INVESTMENT GRADE AUDIT

FOR: CITY OF CARNATION, SOLAR PV PLUS STORAGE FEASIBILITY STUDY

ATTN:
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PREPARED BY
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UMC, INC.
DES AUTHORIZATION #: 2024 – 899 A (1)

Date: 5/21/2025

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1.0 Project Contact Page

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2.0 Executive Summary

UMC is pleased to present this Investment Grade Audit (IGA) to the City of Carnation. This project was funded by a grant from the Washington State Dept. of Commerce, Solar plus Storage for Resilient Communities Program. And has been developed to assess the feasibility of installing Solar Photovoltaic (PV) arrays with battery storage at City of Carnation facilities.
Utilizing the state Energy Savings Performance Contracting (ESPC) program, as administered by the WA Department of Enterprise Services, UMC provides a turnkey design-build approach that will deliver the entire project including, but not limited to, engineering development, design, construction commissioning, training, and Measurement & Verification.
The IGA, which is this document, provides the results of the feasibility study with Rough Order of Magnitude (ROM) cost and savings. From this report the city will select which Resource Conservation Measures (RCMs) to include in the Energy Services Proposal (ESP). Actual energy and pricing guarantees will be provided in the ESP, which is the next step after narrowing down the measures identified in this IGA report. The ESP includes Guaranteed Maximum Price, Guaranteed Energy Savings and Guaranteed System Performance.

The purpose of this feasibility study is to determine how Solar PV with incorporated battery storage can provide resiliency and support the community during an emergency. Additionally, the solar PV and storage system can help the city reduce its grid purchase of electricity, resulting in lower utility costs for city operations.
The City of Carnation's emergency operations plan requires the city and its residents to be self-supporting. And requires the city to provide assistance – such as road crews to clear debris – to King County and state operations during an emergency. The Solar PV plus Battery Storage project supports the City's emergency operations plan.

The table below identifies the potential sites that were included in the feasibility study.

City of Carnation Solar plus Storage Feasibility Study

Prioritized Site List

Site	Address	Priority
Carnation Community Campus	4001 Tolt Ave, Carnation WA	1
Public Works Building /Domestic Water Pumps	33100 NE 45th St. Carnation, WA	2
Wastewater Vacuum Pump Station	4301 Larson Ave. Carnation, WA	3
City Landfill (Capped)	NE 24th and 328Th Ave NE. Carnation, WA	4

The Landfill site area is not deemed feasible at this time. While the area could support a 290 kW ground mount Solar PV array that could produce an estimated 328,560 kWh / year and connect to the electric grid. The landfill is not cleared for development currently. Refer to Section 4.0 Facility Site Assessment for more information.

The Solar PV Array and Batteries are discrete scope elements. The size and production of each array is dependent on roof space and solar exposure.

- Carnation Community Campus – Solar PV array is rated at 37.96 kW, producing an estimated 32,400 kWh annually.
- Public Works – Solar PV is rated at 35.3 kW producing an estimated 25,753 kWh annually.
- Vacuum Pump Station – Solar PV is rated at 14.5 kW, producing an estimated 14,427 kWh annually.

The city can select one of two battery options for each location. The batteries are about the size of a small garden shed and are fully self-contained with fire suppression and battery management hardware and software. The smaller battery will provide 2-3 days of back up power. The larger battery will supply 5-7 days of backup power. Without any recharging from the solar array, for example in winter.

- Carnation Community Campus:
  - 258 kWh = 2-3 days of backup power.
  - 516 kWh = 5-7 days of backup power.
- Public Works Building:
  - 215 kWh = 2-3 days of backup power.
  - 430 kWh = 5-7 days of backup power.
- Vacuum Pump Station:
  - No battery. The electrical load of the pumps is too large to be met with battery storage.
- Landfill is not considered viable at this time.

The Solar PV and battery system will be net-metered by the local electrical utility and provide an offset to grid purchased electricity.

The table below shows recommended potential Resource Conservation Measures (RCMs) with ROM values for savings and cost. The ROM cost for each of the RCMs is specifically for that RCM. For example, the cost for the Solar PV array is not included in the cost for the battery.

Once the City, in consultation with UMC and DES, selects the preferred options. UMC will fully develop the scope and cost for the ESP. The final guaranteed costs will change based on which measures are selected. The ROM costs presented include all labor and material and soft costs, i.e., engineering, permitting, bond, sales tax, project management etc. and are spread across all the RCMs listed.

Potential RCMs

City of Carnation
Preliminary Project Budget Cost & Savings

Resource Conservation Measures	Electric Savings kWh/yr	Simple Payback Yrs	ROM Annual Savings $	ROM Project Cost $
Mechanical/Electrical Upgrades	-			$ -
RCM-1a: Carnation Commuinity Campus Solar - 37.96 kW	32,400	116.2	3,600	$ 426,000
RCM-1b: Carnation Community Campus Option 1 - 258 kWh Batter	-		-	$ 772,000
RCM-1c: Carnation Community Campus Option 2 - 516 kWh Batter	-		-	$ 1,209,000
RCM-2a: Public Works - 35.3 kW	25,753	128.7	2,900	$ 375,000
RCM-2b: Public Works Option 1 - 215 kWH Battery	-		-	$ 774,000
RCM-2c: Public Works Option 2 - 430 kWH Battery	-		-	$ 1,127,000
RCM-3 Vacuum Pump Station Solar - 14.5 kW	14,427	85.6	1,600	$ 140,000

2.1 Sites and Scope Selected for Track - 2

The following sites and RCM's have been selected by the City of Carnation to submit for Track-2 Grant funding. The final scope and cost details will be determined prior to submitting the Track-2 Grant application. UMC will assist the city with a future grant application and help identify alternative funding opportunities for the city to implement this project.

Analysis and scope descriptions for each RCM can be found in Sections 4.0 Facility Site Analysis and Section 5 Scope of Work, respectively, in the report below.

Selected RCMs

City of Carnation
Preliminary Project Budget Cost & Savings

Resource Conservation Measures	Electric Savings kWh/yr	Simple Payback Yrs	ROM Annual Savings $	ROM Project Cost $
Mechanical/Electrical Upgrades	-			$ -
RCM-1a: Carnation Commuinity Campus Solar - 37.96 kW	32,400	117.1	3,600	$ 430,000
RCM-1c: Carnation Community Campus Option 2 - 516 kWh Battery	-		-	$ 1,217,000
RCM-2a: Public Works - 35.3 kW	25,753	129.6	2,900	$ 378,000
RCM-2b: Public Works Option 1 - 215 kWH Battery	-		-	$ 780,000
RCM-3 Vacuum Pump Station Solar - 14.5 kW	14,427	86.2	1,600	$ 141,000

3.0 Project Development

3.1 Project Overview

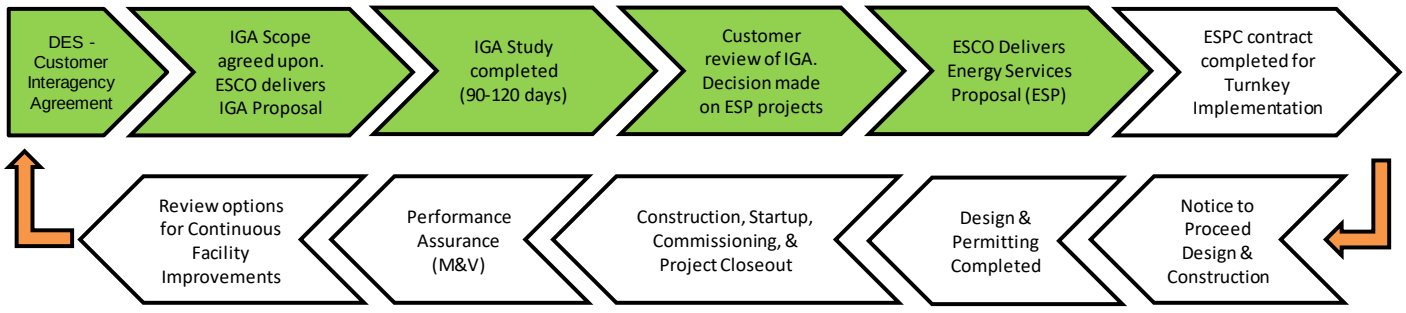
The purpose of this Investment Grade Audit (IGA) is to provide engineering analysis, scope, and financial overview to evaluate the feasibility of Solar P.V. plus Battery Storage opportunities at the City of Carnation facilities. This IGA is to be further evaluated by the developing team (City of Carnation, DES & UMC) to select specific RCMs for implementation. The next step is the ESP, when UMC will develop a comprehensive construction project including each of the selected RCMs.
The intent of this project is to install Solar PV plus Battery Storage to add resiliency to city operations and reduce electric utility costs for the city.

The next steps of the ESP will focus on developing the following:

- Detailed Design & Project Scopes
- Guaranteed Savings for the selected RCMs
- Guaranteed Maximum Project Costs
- Project Financials
- Detailed Measurement and Verification Plan
- Preliminary Construction Implementation Plan

Once DES has approved the IGA document, UMC will package the measures selected by the team and turn it into an ESP. The ESP will be the basis for any future grant applications.

Energy Performance Contracting Process:



In addition to the technical and financial assessment, Community Engagement was an important piece of this feasibility. Two community engagement events were hosted by city staff. The first Community engagement was held on September 19th, 2024, at the Senior Center from 5:00-7:00. UMC presented the initial site selection and early assessment to the public. The second Community Engagement event was held on November 21st, 2024, at the City Hall. It was hosted by the city and well attended.

4.0 Facility Site Assessment

The following provides background information and site selection criteria for the (new) Carnation Community Campus, Public Works Building, Wastewater Vacuum Pump Station, and (capped) City Landfill.

Site Selection Criteria:

- Is the site owned and operated by the city?
- Does the site have adequate solar exposure?
- Does the site have access to 3 phase utility power for grid connection?
- Does the site support emergency operations?
- Will the Solar + Storage system provide resiliency?

Site Name	City Owned Property	Solar Exposure	Accessible Grid Connection	Supports Emergency Operations	Provides Resiliency
Carnation Community Campus	Yes	Yes	Yes	The Carnation Community Campus will include the city administrative office and the City Hall. The new building will also be used as a warming /cooling center for the residents and will be used as the city's emergency operations command center.	Yes
Public Works Building	Yes	Yes	Yes	Public works crews and equipment are identified as critical to support regional emergency operation efforts. The facility supports the city maintenance crew operations. A city water system booster-pump is co-located at this site and provides increased pressure to a section of the city. It will be connected to provide resiliency.	Yes
Wastewater Vacuum Pump Station (WWPS)	Yes	Yes	Yes	The WWPS is critical infrastructure that relies on power to operate 24/7. The WWPS has a 4-hour operational limit with no power. Solar + Storage will extend emergency generator operations by offsetting and extending diesel reserves.	Yes

City Landfill	Yes	Yes	Yes	The city's landfill has been decommissioned for 25 years. The site provides space for a ground mount solar array connected to the utility grid. This provides dispatchable power production for the electrical utility (PSE). Providing resiliency for the city and surrounding area. The WA Dept. of Ecology monitoring is ongoing and the site is not available for Brownfield development yet.	Yes

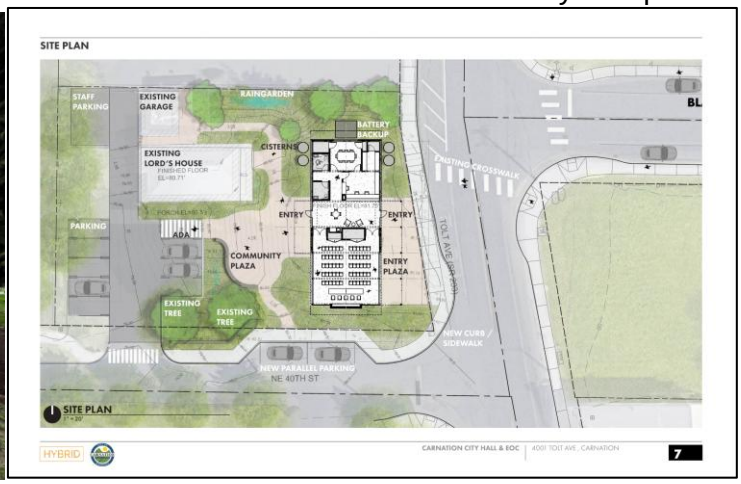
4.1 Facility Existing Conditions

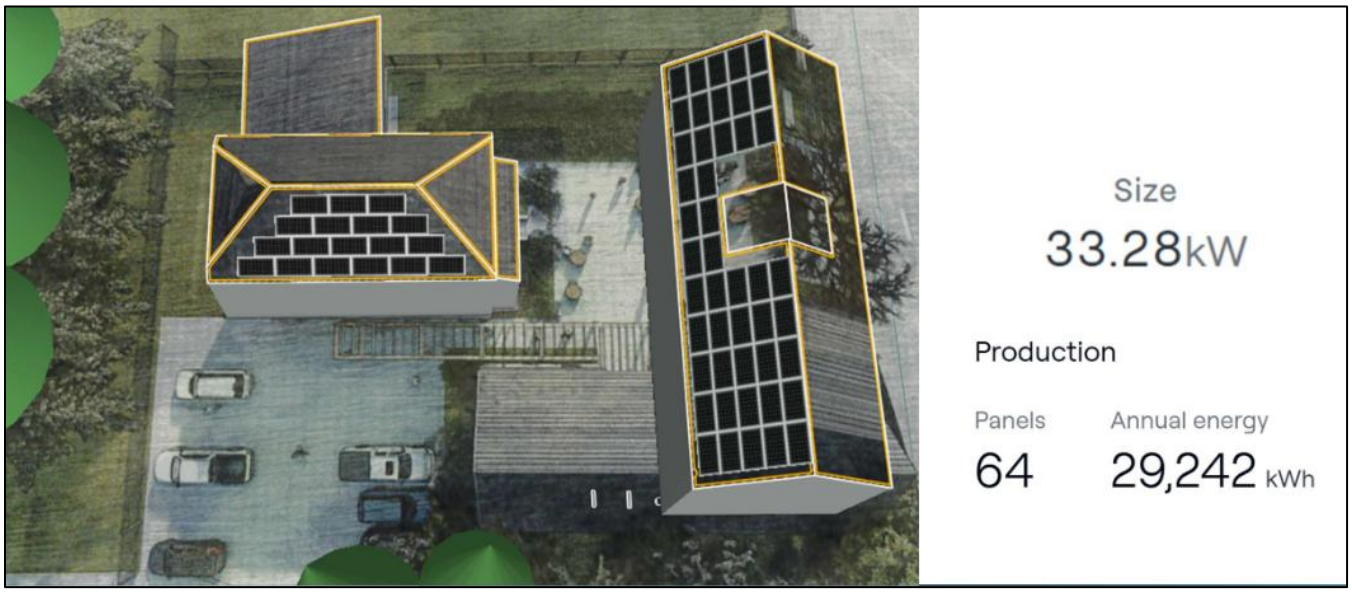
(new) Carnation Community Campus

The Site located at 4001 Tolt Ave. with an existing two-story building known as the Lord House, was built in 1911 and is 2,584 square feet. The new City Hall will be built on the city owned parcel. The new facility will also be used as an Emergency Command Center and a warming /cooling center for up to 60 people. The roof of the existing building is recommended to be replaced before a solar PV array is installed. Roofing costs are not included in the ROM costs.

The existing Lord House building

Site of the new Carnation Community Campus





Public Works Building

The Public Works building located at 33100 45th street was built in 1994 and is 5,560 square feet. The building is in good condition with metal siding and roof. The site provides good solar exposure. With an excellent connection point to the utility grid, with three phase power on the same side of Tolt River Rd. N.E.

The building structure can support the solar PV array with only minor structural improvements. There is adequate space for the storage battery. A bonus is the city's newest water system booster pump station, providing increased water pressure to a section of the city, is on the same property and will be connected to the Solar + Storage system to support the booster pump operation.

Wastewater Vacuum Pump Station

The WWPS located at 4301 Larson Ave., was built in 2006 and is 1,500 square feet. This is critical infrastructure for the city. With 24/7 operations that need to be maintained in an emergency. Limited to four hours of downtime without power before the system reaches its storage capacity. The WWPS collects raw sewage from the city's residences and then pumps that to the King County wastewater treatment plant located 100 yards across the street.

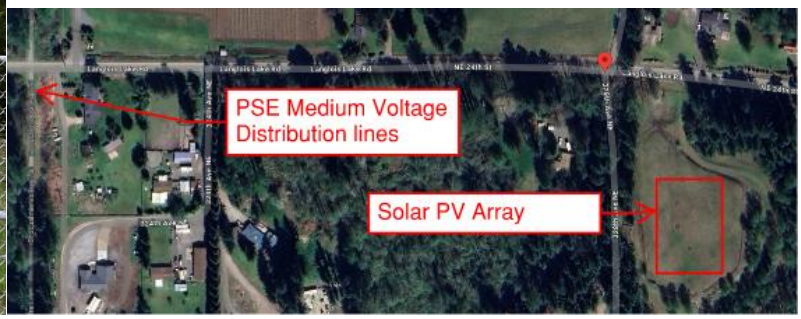
The metal roof can support the solar array. A 500kva utility transformer is located on site within 100' of the building. The emergency generator has a one-week fuel supply.

City Landfill (capped): Not currently feasible

The landfill site located at NE 24th St and 328th Ave NE is approximately 11 acres in size, fenced and secured. It is approximately 1500' east of PSE's medium voltage distribution line that feeds a substation. The ground is well above flood plain with adequate clear space for a ground mount system. And with good solar exposure to the south-west.

The Dept of Ecology requires additional monitoring before the site is recommended for brownfield development. Requirements for protecting the land fill cap and continued environmental testing, making the addition of a Solar PV array too expensive to make the project cost effective. This may change when future testing allows the development of the site.

Entrance to landfill



5.0 Scope of Work

The scope of this IGA report is to investigate the feasibility of using Solar PV and battery storage to provide resiliency for city operations and reduce electrical grid purchases.
Please see a description of each RCM and the options for each on the following pages. Each location is unique and was evaluated for the solar PV array size and production. Battery storage was sized based on two scenarios. One scenario was for battery storage that would last 2-3 days. The other scenario is storage for 5-7 day.

The warranties for the Solar PV and batteries are below.

- Ironridge Racking: 25-yearManufacturer warranty.
  - This is the structure that supports the Solar panels.
- Tier 1 Solar Panels: 25 Year Manufacturer workmanship warranty and 30-year Performance warranty
- Inverters: 12 year Standard Manufacturer Warranty.
  - This can be extended to 20 or 25 years, depending on the inverter model, for an additional fee.
- Batteries: 2-year Workmanship / Material warranty and 5-year Parts Warranty.
  - 5-year extensions available for extra cost. This additional warranty is included in the ROM cost. This can be removed or left in at the City's direction.
- Sphere Solar Energy - 2-year Service and Workmanship Warranty included.

Once the final list of RCMs is selected, a detailed scope of work, construction schedule and guaranteed maximum project cost will be developed for the ESP.

RCM-1.0 a, b, c Carnation Community Campus

Overview of Current Situation

Existing System:

The Carnation Community Campus is a two-building complex. The site has an existing two-story building that will be used as city administrative offices, with a new single-story building that will function as the city hall and warming/cooling center.

- Estimated usage for the campus is around 140,000 kWh / annually.

Proposed System:

The proposed 33.28 kW Solar PV system will have a total of 64 solar photovoltaic panels mounted on the roofs of the buildings. The array will produce an estimated 29,242 kWh annually. A self-contained Li-Ion battery storage system will be pad mounted on site.

RCM -1a

- South roof utilized on existing building for maximum sun exposure. The new building's PV array will be installed on the west side of the building's roof. If the trees directly to the south of the new building are removed the PV array will have better exposure and production.
- West roof array acts as a visual message to the community.

There are two options for the battery storage system.

- RCM -1b: A 258-kWh battery will provide approximately 2-3 days of operation without recharging from the solar array.
- RCM -1c: A 516-kWh battery will provide approximately 5-7 days of operation without recharging from the solar array.

The solar and battery system will be connected to the local electric grid through net metering. The system will be automatically controlled. Sensing an interruption to the electric grid, the building will automatically switch over to the solar/battery system.

Scope of Work

Electrical Upgrades (sub-contracted):

- Installation of Roof Mounted Solar PV
- Installation of battery system
- All grid and building connections

Benefits

- Provides resiliency for city operations
- Reduces grid purchased electricity

RCM-2.0 a, b, c Public Works Building

Overview of Current Situation

Existing System:

The Public Works building is a wood Pole building with steel cladding and roof. The roof structure is built with trusses and doubled up 2x6 roof purlins. The building is used to house equipment and material and do minor repairs on equipment. There is a small office space and bathroom for the staff.

Proposed System:

The proposed 35.3 kW Solar PV system will be mounted on the roof of the building. The array will produce an estimated 25,753 kWh annually. A self-contained Li-Ion battery storage system will be pad mounted on site.

RCM-2a The Solar PV array and batteries will also provide backup for the Domestic Water Booster pumps located in a stand-alone building approximately 250' from the main Public Works building.

There are two options for the battery storage system.

- RCM-2b: A 215-kWh battery will provide approximately 2-3 days of operation without recharging from the solar array.
- RCM-2c: A 430-kWh battery will provide approximately 5-7 days of operation without recharging from the solar array.

The solar and battery system will be connected to the local electric grid through net metering. And will be automatically controlled. Sensing an interruption to the electric grid, the building will automatically switch over to the solar/battery system.

Scope of Work

Electrical Upgrades (sub-contracted):

- Installation of Roof Mounted Solar PV
- Installation of battery system
- All grid and building connections

Benefits

- Provides resiliency for city operations
- Reduces grid purchased electricity

RCM-3.0 Wastewater Vacuum Pump Station

Overview of Current Situation

Existing System:

The Wastewater Vacuum pump station is a concrete block building that houses 5 vacuum pumps and 2 transfer pumps. The system collects wastewater from the community and then transfers it to the King County wastewater treatment plant across the street.

Proposed System:

The proposed 14.5 kW Solar PV system will be mounted on the roof of the building. The array will produce an estimated 14,427 kWh annually.

Please note, there is no battery at this location. The load for the vacuum pumps are too large to make battery storage feasible. The existing diesel generator will continue to provide backup power in case of a power outage.

The solar array will be connected to the local electric grid and will be net metered.

Scope of Work

Electrical Upgrades (sub-contracted):

- Installation of Roof Mounted Solar PV
- All grid and building connections

Benefits

- Provides resiliency for city operations
- Reduces grid purchased electricity

RCMs Investigated and Not Recommended

City Landfill (capped)

The Landfill was investigated for feasibility to install a 290-kW ground mount Solar PV array that could produce an estimated 328,560 kWh / year and connect to the electric grid. This was deemed not feasible due to permitting restrictions imposed by the WA Dept. of Ecology and the required ground water monitoring. This RCM is not recommended due to complications of building on a capped landfill that is still actively monitored.
The estimated ROM range for the Landfill Solar PV array is $2.5 – $5 million.

6.0 Facility Resource Baselines

6.1 Utility Suppliers

The individual utility suppliers for the City of Carnation are listed below.

Electric Utility Supplier

PSE provides electricity for all of the sites. The average rate over the 12 months of calendar year 2024 was $0.11/kWh. The average rate used for the savings calculation is the average for Schedule 24 & 25. These are the Tariff Schedules in use at the Public Works Building and the WWPS.

Copies of the Tariff Schedules can be found in the appendix.

Carnation Community Campus – The current Tariff Schedule 7 – Residential Service used at this location is for the Lord House. This will be changed to Schedule 24 when the new building is put into service.

Public Works Building – This facility uses Tariff Schedule 24 – General Service.

WWPS – This facility uses Tariff Schedule 25 – Small Demand General Service.

There are no other utilities for the City's facilities.

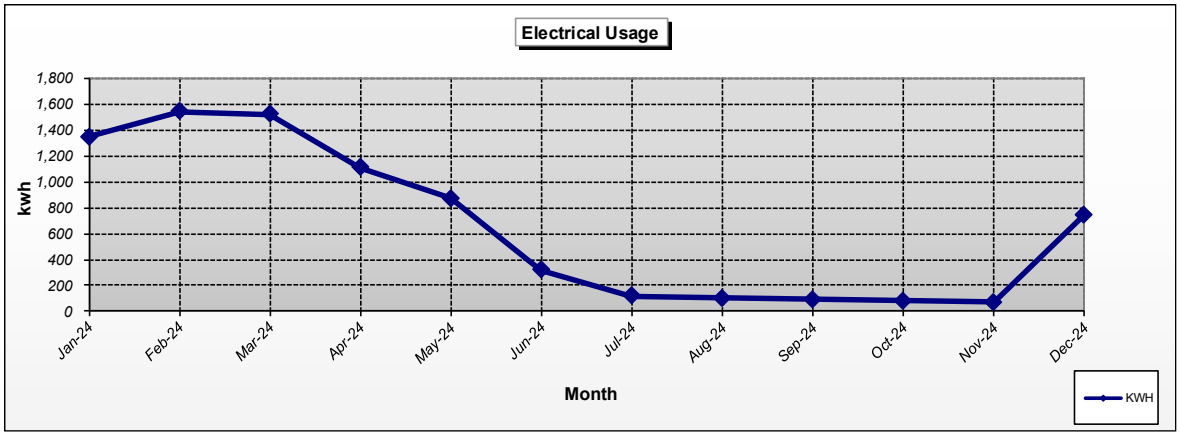
6.2 Building Utility Data

Carnation Community Campus:

The data tables below only account for the current usage of the existing building (Lord House) on the site of the future Carnation Community Campus. The new Community Center building has not been built, and the energy consumption is not known at this time. It is estimated to be 140,000 kWh per year for the campus. Actual consumption when the administrative building is fully occupied will be higher.

City of Carnation
Carnation Community Campus
Annual Usage

		Facility SQ/FT:		2,000
	Electrical			
MON - YR	KWH	KWH $	ELECTRIC $	TOTAL $
Jan-24	1,350	$189	$189	**$189**
Feb-24	1,544	$229	$229	**$229**
Mar-24	1,524	$226	$226	**$226**
Apr-24	1,111	$163	$163	**$163**
May-24	873	$129	$129	**$129**
Jun-24	320	$51	$51	**$51**
Jul-24	117	$24	$24	**$24**
Aug-24	102	$22	$22	**$22**
Sep-24	90	$20	$20	**$20**
Oct-24	82	$19	$19	**$19**
Nov-24	72	$18	$18	**$18**
Dec-24	746	$113	$113	**$113**
Totals	7,931	$1,204	$1,204	$1,204

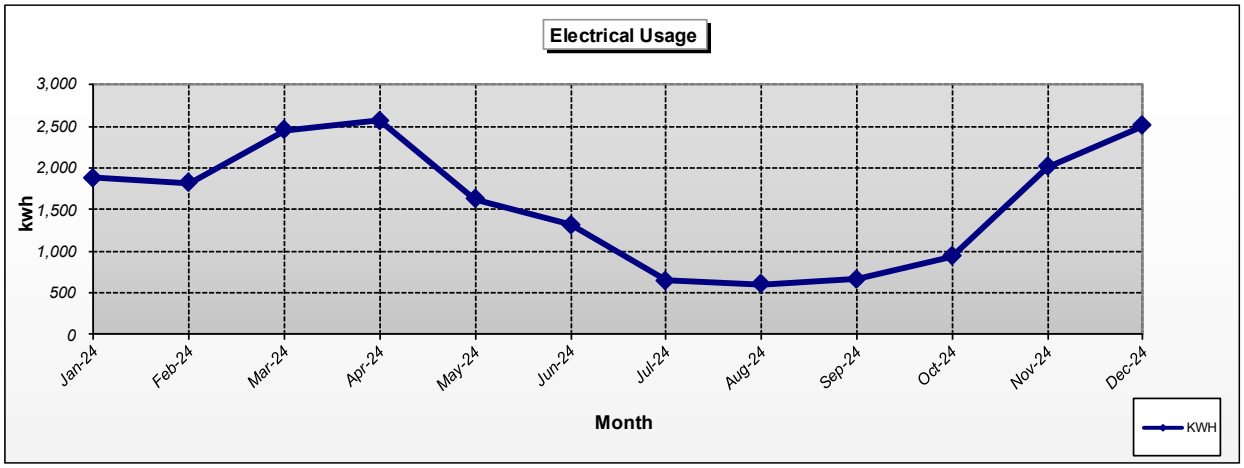


Public Works Building

This data accounts for the building operations only.

City of Carnation
Public Works Building
Annual Usage

		Facility SQ/FT:	5,560
	Electrical		
MON - YR	KWH	KWH $	TOTAL $
Jan-24	1,880	$258	$258
Feb-24	1,818	$345	$345
Mar-24	2,456	$358	$358
Apr-24	2,569	$230	$230
May-24	1,628	$194	$194
Jun-24	1,314	$101	$101
Jul-24	645	$94	$94
Aug-24	599	$104	$104
Sep-24	666	$142	$142
Oct-24	934	$302	$302
Nov-24	2,014	$374	$374
Dec-24	2,509	$337	$337
Subtotals	19,032	$2,839	$2,839

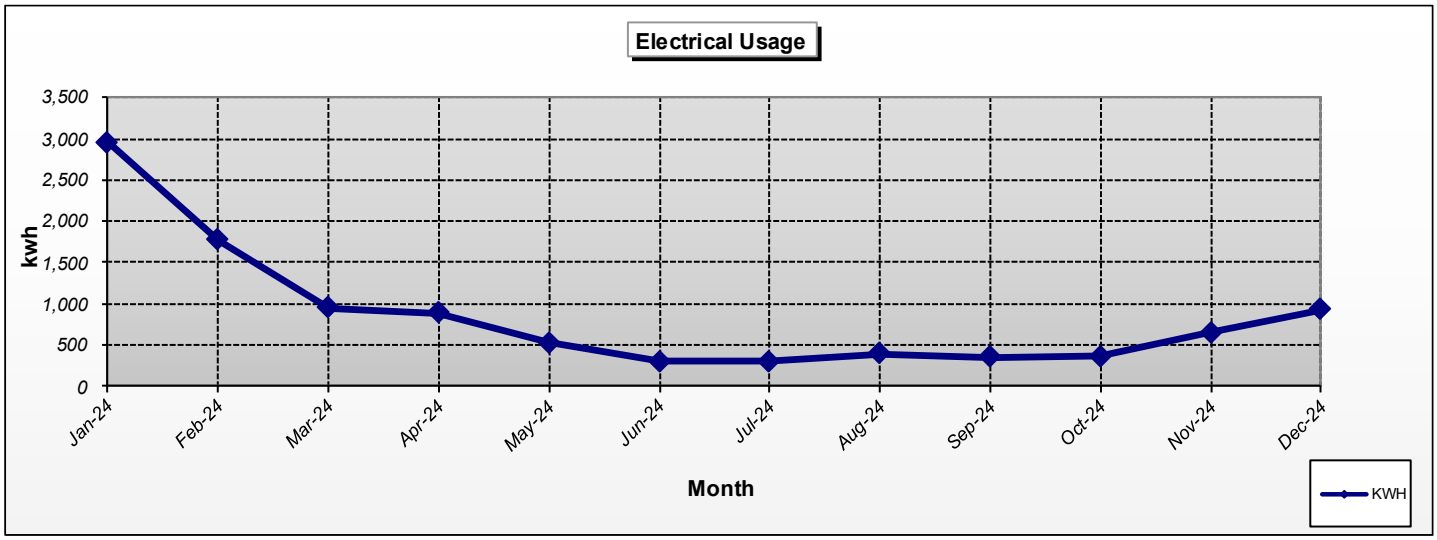


City Water Booster Pump

This data accounts for the Domestic Water booster pump operations only.

City of Carnation
City Water Booster Pump
Annual Usage

			Facility SQ/FT:	0
	Electrical			
MON - YR	KWH	KWH $	ELECTRIC $	TOTAL $
Jan-24	2,959	$410	$410	$410
Feb-24	1,773	$269	$269	$269
Mar-24	951	$157	$157	$157
Apr-24	883	$147	$147	$147
May-24	523	$98	$98	$98
Jun-24	303	$70	$70	$70
Jul-24	303	$70	$70	$70
Aug-24	395	$83	$83	$83
Sep-24	354	$77	$77	$77
Oct-24	363	$79	$79	$79
Nov-24	654	$122	$122	$122
Dec-24	933	$163	$163	$163
Subtotals	10,394	$1,745	$1,745	$1,745

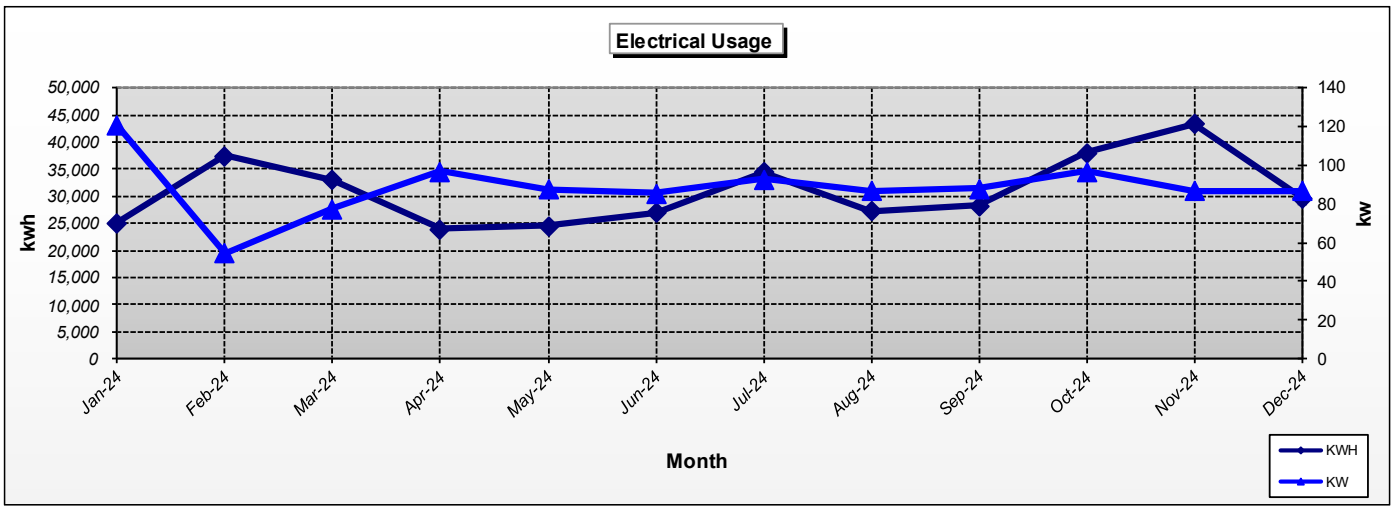


Wastewater Vacuum Pump Station

This data accounts for the operations of the vacuum pump station.

City of Carnation
WWPS
Annual Usage

					Facility SQ/FT:	1,500
	Electrical					
MON - YR	KWH	KWH $	KW	ELECTRIC $		TOTAL $
Jan-24	25,160	$3,792	121	$3,792		$3,792
Feb-24	37,480	$5,769	55	$5,769		$5,769
Mar-24	33,080	$4,396	78	$4,396		$4,396
Apr-24	24,000	$3,654	97	$3,654		$3,654
May-24	24,600	$3,591	88	$3,591		$3,591
Jun-24	26,960	$3,845	86	$3,845		$3,845
Jul-24	34,400	$4,813	93	$4,813		$4,813
Aug-24	27,200	$3,806	87	$3,806		$3,806
Sep-24	28,240	$4,315	88	$4,315		$4,315
Oct-24	38,040	$5,366	97	$5,366		$5,366
Nov-24	43,320	$6,352	87	$6,352		$6,352
Dec-24	29,680	$4,512	87	$4,512		$4,512
Subtotals	372,160	$54,211	1,062	$54,211		$54,211



7.0 Appendix

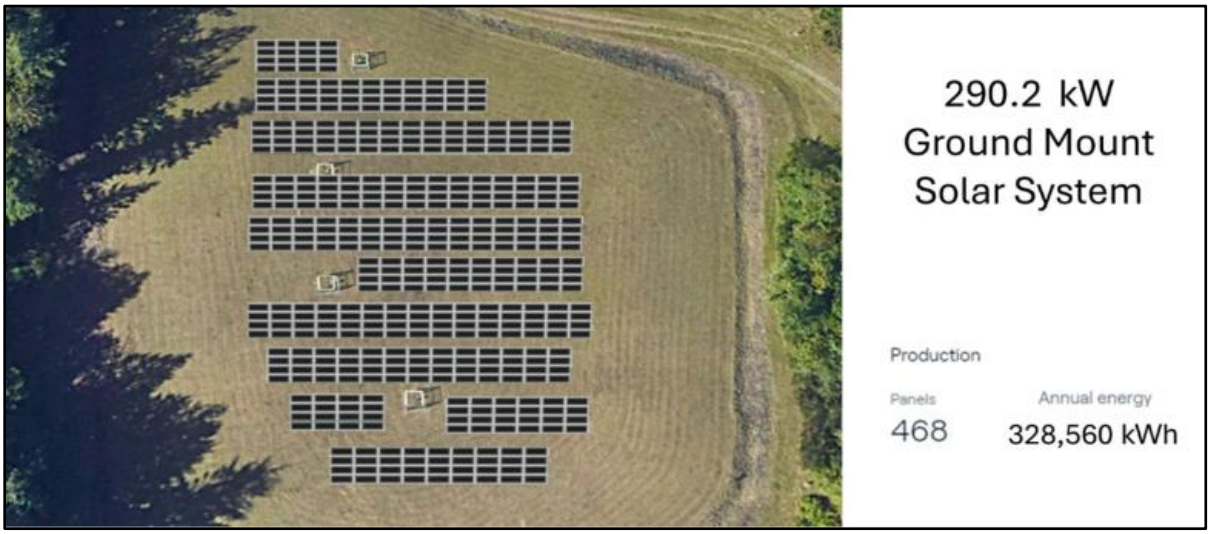
Appendix 1: Preliminary Sketches and Findings

Carnation Community Campus

Public Works Building and domestic water booster pump

Wastewater Vacuum Pump Station

Landfill (not recommended)



Warranty

- 5-Year Extensions for CMG2- 215 kWh battery is $6,200
- 5-Year Extensions for CMMG2- 258 kWh battery is $6,550
- 5-Year Extensions for CMMG2- 430 kWh battery is $9,980
- 5-Year Extensions for CMMG2-516 kWh battery is $10,740

Main Container Includes the Storage Inverter with a Maximum Power Rating of 50-125kW in 5kW Increments
Expansion Container is for Increased Energy Capacity
*System is limited to a 95% DOD
**Dealer Cost Includes:
-Standard Warranty: 2 year Workmanship/Material and Five Years Parts Only
-5 Year ELM Silver Monitoring plan
-Integrated FieldSight Microgrid Site Controller
-Main and Expansion Containers Listed in the Table Above
-1000 Hour Salt Spray
-Powder Coated Galvannealed Steel Enclosure
-Integrated Fire Safety Design
-UL 9540, UL 1973, UL 9540A, and UL 1741 SB Certified

Fieldsight Monitoring Plans

Description	No Plan	Silver Level $150/Month: Billed Annually	Gold Level $250/Month: Billed Annually
Online monitoring and cloud storage of system data		included	included
E-Mail and/or Text notifications of system alerts		included	included
Response time for issue resolution	Less than 12 hours	Less than 12 hours	Less than 6 hours
Remote troubleshooting of system	$125/hr	$125/hr *	included
Vendor collaboration of faulty component	$125/hr	$125/hr	included
Support of system tests	$125/hr	$125/hr	included
Optimization of system parameters for increased perfor	$125/hr	included	included

Silver Level Plan included in all active warranty packages
Upgrade to Gold under warranty for $100/Month (adds monitoring and support of non ELM Components)
* For non ELM components

Selected battery manufacturer or equal

Preliminary Technical Specifications	CMG 125 - 258kWh	CMG 125 - 215kWh	CMG 125 - 430kWh	CMG 125 - 516kWh
System Sizing				
System Sizing	1 CMG 125 Main Enclosure	1 CMG 125 Main Enclosure	1 CMG 125 Main Enclosure + 1 Expansion Enclosure	1 CMG 125 Main Enclosure + 1 Expansion Enclosure
AC Output Power (Discharge)	125kW	107.5kW	125kW	125kW
AC Input Power (Charge)	125kW	107.5kW	125kW	125kW
Battery Capacity	258kWh	215kWh	430kWh	516kWh
Three Phase Operation				
AC Voltage	480 VAC	480 VAC	480 VAC	480 VAC
AC Input/Output Current	150A	129A	150A	150A
AC Frequency (Field Settable)	60Hz/50Hz	60Hz/50Hz	60Hz/50Hz	60Hz/50Hz
MAX AC Overcurrent Protection	250A	250A	250A	250A
Peak Efficiency	97%	97%	97%	97%
AC Connection	3 Phase, 3 Wire	3 Phase, 3 Wire	3 Phase, 3 Wire	3 Phase, 3 Wire
Main Enclosure Specifications				
kWh Per Enclosure	258kWh	215kWh	215kWh	258kWh
Battery Chemistry	LiFePO4	LiFePO4	LiFePO4	LiFePO4
System External Dimensions	60.5" x 60.2" x 99.4" (L x D x H)	60.5" x 60.2" x 99.4" (L x D x H)	109" x 60.2" x 99.4" (L x D x H)	109" x 60.2" x 99.4" (L x D x H)
System Weight	8,200 lbs	7,500 lbs.	13,750 lbs.	15,150 lbs
Lifting Provisions	Fork Lift Slots and Hoist Lifting Rings	Fork Lift Slots and Hoist Lifting Rings	Fork Lift Slots and Hoist Lifting Rings	Fork Lift Slots and Hoist Lifting Rings
Paint Tested	1000 Hour Salt Spray	1000 Hour Salt Spray	1000 Hour Salt Spray	1000 Hour Salt Spray
Operating Temperature Range	-20°C to 50°C	-20°C to 50°C	-20°C to 50°C	-20°C to 50°C

ALL ELM MICROGRID SYSTEM FEATURES

Key System Components	
NEMA 3R Enclosure	✓
Climate Controls	✓
Bi Directional Storage Inverter	✓
DC Disconnect (Battery)	✓
AC Disconnect (Inverter)	✓

Operation Parameters	
Islanded Mode	Off Grid Applications
Grid Tied Mode	Peak Shaving Backup Power Demand Response
Distributed Generation	Time of Use Operation
Certifications	
Batteries	UL 1973, UL 9540A
Inverter	UL 1741 SB
System	UL 9540

Control Software	
ELM Autonomous MicroGrid Site Control System	✓
Access & Alerts on Desktop & Mobile 24/7	✓
Asset Monitoring System Level & Individual	✓
Individual MicroGrid Component Pages	✓
Local HMI IP 65 Touchscreen	✓
Communications: Wifi, Ethernet, Cellular	✓

ELM FieldSight Controller

- Included with all ELM MG Systems
- Built in AI Onsite
  - Intelligent Peak Shaving and TOU Shifting
  - Autonomous Grid Interaction
  - Automated Demand Response
  - Health Monitoring for all Components
  - BMS Connectivity
  - PV Inverter Control and Curtailment
  - Generator Control
- Industry Standard Communications
  - DNP3
  - Custom Multi API Push
  - SCADA
  - Modbus
  - TCP/IP
  - CANbus
  - Cellular, Ethernet and WiFi
- 24/7 Monitoring and Alerts
  - Cloud Hosted Web Portal
  - iOS and Android Native App
  - Text & Email Alerts
  - 24/7 Helpdesk
  - 7 Year Data Retention