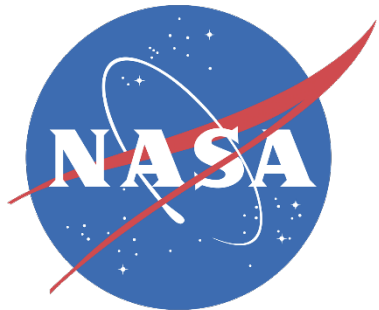


CASE STUDY  
NASA/CLARK ENERGY GROUP  
JPL ESPC CONTRACT

ISWG

May 25, 2017







Jet Propulsion Laboratory, Pasadena, CA



# Introduction:

- NASA contracted with Clark Energy Group for multiple Energy Conservation Measures (ECM) at the Jet Propulsion Laboratory, Pasadena, Ca
- Contract Value: \$35.9M (life cycle cost savings with \$18.8M invested)
- Contract Duration: 22 years



# ECM Summary

Domestic Water	Retrofit toilets, showerheads, faucets, and kitchen sprayers campus-wide
RO Water	Revise operations of reverse osmosis/deionized water system and install VFD and DI water pumps
Irrigation	Repair the existing system, upgrading components, install rain sensing equipment, install well water harvesting
Lighting	Upgrade lighting to T8s and LEDs
Electric Load Shifting	Install new controls with scheduling for chilled water filtration pumps

Envelope	Weatherization to reduce infiltration/exfiltration, insulation in targeted areas that are currently insulated, and window films to reduce solar heat gain
Solar PV	Install a 273kW PV system on the roof of Building 301
Retro-commissioning	Implementation Period Retro-commissioning performed in conjunction with Phase I and Performance Period Retro-commissioning (Note: This was expanded to include changes to the compressed air system as well)



Buildings 126, 156 & 198	Upgrade BAS and scheduling
Building 161 Mechanical	Upgrade BAS and scheduling, upgrade hot water plant to variable flow with OAT reset, and install DP sensor on chilled water loop
Building 170 Mechanical	Replace chiller, upgrade to variable flow chilled and condenser water loops, upgrade BAS and scheduling
Building 183 Mechanical	Replace chiller, upgrade to variable primary flow chilled water loop, upgrade BAS and scheduling, and upgrade variable flow condenser water loop
Building 200 Mechanical	Replace chiller, upgrade to variable flow chilled water loop, and upgrade BAS and scheduling
Building 233 Mechanical	Replace chiller with Turbocor and reset, upgrade to variable flow chilled and condenser water loop, convert AHU to VAV, and upgrade BAS and scheduling
Building 238 Mechanical	Upgrade BAS and scheduling, and upgrade to variable flow chilled water loop
Building 303 Mechanical	Replace chiller, upgrade to variable primary flow chilled water loop, and upgrade to variable flow condenser water loop
Building 317 Mechanical	Upgrade BAS and scheduling, and reset AHU duct static pressure



# Focus of Presentation

Building Envelope and Weatherization





















# Weatherization Activities

- Locations: 115 Buildings
  - Window Film
  - Weather-stripping on doors
  - Thermal boards at soffits
  - Calking of building penetrations

















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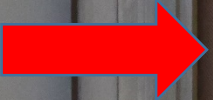


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# Weatherization Financials

- Cost of weatherization ECM: \$1.7M
- Annual Savings: \$132K