Boston Planning & Development Agency

Smart Utilities Policy for Article 80 Development Review - 2018

The Boston Planning & Development Agency ("BPDA") has worked in close collaboration with numerous internal and external stakeholders – the Mayor's Office of Streets, Transportation and Sanitation, the Mayor's Office of Environment, Energy and Open Space ("EEOS"), the City of Boston Department of Information Technology ("DoIT"), the City of Boston Public Works Department ("DPW"), the Public Improvement Commission ("PIC"), the Boston Water and Sewer Commission ("BWSC"), and the City of Boston Transportation Department ("BTD") – to develop a new model for integrated planning among energy, transportation, water, and communications utilities. The resulting *Boston Smart Utilities Vision* project ("SUV project") aims to transform and improve the "business-as-usual" model of utility design, planning, and coordination. With coordinated planning and improved technologies, utility services can be made more affordable, resilient, equitable, and sustainable.

Four key products of the two year-long SUV project include a *Baseline Report*, a *Cost Benefit Analysis*, the *Smart Utility Standards*, and a new policy calling for the incorporation of Smart Utility Technologies ("SUTs") into new developments. The first three of these work products can be found at: http://www.bostonplans.org/planning/planning-initiatives/boston-smart-utilities-project. The fourth work product, the *Smart Utilities Policy for Article 80 Development Review*, is contained herein.

The *Baseline Report* analyzes the cost of doing "business-as-usual" – namely, planning and constructing utilities for the analytical pilot project area using conventional approaches

The *Cost Benefit Analysis* evaluates the financial feasibility of multiple SUTs and concludes that many technologies are financially feasible and cost effective at various scales of real estate development under current market conditions. In addition to the *Cost Benefit Analysis*, several local, large scale developers were consulted for their opinions about the feasibility of a variety of SUTs.

The *Smart Utility Standards* set forth guidelines for planning and integration of SUTs with existing utility infrastructure in existing or new streets, including ten (10) SUTs and cross-section, lateral, and intersection diagrams of an ideal layout for underground services in 40' and 60' right-of-ways. The *Smart Utility Standards* are intended to serve as guidelines for developers, architects, engineers, and utility providers for planning, designing, and locating utilities.

The *Smart Utilities Policy for Article 80 Development Review* presented herein describes which SUTs will be required in new developments of certain size thresholds.

Policy Statement

Projects subject to Article 80B – Large Project, Article 80C – Planned Development Area, and/or Article 80D - Institutional Master Plan review shall incorporate SUTs into the infrastructure design and planning process. Utilizing the most recent *Smart Utility Standards* provided by the Boston Planning & Development Agency ("BPDA") and the City of Boston ("City") (available at: http://www.bostonplans.org/planning/planning-initiatives/boston-smart-utilities-project), the project proponent will be expected to integrate the applicable SUTs into the design and planning of utility infrastructure for water (including but not limited to sewage and stormwater), energy (including but not limited to gas, electricity, and steam), communications, and transportation services. Within two (2) years of adoption of this initial *Smart Utilities Policy for Article 80 Development Review*, the BPDA will evaluate its implementation and consider modifications to the policy both in terms of applicable development thresholds and SUTs.

Definitions

To be clear about what each of the SUTs involves, the following definitions are provided. More detailed standards and specifications will be developed for certain technologies by other City Departments – for example, PIC will adopt standards for the Telecommunications Utilidor.

Adaptive Signal Technology - Adaptive Signal Technology ("AST") utilizes intelligent signals, traffic cameras, pavement sensors, and visual monitoring equipment to manage traffic flow in real-time of all transportation modes, including buses, pedestrians, and bicycles. These technologies are used to reduce wait time and facilitate throughput and safety at intersections.

District Energy - District Energy systems produce steam, hot water, and chilled water ("thermal services") at a central plant. The steam or water is then piped underground to individual buildings for space heating, hot water heating, and air conditioning. Buildings served by district energy do not need their own boilers, furnaces, chillers, and/or air conditioners, and thus have lower capital costs and more usable floor area. District energy provides opportunities to reduce energy use, energy cost, and greenhouse gas ("GHG") emissions.

District Energy Microgrid - An energy system that includes both the thermal services of District Energy (see "District Energy" definition) and the electrical generation and distribution services of a Microgrid (see "Microgrid" definition). One way to achieve a District Energy Microgrid is through a combined heat and power ("CHP") system. CHP refers to the generation of electricity on-site and the capturing of excess heat of that process (which would otherwise be wasted) to provide useful thermal energy – such as steam or hot water – for space heating, cooling, domestic hot water, and industrial processes. District Energy Microgrid systems can be designed and implemented in a modular form, serving an initial energy load and progressively adding modules as the energy loads increase.

District Energy Microgrid Master Plan – Based on the analysis provided by the Feasibility Assessment, the District Energy Microgrid Master Plan will provide a detailed plan and

conceptual layout illustrating and describing the District Energy Microgrid generation and distribution system that will serve the proposed project at full buildout. The Master Plan shall include the timing and phasing of all District Energy Microgrid system components as they relate to the timing and phasing of the proposed development, including modular buildout of the District Energy Microgrid. Where phasing is appropriate, the Master Plan shall define components of the proposed Article 80 project that should be designed to be District Energy Microgrid Ready. The District Energy Microgrid Master Plan should quantify proposed project benefits in terms of a) energy supply resiliency, b) reduced energy use, c) reduced GHG emissions, and d) cost reduction to end users. The District Energy Microgrid Master Plan shall also describe any potential impacts on the public way due to physical system constraints. The Feasibility Assessment must be signed by a Licensed Professional Engineer with substantial experience designing and constructing District Energy Microgrid systems.

District Energy Microgrid Ready – As established in the District Energy Microgrid Master Plan, where modular phasing of a District Energy Microgrid system is appropriate as it relates to the phasing of a development, District Energy Microgrid Ready design may include a) installing a point of common coupling ("PCC") within the development to allow "islanding" the District Energy Microgrid from the electric utility grid; b) to the extent that new streets are to be constructed adjacent to the project as part of the requirements for the development, constructing the District Energy Microgrid distribution system that will ultimately traverse these streets; c) installing building heating and cooling systems in all phases of the project that are compatible with a District Energy system; d) designing buildings in the development such that they can easily connect to the District Energy Microgrid system; and e) designing mechanical rooms in all buildings with sufficient space to accommodate for future equipment that will be required either to connect to the larger District Energy Microgrid system and/or to facilitate District Energy Microgrid service within the building.

Feasibility Assessment for District Energy Microgrid – A Feasibility Assessment is a technical and economic evaluation of the applicability, scope, nature, and extent of a District Energy Microgrid for a Article 80 project, including whether District Energy, a Microgrid, or a District Energy Microgrid are appropriate on the project. Factors to be considered in the assessment include, but are not limited to, utility load profiles, business as usual case, definition of economic parameters, physical system constraints, regulatory constraints, screening analysis, construction cost and schedule, operations and maintenance schedule and an economic model. The Feasibility Assessment should describe the proposed project's goals regarding: a) energy supply resiliency; b) reduced energy use; c) reduced GHG emissions; and d) cost reduction to end users, and explain how the proposed District Energy Microgrid systems can help achieve these benefits. The Feasibility Assessment must be signed by a Licensed Professional Engineer with substantial experience designing and constructing District Energy Microgrid systems.

Green Infrastructure - Green Infrastructure is an approach to water management that includes policies, planning activities, and infrastructure implementation that assist in absorbing, delaying, detaining, and treating stormwater in order to reduce flood risk and pollution downstream. The

Boston Complete Street Guidelines 2013 provide additional information on various green vegetated stormwater management systems (stormwater/bioretention planters, rain gardens, etc.), as well as information on permeable paving materials. Green Infrastructure considered in the SUV project includes: bioretention basins and planters, infiltration chambers, tree pits/trenches, dry wells, and permeable paving.

Microgrid - A Microgrid is an electricity generation and distribution system generally serving multiple buildings that can be operated in a controlled, coordinated way with the main power grid or, as needed, independently when disconnected from the main power grid (in "island mode"). Microgrids are composed of: a) a power source; b) a power management system; c) electricity consuming devices; and d) a utility connection. Microgrids may also include an energy storage system. Microgrids provide opportunities for resiliency in the face of weather or other emergencies that affect the main power grid. Microgrids also present opportunities to improve power quality, flexibility, and reliability by integrating and optimizing various sources of energy, including renewable energy and battery storage.

Telecommunications Utilidor - The Telecommunications Utilidor ("Telecom Utilidor") is an underground conduit duct bank that will house all telecommunication assets. By unifying all the telecommunication assets in one Telecom Utilidor, street disruptions will be significantly decreased for telecommunication buildout, as well as when subsequent providers want to add assets. Through coordination, buildout can be more cost effective for all stakeholders.

Applicable Development Review Threshold Criteria

SUTs required for Article 80 projects will depend on: (a) the floor area of the project; and/or (b) the project's required mitigation of traffic, street lighting, and surface water runoff.

For projects at or above 1.5 million square feet of floor area:

1- The BPDA shall, as part of project review, recommend a Feasibility Assessment for a District Energy Microgrid. If the Feasibility Assessment reviewed and approved by the BPDA demonstrates that a District Energy Microgrid is feasible, then a District Energy Microgrid Master Plan shall be prepared. The project will be expected to implement the District Energy Microgrid Master Plan. If, at a later date, the project proponent wishes to amend the approved Article 80 development plans, the corresponding District Energy Microgrid Master Plan must also be amended to reflect any changes in project phasing, configuration, land use mix, and/or intensity of use.

For projects at or above 1.5 million square feet of floor area, and/or adding or altering road surface in excess of 0.5 miles of roadway:

2- The BPDA and PIC shall, as part of their project review, recommend the incorporation of a Telecom Utilidor. If a Telecom Utilidor is not incorporated into the project plan, the project

proponent shall demonstrate to the BPDA and PIC how other technologies to be incorporated into the project will provide comparable or superior benefits in terms of mitigating and/or reducing street disruptions, yielding more efficient use of underground space, and promoting more equitable access to telecom infrastructure.

For all projects at or above 100,000 square feet of floor area:

3 - The BPDA, in consultation with BWSC, shall recommend the use of Green Infrastructure to retain, on site, a volume of runoff equal to 1.25 inches of rainfall times the total impervious area, prior to discharge, and in compliance with any applicable BWSC stormwater mitigation requirements.

For projects satisfying other threshold criteria:

4- **For all projects where the BTD requires that traffic signals be installed or where existing signal equipment will be fully upgraded,** the BPDA, in consultation with BTD, shall recommend the incorporation of Adaptive Signal Technology ("AST") and any related components into the traffic signal system network, consistent with any applicable BTD standards or guidelines. Where there is no existing AST network, new and upgraded signals should be equipped to be linked together in the future, consistent with any BTD standards or guidelines

5- **For all projects making right-of-way improvements which are responsible for street light installation or a contribution toward the same**, the BPDA and PIC shall recommend that all street lights include additional electrical connection and fiber optic service, consistent with any applicable DPW standards or guidelines.

Timing in the Article 80 Process

The BPDA will publish administrative guidelines concerning the documentation needed at different stages of development review and permitting relative to the *Smart Utilities Policy for Article 80 Development Review* on the SUV project website. Documentation will be reviewed during the following stages:

A. **With the Project Notification Form ("PNF"), Notice of Project Change ("NPC"), or other initial filing,** provide documentation of the integration of applicable SUTs and *Smart Utility Standards* into the design and planning of the project via diagrams, plans, analyses, and descriptions to make clear how these will be integrated into the overall project. Describe all immediate and long-term planning, design, construction, and maintenance strategies that will be employed to avoid, eliminate, or mitigate the adverse impacts of utility construction. Consideration of SUTs does not need to be limited to those described in the *Smart Utility Standards* or *Smart Utilities Policy for Article 80 Development Review.*

B. **During the Article 80 Development Review and prior to Article 80 approval by the BPDA Board,** provide updated documentation of the integration of applicable SUTs and *Smart Utility Standards* into the design and planning of the project via diagrams, plans, analyses, and descriptions to make clear how these will be integrated into the overall project. Describe all immediate and long-term planning, design, construction, and maintenance strategies that will be employed to avoid, eliminate, or mitigate the adverse impacts of utility construction. Consideration of SUTs does not need to be limited to those described in the *Smart Utility Standards* or *Smart Utilities Policy for Article 80 Development Review.*

C. **Prior to filing an application for a building permit,** provide updated documentation of the integration of applicable SUTs and *Smart Utility Standards* into the design and planning of the project via diagrams, plans, analyses, and descriptions to make clear how these will be integrated into the overall project. Describe all immediate and long-term planning, design, construction, and maintenance strategies that will be employed to avoid, eliminate, or mitigate the adverse impacts of utility construction. Consideration of SUTs does not need to be limited to those described in the *Smart Utility Standards* or *Smart Utilities Policy for Article 80 Development Review.*

D. **Prior to applying for a Certificate of Occupancy and final inspection,** provide updated documentation of the integration of applicable SUTs and *Smart Utility Standards* into the construction of the project via diagrams, plans, analyses, and descriptions to make clear how these were integrated into the overall project to avoid, eliminate, or mitigate the adverse impacts of utility construction. Consideration of SUTs does not need to be limited to those described in the *Smart Utility Standards* or *Smart Utilities Policy for Article 80 Development Review.*