Rooftop Energy Potential of Low Income Communities in America (REPLICA) Dataset

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Data Overview

The Rooftop Energy Potential of Low Income Communities in America (REPLICA) Dataset is a tract-level data set (vintage=2015) that provides estimates of Low and Moderate Income (LMI) rooftop solar technical potential at the tract level. The core dataset is a wide-format csv file (“seeds_ii_replica.csv”) that can be tagged to a tract geometry using the GEOID or GISJOIN fields. This dataset is intended to give researchers, planners, advocates, and policy-makers access to credible data to analyze low-income solar issues and, potentially, perform cost-benefit analysis for program design.

Acronyms

ACS	American Community Survey
AMI	Area Median Income
AQI	Air Quality Index
AQS	Air Quality System
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
DSIRE	Database of State Incentives for Renewables and Efficiency
DOE	U.S. Department of Energy
EIA	Energy Information Administration
EPA	Environmental Protection Agency
HUD	U.S. Department of Housing and Urban Development
IECC	International Energy Conservation Code
kWh	kilowatt-hour
LiDAR	Light Detecting and Ranging
LEAD	Low-Income Energy Affordability tool
LIHTC	Low-Income Tax Credit qualified tract
LMI	Low and Moderate-Income
NCES	National Center for Education Statistics
NHPD	National Public Housing Database
QCT	Qualified Census Tracts

Data Table Structures

The Rooftop Energy Potential of Low Income Communities in America (REPLICA) Dataset is comprised of 11 datasets tagged to the Census Tract and delivered in a wide-table format with each row representing a single tract. Table 1 provides a general overview of all the datasets compiled in the REPLICA Dataset . The main dataset ("LMI PV Rooftop Technical Potential") includes estimates of rooftop solar technical potential generated for the NREL-led SEEDSII project (see: https://www.nrel.gov/solar/seeds/2017-2019-study.html). The LMI solar potential estimates are made at the tract level for different demographic groups, broken out by Area Median Income (AMI) income, tenure, and building type. The remaining datasets are supplemental datasets that can be used in conjunction with the technical potential data for general LMI solar analysis, planning, and policy making. Detailed below is each component dataset.

Table 1: Datasets included as part of the SEEDS-II Secondary Market Dataset

Dataset	Source	Field Types
LMI PV Rooftop Technical Potential	Developed by NREL as part of this SEEDSII work (Sigrin and Mooney 2018).	(1) Number of households, (2) Number of solar-suitable buildings, (3) Number of developable roof planes, (4) Total area of developable planes (m^2), (5) Total solar capacity (MW), and (6) Total annual solar generation (MWh) for each AMI income group (0-30% AMI, 30-50% AMI, 50-80% AMI, 80-120% AMI, >120% AMI), building type (multi-family or single-family), and tenure (renter or owner)
Residential Electricity Expenditures	Low Income Energy Affordability Data (LEAD), DOE 2017	(1) Average household electricity expenditures ($/month) for each AMI income group (0-30% AMI, 30-50% AMI, 50-80% AMI, 80-100% AMI, >100% AMI), building type (multi-family or single-family), and tenure (renter or owner)
Electric Utilities	EIA 861, 2016, *Utility to Ultimate Customers*	Utility name, utility type, EIA ID, number of residential customers served by the utility, average electricity rate ($/kWh), average monthly bill ($), average residential cost of electricity ($/kWh)

State Residential Solar Incentives	DSIRE; Collected and organized by NREL in July, 2016.	State averages of: (1) Production based incentives ($/kWh) (2) Capacity based incentives ($/W) (3) Investment based incentives (% of installed cost)
Demographics	American Community Survey, 2011-2015	40 different demographic fields related to household size, income, GINI index of income inequality, gender, age, citizenship, education attainment, employment status, tenure, mortgage-status, and building age.
Air Quality Index	EPA's Air Quality Index – *Annual by County, 2016*	Max, median, and 90th percentile Air Quality Index (AQI)
Heating and Cooling Degree Days	The National Solar Resource Database (NSRDB), 1998-2015	Annual number of heating degree days, number of cooling degree days
Climate Zones	IECC/ASHRAE	Climate zone (i.e. zones that define clusters of climate patterns)
Locales	National Center for Education Statistics, *2015 Locale Boundaries*	Locale type (i.e., Town Fringe, Remote Rural, Urban Center, etc.)
Public Housing	National Housing Preservation Database (NHPD), 2016 *Active Properties*	Tract-level aggregates related to number of public housing units, active public housing subsidies, Fair Market Rents (2BR), percent extremely low-income households covered by public housing subsidies.
Low Income Tax Credit Qualified Tracts	The Department of Housing and Urban Development (HUD), 2017, *Qualified Census Tracts*	Low Income Tax Credit Qualified Tract (Boolean)

Dataset 0: Tract Geographic Base Information

The REPLICA is provided at the Census Tract level. The base geographic information, including shapefile geometries, tract GEOIDs, areas, etc. are sourced from the National Historic Preservation Database (NHPD 2017) using the 2011-2015 American Community Survey GIS shapefile, derived from the Census TIGER/Line shapefiles, for Census Tracts.

Dataset 1: LMI Solar Rooftop Technical Potential

The LMI PV Rooftop Technical Potential dataset provides estimates of technical potential for LMI communities at the Census Tract level, broken out by AMI (Area Median Income) income bin, building type, and tenure. These data were derived from rooftop suitability modeling using LiDAR data for 128 U.S. cities and metropolitan areas from the Department of Homeland Security, representing approximately 40% of the population. A statistical model, trained on areas with data coverage, was used for estimate technical potential for the rest of the nation. Demographic data was pulled from the 2011-2015 American Community Survey 5-Year Estimates and overlaid with LiDAR data to estimate technical potential per U.S. Census tract by income, building type, and tenure. Fields available include estimates of number of households, number of suitable buildings, number of developable planes, area of developable planes (m^2), total capacity potential (MW), and total annual generation potential (MWh) for each of the 20 demographic combinations of AMI Income Group (0-30% AMI, 30-50% AMI, 50-80% AMI, 80-120% AMI, >120% AMI), Housing Type (multi-family or single-family), and Tenure (renter or owner). The result is an array of 120 fields related to LMI solar potential for each Census Tract.

An important note on uncertainty ...

These data are estimates derived from statistical modeling and data munging of datasets sourced from varied geographic units and with varied levels of uncertainty. Care should be taken when interpreting these results particularly for policy-planning or regulatory considerations, particularly tract-level estimates. For a detailed discussion on uncertainty in the data, refer to Sigrin and Mooney (2018).

Dataset 2: Residential Energy Expenditures

The residential energy expenditures dataset provides estimates of average monthly electricity expenditures, at the County level, per AMI income group (0-30% AMI, 30-50% AMI, 50-80% AMI, 80-120% AMI, >120% AMI)[1], building type (multi-family or single-family), and tenure (renter or owner). These data are derived from the Low-Income Energy Affordability (LEAD) Tool developed by the U.S. Department of Energy.

Dataset 3: Electric Utility

The utility information dataset provides information related to the electric utility (name, type, and EIA ID), number of customers served by the utility, the average monthly residential consumption (kWh), average monthly bill for residential customers ($), and average cost of electricity ($/kWh). These data are derived from the 2016 EIA 861 *Utility to Ultimate Customers* form for bundled utilities, by utility and state. In cases where EIA 861 data was missing for utility-state combinations, state averages were used for all except the count of customers served by the utility; for these, we left the value as NULL.

Utilities were tagged to census tracts using the ABB Ventyx 2016 *Electric Service Territory* layer. Many-to-one relationships between utilities to individual tracts were identified and handled using the standard NREL methodology.

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[1] Please note that the electric expenditures data use slightly different AMI binning for middle (80-100% AMI versus 80-120% AMI) and high (>100% AMI versus >120% AMI) incomes compared to D1: LMI PV Rooftop Technical Potential. Therefore, the middle and high income technical potential estimates and electric expenditure estimates do not align properly,

Dataset 4: State Residential Solar Incentives

The state residential solar incentives dataset include data pertaining to the state average production based incentive ($/kWh), capacity based incentives ($/W) and investment based incentives (%). The data were pulled from the Database of State Incentives for Renewables and Efficiency (DSIRE) database for state-based residential solar incentive programs and were organized by NREL in July, 2016.

Dataset 5: Demographics

Derived from the 2011-2015 American Community Survey (ACS) 5-Year tract estimates. Data downloaded using IPUMS NHGIS, University of Minnesota, www.nhgis.org. ACS tables used include the following: B08201, B19113, B19019, B19083, B05002, B05003, B05003I, B05003B, B05003D, B05003C, B05003A, B16010, B05004, B23001, B09001, B25094, B25026, B25127, B25097, B25107, B25027. Fields included were chosen because they were discussed by project partners as pertinent to low-income residential solar PV adoption. These include 40 different demographic fields related to household size, income, GINI index of income inequality, gender, age, citizenship, education attainment, employment status, tenure, mortgage-status, and building age.

Note: No attempts were made to backfill null values for these demographic fields. If null values exist, they are directly attributed to the source ACS table.

Dataset 6: Air Quality Index

Air Quality Index (AQI) is a measure for reporting daily air quality and it focuses on health effects that may be experienced within hours or days after breathing polluted air. The AQI dataset comes from the Environment Protection Agency's (EPA) Air Quality System (AQS), annual summary data (*Annual by County, 2016*). This dataset includes information pertaining to the AQI median, max, and 90th percentile value observed at each county station throughout 2016. The AQI values along with descriptions of how to interpret the value (e.g. a value between 51 is considered "Moderate" while a value of 301 is "Extremely Hazardous") are provided here in the REPLICA.

Note: Due to geographic coverage of measuring stations, the AQI dataset covers approximately 14% of U.S. counties. No attempts were made in REPLICA to backfill these missing counties.

Dataset 7: Heating and Cooling Degree Days

Heating and cooling degree days are measures that reflect the amount of energy needed to heat or cool a building to a comfortable temperature, given how cold or hot it is outside. Cooling degree days are number of degrees that a day's average temperature is above 65℉ and people start to use air conditioning to cool their buildings. Conversely, heating degree days are the number of degrees that a day's average temperature is below 65℉, the temperature below which buildings need to be heated. The Heating and Cooling Degree Days dataset was computed by NREL from the National Solar Resource Database (NSRDB) 1998-2015 solar irradiance data. Census Tracts were tagged to NSRDB stations based on the nearest neighbor. Fields associated with this data include the heating and cooling degree days along with their standard deviation and 95% confidence intervals.

Dataset 8: Climate Zones

The climate zones dataset provides data pertaining to the building climate zone based on the climate designations used by the International Energy Conservation Code (IECC) and the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE). Fields in this dataset include the climate zone (e.g. 1, 2, 3), the climate zone description (e.g., Hot-Humid, Hot-Dry, Marine), and the moisture regime (e.g., A, B, C). These 8 climate zones are using by the U.S. Department of Energy (DOE) in the Building America Program to help builders determine which climate-specific guidance they should use.

Dataset 9: Locales

The locales dataset comes from the National Center for Education Statistics (NCES) *2015 Locale Boundaries*. These NCES locales are based on the census but include more refined information for characterizing a locale. Specifically, it classifies all territories in the United States into four types of areas (city, suburban, town, and rural) and each area is further divided into four subtypes based on population size and proximity to urban areas. The locale data in the REPLICA includes these type-subtype definitions.

Dataset 10: Public Housing

The public housing dataset come from the National Public Housing Database (NHPD) for *Active Priorities in 2016*. The NHPD is an address-level inventory of federally assisted rental housing units in the United States. These address points were tagged to Census Tracts and tract-level aggregates of total number of units, total active subsidies, average months of tenancy, average fair market rents for 2-bedroom homes, average occupancy rate, and percent extremely low-income households subsidized were calculated. These data were collected to provide a general overview of the public housing activity within each Census Tract.

Please note that null data fields exist where data does not exist in the NHPD for that Census Tract.

Dataset 11: Low Income Tax Credit Qualified Tracts

The final dataset in the REPLICA includes a Boolean field (True/False) from referring to whether or not a Census Tract is a Low Income Tax Credit (LIHTC) Qualified Tracts. These qualified tracts data come from the U.S. Department of Housing and Urban Development's (HUD) Qualified Census Tracts spatial data layer for 2017. The LIHTC is a tax credit aimed at incentivizing developers to invest in affordable housing. Under the LIHTC, affordable rental housing projects located in Qualified Census Tracts (QCT) are eligible for up to 30% more tax credits than if they were located in non-qualified census Tracts. Census tracts are eligible to be QCTs if either the poverty rate in the tract is 25 percent or higher, or 50 percent or more of the households in the tract have incomes below 60 percent of the area median income (i.e., would be eligible to live in LIHTC-financed housing).

Data Dictionary

Dataset Ref No.	Field Name	Description
0	geoid	Tract GEOID
0	gisjoin	Tract GISJOIN
0	state_fips	State FIPS Code
0	state_name	State Name
0	state_abbr	State Abbreviation
0	county_name	County Name
0	county_fips	County FIPS Code
0	tract_fips	Tract FIPS Code
0	area_km2	Tract Area (sq.km)
0	centroid_x	Tract Centroid Longitude
0	centroid_y	Tract Centroid Latitude
1	very_low_mf_own_hh	Very Low Income (0-30% AMI) - Multi-Family - Owner-Occupied - Household Count
1	very_low_mf_rent_hh	Very Low Income (0-30% AMI) - Multi-Family - Renter-Occupied - Household Count
1	very_low_sf_own_hh	Very Low Income (0-30% AMI) - Single-Family - Owner-Occupied - Household Count
1	very_low_sf_rent_hh	Very Low Income (0-30% AMI) - Single-Family - Renter-Occupied - Household Count
1	low_mf_own_hh	Low Income (30-50% AMI) - Multi-Family - Owner-Occupied - Household Count
1	low_mf_rent_hh	Low Income (30-50% AMI) - Multi-Family - Renter-Occupied - Household Count

1	low_sf_own_hh	Low Income (30-50% AMI) - Single-Family - Owner-Occupied - Household Count
1	low_sf_rent_hh	Low Income (30-50% AMI) - Single-Family - Renter-Occupied - Household Count
1	mod_mf_own_hh	Moderate Income (50-80% AMI) - Multi-Family - Owner-Occupied - Household Count
1	mod_mf_rent_hh	Moderate Income (50-80% AMI) - Multi-Family - Renter-Occupied - Household Count
1	mod_sf_own_hh	Moderate Income (50-80% AMI) - Single-Family - Owner-Occupied - Household Count
1	mod_sf_rent_hh	Moderate Income (50-80% AMI) - Single-Family - Renter-Occupied - Household Count
1	mid_mf_own_hh	Middle Income (80-120% AMI) - Multi-Family - Owner-Occupied - Household Count
1	mid_mf_rent_hh	Middle Income (80-120% AMI) - Multi-Family - Renter-Occupied - Household Count
1	mid_sf_own_hh	Middle Income (80-120% AMI) - Single-Family - Owner-Occupied - Household Count
1	mid_sf_rent_hh	Middle Income (80-120% AMI) - Single-Family - Renter-Occupied - Household Count
1	high_mf_own_hh	High Income (>120% AMI) - Multi-Family - Owner-Occupied - Household Count
1	high_mf_rent_hh	High Income (>120% AMI) - Multi-Family - Renter-Occupied - Household Count
1	high_sf_own_hh	High Income (>120% AMI) - Single-Family - Owner-Occupied - Household Count
1	high_sf_rent_hh	High Income (>120% AMI) - Single-Family - Renter-Occupied - Household Count
1	very_low_mf_own_bldg_cnt	Very Low Income (0-30% AMI) - Multi-Family - Owner-Occupied - Suitable Building Count
1	very_low_mf_rent_bldg	Very Low Income (0-30% AMI) - Multi-Family -

	_cnt	Renter-Occupied - Suitable Building Count
1	very_low_sf_own_bldg_cnt	Very Low Income (0-30% AMI) - Single-Family - Owner-Occupied - Suitable Building Count
1	very_low_sf_rent_bldg_cnt	Very Low Income (0-30% AMI) - Single-Family - Renter-Occupied - Suitable Building Count
1	low_mf_own_bldg_cnt	Low Income (30-50% AMI) - Multi-Family - Owner-Occupied - Suitable Building Count
1	low_mf_rent_bldg_cnt	Low Income (30-50% AMI) - Multi-Family - Renter-Occupied - Suitable Building Count
1	low_sf_own_bldg_cnt	Low Income (30-50% AMI) - Single-Family - Owner-Occupied - Suitable Building Count
1	low_sf_rent_bldg_cnt	Low Income (30-50% AMI) - Single-Family - Renter-Occupied - Suitable Building Count
1	mod_mf_own_bldg_cnt	Moderate Income (50-80% AMI) - Multi-Family - Owner-Occupied - Suitable Building Count
1	mod_mf_rent_bldg_cnt	Moderate Income (50-80% AMI) - Multi-Family - Renter-Occupied - Suitable Building Count
1	mod_sf_own_bldg_cnt	Moderate Income (50-80% AMI) - Single-Family - Owner-Occupied - Suitable Building Count
1	mod_sf_rent_bldg_cnt	Moderate Income (50-80% AMI) - Single-Family - Renter-Occupied - Suitable Building Count
1	mid_mf_own_bldg_cnt	Middle Income (80-120% AMI) - Multi-Family - Owner-Occupied - Suitable Building Count
1	mid_mf_rent_bldg_cnt	Middle Income (80-120% AMI) - Multi-Family - Renter-Occupied - Suitable Building Count
1	mid_sf_own_bldg_cnt	Middle Income (80-120% AMI) - Single-Family - Owner-Occupied - Suitable Building Count
1	mid_sf_rent_bldg_cnt	Middle Income (80-120% AMI) - Single-Family - Renter-Occupied - Suitable Building Count
1	high_mf_own_bldg_cnt	High Income (>120% AMI) - Multi-Family - Owner-Occupied - Suitable Building Count

1	high_mf_rent_bldg_cnt	High Income (>120% AMI) - Multi-Family - Renter-Occupied - Suitable Building Count
1	high_sf_own_bldg_cnt	High Income (>120% AMI) - Single-Family - Owner-Occupied - Suitable Building Count
1	high_sf_rent_bldg_cnt	High Income (>120% AMI) - Single-Family - Renter-Occupied - Suitable Building Count
1	very_low_mf_own_devp_cnt	Very Low Income (0-30% AMI) - Multi-Family - Owner-Occupied - Developable Plane Count
1	very_low_mf_rent_devp_cnt	Very Low Income (0-30% AMI) - Multi-Family - Renter-Occupied - Developable Plane Count
1	very_low_sf_own_devp_cnt	Very Low Income (0-30% AMI) - Single-Family - Owner-Occupied - Developable Plane Count
1	very_low_sf_rent_devp_cnt	Very Low Income (0-30% AMI) - Single-Family - Renter-Occupied - Developable Plane Count
1	low_mf_own_devp_cnt	Low Income (30-50% AMI) - Multi-Family - Owner-Occupied - Developable Plane Count
1	low_mf_rent_devp_cnt	Low Income (30-50% AMI) - Multi-Family - Renter-Occupied - Developable Plane Count
1	low_sf_own_devp_cnt	Low Income (30-50% AMI) - Single-Family - Owner-Occupied - Developable Plane Count
1	low_sf_rent_devp_cnt	Low Income (30-50% AMI) - Single-Family - Renter-Occupied - Developable Plane Count
1	mod_mf_own_devp_cnt	Moderate Income (50-80% AMI) - Multi-Family - Owner-Occupied - Developable Plane Count
1	mod_mf_rent_devp_cnt	Moderate Income (50-80% AMI) - Multi-Family - Renter-Occupied - Developable Plane Count
1	mod_sf_own_devp_cnt	Moderate Income (50-80% AMI) - Single-Family - Owner-Occupied - Developable Plane Count
1	mod_sf_rent_devp_cnt	Moderate Income (50-80% AMI) - Single-Family - Renter-Occupied - Developable Plane Count
1	mid_mf_own_devp_cnt	Middle Income (80-120% AMI) - Multi-Family -

		Owner-Occupied - Developable Plane Count
1	mid_mf_rent_devp_cnt	Middle Income (80-120% AMI) - Multi-Family - Renter-Occupied - Developable Plane Count
1	mid_sf_own_devp_cnt	Middle Income (80-120% AMI) - Single-Family - Owner-Occupied - Developable Plane Count
1	mid_sf_rent_devp_cnt	Middle Income (80-120% AMI) - Single-Family - Renter-Occupied - Developable Plane Count
1	high_mf_own_devp_cnt	High Income (>120% AMI) - Multi-Family - Owner-Occupied - Developable Plane Count
1	high_mf_rent_devp_cnt	High Income (>120% AMI) - Multi-Family - Renter-Occupied - Developable Plane Count
1	high_sf_own_devp_cnt	High Income (>120% AMI) - Single-Family - Owner-Occupied - Developable Plane Count
1	high_sf_rent_devp_cnt	High Income (>120% AMI) - Single-Family - Renter-Occupied - Developable Plane Count
1	very_low_mf_own_devp_m2	Very Low Income (0-30% AMI) - Multi-Family - Owner-Occupied - Suitable Area (sq.m)
1	very_low_mf_rent_devp_m2	Very Low Income (0-30% AMI) - Multi-Family - Renter-Occupied - Suitable Area (sq.m)
1	very_low_sf_own_devp_m2	Very Low Income (0-30% AMI) - Single-Family - Owner-Occupied - Suitable Area (sq.m)
1	very_low_sf_rent_devp_m2	Very Low Income (0-30% AMI) - Single-Family - Renter-Occupied - Suitable Area (sq.m)
1	low_mf_own_devp_m2	Low Income (30-50% AMI) - Multi-Family - Owner-Occupied - Suitable Area (sq.m)
1	low_mf_rent_devp_m2	Low Income (30-50% AMI) - Multi-Family - Renter-Occupied - Suitable Area (sq.m)
1	low_sf_own_devp_m2	Low Income (30-50% AMI) - Single-Family - Owner-Occupied - Suitable Area (sq.m)
1	low_sf_rent_devp_m2	Low Income (30-50% AMI) - Single-Family - Renter-Occupied - Suitable Area (sq.m)

1	mod_mf_own_devp_m2	Moderate Income (50-80% AMI) - Multi-Family - Owner-Occupied - Suitable Area (sq.m)
1	mod_mf_rent_devp_m2	Moderate Income (50-80% AMI) - Multi-Family - Renter-Occupied - Suitable Area (sq.m)
1	mod_sf_own_devp_m2	Moderate Income (50-80% AMI) - Single-Family - Owner-Occupied - Suitable Area (sq.m)
1	mod_sf_rent_devp_m2	Moderate Income (50-80% AMI) - Single-Family - Renter-Occupied - Suitable Area (sq.m)
1	mid_mf_own_devp_m2	Middle Income (80-120% AMI) - Multi-Family - Owner-Occupied - Suitable Area (sq.m)
1	mid_mf_rent_devp_m2	Middle Income (80-120% AMI) - Multi-Family - Renter-Occupied - Suitable Area (sq.m)
1	mid_sf_own_devp_m2	Middle Income (80-120% AMI) - Single-Family - Owner-Occupied - Suitable Area (sq.m)
1	mid_sf_rent_devp_m2	Middle Income (80-120% AMI) - Single-Family - Renter-Occupied - Suitable Area (sq.m)
1	high_mf_own_devp_m2	High Income (>120% AMI) - Multi-Family - Owner-Occupied - Suitable Area (sq.m)
1	high_mf_rent_devp_m2	High Income (>120% AMI) - Multi-Family - Renter-Occupied - Suitable Area (sq.m)
1	high_sf_own_devp_m2	High Income (>120% AMI) - Single-Family - Owner-Occupied - Suitable Area (sq.m)
1	high_sf_rent_devp_m2	High Income (>120% AMI) - Single-Family - Renter-Occupied - Suitable Area (sq.m)
1	very_low_mf_own_mw	Very Low Income (0-30% AMI) - Multi-Family - Owner-Occupied - Capacity (MW)
1	very_low_mf_rent_mw	Very Low Income (0-30% AMI) - Multi-Family - Renter-Occupied - Capacity (MW)
1	very_low_sf_own_mw	Very Low Income (0-30% AMI) - Single-Family - Owner-Occupied - Capacity (MW)
1	very_low_sf_rent_mw	Very Low Income (0-30% AMI) - Single-Family -

		Renter-Occupied - Capacity (MW)
1	low_mf_own_mw	Low Income (30-50% AMI) - Multi-Family - Owner-Occupied - Capacity (MW)
1	low_mf_rent_mw	Low Income (30-50% AMI) - Multi-Family - Renter-Occupied - Capacity (MW)
1	low_sf_own_mw	Low Income (30-50% AMI) - Single-Family - Owner-Occupied - Capacity (MW)
1	low_sf_rent_mw	Low Income (30-50% AMI) - Single-Family - Renter-Occupied - Capacity (MW)
1	mod_mf_own_mw	Moderate Income (50-80% AMI) - Multi-Family - Owner-Occupied - Capacity (MW)
1	mod_mf_rent_mw	Moderate Income (50-80% AMI) - Multi-Family - Renter-Occupied - Capacity (MW)
1	mod_sf_own_mw	Moderate Income (50-80% AMI) - Single-Family - Owner-Occupied - Capacity (MW)
1	mod_sf_rent_mw	Moderate Income (50-80% AMI) - Single-Family - Renter-Occupied - Capacity (MW)
1	mid_mf_own_mw	Middle Income (80-120% AMI) - Multi-Family - Owner-Occupied - Capacity (MW)
1	mid_mf_rent_mw	Middle Income (80-120% AMI) - Multi-Family - Renter-Occupied - Capacity (MW)
1	mid_sf_own_mw	Middle Income (80-120% AMI) - Single-Family - Owner-Occupied - Capacity (MW)
1	mid_sf_rent_mw	Middle Income (80-120% AMI) - Single-Family - Renter-Occupied - Capacity (MW)
1	high_mf_own_mw	High Income (>120% AMI) - Multi-Family - Owner-Occupied - Capacity (MW)
1	high_mf_rent_mw	High Income (>120% AMI) - Multi-Family - Renter-Occupied - Capacity (MW)
1	high_sf_own_mw	High Income (>120% AMI) - Single-Family - Owner-Occupied - Capacity (MW)

1	high_sf_rent_mw	High Income (>120% AMI) - Single-Family - Renter-Occupied - Capacity (MW)
1	very_low_mf_own_mwh	Very Low Income (0-30% AMI) - Multi-Family - Owner-Occupied - Annual Generation (MWh)
1	very_low_mf_rent_mwh	Very Low Income (0-30% AMI) - Multi-Family - Renter-Occupied - Annual Generation (MWh)
1	very_low_sf_own_mwh	Very Low Income (0-30% AMI) - Single-Family - Owner-Occupied - Annual Generation (MWh)
1	very_low_sf_rent_mwh	Very Low Income (0-30% AMI) - Single-Family - Renter-Occupied - Annual Generation (MWh)
1	low_mf_own_mwh	Low Income (30-50% AMI) - Multi-Family - Owner-Occupied - Annual Generation (MWh)
1	low_mf_rent_mwh	Low Income (30-50% AMI) - Multi-Family - Renter-Occupied - Annual Generation (MWh)
1	low_sf_own_mwh	Low Income (30-50% AMI) - Single-Family - Owner-Occupied - Annual Generation (MWh)
1	low_sf_rent_mwh	Low Income (30-50% AMI) - Single-Family - Renter-Occupied - Annual Generation (MWh)
1	mod_mf_own_mwh	Moderate Income (50-80% AMI) - Multi-Family - Owner-Occupied - Annual Generation (MWh)
1	mod_mf_rent_mwh	Moderate Income (50-80% AMI) - Multi-Family - Renter-Occupied - Annual Generation (MWh)
1	mod_sf_own_mwh	Moderate Income (50-80% AMI) - Single-Family - Owner-Occupied - Annual Generation (MWh)
1	mod_sf_rent_mwh	Moderate Income (50-80% AMI) - Single-Family - Renter-Occupied - Annual Generation (MWh)
1	mid_mf_own_mwh	Middle Income (80-120% AMI) - Multi-Family - Owner-Occupied - Annual Generation (MWh)
1	mid_mf_rent_mwh	Middle Income (80-120% AMI) - Multi-Family - Renter-Occupied - Annual Generation (MWh)
1	mid_sf_own_mwh	Middle Income (80-120% AMI) - Single-Family -

		Owner-Occupied - Annual Generation (MWh)
1	mid_sf_rent_mwh	Middle Income (80-120% AMI) - Single-Family - Renter-Occupied - Annual Generation (MWh)
1	high_mf_own_mwh	High Income (>120% AMI) - Multi-Family - Owner-Occupied - Annual Generation (MWh)
1	high_mf_rent_mwh	High Income (>120% AMI) - Multi-Family - Renter-Occupied - Annual Generation (MWh)
1	high_sf_own_mwh	High Income (>120% AMI) - Single-Family - Owner-Occupied - Annual Generation (MWh)
1	high_sf_rent_mwh	High Income (>120% AMI) - Single-Family - Renter-Occupied - Annual Generation (MWh)
2	very_low_mf_own_elep_hh	Very Low Income (0-30% AMI) - Multi-Family - Owner-Occupied - Average Household Electricity Expenditures ($/month)
2	very_low_mf_rent_elep_hh	Very Low Income (0-30% AMI) - Multi-Family - Renter-Occupied - Average Household Electricity Expenditures ($/month)
2	very_low_sf_own_elep_hh	Very Low Income (0-30% AMI) - Single-Family - Owner-Occupied - Average Household Electricity Expenditures ($/month)
2	very_low_sf_rent_elep_hh	Very Low Income (0-30% AMI) - Single-Family - Renter-Occupied - Average Household Electricity Expenditures ($/month)
2	low_mf_own_elep_hh	Low Income (30-50% AMI) - Multi-Family - Owner-Occupied - Average Household Electricity Expenditures ($/month)
2	low_mf_rent_elep_hh	Low Income (30-50% AMI) - Multi-Family - Renter-Occupied - Average Household Electricity Expenditures ($/month)
2	low_sf_own_elep_hh	Low Income (30-50% AMI) - Single-Family - Owner-Occupied - Average Household Electricity Expenditures ($/month)
2	low_sf_rent_elep_hh	Low Income (30-50% AMI) - Single-Family - Renter-Occupied - Average Household Electricity Expenditures ($/month)

2	mod_mf_own_elep_hh	Moderate Income (50-80% AMI) - Multi-Family - Owner-Occupied - Average Household Electricity Expenditures ($/month)
2	mod_mf_rent_elep_hh	Moderate Income (50-80% AMI) - Multi-Family - Renter-Occupied - Average Household Electricity Expenditures ($/month)
2	mod_sf_own_elep_hh	Moderate Income (50-80% AMI) - Single-Family - Owner-Occupied - Average Household Electricity Expenditures ($/month)
2	mod_sf_rent_elep_hh	Moderate Income (50-80% AMI) - Single-Family - Renter-Occupied - Average Household Electricity Expenditures ($/month)
2	high_mf_own_elep_hh	Middle and High Income (>80% AMI) - Multi-Family - Owner-Occupied - Average Household Electricity Expenditures ($/month)
2	high_mf_rent_elep_hh	Middle and High Income (>80% AMI) - Multi-Family - Renter-Occupied - Average Household Electricity Expenditures ($/month)
2	high_sf_own_elep_hh	Middle and High Income (>80% AMI) - Single-Family - Owner-Occupied - Average Household Electricity Expenditures ($/month)
2	high_sf_rent_elep_hh	Middle and High Income (>80% AMI) - Single-Family - Renter-Occupied - Average Household Electricity Expenditures ($/month)
3	company_na	Utility Company Name
3	company_ty	Utility Company Type
3	eia_id	EIA ID
3	cust_cnt	Utility Customer Count
3	avg_monthly_consumption_kwh	Average Monthly Consumption (kWh)
3	avg_monthly_bill_dlrs	Average Monthly Bill ($)

3	dlrs_kwh	Average Cost of Electricity ($/kWh)
4	avg_pbi_usd_p_kwh	Average State Residential Solar Production-based Incentive ($/kWh)
4	avg_cbi_usd_p_w	Average State Residential Solar Capacity-based Incentive ($/W)
4	avg_ibi_pct	Average State Residential Solar Investment-based Incentive (%)
5	hh_size_1	Number of 1 person households
5	hh_size_2	Number of 2 person households
5	hh_size_3	Number of 3 person households
5	hh_size_4	Number of 4 person households
5	fam_med_income	Median family income
5	hh_med_income	Median household income
5	hh_gini_index	Household GINI Index of Income Inequality
5	pop_total	Total population
5	pop_male	Total male population
5	pop_female	Total female population
5	pop_us_citizen	Total US citizens
5	pop_nat_us_citizen	Total naturalized US citizens
5	pop_non_us_citizen	Total non-US citizens
5	pop_hispanic	Total hispanics
5	pop_african_american	Total african american population
5	pop_asian	Total asian population
5	pop_native_american	Total american indian/alaska native population
5	pop_caucasian	Total caucasian population

5	pop25_some_college_plus	Total population with at least some college education (Population 25 years and over)
5	pop25_high_school	Total population with a high school diploma (Population 25 years and over)
5	pop25_no_high_school	Total population with less than a high school diploma (Population 25 years and over)
5	pop_med_age	Median age
5	p16_employed	Total employed (Population 16 years and over)
5	p16_unemployed	Total unemployed (Population 16 years and over)
5	fam_children_under_6	Total number of families with children under 6 years
5	fam_children_6to17	Total number of families with children ages 6-17 years
5	pop_over_65	Total population over 65 years
5	pop_under_18	Total population under 18 years
5	hu_monthly_owner_costs_lessthan_1000dlrs	Total number of owner-occupied units with housing costs less than $1000/month
5	hu_monthly_owner_costs_greaterthan_1000dlrs	Total number of owner-occupied units with housing costs greater than $1000/month
5	hu_own	Total number of owner occupied housing units
5	hu_rent	Total number of renter occupied housing units
5	hu_vintage_2010toafter	Number of occupied units built after 2010
5	hu_vintage_2000to2009	Number of occupied units built between 2000-2009
5	hu_vintage_1980to1999	Number of occupied units built between 1980-1999
5	hu_vintage_1960to1970	Number of occupied units built between 1960-1979

5	hu_vintage_1940to1959	Number of occupied units built between 1940-1959
5	hu_vintage_1939toearlier	Number of occupied units built before 1939
5	hu_med_val	Median value of owner-occupied housing units
5	hu_mortgage	Number of owner-occupied housing units with a mortgage
5	hu_no_mortgage	Number of owner-occupied housing units without a mortgage
6	aqi_max	Max Air Quality Index
6	aqi_max_description	Max Air Quality Index Description
6	aqi_90th_percentile	90th Percentile Air Quality Index
6	aqi_90th_percentile_description	90th Percentile Air Quality Index Description
6	aqi_median	Median Air Quality Index
6	aqi_median_description	Median Air Quality Index Description
7	hdd	Heating Degree Days
7	hdd_std	Heating Degree Days Standard Deviation
7	hdd_ci	Heating Degree Days Confidence Interval
7	cdd	Cooling Degree Days
7	cdd_std	Cooling Degree Days Standard Deviation
7	cdd_ci	Cooling Degree Days Confidence Interval
8	climate_zone	Climate Zone
8	climate_zone_description	Climate Zone Description
8	moisture_regime	Moisture Regime

9	locale	Locale
10	total_units	Total Number of Active Public Housing Units
10	active_subsidies	Total Number of Active Subsidies
10	avg_months_tenancy	Average Months of Tenancy
10	fmr_2br	Fair Market Rent - 2 BR
10	occ_rate	Occupancy Rate
10	pct_eli_hh	Percent Extremely Low Income
11	lihtc_qualified	Low Income Tax Credit Qualification (T/F)

Supplemental Shapefiles

To compliment the REPLICA dataset, we provide 22 supplemental shapefiles. Listed below are the shapefiles and their data dictionaries.

'high_mf_own.shp'

Contains PV Rooftop technical potential estimates for high income (>120% AMI), multi-family, owner-occupied buildings at the Census Tract level.

Field Name	Description
geoid	Tract GEOID
himohh	High Income (>120%AMI) - Multi-Family - Owner-Occupied - Number of Households
himobcnt	High Income (>120%AMI) - Multi-Family - Owner-Occupied - Suitable Building Count
himodcnt	High Income (>120%AMI) - Multi-Family - Owner-Occupied - Developable Plane Count
himodm2	High Income (>120%AMI) - Multi-Family - Owner-Occupied - Suitable Area (square meters)
himomw	High Income (>120%AMI) - Multi-Family - Owner-Occupied - Capacity (MW)
himomwh	High Income (>120%AMI) - Multi-Family - Owner-Occupied - Annual Generation (MWh)

‘high_mf_rent.shp’

Contains PV Rooftop technical potential estimates for high income (>120% AMI), multi-family, renter-occupied buildings at the Census Tract level.

Field Name	Description
geoid	Tract GEOID
himrhh	High Income (>120% AMI) - Multi-Family - Renter-Occupied - Number of Households
himrbcnt	High Income (>120% AMI) - Multi-Family - Renter-Occupied - Suitable Building Count
himrdcnt	High Income (>120% AMI) - Multi-Family - Renter-Occupied - Developable Plane Count
himrdm2	High Income (>120% AMI) - Multi-Family - Renter-Occupied - Suitable Area (square meters)
himrmw	High Income (>120% AMI) - Multi-Family - Renter-Occupied - Capacity (MW)
himrmwh	High Income (>120% AMI) - Multi-Family - Renter-Occupied - Annual Generation (MWh)

‘high_sf_own.shp’

Contains PV Rooftop technical potential estimates for high income (>120% AMI), single-family, owner-occupied buildings at the Census Tract level.

Field Name	Description
geoid	Tract GEOID
hisohh	High Income (>120% AMI) - Single-Family - Owner-Occupied - Number of Households
hisobcnt	High Income (>120% AMI) - Single-Family - Owner-Occupied - Suitable Building Count
hisodcnt	High Income (>120% AMI) - Single-Family - Owner-Occupied - Developable Plane Count

hisodm2	High Income (>120% AMI) - Single-Family - Owner-Occupied - Suitable Area (square meters)
hisomw	High Income (>120% AMI) - Single-Family - Owner-Occupied - Capacity (MW)
hisomwh	High Income (>120% AMI) - Single-Family - Owner-Occupied - Annual Generation (MWh)

'high_sf_rent.shp'

Contains PV Rooftop technical potential estimates for high income (>120% AMI), single-family, renter-occupied buildings at the Census Tract level.

Field Name	**Description**
geoid	Tract GEOID
hisrhh	High Income (>120% AMI) - Single-Family - Renter-Occupied - Number of Households
hisrbcnt	High Income (>120% AMI) - Single-Family - Renter-Occupied - Suitable Building Count
hisrdcnt	High Income (>120% AMI) - Single-Family - Renter-Occupied - Developable Plane Count
hisrdm2	High Income (>120% AMI) - Single-Family - Renter-Occupied - Suitable Area (square meters)
hisrmw	High Income (>120% AMI) - Single-Family - Renter-Occupied - Capacity (MW)
hisrmwh	High Income (>120% AMI) - Single-Family - Renter-Occupied - Annual Generation (MWh)

'mid_mf_own.shp'

Contains PV Rooftop technical potential estimates for middle income (80-120% AMI), multi-family, owner-occupied buildings at the Census Tract level.

Field Name	Description
geoid	Tract GEOID
mimohh	Middle Income (80-120% AMI) - Multi-Family - Owner-Occupied - Number of Households
mimobcnt	Middle Income (80-120% AMI) - Multi-Family - Owner-Occupied - Suitable Building Count
mimodcnt	Middle Income (80-120% AMI) - Multi-Family - Owner-Occupied - Developable Plane Count
mimodm2	Middle Income (80-120% AMI) - Multi-Family - Owner-Occupied - Suitable Area (square meters)
mimomw	Middle Income (80-120% AMI) - Multi-Family - Owner-Occupied - Capacity (MW)
mimomwh	Middle Income (80-120% AMI) - Multi-Family - Owner-Occupied - Annual Generation (MWh)

‘mid_mf_rent.shp’

Contains PV Rooftop technical potential estimates for middle income (80-120% AMI), multi-family, renter-occupied buildings at the Census Tract level.

Field Name	Description
geoid	Tract GEOID
mimrhh	Middle Income (80-120% AMI) - Multi-Family - Renter-Occupied - Number of Households
mimrbcnt	Middle Income (80-120% AMI) - Multi-Family - Renter-Occupied - Suitable Building Count
mimrdcnt	Middle Income (80-120% AMI) - Multi-Family - Renter-Occupied - Developable Plane Count
mimrdm2	Middle Income (80-120% AMI) - Multi-Family - Renter-Occupied - Suitable Area (square meters)
mimrmw	Middle Income (80-120% AMI) - Multi-Family - Renter-Occupied - Capacity (MW)

mimrmwh	Middle Income (80-120% AMI) - Multi-Family - Renter-Occupied - Annual Generation (MWh)

'mid_sf_own.shp'

Contains PV Rooftop technical potential estimates for middle income (80-120% AMI), single-family, owner-occupied buildings at the Census Tract level.

Field Name	Description
geoid	Tract GEOID
misohh	Middle Income (80-120% AMI) - Single-Family - Owned-Occupied - Number of Households
misobcnt	Middle Income (80-120% AMI) - Single-Family - Owned-Occupied - Suitable Building Count
misodcnt	Middle Income (80-120% AMI) - Single-Family - Owned-Occupied - Developable Plane Count
misodm2	Middle Income (80-120% AMI) - Single-Family - Owned-Occupied - Suitable Area (square meters)
misomw	Middle Income (80-120% AMI) - Single-Family - Owned-Occupied - Capacity (MW)
misomwh	Middle Income (80-120% AMI) - Single-Family - Owned-Occupied - Annual Generation (MWh)

'mid_sf_rent.shp'

Contains PV Rooftop technical potential estimates for middle income (80-120% AMI), single-family, renter-occupied buildings at the Census Tract level.

Field Name	Description
geoid	Tract GEOID
misrhh	Middle Income (80-120% AMI) - Single-Family - Renter-Occupied - Number of Households

misrbcnt	Middle Income (80-120% AMI) - Single-Family - Renter-Occupied - Suitable Building Count
misrdcnt	Middle Income (80-120% AMI) - Single-Family - Renter-Occupied - Developable Plane Count
misrdm2	Middle Income (80-120% AMI) - Single-Family - Renter-Occupied - Suitable Area (square meters)
misrmw	Middle Income (80-120% AMI) - Single-Family - Renter-Occupied - Capacity (MW)
misrmwh	Middle Income (80-120% AMI) - Single-Family - Renter-Occupied - Annual Generation (MWh)

‘mod_mf_own.shp’

Contains PV Rooftop technical potential estimates for moderate income (50-80% AMI), multi-family, owner-occupied buildings at the Census Tract level.

Field Name	**Description**
geoid	Tract GEOID
momohh	Moderate Income (50-80% AMI) - Multi-Family - Owner-Occupied - Number of Households
momobcnt	Moderate Income (50-80% AMI) - Multi-Family - Owner-Occupied - Suitable Building Count
momodcnt	Moderate Income (50-80% AMI) - Multi-Family - Owner-Occupied - Developable Plane Count
momodm2	Moderate Income (50-80% AMI) - Multi-Family - Owner-Occupied - Suitable Area (square meters)
momomw	Moderate Income (50-80% AMI) - Multi-Family - Owner-Occupied - Capacity (MW)
momomwh	Moderate Income (50-80% AMI) - Multi-Family - Owner-Occupied - Annual Generation (MWh)

‘mod_mf_rent.shp’

Contains PV Rooftop technical potential estimates for moderate income (50-80% AMI), multi-family, renter-occupied buildings at the Census Tract level.

Field Name	Description
geoid	Tract GEOID
momrhh	Moderate Income (50-80% AMI) - Multi-Family - Renter-Occupied - Number of Households
momrbcnt	Moderate Income (50-80% AMI) - Multi-Family - Renter-Occupied - Suitable Building Count
momrdcnt	Moderate Income (50-80% AMI) - Multi-Family - Renter-Occupied - Developable Plane Count
momrdm2	Moderate Income (50-80% AMI) - Multi-Family - Renter-Occupied - Suitable Area (square meters)
momrmw	Moderate Income (50-80% AMI) - Multi-Family - Renter-Occupied - Capacity (MW)
momrmwh	Moderate Income (50-80% AMI) - Multi-Family - Renter-Occupied - Annual Generation (MWh)

‘mod_sf_own.shp’

Contains PV Rooftop technical potential estimates for moderate income (50-80% AMI), single-family, owner-occupied buildings at the Census Tract level.

Field Name	Description
geoid	Tract GEOID
mosohh	Moderate Income (50-80% AMI) - Single-Family - Owner-Occupied - Number of Households
mosobcnt	Moderate Income (50-80% AMI) - Single-Family - Owner-Occupied - Suitable Building Count
mosodcnt	Moderate Income (50-80% AMI) - Single-Family -

	Owner-Occupied - Developable Plane Count
mosodm2	Moderate Income (50-80% AMI) - Single-Family - Owner-Occupied - Suitable Area (square meters)
mosomw	Moderate Income (50-80% AMI) - Single-Family - Owner-Occupied - Capacity (MW)
mosomwh	Moderate Income (50-80% AMI) - Single-Family - Owner-Occupied - Annual Generation (MWh)

'mod_sf_rent.shp'

Contains PV Rooftop technical potential estimates for moderate income (50-80% AMI), single-family, renter-occupied buildings at the Census Tract level.

Field Name	Description
geoid	Tract GEOID
mosrhh	Moderate Income (50-80% AMI) - Single-Family - Renter-Occupied - Number of Households
mosrbcnt	Moderate Income (50-80% AMI) - Single-Family - Renter-Occupied - Suitable Building Count
mosrdcnt	Moderate Income (50-80% AMI) - Single-Family - Renter-Occupied - Developable Plane Count
mosrdm2	Moderate Income (50-80% AMI) - Single-Family - Renter-Occupied - Suitable Area (square meters)
mosrmw	Moderate Income (50-80% AMI) - Single-Family - Renter-Occupied - Capacity (MW)
mosrmwh	Moderate Income (50-80% AMI) - Single-Family - Renter-Occupied - Annual Generation (MWh)

‘low_mf_own.shp’

Contains PV Rooftop technical potential estimates for low income (30-50% AMI), multi-family, owner-occupied buildings at the Census Tract level.

Field Name	Description
geoid	Tract GEOID
lomohh	Low Income (30-50% AMI) - Multi-Family - Owner-Occupied - Number of Households
lomobcnt	Low Income (30-50% AMI) - Multi-Family - Owner-Occupied - Suitable Building Count
lomodcnt	Low Income (30-50% AMI) - Multi-Family - Owner-Occupied - Developable Plane Count
lomodm2	Low Income (30-50% AMI) - Multi-Family - Owner-Occupied - Suitable Area (square meters)
lomomw	Low Income (30-50% AMI) - Multi-Family - Owner-Occupied - Capacity (MW)
lomomwh	Low Income (30-50% AMI) - Multi-Family - Owner-Occupied - Annual Generation (MWh)

‘low_mf_rent.shp’

Contains PV Rooftop technical potential estimates for low income (30-50% AMI), multi-family, renter-occupied buildings at the Census Tract level.

Field Name	Description
geoid	Tract GEOID
lomrhh	Low-Income (30-50% AMI) - Multi-Family - Renter-Occupied - Number of Households
lomrbcnt	Low-Income (30-50% AMI) - Multi-Family - Renter-Occupied - Suitable Building Count
lomrdcnt	Low-Income (30-50% AMI) - Multi-Family - Renter-Occupied - Developable Plane Count

lomrdm2	Low-Income (30-50% AMI) - Multi-Family - Renter-Occupied - Suitable Area (square meters)
lomrmw	Low-Income (30-50% AMI) - Multi-Family - Renter-Occupied - Capacity (MW)
lomrmwh	Low-Income (30-50% AMI) - Multi-Family - Renter-Occupied - Annual Generation (MWh)

'low_sf_own.shp'

Contains PV Rooftop technical potential estimates for low income (30-50% AMI), single-family, owner-occupied buildings at the Census Tract level.

Field Name	Description
geoid	Tract GEOID
losohh	Low Income (30-50% AMI) - Single-Family - Owner-Occupied - Number of Households
losobcnt	Low Income (30-50% AMI) - Single-Family - Owner-Occupied - Suitable Building Count
losodcnt	Low Income (30-50% AMI) - Single-Family - Owner-Occupied - Developable Plane Count
losodm2	Low Income (30-50% AMI) - Single-Family - Owner-Occupied - Suitable Area (square meters)
losomw	Low Income (30-50% AMI) - Single-Family - Owner-Occupied - Capacity (MW)
losomwh	Low Income (30-50% AMI) - Single-Family - Owner-Occupied - Annual Generation (MWh)

‘low_sf_rent.shp’

Contains PV Rooftop technical potential estimates for low income (30-50% AMI), single-family, renter-occupied buildings at the Census Tract level.

Field Name	Description
geoid	Tract GEOID
losrhh	Low Income (30-50% AMI) - Single-Family - Renter-Occupied - Number of Households
losrbcnt	Low Income (30-50% AMI) - Single-Family - Renter-Occupied - Suitable Building Count
losrdcnt	Low Income (30-50% AMI) - Single-Family - Renter-Occupied - Developable Plane Count
losrdm2	Low Income (30-50% AMI) - Single-Family - Renter-Occupied - Suitable Area (square meters)
losrmw	Low Income (30-50% AMI) - Single-Family - Renter-Occupied - Capacity (MW)
losrmwh	Low Income (30-50% AMI) - Single-Family - Renter-Occupied - Annual Generation (MWh)

‘very_low_mf_own.shp’

Contains PV Rooftop technical potential estimates for very low income (0-30% AMI), multi-family, owner-occupied buildings at the Census Tract level.

Field Name	Description
geoid	Tract GEOID
vlmohh	Very Low Income (0-30% AMI) - Multi-Family - Owner-Occupied - Number of Households
vlmobcnt	Very Low Income (0-30% AMI) - Multi-Family - Owner-Occupied - Suitable Building Count
vlmodcnt	Very Low Income (0-30% AMI) - Multi-Family - Owner-Occupied - Developable Plane Count

vlmodm2	Very Low Income (0-30% AMI) - Multi-Family - Owner-Occupied - Suitable Area (square meters)
vlmomw	Very Low Income (0-30% AMI) - Multi-Family - Owner-Occupied - Capacity (MW)
vlmomwh	Very Low Income (0-30% AMI) - Multi-Family - Owner-Occupied - Annual Generation (MWh)

'very_low_mf_rent.shp'

Contains PV Rooftop technical potential estimates for very low income (0-30% AMI), multi-family, renter-occupied buildings at the Census Tract level.

Field Name	**Description**
geoid	Tract GEOID
vlmrhh	Very Low Income (0-30% AMI) - Multi-Family - Renter-Occupied - Number of Households
vlmrbcnt	Very Low Income (0-30% AMI) - Multi-Family - Renter-Occupied - Suitable Building Count
vlmrdcnt	Very Low Income (0-30% AMI) - Multi-Family - Renter-Occupied - Developable Plane Count
vlmrdm2	Very Low Income (0-30% AMI) - Multi-Family - Renter-Occupied - Suitable Area (square meters)
vlmrmw	Very Low Income (0-30% AMI) - Multi-Family - Renter-Occupied - Capacity (MW)
vlmrmwh	Very Low Income (0-30% AMI) - Multi-Family - Renter-Occupied - Annual Generation (MWh)

‘very_low_sf_own.shp’

Contains PV Rooftop technical potential estimates for very low income (0-30% AMI), single-family, owner-occupied buildings at the Census Tract level.

Field Name	Description
geoid	Tract GEOID
vlsohh	Very Low Income (0-30% AMI) - Single-Family - Owner-Occupied - Number of Households
vlsobcnt	Very Low Income (0-30% AMI) - Single-Family - Owner-Occupied - Suitable Building Count
vlsodcnt	Very Low Income (0-30% AMI) - Single-Family - Owner-Occupied - Developable Plane Count
vlsodm2	Very Low Income (0-30% AMI) - Single-Family - Owner-Occupied - Suitable Area (square meters)
vlsomw	Very Low Income (0-30% AMI) - Single-Family - Owner-Occupied - Capacity (MW)
vlsomwh	Very Low Income (0-30% AMI) - Single-Family - Owner-Occupied - Annual Generation (MWh)

‘very_low_sf_rent.shp’

Contains PV Rooftop technical potential estimates for very low income (0-30% AMI), single-family, renter-occupied buildings at the Census Tract level.

Field Name	Description
geoid	Tract GEOID
vlsrhh	Very Low Income (0-30% AMI) - Single-Family - Renter-Occupied - Number of Households
vlsrbcnt	Very Low Income (0-30% AMI) - Single-Family - Renter-Occupied - Suitable Building Count
vlsrdcnt	Very Low Income (0-30% AMI) - Single-Family - Renter-Occupied - Developable Plane Count

vlsrdm2	Very Low Income (0-30% AMI) - Single-Family - Renter-Occupied - Suitable Area (square meters)
vlsrmw	Very Low Income (0-30% AMI) - Single-Family - Renter-Occupied - Capacity (MW)
vlsrmwh	Very Low Income (0-30% AMI) - Single-Family - Renter-Occupied - Annual Generation (MWh)

'elep_hh.shp'

Contains Average Electricity Expenditure ($/month) data at the tract level, not included in main REPLICA dataset due to inconsistency in AMI brackets.

Data Dictionary:

Field Name	Description
vlso	Very Low Income (0-30% AMI) - Owner-Occupied - Single-Family - Average Electricity Expenditures ($/month)
loso	Low Income (0-30% AMI) - Owner-Occupied - Single-Family - Average Household Electricity Expenditures ($/month)
moso	Moderate Income (0-30% AMI) - Owner-Occupied - Single-Family - Average Household Electricity Expenditures ($/month)
miso	Middle Income (80-100% AMI) - Owner-Occupied - Single-Family - Average Household Electricity Expenditures ($/month)
hiso	High Income (>100% AMI) - Owner-Occupied - Single-Family - Average Household Electricity Expenditures ($/month)
vlsr	Very Low Income (0-30% AMI) - Renter-Occupied - Single-Family - Average Household Electricity Expenditures ($/month)
losr	Low Income (0-30% AMI) - Renter-Occupied - Single-Family - Average Household Electricity Expenditures ($/month)
mosr	Moderate Income (0-30% AMI) - Renter-Occupied - Single-Family - Average Household Electricity Expenditures ($/month)
misr	Middle Income (80-100% AMI) - Renter-Occupied - Single-Family - Average Household Electricity Expenditures ($/month)

hisr	High Income (>100% AMI) - Renter-Occupied - Single-Family - Average Household Electricity Expenditures ($/month)
vlmo	Very Low Income (0-30% AMI) - Owner-Occupied - Multi-Family - Average Household Electricity Expenditures ($/month)
lomo	Low Income (0-30% AMI) - Owner-Occupied - Multi-Family - Average Household Electricity Expenditures ($/month)
momo	Moderate Income (0-30% AMI) - Owner-Occupied - Multi-Family - Average Household Electricity Expenditures ($/month)
mimo	Middle Income (80-100% AMI) - Owner-Occupied - Multi-Family - Average Household Electricity Expenditures ($/month)
himo	High Income (>100% AMI) - Owner-Occupied - Multi-Family - Average Household Electricity Expenditures ($/month)
vlmr	Very Low Income (0-30% AMI) - Renter-Occupied - Multi-Family - Average Household Electricity Expenditures ($/month)
lomr	Low Income (0-30% AMI) - Renter-Occupied - Multi-Family - Average Household Electricity Expenditures ($/month)
momr	Moderate Income (0-30% AMI) - Renter-Occupied - Multi-Family - Average Household Electricity Expenditures ($/month)
mimr	Middle Income (80-100% AMI) - Renter-Occupied - Multi-Family - Average Household Electricity Expenditures ($/month)
himr	High Income (>100% AMI) - Renter-Occupied - Multi-Family - Average Household Electricity Expenditures ($/month)

‘replica_supplemental.shp’

Contains the 74 supplemental attribute fields following--but not including--the final household energy expenditure field (high_sf_rent_elep_hh).

Data Dictionary:

Field Name	Description
company_na	Utility Company Name
company_ty	Utility Company Type
eia_id	EIA ID
cust_cnt	Utility Customer Count
avg_monthl	Average Monthly Consmption (kWh)
avg_mon_01	Average Monthly Bill ($)
dlrs_kwh	Average Cost of Electricity ($/kWh)
avg_pbi_us	Average State Residential Solar Production-based Incentive ($/kWh)
avg_cbi_us	Average State Residential Solar Capacity-based Incentive ($/W)
avg_ibi_pc	Average State Residential Solar Investment-based Incentive (%)
hh_size_1	Number of 1 person households
hh_size_2	Number of 2 person households
hh_size_3	Number of 3 person households
hh_size_4	Number of 4 person households
fam_med_in	Median family income
hh_med_inc	Median household income
hh_gini_in	Household GINI Index of Income Inequality
pop_total	Total population
pop_male	Total male population

pop_female	Total female population
pop_us_cit	Total US citizens
pop_nat_us	Total naturalized US citizens
pop_non_us	Total non-US citizens
pop_hispan	Total hispanics
pop_africa	Total african american population
pop_asian	Total asian population
pop_native	Total American indian/Alaska native population
pop_caucas	Total caucasian population
pop25_some	Total population with at least some college education (Population 25 years and over)
pop25_high	Total population with a high school diploma (Population 25 years and over)
pop25_no_h	Total population with less than a high school diploma (Population 25 years and over)
pop_med_ag	Median age
p16_employ	Total employed (Population 16 years and over)
p16_unempl	Total unemployed (Population 16 years and over)
fam_childr	Total number of families with children under 6 years
fam_chi_01	Total number of families with children ages 6-17 years
pop_over_6	Total population over 65 years
pop_under_	Total population under 18 years
hu_monthly	Total number of owner-occupied units with housing costs less than $1000/month
hu_mont_01	Total number of owner-occupied units with housing costs greater than $1000/month
hu_own	Total number of owner occupied housing units
hu_rent	Total number of renter occupied housing units

hu_vintage	Number of occupied units built after 2010
hu_vint_01	Number of occupied units built between 2000-2009
hu_vint_02	Number of occupied units built between 1980-1999
hu_vint_03	Number of occupied units built between 1960-1979
hu_vint_04	Number of occupied units built between 1940-1959
hu_vint_05	Number of occupied units built before 1939
hu_med_val	Median value of owner-occupied housing units
hu_mortgag	Number of owner-occupied housing units with a mortgage
hu_no_mort	Number of owner-occupied housing units without a mortgage
aqi_max	Max Air Quality Index
aqi_max_de	Max Air Quality Index Description
aqi_90th_p	90th Percentile Air Quality Index
aqi_90t_01	90th Percentile Air Quality Index Description
aqi_median	Median Air Quality Index
aqi_med_01	Median Air Quality Index Description
hdd	Heating Degree Days
hdd_std	Heating Degree Days Standard Deviation
hdd_ci	Heating Degree Days Confidence Interval
cdd	Cooling Degree Days
cdd_std	Cooling Degree Days Standard Deviation
cdd_ci	Cooling Degree Days Confidence Interval
climate_zo	Climate Zone
climate_01	Climate Zone Description
moisture_r	Moisture Regime
locale	Locale

total_unit	Total Number of Active Public Housing Units
active_sub	Total Number of Active Subsidies
avg_months	Average Months of Tenancy
fmr_2br	Fair Market Rent - 2 BR
occ_rate	Occupancy Rate
pct_eli_hh	Percent Extremely Low Income
lihtc_qual	Low Income Tax Credit Qualification (T/F)