Laguna Woods Village®

OPEN MEETING

REPORT FOR REGULAR MEETING OF THE VILLAGE ENERGY TASK FORCE

Wednesday, July 3, 2019 – 1:30 P.M.
Laguna Woods Village Community Board Room
24351 El Toro Road

MEMBERS PRESENT:	Carl Randazzo, – Vice Chair, Dick Palmer (left at 3:15pm), Sue Margolis, Steve Parsons (in for Cush Bhada) Advisors: Bill Walsh, Sue Stephens
MEMBER ABSENT:	Cush Bhada, Steve Leonard, John Frankel
OTHERS PRESENT:	Juanita Skillman, Maggie Blackwell, Diane Phelps Pat English, Dick Rader, Bert Moldow, Elsie Addington, Manual Armendariz
STAFF PRESENT:	Ernesto Munoz - Staff Officer, Laurie Chavarria

1. Call to Order

Vice Chair Randazzo called the meeting to order at 1:31 PM.

2. Acknowledgment of Media

Vice Chair Randazzo noted no members of the media were present.

3. Approval of the Agenda

Advisor Walsh added SCE Demand Charges to the agenda as Item 12. The agenda was approved as amended.

4. Approval of Meeting Report for May 1, 2019

The Meeting Report of May 1, 2019, was approved as written.

5. Chairman's Remarks

Vice Chair Randazzo commented on the legality of the Village Energy Task Force Chairman and he read a quote for the day from Thomas Edison: "The three great essentials to achieve anything worthwhile are: Hard work, Stick-to-itiveness, and Common sense."

Member Comments *(Items Not on the Agenda)*

- Jean Janowsky (193-A) commented on her walkway lighting request.
- Pat English (2022-D) commented on the GRF bylaws regarding Committee's and Task Forces.
- Bert Moldow (3503-A) commented on the definition of a Task Force.
- Maggie Blackwell (71-d) commented on the use of a Task Force.

The Vice Chair and various Directors and Advisors responded briefly to all comments.

6. Department Head Update

Staff Officer Ernesto Munoz provided a brief summary of the energy consultants' role and what tasks have been assigned to them. The energy consultant representatives, TEC, presented a Microgrid Feasibility analysis to the Task Force, as attached to this report, and discussed what has been done and the next steps regarding the infrastructure assessment for the Mutual's.

Staff Officer Ernesto Munoz and the consultant addressed questions from the Task Force and the audience.

Discussion ensued regarding generator usage; disaster preparedness; SCE incentives; net metering programs; carbon tax credits; ROI on a Microgrid installation; energy conservation methods; demand charges from SCE; transformer upgrades.

Vice Chair Randazzo called for a recess at 3:30pm. The meeting reconvened at 3:41pm.

Consent:

All matters listed under the Consent Calendar are considered routine and will be enacted by the Task Force by one motion. In the event that an item is removed from the Consent Calendar by members of the Task Force, such item(s) shall be the subject of further discussion and action by the Task Force.

By consensus, the Task Force approved all items on the Consent Calendar.

7. Project Log
8. Street Light Outage Report

Reports:

9. EV Charging Station Update (oral discussion)

Staff Officer Ernesto Munoz provided an update and showed pictures of the work in progress at the Community Center. The work is scheduled to be completed in September.

10. Street Light Pilot Program Update (oral discussion)

Staff Officer Ernesto Munoz provided an update on the pilot program. A special open meeting to discuss the options for the second pilot has been scheduled for July 18, 2019 at 9:00am.

Discussion ensued regarding a bulb installation by a lighting contractor; coupling nuts for fixture arms, structural engineering, and stress test for poles.

11. LED Solar Street Lights (oral discussion)

Director Margolis commented on the use of solar street lights as an option to increase street lighting in the darker areas. She suggested that staff should compile a map of the dark spots throughout the Mutual's walkways.

Discussion ensued regarding walkway lighting, budgeting for solar lighting and analysis by the lighting consultant.

12. SCE Demand Charges to Third Mutual

Discussion ensued regarding SCE bills; energy efficiency; batteries, solar, EMS systems; review of meters.

Advisor Walsh was designated to head the SCE Demand Charge Ad-hoc Task Force. He will gather Clubhouse energy bills and contact MIS Director Chuck Holland to review the energy management systems.

Items for Future Agendas:

Third Mutual:

- Electric Vehicle History Report
- Golf Cart Report
- LED Solar Street Lights (to be considered after the street fixture LED conversion project is completed.)

United Mutual:

- LED Solar Street Lights (priority)
- Electric Vehicle History Report
- Golf Cart Report
- Additional Walkway Lighting (Review of Dark Areas)

GRF:

- Install Level II EV Bollard Chargers (on the streets)
- Community Choice Aggregation
- SCE Demand Charges

Concluding Business:

Committee Member Comments:

- Vice Chair Randazzo commented that Committee member requests should go through the Committee chair and not directly to staff.

Date of next meeting – September 4, 2019

Adjournment

This meeting was adjourned at 4:29 PM.

Carl Randazzo, Vice Chair

Golden Rain Foundation Microgrid Feasibility Analysis

July 3, 2019

Meeting Agenda

- Microgrid Scoping Task
- Microgrid Goal and Objectives
- Microgrid Load
- Microgrid Options Analyzed
- Proposed Microgrid Description
- Proposed Microgrid Benefits
- Q&A

1. Microgrid Scoping Task

Approach

- Identify Goal & Objectives
- Perform Scoping Review
  - Identify expectations of the system
  - Identify critical loads to be served by the microgrid
  - Determine grid interface based on objectives (grid-connected or islandable)
  - Review site data
  - Review and consider existing or potential renewable energy assets
  - Develop possible operating scenarios based on objectives identified
  - Conduct preliminary siting of Distributed Energy Resources (DERs) and energy storage

2. Microgrid Goal and Objectives

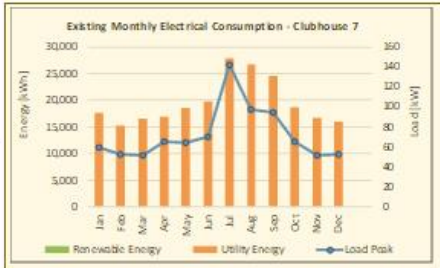
Goal

Provide a set of conceptual design scenarios for a resilient microgrid including the Community Center, Clubhouse 7, and the parking lot located in between these two buildings.

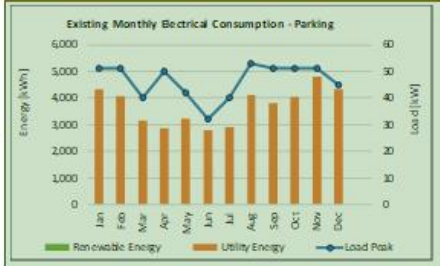
Microgrid Objectives

- Resiliency & Reliability
- Cost-effectiveness
- Increased Renewable Energy Penetration
- Reduced Greenhouse Gases (GHG) and Air Emissions

3. Microgrid Load



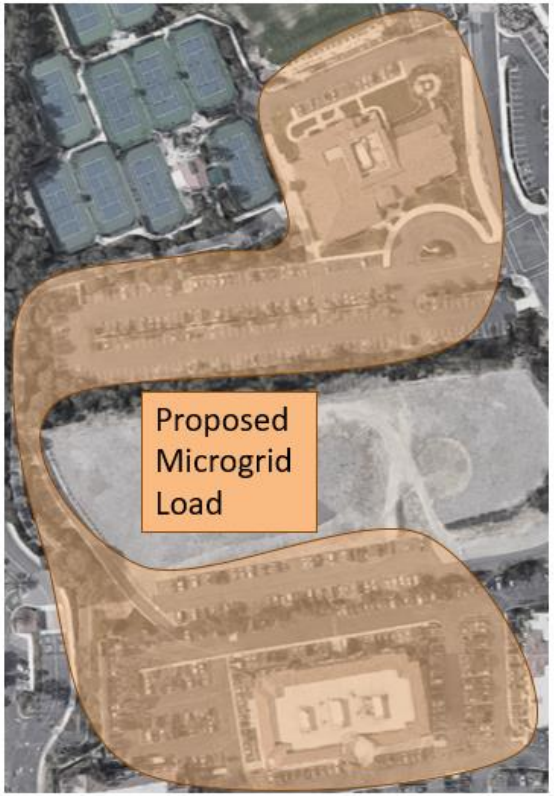
CURRENT ELECTRICITY BILLING DATA & SELF GENERATION	
Service Account #:	3-004-4489-08 (SCE)
Electrical Rate :	TOU-GS2-D
Meter Number:	259000-048414
Energy Purchased:	234,846 kWh
Peak Power Purchased:	142 kW
Assumed Blended Utility Rate:	$0.18/kWh
Existing Solar PV Cap.:	0 kWdc
Ex. Ren. Energy Gen.:	0 kWh/yr (0%)

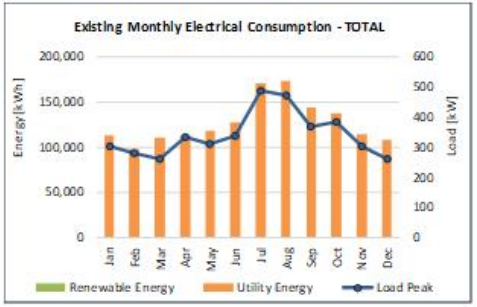


CURRENT ELECTRICITY BILLING DATA & SELF GENERATION	
Service Account #:	3-004-4489-08 (SCE)
Electrical Rate :	TOU-GS3-E
Meter Number:	259000-050297
Energy Purchased:	44,418 kWh
Peak Power Purchased:	53 kW
Assumed Blended Utility Rate:	$0.34/kWh
Existing Solar PV Cap.:	0 kWdc
Ex. Ren. Energy Gen.:	0 kWh/yr (0%)

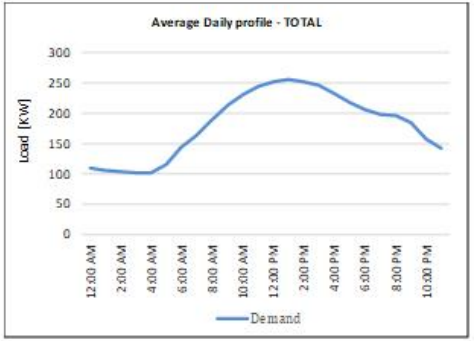
CURRENT ELECTRICITY BILLING DATA & SELF GENERATION	
Service Account #:	3-004-4489-08 (SCE)
Electrical Rate :	TOU-GS3-D
Meter Number:	V349N-004693
Energy Purchased:	1,250,995 kWh
Peak Power Purchased:	417 kW
Assumed Blended Utility Rate:	$0.15/kWh
Existing Solar PV Cap.:	0 kWdc
Ex. Ren. Energy Gen.:	0 kWh/yr (0%)

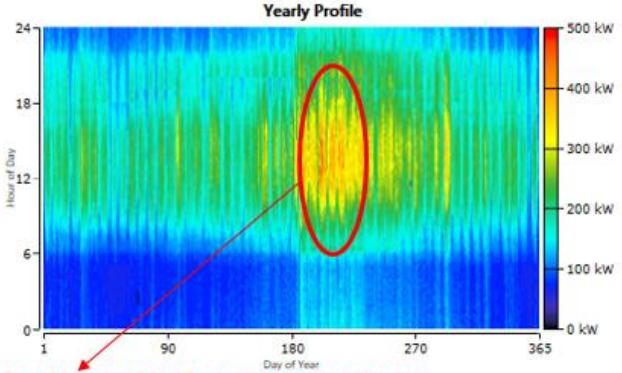
3. Microgrid Load





CURRENT ELECTRICITY BILLING DATA & SELF GENERATION	
Service Account #:	3-004-4489-08 (SCE)
Electrical Rate :	TOU-GS-3: Opt. D
Meter Number:	V349N-004693, 259000-048414, & 259000-050297
Energy Purchased:	1,530,259 kWh
Peak Power Purchased:	488 kW
Blended Utility Rate:	$0.16/kWh
Existing Solar PV Cap.:	0 kWdc
Ex. Ren. Energy Gen.:	0 kWh/yr (0%)





Highest coincident load occurs in the summer season

4. Microgrid Options Analyzed

1) The following DER would be required to maintain the capability to island indefinitely, with the removal of the existing generator (Community Center):

- 2.5 MW_{dc} of solar PV
- 850 kW/7.7 MWh BESS

Not enough space is available to install these DER. Furthermore, they could not be interconnected to SCE.

2) Most cost-effective solution would be to install the following DER:

- 194 kWdc solar PV
- Existing generator (Community Center)

Even though the payback could be as low as 5.5 years, LW would not have the capability to island from the main grid without using the existing generators.

3) A solution that would allow LW to meet all the objectives listed would consist of the following DER:

- 888 kWdc solar PV
- 540 kW/1,053 kWh BESS

Existing generator (used in very critical scenarios)

This solution is conceptually designed to be able to island the microgrid using solely renewable energy for a minimum of 8 hours.

Microgrid Objectives	Achieved?
Resiliency & Reliability	✓
Cost-effectiveness	✗
Increased Renewable Energy Penetration	✓
Reduced Greenhouse Gases (GHG) and Air Emissions	✓

Microgrid Objectives	Achieved?
Resiliency & Reliability	✗
Cost-effectiveness	✓
Increased Renewable Energy Penetration	✓
Reduced Greenhouse Gases (GHG) and Air Emissions	✓

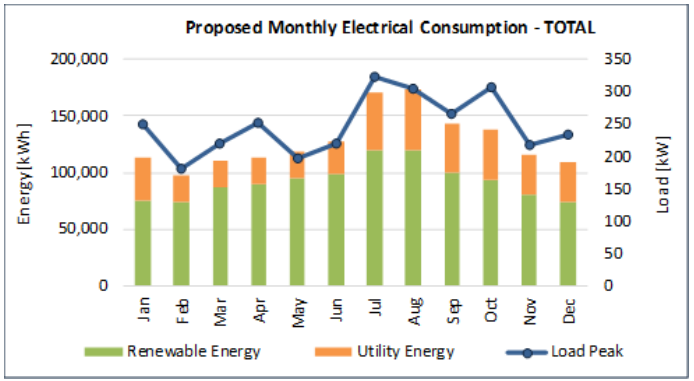
Microgrid Objectives	Achieved?
Resiliency & Reliability	✓
Cost-effectiveness	✓
Increased Renewable Energy Penetration	✓
Reduced Greenhouse Gases (GHG) and Air Emissions	✓

5. Proposed Microgrid Description

The proposed microgrid would consist of the following DER:

- 888 kWdc solar PV (ground mount system)
- 540 kW/1,053 kWh BESS
- Existing generators

On average (including Major Event Days) the LW community suffers 1.19 outage events of approximately 2 hours every year [1]. The system has been conceptually designed to be able to island the microgrid using solely renewable energy for a minimum of 8 hours. Therefore, the existing generators would only be used if a very critical emergency occurs.

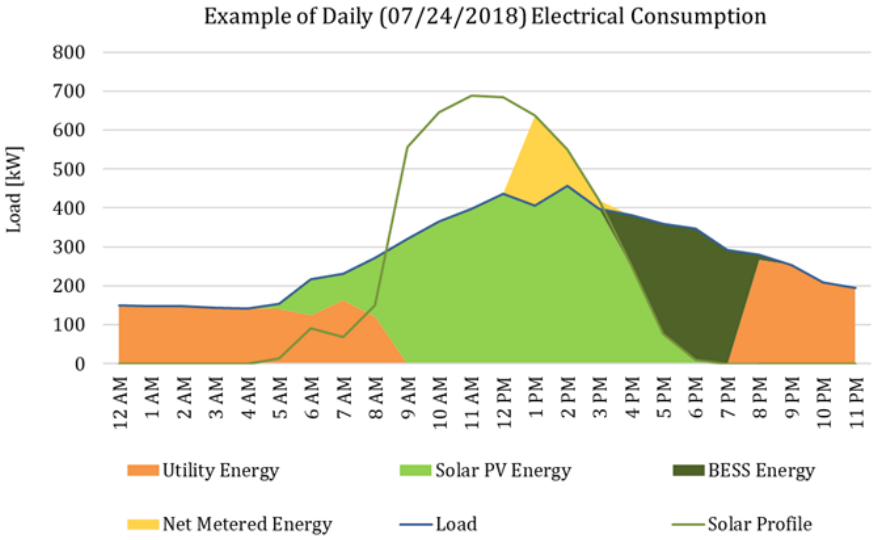


[1] Customer Average Interruption Duration Index (CAIDI) = average outage restoration time. SCE's CAIDI = 117 minutes
System Average Interruption Frequency Index (SAIFI) = average number of interruptions that a customer would experience. SCE's SAIFI: 1.19
System Average Interruption Duration Index (SAIDI) = average outage duration for each customer served. SCE's SAIDI = 140 minutes

6. Proposed Microgrid Benefits

POTENTIAL SAVINGS	
Energy Savings (Saved Utility Energy):	1,107,487 kWh/yr (72%)
Ren. Energy Sold (as % Ren. En. Generated):	419,327 kWh/yr (27%)
Max. Utility Peak Power Reduction:	168 kW/yr (34%)
GHG Emissions Reduction:	310.1 MTCO2/yr
SO_2 & NO_x reductions:	9,961.7 lb/yr
30% ITC Project Incentives:	$873,728
SGIP Project Incentives:	$257,985
Total Project Incentives:	$1,131,713
Annual Cost Savings:	$135,646/yr

TOTAL ANNUAL SAVINGS, EMISSIONS REDUCTION & COST	
Energy Savings (Saved Utility Energy):	1,107,487 kWh/yr (72%)
Renewable vs Conventional Energy:	100%
GHG Emissions Reduction:	310.1 MTCO2/yr
SO_2 & NO_x reductions:	9,961.7 lb/yr
Cost Savings (including NET metering):	$135,646/yr



6. Proposed Microgrid Benefits

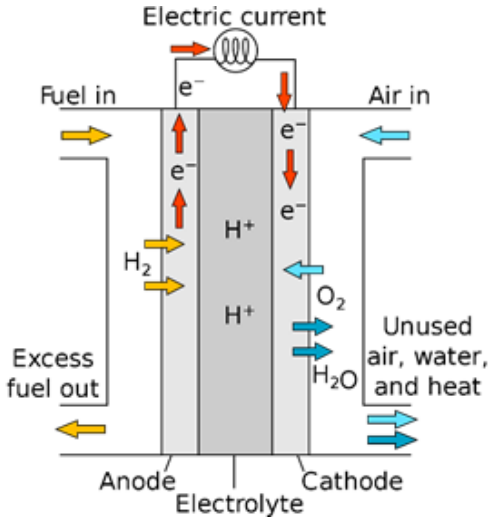
- **Resiliency & Reliability**
  - On average (including Major Event Days) the LW community suffers 1.19 outage events of approximately 2 hours every year[1].
  - The system has been conceptually designed to be able to island the microgrid using solely renewable energy for a minimum of 8 hours.
- **Increased Renewable Energy Penetration**
- **Energy Cost Savings**
  - Offset Utility Energy: 1,107,487 kWh/yr (72% of load will be offset)
  - Renewable Energy Sold: 419,327 kWh/yr
  - Cost Savings: $135,646/yr
- **Reduced Greenhouse Gases and Air Emissions**
  - 310 MTCO2/year
  - 9,961 lb./year of SO2 and NOx reductions
- **Support Load for EV Chargers**
  - Sufficient solar capacity and battery can be installed to offset load for future EV chargers

Q & A

Fuel Cells

How do they work?

- Use electrochemical reactions to generate electricity: CH4 + 2O2 → CO2 + 2H2O + e- (electricity) + Heat
- They are composed of an anode, a cathode, and an electrolyte membrane.
- Electrolyte allows protons from anode to cathode to travel but repels electrons, which go around the external circuit



Even though the graph represents a hydrogen fuel cell, the concept is the same

Advantages

- Lower emissions
- Higher efficiency than generators
- Demand & Energy decoupled from each other
- Reliable
- Silent operation

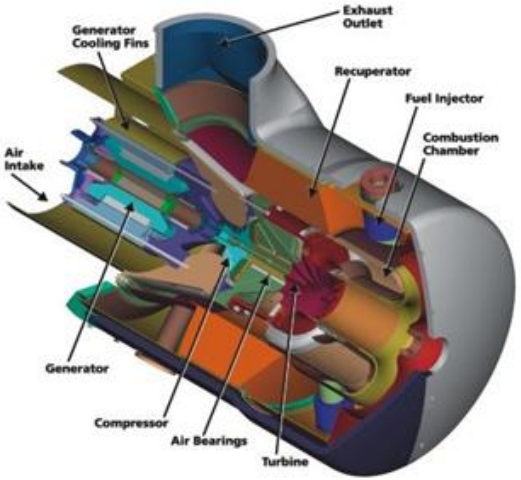
Disadvantages

- Costly
- Need to operate 24/7 as a baseload
- Generate (Low) Emissions

Microgrid Objectives	Achieved?
Resiliency & Reliability	✓
Cost-effectiveness	✗
Increased Renewable Energy Penetration	✗
Reduced Greenhouse Gases (GHG) and Air Emissions	✓

Microturbines/Generator

What is a Microturbine?
Microturbines are small combustion turbines approximately the size of a refrigerator with outputs of 25 kW to 500 kW.



Even though the graph represents a hydrogen fuel cell, the concept is the same

Advantages

- Capability to follow the load
- Demand & Energy Decoupled from each other
- Reliable
- Cost-effective

Disadvantages

- Do not increase renewable energy penetration
- Generate Emissions

Microgrid Objectives	Achieved?
Resiliency & Reliability	✓
Cost-effectiveness	✓
Increased Renewable Energy Penetration	✗
Reduced Greenhouse Gases (GHG) and Air Emissions	✗