
BEFORE THE
NOVA SCOTIA UTILITY AND REVIEW BOARD

IN THE MATTER OF *The Public Utilities Act*, R.S.N.S., 1989, c. 380, as amended

— and —

IN THE MATTER OF an application to approve Nova Scotia Power Incorporated's
Demand Side Management Plan

EVIDENCE FILED BY BRUCE BIEWALD

On behalf of:

The Utility and Review Board Staff

March 17, 2008

**Synapse Energy Economics
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Exhibit BB-1: Biewald Resume

1 **1. INTRODUCTION, QUALIFICATIONS, AND RECOMMENDATIONS**

2

3 **Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**

4 A. My name is Bruce Edward Biewald. I am the President of Synapse Energy
5 Economics, Inc., a consulting firm located at 22 Pearl Street in Cambridge,
6 Massachusetts, 02139.

7

8 **Q. PLEASE DESCRIBE SYNAPSE ENERGY ECONOMICS.**

9 A. Synapse Energy Economics ("Synapse") is a research and consulting firm
10 specializing in energy and environmental issues, including electric generation,
11 transmission and distribution system reliability, market power, electricity market
12 prices, efficiency, renewable energy, environmental quality, and nuclear power.
13 Synapse's clients include state consumer advocates, public utilities commission staff,
14 attorneys general, environmental organizations, federal government, and utilities. A
15 complete description of Synapse is available at our website, [www.synapse-](http://www.synapse-energy.com)
16 [energy.com](http://www.synapse-energy.com).

17

18 **Q. PLEASE DESCRIBE YOUR BACKGROUND AND QUALIFICATIONS.**

19 A. I am founder and President of Synapse Energy Economics. Since 1980, I have
20 analyzed the electricity industry and have advised state agencies, consumer and
21 environmental advocates, utilities, and others on issues related to the production and
22 consumption of energy. I have testified in more than one hundred cases including
23 utility regulatory proceedings in twenty-five states, the Federal Energy Regulatory
24 Commission, the Nuclear Regulatory Commission's Atomic Safety and Licensing
25 Board, two Canadian provinces, and in State and Federal Courts.

26

1 I have co-authored more than one hundred reports, including studies for the Electric
2 Power Research Institute, the U.S. Department of Energy, the U.S. Environmental
3 Protection Agency, the U.S. Department of Justice, the Office of Technology
4 Assessment, the Interfaith Center on Corporate Responsibility, the New England
5 Governors' Conference, the New England Conference of Public Utility
6 Commissioners, the National Association of Regulatory Utility Commissioners, and
7 the United Nations Framework Convention on Climate Change. My papers have been
8 published in the Electricity Journal, Energy Journal, Energy Policy, Public Utilities
9 Fortnightly, and numerous conference proceedings.

10

11 Prior to founding Synapse, I was with Energy Systems Research Group (later Tellus
12 Institute) where I consulted on a wide range of electric system regulatory and
13 economic issues (from 1980 to 1996). I studied architecture and building technology
14 at MIT.

15

16 **Q. ON WHOSE BEHALF ARE YOU TESTIFYING IN THIS PROCEEDING?**

17 A. I am testifying on behalf of the Nova Scotia Utility and Review Board Staff.

18

19 **Q. WHAT HAS YOUR ROLE BEEN WITH REGARD TO SYSTEM PLANNING
20 AND DEMAND-SIDE MANAGEMENT IN NOVA SCOTIA?**

21 A. My work for the UARB staff in the last couple of years includes consulting on NSPI's
22 integrated resource plan, demand side management, and Tufts Cove waste heat
23 recovery project.

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25 **Q. WHAT IS THE PURPOSE OF YOUR EVIDENCE IN THIS CASE?**

26 A. My focus is on demand-side management (DSM) in the context of system planning
27 and operations.

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Q. WHAT IS YOUR KEY CONCLUSION?

A. The recent NSPI IRP analyzed the costs and benefits of DSM in the context of the NSPI system and found that DSM offers tremendous economic and environmental benefits to the citizens and businesses of Nova Scotia. Stated concisely, the plans with aggressive implementation of DSM in the Province consistently showed net present value savings of hundreds of millions of dollars relative to plans with modest or delayed DSM efforts. There has already been significant delay in DSM implementation relative to the IRP assumptions.

Q. WHAT IS YOUR RECOMMENDATION IN THIS CASE?

A. I recommend that the UARB approve NSPI’s proposed DSM programs for the years 2008 to 2009. Avoiding further delay in DSM implementation should be a top priority.

2. TESTIMONY ON PLANNING AND DSM

Q. WOULD YOU DESCRIBE IN MORE DETAIL YOUR ROLE IN NSPI’S RECENT IRP PROCESS?

A. From October 2006 through July 2007 I worked with Dr. John Stutz of the Tellus Institute, as consultants to the UARB Staff. We collaborated with NSPI on the development of NSPI’s Integrated Resource Plan. This role included reviewing and commenting on many aspects of the IRP, including the overall planning approach, the input assumptions, the preliminary and final model results, the modeling methods, the plans and sensitivity cases to be analyzed, and the reports. I believe that the IRP process was successful, in that the analysis was strong and the recommendations for priorities clear.

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Q. PLEASE DESCRIBE YOUR ROLE IN THE REVIEW OF NSPI'S PROPOSED TUFTS COVE 6 WASTE HEAT RECOVERY PROJECT.

A. Subsequent to the IRP, I was retained by the UARB staff to review the work order request for NSPI's proposed Tufts Cove Waste Heat Recovery Project. The IRP served as a context for this analysis. The IRP provided a set of resource plans, sensitivity analyses, and "worlds" in which to consider the costs and benefits and risks of the Tufts Cove project. Ultimately, I recommended that the combined cycle portion of the project be approved to proceed, but without the inclusion of the proposed "duct firing."

Q. PLEASE DESCRIBE YOUR ROLE IN THE DEVELOPMENT OF NSPI'S DSM PLANS.

A. Work on DSM occurred during the IRP process, and has continued to the present. With Dr. David Nichols, I have participated in frequent conference calls and meetings, and have reviewed and commented on many of the plans and documents prepared by the Company and its consultants on DSM programs to be implemented in the Province.

Q. IN YOUR VIEW, WHAT WAS THE KEY CONCLUSION OF THE NSPI IRP?

A. The IRP analysis was quite detailed, and it addressed a range of resource options and their potential for meeting future electricity demands and environmental compliance requirements in a cost-effective manner. There were numerous conclusions, the most important of which are nicely summarized in Sections 5 and 6 of the July 2007 IRP Report (pages 18 to 38). In my view the most important and compelling results had to do with the benefits of DSM.

1 For example, under the base set of assumptions, the “Reference Plan,” which
2 included an aggressive “5 percent” DSM effort, outperformed the resource plans with
3 less DSM by \$1.0 to \$1.5 billion dollars (cumulative 2006 net present value).¹ The
4 plans with aggressive DSM consistently outperformed the other plans over a range of
5 sensitivity cases (e.g., high and low fuel prices, high and low capital costs, high and
6 low DSM program costs) and a range of alternate “worlds” (e.g., high and low loads,
7 high and low environmental constraints).

8
9 One of the cases analyzed as part of the IRP had the DSM ramp up delayed by two
10 years compared to the reference case. This showed an increase in costs of \$650
11 million (cumulative 2006 net present value dollars), or almost \$1 million for each day
12 of delay.²

13
14 **Q. WHAT OTHER DSM SENSITIVITY CASES WERE ANALYZED AS PART**
15 **OF THE IRP?**

16 A. There were quite a few sensitivity cases run, with variations on the DSM trajectory.
17 For example, the “2 percent” DSM plan was run with a “delay” of 2 years. That
18 delay case showed an increase in cost of approximately one quarter of a billion
19 dollars (cumulative 2006 net present value).³

20
21 **Q. WHAT ARE THE WAYS IN WHICH DSM CREATES BENEFITS TO THE**
22 **NSPI SYSTEM?**

23 A. The DSM investments reduce the system energy and capacity requirements. The
24 energy reductions are, in dollar terms, primarily associated with decreased fossil fuel

¹ See the summary table on page 19 of the July 2007 IRP Report.

² See page 32 of the July 2007 IRP Report.

³ Calculated by comparing “study period” costs from Appendices B and K in the May 11th, 2007 “IRP Modeling Results” package.

1 purchases. The DSM savings also make it less expensive for the NSPI system to
2 comply with air emission caps than would otherwise be the case. The system
3 capacity benefits depend upon NSPI planners being able to defer or avoid investments
4 in supply side additions. Because the supply additions can have long lead times (for
5 permitting and construction) one of the essential things to be done over the next
6 couple of years in Nova Scotia is to demonstrate that DSM investments can really
7 deliver savings in the province, as they have elsewhere in North America. Also, the
8 Nova Scotia experience with DSM implementation, and with monitoring and
9 evaluation, will help to verify and/or refine the DSM assumptions that were made for
10 the IRP. Having confidence in the cost and savings numbers, and experience with on
11 the ground implementation of DSM will help to enable the projected benefits from
12 DSM to materialize, and are particularly important with regard to the system capacity
13 savings.

14
15 DSM implementation has already been delayed by roughly one year, relative to the
16 assumptions made for the IRP. Avoiding further delay should be a top priority.

17
18 **Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

19 A. Yes.