STATE OF MAINE PUBLIC UTILITIES COMMISSION

DOCKET NO. 2012-00589

PROPOSAL FOR RELIABILITY TRANSMISSION SOLUTION

January 17, 2014

On behalf of
Central Maine Power Company
83 Edison Drive
Augusta, ME 04336
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1. **Introduction**

On December 18, 2012, the Commission opened this investigation into the electric reliability issues in the Northern Maine Independent System Administrator (NMISA) region, including the adequacy of existing structures and processes to address and resolve reliability issues in the region, in an effort to assess what steps it should take to address these issues. In a Procedural Order dated September 24, 2013, the Hearing Examiners directed Maine Public Service (MPS) (now known as Emera Maine)\(^1\) to make a filing in the docket on or before January 15, 2014 to provide its proposed solution to the identified reliability problems in northern Maine and to indicate whether its proposed solution requires a Certificate of Public Convenience and Necessity (CPCN). The Procedural Order also indicated that other interested persons may file proposals by that same date to address the reliability problems in northern Maine.

Pursuant to the September 24 Procedural Order, Central Maine Power Company (CMP) submits this proposal for the Commission’s consideration. CMP’s proposal is to construct a new 345 kV transmission line between the existing Maine Electric Power Company (MEPCO) transmission line in the Haynesville, Maine area to a new 345 kV substation near the existing Mullen substation in Houlton, Maine (this project is referred to herein as the Maine Power Connection or MPC) as a solution to the northern Maine transmission reliability needs and supply issues identified in the preliminary results of the system studies currently underway by RLC Engineering (RLC) and others. This proposed transmission solution would require a CPCN.

\(^{1}\) Effective January 1, 2014, Maine Public Service became Emera Maine. Unless necessary for historical context, this filing will refer to MPS as Emera Maine.
Presentations at the September 17, 2013 meeting of the Northern Maine Planning Advisory Group (PAG) indicate that a 345 kV interconnection between the northern Maine transmission system of Emera Maine (formerly the MPS transmission system) and the ISO New England (ISO-NE) Administered Transmission System is likely the most robust solution to the identified reliability needs in northern Maine. At the December 2013 PAG meeting, Emera Maine announced that it intends to propose a new 138 kV tie to New Brunswick Power (NB Power) as well as a regulated power supply arrangement as its preferred solution to northern Maine’s reliability issues. Without access to the on-going RLC System Studies, CMP finds it difficult to determine the relative reliability benefits of the MPC and the Emera Maine proposed solutions. However, one clear difference between the MPC and Emera Maine’s proposed solution is that, in addition to addressing the identified reliability needs, a 345 kV connection between the northern portion of Emera Maine’s transmission system and the ISO-NE system would also open northern Maine to a much larger power supply resource base than currently available and would provide generators in northern Maine, including large, new renewable generation facilities currently in development, access to a much larger market. Thus, not only would CMP’s proposed solution address the reliability issues plaguing northern Maine, it would also bring a competitive market to the northern Maine region.

Now may be a particularly opportune time to interconnect northern Maine to the ISO-New England (ISO-NE) Transmission Control Area. The current desire of southern New England states to access northern Maine renewable resources, as evidenced by the long-term power purchase agreements (PPAs) recently approved by regulators in Connecticut and Massachusetts, presents an opportunity and leverage for Maine to negotiate a fair transition that mitigates the transmission and ISO-NE cost impacts on northern Maine customers of the
northern portion of Emera Maine joining ISO-NE. When the New England utilities originally merged their transmission systems under a common tariff, they negotiated a lengthy transition period to soften the impact on those utilities whose costs increased as a result (including in particular Bangor Hydro Electric Company (BHE)). A similar lengthy transition period for northern Maine joining ISO-NE at this time would be reasonable and the cost of providing such mitigation to the relatively small load in northern Maine should be inconsequential when spread over the entire New England region.

CMP’s MPC proposal presented here is nearly identical to the Elective Upgrade request made by CMP and MPS to ISO-NE, identified as Queue #324. The major difference is the proposed conductor size, which could change as additional analysis is completed. This proposal could also be configured in a manner that would result in synergies between this effort and the interconnection of a new large renewable facility in northern Maine (ISO-NE Queue #422). CMP’s proposal addresses, but does not take a position regarding, whether the northern portion of Emera Maine should join ISO-NE in the event that this proposed 345 kV interconnection between the two regions is constructed.

2. **Project Overview**

2.1 **Maine Power Connection (MPC) Project Description**

The MPC project consists of an approximately twenty-six (26) mile 345 kV transmission line interconnected to the existing MEPCO line in the Haynesville area at the southern end and to a new 345 kV substation near the existing Mullen substation in Houlton at the northern end. It is envisioned that the existing Mullen substation would interconnect with a 345/69 kV transformer located in the new substation. System studies indicate that a 30 MVAR shunt reactor will likely be needed in the Houlton area as well, although this could change as a result of the Queue #422
renewable project. The physical Point of Interconnection (POI) with the ISO-NE Administered Transmission System will be at a new three breaker switching station in Haynesville. The physical interconnection point with Emera Maine will be at the 69 kV bus in the new Houlton substation. The ultimate POI for cost allocation purposes under the ISO-NE Tariff will depend upon whether northern Maine joins ISO-NE. While additional studies will be required to address any interconnection to the ISO-NE grid, system study results completed to date, including steady state, stability and extreme contingency analysis, indicate that the proposed project would not have an adverse impact on the ISO-NE Administered Transmission System. No other proposed solution to be presented to the Commission in this docket is likely to have completed this level of analysis. ²

The MPC project would utilize the existing right of way known as the Bridal Path, a substation site under option by CMP in Haynesville and a short section of new right of way adjacent to the MEPCO corridor between the end of the Bridal Path and the new Haynesville Substation, soon also to be under option by CMP. The proposed project is expected to cost approximately $152 million based on CMP’s recent experience building similar transmission lines and substations. More detail on the conceptual cost estimate for the proposed project is provided in Section 9 below.

Exhibit CMP-MPC-1 depicts the planned route of the MPC project.

2.2 MPC Interconnection of Northern Maine to the Rest of New England

The MPC Project would connect the northern Maine transmission system with the New England bulk power grid. Currently, northern Maine is interconnected only with the New

² As discussed in Section 3 below, CMP has completed all steady state, stability, and short-circuit and Electro-Magnetic Transients analyses necessary for a Proposed Plan Application approval of the MPC under Section 1.3.9 under the ISO-NE Transmission, Markets and Services Tariff, except a final “true up” of projects in the ISO-NE generation interconnection queue that did not have complete System Impact Studies at the time of the MPC study.
Brunswick Power transmission system. There is no direct transmission interconnection between northern Maine and the electric transmission systems of the rest of the State of Maine or the rest of the United States. Northern Maine has no direct outgoing transfer capacity to the rest of New England, and although it has several interconnections with the New Brunswick system, transfer capacity through New Brunswick to New England is limited. Interconnecting northern Maine to the ISO-NE system is not only a potential solution to the identified reliability needs in northern Maine, but such a connection would also open northern Maine to a much larger power supply resource base and would provide generators in northern Maine, including large, new renewable generation facilities in development, access to the much larger New England market. These potential benefits are discussed in more detail in Section 3 below.

2.3 Potential Synergies with ISO Queue #422

ISO-NE has received a relatively new interconnection request, Queue #422, for a 301.29 MW wind facility in Aroostook County, Maine. The facility has an estimated Commercial Operations Date (COD) of December 30, 2016 and has designated its POI to be the MEPCO 345 kV transmission line in Haynesville. CMP has had extensive communications with the developer of Queue #422 and the developer sees significant potential synergies between this proposal and their desire to interconnect directly to the ISO-NE system. However, as discussed in Section 5 below, timing may present certain challenges given the developer’s COD. These potential synergies are discussed in more detail in Section 5 below.

2.4 Project Structure

At this time, CMP is not proposing an ownership structure for the MPC Project. CMP has invested several million dollars completing system studies, and planning and designing the MPC project over the past several years, and the Company desires to construct and own the
project. CMP views the electrical interconnection of northern Maine to the rest of New England as a beneficial development for the entire state and New England region. As such, CMP has explored, and is open to, alternative ownership structures, such as MEPCO owning the proposed project or a new joint venture between CMP and Emera Maine owning all or portions of the project.

3. **MPC Addresses Reliability Concerns in Northern Maine**

   At the September 2013 PAG meeting, RLC indicated that a connection between the northern portion of the Emera Maine transmission system and ISO-NE would be one of the more robust solutions to the identified northern Maine reliability issues. As of that time, RLC had studied numerous alternative solutions, including adding two new generators to the northern Maine transmission system, eight (8) different potential interconnections with the New Brunswick (NB) Power transmission system and six (6) different interconnections with the ISO-NE Administered Transmission System. RLC then distilled the list of alternatives down to one representing additional generation within the region, one representing a new interconnection with NB Power and one representing an interconnection with the rest of Maine and New England. The RLC ISO-NE Alternative is nearly identical to the MPC project proposed herein. RLC included additional upgrades to the northern Maine system itself (Line Section 6910) as well as a 15 MVAR capacitor bank at Flo’s Inn Substation, while the MPC proposal includes a 30 MVAR shunt reactor in the Houlton area and does not include any new upgrades to the northern Maine transmission system beyond those needed to accommodate the new interconnection to New England. The existing need to upgrade Section 6910 is addressed in the Queue #324 System Study. The differences between the previous studies done by RLC and others for this MPC

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proposal and the ISO-NE Alternative more recently studied by RLC in the PAG process are minor and most likely due to different assumptions regarding available resources in northern Maine and other projects in the queue and perhaps the fact that the PAG studies are still underway.

At this time, the RLC analysis is not complete. Therefore, CMP cannot determine conclusively that its MPC proposal is the best solution to the identified reliability needs in northern Maine. However, CMP, in conjunction with MPS, in the past has conducted numerous studies of interconnecting northern Maine with the rest of New England and the associated benefits of doing so. These studies range from the most recent analyses conducted in conjunction with ISO-NE Queue #324, a straight-forward interconnection between the northern Maine transmission system and the ISO-NE Administered Transmission System, with northern Maine remaining as part of the New Brunswick Operation Authority, to the studies associated with the joint CPCN petition made by CMP and MPS in Docket 2008-256,\(^4\) which envisioned not only an interconnection with ISO-NE, but also the integration of 800 MW of new renewable resources in northern Maine. A copy of the January 10, 2011 Interconnection System Impact Study Report for the MPC, ISO-NE Queue #324, is attached as confidential Exhibit CMP-MPC-2 which is subject to Protective Order No. 5 issued on January 15, 2014.

Based on these studies, CMP is well versed on the electrical issues likely to arise as system studies continue and the potential solutions to such issues are developed. Based upon the breadth of these well informed analyses, CMP proposes the MPC project as a viable solution to the reliability needs in northern Maine. As discussed below, the MPC will provide the further

benefit of addressing supply market issues in northern Maine by opening a direct link to the more robust and liquid ISO-NE markets and by facilitating the development of new generation in northern Maine, including large renewable wind generation facilities under development and to be located in Aroostook County.

Ultimately, any new interconnection between northern Maine and the ISO-NE system or between northern Maine and NB Power will require significant additional study. The studies completed to date regarding the MPC project, however, demonstrate its viability as a solution to the reliability and market supply issues confronting northern Maine.

Specifically, as reflected in Exhibit CMP-MPC-2, the MPC proposal has already been extensively studied as part of the joint MPS/CMP Queue #324 request to ISO-NE including the completion of steady state, stability (including southern New England extreme contingency and BPS classification contingencies), and Electro-Magnetic transient analyses. Accordingly, the list of system upgrades needed to avoid adverse impacts related to stability concerns or extreme contingency/BPS has been established, subject to review and update due to any impacts from projects that have joined the queue since the studies were completed. As recent history has shown, stability and extreme contingency/BPS analysis for other transmission projects has often resulted in the need for significant additional upgrades.

Due to an omission in the ISO-NE Open Access Transmission Tariff (ISO-NE OATT, or Tariff) and associated ISO-NE planning procedures, there is no established queue position for Elective Transmission Upgrades under the ISO-NE OATT. As a result, the joint MPS/CMP effort on the MPC was delayed and the project has not yet received ISO-NE approval under
Section I.3.9 of the ISO-NE Transmission, Markets and Services Tariff, finding that the project has no adverse impact on the ISO-NE transmission system. However, the project remains in the ISO-NE Queue. Additional studies will be required before this proposal, or any other proposal to interconnect northern Maine to ISO-NE, can be accepted by ISO-NE. Based on discussions with ISO-NE, CMP is confident that a solution to the Elective Transmission Upgrade process, even under the existing Tariff, will be reached such that the MPC project will obtain Section I.3.9 approval.

4. Other MPC Project Benefits

While other solutions may solve the identified reliability issues in northern Maine, only an interconnection to the rest of New England (of adequate size) can resolve the reliability concerns, provide an expanded market for existing and new generation in northern Maine, and mitigate the long-standing lack of a competitive electricity market in the region. Planned to provide a 345 kV interconnection to northern Maine, the MPC is designed to provide these additional benefits for northern Maine. In addition, southern Maine and the rest of New England stand to benefit from the project because the interconnection will open a pathway south for renewable generation in northern Maine, potentially lowering ISO-NE supply prices, reducing the region’s dependence on natural gas and other fossil fuel fired generation, and providing an opportunity for the New England states to meet their renewable portfolio standards.

4.1 Existing Northern Maine Generation Opportunities

Existing thermal generators in northern Maine have ceased operations, with more considering shutting down in the future. A 345 kV interconnection between northern Maine and the rest of New England might well enable some of the mothballed generation in northern Maine

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to restart and sell into the much larger New England markets. In comparison to a 115 kV or 138 kV transmission line, a 345 kV transmission line interconnecting northern Maine will reduce line losses, thereby reducing costs and supporting northern Maine generation. A 345 kV line coupled with such local generation would also likely provide much needed voltage support to northern Maine, which may reduce reactive support costs. In addition, a direct connection to the ISO-NE system would also allow qualified renewable generation to sell into the lucrative southern New England renewable markets without having to wheel through New Brunswick. A revitalized local generation market in northern Maine would benefit Emera Maine’s customers as well as the generators themselves. Whether this happens is of course dependent upon the economic situation of each individual facility, but it is an opportunity that no other proposed solution offered to date provides.

4.2 Renewable Generation Development

Similarly, an interconnected system would allow northern Maine customers to benefit from already planned renewable development within their region and perhaps new development as well. In the last several years, renewable development in northern Maine has slowed due to the lack of a direct connection with the rest of New England. Those projects that continue today are proposing to build long generator leads to interconnect directly to the ISO-NE system, bypassing the northern Maine system entirely. Such duplicative facilities are not economically efficient and provide no benefit to northern Maine. While market prices in New England will be reduced if these projects are successful, northern Maine will not receive any similar reduction in market prices due to the lack of an interconnection. The MPC would allow northern Maine to share in these market price benefits.
For example, as discussed in more detail in Section 5 below, a large renewable facility is currently under development north of Houlton. This facility has already obtained a long-term contract to sell some of its output to entities in southern New England, but a significant amount of its capacity remains available. This facility is currently planning on interconnecting directly to the ISO-NE system. However, if the interconnection included an electrical connection with northern Maine, as the MPC does, the opportunity would exist for significant renewable energy to benefit northern Maine.

4.3 Supply Market Benefits and Competition

The impact on northern Maine power supply costs would depend upon several factors, including whether the interconnection results in northern Maine joining ISO-NE or if the region remains part of the New Brunswick operating authority. In the first instance, the New England electricity markets would be extended into northern Maine and the reduction in Locational Marginal Prices (LMPs) from renewable facilities within northern Maine would benefit northern Maine customers. A study done by LaCapra Associates (LaCapra) in 2008 found that the MPS/CMP proposed MPC Project “will reduce wholesale market prices across the regional market, with the most pronounced effects in northern Maine and more generally across the rest of Maine.”6 Although the MPC project proposed by MPS and CMP in 2008 was larger in scope than CMP’s current MPC, based on the assumption of greater renewable development in northern Maine, a similar study conducted today would likely produce similar (albeit modestly reduced) results, showing that wholesale market prices will go down in northern Maine.

The lack of a competitive wholesale electricity market in northern Maine is a well-recognized concern that has yet to be resolved. In the fall of 2006, the Commission issued a

Request for Proposals seeking bids to serve MPS's standard offer customers.\textsuperscript{7} The Commission subsequently rejected all bids and terminated the bid process as it had received bids from only one bidder. The Commission concluded that the bid process had not been competitive:

> Participation by a single bidder is contradictory to the basic premise of competition for those customers who do not or cannot obtain electricity supply directly from the competitive market. A solicitation process that yields only one bidder cannot be considered competitive and frustrates the purposes of the standard offer process. In addition, the lack of competing bids makes it extremely difficult to determine whether the prices are reasonable and in the public interest.\textsuperscript{8} The Commission noted that the northern Maine market had been characterized since the advent of restructuring by “the comparatively small size of the load, the small number of generating facilities in northern Maine, and the lack of direct interconnection to the rest of the New England retail electricity market,” and, given this situation, observed that “it was not clear that sufficient competition would develop in northern Maine.”\textsuperscript{9} The fact that its RFP solicitation had brought forth bids from only a single bidder precluded any hope, in the Commission's view, that a reasonable competitive market might develop. “Now that we have only one bidder, the competitive situation in northern Maine has gone from worrisome to one of obvious failure.”\textsuperscript{10}

While recent Standard Offer prices are slightly higher in northern Maine than the rest of the state, generally northern Maine Standard Offer prices have tracked those throughout the state since 2006. It is unclear whether this has resulted from a benevolent provider and/or ongoing scrutiny by the Commission, but what is clear is that competition for the northern Maine


\textsuperscript{9} Id. at 3.

\textsuperscript{10} Id. at 3.
Standard Offer continues to be a tenuous situation as continued multiple bidders for the Standard Offer in northern Maine is far from guaranteed.

Furthermore, the number of Competitive Electric Providers (CEP) selling directly to retail customers in northern Maine has not kept pace with the rest of the state. With no way to move power into and out of northern Maine other than through NB Power, this is not surprising. The concept that increased competition results in lower prices is a widely accepted premise and is as applicable in northern Maine as it is in other markets. As a result, retail customers in northern Maine are paying more than they would in a more competitive market. While this difference is difficult to quantify with the limited publicly available data, it is a factor that should be considered in developing any solution to the northern Maine reliability and supply issues. While a long term regulated power supply contract might address standard offer service, such an approach would do little to encourage direct retail sales by CEPs, with the result being that customers will continue to pay more than they would in a competitive market. In contrast, an interconnection to ISO-NE, such as that provided by the MPC, would allow for enhanced competition in the supply market across northern Maine.

5. **Synergies with Queue #422’s Interconnection Request**

A large (up to approximately 300 MW) renewable facility is under development in northern Maine (Queue #422). This facility will be located north of Houlton and has requested to be interconnected to the MEPCO Line near Haynesville. This facility has sold a significant portion (250 MW) of its capacity to two load serving entities in southern New England and is expected to be in commercial operation by December 2016. Such a long-term PPA is a major milestone for any such development project and is a key indicator that this renewable project is moving forward. ISO-NE is just starting the necessary System Impact Study for this project.
CMP, representing MEPCO, has met with the developer regarding its interconnection request. During those discussions, it became obvious that there are significant synergies between this renewable project and the MPC project proposed herein. Both proposals have a suggested interconnection to MEPCO at Haynesville. A 300 MW generator located north of Houlton will likely require a 345 kV generator lead. As reflected on Exhibit CMP-MPC-1, the location of the proposed renewable facility and proposed northern termination of the proposed MPC interconnection between northern Maine and the ISO-NE system are compatible. While the renewable project has a PPA in place for a significant portion of its capacity, approximately 50 MW of additional capacity could be available for use within northern Maine if so desired.

MEPCO and the developer have executed an Engineering and Procurement (E&P) Agreement associated with the Interconnection Request. This is a common practice for developers under time constraints. Separate from the interconnection request, CMP and the developer have also executed a Memorandum of Understanding (MOU) to continue to investigate the clear synergies between the Interconnection Request and the proposed MPC interconnection between the two regions. The developer has expressed a willingness to select a path for its generator lead that would bring it as close as possible to the northern terminus of the proposed MPC 345 kV line. Ideally, the ultimate solution would be for the Generator Lead to connect to the proposed MPC line in the Houlton area. The new 345 kV line would then interconnect both the northern Maine transmission system and the proposed renewable generation facility to MEPCO, eliminating parallel 26 mile 345 kV transmission lines.

Unfortunately, the timing is such that it is unlikely that both parties will be ready for the December 2016 COD of the new generator. Rather, the developer would likely need to commence construction of the generator lead, which would not require a CPCN under 35-A
M.R.S. § 3132 (1-B), before a decision is made regarding whether northern Maine should interconnect to the ISO-NE System and whether northern Maine will join ISO-NE or remain part of the New Brunswick Operating Authority. Given this likely sequencing, CMP’s interconnection group, on behalf of MEPCO, is continuing to work with the developer and ISO-NE to complete the generator interconnection at Haynesville in a timely fashion. The MPC project team will also work with the developer to try to preserve the opportunity for northern Maine to interconnect to the ISO-NE without having to build an additional, parallel 345 kV transmission line should such an interconnection be determined to be the best solution for the reliability and supply issues in northern Maine. CMP has kept Emera Maine informed of its efforts in this regard and will continue to look to collaborate with Emera Maine on the MPC project.

6. Proposed MPC Route

6.1 Overview and General Description of Proposed Transmission Corridor

The new 345 kV MPC transmission line will make use of the existing so-called Bridal Path right-of-way. MEPCO secured rights to the Bridal Path about forty years ago, and those rights were subsequently transferred to MPS in the 1970s so as to ensure that MPS would have a feasible alternative to relying solely on New Brunswick for its bulk power supply. The Bridal Path was cleared for most of its length some time ago, although the path has since re-vegetated with relatively young tree growth. The prior clearing, as well as the Bridal Path's location

\[\text{[W4048392.10]}\]
(through a lightly populated and sparsely developed area), minimizes environmental and community impacts, thus making it an ideal corridor. Based upon a prior survey, the Bridal Path is approximately 26 miles long, crosses 78 parcels of land and passes within 300 feet of 20 existing dwellings. If MPC moves forward, this data will be updated. The current proposal is to use 170 feet of the 225 foot width of the right of way.

Exhibit CMP-MPC-3 presents cross sections for the proposed 345 kV line and its currently proposed location within the Bridal Path. Section 6.2 below discusses the ongoing review of the exact configuration of the proposed line.

There is a short gap, approximately one-quarter of a mile long, between the end of the Bridal Path and the proposed Haynesville Substation site. CMP is in the process of obtaining an option to purchase in fee the property needed to close this gap.

### 6.2 Rights to Use the Bridal Path

As a result of the development of the original joint MPS/CMP MPC proposal, CMP had certain rights to obtain an easement to the Bridal Path if MPS withdrew from the project, which it did. CMP and Emera Maine are negotiating the terms of this easement. One issue under review is how much of the 225 foot right of way is needed to build a new 345 kV line. CMP prefers taking advantage of the design, engineering, and environmental work already completed for the original MPC Project. That project envisioned a 345 kV line built using H-Frame structures within a 170 foot easement. Emera Maine has suggested that a much narrower easement be used in order to preserve the opportunity to build a second line on the Bridal Path. While the ultimate resolution of this issue will have an impact on the cost of the proposed new line, CMP is confident that the project cost will be within the range of the estimated costs discussed herein regardless of the outcome.
6.3 **Substation Sites**

The new Haynesville 345 kV Substation will be located in Haynesville, east of Fitzpatrick Road in the existing MEPCO Section 3001 right of way. CMP has acquired an option to purchase in fee the land necessary for the substation. The substation will be approximately four acres in size.

The new Houlton 345/69 kV Substation will be located in Houlton, slightly north of the existing Mullen Substation. Preliminary site investigations to identify the precise location of Houlton substation are underway.

6.4 **Environmental Impacts**

As part of the original MPC Project, a wide array of environmental resource information has already been collected for the project including stream and wetland delineations, vernal pool surveys, rare, threatened, and endangered species analysis, special natural community information, historic and pre-historic archaeology site data, and significant wildlife area data. This information was used in the design of the transmission line. This information will be updated and used to support the permitting and engineering for the MPC proposed herein.

Sufficient soil and wetland data to allow engineering and permitting to begin has also been collected for the Haynesville Substation site.

7. **Transmission Line Design**

In general, the proposed new 345 kV MPC transmission line will be constructed using two-pole wood H-frame-type structures at tangent structure locations as shown in Exhibit CMP-MPC-4. Where the direction of the line changes, three-pole angle structures will be used due to the magnitude of the transverse loading at these locations. The use of these structure types is based on a number of factors including economics, structure height, environmental impacts and
maintenance. In general, the poles will be directly embedded in the ground. Where poor soil conditions are encountered or in situations where guying is not possible, some structures may require a concrete caisson foundation. Guy wires may be used to support the structures at locations where the direction of the line changes.

Each phase of the line will consist of a two-conductor bundle with each conductor being a 1,590 thousand circular mils (KCM), 54/19 aluminum conductor with steel reinforced strand (ACSR). Each conductor is approximately 1.5 inches in diameter. The lowest conductor will be a minimum of 32 feet above ground. Two overhead shield wires will be installed above the phase conductors, one being an overhead ground wire (OHGW) and the other an optical ground wire (OPGW). The phase conductor selection is based on an economic evaluation, done for the Maine Power Reliability Program (MPRP), which considered the initial capital costs associated with a given wire size and the subsequent net present value of the estimated costs associated with line losses for that conductor. This study also considered the effects of audible noise and corona, each a function of the effective diameter of the conductor bundle. Based on the benefits of standardization, including commonality of spare parts, repair procedures, and safety processes, CMP proposes to use a conductor having identical specifications to that selected for the MPRP.

Structures will be spaced approximately 650 feet apart, although the exact spacing will vary depending upon a number of factors, including but not limited to structure height, wire design tensions, terrain topography, environmental constraints and crossing features. Based on this structure spacing and the total project length, approximately 221 new 345 kV structures are anticipated. Pole heights will vary depending upon span length and terrain, but generally 85-foot poles will be utilized with 75 feet above ground. The proposed 345 kV transmission line will be built in accordance with “Good Utility Practice,” including all necessary live-line working
clearances and strength and load factors as governed by the National Electrical Safety Code (NESC). In all instances, the lines will be designed to meet or exceed the NESC standards. The transmission lines and all facilities will be operated in full compliance with CMP’s safety standards, which fully comply with the Federal Occupational Safety & Health Administration requirements.

8. **Substation Design**

8.1 **Haynesville Substation**

The new Haynesville 345 kV Substation will be located in Haynesville, east of Fitzpatrick Road in the existing MEPCO Section 3001 right of way. This new station will be built to accommodate a 345 kV breaker-and-a-half configuration with a future series breaker position consistent with ISO-NE Planning Procedure 9. The station will be operated initially as a ring bus configuration with three 345 kV terminal positions. The one-line diagram for this station is attached as Exhibit CMP-MPC-5. If required as part of the system impact study for the renewable facility Queue #422, there is also room on this site to accommodate a Static VAR Compensator (SVC) or other device needed for voltage support. The proposed substation site without the SVC will be approximately four acres in size.

8.2 **Houlton Substation**

The new Houlton 345/69 kV Substation will be located in Houlton, slightly north of the existing Mullen Substation. This new station will be built to accommodate a 345 kV breaker-and-a-half configuration with future series breaker positions. The station will be operated initially as a ring bus configuration with three 345 kV terminal positions. One of the terminals will consist of a 345/69 kV auto transformer. The 69 kV tie to Emera Maine will consist of a low side 69 kV breaker and a new 69 kV transmission line to the existing Mullen Substation. A
one-line diagram for this substation is attached as Exhibit CMP-MPC-6. If required as part of the system impact study, the site will be designed to accommodate a Reactor or SVC. The proposed substation site without the SVC will be approximately six acres in size.

9. **Estimated Costs**

9.1 **Cost Estimation Approach**

A conceptual cost estimate for the MPC project is provided in Exhibit CMP-MPC-7. The cost range for the project is $114 million to $228 million, with the midpoint estimated cost at approximately $152 million. This cost estimate was derived using a unit price approach. Unit costs were obtained largely from as-built construction costs from the MPRP. These unit costs for transmission and substation components were then used in a building block approach to determine estimates for each project segment.

This cost estimate is considered “Conceptual” as defined in ISO-NE Planning Procedure #4 (PP4), with a level of project definition of 15% to 40%. PP4 also suggests a target accuracy range of -25% to +50%, and a contingency of 30% for this class of estimates. These values were used in the creation of this cost estimate.

All costs reflected in this estimate are based on 2013 dollars. No inflation or escalation was added to these figures.
The figure below provides a conceptual cost estimate for the MPC.

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Unit</th>
<th>Location</th>
<th>Description</th>
<th>Unit Cost</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Each</td>
<td>Haynesville</td>
<td>345KV Switch Station (3 Terminal)</td>
<td>$18.6</td>
<td>$18.6</td>
</tr>
<tr>
<td>26</td>
<td>Miles</td>
<td>Haynesville to Houlton</td>
<td>345KV H-Frame Wood T-Line</td>
<td>$2.8</td>
<td>$72.8</td>
</tr>
<tr>
<td>1</td>
<td>Each</td>
<td>Houlton</td>
<td>345KV Substation with Auto Transformer</td>
<td>$22.6</td>
<td>$22.6</td>
</tr>
<tr>
<td>35</td>
<td>Miles</td>
<td>Haynesville to Keene Rd</td>
<td>ADSS Fiber</td>
<td>$0.1</td>
<td>$2.9</td>
</tr>
</tbody>
</table>

Subtotal: $116.8
Contingency: 30% $35.0
Total Mid Range (2013 Dollars): $151.8
Total Low Range (2013 Dollars): $113.9
Total High Range (2013 Dollars): $227.7

10. **Impact on Northern Maine Customers – Issues to be Resolved**

Each solution to the identified northern Maine reliability issues will impact northern Maine customers through improved reliability and delivery rates. Power supply related issues, especially the lack of competition, are more difficult to quantify. In addition, any solution including the MPC proposal that provides for the interconnection of northern Maine to the ISO-NE transmission grid raises the question of whether the former MPS system should join ISO-NE or remain part of the New Brunswick Balancing Authority. In either case, a more open and competitive market would result, and such competition will reduce supply costs. These reduced supply costs as well as the benefits from increased generation development in northern Maine must be factored into the assessment of the best comprehensive solution for northern Maine.

CMP does not propose an answer as to whether the former MPS system should join ISO-NE in the event a direct interconnection is established. However, the following discussion of options presents some key considerations regarding this important issue.
10.1 Northern Portion of Emera Maine Joins ISO-NE

Building an interconnection to the rest of New England opens the opportunity for northern Maine to join ISO-NE as an Additional Participating Transmission Owner (APTO). The Transmission Operating Agreement (TOA), one of the key agreements establishing ISO-NE, clearly contemplates allowing additional utilities to join the region:

After the Operations Date, subject to the terms set forth herein, including Section 6.06, any owner of transmission facilities may become a [Participating Transmission Owner] PTO under this Agreement and a Party to this Agreement by executing and delivering a counterpart to this Agreement with the consent or approval of the ISO, such consent or approval not to be unreasonably withheld. Owners of transmission facilities that become PTOs pursuant to the terms of this Section 11.05 shall be referred to herein as “Additional Participating Transmission Owners”; provided, however, that, notwithstanding any other provision contained herein to the contrary, Independent Transmission Companies shall not be deemed to be Additional Participating Transmission Owners hereunder. Notwithstanding Section 11.04 or any other provision contained herein to the contrary, Additional Participating Transmission Owners may become parties to this Agreement without any consent or approval of the other PTOs and without any amendment to this Agreement, except that this Agreement may be amended pursuant to Section 11.04(a)(iii)(E) if an unaffiliated transmission utility from outside the Control Area becomes or is about to become an Additional Participating Transmission Owner.\(^\text{12}\)

Unfortunately, the TOA does not address the process necessary to determine what transmission facilities are needed to integrate northern Maine into the New England Transmission System nor how such facilities are to be treated under the cost allocation provisions of the ISO-NE Tariff. However, discussions with ISO-NE in conjunction with the original MPC proposal indicated support for treating an APTO much the same as the Participating Transmission Owners (PTOs). If this is the case, once northern Maine became an APTO, any segments of its transmission system that qualify as a Pool Transmission Facility (PTF) would be eligible for regional cost recovery under the ISO-NE Tariff.

Bangor Hydro Electric (BHE) (now part of Emera Maine) was an original signatory to the TOA and is a PTO. The MPC Project would integrate the northern Maine portion of Emera Maine’s transmission system (former MPS system) with the southern portion (former BHE system). While the merger of MPS and BHE into Emera Maine raises new issues not considered by ISO-NE and PTOs regarding the earlier MPC project, logic would suggest that since part of Emera Maine is already a PTO, adding its northern Maine facilities once they are interconnected would certainly be acceptable. Whether this would result in Emera Maine being a PTO with all of its facilities being covered under the Tariff or whether its system would be split into two portions is a matter for future discussion (if northern Maine decides to join ISO-NE).

At the December 2013 PAG meeting, Emera Maine presented a redacted briefing paper and presentation addressing its Draft Plan for providing transmission reliability to northern Maine.\textsuperscript{13} The Draft Plan addressed the impact of a phased-in approach to ISO-NE cost allocation. As discussed above, there is precedence for phasing in the impact of northern Maine joining ISO-NE, and CMP agrees that such an approach has merit and should be investigated further. Given southern New England’s desire to access northern Maine renewable resources in order to meet renewable portfolio standards, now may be an opportune time for Maine to negotiate for such a phased in approach, particularly since the impacts of spreading the costs of such mitigation across the rest of New England region should be inconsequential given northern Maine’s relatively small load.

Such a mitigation plan should also address the requirements of 35-A M.R.S. § 3132(14) at least in part. That statute requires that, in the event the northern portion of Emera Maine joins ISO-NE, as a result of a direct interconnection, such that the scope of responsibilities of NMISA

\textsuperscript{13} Maine Public Service Company’s Draft Plan to Provide Long Term Transmission System Reliability to its Customers in Northern Maine at 3, Docket No. 2012-00589, (Dec. 18, 2013) (Draft Plan).
are either eliminated or materially modified, the CPCN for the interconnecting transmission line must provide for full compensation for any net adverse effects on customers resulting from the interconnection. “The determination of the net adverse effects must include, but is not limited to, known and measurable transmission cost effects.” 14 The compensation required by this statute must be provided through a rebate, reduction in rates or other appropriate mechanism and must be calculated over a period of not more than 10 years. 15 Because this statute focuses on “net adverse effects,” it will be necessary for the Commission to weigh not only the transmission related costs of northern Maine interconnecting with ISO-NE, but also the costs and benefits to northern Maine customers arising from increased supply competition and generation development facilitated by any such interconnection.

10.2 Northern Portion of Emera Maine Remains Part of New Brunswick Balancing Authority

Another option is for northern Maine to interconnect to the rest of New England but remain as part of NMISA and under the New Brunswick Operating Authority. If this approach is selected, the costs of the northern Maine transmission system and the MPC Project could not be recovered under the ISO-NE Tariff, but would be recovered locally. While the Emera Draft Plan and associated materials state that this results in a lower impact to northern Maine customers, it appears that this conclusion was based only on the impact of transmission cost allocation under the ISO-NE Tariff versus cost recovery under a local northern Maine tariff. MPS mentions reciprocity agreements, but such an approach is not assured. Without such an agreement, transactions between the regions could be subject to through and out charges. It is not clear if MPS included such costs in its analysis.

14 35-A M.R.S. § 3132(14).
15 Id.
While this approach would increase the competitiveness of the power supply market in northern Maine, the market would still be based on bilateral transactions and not an hourly market. While a significant improvement to the current situation, many of the advantages of an active energy and ancillary services market would still be lacking. In contrast, participation in the markets administered by ISO-NE would provide access to competitive day-ahead and real-time energy markets that support a deeply traded bilateral market with hundreds of active trading partners. This liquidity and the hedging capability that it supports would introduce significantly greater competition in northern Maine in both the wholesale and retail sectors, to the benefit of both energy producers and customers.

10.3 Assumptions

In its briefing at the December 2013 PAG meeting, Emera Maine provided charts showing the estimated impact on northern Maine customers of the alternatives Emera Maine studied. Rather than providing an analysis solely of the MPC Project based upon what would likely be a different set of assumptions, CMP suggests that each proposal submitted in this proceeding be analyzed using common assumptions reviewed by and acceptable to the Commission. With that in mind, below is a brief review of some of the assumptions used by Emera Maine in its analysis. While the Emera Maine assumptions may be acceptable for a draft plan, CMP has some concern that several of the assumptions may result in ignoring important benefits of the MPC proposal, as well as any other proposals to interconnect northern Maine to the rest of New England.

10.3.1 Supply Costs

Regarding supply costs, Emera Maine’s Draft Plan assumed that “import prices from NBP would continue to track ISO-NE market prices, and so the NBP and ISO-NE connection
options were basically the same with respect to their effect on supply costs.” While CMP agrees that Standard Offer prices in northern Maine have roughly tracked those in the rest of the state, Standard Offer prices are not the only indicator of supply costs. With basically a single provider in northern Maine, albeit a reliable one, this history is no guarantee that future prices will track as in the past. Furthermore, the lack of a competitive CEP market in northern Maine provides evidence that customers in this region are likely paying more than similarly situated customers in the rest of Maine. For a CEP to do business for long, it must offer some benefit to customers not available under the Standard Offer. In most cases, this benefit is a lower price. Emera Maine’s analysis in its Draft Plan does not take this factor into account. Quantifying this impact is difficult given the nature of CEP prices. However, it is a factor that should be addressed in selecting a comprehensive solution to both the supply and reliability issues in northern Maine.

Emera Maine is recommending a new tie to NB Power to resolve the identified reliability issues.

Specifically, constructing a new 138kV transmission tie line to connect the New Brunswick Power system near Woodstock to Maine Public’s transmission system north of Houlton, along with a number of smaller changes to both systems, will meet Maine Public’s long term reliability criteria at a lower cost to Maine Public and other Northern Maine electricity customers than the in-region generation options, or the options involving connection to the ISO-NE grid. Both transmission cost and supply cost effects were considered in the analysis.17

This is a reasonable solution to the reliability issues, but Emera Maine recognizes that this solution does not address the lack of competition in northern Maine. As a solution, Emera Maine suggests a return to the regulated supply approach:

16 Draft Plan at 3.
17 Id. at 3.
Maine Public believes that it is in the best interest of its customers to mitigate this risk by putting in place a long term (10 year) supply contract which is indexed to prices in Bangor (or another suitable part of ISO-NE). Maine Public believes that NBP Energy Marketing is also interested in a longer term supply contract, and would be willing to provide pricing indexed to the ISO-NE part of Maine.¹⁸

If establishing a competitive market via interconnecting the two regions is determined to be too costly, then such a long-term power supply approach may have merit. However, CMP is not convinced that a competitive market is beyond reach if all factors are taken into account.

Emera Maine’s recommended approach includes significant upgrades on the Canadian side of the border. Emera Maine has assumed that NB Power will be willing to pay for these upgrades. NB Power may well be willing to do so, but it will have to recover the associated costs from someone. It is doubtful that NB Power (or its regulator) will expect its native load customers to pay these costs. The only alternative is to recover these costs via power sales into northern Maine. This will increase power supply prices over what they have been absent these upgrades since the northern Maine load is somewhat fixed, at least in the short term. This seems to conflict with Emera Maine’s assumption that power supply costs are expected to be equal for interconnections to New England or a new tie to Canada.

**10.3.2 Benefits to Northern Maine Suppliers**

Emera Maine, in its Draft Plan, acknowledges that keeping local generation on line or available would have reliability benefits. Emera Maine specifically mentions that the Fort Fairfield facility has qualified for Class 1 RECs, and is being considered by Connecticut in its renewable RFP process. Today, the only way for the Fort Fairfield facility to get its power to Connecticut, or for any other generator in northern Maine to participate in the New England REC or other markets, would be to wheel through NB Power and down the MEPCO or NRI lines.

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¹⁸ *Id.* at 3.
This opportunity is limited and requires wheeling payments to NB Power. If the MPC Project is built, generators in northern Maine would have direct access to New England markets. This access might make the difference between a generator in northern Maine being able to continue in business or having to shut down. The benefits of local generation go beyond reliability and include local jobs at the generators and their suppliers, property taxes, and other secondary impacts to the involved communities.

In summary, CMP recommends that each proposal submitted in this proceeding be evaluated based on the total package of benefits the proposal brings to northern Maine. First and foremost, the proposal must resolve the identified northern Maine reliability issues. Second, proposals that bring a more competitive supply market to northern Maine will result in lower supply costs, if not via lower standard offer bids, then by increasing the number of competitive suppliers in the area. These lower costs should be included in the analysis. Finally, while more difficult to quantify, the benefits of providing a path to the rest of New England for renewable generation as well as all other generation in northern Maine should be included in the evaluation.

11. Conclusion

CMP submits this proposal for the MPC in order to address the reliability and supply issues confronting northern Maine. The Company believes that the MPC presents a strong and viable solution to these issues and will provide real benefits to the customers of northern Maine as well as the rest of Maine and New England. It also provides the means for renewable generation in northern Maine to deliver to the New England markets. CMP looks forward to working with the Commission and other parties to evaluate the proposals in this proceeding on a fair and comprehensive basis and in a timely and thorough manner.
Respectfully submitted,

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