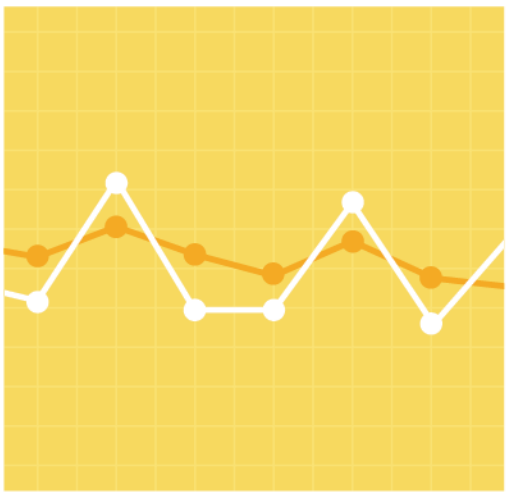
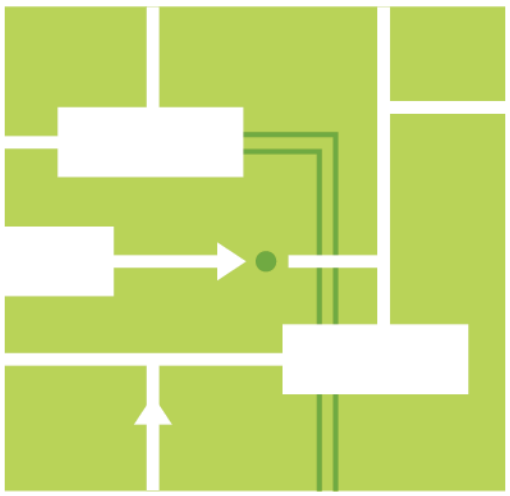
Final Second Maine Resource Integration Study

FINAL REPORT – REDACTED NON-CEII VERSION

OCTOBER 30, 2020





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Section 1
Executive Summary

ISO New England (ISO) conducted the *Second Maine Resource Integration Study* (Second MRIS) to identify the transmission upgrades necessary to enable the interconnection of proposed new resources in northern Maine. This Second MRIS was conducted pursuant to Attachment K of the ISO's *Open Access Transmission Tariff* (OATT), which is Section II of the *ISO New England Inc. (ISO) Transmission, Markets and Services Tariff* (ISO tariff), in consultation with the Planning Advisory Committee (PAC).[1]

This study was conducted as part of the approach to Clustering Interconnection Requests in the ISO-administered interconnection queue that was approved by the Federal Energy Regulatory Commission (FERC) in an order issued on October 31, 2017.[2] Clustering under the FERC-approved rules uses a two-phased study methodology in certain circumstances to expedite the consideration of two or more Interconnection Requests and allocate interconnection upgrade costs among Interconnection Customers (ICs) on a cluster basis.

The first phase of Clustering involves conducting a transmission planning study, performed under the Regional System Planning Process pursuant to the OATT, Attachment K (Section 15.4), to identify the transmission infrastructure and associated system upgrades necessary to enable the interconnection of potentially all the proposed resources in the interconnection queue. This infrastructure is called "Cluster Enabling Transmission Upgrades" (CETUs), and the study is referred to as a CETU Regional Planning Study (CRPS).

The second phase consists of conducting a Cluster Interconnection System Impact Study (CSIS) pursuant to the Interconnection Procedures in the OATT (Schedule 22, Section 4.2.3; Schedule 23, Section 1.5.3.3; and Schedule 25, Section 4.2.3) and a Cluster Interconnection Facilities Study (CFAC) performed under the Interconnection Procedures.[3] These studies must identify the specific facilities required to interconnect the resources that elect to move toward interconnection and meet the associated second-phase entry requirements.

This draft Second MRIS report documents the findings of the CRPS and identifies the Interconnection Requests, by Queue Position, that are eligible to be included in the second-phase study, the transmission upgrades (i.e., CETUs and associated system upgrades) required to enable interconnection, and the cost allocation for eligible projects if they elect to proceed to the second phase of Clustering.

Consistent with Section 2.4 (d) of Attachment K, the posting of the final CRPS report on the ISO website will trigger the entry deadline for the CSIS (Cluster Entry Deadline) specified in the OATT

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[1] *ISO New England Inc. Transmission, Markets, and Services Tariff* (ISO tariff) (2018), http://www.iso-ne.com/regulatory/tariff/index.html, including Section II, *ISO New England Open Access Transmission Tariff* (https://www.iso-ne.com/participate/rules-procedures/tariff/oatt), Attachment K, "Regional System Planning Process."

[2] FERC, *Order Accepting Tariff Revisions*, ISO New England Inc., Docket No. ER17-2421-000, 16 FERC ¶ 61,123 (October 31, 2017), https://www.iso-ne.com/static-assets/documents/2017/11/er17-2421-000_order_accept_interconnection_queue_clustering.pdf.

[3] ISO New England, OATT, Schedule 22, *Large Generator Interconnection Procedures* (2017); Schedule 23, *Small Generator Interconnection Procedures* (2017); and Schedule 25, *Elective Transmission Upgrade Interconnection Procedures* (2017), https://www.iso-ne.com/participate/rules-procedures/tariff/oatt.

(Schedule 22, Section 4.2.3.1; Schedule 23, Section 1.5.3.3.1; and Schedule 25, Section 4.2.3.1). The associated Cluster Entry Deadline is 30 days after the posting of the final CRPS report.

1.1 Eligible Queue Positions

The Interconnection Procedures provide for Interconnection Requests to be considered on a cluster basis when (a) there are two or more Interconnection Requests without completed Interconnection System Impact Studies in the same electrical part of the New England Control Area based on the requested Point of Interconnection, and (b) the system operator determined that none of the Interconnection Requests identified in (a) will be able to interconnect, either individually or on a cluster basis, without the use of common significant new transmission line infrastructure rated at or above 115 kV alternating current (AC) or high-voltage direct current (HVDC).

In accordance with the OATT (Schedule 22,Section 5.1.1.2; Schedule 23, Section 1.6.1.2; and Schedule 25, Section 5.2.1.2) , Interconnection Requests seeking to interconnect into the northern Maine part of the New England Control Area that do not have a completed Interconnection System Impact Study by publication of the final CRPS report shall be included in the Second MRIS. The ISO identified the following Interconnection Requests, referenced by Queue Position (QP), as eligible to participate in the second-phase cluster studies (in accordance with the OATT Schedule 22, Section 4.2.3; Schedule 23, Section 1.5.3.3; and Schedule 25, Section 4.2.3):

- **Northern Maine Generation Queue Positions**

QP 729	QP 732
QP 730	QP 733
QP 731	

The ISO also identified the following Elective Transmission Upgrade Queue Positions as eligible to elect to participate in the second-phase cluster studies.

- **Elective Transmission Upgrade Queue Positions**

QP 640	QP 740	QP 742
QP 738	QP 741	

1.2 Description of the Clusters, Cluster-Enabling Transmission Upgrades, and Associated Upgrades

This Second MRIS provides a planning level description of the CETUs and associated system upgrades. It also provides the approximate megawatt (MW) quantities of resources that could be interconnected in a manner that meets the Network Capability Interconnection Standard and the Capacity Capability Interconnection Standard in accordance with (and defined in) Schedules 22, 23, and 25 of the OATT.

Figure 1-1 presents a one-line network diagram of the cluster upgrades.

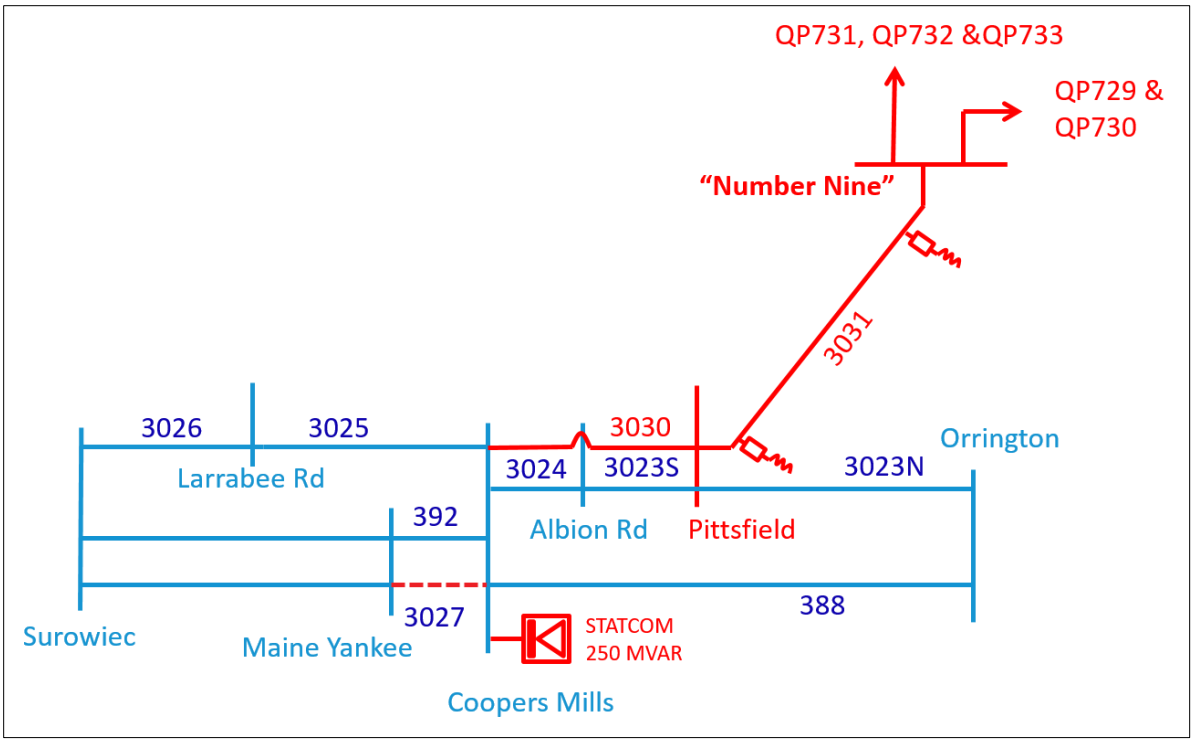

Figure 1-1: One-Line representation of the cluster-enabling upgrades for generation in northern Maine.

The Second MRIS identifies a set of cluster-eligible generation Queue Positions in northern Maine. To interconnect these approximately 520 MW of proposed resources in the Aroostook County area, a new 345 kV line will need to be extended from a new substation in the vicinity of the "Number Nine" wind farm to a new substation on the existing 345 kV Orrington–Albion 3023 line in the vicinity of Pittsfield. In addition, a new 345 kV line will be required between Pittsfield and Coopers Mills. The addition of a second 345 kV Coopers Mills–Maine Yankee 392 line was identified as a required upgrade for Queue Position 639 and this upgrade is a Contingent Facility for this cluster. Figure 1-1 also shows the location and size of the required reactive devices for the interconnections. These upgrades would allow the identified 520 MW of generation to interconnect in a manner that meets the Network Capability Interconnection Standard. The upgrades would not enable the generation to connect in a way that meets the Capacity Capability Interconnection Standard if earlier-queued projects proceed and interconnect according to this standard.

Five Elective Transmission Upgrades (ETUs) were also identified as eligible to participte in this Second MRIS and will be eligible to elect to participate in the CSIS. These ETUs themselves constitute significant new transmission line infrastructure rated at or above 115 kV alternating current (AC) or high-voltage direct current (HVDC). This significant new infrastructure would allow these ETUs to connect either individually or on a cluster basis.

1.3 Elective Transmission Upgrades that Can Serve as Cluster-Enabling Transmission Upgrades

Section 4.2.1 of Schedule 25 of the OATT provides that Interconnection Requests for Internal ETUs in the ISO-administered interconnection queue may be eligible to take the place of CETUs in the second-phase cluster studies as potentially eligible. In the case of this Second MRIS, none of the cluster-eligible ETUs are eligible to take the place of the CETUs that have been identified in association with the northern Maine generation. However, these ETUs may still electively decide to proceed in the interconnection process by entering into the CSIS. Note that these ETUs, listed in Table 1-1 below, are independent from the upgrades needed to interconnect the cluster-eligible generation in northern Maine and, if they meet the cluster-entry requirements, they may be studied in separate CSIS.

1.4 Cost Estimates and Cost Allocation

Table 1-1 provides a nonbinding good-faith order-of-magnitude estimate, developed by the applicable transmission owners (TOs), of the costs for the CETUs. The list also includes other facilities that may be needed in addition to the CETUs and a nonbinding good-faith order-of-magnitude estimate, developed by the applicable TOs, of the costs for these facilities. The Second MRIS does not provide descriptions of expected Interconnection Facilities for specific Interconnection Requests when the Interconnection Facilities cannot be finalized until the actual Interconnection Requests that will be moving forward in the cluster are known. Finally, the list reflected in Table 1-1 also provides the expected cost allocation for the eligible Interconnection Requests, calculated in accordance with Schedule 11 of the OATT.

Table 1-1
Cost Allocation for the Cluster Upgrades

Cost Allocation		New 345 kV AC Transmission Line from Number Nine S/S to Pittsfield (DCT)	New 345 kV AC Transmission Line from Pittsfield - Coopers Mills	New Pittsfield 345 kV Switching Station	Additional statcom at the Coopers Mills S/S		
	Cost $ M	$ 540.9	$127.0	$57.3	$53.9	Cost	Cluster
Queue Position	MW					Allocation	Participation
Northern Total	520	$ 540.9	$127.0	$57.3	$53.9	$ 779.1	Deposit $ M
729	104	$ 108.2	$ 25.4	$11.5	$10.8	$ 155.8	$ 7.79
730	104	$ 108.2	$ 25.4	$11.5	$10.8	$ 155.8	$ 7.79
731	104	$ 108.2	$ 25.4	$11.5	$10.8	$ 155.8	$ 7.79
732	104	$ 108.2	$ 25.4	$11.5	$10.8	$ 155.8	$ 7.79
733	104	$ 108.2	$ 25.4	$11.5	$10.8	$ 155.8	$ 7.79
ETUs	-	-	-	-	-	$ -	
640	ETU	-	-	-	-	$ -	$ 1.00
738	ETU	-	-	-	-	$ -	$ 1.00
740	ETU	-	-	-	-	$ -	$ 1.00
741	ETU	-	-	-	-	$ -	$ 1.00
742	ETU	-	-	-	-	$ -	$ 1.00

Each Interconnection Customer that choses to enter the CSIS must pay a Cluster Participation Deposit (CPD), as shown in Table 1-1 for each Interconnection Request, on the basis of the expected cost allocation for each Interconnection Request. The CPD for Internal ETUs, as shown on the table, is $1 million. In general for Internal ETUs, the CPD is the lesser of $1million, or 5% of the Interconnection Customer's estimated costs for the Internal ETU as of the time the initial Cluster Participation Deposit is due.

Section 2
Introduction

2.1 Background to the Second Maine Resource Integration Study

The northern and western Maine areas of the system comprise a transmission network built to serve low levels of area load, and a number of generators already are interconnected, leaving this part of the transmission system at its performance limit with no remaining margin. However, the ISO's interconnection queue contains requests for proposed new resources (mostly wind) seeking to interconnect in the area.

Significant new transmission infrastructure is required to interconnect the quantity of proposed resources in northern Maine. This identified need for significant transmission infrastructure is common to all of the resources seeking to interconnect in these areas of the system. Individually, each Interconnection Request would involve complex, lengthy engineering studies to identify the significant transmission infrastructure needed to accommodate the proposed resource, and individual interconnection projects are not able or willing to individually make the necessary system upgrade investments. This combination of circumstances led to the development of a clustering solution to move the situation forward.

Revisions to the ISO New England *Transmission, Markets and Services Tariff* (ISO tariff) were developed to incorporate a clustering approach (Clustering Rules).[4] The ISO filed the Clustering Rules with the Federal Energy Regulatory Commission (FERC) on September 1, 2017, and FERC approved on October 31, 2017.[5] The Clustering Rules provide the process to resolve the queue backlog in northern and western Maine and elsewhere on the New England transmission system, should similar conditions arise in the future. More specifically, the rules establish a two-phased study methodology for expediting the consideration of two or more Interconnection Requests and allocating interconnection upgrade costs among Interconnection Customers (ICs) in a cluster in certain circumstances.

The ISO initiated this Second Maine Resource Integration Study (MRIS) to identify the transmission upgrades necessary to enable the interconnection of potentially all the proposed resources in northern Maine. This study is a Cluster Enabling Transmission Upgrade Regional Planning Study (CRPS) and will be the basis for a subsequent Cluster Interconnection System Impact Study (CSIS).

[4] *ISO New England Inc. Transmission, Markets, and Services Tariff* (ISO tariff) (2018), https://www.iso-ne.com/participate/rules-procedures/tariff.

[5] ISO New England, Joint Filing of Revisions to the ISO New England Inc. Transmission, Markets and Services Tariff to Incorporate a Clustering Approach in the Interconnection Procedures, Docket No. ER17-000, FERC filing (September 1, 2017), https://www.iso-ne.com/static-assets/documents/2017/09/rev_to_incorporate_clustering.pdf. FERC, Order Accepting Tariff Revisions, ISO New England Inc., Docket No. ER17-2421-000, 16 FERC ¶ 61,123 (October 31, 2017), https://www.iso-ne.com/static-assets/documents/2017/11/er17-2421-000_order_accept_interconnection_queue_clustering.pdf.

In this report, the capitalized terms refer to terms defined in the ISO's *Transmission, Markets, and Services Tariff*, Section 1, as well as in the OATT, Schedules 22, 23, and 25.[6]

2.2 Summary of the Study Approach

The purpose of a CRPS is to identify the new transmission infrastructure and any associated system upgrades to enable the interconnection of potentially all the resources proposed in the Interconnection Requests, for which the ISO has identified that significant common new infrastructure is required to interconnect.

For this Second MRIS, the ISO prepared and posted on its website a proposed scope of study along with the associated parameters and assumptions. The scope was discussed at the June 13, 2018, and September 27, 2018 Planning Advisory Committee (PAC) meetings to solicit stakeholder input for the ISO's consideration on the CRPS scope, parameters, and assumptions, consistent with the responsibilities of the PAC.[7]

The ISO identified that the CRPS would include the following:

- A summary of the Interconnection Requests that gave rise to the need to consider major new transmission line infrastructure
- The preliminary transmission upgrade concepts proposed for consideration in the study

The Second MRIS initially focused on the use of new High Voltage Direct Current (HVDC) transmission upgrade concepts to integrate the proposed resources in Maine. This approach accounted for previously conducted transmission-reinforcement studies and previously identified concepts for transmission upgrades in the relevant electrical area, including Elective Transmission Upgrades (ETUs) with Interconnection Requests pending in the interconnection queue before the initiation of the study.

At the June 17, 2019 PAC meeting, the ISO presented prelimary results of the use of HVDC solutions to interconnect northern and western Maine resources.[8] Section 3 of this report discusses the results of these evaluations. At the June 17, 2019 PAC meeting, the ISO also identified that, since the initiation and scoping of the Second MRIS, most projects in Northern and Western Maine had withdrawn from the interconnection queue and that 520 MW of incremental generation remained cluster-eligible for the Second MRIS. During PAC discussions and in written comments, participants inquired about the ability to interconnect pursuant to the Network Capability Interconnection Standard only, rather than also seeking to identify upgrades that would be expected to provide the ability to also meet the Capacity Capability Interconnection Standard. As a result, the initial use of

[6] ISO New England, ISO tariff, Section 1, *General Terms and Conditions* (November 21, 2017); *Open Access Transmission Tariff*, Schedule 22, *Large Generator Interconnection Procedures* (November 1, 2017); Schedule 23, *Small Generator Interconnection Procedures* (November 1, 2017); and Schedule 25, *Elective Transmission Upgrade Interconnection Procedures* (November 1, 2017), https://www.iso-ne.com/participate/rules-procedures/tariff/oatt.

[7] ISO New England, *Initiation of the Second Maine Resource Integration Study*, PAC presentation (June 13, 2018), https://www.iso-ne.com/static-assets/documents/2018/06/a10_second_maine_resource_integration_study.pdf. ISO New England, *Second Maine Resource Integration Study: Scope*, PAC presentation (September 27, 2018), https://www.iso-ne.com/static-assets/documents/2018/09/a12_second_maine_resource_integration_study_scope_rev1.pdf.

[8] ISO New England, *Second Maine Resource Integration Study—Preliminary Results*, PAC presentation (June 17, 2019), https://smd.iso-ne.com/operations-services/ceii/pac/2019/06/a2_second_maine_resource_integration_study_preliminary_results.pdf.

HVDC connections was abandoned and the exploration of CETUs reverted back to concepts that had been developed in the first MRIS.

The final results of the Second MRIS testing were presented at the November 20, 2019 PAC meeting and are discussed in Section 4 of this report.[9]

2.3 Megawatt Sensitivities and Scenario Analyses

One of the deliverables of the CRPS is to identify the approximate megawatt quantity (or quantities if more than one level of megawatt injection was studied) of resources that could be interconnected in a way that meets the Network Capability Interconnection Standard and the Capacity Capability Interconnection Standard (CCIS) in accordance with Schedules 22, 23 and 25 of the OATT. Section 5 of this report contains a discussion of megawatt sensitivities.

2.4 Cost Estimates and Cost Allocation

Cost estimates for the preferred upgrade configuration were developed by the Interconnecting Transmission Owners: Central Maine Power (Avangrid) and Versant Power (f/k/a Emera Maine). The cost estimates were discussed at the November 2019 PAC meeting. Section 6 of this report contains the cost estimates and projected cost allocations for the required upgrades.

[9] ISO New England, *Second Maine Resource Integration Study—Results*, PAC presentation (November 20, 2019), https://www.iso-ne.com/static-assets/documents/2019/11/a3_second_maine_resource_integration_study_final_results.pdf.

Section 3
Initial Evaluation of HVDC Alternative Upgrade Concepts

Information from this Section is not included in this redacted, non-critical energy infrastructure information version of this report.

Section 4
Detailed Testing of Preferred Upgrades

Information from this Section is not included in this redacted, non-critical energy infrastructure information version of this report.

Section 5
Megawatt Sensitivities and Scenario Analyses

As described in Section 4, the detailed testing for the MRIS was conducted with the assumption of 520 MW of resources in northern Maine. One additional sensitivity was analyzed to estimate the upgrades that would be needed for a different level of megawatt participation in the cluster.

5.1 Additional Northern Generation Threshold

The additional threshold for northern Maine generation identifies the maximum amount of megawatts of northern resources that can be interconnected to the New England system with the following upgrades:

- New Pittsfield–Number Nine 345 kV line
- No new 345 kV lines between Pittsfield and Coopers Mills or between Coopers Mills and Maine Yankee
- Reactive upgrades as needed

Approximately 325 to 350 MW can be interconnected with these upgrades. The interconnection limit is caused by N-1 and N-1-1 violations on lines south from Orrington. An approximately 100-200 MVAR Statcom at Coopers Mills in addition to one or more synchronous condensers at the wind farm locations would also be required for this megawatt level of injection. The exact megawatt and MVAR values would be determined by the exact set of resources that proceeded in this configuration.

5.2 Megawatt Quantity that Could Be Interconnected in a Manner that Meets the Capacity Capability Interconnection Standard

This MRIS provides an approximate megawatt quantity of resources that could be interconnected in a manner that meets the Capacity Capability Interconnection Standard (CCIS) in accordance with Schedules 22, 23 and 25 of the OATT.

The availability of Capacity Network Resource Capability (CNRC) "headroom" on the Surowiec–South interface is a primary factor in the ability of the proposed resources to meet the CCIS. If other, earlier-queued resources, also north of Surowiec–South, proceed with achieving CCIS, then it is not expected that the final upgrades identified in this Second MRIS will result in any ability of the clustered generating resources to achieve CCIS. In such a case, to achieve CCIS would require HVDC upgrades or other major upgrades such as those initially explored in the Second MRIS.

This analysis does not constitute the definitive determination of the ability to meet the CCIS. Definitive evaluation takes place within the Capacity Network Resource (CNR) Group Study as part of Forward Capacity Market (FCM) qualification. Note that wind resources are qualified for the FCM as intermittent resources. The qualified capacity of intermittent resources is based on the output over specified (reliability) peak hours in each season. Typically, onshore wind resources qualify for the FCM with summer qualified capacity of approximately 15 to 20% of their nameplate capability.

Section 6
Cost Estimates, and Cost Allocation

This section describes the cost estimates of the associated infrastructure and assumptions for each cluster.

6.1 Cost Estimates

Table 6-1 shows the estimates for the northern resource upgrades.

Table 6-1
Cost Estimates for Upgrades for Northern Resources[a]

Transmission Facility Upgrades (520 MW Northern)		Miles/Size (MVAR)	Cost ($M)
Substation	New Pittsfield 345 kV switching station		57.3
Transmission upgrades[b]	New 345 kV AC transmission line from "Number Nine" substation to Pittsfield[c]	162	540.9
	New 345 kV AC transmission line between Pittsfield and Coopers Mills[c]	40	127.0
Reactive upgrades	Additional statcom at the Coopers Mills substation	250	53.9
	Shunt reactors at Pittsfield	2 x 42.5	(d)
	Shunt reactors at Number Nine end of new line	2 x 42.5	(d)
		Total	**779.1**

(a) The estimates are good-faith, nonbinding, order-of-magnitude estimates per the ISO's Planning Procedure No. 4, Appendix D, with an assumed accuracy of –50% to +200%. The assumed contingency is 30%, and the billing adder is 16%. Because developers are assumed to supply the capital for the project, there is no allowance for funds used during construction (i.e., the AFUDC = is 0%). The assumed escalation is 8.3%; four years of escalation are assumed with construction assumed to occur in 2021. In general, Maine Electric Power Company (MEPCO) provided estimates based on the breaker configuration identified in this study; breaker configurations will be finalized in the CSIS.

(b) Estimates assumed the use of bundled (2) 1590 ASCR conductor for all new 345 kV transmission lines.

(c) Substation terminal costs are included in the pricing.

(d) Number Nine/Pittsfield shunt reactor costs are included in substation costs.

6.2 Cost-Allocation Calculations

In accordance with Schedule 11 of the OATT, if a Generator or ETU Interconnection Related Upgrade (Upgrade) "consists of Interconnecting Transmission Owner's Interconnection Facilities, Network Upgrades, or Distribution Upgrades, including a Cluster Enabling Transmission Upgrade, that were identified under Clustering and are not included in Direct Interconnection Transmission Costs, then the costs to be paid by each Generator Owner or ETU IC (that is not the ETU IC for an ETU that is taking the place of a CETU, or portion thereof, pursuant to Section 4.2.3.4 of Schedule 22, Section 1.5.3.3.3.4 of Schedule 23, or Section 4.2.3.4 of Schedule 25, Section II of the Tariff) with an Interconnection Request included in the cluster shall be the total costs of such Upgrade multiplied by the ratio of the Generator Owner or ETU IC's respective distribution impact divided by the total distribution impact of the entire cluster based on the following distribution factor cost allocation methodology."

The distribution factor is the measure of responsiveness (i.e., change in electrical loading on system facilities due to a change in electric power transfer from one part of the electric power system to

another), expressed in percentage of the change in the power transfer. The calculation of the distribution factor for each of the eligible upgrades must do the following:

- Use the final CSIS study case for summer peak load conditions
- Use the precontingency condition (i.e., no contingencies will be modeled)
- Be conducted using a transfer from the injection point associated with the respective generator owner or ETU IC's facility to New England Control Area load

The distribution impact of each generator or ETU IC with an Interconnection Request included in the cluster shall be determined by multiplying the generator or ETU IC's respective distribution factor, as calculated above, by the summer Network Resource Capability (in the case of a Generating Facility) or the absolute value of the higher of the requested bidirectional capability that results in a positive distribution factor (in the case of an Elective Transmission Upgrade).

The total distribution impact of the entire cluster must be the sum of all the individual distribution impacts for the generator and ETU ICs with Interconnection Requests included in the cluster.

Where the cost allocation for an upgrade identified under Clustering cannot be determined using the distribution factor cost-allocation methodology (e.g., a dynamic reactive device), each generator or ETU IC with an Interconnection Request included in the cluster must be obligated to pay the costs of such an upgrade based on its pro-rata-megawatt share of the Interconnection Requests included in the cluster study, to be determined using the summer Network Resource Capability (in the case of a Generating Facility) and the absolute value of the higher of the requested bidirectional capability (in the case of an Elective Transmission Upgrade).

Table 6-2 contains the distribution factors for the cluster upgrades. Table 6-3 contains the distribution impacts for the cluster upgrades. Table 6-4 contains the impact share for the cluster upgrades, and Table 6-5 contains the cost allocation for the cluster upgrades.

Table 6-2 Distribution Factors for the Cluster Upgrades

Distribution Factors		New 345 kV AC Transmission Line from Number Nine S/S to Pittsfield	New 345 kV AC Transmission Line from Pittsfield - Coopers Mills	New Pittsfield 345 kV Switching Station	Additional statcom at the Coopers Mills S/S			
	Cost $ M	$540.9	$127.0	$57.3	$53.9			
Queue Position	MW							
Northern Total	520	100.0%	29.0%					
729	104	100.0%	29.0%					
730	104	100.0%	29.0%					
731	104	100.0%	29.0%					
732	104	100.0%	29.0%					
733	104	100.0%	29.0%					
ETUs	-	-	-					
640	ETU	-	-					
738	ETU	-	-					
740	ETU	-	-					
741	ETU	-	-					
742	ETU	-	-					

Table 6-3: Distribution Impacts for the Cluster Upgrades

Distribution Impact		New 345 kV AC Transmission Line from Number Nine S/S to Pittsfield	New 345 kV AC Transmission Line from Pittsfield - Coopers Mills	New Pittsfield 345 kV Switching Station	Additional statcom at the Coopers Mills S/S			
	Cost $ M	$540.9	$127.0	$57.3	$53.9			
Queue Position	MW							
Northern Total	520	520	150.8					
729	104	104	30.16					
730	104	104	30.16					
731	104	104	30.16					
732	104	104	30.16					
733	104	104	30.16					
ETUs	-	-	-					
640	ETU	-	-					
738	ETU	-	-					
740	ETU	-	-					
741	ETU	-	-					
742	ETU	-	-					

Table 6-4: Impact Shares for the Cluster Upgrades

Impact Share		New 345 kV AC Transmission Line from Number Nine S/S to Pittsfield	New 345 kV AC Transmission Line from Pittsfield - Coopers Mills	New Pittsfield 345 kV Switching Station	Additional statcom at the Coopers Mills S/S			
	Cost $ M	$540.9	$127.0	$57.3	$53.9			
Queue Position	MW							
Northern Total	520	1	1	1	1			
729	104	0.2	0.2	0.2	0.2			
730	104	0.2	0.2	0.2	0.2			
731	104	0.2	0.2	0.2	0.2			
732	104	0.2	0.2	0.2	0.2			
733	104	0.2	0.2	0.2	0.2			
ETUs	-	-	-	-	-			
640	ETU	-	-	-	-			
738	ETU	-	-	-	-			
740	ETU	-	-	-	-			
741	ETU	-	-	-	-			
742	ETU	-	-	-	-			

Table 6-5: Cost Allocation for the Cluster Upgrades

Cost Allocation		New 345 KV AC Transmission Line from Number Nine S/S to Pittsfield (DCT)	New 345 KV AC Transmission Line from Pittsfield - Coopers Mills	New Pittsfield 345 kV Switching Station	Additional statcom at the Coopers Mills S/S		
	Cost $ M	$540.9	$127.0	$57.3	$53.9	Cost	Cluster
Queue Position	MW					Allocation	Participation
Northern Total	520	$540.9	$127.0	$57.3	$53.9	$ 779.1	Deposit $ M
729	104	$108.2	$ 25.4	$11.5	$10.8	$ 155.8	$ 7.79
730	104	$108.2	$ 25.4	$11.5	$10.8	$ 155.8	$ 7.79
731	104	$108.2	$ 25.4	$11.5	$10.8	$ 155.8	$ 7.79
732	104	$108.2	$ 25.4	$11.5	$10.8	$ 155.8	$ 7.79
733	104	$108.2	$ 25.4	$11.5	$10.8	$ 155.8	$ 7.79
ETUs	-	-	-	-	-	$ -	
640	ETU	-	-	-	-	$ -	$ 1.00
738	ETU	-	-	-	-	$ -	$ 1.00
740	ETU	-	-	-	-	$ -	$ 1.00
741	ETU	-	-	-	-	$ -	$ 1.00
742	ETU	-	-	-	-	$ -	$ 1.00

Section 7
Conclusion

This Second Maine Resource Integration Study constitutes a Cluster Enabling Transmission Upgrade Regional Planning Study pursuant to Section 15.4 of Attachment K of the OATT, and forms the basis for a subsequent Cluster Interconnection System Impact Study to be conducted in accordance with Section 4.2.3 of Schedule 22, Section 1.5.3.3 of Schedule 23, and Section 4.2.3 of Schedule 25 to the OATT. As described in this report, the study identifies the Interconnection Requests, by Queue Position, eligible to be included in the second-phase study; the transmission upgrades (i.e., CETUs and associated system upgrades) required to enable the interconnection; and the cost allocation for eligible projects if they elect to proceed to the second phase of the clustering process.

Consistent with Section 2.4 (d) of the OATT Attachment K, the posting, of the final CRPS report on the ISO website will trigger the CSIS Entry Deadline specified in Section 4.2.3.1 of Schedule 22, Section 1.5.3.3.1 of Schedule 23, and Section 4.2.3.1 of Schedule 25 of the OATT. The associated CSIS Entry Deadline is 30 days from the posting of the final CRPS report.

Appendix 1
Steady-State Base-Case Summaries

All of the appendices are unchanged from the draft version of the report.

Appendix 2
Detailed Testing Steady-State Base Case Contingency List

Appendix 3
Detailed Testing Stability Base-Case Summaries

Appendix 4
Local and Systemwide Contingencies Considered