I’ve Benchmarked, Now What?
A Building Energy Performance Workshop

Contractor Insights

Next Step After Benchmarking – Looking at the Data and Identifying Needs
Keith Derrington – Recurrent Innovative Solutions

Leveraging Building Tune-Up and Monitor-Based Commissioning to plan for your improvements

- Mike Cain – ERA Building Solutions

How to make an idea into an energy project and maximize resources and returns

- Ric Sandoval – Green Generation
Next Steps After Benchmarking – Looking at the Data and Identifying Needs
Annual Building Energy Use

Last 3 Years VS Median of the CBECS Peer Group

Energy Use Intensity EUI [kBtu/sq-ft-yr]

- Jul '15 - Jun '16
- Jul '16 - Jun '17
- Baseline (Jul '17 - Jun '18)
- National Median

Site EUI

Increase YoY
Electric Interval Data

2018 Daily Electric Consumption

kWh

0 1 2 3 4 5 6 7

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Analyze Interval Data

Average Hourly Electric Demand (kW)
Data Logging
Existing Building Electrical Energy End Uses

Electrical Energy End Uses

- HVAC energy use share is > 80.
- Double the amount it should be!

Recurrent submetering results
Energy Savings from Proposed Lighting, Controls, and HVAC Upgrades

Deep Energy Retrofit financed 100% Yielding $40,000 in annual net positive cash flow after amortization costs.
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• How to make an idea into an energy project and maximize resources and returns 
• Ric Sandoval – Green Generation
The Cost of Time
retrocommissioning
“Building Tune-Up”

- Optimize the Existing Building Systems
- Identify Energy Saving Opportunities
- Determine Energy Usage
monitoring based commissioning
“MBCx”
areas of focus
Full Building Tune-Up
Monitoring-Based Commissioning
Building Tune-Ups can be so impactful that local utility incentive programs will cover up to 75% of the cost of implementation for qualified properties.
If your building...

...you might be a candidate.
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How to Make an Idea into an Energy Project

- Establish objectives
- Assess the property
- Engineer solutions
- Project financing
- Implementation
- Perform Measurement and Verification (M&V)
Establish objectives

- What are your goals?
- Who are your key stakeholders?
- What is the time horizon?
Assess the property

- Top to bottom onsite review
- Leverage benchmarking and building monitoring initiatives
- Consumption vs. Demand
- ECMs vs. CapEx
Engineer the Solutions

- Energy modeling
- Develop ROI
- Iterative process with onsite team
- Rebate and incentives
- Develop final scopes of work
Project Funding

- Direct Capital Investment
  - Operating Budget
  - Capital Budget

- Reserves
  - Building
  - Mortgage

- Rebates and incentives
  - Pepco
  - MEA

- Loans
  - Green Bank
  - Lawton Loan Program
  - PACE

- Lease
  - Operating
  - Capital
Implementation thru Measurement & Verification

- **Implementation**
  - RFP process
  - Project management - Onsite vs. Remote
  - Quality assurance and quality control

- **Measurement and Verification**
  - Confirm you received the savings you “bought”
  - Ongoing M&V to maintain/increase savings
This resident-owned cooperative community located in Bethesda, Maryland is a distinctive full-service retirement community that included assisted living and skilled nursing services.

Solution focused on a combination of strategic energy conservation measures as well as end of useful-life capital projects.

GreenGen completed cost benefit analyses to compare “like-kind” replacements to “high efficiency” alternatives.

The project was awarded Maryland Energy Administration’s EmPower Maryland grant funding of $500,000.

<table>
<thead>
<tr>
<th>Project Summary</th>
<th>Gross Investment</th>
<th>Simple Payback</th>
<th>Utility Rebates</th>
<th>Net Investment</th>
<th>Annual Savings</th>
<th>Net Payback</th>
<th>% Cost Reduction</th>
<th>kWh Reduction</th>
<th>% kWh Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Solutions</td>
<td>$ 1,434,798</td>
<td>9.48</td>
<td>$ 510,866</td>
<td>$ 923,932</td>
<td>$ 151,415</td>
<td>6.10</td>
<td>15.8%</td>
<td>1,181,712</td>
<td>20.2%</td>
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<tr>
<td><strong>Total Conservation Measures</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lighting</td>
<td>$ 501,666</td>
<td>7.68</td>
<td>$ 196,657</td>
<td>$ 305,009</td>
<td>$ 65,353</td>
<td>4.67</td>
<td>7.0%</td>
<td>532,383</td>
<td>9.1%</td>
</tr>
<tr>
<td>VFD Fans</td>
<td>$ 26,795</td>
<td>1.13</td>
<td>$ 15,602</td>
<td>$ 11,193</td>
<td>$ 23,637</td>
<td>0.47</td>
<td>2.4%</td>
<td>189,690</td>
<td>3.2%</td>
</tr>
<tr>
<td>VFD Pumps</td>
<td>$ 51,937</td>
<td>2.30</td>
<td>$ 23,119</td>
<td>$ 28,818</td>
<td>$ 22,558</td>
<td>1.28</td>
<td>2.3%</td>
<td>181,033</td>
<td>3.1%</td>
</tr>
<tr>
<td>Data Visualization</td>
<td>$ 24,666</td>
<td>3.42</td>
<td>$ 7,216</td>
<td>$ 17,450</td>
<td>$ 7,218</td>
<td>2.42</td>
<td>0.7%</td>
<td>37,961</td>
<td>0.7%</td>
</tr>
<tr>
<td>Low Flow Faucets</td>
<td>$ 10,192</td>
<td>2.75</td>
<td>-</td>
<td>$ 10,192</td>
<td>$ 3,710</td>
<td>2.75</td>
<td>0.4%</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Total CapEx Measures</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RTU/HP Replacement</td>
<td>$ 557,995</td>
<td>30.42</td>
<td>$ 189,647</td>
<td>$ 368,348</td>
<td>$ 18,343</td>
<td>20.08</td>
<td>1.9%</td>
<td>147,202</td>
<td>2.5%</td>
</tr>
<tr>
<td>Cooling Tower Replacement</td>
<td>$ 261,547</td>
<td>24.68</td>
<td>$ 78,625</td>
<td>$ 182,922</td>
<td>$ 10,596</td>
<td>17.26</td>
<td>1.1%</td>
<td>93,443</td>
<td>1.6%</td>
</tr>
</tbody>
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Financing Resources –
When Your Cash is not Enough

- Lindsey Shaw – Dept of Environmental Protection
- Tom Deyo – Montgomery County Green Bank
Montgomery County Commercial PACE Program

Innovative Financing for Building Upgrades

Presented by the Department of Environmental Protection

October 23, 2019
Commercial PACE Basics

• Allows property owners to make EE and RE upgrades to their property
• Secured by the property, repaid via the property tax bill
• Can finance up to 100% of the project hard and soft costs upfront with terms up to 20 years
• Project cost minimum $5K, but makes the most financial sense starting at $250K+
• Offers “off-balance sheet” financing for building owners
• To date, the County’s program accepted 12 C-PACE projects totaling more than $8.4M in private capital into our building stock.
# What is C-PACE Eligible?

## Eligible Measures
- Lighting fixtures
- HVAC and automated controls
- Solar PV/thermal, geothermal, biomass
- Insulations
- Energy-efficient windows
- EV charging stations
- Water efficiency measures
- Any other upgrade of equipment, device, or other material intended to reduce energy use or expand renewable energy use
- *Includes hard and soft costs

## Eligible Properties
- A commercial property located in Montgomery County either not designated for human habitation OR multi-family dwelling used for human habitation with more than 4 rental units.
- Includes: Commercial, Multi-family, Agricultural, Industrial, and Non-Profits
- Excludes: Condominiums
- Property must be current and in good standing on property tax payments
- Applicant must be the legal owner of property
How much can I finance?

• For Existing Buildings:
  • 20% maximum C-PACE loan amount vs. value of building
  • 90% maximum debt vs. value of building

• For New Construction:
  • 15% maximum C-PACE loan amount if designed building energy performance exceeds code by no more than 5%
  • 20% maximum C-PACE loan amount if designed building energy performance exceeds code by 5% or more
  • 90% maximum debt vs. value of building

• For all C-PACE Loans, mortgage holder(s) must consent to C-PACE
MC-PACE Case Study

Shady Grove Professional Building & Comfort Inn
Shady Grove

Project Need & Solution: Commercial office building and hotel implementing cost-saving energy efficiency upgrades.

Energy: Building envelope, HVAC replacement, LED Lighting

Total Project Cost: ~ $1,400,000

Money Down: $0.00
C-PACE Financing: ~ $1,400,000 Term: 20 years
Annual PACE Surcharge: ~ $125,000

Annual Cost Savings: ~ $155,000
Annual Energy Savings: 1,600 MMBtu

Net Annual Cash Flow: ~ $30,000
Lifetime Cost Savings: ~ $3,000,000

PACE to Value <10%
DTV< 80%
Supporting Commercial Properties

Presentation by:
Tom Deyo, Montgomery County Green Bank
Who We Are

Montgomery County Green Bank

➢ The nation’s FIRST County-level green bank, designated in July 2016, chartered by the County in 2015. Independent, 501(c)3 non-profit corporation.

➢ Purpose to accelerate investment in energy efficiency and renewable energy in the County

➢ Not a Bank, an Investment Fund.

➢ Capital opportunity of over $20 million from County settlement from Pepco-Exelon merger.

➢ Look for market gaps in energy efficiency and renewable financing markets

➢ Co-invest with lenders to reduce perceived risk and bring their private capital to market
What We Offer.
Multiple Approaches to Support Commercial Properties

➢ **Commercial Loan for Energy Efficiency and Renewables (CLEER)**
  ❖ 100% Financing
  ❖ No lien on property
  ❖ Offered through Revere Bank, Latino Economic Development Center, Ascentium Capital

➢ **Open solicitation of financing needs to learn about market**
  ❖ Specific needs of effort underway
  ❖ Provide information on situation and financial need of project

➢ **Outreach to Increase Awareness and Introduce Concepts for Specialty Markets**
  ❖ Common Ownership Communities
  ❖ Faith-Based Institutions

➢ **Technical Assistance – Affordable Housing Pilot as a Test**
  ❖ Start with assessment; define scope, budget and financing; support implementation

➢ **Community Solar – Opportunities to leverage unused rooftops for LMI program**

➢ **Commercial Solar PPA – Small solar array strategy**
When Cash Is Not An Option. Using CLEER to Finance a Project.

### Simple Payback Model – Customer Cash

<table>
<thead>
<tr>
<th>Category</th>
<th>Project - HVAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of Project</td>
<td>$198,000</td>
</tr>
<tr>
<td>Less: Pepco Utility Incentives</td>
<td>$48,000</td>
</tr>
<tr>
<td>Balance to be Funded</td>
<td>$150,000</td>
</tr>
<tr>
<td>Customer Cash</td>
<td>$150,000</td>
</tr>
</tbody>
</table>

- **Projected Energy Savings Per Year**
  - (179,500 KwH @14 Cents per KwH; assumed an all-in rate)
  - $25,130

- **Number of Years to Recover Cash Outlay**
  - 6

### CLEER Financing Alternative – No Customer Cash

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</tr>
<tr>
<td>Balance to be Funded</td>
<td>$150,000</td>
</tr>
<tr>
<td>Loan Amount</td>
<td></td>
</tr>
<tr>
<td>100% of balance</td>
<td>$150,000</td>
</tr>
<tr>
<td>CLEER fees</td>
<td>$5,250</td>
</tr>
<tr>
<td><strong>Total Loan Amount</strong></td>
<td>$155,250</td>
</tr>
<tr>
<td>Term and Rate</td>
<td>10 yr / 6.375%</td>
</tr>
<tr>
<td>Annual Debt Service</td>
<td>$21,036</td>
</tr>
</tbody>
</table>

- **Projected Energy Savings Per Year**
  - (179,500 KwH @14 Cents per KwH; assumed an all-in rate)
  - $25,130

- **Annual Customer Cash Flow After Debt Service**
  - $4,094
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Audience Q&A