Department of General Services
SmartRoof Program

Combining Roof Asset and Energy Management

DGS
THE DEPARTMENT OF GENERAL SERVICES

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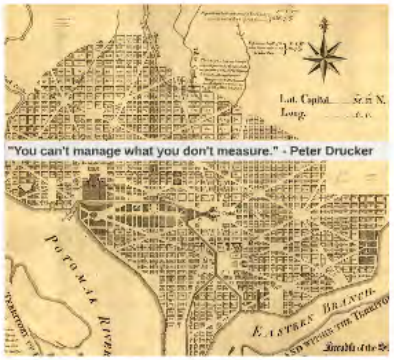
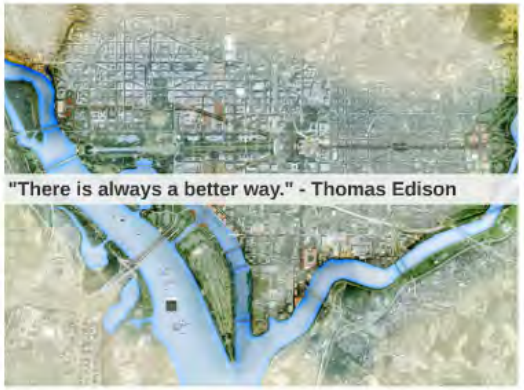
Program Goals

1. Maximize Roof Life and Performance
2. Reduce Building Energy Consumption and CO2 Emissions
3. Employ the Roof as a Platform for Renewable Energy





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"You can't manage what you don't measure." - Peter Drucker

DGS Roofs circa 2009

- Unknown Inventory and Condition
- Active Leaks and Property Damage
- No Database
- No Plan

Conclusion: Not Smart Roofs

DGS Roof Management

Step 1: Build the Program

- Baseline Roof Assessment with Energy Audit
- Preventive Maintenance and Minor Repair
- Online Database Development
- 10-Year Capital Plan
- Bundled Scopes of Work

Step 2: Implement the Program

- Procurement
- Construction Management
- Emergency Leak Response
- Routine Maintenance and Periodic Inspection

Results

- Roof Leaks Dropped by 75%
- Capital Requirements Dropped by 25%
- Major Safety Issues were Resolved
- Online Database for Stakeholders

DGS Portfolio

- 400 Buildings
- 2,250 Roof Sections
- 11 Million SF of Roof Area

Asset Value: $234 Million

Once the Roofs are Stable, We Can Optimize them from an Energy Standpoint.

Converting Roofs into *Smart Roofs!*

"You can't manage what you don't measure." - Peter Drucker

"There is always a better way." - Thomas Edison

SmartRoof Components

(a) Cool Roofs

(b) Vegetated Roofs

(c) Solar Thermal

(d) Solar PV

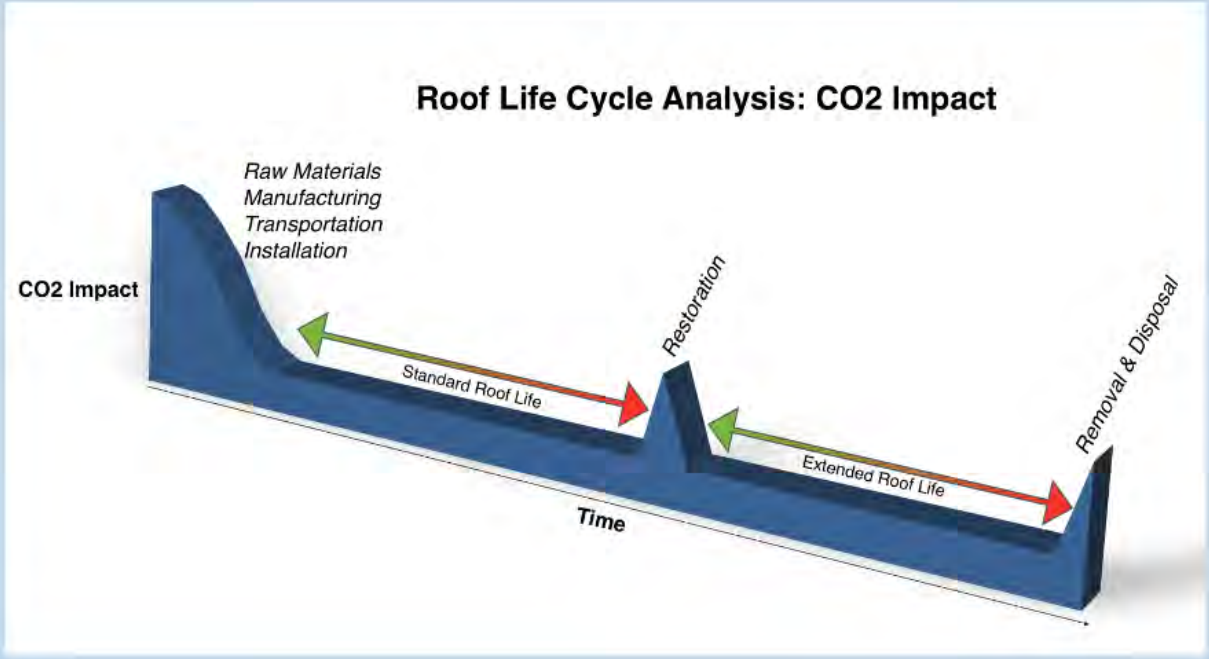
Leverage the Portfolio for Maximum Impact

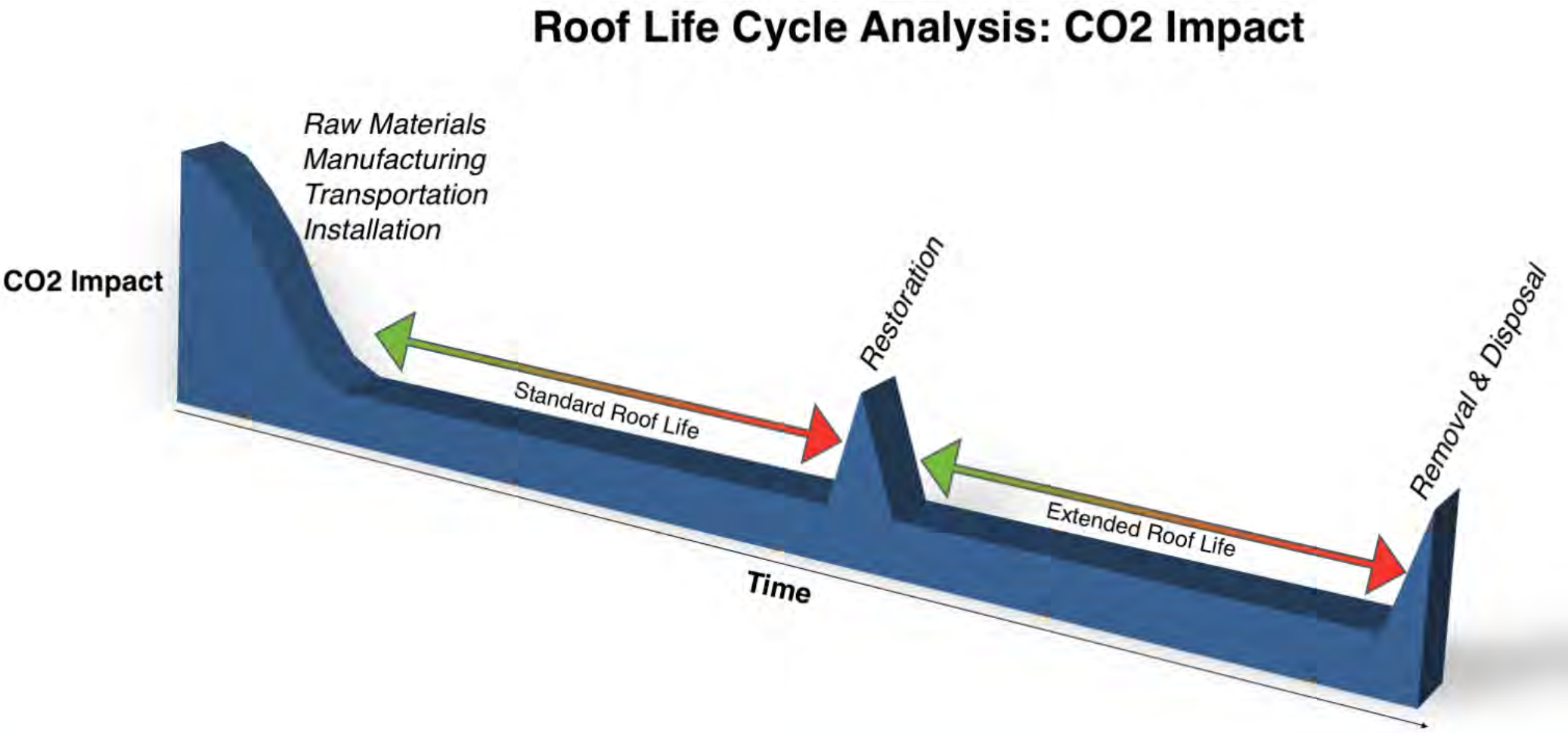
(a) Cool Roofs

Highly reflective roof restorations:

- Reduce Urban Heat Island Effect
- Provide Local Economic Development through Technical Training
- Extend Roof Life and Reduce Landfill Waste

Extending Roof Life Reduces CO2 Impact




Roof Life Cycle Analysis: CO2 Impact
Raw Materials
Manufacturing
Transportation
Installation
CO2 Impact
Restoration
Removal & Disposal
Standard Roof Life
Extended Roof Life
Time

Extending the Average DGS Roof Life from 18 to 35 Years, through Maintenance and Restoration, Will Save:

700 Metric Tons of CO_2 per Year

The Equivalent of 78,000 Gallons of Gasoline

(b) Vegetated Roofs

- Reduce Storm Water Runoff
- Reduce Urban Heat Island Effect
- Provide Educational Opportunities in Schools

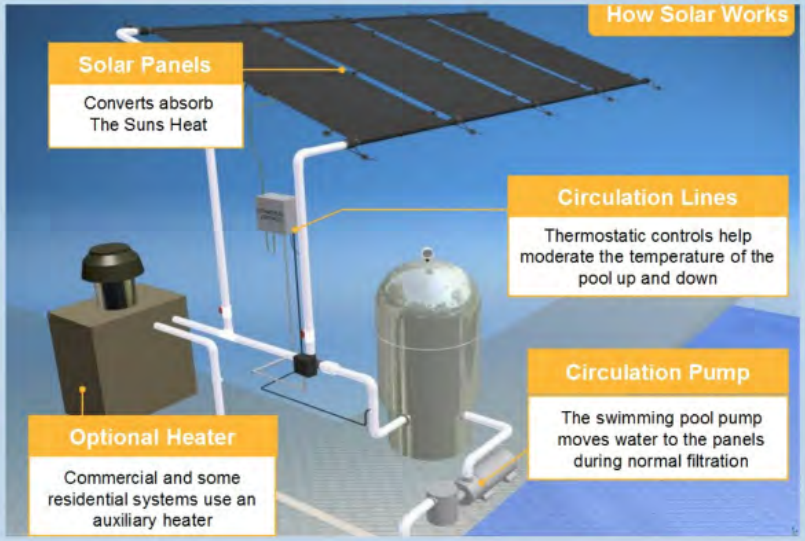
Project Target: 85,000 SF

(c) Solar Thermal

Generate Hot Water on the Roof for:

- Pools
- Showers and Restrooms
- Food Service
- Facility Heating

Offset Natural Gas and Electricity Consumption

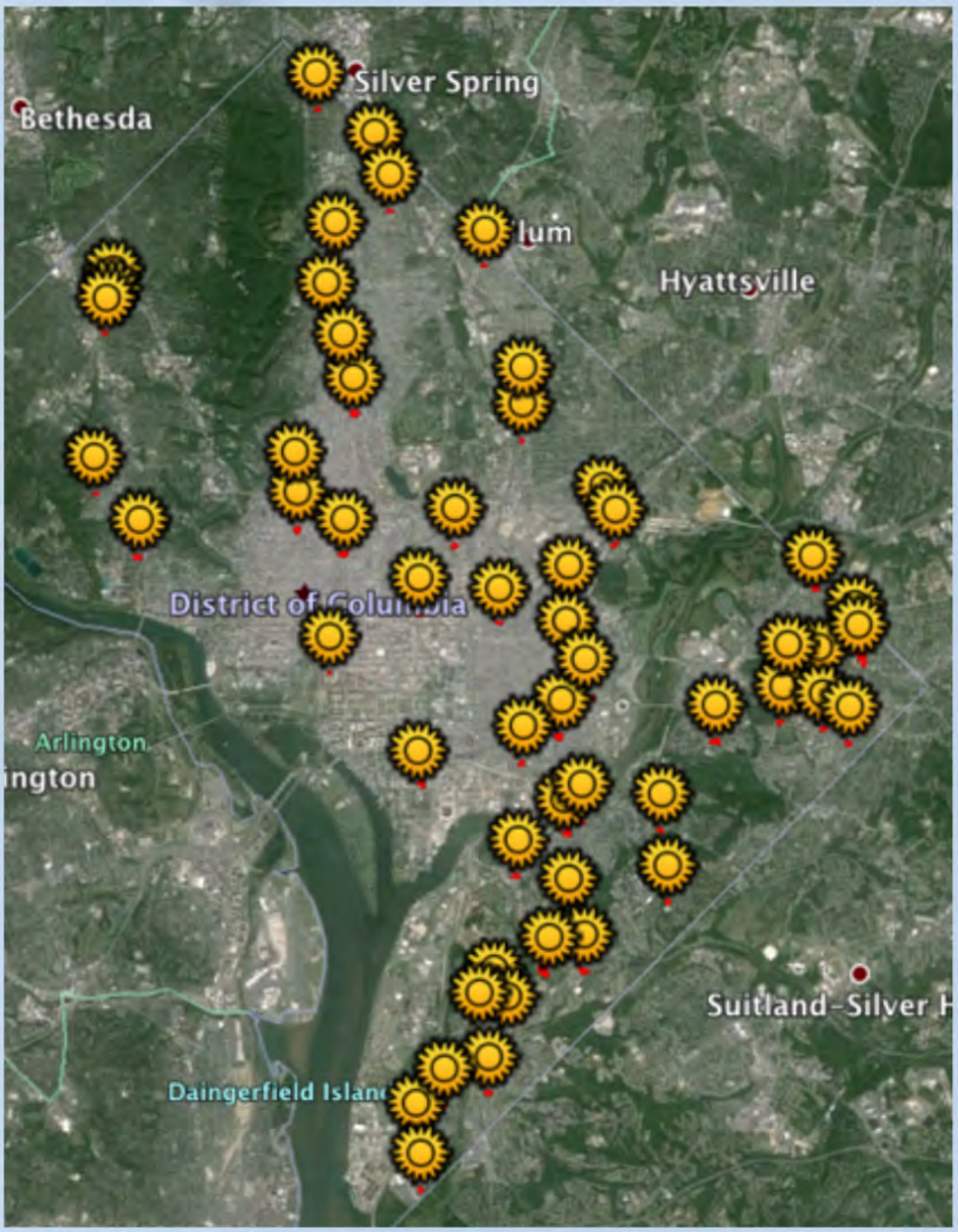

How Solar Works
Solar Panels
Converts absorb The Suns Heat
Circulation Lines
Thermostatic controls help moderate the temperature of the pool up and down
Circulation Pump
The swimming pool pump moves water to the panels during normal filtration
Optional Heater
Commercial and some residential systems use an auxiliary heater

(d) Solar Photovoltaic (PV)

Rooftop Electricity Generation:

- Clean Energy
- Peak Shaving
- Net-Zero Buildings

Target: 50+ Sites, 10+ Megawatts


Silver Spring
Bethesda
Hyattsville
District of Columbia
Arlington
Suitland-Silver H
Daingerfield Island

Recap

1. Build a Roof Management Program - Survey, Repair, Restore/Replace

2. Implement the Program - Maintain, Maintain, Maintain

3. Let the Roof Help the Environment

    - *Reduce Urban Heat Island Effect*
    - *Manage Carbon*
    - *Reduce Storm Water Runoff*
    - *Capture Solar Energy*

SmartRoof!

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