

# RENOVATE AMERICA GREEN BONDS

## HERO FUNDING TRUST 2016-2

### 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 as Green Bonds under its Asset Backed Security (“ABS”) Framework called Home Energy Renovation Opportunity (“HERO”) Funding Trust 2016-2. Renovate America retained Sustainalytics to review the structure of the issuance and to provide an opinion on the alignment of the HERO Funding Notes, Series 2016-2 (Class A Notes) and residual interest certificates (hereafter: “Notes”) with the green bond framework. The Notes are secured by a pool of limited obligation improvement bonds called Property Assessed Clean Energy (“PACE”) bonds, the proceeds of which are used to finance home improvement projects and products.

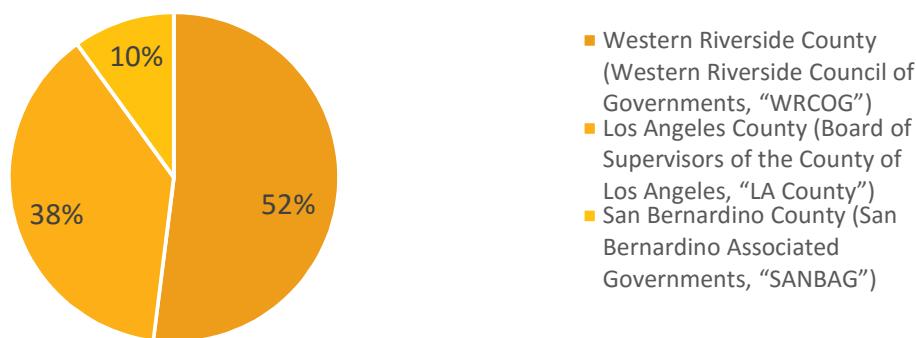
Sustainalytics engaged with members of Renovate America’s management team to understand the sustainability impact of the issuance and reviewed the use of proceeds for the issuance of the 2016-2 Green Bonds. Sustainalytics also reviewed the public and internal documents from Renovate America specifically relevant for the Notes. This document contains two sections: Sustainalytics’ Opinion – an opinion on the HERO Funding Notes, Series 2016-2 issuance and Framework Overview – summary of the Renovate America Green Bond framework.

## Securitization of PACE Bonds through the Issuer

HERO Funding Trust 2016-2 provides collateral for the issuance in the form of a pool of PACE bonds, and uses the PACE bond payments to back the 2016-2 issuance. Hence, the notes and certificates issued by the HERO program are secured by the PACE bond portfolio, which in turn is secured by the property tax assessments or PACE assessments levied against the homeowners’ properties.

The HERO Funding Notes, Series 2016-2, includes three issuers of PACE bonds (and operators of the HERO programs). These issuers are, through their own PACE programs, providing the underlying limited obligations PACE bonds that serve as the collateral for the Notes (see Figure 1).

Figure 1: HERO Funding Notes, Series 2016-2- Included Issuers of PACE Assessments



% in terms of the monetary value of the 2016-2 Notes

The average PACE assessment is 23,433.30 USD, with an average annual payment of 3,159.12 USD. Renovate America is directly responsible for originating these PACE assessments.

## **HERO 2016-2 NOTES AND RESIDUAL CERTIFICATES**

The HERO Funding Trust 2016-2 Notes are secured by 24 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 13,432 PACE assessments levied against 13,432 residential properties (“PACE Assessments”). The average PACE Assessment is valued at 23,433.30 USD with an average annual payment of 3,159.12 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 305,313,000.00 USD HERO 2016-2 Notes are secured by 314,756,149.16 USD in property tax assessments.

## 2. SUSTAINALYTICS' OPINION

Sustainalytics reviewed and assessed the HERO Funding Notes, Series 2016-2 and its adherence with Renovate America's green bond framework. See also the "Documents Reviewed" section at the end of this Opinion for a list of the documents reviewed.

**Hero Funding Trust 2016-2 Issuance:** Renovate America's HERO Funding Notes, Series 2016-2 provide financing for eligible energy efficiency, renewable energy, and water efficiency home improvement projects through the purchase of municipal PACE bonds. Table 1 below provides an overview and summary of the adherence of the 2016-2 issuance with the Green Bond Principles 2015.

Table 1: HERO Funding Trust Series - Adherence to Green Bond Principles

Principle	In line with GBP 2015?	Comments
<b>Use of Proceeds</b>	Yes	The Use of Proceeds of this green bond are clearly described in the legal documentation of the security. The Notes are backed by PACE bonds and enable PACE bond issuers to fund renewable energy, energy efficiency and water conservation improvements to residential properties within their jurisdictions. Based on the review of these project categories, Sustainalytics is confident regarding the green credentials of the use of proceeds and the Notes' adhere to the Use of Proceeds criteria.
<b>Project selection process</b>	Yes	The green bond is 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. The HERO program also ensures compliance of the projects with the eligibility criteria through rigorous review and assessments processes. Sustainalytics has reviewed the adherence of the project list to 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.
<b>Management of Proceeds</b>	Yes	The PACE bonds amount is equal to or greater than the amount of the bond issuance. The issuance of the bond and the residual certificates and the purchase of the PACE bonds by the HERO Funding Trust occurs simultaneously. Because of this, the management of proceeds is a straightforward process and in line with ABS green bond principles and purposes.

<p><b>Reporting</b></p>	<p>Yes</p>	<p>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.</p>
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**Conclusion**

Sustainalytics is of the opinion that Renovate America’s HERO Funding Notes, Series 2016-2, is aligned with market standards and norms, including the four pillars of the ICMA Green Bond Principles 2015. The use of proceeds, project selection, management of proceeds, and reporting are robust and credible. The criteria that are used for the green bond framework are comprehensive and the selection processes are diligent.

The issuance of the HERO Funding Notes, Series 2016-2, therefore supports investments in residential renewable energy, energy efficiency and water efficiency by providing financing to eligible home improvement projects. Renovate America’s Green Bond framework, according to which the 2016-2 Notes are issued, is aligned with market standards and norms, including the ICMA Green Bond Principles 2015. The issuance supports investments in projects with positive environmental impacts, including residential renewable energy, energy efficiency and water efficiency by providing financing to eligible home improvement projects in California.

## 3. FRAMEWORK OVERVIEW

### 3.1 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 PACE<sup>1</sup> 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 establish and administer their PACE programs, and has financed over 90% of all residential PACE projects in California. As of April 30, 2016, Renovate has originated over 63,000 PACE Assessments, presenting more than 1.39 billion USD in PACE funding for residential property owners in California.

#### The PACE Process

Enabled by PACE legislation, 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 to be installed on their properties. 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.

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 between other partners and service providers of 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 provision of funds to the issuers for their PACE programs and borrowing activities, and origination fees.

### 3.2 Renovate America’s Green Bond Framework

Renovate America plans to issue the HERO Funding Notes, Series 2016-2 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

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

its HERO program are to be equal to or greater than the amount raised by its ABS Framework for the 2016-2 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.

### 3.2.1 Use of Proceeds

The proceeds of the HERO Funding Notes, Series 2016-2 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

### 3.2.2 Process for Project Evaluation and Selection

#### Eligibility Criteria

To be funded through the proceeds of the issuance, 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 3.2.1.
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.

### 3.2.3 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. The HERO Funding Trust 2016-2 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 issuing transactions of the Notes, the residual certificates and the purchasing of the PACE bonds by HERO Funding Trusts Series 2016-2 is done on a back-to-back basis. The purchase of the PACE bonds is done by using the proceeds from the Notes, resulting in full allocation of the proceeds to the PACE bonds that are backed by the assessment pool for the Notes.

### 3.2.4 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)

See Appendix 2 for figures on the estimated environmental impacts from the projects funded by the PACE Assessments underlying the HERO Funding Trust Issuances.

## APPENDICES

### Appendix 1 –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"> <li>Product must be listed as California Solar Initiative incentive-eligible photovoltaic module in compliance with CA-SB1 guidelines.</li> <li>System must be grid connected unless the property is not currently connected to the grid.</li> <li>Installed per manufacturer specifications.</li> </ol>	20
	Solar Inverter	<ol style="list-style-type: none"> <li>Product must be listed as California Solar Initiative eligible inverter in compliance with CA-SB1 guidelines.</li> <li>System must be grid connected unless the property is not currently connected to the grid.</li> <li>Installed per manufacturer specifications.</li> </ol>	20
Solar Thermal	Solar Water Heating	<ol style="list-style-type: none"> <li>System must have the OG-300 System Certification by the Solar Rating and Certification Corporation (SRCC).</li> <li>Auxiliary tank must be residential class.</li> <li>Installed per manufacturer specifications.</li> </ol>	15
	Solar Pool Heating	<ol style="list-style-type: none"> <li>Product must have the OG-100 Collector Certification by the Solar Rating and Certification Corporation (SRCC).</li> <li>Installed per manufacturer specs.</li> </ol>	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"> <li>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).</li> <li>Product must be grid connected unless the property is not currently connected to the grid.</li> <li>Installed per manufacturer specs.</li> </ol>	20
	Advanced Energy Storage System	<ol style="list-style-type: none"> <li>System must have obtained certification from a nationally recognized testing laboratory for one of the acceptable standards:                             <ol style="list-style-type: none"> <li>UL 1973</li> <li>UL Subject 9540</li> <li>IEC 62842-2</li> <li>IEC 62109</li> <li>UL 1741</li> <li>Other equivalent standard</li> </ol> </li> <li>System must maintain roundtrip efficiency <math>\geq</math> 63.5%.</li> <li>System must carry a minimum 10-year manufacturer warranty.</li> <li>System must be <a href="#">pre-approved</a> and listed on HERO-approved AES list.</li> </ol>	10
	Electric Vehicle Charging Station	<ol style="list-style-type: none"> <li>Product must certified as meeting the UL Subject 2594 Standard Testing for Charging Stations.</li> <li>Product must be a Level 2 charger with SAE J1772 standard charging plug.</li> <li>Installed per manufacturer specs.</li> </ol>	10
	Stationary Fuel Cell Power System	<ol style="list-style-type: none"> <li>System must be certified as meeting the ANSI/CSA America FC1 standard.</li> <li>Installed per manufacturer specs.</li> <li>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.</li> </ol>	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"> <li>Product must be AHRI Certified and AHRI number must be provided.</li> <li>Product efficiency must be:                             <ol style="list-style-type: none"> <li>Split: SEER <math>\geq</math> 14.5 and EER <math>\geq</math> 12 and HSPF <math>\geq</math> 8.2.</li> <li>Package: SEER <math>\geq</math> 14 and EER <math>\geq</math> 11 and HSPF <math>\geq</math> 8.0.</li> </ol> </li> <li>Must replace an existing product.</li> <li>Installed per manufacturer specs.</li> </ol>	15
	Central Air Conditioner	<ol style="list-style-type: none"> <li>Product must be AHRI Certified and AHRI number must be provided.</li> <li>Product efficiency must be:                             <ol style="list-style-type: none"> <li>Split: SEER <math>\geq</math> 14.5 and EER <math>\geq</math> 12.</li> <li>Package: SEER <math>\geq</math> 14 and <math>\geq</math> EER 11.</li> </ol> </li> <li>Must replace an existing product.</li> <li>Installed per manufacturer specs.</li> </ol>	15
	Furnace	<ol style="list-style-type: none"> <li>Product must be AHRI Certified.</li> <li>Product efficiency must be:                             <ul style="list-style-type: none"> <li>AFUE <math>\geq</math> 80% with ECM, or</li> <li>AFUE <math>\geq</math> 90%</li> </ul> </li> <li>Must replace an existing product.</li> <li>Installed per manufacturer specs.</li> </ol>	20
	Evaporative Cooler	<ol style="list-style-type: none"> <li>Product must be listed in California Energy Commission Appliance Efficiency Database.</li> <li>Must have separate ducting system— independent of the air conditioning and heating duct system.</li> <li>Must be permanently installed through wall or on the roof; window installed product is not eligible.</li> <li>Installed per manufacturer specs.</li> </ol>	10
	Boiler	<ol style="list-style-type: none"> <li>Product must be AHRI Certified and AHRI number must be provided.</li> <li>Product efficiency must be:                             <ul style="list-style-type: none"> <li>AFUE <math>\geq</math> 85%</li> </ul> </li> <li>Must replace an existing product.</li> <li>Installed per manufacturer specs.</li> </ol>	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)	Geothermal Heat Pump	<ol style="list-style-type: none"> <li>Product efficiency must be:               <ol style="list-style-type: none"> <li>Closed Loop Water-to-Air: <math>\geq 14.1</math> EER and <math>\geq 3.3</math> COP</li> <li>Open Loop Water-to-Air: <math>\geq 16.2</math> EER and <math>\geq 3.6</math> COP</li> <li>Closed Loop Water-to-Water: <math>\geq 15.1</math> EER and <math>\geq 3.0</math> COP</li> <li>Open Loop Water-to-Water: <math>\geq 19.1</math> EER and <math>\geq 3.4</math> COP</li> <li>DGX: <math>\geq 15.0</math> EER and <math>\geq 3.5</math> COP</li> </ol> </li> <li>Product must replace an existing product.</li> <li>Installed per manufacturer specs.</li> </ol>	15
	Hydronic Radiant Heating System	<ol style="list-style-type: none"> <li>System must be powered by a high-efficiency HERO-qualified heating source.</li> <li>Installed per manufacturer specs.</li> </ol>	15
	Mini-Split Air Conditioner	<ol style="list-style-type: none"> <li>Product must be AHRI certified and AHRI number must be provided.</li> <li>Efficiency: <math>\geq 15</math> SEER.</li> <li>Installed per manufacturer specs.</li> </ol>	15
	Mini-Split Heat Pump	<ol style="list-style-type: none"> <li>Product must be AHRI certified and AHRI number must be provided.</li> <li>Efficiency: <math>\geq 15</math> SEER and HSPF <math>\geq 8.2</math>.</li> <li>Installed per manufacturer specs.</li> </ol>	15
	Biomass / Wood Stove	<ol style="list-style-type: none"> <li>Product must be certified and listed on the EPA Certified Wood Stoves list.</li> <li>Installed per manufacturer specs.</li> </ol>	15
	Duct Replacement	<ol style="list-style-type: none"> <li>Duct system leakage:               <ol style="list-style-type: none"> <li>Partial Replacement: <math>\leq 15\%</math> total system nominal flow</li> <li>Full Replacement: <math>\leq 6\%</math> total system nominal flow</li> </ol> </li> <li>Duct Insulation R-Value <math>\geq R-6</math>.</li> <li>Installed per Title 24, Part 6.</li> </ol>	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	<ol style="list-style-type: none"> <li>Product must be certified by the Home Ventilation Institute (HVI).</li> <li>Installed per manufacturer specs.</li> </ol>	10
	Exhaust Ventilation Fixture	<ol style="list-style-type: none"> <li>Product must be ENERGY STAR Certified.</li> <li>Installed per manufacturer specs.</li> </ol>	10
	Whole House Fan	<ol style="list-style-type: none"> <li>Product must be listed in California Energy Commission Appliance Efficiency Database.</li> <li>Installed per manufacturer specs.</li> </ol>	20
	Attic Ventilation Fixture	<ol style="list-style-type: none"> <li>Product must have thermostat control.</li> <li>Installed per manufacturer specs.</li> </ol>	15
	Ceiling Fan	<ol style="list-style-type: none"> <li>Product must be ENERGY STAR Certified.</li> <li>Installed per manufacturer specs.</li> </ol>	10
Windows, Doors, and Skylights	Window	<ol style="list-style-type: none"> <li>Product must be NFRC Certified:               <ol style="list-style-type: none"> <li>U-Factor <math>\leq 0.32</math> and SHGC <math>\leq 0.30</math>.</li> </ol> </li> <li>Product must replace existing product.</li> <li>Installed per manufacturer specs.</li> <li>Product must meet Title 24 requirements.</li> </ol>	20
	Door	<ol style="list-style-type: none"> <li>Product must be NFRC Certified:               <ol style="list-style-type: none"> <li>Opaque (No Glass): U-Factor <math>\leq 0.21</math> and SHGC = Any</li> <li><math>\leq 1/2</math>-Glass: U <math>\leq 0.27</math> and SHGC <math>\leq 0.30</math></li> <li><math>&gt; 1/2</math>-Glass: U <math>\leq 0.32</math> and SHGC <math>\leq 0.30</math></li> </ol> </li> <li>Product must replace existing product.</li> <li>Installed per manufacturer specs.</li> </ol>	20
	Skylights and Tubular Daylighting Device	<ol style="list-style-type: none"> <li>Product must be NFRC Certified:               <ol style="list-style-type: none"> <li>U-Factor <math>\leq 0.55</math> and SHGC <math>\leq 0.30</math>.</li> </ol> </li> <li>Installed per manufacturer specs.</li> </ol>	20
	Applied Window Film	<ol style="list-style-type: none"> <li>Product must be NFRC Certified.</li> <li>Installed per manufacturer specs.</li> </ol>	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"> <li>Product must be permanently secured to the exterior of the property.</li> <li>Each product must be installed to provide shading to at least one window or door.</li> <li>Product must be one of the following styles:               <ol style="list-style-type: none"> <li>Patio Covers</li> <li>Fixed Awnings</li> <li>Operable Awnings</li> <li>Operable Shutters</li> <li>Solar Screens</li> </ol> </li> <li>Product is <b>NOT</b> eligible to be installed on properties located within LA County or California Building Climate Zones 1, 3-5.</li> <li>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 <b>NOT</b> eligible.</li> <li>Interior window shading products are <b>NOT</b> eligible.</li> <li>Installed per manufacturer specs.</li> </ol>	10
Building Envelope	Cool Wall Coating	<ol style="list-style-type: none"> <li>Product must be a preapproved HERO Cool Wall Coating product.</li> <li>Product must have solar reflectance <math>\geq 0.5</math> as tested to ASTM C1549-09 standard.</li> <li>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.</li> <li>Product is <b>only</b> eligible to be installed on properties located within CA Building Climate Zones 4-10 and 12-15.</li> <li>Installed per manufacturer specs.</li> </ol>	20
	Cool Roof - Prescriptive	<ol style="list-style-type: none"> <li>Product must meet the following specifications:               <ol style="list-style-type: none"> <li>Low-Slope Roofs (<math>\leq 2:12</math>):                   <ul style="list-style-type: none"> <li><math>\geq 0.5</math> Aged (3 yrs.) Solar Reflectance</li> </ul> </li> <li>Steep-Slope Roofs (<math>&gt; 2:12</math>):                   <ul style="list-style-type: none"> <li><math>\geq 0.15</math> Aged Solar Reflectance</li> </ul> </li> </ol> </li> <li>Product also must meet Title 24, Part 6.</li> <li>Product must be listed in the CRRC or ENERGY STAR product directories.</li> </ol>	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"> <li>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"> <li>Install <math>\geq 1</math>" Air-space between the top of the roof deck to the bottom of the roofing product.</li> <li>Insulate attic floor to R-value <math>\geq 38</math>.</li> <li>Seal &amp; Insulate attic HVAC duct work to R-8 and <math>\leq 6\%</math> leakage.</li> <li>Install an eligible radiant barrier.</li> <li>Insulate roof deck to R-value <math>\geq 4</math>.</li> <li>Install roof construction with thermal mass over a membrane with a weight of at least 25 lb/ft<sup>2</sup>.</li> </ol> </li> <li>Project must comply with CA Title 24 Part 6. Project stakeholder is fully and solely responsible to meet any such additional requirements.</li> </ol>	20
	Attic Insulation	<ol style="list-style-type: none"> <li>R-value <math>\geq 38</math>.</li> <li>Installed per CEC QII Standards.</li> </ol>	20
	Wall Insulation	<ol style="list-style-type: none"> <li>R-value <math>\geq 13</math> to full framing cavity depth.</li> <li>Installed per CEC QII Standards.</li> </ol>	20
	Under-Floor Insulation	<ol style="list-style-type: none"> <li>R-value <math>\geq 19</math> to full joist depth.</li> <li>Installed per CEC QII Standards.</li> </ol>	20
	Radiant Barrier	<ol style="list-style-type: none"> <li>Emissivity <math>\leq 0.1</math>.</li> <li>Reflectivity <math>\geq 0.9</math>.</li> <li>Installed per manufacturer specs.</li> </ol>	20
	Air Sealing	<ol style="list-style-type: none"> <li>Performed to BPI, ENERGY STAR, and ASHRAE 62.2 guidelines.</li> </ol>	10
	Insulated Siding	<ol style="list-style-type: none"> <li>R-value <math>\geq 2</math>.</li> <li>Certified as meeting ASTM D7793 standard (or equivalent) and listed by Vinyl Siding Institute.</li> <li>Primary application surface must be exterior walls of conditioned buildings. Trim, soffit, and/or fascia may be included in work scope, as applicable.</li> <li>Installed per manufacturer specs.</li> </ol>	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	<ol style="list-style-type: none"> <li>Product must be ENERGY STAR Certified.</li> <li>EF <math>\geq</math> 0.67.</li> <li>Installed per manufacturer specs.</li> </ol>	10
	Electric Heat Pump Storage Water Heater	<ol style="list-style-type: none"> <li>Product must be ENERGY STAR Certified.</li> <li>EF <math>\geq</math> 2.0.</li> <li>Installed per manufacturer specs.</li> </ol>	10
	Gas Tankless Water Heater	<ol style="list-style-type: none"> <li>Product must be ENERGY STAR Certified.</li> <li>EF <math>\geq</math> 0.90.</li> <li>Installed per manufacturer specs.</li> </ol>	10
High-Efficiency Pool Equipment	Pool Pump and Motor	<ol style="list-style-type: none"> <li>Product must be ENERGY STAR Certified:                             <ol style="list-style-type: none"> <li>Single Speed Pump: EF <math>\geq</math> 3.8 for single speed</li> <li>Multi/Variable Speed/Flow: EF <math>\geq</math> 3.8 for most efficient speed.</li> </ol> </li> <li>Product must replace existing product.</li> <li>Installed per manufacturer specs.</li> </ol>	10
	Electric Heat Pump Pool Heater	<ol style="list-style-type: none"> <li>Product must be listed in California Energy Commission Appliance Efficiency Database.</li> <li>COP <math>\geq</math> 4.5.</li> <li>Installed per manufacturer specs.</li> </ol>	10
	Gas Pool Heater	<ol style="list-style-type: none"> <li>Product must be listed in California Energy Commission Appliance Efficiency Database.</li> <li>Thermal Efficiency <math>\geq</math> 83%.</li> <li>Installed per manufacturer specs.</li> </ol>	10
	Automatic Pool Cover	<ol style="list-style-type: none"> <li>Product must be an automatic pool cover UL certified as meeting ASTM F1346 Standard Performance Specification.</li> <li>Product must be permanently installed on an existing swimming pool.</li> <li>Installed per manufacturer specs.</li> <li>Manual swimming pool covers are not eligible.</li> </ol>	10

## California HERO Program Residential Eligible Product List

PRODUCT CATEGORY	PRODUCT TYPE	ELIGIBILITY SPECIFICATIONS	MAXIMUM TERM (YEARS)
High-Efficiency Lighting	Indoor Lighting Fixture	<ol style="list-style-type: none"> <li>Product must be ENERGY STAR Certified and meet Title 24, Part 6 requirements.</li> <li>Product must be permanently installed.</li> <li>Installed per manufacturer specs.</li> </ol>	20
	Outdoor Lighting Fixture	<ol style="list-style-type: none"> <li>Product must be ENERGY STAR Certified and meet Title 24, Part 6 requirements.</li> <li>Product must be permanently installed.</li> <li>Installed per manufacturer specs.</li> </ol>	20
	Lighting Control	<ol style="list-style-type: none"> <li>Product must be listed in the California Energy Commission Appliance Efficiency Database.</li> <li>Eligible control types include:               <ol style="list-style-type: none"> <li>Automatic Time-Switch</li> <li>Daylight/Photo- Sensor</li> <li>Dimmer</li> <li>Occupant/Motion/Vacancy Sensor</li> </ol> </li> <li>Install per manufacturer specs.</li> </ol>	20

### Water Efficiency Products

PRODUCT CATEGORY	PRODUCT TYPE	ELIGIBILITY SPECIFICATIONS	MAXIMUM TERM (YEARS)
Indoor Water Efficiency	High-Efficiency Toilet Fixture	<ol style="list-style-type: none"> <li>Product must be WaterSense Qualified.</li> <li>Toilet and urinals fixtures are eligible.</li> <li>Flow rate <math>\leq</math> 1.28 GPF.</li> <li>Installed per manufacturer specs.</li> </ol>	20
	High-Efficiency Faucet Fitting	<ol style="list-style-type: none"> <li>Product must be WaterSense Qualified.</li> <li>Flow rate <math>\leq</math> 1.5 GPM.</li> <li>Must be permanently installed.</li> <li>Installed per manufacturer specs.</li> </ol>	15
	High-Efficiency Showerhead	<ol style="list-style-type: none"> <li>Product must be WaterSense Qualified.</li> <li>Flow <math>\leq</math> 2.0 GPM.</li> <li>Installed per manufacturer specs.</li> </ol>	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"> <li>System meets the definition of one of the following water delivery options:               <ol style="list-style-type: none"> <li>Dedicated Recirculation Line</li> <li>Whole House Manifold System</li> <li>Demand-initiated Recirculating System</li> <li>Core Plumbing System</li> </ol> </li> <li>Installed per manufacturer specs.</li> </ol>	15
Outdoor Water Efficiency	High-Efficiency Sprinkler Nozzle	<ol style="list-style-type: none"> <li>Product must be on SoCal Water Smart Qualified Sprinkler Nozzle product list.</li> <li>Installed per manufacturer specs.</li> </ol>	10
	Weather-Based Irrigation Controller	<ol style="list-style-type: none"> <li>Product must be WaterSense Qualified.</li> <li>Installed per manufacturer specs.</li> </ol>	10
	Drip Irrigation	<ol style="list-style-type: none"> <li>Product installed be installed in turf, garden, planter, or flower bed area.</li> <li>Installed per manufacturer specs.</li> </ol>	10
	Rainwater Catchment System	<ol style="list-style-type: none"> <li>Sized to hold <math>\geq</math> 50 gallons at one time.</li> <li>Must be permanently installed.</li> <li>Installed per manufacturer specs.</li> </ol>	20
	Gray Water System	<ol style="list-style-type: none"> <li>System must meet California Plumbing Code, Chapter 16A.</li> <li>Product must comply with local code and permitting requirements.</li> <li>Eligible system types include:               <ol style="list-style-type: none"> <li>Single-Fixture</li> <li>Multi-Fixture Simple (<math>\leq</math> 250 GPD)</li> <li>Multi-Fixture Complex (<math>&gt;</math> 250 GPD)</li> </ol> </li> <li>Installed per manufacturer specs.</li> </ol>	20
	Artificial Turf	<ol style="list-style-type: none"> <li>Product must be water and air permeable.</li> <li>Product must be non-toxic and lead free.</li> <li>Product must be recyclable.</li> <li>Product installation must carry <math>\geq</math> 10 year warranty.</li> <li>Installed per manufacturer specs.</li> <li>Product infill material must be one of the following:               <ol style="list-style-type: none"> <li>Acrylic Covered Sand</li> <li>Crumb Rubber</li> <li>Herofill</li> <li>Zeolite</li> </ol> </li> </ol>	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"> <li>1. Product must be water and air permeable.</li> <li>2. Product must be non-toxic and lead free.</li> <li>3. Product must be recyclable.</li> <li>4. Product installation must carry <math>\geq</math> 15 year warranty.</li> <li>5. Installed per manufacturer specs.</li> <li>6. Product infill material must be one of the following:                             <ol style="list-style-type: none"> <li>a. Acrylic Covered Sand</li> <li>b. Crumb Rubber</li> <li>c. Herofill</li> <li>d. Zeolite</li> </ol> </li> </ol>	15
	Drought Tolerant Landscaping	<ol style="list-style-type: none"> <li>1. Product installation area must replace existing live turf grass area.</li> <li>2. Requested financing amount may include:                             <ol style="list-style-type: none"> <li>a. Removal/disposal of existing turf grass material</li> <li>b. Site preparation for landscaping installation</li> <li>c. Installation of drought tolerant landscaping options</li> <li>d. Installation or conversion to eligible irrigation options</li> </ol> </li> <li>3. Requested finance amount may not include:                             <ol style="list-style-type: none"> <li>a. Installation of live plants or biodegradable plant material</li> <li>b. Removal of pre-existing hardscape areas (i.e. driveways, pools, etc.)</li> <li>c. Installation of water features (i.e. ponds, fountains, etc.)</li> <li>d. Installation of any other products not listed in specification #2</li> </ol> </li> <li>4. All products to be installed to manufacturer specs and industry best practices.</li> </ol>	20

## Appendix 2 – Securitization Impact Statistics for HERO 2016-2

As is explained in Section 3.2.4 on Impact Reporting, Renovate America utilizes proprietary forecasting models to estimate the environmental impacts of the projects related to PACE Bonds. The following tables show environmental impact figures which are estimated from the projects funded by the PACE Assessments underlying the notes.

Table 1: Impact Statistics HERO Funding Trust 2016-2

Environmental Impact	Impact Metrics	Impact Figures
Water Savings	Annual Water Savings (Gal)	84.425.474
	Lifetime Water Savings (Gal)	1.342.752.540
	Annual Water Bill Savings (USD)	\$379.915
	Lifetime Water Bill Savings (USD)	\$12.939.732
Energy Savings	Annual kWh Savings	48.372.603
	Annual Therm Savings	1.777.977
	Annual Energy Savings (kWhe)	100.414.046
	Lifetime Energy Savings (kWhe)	1.804.357.237
	Annual Energy Bill Savings (USD)	\$13.371.955
	Lifetime Energy Bill Savings (USD)	\$483.551.094
Greenhouse Gas (GHG) Emission Reduction	Annual Emission Reduction (Tons)	26.293
	Lifetime Emission Reduction (Tons)	481.345
Renewable Energy Generation	Solar PV Capacity Installed (kW)	19.310

## DOCUMENTS REVIEWED

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

Number	Document Name
1	HEROProductReviewVerificationProcess_20151020
2	HEROImpactValuationMethodologyOverview_20151020
3	Asset Pool HERO Funding Trust Issuances 2016-2
4	Securitization Impact Statistics for HERO Funding Trust Issuance 2016-2
5	Confidential Preliminary Private Placement Memorandum for HERO Funding Trust Issuance 2016-2

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