COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENERGY & ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
THE OFFICE OF APPEALS AND DISPUTE RESOLUTION

In the Matter of Brockton Power Co., LLC	OADR Docket No. 2011-025 & 026 File No. W207973 Brockton, MA

DIRECT TESTIMONY OF ELIZABETH STANTON

Q. Please state your name, position, and business address.

A. My name is Elizabeth A. Stanton. I am a Principal Economist at Synapse Energy Economics, Inc., located at 485 Massachusetts Avenue, Suite 2, Cambridge, MA 02139.

Q. On whose behalf are you testifying?

A. I am testifying on behalf of the Petitioner Residents of Brockton, West Bridgewater, and East Bridgewater.

Q. Please describe Synapse Energy Economics.

A. Synapse Energy Economics is a research and consulting firm specializing in electricity and natural gas industry regulation, planning, and analysis. Our work covers a range of issues, including economic and technical assessments of energy resources; electricity market modeling and assessment; integrated resource planning; energy efficiency policies and programs; renewable resource technologies and policies; and climate change strategies. Synapse works for a wide range of clients, including attorneys general, offices of consumer advocates, public utility commissions, environmental advocates, the U.S. Environmental Protection Agency, U.S. Department of Energy, U.S. Department of Justice, the Federal Trade Commission, and the National Association of Regulatory

Utility Commissioners. Synapse has over 25 professional staff with extensive experience in the electricity industry.

Q. Please summarize your professional and educational experience.

A. I have more than 15 years of professional experience as an environmental economist. At Synapse, I have led studies examining environmental regulation, cost-benefit analyses, and the economics of energy efficiency and renewable energy. I have submitted expert reports and testimony in Illinois, Vermont, New Hampshire, Massachusetts, and several federal dockets; and I have authored more than 80 reports, policy studies, white papers, journal articles, and book chapters on topics related to energy, the economy, and the environment.

Prior to joining Synapse, I was a Senior Economist with the Stockholm Environment Institute's (SEI's) Climate Economics Group, where I was responsible for leading the organization's work on the Consumption-Based Emissions Inventory (CBEI) model and on water issues and climate change in the western United States. While at SEI, I led domestic and international studies commissioned by the United Nations Development Programme, Friends of the Earth-U.K., and Environmental Defense.

My articles have been published in *Ecological Economics*, *Renewable Resources Journal*, *Environmental Science & Technology*, and other journals. I have also published books, including *Climate Change and Global Equity* (Anthem Press, 2014) and *Climate Economics: The State of the Art* (Routledge, 2013), which I co-wrote with my colleague at Synapse, Dr. Frank Ackerman. I am also coauthor of *Environment for the People* (Political Economy Research Institute, 2005, with James K. Boyce) and coeditor of

Reclaiming Nature: Worldwide Strategies for Building Natural Assets (Anthem Press, 2007, with Boyce and Sunita Narain).

I earned my Ph.D. in economics at the University of Massachusetts-Amherst, and have taught economics at Tufts University, the University of Massachusetts-Amherst, and the College of New Rochelle, among others. My curriculum vitae is attached as Exhibit EAS-1.

Q. What connection, if any, have you had with Brockton Power, the Brockton and Bridgewater residents, or the City of Brockton?

A. None.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to explain the appropriate way to assess the economic impacts of a large industrial project, such as an electric generating facility, and to present the results of my review and evaluation of:

(1) Brockton Power Company's ("Brockton Power") cost-benefit analyses of the proposed electric generating facility in Brockton, Massachusetts;

(2) Economic Development Research Group, Inc.'s ("EDRG") September 29, 2009 "Economic Assessment of Proposed Power Facility in Brockton, MA";

(3) EDRG's March 2015 "Brockton Power Plant Economic Impact Study Update"; and

(4) Massachusetts Department of Environmental Protection's ("DEP") cost-benefit analyses of the proposed electric generating facility in Brockton, Massachusetts.

Q. Please identify any regulatory proceedings for electricity generating facilities in which you have testified.

A. I testified before the New Hampshire Public Utilities Commission in DE 11-250, an

investigation of the scrubber costs and cost recovery related to the Merrimack plant.

Q. What documents did you review in support of your testimony?

A. I have reviewed the following documents for this proceeding:

- "Demonstration that Benefits Significantly Outweigh Costs" in Brockton Power Company (Brockton Power)'s March 25, 2010 Consolidated Air Plan Approval Application;
- Economic Development Research Group (EDRG)'s Economic Assessment of Proposed Power Facility in Brockton, MA, dated September 29, 2009;
- "Environmental Justice (EJ)" analysis in the Massachusetts Department of Environmental Protection (DEP)'s July 20, 2011 Conditional Approval;
- EDRG's March 2015 Brockton Power Plant Economic Impact Study Update;
- "Demonstration that Benefits Significantly Outweigh Costs" in Brockton Power's April 2015 Updated Consolidated Air Plan Approval Application;
- Direct Testimony of Jonathan W. Winslow on behalf of Brockton Power; and
- Direct Testimony of Thomas Cushing on behalf of the Massachusetts DEP.

Q. Please discuss how the economic impacts of the construction and operation of an industrial facility, such as an electric generating facility, should be evaluated.

A. Economic impact studies of the construction and operation of an industrial facility look at spending and employment, environmental and social impacts. Spending and employment impacts include direct impacts, indirect impacts, and induced impacts.

- Direct impacts include materials and services purchased towards the construction or operations of a facility, as well as labor costs towards the construction or operations of a facility. The development of direct job impacts relies primarily

upon three main inputs: investment level (i.e., dollars spent), share of that investment spent on labor, and state- and industry-specific wages. Ideally, jobs should be expressed in full-time equivalency (FTE), meaning one job is equal to one person working full time for one year. At the very least, it should be clear whether job numbers are FTEs or whether every temporary, part-time, and full-time position is being counted as a job and added together.

- Indirect impacts are the upstream activities needed to support construction and operations. For instance, an investment in a new wind farm not only creates jobs at the wind farm, but also up the supply chain, increasing economic activity at turbine and other component manufacturers.
- Induced impacts result from employees in direct and indirect jobs spending their paychecks on restaurants, auto-mechanics, and other consumer goods and services.

Construction of an electric generating facility will involve direct spending over a defined period of time on labor—in the form of short-term construction jobs—and supplies. It will also lead to indirect economic impacts in sectors within the region that supply goods and services to the project, and induced economic effects resulting as workers spend their earnings in the region. The on-going operation and maintenance of the project, once construction is complete, will also create some jobs and lead to indirect and induced economic impacts in the region.

In addition to these spending and employment related economic impacts, environmental and social costs that result from the construction of an electric generating facility are considered in impact assessments. Increases in noise, traffic, air and water pollution,

health impacts, and greenhouse gas emissions, as well as a reduction in property values and impacts on people's use and enjoyment of an area can have economic effects on residents living near a new electric generating facility.

Q. Please summarize your understanding of the requirements of Massachusetts regulation 310 C.M.R. 7.00, Appendix A, Section (8)(b).

A. My understanding of this regulation is that it requires a demonstration that the benefits of a project significantly outweigh the environmental and social costs imposed by the project as a result of its location and construction. The text of the rule specifically says that alternative sites, sizes, production processes and environmental control techniques should be analyzed as part of this demonstration:

> By means of an analysis of alternative sites, sizes, production processes and environmental control techniques for such proposed new or modified stationary source, the owner or operator of the proposed stationary source or modification shall demonstrate to the satisfaction of the Department [of Environmental Protection] that the benefits of the proposed source significantly outweigh the environmental and social costs imposed as a result of its location, construction or modification.[1]

Q. In your opinion, did Brockton Power's April 25, 2008 (updated March 25, 2010) consolidated air plan approval application adequately demonstrate that the benefits of the project significantly outweigh the environmental and social costs?

A. No. Brockton Power's application fails to demonstrate that the benefits of the proposed project significantly outweigh its costs in two ways.

[1] See Brockton Power March 25, 2010 Consolidated Air Plan Approval Application at page 4-9.

First, while the application provides some explanation of how the site and turbine size were chosen and what environmental control techniques will be employed, it fails to analyze any alternative production processes. With the omission of reasonable alternatives, there is nothing against which to compare the potential costs and benefits of the project.

Second, the application lists benefits of the proposed project but not the costs. Environmental and social costs—such as air pollution, noise, traffic, water supply, public health impacts, property value impacts, and visual concerns—are not monetized. Instead, the application explains that these costs are "minimal." It is not clear how the use of natural gas at a natural gas electric generating facility "further reduces the already minimal environmental impacts" of that facility. Brockton Power's assertion that expected air pollutants from the project meet EPA standards is not equivalent to a thorough assessment and presentation of environmental and social impacts, which include but are not limited to: increases in noise, traffic, air and water pollution, health impacts, greenhouse gas emissions, reduction in property values, and impacts on the local communities' use and enjoyment of their neighborhoods.

Q. In your opinion, did EDRG's 2009 Economic Assessment of Proposed Power Facility in Brockton, MA adequately demonstrate that the benefits of the project significantly outweigh the environmental and social costs?

A. No, the 2009 assessment does not adequately demonstrate that the benefits of the proposed project significantly outweigh its costs. The 2009 EDRG assessment evaluates the economic benefits of the project only—it does not estimate the costs.

The 2009 study is a spending and employment analysis estimating how construction and operation of a new power generating facility might create jobs and bring tax benefits. It makes no attempt to identify, let alone quantify, the environmental and social costs resulting from the construction of the project.

Q. Please describe the methodology employed by EDRG in its 2009 analysis.

A. In its 2009 assessment, EDRG states that it used the IMPLAN model to assess the economic impacts of constructing and operating the proposed Brockton Power facility. IMPLAN is an input-output model utilized in economic impact assessments. It estimates the indirect and induced impacts (also known as multiplier impacts) from spending and employment in a given industry and location. Input-output models estimate how much a given industry relies on supplies from other industries in producing its output.

EDRG also relies on numerous assumptions—unrelated to IMPLAN—regarding (1) the direct spending and employment in construction and operation of the Brockton Power facility, (2) Brockton Power's plan to hire and purchase supplies from the greater three-county region, and (3) Brockton Power's plan to hire and purchase supplies from Brockton.

These assumptions are pivotal to EDRG's spending and jobs findings, but are not substantiated in the report. To be clear: these assumptions do not come from the IMPLAN model or data, and different assumptions would result in different spending and employment findings.

The key unsubstantiated assumptions used are:

(1) <u>The direct spending and employment in construction and operation of the Brockton Power facility</u>: EDRG explains that the direct effects from construction and operation

of the facility were calculated based on Brockton Power's estimates for labor and materials purchases.[2]

(2) Brockton Power's plan to hire and purchase supplies from the greater three-county region: EDRG introduced project-specific spending data into the model. It then manually entered regional multipliers for a given sector based on targets set by Brockton Power in order to calculate the portion of demand that is met by businesses in the three-county region.[3] Regional multipliers are an assumed share of the total expenditures expected by the company to take place within the three-county region. For those spending categories for which no target was set by the company, EDRG used IMPLAN's Regional Purchase Coefficient (RPC).[4] To allocate jobs to three-county area residents, the 2009 assessment assumes that 100 percent of all construction workers and 82 percent of operations workers will be three-county residents.

(3) Brockton Power's plan to hire and purchase supplies from Brockton: The share of the regional impacts assumed to occur in Brockton were calculated by comparing the economies of Brockton to the three-county area using IMPLAN.[5] For example, if two thirds of the three-county area's concrete sellers are located in Brockton, EDRG assumes that two thirds of Brockton Power's required cement purchases will come from Brockton. To allocate jobs to Brockton residents, the 2009 assessment assumes that 50-percent of all construction workers and 82 percent of all operations workers will be Brockton residents.

[2] EDRG (2009) at 4.
[3] EDRG (2009) at 5.
[4] EDRG (2009) at 5.
[5] EDRG (2009) at 7.

Q. What are the strengths and weaknesses of an IMPLAN model and the assumptions used by EDRG?

A. IMPLAN is an industry standard model that is frequently used to inform policy making. IMPLAN results are based on national input-output data that are adapted to smaller geographic areas using local data. The smaller the geographic area, the less robust the findings. An IMPLAN analysis for the Commonwealth of Massachusetts would be more robust than the same analysis performed for the three-county area, for example.

It is important to emphasize that EDRG's findings combine IMPLAN modeling with additional unsubstantiated assumptions. These assumptions certainly determine the findings regarding spending and jobs in Brockton, and very strongly influence the findings regarding spending and jobs in the three-county area. Because the majority of these assumptions are neither cited nor explained, it is not possible to comment on their accuracy.

Similarly, IMPLAN outputs are only as good as the inputs to the analysis, namely, Brockton Power's projected direct spending and employment. No mention is made of any independent, third-party verification of these projections.

Q. In your opinion, is the methodology used in EDRG's 2009 analysis sound?

A. EDRG does not provide sufficient information in its 2009 assessment for me to conclude that its methodology is sound. Several of EDRG's reported assumptions seem implausible; for example, the expected shares of employment from the three-county area and from Brockton. Because these assumptions are neither explained nor substantiated it is not possible to assess the quality of the analysis. For instance, why does EDRG believe

that it is reasonable to assume that 50 percent of construction workers will come from Brockton (an assumption which then heavily influences the induced impacts)?

In addition, the relationships between direct and indirect spending and induced spending are unexpectedly inconsistent between Brockton and the three-county area. The ratio of direct and indirect spending to induced spending differs dramatically between Brockton and the three-county area. I would expect this relationship to be fairly consistent at the two geographic scales.

While some of these conclusions seem implausible, without access to EDRG's modeling inputs and outputs, it is not possible to meaningfully assess the quality of the assessment.

Q. In your opinion, are the conclusions set forth in EDRG's 2009 analysis reasonable?

A. No. The conclusion that the city of Brockton will benefit from the construction jobs and materials purchases associated with $279 million in spending is incorrect and misleading. It is premised on the assumption that all direct effects from construction (jobs and purchase of supplies) occur at the site (i.e., in Brockton), which EDRG itself explains earlier in the report is not the case. In fact, EDRG asserts that the majority of spending on supplies will occur outside of the region (i.e., materials will be imported)[6] and only half the construction jobs are projected to be filled by Brockton residents.[7] In addition, the conclusion fails to account for any environmental and social costs—such as air pollution, noise, traffic, water supply, public health impacts, property value changes and visual concerns.

Q. In your opinion, did DEP's 2011 Conditional Approval adequately demonstrate that the benefits of the project significantly outweigh the environmental and social costs?

[6] EDRG (2009) at 7.
[7] EDRG (2009) at 6, 8.

A. No. DEP appears to base its assessment of the project's benefits directly on EDRG's 2009 assessment submitted to the agency as an attachment to Brockton Power's application. Neither DEP nor Brockton Power appear to have evaluated alternative production processes—as required by state regulations—and no attempt is made to evaluate the environmental and social costs derived from the project. DEP makes no attempt to quantify costs.

It is not possible to determine that the benefits significantly outweigh the costs when no evaluation of costs has been conducted and no potential alternatives analyzed.

Q. Please describe the methodology employed by EDRG in its 2015 update to the Economic Assessment of Proposed Power Facility in Brockton, MA.

A. EDRG's 2015 update uses substantially different assumptions than those used in the 2009 assessment, including:

- Direct spending by the Company is 24 percent higher;
- Spending on construction and operations by the Company is 81 percent higher;
- Total number of construction workers assumed to live in Brockton fell from 3,300 to 1,350;
- Brockton residents hired as construction workers for the Brockton Power facility grew from 150 to 270 (that is, from 5 percent of Brockton's construction workforce up to 20 percent);
- Facility purchases from Brockton businesses as a share of facility purchases from three-county businesses grew between 0.5 and 6.2 percent—depending on type of expense—up to between 13.7 and 100 percent; and

- Three-county residents hired as operations workers for the Brockton Power facility fell from 80 percent down to 50 percent.

No explanation of these changes is offered in the 2015 assessment.

Q. In your opinion, is the methodology employed in EDRG's 2015 updated analysis of the proposed electric generating facility in Brockton, MA sound?

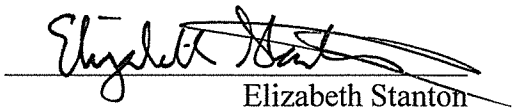
A. Again, EDRG has not presented sufficient information about its analysis to allow for a meaningful third-party review. Many of the assumptions changed dramatically—without explanation—from the 2009 assessment, calling into question the accuracy of both assessments. Several of EDRG's reported assumptions in the 2015 assessment seem implausible; for example, the expected shares of employment from the three-county area and from Brockton. Not only does the ratio of direct and indirect spending to induced spending differ dramatically between Brockton and the three-county area, it also differs radically from the ratios used in the 2009 Assessment. I would expect these relationships to be fairly consistent at the two geographic scales and between the two assessments. Because these assumptions are neither explained nor substantiated, it is not possible to assess the quality of the analysis. And again, EDRG makes no attempt to identify, let alone quantify, the environmental and social costs resulting from the construction of the project.

Without additional access to EDRG's modeling inputs and outputs, it is not possible to meaningfully assess the quality of the analysis.

Q. What data or studies would you recommend that an economic assessment include and rely upon to calculate environmental and social costs?

A. I would expect an economic assessment to provide expected impacts related to noise, traffic, air and water pollution, health impacts, greenhouse gas emissions, other air quality measures, property values and measures related to the use and enjoyment of the local area. The U.S. Environmental Protection Agency's electric-sector regulatory impact assessments routinely provide estimates for these kinds of impacts and provide a useful example of the appropriate methodology and assumptions for such an assessment.

Signed under the pains and penalties of perjury this 19th day of June 2015.



Elizabeth Stanton

Exhibit EAS-1

Elizabeth A. Stanton, Ph.D., Principal Economist

Synapse Energy Economics I 485 Massachusetts Avenue, Suite 2 I Cambridge, MA 02139 I 617-453-7063
eastanton@synapse-energy.com

PROFESSIONAL EXPERIENCE

Synapse Energy Economics Inc., Cambridge, MA. *Principal Economist*, 2012 – present.

Consult on issues of energy economics, environmental impacts, climate change policy, and environmental externalities valuation.

Stockholm Environment Institute - U.S. Center, Somerville, MA. *Senior Economist*, 2010 – 2012; *Economist*, 2008 – 2009.

Wrote extensively for academic, policy and general audiences, and directed studies for a wide range of government agencies, international organizations, and nonprofit groups.

Tufts University, Global Development and Environment Institute, Medford, MA. *Researcher*, 2006 – 2007.

University of Massachusetts-Amherst, Amherst, MA. *Editor and Researcher – Natural Assets Project*, Political Economy Research Institute, 2002 – 2005.

Center for Popular Economics, Amherst, MA. *Program Director*, 2001 – 2003.

TEACHING EXPERIENCE

College of New Rochelle, New Rochelle, NY
Assistant Professor, Department of Social Sciences, 2007 – 2008

Tufts University, Medford, MA
Adjunct Professor, Department of Urban Environmental Policy and Planning, 2007

Fitchburg State College, Fitchburg, MA
Adjunct Professor, Social Sciences Department, 2006

University of Massachusetts-Amherst, Amherst, MA
Adjunct Professor, Department of Economics, 2003 – 2006

Castleton State College and the Southeast Vermont Community Learning Collaborative, Dummerston, VT
Adjunct Professor, 2005

School for International Training, Brattleboro, VT
Adjunct Professor, Program in Intercultural Management, Leadership, and Service, 2004

EDUCATION

University of Massachusetts-Amherst, Amherst, MA
Doctor of Philosophy in Economics, 2007

New Mexico State University Las Cruces, NM
Master of Arts in Economics, 2000

School for International Training, Brattleboro, VT
Bachelor of International Studies, 1994

AFFILIATIONS

Global Development and Environment Institute, Tufts University, Medford, MA.
Visiting Scholar, 2013 – present, *Research fellow*, 2007 – 2012.

BOOKS AND BOOK CHAPTERS

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