2030. SB 350 also mandated studies be conducted to improve understanding of barriers for low-income customers to access energy efficiency, weatherization, renewable energy, and zero-emission transportation options, as well as barriers to contracting opportunities for local small businesses in disadvantaged communities. The California Air Resources Board prepared and published a draft study on barriers to zero-emission transportation options and plans to publish a final guidance document later in 2017.<sup>3</sup> The Energy

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1 California Energy Commission. December 20, 2016. Tracking Progress: Greenhouse Gas Emission Reductions. [http://energy.ca.gov/renewables/tracking\\_progress/documents/Greenhouse\\_Gas\\_Emissions\\_Reductions.pdf](http://energy.ca.gov/renewables/tracking_progress/documents/Greenhouse_Gas_Emissions_Reductions.pdf).

2 Morello-Frosch, Rachel, Manuel Pastor, Jim Sadd, and Seth B. Shonkoff. May 2009. The Climate Gap: Inequalities in How Climate Change Hurts Americans and How to Close the Gap. Program for Environmental and Regional Equity (PERE) Publications. University of Southern California. <https://dornsife.usc.edu/perc/climategap/>

3 California Air Resources Board. April 12, 2017. *Low-Income Barriers Study, Part B: Overcoming barriers to Clean Transportation Access for Low-Income Residents*. Draft Guidance Document.

Commission prepared and published a study of barriers to expand low-income communities' access to energy efficiency, weatherization, and renewable energy investments, and small businesses located in disadvantaged communities.<sup>4</sup>

## Barriers

The Energy Commission's 2016 Low-Income Barriers Study categorized barriers into three broad categories: structural barriers, policy and program barriers, and small business contracting barriers. Specifically, the study identified the following structural barriers limiting low-income communities' access to energy efficiency and clean energy generation technologies:

- Low home ownership rates
- Complex needs, ownership, and financial arrangements for low-income multifamily housing
- Insufficient access to capital
- Building age
- Remote or underserved communities

The study also identified the following policy and program barriers limiting low-income customers' access to clean energy: market delivery problems, barriers to program integration (missed opportunities to streamline services), data limitations, and unrecognized non-energy benefits.

For local small businesses in disadvantaged communities, the study identified the following barriers to contracting for the provision of clean energy related services: lack of access to information, technical assistance and workforce development needs, financial obstacles and insufficient access to private funding, and a need to "level the field" by providing greater access to mentorship, networking, and subcontracting opportunities, as well as strong oversight to ensure compliance with subcontractor requirements.

## Addressing Barriers

The Barriers Study suggested five principal and seven additional recommendations to address these barriers, including a recommendation to track progress through better

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[https://www.arb.ca.gov/msprog/transoptions/draft\\_sb350\\_clean\\_transportation\\_access\\_guidance\\_document.pdf](https://www.arb.ca.gov/msprog/transoptions/draft_sb350_clean_transportation_access_guidance_document.pdf).

4 Scavo, Jordan, Suzanne Korosec, Esteban Guerrero, Bill Pennington, and Pamela Doughman. 2016. *Low-Income Barriers Study, Part A: Overcoming Barriers to Energy Efficiency and Renewables for Low-Income customers and Small Business Contracting Opportunities in Disadvantaged Communities*. California Energy Commission. Publication Number: CEC-300-2016-009-CMF. [http://doCKETpublic.energy.ca.gov/PublicDocuments/16-OIR-02/TN214830\\_20161215T184655\\_SB\\_350\\_LowIncome\\_Barriers\\_Study\\_Part\\_A\\_Commission\\_Final\\_Report.pdf](http://doCKETpublic.energy.ca.gov/PublicDocuments/16-OIR-02/TN214830_20161215T184655_SB_350_LowIncome_Barriers_Study_Part_A_Commission_Final_Report.pdf).

use of data-driven performance indicators. Each recommendation addresses a number of the barriers identified in the study.

Led by Commissioner Janea Scott, Energy Commission staff is working closely with other state agencies to implement the recommendations in Part A and Part B of the Barriers Study. The Governor's Office has organized a joint agency task force, with the support of the Energy Commission and Air Resources Board staff, to identify and prioritize near term actions state agencies should take to support implementation of the Barriers Study recommendations.

## **Leveraging Existing Indicators and Best Practices**

This report provides a draft framework and set of proposed indicators to ensure low-income customers and disadvantaged communities have equitable levels of clean energy access, investment, and resilience. These indicators will be used to set a statewide baseline, advance energy savings, and track performance. To inform further development of indicators proposed in this report, staff seeks input on available data, existing indicators, and best practices. Specifically,

1. How should these indicators be revised to improve measurement of clean energy access, investment, and resilience for California's low-income communities and disadvantaged communities?
2. How can these indicators best leverage existing equity indicators and data?
3. Which agency, organization, or program administrator(s) should take the lead for each indicator?
4. How can local priorities be most effectively integrated into these indicators?

# CHAPTER 2:

## A Framework for Clean Energy Equity

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As stated in the Energy Commission’s Barriers Study, standardized energy equity indicators should be developed to “ensure low-income customers are being served. The purpose of metrics is to set a statewide baseline, advance energy savings, and track performance.”

Energy Commission staff has identified three objectives to ensure low-income customers are being served: improve access, expand investment, and increase community resilience. Staff has also selected draft indicators of local conditions and priorities.

### Improve Access to Clean Energy

The first objective is to improve low-income customers’ access to clean energy technologies. This includes access to product selection options, access to good jobs, small-business contracting opportunities, and nondebt financing opportunities available for low-income customers and disadvantaged communities.

Indicators for product selection, small-business contracting opportunities, and nondebt financing will focus on the outcomes expected from improved product selection, such as households served (to track participation in available programs) and MWh saved (to track program effectiveness in saving energy).

In general, traditional, debt-based financing will be of limited assistance to multifamily building owners or single-family homeowners in low-income or disadvantaged communities.<sup>5</sup> There is an unmet need for expansion of other, innovative, inclusive nondebt financing opportunities for energy efficiency upgrades in rental housing in California.<sup>6, 7</sup>

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5 Stamas, Maria. September 29, 2016, Comments of the GREEN-Energy Efficiency for All Coalition, including NRDC, CHPC, AEA, Greenlining Institute, and Build It Green.  
[http://doCKETpublic.energy.ca.gov/PublicDocuments/16-OIR-02/TN213843\\_20160929T152126\\_Maria\\_Stamas\\_Comments\\_Comments\\_of\\_the\\_GREENEnergy\\_Efficiency\\_fo.pdf](http://doCKETpublic.energy.ca.gov/PublicDocuments/16-OIR-02/TN213843_20160929T152126_Maria_Stamas_Comments_Comments_of_the_GREENEnergy_Efficiency_fo.pdf).

6 Scavo, Jordan, Suzanne Korosec, Esteban Guerrero, Bill Pennington, and Pamela Doughman. 2016. *Low-Income Barriers Study, Part A: Overcoming Barriers to Energy Efficiency and Renewables for Low-Income Customers and Small Business Contracting Opportunities in Disadvantaged Communities*. California Energy Commission. Publication Number: CEC-300-2016-009-CMF.  
[http://doCKETpublic.energy.ca.gov/PublicDocuments/16-OIR-02/TN214830\\_20161215T184655\\_SB\\_350\\_LowIncome\\_Barriers\\_Study\\_Part\\_A\\_Commission\\_Final\\_Report.pdf](http://doCKETpublic.energy.ca.gov/PublicDocuments/16-OIR-02/TN214830_20161215T184655_SB_350_LowIncome_Barriers_Study_Part_A_Commission_Final_Report.pdf).

7 Schwartz, Matt, Blanca de la Cruz, Caroline McCormack, Stephanie Wang. March 2017. *Financing Energy Savings Through On-Bill Repayment: Testing a New Financing Strategy for Affordable Rental Homes in Santa Monica*. California Housing Partnership Corporation. Available online from <http://chpc.net/resources-library/>.

For example, in December 2016 comments on the SB 350 Low-Income Barriers Study, Clean Energy Works described successes achieved through tariffed on-bill programs in other states:

In particular, state energy offices in Arkansas and Tennessee have played an active role in supporting implementation of best practices, offering technical assistance, and convening stakeholders for voluntary participation in workshops designed to support program planning and implementation. In each case, only those utilities that are interested in offering an inclusive financing solution are receiving the benefits of that assistance, and the authority to decide whether to offer a tariffed on-bill program remains with the governing bodies of those utilities.<sup>8</sup>

Local conditions and priorities will affect the baseline, energy savings, and effect of actions to improve performance of these indicators. For example, a disadvantaged community in coastal San Diego County may have a large proportion of homes built in the 1960s without air conditioning or wall insulation. Historically, the weather was mild, but climate change projections indicate average temperatures will rise in coming decades, making it increasingly difficult to remain comfortable in such housing.

Residents, especially renters, are likely to seek low-cost air conditioning options in greater numbers over time, although they may not be able to afford to operate the units as frequently as needed to maintain comfort. Access to programs or business models to provide incentives to homeowners to bring homes up to current Title 24 building efficiency standards at no or low cost to renters would provide energy savings important to the renter and avoid potential load growth in local energy use.

Indicators should include data to track changes over time within a disadvantaged community in comparison to neighboring communities and other disadvantaged communities in California.

## **Expand Clean Energy Investment**

The second objective is to expand investment in disadvantaged communities in California. This includes investments in building-owner investments, research demonstrations, infrastructure, emergency preparedness, and capacity building, including investments in local small businesses.

Motivating building owners to invest is the most critical step to make a sea change in low-income programs. The framework is clear about the importance of building owner engagement, and focusing on identifying and removing the barriers that cause building

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<sup>8</sup> Hummel, Holmes. December 8, 2016. Clean Energy Works Comments: On Revised Draft of the SB 350 Barriers Study. [http://doCKETpublic.energy.ca.gov/PublicDocuments/16-OIR-02/TN214717\\_20161208T200842\\_Holmes\\_Hummel\\_Comments\\_Comments\\_on\\_Revised\\_Draft\\_of\\_the\\_SB350\\_B.pdf](http://doCKETpublic.energy.ca.gov/PublicDocuments/16-OIR-02/TN214717_20161208T200842_Holmes_Hummel_Comments_Comments_on_Revised_Draft_of_the_SB350_B.pdf).

owners not to invest. The framework includes explicit indicators regarding the extent that this is happening and the success of removing barriers to building owner investment.

## Increase Resilience

The third objective is to improve resilience, defined as the ability to recover from extreme weather, fires, flooding, electricity outages, and other disasters. This includes energy reliability, energy affordability (energy burden), health, and safety.

In comments informing development of the SB 350 Low-Income Barriers report, GREEN-Energy Efficiency for All Coalition (GREEN-EEFA) highlighted the importance of addressing the energy burden through energy efficiency programs and metrics. Specifically, it recommended “low-income programs contain overall energy savings and energy burden reduction goals. Setting a high-level goal will ensure programs are optimized to achieve it. The Energy Commission further recommends these metrics be tracked over time to assess program success at reducing bills and achieving savings. Refocusing on energy burden reductions will also require low-income efficiency programs to provide funding for measures with significant bill and energy usage reduction potential.”<sup>9</sup>

Table 1 shows how each recommendation in the SB 350 Low-Income Barriers report will contribute to the three objectives: access, investment, and resilience. However, the primary effect of each recommendation is indicated by the table cells highlighted in green.

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9 Stamas, Maria. September 29, 2016, Comments of the GREEN-Energy Efficiency for All Coalition, including NRDC, CHPC, AEA, Greenlining Institute, and Build It Green. [http://docketpublic.energy.ca.gov/PublicDocuments/16-OIR-02/TN213843\\_20160929T152126\\_Maria\\_Stamas\\_Comments\\_of\\_the\\_GREENEnergy\\_Efficiency\\_fo.pdf](http://docketpublic.energy.ca.gov/PublicDocuments/16-OIR-02/TN213843_20160929T152126_Maria_Stamas_Comments_of_the_GREENEnergy_Efficiency_fo.pdf).

**Table 1: Objectives Addressed by SB 350 Low-Income Recommendations**

<b>SB 350 Low-Income Recommendation</b>	<b>Access</b>	<b>Investment</b>	<b>Resilience</b>
1. Task force	Product selection Nondebt financing Small business opps	Infrastructure Emergency prep Capacity building	Energy reliability Energy affordability Health Safety
2. Community solar	Product selection Nondebt financing Small business opps	Infrastructure Emergency prep Capacity building	Energy reliability Energy affordability
3. Workforce development	Nondebt financing Small business opps	Capacity building	Health Safety
4. Clean energy financing pilot programs	Product selection Nondebt financing Small business opps	Invest. by owner Infrastructure Emergency prep Capacity building	Energy affordability Health Safety
5. Common performance metrics and data	Product selection Nondebt financing Small business opps	Invest. by owner Research demo Infrastructure Emergency prep Capacity building	Energy reliability Energy affordability Health Safety
6. Access to solar energy technologies	Product selection Nondebt financing Small business opps	Infrastructure Emergency prep Capacity building	Energy reliability Energy affordability
7. Affordable housing tax credits	Product selection Nondebt financing Small business opps	Invest. by owner Infrastructure Emergency prep Capacity building	Energy affordability Health Safety
8. Regional one-stop pilots	Product selection Nondebt financing Small business opps	Capacity building	Energy reliability Energy affordability Health Safety
9. Investigate the need for heightened clean energy consumer protection	Product selection Small business opps	Capacity building	Safety
10. Collaboration with community-based organizations	Product selection Nondebt financing Small business opps	Capacity building	Energy affordability Health Safety
11. R&D to benefit disadvantaged communities	Product Selection Nondebt financing Small business opps	Research demo	Energy reliability Energy affordability Health Safety
12. Study on small-business contracting opportunities	Product selection Nondebt financing Small business opps	Capacity building	Energy affordability Health Safety

Source: California Energy Commission staff, based on Scavo, Jordan, Suzanne Korosec, Esteban Guerrero, Bill Pennington, and Pamela Doughman. 2016. *Low-Income Barriers Study, Part A: Overcoming Barriers to Energy Efficiency and Renewables for Low-Income Customers and Small Business Contracting Opportunities in Disadvantaged Communities*. California Energy Commission. Publication Number: CEC-300-2016-009-CMF.

## Local Conditions and Priorities

Local conditions help identify opportunities to improve clean energy access, investment, and resilience. For example, access to affordable air conditioning in one part of the state may be a large factor for public health; in another location, it may be less essential. Place-based considerations related to the local economy, geography, demography, social engagement, public health, and environmental quality interact to affect local energy-related challenges and opportunities. This framework includes the following geospatial indicators of local conditions and priorities. Where data are available, staff plans to apply these indicators at the census tract level:

- G1. Regional economic dynamics (local economic drivers, income inequality)
- G2. Climate zones (physical stressors and risks related to climate change)
- G3. Population density (multifamily housing, urban versus rural)
- G4. Local resources, including local engagement (local government resources, community-based organizations), utility programs, and energy infrastructure characteristics (ability to absorb additional local energy resources)
- G5. Public health indicators (air quality, water quality, and so forth)
- G6. CalEnviroScreen score (disadvantaged communities)

For example, Los Angeles Department of Water and Power used its equity indicators to identify census tracts with fewer rooftop solar systems installed than other census tracts in their service territory. LADWP used this information to target development of its community solar program to increase clean energy investment where most needed.

# CHAPTER 3:

## Tracking Progress With Energy Equity Performance Indicators

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This framework includes geospatial and performance indicators. The geospatial indicators are widely available. The performance indicators need further input to clarify existing data sources and applicable lead agencies.

In selecting proposed clean energy equity performance indicators, Energy Commission staff leveraged existing data collection and indicator development efforts. Staff reviewed published reports and consulted with relevant experts, including staff at state agencies, the U.S. Department of Energy and the Los Angeles Department of Water and Power. Staff seeks input on data sources and lead agencies for the following indicators.

Staff proposes the following set of clean energy equity performance indicators to measure progress toward expanding clean energy access, investment, and resilience in California's low-income and disadvantaged communities. Where feasible, each performance indicator will be measured by census tract (or zip code, if necessary) to facilitate comparison of performance across geospatial indicators. Criteria for selection included data availability and relevancy. All indicators are relevant to the following cross-cutting Barriers Study recommendations: Recommendation 1 (Task Force) and Recommendation 5 (Metrics and Data). Relevance of indicators to other recommendations is described below and summarized in Table 2.

### Proposed Performance Indicators and Data Sources

Each proposed performance indicator is described below along with potential data sources.

- P1. **Energy savings (MWh or therms saved).** This indicator measures energy saved from energy efficiency measures installed through implementing recommendations in the SB 350 Low-Income Barriers report. This indicator applies to all three objectives: access (outcome of product selection, nondebt financing, and small business opportunities); investment (outcome of research and demonstration, emergency preparedness); and resilience (component of energy affordability). Place-based considerations to be taken into account when using this indicator include climate zone and expected increase in extreme heat events due to climate change and local resources (achieved proportion of willingness to participate in direct install programs). This indicator is most applicable to the following Low-Income Barrier report recommendations:
  - a. Energy efficiency financing pilots (Recommendation 4)
  - b. Affordable housing credits (Recommendation 7)

- c. State-local collaboration (Recommendation 10)
- d. Research and development (Recommendation 11)

Data sources for this indicator will be the evaluation, measurement, and verification reports required for each program. Key resources include:

- a. Energy efficiency program tracking data and evaluation studies, and cost-effectiveness tools available from the California Energy Efficiency Statistics. <http://eestats.cpuc.ca.gov/Default.aspx>.
- b. Publicly owned utility energy efficiency and performance metrics that are available from the California Energy Commission at [http://www.energy.ca.gov/pou\\_reporting/background/metrics.html](http://www.energy.ca.gov/pou_reporting/background/metrics.html).
- c. The definition by the American Council for an Energy-Efficient Economy (ACEEE) of industry performance metrics used by California publicly owned electric utilities, including energy savings. For more information, see <http://aceee.org/ee-metrics>.
- d. The U.S. DOE State and Local Energy Efficiency Action Network (SEE Action) Evaluation, Measurement, and Verification (EM&V) Resource Portal at <https://www4.eere.energy.gov/seeaction/evaluation-measurement-and-verification-resource-portal>.

**P2. Number of households and small businesses served.** This indicator measures the number of households and small businesses served in low-income and disadvantaged communities. This indicator measures progress toward expanding access to energy efficiency and renewable energy, including product selection, nondebt financing, and small business opportunities. Place-based considerations related to this indicator include regional economic dynamics (technologies most relevant to local economic conditions, income inequality), climate zones (technologies most relevant to local climate-related stressors and risks), population density (multifamily housing, urban versus rural), and local engagement (participation of local government and community-based organizations). This indicator applies to the following recommendations:

- a. Solar access (Recommendation 6)
- b. One-stop shop (Recommendation 8)
- c. Investigating the need for heightened energy consumer protection (Recommendation 9)
- d. Small business opportunities (Recommendation 12)

Data for this indicator will be the number of households and small businesses participating in programs to expand access to energy efficiency and renewable energy product selection, nondebt financing, and small business opportunities. Data should be collected from program administrators. For example, one-stop

shops could survey communities within their region to assess local availability of services and products from energy service companies accredited by the National Association of Energy Service Companies. The survey could include feedback from customers, small businesses, and service providers on lessons learned, success stories, and remaining needs. Data should include the census tract of the participant and the service provider to simplify targeting resources to underserved low-income and disadvantaged communities, taking the following local conditions into account: regional economic dynamics (technologies most relevant to local economic conditions), climate zones (technologies most relevant to local climate-related stressors and risks), population density (government and private-sector energy-related services and programs available for urban versus rural locations), and local engagement (resources available to local communities from local government and community-based organizations).

**P3. Renewable energy MWh generated per year/MW installed.**

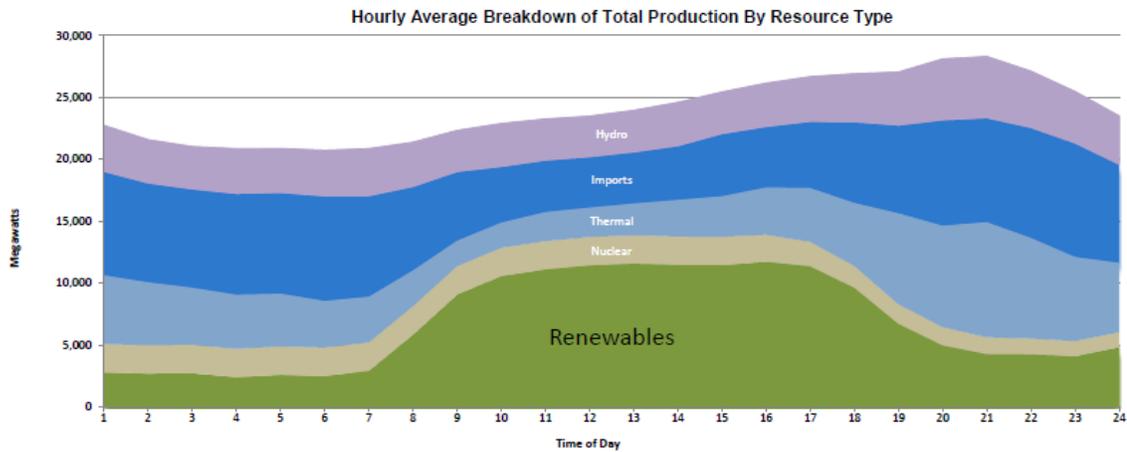
This indicator will measure the amount of renewable energy generated per year per megawatt installed where data are available. Where data are not available, estimates of generation will be used based on net load or other applicable data. This indicator measures how well renewable energy systems perform, reflecting on the quality of the site and workmanship of installation/operation. The objectives addressed by this indicator include access (product selection), investment (research demonstration, infrastructure, emergency preparedness, and capacity building), and resilience (reliability and affordability). Place-based considerations for this indicator include climate zone (insolation), and population density (multifamily housing, distributed versus utility-scale renewable energy), and energy infrastructure characteristics (ability to absorb additional local energy resources). This indicator applies to the following recommendations:

- a. Community solar (Recommendation 2)
- b. Workforce development (Recommendation 3)
- c. Access to solar technologies (Recommendation 6)
- d. Research and development (Recommendation 11)

These data should be collected by energy service companies, system operators, utilities, or California ISO, as applicable, annually to assess the performance of installed systems relative to the installed capacity. For example, the California ISO provides the hourly average breakdown of total production by resource type (Figure 1). For wind and solar, the California ISO summarizes this information on annual basis to indicate the amount and timing of afternoon ramp needed from other resources (Figure 2). Where data are available, actual energy generation, installed capacity, and the ratio should be reported by census tract, zip code, or climate zone, depending on the level of aggregation, or collection, needed to

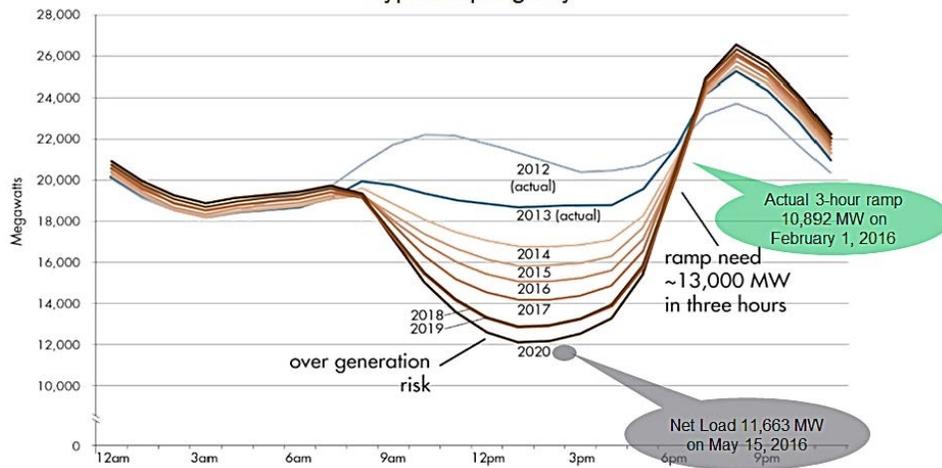
protect private information. Locational information is needed to target additional resources to underserved communities, taking into account climate zone (insolation) and population density (available locations for rooftop versus ground-mounted systems).

**Figure 1: California ISO: Total Hourly Electricity Production by Resource Type for Saturday, April 22, 2017**



Source: California ISO, Renewables Watch. Saturday, April 22, 2017.

**Figure 2: California ISO Net Load Curve Typical Spring Day**



Source: California ISO, 2016, Fast Facts: What the duck curve tells us about managing a green grid.

**P4. Proportion of low-income and disadvantaged communities with clean energy small business contracts.**

This indicator will measure the number of low-income and disadvantaged communities with clean energy small business contracts divided by the total number of low-income and disadvantaged communities. This will identify specific communities in need of additional assistance to improve the success of local small businesses in bidding for utility and government contracting opportunities. The objectives addressed by this indicator include access (small business opportunities) and investment (capacity building, research and development). Place-based considerations include regional economic dynamics (number of small businesses by zip code), population density (urban versus rural, proximity to distributed versus utility-scale renewable energy), local resources (availability/proximity of services from the electric utility, local chamber of commerce, business incubators, and federal small-business support agencies), and CalEnviroScreen score (disadvantaged communities). This indicator applies to the following recommendations:

- a. Community solar (Recommendation 2)
- b. Workforce development (Recommendation 3)
- c. Energy efficiency financing pilots (Recommendation 4)
- d. Access to solar technologies (Recommendation 6)
- e. Research and development (Recommendation 11)
- f. Small business opportunities (Recommendation 12)

For state contracts, the California Department of General Services Office of Small Business and Disabled Veteran Business Enterprise Services provides annual consolidated reports.<sup>10</sup> Staff seeks input on publicly available data regarding utility contracts with small businesses. In addition, data are needed for this indicator on how much state and utility funding is allocated to small businesses in disadvantaged and low-income communities. The data should include the number of employees in each small business.

**P5. Amount invested.**

This indicator will measure the amount of energy-related state, utility, and private-sector funding invested in low-income and disadvantaged communities by targeted sectors and statewide. Targeted sectors include market-rate rental housing (single and multifamily), affordable housing (single and multifamily), tenant-occupied commercial buildings, energy infrastructure (distribution

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<sup>10</sup> For example, the report for FY 2015-2016 is available online at <https://www.documents.dgs.ca.gov/pd/smallbus/ReportsPage/FY2015-16/FY2015-16AnnualReport.pdf>.

system upgrades), and local community and critical facilities (food banks, community centers, churches, fueling stations, fire stations, police stations, hospitals, and evacuation centers). This indicator addresses the objective of increasing energy-related investment in low-income and disadvantaged communities through research and development, infrastructure, and emergency preparation. Place-based considerations include regional economic dynamics (agriculture, local industry), climate zones (physical stressors and risks related to climate change), population density (urban versus rural), local engagement (availability of local government resources, community-based organizations), public health indicators (air quality, water quality, and so forth), and CalEnviroScreen score (disadvantaged communities). This indicator applies to the following recommendations:

- a. Community solar (Recommendation 2)
- b. Energy efficiency financing pilots (Recommendation 4)
- c. Access to solar technologies (Recommendation 6)
- d. Affordable housing credits (Recommendation 7)
- e. Research and development (Recommendation 11)

Data on the amount of energy-related state funding should be available from program administrators. Data on the amount of greenhouse gas reduction fund investments is available from the California Air Resources Board.<sup>11</sup> Data on the amount of utility funds invested in energy efficiency and renewable energy are available from <http://eestats.cpuc.ca.gov/>. Data for utility investments in other energy-related facilities should be available from the CPUC or utilities in general rate cases. Staff seeks recommendations for data on the amount of private- or nonprofit-sector funding for energy efficiency and renewable energy. In particular, staff seeks input on data sources, surveys, and responsible entities to identify the extent that building owners are investing in energy efficiency and renewable energy and the success of removing barriers to building-owner investment.

**P6. Workforce and small business development.** Staff seeks input on existing equity indicators and best practices for tracking workforce and small business development and placement. This purpose of this indicator is to address the following objectives: to expand access (small business opportunities) and increase investment (capacity building).<sup>12</sup> Local considerations include regional

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<sup>11</sup> For example, see California Climate Investments. March 2017. 2017 Annual Report: California Climate Investments Using Cap-and-Trade Auction Proceeds. Greenhouse Gas Reduction Fund Monies. [https://www.arb.ca.gov/cc/capandtrade/auctionproceeds/cci\\_annual\\_report\\_2017.pdf](https://www.arb.ca.gov/cc/capandtrade/auctionproceeds/cci_annual_report_2017.pdf).

<sup>12</sup> For example, the Union of Concerned Scientists and Greenlining published a report noting the importance of access to training to expand access to clean energy jobs. See Chandler, Sara, Joel Espino, and Jimmy O’Dea. October 2016. *Delivering Opportunity: How Electric Buses and Trucks Can Create Jobs and Improve Public*

economic dynamics (income inequality),<sup>13</sup> climate zones (physical stressors and risks related to climate change), population density (urban versus rural), local resources (availability of local government resources, community-based organizations), public health indicators (air quality, water quality, and so forth), and CalEnviroScreen score (disadvantaged communities). This indicator is applicable to the following recommendation:

- Workforce development (Recommendation 3)

To match workforce and small business development with anticipated job availability, potential sources of data for this indicator include:

- e. Data from training providers on the number of people completing applicable training programs for energy efficiency, photovoltaic, energy storage, and other clean energy jobs. Data should include the census tract or zip code of the training facility and trainees to identify underserved communities.
- f. Data from training providers on the number of small businesses sending employees to energy efficiency or clean energy training. Data should include the census tract or zip code of the training facility and small businesses represented among trainees to identify underserved communities.
- g. Publicly available data clean energy industry trends and anticipated job growth. These data can help identify unmet needs and expected clean energy private-sector job growth in or near low-income and disadvantaged communities.

#### **P7. Number and quality of jobs.**

This indicator measures the number and quality (wages and working conditions) of jobs created to provide energy-related services by targeted sector. This indicator will be used to identify adjustments needed to job training services and energy-related investment to match workforce and small business development with anticipated job availability by targeted sector. Targeted sectors focus on energy-related services with unmet need and expected job growth in or near low-income and disadvantaged communities. This indicator addresses the following

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*Health in California.* <http://www.ucsusa.org/sites/default/files/attach/2016/10/UCS-Electric-Buses-Report.pdf>.

<sup>13</sup> For example, what are the local trends in low-wage, middle-wage, and high-wage jobs? For a discussion of trends in the San Francisco Bay Area Region, see PolicyLink and the Program for Environmental and Regional Equity (PERE) at the University of Southern California, April 2015. An Equity Profile of the San Francisco Bay Area Region. Summary. [http://dornsife.usc.edu/assets/sites/242/docs/Bay\\_Area\\_Summary\\_21April2015\\_Final.pdf](http://dornsife.usc.edu/assets/sites/242/docs/Bay_Area_Summary_21April2015_Final.pdf).

objectives: to expand access (access to good jobs and small business opportunities) and increase investment (capacity building). Place-based considerations include regional economic dynamics (agriculture, local industry), climate zones and climate change (physical stressors and risks related to climate change), population density (urban versus rural), local engagement (availability of local government resources, community-based organizations), public health indicators (air quality, water quality, and so forth), and CalEnviroScreen score (disadvantaged communities). This indicator applies to:

- a. Task force (Recommendation 1)
- b. Community solar (Recommendation 2)
- c. Workforce development (Recommendation 3)
- d. Energy upgrade financing pilot programs (Recommendation 4)
- e. Access to solar (Recommendation 6)
- f. Affordable housing credits (Recommendation 7)
- g. One-stop shops (Recommendation 8)
- h. Small business opportunities (Recommendation 12)

The California Employment Development Department provides official monthly estimates of job creation. Data are available statewide, by county, and by metropolitan area. Data are also available by industry classification.<sup>14</sup>

**P8. Job Access.** This indicator measures whether people living in disadvantaged communities are getting jobs in clean energy. Targeted sectors focus on energy-related services with unmet need and expected job growth in or near low-income and disadvantaged communities. This indicator addresses the following objectives: to expand access (access to good jobs and small business opportunities) and increase investment (capacity building). Local considerations include regional economic dynamics (agriculture, local industry), climate zones and climate change (physical stressors and risks related to climate change), population density (urban versus rural), local engagement (availability of local government resources, community-based organizations), public health indicators (air quality, water quality, and so forth), and CalEnviroScreen score (disadvantaged communities). This indicator applies to:

- a. Task force (Recommendation 1)
- b. Community solar (Recommendation 2)
- c. Workforce development (Recommendation 3)

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<sup>14</sup> <http://www.labormarketinfo.edd.ca.gov/>.

- d. Energy upgrade financing pilot programs (Recommendation 4)
- e. Access to solar (Recommendation 6)
- f. Affordable housing credits (Recommendation 7)
- g. One-stop shops (Recommendation 8)
- h. Small business opportunities (Recommendation 12)

Staff seeks input on the best data available for this indicator.

**P9. System Average Interruption Duration Index (SAIDI).** This indicates the duration (measured in minutes) of outages per customer per year using the adopted CPUC method.<sup>15</sup> This indicator addresses the objective to improve community resilience. Within the indicator framework described in Chapter 2, this indicator represents the energy reliability category. Together, California’s three largest investor-owned utilities – Pacific Gas and Electric, Southern California Edison, and San Diego Gas & Electric – measure this indicator for 60 subregions. Leveraging these data, this indicator will use the following place-based considerations to identify locations in need of additional improvement from an equity perspective: climate zones and climate change (physical stressors and risks related to climate change), population density (urban versus rural), and CalEnviroScreen score (disadvantaged communities). This indicator applies to the following recommendations:

- a. Community solar (Recommendation 2)
- b. Access to solar technologies (Recommendation 6)
- c. One-stop shop (Recommendation 8)
- d. Research and development (Recommendation 11)

For this indicator, staff proposes to use the CPUC method, which includes “all generation, transmission, and distribution outages, excluding planned and CAISO outages.”<sup>16</sup> Under California Public Utilities Code Section 2774.1, this is one of the indicators reported annually and used to determine areas that require

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15 For more information on this indicator, see Kurtovich, Martin and Marzia Zafar. May 9, 2016. *California Electric Reliability Investor-Owned Utilities Performance Review 2006-2015*. California Public Utilities Commission. Available online at [http://www.cpuc.ca.gov/uploadedFiles/CPUC\\_Public\\_Website/Content/About\\_Us/Organization/Divisions/Policy\\_and\\_Planning/PPD\\_Work/PPD\\_Work\\_Products\\_\(2014\\_forward\)/PPD%20Reliability%20Review.pdf](http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/About_Us/Organization/Divisions/Policy_and_Planning/PPD_Work/PPD_Work_Products_(2014_forward)/PPD%20Reliability%20Review.pdf).

16 For more information on this indicator, see Kurtovich, Martin and Marzia Zafar. May 9, 2016. *California Electric Reliability Investor-Owned Utilities Performance Review 2006-2015*. California Public Utilities Commission. Available online at [http://www.cpuc.ca.gov/uploadedFiles/CPUC\\_Public\\_Website/Content/About\\_Us/Organization/Divisions/Policy\\_and\\_Planning/PPD\\_Work/PPD\\_Work\\_Products\\_\(2014\\_forward\)/PPD%20Reliability%20Review.pdf](http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/About_Us/Organization/Divisions/Policy_and_Planning/PPD_Work/PPD_Work_Products_(2014_forward)/PPD%20Reliability%20Review.pdf).

investment to improve reliability deficiencies. The CPUC method calculates SAIDI as the total minutes customers were without power due to sustained outages divided by the total number of customers.

**P10. Electricity bill as a proportion of income.** This indicator will measure the average expenditure as a proportion of average income per year by county for owners and renters. This indicator addresses the objective to increase resilience (energy affordability). Place-based considerations include climate zones and public health indicators (air quality). This indicator applies to the following recommendations:

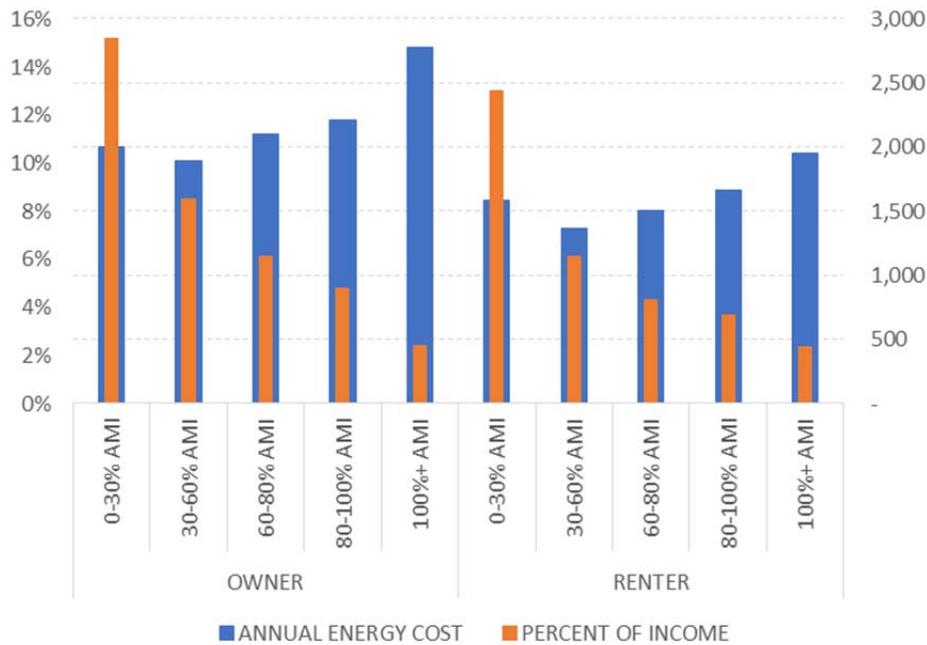
- a. Task force (Recommendation 1)
- b. Community solar (Recommendation 2)
- c. Energy upgrade financing pilot programs (Recommendation 4)
- d. Access to solar technologies (Recommendation 6)
- e. Affordable housing credits (Recommendation 7)
- f. One-stop shops (Recommendation 8)
- g. State-local program collaboration (Recommendation 10)
- h. Research and development (Recommendation 11)
- i. Small business opportunities study (Recommendation 12)

For this indicator, staff suggests two potential data sources. The first is the energy burden methodology used in the 2013 Low-Income Needs Assessment, which measured energy costs as a percentage of household income through a telephone survey, utility billing data, and self-reported income.<sup>17</sup> The second is the U.S. DOE energy burden indicator, which is based on average expenditures/average income, \$/year for owners and renters by county. Figure 3 shows an example of these preliminary data for Fresno County for 2014.

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<sup>17</sup> Evergreen Economics. December 15, 2016. Needs Assessment for the Energy Savings Assistance and the California Alternate Rates for Energy Programs. Final Report. Volume 1 and Volume 2. Prepared for the California Public Utilities Commission, Southern California Edison, Pacific Gas and Electric Company, San Diego Gas & Electric, and Southern California Gas Company. CALMAC ID: SCE0396.01 and SCE0396.02.

**Figure 3: 2014 Energy Burden (Avg. Expend./Avg. Income, \$/yr.) for Fresno County**



Source: U.S. Department of Energy, Clean Energy for Low Income Communities Accelerator

**P11. Number of household health and safety issues abated.** This indicator will measure the number of reported household health and safety issues abated as non-energy cobenefits for energy-related investments. This indicator addresses the objective to increase resilience of low-income and disadvantaged communities. Local considerations for this indicator include climate zones and climate change (physical stressors and risks related to climate change), population density (urban versus rural), and public health indicators (air quality, water quality, and so forth). This indicator applies to the following recommendations:

- a. Investigating the need for heightened energy consumer protection (Recommendation 9)
- b. Research and development (Recommendation 11)
- c. Small business opportunities study (Recommendation 12)

Staff seeks input on sources of data and responsible agencies for this indicator. Here are some existing resources staff aims to leverage for this indicator:

- a. Data from existing health and safety funds for issues that require abatement before energy efficiency retrofits can begin, such as lead, asbestos, mold remediation, deferred maintenance, and other issues.

Examples include the Brace and Bolt program and Clean Energy Works.<sup>18</sup>

- b. Lisa Skumatz, *Non-Energy Benefits/Non-Energy Impacts and Their Role & Values in Cost-Effectiveness Tests: State of Maryland*. (2014).<sup>19</sup>
- c. The California Environmental Health Tracking Program has data on healthy housing for California, including lead, asthma, and other information.<sup>20</sup>
- d. The California Department of Health Building Resilience Against Climate Effects (CalBRACE) Project produced climate change and health indicators for California communities, including an indicator of vulnerability to extreme heat and population density living near areas vulnerable to sea level rise. These indicators are available through Cal-Adapt and can be used to when assessing place-based climate risk considerations and health-related vulnerabilities.
- e. The Healthy Communities Data and Indicators project provides a range of statistical measures and tools for evaluating the effect of programs and policies on community health.<sup>21</sup> Examples include:<sup>22</sup>
  - Annual average number of unhealthy days of ozone air pollution.
  - Average ambient PM2.5 concentration.
  - Unsafe drinking water.
- f. Bay Area LISC and Build It Green identify indoor air quality concerns to address when rehabilitating multifamily buildings, including testing for lead and asbestos, installing ENERGY STAR® fans that vent to the outside, avoiding interior products with urea formaldehyde

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18 Stamas, Maria. September 29, 2016, Comments of the GREEN-Energy Efficiency for All Coalition, including NRDC, CHPC, AEA, Greenlining Institute, and Build It Green. [http://docketpublic.energy.ca.gov/PublicDocuments/16-OIR-02/TN213843\\_20160929T152126\\_Maria\\_Stamas\\_Comments\\_of\\_the\\_GREENEnergy\\_Efficiency\\_fo.pdf](http://docketpublic.energy.ca.gov/PublicDocuments/16-OIR-02/TN213843_20160929T152126_Maria_Stamas_Comments_of_the_GREENEnergy_Efficiency_fo.pdf).

19 <http://energyefficiencyforall.org/resources/non-energy-benefitsnon-energy-impacts-nebsneis-and-their-role-values-cost-effectiveness>.

20 For more information, see [http://cehtp.org/page/healthyhousing/healthy\\_housing\\_data](http://cehtp.org/page/healthyhousing/healthy_housing_data).

21 California Department of Human Health, *Healthy Communities Data and Indicators Project*, Summary and link, docketed in the Energy Commission's SB 350 Barriers Report docket 16-OIR-02. [http://docketpublic.energy.ca.gov/PublicDocuments/16-OIR-02/TN211062\\_20160414T130314\\_Healthy\\_Communities\\_Data\\_and\\_Indicators\\_Project.pdf](http://docketpublic.energy.ca.gov/PublicDocuments/16-OIR-02/TN211062_20160414T130314_Healthy_Communities_Data_and_Indicators_Project.pdf).

22 For more information, see <http://www.cdph.ca.gov/programs/Pages/HealthyCommunityIndicators.aspx>.

(such as pressed wood), and using no- or low-volatile organic compound paint, adhesives, and related products.<sup>23</sup>

- g. Local community-based data and feedback on safety concerns and solutions related to access to clean energy resources.

**P12. Proportion of critical facilities with resilient on-site generation and storage.**

This indicator will measure the number of critical facilities with on-site renewable backup generation and storage with the capability to provide on-site electricity in the event of an outage. Local community and critical facilities targeted by this measure include food banks, community centers, churches, fueling stations, fire stations, police stations, hospitals, and evacuation centers. Place-based considerations include climate zones and climate change (physical stressors and risks related to climate change), population density (urban versus rural), local engagement (availability of local government resources, community-based organizations), and public health indicators (air quality, water quality, and so forth). This indicator applies to the following recommendations

- a. Community solar (Recommendation 2)
- b. Access to solar technologies (Recommendation 6)
- c. One-stop shops (Recommendation 8)
- d. Investigating the need for heightened energy consumer protection (Recommendation 9)
- e. Research and development (Recommendation 11)

This indicator will require data from periodic surveys of local permitting agencies and utilities to identify the proportion of critical facilities with on-site renewable backup generation and storage capable of providing on-site generation in the event of an electricity outage.

Table 2 summarizes the clean energy equity indicators by SB 350 Low-Income Barriers Study recommendations.

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<sup>23</sup> [http://docketpublic.energy.ca.gov/PublicDocuments/16-OIR-02/TN211063\\_20160414T130313\\_Green\\_Rehabilitation\\_of\\_Multifamily\\_Rental\\_Properties.pdf](http://docketpublic.energy.ca.gov/PublicDocuments/16-OIR-02/TN211063_20160414T130313_Green_Rehabilitation_of_Multifamily_Rental_Properties.pdf).

**Table 2: Indicators Address SB 350 Low-Income Recommendations**

Recommendation	Indicators
1. Task force	[All 12 indicators]
2. Community solar	Renewable energy MWh-yr./MW Households/small businesses served \$ invested Electricity bill as a proportion of income \$/yr. Small business contracts SAIDI Critical facilities with renewable backup/storage
3. Workforce development	Renewable energy MWh-yr./MW Small business contracts Number of workers trained Number of jobs Reported job quality impacts
4. Clean energy financing pilot programs	Energy savings (MWh saved) \$ invested Electricity bill as a proportion of income \$/yr. Small business contracts
5. Common perf. metrics and data	[All 12 indicators]
6. Access to solar energy technologies	Households/small businesses served Renewable energy MWh-yr./MW \$ invested Electricity bill as a proportion of income \$/yr. SAIDI Small business contracts Critical facilities with renewable backup/storage
7. Affordable housing tax credits	Energy savings (MWh saved) \$ invested Electricity bill as a proportion of income \$/yr.
8. Regional one-stop pilots	Households/small businesses served Electricity bill as a proportion of income \$/yr. SAIDI Critical facilities with renewable backup/storage
9. Investigate the need for heightened clean energy consumer protection	Households/small businesses served Households health/safety issues abated Critical facilities with renewable backup/storage
10. Collaboration with community-based organizations	Energy savings (MWh saved) Electricity bill as a proportion of income \$/yr.
11. R&D to benefit disadvantaged communities	Energy savings (MWh saved) Renewable energy MWh-yr./MW Small business contracts \$ invested Electricity bill as a proportion of income \$/yr. SAIDI Household health/safety issues abated Critical facilities with renewable backup/storage
12. Study on small-business contracting opportunities	Households/small businesses served Small business contracts Electricity bill as a proportion of income \$/yr. Household health/safety issues abated

Source: California Energy Commission staff, based on Scavo, Jordan, Suzanne Korosec, Esteban Guerrero, Bill Pennington, and Pamela Doughman. 2016. *Low-Income Barriers Study, Part A: Overcoming Barriers to Energy Efficiency and Renewables for Low-Income Customers and Small Business Contracting Opportunities in Disadvantaged Communities*. California Energy Commission. Publication Number: CEC-300-2016-009-CMF.

## **Input Needed: Lead and Supporting Agencies for Geospatial Indicators and Performance Indicators**

Staff seeks input on identifying potential lead and supporting agencies for each performance indicator, leveraging existing data collection efforts.