

**BPDA – Smart Utilities Policy
Master Plan for District Energy Microgrids
Outline Draft**

Introduction:

The completion of a District Energy Microgrid Master Plan should follow the completion of a District Energy Microgrid Feasibility Assessment when a particular system analyzed in the study is deemed feasible. The Master Plan should provide a plan and conceptual layout illustrating and describing the District Energy Microgrid generation and distribution system that will serve the proposed development project at full buildout, as it relates to the phasing-in of a development. The main goals of the Master Plan are to

1. Ensure the development design includes spacing considerations for the main components and operating units of the energy system within the development campus, for use during future development review and design review processes of the individual buildings.
2. Ensure the development design takes into consideration the modular buildout of the District Energy Microgrid and the integration of District Energy Microgrid-Ready design for both buildings and streets, as needed due to phasing and timing considerations of the proposed development.
3. Ensure the pertinent permitting and approval processes for the particular energy system are contemplated early on as part of the plan so that they don't become a barrier to the implementation of the energy system at a later stage.

The Master Plan must be signed by a Licensed Professional Engineer with substantial experience designing and constructing District Energy Microgrid systems. The Master Plan is composed of two parts – “Part A” and “Part B”. Unless a different process is agreed upon between the project proponent and the BPDA, Part A should be submitted prior to approval of the development project by the BPDA Board. Part B should be completed prior to applying for a building permit.

The review of the Master Plan Parts A and B should be a collaborative, iterative process, with several meetings between the project proponent, the BPDA, and any other pertinent parties.

The Master Plan should include – but is not limited to – the following sections:

Part A:

- A.1. Process Design
- A.2. Permitting and Approval – Stage I

Part B:

**BPDA – Smart Utilities Policy
Master Plan for District Energy Microgrids
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- B.1. Civil Engineering – Site Development
- B.2. Mechanical Engineering
- B.3. Electrical Engineering
- B.4. Fire Detection, Suppression and Alarms
- B.5. Permitting and Approval – Stage II

The minimum requirements for completion of each section are described below.

Part A:

A.1. Process Design

- a) Process & Instrument Diagrams: *This section should define all major equipment and processes that will constitute the energy system.*
- b) Heat and Material Balance - Summer Case: *This section should describe the Summer Design Day, showing maximum chilling output.*
- c) Heat and Material Balance - Winter Case: *This section should describe the Winter Design Day, showing maximum heating output.*
- d) Heat Balance - Shoulder Case: *This section should describe the Spring/Fall low thermal cases.*
- e) Electrical One Line Diagram, Power & Control: *This section should describe the high voltage system, including the generation system, utility interconnection, customer distribution system, and station service system. The section should also show the protective relaying and metering as required by the utility interconnection application.*
- f) Control Architecture Diagram: *This section should provide a diagram of the major control system attributes including any Programmable Logic Controllers (PLCs) and Human Machine Interfaces (HMIs).*
- g) Hot Water and Chilled Water Distribution System Diagram: *This section should provide a diagram of the water distribution system between the energy system and the buildings, clearly identifying the layout on streets when applicable.*

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- h) Equipment Location Drawing: *This section should provide information regarding the location of the equipment within the development (i.e., mechanical rooms, roofs, etc).*
- i) General Arrangement Drawing: *This section should show the location of the equipment within the equipment rooms. This will be used to assess design considerations for potential future growth needs.*

A.2. Permitting and Approval – Stage I

- a) Electric Interconnection Application: *This section provides the completed interconnection application with supporting documentation as submitted to the local electrical utility.*
- b) Natural Gas Load Letter: *This section provides the complete load letter and supporting documentation as submitted to the gas utility.*

Part B:

B.1. Civil Engineering – Site Development

- a) Underground Utilities Distribution Drawings: *This section should provide the concept for the distribution of underground utilities on the site, including duct banks, manholes, and other major system details. Of particular importance, as applicable, are a) the electrical distribution system to and between buildings and b) the distribution system for chilled water and hot water/steam, and how these systems will share the space with other underground utility infrastructure. If applicable, the section should also show the Point of Common Coupling (“PCC”) where the development area can disconnect and “island” from the electric utility transmission and distribution system. The section should also show the planned phasing of the system as it relates to the phasing of the entire development area.*
- b) Overhead Utilities Drawings: *This section should provide the concept for the distribution of overhead utilities on the site, including electric, telecommunication, and light poles. The section should also show the planned phasing of the system as it relates to the phasing of the entire development area.*

B.2. Mechanical Engineering

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- a) Exhaust Ductwork Routing Drawing: *This section should show the location of the exhaust system, if applicable, for any fuel-burning equipment. This section will be reviewed particularly as it relates to District Energy Microgrid-Ready design.*
- b) Vents chase way: *This section should show the chase allocation for the plant vents required by safety codes. This section will be reviewed particularly as it relates to District Energy Microgrid-Ready design.*
- c) HVAC layout: *This section should show, if applicable, the CHP plant ventilation for process equipment and combustion air, the building louvres for inlet and exhaust air, and the sound treatment of the ventilation systems. This section will be reviewed particularly as it relates to District Energy Microgrid-Ready design.*

B.3. Electrical Engineering

- a) Site Electrical Plan: *This section should describe the location of all major system components that make up the microgrid.*
- b) Electrical Area Classification Plan: *This area should show the classification of the equipment areas per the electrical code.*
- c) Load Flow Calculations: *This section should show the calculations used for sizing the electrical system.*

B.4. Fire Detection, Suppression, and Alarms

- a) Fire Detection & Alarm Concept Plan: *This section should provide a conceptual description of the fire detection and alarm system, as it relates to the phasing of the energy system in the development area. This section will be reviewed particularly as it relates to District Energy Microgrid-Ready design.*
- b) Fire Suppression Concept Plan: *This section should provide a conceptual description of the fire suppression system, as it relates to the phasing of the energy system in the development area. This section will be reviewed particularly as it relates to District Energy Microgrid-Ready design.*

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Master Plan for District Energy Microgrids
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B.5. Permitting and Approval – Stage II

- a) Background Noise/Sound Level Measurement & Noise Model: *If applicable, this section is particularly important as it relates to phasing of the entire development area and District Energy Microgrid-Ready design.*
- b) DEP Air Permit Application: *If applicable, this section is particularly important as it relates to phasing of the entire development area and District Energy Microgrid-Ready design.*