

# LBE 101: Benchmarking

## Introduction:

- Dan Lauf, Program Director, Center for Best Practices - Energy, Infrastructure & Environment

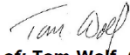
## Speakers:

- Julien Gaudion, Deputy Secretary, Property and Asset Management, Pennsylvania Department of General Services

At DGS, our mission is to help government operate more efficiently, effectively, and safely, delivering exceptional value for all Pennsylvanians.



# Energy Conservation & Sustainability EO

<b>Executive Order</b> Commonwealth of Pennsylvania Governor's Office	
<b>Subject:</b> Commonwealth Leadership in Addressing Climate Change and Promoting Energy Conservation and Sustainable Governance	<b>Number:</b> 2019-01
 <b>By Direction of: Tom Wolf, Governor</b>	<b>Date:</b> January 8, 2019

WHEREAS, the Constitution of Pennsylvania protects the Commonwealth's citizens' rights to life, liberty, possessing and protecting property, and happiness. Further, the Constitution of Pennsylvania and various other laws also preserve the Commonwealth's citizens' right to clean air, pure water, and the preservation of the natural, scenic, historic and aesthetic values of the environment; and

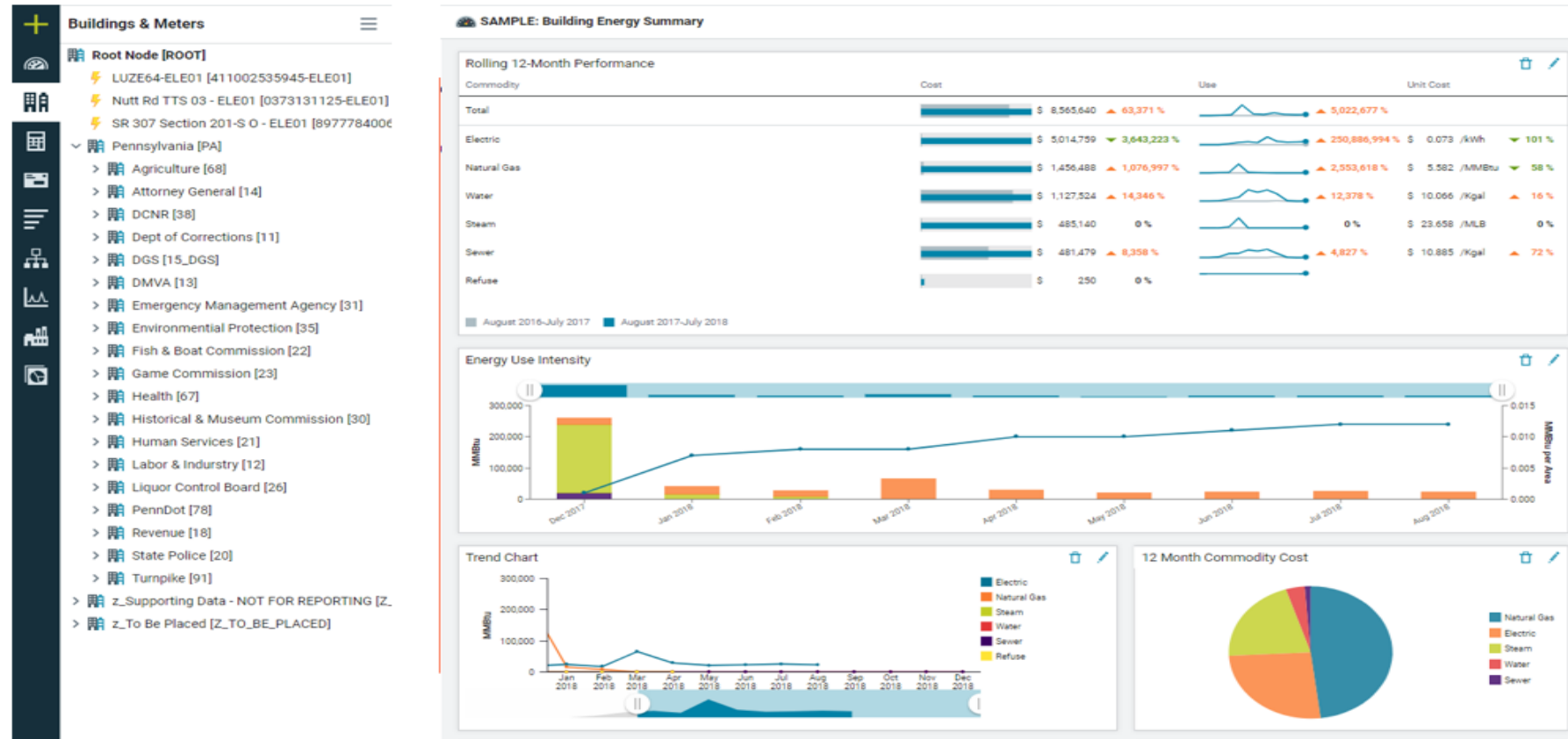
WHEREAS, the Commonwealth government has long protected, valued, and recognized these rights, specifically under *Executive Orders: 1973-9 Environmental Protection by State Agencies; 1980-3 Life Cycle Costing; 1998-1 Governor's Green Government Council; 2002-8 Governor's Interagency Task Force on Energy; and 2004-12 Energy Management and Conservation in Commonwealth Facilities*; and

WHEREAS, climate change impacts in Pennsylvania are real and continue to put Pennsylvanians at risk: in recent years, extreme weather and natural disasters have become more frequent and more intense. Like many areas of the United States, Pennsylvania is expected to experience higher temperatures, changes in precipitation, and more frequent extreme weather events and flooding because of climate change in the coming decades; and

WHEREAS, the Commonwealth is committed to further reducing its net greenhouse gas emissions which, left unchecked, would create a high risk of irreversible, widespread, severe climate impacts in the Commonwealth and beyond; and

- Leading by example with Goals for State Agencies
- Reduce overall energy consumption by 3% per year
- Collective Agency Goal – 21% reduction by 2025
- Measuring performance through commonwealth wide agency energy consumption platform
- GreenGov Council leadership

# EnergyCAP Summary of Benefits



- **Standard platform capturing all agencies**
- **Electricity and natural gas tracking and reporting**
- **Broad automated visibility**
- **Benchmark year - fiscal year 2017/2018**

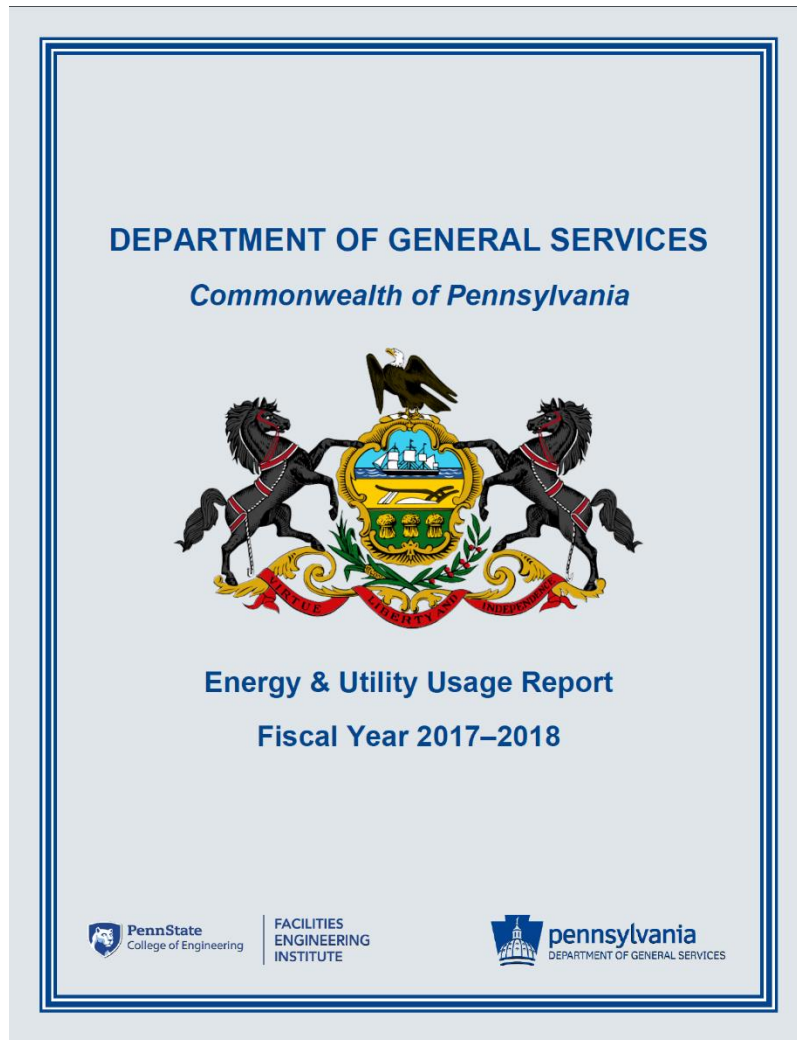
# CWOPA Utility Bill Management – Project Benefits

## **EnergyCAP Project Goals:**

- Define the current baseline for electricity and natural gas cost and consumption across all Commonwealth buildings. (Total energy usage (mmBtu) and cost)
- Improve local facilities managers' visibility of utility bills to investigate any discrepancies identified in the bill.
- Ensure all electricity and natural gas accounts are being centrally procured and included in DGS statewide pricing.
- Help agencies implement facilities improvements to reduce energy consumption
- Consistently measure year-over-year changes in electricity and natural gas use and cost, implementing efforts to reduce consumption each year.



# DGS management of commonwealth facilities

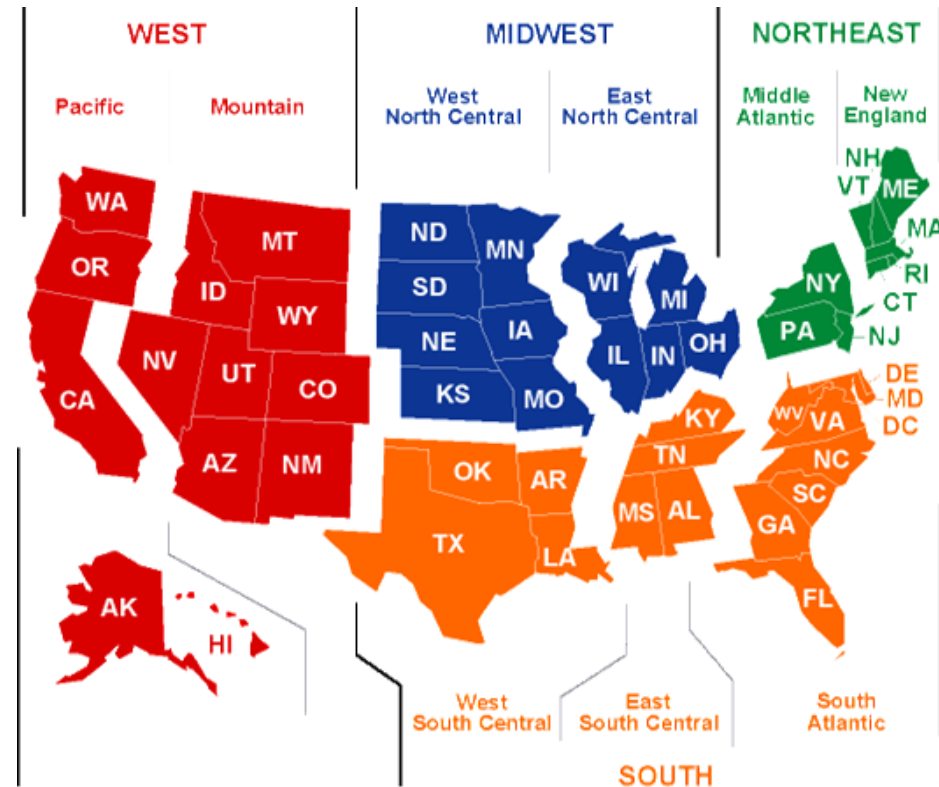


- 7.6 million square feet of conditioned space
- Capitol Complex and Offices
- Track energy and water consumption and costs
- Btu by square foot energy intensity tracking
- Fleet Benchmarking, Validating Efficiency Improvements, Measuring Performance

# Commercial Building Energy Consumption Survey (CBECS)

- U.S. Energy Information Association (EIA) Survey

- ▣ 2012 – Energy Use Intensity (EUI) Survey Baselines
- ▣ Northeast Region – Green States
- ▣ CBECS for Offices Category
- ▣ Northeast Region 93,900 BTU/sq.ft.
- ▣ National Average 77,800 BTU/sq.ft.
- ▣ PA DGS Average 77,829 BTU/sq.ft.



# DGS procurement of energy supply

## MANAGING OUR ELECTRICITY

### PROCUREMENT STRATEGY (2015-2017)

Leveraging  
Technology and  
Strategic  
Partnerships

**E**nergy  
**R**isk  
**M**anagement  
**A**pplication

Penn State  
Facilities Engineering  
Institute

- ▲ Increase market visibility
- ▲ Apples-to-apples bid comparison
- ▲ Quick electronic award system
- ▼ Reduce market-based price risk

#### Rethinking Bundling and Aggregation

FROM

Individual  
Contracts

DOC SCI

\$/KWH

DHS HOSPITAL

\$/KWH

DMVA VET HOME

\$/KWH

PADOT TUNNEL

\$/KWH

TO

Bundled  
Contracts

DOC SCI

DHS HOSPITAL

PADOT TUNNEL



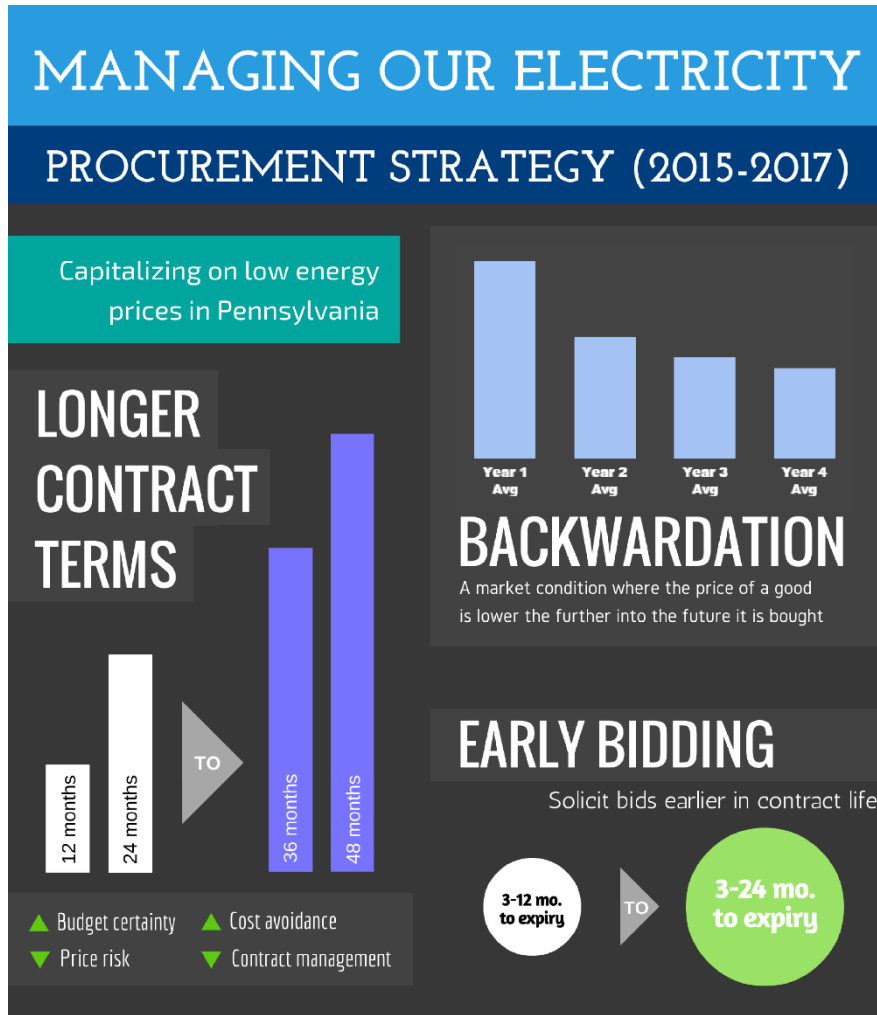
\$/KWH

- ▲ Increase savings as a bundle
- ▲ Buying power of the Commonwealth
- ▲ Ease of contract management
- ▼ Reduce administrative burden

- Annual total energy spend of \$125M with electricity accounting for \$85M
- Managing over 10,000 individual CWOPA electricity accounts across PA
- Act as a large scale consumer reducing bid prices and administrative burden
- Solicitations via ERMA platform including PASSHE schools and CoStars local government partners



# DGS procurement of energy supply



- Aligning customer agency goals while taking advantage of market conditions
- Steadily reduce weighted average rate from 5.8 cents in 2015 to 4.8 cents through 2022
- 4.8 cent rate is fixed including capacity and transmission
- Actual electricity contract savings of over \$25M from 2015 – 2022
- Rates fixed through Dec 2022

# GESA Program Project Overview

## GUARANTEED ENERGY SAVINGS PROJECTS

**10** GESA Projects



Total Project Investment



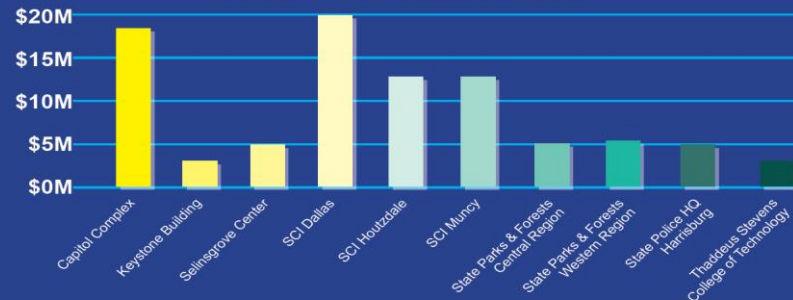
**\$89.9M**

Minimum Annual Savings



**\$4.6M**

### PROJECT INVESTMENT



### MINIMUM ANNUAL ENERGY SAVINGS EQUIVALENT TO:



More than 3,100  
Cars off the road



More than 37,000  
Trees planted



More than 1,500  
Homes' energy use

- Path for agencies to procure energy efficient equipment financed through project savings
- Projects do not require legislative approval and GESA has it's own section in the Procurement Code (Title 62, subchapter E)
- First step in developing a project is for agency personnel to connect with DGS ERMO team
- In-house scoping team will determine Core ECMs

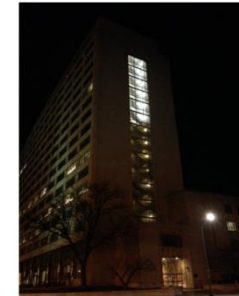
# Increasing Efficiency Through Successful Projects

## Labor and Industry Building Lighting Project

- Converted more than 3.2 million square feet to LED lighting
  - ▣ Keystone Building
  - ▣ Judicial Center Building
  - ▣ Main Capitol Pumpkin Ball Lights and Chandeliers Capital Project
  - ▣ In-House conversions to LED
    - ▣ Capitol Media Center
    - ▣ East Wing Atrium
  - ▣ East Wing Parking Garage
  - ▣ Health & Welfare Building
  - ▣ Labor & Industry Building
  - ▣ North Office Building & Tunnels
- ▣ **Over 35,000 lights replaced to date**



Before



During



After



**800+**  
\$802 Annual Savings  
\$313 Act 129 Rebate



**10K**  
10,693 KwH  
Annual Savings



**50% LESS**  
204 26W CFL Bulbs Removed  
102 40W LED Bulbs Installed

### BENEFITS

+ SECURITY

+ SAFETY

- OPERATIONAL  
MAINTENANCE



**pennsylvania**  
DEPARTMENT OF GENERAL SERVICES

**sylvania**  
IT OF GENERAL SERVICES



# Capitol Complex GESA – New Central Plant Chillers

## Old Chiller Removed

- 1957 York Turbomaster
- R12 refrigerant
- Single speed machine
- Standard oil bath bearings



## New Chiller Delivery

- Smardt Variable Speed
- R-134a refrigerant
- Computer processor staging variable equipment speeds
- Magnetic bearings eliminating friction and need for oil





# Successful GESA Project – Year Two M&V

## Successful GESA Project Exceeds Projected Savings

### SCI Dallas Year 2 Energy Savings

Actual savings exceeded by  
**22%**

Guaranteed annual savings  
**\$2.2M**

Actual Year 2 savings  
**\$2.7M**

**SCI DALLAS 2019**

#### Commodity:

 Water  
 Electricity  
 Fuel  
 Sludge

#### Guaranteed:

29%  
8%  
66%  
37%

#### Actual:

43%  
35%  
68%  
79%



Project Investment

**\$20M**

#### TOTAL YEAR 2 SAVINGS:

 Water

170,321 mGal  
\$437,768

 Electricity

1,926,707 kWh  
\$238,649

 Fuel

54,174 mmBtu  
\$1.8M

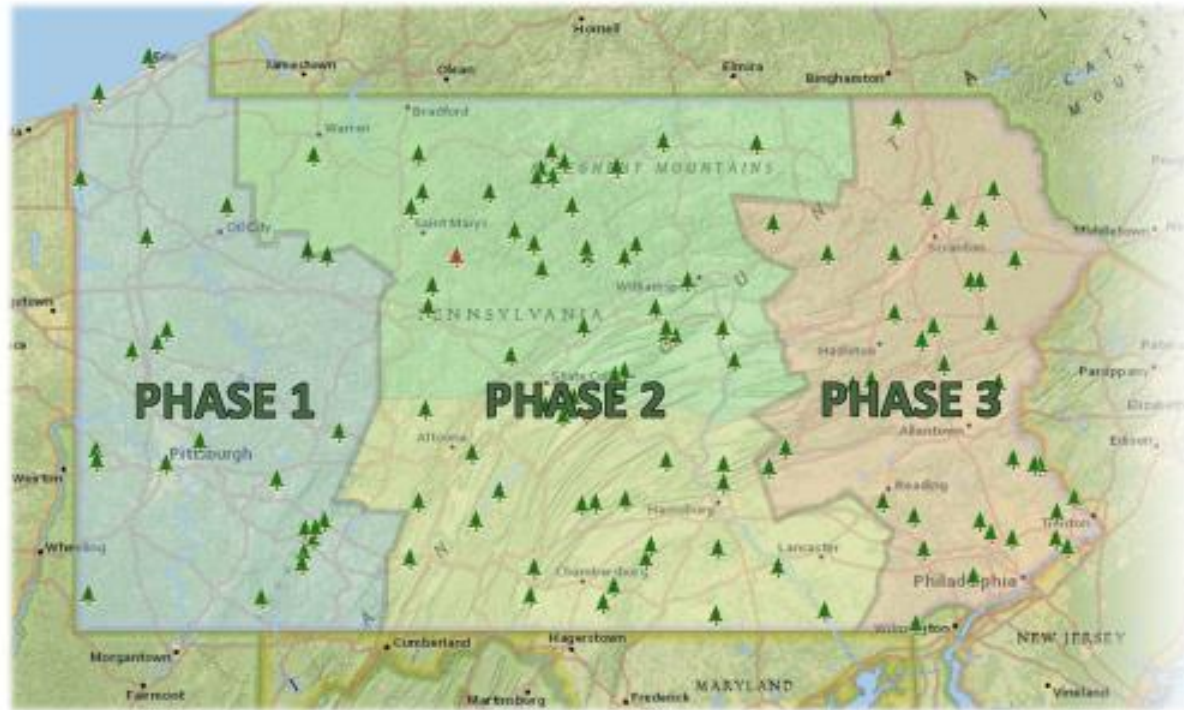
 Sludge

723,600 mGal  
\$197,102



# GESA Projects Aggregating Multiple Small Sites

## Guaranteed Energy Savings Act (GESA) Project Phase 1



- DCNR, DGS and Energy Systems Group
- Oct. 2018 – Oct. 2019
- 22 state parks with infrastructure in the Western Region plus Forbes, Gallitzin, Clear Creek & Cornplanter state forests
- Energy efficient improvements include lighting upgrades, building weatherization and insulation, domestic water improvements, HVAC control improvements, plus Forestry & Parks “want list” items.
- \$5.6 million project estimate
- Guaranteed utility cost savings of \$7.5 million over 20 years