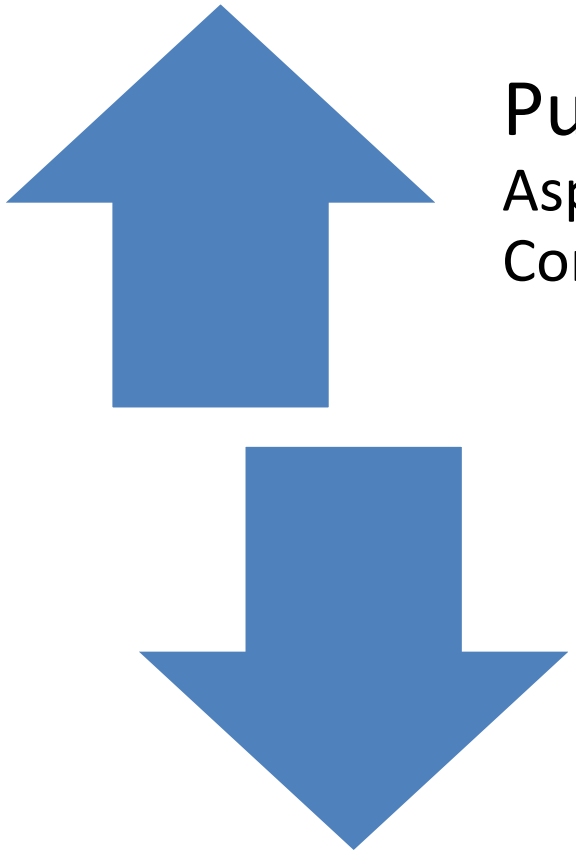
Implementing Boston's Microgrid & District Energy Policy

Presented by Terence Waldron, PE

25 June 2019

Public Policy Becomes Engineered Reality



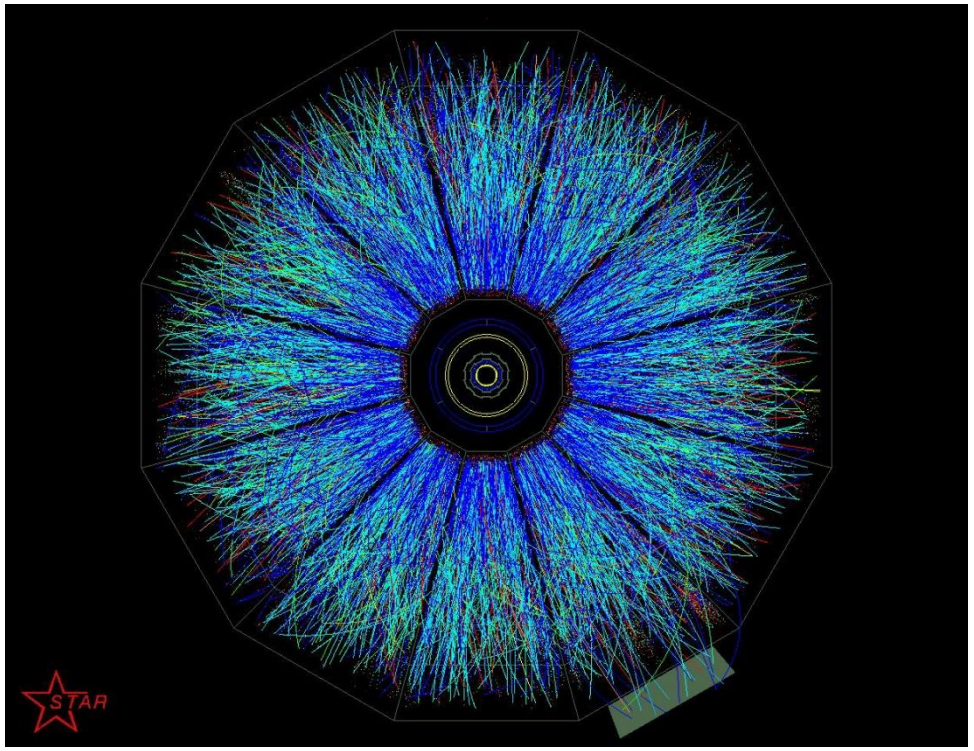
Public Policy

Aspirational Goals for
Common Good

Technical Execution

Bounded by Constraints

What is Public Policy? Engineer's View

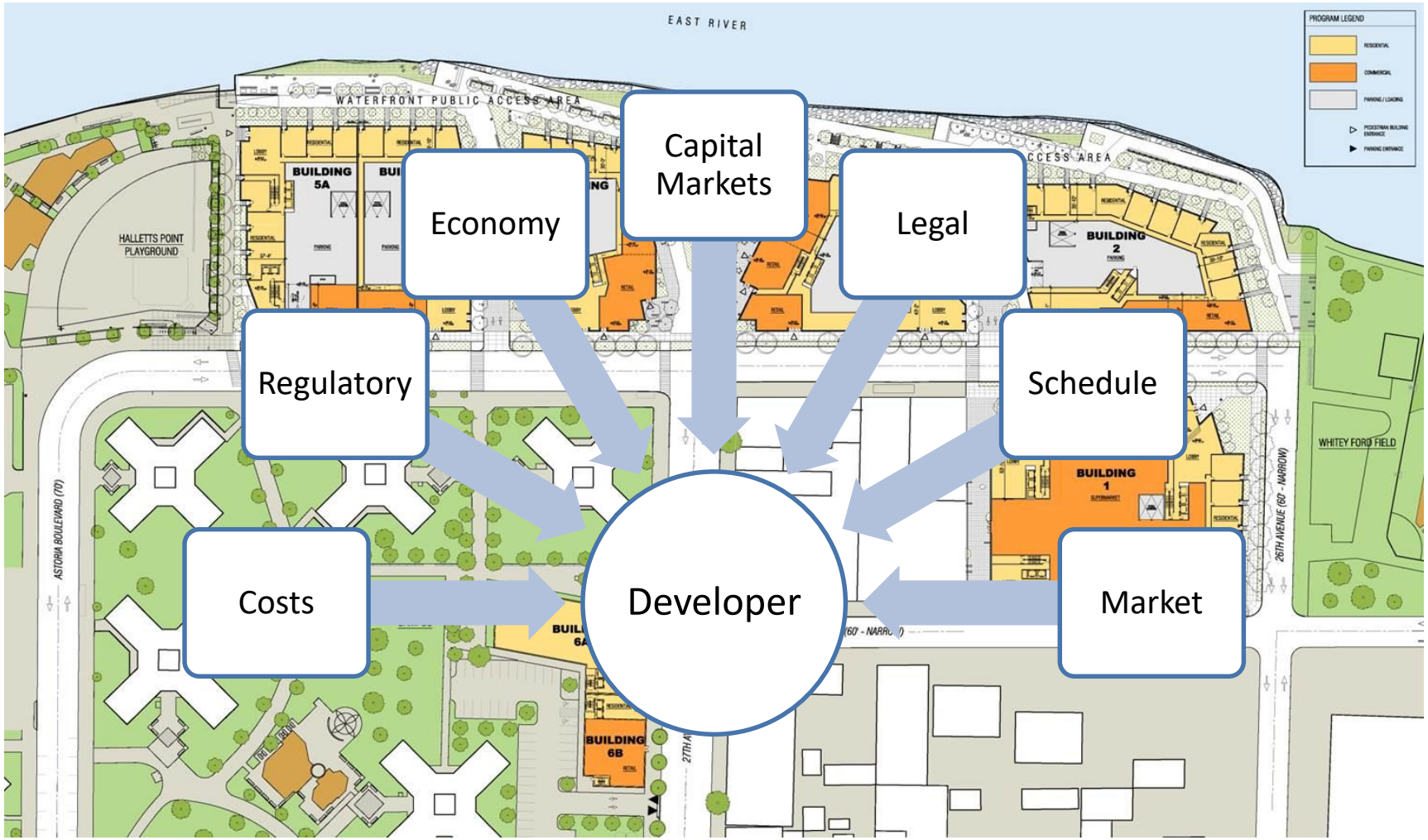


- Quantum Theory
- Advances Agenda in Measured Steps
- No Single Path, a Probability of Results
- Range of Solutions

Engineer’s World

- Factual Inputs
- Bounded by Codes
- Exact Calculations
- Measurable Results
- A Certain World

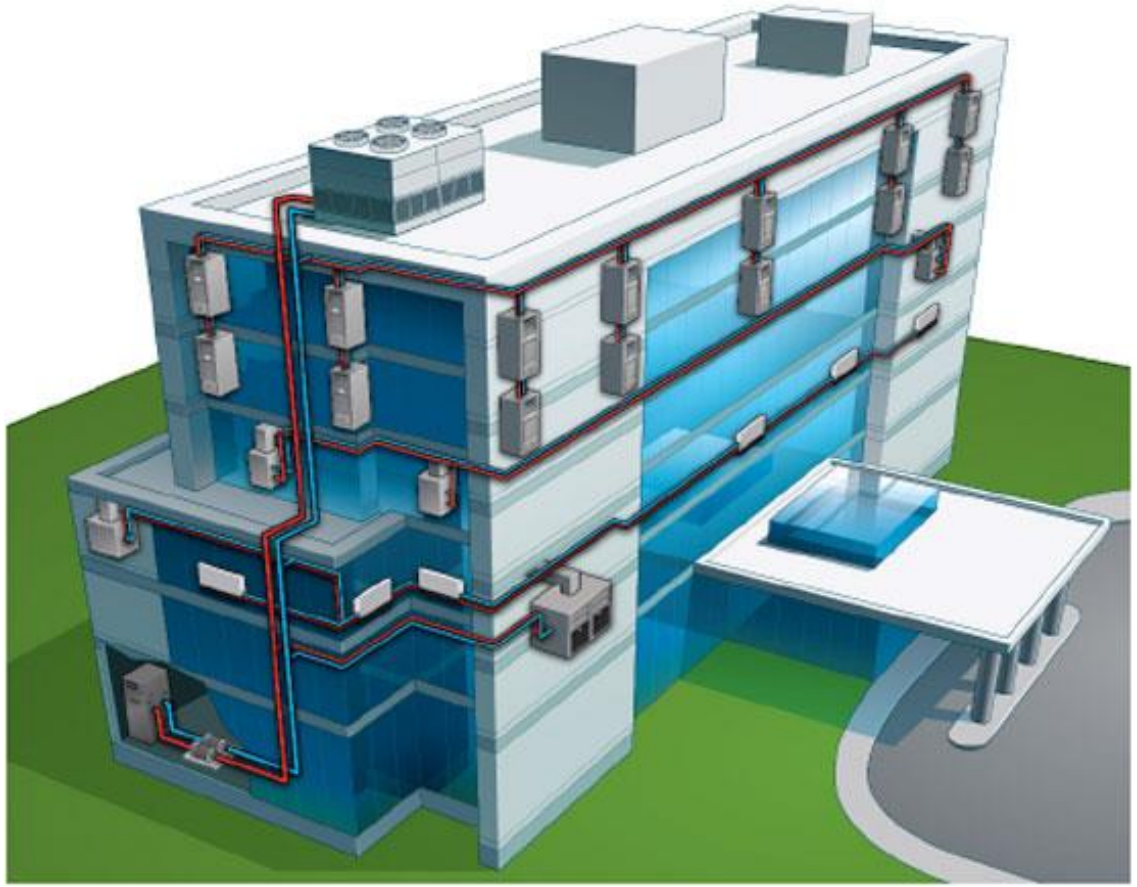
Developer's World



Business as Usual - General

- Commercially Available Design
- Limited Opportunity for Renewables
- Decentralized Systems
- Follows Codes
- Minimize First Cost
- Work Familiar to Trades
- Stay Within the Investor's Comfort Zone

Business as Usual – Heating & Cooling



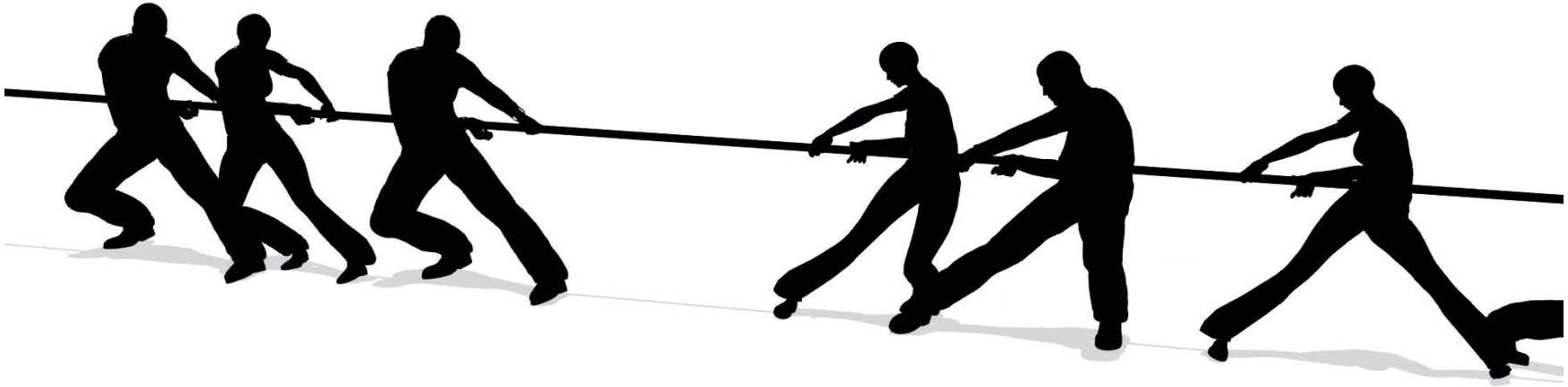
Typical Building Systems
Water Source Heat Pumps

- Excellent Performance Above 35 Degrees
- Allows for Simultaneous Heating and Cooling in Building
- High Energy Consumption Below 35 Degrees

Developer vs. Regulator

Developer – Focus on the Optimal Deal

Regulator – Focus on Common Good for the City



Mayor - Balances Growth & Economy vs. Common Good

Policy Goals

- Energy Resiliency
- Minimize Energy Consumption
- Reduce Greenhouse Gas Emissions
- Push the Regulatory Envelope
- Economic Feasibility

Developer's Mind

- How to Monetize Resiliency?
- Efficiency can be sold to Customers
- Greenhouse Gas Boston is a Coastal City
- High Regulatory Risk
- Show Me

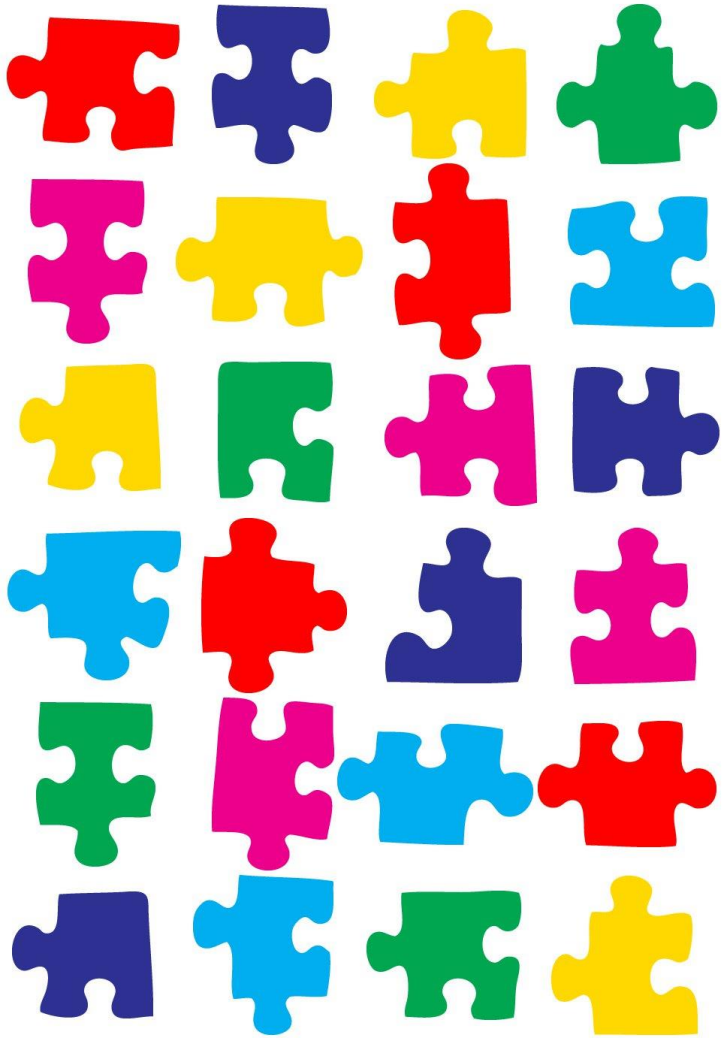
Lets Get Going with a Feasibility Study

Part A:

A.1. Data Collection and Site Investigation
A.2. Utility Load Profiles
A.3. Physical System Constraints
A.4. Regulatory Constraints

Part B:

B.1. Definition of Economic Parameters
B.2. Business as Usual Case
B.3. Screening Analysis
B.4. Construction Cost and Schedule
B.5. Operations and Maintenance Cost
B.6. Economic Analysis
B.7. Technical Description



Feasibility Study Process Observations

- Goal to Vet a Microgrid and District Energy Concept
- Building Use Not Well Defined, Dictated by Future Market
- Uncovered a Lack of Expertise in the Market
- Phasing is a Challenge
- Became an Educational Exercise for BPDA
- Study Viewed by Some as a Box to Check Not an Opportunity
- Capital Drives Decisions
- Efficiency Drives Results
- Higher level of Regulatory Experience

Feasibility Study Process Results

- Million Ways to Fail
- Financial Models for Real Estate do not Match Up With Infrastructure
- Building Based Systems work with Sufficient Size
- Clusters of Smaller Buildings require phasing and readiness

Take A way's

- Developers need to add Utility Engineers to team.
- Feasibility Study Needs to be Executed by the Utility Engineer with Vision Towards the Future.
- Building Systems Need to be Designed to Make Utility Supply Less Carbon Intensive with an infrastructure that can be Used for a Zero-Carbon System.
- Policy must Show Clear Pathways to Solutions to Keep Capital Flowing
- Comfort Zones Must be checked at the Door if True Progress is to be Made on Resiliency and Greenhouse Gas Impacts
- We Must Up Our Game!

Questions…