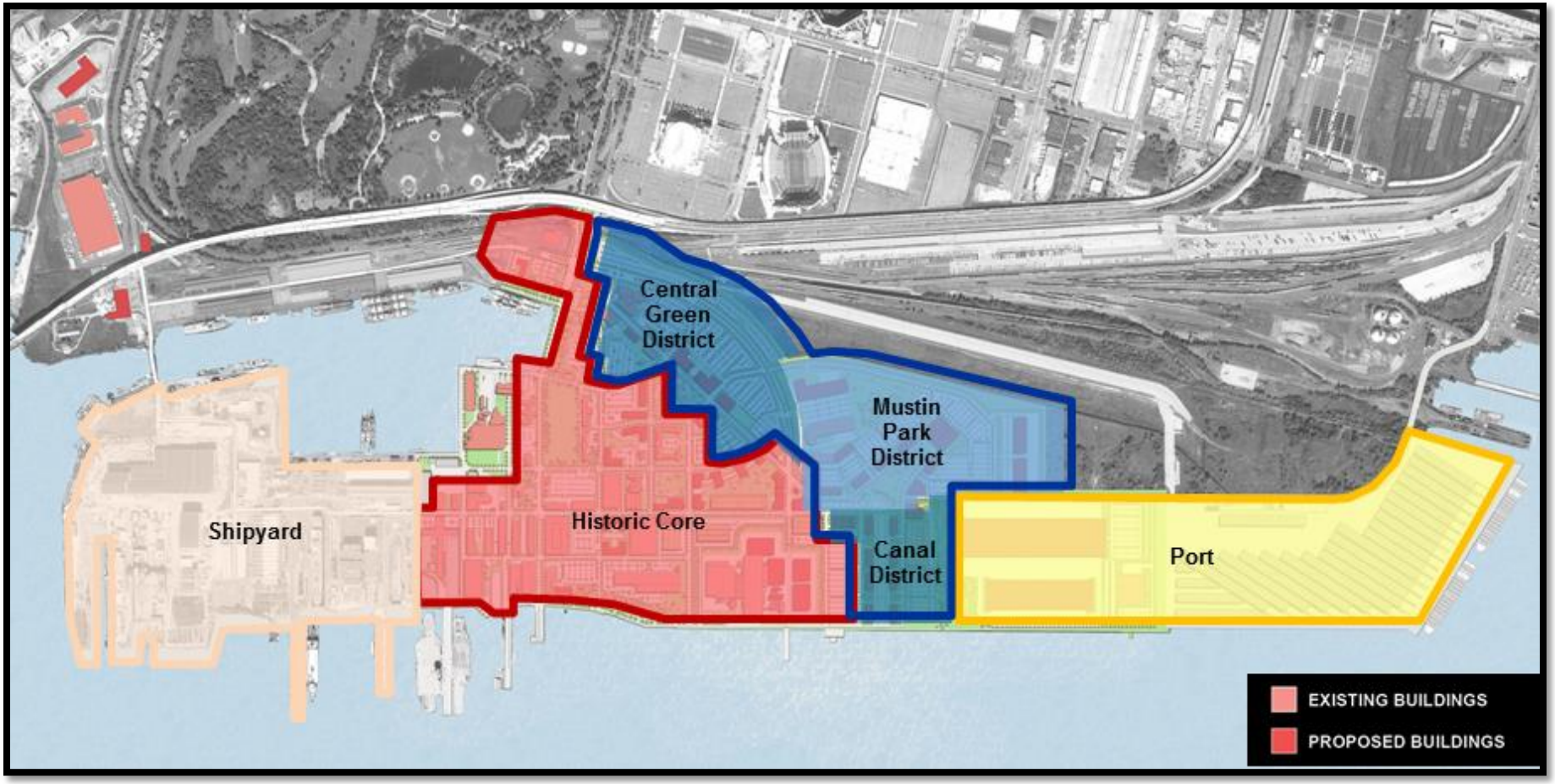
CBEI – Demonstrating On-bill Financing to Drive Deep Retrofits

2015 Building Technologies Office Peer Review



U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

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Project Summary

Timeline:

Start date: May 1, 2014

Planned end date: April 30, 2016

Key Milestones

1. Proposed tariff approach and tenant engagement strategy; 9/30/2014
2. Build out recommended program for proposing to tenants, 10/1/2014
3. Provide materials to engage Navy Yard tenants, including tenant feedback/buy-in; 1/30/2015
4. Revise program plan based on feedback and draft case study report; 2/2/2015

Budget:

Total DOE $ to date: $200,000

Total future DOE $: $250,000

Target Market/Audience:

- States / Public Utility Commissions (PUCs)
- Utility programs and program administrators
- Small- and medium-sized commercial and industrial (C&I) building owners and tenants

Key Partners:

Philadelphia Industrial Development Corporation (PIDC)
The Navy Yard Electric Utility (TNYEU)
Mondre Energy Incorporated (MEI)
Booz Allen Hamilton (BAH)

Project Goal:

- Develop the framework for an on-bill financing program at The Navy Yard (TNY) that supports deep retrofits
- Show tenant interest in the program to demonstrate program size

CBEI CONSORTIUM for BUILDING ENERGY INNOVATION

Vision:

By 2030, deep energy retrofits that reduce energy use by 50% in existing SMSCB, which are less than 250,000 sq ft

Mission:

Develop, demonstrate and deploy technology systems and market pathways that permit early progress (20-30% energy use reductions) in Small and Medium Sized Commercial Buildings

Our Goals:

- **Enable deep energy retrofits** in small to medium sized commercial buildings
- **Demonstrate energy efficient systems** tailored for SMSCBs in occupied buildings – living labs
- **Develop effective market pathways** for energy efficiency with utilities and other commercial stakeholders: brokers, finance, service providers.
- **Provide analytical tools** to link state and local policies with utility efficiency programs

CBEI Partners

Industry

Bayer MaterialScience

United Technologies Research Center

Economic Development Organizations

DVIRC

PIDC

Driving growth to every corner of Philadelphia

Ben Franklin Technology PArtners

Universities

PENNSTATE 1855

NJIT

Penn University of Pennsylvania

Drexel University

Carnegie Mellon University

VirginiaTech 1872 Invent the Future

PURDUE UNIVERSITY

MORGAN STATE UNIVERSITY Gateway to Opportunity Stairway to Excellence

RUTGERS

Purpose and Objectives

Problem Statement:

- States and utilities are challenged with driving deep energy efficiency retrofits
- Building owners and tenants are capital constrained, making major retrofits difficult to implement
- Lease terms limit opportunities for economic payback
- Most programs that offer financing of retrofits, paid through the utility bill (on-bill financing), focus on residential customers. The few programs for commercial buildings focus on simple, short payback solutions.

Target Market and Audience:

- Market: Small- and medium-sized C&I buildings
- Audience: States / PUCs, utilities, program administrators, and C&I owners and tenants

Impact of Project:

- Develop a framework with national applicability, for an on-bill financing (OBF) pilot program, which promotes implementation of deeper retrofits, with payments tied to the meter
- Improved understanding of the tenant/owner perspective for deep retrofits that may exceed lease length, and lessons learned about key drivers for uptake of an advanced-retrofit and energy efficiency OBF program

An OBF supports TNYEU Energy Master Plan

- **Objectives**
  - Drive deep retrofits to reduce building energy use to support additional development and achievement of 20% EE reduction goal in The Navy Yard Electric Utility (TNYEU) Master Plan
  - Align research with interests of TNYEU Energy Master Plan
    - Support a future demand reduction program
    - Desire to demonstrate applicability/lessons learned regionally and nationally
- **Opportunities**
  - TNYEU's unregulated grid
  - Strong relationships with building owners and tenants
  - OBF funding internally available through TNYEU service charges
  - OBF funding available through TNYEU service charges
  - Multiple building use types and structures offer a variety of test-bed opportunities
- **Key Issue**
  - Split incentive issues due to non-owner occupied space
- **Distinctive Characteristics**
  - Payback tied to the meter instead of the tenant to allow for longer payback retrofits
  - Diversity of allowed retrofit solutions to provide the greatest flexibility to tenants and owners

Approach

Phases

1. Develop OBF Framework
2. Solicit Owner & Tenant Interest
3. Revise Framework and Identify Pilots for BP5 Implementation

Key Activities

1. Develop OBF Framework

- Review existing OBF structures for lessons learned
- Review TNY building stock to characterize building use and energy reduction potential
- Develop recommended program for proposing to tenants

2. Solicit Owner & Tenant Interest

- Draft program and supporting materials to brief subset of tenants
- Identify subset of owners and tenants to solicit feedback
- Conduct meetings/calls to solicit feedback
- Meet with with external stakeholders (utility, regulator) to get feedback on program

3. Revise Framework and Identify Pilots for BP5 Implementation

- Synthesize inputs from tenants, owners, and external stakeholders
- Make any updates to framework
- Identify at least 2 tenants for BP5 pilot
- Develop case study of lessons learned

TNY OBF Program Will Apply a Tariff Approach

Characteristic	Pilot	Justification
Funding Source	TNYEU	• The Philadelphia Navy Yard Electric Utility (TNYEU) will be using available TNYEU capital for the program • Current demand not expected to be sufficient to seek third party financing (i.e., not ripe for on-bill repayment) • Use current TNYEU customer credit assessment
Payment Responsibility	Tariff (tied to meter)	• Treated as a utility charge, allowing obligation to transfer to subsequent owner/ tenant • Allowing retrofit costs to be tied to the meter will allow for deeper retrofits (high cost) and payback beyond the typical tenant lease term
Default Actions	Disconnection	• Disconnection already in place for accounts with TNYEU
Allowed Measures	Multiple Efficiency	• Objective is to achieve deep retrofits, requiring multiple measures • May expand to renewables and water conservation in the future
PECO Incentives	Yes	• Collected from PECO by TNYEU and applied to account
Building Type	Commercial and Industrial	• Opportunities exist within the TNY to support deep retrofits in both building types • Necessary to have different owners and tenants to identify ways to overcome the split incentive

Tenant Selection

- Characterize Relevant Building Stock
  - Industrial, Office, Other; (e.g., R&D, Data Center, Ship Services, Warehouse)
- Identify Ownership Characteristics
  - Tenant is the Owner
  - Tenant leases the space (non-owner)
- Identify and Rank Most-Likely Measures by Energy Use Intensity and Cost Impact
  - Energy Conservation Measure (ECM): Lighting, HVAC, Refrigeration, etc.
  - Installation Cost – range per measure type
  - Energy (electricity) consumption reduction

Tenant Pool for Program Review

Commercial/ Office Use

- Lopez McHugh LLP
- McDevit Company
- Nason Construction
- Norfolk Southern
- QED Systems Inc.
- Revzilla
- Rhoads Industries
- Serco Inc.
- Tecnico Inc.

Industrial Use

- Aker Philadelphia Shipyard
- PennShip Service LLC
- Rhoads Industries

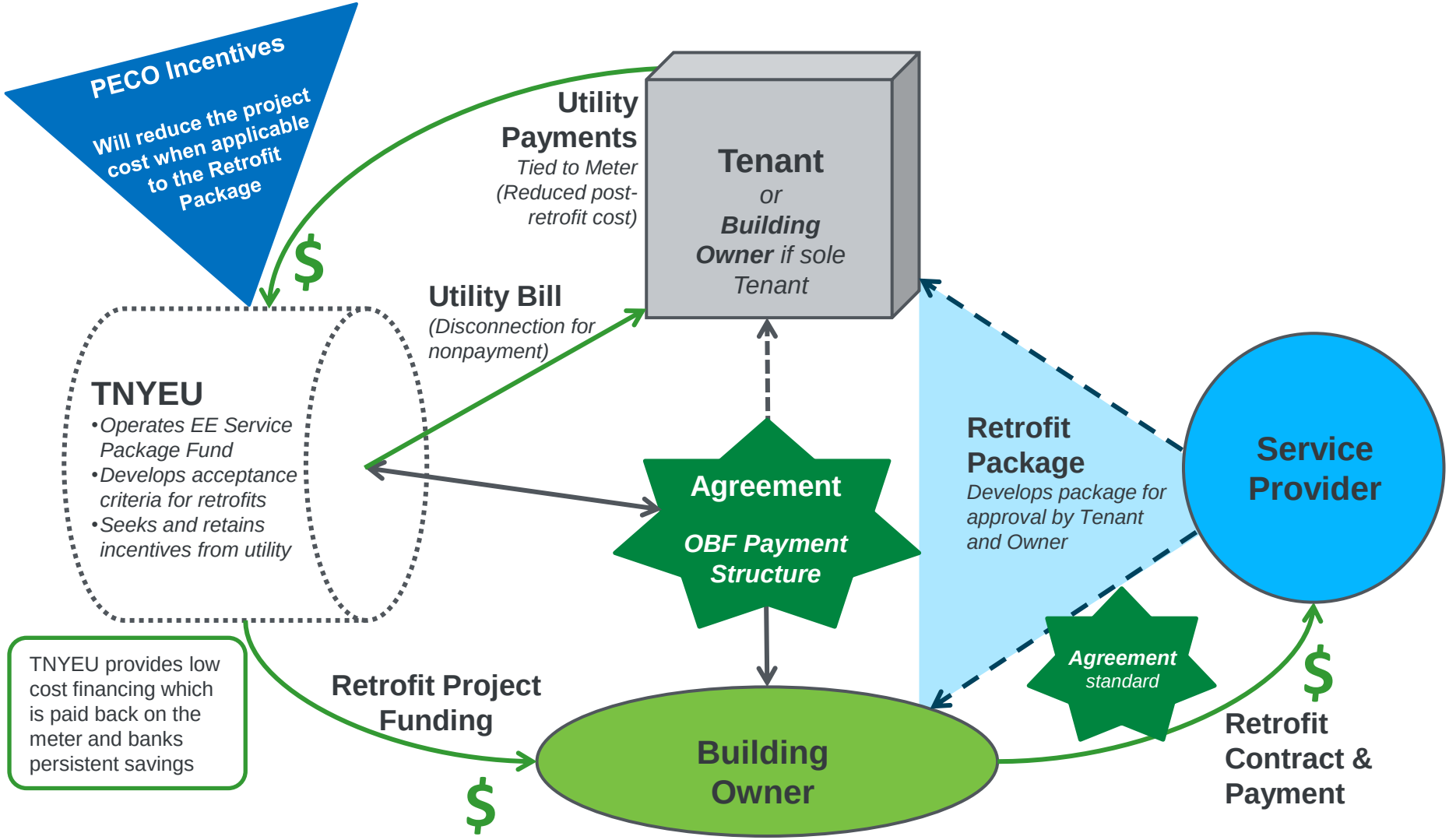
Other Use

- TierPoint
- *(data center)*
- Pennsylvania Horticultural Society *(Warehouse)*
- Vane Brothers *(Barge/Tug Operator)*

Building/Facility Owners Represented

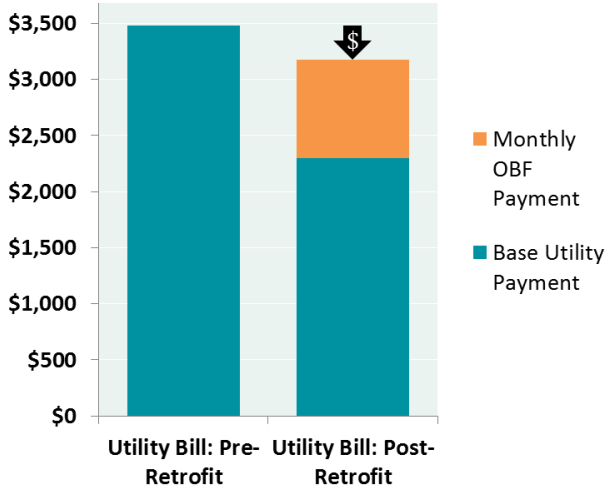
- Liberty Property Trust
- Rhoads Industries
- PAID

TNY OBF Framework

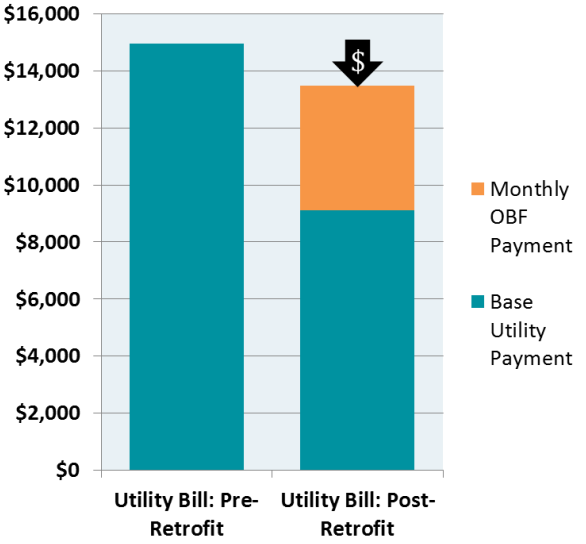


Two Example Commercial Scenarios: Building A & B

- Building A – Simple Retrofit
  - Interior lighting replacements: Halogen Pars and T8s to LED
  - Install 24 occupancy sensors to control
  - Perform retro-commissioning to restore HVAC control capability
  - Install building management system to reduce overall electric use
  - Estimated Energy Savings 34% Electric, 38% Gas
  - Annual Savings: $14,166



- Building B – Deeper Retrofit
  - Interior lighting replacements: Halogen MR16s, T5 and T8 to LED
  - Exterior lighting replacements: Metal Halides to LED
  - Replace AHU Supply Fan VFD Drives
  - Replace AHU Exhaust Fan VFD Drives
  - Implementing a Building Automation System
  - Estimated Energy Savings 40% Electric, 42% Gas
  - Annual Savings $70,025



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Tenant Feedback Summary – Tenant Characteristics

Level of Interest	High *(Ready to start process)*	High *(Ready to start process)*	High *(Requires project scope)*	Low *(Operational Constraints)*
Company	**A**	**B**	**C**	**D**
Building/Site Use Category	Industrial Heavy metal fabrication and ship repair services Buildings, piers, drydock	Retail 1-Warehouse, distribution 2-Corporate offices, showroom	Data Center, Office Remote education center	Industrial/ Office New ship engineering & construction
User –Owner Relationship	• Owner occupied	• Single tenant lease from 3rd party owner	• Single tenant lease from 3rd party owner	• Single tenant lease from 3rd party owner
Projects Available for Evaluation	• Deep retrofit potential- LED high bay, HVAC, Larger motor VSC, BEM • BTM-solar generation with energy storage • Demand response project: NG generation	LED High Bay Building Energy Management system (BEM)	• Update facility evaluation: Envelope, computer room air conditioning (CRAC) • Envelop enhancement for improving climate control around all essential electrical equipment	• Facility equipment is 15 years old • Improve portable heating to docked ships • Cost effective Demand response
Reaction to On-Bill	• Business is strong but capital is very tight and reserved for business needs • On-bill would facilitate their desire for and ability to invest in EE /DR projects	• Entrepreneurial company with strong interest in energy efficiency and corporate sustainability	• Interested in on-bill but would need further opportunity assessment to make commitment	• Cost intensive operation funded principally by each new ship contract • No contract, no company • EE/DR savings-revenue relatively small but can create a large distraction

Tenant Feedback Summary – Key Questions

Tenant Engagement: Key Program Attributes	Is this in current plan? Can this be offered/included?
Off-balance sheet financing options	The OBF program structure to accommodate financial accounting treatment will be evaluated as a key design element during the pilot program.
Broad suite of technologies and retrofit options available	Yes, PIDC is open to technologies in different categories beyond typical, prescriptive energy efficiency measures as long as the retrofit/installation improves either energy use intensity or peak demand (e.g., controls, storage, on-site renewable generation, envelope upgrades).
Offer longer than 10 year payback or an energy bill projected higher than what we're paying now	Yes, the pilot program can be structured by TNYEU to offer repayment terms longer than 10 years, for property owners and tenants with comparable existing occupancy commitments at TNY. We are setting up the pilot to make it attractive to customers by having it be bill neutral, but we are open to higher monthly payments if that works for the tenant.
If the building owner is not interested, but the tenant is, can payback be aligned with the current lease terms	Yes, the tenant and service providers would work together during the pilot program to identify energy efficiency projects which meet the payback requirement and submit for approval by TNYEU, and the building owner's participation and role will be determined consistent with the desires of all parties.

PUC and Utility Preliminary Interest Areas

PA PUC

- Issues that arose in previous on-bill program development efforts that are of interest to the PA PUC
  - Difficulty in developing a model that successfully matched energy improvement projects (efficiency enhancements, conservation, weatherization, etc.) with willing partners to finance the projects
  - Ensuring that the savings achieved by the financed projects match or exceed the financing terms offered by the utility
  - Given both the breadth and scope of proposed projects it was difficult to modify terms and conditions to see if such modifications would improve the programs from both the customer and utility perspectives

PECO

- Costly infrastructure changes required to implement
- Sufficient customer acceptance
- No leverage for cases in default
- What is the appropriate length of financing
- Effort needed to manage and monitor
- Doubts about true benefits of on-bill options vs. customer financing
- Establishing the optimal interest rate for acceptance
- Concern about type of customers who would prefer OBF

Progress and Accomplishments

Lessons Learned:

- Strong interest from a diverse set of TNY owners and tenants
- OBF candidates interested in the flexibility of including a broad suite of technologies and retrofit options
- Access to off-balance sheet financing is critical, particularly for the smaller, growing companies

Accomplishments:

- Successfully built an OBF approach that appeals to tenants and owners, while supporting aggressive TNYEU energy master plan reduction goals
- Three (3) stakeholders interested in piloting the program in BP5

Market Impact:

- Interest from the PA PUC and PECO, particularly on how to sell to tenants/owners
- Build out potential at TNY for robust OBF program

Awards/Recognition:

None

Project Integration and Collaboration

Project Integration:

- Working with PA PUC and PECO to provide feedback
- Collaborating with EDF to share lessons learned nationally
- Working with WIPO to leverage lessons learned to states and regional cooperatives

Partners, Subcontractors, and Collaborators:

- Philadelphia Industrial Development Corporation (PIDC) – pilot program initiator, manager and administrator
- Mondre Energy – existing service provider to TNY specializing in advanced energy efficiency projects
- Booz Allen Hamilton – management consultant involved on program development and deployment strategies on a national level
- EDF – providing platform to share lessons learned nationally

Communications:

- None to date

Next Steps and Future Plans

- Continue to work with additional tenants/owners to achieve project metrics
  - Conduct outreach and get meetings with a total of 20 commercial and industrial (C&I) owners or tenants about the developed on-bill financing program (Outreach to 12 conducted to date)
  - Engage 7 C&I owners or tenants, who express further interest, in specific project merit discussions (8 have expressed further interest to date)
  - Secure verbal commitments from 3 owners/tenants to pursue more detailed planning for at least one project (3 tenants interested in pursuing more detailed planning)
- Develop final deliverables
  - Final program materials for briefing TNY tenants
  - Implementation plan
  - Case Study/White Paper
- Program Implementation Development

REFERENCE SLIDES

Project Budget

Project Budget:

- BP4 (5/1/2014 – 4/30/2015): $200,000
- BP5 planned (5/1/2015 – 4/30/2016): $250,000

Variances: None

Cost to Date: $200,000 to be expended by end of April 2015

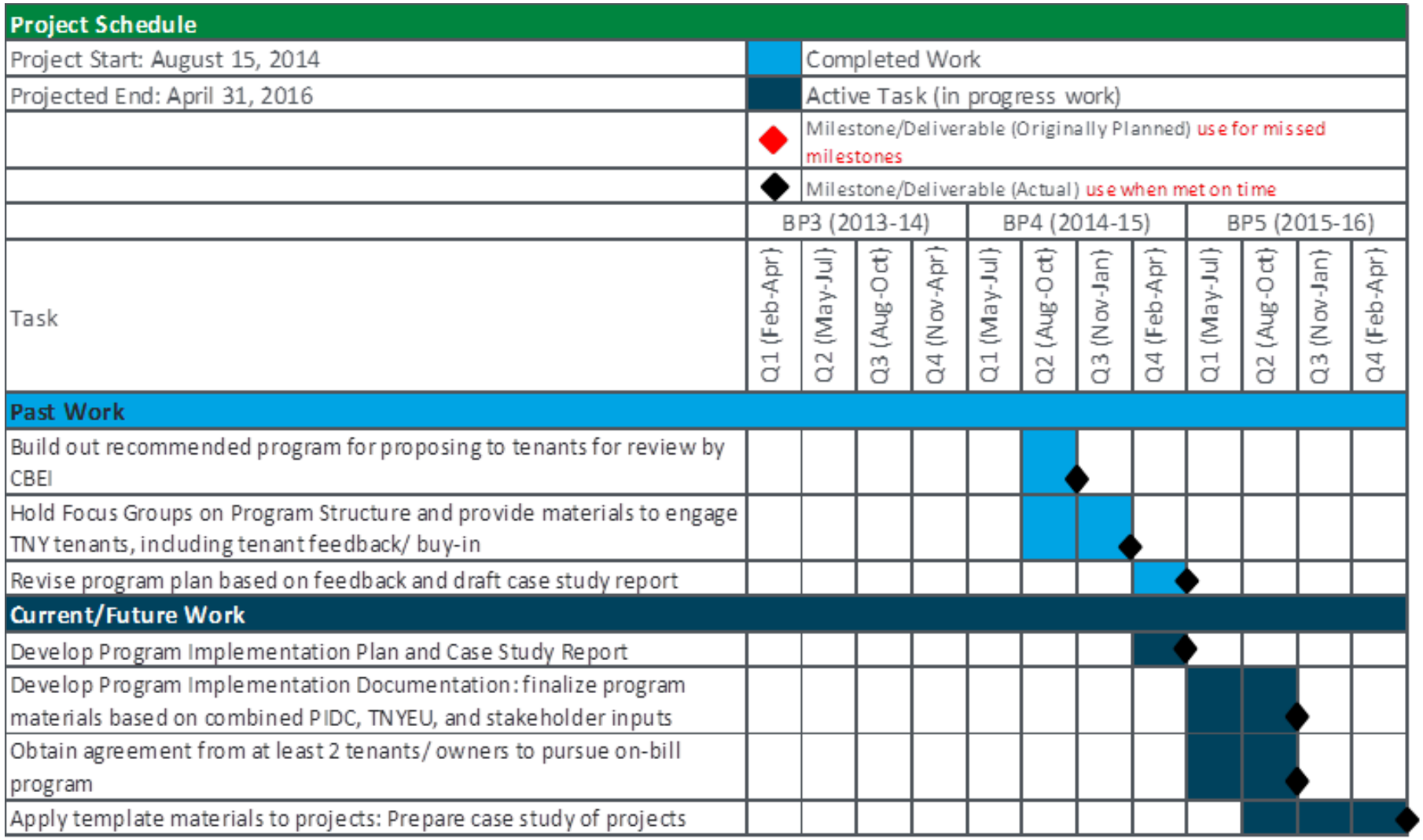
Additional Funding: $250,000 in BP5 to pilot program with 2 tenants/owners

Budget History					
CBEI BP3 (past) 2/1/2013 – 4/30/2014		CBEI BP4 (current) 5/1/2014 – 4/30/2015		CBEI BP5 (planned) 5/1/2015 – 4/30/2016	
DOE	Cost-share	DOE	Cost-share	DOE	Cost-share
$0	$0	$200,000	$0	$250,000	$0

CBEI – Consortium for Building Energy Innovation (formerly EEB Hub)

BP – Budget Period

Project Plan and Schedule



BP – Budget Period for Consortium for Building Energy Innovation (formerly EEB Hub)