Pittsburgh District Energy
Past, Present & Future

Vision and Aspiration meet Reality

June 26, 2019
Downtown Pittsburgh – District Energy Legacy

North Shore
- 50 year CW/Steam/Hot Water System

Uptown
- UPMC (anchor customer)
- Greenfield system
- One year old system
- Hot water growth opportunity

Duquesne University
- CHP/Steam Chilled Water
- Interconnect to Uptown
- Utilize excess capacity
- Operational Efficiencies

PACT Downtown Co-op
- 100 yr. steam system
- Modernization transition in progress
- Opportunity to interconnect to neighboring Uptown
- Significant improved energy efficiency opportunity
- Steam/hot water hybrid potential

Various ages, sizes and types of District Energy Systems each with their own history and future
Downtown Pittsburgh –
Adjacent District Energy Systems

Interconnecting systems provides opportunity of synergies, resiliency and efficiency
Key Milestones of Community Support for Development of District Energy

<table>
<thead>
<tr>
<th>Year</th>
<th>Critical Milestones</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>IDEA performs a preliminary district energy assessment on the Pittsburgh Penguins’ Lower Hill development site</td>
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<tr>
<td>July 2015</td>
<td>City of Pittsburgh signs an MOU with the Department of Energy to develop a clean energy plan focused on district energy systems</td>
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Catalyst to District Energy growth – Pittsburgh Penguins development site
Planned Uptown District Energy System

Uptown stakeholder's evaluate District Energy
## Key Milestones of Community Support for Development of District Energy

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<td>April 2016</td>
<td>Clearway Energy, Inc. applies to the Urban Redevelopment Authority to purchase land adjacent to the Pittsburgh Penguins’ PPG Paints Arena for the future Uptown district energy plant</td>
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<td>August 2016</td>
<td>UPMC Mercy hospital commits to Clearway Energy as a future anchor customer of the new Uptown district energy system</td>
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<tr>
<td>November 2016</td>
<td>Clearway Energy completes a district energy system modernization master plan study for transforming the PACT 100-plus-year-old legacy downtown system</td>
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<tr>
<td>March 2017</td>
<td>Clearway breaks ground for the new Uptown district energy system</td>
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<tr>
<td>March 2018</td>
<td>Clearway Energy’s Uptown district energy system begins providing steam to UPMC Mercy. Chilled water and backup electric power service start in June 2018</td>
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City of Pittsburgh leadership and stakeholder collaboration and commitment
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<td>March 2018</td>
<td>The city of Pittsburgh, University of Pittsburgh and Danish government announce an agreement to collaborate on energy planning and research including district heating planning and microgrid feasibility assessments.</td>
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<td>March 2019</td>
<td>Clearway Energy acquires Duquesne District Energy Facility. Plans interconnection to Uptown System</td>
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<td>March 2019</td>
<td>The Pittsburgh Penguins announce development plans for the Lower Hill site next to the Uptown district energy system – a system expansion opportunity</td>
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Penguins facilitate stakeholder engagement - Clearway, City of Pittsburgh and City's Partners assess district energy benefits and hot water design
Uptown System Interconnected w/ Duquesne University

Interconnection provides additional system capacity, operating synergies, efficiencies and resiliency
Downtown System Modernization

Opportunity to leverage adjacent Uptown System to extend distribution from Uptown to Downtown

* Potential piping shown is long-term distribution plan; actual piping may vary as system develops
Downtown Pittsburgh
Interconnected Systems Potential

Future opportunity to modernize and optimize district energy City-wide in downtown