

RENOVATE AMERICA GREEN BONDS: HERO FUNDING TRUST 2016-1

FRAMEWORK OVERVIEW AND SECOND OPINION BY
SUSTAINALYTICS

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1. INTRODUCTION

Renovate America, Inc. (“Renovate America”) intends to issue a series of notes under its Asset Backed Security (“ABS”) Framework called Home Energy Renovation Opportunity (“HERO”) Funding Trust 2016-1 (hereafter: “Notes”). The Notes are secured by limited obligation improvement bonds called PACE Bonds and finances home improvement projects and products. Renovate America engaged Sustainalytics to provide a deal specific and independent opinion on its Green Bond Framework and on the environmental credentials of the HERO Funding Trust 2016-1 Notes. Sustainalytics held conversations with various members of Renovate America’s management team to understand the sustainability impact of their business processes and reviewed the planned use of proceeds for the issuance of the 2016-1 Green Bonds. Sustainalytics also reviewed the public and internal documents from Renovate America specifically relevant for the HERO Funding Trust 2016-1 Notes. This document contains two sections: Framework Overview – summary of the Renovate America Green Bond framework; and Sustainalytics’ Opinion – an opinion on the framework.

2. FRAMEWORK OVERVIEW

2.1 Introduction

Overview

Renovate America is a technology-focused finance company headquartered in San Diego, California, with over 600 full-time employees. Founded in 2009, it partners with local governments to administer financing for home improvement projects involving installation of energy efficiency, renewable energy and water efficiency products through its Home Energy Renovation Opportunity (HERO) program. The HERO program is delivered through California’s Property Assessed Clean Energy (PACE)¹ legislation, which allows homeowners to finance their renewable energy, energy efficiency and water efficiency renovations through voluntary property tax assessments. Renovate America is contracted by local municipalities to create and administer their PACE programs, and has financed over 90% of all residential PACE projects in California. As of January 2016, Renovate has originated over 50,000 PACE Assessments, representing more than 1.1 billion USD in PACE funding for residential property owners in California.

The PACE Process

Enabled by PACE, local governments raise capital through issuances of limited obligation municipal bonds or PACE bonds. The proceeds from these bonds are administered by the HERO program and are used to enable homeowners to carry out energy and water efficiency home improvements. The HERO program directly pays contractors for the installation of water efficient, energy efficient or renewable energy generating products in consumer homes. Homeowners, through the HERO technology platform, choose both the contractors and the eligible products. By virtue of the PACE financing structure, homeowners do not incur upfront payments for their energy and water efficient home improvements. Instead, homeowners repay the financing for their green renovations through bi-annual property tax payments. Municipalities service this repayment as a part of their annual tax collection process, and remit these tax payments via a trustee to PACE bondholders.

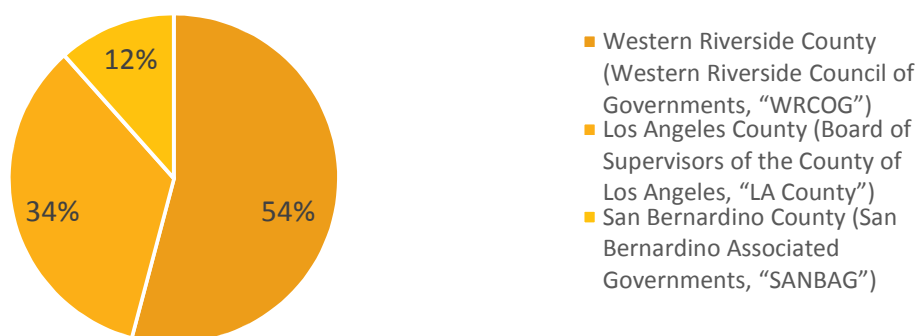
¹ <http://energy.gov/eere/slsc/property-assessed-clean-energy-programs>

Securitization of PACE bonds through the Issuer

HERO Funding Trust 2016-1 (the “Issuer”) provides collateral for the Notes in the form of a pool of Property Assessed Clean Energy (“PACE”) bonds, and uses the PACE bond payments to back the issue of the Notes and residual certificates. Hence, the Notes and certificates issued by the HERO program are secured (or supported) by the PACE bond portfolio, which in turn is secured by the property tax assessments or PACE assessments levied against the homeowners’ properties.

For the 2016-1 Notes, three issuers of PACE bonds (and operators of the HERO programs) are included. These issuers are, through their own PACE programs, providing the underlying limited obligations PACE bonds that serve as the collateral for the 2016-1 Notes (see Figure 1).

Figure 1: HERO 2016-1 Notes - Included Issuers of PACE Assessments



% in terms of the monetary value of the 2016-1 Notes

The average PACE assessment is 24,235.85 USD, with an average annual payment of 3,295.54 USD. Renovate America is directly responsible for originating these assessments.

Renovate America has more than 8,000 registered licensed contractors participating in its HERO program. It provides these contractors with training programs on marketing and eligible equipment criteria, access to financing and marketing data, and tracking capabilities. All registration and administration fees charged are split with other partners and service providers in the PACE program (i.e. municipalities, legal consultants, public finance consultants etc.). Renovate America’s principal source of revenue stems from the difference in interest rates between its lending and borrowing activities and origination fees assessed to contractors.

2.2 Renovate America's Green Bonds

Renovate America is planning to issue the 2016-1 Notes as "Green Bonds" using the standard securitization process described above. The proceeds of the Notes will be used to finance eligible energy efficiency, renewable energy, and water efficiency home improvement projects through the purchase of municipal PACE bonds. The amount of assessments generated by Renovate America through its HERO program are to be equal to or greater than the amount raised by its ABS Framework for the 2016-1 Notes (see Annex 1 for details). The following sections summarize Renovate America's Green Bond Framework with respect to the use of proceeds, project selection, the management of proceeds, and reporting.

2.2.1 Use of Proceeds

The proceeds of the Notes issued by the Issuer will be used to finance products that fall under the categories outlined below.

- Renewable & Alternative Energy Products
 - Solar Photovoltaic
 - Solar Thermal
 - Advanced Energy Storage System - Electric Vehicle Charging Station
 - Stationary Fuel Cell Power System
- Energy Efficiency Products
 - High-Efficiency Heating, Ventilation, and Air Conditioning (HVAC)
 - Building Envelope (Insulation, Cool Roofing, Air Sealing, etc.)
 - High-Efficiency Lighting
 - High-Efficiency Pool Equipment
 - High-Efficiency Water Heating
 - Windows, Doors, and Skylights
- Water Efficiency Products
 - Indoor Water Efficient Fixture & Fittings
 - Outdoor Water Efficient Landscaping
- Custom Energy Efficiency Products
 - Energy Audit
 - Site Preparation

2.2.2 Process for Project Evaluation and Selection

Eligibility Criteria

To be funded through the proceeds of Notes, the home improvement project (by installing a product or a bundle of products) must meet the following eligibility criteria:

1. The project must fall under one or more of the four categories specified above in section 2.2.1.
2. The project must meet certain product specific eligibility criteria, as outlined in Appendix 1. The products that are used for the project must meet the product-specific eligibility criteria detail the minimum product performance, installation values, and/or qualification requirements for each product type.
3. The used product's energy/water efficiency or renewable energy generation performance must be measurable and verifiable for its installed application in a broad variety of single-family residential property settings.
4. The used product's energy efficiency/water efficiency/energy generation must be achieved through broadly available, non-proprietary technology that is offered by more than one manufacturer.
5. If the cost of a qualified product for a project is significantly greater than their conventional/standard efficiency counterpart, the incremental cost incurred will be offset by direct savings (i.e. utility bill reduction) or indirect savings (i.e. property value increase, induced economic impact, etc.) within a reasonable period of time.
6. The projects were funded within the 24 months prior to the issuance of the bond.

The HERO product specific eligibility criteria (as outlined in Appendix 1) reference third-party efficiency program standards and certified product directories, when available, and rely on internal and external subject matter expertise to generate relevant standards and eligibility specifications. This third-party reference process ensures that products have met a nationally recognized standard of efficiency, and have submitted the necessary performance documentation in order to be listed in the directories.

The third-party sources used for the HERO eligibility specifications are prioritized as follows:

- American National Standards Institute
- ASTM International
- Air Conditioning Heating and Refrigeration Institute
- Building Performance Institute
- California Energy Commission
- California Self Generation Incentive Program
- California Solar Initiative Program
- California Title 24, Section 6 Building Efficiency Standards
- Cool Roof Rating Council
- Home Ventilating Institute
- International Association of Plumbing and Mechanical Officials
- National Fenestration Rating Council
- Underwriters Laboratory
- U.S. Department of Energy (DOE) Appliance Certification Database

- U.S. Department of Energy (DOE) ENERGY STAR Product Directory
- U.S. Environmental Protection Agency (EPA) WaterSense Product Directory
- SoCal Water Smart Program
- Solar Rating and Certification Corporation

Product Catalogue

The HERO program has built a custom database (product catalogue) that aggregates product records and associated details (i.e. manufacturer, brand, model, performance specifications, etc.) from the third-party reference sources listed above. Aggregated product records are then filtered on the defined eligibility specifications for each product type and flagged as being eligible or not eligible for HERO financing. The product catalogue includes over 1 million eligible product records that are available to contractors and property owners for their projects and is updated on a daily basis to ensure that records are consistent with the third-party product directories.

In addition to the HERO Product Eligibility Specifications, all product specifications and installation quality must meet or exceed applicable local, state, and/or federal permitting, codes, and standards. Project stakeholders are fully and solely responsible for ensuring product compliance with applicable sections of the current California Building Energy Efficiency Standards.

2.2.3 Management of Proceeds

The Notes are secured by all PACE assessments in the pool, an amount equal to or greater than the amount of the bond issuance. As part of the transaction process, a third-party data audit is performed and filed with the U.S. Securities and Exchange Commission (SEC) on Form 15Ga-2. The Issuer is the sole buyer of PACE Bonds issued by the partnering municipalities. Therefore, the net proceeds arising from the issuance of the Notes and residual certificates shall be used to repay PACE bonds funding eligible products. The transaction of issuing the Notes and the residual certificates and purchasing the PACE bonds by HERO Funding Trust occurs at the same time. The purchase of the PACE bonds is made using the proceeds from the Notes, resulting in full allocation of the proceeds to the PACE bonds that are backed by the assessment pool.

2.2.4 Impact Reporting

Renovate America reports on estimated impact in the following areas:

- Water savings,
- Energy savings,
- Renewable energy generation, and
- Greenhouse Gas (GHG) emission reductions.

Renovate America calculates the estimated impact in each of these areas using proprietary forecasting models that are largely derived from relevant third-party sources. Each model is customized for inputs that are specific to the property being assessed, taking into account the location of house, the year built, the number of occupants, climate zone, etc. Where applicable, Renovate America reports on both annual and life-time metrics of the installed improvements. The impact reporting methodology, its original third-party source, and the associated metrics are listed below, disaggregated by different variables.

Water Savings

1. *Methodology*

Water savings estimates are reported for both indoor and outdoor water efficiency projects. This impact model derives primarily from methodologies used by the U.S. Environmental Protection Agency (EPA) WaterSense Program, the California Department of Water Resources, and the California Institute for Public Policy.

2. *Specific Impact Metrics*

- a. Annual Water savings (gallons & bill savings)
- b. Lifetime Water savings (gallons & bill savings)

Energy Savings

1. *Methodology*

Energy savings estimates are reported for each energy efficiency home improvement project. The impact model used to calculate home energy savings derives from calculation methodologies used by the U.S. Department of Energy (DOE).

2. *Specific Impact Metrics*

- a. Annual kWh Savings
- b. Annual Therm Savings
- c. Annual Energy Savings (kWh-e & bill savings)
- d. Lifetime Energy Savings (kWh-e & bill savings)

Greenhouse Gas (GHG) Emission Reduction

1. *Methodology*

GHG emission reductions are reported for both energy efficiency projects and projects that generate renewable energy. The impact model used to calculate GHG emission reduction derives from methodologies used by the U.S. EPA eGRID Power Profiler, and the GHG Equivalency Calculator.

2. *Specific Impact Metrics*

- a. Annual Emission Reduction (Tons GHG)
- b. Lifetime Emission Reduction (Tons GHG)

Renewable Energy Generation

1. *Methodology*

Renewable energy generation estimates are reported for solar photovoltaic installation projects. The impact model used to calculate renewable energy generation estimates derives from methodologies used by the National Renewable Energy Laboratory's PV Watts Calculator.

2. *Specific Impact Metrics*

- a. Sum of Solar System Size (W)
- b. Annual Energy Savings (kWh & bill savings)
- c. Lifetime Energy Savings (kWh & bill savings)

3. SUSTAINALYTICS' OPINION

An expansion of an innovative program to promote home energy efficiency: By issuing its second series of Green Bonds in the form of HERO 2016-1 Notes, Renovate America continues to leverage the PACE program and continues to promote and enable home owners to install green projects and to improve home energy efficiency. For their issuance of the 2016-1 Notes, Renovate America has applied the same ABS Framework as it used for its first issuance of HERO Funding Trust 2015-3. Under this ABS Framework, the 2016-1 Notes are backed by collateral through PACE programs that fund projects and products managed through the HERO program. Also, the 2016-1 Notes are backed by limited obligation PACE bonds that in turn are secured by PACE property tax assessments (see also: Annex 1). The PACE program incentivizes homeowners to install green products by financing their installation through special assessments invoiced with their home property taxes, payable over an extended time frame. The HERO program that forms the basis for the ABS Framework of the Green Bonds is an effective way to promote the uptake of energy and water efficiency products as well as renewable energy-generating products in the United States. With these Notes, Renovate America (as a PACE administrator) continues to expand its efforts to offer homeowners financing for investments in energy efficient home improvements which are paid back through an increase in property taxes.

Use of Proceeds: Renewable & Alternative Energy Products, Energy Efficiency Products and Water Efficiency Products are commonly accepted green project categories, as they contribute to climate change mitigation and the sustainable use of natural resources. Energy Audit and Site Preparation projects support the overall environmentally positive home improvement and renovation projects. Based on the review of these project categories, Sustainalytics is confident about the green credentials of the use of proceeds.

Process of Project Selection: The 2016-1 Notes are backed by assets in the form of PACE bonds that fund projects and products managed through the HERO program. For the eligible projects and products, the HERO program bases eligibility on two sets of criteria—HERO program-specific criteria, and product-specific criteria. Collectively, these criteria specify that the funded product contributes to energy and cost savings, meets minimum product performance, and is performance tested. The product-specific criteria are based on third-party efficiency standards and certified product directories. They use third-party standards from parties such as the American National Standards Institute and the U.S. Department of Energy, providing assurance that eligible products have met nationally recognized standards of efficiency. The HERO program also ensures compliance of the projects with the eligibility criteria through rigorous review and assessments processes. Sustainalytics has reviewed the eligibility criteria and is of the opinion that the selection process for projects and products is robust and that these selected products and projects will most likely result in improving energy efficiency of homes.

Management of Proceeds: PACE bonds amount to equal to or greater than the amount of the Notes issuance. The issuance of the Notes and the residual certificates and the purchase of the PACE bonds by the HERO Funding Trust occurs at the same time. Because of this, the management of proceeds is a straightforward process and in line with ABS green bond norms.

Impact Reporting: Renovate America's reporting on the impact of the proceeds from the Notes is very detailed and rigorous. The HERO platform collects data on all projects and products funded, and reports on both annual and lifetime metrics for each funded product. Additionally, the methodologies for calculating energy efficiencies, water efficiencies, GHG emission reduction and renewable energy generation are all based on credible third-party sources. The calculation methodologies are derived primarily from governmental departments and agencies. Sustainalytics is therefore of the opinion that Renovate America's reporting on positive environmental impact is robust.

Conclusion

Renovate America uses a robust Framework and selection process to finance home improvement projects and products with its 2016-1 Notes. Renovate America has applied the same ABS Framework in the form of the HERO program as when it issued its first Green bonds HERO Funding Trust 2015-3. The criteria that are used for the Framework are robust and the selection processes are diligent. The 2016-1 Notes issuance therefore supports investments in residential renewable energy, energy efficiency and water efficiency by providing financing to eligible home improvement projects. In addition, the reporting on the impact of the 2016-1 Notes proceeds is in line with best practice.

For the 2016-1 issuance the total property tax assessments backing the PACE bonds will exceed the proceeds of the Notes. Therefore, the capital raised through the issuance of the Notes will be allocated entirely towards energy or water efficient home improvement projects, through the purchase of PACE bonds.

Renovate America's Green Bond framework, according to which the 2016-1 Notes are issued, is aligned with market standards and norms, including the ICMA Green Bond Principles 2015. Sustainalytics is of the opinion that the Framework behind the 2016-1 Notes continues to be robust, credible and effective in supporting energy efficiency projects for residential properties in the United States.

ANNEX 1: HERO 2016-1 NOTES AND RESIDUAL CERTIFICATES

The HERO Funding Trust 2016-1 Notes are secured by 28 limited obligation improvement bonds (each, a “PACE Bond”, and collectively the “PACE Bond Portfolio”) issued by LA County, Western Riverside Council of Governments (“WRCOG”) and San Bernardino Associated Governments (“SANBAG”).

The PACE Bond Portfolio is secured by 9,252 PACE assessments levied against 9,166 residential properties (“PACE Assessments”) in 27 California counties. The average PACE Assessment is valued at 24,235.85 USD with an average annual payment of 3,295.54 USD. The transaction benefits from credit enhancement in the form of excess spread, overcollateralization, and a liquidity reserve.

Renovate America has disclosed that the proceeds of the 217,500,000 USD HERO 2016-1 Notes will be secured by 224,230,116 USD in property tax assessments.

HERO Funding Trust 2016-1 Notes and Residual Certificates adhere to the use of proceeds criteria, project selection, management of proceeds and reporting process described in the Green Bond Framework above.

APPENDICES

Appendix 1 – California HERO Program Residential Eligible Product List

California HERO Program Residential Eligible Product List

ALL PRODUCTS

In addition to the HERO Product Eligibility Specifications listed below, all product specifications and installation quality must meet or exceed applicable local, state, and/or federal permitting, codes, and standards. Project stakeholders are fully and solely responsible for ensuring product compliance with applicable sections of the current California Building Energy Efficiency Standards (Title 24, Part 6, Subchapters 1, 2, 7, 9).

Renewable & Alternative Energy Products

PRODUCT CATEGORY	PRODUCT TYPE	ELIGIBILITY SPECIFICATIONS	MAXIMUM TERM (YEARS)
Solar Photovoltaic	Solar Panel	<ol style="list-style-type: none"> Product must be listed as California Solar Initiative incentive-eligible photovoltaic module in compliance with CA-SB1 guidelines. System must be grid connected unless the property is not currently connected to the grid. Installed per manufacturer specifications. 	20
	Solar Inverter	<ol style="list-style-type: none"> Product must be listed as California Solar Initiative eligible inverter in compliance with CA-SB1 guidelines. System must be grid connected unless the property is not currently connected to the grid. Installed per manufacturer specifications. 	20
Solar Thermal	Solar Water Heating	<ol style="list-style-type: none"> System must have the OG-300 System Certification by the Solar Rating and Certification Corporation (SRCC). Auxiliary tank must be residential class. Installed per manufacturer specifications. 	15
	Solar Pool Heating	<ol style="list-style-type: none"> Product must have the OG-100 Collector Certification by the Solar Rating and Certification Corporation (SRCC). Installed per manufacturer specs. 	15

California HERO Program Residential Eligible Product List

PRODUCT CATEGORY	PRODUCT TYPE	ELIGIBILITY SPECIFICATIONS	MAXIMUM TERM (YEARS)
Alternative Energy	Small Wind Turbine	<ol style="list-style-type: none"> 1. Product must be certified by the Small Wind Certification Council as meeting the requirements of the AWEA <i>Small Wind Turbine Performance and Safety Standard</i> (9.1-2009). 2. Product must be grid connected unless the property is not currently connected to the grid. 3. Installed per manufacturer specs. 	20
	Advanced Energy Storage System	<ol style="list-style-type: none"> 1. System must have obtained certification from a nationally recognized testing laboratory for one of the acceptable standards: <ol style="list-style-type: none"> a. UL 1973 b. UL Subject 9540 c. IEC 62842-2 d. IEC 62109 e. UL 1741 f. Other equivalent standard 2. System must maintain roundtrip efficiency \geq 63.5%. 3. System must carry a minimum 10-year manufacturer warranty. 4. System must be pre-approved and listed on HERO-approved AES list. 	10
	Electric Vehicle Charging Station	<ol style="list-style-type: none"> 1. Product must be certified as meeting the UL Subject 2594 Standard Testing for Charging Stations. 2. Product must be a Level 2 charger with SAE J1772 standard charging plug. 3. Installed per manufacturer specs. 	10
	Stationary Fuel Cell Power System	<ol style="list-style-type: none"> 1. System must be certified as meeting the ANSI/CSA America FC1 standard. 2. Installed per manufacturer specs. 3. Installed in accordance with local code and/or the Standard for the Installation of Stationary Fuel Cell Power Plants, NFPA 853, the National Fuel Gas Code, ANSI Z223.1/NFPA 54, National Electrical Code, NFPA 70, as applicable. 	15

California HERO Program Residential Eligible Product List

Energy Efficiency Products

PRODUCT CATEGORY	PRODUCT TYPE	ELIGIBILITY SPECIFICATIONS	MAXIMUM TERM (YEARS)
High-Efficiency Heating, Ventilation, and Air Conditioning (HVAC)	Air-Source Heat Pump	<ol style="list-style-type: none"> Product must be AHRI Certified and AHRI number must be provided. Product efficiency must be: <ol style="list-style-type: none"> Split: SEER \geq 14.5 and EER \geq 12 and HSPF \geq 8.2. Package: SEER \geq 14 and EER \geq 11 and HSPF \geq 8.0. Must replace an existing product. Installed per manufacturer specs. 	15
	Central Air Conditioner	<ol style="list-style-type: none"> Product must be AHRI Certified and AHRI number must be provided. Product efficiency must be: <ol style="list-style-type: none"> Split: SEER \geq 14.5 and EER \geq 12. Package: SEER \geq 14 and \geq EER 11. Must replace an existing product. Installed per manufacturer specs. 	15
	Furnace	<ol style="list-style-type: none"> Product must be AHRI Certified. Product efficiency must be: <ul style="list-style-type: none"> AFUE \geq 80% with ECM, or AFUE \geq 90% Must replace an existing product. Installed per manufacturer specs. 	20
	Evaporative Cooler	<ol style="list-style-type: none"> Product must be listed in California Energy Commission Appliance Efficiency Database. Must have separate ducting system— independent of the air conditioning and heating duct system. Must be permanently installed through wall or on the roof; window installed product is not eligible. Installed per manufacturer specs. 	10
	Boiler	<ol style="list-style-type: none"> Product must be AHRI Certified and AHRI number must be provided. Product efficiency must be: <ul style="list-style-type: none"> AFUE \geq 85% Must replace an existing product. Installed per manufacturer specs. 	20



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Last updated: 09/16/2015

California HERO Program Residential Eligible Product List

PRODUCT CATEGORY	PRODUCT TYPE	ELIGIBILITY SPECIFICATIONS	MAXIMUM TERM (YEARS)
High-Efficiency Heating, Ventilation, and Air Conditioning (HVAC)	Geothermal Heat Pump	<ol style="list-style-type: none"> Product efficiency must be: <ol style="list-style-type: none"> Closed Loop Water-to-Air: ≥ 14.1 EER and ≥ 3.3 COP Open Loop Water-to-Air: ≥ 16.2 EER and ≥ 3.6 COP Closed Loop Water-to-Water: ≥ 15.1 EER and ≥ 3.0 COP Open Loop Water-to-Water: ≥ 19.1 EER and ≥ 3.4 COP DGX: ≥ 15.0 EER and ≥ 3.5 COP Product must replace an existing product. Installed per manufacturer specs. 	15
	Hydronic Radiant Heating System	<ol style="list-style-type: none"> System must be powered by a high-efficiency HERO-qualified heating source. Installed per manufacturer specs. 	15
	Mini-Split Air Conditioner	<ol style="list-style-type: none"> Product must be AHRI certified and AHRI number must be provided. Efficiency: ≥ 15 SEER. Installed per manufacturer specs. 	15
	Mini-Split Heat Pump	<ol style="list-style-type: none"> Product must be AHRI certified and AHRI number must be provided. Efficiency: ≥ 15 SEER and HSPF ≥ 8.2. Installed per manufacturer specs. 	15
	Biomass / Wood Stove	<ol style="list-style-type: none"> Product must be certified and listed on the EPA Certified Wood Stoves list. Installed per manufacturer specs. 	15
	Duct Replacement	<ol style="list-style-type: none"> Duct system leakage: <ol style="list-style-type: none"> Partial Replacement: $\leq 15\%$ total system nominal flow Full Replacement: $\leq 6\%$ total system nominal flow Duct Insulation R-Value $\geq R-6$. Installed per Title 24, Part 6. 	20

California HERO Program Residential Eligible Product List

PRODUCT CATEGORY	PRODUCT TYPE	ELIGIBILITY SPECIFICATIONS	MAXIMUM TERM (YEARS)
High-Efficiency Heating, Ventilation, and Air Conditioning (HVAC)	Heat/Energy Recovery Ventilator	1. Product must be certified by the Home Ventilation Institute (HVI). 2. Installed per manufacturer specs.	10
	Exhaust Ventilation Fixture	1. Product must be ENERGY STAR Certified. 2. Installed per manufacturer specs.	10
	Whole House Fan	1. Product must be listed in California Energy Commission Appliance Efficiency Database. 2. Installed per manufacturer specs.	20
	Attic Ventilation Fixture	1. Product must have thermostat control. 2. Installed per manufacturer specs.	15
	Ceiling Fan	1. Product must be ENERGY STAR Certified. 2. Installed per manufacturer specs.	10
Windows, Doors, and Skylights	Window	1. Product must be NFRC Certified: a. U-Factor ≤ 0.32 and SHGC ≤ 0.30 . 2. Product must replace existing product. 3. Installed per manufacturer specs. 4. Product must meet Title 24 requirements.	20
	Door	1. Product must be NFRC Certified: a. Opaque (No Glass): U-Factor ≤ 0.21 and SHGC = Any b. $\leq 1/2$ -Glass: U ≤ 0.27 and SHGC ≤ 0.30 c. $> 1/2$ -Glass: U ≤ 0.32 and SHGC ≤ 0.30 2. Product must replace existing product. 3. Installed per manufacturer specs.	20
	Skylights and Tubular Daylighting Device	1. Product must be NFRC Certified: a. U-Factor ≤ 0.55 and SHGC ≤ 0.30 . 2. Installed per manufacturer specs.	20
	Applied Window Film	1. Product must be NFRC Certified. 2. Installed per manufacturer specs.	10

California HERO Program Residential Eligible Product List

PRODUCT CATEGORY	PRODUCT TYPE	ELIGIBILITY SPECIFICATIONS	MAXIMUM TERM (YEARS)
Windows, Doors, and Skylights	Exterior Window Shading Device	<ol style="list-style-type: none"> Product must be permanently secured to the exterior of the property. Each product must be installed to provide shading to at least one window or door. Product must be one of the following styles: <ol style="list-style-type: none"> Patio Covers Fixed Awnings Operable Awnings Operable Shutters Solar Screens Product is <u>NOT</u> eligible to be installed on properties located within LA County or California Building Climate Zones 1, 3-5. Other exterior structural products including, but not limited to, sunroom enclosures, exterior decks, balconies, roof overhangs, detached/free-standing arbors, detached/free-standing pergolas, and/or carports are <u>NOT</u> eligible. Interior window shading products are <u>NOT</u> eligible. Installed per manufacturer specs. 	10
Building Envelope	Cool Wall Coating	<ol style="list-style-type: none"> Product must be a preapproved HERO Cool Wall Coating product. Product must have solar reflectance ≥ 0.5 as tested to ASTM C1549-09 standard. Product primary application surface must be exterior wall surfaces of conditioned buildings. Trim, soffit, and/or fascia may be included in work scope, as applicable. Product is <u>only</u> eligible to be installed on properties located within CA Building Climate Zones 4-10 and 12-15. Installed per manufacturer specs. 	20
	Cool Roof - Prescriptive	<ol style="list-style-type: none"> Product must meet the following specifications: <ol style="list-style-type: none"> Low-Slope Roofs ($\leq 2:12$): <ol style="list-style-type: none"> ≥ 0.5 Aged (3 yrs.) Solar Reflectance Steep-Slope Roofs ($> 2:12$): <ol style="list-style-type: none"> ≥ 0.15 Aged Solar Reflectance Product also must meet Title 24, Part 6. Product must be listed in the CRRC or ENERGY STAR product directories. 	20

California HERO Program Residential Eligible Product List

PRODUCT CATEGORY	PRODUCT TYPE	ELIGIBILITY SPECIFICATIONS	MAXIMUM TERM (YEARS)
Building Envelope	Cool Roof - Performance	<ol style="list-style-type: none"> If a Cool Roof - Prescriptive roofing product is not specified, one of the following cool roof performance measures must also be implemented in the scope of work: <ol style="list-style-type: none"> Install $\geq 1"$ Air-space between the top of the roof deck to the bottom of the roofing product. Insulate attic floor to R-value ≥ 38. Seal & Insulate attic HVAC duct work to R-8 and $\leq 6\%$ leakage. Install an eligible radiant barrier. Insulate roof deck to R-value ≥ 4. Install roof construction with thermal mass over a membrane with a weight of at least 25 lb/ft². Project must comply with CA Title 24 Part 6. Project stakeholder is fully and solely responsible to meet any such additional requirements. 	20
	Attic Insulation	<ol style="list-style-type: none"> R-value ≥ 38. Installed per CEC QII Standards. 	20
	Wall Insulation	<ol style="list-style-type: none"> R-value ≥ 13 to full framing cavity depth. Installed per CEC QII Standards. 	20
	Under-Floor Insulation	<ol style="list-style-type: none"> R-value ≥ 19 to full joist depth. Installed per CEC QII Standards. 	20
	Radiant Barrier	<ol style="list-style-type: none"> Emissivity ≤ 0.1. Reflectivity ≥ 0.9. Installed per manufacturer specs. 	20
	Air Sealing	<ol style="list-style-type: none"> Performed to BPI, ENERGY STAR, and ASHRAE 62.2 guidelines. 	10
	Insulated Siding	<ol style="list-style-type: none"> R-value ≥ 2. Certified as meeting ASTM D7793 standard (or equivalent) and listed by Vinyl Siding Institute. Primary application surface must be exterior walls of conditioned buildings. Trim, soffit, and/or fascia may be included in work scope, as applicable. Installed per manufacturer specs. 	20

California HERO Program Residential Eligible Product List

PRODUCT CATEGORY	PRODUCT TYPE	ELIGIBILITY SPECIFICATIONS	MAXIMUM TERM (YEARS)
High-Efficiency Water Heating	Gas Storage Water Heater	1. Product must be ENERGY STAR Certified. 2. EF \geq 0.67. 3. Installed per manufacturer specs.	10
	Electric Heat Pump Storage Water Heater	1. Product must be ENERGY STAR Certified. 2. EF \geq 2.0. 3. Installed per manufacturer specs.	10
	Gas Tankless Water Heater	1. Product must be ENERGY STAR Certified. 2. EF \geq 0.90. 3. Installed per manufacturer specs.	10
High-Efficiency Pool Equipment	Pool Pump and Motor	1. Product must be ENERGY STAR Certified: a. Single Speed Pump: EF \geq 3.8 for single speed b. Multi/Variable Speed/Flow: EF \geq 3.8 for most efficient speed. 2. Product must replace existing product. 3. Installed per manufacturer specs.	10
	Electric Heat Pump Pool Heater	1. Product must be listed in California Energy Commission Appliance Efficiency Database. 2. COP \geq 4.5. 3. Installed per manufacturer specs.	10
	Gas Pool Heater	1. Product must be listed in California Energy Commission Appliance Efficiency Database. 2. Thermal Efficiency \geq 83%. 3. Installed per manufacturer specs.	10
	Automatic Pool Cover	1. Product must be an automatic pool cover UL certified as meeting ASTM F1346 Standard Performance Specification. 2. Product must be permanently installed on an existing swimming pool. 3. Installed per manufacturer specs. 4. Manual swimming pool covers are not eligible.	10



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California HERO Program Residential Eligible Product List

PRODUCT CATEGORY	PRODUCT TYPE	ELIGIBILITY SPECIFICATIONS	MAXIMUM TERM (YEARS)
High-Efficiency Lighting	Indoor Lighting Fixture	1. Product must be ENERGY STAR Certified and meet Title 24, Part 6 requirements. 2. Product must be permanently installed. 3. Installed per manufacturer specs.	20
	Outdoor Lighting Fixture	1. Product must be ENERGY STAR Certified and meet Title 24, Part 6 requirements. 2. Product must be permanently installed. 3. Installed per manufacturer specs.	20
	Lighting Control	1. Product must be listed in the California Energy Commission Appliance Efficiency Database. 2. Eligible control types include: a. Automatic Time-Switch b. Daylight/Photo- Sensor c. Dimmer d. Occupant/Motion/Vacancy Sensor 3. Install per manufacturer specs.	20

Water Efficiency Products

PRODUCT CATEGORY	PRODUCT TYPE	ELIGIBILITY SPECIFICATIONS	MAXIMUM TERM (YEARS)
Indoor Water Efficiency	High-Efficiency Toilet Fixture	1. Product must be WaterSense Qualified. 2. Toilet and urinals fixtures are eligible. 3. Flow rate \leq 1.28 GPF. 4. Installed per manufacturer specs.	20
	High-Efficiency Faucet Fitting	1. Product must be WaterSense Qualified. 2. Flow rate \leq 1.5 GPM. 3. Must be permanently installed. 4. Installed per manufacturer specs.	15
	High-Efficiency Showerhead	1. Product must be WaterSense Qualified. 2. Flow \leq 2.0 GPM. 3. Installed per manufacturer specs.	15

California HERO Program Residential Eligible Product List

PRODUCT CATEGORY	PRODUCT TYPE	ELIGIBILITY SPECIFICATIONS	MAXIMUM TERM (YEARS)
Indoor Water Efficiency	Hot Water Delivery System	<ol style="list-style-type: none"> System meets the definition of one of the following water delivery options: <ol style="list-style-type: none"> Dedicated Recirculation Line Whole House Manifold System Demand-initiated Recirculating System Core Plumbing System Installed per manufacturer specs. 	15
	High-Efficiency Sprinkler Nozzle	<ol style="list-style-type: none"> Product must be on SoCal Water Smart Qualified Sprinkler Nozzle product list. Installed per manufacturer specs. 	10
Outdoor Water Efficiency	Weather-Based Irrigation Controller	<ol style="list-style-type: none"> Product must be WaterSense Qualified. Installed per manufacturer specs. 	10
	Drip Irrigation	<ol style="list-style-type: none"> Product installed be installed in turf, garden, planter, or flower bed area. Installed per manufacturer specs. 	10
	Rainwater Catchment System	<ol style="list-style-type: none"> Sized to hold ≥ 50 gallons at one time. Must be permanently installed. Installed per manufacturer specs. 	20
	Gray Water System	<ol style="list-style-type: none"> System must meet California Plumbing Code, Chapter 16A. Product must comply with local code and permitting requirements. Eligible system types include: <ol style="list-style-type: none"> Single-Fixture Multi-Fixture Simple (≤ 250 GPD) Multi-Fixture Complex (> 250 GPD) Installed per manufacturer specs. 	20
	Artificial Turf	<ol style="list-style-type: none"> Product must be water and air permeable. Product must be non-toxic and lead free. Product must be recyclable. Product installation must carry ≥ 10 year warranty. Installed per manufacturer specs. Product infill material must be one of the following: <ol style="list-style-type: none"> Acrylic Covered Sand Crumb Rubber Herofill Zeolite 	10

California HERO Program Residential Eligible Product List

PRODUCT CATEGORY	PRODUCT TYPE	ELIGIBILITY SPECIFICATIONS	MAXIMUM TERM (YEARS)
Outdoor Water Efficiency	Artificial Turf Premium	<ol style="list-style-type: none"> 1. Product must be water and air permeable. 2. Product must be non-toxic and lead free. 3. Product must be recyclable. 4. Product installation must carry ≥ 15 year warranty. 5. Installed per manufacturer specs. 6. Product infill material must be one of the following: <ol style="list-style-type: none"> a. Acrylic Covered Sand b. Crumb Rubber c. Herofill d. Zeolite 	15
	Drought Tolerant Landscaping	<ol style="list-style-type: none"> 1. Product installation area must replace existing live turf grass area. 2. Requested financing amount may include: <ol style="list-style-type: none"> a. Removal/disposal of existing turf grass material b. Site preparation for landscaping installation c. Installation of drought tolerant landscaping options d. Installation or conversion to eligible irrigation options 3. Requested finance amount may not include: <ol style="list-style-type: none"> a. Installation of live plants or biodegradable plant material b. Removal of pre-existing hardscape areas (i.e. driveways, pools, etc.) c. Installation of water features (i.e. ponds, fountains, etc.) d. Installation of any other products not listed in specification #2 4. All products to be installed to manufacturer specs and industry best practices. 	20

DOCUMENTS REVIEWED

Sustainalytics reviewed the following documents for the purposes of writing this report

Number	Document Name
1	RA 10 13 2015 Deck
2	HEROProductReviewVerificationProcess_20151020
3	HEROImpactValuationMethodologyOverview_20151020
4	10 22 RA HERO 2015-3 Green Bond
5	Asset Pool Green Bond Review HERO 2016-1
6	California HERO Program Report Revised December 7 2015

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