

Philadelphia Navy Yard

An Innovative City Inside the City



By

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Imagination at work.

GE Grid Solutions – Re-thinking Urban Integration

CITY RESILIENCE PUBLIC SAFETY

Infrastructure Reliability

1. More Unplanned **Electric Outages**
 1. Hurricane Irene
 2. Super Storm Sandy
 3. ...
2. **Security Threats**



CITY JOBS ECONOMY

Technology Innovation

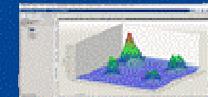
1. Information Communication Technology (ICT)
 1. **Internet Of Things (IoT)**
 2. Information Networks
2. Smart Grids & **City Microgrids**
 1. Energy Asset Management
 2. Automation & Optimization
 3. Less **Energy Supply** at Affordable Price
3. **Smart Traffic & Parking Systems**



CITY GREEN GOALS

Climate Change

- Emergence of Distributed Energy Resources **DER Assets**
1. Renewables
 2. Storage
 3. Demand Response
 4. Energy Efficiency
 5. Electric Vehicle



**Worldwide -> 50 billions of devices & DER assets expected to be connected by 2020 !
The US national economy Impact - Last 3 year outages impacted billions of dollars !!**



The Navy Yard, Philadelphia – A Mini-City

Owner Representative – Philadelphia Industrial Development Corp (PIDC)

Mission:

PIDC implements economic development initiatives which retain and generate jobs throughout Philadelphia

Navy Yard Today

- 150+ Companies
- More than 12000 People
- In Excess of 7.6 Million SF Occupied
- \$700+ million of private investment

PIDC Serves all market segments

- Technology
- Higher Education – R&D
- Industrial / Manufacturing
- Medical
- Community/Small Business
- Cultural & Tourism
- Commercial /Offices



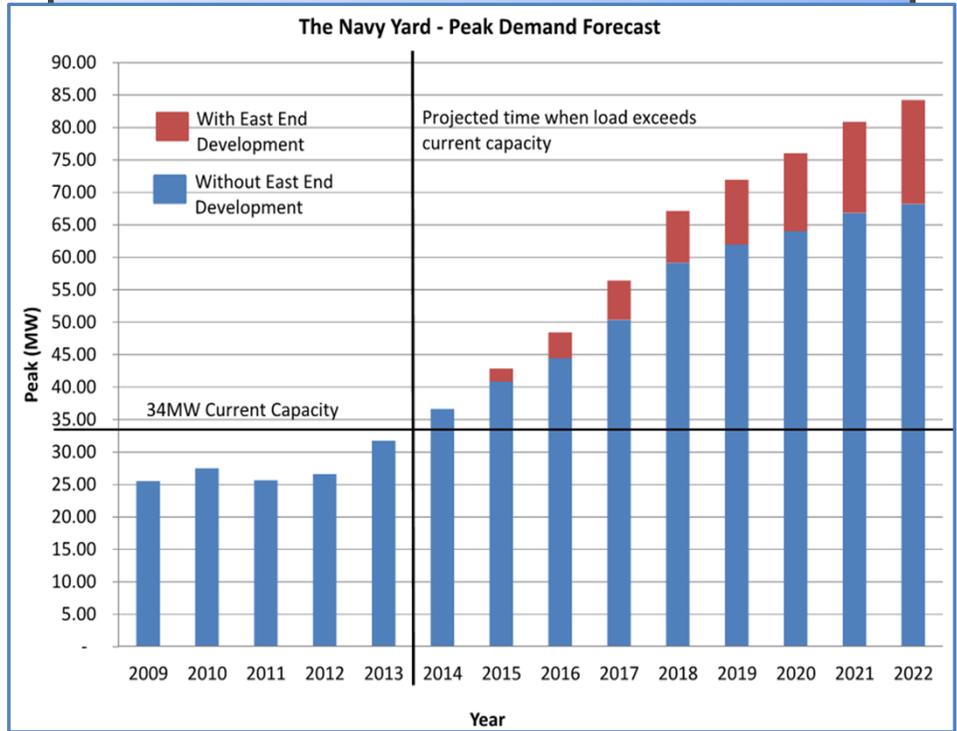
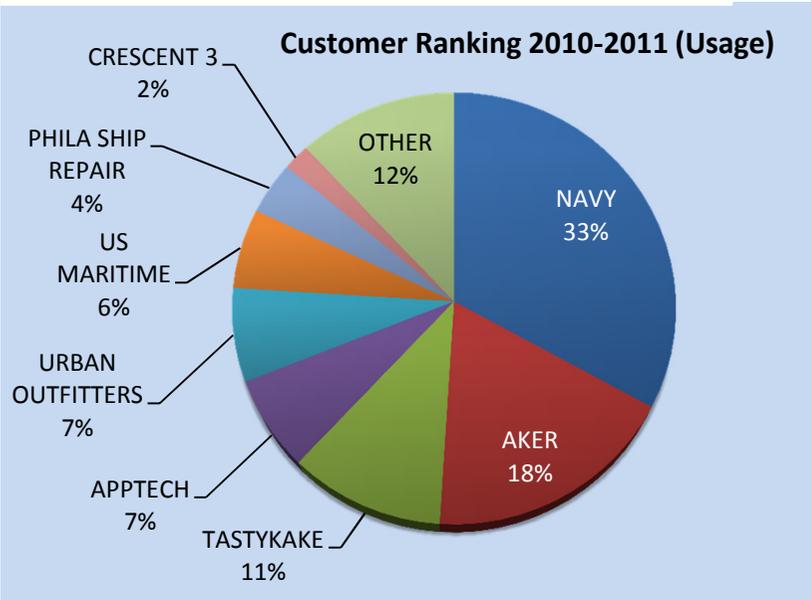
The Navy Yard – A Mini-City Experience

Overview and Problem Statement

PIDC (Philadelphia Industrial Development Corporation) - Overview



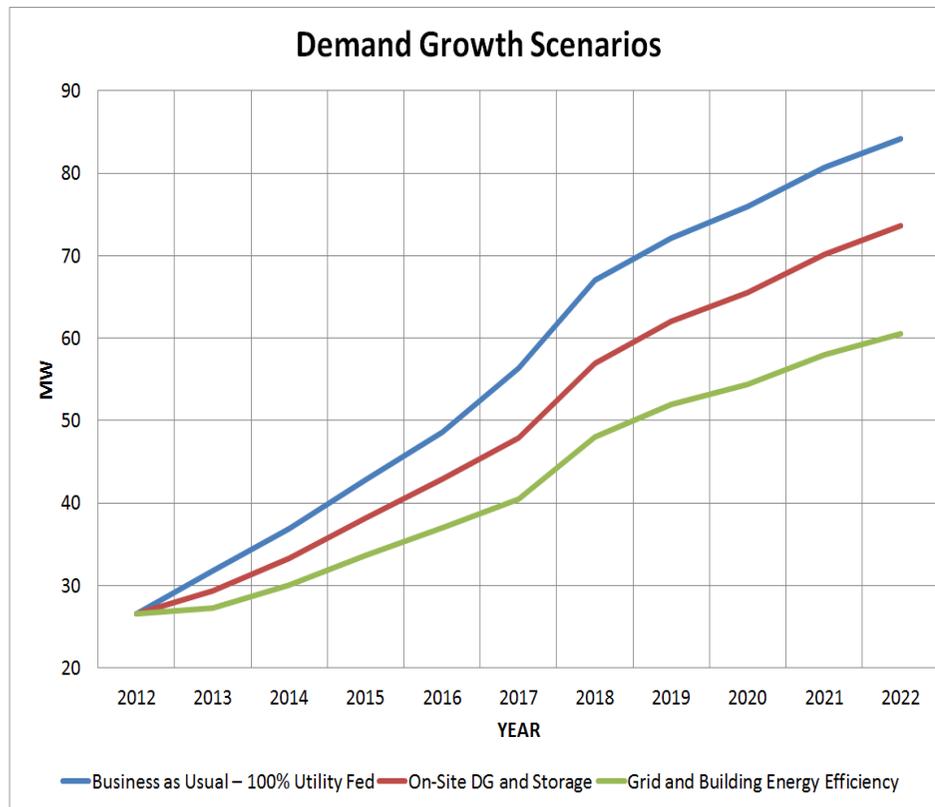
- **Rapid Growth**
- Vintage 1930s – 2 primary substations
- PJM → PECO → 13.2 KV Supply
- Current - 25 MW Peak Load
- Ambition of 10+ MW DER with 50+ MW



The Navy Yard – A Mini City Experience

Key Element - Mini City Energy Master Plan

Energy Master Plan Project: 2012 – 2013



Cumulative Usage decrease – over 61,000 MWh



Optimized Scenario & Business Plan

Business as Usual – 100% Utility Fed

- All PECO supply
 - No On-site generation (DG)
 - No proactive EE or DR effort
- Utility Demand - 82 MW

On-Site DG

Grid Programs:

- Natural gas DG
 - 6 MW Peak Reduction
 - 3 MW CHP (data center)
 - 1 MW Solar PV
 - 600 KW Fuel Cell
- Utility Demand - 72 MW

SG Infrastructure / Priority Repairs / Demand Response & Energy Efficiency

Customer programs:

- 20% EE goal by 2022
 - Navy DOD mandates
 - B-T-M Demand Reduction
- Utility Demand - 60 MW

Grid Capacity Upgrades
\$35M

Stand Alone Energy Projects
\$25M

Smart Grid & Operation Infrastructure
\$35M

The Navy Yard – A Mini City Experience

Key Element - Mini City Grid NOC (Network Operation Center)

- integrating on-site generation and storage with external supply
- new 4-year contract with Constellation Energy that includes block and index procurement strategies that utilize on-site resources
- DOE MicroGrid controller funding and participation
- providing electric customer participation and economic benefits
- results: significant energy efficiency (EE) and demand response participation *by the end-user customer*
- schedule:
 - project underway **DONE!**
 - in service: 1st Q, 2016

