



## The Evolving DE Systems Landscape in Pittsburgh

Cliff Blashford

Clearway Energy, Inc.

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# The Evolving DE Systems Landscape in Pittsburgh

## Today's Agenda – 6/24/2019

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- Introduction
- Pittsburgh: Resiliency
- Pittsburgh: Connectedness
- Pittsburgh: Vision
- Pittsburgh – District Energy Systems
  - DES – Clearway Energy
  - DES – Duquesne University
  - DES – University Complex
  - DES – PACT
- Pittsburgh – The Future



***Resiliency – “the capacity to recover quickly from difficulties; toughness”***

- **250 Year History**
  - Strategically critical in Western Expansion and Industrial Revolution
- **Renaissance 1 - (1945 to 1975)**
  - The “Iron City” begets the “Smokey City”  
Post War Investment in Downtown Pittsburgh – “Golden Triangle”
  - Point Park, Gateway Center, Mellon Square
  - Coordinated Urban Planning / Economic Development efforts
- **Renaissance 2 – (1975 to 2005)**
  - Ramped up downtown investment
  - US Steel Tower, One Oxford Center, PPG Place, DL Convention Center
  - Fifth Avenue Place, PNC Park
  - Early adopter of clean air standards
- **Renaissance 3 – (2005 to ????)**
  - Economy in transition (→ Tech, Energy, Healthcare, Education)
  - PPG Paints Arena, Heinz Field, PNC Tower, North Shore Development
  - Eco-Innovation Districts, Sustainability
  - Penguins “Center for Energy”

## Evolving DE Systems Landscape Pittsburgh: Community & Connectedness

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- Rivers, Roads & Bridges
- Neighborhoods
- Family & Tradition
- Sports Teams
- Technology & Innovation
- Arts & Education





# State of the Pittsburgh Market

## Economic Indicators - Convergence of Positive Influencers

### Changing demographics

- Urban renewal; Millennial sensibilities
- Reduce waste; expand renewables; leverage tech

### Aging Legacy Infrastructure

- 100 years old
- Steam, water, natural gas, electric

### Political vision & influence

- Mayor Bill Peduto's "Grid of Microgrids"
- Penguins "Center for Energy"
- City of Pittsburgh, Allegheny County, SEA, DOE Collaboration



### Increased Non-Profit Activity

- Higher Education; STEM; Robotics
- Healthcare Competition; Expansion





City of Pittsburgh – Market Ripe for District Energy & Utility Infrastructure Investment

# Evolving DE Systems Landscape Pittsburgh: Vision

 Clearway Energy 

**Northside Energy District**

Established in 1999, Energy Center Pittsburgh provides both district heating and cooling services to a total of 6.3 million square feet of building space which serves more than 30 buildings on the north side of Pittsburgh. This includes PNC Park, Carnegie Science Center, and Allegheny General Hospital.

 UPMC 

**Uptown Energy District**

has begun designing a new heat and power plant in the Lower Hill/Uptown District to deliver heat to surrounding buildings including UPMC Mercy. This energy district could also integrate Duquesne University's Cogeneration Plant.



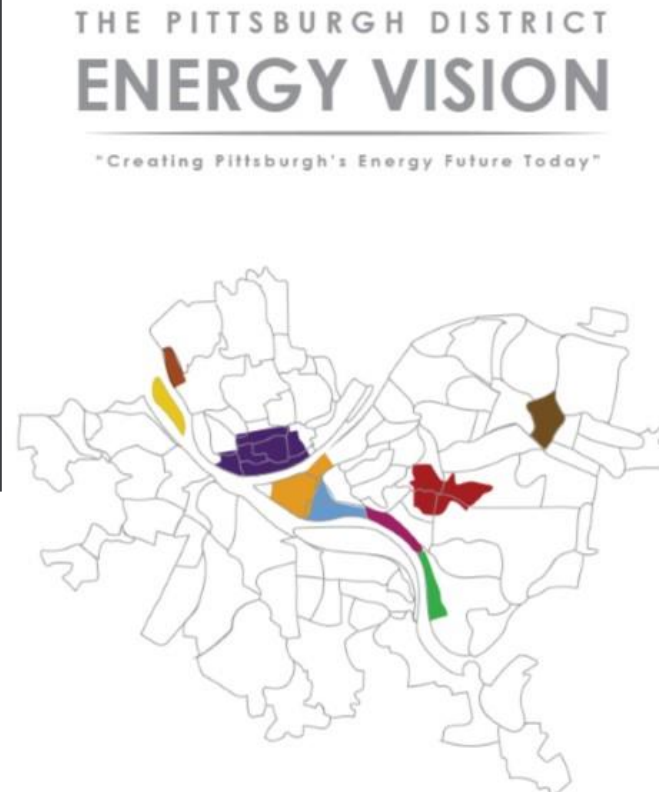
**Oakland Energy District**


Built in 1907, Bellefield Boiler Plant, serves most of Oakland's major institutions, including Carnegie Mellon University and Carnegie Museums of Pittsburgh. Carrillo Steam Plant in Oakland was established in 2009 and serves the UPMC. The two sites have interconnecting steam distribution lines.




**Downtown Energy District**

Established in 1983, Pittsburgh Allegheny County Thermal (PACT) serves 59 buildings downtown including many local government buildings.



 **Energy District**

This Property is a mixed-use development in Hazelwood on a 178-acre former steel mill river-front that would be operated almost exclusively on renewable-based distributed energy.

 **Larimer Energy District**

A community-based microgrid that would be part of the redevelopment of a 285-acre neighborhood in the east end of Pittsburgh.

 **Brunot Island Microgrid**

Existing electric substation and is a possible site for a biogas and waste-to-energy plant.

 **Woods Run Microgrid**

Duquesne Light Company is installing a nominal 10 MW<sup>+</sup> microgrid at their Woods Run operations center on the north side of Pittsburgh. The facility will be used to investigate challenges and solutions to integrating distributed energy technologies such as photovoltaics, wind, and energy storage.

 **2nd Avenue Microgrid**

A project that will link grid and transportation modernization through garage/rooftop solar and electric vehicle charging stations.



# Evolving DE Systems Landscape

## Clearway Energy – Energy Center Pittsburgh – System Expansion



- North Shore System (1969)
- Uptown System (2018)
- Duquesne University Integration (2019)
- Downtown District (Target 2021)

# Energy Center Pittsburgh - System Map Detail

## North Shore; Uptown





# Clearway Energy, Inc. Energy Center Pittsburgh LLC – North Shore System



Clearway Energy, Inc.  
Energy Center Pittsburgh LLC – North Shore System

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Plant Attribute	Data
Year Established	1969
Services Provided	Steam, Chilled Water, Hot Water (to PNC Park)
No. of Customers; Buildings	30; 30
Heating Capacity (Installed)	203,000 lbs/hr (Natural Gas; multiple units)
Cooling Capacity (Installed)	11,250 T (Electric; Steam)
Electrical (if applicable)	Backup Diesel to Plant Equipment
Distribution	~ 2 miles direct buried pipe (Steam, condensate, CWS, CWR, HWS, HWR)
Miscellaneous	Rates Regulated by PA PUC. 200kW Fuel Cell Demo (FCE, NET.L, DOE) Planned capital upgrades to chiller, cooling tower and distribution assets. Satellite assets @ hospital & museum.



# Clearway Energy, Inc. Energy Center Pittsburgh LLC – Uptown System



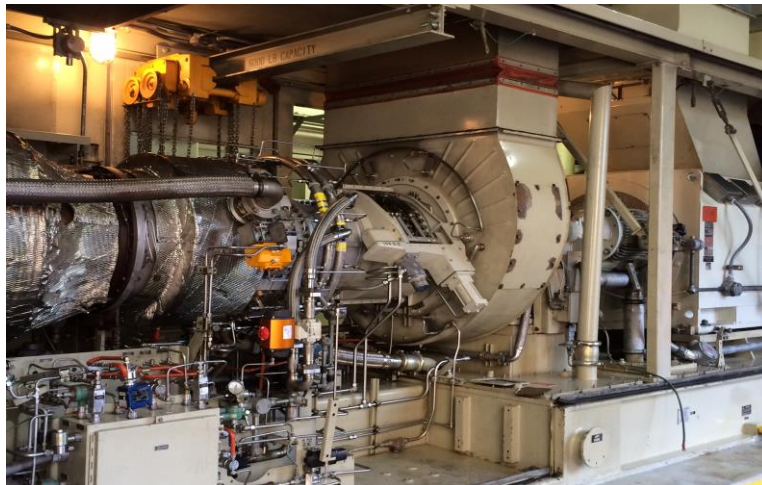


Clearway Energy, Inc.  
Energy Center Pittsburgh LLC – Uptown System

Plant Attribute	Data
Year Established	2018
Services Provided	Steam, CW, Backup Power (to UPMC Mercy)
No. of Customers; Buildings	1; 4 (...thus far!)
Heating Capacity (Installed)	150,000 lbs/hr (Natural Gas; 3 x 50,000 lbs/hr.)
Cooling Capacity (Installed)	8,250T (Electric; 3 x 2,750T)
Electrical Capacity (if applicable)	7.5MW (Emergency Backup to Plant & UPMC Mercy Hospital only)
Distribution	~ 0.5 mile direct buried pipe (Steam, condensate, CWS, CWR)
Miscellaneous	<p>Rates regulated by PA PUC.</p> <p>Strategically located to meet DE system development in Uptown district.</p> <p>Planned interconnection to newly acquired Duquesne University assets for redundancy, resiliency, and operational synergies.</p>

Clearway Energy, Inc.  
ECP Uptown Campus LLC (formerly "Duquesne University Energy Center")

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Clearway Energy, Inc.  
ECP Uptown Campus LLC (formerly “Duquesne University Energy Center”)



Plant Attribute	Data
Year Established	1997 (acquired by CWEN in 2019)
Services Provided	Steam, CW, Electricity (to Duq Univ Campus)
No. of Customers / Buildings	50 acre campus; 4MM square feet of building
Heating Capacity (Installed)	181,000 lb/hour (3 x 52kpsh NG + HRSG)
Cooling Capacity (Installed)	6600T (Electric; Steam Absorption)
Electrical Capacity (if applicable)	5.6MW Gas Turbine (Solar)
Distribution	Owned by Duq Univ; Maintained by Clearway
Miscellaneous	Unregulated subsidiary of Clearway Energy 40 Year Energy Service Agreement 6000T Ice Storage Added in 2007 Planned interconnection to Uptown distribution assets for redundancy, resiliency, and operational synergies.



## Evolving DE Systems Landscape Oakland Area University Complex – Bellefield Boiler Plant



Legacy (circa 1907) central steam supply to:

- University of Pittsburgh
- UPMC hospitals
- Carnegie Mellon University
- Carnegie Museums/Library
- Phipps Conservatory
- Pittsburgh Public Schools

Converted combustion fuel from coal to NG in 2009



## Evolving DE Systems Landscape Oakland Area University Complex – Carrillo Street Steam Plant



Incremental steam supply to expanding University of Pittsburgh main campus and UPMC hospital complex.

- Est. 2009
- 600,000 lbs/hour capacity
- Sized to meet current and future needs
- NG (primary) or oil
- Lower emissions than Bellefield boiler plant



## Evolving DE Systems Landscape Downtown Pittsburgh – PACT – Pittsburgh Allegheny County Thermal

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Legacy (circa 1915) central steam to downtown Pittsburgh.

- Formerly “Allegheny County Steam Heating”
- Member owned cooperative since 1982
- 500,000 lbs/hr capacity
- 4 x 125kpsh NG boilers
- Combination of tunnels and direct buried distribution
- Approx. 55 buildings served





## Evolving DE Systems Landscape DE Pittsburgh: Clearway Energy Vision

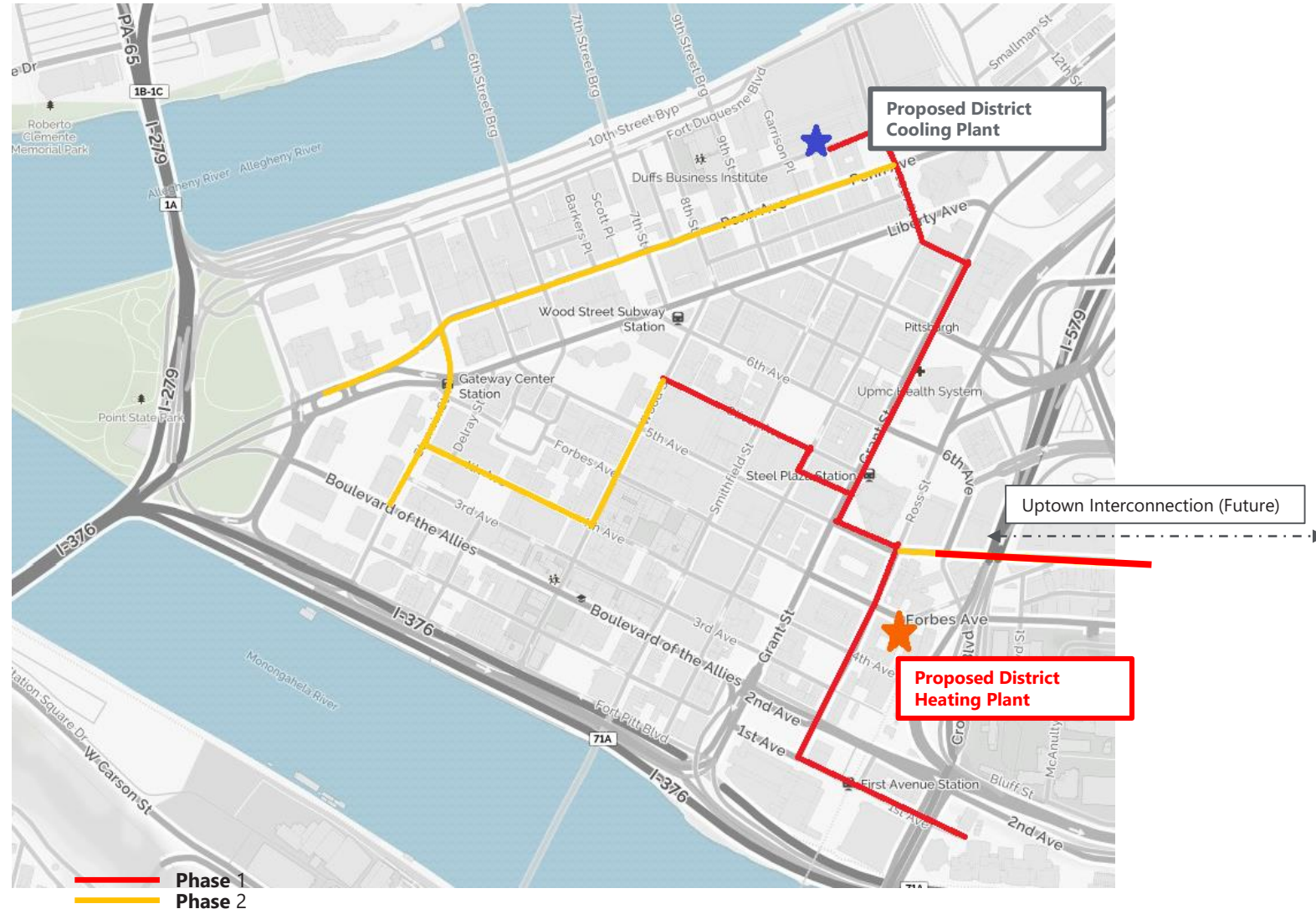
**FIGURE 2.** Potential future downtown Pittsburgh district energy network.



Source:  
Clearway  
Energy, Inc.

# Evolving DE Systems Landscape

## Clearway Energy Vision – Downtown DE District (Proposed)



Any Questions...?

Cliff Blashford  
Clearway Energy, Inc.  
6/24/2019