City of Santa Rosa

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City-Wide Energy Efficiency, Renewables, and Microgrid Feasibility Study

October 13, 2021

City of Santa Rosa

1 Energy Efficiency

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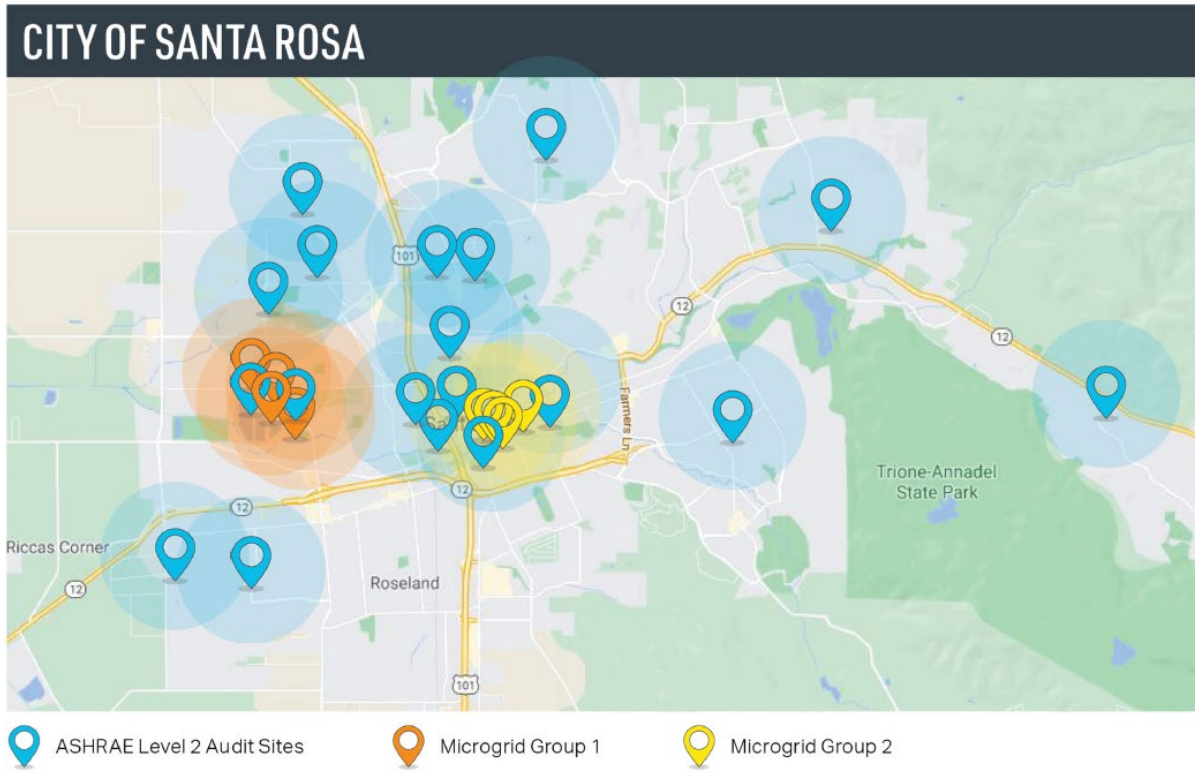
Energy Efficiency

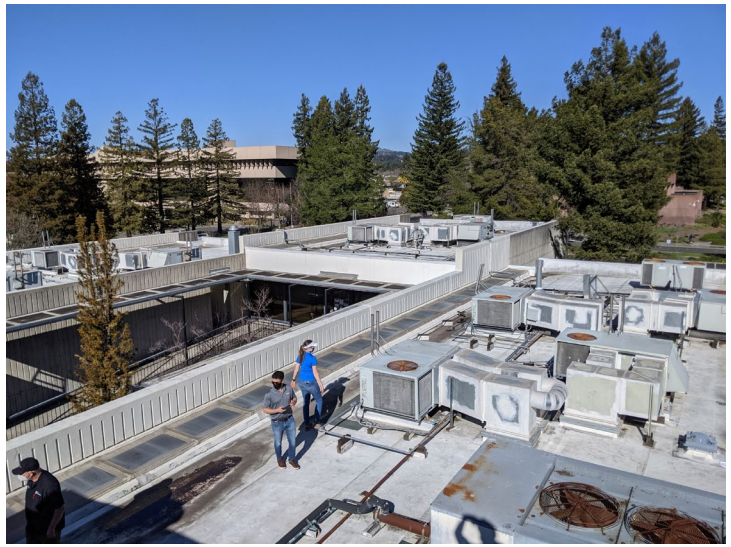
- Scope Overview
  - Perform Site Investigations for 47 Facilities
  - Provide the City:
    - Energy Efficiency Measures
      - Reducing Energy Consumption
      - Addressing Deferred Maintenance
      - Supporting City Electrification Goals



Energy Efficiency

– Results

- Lighting/lighting controls upgrade across 40 City facilities will result in approximately $155,000 savings per year with a simple payback of 5.5 years
- Equipment at the End of Service Life
- Majority of Equipment
  - 15+ Years Old (63% of Total Equipment)
  - Operates with R-22 Refrigerant (66% of Equipment)



Packaged HVAC Units Age Summary				
Age Range (Years)			Count	%
0	to	5	6	5%
6	to	10	23	18%
11	to	15	19	15%
16	to	20	11	8%
21	to	25	12	9%
24	to	30	58	44%
31	+		2	2%
Total			131	100%

Operating Refrigerant		
Type	Count	%
410A	44	34%
R-22	84	66%
Total	128	100%

*Missing 3 Units are HV Units without Cooling Capabilities

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2 Renewables

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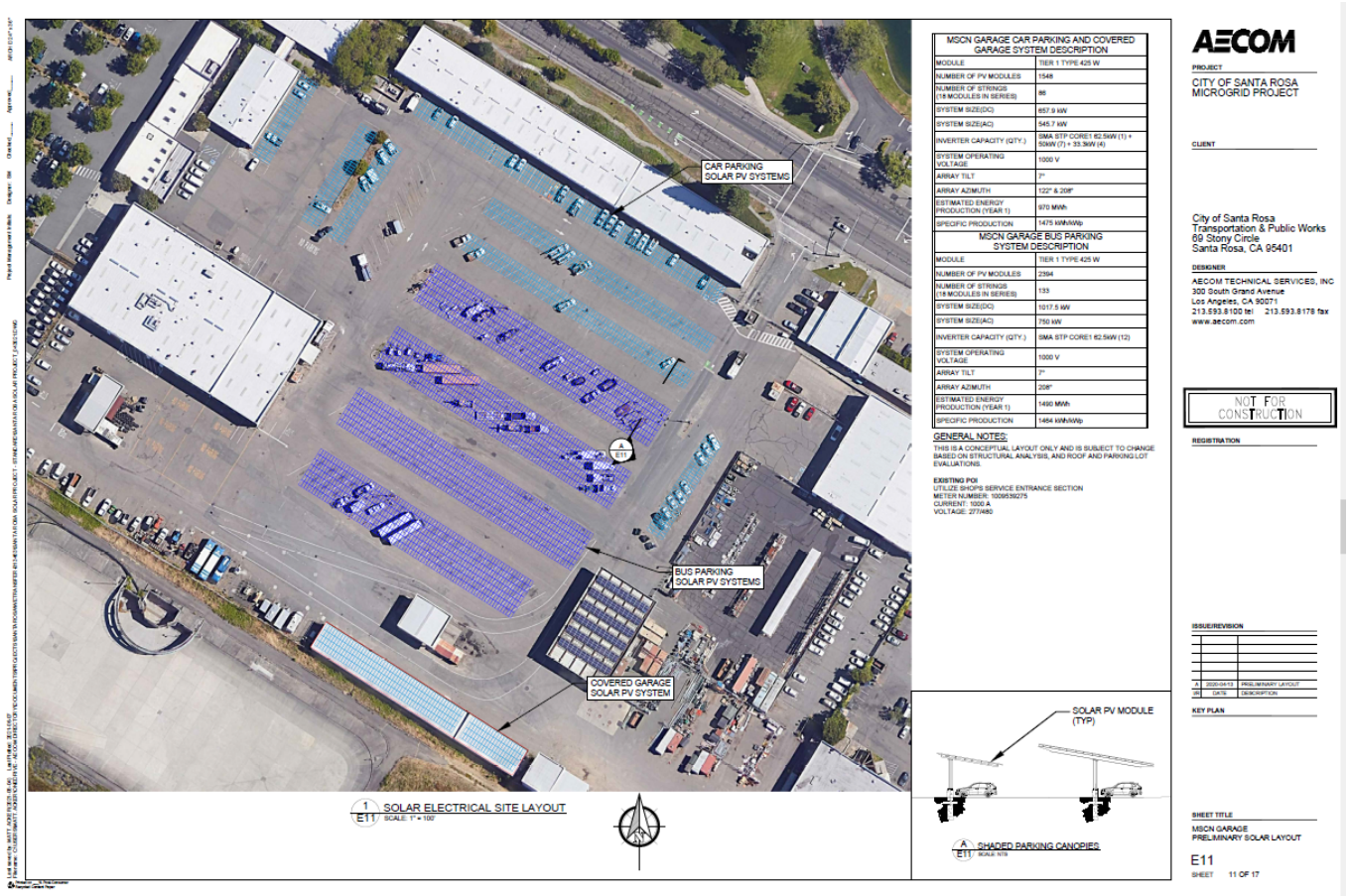
Renewables

- Scope Overview
  - Total of 107 Sites
  - Evaluated for Solar Application Based on:
    - Space Availability
    - Shading
    - Electrical Infrastructure
    - Ease of Construction

Renewables

– Results

- Maximum Solar Potential of 7.2 MWdc at 17 Sites



Renewables

– Results (Tier 1)
  - Maximum Solar Potential of 3.2 MWdc at 11 Sites
  - Tier 1 Recommendations
    - Adequate Space
    - No Shading or Obstructions
    - Optimal Orientation
    - Electrical Load to Offset
    - Point of Connection Identified

Tier 1 Solar PV Summary of Energy Production and Implementation Costs

ECM Description	System Size (kWac)	System Size (kWdc)	Electrical Production (kWh)	ECM Implementation Cost ($)
Finley Senior Center 76.5 kWdc Canopy	63	77	113,877	$149,611
Fire Station 3 38.3 kWdc Roof Mount	33	38	55,992	$86,251
Fire Station 4 38.3 kWdc Roof Mount	33	38	55,513	$86,251
MSCN Garage Car Parking 657.9 kWdc Canopy	546	658	970,178	$1,148,547
MSCN Garage Bus Parking 1017.5 kWdc Canopy	750	1,018	1,489,358	$1,735,444
MSCS 183.6 kWdc Roof Mount	150	184	268,597	$334,542
Sam Jones Hall 206.6 kWdc Rooftop & Canopy	200	207	303,554	$377,807
Sonoma Brookwood Ctr 38.3 kWdc Roof Mount	33	38	55,936	$86,251
Finley Park Community Center 504.9 kWdc Canopy	400	505	745,329	$888,914
Bayer Park and Gardens 38.3 kWdc Canopy	33	38	56,792	$86,251
Bayer Park and Gardens 15.3 kWdc Roof Mount	12	15	22,670	$47,374
Gavlin Community Park 229.5 kWdc Canopy	192	230	342,317	$411,724
Northwest Community Park 153 kWdc Canopy	133	153	597,492	$285,005
TOTAL	**2,578**	**3,198**	**5,077,605**	**$5,723,972**

Renewables

– Results (Tier 2)

- Maximum Solar Potential of 4.0 MWdc at 6 Sites
- Tier 2 Recommendations
  - Adequate Space
  - No Shading or Obstructions
  - Optimal Orientation
  - ~~Electrical Load to Offset~~
  - ~~Point of Connection Identified~~

Tier 2 Solar PV Summary of Energy Production and Implementation Costs

ECM Description	System Size (kWac)	System Size (kWdc)	Electrical Production (kWh)	ECM Implementation Cost ($)
A Place to Play 2237 kWdc Ground Mount	1,750	2,237	3,486,103	$3,775,908
A Place to Play 497.3 kWdc Canopy	375	497	732,489	$859,247
Coffee Park 535.5 kWdc Canopy	438	536	797,139	$829,393
Finali Park 76.5 kWdc Canopy	63	77	112,597	$149,611
Southwest Community Park 198.9 kWdc Canopy	158	199	294,702	$357,789
Hidden Valley Park 153 kWdc Canopy	125	153	227,754	$279,222
Rincon Valley Community Park 306 kWdc Canopy	250	306	455,508	$538,443
Total	**3,158**	**4,004**	**6,106,292**	**$6,789,613**

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3 Microgrid

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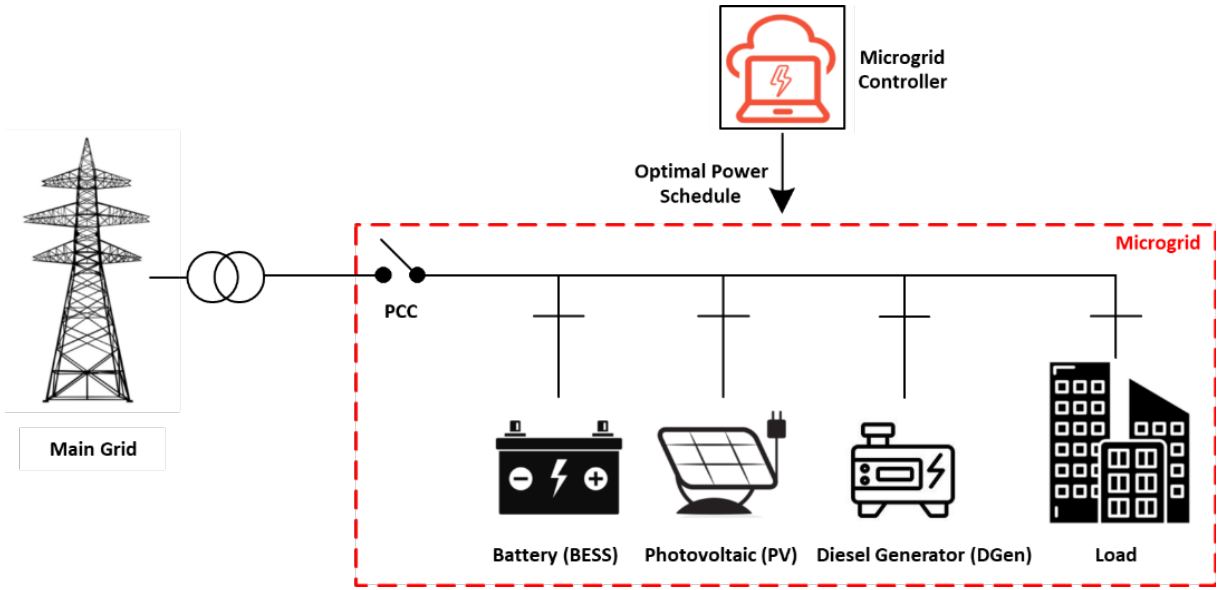
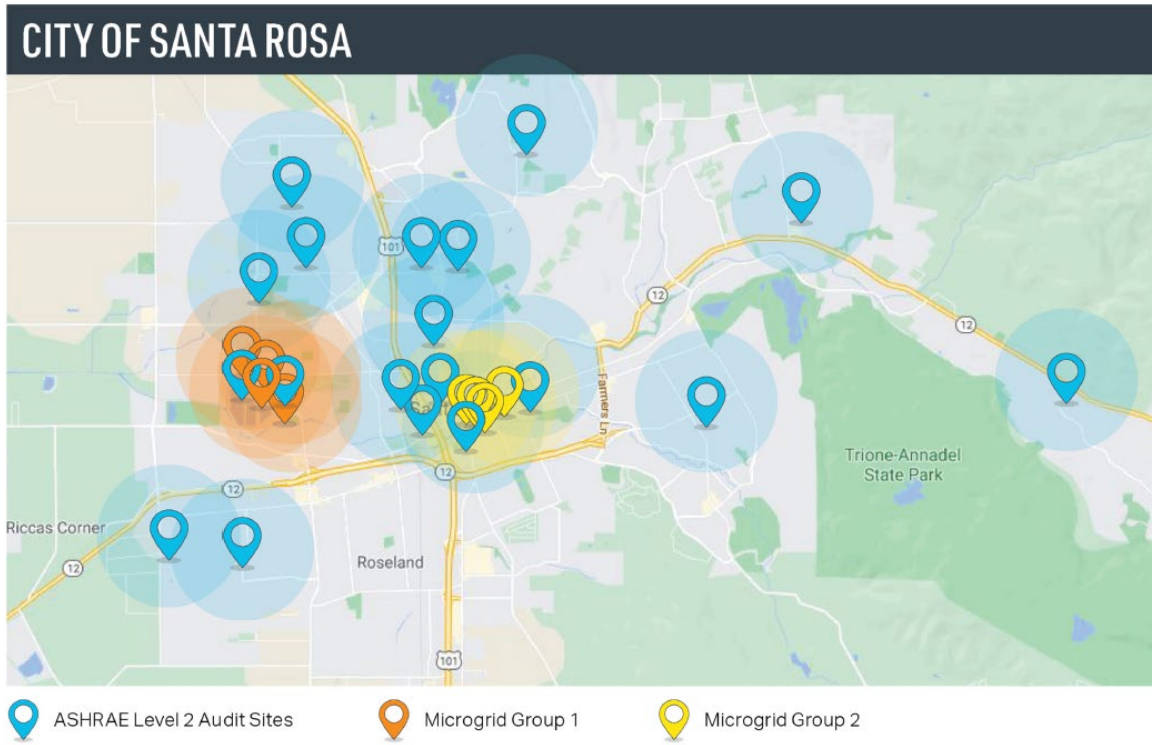
Microgrid

– Scope Overview
  • Investigate Microgrid Viability for Two Groups of Facilities





Microgrid

– Scope Overview
  - Investigate Microgrid Viability for Two Groups of Facilities
  - Group 1
    - 18 Buildings
    - 4 Unique Address

Microgrid Group 1			
A Maintenance Service Center North 55 Stony Point Road	B Fire Training Center 2126 West College Avenue	C Finley Community Center 2060 West College Avenue	D Maintenance Service Center South 69 Stony Circle
MSCN Admin/Lab building	Fire Training Tower	Finley Senior Wing	MSCS
MSCN Shop building	Fire Training storage building 1	Finley Community Center	
MSCN Warehouse	Fire Training office 1		
MSCN Garage	Fire Training classroom 2		
MSCN Vehicle Storage Building	Fire Training classroom 3		
MSCN Steam Cleaning Station	Fire Training storage building 2		
MSCN Wash Station #1			
Transit Operations Building			
Transit Wash Station Building			
9	6	2	1

Microgrid

– Scope Overview
  - Investigate Microgrid Viability for Two Groups of Facilities
  - Group 2
    - 7 Buildings
    - 4 Unique Address

Microgrid Group 2			
A City Hall 100 Santa Rosa Avenue	B Public Safety Building 965 Sonoma Avenue	C City Hall Annex 90 Santa Rosa Avenue	D Chamber Building 555 1st Street Santa Rosa
City Hall 2-5	PSB	City Hall Annex	Chamber Building-637 1st St
City Hall 6-8	PSB storage building		
City Hall 1, 9-11			
3	2	1	1

Microgrid

– Results

- Seven (7) Individual Microgrids

Microgrid Implementation Cost Summary					
Facility	Battery Energy Storage System	Solar PV (kWac)	Stand By Generator (kW)	Implementation Cost ($)	O&M Costs ($)
MSCN	840 kWh / 200 kW	400	365	$1,991,000	$35,000
MSCS	106 kWh / 46 kW	150	100	$905,000	$10,000
City Hall	210 kWh / 50 kW	0	450	$923,500	$25,000
City Hall Annex	210 kWh / 50 kW	0	450	$923,500	$25,000
PSB	840 kWh / 200 kW	0	365	$1,635,000	$25,000
Finley Park Senior Center	210 kWh / 50 kW	310	100	$1,467,000	$25,000
Finley Park Community Center	132 kWh / 58 kW	63	100	$933,000	$17,500
TOTAL		**613**	**1,930**	**$8,778,000**	**$162,500**

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