



SAN JUAN COUNTY  
DEPARTMENT OF COMMUNITY DEVELOPMENT

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**ADDENDUM TO JANUARY 3, 2020 STAFF REPORT**

**DATE:** January 3, 2020

**TO:** San Juan County Council  
San Juan County Planning Commission

**CC:** Mike Thomas, County Manager

**FROM:** Sophia Cassam, Planner I  
Linda Kuller, AICP, Planning Manager 

**RE:** Second Draft Utilities Inventory  
SJC Comprehensive Plan Appendix 8

**BRIEFINGS:** County Council: TBD  
Planning Commission January 17, 2020

**ATTACHMENTS:** Public Comments from OPALCO and Friends of the San Juans

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**Purpose:** To transmit public comments received on the Utilities Inventory. These comments are posted on the project webpage: <https://www.sanjuanco.com/1306/Comprehensive-Plan-Elements> under the capital facilities and utilities tabs.

## Linda Ann Kuller

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**From:** Stephanie Buffum <stephanie@sanjuans.org>  
**Sent:** Friday, October 25, 2019 7:10 PM  
**To:** Adam Zack  
**Cc:** Comp Plan Update  
**Subject:** Public Comment: San Juan County Comprehensive Landuse Plan update for Capital Facilities and Utilities Inventory Element  
**Attachments:** Friends\_of\_the\_San\_Juans\_Comp\_Plan Capital Facilities and Utilities Inventory Element 10\_25\_19.docx

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Dear Adam

Thank you for providing this opportunity to comment on the San Juan County Comprehensive Landuse Plan update for Capital Facilities and Utilities Inventory Element (attached).

Regards,  
Stephanie

Stephanie Buffum, MPA, MURP  
Executive Director  
Friends of the San Juans  
P.O. Box 1344 | Friday Harbor, WA 98250  
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# Friends *of the* San Juans

360.378.2319  
www.sanjuans.org

P.O. Box 1344  
Friday Harbor, WA 98250

Date: October 25, 2019

Adam Zack - SJC Department of Community Development  
PO Box 947  
Friday Harbor, WA 98250  
adamz@sanjuanco.com  
cc: complancomments@sanjuanco.com

**RE: Public Comment: San Juan County Comprehensive Landuse Plan update for Capital Facilities and Utilities Inventory Element**

Thank you for providing this opportunity to comment on the San Juan County Comprehensive Landuse Plan update for Capital Facilities and Utilities Inventory Element.

The Friends of the San Juans (Friends) represents over 2000 members who live, work and recreate in the San Juan Islands. Our mission is to protect and restore the San Juan Islands and the Salish Sea for people and nature. We have been active since 1979, and work with diverse stakeholders, including citizens, tribal and non-tribal governmental agencies, as well as with other non-profit organizations in the transboundary waters of the Salish Sea.

Capital facilities are important because they support the growth envisioned in the County's Comprehensive Plan. Capital facilities for the purposes of this plan correctly include facilities owned by San Juan County and other public entities necessary to support the county's current and forecast population growth. These include, but are not limited to, roads, bridges, sewers, parks, water supply and conveyance systems, stormwater management systems, water and wastewater disposal and treatment systems, schools, fire facilities, and county buildings. This inventory should also include a broad range of local, state and federal public agencies such as state and national parks, Washington State Ferries and our Power Cooperative "OPALCO" that supports county operations and services.

The County can use planning best practices to identify, coordinate and prioritize projects, and be ready to apply for funding. The Capital Facilities Plan can help the county use its limited funding wisely and most efficiently to maximize funding opportunities. Additionally, the CFP amendment is a way for the County to be transparent with its capital improvement planning. The public has an opportunity to be informed of and comment on the county's capital improvement plan.

As required by the Washington State Growth Management Act (GMA), San Juan County must adopt comprehensive plans that identify key elements: 1. inventory of existing capital facilities and their capacities and locations; 2. **forecast future needs for such facilities** based on land use element, 3. the proposed location and capacities of new or expanded facilities; 4. minimum level of services; 5. include a six-year realistic financing plan and clearly identify sources of funding; and 6. re-adjust the comprehensive plan if funding is inadequate.

Three main drivers that make up the need for capital facilities include, operation and maintenance of existing facilities; **deficiencies in existing facilities and new facilities for projected new growth.** Counties required to plan under the GMA are authorized to “impose impact fees on development activity as part of the financing for public facilities...” (RCW 82.02.050(2)). This applies only to capital facilities owned and operated by governmental entities including: public streets and roads; publicly owned parks, open space, and recreation facilities; school facilities; and fire protection facilities.

### **Omissions and Trends**

Since the last update in 2009, many things have changed in San Juan County impacting the cost of community services, energy, climate adaptation, housing, tourism, and the needs of our youth.

The Growth Management Act did not contemplate, nor plan for, the types of disruptions happening in our community such as climate related disruptions including but not limited to sea level rise, forest fire, water use, or over tourism. Nor did it contemplate trends in electrification of power for housing and transportation, vacation rentals or increased fare increases and cost of waste management.

Capital facilities planning needs to contemplate trends for this next comprehensive land-use update that include substantial new areas for our community including, but not limited to:

1. The creation of new facilities for industrial composting (food, cardboard) as well as glass crushing and commercial bio char areas or mobile units;
2. Fuel reduction - Feedstock holding areas for materials;
3. Youth - Increased homeless youth, needs of youth and school districts to provide services (e.g. housing, mental health, food, and foster care);
4. Incorporate sea level rise and salt water intrusion into all public facilities such as sewer district, schools, ports, planning.
5. Electric battery storage areas;
6. Alternative power source infrastructure (tidal, wave, solar, micro hydro).

### **Omission: forecast future needs for facilities**

On Page 10 On ADD trends in Affordable Housing

Needs and funding trends for affordable housing, include funding to improve the affordability of both new and existing housing through investments in energy conservation and/or efficiency, and renewable energy generation. Require that UGA expansions include a permanent affordability requirement for at least 50% of the units created.

Page 46. Section 7.3.6 Proposed New Sections

ADD SECTION on other public land managers

Because of the national and international significance of the San Juan Islands, this plan should leverage the inclusion of our state and federal partners to help pay for additional facilities (bathrooms, transit, signage, waste reduction, fuel reduction, and cost sharing for all of these elements) through the inclusion of these facilities in the Capital Facilities Plan

State and Federal Land Managers in the San Juan County

- San Juan Island National Historic Parks.
- San Juan Islands National Wildlife Refuge and related light houses.
- San Juan Islands National Monument administered by the Bureau of Land Management
- Washington State Ferries Terminals
- Washington State Parks

Include these agencies in Capital facilities planning and cost share projects related to tourism planning, transportation, housing and water, waste water.

In Section 7.3.10 on page 82 ADD Health and Social Services section for Youth

Youth services and needs are not reflected in our CFP.

San Juan County Juvenile Services and public schools provide services to youth who are living in unstable housing each year. Many 'homeless' youth are students residing with a family member, friends, and are likely 'couch surfing,' or are in foster or "host" family care. Trend in Youth Services need to be included in this analysis. During the school year, families of students who are experiencing difficulty financially can sign up for the National School Lunch Program, which provides free or reduced lunch. The school also gives students weekend food packages.

Sources for constructing trends and needs in a new section titled, "Youth Services" include but are not limited to: All San Juan County public school superintendents, student housing questionnaires, school district trends for homeless youth, San Juan County Juvenile courts, and family resource centers on Orcas, San Juan and Lopez Islands.

These program statistics and trends should be captured in trends needs for youth transitional housing which except for a handful of foster or host homes is sorely lacking in San Juan County. We need to plan for transitional youth facilities in San Juan County.

On Page 11 ADD Trends in Waste Management

This plan should include a projections for refuse and recycled materials cost to increase for transportation and burial. This plan should include projections for industrial compost facilities on ferry served island.

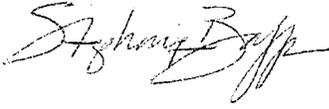
On Page 75 ADD trends in Transportation and Marine Facilities

- Encouraging best practices for fleet management including electric and or hybrid fleet cars, electric charging stations at public facilities for cars and ferries.
- Include electric charging stations at docks, and county parking areas
- Plan for impacts of sea level rise and accompanying erosion when undertaking new construction or conducting repairs and maintenance of docks and associated parking areas.
- transit providers are providing expanded low /zero emissions transportation services that support the needs of local residents and visitors.

ADD NEW policies

1. Site all new capital facilities in places that are not at risk from potential sea level rise or extreme weather conditions.
2. Use the latest science to identify potential sea level rise, flood zones, and
3. other characteristics when identifying locations for capital facilities infrastructure.
4. Install low /zero emissions and energy -efficient energy systems in any new capital facilities.
5. All new County buildings should be LEED certified at the Gold or Platinum level.
6. Monitoring water quality and clean all drainage ferry parking areas in San Juan County.
7. Ensure that all plans consider climate change projections and anticipated impacts such as saltwater intrusion and precipitation change, and incorporate adaptation measures to increase climate resilience and ensure adequate fresh, clean water in the long term planning.
8. Paying for Capital Facilities
  - a. Ensure that costs of county-owned capital facilities are within the county's funding capacity, and equitably distributed between users and the county in general.
  - b. Promote efficient and joint use of facilities with neighboring governments
  - c. and private citizens through such measures as interlocal agreements and negotiated use of privately and publicly owned lands or facilities (such as open space, stormwater facilities or government buildings).
  - d. Explore regional funding strategies and agreements between the County, Town of Friday Harbor and Port Districts for financing of capital facilities costs.
  - e. Users pay for capital facilities, except when it is clearly in the public interest not to do so.

Sincerely,

A handwritten signature in black ink, appearing to read 'Stephanie Buffum'. The signature is fluid and cursive, with the first name 'Stephanie' written in a larger, more prominent script than the last name 'Buffum'.

Stephanie Buffum, MURP, MPA  
Executive Director

## Linda Ann Kuller

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**From:** Jay Kimball <jay@mountaincedar.com>  
**Sent:** Thursday, October 31, 2019 5:52 PM  
**To:** Sophia Cassam; Adam Zack  
**Cc:** Comp Plan Update; Foster Hildreth; Russell H. Guerry; Jeff Alan Smith  
**Subject:** Comp Plan Utilities Inventory - OPALCO updates  
**Attachments:** 2019-10-02\_Draft\_Ap\_8\_Uilities\_Inventory - OPALCO Comments.docx

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Hi Sophia and Adam,

Here is the updated Utilities Inventory, with OPALCO and Rock Island Communications edits.

Let me know if you have any questions. I can be reached at 376-5360.

All material was added with Change Tracking on to make it easy to delineate from County material. Change tracking makes the colors of some of the material look odd, so you may want to turn it off to see the normal appearance. Some of the material we pasted in has different formatting than the County Word doc. I hope that you can tidy that up and make it consistent with the way you like the documents to look.

Regards,

Jay Kimball

cc: Comp Plan Update email submission link

**COMPREHENSIVE PLAN**

**Appendix 8**

**SECOND DRAFT**  
**UTILITIES INVENTORY**  
**AND EXISTING CONDITIONS**

**August 4, 2017**

**January 3, 2020**~~October 31, 2019~~

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**APPENDIX 8**  
**DRAFT**  
**UTILITIES INVENTORY**  
**AND EXISTING CONDITIONS**

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<NOTE: update table above after changes below are formalized>



Location	Base Capacity (MVA)	Max Capacity (MVA)
<b>Roche Harbor</b>	12	22.4
<b>Friday Harbor</b>	12	22.4
<b>Gravel Pit</b>	12	20

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~~Table 8.2.1 Capacity of OPALCO Electric Facilities (2017).~~

Substation	Location (Parcel Number)	Capacity (MW)
No. 1 Decatur	152232002	1
No. 2 Lopez	252634004	12
No. 3 Shaw	262844002	3.75
No. 4 Oreas	261022010	12
No. 5 Friday Harbor	351391410	12
No. 7 Roche Harbor	462441001	12
No. 8 Olga	160943003	7.5
No. 9 Thatcher	150414002	1
No. 10 Eastsound	271421004	12
No. 11 FH Grover St.	351391323	12

Source: OPALCO 2017

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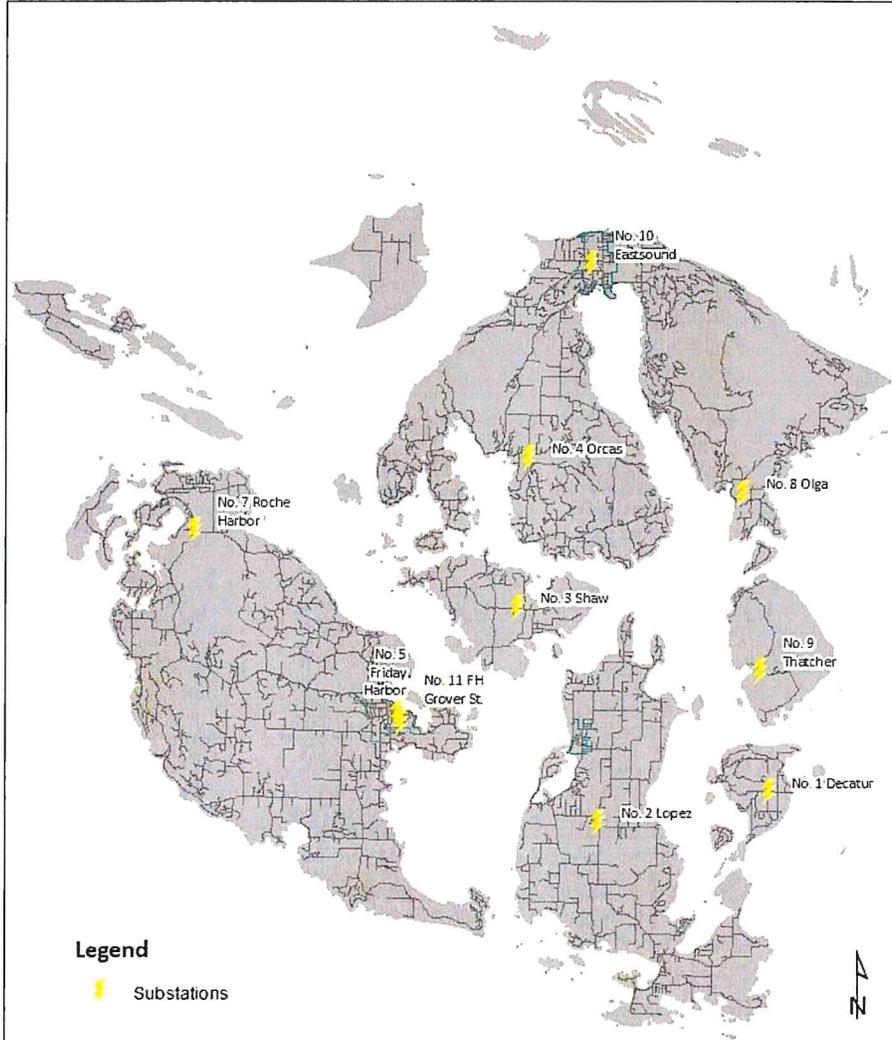
Map 1. OPALCO Electrical ~~Facilites~~Facilities (2019~~7~~).

### OPALCO Islands Served



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0 1.25 2.5 5 7.5 10 Miles

Map Drawn: 10/2/2019  
By Adam Zack, Planner III

This map is a graphic representation derived from San Juan County's Geographic Information System. Its designed and intended for reference only, and is not guaranteed to survey accuracy. Information represented in this map is subject to change without notice.



Armitage	±
Bell	±
Fawn	±
<b>Total</b>	<b>13,951</b>

Source: OPALCO 2017

### 8.2.2 Energy Outlook

- Climate impact is warming winters and summers. At the current rate, winters will be summer-like by the end of the century. Summers will be much warmer. There is a rotation of load from winter-peaking to summer-peaking that will unfold over the coming decades. Heat load will decrease, due to warming winters and steadily growing market share of super-efficient heat pumps replacing less efficient electric resistance heating. Air conditioning load will increase, but, being heat pump based, it is inherently efficient. Snowpack is receding (more rain, less snow fall) leading to a shift of hydro flow away from summer, toward winter. This will especially challenge mainland urban areas that depend on air conditioning to stay cool during more frequent climate changed heat waves. That said, trends in local warming, though moderated by the cool surrounding Salish Sea, will become uncomfortable in summers, especially challenging our vulnerable (larger than the mainland) elder population.
- Mainland power will become more costly and less reliable in the coming decade as demand for firm, clean, reliable affordable hydro increases, driven by the decommissioning of coal power plants. Capacity will go down, driving energy prices up. Demand will exceed supply, leading to regional rolling blackouts and demand rate inflation during periods of peak load demand. Increasing local renewable energy resources will be an important part of the solution.
- There is time to solve the problem, if we start now. Gradual incremental deployment of cost-effective solutions reduces risk and saves money. An ounce of prevention is worth a pound of cure. Delay would lead to unmanageable risk and rate shock. OPALCO's near term focus is on building equity, winning grants, and incentivizing member efficiency, renewable energy and battery storage programs.
- OPALCO expects that local renewable energy resources will become competitive with mainland power wholesale electric rates around 2025 (grid parity). Solar + storage will be essential parts of our resource mix. Storage is the "Swiss Army knife" of the grid, helping firm the increasing contribution of intermittent resources like solar, helping reduce demand charges, keeping critical infrastructure and town-centers operating during outages, and much more.
- Direct member investment will be an essential part of growing our local energy resource mix. This is an especially important way to accelerate local energy resource deployment, before grid parity, without impacting rates. OPALCO's Switch it Up! program will be used to incentivize direct member investment in over 3 MW of member battery storage, and efficiency measures including heat pumps, dispatchable water heaters, dispatchable EV chargers, and smart inverters coupled with rooftop solar.
- Mainland power will remain an essential part of our resource mix, albeit less. As we increase local energy resilience with the addition of local energy resources (member and community solar, and utility-scale solar, storage, wind and tidal), mainland energy purchases will decline to about half of total kWh consumption by 2040, depending on post grid parity investment levels. Yet, it

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1 will remain a vital resource for firming intermittent resources, powering us during cold snaps, at  
2 night and in long gray winters when solar production is limited – the ultimate “backup battery.”

3 ■ Load continues to be flat but will change in the coming decade as more members use electricity  
4 for heating and transportation. EVs are projected to reach cost parity with fossil-fueled cars in  
5 2022. EVs will be a significant driver of load growth and revenue toward the end of the 2020s.  
6 Ferry electrification will add to load in the 2030s. The increasingly transactional grid helps load  
7 and resources become more dispatchable (home battery storage, smart water heaters). This will be  
8 an essential tool in avoiding peak demand charges.

9 ■ We are in the early stages of a highly transactional grid. OPALCO has an outstanding grid that  
10 has served us well for over 80 years, more reliable than ever. As communication protocols  
11 standardize, we will see increased two-way energy and information flow, members buying and  
12 selling energy, solar + batteries increasing local energy resilience, enabled by OPALCO’s fast  
13 reliable fiber and wireless internet. OPALCO will increasingly serve as a balancing exchange,  
14 keeping voltage stable as members buy and sell energy from each other, with mainland power  
15 serving as a vital source of firm energy when local energy demand exceeds local generation  
16 capacity.

17 ■ Efficiency continues to improve, helped along by the “internet of things” (IoT) – enabled by the  
18 OPALCO/Rock Island fiber and LTE wireless broadband backbone. The “automated home”  
19 market exceeded \$23 billion in 2018 and is expected to reach \$75 billion by 2025, at an impressive  
20 compound annual growth rate of 18%. This presents encouraging impetus for helping OPALCO  
21 members make their energy use smarter and more efficient, including smart thermostats and  
22 appliances, better grid monitoring, grid control and crew information access. Heat pumps will be  
23 the largest reducer of load as members convert from resistance heat to super-efficient heat pumps.  
24 Bundling fiber with smart home systems helps incentivize uptake.

25 The table below summarizes the resources to be developed, the purpose of those new resources,  
26 and the investment source, before and after grid parity (the point at which local power resources  
27 become lower cost than mainland power).

	<u>Before Grid Parity</u>	<u>After Grid Parity</u>
<u>Resources</u>	<u>Deploy moderate amounts of local renewable energy resources: a combination of solar + storage + demand response, community solar, and utility-scale solar. Incentivize rooftop solar, dispatchable home storage, and demand response units.</u>	<u>Accelerate deployment of local renewable energy resources, as they become affordable, to significantly reduce our dependence on mainland power. Initially solar, eventually tidal energy, likely in the 2030s.</u>
<u>Purpose</u>	<u>Reduce vulnerability to mainland demand charges. Increase local energy resilience, especially for critical services in the county: first responders, town centers, government. Community solar helps members lower the cost of their electricity.</u>	<u>Cushion us against the increasing cost of mainland power. Increase local energy resilience.</u>

	<b>Before Grid Parity</b>	<b>After Grid Parity</b>
<b>Investment Source</b>	Community solar is paid for by subscribers. Utility-scale solar is funded through grants and RESP program. Member storage and demand response is paid for through direct member investment, grants and RESP program.	Direct member investment, Grants, RESP program, and rates as a last resort.

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1 Over the 20-year IRP planning horizon, OPALCO sees four distinct themes playing out. First, start  
 2 with preparing for CETA, developing critical local energy resilience resources, especially  
 3 dispatchable storage. Also prepare for grid parity, leveraging local grid control backbone to  
 4 manage the increasingly smart, dispatchable distributed local resource mix. And OPALCO begins  
 5 negotiations with BPA on the 2028 contract. OPALCO expects that BPA mainland power will be  
 6 in high demand regionally and all the way down to California, serving as the ultimate low carbon  
 7 backup battery for the increased intermittent renewable resource mix.

8 In the later 20s, OPALCO navigates some troubled waters as CETA reduces near-term regional  
 9 power capacity, increasing demand spikes and risk of mainland power disruption. Beyond that, by  
 10 2040, most transportation and heating will be clean electric, most of our energy will be local, with  
 11 BPA as the ultimate backup battery. Power will be more distributed, resilient and affordable than  
 12 mainland alternatives. The transformation is funded with a mix of grants, Rural Utility Service  
 13 funds, direct member investment and, for large local utility-scale renewable generation projects,  
 14 possibly with investor renewable energy credits (IRECS).

15 The table below summarizes OPALCO's Integrated Resource Plan themes.

### IRP Themes

2020	2025	2030	2035	2040
<b>Prepare for CETA and Grid Parity</b> Increase... - critical infrastructure resilience - dispatchable load, storage - community solar Direct Member Investment (DMI)... - member storage - community solar CETA and BPA contract prep Grants, RESP, DMI, build equity	<b>Regional Power Risk</b> CETA Risk Multipliers - reduced capacity, reliability - increasing demand Grid Parity: ramp up... - utility-scale solar + storage CETA Compliance BPA contract negotiation Grants, RESP, DMI, build equity	<b>Electrify Everything</b> Most members drive EVs and heat with heat pumps Electric ferries ramp up Local renewables expand All town centers and critical infrastructure are resilient CETA Compliance Grants, RESP, DMI, build equity	<b>Local Energy Takes Lead</b> Most energy generated locally BPA as "ultimate backup battery" Tidal energy grid parity - trial small system - ramp up at grid parity CETA transformation complete Grants, RESP, IRECS, build equity	

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### 8.2.2-3 Capacity Needs

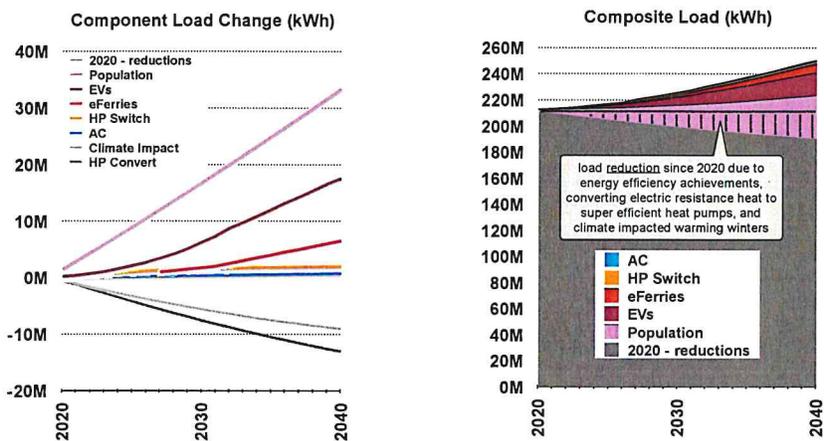
The chart below provides a component and composite view of OPALCO's 20-year load forecast.

- **Population growth**, even though it is less than 1%, it remains the most significant component of load growth. Each new member consumes an average of about 12,000 kWh per year.
- **EV charging** load starts softly, but ramps up in the mid-2020s as the price of EVs become less than fossil-fueled cars. EVs currently account for about 6% of cars in San Juan County, growing at about 60% per year.
- **eFerries** start to come online in the 2030s.
- **Climate Impact** with warming winters significantly reduces winter load.
- **Air conditioning increases load as climate impact warms our summers**
- **Heat Pump Conversions** from electric resistance heat also reduces load significantly.
- **Heat Pump Conversions** from fossil fuel heat increases load slightly.

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population + EVs + eFerries + fuel switching + AC - efficiency - climate reduced heating



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An analysis of capacity development necessary to meet future demand is contained in OPALCO's long-range plan. OPALCO also develops load forecasts and construction projects in their 4-year Construction Work Plan (CWP) in addition to its long-range planning program. OPALCO is currently implementing its 2017-2020 CWP which is reviewed and updated annually as necessary. These capital-planning programs are referenced here for future comprehensive planning purposes.

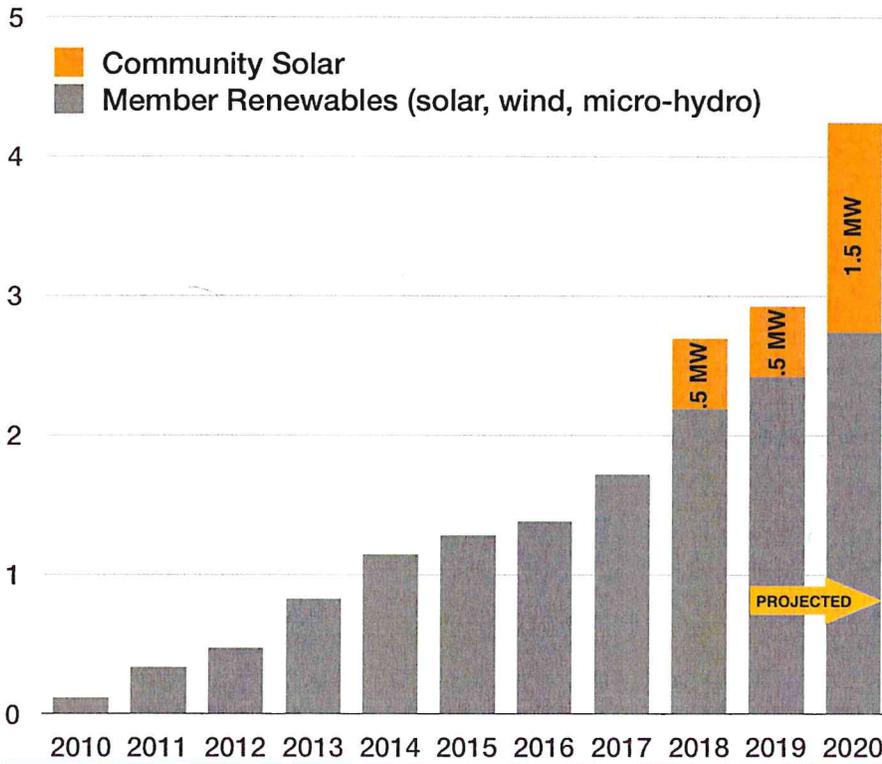
Detailed analyses have been and will be conducted by OPALCO based on planned land use. Planned construction of electric utility facilities serving local load areas is based on existing and projected load rather than time (years). Utilities determine the need for expanded or new electric utility regional transmission network facilities on the basis of established planning standards that define required system performance under specified conditions including load and generation levels, equipment outages, weather, and equipment ratings. As the electric load within San Juan County grows due to an increase in customers and demand, OPALCO will need to add new electrical facilities to increase the capacity of its distribution system. OPALCO estimates an average annual increase of 0.75 percent for residential accounts and 2.0 percent for commercial accounts. Since 2007, OPALCO has increased its consumer accounts by approximately 10 percent or an increase of over 1,400 customers.

**8.2.3-4 Community Solar Local Energy Resources**

OPALCO operates a 500 KW solar array located on 3.6 acres at the Decatur Substation (TPN 152232002000). This is OPALCO's first Community Solar Project—a program where members offset a portion of their energy use and electric bill via credits by buying shares of a solar array OPALCO operates. Decatur Community Solar began operating in July 2018, and is expected to produce approximately 570,000 kWh/year.

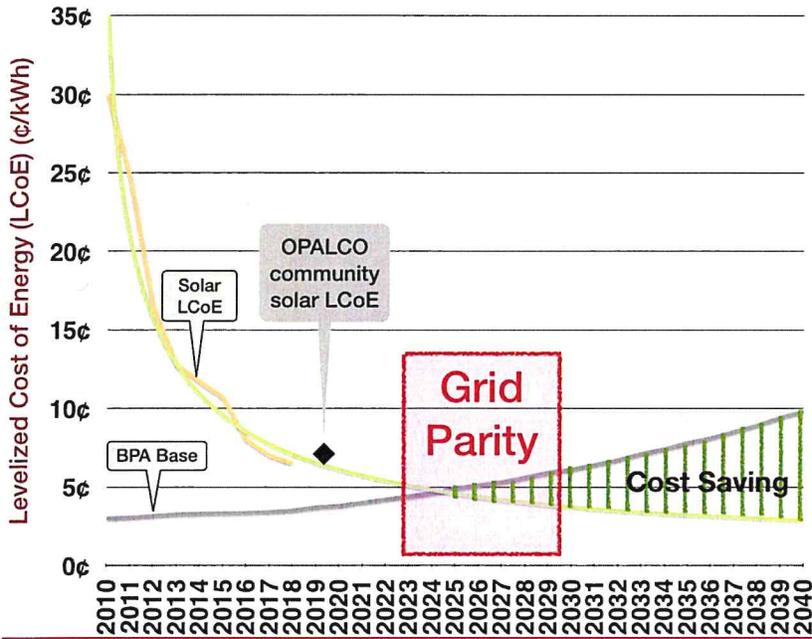
The chart below shows local renewable energy capacity by year with projected capacity for 2019 and 2020.

## Local Renewables Capacity (MW)



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Renewable energy resource costs have been falling, while mainland pricing has been slowly rising. The point at which they cross is called **Grid Parity**. In other words, Grid Parity is the point at which an emerging technology becomes economically viable. At that point, the emerging technology has increasing cost savings compared to the legacy technology (see slide below).

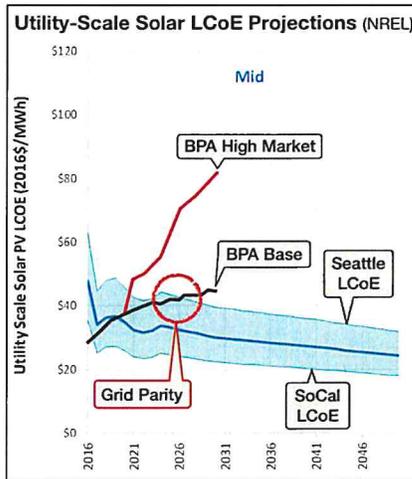


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Once a resource is at grid parity or better, it can be added into the energy portfolio to replace or moderate the cost of legacy energy sources.

The chart at right shows mid-level pricing (for the local solar equipment), through 2050. The upper bound of the blue range is Northwest (Seattle) price point. OPALCO has overlaid the northwest mainland base and high market forecast. Having just completed a 500 kW community solar array, the pricing is more representative of larger arrays, with their efficiencies of scale. And mainland pricing has been running a bit above base. Given that, OPALCO projects that utility-scale solar pricing will cross mainland pricing around 2025 (grid parity).

CETA injects additional uncertainty that can impact the LCoE calculus, changing the path the cost of mainland power will follow – base, or high market. For example, CETA may require purchase of Renewable Energy Credits (RECs), increase administrative process to track and meet emerging

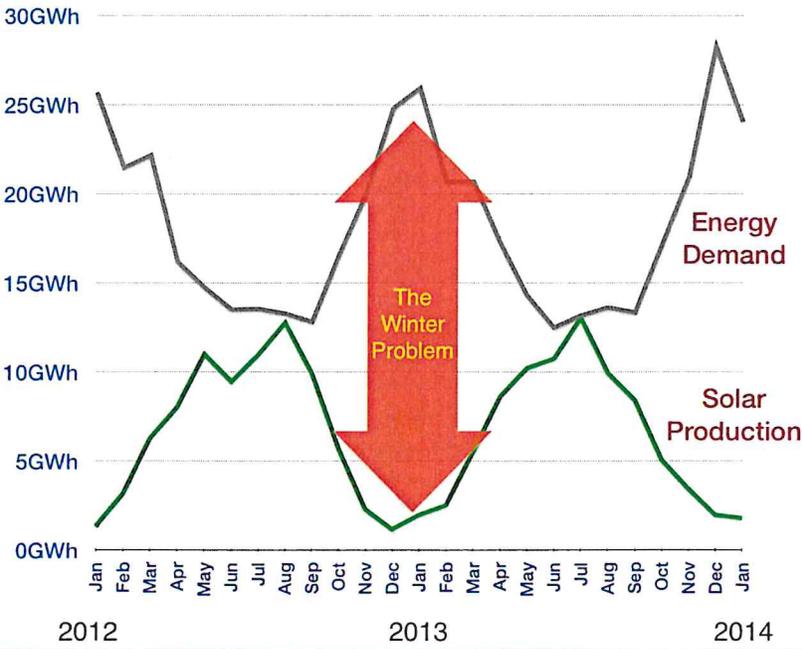


1 new clean energy requirements, and penalties for non-compliance to as yet undefined rules. This  
2 may prematurely increase the cost of mainland power.

### 3 The Winter Problem

4 San Juan County solar in summer is quite good, but in winter, output drops to one-fifth of summer  
5 output. This is known as “the winter problem.” The best year-round resource for our island region  
6 is tidal energy, but it is an emerging technology, and OPALCO doesn’t expect it to be affordable  
7 until the 2030s.

8 OPALCO rooftop solar members use the grid as their battery, generating energy in the summer,  
9 selling excess to the grid, using net metering, and buying it back in the winter when solar output  
10 is minimal. The chart below offers an example of the winter problem. Assuming each home had  
11 good sun, and had a 7.5 kW array, solar would only meet about 38% of the county electric load,  
12 due to limitations of sun in the Northwest. In winter, load doubles, but solar decreases by 80%.  
13 But, with climate change. Winters are warming and summers are too. There will be reduced need  
14 for winter heat and increased need for summer air conditioning. Snowpack is decreasing, which  
15 means less hydro flow in summer, which could mean lower hydro production and higher hydro  
16 costs in summer when big cities have increased air conditioning load. Solar can help fill the gap  
17 from reduced summer hydro. And, increasing local renewable energy such as solar, wind and tidal  
18 helps increase local energy and economic resilience.



19  
20

1 Tidal Energy

2 Tidal energy potential in San Juan County is enormous.

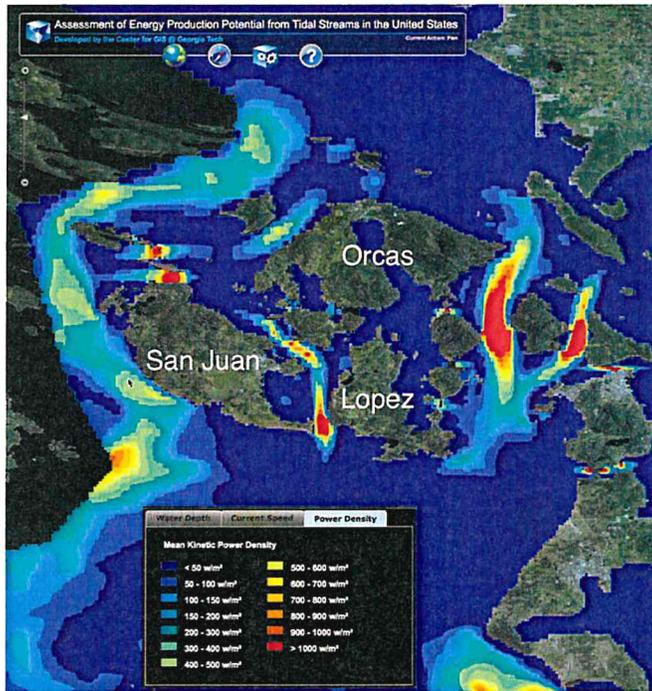
3 It has several features suited to our island area:

4 ■ In the US, just as sun is better in southern states, tidal energy is best in the northern latitudes, where  
5 tidal flows along coastal waters move massive amounts of water back and forth about four times  
6 each day. The chart below shows areas of strong tidal flow in red.

7 ■ It is predictable energy. This predictability makes the management of tidal energy much simpler  
8 than the highly intermittent nature of solar and wind energy.

9 ■ Tidal energy is year-round energy, with minimal seasonality. It can help fill the solar winter gap.

10 That said, just because a resource is being used elsewhere doesn't mean that the community will  
11 support it in our territory. OPALCO has a long track record of care for our environment. Any  
12 development of tidal resources needs to be done with community support, and engagement with  
13 stakeholders, including those most involved with our sensitive marine environments such as the  
14 Friends of the San Juans and SeaDoc Society.



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1 **Biomass Energy**

2 There are positive developments and interest in the county toward biomass and biochar carbon  
3 sequestration and Combined Heat and Power (CHP) production. The Orcas exchange and  
4 Conservation District are exploring grants and emerging biogassification technology to process  
5 woody biomass. This can have the beneficial side effects of:

6 ■ Reduced fire risk in a climate impacted world. Increased proactive stewardship of county forests,  
7 removing wood fall and woody biomass “fuel” from forest floors, and using it to generate energy.

8 ■ Energy production, perhaps purchased by the co-op through a Power Purchase Agreement (PPA).

9 The chart below offers an example of how biomass compares with solar.

**COMBINED HEAT-AND-POWER + BIOCHAR**

200, 300, 400, 500 kWe  
modular units

~30% power production



**Example Outputs**

- 200kW electric, 326kW thermal
- 5,000 operating hrs per yr (or more)
- Approx. 2.6M total kWh per year
  - 1M kWh generated electricity
  - 1.6M kWh “negawatts” – thermal energy displacing electric resistance heating
- Approx. 1,300 tons/yr (at 35% mc)

**For Reference**

- 504 kW Community Solar array
- Approx. 570,000 total kWh per year

WE

10

11 San Juan County biologist and forestry guru Tom Schroeder, researches and writes extensively on  
12 County forests. As many have observed, and Tom notes:

13 *Trees in our local forests grow more slowly, are much shorter at every age, and*  
14 *experience challenging conditions that derive from peculiarities of local geology*  
15 *and climate.*

16 *Low timber productivity in San Juan County means that, even at culmination, the*  
17 *rate of volume growth is low. Culmination - the age at maximum timber growth - is*  
18 *also relatively delayed compared to more productive areas. In this county's forests*  
19 *culmination is at 100-120 years, whereas in forests on "good" land of grade II*  
20 *culmination is at about 50 years. For sustainability, age at culmination should be*  
21 *matched to rotation of timber harvesting, so it follows that San Juan's forests are*

1 being harvested 2 to 3 times too rapidly (turning over every 45 years vs 100-120  
2 years).

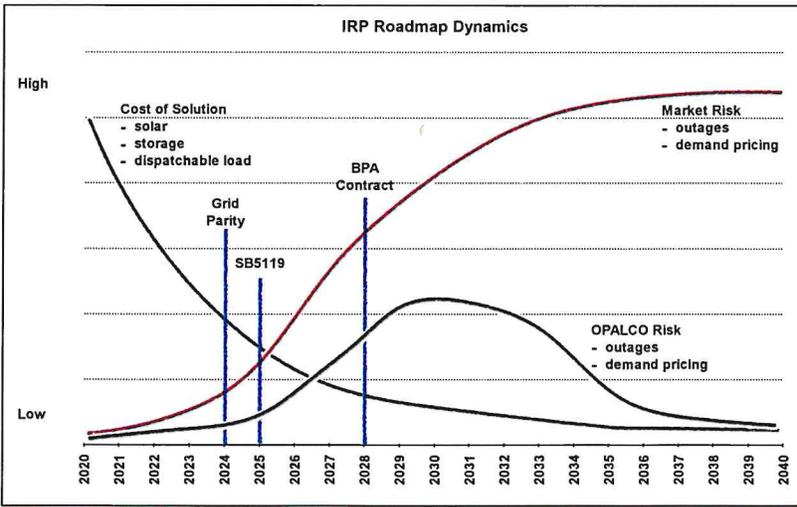
3 One estimate suggests that only about 320 to 500 of the total 70,000 acres of County forest could  
4 be harvested annually in a sustainable fashion. In the Pacific Northwest, hybrid poplar grown for  
5 saw-log production is estimated to yield up to 12 dry tons per acre of chips for energy production  
6 at the time of harvest (Stanton et al. 2002). So, 320-500 acres x 12 ODT (one dry ton) = 3,840 to  
7 6,000 tons/yr of burnable biomass. It takes from 5,600 to 8,600 ODT to generate 1 MW of power.  
8 So, about 1MW, or 5,600 tons of woody mass/yr. At best, this gives about 8,760MWh, or 4.4% of  
9 our annual 200,000 MWh demand, and more likely only 3% if you assume a 70-80% capacity  
10 factor.

11 And at the end of the day, you are releasing all that carbon, comparable to coal, into the  
12 atmosphere. Just as it has been said that much of the remaining oil and coal should be left in the  
13 ground, when it comes to burning wood, to paraphrase, “leave it on the ground” for a slower  
14 release of carbon, and nutritive benefit of the soil.

15 That said, though biomass emits carbon when burned for energy, and is considered by many a  
16 problematic source of renewable energy, biogassification systems are becoming increasingly  
17 efficient, and carbon neutral holding promise as a potential source for local energy production and  
18 fire risk mitigation.

### 19 Resource Roadmap

20 OPALCO’s resource roadmap unfolds over a very dynamic decade ahead, with grid parity  
21 expected around 2024, CETA legislation decommissioning coal plants by 2025, and negotiation  
22 of a new BPA contract by 2028. The chart below shows how trends in local renewable energy  
23 resource cost, and mainland power reliability and cost risk ployaut against these important  
24 markers.



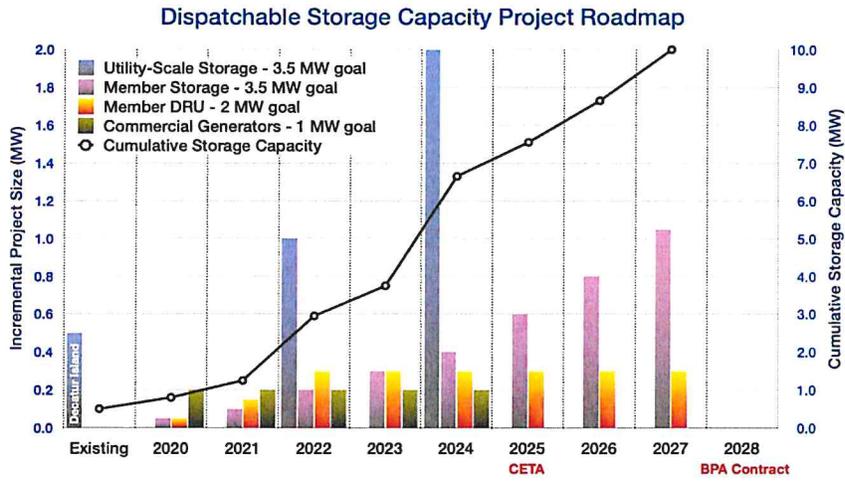
1 Initially, OPALCO's risk is lower than market risk, thanks to the contract guarantees for BPA  
 2 power. But OPALCO and BPA co-exist in a complex shared transmission system, making it  
 3 difficult to know how buffered we will be from CETA effects. As we increase our local generation  
 4 resource portfolio, especially in winter-strong tidal capacity, we expect to see that risk reduce.  
 5 Given the above dynamics, the table below summarizes a recommended roadmap for OPALCO  
 6 resource development, in four-year Capital Work Plan (CWP) increments.  
 7  
 8 Each of the following Themes, Benefits, and Actions tie back to our Mission and Strategic  
 9 Directives – safe, clean, cost-effective, reliable and sustainable energy, with a commitment to the  
 10 use of renewable resources and carbon reduction.

<b>Schedule</b>	<b>Theme and Benefits</b>	<b>Actions</b>
<b>2020 – 2024</b>  <b>CWP 1</b>	<b><u>Before Grid Parity + CETA Preparation</u></b> Increase local energy resilience at minimum cost to members through community solar subscriptions, grants and RESP funds.  This helps increase local energy resilience, especially for critical services in the County: first responders, town centers, government. Community solar helps members lower the cost of their electricity  Continue beneficial electrification programs.	Deploy as much community solar as members want (at least 1 MW) – funded by subscribers.  Create incentives and OBF program for 3 MW dispatchable home storage - funded by grants and RESP funds.  Create incentives and OBF program for 2 MW dispatchable load (water heaters) for home and business - funded by grants and RESP funds.  Create incentives for dispatchable commercial member generation for peak demand mitigation.  Cooperate with partners on grant-funded tidal projects that help assess potential solutions.  Continue grid modernization projects (see Grid chapter below).
<b>2024 – 2028</b>  <b>CWP 2</b>	<b><u>At utility-scale solar Grid Parity and CETA</u></b> Increase local energy resilience by ramping up utility-scale solar.  Cushion against the increasing cost of mainland power. Rate inflation should start to flatten.  Continue beneficial electrification programs. More revenue helps moderate rate increases.	Deploy all cost-effective local energy resources, including solar, storage and dispatchable load solutions, funded by grants, RESP and rates.  Continue grid modernization projects (see Grid chapter below).  Continue tidal power collaborations, through grant funded projects.
<b>2028 - 2032</b>  <b>CWP 3</b>	<b><u>New BPA Contract</u></b> Continue deploying local energy solutions.  Optimize mix of local generation with BPA as firming and gap filling.  Continue beneficial electrification programs.	Continue deploying all cost-effective local energy resources, including solar, storage and dispatchable load solutions, funded by grants, RESP and rates.  Continue grid modernization projects (see Grid chapter below).  As tidal approaches grid parity, prepare for deployment when cost effective.

Schedule	Theme and Benefits	Actions
<u>2032 – 2036</u> <u>CWP 4</u>	<u>Ramp up Tidal Power at Grid Parity</u> Switch from solar to tidal investment to strengthen winter generation resource portfolio. Further reducing dependence on mainland power and pricing. Continue beneficial electrification programs.	Funded through grants, RESP program, rates.
<u>2036 – 2040</u> <u>CWP 5</u>	<u>Build Equity</u> In preparation for forthcoming submarine cable replacement projects. Continue beneficial electrification programs.	Grants, RESP program, rates.

1 Storage Project Roadmap

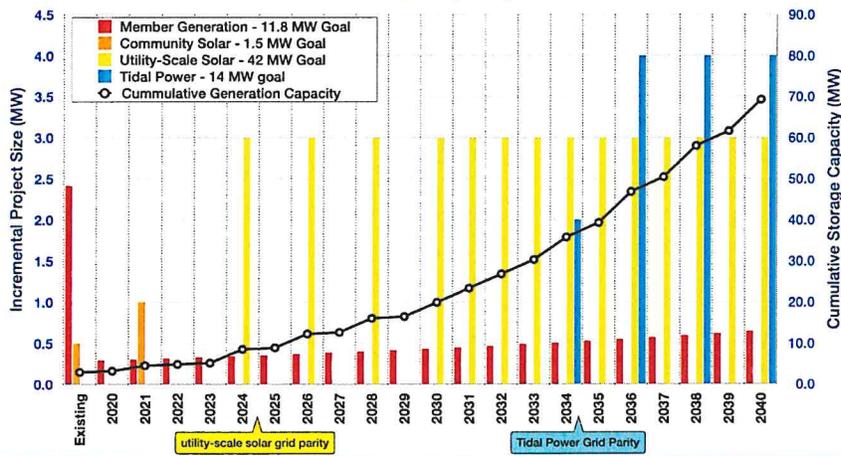
2 The roadmap below lays out a mix of dispatchable storage resources between now and 2028, with  
 3 a goal of having 10 MW of capacity by 2028. Storage helps with demand cost control, outage  
 4 mitigation, intermittent resource smoothing, and other valuable functions.



5  
6  
7

1 Local Renewable Generation Project Roadmap  
 2 The roadmap below lays out a mix of local renewable energy resources between now and 2040,  
 3 with a goal of building capacity at a steady rate once utility-scale solar hits grid parity. In the  
 4 example below, OPALCO is adding 3 MW of solar every other year, in the 2020s, and every year  
 5 in the 2030s. Once tidal cost hits grid parity, OPALCO starts with 2 MW of tidal for the first  
 6 project, ramping to 3 MW every other year, which, in this example takes us to 2040. As mentioned  
 7 above, local renewable energy resources help moderate the rising cost of mainland energy and  
 8 improve local energy resilience. With climate impact accelerating, it is possible that deployment  
 9 of local renewables might accelerate, if grant funding rises, allowing OPALCO to build more for  
 10 less.

Local Generation Capacity Project Roadmap



11  
12

1 The chart at right shows the resulting local  
2 resource capacity mix in 2040. It's worth  
3 remembering that as we ramp up local generation,  
4 the load on the mainland cables is reduced,  
5 extending the life of the transmission and  
6 submarine cables through congestion relief and  
7 asset deferral. That improves the cost benefit  
8 equation.

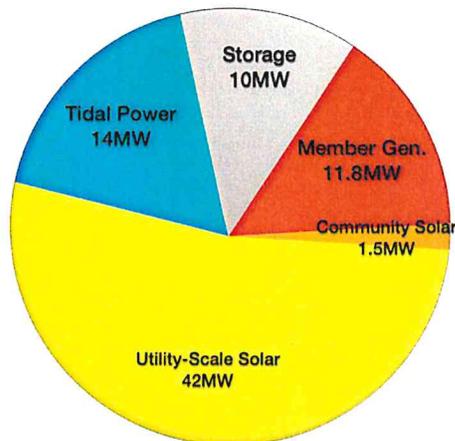
9 **Winter, Summer, Night, Day**

10 This emerging mix of local renewable energy,  
11 each resource with its own seasonal and daily  
12 productions patterns, has some remarkable  
13 implications for when we draw on mainland  
14 power. OPALCO is in the early stages of modeling  
15 this, but here are a few preliminary implications to  
16 consider:

- 17 ■ 14 MW of tidal power yields 4 MW of power  
18 (30% Capacity Factor). That is day and night, winter and summer.
- 19 ■ 55 MW of local solar (member + community + utility), yields 8 MW of power (15% Capacity  
20 Factor). That is daytime only in summer. In winter solar is daytime only, and 20% of summer –  
21 1.6 MW.
- 22 ■ Summer load in 2040 is forecast to typically be 17 MW. So, summer daytime load will be mostly  
23 met by local generation. Summer nights tidal is still generating, but we will need more mainland  
24 power. In summer, mainland power daytime rates may be expensive due to climate heating,  
25 increased demand for air conditioning, and reduced hydro flow due to reduced snowpack.
- 26 ■ Winter load in 2040 is forecast to typically be 23 MW. So, winter daytime load will be mostly met  
27 by mainland generation. Daytime will have about 1.6 MW of solar on the occasional sunny day.  
28 Day and night will have about 4 MW of tidal. That gives us about 5.6 MW of local energy, leaving  
29 about 17 MW need from the mainland. In winter, mainland power daytime, and especially  
30 nighttime rates may be less expensive than summer, with warming winters, reduced heat load, and  
31 a shift in hydro from summer to winter as snow decreases, and winter rains increase, increasing  
32 winter hydro flow.

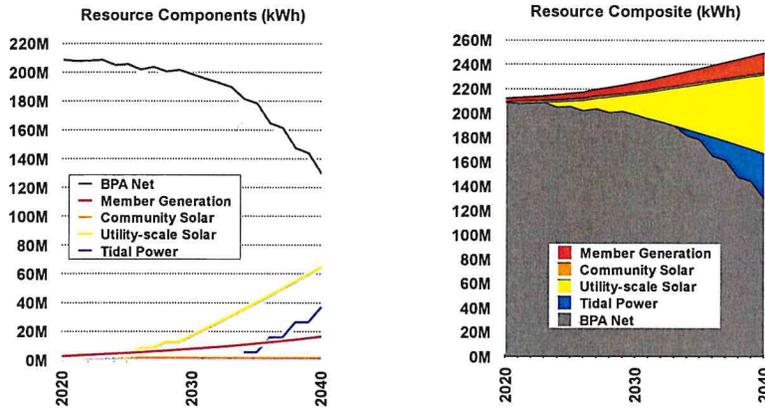
33 Given the roadmap above, the chart below shows the energy production over time as we ramp up  
34 the local energy resource mix. The left chart breaks out the component energy resources in the  
35 mix. The right chart shows the combination of the components.

2040 Local Resource Capacity



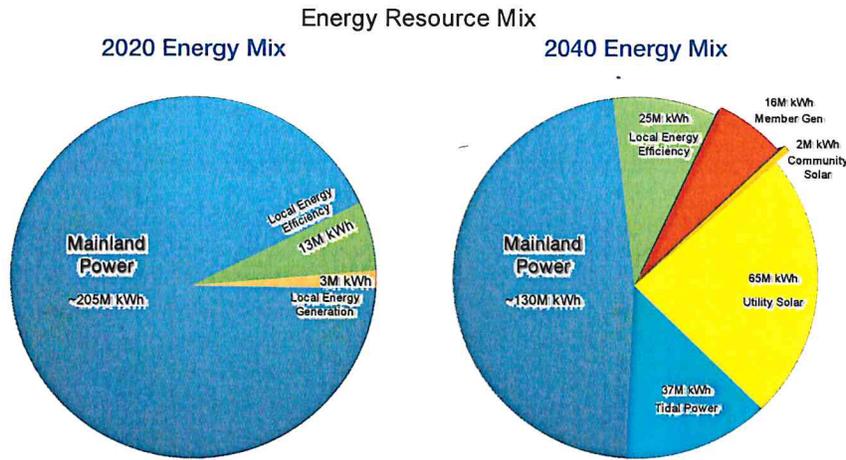
### BPA + Local Generation Energy Forecast

BPA + Member Generation (solar, wind, micro-hydro) + Community Solar + Utility-scale Solar + Tidal



1

2 The chart below shows the energy production mix for 2040 compared to 2020. It is worth noting  
 3 that 52% of the energy is still coming from the mainland in this example. The 2040 resource mix  
 4 requires a steady aggressive resource development commitment. There are a number of challenges  
 5 behind this, including securing and permitting adequate siting for local solar, tidal, wind and other  
 6 resources.



7

8 OPALC will be exploring low and high cases in their Long Range Plan, in 2020. There are two  
 9 drivers they want to explore as we model high and low business cases.

- 1 ■ CETA drives investment in storage to mitigate demand and outages – a form of insurance. How
- 2 much storage do we want to roll out to mitigate CETA exposure? And there are beneficial side-
- 3 effects of have that storage for the many use cases storage offers?
- 4 ■ EVs load increases revenue using existing infrastructure – no new capital needed to handle the
- 5 increasing load. That new revenue helps moderate rates. EV market share has been accelerating.
- 6 Will it continue, especially given the current political climate in Washington, DC aimed at slowing
- 7 climate action, clean energy incentives, etc?
- 8

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## 1 Right of Way (ROW) and Essential Public Facilities

2 With climate impact, there is rising risk of extreme wind and fire, as evidenced by recent wildfires  
3 in California. It is increasingly important to maintain clear right of way around utility high voltage  
4 electric distribution and transmission systems. Much of San Juan County is heavily forested, with  
5 electric aerial cables threading their way those forests. With increased fire risk and tree fall in  
6 heavy winds, it is therefore important to ensure adequate clearance between electric facilities and  
7 nearby vegetation. The county needs to maintain their roadside rights of way for joint franchise  
8 use, to ensure easy safe access by public utilities and assistance in clearance to overhead high  
9 voltage lines.

10 With mainland power capacity likely to be reduced in coming decades, leading to potentially  
11 increasingly unreliable mainland electric service, development of substantial local energy  
12 resources is essential. The NW Power and Conservation Council estimates there is a 30-50 percent  
13 chance of a major outage in the next 10 years.

14 The problem is two-fold: The mainland is reducing capacity, and there is no plan or funding to  
15 replace that capacity. The table below summarizes the actions that are underway that will impact  
16 regional power capacity, and the impact/reaction that reduction will have. Reduced mainland  
17 capacity will necessitate development of local energy resources to mitigate mainland challenges.  
18 This is discussed in the Energy Resources section below.

Action	Reaction
<ul style="list-style-type: none"> <li>Increased hunger for climate friendly hydro, especially in California</li> <li>CETA</li> <li>Decommissioning coal/nuke plants</li> <li>Potential dam removal</li> </ul>	<ul style="list-style-type: none"> <li><b>Reducing Capacity</b></li> <li><b>Demand Charge increases</b></li> <li><b>Energy cost increases</b></li> <li><b>Brownouts</b></li> <li><b>Rolling Blackouts</b></li> </ul>

19  
20 Reduced capacity and the attendant impact will lead to increased costs for OPALCO and their  
21 members. There are two kinds of cost:

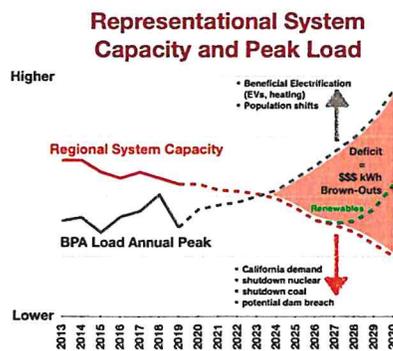
22 **■ Direct Cost of Power – energy cost and demand charges**

23 **■ Indirect Cost of Outages**

24 The potential impact of capacity shortages on cost of  
25 power are shown at right, representationally. The  
26 regional capacity is falling, while load is increasing  
27 and accelerating as beneficial electrification hits its  
28 stride in the mid-2020s.

29 The development of new local and regional  
30 renewables can mitigate outages, but it will take time  
31 to implement an adequate capacity to balances  
32 losses.

33 Which brings us to the indirect costs. As the potential  
34 for outages and brownouts increase, there is an





1 infrastructure, the availability of fiber optic services will continue to grow. Once complete, 60 percent to 70  
2 percent of residential and business locations will have access to a direct fiber connection by 2025. FTTPH  
3 enables homes and businesses to scale their needs up to 1Gbps (1,000 Mbps) upon initial installation with the  
4 ability to go to 10Gbps (10,000 Mbps) as required. Fiber is considered a future-proof technology that allows  
5 for massive increases in available bandwidth for generations to come. Fiber is a future proof technology that  
6 allows for unlimited potential in terms of data volume and capacity. The As of July 2017, over 1,000 locations  
7 around the county are serviced with an average monthly new connection rate of is 30-40 locations. The  
8 fiber is spanning 500 plus miles connecting all major islands and to the mainland with multiple upstream  
9 connections in Bellingham and Seattle.

### 12 8.3.2 Telephone – Voice over Internet Protocol (VoIP)

14 With the increase use of data communication services, Voice over Internet Protocol (VoIP) has become the  
15 predominate method for non-wireless based voice communications around the nation, particularly for  
16 businesses. VoIP services are dependent on reliable, low-latency internet connectivity. VoIP services are  
17 dependent upon reliable internet connectivity to function, as most services offerings are cloud-based. Unlike  
18 Plain Old Telephone Service (POTS) lines, the Washington Utilities and Transportation Commission (WUTC)  
19 does not regulate VoIP.

21 There are various resellers of VoIP services for residents and businesses in San Jun County. Anyone with a  
22 reliable internet connection can purchase voice services from a variety of national providers. Each of these  
23 providers deliver a wide variety of services and advanced features based upon the consumer requirements.

### 25 8.3.3 Wireless – Fixed Wireless Long Term Evolution (LTE)

27 In addition to deploying FTTH around the county, LTE locations have been deployed to service areas where  
28 fiber is unavailable currently. Fixed Wireless LTE locations have been deployed in areas inaccessible to a fiber  
29 connection. Fixed Wireless LTE utilizes cellular technology enabling high-speed data and voice connections in  
30 the range of 25Mbps to 150 Mbps. As of Oct 2019, 3,000 locations were serviced with fixed wireless  
31 broadband service recognized nationally as one of the top 10 fastest wireless services available to U.S.  
32 residents and the highest available offering in Washington State. This includes service to 18 non ferry-served  
33 islands, some without utility power service. With increased capacity being added regularly, this service is  
34 available to over 4,500 locations in San Juan County. As of July 2017, 1,500 locations were serviced with a  
35 future plan to serve up to 4000-5000 locations county wide by 2020. Fixed Wireless service does enabling for  
36 the first time true broadband in unserved and under-served areas of the county such as Stuart and Waldron  
37 Islands.

### 39 8.3.4 Wireless – Cellular

41 Personal wireless communication facilities are not classified as public utilities or essential services, but are a  
42 commercial service. Nationally, the Federal Communications Commission (FCC) regulates the airwaves and  
43 the personal wireless communications industry and is responsible for issuing construction permits for  
44 transmission facilities and licenses to operate wireless systems. All major national cell phone providers have  
45 a presence in San Juan County from T-Mobile, Verizon, AT&T and Sprint to smaller service providers. Overall  
46 capacity of the network with multiple new frequency bands opening enables for higher throughput and data  
47 rates. It is expected providers will expand their capacity and coverage area over time to accommodate their  
48 respective customer base.

50 Local governments regulate the development of the wireless communications network by specifying where

1 facilities can locate, applying buffering and setback requirements, etc. Federal case law from regulating  
2 facilities covered by the Federal Aviation Administration (FAA) has preempted local governments. The FAA  
3 reviews the location and height of proposed support structures to prevent interference with operations of  
4 airports and flight paths. The FAA regulates proposed towers that exceed 200 feet and smaller structures  
5 located within 20,000 feet of a major airport and 10,000 feet of a general aviation airport. The FAA does not  
6 have the authority to deny an FCC construction permit, but it can cite a proposed support structure as a hazard  
7 to navigation. (See the discussion on Airport facilities in Element II-D Transportation.) In 2014, San Juan  
8 County adopted a joint use wireless ordinance enabling the broader development of wireless infrastructure  
9 for essential public services.

### 10 11 **8.3.5 Telephone - Plain Old Telephone Service (POTS)**

12  
13 CenturyLink, based in Monroe, Louisiana, is the primary provider of POTS (Plain Old Telephone Service), to  
14 approximately 10,000 residential and business customers in the county. The number of locations decreases  
15 as consumers discontinue landline service or port their number over to VoIP providers such as Rock Island  
16 Communications, a subsidiary of OPALCO. In addition, CenturyLink also provides digital subscriber line (DSL)  
17 service; as well as private dedicated services (i.e. Ethernet) which helps meet the needs of telecommunication  
18 customers throughout the county.

19  
20 CenturyLink provides service to the county via a fiber optic cable network that connects all the major islands  
21 to the mainland. It provides these essential services to meet the needs of telecommuters and those who run  
22 businesses from their homes. Service is currently provided to Blakely, Brown, Center, Crane, Decatur, Henry,  
23 Lopez, Obstruction, Orcas, Pearl, San Juan and Shaw Islands.

24  
25 Geographic isolation and comparatively small resident populations have historically inhibited the extension  
26 of telephone service to some islands within the county, such as Stuart Island.

### 27 28 **8.4 INTERNET & CABLE SERVICES**

29 Fast, reliable Internet connection is increasingly important to economic development, health and safety, and  
30 daily life in San Juan County. Broadband Internet connection allows residents opportunities to work remotely  
31 and connect with others globally. Medical facilities and emergency services rely heavily on broadband Internet  
32 in order to provide modern, up-to-date care. The Economic Development Element of this Comprehensive  
33 Plan states the goal of "support[ing] development of reliable high-speed (100 Mbps or higher, or the current  
34 standard for urban regions of the U.S., whichever is higher) broadband infrastructure that enables the creation  
35 of jobs and improved educational opportunities for islanders, and increased competitiveness for the county."  
36 Internet utility infrastructure comes in several forms, including LTE fixed wireless, fiber, and cable.

37 Rock Island Communications provides broadband Internet via LTE fixed wireless and fiber in San Juan County.  
38 Rock Island is a subsidiary of OPALCO, as of 2015. Fiber connectivity is currently limited, but increasing as  
39 demand grows rapidly, with LTE providing service in areas awaiting fiber deployment. Cable  
40 Television and Internet services have continued to see a significant decrease throughout the county with  
41 CenturyLink, Zito Media and POGO Zone which operates the old cable tv facilities Mt. Baker Cable covering  
42 parts of Friday Harbor and Orcas Island respectively. This decline has been driven by the consumer move to  
43 online streaming services such as Netflix, Hulu and Amazon as broadband services via fiber and wireless  
44 increase, in addition to increased competition from satellite providers.

### 45 46 47 48 **8.5 COMMUNICATION SITES AND FACILITIES**

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Antennae and towers atop Mt. Constitution on Orcas Island are used to provide broadcast communications and electronic controls. As telecommunications technology and demands continue to change, service providers must retain the ability to expand existing and build new antennae and towers for operational purposes.

Mt. Constitution Sites, Inc. owns 160 acres of land within Moran State Park and leases communication towers to approximately 40 users. In all they have five towers with three primary sites ranging from 500', 400', to a 235' tower, located in the northeast corner of this property.

East of the 160-acres of private property mentioned above, the U.S. Coast Guard leases a one-acre site from the Washington State Parks and Recreation Commission (WSPRC) and operates a 100-foot tower with microwave dishes to monitor small vessels. KVOS leases a one-acre site from the WSPRC at the 2,409 summit of Mt. Constitution and operates a transmitter facility and a 150-foot tower. Washington State Department of Transportation (WSDOT) leases a one-acre site from WSPRC southwest of the KVOS site and operates two 70-foot towers. The U.S. Forest Service also leases one acre from WSPRC and operates two 70-foot towers. The University of Washington also operates a seismographic telemetry station at this site. This site may, at some point, no longer be sufficient for future forms of, or demand for, personal wireless services. The county adopted Ordinance 8-1997, which established a subarea plan and requirements for future personal wireless communication service facilities through Chapter 16.80 of the SJCC.

**[INSERT MAP OF TOWERS HERE—COMING FROM GIS]**  
<OPALCO recommends limiting location of utility assets, to minimize vulnerability from domestic and foreign terrorism. Energy and communication infrastructure is expected to be a prime target of attack>