

# ENERGY NEUTRAL WASTEWATER TREATMENT:

*BUILDING RESILIENCY THROUGH  
RENEWABLE ENERGY*

**Logan Olds**  
**VVWRA General Manager**



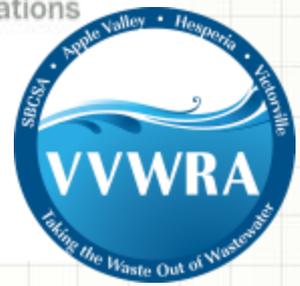
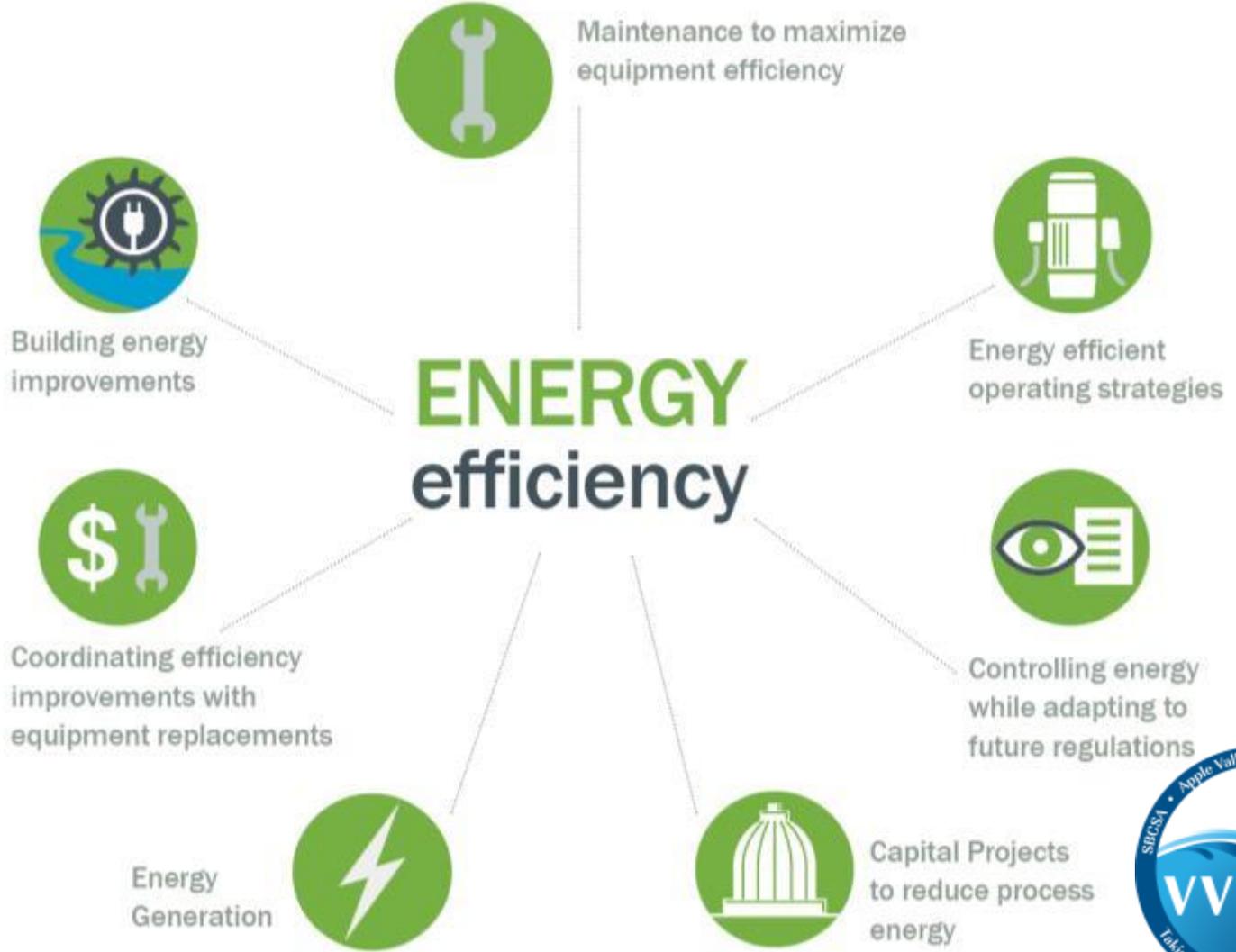
# VVWRA covers 446 acres



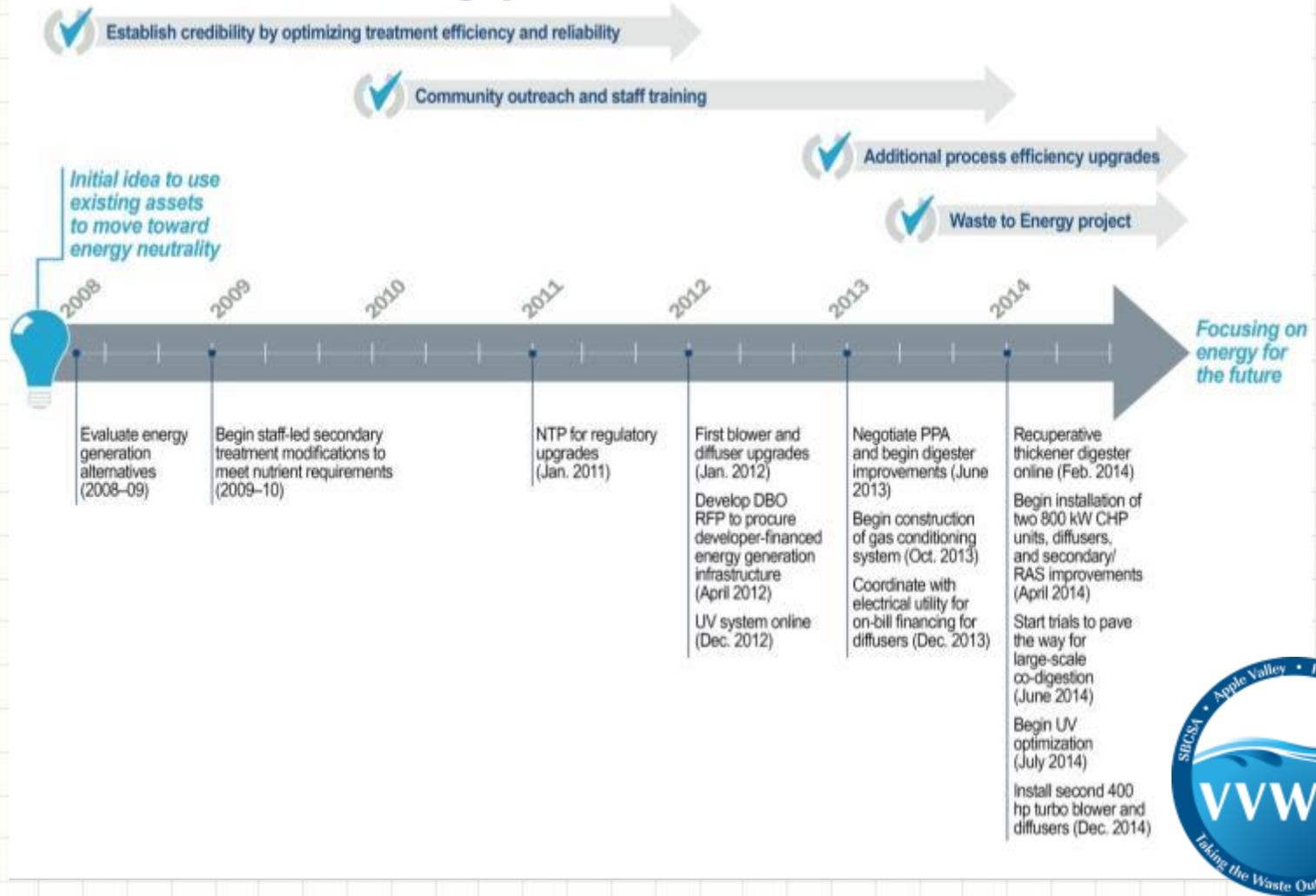
**Victorville, CA**  
**Mojave Desert**  
85 miles NE of Los Angeles



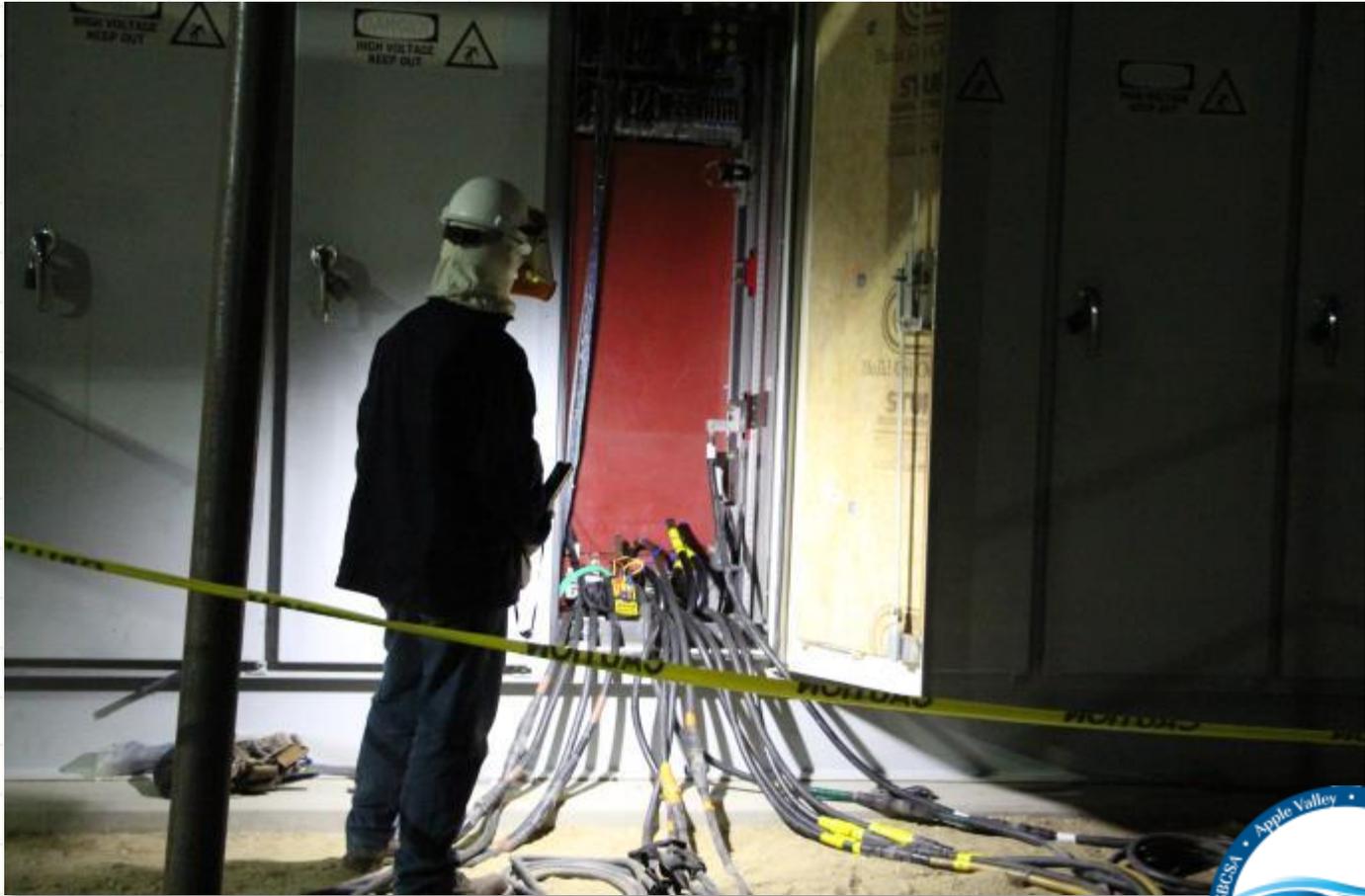
# WERF Barriers to Energy Efficiency Project



# Nutrient Limits Provide Impetus to Address Energy



# The struggle is real!



# UV Optimization

UV re-commissioning, supported by electrical utility incentive payments, eliminated over-treatment by using bioassay techniques to determine proper dosing, saving 5% of plant energy consumption. -- \$48,846



# December 2013

- Coordination with Edison electrical utility regarding On Bill Financing for Aquarius Diffusers--\$121,919





Would you  
throw  
away  
your used  
car?

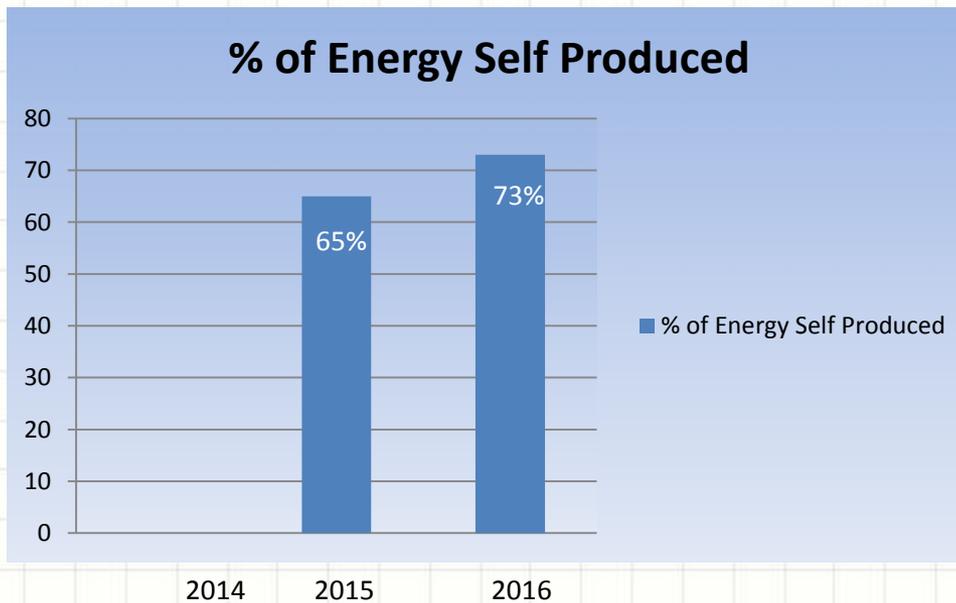
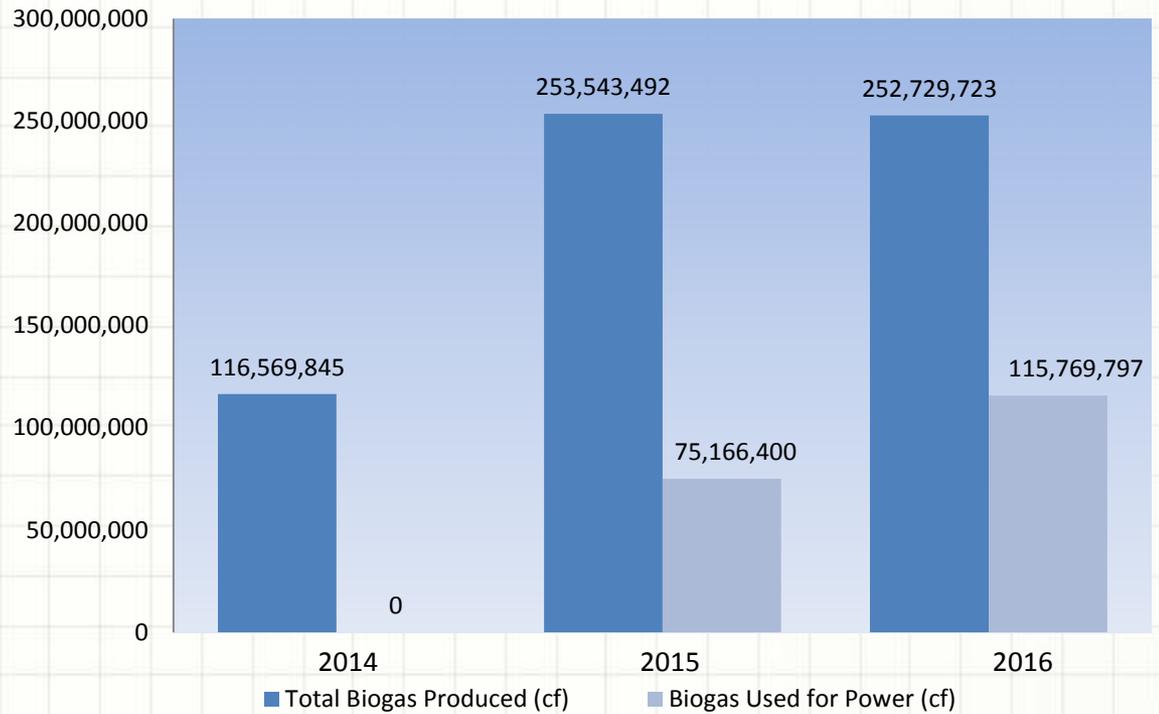


# Gas Conditioning to Reduce Natural Gas Cost

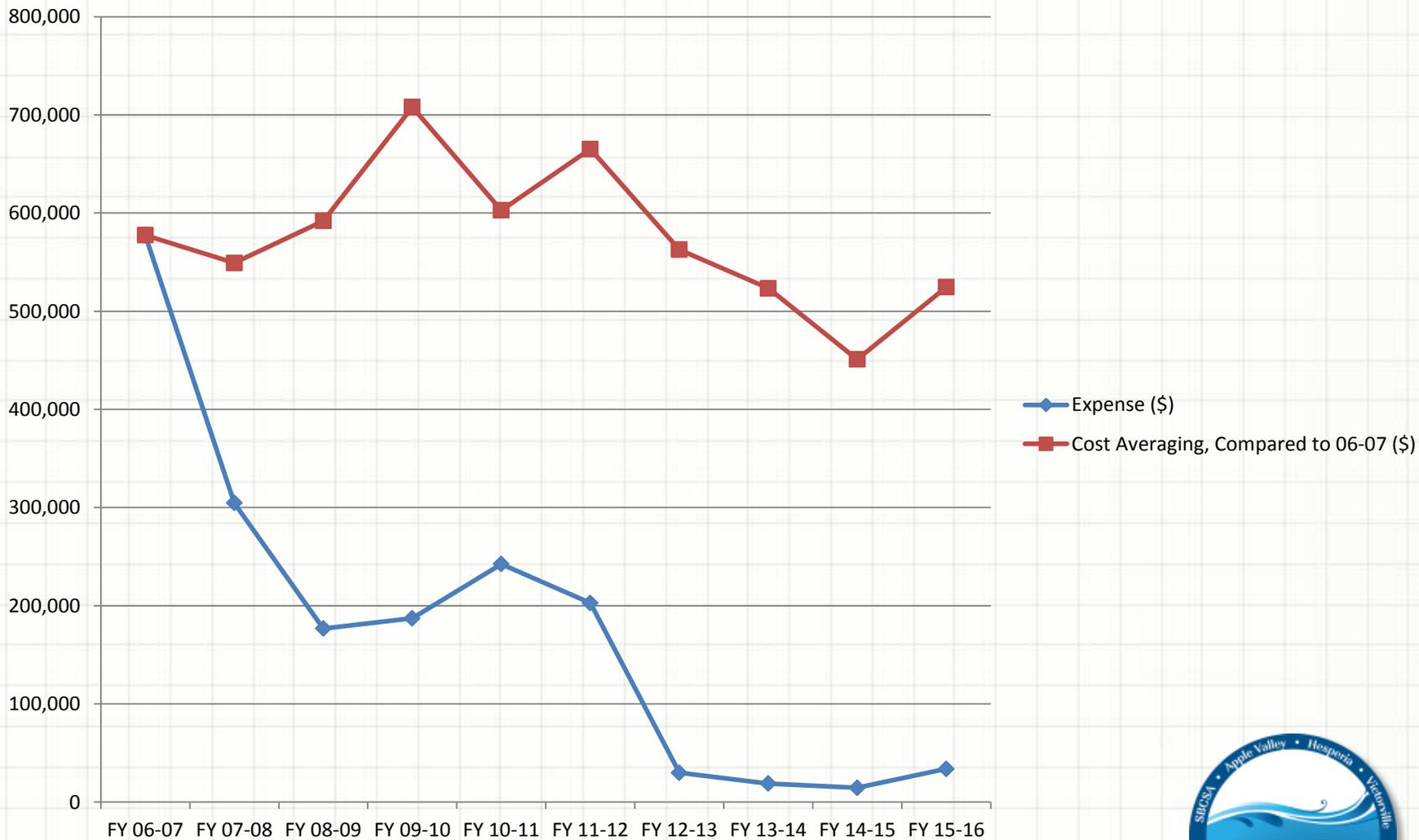
Gas conditioning was sized for double the normal biogas flow at the time of construction—with future co-digestion in mind.



# Biogas Generated



# Natural gas expense





# Average Total Nitrogen

2006

- Min: 7.49 mg/L
- Max: 11.9 mg/L

2006 Avg Dry Weather Q: 12.18 MGD

2016

- Min: 2.07 mg/L
- Max: 8.95 mg/L

2016 Avg Dry Weather Q: 10.49 MGD



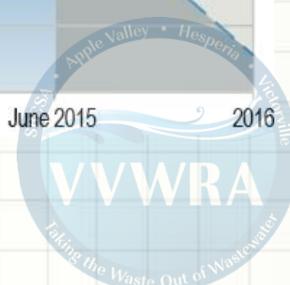
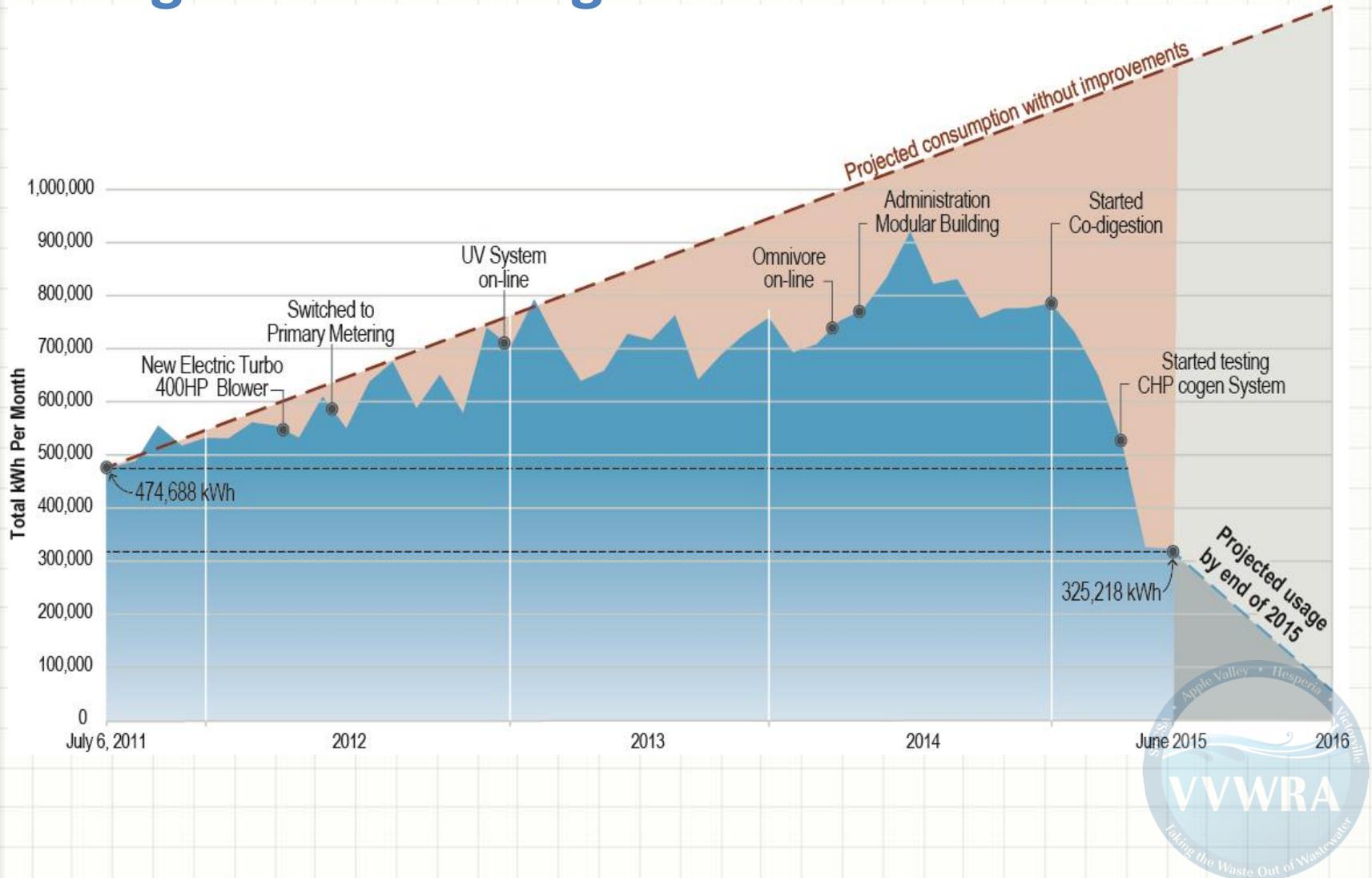
# Public Private Partnerships to mitigate risk



- Off book transactions
- Leveraging existing resources



# Energy Efficiency Flattens Power Increase Codigestion and Cogeneration Lead to Net Zero



# Energy Reliability by Producing Renewable Power

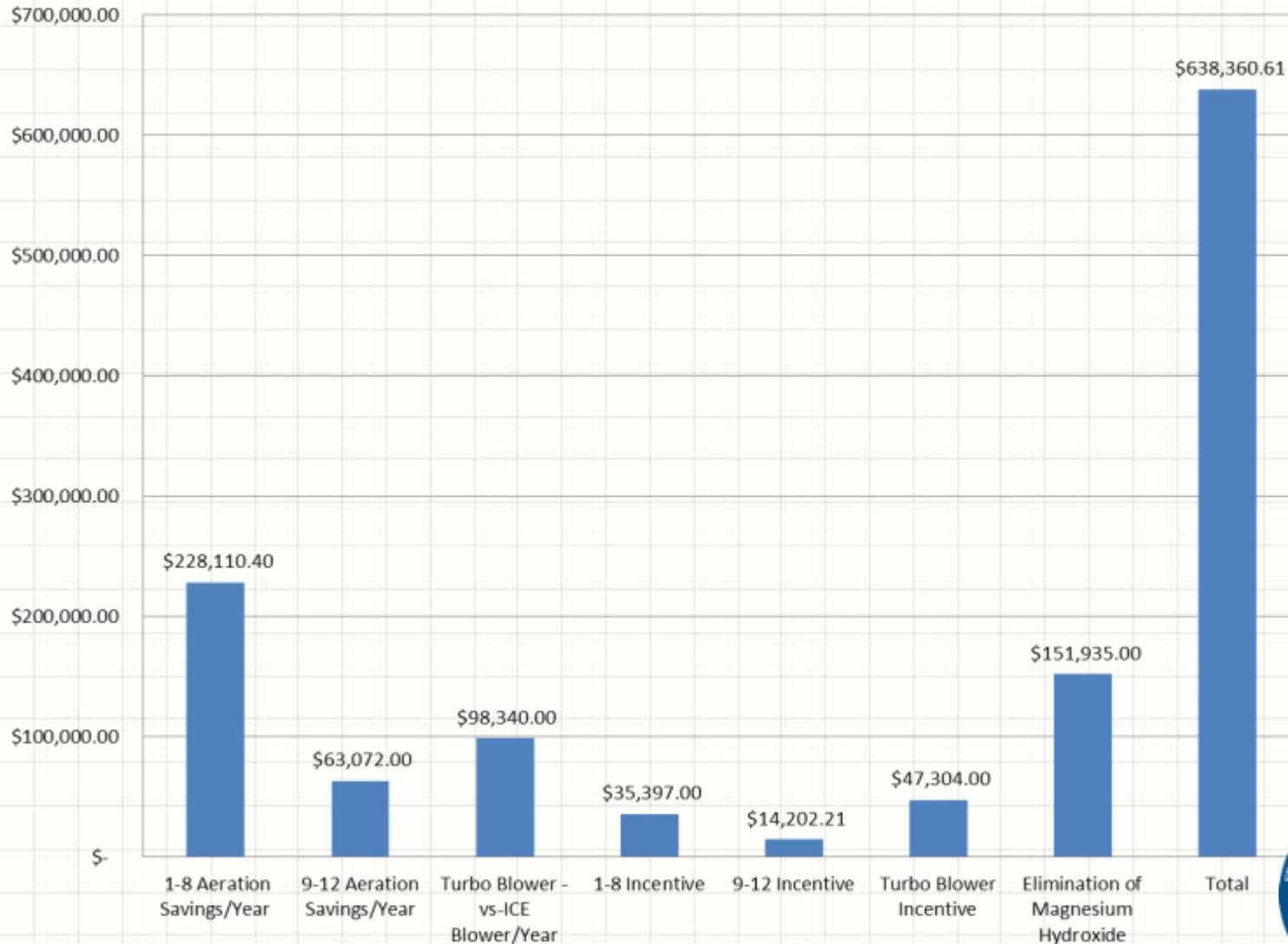


# June 2013

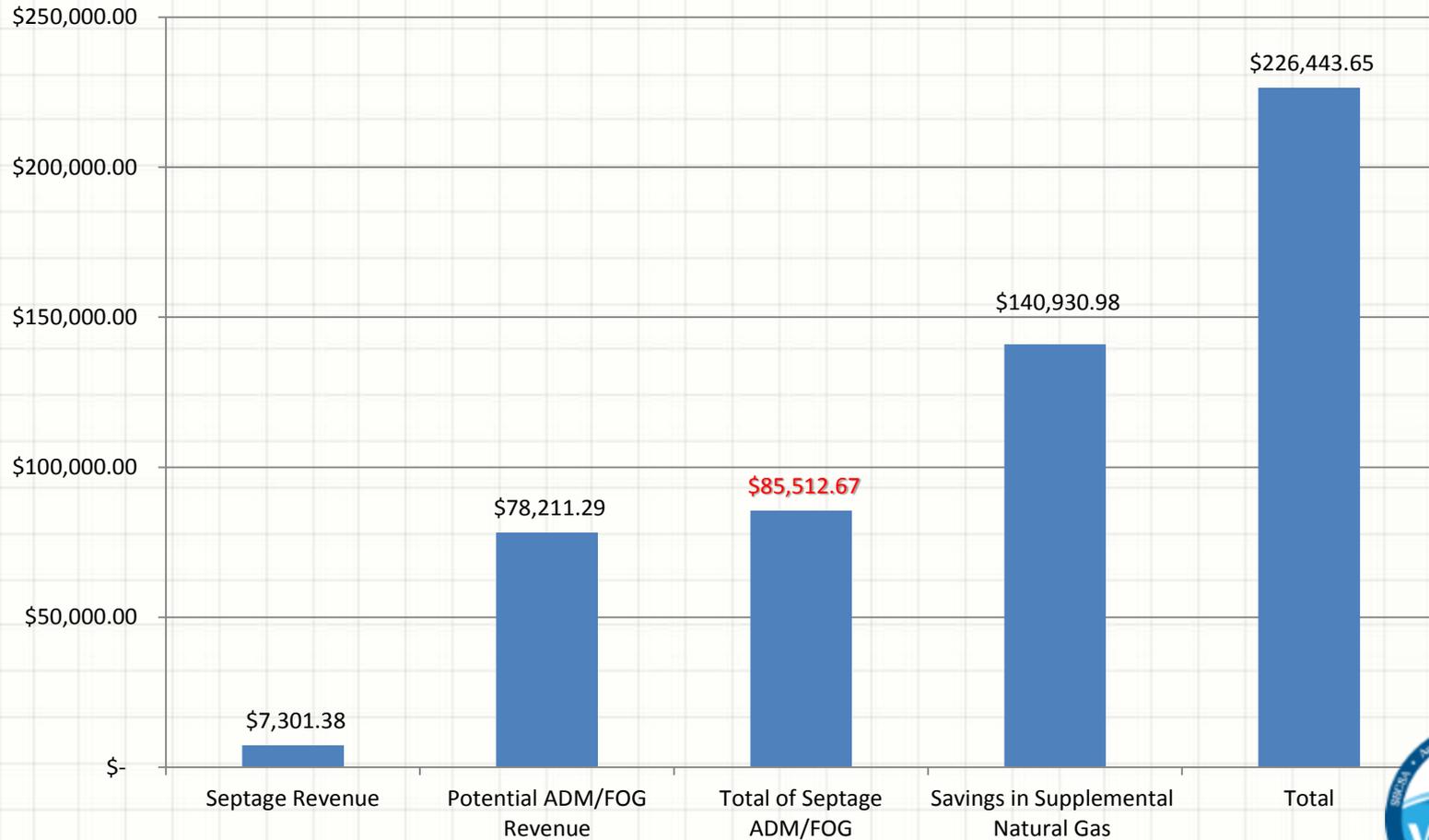
- Construction of Omnivore digester improvements begins
- Public Private Partnership (PPP) \$2.6 million



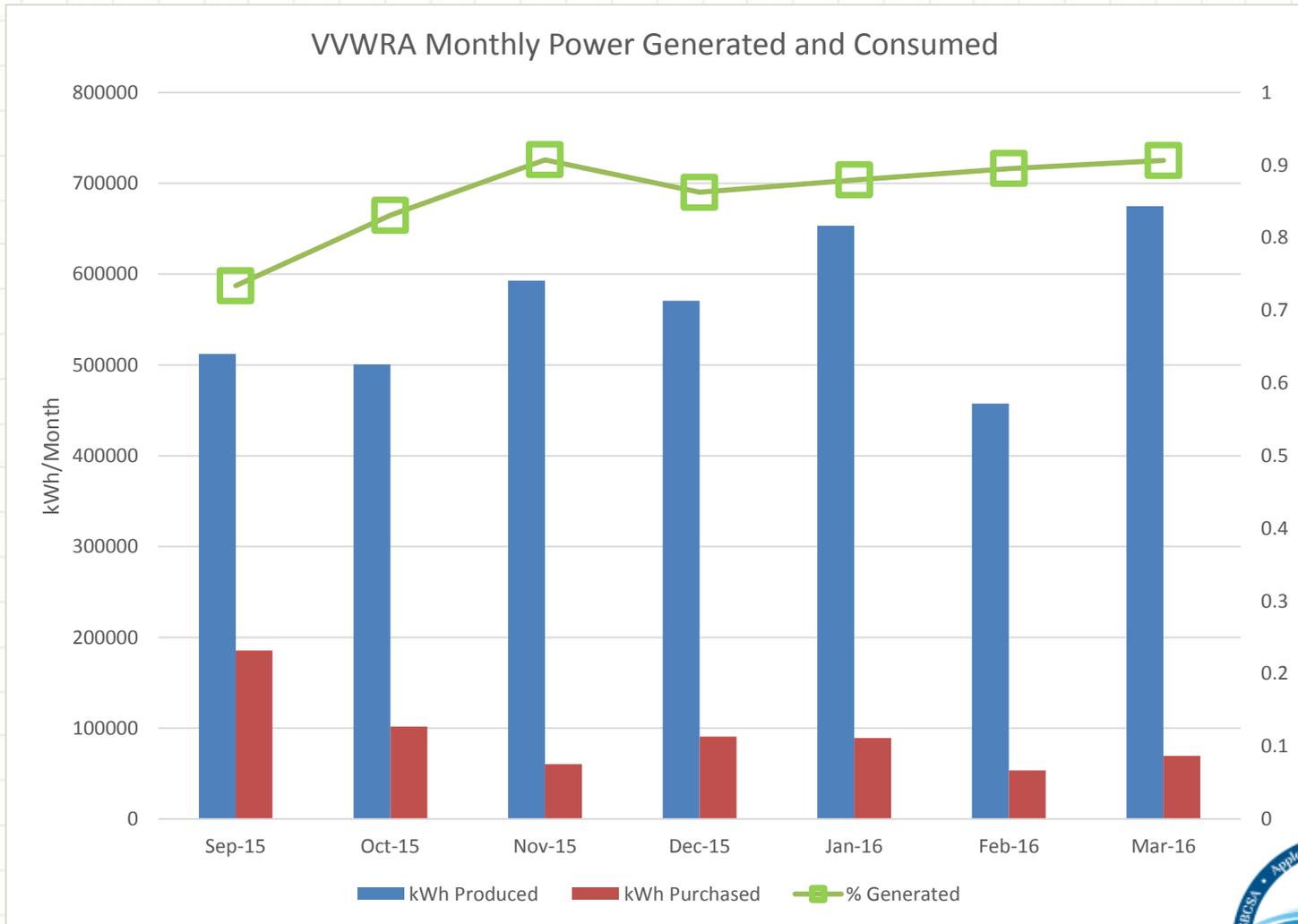
# Saving and Incentives



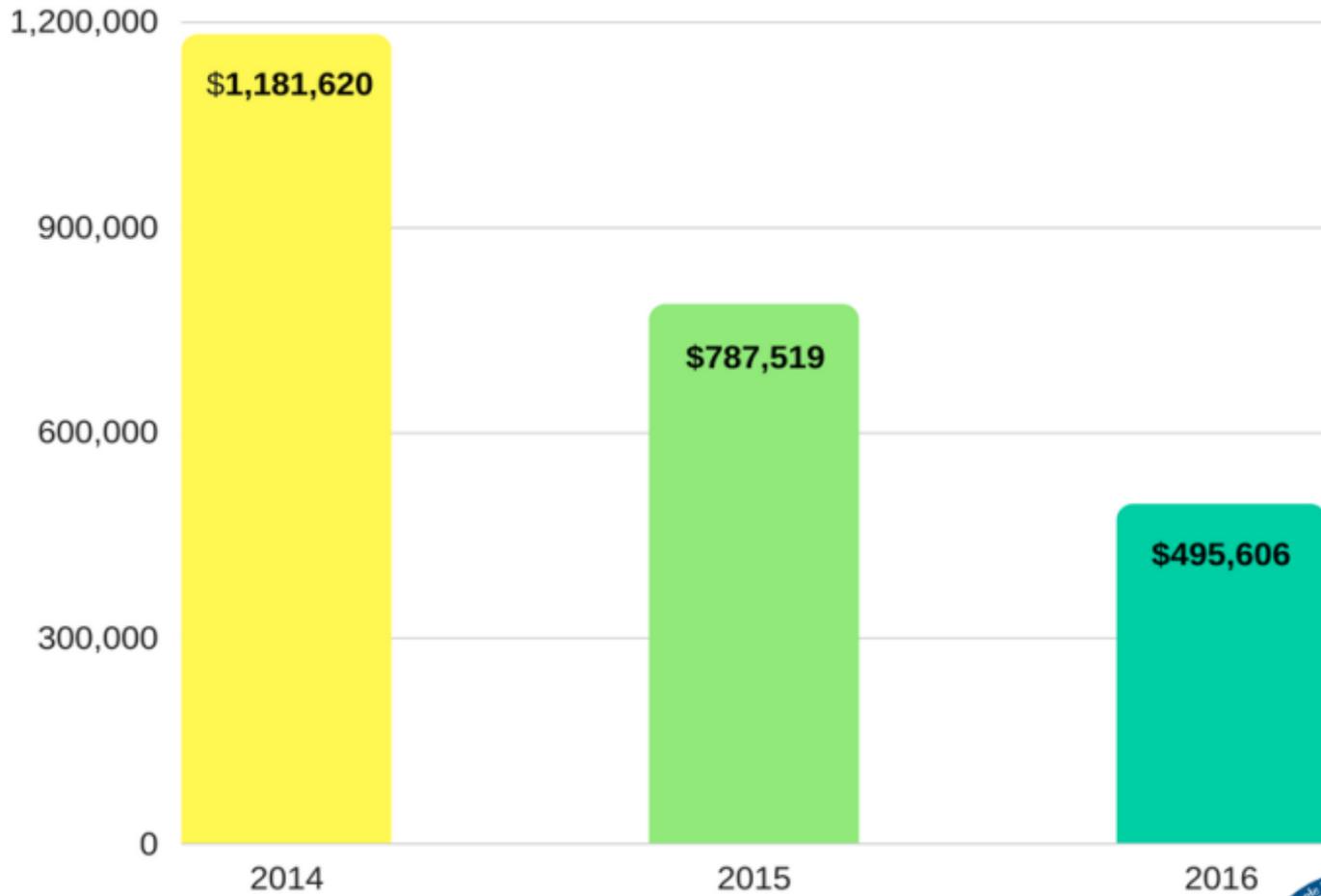
# ADM/FOG/Septage Potential Revenue



# Energy Consumption & Production



# SCE Power Purchased



# Estimated energy cost savings 2015-2034

<i>Electrical energy savings:</i>		<b><i>\$11,824,069</i></b>
<i>Natural gas savings:</i>		<b><i>\$ 8,432,780</i></b>
		<b><i>=</i></b>
<i>Total energy savings:</i>		<b><i>\$20,256,849</i></b>
	<b><i>+</i></b>	
<i>ADM/FOG revenue</i>		<b><i>\$ 4,582,656</i></b>

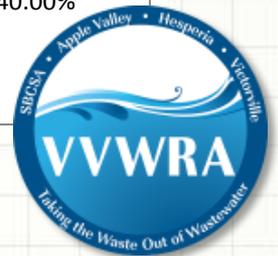
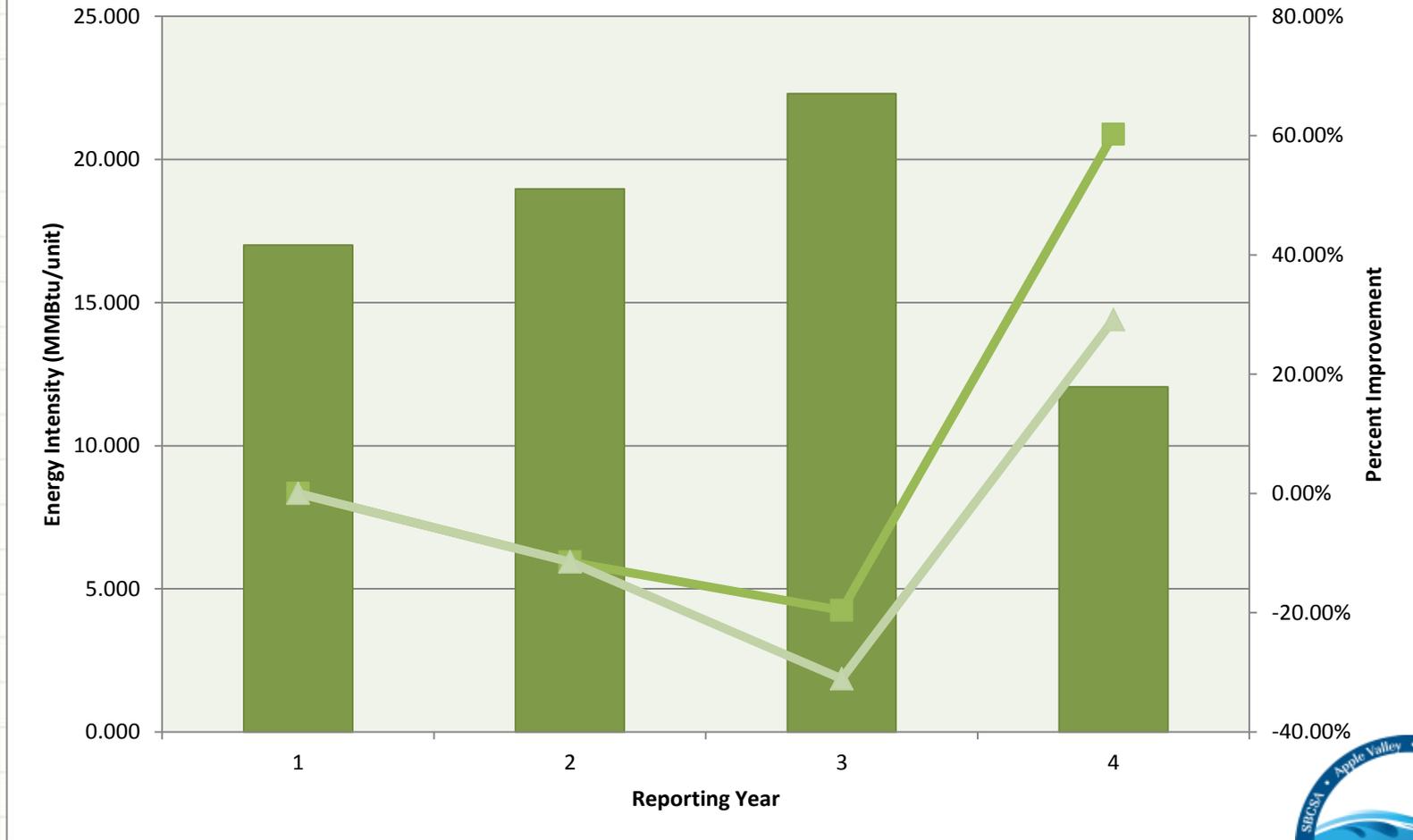




# DOE Better Plants Program



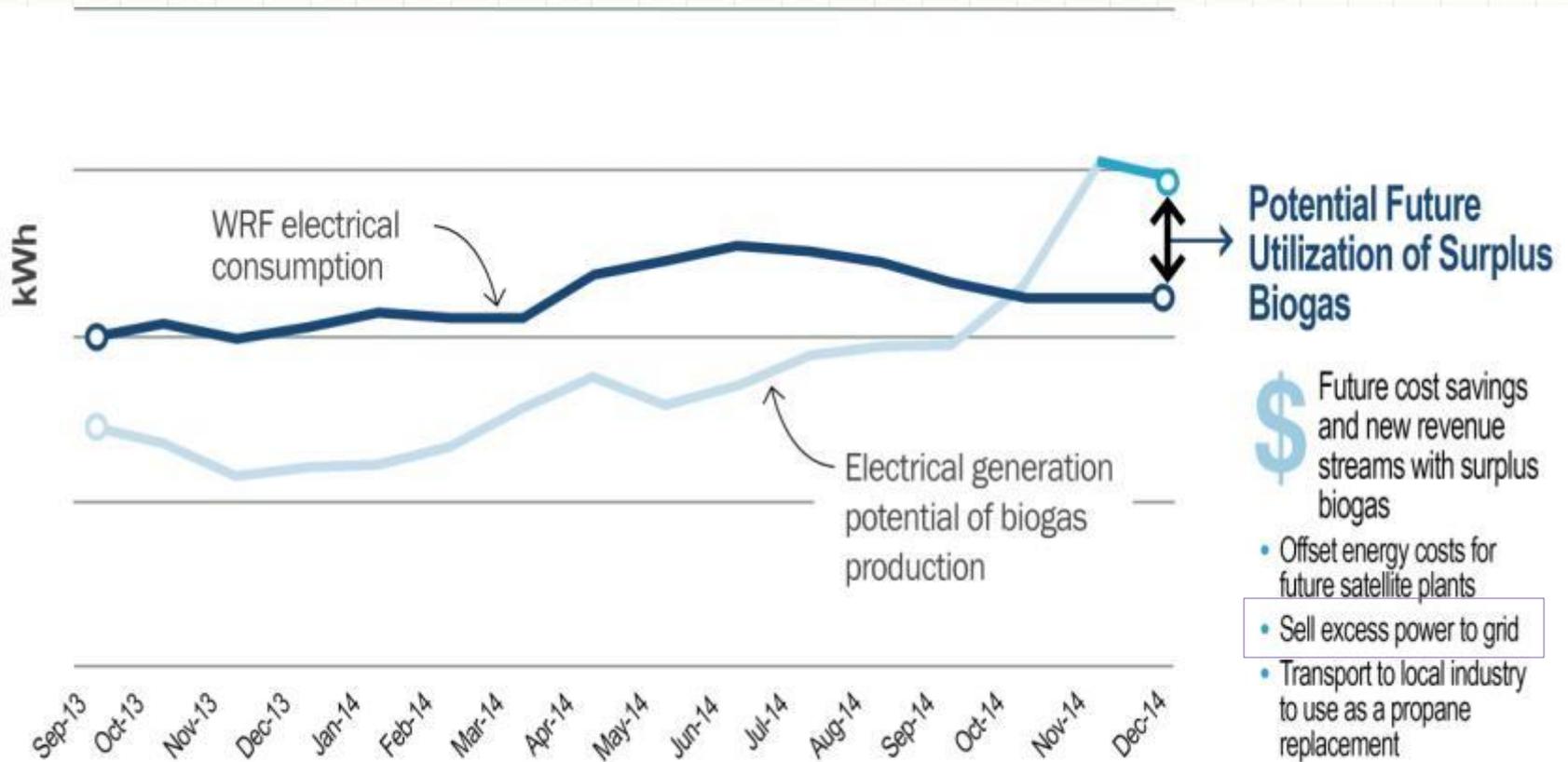
■ Production Energy Intensity (MMBtu/unit production) ■ Annual Improvement in Energy Intensity (%)  
▲ Total Improvement in Energy Intensity (%)



# Better Buildings Challenge Goal Achievers



# Beyond Net Zero



## Potential Future Utilization of Surplus Biogas

**\$** Future cost savings and new revenue streams with surplus biogas

- Offset energy costs for future satellite plants
- Sell excess power to grid
- Transport to local industry to use as a propane replacement



# What's next?

- Privatize three anaerobic digesters
- Building a flow cell battery storage system and microgrid
- Onsite grid reliability
- Reach and surpass net zero goal



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Reclamation Authority***

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