

STATE OF VERMONT  
PUBLIC UTILITY COMMISSION

Case No. 17-1247-NMP

Application of Derby GLC Solar, LLC for a certificate of public good, pursuant to 30 V.S.A. §§ 248 and 8010, for a 500 kW group net-metered solar electric power system in Derby, Vermont	
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Order entered: 1/24/2019

**ORDER DENYING NET-METERING APPLICATION**

**I. INTRODUCTION**

This case presents the Vermont Public Utility Commission (“Commission”) with a fundamental question: whether to allow the displacement of existing, lower-cost renewable energy with new, higher-cost renewable energy, in an area where the transmission system is already overloaded and where demand for electricity is low.

Specifically, this case involves an application filed with the Commission by Derby GLC Solar, LLC (“Applicant”). The Applicant seeks a certificate of public good (“CPG”), pursuant to 30 V.S.A. §§ 248 and 8010, to construct and operate a 500 kW (AC) solar net-metering system in Derby, Vermont (the proposed “Project”). In today’s Order, we deny the application because it fails to meet two requirements of Section 248(b) and will not promote the public good of the State of Vermont.

The Project is proposed to be located in a particular part of Vermont that is currently experiencing constraints on the electrical transmission system—the Sheffield-Highgate Export Interface (“SHEI”) area in northern Vermont, including most of the Northeast Kingdom. In this largely rural area, output from existing renewable energy plants often exceeds electric demand. Further, the capacity of the electrical transmission lines leading out of the area is not sufficient to transport the excess power without jeopardizing the reliable operation of the electrical grid. These existing constraints have already resulted in financial harm to Vermont utilities and customers. The addition of the Project would increase these constraints and cause further financial harm.

The Vermont Department of Public Service (“Department”), Vermont Electric Cooperative, Inc. (“VEC”), and Green Mountain Power Corporation (“GMP”) all agree that the Project has a fundamental flaw: Due to its location in a transmission-constrained area, the Project would at times displace existing, less expensive renewable energy generation. This displacement occurs through a practice known as “curtailment.” The Department and these utilities note that the curtailment at issue here would harm Vermont utilities and customers and would be inconsistent with the Department’s Comprehensive Energy Plan. They provided extensive and persuasive prefiled testimony and live testimony during a two-day hearing supporting these claims, and we agree.

Curtailement arises when the transmission lines in a particular area are at risk of being overloaded. When that occurs, the regional grid operator requires certain generators, typically with a capacity of 5 MW or larger, to curtail (reduce) their electrical output to ensure reliable operation of the transmission system. Here, during small, but meaningful, periods of the Project’s operations, the Project would contribute to an increase in curtailments of existing large generators in the area but would not be subject to curtailment itself. Almost all of the large generators that would be curtailed in this particular area are renewable energy plants. Those existing generators produce renewable energy that costs ratepayers less than the energy that would be produced by the Project. Such a trade-off, whereby a new, more expensive generator displaces already existing—and less expensive—renewable energy, would harm Vermont utilities and customers. It is also inconsistent with the Department’s Comprehensive Energy Plan. The Project therefore fails to comply with two of the explicit requirements for approval under Section 248.

First, the Project does not comply with Subsection (b)(10), which requires the Applicant to demonstrate that the Project “can be served economically by existing or planned transmission facilities *without undue adverse effect on Vermont utilities or customers.*”<sup>1</sup> Due to transmission constraints in the SHEI area, the Project would at times displace existing, less expensive renewable energy generation. This would necessarily hurt Vermont utilities and customers. The only question in this case is whether those adverse effects are undue. We find that they are. We find undue adverse effects here because, even if this Project caused displacement only some of

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<sup>1</sup> 30 V.S.A. § 248(b)(10) (emphasis added).

the time, even a small amount of displacement creates unnecessarily higher costs for Vermont utilities and customers. The Project therefore fails Subsection (b)(10).

Second, the Project does not comply with Subsection (b)(7), which requires the Applicant to demonstrate that the Project “is in compliance with the electric energy plan approved by the Department . . . , or that there exists good cause to permit the proposed action.”<sup>2</sup> Although the Comprehensive Energy Plan generally promotes renewable energy and distributed generation, the reasons for doing so are not furthered by this Project. For instance, the Comprehensive Energy Plan promotes distributed generation as a way to *reduce* the need for transmission and distribution upgrades. The Project, by contrast, would exacerbate an existing transmission problem and would thus *increase* the need for transmission upgrades. Additionally, the Comprehensive Energy Plan promotes distributed generation because distributed generation can place generation near where energy is consumed. The Project, by contrast, would locate generation in a place where there is already a surplus of electricity. Again, this would exacerbate the transmission constraints that already exist in this area.

As a result of our decision on these two criteria, we need not address other applicable Section 248 criteria in this proceeding.<sup>3</sup>

## **II. BACKGROUND**

Our decision addresses several issues that concern the operation of the regional electric power grid. For context, a brief summary of the grid’s operation is provided below.

The New England regional electric power grid serves Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont. The power grid is an interconnected system of generating resources, transmission lines, substations, distribution lines, and end users (households and businesses). Electricity is produced by generating resources—

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<sup>2</sup> 30 V.S.A. § 248(b)(7).

<sup>3</sup> Pursuant to Section 8010 and Commission Rule 5.111, the Commission conditionally waives review of certain Section 248 criteria. On September 21, 2017, we rescinded the conditional waivers of Subsections 248(b)(4), (b)(7), and (b)(10). We held a two-day hearing on compliance with those three criteria, and the parties have fully briefed these matters. We ultimately determined not to decide whether the Project complies with Subsection (b)(4). We note, however, that we disagree with the Applicant’s claim that the Project meets the requirements of Subsection (b)(4) based purely on the economic benefits of the Project’s construction and associated jobs and taxes. We have previously held that to meet the requirements of Subsection (b)(4), any negative economic impacts must be “outweighed by positive impacts so that the net result is economic gain.” *Joint Petition of GMP, VEC, and VELCO to construct up to a 63 MW wind electric generation facility*, Docket 7628, Order of 5/31/11 at 39-40. However, we need not reach that issue as the Project clearly fails to meet the requirements of Subsections (b)(10) and (b)(7).

power plants fueled by various sources, including wind and solar power. Electricity is transferred from generating resources to end-users over transmission and distribution lines. Transmission lines move high-voltage (115 kV and above) electricity over long distances from generating resources to substations that transfer the electricity to the distribution system. This is often referred to as the “bulk” transmission system. Distribution lines move low-voltage electricity over shorter distances from substations to homes and businesses. End users consume electricity from the grid, and this electricity demand is often referred to as electric load (or simply load).

The New England grid is managed and operated at the transmission level and the distribution level. At the transmission level, ISO New England is authorized by the Federal Energy Regulatory Commission (“FERC”) to serve as the independent system operator for New England’s bulk electric power generation and transmission system. ISO New England provides centrally dispatched direction for the generation and flow of electricity across the region’s interstate transmission lines, ensuring the constant availability of electricity at substations for delivery by distribution utilities to end users. The operation of the grid also includes running the markets where wholesale electricity is bought and sold.<sup>4</sup>

ISO New England coordinates the operation of the transmission system with the utilities that own the transmission lines. The transmission utilities monitor the more local aspects of their portion of the electric power grid and take direction from ISO New England regarding necessary local actions, such as switching a transmission line in and out of service. Vermont Electric Power Company (“VELCO”) is the transmission utility that serves Vermont.

At the distribution level, local utilities own and operate the distribution lines that provide retail power to end-use customers. The operation is coordinated with the local transmission utility—in this case, VELCO. Vermont has 17 distribution utilities, including VEC and GMP. Vermont distribution utilities also purchase or generate the electricity that is sold as retail power to its end-use customers. Both the distribution and the sale of retail electricity are regulated by the Commission.

In New England, wholesale electricity is bought and sold two ways: through contracts between individual buyers and sellers; and through markets managed by ISO New England. The

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<sup>4</sup> The Transmission, Markets, and Services Tariff stipulates the rates, terms, and conditions for transmission, market, and other services provided by ISO New England.

wholesale electricity markets include: energy markets for buying and selling day-to-day wholesale electric power; a capacity market for ensuring long-term system reliability; and ancillary services for ensuring short-term system reliability. Today's Order does not concern the capacity and ancillary markets—thus additional background is not provided on these markets.

The wholesale energy market consists of buyers and sellers and the matching of electricity supply and demand. Power plants generate and sell the energy. Electric distribution utilities or electric suppliers buy energy wholesale in the market and sell it to retail consumers.

To meet the demand for electricity across the New England grid, ISO New England schedules and dispatches power plants through the energy markets. The dispatch of a generating resource entails telling the plant operator to start up, operate at a certain level of output, or shut down. This dispatch is also referred to as economic dispatch because it matches supply to demand at the lowest possible cost.

To determine the wholesale energy market price, generators offer prices and quantities of electricity (that is, supply) that they are willing to produce and schedule. At the same time, buyers place bids for the maximum amount they are willing to pay for the anticipated amount to be used (or, the demand). ISO New England uses a clearing algorithm that selects bids and offers to match supply to demand, subject to transmission constraints. Under the market-based system, the energy price is determined by the generator with the lowest-cost energy offer that can serve that next increment of power needed to meet the demand for electricity—referred to as the locational marginal price.

Locational marginal pricing is a way for wholesale electric energy prices to reflect the value of electric energy at different locations, accounting for the patterns of electricity demand, electricity generation, and the physical limits of the transmission system.

In New England, wholesale energy prices are determined at more than 1,000 pricing nodes (i.e., locations) on the transmission system. If the system were entirely unconstrained and had no losses, all locational marginal prices would be the same, reflecting only the cost of serving the next increment of electricity demand. The generator with the lowest-cost energy offer available would serve that increment of demand, and electric energy from that generator would be able to flow to any node on the transmission system.

Locational marginal prices can differ across the transmission system due to import and export constraints. At times, in import-constrained areas where transmission flows are limited

from entering the area, demand is high relative to local supply and more expensive generation may be dispatched. This results in higher locational marginal prices at the nodes in that portion of the transmission system. In contrast, in export-constrained areas where transmission flows are limited from leaving the area, supply is high relative to local demand and less expensive generation may be dispatched. This results in lower locational marginal prices at the nodes in this portion of the transmission system. This type of export constraint occurs in the SHEI area of Vermont.

The locational marginal prices are used by ISO New England to determine which distribution utilities pay for the energy produced by the generators that participate in the market (known as the ISO New England settlement system). Participating generators are paid for the electricity they produce based on the locational marginal price at their respective pricing nodes. Distribution utilities are required to purchase the electricity needed for their customers based on the locational marginal price at their respective load zones, which is their ISO New England load obligation. The load-zone price is an average price of the individual nodes in that zone. In Vermont, the load zone covers the entire state.

Typically, large generating resources (greater than 5 MW) interconnect to transmission lines, sell their electricity in the wholesale energy market, and are scheduled and dispatched to run by ISO New England. Small generating resources (less than 5 MW) typically interconnect to distribution lines, sell their electricity directly to the distribution utility, and are *not* dispatched by ISO New England. Referred to as “distributed generation,” these resources remain outside of the wholesale energy market and instead help reduce the Vermont utilities’ requirement to purchase electricity through the regional market (i.e., load obligation). Thus, these resources are often referred to as load reducers in the ISO New England settlement system.

A distribution utility must obtain enough electricity to meet the needs of its customers. In Vermont, a distribution utility meets this customer need in a number of ways: purchasing power in the wholesale market, contracting for wholesale power with individual sellers, generating power from resources it owns, and purchasing from small generation resources that interconnect at distribution lines. In addition, the distribution utility must pay for the transmission of power purchased at the wholesale level and incurs the costs for providing power at the distribution level. The distribution utility recovers the costs for power, transmission, and distribution through retail electricity rates that it charges its customers for electric service.

In Vermont, retail electric rates are set through a regulatory process where the Commission reviews a distribution utility's costs to determine the total amount of money the utility will need to provide service to customers. In this process, the revenue received by a distribution utility from wholesale sales of electricity it owns reduces the amount of money the utility will need to collect from its retail customers. As a result, when the locational marginal price at which a utility can sell wholesale electricity decreases, the utility receives less money from sales of wholesale electricity. This in turn increases the amount of money that the utility may seek to collect from its retail customers.

### **III. PROCEDURAL HISTORY**

On February 8, 2017, the Applicant filed a net-metering application for the Project.

The following entities are parties to the proceeding: the Applicant; the Department; VEC; GMP; the Vermont Agency of Natural Resources; the Department of Agriculture, Food and Markets; and the Natural Resources Board. The positions of the latter three parties are not represented or addressed in this Order because they did not participate in the particular Section 248 criteria that are addressed in this Order.

On March 10, 2017, the Applicant filed its final application with the Commission and provided notice to all entities entitled to receive notice pursuant to Commission rules.

On April 14, 2017, VEC filed comments raising several concerns about the Project and asked the Commission to hold hearings on these concerns. The Department also filed comments on this date supporting VEC's request for a hearing.

On September 21, 2017, after allowing for comments and replies to be filed, the hearing officer issued a Procedural Order, which, among other things, rescinded the conditional waivers for 30 V.S.A §§ 248(b)(4), (b)(7), and (b)(10), granted the requests for a hearing, and set a date for a prehearing conference.

On October 6, 2017, a prehearing conference was held.

On November 2, 2017, the hearing officer conducted a site visit.

On January 9, 2018, after motions were filed and comments on those motions were received, the hearing officer issued a procedural order directing the Applicant to prefile additional testimony under Subsection 248(b)(4), 248(b)(7), and 248(b)(10).

From January 22, 2018, through June 8, 2018, the parties exchanged testimony and discovery requests and answers pursuant to the schedule for the proceeding.

On June 14, 2018, the Commission issued an Order announcing that the full Commission would conduct the evidentiary hearing on July 10 and 11, 2018.

On July 2, 2018, at the request of several parties, the Commission issued an Order rescheduling the evidentiary hearing to August 9 and 10, 2018.

On August 9 and 10, 2018, the full Commission held an evidentiary hearing on the three disputed criteria. At the close of the hearing, the Commission directed the parties to file comments regarding a potential generic proceeding to address the impacts of net-metering projects located in the SHEI.

On August 20, 2018, the Applicant, VEC, GMP, and the Department filed comments regarding the generic proceeding. The Applicant opposed further proceedings.

On August 31, 2018, the Commission issued an Order: (1) concluding that this case would not be stayed; (2) concluding that no generic proceeding would be initiated; and (3) setting forth the final briefing schedule.

On September 26, 2018, the Applicant, VEC, GMP, and the Department filed briefs.

On October 10, 2018, the Applicant, VEC, GMP, and the Department filed reply briefs.

#### **IV. POSITIONS OF THE PARTIES**

##### The Applicant

The Applicant argues that the Project meets all of the requirements of Section 248, including Subsections (b)(10) and (b)(7).

Regarding Subsection (b)(10), the Applicant's expert concedes that curtailment of existing renewable generation will occur and does not dispute that there will be a cost to ratepayers, but the Applicant contends that existing transmission facilities can still serve the Project economically, even with a limited amount of acceptable curtailment; that for large amounts of the time the Project would be operating without any curtailment at all; that future mitigation will reduce curtailment; and that the Project passed VEC's Fast Track Analysis, which illustrates that existing transmission facilities are adequate to serve the Project.<sup>5</sup> Accordingly, the Applicant argues that the Project complies with Subsection 248(b)(10).

Regarding Subsection (b)(7), the Applicant contends that the Project will accomplish several major goals of the Comprehensive Energy Plan: increasing portfolio diversity, increasing

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<sup>5</sup> Fagan reb. pf. at 10; tr. 8/9/18 at 64 and 67 (Fagan); Applicant Brief at 15-16.



participation in net-metering, generating renewable energy credits that will be transferred to the utility, and creating a net increase in renewable energy generation in Vermont.<sup>6</sup> Accordingly, the Applicant argues that the Project complies with Subsection 248(b)(7).

### The Department and the Utilities

The Department, GMP, and VEC (with GMP and VEC referred to collectively as “the Utilities”) argue that the Project does not meet the requirements of Section 248, specifically Subsections 248 (b)(4),<sup>7</sup> (b)(7), and (b)(10). The Department and VEC ask the Commission to deny the CPG application. The Department contends that:

[u]ntil such time as the SHEI issue is resolved, or, alternatively, a process is in place by which the appropriate cost to a Petitioner who chooses to locate projects in this constrained area can be properly assessed, the Department recommends denial of this and any other like projects located within the SHEI area.<sup>8</sup>

Regarding Subsection 248(b)(10) specifically, the Department and the Utilities contend that the Project cannot be economically served by existing transmission facilities because current generation in the SHEI exceeds loads, transmission lines are not adequate to export excess power out of the SHEI, and the Project would require existing renewable generation in the SHEI to be reduced, to the detriment of Vermont ratepayers.<sup>9</sup> Accordingly, the Department and the Utilities argue that the Project does not comply with Subsection 248(b)(10).

Regarding Subsection 248(b)(7), the Department and the Utilities contend that the Project does not comply with the Comprehensive Energy Plan because it would result in the curtailment of existing renewable generation in the SHEI; would not provide the benefits that distributed generation usually provides and as contemplated by the Comprehensive Energy Plan; and would not help VEC to achieve its Renewable Energy Standard (“RES”) goals as the Comprehensive Energy Plan intended.<sup>10</sup> Accordingly, the Department and the Utilities argue that the Project does not comply with Subsection 248(b)(7).

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<sup>6</sup> Applicant Brief at 11. We took administrative notice of the 2016 Comprehensive Energy Plan on August 9, 2018, during the first day of evidentiary hearings. No party objected to our taking notice of the document. *See* tr. 8/9/18 at 128.

<sup>7</sup> *See* footnote 3, *supra*.

<sup>8</sup> Department Brief at 7.

<sup>9</sup> VEC Brief at 45; GMP Brief at 6-7; Department Brief at 6-7.

<sup>10</sup> VEC Brief at 39-41; GMP Brief at 6; Department Brief at 4-5. Act 56 and the Renewable Energy Standard were passed to further drive Vermont toward meeting its interim and overall Comprehensive Energy Plan goals. *See* Comprehensive Energy Plan at 2.

## **V. FINDINGS OF FACT**

Based on the record evidence presented to us in this proceeding, we make the following findings of fact and conclusions of law.

### **Background and Project Description**

#### **Project Description**

1. The Project is a 500 kW (AC) net-metered solar generation facility that would be located in VEC's service territory. Exhs. Derby-1 at 1.
2. The Project would occupy approximately 3.9 acres of a 65.6-acre parcel located at 2021 Route 5 in Derby, Vermont. Exh. Derby-1 at 1.
3. The Project would be located on a reclaimed portion of a site that is used as a sand and gravel extraction operation. The Project would be bounded to the west by Derby Line Road (Route 5), to the east and north by woods, and to the south by the active sand and gravel operation. Exh. Derby-1 at 1.
4. The Project would include: (a) approximately 17 rows of solar panels attached to a fixed ground-mounted racking system; (b) string inverters; (c) three step-up transformers mounted on a riser pole that serves as the point of interconnection to VEC's distribution system; and (d) underground wiring to connect the array to the transformers. Exhs. Derby-1 at 1 and Derby-2 at 1.
5. The Project is proposed to interconnect with VEC's existing three-phase distribution line along Route 5. Exh. Derby-2 at 1.

#### **VEC's Distribution System**

6. VEC is able to connect part of its electric load to either Quebec or Vermont. VEC refers to this portion of its load as Block Load. Craig Kieny, VEC ("Kieny") pf. at 5.
7. The amount of time VEC is connected to Quebec versus Vermont is a function of the price of power VEC pays when the Block Load is tied to Quebec compared to Vermont and the transmission costs VEC will incur if the Block Load is tied to Vermont. Kieny pf. at 5-6.
8. The Project would be located in the Block Load. Kieny at 6.

Description of SHEI Area

9. The Project, if constructed, would be in the SHEI when the Block Load is connected to Vermont. Kieny pf. at 6.

10. The SHEI refers to a constraint on the electric transmission system that occurs in northern Vermont. It currently extends from approximately the Vermont/New Hampshire border in northeastern Vermont to Alburgh in northwestern Vermont, extending south for some distance. Kieny pf. at 2.

11. The SHEI is often export-constrained. An export constraint occurs when the energy generation resources exceed the electric demand in the area, and the transmission lines leading out of the area are not sufficient to transport out the excess energy without jeopardizing the reliable operation of the grid. This situation tends to be worse in times of high local generation and low local demand, both of which increase the amount of energy that needs to be exported. Kieny pf. at 3; Doug Smith, GMP (“Smith”) at 6.

12. In 2013, ISO New England demarcated the SHEI and established generator operation limits to ensure that the transmission system’s capacity to function reliably remains intact. During certain operational periods, these limits are reached and generation resources in areas of northern Vermont that sell power in the regional energy markets are required to curtail their output due to the lack of transmission system capacity to export power. Kieny pf. at 7; exh. Derby-RF-3.

13. On May 25, 2016, ISO New England implemented a change to the rules that governs the dispatch of renewable energy. Under the Do-Not-Exceed dispatch rule, ISO New England manages the generation in an export-constrained interface (constraint that limits the amount of power that can be moved from one region to another) by scheduling and dispatching generation through the energy markets based on energy bid price. Before this rule change, renewable resources, such as wind, were not included in the determination of energy market prices or locational marginal prices. Kieny pf. at 3-4; Smith pf. at 4.

14. As a result of the Do-Not-Exceed dispatch rule change, during times when the SHEI is export-constrained, locational marginal prices at generation nodes in the SHEI are reduced compared to the rest of Vermont and New England. In addition, existing generation resources in the SHEI that sell output in the electricity markets receive dispatch instructions from ISO New

England to reduce output. These occurrences reduce the net energy revenues that the generator receives. Kieny pf. at 4-5; Smith pf. at 4.

15. The SHEI includes multiple large energy resources (greater than 5 MW), including: imports from Hydro-Quebec across the Highgate converter station (Vermont utilities purchase approximately 225 MW under a long-term contract with Hydro-Quebec); the Kingdom Community Wind project (approximately 63 MW); the Sheffield Wind project (approximately 40 MW); and the Sheldon Springs hydroelectric project (approximately 27 MW). These generation resources sell their energy output in the ISO New England electricity markets. Kieny pf. at 2-5; Smith pf. at 4.

16. GMP owns the Kingdom Community Wind project. GMP is entitled to 55 MW of that project's output, and the remaining 8 MW of its output is sold to VEC under a cost-based power purchase agreement. Kieny pf. at 4; Smith pf. at 4.

17. The SHEI area also includes multiple small (less than 5 MW) hydroelectric, solar, and farm methane generators. These generators do not sell their energy output in the electricity market, but instead operate as load reducers in the ISO New England settlement system, reducing the distribution utility's obligation to purchase electricity that matches its customers' use. Kieny pf. at 3 and 7.

18. There are several other projects, in addition to the Project, proposed to be constructed in the SHEI, including 5.8 MW of new net-metering generation, a new 2.2 MW standard-offer project, and 60 MW of new larger-scale generation, for a total of 68 MW of newly proposed generation. Kieny sur. reb. pf. at 6; Kieny supp. pf. at 2-3.

### **Existing Or Planned Transmission Facilities**

[30 V.S.A. § 248(b)(10)]

19. The Project cannot be served economically by existing or planned transmission facilities without undue adverse effect on Vermont utilities or customers. This finding is supported by findings 20 through 48, below.

20. Existing transmission constraints in the SHEI and rules implemented by ISO New England have resulted in reductions of output from existing generators and reductions in the locational marginal prices at SHEI nodes. Kieny pf. at 5.

21. VEC, the City of Burlington Electric Department ("BED"), GMP, and Washington Electric Cooperative, Inc. ("WEC") own or purchase the output of generation that operates in the

SHEI. The energy output of each of these sources is sold in the ISO New England energy markets, with the associated revenues reflected in the power supply costs of the purchasing/owning utility. To the extent that constraints in the SHEI cause the output of local generation sources to be reduced or lower the locational marginal price revenues that these sources receive, these Vermont electric utilities and their customers are economically harmed. Kieny pf. at 4-5; Smith pf. at 4.

22. The locational marginal price reductions that result when the SHEI is constrained reduce the net energy revenues that GMP receives for the output of the Kingdom Community Wind project in the regional energy market, increasing GMP's net power supply costs. In addition, when the SHEI is constrained, the Kingdom Community Wind project often receives dispatch instructions from ISO New England to reduce output. When this occurs, GMP loses the market value of the Kingdom Community Wind energy that could have been produced, along with renewable energy credits and federal production tax credits associated with that project's output. Smith pf. at 4-5.

23. From March 1, 2017, to February 28, 2018, VEC's net power costs are estimated to have increased by approximately \$587,750, due to lower locational marginal price revenues as the result of existing SHEI constraints. The total financial impact of the SHEI constraints and associated curtailments on Vermont's utilities and electric customers is much larger than for VEC alone. Kieny pf. at 5.

24. Also due to the SHEI constraints, the combination of locational marginal price effects and lost generation value cost GMP ratepayers several million dollars during the approximately 18-month period from June 2016 to December 2017. Tr. of 8/10/18 at 13 (Smith).

25. Increases in VEC's and GMP's net power costs result in an upward pressure on the retail electric rates that customers pay. Kieny pf. at 5; Smith pf. at 5.

26. Vermont customers can realize some limited benefits from the lower locational marginal prices that occur as a result of SHEI constraints. Vermont utilities are required to purchase through the regional market the amount of electricity that meets their customer demand (their ISO New England load obligation). This purchase is based on the Vermont zone locational marginal prices, which are determined based on a weighted average of the individual locational marginal price zones across the state. The lower locational marginal prices at the SHEI nodes help to lower the Vermont zone price, and thus lower the cost of the load obligation. However,

because the load within the SHEI is typically less than 10 percent of the overall load in the Vermont zone, the lost locational marginal price revenue associated with the SHEI constraint consistently exceeds the benefit of this reduction in the cost of the load obligation. Smith pf. 13-14.

27. VEC anticipates continuing to have the Block Load connected to Vermont as much as possible to manage its power costs. Switching the Block Load from Quebec to Vermont has the added benefit of increasing load in the SHEI, which tends to increase the amount of generation allowed in the area before the export interface limit is reached. Kieny pf. at 6-7.

28. Existing curtailments in the SHEI cannot be eliminated by changing the VELCO maintenance schedules. Although it is possible that there may be some instances when maintenance scheduling practices can reduce curtailments and congestion charges, rescheduling maintenance will not eliminate curtailments and congestion charges entirely. Kieny pf. at 12-13; Kieny sur. reb. pf. at 10-11.

29. Additional energy sources in the SHEI will tend to increase the curtailments of existing generation that prevent the export interface limit from being exceeded. Kieny pf. at 7.

30. Because the Project is a net-metered system, the Project would operate as a load reducer in the ISO New England settlement system. The Project would reduce the effective amount of electric demand within the SHEI area that is available to absorb local generation. Kieny pf. at 7.

31. During periods of high local generation or low local electricity demand, the Project's output would displace (cause ISO New England to reduce) some amount of output from an existing generator in the SHEI. Because almost all of the energy sources in the area are renewable resources (except the Swanton gas turbine plant, which operates infrequently), the Project's output would displace existing renewable generation. Kieny pf. at 7.

32. In the SHEI, wind generation and solar generation often occur at the same time. Examining a test year of March 1, 2017, through February 28, 2018, the Kingdom Community Wind project would have been generating in more than 90% of the hours that the Project is expected to be generating. Kieny sur. reb. pf. at 14-15; Kieny pf. at 12.

33. Had the Project operated during the March 2017 – February 2018 test year, it would have generated approximately 897 MWh at a cost to VEC ratepayers of approximately \$151,778 based on the net-metering rate of 16.919 cents per kWh. Kieny sur. reb. pf. at 3.

34. Had the Project operated during the March 2017 – February 2018 test year, there would have been additional Kingdom Community Wind curtailments of approximately 57 MWh. Kieny sur. reb. pf. at 3-4 and 8.

35. The cost of operating Kingdom Community Wind is fixed, whether it is generating power or not, so there are no cost savings to curtailing the Kingdom Community Wind plant for 57 MWh each year. Kieny sur. reb. pf. at 3-4.

36. During times of curtailment, the 57 MWh received from the Project (paid at the net-metering rate of \$0.16919 per kWh) instead of from Kingdom Community Wind (at no additional cost) would increase the annual cost to Vermont ratepayers by approximately \$9,692 (57 MWh times \$0.16919 per kWh). Kieny sur. reb. pf. at 3-4 and 8.

37. Had the Project operated during the March 2017 – February 2018 test year, the Kingdom Community Wind project would have lost approximately \$612 in annual revenue due to the reductions in locational marginal prices as a result of the SHEI constraints. Kieny sur. reb. pf. at 4.

38. If the Project went into operation, the total annual costs to ratepayers would be, at a minimum, approximately \$10,304 (the sum of \$9,692 and \$612) for every year that the Project operated. Kieny sur. reb. pf. at 8.

39. The \$10,304 in estimated annual costs to ratepayers does not account for the utilities' loss of revenue from the renewable energy credits and federal production tax credits associated with the Kingdom Community Wind project's output. Kieny sur. reb. pf. at 8; Smith pf. at 4-5; tr. 8/10/18 at 8-9 (Smith).

40. The \$10,304 in estimated annual costs to ratepayers does not account for the impacts to other generation resources in the region. These unaccounted-for impacts include the locational marginal price-suppressing impacts across the entire SHEI (i.e., reduction of output or lower locational marginal price revenues of other generation sources in the SHEI), and the reduction in revenues from the renewable energy credits and federal production tax credits from these other resources. Kieny sur. reb. pf. at 6-8; Smith pf. at 4-5; tr. 8/10/18 at 8-9 (Smith).

41. The \$10,304 in estimated annual costs to ratepayers also does not account for additional costs from system upgrades that VEC or VELCO may need to install to address the additional generation in the SHEI. Kieny sur. reb. pf. at 6-8.

42. There are currently no existing or planned transmission facilities that would resolve all of the existing SHEI constraints or the incremental constraints caused by the Project.

McNamara pf. at 8; Kieny supp. pf. at 13.

43. To fully resolve the congestion in the SHEI area would require an investment of “several hundred million dollars to upgrade the major VELCO transmission lines in the area.” Tr. 8/10/18 at 84-86 (McNamara).

44. Without changes to the transmission system, the distribution system, or the ISO New England dispatch rules, the \$10,304 in estimated annual costs is a reasonable expected minimum cost for each year that the Project operates. Tr. 8/9/18 at 197 (Kieny).

45. The projected life of the project is 25 years. Tr. 8/10/18 at 76 (McNamara); tr. 8/9/18 at 57 and 115 (Fagan).

46. Over this 25-year period, and without changes to the transmission system, the distribution system, or the ISO New England dispatch rules, the Project’s minimum annual costs of approximately \$10,304 would result in costs to ratepayers of more than \$250,000 (in current dollars). *See* Kieny sur. reb. pf. at 8.

47. The Vermont System Planning Committee and a utility working group are currently investigating ways to address the SHEI limitations so as to reduce or eliminate curtailments of generation located within the interface.<sup>11</sup> These efforts are focused on the curtailments being caused by existing generation, not new generation. Smith pf. at 7-8; tr. 8/9/18 at 129 (Hopkins) and 176 (Kieney); tr. 8/10/18 at 91 (McNamara).

48. GMP expects to install an Automatic Voltage Regulator at the Sheldon Springs hydroelectric facility sometime in 2019. This project will mitigate some congestion and curtailment in the SHEI. However, the Automatic Voltage Regulator is meant to help remediate current curtailments, not new curtailments caused by the operation of the Project. The Automatic Voltage Regulator will reduce but not eliminate the existing curtailments in the SHEI. Other fixes are under consideration, but their effectiveness and cost-effectiveness are not known currently. Tr. 8/10/18 at 128 (McNamara); tr. 8/10/18 at 23-24 (Smith).

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<sup>11</sup> The Vermont System Planning Committee was established by the Commission to promote public engagement, long-term planning, and effective collaboration in addressing Vermont’s electrical transmission needs. The Vermont System Planning Committee structure and purpose are set forth in a memorandum of understanding, most recently approved by the Commission in its June 13, 2018, Order in Docket 8875.



## Discussion

With regard to the requirements of Subsection 248(b)(10), we conclude that the Project cannot be served economically by existing or planned transmission facilities without undue adverse effect on Vermont utilities or customers.

The SHEI is at times export-constrained. This existing export constraint occurs when the energy generation resources exceed the electric demand in the area, and the transmission lines leading out of the area are not sufficient to transport the excess energy out of the area without jeopardizing reliable operation of the grid.<sup>12</sup> The Project is proposed to be located in the SHEI.

The existing transmission constraints in the SHEI have resulted in financial harm to Vermont utilities and their customers. Existing transmission constraints in the SHEI and rules implemented by ISO New England have resulted in reductions of output from existing generation and resulted in reductions of the locational marginal prices within the SHEI.<sup>13</sup> VEC, BED, GMP, and WEC own or purchase the output of generators that operate in the SHEI. The energy output of each of these sources is sold in the ISO New England energy markets, with the associated revenues reflected in the power supply costs of the purchasing or owning utility.<sup>14</sup> These Vermont electric utilities and their customers are financially harmed when the constraints in the SHEI cause the output of local generation sources to be reduced or lower the locational marginal price revenues that these sources receive.<sup>15</sup>

Vermont utilities and their customers are experiencing measurable financial effects from the existing constraints in the SHEI. During the March 2017 to February 2018 time period, VEC's net power costs increased by approximately \$587,750 due to lower locational marginal price revenues as the result of existing SHEI constraints.<sup>16</sup> GMP has also experienced increases in net power costs due to the SHEI constraints. Specifically, the reductions in locational marginal price revenues that GMP receives for the output of the Kingdom Community Wind project increase GMP's net power supply costs.<sup>17</sup> In addition, when the Kingdom Community Wind project's output is reduced, GMP loses the market value of the Kingdom Community Wind energy that could have been produced, along with renewable energy credits and federal

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<sup>12</sup> Kieny pf. at 3; Smith at 6.

<sup>13</sup> Kieny pf. at 5.

<sup>14</sup> Kieny pf. at 4-5.

<sup>15</sup> Kieny pf. at 4-5.

<sup>16</sup> Kieny pf. at 5.

<sup>17</sup> Smith pf. at 4-5.

production tax credits associated with its output.<sup>18</sup> GMP estimates that the combination of locational marginal price effects and lost generation value cost GMP ratepayers several million dollars during the approximately 18-month period from June 2016 to December 2017.<sup>19</sup>

The addition of the Project to the SHEI would increase the existing transmission constraints and the resulting adverse effects on Vermont utilities and their customers. During periods of high local generation or low local electricity demand, the Project's output would displace some amount of output from existing generation in the SHEI.<sup>20</sup> This increased displacement would result because the Project would not be participating in the energy markets and instead would operate as a "load reducer," reducing VEC's obligation to purchase electricity that matches its demand in the ISO New England settlement system. Thus, the output of the *Project* would not be reduced during SHEI curtailments. Instead, existing generation in the SHEI selling into the energy market would be reduced,<sup>21</sup> while the Project would not experience any adverse financial impacts. Consequently, Vermont utilities purchasing or operating generation in the SHEI would experience increased adverse financial impacts, which would ultimately be borne by Vermont ratepayers.

Vermont ratepayers ultimately bear the cost of the SHEI curtailments because retail electric rates (the amount a utility charges its customers for electric service) are set based on the distribution utility's costs to provide service to its customers. The cost of curtailments to ratepayers can be demonstrated by examining the reduction in Kingdom Community Wind generation and the reduction in locational marginal prices within the SHEI. Under a curtailment, Kingdom Community Wind produces less electricity than it is capable of producing, and thus GMP and VEC receive less revenue because they sell less electricity in the wholesale energy market.<sup>22</sup> Further, the locational marginal price at which GMP and VEC are paid for these sales is lower, resulting in an additional reduction in revenues received. In addition, because Kingdom Community Wind is producing less electricity, GMP and VEC must purchase electricity from other resources to meet their customers' needs.

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<sup>18</sup> Smith pf. at 4-5.

<sup>19</sup> Tr. 8/10/18 at 13 (Smith).

<sup>20</sup> Kieny pf. at 7.

<sup>21</sup> Kieny pf. at 7.

<sup>22</sup> GMP is entitled to 55 MW of Kingdom Community Wind's output, and the remaining 8 MW is sold to VEC under a cost-based power purchase agreement. *See* Finding 16.

Here, during curtailments, VEC would have to buy the Project's total output at the net-metering rate, rather than receive that power for no additional cost from Kingdom Community Wind. This results in increased power costs for VEC.

This reduction in revenue and increase in power costs puts upward pressure on the retail electric rates paid by the utilities' customers.<sup>23</sup>

The Applicant and VEC both agree that the Project will result in additional curtailments to the Kingdom Community Wind project and a resulting cost to Vermont ratepayers. The Applicant and VEC disagree on the number of curtailments and the specific dollar amount of the resulting costs. The Applicant estimates that the Project would increase the cost to Vermont ratepayers by \$150 to \$850 annually due to the reductions in locational marginal prices from the Kingdom Community Wind curtailments.<sup>24</sup> VEC has estimated that the Project would increase the cost to Vermont ratepayers by approximately \$10,304 annually due to the loss of revenue from the Kingdom Community Wind curtailments, some of the reductions in locational marginal prices, and the need during times of curtailment to purchase 57 MWh at the net-metering rate instead of obtaining that power at no additional cost from Kingdom Community Wind.<sup>25</sup> As we explain in more detail below, we find VEC's estimate persuasive as a minimum amount of the annual financial impact.

We disagree with the estimate made by the Applicant's expert of the costs of Kingdom Community Wind curtailments.<sup>26</sup> This estimate fails to account for the need during times of curtailment to purchase 57 MWh at the net-metering rate instead of obtaining that power at no additional cost from Kingdom Community Wind. As VEC's expert correctly explains, this creates an additional annual cost to Vermont ratepayers of approximately \$9,692 (57 MWh times \$0.16919 per kWh).<sup>27</sup> The Applicant's expert has failed to take these costs into account. Further, the Applicant's estimate assumes an unreasonably low number of curtailments (23 MWh per year versus VEC's estimate of 57 MWh per year).<sup>28</sup> As we discuss further below, we find VEC's estimate of the magnitude of incremental curtailments to be persuasive.

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<sup>23</sup> Smith pf. at 5.

<sup>24</sup> Tr. 8/9/18 at 69 (Fagan).

<sup>25</sup> Kieny sur. reb. pf. at 3-8.

<sup>26</sup> Fagan pf. at 18-20.

<sup>27</sup> Kieny sur. reb. pf. at 3-4 and 8.

<sup>28</sup> Fagan pf. sur. reb. 20-22.

At any rate, while the experts disagree on the specific cost to Vermont ratepayers, it is undisputed that the Project would result in increased costs to Vermont ratepayers. Moreover, the estimates provided do not capture the full range of the negative impacts of the curtailments that would be caused by the Project. The curtailments also would increase costs to ratepayers by resulting in a loss of revenue to the utilities from the renewable energy credits and federal production tax credits associated with Kingdom Community Wind's reduced output.<sup>29</sup> Further, the cost estimates do not account for increased costs to ratepayers to make up for utility revenue losses from the locational marginal price-suppressing impacts across the entire SHEI (i.e., reduction of output or lower locational marginal price revenues of other generation sources in the SHEI), or the reduction in revenues from the renewable energy credits and federal production tax credits for these other resources.<sup>30</sup> In addition, the cost estimates do not account for increased costs to ratepayers to pay for system upgrades that VEC or VELCO may need to install as generation increases in the SHEI.<sup>31</sup>

These costs, both the quantified and unquantified, are meaningful and harm ratepayers. Moreover, because the Project is a net-metered resource and does not participate in the wholesale energy market, its own output would not be reduced during times when constraints on the transmission system cause curtailments.<sup>32</sup> Thus, the costs associated with the Project would not be paid by the Applicant, but instead by ratepayers. These costs would result in financial harm to Vermont utilities and their customers.

Further, during periods of high local generation or low local electricity demand, the Project's output would displace existing renewable generation because almost all of the energy resources in the SHEI are renewable.<sup>33</sup> Moreover, the Project would displace less expensive renewable energy generation. The Project would be paid at the net-metering rate of 16.919 cents per kWh.<sup>34</sup> The renewable energy generation that the Project would displace comes at significantly lower price.<sup>35</sup> Thus, the Project would be a more expensive renewable resource that

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<sup>29</sup> Kieny sur. reb. pf. at 6-8; Smith pf. at 4-5; tr. 8/10/18 at 8-9 (Smith).

<sup>30</sup> Kieny sur. reb. pf. at 6-8; Smith pf. at 4-5; tr. 8/10/18 at 8-9 (Smith).

<sup>31</sup> Kieny sur. reb. pf. at 6-8.

<sup>32</sup> Kieny pf. at 7.

<sup>33</sup> Kieny pf. at 7.

<sup>34</sup> Kieny sur. reb. pf. at 3.

<sup>35</sup> Kieny pf. at 15; Kieny sur. reb. pf. at 3-5.

would cause the curtailment of already operational and less expensive renewable energy resources.

The Project cannot be served economically by planned transmission facilities without undue adverse effect on Vermont utilities or customers. There are currently no planned transmission facilities that would resolve all of the existing SHEI constraints or the incremental constraints caused by the Project.<sup>36</sup> The efforts by the Vermont System Planning Committee and a utility working group to reduce or eliminate curtailments of generation located within the SHEI are focused on the curtailments being caused by existing generation, not new generation.<sup>37</sup> GMP expects to install an Automatic Voltage Regulator at the Sheldon Springs hydroelectric facility sometime in 2019. The Automatic Voltage Regulator project is meant to reduce current curtailments but will not eliminate them altogether.<sup>38</sup> The addition of the Project would erode the value Vermont customers are expected to realize from this Automatic Voltage Regulator investment to relieve the existing SHEI constraints.

The Applicant presents several arguments why it believes the Project can be served economically by existing and planned transmission facilities without undue adverse effect on Vermont utilities or customers. We are not persuaded by these arguments.

First, the Applicant argues that limited curtailment of the Kingdom Community Wind project is an acceptable financial outcome because it is cheaper than upgrading the transmission grid to eliminate curtailment entirely.<sup>39</sup> This argument fails to address why the Project can be economically served by existing or planned transmission facilities. It also fails to address why Vermont utilities and customers should bear the financial effects of the Project. The Project would result in additional curtailments in the SHEI that would result in increased costs with an adverse effect on Vermont utilities and customers. The fact that the Project's curtailments of the Kingdom Community Wind project would be less costly than upgrades needed to eliminate curtailments in the SHEI does not lead to the conclusion that the Project would not result in an undue adverse effect.

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<sup>36</sup> McNamara pf. at 8.

<sup>37</sup> Smith pf. at 7-8; tr. 8/9/18 at 129 (Hopkins); tr. 8/10/18 at 91 (Smith).

<sup>38</sup> Tr. 8/10/18 at 128 (McNamara); tr. 8/10/18 at 23-24 (Smith).

<sup>39</sup> Applicant Brief at 15.

Second, the Applicant argues that for an estimated 93% to 97% of the time, the Project would be operating without curtailment occurring at all.<sup>40</sup> The Applicant further contends that the Project's impact on the Kingdom Community Wind project's output (based on VEC's estimate) would be small—roughly 57 MWh per year of Kingdom Community Wind's 186,000 MWh per year, or 0.03% of Kingdom Community Wind's total output, which is less than a single hour of the Kingdom Community Wind project operating at its full capacity of 63 MW.<sup>41</sup> However, the Project's effects would not be limited to the curtailments at the Kingdom Community Wind project but would include the reduction of output and lower locational marginal price revenues at other generation sources in the SHEI. While most of the Project's operation would not result in additional curtailments, the Project would add to an existing transmission constraint that has already adversely affected Vermont utilities and customers. We agree with the Department and the Utilities that this additional effect is unacceptable, especially given that: (1) the resulting curtailments would be to existing, less expensive renewable generation operating in the SHEI; and (2) the increase in costs would be paid by ratepayers. Over the 25-year expected life of the Project, and without changes to the transmission system, the distribution system, or the ISO New England dispatch rules, the Project's minimum annual costs of \$10,304 would result in costs to ratepayers of more than \$250,000 (in current dollars). These increased costs to ratepayers provide no benefit to ratepayers relative to the less expensive renewable generation that is already available during those times.

Third, the Applicant maintains that VEC's estimate that 93.6% of the Project's output would be curtailment-free is likely low because it is based on VEC's "unreasonable assumptions" that: (1) there is a high correlation between wind generation occurring when solar output occurs in the SHEI; (2) the SHEI will experience a major maintenance-related outage on the VELCO transmission system every year; and (3) no upgrades will be implemented to address the pre-existing conditions in the SHEI.<sup>42</sup> According to the Applicant, the Project's output may be curtailment-free as much as 97% of the time, and the Applicant thus argues that only 23 MWh of the Kingdom Community Wind project would be curtailed every year, rather than the 57 MWh calculated by VEC's expert.<sup>43</sup> We find that VEC has made reasonable assumptions, and

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<sup>40</sup> Applicant Brief at 15.

<sup>41</sup> Applicant Brief at 3.

<sup>42</sup> Applicant Brief at 15; Applicant Reply Brief at 2-3 and 5.

<sup>43</sup> Applicant Brief at 13.

we are therefore persuaded that the Project would cause additional annual curtailments of the Kingdom Community Wind project of approximately 57 MWh.<sup>44</sup> VEC has chosen a reasonable test year to estimate the curtailments caused by the Project. With respect to the correlation between wind generation and solar, VEC has appropriately examined the relevant question of whether wind generation occurs at times of solar production and found that in the test year examined, the Kingdom Community Wind project would have been generating in more than 90% of the hours that the Project is expected to be generating.<sup>45</sup> With respect to maintenance outages, VEC has reasonably assumed that some maintenance will be needed every year, with some years likely including major outages, and that curtailments in the SHEI cannot be eliminated entirely by changing VELCO's maintenance schedules.<sup>46</sup> With respect to planned upgrades, VEC has chosen a test year that includes the existing curtailments and the assumption that no remediation of curtailments is planned. We find this reasonable. The solution to the existing curtailments in the SHEI is still under investigation, with one partial solution in the planning phase (i.e., the Automatic Voltage Regulator at Sheldon Springs).<sup>47</sup> While these assumptions may not precisely capture how the Project would operate in any given year, they inform a reasonable estimate of the curtailments the Project might cause.

Fourth, the Applicant argues that the direct financial impact of the Project on the revenue stream of the Kingdom Community Wind project was estimated by VEC to be only several hundred dollars per year, and the Applicant's expert has estimated that the financial impacts are likely to be much smaller.<sup>48</sup> As discussed above, we find that VEC has made a reasonable estimate of the minimum cost of the Project to Vermont ratepayers due to the loss of revenue from the Kingdom Community Wind curtailments and reductions in locational marginal prices.<sup>49</sup> We also recognize that VEC's estimate does not fully capture the Project costs because it does not account for locational marginal price-suppressing impacts to multiple utilities and generators across the entire SHEI, nor does it account for the costs of system upgrades. For purposes of Subsection 248(b)(10), a precise determination of cost to Vermont utilities and customers is not necessary. All parties agree that the Project would result in some amount of negative financial

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<sup>44</sup> Kieny sur. reb. pf. at 3-4 and 8.

<sup>45</sup> Kieny sur. reb. pf. at 14-15.

<sup>46</sup> Kieny sur. reb. pf. at 10-11.

<sup>47</sup> Tr. 8/10/18 at 128 (McNamara); tr. 8/10/18 at 23-24 (Smith).

<sup>48</sup> Applicant Brief at 4.

<sup>49</sup> Kieny sur. reb. pf. at 3-8.

consequences for the utilities operating or purchasing generation resources in the SHEI and for Vermont ratepayers who pay for these financial consequences. We find these impacts to be undue here because these negative financial impacts to ratepayers—which, without changes to the transmission system, the distribution system, or the ISO New England dispatch rules, total more than \$250,000 (in current dollars) in costs over the life of the Project—provide no benefit to ratepayers relative to the less expensive renewable generation that is already available during times of curtailment.

In a brief filed after the evidentiary hearing, the Applicant offered to pay a mitigation fee that could be used to fund new transmission upgrades to address the constraints in the SHEI. However, the proposed amount would not prevent undue adverse financial impacts. Specifically, the Applicant has offered two options for a mitigation fee, one with a net present value of \$5,933, and another with a net present value of \$10,840.<sup>50</sup> This proposal greatly underestimates the true cost to ratepayers, which, without changes to the transmission system, the distribution system, or the ISO New England dispatch rules, would be more than \$250,000 in costs (in current dollars) over the life of this Project (and likely even more when one accounts for the locational marginal price-suppressing impacts across the entire SHEI and the costs of system upgrades). Thus, the Applicant's proposal would, at best, cover only approximately 5% of the additional costs to ratepayers resulting from curtailments caused by the Project. Accordingly, the proposal does not adequately address the resulting undue financial harm caused to Vermont utilities and customers if the Project were built.

Fifth, the Applicant argues that existing transmission facilities are adequate to serve the Project because the Project passed VEC's Fast Track Analysis required under Commission Rule 5.500.<sup>51</sup> The Applicant contends that the Commission has found that a Project's conformance with Subsection 248(b)(3) (system stability and reliability) is directly relevant to its determination under Subsection 248(b)(10).<sup>52</sup> This argument, however, fails to address the concerns raised under Subsection 248(b)(10). While the Project met the Fast Track Analysis with respect to VEC's *distribution* system, that analysis did not address the constraints on the

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<sup>50</sup> Applicant Brief at 18-19.

<sup>51</sup> Applicant Brief at 16.

<sup>52</sup> Applicant Brief at 15-16 (citing *Petition of Otter Creek Solar*, Case 17-3727-PET, Order of 6/13/18 at 33; *Petition of Triland Partners*, Docket 8666, Order of 4/20/18 at 21; *Petition of Coolidge Solar*, Docket 8685, Order of 3/23/17 at 35).



bulk *transmission* system. In particular, the Fast Track Analysis looks at safety and reliability. It does not measure or identify the curtailments caused by the Project or the Project's contribution to lower locational marginal prices. Accordingly, the Project passing the Fast Track Analysis has no bearing on whether the Project can be served economically by existing or planned transmission facilities without undue adverse effects on Vermont utilities or customers.

Sixth, the Applicant argues that a direct correlation cannot be proved between the Project and the curtailment of the Kingdom Community Wind project's output because of the dynamic nature of the transmission system's "innumerable" input and output variables and the inability to materially differentiate between curtailment caused by the Project and the curtailment caused by small net-metering systems not opposed by VEC.<sup>53</sup> We agree that the dynamic nature of the transmission system does not allow precise analysis regarding which energy resource has caused the curtailment of another generation resource at any particular moment in time. However, in aggregate, the SHEI is often export-constrained, and the addition of new energy sources in the SHEI, including the Project, will increase the curtailments of existing generation.<sup>54</sup> Therefore, it is appropriate that we review the Project's contribution to these curtailments. We do recognize that the Commission's Section 248 and 8010 review process currently focuses on ground-mounted projects greater than 50 kW in size, allowing certain net-metered projects that may increase curtailments to be added to the SHEI without significant review.<sup>55</sup> We will consider outside this proceeding whether this policy remains appropriate given the existing constraints in the SHEI.<sup>56</sup>

Seventh, the Applicant argues that the constraint-related financial impacts to GMP and VEC are an existing problem that is a function of the risk-reward decisions that the utilities made in constructing the Kingdom Community Wind project in 2012.<sup>57</sup> The Applicant incorrectly contends that VEC and GMP ratepayers should thus bear the costs of the incremental curtailment

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<sup>53</sup> Applicant Brief at 3.

<sup>54</sup> Kieny pf. at 3 and 7; Smith at 6.

<sup>55</sup> Commission Rule 5.105 allows for a registration procedure for net-metered hydroelectric facilities, ground-mounted solar facilities of up to 15 kW in capacity, and roof-mounted solar net-metering systems of any capacity up to 500 kW. Commission Rule 5.106 allows an application procedure for net-metered ground-mounted solar net-metering systems greater than 15 kW and up to and including 50 kW and for facilities using other technologies up to and including 50 kW.

<sup>56</sup> VEC has explicitly stated in this proceeding that it does not seek to halt the installation of smaller net-metering projects of 15 kW or less in the SHEI. See Letter to Judith Whitney, Clerk of the Commission, from VEC, dated August 20, 2018.

<sup>57</sup> Applicant Brief at 2.

of the Kingdom Community Wind project. Decisions regarding the Kingdom Community Wind project were made with the best information available under rules in place at the time. In a 2011 Order, the Commission concluded that the Kingdom Community Wind project could be served economically by existing or planned transmission facilities without undue adverse effect on Vermont utilities or customers and would have no adverse impact on the transmission system.<sup>58</sup> The Commission's decision recognized that the System Impact Study for the project called for the installation of a synchronous condenser to address possible ISO New England curtailment limits.<sup>59</sup> In 2013, the synchronous condenser was installed to address curtailments.<sup>60</sup> In addition, the decision on the Kingdom Community Wind project predates ISO New England's Do-Not-Exceed dispatch rule change and predates the increased amount of net-metered generation that has occurred in the SHEI area. Subsection 248(b)(10) requires the Commission to assess the Project based on the grid as it exists, rather than second-guess previously made renewable investments.

Finally, the Applicant argues that GMP's expert's opinions at the evidentiary hearing on Project-specific locational marginal price impacts do not meet the pre-filing requirements under Commission Rule 2.213 or V.R.C.P. 26 (as expressly incorporated through Commission Rule 2.214).<sup>61</sup> The Applicant argues that GMP's conclusions relating to locational marginal price impacts are "suspect at best, fail to rebut the evidence presented by the Applicant, and should be disregarded in this case."<sup>62</sup> In reaching our decision, we have not relied on the testimony of GMP's expert on Project-specific locational marginal price impacts provided at the evidentiary hearing. Accordingly, we do not address the Applicant's argument on this matter.

In summary, the Project cannot be served economically by existing or planned transmission facilities without undue adverse effects on Vermont utilities or customers. The SHEI is currently export-constrained, and the Project would add to the curtailment of existing generation. The Project would reduce the output of existing, lower-cost renewable generation in the SHEI and would impose unnecessary costs on Vermont ratepayers.

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<sup>58</sup> See *Joint Petition of GMP, VEC, VELCO*, Docket 7628, Order of 5/31/11.

<sup>59</sup> Before ISO New England's Do-Not-Exceed dispatch rule change, curtailments were determined manually and did not affect the locational marginal price.

<sup>60</sup> *Petition of GMP*, Docket 7987, Order of 4/26/13.

<sup>61</sup> Applicant Reply Brief at 6.

<sup>62</sup> Applicant Reply Brief at 7.

**Comprehensive Energy Plan**

[30 V.S.A. § 248(b)(7)]

49. The Project does not comply with the Vermont Comprehensive Energy Plan. This finding is supported by findings 50 through 63, below.

50. The Comprehensive Energy Plan contains a goal to “meet 25% of the remaining energy need from renewable sources by 2025, 40% by 2035, and 90% by 2050.” Comprehensive Energy Plan at 1.

51. The Tier 2 Renewable Energy Standard will require 10% of electricity in 2032 to come from small, renewable generators connected to Vermont’s electric grid. Comprehensive Energy Plan, Executive Summary at 9.

52. One goal of the Tier 2 Renewable Energy Standard and distributed energy more generally is to place new generation close to demand “to avoid costly transmission upgrades.” Comprehensive Energy Plan at 12.

53. Renewable energy projects should not be developed without consideration of their relative cost impact. The Comprehensive Energy Plan provides that Vermont should “[p]lan carefully to meet all three tiers of the [Renewable Energy Standard] in a least-cost manner [and] [s]trive to lower both energy bills and electric rates.” Smith pf. at 11; Comprehensive Energy Plan, Executive Summary at 10.

54. The Comprehensive Energy Plan places a strong emphasis on ratepayer value in assessing the selection of renewable generation: “When developing Tier 2 compliance portfolios, utilities should directly account for the in-state and grid-supporting nature of these resources. When choosing such resources, then, utilities should strive to deliver maximum ratepayer value, combining load shape (and related capacity value), location, and price to an optimal mix.” Comprehensive Energy Plan at 236.

55. “Fostering small-scale and distributed renewable energy is an objective of the Comprehensive Energy Plan. As the number of small-scale generators in the state grows, the [Department] and electric utilities will continue to evaluate how to integrate these generators into the electric system in the most cost-effective and reliable ways.” Comprehensive Energy Plan at 243.

56. The Comprehensive Energy Plan envisions “a distributed energy future in which a significant portion of Vermont’s energy is produced near where it is consumed, and which is

shaped by many coordinated actions by distributed energy users, rather than through singular central control.” Comprehensive Energy Plan, Executive Summary at 4.

57. Distributed generation should provide the following benefits: (1) a reduction in the need for transmission and distribution upgrades; (2) the production of renewable energy to meet renewable energy goals; and (3) a reduction in transmission and wholesale energy costs.

McNamara pf. at 6; Comprehensive Energy Plan at 236, 243, 293, and 296.

58. The Comprehensive Energy Plan identifies the benefits that should derive from solar distributed generation:

Solar [photovoltaic] also has electric-system benefits, due to the time and location of its power production. Solar [photovoltaic] is largely a peak electric load-following resource — meaning that during peak summer loads, solar [photovoltaic] systems are at near their highest production, resulting in cost savings to the utility and providing reliability benefits to the grid.

Solar [photovoltaic] can also be extremely distributed, meaning it can produce power throughout the electric distribution system close to the houses and businesses where the electricity is used. This distributed nature of solar [photovoltaic] lowers line losses for the utility, as less power needs to be transported through its lines, adding another element of cost savings.

Comprehensive Energy Plan at 293.

59. The Comprehensive Energy Plan also recognizes challenges associated with solar: “As the amount of installed solar [photovoltaic] grows, the land use and grid-reliability challenges become more pronounced. It will be a challenge to find sites that have good solar access and can meet the aesthetic, environmental, and grid stability challenges for all this new generation.” Comprehensive Energy Plan at 295.

60. The Comprehensive Energy Plan recommends “utility regulations and net metering rules, policies, and incentive programs to promote installation of solar [photovoltaic] projects where there is electric demand, and on locations where the land has already been built impacted (e.g. roofs, parking lots, landfills).” Comprehensive Energy Plan at 297.

61. Rather than *reduce* the need for transmission upgrades, the Project would exacerbate the existing need for transmission upgrades by placing additional generation in a place where the transmission system is already constrained. Tr. 8/10/28 at 51-52 (Smith); McNamara pf. at 6.

62. While the Comprehensive Energy Plan promotes distributed generation because distributed generation can place generation near where energy is consumed, the Project would locate generation in a place where there is already a surplus of electricity. This would also

exacerbate the transmission constraints that already exist in this area. Tr. 8/10/28 at 51-52 (Smith); McNamara pf. at 6.

63. The Project would cause curtailments that displace lower-cost existing renewable energy and is therefore not a least-cost method for meeting the State's renewable energy goals. *See Findings 9-48* above regarding Subsection 248(b)(10).

### Discussion

With regard to the requirements of Subsection 248(b)(7), we conclude that the Project does not comply with the Vermont Comprehensive Energy Plan.

Subsection 248(b)(7) provides that before the Commission may issue a CPG for a net-metering project, it must find that the project "is in compliance with the electric energy plan approved by the Department under section 202 of this title [the Comprehensive Energy Plan], or that there exists good cause to permit the proposed action."

Pursuant to 30 V.S.A. § 202(b), the Department is required to develop a Comprehensive Energy Plan and is charged with determining whether proposed energy projects are consistent with that plan. Section 202(f) further provides:

After adoption by the Department of a final plan [the Comprehensive Energy Plan], any company seeking Commission authority to make investments, to finance, to site or construct a generation or transmission facility, or to purchase electricity or rights to future electricity, shall notify the Department of the proposed action and request a determination by the Department whether the proposed action is consistent with the Plan. In its determination whether to permit the proposed action, the Commission shall consider the Department's determination of its consistency with the Plan along with all other factors required by law or relevant to the Commission's decision on the proposed action. If the proposed action is inconsistent with the Plan, the Commission may nevertheless authorize the proposed action if it finds that there is good cause to do so.

The Department has determined that the Project is not consistent with the Comprehensive Energy Plan.<sup>63</sup> While we are not bound by that determination, we do afford it deference. In the *Korrow* case, the Supreme Court of Vermont recently highlighted the importance of giving agencies deference where their determinations deal with complex methodologies, unless it can be shown that the agency decision was "wholly irrational and unreasonable in relation to its

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<sup>63</sup> McNamara pf. at 5.

intended purpose.”<sup>64</sup> Here, we agree with the Department that the Project does not comply with the Comprehensive Energy Plan.

Further, pursuant to both Sections 202(f) and 248(b)(7), when the Department determines that a project is inconsistent with the Comprehensive Energy Plan, the Commission is directed to determine whether there exists good cause for that project to move forward. In this instance, we find there exists no good cause to permit the Project for at least three reasons. First, the Comprehensive Energy Plan promotes distributed generation as a way to *reduce* the need for transmission and distribution upgrades. The Project, by contrast, would exacerbate an existing transmission problem and would thus *increase* the need for transmission upgrades. Second, the Comprehensive Energy Plan promotes distributed generation because distributed generation can place generation near where energy is consumed. The Project, by contrast, would locate generation in a place where there is already a surplus of electricity. Again, this would exacerbate the transmission constraints that already exist in this area. Third, the Project would cause curtailments that displace lower-cost existing renewable energy and thus fails to meet the Comprehensive Energy Plan’s requirement of meeting “all three tiers of the [Renewable Energy Standard] in a least-cost manner.”<sup>65</sup>

The Department contends that while the Comprehensive Energy Plan indicates strong support for distributed generation, including net-metered projects, this does not mean that every proposed distributed generation project will be consistent with the Comprehensive Energy Plan.<sup>66</sup> The Department maintains that distributed generation is not a good in and of itself and that the benefits of a distributed generation project are specific to the location and type of project.<sup>67</sup> The Department contends that the Comprehensive Energy Plan goals are not meaningfully advanced by approving renewable energy projects that would depress the production of other renewable resources because such action would add cost to Vermont ratepayers without necessarily furthering the Comprehensive Energy Plan’s goals.<sup>68</sup> Further, the Department argues that net-metered projects can be proposed at any time, including after a solution to the existing SHEI constraints has been implemented, and that advancing the

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<sup>64</sup> *In re Korrow Real Estate, LLC Act 250 Permit Amendment Application*, 2018 VT 39, ¶ 21, 187 A.3d 1125, 1132, (citing *Plum Creek Me. Timberlands, LLC*, 2016 VT 103, ¶ 28, 203 Vt. 197, 155 A.3d 694).

<sup>65</sup> Comprehensive Energy Plan, Executive Summary at 10.

<sup>66</sup> McNamara pf. at 4.

<sup>67</sup> McNamara pf. at 5.

<sup>68</sup> McNamara pf. at 7.

Comprehensive Energy Plan goals does not require that the Project, at this time, be approved.<sup>69</sup> The Department maintains that the general support that the Comprehensive Energy Plan expresses for net-metering cannot obviate the need to review individual projects and make a determination based on the merits of each project.<sup>70</sup>

The Comprehensive Energy Plan envisions a future in which a significant portion of Vermont's energy is produced near where it is consumed, through distributed energy users, rather than through singular central control.<sup>71</sup> This vision is supported by the Tier 2 Renewable Energy Standard, which requires 10% of electricity in 2032 to come from small, renewable generators connected to Vermont's electric grid.<sup>72</sup> While fostering small-scale and distributed renewable energy is an objective of the Comprehensive Energy Plan, the Plan also places an emphasis on ratepayer value and integration of renewable energy into the electrical system in the most cost-effective and reliable manner.<sup>73</sup>

The Project does not meet the Comprehensive Energy Plan goals for distributed generation. As discussed above with respect to Subsection 248(b)(10), the Project would have an undue adverse effect on Vermont utilities and their customers by adding generation in a constrained area where electricity supply already often exceeds demand, causing the curtailment of existing renewable resources and reducing the revenue to owners of existing renewable resources in the SHEI. Because this Project's output would cost more than and incrementally curtail existing renewable generation, it does not represent cost-effective power that provides ratepayer value. Nor would this output contribute to the reliable operation of the grid. In fact, rather than decrease the need for transmission upgrades, it would increase the need for such upgrades.

The Applicant presents several arguments why the Project complies with the Comprehensive Energy Plan. We are unpersuaded.

First, the Applicant contends that the Project will accomplish several major goals of the Comprehensive Energy Plan, including increasing portfolio diversity, increasing participation in net-metering, generating renewable energy credits that will be transferred to the utility, and

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<sup>69</sup> McNamara pf. at 7.

<sup>70</sup> McNamara pf. at 7.

<sup>71</sup> Comprehensive Energy Plan, Executive Summary at 4.

<sup>72</sup> Comprehensive Energy Plan, Executive Summary at 9.

<sup>73</sup> Comprehensive Energy Plan at 236 and 293.

creating a net increase in renewable energy generation in Vermont despite minimal curtailment of other renewable resources.<sup>74</sup> The Applicant further contends that the Project's potential curtailment impact would be small relative to the uncongested output of either the Project or the wind resources at issue.<sup>75</sup>

While a large portion of the Project's operation would result in additional renewable energy, a portion would cause incremental transmission constraints that would reduce the operation of existing renewable generation. This reduction would cause financial harm to Vermont ratepayers and would not be consistent with the "least-cost" and other requirements of the Comprehensive Energy Plan.<sup>76</sup> Further, the Comprehensive Energy Plan recommends promoting the installation of solar projects where there is electric demand.<sup>77</sup> In this instance, the Project would operate at times when there would be no local electric demand for the Project.

Second, in response to the Department's and the utilities' arguments that the Project is not consistent with the Comprehensive Energy Plan because peak demand is moving later in the day into early evening, the Applicant argues that the fact that solar projects are providing less direct benefits than in the past does not mean that the Project would provide no benefits and would therefore be inconsistent with the Comprehensive Energy Plan.<sup>78</sup> The Comprehensive Energy Plan recognizes that increased solar power production will shift the daytime peak further toward sundown, thereby diminishing the peak-shaving benefit of solar.<sup>79</sup>

Our concerns about the Project's consistency with the Comprehensive Energy Plan do not rely on concerns about the shifting peak. Instead, we find the Project to be noncompliant with the Comprehensive Energy Plan because the Project would at times operate when there is no local electric demand for the Project and would reduce the operation of existing renewable generation.

Finally, the Applicant contends that the Department, VEC, and GMP have attempted to divert attention from the many ways that the Project does comply with the Comprehensive Energy Plan by focusing on whether there is a "need" for the Project. The Applicant argues that this reliance is misplaced because the conditional waiver of Subsection 248(b)(2), addressing

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<sup>74</sup> Applicant Brief at 11; Applicant Reply Brief at 2-3.

<sup>75</sup> Applicant Reply Brief at 3.

<sup>76</sup> Comprehensive Energy Plan, Executive Summary at 10.

<sup>77</sup> Comprehensive Energy Plan at 297.

<sup>78</sup> Applicant Reply Brief at 14-15.

<sup>79</sup> Comprehensive Energy Plan at 293.



need, was not revoked, and the Applicant is not required to show Project need to demonstrate compliance with the Comprehensive Energy Plan.<sup>80</sup> The Applicant maintains that VEC's argument that it has no "need" for renewable energy credits is inconsistent with Rule 5.100 and the Commission's precedent, neither of which caps the net-metering program according to a utility's need for renewable energy credits.<sup>81</sup>

As the Applicant has noted, we have not rescinded the conditional waiver of Subsection 248(b)(2) and we are not addressing the need for the Project. We are denying this Project for failure to comply with Subsections (b)(10) and (b)(7).

## **VI. CONCLUSION**

We deny the application for a certificate of public good for failure to comply with Subsections 248(b)(7) and (b)(10) of Title 30. We therefore conclude that the Project would not promote the public good under Subsection 248(a).

## **VII. ORDER**


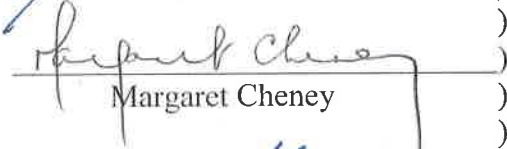

IT IS HEREBY ORDERED, ADJUDGED, AND DECREED by the Public Utility Commission of the State of Vermont that Derby GLC Solar, LLC has not demonstrated that the net-metering system proposed in this proceeding for construction and operation in Derby, Vermont, would satisfy the requirements of Title 30, Vermont Statutes Annotated, Subsections 248(b)(7) and (b)(10). The proposed project thus also fails to promote the public good under Title 30, Vermont Statutes Annotated, Subsection 248(a). The application is therefore denied.

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<sup>80</sup> Applicant Reply Brief at 12.

<sup>81</sup> Applicant Reply Brief at 12.

Dated at Montpelier, Vermont this 24th day of January, 2019.

 _____ Anthony Z. Roisman	)	PUBLIC UTILITY COMMISSION OF VERMONT
 _____ Margaret Cheney	)	
 _____ Sarah Hofmann	)	

OFFICE OF THE CLERK

Filed: January 24, 2019

Attest: Judith C. Whitney  
Clerk of the Commission

*Notice to Readers: This decision is subject to revision of technical errors. Readers are requested to notify the Clerk of the Commission (by e-mail, telephone, or in writing) of any apparent errors, in order that any necessary corrections may be made. (E-mail address: [puc.clerk@vermont.gov](mailto:puc.clerk@vermont.gov)).*

*Appeal of this decision to the Supreme Court of Vermont must be filed with the Clerk of the Commission within 30 days. Appeal will not stay the effect of this Order, absent further order by this Commission or appropriate action by the Supreme Court of Vermont. Motions for reconsideration or stay, if any, must be filed with the Clerk of the Commission within 28 days of the date of this decision and Order.*