

**STATE OF VERMONT
PUBLIC SERVICE BOARD**

Petition of Coolidge Solar I, LLC for a)
certificate of public good, pursuant to 30)
V.S.A. § 248, authorizing the installation and)
operation of a 20 MW solar electric generation) Docket No. _____
facility to be located in Ludlow and)
Cavendish, Vermont, to be known as the)
“Coolidge Solar Project”)

**PREFILED TESTIMONY OF
THOMAS VITOLO, PH.D.
ON BEHALF OF
PETITIONER**

December 14, 2015

Dr. Vitolo’s testimony addresses the need for the proposed Project (30 V.S.A. § 248(b)(2)) and the economic benefit criterion (30 V.S.A. § 248(b)(4)).

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EXHIBITS

Exhibit Petitioner TV-1

Resume of Thomas Vitolo, Ph.D.

Exhibit Petitioner TV-2

Economic Benefit Report of the Coolidge Solar
Project

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1 **1. Introduction**

2 Q1. Please state your name, occupation and business address.

3 A1. My name is Thomas Vitolo. I am a Senior Associate at Synapse Energy Economics, Inc.
4 (“Synapse”). My address is 485 Massachusetts Avenue, Suite 2, Cambridge,
5 Massachusetts 02139.

6
7 Q2. Please describe Synapse Energy Economics, Inc.

8 A2. Synapse Energy Economics is a research and consulting firm specializing in electricity
9 and natural gas industry regulation, planning, and analysis. Our work covers a range of
10 issues, including integrated resource planning; economic and technical assessments of
11 energy resources; electricity market modeling and assessment; energy efficiency policies
12 and programs; renewable resource technologies and policies; and climate change
13 strategies. Synapse works for a wide range of clients, including attorneys general, offices
14 of consumer advocates, public utility commissions, environmental advocates, the U.S.

1 Environmental Protection Agency, the U.S. Department of Energy, the U.S. Department
2 of Justice, the Federal Trade Commission and the National Association of Regulatory
3 Utility Commissioners. Synapse has over 25 professional staff with extensive experience
4 in the electricity industry.

5
6 Q3. Please describe your educational background and work experience.

7 A3. I earned my doctorate in systems engineering from Boston University, and have more
8 than seven years of professional experience as a consultant, researcher, and analyst.
9 Since joining Synapse in 2011, I have focused on utility resource planning, variable
10 resource integration and valuation, avoided costs, renewable energy and carbon markets,
11 and issues that typically involve statistical analysis, computer simulation modeling, and
12 stochastic processes. I have filed expert testimony in Missouri related to utility integrated
13 resource planning, in South Carolina related to a methodology for calculating the costs
14 and benefits of solar net energy metering, and in California regarding the state's Long
15 Term Procurement Plan proceeding affecting the three largest investor-owned utilities. I
16 have also provided analysis on the costs and benefits of distributed generation in
17 California, Kentucky, Maine, Mississippi, New York, North Carolina, South Carolina,
18 Utah, and Wisconsin. I have reviewed and critiqued the numerical analysis, modeling,
19 and decision strategies of integrated resource plans and certificates of public convenience
20 and necessity submitted by utilities located in Colorado, Florida, Georgia, Illinois,
21 Kansas, Kentucky, Missouri, Nebraska, New York, New Mexico, North Carolina, and
22 Tennessee.

23

1 My recent work includes leading projects to review and comment on utility and
2 municipal electric resource planning in Colorado, Illinois, Missouri, and Nebraska;
3 reviewing utility filings from Kansas City Power & Light, Georgia Power, and
4 PacifiCorp IRP cases; analyzing system integration issues related to intermittent
5 renewable resources in California and in Nova Scotia; providing comments,
6 presentations, or testimony in proceedings to determine the value of distributed solar
7 energy in Maine, North Carolina, New York, South Carolina, and Utah; and developing
8 and analyzing national electricity resource scenarios for a variety of public interest
9 clients.

10
11 Before joining Synapse, I worked at the Massachusetts Institute of Technology's Lincoln
12 Laboratory, where I designed algorithms and implemented software to create network
13 topologies for orbital, aerial, land-based, and nautical vehicles. My academic work
14 focused on optimizing physical and financial systems through quantitative analysis, linear
15 and nonlinear programming, and other optimization methods.

16
17 Q4. What is the purpose of your testimony?

18 A4. My testimony sponsors the report entitled: "Economic Benefits of the Proposed Coolidge
19 Solar I Solar Project," prepared under my direction by Synapse. This report is attached
20 as Exhibit Petitioner TV-2 (the "Synapse Report"). The Synapse Report addresses the
21 need for the Coolidge Solar Project (the "Project") under 30 V.S.A. § 248(b)(2) and the
22 economic benefits of the proposed Project consistent with 30 V.S.A. § 248(b)(4). My

1 testimony summarizes the Synapse Report’s principal findings: 1) that the Project will
2 help meet a regional and state need for both power in general and renewable resources in
3 particular, and 2) that the Project will provide substantial economic benefits to Vermont
4 residents.

5
6 **2. Need for the Project [30 V.S.A. § 248(b)(2)]**

7 Q5. Is the Project required to meet the need for present and future demand for service which
8 could not otherwise be provided in a more cost effective manner through energy
9 conservation programs, energy efficiency, and load management measures?

10 A5. Yes. The Project will help meet clearly demonstrated needs for capacity, energy, and
11 renewable generation—both in Vermont and the region as a whole. The Synapse Report
12 demonstrates this, concluding that:

- 13 • The Project will help alleviate a well-documented gap between needed and
14 available capacity—primarily during the summertime peak—that the region will
15 face in the forthcoming years due in part to substantial retirements of existing
16 fossil and nuclear generating units.
- 17 • The Project’s stably priced, long-term contract will help protect Vermont
18 ratepayers from short-term price increases that can result from summer
19 heatwaves, winter cold snaps, or large generation or transmission outages. The
20 contract will also provide a hedge against long-term price increases stemming
21 from unexpected retirements of large, low marginal cost units not included in
22 Vermont’s applicable Rule 4.100 rates.

- 1 • The Renewable Energy Credits (“RECs”) generated by the Project can be used for
2 compliance with so-called Tier I of the Vermont Renewable Energy Standard or
3 for compliance with the Renewable Portfolio Standards in other New England
4 states. Thus, the Project can help meet an ever-increasing need for renewable
5 energy resources to comply with legislated requirements. Other energy trends
6 also contribute to the rising demand for renewable energy resources, including the
7 decline in coal and oil generation and the mass-based limits on carbon emissions
8 contained in the Clean Power Plan¹ and the Regional Greenhouse Gas Initiative.

9
10 **3. Economic Benefit [30 V.S.A. § 248(b)(4)]**

11 Q6. Will the Project result in an economic benefit to the State and its residents?

12 A6. Yes. As shown in the Synapse Report, the construction and operation of the Project will
13 generate positive economic benefits for Vermont residents over its 20-year contract,
14 including:

- 15 • 245 job-years;²
16 • More than \$15 million in labor income;
17 • More than \$25 million in gross domestic product for the state; and
18 • Nearly \$4 million in increased state and local tax revenue.

19 Should the Project continue to operate beyond the 20-year period, it would continue to
20 generate economic benefits for Vermont that are not captured above.

¹ While Vermont is exempt from the Clean Power Plan, the other states within ISO New England are not.

² A job-year is the equivalent of one job over one year. Impacts are presented in job-years in order to combine construction and operation activities that occur over different periods of time.

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Q7. In addition to these quantified benefits, please summarize your report’s findings regarding any unquantified economic and societal benefits associated with the Project.

A7. The Project will provide other key benefits to ratepayers in Vermont. Firstly, it will act as a hedge against wholesale market volatility by including a long-term, stably priced contract over a multi-year timeframe. Secondly, by displacing more expensive generation, it will lower electricity costs to ratepayers by suppressing wholesale markets and placing downward pressure on other short-term power contracts. Finally, the Project provides an estimated \$27.9 million social benefit in avoided CO₂ emissions.

Q8. You mention the low cost of power associated with this Project. How does the cost of the Project’s power compare to other recent solar projects in Vermont?

A8. As we show in the report, the levelized cost of the Project is significantly less expensive than the 5 MW GMPSolar Williston project, which GMP asserted to be “competitive with the very lowest-priced solar options presently available to GMP.”³ The 20-year levelized energy and capacity payments for the Project are \$78.18 per MWh, while the 25-year levelized cost of the GMPSolar Williston, without the inclusion of RECs, is priced at \$85 MWh. Over the course of 20 years, the Project’s output would result in \$4.5 million in savings compared to a same-sized project with the GMPSolar Williston’s levelized cost.

³ Docket No. 8562, 7/15/15 pf. of D. Smith at 17.

1 **4. Conclusion**

2 Q9. Does this conclude your testimony at this time?

3 A9. Yes, it does.