



Final Report for Solar Array and Energy-Efficient Heat Pump Grant 23-G550-02EMS

1. Project Summary

This project involved the purchase and installation of a 20 kWh solar array on the roof of our Harrison County Landfill Office and the installation of a new energy-efficient heat pump system. The solar array and heat pump were installed to reduce our facility's reliance on non-renewable energy, improve energy efficiency, and lower operational costs.

- **Purchase and Installation:**
 - The 20 kWh solar array was purchased and installed in May 2023. The installation process, completed by JP Electric, took approximately three days. We had to wait three months for Mid American Energy to come out and inspect the work and install a dual meter so that production and consumption could be measured. Mid American performed this work on August 9, 2023.
 - The energy-efficient heat pump was purchased and installed on January 20, 2023. Loftus Heating and Cooling installed a Daikin air handler and heat pump that was designed for solar power.
- **Operation and Measurable Goal Progress:**
 - Since installation, the solar array has generated 39,200 kWh, covering approximately 181% of the landfill office's energy needs, resulting in an estimated energy savings of \$4,310.
 - The heat pump has demonstrated a marked improvement in energy use, reducing heating and cooling costs by 27% in the months between heat pump installation and solar array coming online. Together, these systems have helped reduce the office's carbon footprint by an estimated 9.9 metric tons of CO₂ equivalent emissions during the reporting period.

2. Economic and Environmental Impacts

- **Economic Impacts:**
 - The solar array has reduced our facility's annual energy expenses by \$4,310 leading to significant cost savings over the past year. These savings are projected to increase as energy prices rise, making the landfill's operations more financially sustainable.



- The heat pump has also reduced operational costs through improved energy efficiency, particularly during extreme weather conditions, minimizing the need for supplemental heating and cooling.
- **Environmental Impacts:**
 - The reduction in greenhouse gas emissions from using renewable energy has helped Harrison County Landfill align more closely with local and state environmental goals.
 - The success of the solar array and heat pump system has also served as a model for nearby organizations considering similar renewable energy initiatives, fostering indirect environmental benefits across the region.

3. Public Awareness and Feedback

- Customers have been excited to learn about the solar array and its benefits.
- **Feedback:**
 - Community feedback has been overwhelmingly positive. Many residents and businesses expressed interest in similar projects, the Logan-Magnolia School did a feasibility study of installing a rooftop solar array after visiting our site. To date no work has been done at the school.

4. Obstacles and Barriers

- **Challenges:**
 - The Solar Array had a few challenges. First it took longer than expected for the material to arrive. Then we had to wait for the weather to cooperate. we have a metal roof so it needs to be dry for installation to allow electricians to maneuver on the roof. It was May before the panels were installed. Then we had to wait for the electric company (Mid American) to inspect the solar array and install a dual meter to track consumption and production. This task was not completed until August. Lastly, the weather will always be a constant challenge. In January we had quite a bit of snow that kept the panels covered almost all of the month. This summer with the draught we have had to wash dust off the panels to reach its maximum potential.
- **Response and Outcome:**
 - With the delays in installation of panels and the dual meter we made phone calls to keep trying to encourage the process to get contractors onsite. With the snow pack we have no solution at this point except for letting it melt. When the panels get dusty we a hose to wash them off.



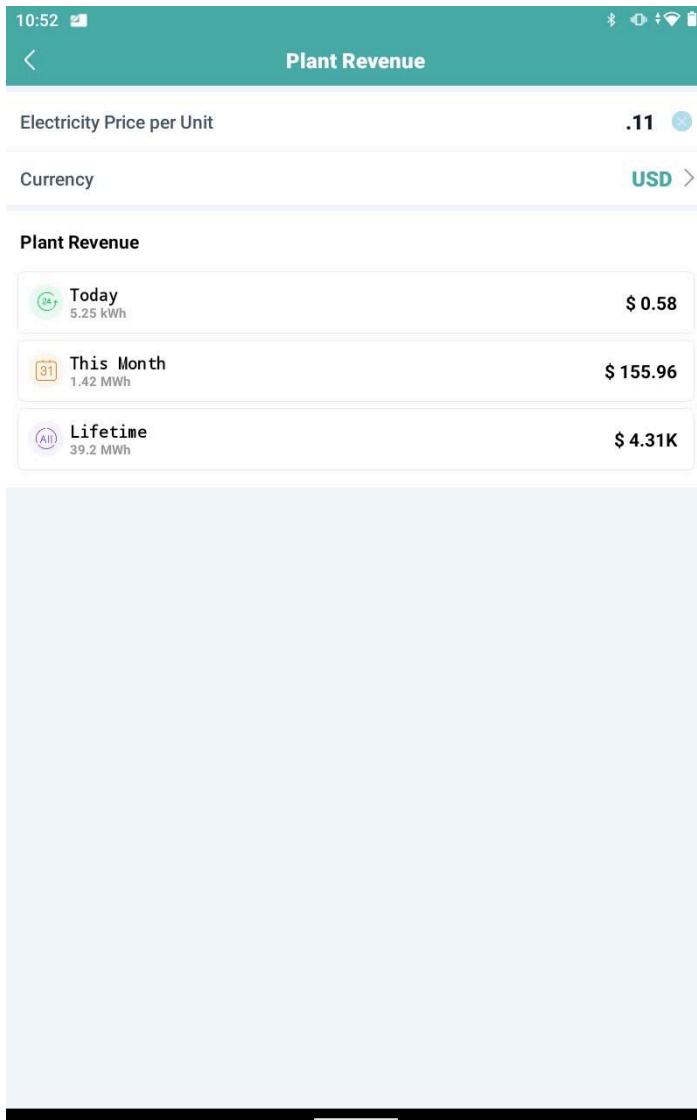
EMS Objective, Target and Action Plan

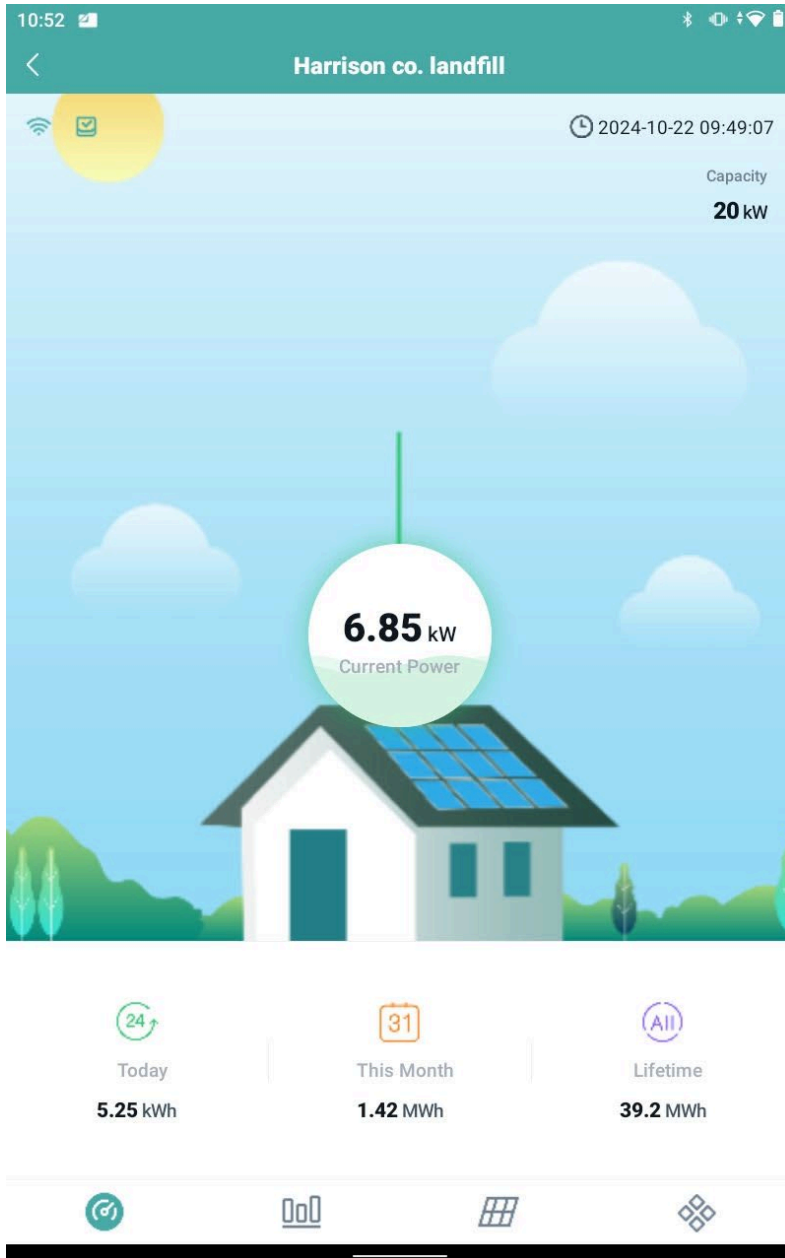
EMS Objective, Target and Action Plan						Document No.	
EMS Participant Name			Harrison County Landfill Commission				
Common Name for Objective/Target			Solar array, HVAC, LED Lighting				
Objective Description							
Action	Subject			Aspect	Adoption Date		
Improve	Install energy efficient HVAC system at HCLC scale house			Building use of heat and electricity at landfill	9/14/2022		
Target 1 Description (Add sections for additional targets as needed.)							
Action	Subject			Qty to	Metric		
Decrease	kWh purchased for usage at the scale house			3000	kWh		
Time Period		Time Period Type (Select)			Component Area (Select)		
8/1/23 to 7/31/24		Annual			Greenhouse Gas Reduction		
Results/Baseline (Update periodically, including each fiscal year by June 30th. Add rows for additional results as needed.)							
Criteria	Applicable Time Period	Qty for Period	Qty for Target To Date	% from Baseline (Calculated)	Narrative Description	Date of Update	
Baseline	FY 2022	27363 kWh			Total kWh used by HCLC @ scale house	7/1/2023	
1	Results Update	10/1/2023	1358.00	1358.00	5%	Meter installed in Aug. Still Consuming kWh during operation hours but much less.	10/1/2023
2	Results Update	1/1/2024	2909.00	4267.00	16%	November and December we were not producing as much solar to offset our consumption	1/10/2024
3	Results Update	4/1/2024	4215.00	8482.00	31%	January was very cold + snow	4/1/2024
4	Results Update	7/1/2024	1885.00	10367.00	38%	Still consuming kWh during normal operating hours.	7/31/2024
Closure/Final		7/1/2024		10367.00	38%	Produced 6135 more kWh than consumed	7/31/2024
Closure Status (Select)			Partially Met				

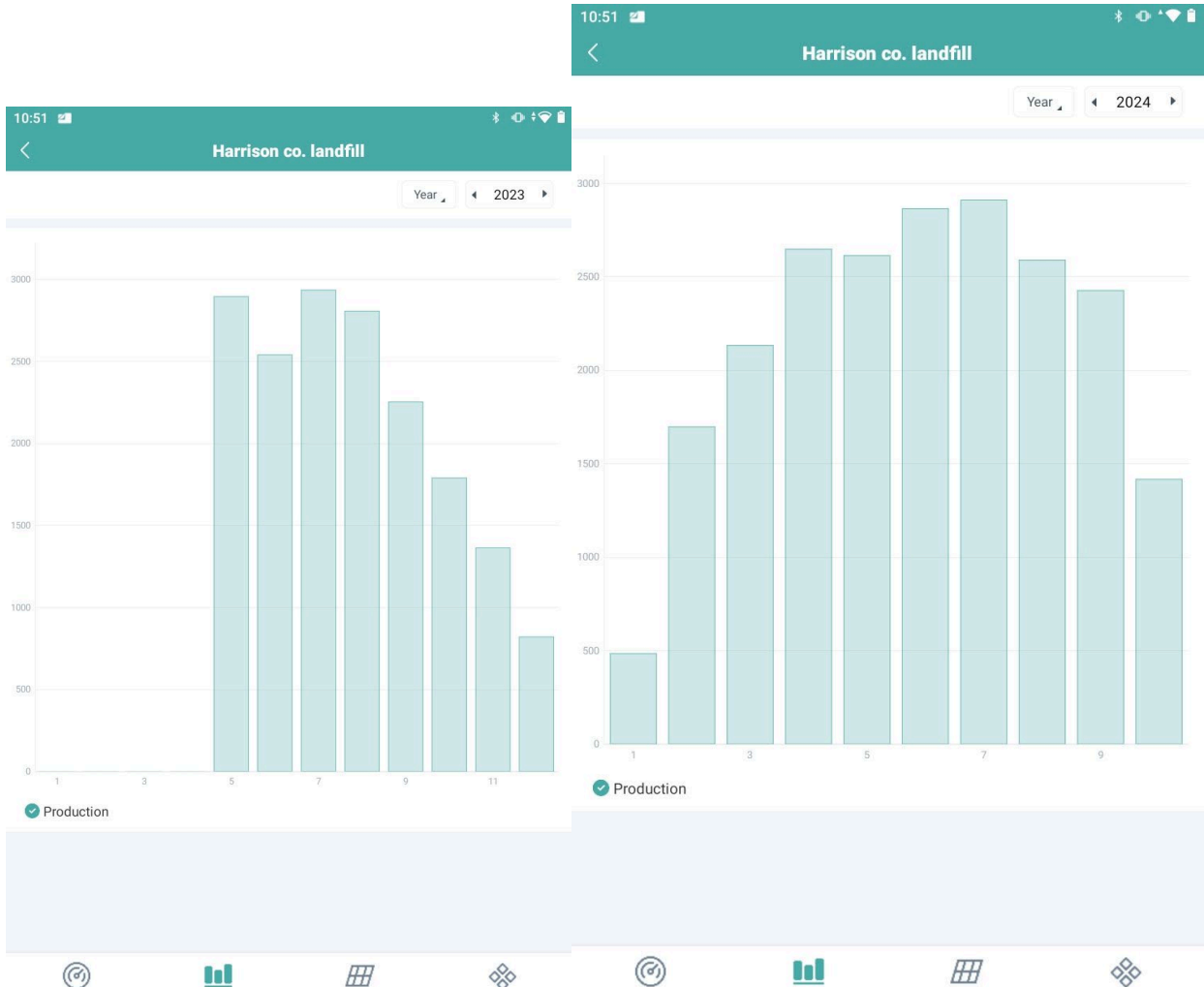


We adjusted the reporting time period on the O & T action plan to reflect the reporting period for the grant report. This period was changed to go into effect when the dual meter was installed by Mid American Energy. Our target was to reduce kWh used to 3000. We selected Partially Met because we did not hit our goal of 3000, but that only tells part of the story. It is true that during operating hours we consumed more energy than we expected to. When we were not in operation our solar array was busy producing 15,139 kWh. Making us net positive 4,772 kWh during the reporting period.

5. Photos











This final report highlights the success of the solar array and heat pump project, showcasing its economic, and environmental benefits for the landfill and the community. The project has been a net positive in terms of energy savings and community engagement, making it a model for future sustainability efforts.