Distributed Generation Contracts Program and Renewables Energy Fund

Jobs, Economic and Environmental Impact Study

Kick-Off Meeting Presentation

PRESENTED BY

Mark Berkman

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THE Brattle GROUP

Study Objective

The Distributed Generation Contracts law as amended in July 2013 requires that:

The office of energy resources shall submit to the governor, the president of the senate, and the speaker of the house of representatives, an annual jobs, economic impact and environmental impact study on the distributed energy standards contract program.

The study shall include, but be limited to, environmental benefits, including carbon emissions reductions from the installations, economic impacts including but not limited to system reliability improvements; property and income tax benefits; and ratepayer impacts including, but not limited to hedges against general inflation and fuel price volatility, short term price impacts and wholesale price suppression.

Study Objective

At the request of Office of Energy Resources (OER) and the Rhode Island Commerce Corporation (Commerce RI), the study will also address the economic, fiscal, and environmental impacts of the Renewable Energy Fund (REF) program from 2009 through 2013.

The study will also evaluate different megawatt (MW) expansion scenarios (40, 70 and 110 MW capacity each year) for the Distributed Generation Contracts (DGC) Program with 15 and 20 year contracts.

This project will help both the OER and Commerce RI make informed policy and programmatic decisions necessary to develop renewable energy.

Presenter Information

MARK BERKMAN

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Dr. Berkman is an expert in applied microeconomics. His experience spans the areas of the environment, energy, and natural resources; environmental health and safety; discrimination; and intellectual property. He has assisted both public and private clients and provided testimony before state and federal courts, arbitration panels, regulatory bodies, and legislatures.

His environmental work has involved the review of proposed air, water, solid waste, and worker and product safety regulations. Dr. Berkman has quantified the costs and benefits of these regulations, as well as toxic tort and product liability claims. In addition, he has valued natural and water resources as well as property damages associated with pollution from Superfund sites, landfills, and power plants.

His work on energy matters includes the assessment of renewable energy investments and policies. He recently completed a study of the future impacts of federal investment tax credits on solar market penetration for the Solar Energy Industry Association (SEIA) and studied the impacts of tariff s on Chinese photovoltaic equipment on the domestic solar industry for the Coalition for Affordable Solar Energy (CASE). Dr. Berkman has also valued coal resources, fossil fired power plants, and transmission rights-of-way. He has extensive experience working with Native American tribes on these matters.

Presenter Information

JÜRGEN WEISS

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Dr. Weiss specializes in issues broadly motivated by climate change concerns, such as renewable energy, energy efficiency, energy storage, the interaction between electricity, gas and transportation, and carbon pricing and the impact these changes have on existing assets, market structures, and long-term planning needs for electric utilities in North America, Europe, and the Middle East.

His consulting and expert testimony experience have focused on the impact of changing regulatory and incentive frameworks for low-carbon technologies, on the economics of both renewable generation sources and existing generation assets, and on the design of efficient incentive mechanisms for renewable energy, energy efficiency, energy storage, and climate change measures.

Jürgen has advised clients and authored reports on the design of incentives for renewable energy, the impact of renewable energy on existing wholesale markets, the role energy storage might play in future energy systems characterized by an increasing share of renewable energy, the optimal choice of alternative approaches to lowering energy consumption and/or GHG emissions, and the implications of a changing energy system on wholesale market design. He has also been active in determining the value of electric power assets in a quickly changing market environment.

Jürgen has testified in U.S. state and federal courts, as well as in state regulatory proceedings on related issues, most recently on several long-term contracts for renewable power projects. He has served on advisory councils as diverse as one for California's Low Carbon Fuel Standard and the King Abdullah City of Atomic and Renewable Energy in Saudi Arabia.
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About Brattle

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Relevant Experience

Recently estimated impacts of various PV ITC scenarios for the Solar Energy Industry Association (SEIA)

Conducting reviews for the Massachusetts Attorney General of Purchase Power Agreements for renewables under Section 83 of the Green Communities Act

Completed specific wind and solar project impact studies for First Solar and Alta Wind Energy

Completed US offshore wind potential for the US Offshore Wind Collaborative, Clean Energy States Alliance, and the Sierra Club

Relevant Experience

Developed Rooftop Solar PV "Green Bank" Financing Model with the Clean Energy Finance and Investment Authority

Prepared "Importance of Long Term Contracting for Facilitating Renewable Energy Project Development" for Ridgeline Energy LLC.

Prepared "Exploring Natural Gas and Renewables in ERCOT for the Texas Clean Energy Coalition

Prepared Connecticut Integrated Resource Plan, 2010

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Description of General Approach

- Estimating the impacts of the DCG and REF Programs requires the comparison of a set of metrics with and without the programs in place. The differences measure program costs and benefits.
- This requires the preparation of a baseline case from the time of program inception thru today and forward thru 2035.
- The metrics will assume that the REF and DGC installations are operational for 25 years.
- The baseline case will account for changes in the generation mix, capacity additions, electricity price, emissions, employment, and tax revenues absent the influence of DCG and REF.
- The program case will account for actual program investments and result so far and specified future levels of investment and related impacts on generation mix, capacity additions, electricity price, emissions, employment, and tax revenues.

This will not be primarily a modeling exercise

- Modeling results from relevant studies will be used to determine metrics for the with and without cases, but de novo modeling exercises will be limited to the application of IMPLAN to estimate output and employment impacts
- Relevant studies will include those completed by or for state or regional agencies and by local utilities (e.g. National Grid)
- Studies conducted by NREL, Synapse Energy and EIA will be referenced as well
- In addition activities and data provided by the ISO-New England Distributed Generation Forecast Working Group will be utilized
- In most cases the impacts and benefits of DGC and REF will be calculated at the project level and extrapolated to determine total values

With and Without Comparison

We will use standard metrics.

- Cost impacts will generally follow LACE-LOCE
  - whether a candidate project's economic value exceeds it costs
  - LOCE – levelized cost of energy, a common cost measure reflecting both capital and operating costs
  - LACE – levelized avoided cost of energy, a measure of what it would cost to meet demand that is otherwise displaced by a new generation project
- Energy costs other than generation and transmission will be determined by cost differences measured by avoided losses or damages or options
- Environmental impacts will be measured by emission differences monetized using a range of published values

Methods and Sources by Category

Energy	Annual generation, including line losses distinguished by seasonal on and off peak periods.	Annual generation, including line losses distinguished by seasonal on and off peak periods.	Levelized avoided cost approach example: The difference in line losses will be translated into cost savings	Synergy Energy Economics, 2013, Avoided Energy Supply Costs in New England; utility studies
Generation Capacity	Peak coincident, and average annual generation capacity, including line losses - differentiated by season	Peak coincident, and average annual generation capacity, including line losses - differentiated by season	Levelized avoided cost approach example: The difference in capacity requirements will be translated into cost savings (increase)	Synergy Energy Economics, 2013, Avoided Energy Supply Costs in New England; utility studies
Transmission and Distribution	Deferring of upgrades or new transmission capacity. Peak coincident and average annual capacity including line losses differentiated by season	Deferring of upgrades or new transmission capacity. Peak coincident and average annual capacity including line losses differentiated by season	Levelized avoided cost approach example: The difference in T&D requirements will be translated into cost savings (increase)	National Grid reports Other studies TBD

Methods and Sources by Category

Grid Support	Ability of distributed PV to provide grid support services - voltage and frequency regulation, reserve requirements, and balancing	Grid support services absent distributed PV	Levelized avoided cost approach example: The difference in grid support costs will be calculated.	Studies to be determined
Market Price Impacts	Wholesale price for energy and capacity due to lower total demand.	Wholesale price for energy and capacity under baseline conditions.	Whether a difference in wholesale prices exists with and without the programs will be assessed by reference to electricity demand and supply conditions present during the program period anticipated in the future. We anticipate obtaining sufficient information from existing studies and forecasts rather than by de novo model simulation s and projections. The difference in price will be applied to projected demand with and without the programs to measure cost savings.	DRIPE estimates from Synapse Energy Economics, 2013, Avoided Energy Supply Costs in New England EIA Annual Energy Outlook, 2013 Elasticity studies Other studies TBD

Methods and Sources by Category

Reliability / Resilience	Establish risk levels with respect to loss of load, fuel supply interruptions, more stringent environmental regulations, etc.	Establish risk levels with respect to loss of load, fuel supply interruptions, more stringent environmental regulations, etc.	Risk level differences will be measures based on options value differences if data is sufficient. Otherwise, this benefit category will be discussed and additional research necessary to overcome data.	National Grid reports Other studies TBD
Environment	CO2 and other emissions based on amount and type of generation as a consequence of programs.	CO2 and other emissions based on amount and type in the absence of programs.	The difference in emissions will be monetized using recent estimates of environmental damage.	Sources will include National Academy of Sciences estimates and U.S. EPA values. We will account for RPS compliance and RGGI mechanisms.

Methods and Sources by Category

Jobs and Revenues	Gross or net job impacts (direct and/or indirect) during construction, operation phases, and property tax revenues; Induced jobs will be calculated too.	Baseline job levels (direct, indirect and induced)		Grover (2012) - Energy, Economic, and Environmental Benefits of the Solar America Initiative, NREL is an example of a paper that looks at benefits instead of just impacts. DGC program data. REF program data.
Participant investments	Participant costs - net of federal tax incentives	We will estimate the level of investment that would have occurred absent the programs. Economic conditions and technology cost trends will be considered in our projections to 2035.	Investment and operations with and without the programs will be compared to measure any net costs.	Client documents and data

Methods and Sources by Category

Program costs	Program and state incentives, program administrative costs	We will assume that no other programs would have expanded absent the introduction of the DGC and REF programs.	Costs of the programs will be based on actual expenditures to date and projected future expenses for each scenario under review.	Client documents and data
Other	Other costs related to expanded PV capacity not internalized by participant or program costs	To be determined.		

Timeline for Report

The analysis and review of the programs will be conducted between January and March.

There will be a public follow up meeting to go over the results of the report in April.

The final DGC and REF report will be delivered to the OER and Commerce RI by Friday, April 18, 2014.

Questions or Comments