README: ResStock 2025 Release 1

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Introduction

This README provides key information to help users navigate and understand the ResStock dataset. The residential building stock model, or ResStock™, is a highly granular, bottom-up model that uses multiple data sources, statistical sampling methods, and advanced building energy simulations to estimate the annual subhourly energy consumption of the housing stock across the United States.

This document outlines the structure and contents of the ResStock dataset on the Open Energy Data Initiative (OEDI) data lake, describes the file types and how to open them, explains naming conventions, and highlights recent changes and additions. This include new upgrade measures and updates to the baseline building stock model. It also provides guidance for properly citing the dataset.

Starting from this ResStock release, 2025 Release 1, and moving forward, each release will rerun existing measures and add a handful of new measures. Pre-2025 Release 1 ResStock releases do not follow this pattern. The rest of this document is only applicable to this ResStock release and may not be true for previous ResStock releases.

ResStock data come in different forms, and they can be used successfully in many ways. Before using ResStock data, consider which type of results would be best for the use case. Annual results along with building characteristics are found in the "metadata_and_annual_results" files while timeseries results that are aggregated up to a geography are found in "timeseries_aggregates" files. Additionally, individual model's timeseries data are found in "timeseries_individual_buildings" files. It is important to consider how many representative dwelling units are being used to make annual or timeseries conclusions. To limit uncertainty to 15%, the ResStock team generally recommends using at least 1,000 individual dwelling models to draw a conclusion. More information about the number of samples and how it impacts uncertainty can be found here, and a further explanation that one line of data is not equal to one dwelling unit or household be found here. If you have questions about your ResStock use case, and want to check with our team, please email us at ResStock@nrel.gov .

OEDI Data Lake Contents

The contents of the OEDI data lake are summarized in the table, below.

Name	Contents
ResStockTechnicalReferenceGuide_2025_1.pdf	Technical report describing the baseline of ResStock 2025 Release 1.
batch_state.json	File processing code artifact, not relevant for users.
building_energy_models	Building energy models, in OpenStudio format, that were run to create the dataset. Note that OpenStudio files can be converted to EnergyPlus IDF files as needed.
geographic_information	Information on various geographies used in the dataset provided for convenience. Includes map files showing the shapes of the geographies (states, PUMAs) used for partitioning and a lookup table mapping between census tracts and various other geographies.
metadata_and_annual_results	Building characteristics (vintage, floor area, HVAC system type, etc.) and annual results for each building energy models.
timeseries_aggregates	Aggregate end-use load profiles by building type and geography that can be opened and analyzed in Excel, python, or other common data analysis tools.
timeseries_individual_buildings	The raw individual building timeseries data. The file names in this directory correspond to the "bldg_id" column in the metadata_and_annual_results files.
weather	Key weather data parameters in csv format used as an input to run the building energy models to create the dataset.
data_dictionary.tsv	Describes the column names, types, and applicable units found in the metadata and timeseries data files.
enumeration_dictionary.tsv	Provides the enumeration of all possible values for all building characteristics in the metadata files.

upgrades_lookup.json	Lookup table with upgrade ID and upgrade name for the given dataset release.
measure_name_crosswalk.csv	Relates a universal "Measure ID" and the upgrade IDs and upgrade names (found in upgrades_lookup.json) across dataset releases.

File Types and How to Open

The following table lists the file types included on the ResStock OEDI data lake and provides details for how to open each file type.

File type	Description	How to Open
.csv (Comma-Separated Values)	A plain text file that stores tabular data, where each line is a data row and values are separated by commas.	Use spreadsheet software like Excel or Google Sheets, or programmatically with tools like Python's "pandas."
.json (JavaScript Object Notation)	A lightweight, text-based format for storing structured data as key-value pairs; widely used in APIs and configurations.	Open with any text editor or view/edit with code editors like VisualStudioCode; programmatically accessible with Python (json module) or JavaScript.
.geojson	A json based file that specifically stores geographic information.	Open with any text editor or view/edit with code editors like VisualStudioCode; programmatically accessible with Python (json module) or JavaScript.
.osm (OpenStudio Model)	A file format used by OpenStudio to define energy models for buildings, including geometry, HVAC, schedules, and loads.	Open with the OpenStudio Application or edit programmatically with the OpenStudio SDK. Note that OpenStudio files can be converted to EnergyPlus IDF files as needed.
.parquet	A columnar storage file format optimized for large-scale data processing, commonly used with big data tools. The file sizes are much smaller than the .csv versions and are therefore easier to download and store.	Use Python libraries like "pyarrow" or "pandas", or tools like Apache Spark. When opening with the newest version of "pandas", you can specify the engine as "fastparquet". See our FAQ, "What software can I use to

		open .parquet files", for sample code on how to open parquet files.
.tsv (Tab-Separated Values)	Similar to CSV, but uses tabs instead of commas to separate values; used for cleanly formatted tabular data.	Open with Excel, Google Sheets (specifying tab as delimiter), or programmatically using tools such as Python.

Dataset Naming Convention

ResStock releases use the following naming convention for this ResStock 2025 Release 1 dataset. Older ResStock datasets may not follow this format. Each major release is expected to have new measures and/or changes to the ResStock baseline.

<dataset type>_<weather data>_release_<release number>

example: resstock_amy2018_release_1

- dataset type
  - resstock = residential building stock
  - comstock = commercial building stock
- weather data
  - amy2018 = actual meteorological year 2018 (2018 weather data from NOAA ISD, NSRDB, and MesoWest)
  - amy2012 = actual meteorological year 2018 (2018 weather data from NOAA ISD, NSRDB, and MesoWest)
  - tmy3 = typical weather from 1991-2005 (see this publication for details)
- release_<major>.<minor>
  - release_1 = first major release of the dataset during the year of publication
  - release_2 = second major release of the dataset during the year of publication
  - release_1.1 = first minor release that modifies the release_1 dataset

Major Updates to ResStock

New dataset releases include updates to the ResStock baseline model and new technologies available as upgrade measures. Major updates in 2025 Release 1 are highlighted below. For a complete list of feature changes in this release, see the GitHub release change log.

Column naming convention has changed

This ResStock release had significant changes in our column names compared to the previous ResStock releases. Below is a summary of what has changed.

- All units are now at the end of the column name, separated by ".."
- New inputs, parameters, and results related to electric panels and electric vehicles
- Television is now its own end use separate from plug loads
- Solar thermal water heating is no longer its own field, it's now part of other water heater inputs

- Several new geographic characteristics available such as county metro status and metropolitan and micropolitan statistical area
- Different indoor and outdoor environmental conditions published
- Including schedule information in individual ID timeseries results
- Including intensities (results per square foot)
- Including weighted results in metadata_and_annual results files
- Included peak savings
- Primary heating/cooling and total heating/cooling capacities included separately
- Several other renames of existing fields

New states added – Alaska and Hawaii

ResStock added Alaska and Hawaii results. Now, ResStock models all 50 U.S. states and Washington D.C. Alaska housing stock data mainly comes from the 2008-2022 Alaska Retrofit Information System (ARIS) and RECS 2020 while Hawaii data comes from RECS 2020 with PV saturation from EIA 861.

The number of samples in the dataset remained the same at roughly 500,000 while the number of housing units represented increased to account for the new states. This means the weight per building sample or energy model has changed and it increased from 252.3 in ResStock 2024 Release 2 to 253.9 in ResStock 2025 Release 1.

Electric vehicles and flexible charging

Electric vehicles (EV) with diversity in battery capacity, outlet access, charger level, vehicle miles traveled, and stochastic home charging schedules are now in the baseline. The baseline captures EV saturation as of 2023 based on TEMPO, an NREL transportation model, and assumes at most one EV per dwelling unit. EV charging load, including for multi-family units where charging may take place in a common garage and is metered separately, is attributed to the dwelling's total load. Demand flexibility from off-peak EV charging is available as measures in this dataset. More information can be found in this report, and in the measure documentation when released.

Utility rates

Electricity utility rates were generally updated to 2023 pricing. They were taken from the URDB up through May 2025 and then analyzed with EIA 861 data of the same period to get a final volumetric rate. An average fixed meter charge of $13.80/mo was also found using URDB.

Natural gas utility rates were generally updated to 2023 pricing. Natural gas customer charges were updated from a national average to a census average.

Propane and fuel oil costs were taken from EIA data ranging from December 2024 through February 2025 for all states except Alaska, where state-specific databases were used.

More information about these values can be found in the Technical Reference Guide.

HVAC demand flexibility

Demand flexibility in the form of HVAC load shedding or load shifting from system peak hours are available as several measures in this dataset. These are modeled as thermostat setpoint adjustment by 2°F or 4°F during the peak hour (on-peak) to reduce HVAC load or 2-hr or 4-hr before the peak hour (pre-peak) to pre-condition the house. Peak hours for each state were identified using Cambium's MidCase2050 net load data, and were identified for summer months (June to September), winter months (January to March, and December), and shoulder months (April to May, and then October to November) (Gagnon, et al., 2024).

Load shedding uses on-peak events (by increasing cooling setpoint or decreasing heating setpoint) to curtail load during peak periods to provide ancillary services to the grid. Load shifting uses pre-peak events to either preheat or precool the house depending on the season to shift demand away from the peak periods. Demand curtailed from a load shedding event may not be recovered, whereas the demand from a load shifting event is generally met by design by shifting to a different time.

The HVAC demand flexibility is dispatched nearly every day in the modeled dataset to show maximum technical potential. Exceptions are made in shoulder seasons when the daily average temperature is greater than 50°F but less than 68°F. On those days, load shedding is dispatched exclusively to ensure load reduction. Because the upgrade measure is meant to simulate the technical potential of maximal dispatch, there is an unrealistically high number of dispatch days compared to a conventional demand flexibility program and the results must therefore be used thoughtfully. This is also to allow users the flexibility to choose the dispatch days they need for their analysis. To do this, use the daily profiles from the baseline for most days of the year, and splice in the daily profiles from the upgrade for only the days that demand flexibility is dispatched. Because of the over-representation of dispatch, annualized energy consumption or energy savings metrics should not be used directly. Users should also check comfort metrics to understand possible changes in delivered services.

More information on these packages will be released in upcoming measure documentation.

Electrical Panels

Electrical panel breaker spaces and capacity ratings are now characterized for each dwelling in the baseline based on retrofit program survey data. For each measure upgrade, a load-based calculation per the National Electrical Code is performed to determine potential panel constraint in terms of insufficient capacity or breaker space. More information on this, including the methodology and assumptions, are found in the Technical Reference Guide.

Improved air source heat pump modeling

The variable speed air-source heat pump model in the 2025.1 release uses performance data derived from the NEEP database to describe how it operates. These data include capacity and COP values at minimum and maximum compressor speeds and various outdoor temperatures.

This release also introduces the ability to restrict the sizing of heat pumps to what the baseline duct size allows. This reflects a scenario where an occupant installs a heat pump into an existing household but does not expand or retrofit the duct system. This sizing restriction is used with the cold climate air-source heat pump model in the 2025.1 release.

Improved geothermal heat pump modeling

New models of different types of geothermal heat pumps (GHPs), including two stage and variable speed equipment, are included in the latest release. Scenarios modeled include single-stage, two-stage, and variable speed GHP. Two-stage GHPs make up the majority of the market today, and a scenario of a two-stage GHP plus envelope improvements was also included in this release. The workflow now takes advantage of different EnergyPlus objects designed for modeling variable speed equipment more explicitly.

Other housing characteristics updates

As a result of Alaska and Hawaii integration, several baseline housing characteristics are updated. Notably, secondary heating is modeled for Alaskan homes, water heaters now include solar thermal (mostly in Hawaii), pool heaters now include heat pump heaters, and rooftop PV saturation (modeled for single-family detached only) has been updated from 2018 level to 2023 per EIA 861 reporting.

Upgrade Measures

The following table summarizes the new upgrade measures introduced in this dataset release. All upgrade measures in this release are considered new. Throughout ResStock documentation, the terms upgrade and measure are used interchangeably.

Measure ID	Upgrade ID	Measure Documentation Name	upgrades_lookup.json name	Description
hvac_001	01	ResStock Measure Documentation: Natural Gas Furnace 95% AFUE	Natural Gas Furnace 95% AFUE for All Dwellings with Ducts	This upgrade replaces the heating system of applicable dwellings with a high-efficiency natural gas furnace (95% AFUE). Applicable dwellings must have a non-shared, ducted HVAC system that is heated either by electricity (including heat pumps), natural gas (if system is less efficient),

				propane, or fuel oil (no wood or other fuel).
hvac_002	02	ResStock Measure Documentation: Propane Furnace 95% AFUE or Fuel Oil Furnace 88% AFUE	Propane or Fuel Oil Furnace 95% AFUE	This upgrade replaces existing ducted propane and fuel oil furnaces from low efficiency to high efficiency (95% AFUE for propane and 88% AFUE for fuel oil).
hvac_003	03	ResStock Measure Documentation: Reference Space Heating and Air Conditioning Upgrade Circa 2025	Minimum Efficiency Boilers, Furnaces, and Air Conditioners Circa 2025	This upgrade represents a reference case to replace any ducted space heating and cooling equipment at wear-out. It replaces equipment like-for-like with units that meet at least federal minimum efficiency standards as of 2025. This means existing equipment below the efficiency standard are brought up to standard while higher efficiency equipment are replaced with the same equipment (due to wear-out). The federal minimum standard is: - 80% AFUE for natural gas and propane furnaces, - 83% AFUE for fuel oil furnace, - SEER2 13.4 for central AC in southern states, - SEER2 14.3 for northern states, and - SEER2 14.3, 7.5 HSPF2 for ducted air-source heat pump.
hvac_004	04	ResStock Measure Documentation: Cold Climate Air-Source Heat Pump	Typical Cold Climate Ducted Air Source Heat Pump with Detailed Performance Data	This upgrade replaces the HVAC system of applicable dwellings with a variable speed ducted air-source heat pump (ASHP) (HSPF2 8.5, SEER2 17.5) with electric resistance backup. Applicable dwellings must have a ducted HVAC system heated by electricity, natural gas, propane or fuel oil (no wood or other fuel). If

				they are multi-family with shared heating or cooling, they must also have an existing compressor-based system (e.g., central AC or heat pump) to make space for the upgrade.
hvac_005	05	ResStock Measure Documentation: Dual Fuel Heat Pump	Dual Fuel Heating System	This upgrade replaces the HVAC system of applicable dwellings with a dual fuel system consisting of an air source heat pump (ASHP) (HSPF2 7.8, SEER2 15.2) and a backup natural gas furnace (92% AFUE if in IECC climate zones 1-4 and 95% AFUE everywhere else). Applicable dwellings must have a ducted, non-shared HVAC system and have access to natural gas.
hvac_006	06	ResStock Measure Documentation: Residential Single-Stage Geothermal Heat Pump (3.8 COP, 18.6 EER)	Single-Speed Geothermal Heat Pump with Thermally Enhanced Grout and Pipes	This upgrade replaces the HVAC system of applicable dwellings with a single-speed compressor, variable speed air handler, water-to-air geothermal heat pump (GHP) (3.8 COP, 18.6 EER) with vertical ground heat exchanger. Applicable dwellings must have a ducted HVAC system heated by electricity, natural gas, propane or fuel oil (no wood or other fuel). They must be within a low-rise building with less than 8 stories. Their ground thermal conductivity must be more than 0.8.
hvac_007	07	ResStock Measure Documentation: Residential Two-Stage Geothermal Heat Pump (4.0 COP, 20.5 EER)	Dual-Speed Geothermal Heat Pump with Thermally Enhanced Grout and Pipes	This upgrade replaces the HVAC system of applicable dwellings with either ducted heating or ducted cooling to a two-speed compressor, variable speed air handler, water-to-air geothermal heat pump (GHP) (4.0 COP, 20.5 EER) with vertical ground heat exchanger.

				Applicable dwellings must have a ducted HVAC system heated by electricity, natural gas, propane or fuel oil (no wood or other fuel). They must be within a low-rise building with less than 8 stories. Their ground thermal conductivity must be more than 0.8.
hvac_008	08	ResStock Measure Documentation: Residential Variable Speed Geothermal Heat Pump (4.4 COP, 30.9 EER)	Variable-Speed Geothermal Heat Pump with Thermally Enhanced Grout and Pipes	This upgrade replaces the HVAC system of applicable dwellings with a variable-speed compressor, variable-speed air handler, water-to-air geothermal heat pump (GHP) (4.0 COP, 20.5 EER) with vertical ground heat exchanger. Applicable dwellings must have a ducted HVAC system heated by electricity, natural gas, propane or fuel oil (no wood or other fuel). They must be within a low-rise building with less than 8 stories. Their ground thermal conductivity must be more than 0.8.
water_001	09	ResStock Measure Documentation: Heat Pump Water Heater	Heat Pumps Water Heater	This upgrade installs a 240V heat pump water heater (HPWH) to all dwelling units that are not currently using a HPWH or a solar thermal water heater. The equipment has a Uniform Energy Factor (UEF) no less than 3.3 and a First Hour Rating (FHR) no less than 45 gal/h.
water_002	10	ResStock Measure Documentation: Natural Gas Water Heater	High Efficiency Natural Gas Tankless Water Heater	This upgrade installs a high efficiency condensing natural gas tankless water heater with a Uniform Energy Factor (UEF) of 0.95 and a burner capacity of 199 kBtu/h to all dwelling units that are not currently using solar thermal, heat pump, or gas tankless water heaters and have access to gas.

env_001	11	ResStock Measure Documentation: Air Sealing	Air Sealing	This upgrade air seals dwellings down to 5 ACH50 if they have an infiltration rate of ≥6 ACH50.
env_002	12	ResStock Measure Documentation: Attic Floor Insulation	Attic Floor Insulation for Unfinished Attics	This upgrade brings the attic floor insulation in unfinished attics to the prescriptive level from IECC 2021 (R-49 for IECC climate zone 1 and R-60 everywhere else) where the existing insulation is R-10 or more less than the prescriptive level.
env_003	13	ResStock Measure Documentation: Duct Sealing and Insulation	Duct Sealing and Insulation	This upgrade seals and insulates HVAC ducts from more than 6% duct leakage to outside and less than R-6 duct insulation to 5% duct leakage to the outside and R-8 duct insulation.
pkg_001	14	ResStock Measure Documentation: Air Sealing with Drill-and-Fill Wall Insulation	Drill and Fill Wall Insulation with Air Sealing	This upgrade applies R-13 drill-and-fill insulation to uninsulated exterior wood-stud walls. It also includes env_001 to air seal dwellings down to 5 ACH50 if they have an infiltration rate of ≥6 ACH50. An applicable dwelling may receive one or both individual measures.
pkg_002	15	ResStock Measure Documentation: Air Sealing, Attic Floor Insulation, and Duct Sealing and Insulation	Air Sealing + Attic Floor Insulation + Duct Sealing	This upgrade applies air sealing (env_001), attic floor insulation (env_002), and duct sealing and insulation (env_003) to applicable dwelling units. An applicable dwelling may receive some or all individual measures.
pkg_003	16	ResStock Measure Documentation: Air Sealing, Attic Floor Insulation, Duct Sealing and Insulation, and	Air Sealing + Attic Floor Insulation + Duct Sealing + Drill and Fill Wall Insulation	This upgrade applies air sealing (env_001), attic floor insulation (env_002), duct sealing and insulation (env_003), and drill-and-fill wall insulation (part of pkg_001) to applicable dwelling units. An applicable dwelling may receive some or all individual measures.

		Drill-and-Fill Wall Insulation		
env_004	17	ResStock Measure Documentation: ENERGY STAR Windows	EnergyStar Windows	This upgrade replaces any existing windows with less than the performance level specified by ENERGY STAR Version 7.0 (by climate regions) with windows meeting this performance level. This upgrade includes the air infiltration reduction benefit from window replacement.
pkg_004	18	ResStock Measure Documentation: Residential Two-Stage Geothermal Heat Pump (4.0 COP, 20.5 EER) with Envelope Improvements	Package – Dual-Speed Geothermal Heat Pump with Thermally Enhanced Grout and Pipes with Air Sealing with Attic Floor Insulation with Duct Sealing	This upgrade combines the dual-speed geothermal heat pump (hvac_007) with envelope improvements (pkg_002), which consist of air sealing, attic floor insulation, and duct sealing and insulation.
ev_001	19	ResStock Measure Documentation: Electric Vehicle Adoption with Level 1 Charging	Electric Vehicle Adoption with Level 1 Charging	This upgrade adds one EV and one Level 1 charger to every occupied dwelling unit that does not already have an EV.
ev_002	20	ResStock Measure Documentation: Electric Vehicle Adoption with Level 2 Charging	Electric Vehicle Adoption with Level 2 Charging	This upgrade adds one EV and one Level 2 charger to every occupied dwelling unit that does not already have an EV or Level 2 charger.
ev_003	21	ResStock Measure Documentation: Efficient Electric Vehicle Adoption with Level 2 Charging	Efficient Electric Vehicle Adoption with Level 2 Charging	This upgrade adds one efficient EV (15% more efficient than baseline) and one Level 2 charger to every occupied dwelling unit that does not already have the efficient EV or Level 2 charger.

ev_004	22	ResStock Measure Documentation: Electric Vehicle Adoption with Level 2 Charging and Demand Flexibility	Electric Vehicle Adoption with Level 2 Charging and Demand Flexibility	This upgrade adds one EV and one Level 2 charger to every occupied dwelling unit that does not already have an EV or Level 2 charger. (ev_002). EV charging is suspended during on-peak hours to provide demand flexibility.
ev_005	23	ResStock Measure Documentation: Efficient Electric Vehicle Adoption with Level 2 Charging and Demand Flexibility	Efficient Electric Vehicle Adoption with Level 2 Charging and Demand Flexibility	This upgrade adds one efficient EV (15% more efficient than baseline) and one Level 2 charger to every occupied dwelling unit that does not already have the efficient EV or Level 2 charger (ev_003). EV charging is suspended during on-peak hours to provide demand flexibility.
dr_001	24	ResStock Measure Documentation: HVAC Load Flexibility	HVAC Demand Flexibility – On-peak Load Shedding, 2F Offset	This upgrade curtails loads by setting back the HVAC thermostat setpoints by 2°F throughout a one-hour on-peak window.
dr_002	25	ResStock Measure Documentation: HVAC Load Flexibility	HVAC Demand Flexibility – Pre-peak Load Shifting, 2F Offset, 4hr Pre-peak Duration	This upgrade shifts loads by changing the HVAC thermostat setpoints by 2°F throughout a four-hour pre-peak window to pre-heat or pre-cool the dwelling.
dr_003	26	ResStock Measure Documentation: HVAC Load Flexibility	HVAC Demand Flexibility – On-peak Load Shedding, 4F Offset	This upgrade curtails loads by setting back the HVAC thermostat setpoints by 4°F throughout a one-hour on-peak window.
dr_004	27	ResStock Measure Documentation: HVAC Load Flexibility	HVAC Demand Flexibility – Pre-peak Load Shifting, 4F Offset, 4hr Pre-peak Duration	This upgrade shifts loads by changing the HVAC thermostat setpoints by 4°F throughout a four-hour pre-peak window to pre-heat or pre-cool the dwelling.
dr_005	28	ResStock Measure Documentation:	HVAC Demand Flexibility – Pre-peak Load	This upgrade shifts loads by changing the HVAC thermostat setpoints by 2°F throughout a one-

HVAC Load Flexibility	Shifting, 2F Offset, 1hr Pre-peak Duration	hour pre-peak window to pre-heat or pre-cool the dwelling.

Citation and Data Attribution

Suggested Citation

When citing this dataset, **please cite both the specific dataset and the technical reference guide**, as shown below. Users are welcome to also cite the measure documents directly (when published).

ResStock 2025 Release 1 Dataset in APA format

Parker, A., Adhikari, R., Brossman, J., Liu, L., Lou, Y., Maguire, J., Phoung, S., Robertson, J., Speake, A., Stenger, K., White, P., Clark, K., Fontanini, A., Horowitz, S., Present, E., Reyna, J., Swindler, A., Wilson, E., Bianchi, C., Chintala, R., Harris, C., Merket, N., Moore N., Munankarmi, P., & Sandoval, N. (2025). *ResStock 2025 Release 1* [Dataset]. Open Energy Data Initiative (OEDI). National Renewable Energy Lab (NREL). https://data.openei.org/s3_viewer?bucket=oedi-data-lake&prefix=nrel-pds-building-stock%2Fend-use-load-profiles-for-us-building-stock%2F2025%2Fresstock_amy2018_release_1%2F

ResStock 2025 Release 1 Technical Reference Guide in APA format

Reyna, J., Fontanini, A., Parker, A., Present, E., Liu, L., Adhikari, R., Bianchi, C., Brossman, J., Chintala, R., Clark, K., Harris, C., Horowitz, S., Lou, Y., Maguire, J., Merket, N., Moore, N., Munankarmi, P., Phoung, S., Robertson, J., Sandoval, N., Speake, A., Stenger, K., White, P., Wilson, E. (2025). *ResStock Technical Reference Documentation, Active Development Version* [Technical report]. National Renewable Energy Laboratory (NREL). Retrieved from https://nrel.github.io/ResStock.github.io/assets/trd/ResStockTechnicalReferenceGuide_2025_1.pdf

Data Attribution

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