"Case in Point"
Community-Scale Renewable Energy
at
Blue Lake Rancheria

Prepared for:
U.S. Department of Energy
Community Scale Renewable Energy Workshop
Palm Springs, CA
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www.bluelakerancheria-nsn.gov

Overview

- Introductions
  - Jana Ganion, Energy Director, Blue Lake Rancheria
- Energy Vision
- Renewable Energy Development Details
- Related Financial Initiatives
- Q&A

Mad River Residents

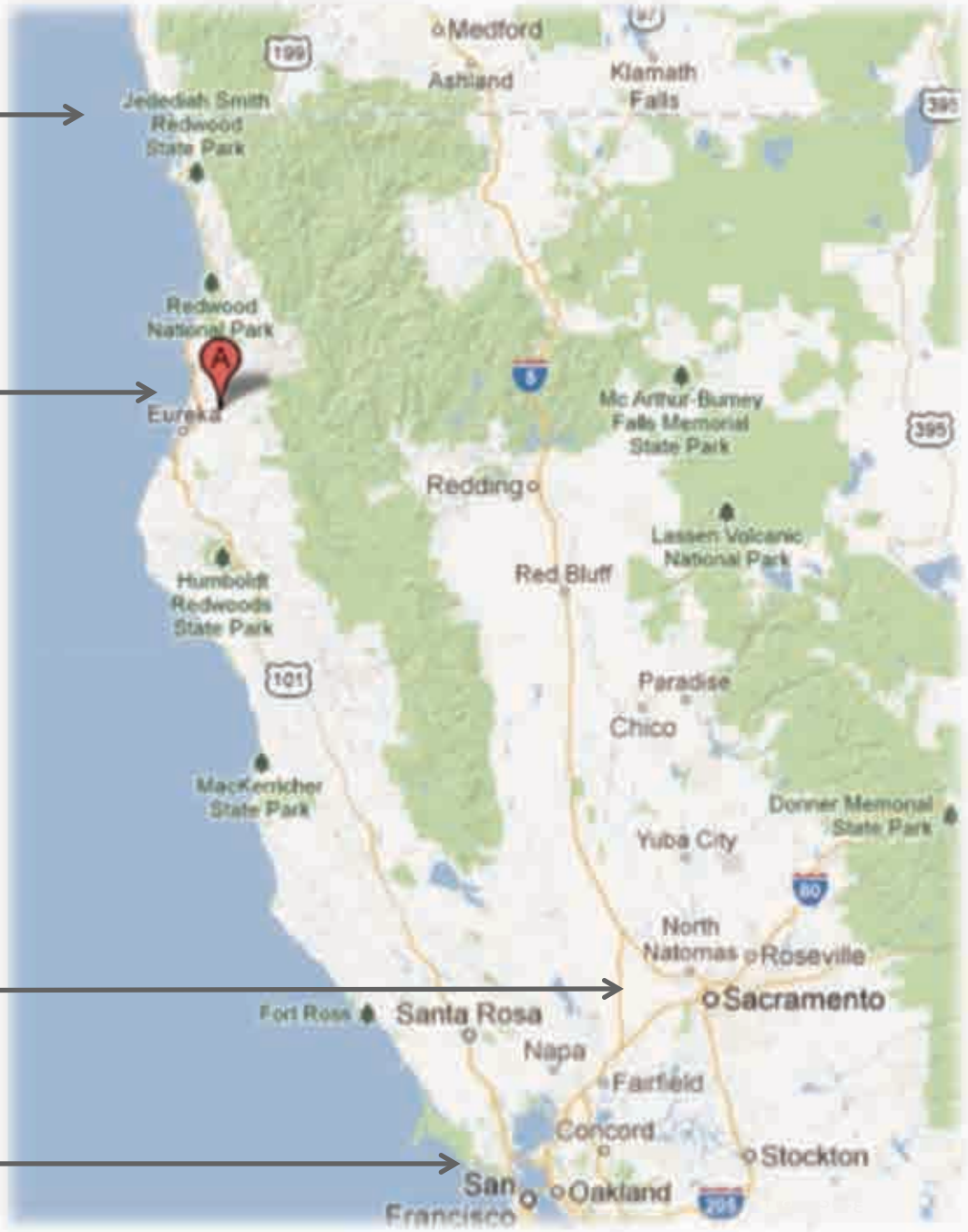
Photo courtesy of fishingwithjd.com

Oregon / California Border

Blue Lake Rancheria

Sacramento Region

San Francisco Bay Area



Blue Lake Rancheria, California

- Federally Recognized (1908) | 51 Members
- Tribal Government | 15 Divisions | 30 Programs
- ~100 Acres of Trust Land along the Mad River | Co-manager
- Economic Enterprises | ~400 EEs | 2,000 Visitors Daily
- 2015-16 White House “Climate Action Champion”
- 2014 “Integration Award” from PG&E
- Appointed to Dept. of Energy’s National Indian Country Energy and Infrastructure Working Group (ICEIWG)

Energy Vision

- **Climate Action / GHG Reductions / Community Resilience**
- Community-wide Energy Strategy / Aligned with Regional Plans
- Community Resilience / Energy Security
- Levelized (Predictable) Cost of Energy / Economic Development
- Goals: 40% GHG Reductions by 2018 (2014 baseline)
  100% renewable energy through onsite generation

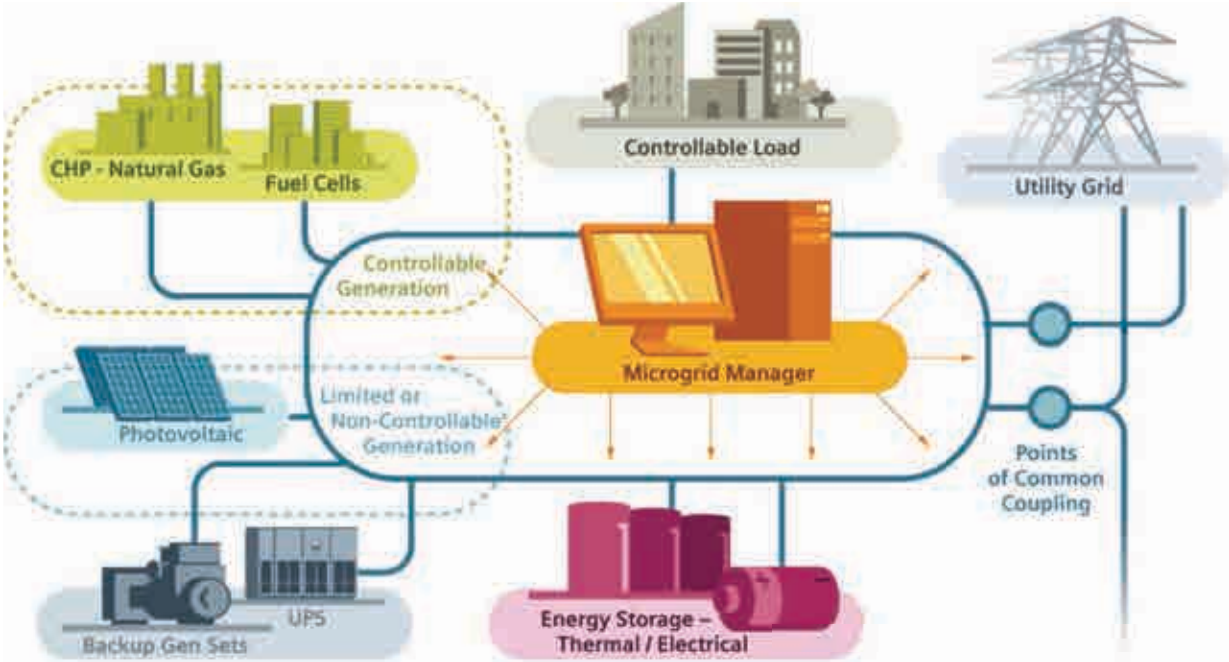
Microgrid Groundbreaking at BLR

Local Climate Change Impacts

- Big Wildfires
- Drought & Water Shortage
- Extreme Storms & Floods
- Landslides
- Infrastructure Damage
- Threats to Life & Safety

Microgrid Project

- Low-carbon, Community-scale Microgrid for Critical Infrastructure
- Purchase Utility Infrastructure
- ~1.6 MW of Onsite Power
- 1MWh of Battery Storage
- Layering multiple renewable power sources (solar, biomass/fuel cell)
- ~0.8 MW of Onsite Load (~6 buildings)
- Microgrid Control System



Microgrid Objectives

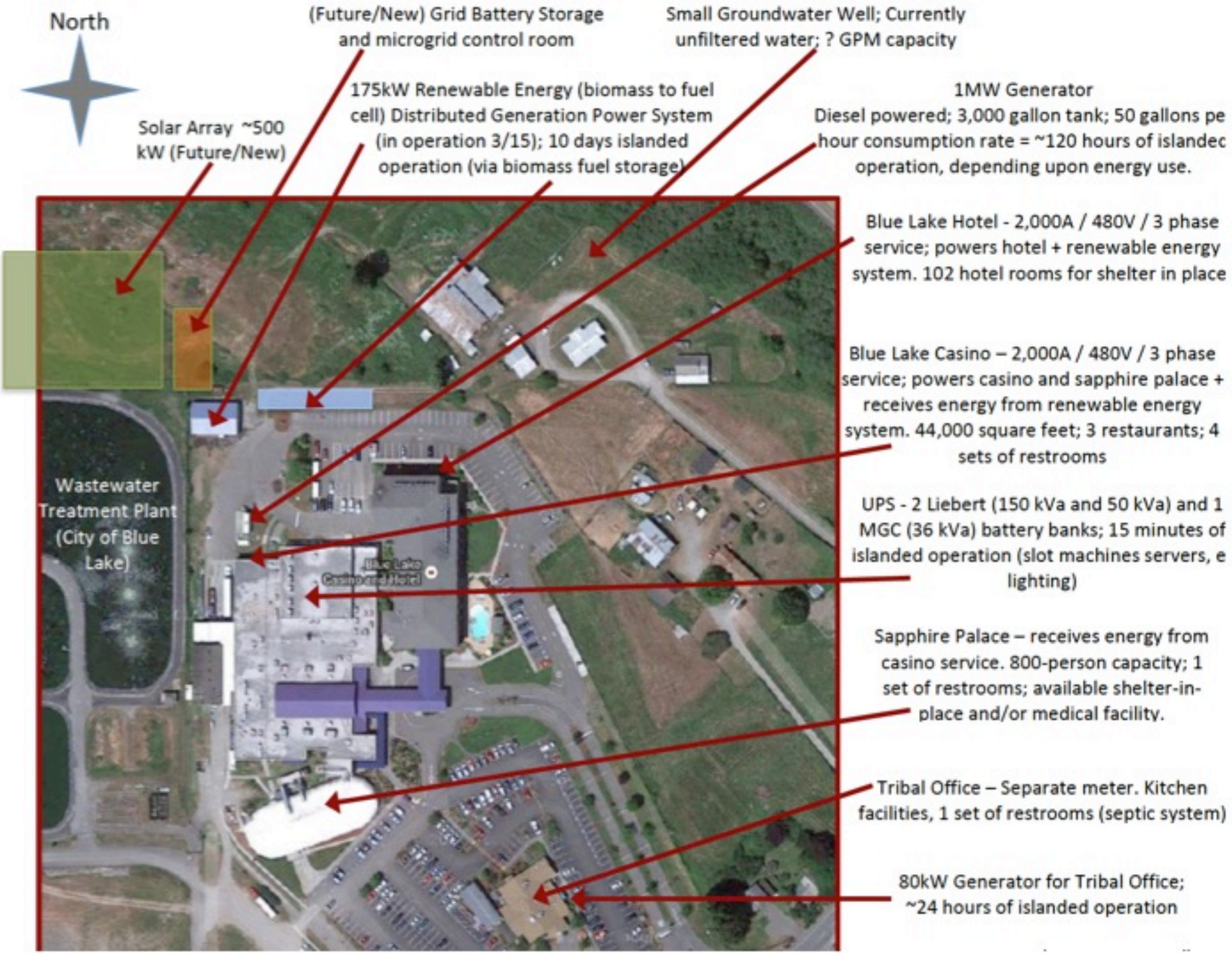
- Power a certified American Red Cross shelter-in-place
- Integrate multiple renewable energy sources, energy storage, and controllable loads
- >40% of annual energy production with renewables
- Demonstrate finer-grained demand response ability
- Displace fossil electrical energy consumption by ~1,500 MWh in year 1
- Replicable model

Microgrid Development Process

- Critical infrastructure review
- Design
  - Generation sources – 500kW solar; 1MWh battery storage; 175kW biomass/fuel cell; 1MW diesel gen set + 80kW gen set
  - Loads – tribal government office, casino 480kW, hotel 200kW, 3 restaurants, event center, and other buildings
  - Load shed + stability
  - Forecasting of economic factors (based on utility rate)
  - Forecasting of weather and other environmental factors
  - Anti-islanding safety + islanding functionality
    - UL 1741 + IEEE 1547
- Funding Application and Approval (California Energy Commission)

Microgrid Development Process

- Operational scenarios
  - Blue sky, business as usual
  - Mandatory demand response
  - Bid demand response
  - Short term outage ~< 3 days
  - Long term outage ~> 3 days
  - Black start
  - Reconnection back to the grid


North
(Future/New) Grid Battery Storage and microgrid control room
Small Groundwater Well; Currently unfiltered water; ? GPM capacity
175kW Renewable Energy (biomass to fuel cell) Distributed Generation Power System (in operation 3/15); 10 days islanded operation (via biomass fuel storage)
1MW Generator
Diesel powered; 3,000 gallon tank; 50 gallons pe hour consumption rate = ~120 hours of islandec operation, depending upon energy use.
Solar Array ~500 kW (Future/New)
Blue Lake Hotel - 2,000A / 480V / 3 phase service; powers hotel + renewable energy system. 102 hotel rooms for shelter in place
Blue Lake Casino – 2,000A / 480V / 3 phase service; powers casino and sapphire palace + receives energy from renewable energy system. 44,000 square feet; 3 restaurants; 4 sets of restrooms
Wastewater Treatment Plant (City of Blue Lake)
UPS - 2 Liebert (150 kVa and 50 kVa) and 1 MGC (36 kVa) battery banks; 15 minutes of islanded operation (slot machines servers, e lighting)
Sapphire Palace – receives energy from casino service. 800-person capacity; 1 set of restrooms; available shelter-in-place and/or medical facility.
Tribal Office – Separate meter. Kitchen facilities, 1 set of restrooms (septic system)
80kW Generator for Tribal Office; ~24 hours of islanded operation

Microgrid Partnerships

- Schatz Energy Research Center (SERC)
- Humboldt State University
- California Energy Commission
- Idaho National Laboratory
- National Renewable Energy Laboratory
- Pacific Gas & Electric Company (PG&E)
- Blue Lake Rancheria
- Technology Partners

Lessons Learned

- Equipment connection compatibility/compliance
  - Inverters smart enough to interact with microgrid management system and other components
- Electrical engineer, electrician, facilities manager
- Utility communication – early and often
- Timeline: final design 3/16; online 12/16
- Energy management system for HVAC
- State-funded project on Tribal lands (e.g., CEQA)

Community Scale Benefits

- Climate Action
  - Transition from conventional to renewable energy and fuels
  - Support regional, national, and global GHG reductions
  - Utilize cleanest forms of energy
- Community Resilience
  - Greater control over power infrastructure
  - Short- and long-term operability as a regional shelter-in-place
  - Emergency power with the ability to island
- Economic Benefits
  - Business-as-usual blue sky conditions – dispatch management
  - Retail energy savings - $40,000/year (2014) to ~$200,000/year (2017)
  - Renewable energy / energy efficiency incentives – Clean Power Plan, RECs
  - Utilize lowest cost source(s) of onsite energy
  - Economic development
    - Utility

Current and Upcoming Initiatives

- DOE Office of Indian Energy Policy and Programs START Project
  - Strategic communications for energy
  - M&V - GHG baseline to verify reductions
- DOE Technical Assistance
  - Building Efficiency
  - Cyber Security
- Clean Power Plan
  - Structure for more tribes to participate in the trading market

Thank you.
Questions?

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