State of Hawaii
Department of Business, Economic Development & Tourism
Hawaii Green Infrastructure Authority

STATUS OF THE ACTIVITIES OF THE HAWAII GREEN INFRASTRUCTURE AUTHORITY

REPORT TO THE GOVERNOR AND THE LEGISLATURE OF THE STATE OF HAWAII

Pursuant to

Act 211, Session Laws of Hawaii 2013

December 2017

Prepared by the

State of Hawaii

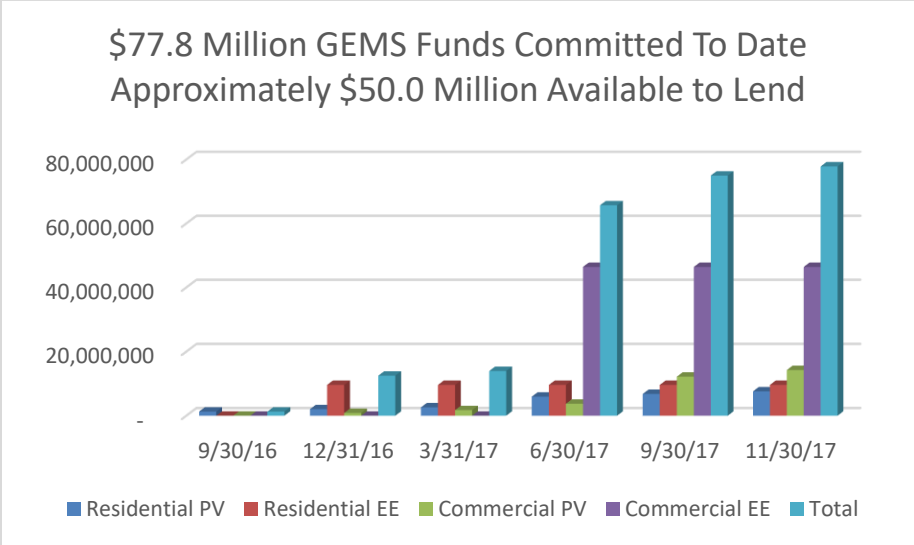
Hawaii Green Infrastructure Authority

December 2017

EXECUTIVE SUMMARY

Purpose. The Hawaii Green Infrastructure Authority ("HGIA" or "Authority") was created by the Legislature to make renewable energy investments accessible and affordable to Hawaii's consumers, with a portion of its funds to benefit underserved communities, low- and moderate-income homeowners, renters, and non-profits. HGIA, through the Green Energy Market Securitization ("GEMS") program, was capitalized through an innovative market-driven financing mechanism to improve access to renewable energy infrastructure and thus advance the State's goal of achieving 100% renewable portfolio standard in the electricity sector by 2045.

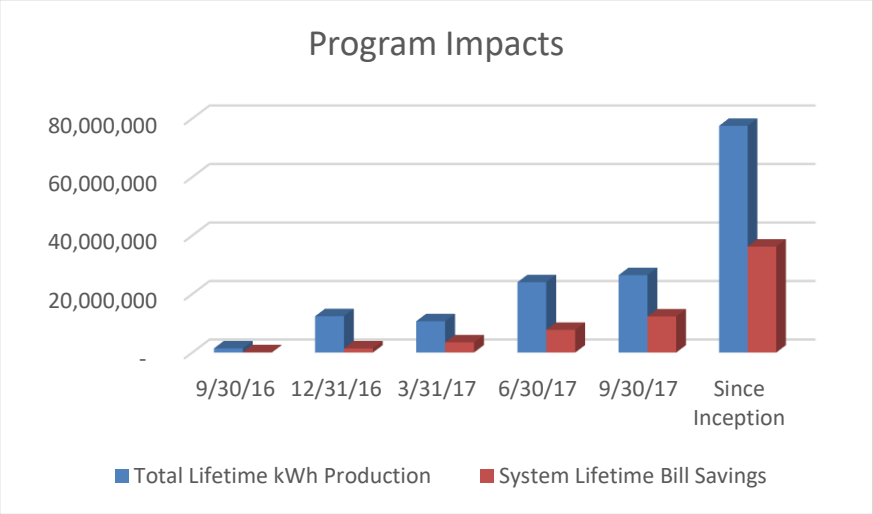
Progress. As of November 30, 2017, $77.8 million or 53.2% of the GEMS funds have been committed.



Items of note:

- On September 30, 2016, the GEMS program consisted only of a residential PV loan product (dark blue bar);
- In late 2016, HGIA launched a new commercial loan product for nonprofits, multi-family rental projects and small businesses (green bar);
- In December 2016, HGIA committed $9.6 million to finance residential solar thermal for Molokai, subject to approval and implementation of its On-Bill platform (red bar);
- In June 2017, Act 057 was signed into law to loan $46.4 million to the Department of Education for energy efficiency retrofits (purple bar);
- The light blue bar is the aggregated total.

On October 26, 2017, the Hawaii Public Utilities Commission filed Decision and Order No. 34930 which amended the order of loan repayments received to be first applied towards the replenishment of the Public Benefits Fee before payment of HGIA's Program administrative costs. As HGIA is not supported by General Funds, and as loan administration and servicing will continue for 20+ years, this Order requires HGIA to set aside and reserve a portion of the loan funds to ensure proper administration and servicing until the loans are paid in full, resulting in approximately $50.0 million in GEMS funds available to lend.



A detailed listing of Program Impacts is provided in Section II, however, a quick snapshot of the lifetime kWh production (77.5 million kWh) and bill savings ($36.2 million) of the loans funded as of September 30, 2017 is shown above.

Opportunities. With approximately only $50.0 million remaining available to lend, the Authority foresees potential opportunity to continue to expand its clean energy financing program.

In addition to solar PV financing, the Authority will be seeking Hawaii Public Utilities Commission ("Commission" or "PUC") approval to expand the clean energy technologies eligible under the GEMS program.

The Authority is eager to leverage the on-bill mechanism to democratize clean energy and expand access and affordability of renewable energy and energy efficiency projects for renters and low and moderate-income homeowners. On November 24, 2017, the Hawaiian Electric Companies filed a "Status Update and Request for Guidance on the On-Bill Repayment Mechanism" in Docket No. 2014-0135. On December 4, 2017, the Authority filed a Response to the Hawaiian Electric Companies' filing, and await a positive response from the Commission on the Hawaiian Electric Companies' last remaining issues.

By converting a portion of the GEMS fund into a revolving credit facility for any state agency to access low-cost financing to install energy efficiency measures would provide significant impacts towards the achievement of the state's Energy Efficiency Portfolio Standard ("EEPS") goals as well as substantial, on-going benefits toward the reduction in energy costs for both the state and Hawaii's taxpayers.

Lastly, the Authority believes that the GEMS funds can play an active role in Community Based Renewable projects and look forward to the Commission's final determination of this initiative.

Capital for Energy Innovation. GEMS funding is uniquely positioned to have significant, positive impact in the coming years. As a market-based program, it is critical for GEMS to remain flexible and open to innovation in a rapidly moving sector of the market. We remain confident that the program can be instrumental in achieving the State's energy sustainability.

REPORT

Reporting Pursuant to Act 211, Session Laws of Hawaii 2013

This document fulfills the statutory requirement to report on the status of the Authority's activities, including approved loan program description and uses; summary information and analytical data concerning the implementation of the loan program; summary information and analytical data concerning the deployment of clean energy technology, demand response technology, and energy use reduction and demand-side management infrastructure, programs and services; and repayments made or credits provided to electric utility customers, pursuant to Section 9 of Act 211(13). The Authority respectfully submits this status report outlining the steps taken to further design, develop and deploy GEMS capital in 2017 as well as plans for 2018.

I. GEMS Program Background and Context

Legislative Authorization

On April 30, 2013, the Legislature enacted, and on June 27, 2013, the Governor signed into law, Act 211, authorizing the establishment of a green infrastructure financing program, known as GEMS to deploy clean energy infrastructure that will contribute towards Hawaii's aggressive pursuit of its statutory 100% clean energy goals by 2045 while helping ratepayers lower their energy costs.

Act 211 established a legal structure that enabled DBEDT to issue bonds to fund green infrastructure financing programs, leveraging public and private capital, to facilitate the achievement of the State of Hawaii's aggressive clean energy goals and provide opportunities for consumers to invest in and save money from green infrastructure investments.

Key objectives of the GEMS program are to:

1. Address financing market barriers to increase the installation of clean energy projects and infrastructure to meet the State's clean energy goals, including the RPS and EEPS;
2. Democratize clean energy by expanding access and affordability of renewable energy and energy efficiency projects for identified underserved markets, while expanding the market generally;
3. Enable more ratepayers to reduce their energy use and energy costs by helping them finance clean energy improvements;
4. Partner with and support existing market entities in the clean energy and financing sector to ensure GEMS can bridge market gaps and facilitate a sustainable and efficient private sector market; and
5. Balance the aforementioned goals and objectives with repayment risk to achieve an appropriate rate of return and build a sustainable financing program.

PUC Approval and Orders

To effectuate Act 211, GEMS required Commission approval of its Financing Order and Program Order Applications. The PUC approved the GEMS Financing Order on September 4, 2014 and the GEMS Program Order on September 30, 2014.

The regulatory Orders approved by the Commission established the general parameters and program processes for GEMS. With feedback and support from several interveners - including but not limited to the Consumer Advocate and the Hawaii Solar Energy Association, the PUC granted GEMS the flexibility to work with the market to provide financing programs to enable more of Hawaii's consumers to invest in and benefit from clean energy.

Pursuant to HRS 269-162, the Financing Order provided regulatory approval for the issuance of low-cost Green Infrastructure Bonds (GEMS Bonds) to capitalize the GEMS Loan Fund. Pursuant to HRS 269-170, the Program Order provided approval for the deployment of funds from the issuance of the GEMS Bonds. Included in the Program Order were general program parameters and specific deployment strategies, outlining a clean energy financing program that was best thought to serve Hawaii's consumers at that time.

Hawaii Green Infrastructure Authority

In order to oversee the GEMS program, the Hawaii Green Infrastructure Authority was constituted on October 23, 2014. HGIA is overseen by a five-person board of directors and is administratively attached to DBEDT. The Authority is tasked with administering and governing the GEMS Program and ensuring that capital is deployed effectively to achieve program objectives. HGIA is committed to the accountable use of funds through various reporting mechanisms, including submitting Legislative Reports, providing quarterly and annual reports to the PUC, as well as performing annual audits.

II. 2017 GEMS Program Activities

Lending Activities

Lending activity increased markedly over the past year with continued focus on residential loan program improvements and grass-roots marketing of the commercial loan program.

Residential PV Loan Product

Residential solar PV loan applications are holding steady as consumers and solar contractors rushed to meet the year-end deadline. However, the long-term growth prospects of the program remain limited by the broader market environment without the ability to finance storage.

Commercial PV Loan Products

The market continues to respond positively to GEMS financing since the launch of its

commercial loan products late last year and the Authority has seen a steady volume of inquiries, applications, and approvals.

Commercial Energy Efficiency

As approved by Act 057 (2017), a $46. 4 million loan has been made to finance energy efficiency measures for the state's Department of Education ("DOE"). As the state's second largest consumer of electricity (amongst state agencies) consuming over 135 million kWh annually at an average cost of $38.0 million per year, the energy efficiency measures planned for implementation with GEMS financing are estimated to reduce the DOE's energy consumption by approximately 25% and related costs by over $8.0 million annually.

Impacts (As of September 30, 2017)

3.1 Energy and Environment Impact			
Clean Energy Production of Projects Financed	**This Quarter: 7/1 -9/30/17**	**FY 2018 To Date**	**Since Program Inception**
Installed Capacity (Actual kW)	809.8	809.8	2,577.3
Total Yr 1 Production (Estimated kWh)	1,387,334.0	1,387,334.0	4,062,998.0
Total Project Production Over Lifetime of Installed PV (Projected kWh) (including 0.50% degradation)	26,467,424.0	26,467,424.0	77,513,485.0
Electricity Reductions from Energy Efficiency Projects Financed			
Cumulative Annual Electric Energy Saved (kWh)	0	0	0
Total Resource Benefit (kWh)	0	0	0
Petroleum Displaced by Clean Energy and Energy Efficiency Projects			
Total Petroleum Displaced/Saved Over Lifetime (Clean Energy and Energy Efficiency Projects (1)) (Estimated barrels)	16,255.6	16,255.6	47,606.9
Petroleum Displaced/Saved based on Yr 1 Clean Energy Generation (Estimated barrels)	852.1	852.1	2,495.4
Petroleum Displaced Over Lifetime of Installed PV (Projected barrels)	16,255.6	16,255.6	47,606.9
Cumulative Annual Petroleum saved from Yr 1 Efficiency Projects	0	0	0
Petroleum Saved over Lifetime of Efficiency Projects	0	0	0
Greenhouse Gas Avoided			
Total Greenhouse Gas Avoided (2) Over Lifetime (Clean Energy and Energy Efficiency Projects) (Est. metric tons CO2)	7,964.8	7,964.8	23,325.9
Greenhouse Gas Avoided from Clean Energy Yr 1 Production (Estimated metric tons CO_2)	417.5	417.5	1,222.7
Greenhouse Gas Avoided Over Lifetime of Installed PV (Projected metric tons CO_2)	7,964.8	7,964.8	23,325.9
Greenhouse Gas Avoided from Yr 1 Energy Efficiency	0	0	0
Greenhouse Gas Avoided over Lifetime of Energy Efficiency Project	0	0	0
(1) Reference unitjuggler.com for conversion metric.			
(2) Reference eia.gov for conversion metrics.			

3.2 Economic Development Impact

Projects Financed According to Technology Type/Category			
Solar Photovoltaic Systems (1)	38	38	153
Energy Storage	0	0	0
Lighting Upgrades	0	0	0
HVAC Upgrades	0	0	0
Mechanical Upgrades	0	0	0
Controls and Monitoring Devices	34	34	161
Energy/Water Nexus	0	0	0
Total No. of Projects	18	18	94
Indirect Economic Impact - Jobs Created/Retained (2)	81.2	81.2	914.5

(1) Including advanced inverters and smart modules.

(2) Jobs created or retained, utilizing the SBA's metric of one job created or retained for every $65,000 of total project cost.

3.3 Market Expansion Impact

Residential PV Loan Program	This Quarter: 7/1 -9/30/17	FY 2018 To Date	Since Program Inception
Total No. of GEMS Loans	14	14	83
No. Loans Serving Underserved Market (1)	11	11	68
% Loans Serving Underserved Market	78.6%	78.6%	81.9%
(1) See AMI Distribution			
Status of Applications:			
No. of Residential PV Applications Received	79	79	407
No. of Residential PV Applications In Process	47	N/A	N/A
No. of Residential PV Applications Declined	21	21	147
No. Residential PV Applications Withdrawn	7	7	96
No. of Residential PV Applications Loan Docs Accepted	26	N/A	N/A
Geographic Location			
No. of Loans on Oahu	13	13	68
No. of Loans on Maui	0	0	9
No. of Loans on Molokai	0	0	0
No. of Loans on Lanai	0	0	0
No. of Loans on Hawaii	1	1	6
Profile of Customers			
Number of Customers By Customer FICO Credit Score			
700 and above	4	4	30
675-699	4	4	21
650-674	3	3	14
620-649	1	1	12
600-619	2	2	6
Number of Customers By Income Distribution (self-reported by customers)			
Under $15,000	0	0	0
$15,000-$24,999	0	0	0
$25,000-$34,999	0	0	0
$35,000-$49,999	0	0	3
$50,000-$74,999	4	4	16
$75,000-$99,999	3	3	22
$100,000 and Above	7	7	41

Number of Customers by Area Median Income (1)			
<30% AMI (Extremely Low Income)	0	0	0
30% to <50% AMI (Very Low Income)	2	2	8
50% to <80% AMI (Low Income)	3	3	17
80% to <140% AMI (Moderate Income)	6	6	42
> 140% AMI	3	3	16

(1) Area Median Income as provided by the U.S. Department of Housing & Urban Development (HUD). <30% AMI - Extremely Low Income; 30% to <50% AMI = Very Low Income; 50% to <80% AMI - Low Income; 80% to <140% AMI = Moderate Income.

Commercial PV Loan Program	This Quarter: 7/1 -9/30/17	FY 2018 To Date	Since Program Inception
Total Number of GEMS Loans	5	5	11
No. of Nonprofits Participating in GEMS	4	4	7
Status of Applications:			
No. of Commercial PV Applications Received	9	9	21
No. of Commercial PV Applications Approved	9	9	15
No. of Commercial PV Applications Declined	0	0	0
No. of Commercial PV Applications Withdrawn	0	0	0
No. of Commercial PV Applications Under Review	4	N/A	N/A
No. of Commercial EE Applications Received	0	0	1
No. of Commercial EE Applications Approved	0	0	1
No. of Commercial EE Applications Declined	0	0	0
No. of Commercial EE Applications Withdrawn	0	0	0
No. of Commercial EE Applications Under Review	0	0	0
Geographic Location			
No. of Loans on Oahu*	3	3	8
No. of Loans on Maui	2	2	2
No. of Loans on Molokai	0	0	0
No. of Loans on Lanai	0	0	0
No. of Loans on Hawaii	0	0	1
No. Small Businesses Participating in GEMS	0	0	0
No. Small Businesses by Gross Receipts			
Up to $9,999	0	0	0
$10,000-$24,999	0	0	0
$25,000-$99,999	0	0	0
$100,000-$499,999	0	0	0
$500,000-$999,999	0	0	0
$1,000,000-$4,999,999	0	0	0
Above $5,000,000	0	0	0
Number of Small Businesses by Average Number of Employees			
≤10 Employees	0	0	0
11-50 Employees	0	0	0
51-100 Employees	0	0	0
101-250 Employees	0	0	0
251-500 Employees	0	0	0
501-1,000 Employees	0	0	0
>1,000 Employees	0	0	0
Number of Rental Units Supported by GEMS	-	-	505

Number of Consumer Leases	0	0	0
Income Distribution of Consumer Leases (self-reported)			
Under $15,000	0	0	0
$15,000-$24,999	0	0	0
$25,000-$34,999	0	0	0
$35,000-$49,999	0	0	0
$50,000-$74,999	0	0	0
$75,000-$99,999	0	0	0
$100,000 and Above	0	0	0
Area Median Income (1) Distribution of Consumer Leases			
<30% AMI (Extremely Low Income)	0	0	0
30% to <50% AMI (Very Low Income)	0	0	0
50% to <80% AMI (Low Income)	0	0	0
80% to <140% AMI (Moderate Income)	0	0	0
> 140% AMI	0	0	0

(1) Area Median Income as provided by the U.S. Department of Housing & Urban Development (HUD). <30% AMI - Extremely Low Income; 30% to <50% AMI = Very Low Income; 50% to <80% AMI - Low Income; 80% to <140% AMI = Moderate Income.

3.4 Cost Savings Impact

	This Quarter: 7/1 -9/30/17	FY 2018 To Date	Since Program Inception
Aggregate Estimated **Gross** (1) Electricity Cost Savings from Energy Production (life of system) ($)	$ 12,349,129	$ 12,349,129	$ 36,248,347
Aggregate Estimated **Gross** Electricity Cost Savings From Energy Production (life of system) ($) (Consumer)	$ 2,191,174	$ 2,191,174	$ 10,846,193
Aggregate Estimated **Gross** Electricity Cost Savings From Energy Production (life of system) ($) (Commercial)	$ 10,157,955	$ 10,157,955	$ 25,402,154
Average Estimated **Gross** Electricity Cost Savings From Energy Production (life of system) ($) (Consumer)	$ 156,512	$ 156,512	$ 130,677
Average Estimated **Gross** Electricity Cost Savings From Energy Production (life of system) ($) (Commercial)	$ 2,031,591	$ 2,031,591	$ 2,309,287
Aggregate Estmated **Net** (2) Electricity Cost Savings From Energy Production (life of system) ($) (Consumer)	$ 1,748,663	$ 1,748,663	$ 6,748,541
Aggregate Estimated **Net** Electricity Cost Savings From Energy Production (life of system) ($) (Commercial)	$ 4,588,387	$ 4,588,387	$ 13,105,600
Average Estimated **Net** Electricity Cost Savings From Energy Production (life of system) ($) (Consumer)	$ 124,905	$ 124,905	$ 81,308
Average Estimated **Net** Electricity Cost Savings From Energy Production (life of system) ($) (Commercial)	$ 917,677	$ 917,677	$ 1,191,418
Average Estimated Electricity Cost Savings from Energy Efficiency ($)	0	0	0
Average System Cost per Watt for All Consumers (PV) ($)	$ 3.94	$ 3.94	$ 2.15
Average System Cost per Watt for Underserved Consumers (PV) ($)	$ 3.89	$ 3.89	$ 3.94
Average System Size for All Consumers (PV) (kW)	7.5	7.5	8.3
Average System Size for Underserved Consumers (PV) (kW)	7.4	7.4	8.4

Project Cost per Watt for All Consumers – Energy Efficiency ($)	0	0	0
Average Project Size for All Consumers – Energy Efficiency (kW)	0	0	0
Project Cost per Watt for Underserved Consumers – Energy Efficiency ($)	0	0	0
Average Project Size for Underserved Consumers – Energy Efficiency (kW)	0	0	0
(1) Savings calculation assumes a historical utility rate increase of 5.72% annually.			
(2) Savings calculations includes tax credits, assumes a historical utility rate increase of 5.72% annually and is net of loan payments required.			

III. 2018 Outlook and Plan

While the GEMS program has suffered setbacks during its first two years of existence, the program has made significant advances over the past year. During the upcoming year, in addition to the continued deployment of solar PV loans, the Authority will seek Commission approval to expand its financing toolkit, including but not limited to the following:

- Green Energy Money $aver (GEM$) On-Bill Program
- Commercial Energy Efficiency Financing (Direct and Project Sponsor);
- Residential Energy Efficiency Financing
- Commercial Solar PV Plus Storage Financing
- Residential Solar PV Plus Storage Financing

CONCLUSION

As a public finance authority that uses limited public funds to leverage private investment in clean energy, HGIA seeks to accelerate clean energy market growth while making energy cheaper and cleaner for consumers, driving job creation, and preserving taxpayer dollars. By deploying low-cost capital efficiently through financing to maximize private investment, and lower the costs of clean energy to spark consumer demand, rather than having the industry rely on subsidies that cannot bring markets to scale, HGIA's goal is to use the GEMS funds to offer financing that attracts private investment, enabling a wider reach and the exponential potential for greater impacts by recycling, re-investing and re-lending that same funds.

GEMS funding is uniquely positioned to have significant, positive impact in the coming years. As a market-based program, it is critical for GEMS to remain flexible and open to innovation in a rapidly moving sector of the market. We remain confident that the program can be instrumental in achieving the State's energy sustainability.