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

STATUS OF THE
HAWAII GREEN INFRASTRUCTURE AUTHORITY'S ACTIVITIES

REPORT TO THE

GOVERNOR AND THE LEGISLATURE

OF THE

STATE OF HAWAII

Pursuant to

Act 211, Session Laws of Hawaii 2013

December 2015

Prepared by the

State of Hawaii

Department of Business, Economic Development and Tourism

and the Hawaii Green Infrastructure Authority

December 2015

EXECUTIVE SUMMARY

Now entering its second year, the Hawaii Green Infrastructure Authority (HGIA) was formed with a mandate to make renewable energy investments accessible and affordable to Hawaii's consumers, especially underserved communities, low- and moderate-income homeowners, renters, and non-profits. HGIA, and its associated GEMS program, uses innovative market-driven financing mechanisms to improve access to renewable energy infrastructure and thus advance the State's goal of achieving 100% renewable portfolio standard in the electric sector by 2045.

Not unexpectedly, the complex and innovative nature of the suite of finance programs required to implement and roll-out the GEMS program has required a vigorous effort over the past two years since passage of the enabling legislation. While the HGIA has executed on the original legislative intent, it was designed, in large part, to address the market access challenges prevailing in 2012-2013. While the program infrastructure and financing were being established, external factors have since driven significant changes in the Hawaii marketplace. Interconnection issues, the rise of aggressive private-sector financing for residential solar, and subsequently the end of net energy metering have, in substantial and unanticipated ways, changed the nature of access challenges in the marketplace. Consequently, just as HGIA is funding their first consumer loans in the coming months and delivering on their program timeline, there is the risk that the existing programs will not address future needs.

At the same time, important new opportunities have emerged for HGIA to play a critical role in accelerating the adoption of renewable energy technologies. New technologies like battery storage and programs like community-based renewable energy will define the Hawaii marketplace of the next five years. Fortunately, the Legislature and the PUC established the HGIA with the flexibility to adapt to changes in the market, and they are actively pursuing these opportunities. The lead times to develop these programs—many of which are among the first in the nation and have few precedents—means that the HGIA will need to take a longer term view of future market opportunities and while they will start to deploy capital in 2016, the majority of their funding will be deployed in the 2016-2018 timeframe.

With new executive leadership in place, the HGIA expects to both deliver on the programs with which it was initially chartered, and focus its energies on aggressively addressing the market issues of the next 5-10 years.

REPORT

Reporting Pursuant to Act 211, Session Laws of Hawaii 2013

This report is respectfully submitted to fulfill the requirement to report on the status of the Hawaii Green Infrastructure Authority's activities, including approved loan program description and uses; summary information and analytical data concerning 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 and 10 of Act 211. DBEDT respectfully submits this status report, outlining the steps taken to design, develop and launch GEMS in 2015.

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. GEMS is a high impact strategy to deploy clean energy infrastructure that will contribute towards Hawaii's aggressive pursuit of its statutory 100% clean energy goals by 2045 and to help consumers lower their energy costs.

Act 211 established a legal structure that enables DBEDT to issue bonds to fund green infrastructure financing programs in a manner to efficiently leverage public and private capital to facilitate the State of Hawaii meeting its aggressive clean energy goals and providing 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 PUC 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 PUC established the general parameters and program processes for GEMS. With feedback and support from several interveners—including the Consumer Advocate and Hawaii Solar Energy Association, among others—the PUC granted GEMS the flexibility to effectively work with the market to provide efficient and effective financing opportunities to enable more of Hawaii's consumers to invest in and benefit from clean energy.

Pursuant to HRS 269-162, the Financing Order provides regulatory approval for the issuance of low-cost Green Infrastructure Bonds (GEMS Bonds), which will be deployed through GEMS. Pursuant to HRS 269-170, the Program Order provides approval for the deployment of the funds from the issuance of GEMS Bonds. Included in the Program Order are general program parameters and specific deployment strategies to ensure an effective clean energy financing program to best serve Hawaii's consumers.

GEMS Bond Issuance

With PUC orders approved, DBEDT issued $150 million in Green Energy Market Securitization Series 2014-A Bonds on November 13, 2014. The issuance was designated a green bond, which attracted investors looking for socially responsible investments. The issuance was rated Aaa/AAA/AAA by Moody's Investors Service, Standard & Poor's and Fitch Ratings, respectively, and was priced at a yield of 2.99% with a weighted average life of 7.8 years.

Since the issuance of the Green Energy Market Securitization Series 2014-A Bonds on November 13, 2014, DBEDT has received national and international recognition through the following awards:

- 2014 Council of Development Finance Agencies, Excellence in Energy Finance Award
- 2014 International Financing Review, North America Structured Finance Issue of the Year Award
- 2014 International Financing Review Americas, US Structured Finance Issue of the Year Award
- 2015 The Bond Buyer, Deal of the Year: Non-Traditional Financing

GEMS Estimated Impact

GEMS-financed projects will contribute not only to the achievement of the RPS and EEPS, but also to the infrastructure investment needed for Hawaii to meet its 2045 clean energy mandates. Outlined below is a summary of GEMS' anticipated benefits and impacts, based on an initial program focus on solar PV.

Estimated impacts and benefits of GEMS are estimated to be as follows:

Energy and Environmental Impact

1. More than 92 gigawatt-hours of solar energy may be produced annually through projects financed by combining up to $143 million of Green

Infrastructure Proceeds with private capital. This represents approximately 0.95% of the State's annual electricity consumption.[1]

2. The energy production from over 7,400 financed solar photovoltaic projects has the estimated impact of reducing petroleum consumption by over 7 million gallons or 169,000 barrels annually.[2]

Economic Development Impact

3. A third party analysis of the Hawaii Clean Energy Initiative revealed the need for in excess of $16 billion in capital expenditures across renewable energy and energy efficiency technologies in order to meet the State's clean energy goals.[3] Projects financed through Green Infrastructure Funds will contribute not only to the RPS, but also to the infrastructure investment needed for Hawaii to meet the 2045 goal.

Cost Savings Metrics

4. Statewide estimated energy and cost savings resulting from projects financed through GEMS is 92 gigawatt-hours per year with an estimated cost savings of over $9.8 million.[4] A customer that uses a product deployed with GEMS Proceeds may save 7,200 kWh per year, with an average bill savings of over 20%.

As a highly innovative program at the forefront of the renewable energy industry, there is likely to be uncertainty in the time required to realize these benefits, as the products and services being created are often without any precedent in the commercial market and will require significant analysis, effort, stakeholder engagement and marketing to establish.

Hawaii Green Infrastructure Authority

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

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[1] The calculation uses an annual electricity production in Hawaii of 9,639 GWh for 2012, based on the DBEDT Hawaii Energy Facts & Figures, November 2013, page 2.

[2] Calculated on 542 kWh/barrel and 13 kWh/gallon, as based on the US Energy Information Administration webpage - http://www.eia.gov/tools/faqs/faq.cfm?id=667&t=6 - as of December 6, 2013.

[3] R. Braccio, Booz Allen Hamilton, "Hawaii Clean Energy Initiative Scenario Analysis", March 2012.

[4] Total gigawatt-hour production from GEMS supported systems multiplied by the average kWh cost in Oahu as of December 1, 2013 less average kWh cost of financing ($0.3322- $0.225=$0.107) as shown at http://www.hawaiienergy.com/get-the-facts.

II. 2015 GEMS Program Activities

Governance and Administration

The HGIA currently operates with a minimum of overhead, constituting an Executive Director and 1.5 staff. The program has operated within the established operating budget and overhead limits. The program was overseen by an interim Executive Director from March 2, 2015 to October 15, 2015. A new Executive Director was appointed by the Board of Directors starting October 16, 2015.

Financing Products Launched

Consumer Solar PV Program: This program was detailed and submitted to the PUC as a Program Notification on December 31, 2014 and was launched on June 30, 2015. The program serves to provide debt capital to the market in partnership with private sector entities ("Deployment Partners") with lending criteria that specifically target underserved populations with disadvantaged access to private capital for solar PV projects. To-date, the program has enlisted 11 Deployment Partners, with whom terms have been agreed for the provision of capital. Underwriting standards have been put in place using a 3rd party underwriter.

Marketing activities related to the program begin in Q2 2015. While the pipeline of loans is smaller than forecast, loans are actively being processed. The program pipeline has been adversely affected by external factors related to interconnection and Net Energy Metering (NEM) (see external factors below) as well as competition from commercial lending programs targeting this customer base. As a result, changes may need to be made to the lending criteria and marketing activities to ensure the program can continue to create value for the target population and the State.

Non-Profit Solar PV Program: This program was detailed and submitted to the PUC as a Program Notification on December 31, 2014 and was launched on March 27, 2015. The program provides debt capital to Hawaii-based registered non-profit organizations with owned facilities for solar PV installations.

HGIA engaged a 3rd party ("Clean Power Finance") to engage in the marketing and administration of this program on November 7, 2014. There is an active pipeline of deals currently being reviewed, however no loans have been funded under this program to date. This is a market with limited potential customers and a long sales cycle, and is also adversely affected by the external factors listed below, so the progress to date is unsurprising. HGIA and its 3rd party partner have modified the terms and pricing of the program to improve its competitiveness with private sector lending programs while maintaining responsible and conservative underwriting standards.

New Product Pipeline

As a market-based initiative operating in a rapidly evolving landscape, GEMS requires administrative flexibility to adapt to movements in the market. One of GEMS' key methods for maintaining an open dialogue with market participants will be its Open Solicitation Process. The goal of maintaining such a process is to allow the industry and stakeholders to propose for financing high impact projects that GEMS may not otherwise be aware of.

Dynamic changes in the global, national, and Hawaii energy markets have significantly altered the landscape for infrastructure financing in the last twelve months. As such, the models and programs originally contemplated in the PUC Program Notifications are no longer sufficient to achieve the GEMS program projected impact. GEMS and HGIA play an important role in Hawaii in fostering innovative new technologies and financing models that may not yet be supported in the private financing market. HGIA is currently engaged in substantive discussion and active program development on new, high-impact programs including, but not limited to:

- Commercial energy efficiency financing (term sheet signed with 3rd party partner; anticipate first marketing activities Q1 2016)
- Loan / lease programs for integrated solar PV and battery storage systems for underserved urban and rural populations
- Consumer loan products for small business and residential energy efficiency projects
- Financing for community solar initiatives to provide access to solar PV systems to populations without owned rooftops for installation
- Additional project financing for innovative energy infrastructure programs within the state of Hawaii

New technologies like battery storage present ideal opportunities for the GEMS program. The technology is early in its commercial maturity, and no private financing programs currently exist. The technology has great potential to enable renewable energy while alleviating interconnection-related challenges, and is maturing in both performance and progressively lower cost at a high rate. GEMS can play an important role in encouraging early adoption of such technology and making it broadly available to consumers who would not find viable financing options in the private market.

These new programs, at different stages of development, are expected to enable deployment of the GEMS funds to achieve impact at or greater than the original program goals, with sustainable rates of risk and return. Development of these programs is ongoing in partnership with DBEDT, the PUC, private industry and community stakeholders. One or more of these programs are expected to reach deployment stage in calendar year 2016.

III. Effect of External Factors and Future Risks

As noted in the 2014 Legislative Report, the GEMS program is subject to a number of powerful exogenous factors beyond the ability of HGIA to effectively forecast. Several of those have materially and adversely affected the progress of the GEMS program over 2015:

Interconnection: The solar PV market faces several immediate technical challenges with many circuits being highly penetrated with intermittent renewable energy, leading to limits on utility interconnection and changing interconnection procedures. The impact of solar PV growth on grid stability and reliability led HECO to delay residential interconnection for a period in 2014/2015. While resolved in February, 2015 between the HECO Companies and the PUC, there remained a significant backlog of permitting and installations through much of 2015. These delays significantly slowed the development of a pipeline for the GEMS Consumer Solar PV Program.

On-Bill Mechanism: The timely and successful build-out of the on-bill repayment mechanism by the PUC will impact the ability of GEMS to utilize the mechanism in the initial deployment. The use of on-bill mechanism will allow GEMS to reduce interest rates on its loan offerings to match the reduced risk of customers paying their utility bills. As a result, on-bill is vital to increasing customer savings and reducing interest rates, making GEMS financing products a compelling value for consumers and driving adoption. To date, the on-bill financing mechanism has not been implemented, hindering the ability of GEMS to develop competitive products. Development of this feature is currently scheduled for Q2 2016.

Net Energy Metering: In October 2015, the PUC announced the discontinuation of net energy meeting for new residential solar customers in Hawaii. The new tariffs significantly alter the economic returns and commercial incentives for traditional residential solar PV installations. This change has had a significant near-term impact on demand for, and the long term potential of, the GEMS Consumer Solar PV Program. At the same time, this change creates new, compelling incentives for alternative technologies and financing programs, such as battery storage and community-based renewable energy. As a direct consequence of these changes, HGIA will need additional time to modify the existing solar PV programs and develop new financing products to address the current market reality.

Going forward, significant risks remain which could affect the timing and magnitude of the benefits realized by the GEMS program:

- Interconnection
- Timing of the delivery of the on-bill mechanism
- Changes in energy storage technology
- Changes in the availability and cost of private-sector financing for energy storage projects

IV. 2016 Outlook and Plan

Report of Findings per Section 10 of Act 221

Per Section 10 of the enabling legislation, the HGIA was required to conduct a study in the 2015 calendar year to assess:
"(1) The extent to which the Hawaii green infrastructure authority's activities have benefitted the State by advancing the State's renewable energy goals and reducing energy costs for consumers by providing affordable energy options; and
(2) Whether the loan program shall be extended, eliminated, otherwise modified beginning July 1, 2016."

In response to this requirement, our assessment is as follows:

1. While programs have been implemented and loans deployed consistent with the original program timeline, the quantifiable impact as measured in loan volume is limited. Nonetheless, we believe that there have been some significant benefits toward the State's energy goals as a direct consequence of (a) the marketing activities enacted in conjunction with the program and (b) the presence of the implemented GEMS loan products as a market-competitive alternative to private-sector products. The programs have been faithfully implemented per the original PUC program order, but exogenous factors that could not be foreseen, in particular interconnection impacts, availability of the on-bill mechanism, and changes to the PUC's NEM tariff, have adversely affected the adoption of the loan programs.
2. There are a wide range of high impact, innovative financing programs (cited above) in active stages of development by the HGIA. GEMS financing has a unique role to play in driving the adoption of these new technologies and financing mechanisms, which have not yet been readily adopted by private sector companies. Moreover, modifications to the existing programs are being made to offset the impact of changing market conditions and improve their viability. The current legislative mandate and PUC oversight provide the HGIA with adequate administrative flexibility to effect the necessary changes to its programs.
3. Significant improvements are being made to the organizational capability of the HGIA to efficiently and effectively pursue these emerging, high-impact opportunities.
4. We therefore recommend the loan program be extended beginning July 1, 2016.

2016 Activities and Timeline

Significant work lies ahead to build on the successes of the deployment phase and begin transforming the current pipeline into an active, sustainable portfolio of financing that meets the program objectives. Key priorities are:

- Building the organizational capability of the HGIA to more effectively administer existing programs and develop new ones

- Acceleration of pipeline on existing products and modifications to adapt to exogenous factors
- Further development of the open solicitation process to source innovative new projects and programs
- Development and implementation of new programs to increase impact of the GEMS program, as described above
- Improvements in the administration, governance, and transparent reporting of the GEMS lending portfolio
- Fostering partnerships with institutions in other states pursuing similarly innovative missions (e.g., the New York Green Bank, the Connecticut Green Bank) to share best practices and innovations

Figure 1 below represents the key milestones for the development and implementation of GEMS.

Figure 1. GEMS Timeline

Date	Milestone
Q1 2015	Launched Non-Profit PV Product
Q2 2015	Launched Consumer PV Loan Product
Q4 2015	New Executive Director Hired
Q1 2016	First Consumer PV Project Funded
Q1 2016	Build Team and Organizational Processes
Q1 2016	Open Solicitation Process

CONCLUSION

HGIA and the GEMS program are breaking new ground nationally in the financing and enablement of high-value alternative energy programs. Since HGIA is focused on mobilizing capital into categories of projects that are not currently addressed by the current commercial market, it should be understandable that its largely unprecedented programs take significant time and effort to come to fruition. 2015 marked the first full year of our deployment phase, during which two new programs were brought to market. External factors negatively affected the early success of these programs, but HGIA has identified several emerging opportunities in which 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.