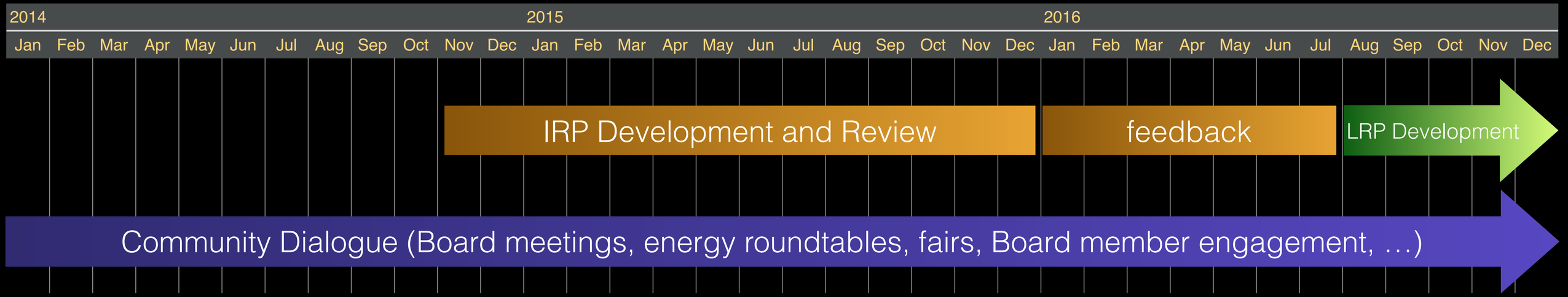
OPALCO 2015 IRP Overview

December 2015 Board Meeting

IRP and Long Range Plan: Timeline



Goals

Reliable (safe and stable)
Affordable (compared to other forms of energy, especially fossil fuels)
Clean (minimal carbon footprint)
Sustainable (for critical services)

Highlights

OPALCO's connection to the mainland is essential

to meet the enormous energy demand of the county, now and into the future

support expansion and firming up of intermittent local distributed renewables

Continue preparing the grid for the future

in good shape, with decades of service life ahead

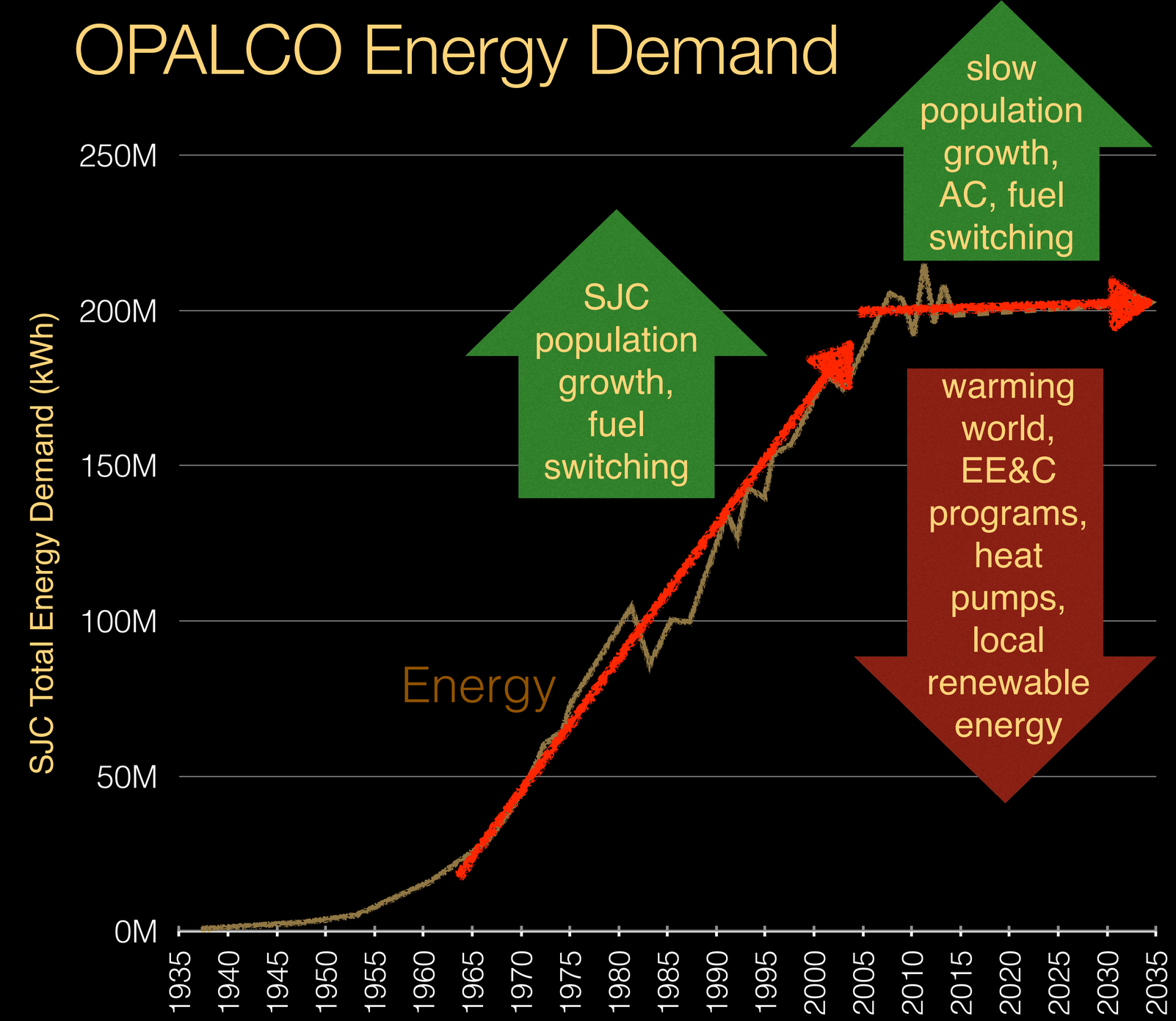
the grid will continue to be improved for increased efficiency, ramping up of local renewable energy, two-way energy markets, increasing conductor sizes and feeders, increased grid control backbone reach and capability, improved communications

Encourage energy efficiency + fuel switching

will help members reduce their **total** energy bill and carbon footprint

increase the efficiency of the grid, help keep the cost of electricity affordable

OPALCO Energy Demand



Source: OPALCO, Cisco VNI

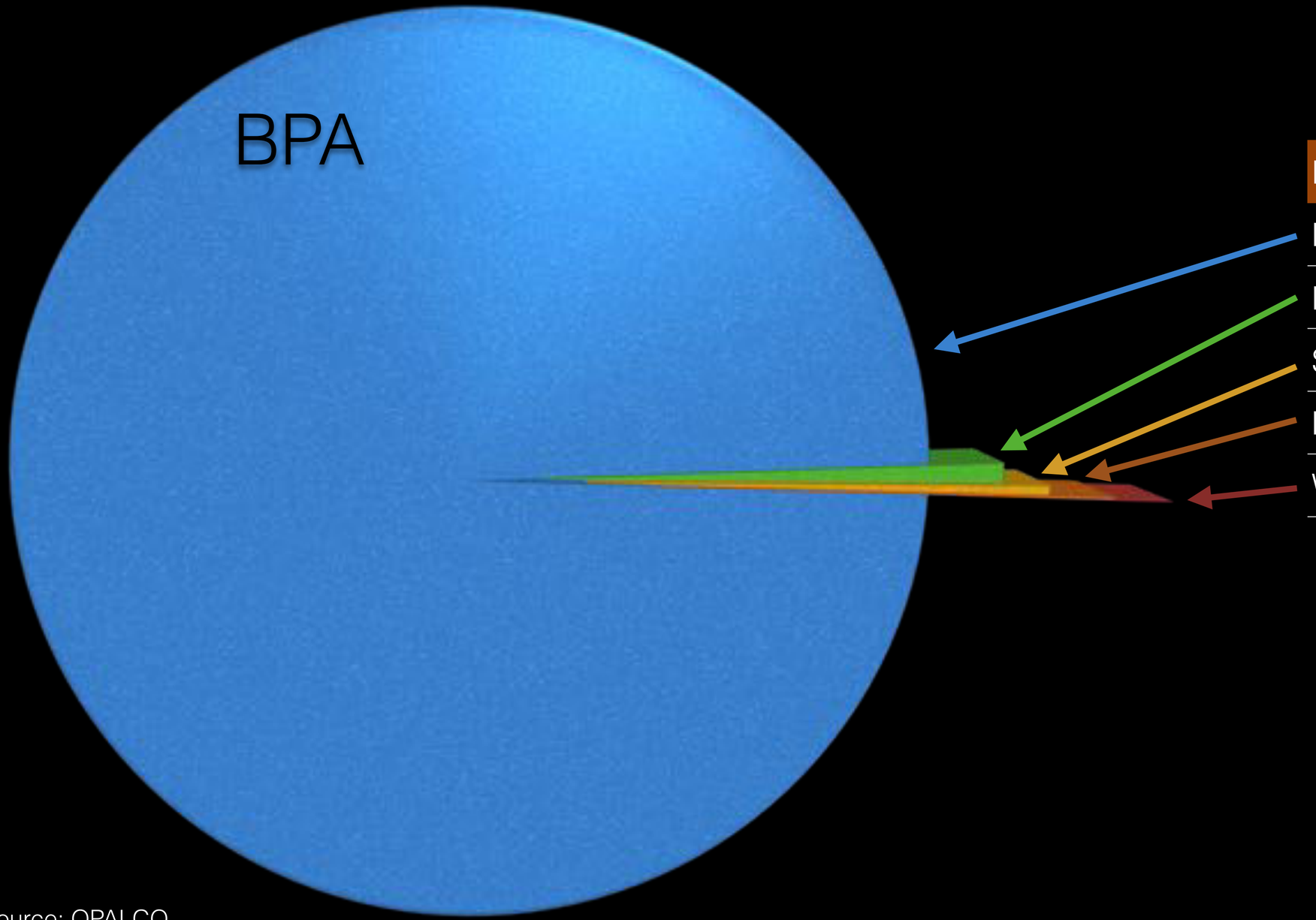
Headline

- In the 20th Century, SJC electric energy demand was driven by:
  - population growth and
  - fuel switching from wood, propane and fuel oil heating

- In the 21st Century, SJC energy demand is projected to be flat - driven up by:
  - slow population growth, and
  - emerging load from AC and fuel switching

  and driven down by:
  - Energy Efficiency & Conservation programs (EE&C),
  - reduced heat load due to a warming world, and increased use of super efficient heat pumps.

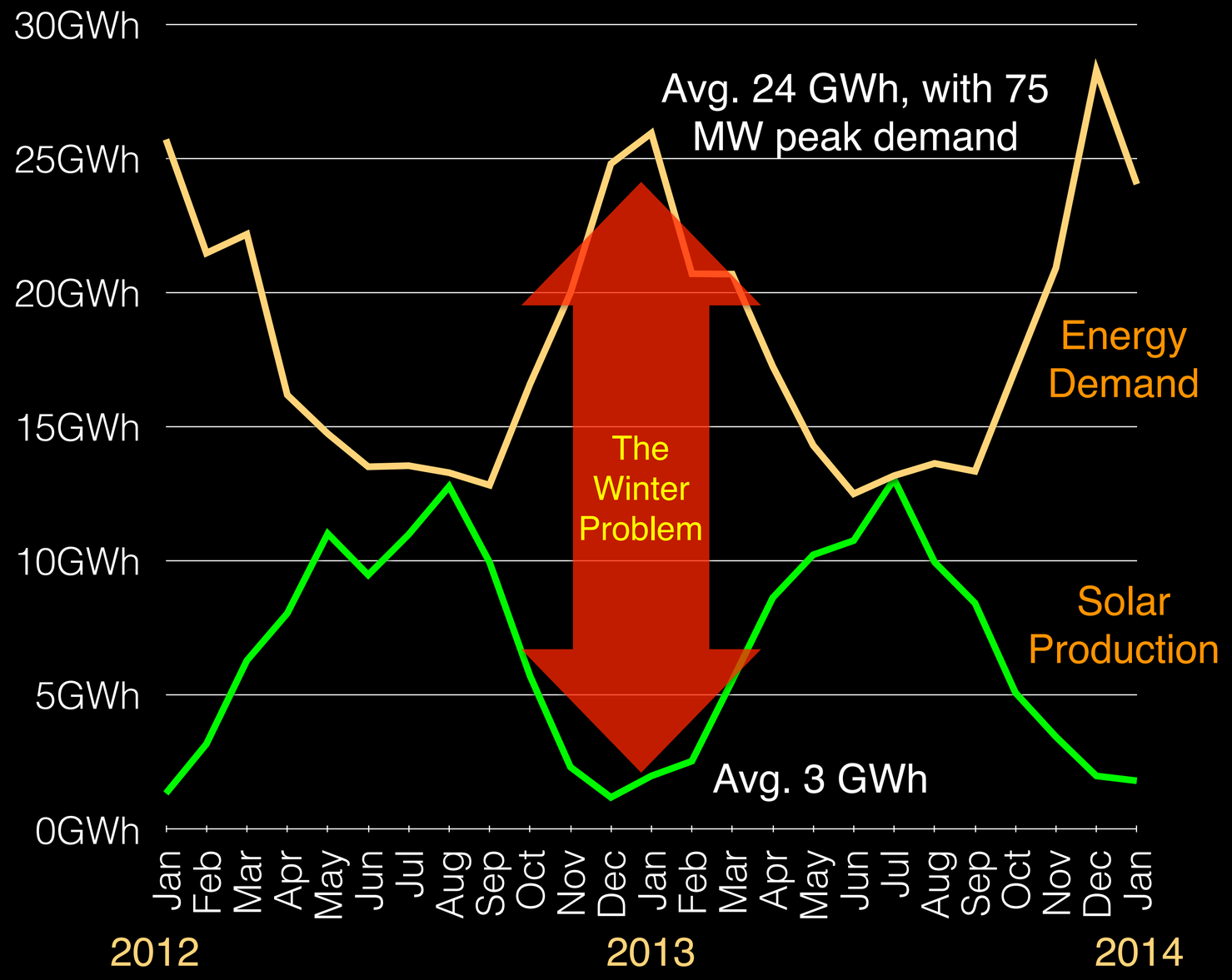
OPALCO Energy Sources: 2014



Energy Source	Production (kWh)
BPA	205,000,000
Energy Efficiency	1,418,000
Solar	624,723
Micro-Hydro	142,027
Wind	5,167
Total	207,189,917

Source: OPALCO

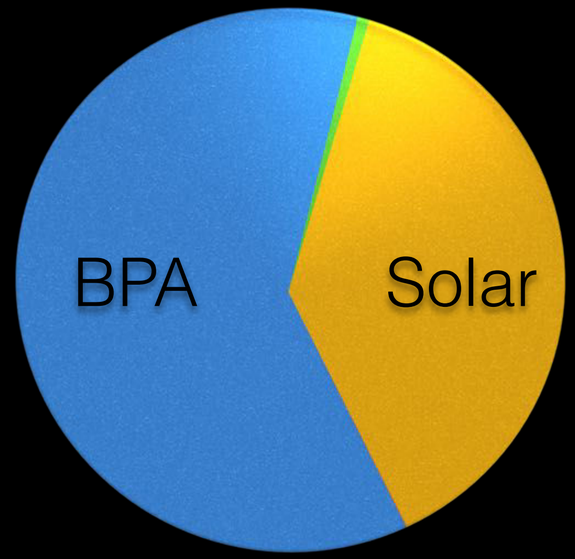
SJC Electric Consumption and Solar Example: Seasonal Load and Solar Production



Source: OPALCO, PVWatts

Notes

- OPALCO load 2012 to 2014
- Solar production from 10,000 rooftop arrays of 7.5 kW each = 75 MW
- Solar cost, about $150 million (not including financing and grid integration)
- Solar production is 180 degrees out of phase with load, needing winter sources like hydro, wind, tidal, pumped hydro,…



Intermittent Local Resources: Community Dialog

Every energy resource has pros and cons.

Over the next 20 years, where do we want our energy to come from?

Community Solar

Off Shore Wind Turbines
Denmark: 5,500,000 people
Retail electric rate: 34¢/kWh

Under Sea Tidal Turbines
Scotland: 5,300,000 people
Retail electric rate: 28¢/kWh

Integrated Resource Plan Roadmap

		2015	2016	2017	2018	2019	2020	2025	2030	2035
	Planning	IRP	Long Range Plan			IRP update	LRP update	IRP, LRP update	IRP, LRP update	IRP, LRP update
Energy Demand	Fuel Switching - heat pumps, EVs		keep usage rate less than fossil fuels, incentivize switching from fossil fuel heaters and transportation to heat pumps and EVs……							
	Energy efficiency programs	education, outreach, fairs, ……..		expand to balance fuel switching, a portion fuel switching funds revenue funds programs beyond BPA…….						
	Demand management		refine TOU rates, education	evaluate DRUs for peak shaving	prep DRU plan	ramp up DRU deployment……..				
Energy Resources	Community Solar: Schools	build complete	admin	admin	admin	admin	admin			
	Community Solar: Home and Business		planning, grant, subscriptions	build site 1, solar + storage (for solar and peak shaving)….		ramp up as cost and member interest dictate……				
	Utility Scale Solar, Wind, Tidal, …		evaluate, community dialog……				wind grid parity? ramp up	solar grid parity? ramp up	tidal grid parity? ramp up	
	TOG rates		design	beta test……..	rollout with smart standards…..					
	BPA	maximize BPA rebates……						contract review……		
	Strategic energy partners	evaluate	commit	join	cleaner fuel mix, peak demand averaging, ….					
The Grid	Grid: Distribution	continue under grounding to improve reliability, heavy up to reduce losses and fortify feeders for distributed local renewables…….								
	Grid: Submarine cables		Lopez - San Juan…….							
	Grid: Transmission			Decatur tap						
	Grid Control Backbone	buildout	fill wireless blackholes		integrate smart inverter and V2G standards……					
	Rock Island	acquire, accelerate neighborhood fiber, LTE, T Mobile…		pay back loan	continue expanding network….		profits start flowing back to co-op in 2021….			

Grid Parity

Grid parity occurs when an alternative energy source can generate power at a levelized cost of electricity (LCOE) that is less than or equal to the price of legacy power sources.

Integrated Resource Plan Roadmap

2015 2016 2017 2018 2019 2020 2025 2030 2035

Energy Demand

Reduce Total Energy Demand

(more efficient, clean, affordable)

- Energy Efficiency
- Fuel Switching (Electrify everything)
- Keep electricity cost less than fossil fuels

Energy Resources

Diversify Resources

(more reliable, affordable, local)

- Optimize BPA
- Build Community solar, storage resources
- Community dialog on tidal and wind energy
- Strategic partners (PNGC)

The Grid

Continue Upgrading Grid

(more efficient, reliable, ready for local distributed intermittent energy)

- Submarine cables
- Grid Control Backbone
- Robust feeders
- Smart Grid interface for Solar, EVs, home

Grid Parity

Ramp Up Solar, Wind, Tidal

(moderated cost)

Diverse intermittent local sources firmed up with local storage + BPA hydro

Reliable
Affordable
Clean
Efficient
Smart
Local

Discussion

Thank You