AMENDED ATTACHMENT TO SPECIAL USE PERMIT APPLICATION

SEPTEMBER 5, 2013

AMENDED ANSWERS TO QUESTIONS 7, 12 – 20

As noted in the Application for Transportation and Utility Systems and Facilities on Federal Lands, several items required extensive responses. Those responses are included in this Attachment. These responses and accompanying Exhibits replace those attached to the June 28, 2011 Special Use Permit (SUP) Application.

Item 7 — Project Description

Northern Pass Transmission LLC (Northern Pass) applies for a SUP from the United States Department of Agriculture Forest Service (Forest Service or USFS) authorizing it to construct, own, operate, and maintain an electric power transmission line (Northern Pass Transmission Line or Project) crossing portions of the White Mountain National Forest (WMNF) for which an existing private easement does not exist (the Proposed Use). *See* Exhibits 1, 2, 3. This SUP Application Amendment amends the Northern Pass SUP Application submitted on June 28, 2011. This Application also follows the Submittal for Initial and Second-Level Screening dated December 29, 2010 (Screening Submittal) which contains additional information regarding the Project, and it reflects the information contained in an amended application with the U.S. Department of Energy (DOE) for a Presidential Permit for the Project filed on July 1, 2013.

Northern Pass's purpose and need for the Project is to build and operate a participant-funded transmission line to deliver 1,200 MW of competitively priced, clean, low-carbon, base-load power (approximately 98 percent hydropower) from Québec to New Hampshire and the rest of New England.

The Project would deliver 1,200 megawatts (MWs) of low-carbon power to the electric transmission system in New Hampshire. Within the United States, the Project would consist of an approximately 153 mile long single circuit ±300 kV high voltage direct current (HVDC) transmission line that would extend from the Canadian-New Hampshire border and run southerly through New Hampshire and across approximately 10.56 miles of the WMNF to a converter terminal that will be located in Franklin, New Hampshire. *See* Exhibits 1, 2, 3. From there, the DC power will be converted to alternating current (AC), and transmitted via a new 345 kV transmission line approximately 34 miles in length to an existing substation in Deerfield, New Hampshire. Neither the converter terminal nor the new 345 kV transmission line would be located on any WMNF lands.

Northern Pass has altered some aspects of this overall route outside of the WMNF to address public comments about the original route. Specifically, in October 2010, Northern Pass proposed an overall route to DOE that it believed was reasonable and minimized any impacts associated with the Project. Public comments, particularly with respect to that part of the North Section where there is no existing transmission right-of-way (ROW), persuaded Northern Pass to seek a new route. In its amended July 1, 2013 Presidential Permit application to DOE, Northern Pass has proposed a new route in the

northern 40 miles of the transmission corridor located on land that its affiliate, Renewable Properties Inc., has purchased or leased or obtained an easement on from willing property owners. Just as it did when proposing the original route, Northern Pass sought to maximize the use of existing ROWs, minimize encroachment upon conservation areas, minimize the environmental impacts of both construction and operation of the line, promote reliability, and minimize visual impacts to New Hampshire communities. While the new proposed route is slightly longer, it makes greater use of existing ROWs and developed transportation corridors; it relies in large part on land that an affiliate of Northern Pass has successfully acquired in fee or by way of lease or easement for Project purposes from willing property owners; it affects 155 fewer parcels of land; it largely avoids more populated areas; thus affecting 70 percent fewer residents in areas with no pre-existing ROW than the originally preferred route would have; and it reduces visibility of the line both through routing changes and refinement of the transmission line design.

Northern Pass proposes to construct a portion of the Project within the existing transmission corridor in the WMNF (Corridor) in order to minimize impacts to the WMNF. This Corridor is 150 feet wide.[1] Despite the changes described above to the overall route, the route within the WMNF is very similar to that proposed in the June 2011 SUP application. With the exception of a new section on a private easement in Stark, discussed below, the proposed WMNF route (the Proposed Route) remains unchanged from 2011. *See* Exhibits 1, 2, 3.

The Proposed Route within the WMNF includes approximately six miles of permit area held by Public Service Company of New Hampshire (PSNH) pursuant to an existing SUP and approximately 4.55 miles of existing private easements (for which Northern Pass does not request a SUP).[2] By using existing transmission corridors in the WMNF, the Project would minimize clearing activities, disturbance of wetlands, and visual impacts, and would avoid a new crossing of the Appalachian Trail (AT).

Constructing the Northern Pass Transmission Line within the WMNF would require the relocation and replacement of all portions of the existing PSNH 115 kV AC transmission line within the WMNF so that both the PSNH line and the Northern Pass can fit within the existing Corridor. PSNH will separately request authorization to relocate its line from the Forest Service in a different SUP application.

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[1] With two exceptions, the PSNH SUPs authorize at least 150' wide corridors. The first is likely a typographical mistake. SUP Authorization WTM0771, east of 1-93, identifies the Corridor as being 100 feet wide. Based on a review of the existing and past Forest Service SUPs for that location, the 100' wide permit area in Authorization WTM0771 appears to be a typographical error. Prior to the 2007 renewal of Authorization WTM0771, the width of the corridor in that location was 225'. A review of available records indicates that PSNH did not make any request to reduce the corridor width in that area, nor is there any record of any explicit or articulated decision by the USFS to alter the corridor width in that location. The probability that a typographical error occurred is also supported by the fact that PSNH holds a private easement in that location that is 225' wide. If the 100' width is the result of a typographical error, no actual widening of the physical corridor covered by the existing permit area in this location would be necessary. The other exception is an approximate ¼ mile long section located in the southern limits of the WMNF where U.S. Department of Agriculture Forest Service SUP FIA-136 provides PSNH with a 100-foot wide area. FIA-136 was issued as a result of PSNH accommodating the construction of Interstate 93. In the location of the FIA-136 SUP PSNH has an existing 225-foot wide easement.

[2] Northern Pass anticipates that Public Service Company of New Hampshire will also submit an amendment to its existing SUPs to relocate its existing transmission line within the Corridor in order to accommodate the Project.

This SUP Application Amendment reflects the following modifications to the Project since Northern Pass LLC filed the original SUP Application in June 2011:

1. Northern Pass has significantly advanced the design of the Project, with the specific objective of reducing the visibility of the Project by taking advantage of forested buffers and natural terrain and by reducing structure heights where possible. The SUP Application Amendment includes information about structure heights and design and six visual simulations that reflect the transmission structures within the WMNF.

2. The SUP Application Amendment now includes a transmission line along a private easement in Stark which traverses the WMNF for a distance of 3,610.10 feet.

3. The SUP Application Amendment includes a request that the Proposed Use include a helicopter landing pad relocated from the existing ROW.

4. The SUP Application Amendment includes additional information on the potential environmental impacts of the Project as revised and proposed measures to avoid or mitigate those impacts.

5. The SUP Application Amendment provides additional information on the historic and cultural resources in the general area of the Project as revised, including the results of preliminary archeological surveys.

(a) **Type of system or facility.**

The Project will be an electric power transmission line.

(b) **Related structures and facilities**

1. Transmission structures

Within the Corridor, Northern Pass proposes to use primarily lattice steel structures, with some tubular steel monopole structures where warranted by local conditions, for the proposed HVDC line and tubular steel monopole structures for the relocated 115 kV transmission line. Exhibit 4 shows the structure types that the Project proposes to use in WMNF. The proposed HVDC transmission line will be co-located with the relocated existing 115 kV transmission line, thus minimizing visual impacts.

The proposed structures heights are identified in Exhibit 5. The HVDC lattice configuration will have an approximate base dimension of 30 feet by 30 feet and taper to a six foot by five foot column half way up the structure. HVDC lattice structures will be anchored to four concrete foundations at the corners of the base approximately three to five feet in diameter. Because the base is spread out on four foundations, it has less environmental impacts to the land's surface than the monopole structures discussed below, which use one large base. The drilled shaft foundation could range from 10 to 20+ feet deep depending on soils and load requirements for individual structural locations.

Monopole configurations for the HVDC transmission line will be approximately five to ten feet in diameter at the base, tapering to approximately one to two feet in diameter at the top. These structures will be anchored to concrete foundations approximately seven to twelve feet in diameter. The drilled

shaft foundation could range from 15 to 30+ feet deep depending on soils and load requirements for individual structural locations.

Relocated 115 kV monopole structures will be approximately two to four feet in diameter at the base, tapering to approximately one to two feet in diameter at the top. Angle structures for the relocated 115 kV line will be anchored to concrete foundations approximately three to five feet in diameter. Tangent structures, in contrast to angle structures, will be constructed with direct-embed foundations in which a hole is drilled three to four feet in diameter, part of the monopole structure is placed in the hole, and the voids are then backfilled with native soil or an engineered crushed rock. During the detailed design process, other foundation designs may be considered where they might improve constructability, reduce environmental impacts, or achieve other benefits.

For the proposed HVDC line the arms of the structures support insulator strings, bundled conductors, a dedicated metallic return conductor, and an overhead shield wire. The overhead shield wires will have a fiber optic core to enable communications and system protection functions between the two HVDC converter terminals, and between the Franklin HVDC converter terminal and the Deerfield Substation. The relocated 115 kV line will have arms that support insulator strings, conductors, and overhead shield wire.

Exhibit 6 shows a typical cross section of what the proposed structures will look like post construction.

Overall, the structure heights that Northern Pass is proposing for the portions of the Project crossing the WMNF range from 75 feet (three structures) to 110.5 feet (one structure). Northern Pass is proposing to construct the overwhelming majority of the structures in the WMNF at heights between 80 feet and 100 feet; a common DC structure height in WMNF will be 85-95 feet; a common AC structure height in WMNF will be 88-97 feet. *See* Exhibit 5.

Because the new structures will be co-located with the PSNH transmission line, they will be spaced approximately the same as the rebuilt PSNH transmission line. The majority of structures will be spaced approximately 500 to 700 feet apart; maximum spacing will be approximately 850 feet. The distance between structures will depend on the terrain and the height of the structures.

As described in the June 28, 2011 SUP Application, the transmission line will cross the AT in one location. As further discussed, this is not a new crossing – rather, Northern Pass has designed the Project so that the Project will cross at the same place the existing PSNH line crosses the AT. Using this one crossing will reduce visual impacts.

Northern Pass has designed the new transmission structures with the WMNF's Scenic Integrity Objectives in mind, including those defined for Very High and High Scenic Integrity.[3] "Very High … [r]efers to landscapes where the valued landscape character 'is intact' with only minute if any deviations. The existing landscape character is expressed at the highest possible level."[4] "High … [r]efers to landscapes where the valued landscape character 'appears intact.' Deviations may be present but must repeat the form, line, color, texture, and pattern common to the landscape character so completely and at

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[3] *See* WMNF Forest Plan Management Area Direction for MA 8.3 at 3-52 (2005).

[4] WMNF Forest Plan Glossary at 28.

such scale that they are not evident."[5] The Scenic Integrity Objectives, along with landscape character goals, inform scenery management desired conditions. As recognized by law, desired conditions that are not management area standards do not need to be consistent with all aspects of a Forest Plan, including scenic objectives, in the same manner that such actions need to be consistent with management standards.

Here, in light of the changes to the Project, the landscape character will remain intact and will appear intact because the Project will be co-located next to a relocated existing transmission line that is already part of the landscape. This co-location will ensure that visual impacts will be minimized.

Northern Pass has included six visual simulations of the Project within the WMNF, attached as Exhibit 7.[6] The simulation locations for the Project were selected to convey to the public what the Project will look like from key vantage points and public viewing areas in the WMNF. Members of the public, the Project team, and LandWorks (the Northern Pass visual impacts consultant) suggested the locations for these and other simulations located on Northern Pass's website.[7] They selected, among others, locations considered to have local, state, or national significance as scenic or recreational resources and locations within conserved landscapes.

The drawings below provide some basis for how we see things in the landscape and ways in which the presence and location of transmission corridors affect visibility and the nature of that visibility.

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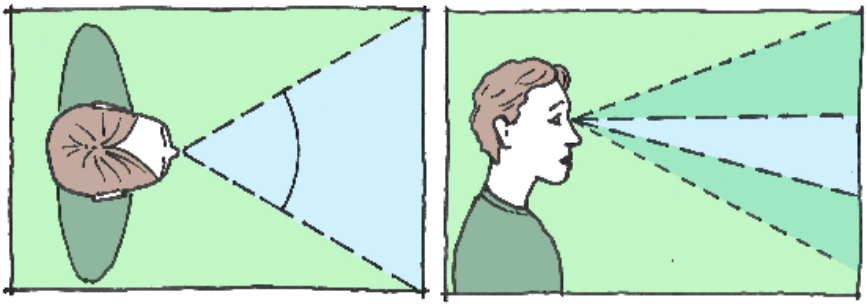
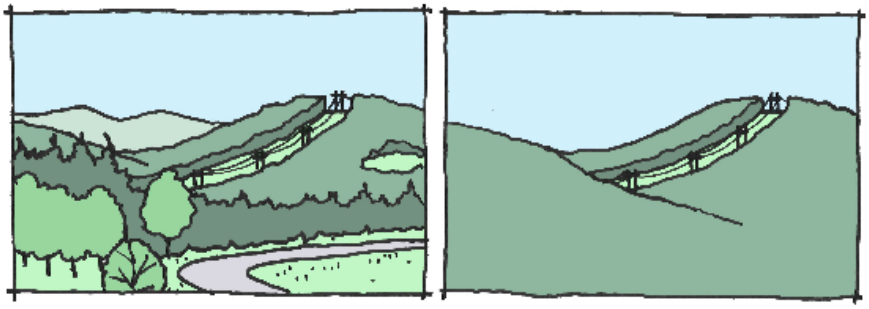
[5] *Id.*

[6] For the new portion of the Project in Stark discussed below, the spacing and configuration of the structures will be slightly different than those in the rest of the WMNF Corridor (and represented in these simulations) due to the proximity of the PNGTS pipeline.

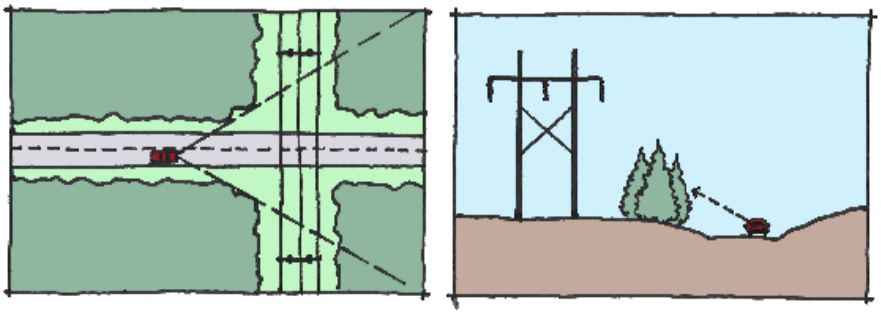
[7] *See* http://northernpass.us/visual-simulations.htm



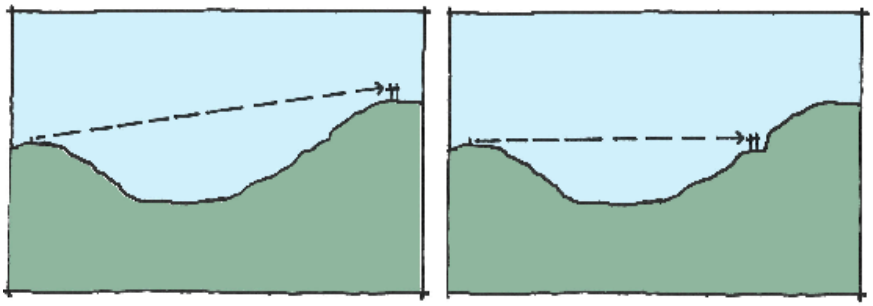
1. How humans perceive the visual environment is based, in part, on the capacity of the human eye to "take in" visual elements in a typical view. These illustrations depict the horizontal and vertical "cone of vision" for the human eye.



2. Landscapes that have many elements in them are able to better accommodate visual change, These two illustrations depict how a transmission line is readily de-emphasized, or "visually absorbed" by a landscape with a number of distinct elements, versus a landscape where the corridor is the only feature.



3. At road and trail crossings, the human cone of vision coupled with movement through the landscape can reduce or eliminate views of transmission structures. Roadside or trailside vegetation and screening can also de-emphasize or eliminate views of a transmission line.



4A. Transmission line structures are likely to be more visible when they are seen against a backdrop of sky, referred to as "sky-lining" or sky-lighting".

4B. Transmission line structures are less visible/ noticeable when there is a vegetative or landform backdrop that provides "back grounding".

Northern Pass will next develop a visual impact assessment for the Project which will include those portions of the Project within the WMNF. Northern Pass has taken significant steps to reduce the visual impacts from the transmission structures and will continue to work with the Forest Service and other interested parties to minimize impacts to the WMNF and the AT.

2. Relocated Helicopter pad

A gravel helicopter landing pad is currently located within the existing Corridor and allows the Appalachian Mountain Club, the Forest Service, and PSNH to access this area of WMNF and the AT by helicopter for trail maintenance, utility maintenance, vegetation management and maintenance, and public safety. Since Northern Pass would occupy the area of the Corridor in which the existing helipad is located, this SUP Application Amendment proposes to relocate the helipad to one of two possible locations. *See* Exhibit 8. After relocation, Northern Pass would use the helipad for maintenance along with the Appalachian Mountain Club, the Forest Service, and PSNH.

The two possible locations for the new helipad were chosen to be in the same local area as the existing helipad. Both are located in the town of Easton approximately 0.5 miles along the existing PSNH corridor to the West from the AT crossing in a currently forested area. Based on a field reconnaissance, there are two suitable helipad sites in this area: Site A is located immediately adjacent to the existing helipad, and Site B is located approximately 400 feet northwest parallel to the edge of the ROW. *See* Exhibit 8. Site A is located in close proximity to forested wetlands and would likely require a small amount of wetland fill associated with the gravel helipad, as well as a larger area of forested wetland vegetation clearing to provide a safe take-off/landing environment. Site B is located in forested upland areas and would not likely require any primary or secondary wetland impacts; however the site is considerably rougher with boulders and bedrock outcrops, making construction of the helipad more difficult.

In addition to an identified relocated helicopter pad, public safety considerations may require the development of temporary emergency helicopter landing sites near the Corridor. Once Northern Pass knows more about where such sites are needed, it will request a separate authorization from the Forest Service for these temporary sites.

Either relocated helicopter pad site would be in an Inventoried Roadless Area and is compatible with all restrictions on the use of that area, including the 2001 Roadless Rule.[8] The 2001 Roadless Rule bars only the construction or reconstruction of roads and certain timber removal activities in Inventoried Roadless Areas. The helicopter pad is not a road. Under the Roadless Rule, a "road" is "[a] motor vehicle travelway over 50 inches wide, unless designated and managed as a trail. A road may be classified, unclassified, or temporary."[9] Most importantly, "road construction" is defined as an "[a]ctivity that results in the addition of forest classified or temporary road miles."[10] Building this helicopter pad will not result in the addition of forest classified or temporary road miles and in fact, there will be no cars or trucks on the helicopter pad.[11]

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[8] *See* Roadless Area Conservation Rule, 66 Fed. Reg. 3244, 3272 (Jan. 12, 2001) (36 C.F.R. §§ 294.12, 294.14).

[9] 66 Fed.Reg. at 3272 (36 C.F.R. § 294.11).

[10] *Id.*

[11] *See Hogback Basin Preservation Ass'n v. U.S. Forest Service*, 577 F.Supp.2d 1139, 1149 (W.D.Wash. 2008)(parking lot was not a road, despite the presence of motorized vehicles); *see also Wilderness Workshop v. U.S. Bureau of Land Mgmt*., 531 F.3d 1220, 1223, 1226-28 (10th Cir. 2008) (deferring to Forest Service that a "travelway" excluded temporary roads built for construction purposes, which it calls construction zones).

Timber-cutting associated with the helicopter pad is also allowed under the Roadless Rule because it is "incidental" to a "not otherwise prohibited" activity.[12] In addition to an identified relocated helicopter pad, field conditions may require the development of future additional helicopter landing sites near the Corridor for use as helicopter emergency landing areas.

3. New Transmission Line Section in Stark

The Project route through the WMNF has been modified to traverse the PSNH easement in Stark, NH.[13] However, this area is not part of the SUP request because it traverses an existing easement, which predates the Forest Service ownership of this land by nearly thirty-eight years and authorizes the holder to erect, repair, maintain, rebuild, operate and patrol electric transmission lines and distribution lines.[14]

The new Stark section will traverse the WMNF in the area identified in Exhibit 2. Within the WMNF, the new Stark section is 150 feet wide and 3,610.10 feet long.

(c) <u>Physical specifications</u>

Northern Pass requests a permit area through the WMNF that would be approximately 31,733 feet (6 miles) in length (not including the area covered by the existing private easements) and approximately 150 feet in width.

The Project will remain within the footprint of the Corridor, including all Project roads. These roads will be generally located where the existing access roads are today, will be approximately 16 feet in width, and will be improved only to the extent needed to accommodate equipment and vehicles typically for off-road construction. The total length of access roads within the WMNF is proposed to be 10.5 miles. The proposed access roads are shown in Exhibit 10. No roads outside the Corridor would be constructed or used: rather, special construction techniques will be used. These will include construction during winter periods when the ground is frozen (most notably the Bog Pond area in Lincoln) which will help to minimize disturbances to wetlands; the use of construction matting; and the use of helicopter construction techniques to minimize the impact on the WMNF.

The Project will require additional clearing and grading in order to construct, operate and maintain the structures necessary to support the transmission line. Generally, the Corridor will have to be cleared to a 150' width. Based on an analysis of 2010 New Hampshire Department of

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[12] *See* 66 Fed. Reg. at 3272 (36 C.F.R. § 294.13(b)(2)); *see also Hogback Basin Preservation Ass'n*, 577 F.Supp.2d at 1154 (cutting 21.5 acres of timber was incidental to a not otherwise prohibited management activity).

[13] *See* Exhibit 9, Easement from Dean F. Miles and Glen E. Miles to Public Service Company of New Hampshire, April 31, 1946 (filed August 27, 1946).

[14] *Id*. A SUP is not required for the portions of the Project in new Stark section because the PSNH's easement is an outstanding property right. *See Minard Run Oil Co. v. United States Forest Service*, 670 F.3d 236, 243 (3d Cir. 2011) (drilling on reserved rights did not require Forest Service authorization, and these holdings "apply with even greater force to outstanding rights"); Forest Service Manual (FSM) 2734.2 (setting forth the Forest Service policy for granting road and trail rights-of-way on Forest Service lands and providing that "[t]he holder of outstanding rights perfected on acquired land prior to Forest Service acquisition ... may exercise those rights without obtaining a special use authorization, unless the document creating the rights provides for an additional authorization"). This was confirmed by the WMNF previously in communications with PSNH.

Transportation aerial photography and input from Northeast Utilities Transmission field personnel, the current PSNH ROWs are cleared as follows:

1. The ¼ mile ROW section adjacent to Interstate 93 covered by PSNH SUP FIA-136 is cleared to approximately 120-feet in width;
2. In a 2.6 mile section near the Kinsman Trail (SUP FIA-120) the ROW cleared width ranges between 75 to 100-feet.
3. For the remainder of WMNF, the ROW cleared width is generally 130' with some sections greater than 130' and some smaller.

For the additional clearing needed, vegetation would be removed from the proposed Northern Pass Transmission Line footprint using mechanical methods. Forested vegetation would be removed using low-impact tree clearing. Low-impact tree clearing incorporates a variety of approaches, techniques, and equipment to minimize site disturbance and to protect wetlands, watercourses, soils, rare species and their habitats, and cultural resources. Appropriate erosion and sediment controls would be deployed as necessary. Where removal of woody vegetation is required, vegetation would be cut flush with the ground surface to the extent possible. Where practical, trees would be felled parallel to and within the Corridor to minimize the potential for off-Corridor vegetation damage. Care would be taken to maintain vegetation along stream banks and within wetlands to the extent possible. During and after the transmission line construction, off-Corridor "hazard" trees that could possibly pose hazards to the integrity of the transmission lines would be identified and removed following consultation with the local Forest Service office. Hazard trees that are weak, broken, decaying, infested or other similar trees could cause flashovers or contact the structures or conductors, or violate the conductor clearance zones if they were to fall toward the transmission lines.

(d) **Term of years needed**

Northern Pass requests a permit area for the life of the transmission line and thus requests a permit area for the maximum duration available under Forest Service regulations.

(e) **Time of year of use or operation**

The Northern Pass Transmission Line will operate year round.

(f) **Volume or amount of product to be transported**

The Northern Pass Transmission Line will transport 1,200 MW of primarily hydro-electric generated power.[15]

[15] The electricity delivered over the Project would consist of "system" power comprised of approximately 98% hydroelectric generation, with the balance made up of a combination of other sources of generation.

(g) **Duration and timing of construction**

Construction of the portion of the Northern Pass Transmission Line within the WMNF will take approximately 9-12 months of active construction to complete. Construction within the WMNF will occur in phases at various times over the approximately 30 months it will take to construct the Northern Pass Transmission Line in its entirety.

(h) **Temporary work areas needed for construction**

Northern Pass will seek to minimize the area needed for temporary work, but the Project will require some temporary work areas to carry out construction within the WMNF. The number and location of these temporary work areas have not yet been determined. The temporary work areas will likely consist of a combination of temporary storage areas, staging areas, and crane pad areas. The temporary storage and staging sites will be within the Corridor or in nearby areas outside the WMNF. As much as possible, the Northern Pass will locate these temporary work areas outside of the WMNF.

Establishing these areas in proximity to construction sites will minimize the potential for inconvenience or nuisance effects to the public (*e.g.*, as a result of the movement of equipment, manpower, and supplies to and from the Corridor along public roads). Within the WMNF, if required, crane pad areas may be located within the Corridor at individual transmission structure locations where the means of access to transport cranes is available. Crane pads are used to stage structure components for final on-site assembly and to provide a safe, level work base for the construction equipment used to erect transmission structures. These pads can vary in size depending on specific requirements for each structure, but they could range between 5,000 and 14,000 square feet. Temporary storage areas are used to store material, equipment, and supplies and are typically between 2 to 5 acres depending on the exact use of the site. Staging areas are used to temporarily stockpile materials for construction closer to the worksite and are typically less than 2 acres.

The quantity or type of temporary work areas required within the WMNF will ultimately depend on the construction methods used. Because Northern Pass has not identified the specific locations of such temporary work areas, it has not identified those locations on the accompanying map. Northern Pass will update this information as more detailed information becomes available through the permit process.

Item 8 – Exhibits

Exhibit 1	WMNF Proposed Route Map 2a
Exhibit 2	WMNF Proposed Route Map 2b (Stark)
Exhibit 3	Outreach Maps
Exhibit 4	Structure Types
Exhibit 5	Northern Pass Project Chart of Proposed Structure Heights
Exhibit 6	Cross sections of Proposed WMNF Structures
Exhibit 7	WMNF Visual Simulations
Exhibit 8	WMNF Preferred Route Proposed Helipad Map 4
Exhibit 9	Easement from Dean F. Miles and Glen E. Miles to Public Service Company of New Hampshire
Exhibit 10	WMNF Preferred Route Access Roads Map 3
Exhibit 11	WMNF Preferred Route Railroad
Exhibit 12	WMNF Preferred Route Railroad (Stark)
Exhibit 13	Wetlands Table

Item 12 — Technical and Financial Capability

Northern Pass, LLC is a New Hampshire limited liability company in good standing in New Hampshire. Northern Pass, LLC is wholly owned by NU Transmission Ventures, Inc., which is, in turn, a wholly-owned subsidiary of Northeast Utilities, a public utility holding company.

Northern Pass, LLC has the technical and financial capacity to complete the Proposed Use. See 36 C.F.R. § 251.54(d). Northern Pass will draw on the proven resources of Northeast Utilities, which has highly developed expertise in the design, siting, and construction of high voltage transmission systems within their service areas in Connecticut, Massachusetts, and New Hampshire. Numerous projects have been completed by Northeast Utilities over the past several years. Northern Pass, as organized, has the economic capability to undertake the Proposed Use. In the last ten (10) years, Northeast Utilities has invested over $3 billion in major new transmission projects. For example, in 2008, to improve electric reliability and reduce costly congestion charges to customers in southwest Connecticut, Northeast Utilities successfully completed $1.6 billion in upgrades, spanning more than 109 miles of the electric grid serving the region. These transmission upgrades have saved customers more than $600 million since they were completed. Those projects won a 2008 Platts Global Energy Award for "Energy Construction

of the Year." In addition, Northeast Utilities won the 2009 Edison Award from the Edison Electric Institute (EEI). The Edison Award, EEI's highest honor, recognizes U.S. and international electric companies for outstanding leadership, innovation, and advancement of the electric industry. More recently, Northeast Utilities received approvals to commence the construction of the $700 million Greater Springfield Reliability Project.

Item 13(a) — Reasonable Alternative Routes and Modes

1. Standard for Reasonable Alternatives

Using the National Environmental Policy Act (NEPA), DOE and the Forest Service will "[r]igorously explore and objectively evaluate all reasonable alternatives" to the Project and thus to the requested SUP.[16] DOE and the Forest Service must also consider a no-action alternative.[17] Not every alternative is reasonable. The Council on Environmental Quality (CEQ) has stated that "[r]easonable alternatives include those that are practical or feasible from the technical and economic standpoint and using common sense."[18] The Forest Service has no obligation to consider alternatives that are not practical or feasible (and thus, unreasonable). The D.C. Circuit has held that "CEQ regulations oblige agencies to discuss only alternatives that are feasible, or (much the same thing) reasonable."[19]

Nor must the Forest Service consider alternatives that do not meet the purpose and need statement articulated in the NEPA analysis.[20] While the NEPA analysis has not yet been completed, the Project's purpose and need is to build and operate a participant-funded transmission line to deliver 1,200 MW of competitively priced, clean, low-carbon, base-load power (approximately 98 percent hydropower) from Québec to New Hampshire and the rest of New England. This Project purpose and need should be prioritized in the development of the NEPA analysis's purpose and need statement.[21] Where "a private party's proposal triggers a project, the agency may 'give substantial weight to the goals and objectives of that private actor.'"[22] Northern Pass evaluated and herein describes reasonable alternative routes and modes with these standards in mind.

2. Methodology for Selecting Project Alternative and Considering Other Alternatives

Northern Pass has evaluated numerous routes throughout the State of New Hampshire for the Northern Pass Transmission Line. Routes other than those seriously considered were deemed unreasonable based on increased social or environmental impacts or excessive costs.

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[16] 40 C.F.R. § 1502.14(a); *see also* 42 U.S.C. § 4332(2)(C)(iii); *Vermont Yankee Nuclear Power v. NRDC*, 435 U.S. 519, 551 (1978).
[17] *See Center for Biological Diversity v. U.S. Dept. of Interior*, 623 F.3d 633, 642-43 (9th Cir. 2010) (rejecting a land exchange because of problems with the agency's assumptions for the no-action alternative).
[18] CEQ 40 Questions, Question 2a
[19] *Citizens Against Burlington v. Busey*, 938 F.2d 190, 195 (D.C. Cir. 1991).
[20] *Biodiversity Conservation Alliance v. Bureau of Land Management*, 608 F.3d 709, 715 (10th Cir. 2010); 40 C.F.R. § 1502.13.
[21] *Colorado Environmental Coalition v. Dombeck*, 185 F.3d 1162, 1174-75 (10th Cir. 1999); *Citizens Against Burlington v. Busey*, 938 F.2d 190, 195 (D.C. Cir. 1991).
[22] *Biodiversity Conservation Alliance*, 608 F.3d at 715 (quoting *Citizens' Comm. to Save Our Canyons v. U.S. Forest Serv.*, 297 F.3d 1012, 1030 (10th Cir.2002)).

In order to develop the potential project routes, specific steps were taken. An initial project area was established, prior to developing routes, based on the Project end points and a preliminary review of possible constraints in the area. Constraints are sensitive resources that could be affected by a transmission line. Constraints were identified by using the following four methods: field reconnaissance, review of United States Geological Survey (USGS) topographic maps, aerial photography and geographic information system (GIS) data, contact with state and federal agencies, and input from natural resource and conservation groups. Project representatives also met with state and federal resource agencies to obtain input on the Project. All of this information was mapped using GIS software to create constraint maps of the Project area.

After development of the constraint maps, the next step was to identify potential routes. The objective was to identify routes that begin at the northern portion of New Hampshire, connect to the proposed Southern Terminal, and continue to the existing Deerfield Substation, while reducing or minimizing impacts to the extent practicable to both human and natural resources. The routes consist of individual segments that can be combined to form a continuous path between endpoints. This step included multiple alternatives through each section of the Project area. The major factors in the routing were identified to minimize impacts to the extent practicable including: using existing private easements and other rights-of-way where possible, including the existing SUP area for PSNH; avoiding or minimizing new rights-of-way (particularly through state or federal forests or parks); minimizing the number of residences along the routes (particularly newly affected residences); minimizing the visual effect of the Project; avoiding conservation areas; and minimizing impacts to known cultural resource sites.

3. Alternatives Considered

Northern Pass considered the following alternatives for the whole of or parts of the Project, including the portions that Northern Pass now proposes to route through WMNF.

1. Original Proposed Route
2. Alternative Route Bypassing WMNF (passing through the towns of Easton, Landaff, Bath, Haverhill, Piermont, Orford, Wentworth, Dorchester, Groton, Rumney, Plymouth, Bridgewater, and Ashland)
3. Underwater Line
4. Underground Line
5. Underground in Highway ROW
6. Railroad ROW
7. Other Proposed Corridors
    a. Champlain Hudson Power Express
    b. Northeast Energy Link
    c. Vermont Transmission Corridor
8. Alternatives to the Project as a Whole
    a. Locally-based renewable energy projects, including wind, small hydro and solar.
    b. Demand-side management (DSM) and energy efficiency.
    c. Natural Gas-Fired Generation.
9. No-Action alternative

Item 13(b) describes these alternatives and discusses why they are unreasonable. Northern Pass also considered alternative structure designs, as described below.

4. Alternative Structure Designs

There are a variety of transmission structure types that Northern Pass could employ. Structures can vary both in height and design, and differing designs are desirable at different locations to address operational, environmental and aesthetic interests. In designing the Project, Northern Pass is doing all that it reasonably can to minimize impacts of the line, recognizing that minimizing one impact can increase another. For example, when lower structures are used, more structures are required. That may reduce the number of locations from which the line can be seen, but the increased number of structures could increase wetlands or other on-the-ground impacts in certain areas.

The base structure design for the Project within the WMNF is lattice structures. The structure heights that Northern Pass is proposing for the portions of the Project crossing the WMNF range from 75 feet (three structures) to 110.5 feet (one structure). Northern Pass is proposing to construct the overwhelming majority of the structures in the WMNF at heights between 80 feet and 100 feet; a common DC structure in WMNF will be 85-95 feet; a common AC structure in WMNF will be 88-97 feet. *See* Exhibit 5.

Item 13(b) — Basis for Alternatives Dismissal

1. Original Proposed Route

For purposes of the alternatives analysis, the original overall route through New Hampshire and its alternative segments (except near the Concord Airport) is no longer the preferred route. Public comments from landowners and residents of communities along the original route in the northern portion of the route and the originally proposed alternative segments in the northern, central (where WMNF is located) and southern portions of the route suggest that acquiring the property that would be needed to build the Project along the originally proposed route and its alternatives may be unachievable. Additionally, the new proposed route, which is in large part either on existing ROW or on land that an affiliate of Northern Pass has acquired, leased or obtained an easement for from willing landowners, is preferable for all the reasons identified above.

2. Alternative Route Bypassing WMNF

An alternate route bypassing WMNF would pass through the towns of Easton, Landaff, Bath, Haverhill, Piermont, Orford, Wentworth, Dorchester, Groton, Rumney, Plymouth, Bridgewater, and Ashland. It was not selected for two principal reasons: first, the desire to minimize impacts on the AT, and second, recognition of the practical challenges associated with the acquisition of a large number of private land holdings that the route would entail.

The AT crosses the entire expanse of the State of New Hampshire. Accordingly, any transmission line running from the northern border to southern New Hampshire must cross the AT. To minimize the impacts to the AT, Northern Pass evaluated various routes for the Northern Pass Transmission Line — focusing on existing private easements, other rights-of-way, and existing transmission line areas to minimize the impacts to the environment, particularly to the AT. The Proposed Route would cross the AT within the Corridor along an existing private easement that is

already used for electricity transmission. This reduces the environmental, visual, recreational, and other impacts to the AT. The Alternate Route, which bypasses the WMNF entirely, would require crossing of the AT at the site of an existing road rather than an existing transmission crossing, requiring a new clearing along the AT area. This would result in greater impacts along the AT than the Proposed Route.

Second, routing the Project entirely around the WMNF also presents significant practical problems that the route through the WMNF does not present. Specifically, the Alternate Route would require Northern Pass to acquire and clear approximately 53 miles of new corridor, which would be approximately 13 miles longer than the Proposed Route and require the acquisition of many parcels of privately held land. While Northern Pass indicated from the beginning that it did not want to rely on eminent domain to acquire needed property rights, in 2012, New Hampshire amended its eminent domain law to preclude the use of eminent domain for projects like Northern Pass.[23] This Alternate Route also would have greater visibility than the Proposed Route. Moreover, the Alternate Route would pass within 500 feet of 44 residences that would be newly affected by a transmission line. This compares to two newly affected residences outside the WMNF along the Proposed Route. Other problems include too-narrow rights of way, technological construction issues, and geographic inefficiencies.

3. Underwater Line

Pointing to the example of the Champlain Hudson Power Express (CHPE) project, several members of the public argued in their scoping comments that Northern Pass should have included in its SUP Application the alternative of an underwater line. In developing an underwater line, CHPE has been able to take advantage of the fact that waterways of considerable length and depth lie between the power source and the power delivery point. Northern Pass does not have that option.

The underwater option is not technically feasible for the Project because, unlike Lake Champlain and the portions of the Hudson River where the CHPE project is designed to traverse underwater, the Connecticut River, the largest north-south waterway in the relevant area, which runs along the Vermont/New Hampshire border, can only be navigated by shallow draft vessels above Enfield, Connecticut. Such shallow draft vessels cannot accommodate the equipment needed to install an underwater cable. Thus, an underwater option that might be feasible in other locations and circumstances cannot be used in the New Hampshire portion of the Connecticut River, and there is no alternative waterway.

Specifically, the CHPE Presidential Permit Application describes the equipment needed to lay and then maintain an underwater cable at the required depths, which CHPE explains generally range from three to four feet to 15 feet beneath the bed surface.[24] Most reaches of the Connecticut River in northern New Hampshire are too narrow or too shallow to accommodate vessels larger than canoes, kayaks and small motorized boats. Dams and waterfalls also occur along the Connecticut River,

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[23] Chapter 2:b of the Laws of 2012; codified at NHRSA 371:1.

[24] *See* CHPE Presidential Permit Application, OE Docket No. PP-362, at 7-10. Available at http://energy.gov/oe/downloads/application-presidential-permit-oe-docket-no-pp-362-champlain-hudson-power-express-inc.

requiring even those in small watercraft to portage around them. The Skagerrak, which is a vessel that is designed for laying cable under water, illustrates the impracticability of the underwater approach for the Project. The Skagerrak has a dead weight of 9,373 tons, a beam of 32 meters and is 112 meters long. The draft of this vessel – without the cable loaded on-board – is 5.4 meters. A vessel of such proportions simply cannot navigate the Connecticut River where it would be needed to lay the cable for the Project.

In short, there is simply no viable underwater route for the Project.

4. Underground Line

Numerous commenters have suggested that the Project should be installed underground—if not along the entire route, at least in areas such as the WMNF. Several alternatives have been suggested for how the line might be placed underground: (i) along the proposed route; (ii) along a railroad bed; and (iii) along the side of highways. There are some constraining issues in common for all three of these alternatives, and there are some that are particular to each. None of them, however, represents a practical alternative to the Project.

Installing an HVDC transmission line underground requires some or all of the following:

- Excavation of a trench along the underground route;

- Use of construction techniques such as jack & bore, directional boring, and micro-tunneling to go under rivers, streams, or wetlands, or to go through mountains and other sensitive areas where open trench construction is not preferred or feasible;

- Installation of a duct bank (including conduits), in areas where direct bury is not available, with a dimension of approximately three feet by five feet with the top of the duct bank located 30 inches below finish grade. The duct bank will be encased in concrete or flowable backfill for physical protection;

- Installation of cable splice vaults or splicing pads approximately 60 feet long, 15 feet wide and eight feet tall (vaults only) and located approximately every 1,800 feet. The specific dimensions between splice locations are driven by the cable length that can be transported over the road and the physical conditions (terrain, wetlands, water bodies, etc.) of the cable installation location. The specific distance between splicing locations could vary from less than 1,000 feet to approximately 3,000 feet based on these factors;

- Use of large pieces of equipment, including:
  - flatbed trucks to deliver the cable reels (approximately 12 to 14 feet high and weighing approximately 25 to 30 tons each);
  - cranes needed to lift and place the splice vaults into the ground; and
  - a cable-pulling rig needed to install the cable into the completed duct bank system.

- ROW terrain that is accessible by the required large equipment along the entire length of the ROW to allow the cable reels to be placed in the proper position for installation, and allow the cable splice trailers to access the splice locations.

Because cable trenching involves more extensive and permanent disruption of the affected land, inevitably, underground placement typically results in greater impacts than an overhead line in all respects except visibility. It also presents enhanced operations and repair challenges. In an Edison Electric Institute (EEI) survey, utilities identified numerous challenges associated with operating underground, including:

- Longer timeframes and more difficult challenges in installing, maintaining and repairing equipment;
- Greater difficulty to upgrade or make system changes;
- Greater susceptibility to flooding and damage from dig-ins;
- Difficulty of making repairs in frozen ground or areas of heavy snow;
- Need for greater coordination with landowners; and
- Need for more specialized skills and training to maintain systems.[25]

Addressing these challenges entails significant extra costs. The higher costs relate to every aspect of an underground project, including: installation, facility replacement, material costs, design redundancy, operations and maintenance, repairs that require specialty contractors and labor-intensive work to locate faults. EEI also notes that underground projects in geographic areas with severe frost and rocky conditions can face significantly increased costs. Just to build it, however, EEI estimates that an underground line can entail costs that are five to ten times the cost of a comparable overhead line.[26] For a project like Northern Pass that is designed to deliver competitively priced power to the market, these additional costs are economically infeasible if they affect any substantial portion of the line.

Many of the factors that would make an underground route along the entirety of the Project impractical are present in the WMNF. A significant portion of the Proposed Route within the WMNF is located in mountainous areas with steep grades. The installation of a cable requires that a permanent roadway be established along the entire route in order to transport the large cable reels and cable pulling equipment. Additionally, an underground installation would generally require splicing the cables approximately every 1,800 feet. Splicing areas for the cable need to be located on relatively flat terrain, not on the kind of steep slopes present in many areas of the Project.

Constructing the cable system would also have a greater impact on natural resources than an overhead line. The cable system would require that significant construction activities be performed in a continuous straight line. This would afford limited opportunities to avoid wetlands and other sensitive resources within the corridor. By contrast, an overhead line can span sensitive areas, thereby minimizing the disturbance.

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[25] EEI, *Out of Sight, Out of Mind 2012*, at 26-27 (Jan. 2013). Available at http://www.eei.org/issuesandpolicy/electricreliability/undergrounding/Documents/UndergroundReport.pdf

[26] *Id.* at vi. EEI estimates that the costs of an overhead line range from $174,000 to $11 million per mile, whereas the costs of an underground line can range from $1.4 million to $30 million per mile. *Id.* at 30.

In some cases, it would be possible to install a conduit system with a trenchless technology like directional boring. The trenchless construction method would require the use of large equipment at the sending and receiving end of the directional boring locations. Such equipment could not be transported to certain areas of the Project, including substantial areas within the WMNF.

As described above, the Proposed Route crosses hundreds of small streams and several rivers that would require cable installation techniques noted above. An underground cable system and the associated trenching requirements would also likely have a greater adverse impact on archeological resources and sensitive plants and plant communities than an overhead line.

Providing year round access to the entire underground cable route would also present much greater operating challenges than an overhead route, creating the risk that, in the event of trouble with the cable, it could be out of service for an extended period to allow for diagnosis and repair of the problem. Installation of an underground cable system in the WMNF, in particular, would not be practical because of the significant construction impacts and year round access requirements of an underground cable system.

If Northern Pass were to attempt to construct substantial parts of the Project underground in combination with other overhead sections, it would entail a further drawback. Unlike low-voltage lines, an HVDC line at ± 300kV requires a "transition station" at each location where the line would connect the overhead and underground portions of the line. A transition station is similar to a substation: it requires above- and below-grade construction, is surrounded by a chain link fence and occupies an area approximately 160 feet by 180 feet. To include four such permanent facilities (two for each proposed underground segment of the Project) along the 153 mile HVDC line path involves relatively modest impacts. However, building such facilities at regular locations along the line to accommodate each transition between the overhead and underground segments could aggravate, not mitigate, a broad array of the impacts of the Project, including those to wetlands and historic and cultural resources.

Finally, there is an important legal impediment to underground construction along the Proposed Route. Northern Pass has the ability to use the existing PSNH ROW in accordance with and under the conditions of the easements on record. While all of the easements along the Project path allow for overhead lines, very few explicitly provide rights to construct underground facilities. More than 600 easements could require modification for Northern Pass to be authorized to install an underground line. With the passage of legislation in New Hampshire that removed eminent domain rights for the Project, it is extremely unlikely that underground rights for the existing ROW areas could be secured along the entire Proposed Route.

For exactly the kinds of reasons detailed above, during just the last few years, a number of federal agencies have concluded that lengthy underground transmission lines are not a reasonable alternative to overhead lines. Although the projects in question varied in size, design and length, the agencies have uniformly concluded that underground transmission is not a practical alternative except for very short segments. Four examples follow:

- The National Park Service (NPS) rejected full consideration of an underground option for the Susquehanna to Roseland transmission line that crossed three NPS-protected areas because it concluded: "[The] cost would be five to eight times the cost of conventional

construction methods. Additionally, blasting the bedrock for an underground line could produce major irretrievable and irreversible impacts on geology."[27]

- In its Final Environmental Impact Statement (EIS) on the SunZia southwest Transmission Project, the Bureau of Land Management (BLM) found much higher cost multipliers (39 to 52 times the cost of overhead for one segment and 16 to 20 times the cost for another). In addition, it noted that the higher risk of operational problems and longer outage times for repairs was unacceptable for a circuit carrying bulk power to major load centers.[28]
- BLM also looked at an underground transmission option in its EIS on the Gateway West Transmission Project. It included a detailed discussion of the reasons it rejected an underground option as infeasible. Among the concerns it identified were: the more substantial environmental disturbance, including habitat disturbance associated with the need to perform excavation along the entire route, not just at structure locations and the potential for fluid leaks and pipe corrosion; the reliability and maintenance concerns associated with longer outages resulting from the inability to visually diagnose cable failures; costs that range from 10 to as much as 17 times the cost of overhead; technology-related concerns; and a more extended construction period.[29]
- In reasoning that has particular relevance here, the Department of Agriculture rejected an underground option for a small segment of a 125-mile transmission line for a Rural Utility Service project not only because of the greater cost, reliability and environmental concerns, but also because it would not eliminate already existing overhead transmission lines.[30]

In short, no EIS Northern Pass has identified has ever required an applicant to put a transmission line underground because of the many challenges that make such lines infeasible except for short segments, usually in developed areas.

5. Underground in Highway ROW

Some have suggested that, because existing highway routes are already disturbed, underground construction along such highway routes is a practical alternative to the Project as proposed by Northern Pass. In fact, the Proposed Route involves one 2,300 foot segment mostly under a state highway and one 7.5 mile segment along several state and locally maintained roads where there is no clearly available alternative. These underground portions that Northern Pass is proposing will present some significant construction challenges. However, there are no interstate highways in New Hampshire along the Proposed Route between the international border crossing and the delivery point in Deerfield that the Project could use in the way that the Northeast Energy Link (NEL) project envisions using I-95 in Maine.

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[27] Susquehanna to Roseland 500kV Transmission Line Right-of-Way and Special Use Permit Final Environmental Impact Statement, chap. 2, p. 68 (August 2012).
[28] BLM, Final Environmental Impact Statement and Proposed Resource Management Plan Amendments for the SunZia Southwest Transmission Project at 4-263 (June 2013).
[29] BLM, Final Environmental Impact Statement for the Gateway West Transmission Line Project at 2-129 – 2-138 (April 2013).
[30] RUS, Record of Decision, Proposed Hampton – Rochester – La Crosse 345 kV Transmission System Improvement Project at 12 (January 2013).

If the NEL project proceeds, it may be able to use a portion of I-95 that begins in Bangor, Maine and extends south to Massachusetts and southern New England, the location of the intended load. By contrast, the location of I-93 in New Hampshire does not accommodate the needs of the Project. In particular, I-93 is not located anywhere close to the entry point of the power at the U.S./Canadian border in northern New Hampshire.

To construct the Project underground along a highway in an area that the transmission line could carry the power from where it enters at the Canadian border to where it is needed, from Pittsburg to Deerfield, New Hampshire, also would entail some significant construction challenges, including dealing with river and stream crossings and culverts all along the route and disruption to the communities along the route. The most direct path would be along Route 3, from Pittsburg to Franconia, I-93 through Franconia Notch State Park to Concord, Routes 393/4/202 to Northwood and finally Route 107 to the vicinity of the Deerfield Substation, a distance of approximately 170 miles. To carry out the necessary construction activities using the large equipment required to do the job, extended road closures would likely be required in many areas. The impacts would range from nuisance delays for construction in the roadway shoulder area to single lane closures to multiple lane closures of a road for short periods of time. The challenges for construction seem to be nearly insurmountable in certain areas because of the volume of traffic, the lack of a bypass to reroute traffic and the limited construction area available along the roadway, particularly in the Franconia Notch State Park. Further, once the Project was operating, access to the underground cable would be required in order to operate and make repairs in the event of a cable failure.

An underground route along the highway in the area of the WMNF would be along I-93 through Franconia Notch State Park. There are no alternative roads in that area, and thus highway closures associated with construction and maintenance would be particularly burdensome, assuming necessary approvals to close I-93 could be obtained. Moreover, the large boring equipment necessary to carry out construction would encroach on parklands, and approval for that would likely be very difficult to obtain. Most importantly, in the end, visual impacts would not likely be significantly lessened in that the existing transmission line in the ROW through the WMNF would remain in place.

Finally, even where the highway ROW might be wide enough to bring the required equipment to the places where it was needed along the route, the construction costs at best might still be at the low end of EEI's estimate of the costs of underground construction, *i.e.*, five times more expensive than overhead construction. As noted above, other agencies have found much higher cost multipliers for underground construction, and the single 7.5 mile underground segment from Clarksville to Stewartstown that Northern Pass is proposing will add more than $100 million to the cost of the Project. Any substantially greater distance would be cost prohibitive and would not take into account the other economic, environmental, and practical realities.

6. Railroad ROW

Some have also suggested that Northern Pass could construct the Project along railroad ROWs in northern New Hampshire because the land is at a reasonable grade and is already disturbed.

Northern Pass reviewed the potential to use the railroad ROW for an overhead line in the portion of the North Section of the Project area where there is no pre-existing transmission ROW. The railroad ROW in this area is owned by two entities, the State of New Hampshire and a private

railroad operator. The portion that belongs to the State of New Hampshire has been taken out of active service. Some of it is used for rail car storage; on the rest, the track has been removed and the ROW is part of the state recreational trail system. It is possible that the State might be willing to share its ROW. However, the use of the approximate 13 miles of active track on the privately-owned section of the rail bed is uncertain at best, as a railroad operator of an active track can be expected to have legitimate concerns about any activity that could affect the stability of the rail system.

More importantly, even if both the State of New Hampshire and the private railroad operator were willing to share the railroad ROW, further expansion of this ROW would be required. The majority of the railroad track system in New Hampshire has a ROW width of 66 feet with the tracks centered in the ROW. The Project needs a ROW width of approximately 150 feet. Therefore, the alternative of using existing railroad ROW for an overhead line would require Northern Pass to significantly expand the ROW, resulting in the likely disruption or dislocation of businesses, homes and other structures that are located adjacent to the railroad ROW. With the passage of legislation in New Hampshire that removed eminent domain rights for the Project, it is extremely unlikely that the expanded ROW rights that would be needed could be secured along the entire portion of the North Section where there is no pre-existing ROW.

Northern Pass also considered whether an underground cable along the railroad ROW in the portion of the North Section where there is no pre-existing transmission ROW was feasible. However, in addition to having ROW limitations that would impede the installation of an overhead line along this portion of the Project, there are numerous other factors along the railroad ROW that would limit the ability to construct, operate and repair an underground cable. These factors include, but are not limited to, the following: the inability to satisfy requirements to maintain a safe distance between the track and a cable system; an elevated track which further limits the area available for construction; and the presence of 20 streams, three ponds and associated wetlands adjacent to the track, as indicated by a desktop survey. There are also six conservation areas along the railroad ROW that would have to be crossed. These factors affect a significant portion of the railroad ROW in the North Section where there is no existing transmission ROW. Finally, the same cost-prohibitive nature of extended underground segments would also apply to underground construction in the railroad ROW.

Use of a railroad ROW for the remainder of the Project is not an option because there are no continuous sections of railroad track in the general vicinity of the Proposed Route to get from the North Section to the South Section of the Project area. Specifically, in the Central Section, there is no railroad ROW in the area of Franconia Notch State Park in Franconia and Lincoln, nor in or near most of the WMNF.[31] Likewise, there is no railroad ROW in the vicinity of the Project's southern terminus at the Deerfield Substation.

For all of these reasons, railroad ROW for either an overhead or underground line is not a practical alternative; it is in effect a "no action" alternative.

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[31] *See* Exhibits 11 and 12 (showing the closest railroad).

7. Other Proposed Transmission Corridor

Some have suggested other proposed transmission projects as an alternative to the Project: (a) the proposed Champlain Hudson Power Express (CHPE) in New York; (b) the proposed Northeast Energy Link (NEL) in Maine, New Hampshire and Massachusetts; or the (c) Vermont Transmission Corridor. While the routes for those projects avoid the WMNF, none are feasible, nor would they serve the purpose and need of the Project.

a. Champlain Hudson Power Express

The CHPE project, which is being developed by Transmission Developers, Inc., a Canadian corporation, is a 1,000 MW HVDC project that will deliver largely hydropower from Québec into New York City to meet power requirements there. While CHPE is similar to the Project insofar as it would transmit low-carbon power generated in Canada into the United States, CHPE has a very different purpose and need: it is a merchant project that has been designed, sized and routed to serve only the downstate New York market, not the New Hampshire and New England markets that the Project is designed to serve.

CHPE's sole currently-planned converter terminal where power can be delivered is in Astoria, Queens, in New York City.[32] In its Order approving the CHPE project, the New York Public Service Commission supported its finding of public interest, convenience and necessity based on the CHPE project's "unique and substantial benefits" of "serv[ing] New York City load while displacing more-polluting generation sources, advanc[ing] major energy and policy goals as set forth in [New York] City's *PlaNYC 2030: A Greener, Greater New York* and in Commission and State documents, and rely[ing] almost entirely on private investment."[33] With that approval in hand, and based on statements from CHPE that "the permitting process remains on track with a goal of achieving all needed federal and state permits by the end of 2013,"[34] it is not reasonable to think that CHPE would put its project at risk by expanding the focus to include New England.

In addition to the very fundamental differences in the purpose and need for the two projects, there are multiple technical problems that make co-location of the two projects infeasible. CHPE is a 1,000 MW project. Any proposal that would more than double the transmission capacity now planned for CHPE—to enable it to also deliver the 1,200 MW of power Northern Pass seeks to deliver—would require a complete redesign of the project, an entirely new environmental analysis of the impacts of the new project, and an entirely new set of regulatory determinations concerning the economics and the

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[32] Early in the history of CHPE, there was a proposal to also deliver power to Connecticut. CHPE abandoned that idea in 2010 after determining that it was not financially viable. *See Supplement to Application of Champlain Hudson Power Express, Inc.,* Case No. 10-T-0139, at 2 (Jul. 22, 2010), *available at* http://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterCaseNo=10-T-0139.

[33] *Champlain Hudson Power Express, Inc.,* Order Granting Certificate of Environmental Compatibility and Public Need, Case No. 10-T-0139, at 100 (Apr. 18, 2013), *available at* http://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterCaseNo=10-T-0139.

[34] Champlain Hudson Power Express: Project Development Portal, *Champlain Hudson Power Express Receives Key New York State Permit, Achieves Another Major Milestone* (Apr. 18, 2013), *available at* http://www.chpexpress.com/press-releases/041813.php.

public interest of the project.[35] It is difficult to estimate what the environmental impacts of the much larger hypothetical combined project would be, but by way of example, Northern Pass notes that the underground elements of CHPE in particular would have to change dramatically to handle the larger project. Additionally, CHPE would have to run a line underwater in Long Island Sound to deliver power to New England, greatly complicating the technical and economic challenges.

Finally, Northern Pass has no ability to force the developer of CHPE to re-design its project to serve Northern Pass purposes as well. In short, the "common sense realities" of the situation, to which the courts have said federal agencies must pay attention in NEPA alternatives analyses, plainly demonstrate that combining the Project with CHPE is not a practical alternative.

b. Northeast Energy Link

In 2007, Bangor Hydro Electric Company, a subsidiary of Emera, Inc., and National Grid Transmission Services Corporation first announced their intention to build the Northeast Energy Link (NEL), a participant-funded 230-mile, 1,100 MW HVDC transmission line from Orrington, Maine to Tewksbury, Massachusetts, to deliver principally wind power into southern New England. NEL is similar to the Project insofar as it has been proposed as a participant-funded project that would deliver renewable energy into the New England market. NEL, however, is intended to be a vehicle for the development of wind resources in Maine, as well as a conduit for resources from New Brunswick, and not as a means to bring hydropower from Québec.

Although first announced six years ago, NEL is in the very early stages of development. As far as has been made public, there are no subscribers for NEL and, while the transmission line could facilitate the development of wind generation in Maine, the wind projects it would hope to serve do not yet exist, nor have they been proposed in response to the announcement of the plan to build NEL. The project likewise has neither filed nor obtained required Federal Energy Regulatory Commission (FERC) approvals for a Transmission Service Agreement (TSA), and it has not made an ISO-NE I.3.9 Proposed Plan Application to allow evaluation of its impact on the New England transmission system. By contrast, Northern Pass has fully subscribed the capacity of the Project; secured rights for the Proposed Route; completed a substantial part of the engineering design work; nearly concluded the I.3.9 review process; performed many environmental studies; filed applications with DOE, WMNF and FERC; received FERC approval for the Project's TSA; and engaged in many public discussions about the Project.

If the NEL project is ultimately successful, it will complement the Northern Pass Project, focused as it is on delivering wind power to southern New England. However, it is not a practical alternative to, a substitute for, nor a candidate for combination with the Project.

Finally, as is the case with CHPE, Northern Pass has no ability to force the developer of NEL to re-design its project to serve the Project's purposes.

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[35] The CHPE NEPA review is already well underway. According to DOE's EIS schedule for the CHPE project, a draft EIS is expected to be available for public comment in the summer of 2013. *See Project Schedule for DOE's Environmental Impact Statement for the Champlain Hudson Power Express Project*, *available at* http://chpexpresseis.org/schedule.php.

c. Vermont Transmission Corridor

The existing New England Hydro/Hydro Québec Phase I/Phase II ±450 kV HVDC transmission line runs south from the Canadian border through Vermont, New Hampshire and into Massachusetts where it can deliver up to 2,000 MW of power to New England. Northern Pass evaluated whether it might seek the right to share this ROW instead of developing a new route in New Hampshire. Based on this evaluation, Northern Pass concluded that the Vermont option was not viable because the existing ROW is not wide enough to also accommodate the Project, even if it were possible to relocate the existing lines. Additionally, much of the area it traverses in Vermont is now subject to conservation and recreational easement limitations that would in all likelihood preclude expansion of the ROW.

Because of the size limits of the existing ROW, in order to co-locate the two transmission projects a wholly new ROW, parallel to the existing Phase I/Phase II ROW, would have to be created. Creating this parallel path would require disturbance of conserved and undeveloped land and create such a wide ROW that it would result in potentially significant habitat fragmentation. Additionally, much of the ROW in Vermont is now conserved, which was not the case when the existing Phase I/Phase II project was built. It includes lands protected by the Kingdom State Forest, the Silvio O. Conte National Wildlife Refuge, West Mountain Wildlife Management Area, Victory State Forest and Victory Basin Wildlife Management Area.

While there are two possible ways a Vermont route might be brought into New Hampshire, neither provides a means to avoid conservation lands. The first would enter New Hampshire just north of Littleton where it would connect to an existing PSNH ROW and go east through Dalton. This route would connect to the proposed Project route southwest of the Whitefield Substation. The second Vermont alternative would follow the Vermont ROW to Littleton, where it would connect with an existing PSNH ROW and travel through Littleton and Bethlehem to Sugar Hill, where it would then connect with the proposed Project route.

For either Vermont alternative, expanding upon the existing Phase I/Phase II ROW would require traversing 15 more miles of conservation land than the Project's proposed route in New Hampshire and require up to 13 more miles of construction on land where there is no pre-existing ROW in Vermont than would be required in New Hampshire under the Northern Pass Proposed Route.

Given the conservation protections that apply to a significant amount of the land that would be needed to create as much as 53 miles of new ROW parallel to the existing ROW in Vermont, it would not be feasible to acquire it for a transmission line, even if disturbing such conserved land could be deemed environmentally preferable to the Proposed Route. Thus, the Vermont route is not a practical alternative; it is in effect a "no action" alternative.

8. Alternatives to the Project as a Whole

Northern Pass also examined the reasonableness of other alternative energy projects and strategies, as described below. These would not meet the Applicant's purpose and need, which is to build and operate a participant-funded transmission line to deliver 1,200 MW of competitively priced, clean, low-carbon, base-load power (approximately 98 percent hydropower) from Québec to New Hampshire and the rest of New England. Nor, are these alternatives practical answers to the need for

more low-carbon base-load energy. Northern Pass did not select these alternatives for the reasons described below.

a. Locally-based renewable energy projects, including wind, small hydro and solar

None of these resources would provide the large quantity of base-load power the Project is designed to deliver. It bears emphasizing that the Project does not compete with such renewable energy projects to the extent they are designed to meet the requirements of the New Hampshire Renewable Portfolio Standard, for which the Project does not qualify. Rather, the Project complements these emerging technologies.

b. Demand-side management (DSM) and energy efficiency

These activities do not replace base-load power and agencies are not required to consider them as alternatives to such base-load power.[36] Moreover, DSM is used for peak-load shaving, not base-load generation, and the New England states are already national leaders in energy efficiency. Namely, the New England states spent approximately $1.2 billion on energy efficiency between 2008 and 2011; and are expected to spend $5.7 billion between 2015 and 2021.[37] Even with that spending, ISO-NE predicts that between 2012 and 2021, peak demand is projected to grow at an annual rate of approximately one percent, or almost 2,300 MW.[38]

c. Natural gas-fired generation

ISO-NE has identified a host of reliability concerns that this increased dependence on natural gas-fired generation creates. For example:

- generators depend on non-firm transportation to save money, but that means the gas may not be there when needed;
- pipeline capacity into New England may be insufficient, creating a risk of supply disruptions;
- dispatch obligations often do not match fuel nominations, and there is an absence of no-notice service in pipeline tariffs;
- there are differences in timing between the electricity markets and pipeline nomination systems; and
- gas supply disruptions can arise from extreme weather events and unanticipated maintenance issues.[39]

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[36] *See Envtl. Law & Policy Ctr. v. NRC*, 470 F.3d 676, 682-84 (7th Cir. 2006).

[37] *ISO on Background: Energy-efficiency forecast*, at 10-21 (Dec. 12, 2012), *available at* http://iso-ne.com/nwsiss/pr/2012/ee_forecast_slides_final_12122012.pdf.

[38] *Id.*

[39] *Addressing Gas Dependence*, Discussion Draft, at 4-12 (July 30, 2012), *available at* http://www.naesb.org/pdf4/geh080212w1.pdf.

New England's dependence on gas is ISO-NE's number one concern.[40] As ISO-NE explained in its 2013 Regional Electricity Outlook, "the lack of dependable fuel arrangements by generators, limited on-site fuel storage or alternative fuel arrangements, and increasing constraints on the pipeline system have hindered the performance of New England's natural gas generators, creating serious, immediate risks to grid reliability."[41] Further, in its recent 2012/2013 Winter Reliability Assessment, the North American Electric Reliability Corporation found that, while New England "is not the only region in North America facing potential gas dependency and electric reliability issues, the issues are exacerbated there because of the swift switch to gas as the fuel of choice for power and relatively small firm pipeline capacity commitments from generators."[42] While ISO-NE is working toward solutions to the reliability issues, the addition to the market of 1,200 MW of clean, low-carbon, base-load generation that does not suffer from any of these problems must be seen as welcome among those responsible for reliable operation of the grid in New England.

9. No Action Alternative

The no action alternative, not constructing the Project, would obviously eliminate the Project's direct impacts to environmental, historical and cultural resources in the area along the new proposed route.[43] However, that would be at the expense of losing the Project's capacity for delivering 1,200 MW of clean, low-carbon, base-load power and achieving the policy objectives of improving regional fuel diversity and meeting Regional Greenhouse Gas Initiative (RGGI) goals, as well as bringing significant economic and fiscal benefits to New Hampshire and the rest of New England.

The injection of reliable, renewable power from the Project will help the New England region meet its future load growth needs. FERC has identified numerous benefits from the Project, including: increasing competition by offering New England customers an additional supply resource; mitigating system overloads; and lowering wholesale market power prices in New England by allowing more energy to be imported from Québec during peak hours when marginal generation costs and market-clearing prices are the highest. Northern Pass can also help mitigate energy market price volatility, which is often driven by the price of fossil fuel-based sources of power, as well as the newly emerging reliability concern of over-reliance on natural gas in the New England power market. At the same time, the addition of 1,200 MW from the Project to the regional energy mix would allow the retirement of older, less efficient, fossil fuel plants.

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[40] *ISO-NE Regional Update: New Hampshire SB 381 Commission*, at 36 (Aug. 30, 2012), *available at* http://www.iso-ne.com/pubs/pubcomm/pres_spchs/2012/sb361_nh_studycom_8_30_12.pdf.

[41] *ISO-NE 2013 Regional Electricity Outlook*, at 16 (Jan. 31, 2013), *available at* http://www.iso-ne.com/committees/comm_wkgrps/strategic_planning_discussion/materials/2013_reo.pdf. ISO-NE executive vice president and chief operating officer, Vamsi Chadalavada, recently explained that "[t]he underlying issue in New England is that gas pipeline capacity is inadequate to keep prices steady in times of high home heating demand." Matthew L. Wald, *In New England, a Natural Gas Trap*, N.Y. TIMES, Feb. 15, 2013, *available at* http://www.nytimes.com/2013/02/16/business/electricity-costs-up-in-gas-dependent-new-england.html.

[42] North American Electric Reliability Corp., *2012/2013 Winter Reliability Assessment*, at 7 (Nov. 2012), *available at* http://www.nerc.com/news/Headlines%20DL/2012-2013%20Winter%20Reliability%20Assessment.pdf.

[43] Note, however, that, the no action alternative would not result in the cancellation, or delay in construction, of any hydroelectric generation facilities in Canada. The power to be delivered by the Project into New England will be comprised of Hydro Québec system power, including approximately 98 percent hydropower, including run-of-river and large hydro resources available to Hydro Québec.

With RGGI's recent proposal to lower the regional CO_2 emissions cap by 45%, the need to develop sources of low-carbon, renewable power and the need to reduce reliance on fossil fuels are greater than ever. The Project is expected to reduce regional CO_2 emissions by up to five million tons per year. Without this help in meeting RGGI's lower future targets, other transmission lines that would likely have environmental, historical and cultural resource impacts of the same character and magnitude as those created by the Project would need to be built to deliver that power.

Executive Order 12866 directs federal agencies to consider the costs and benefits of their regulatory actions, and an interagency working group of eleven federal agencies, including the Department of Energy, recently concluded that the "social cost of carbon" has a 2015 value of between $12 and $109 per ton of CO_2 emitted.[44] Because approval of Northern Pass will result in the avoidance of up to 5 million tons of CO_2 each year, using the social cost of carbon measure, failure to approve the Project would result in lost benefits valued at as much as $60 million to $545 million a year.

Additionally, without this Project's capacity to bring Hydro-Québec's excess hydropower to the U.S., in order to satisfy future load growth and provide the same level of service from non-intermittent power sources, new power plants would likely need to be built. In summary, as a practical matter the no action alternative does not really serve to avoid impacts; it will only result in similar and potentially more significant impacts to environmental, historical and cultural resources. Based on the Project's combination of characteristics and benefits, the no action alternative is a poor option.

Item 13(c) — Necessity to Cross Federal Lands

As noted above, the Northern Pass Transmission Line must cross federal lands, including the AT. The Proposed Route has the lowest impact on the AT because the crossing of the AT for the proposed route would occur at the same location as an existing transmission corridor crossing pursuant to an existing private transmission line easement. The Proposed Route requires crossing other federal lands within the WMNF, but only along and within the path of the Corridor.

The transmission line is consistent with the 2005 White Mountain National Forest Plan directive that prohibits new utility lines or rights-of-way from crossing the AT "unless they represent the only feasible and prudent alternative to meet an overriding public need." *See* WMNF Forest Plan Management Area Direction for MA 8.3 at 3-48 (2005).

1. Overriding Public Need

The Northern Pass meets public needs and interests because there is a public need and interest for reducing greenhouse gas emissions; decreasing reliance upon fossil fuels and increasing use of low-carbon energy sources; obtaining low-carbon energy from Canada; and increasing the reliability of electricity in New England. Together, these needs and interests constitute an overriding public need.

A) Public need to reduce greenhouse gas emissions. Not only is the increased supply of low-carbon energy consistent with the stated public interests of the New England states, it satisfies a public

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[44] U.S. Government Interagency Working Group on Social Cost of Carbon, *Technical Support Document: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis under Executive Order 12866* at 3. (May 2013).

need by assisting these states in meeting their statutory greenhouse gas emission caps. For example, the New Hampshire legislature recently agreed to changes in the Regional Greenhouse Gas Initiative (RGGI), a New England-wide carbon dioxide (CO_2) cap and trade program, which would lower the 2014 regional CO_2 cap by 45%.[45] Even without these changes, the overall RGGI cap will decrease by 2.5% per year by 2015, for a total reduction of 10% by 2018. Other New England states further limit their greenhouse gas emissions. In Connecticut, the legislature has mandated that greenhouse gases must be 80% below their 2001 level by January 1, 2050.[46] And in Massachusetts, by 2020 greenhouse gas emissions must be between 10% and 25% below the 1990 emissions level.[47]

By providing 1,200 MW of low-carbon base-load power to New England, the Project will meet the public need to reduce greenhouse gases by reducing the reliance on more traditional sources of electricity. Specifically, the Project is expected to reduce CO_2 emissions in New England by up to 5 million tons a year and allow the retirement of older, less efficient, fossil fuel plants that create large amounts of greenhouse gases.

B) Public interest in decreasing reliance upon fossil fuels generally by increasing the use of low-carbon energy sources. The United States, and specifically, the New England states, have determined that increasing their use of low-carbon, renewable energy sources is in the public interest for many reasons, including as stated above, reducing greenhouse gas emissions. The United States Congress has found "that it is in the national security and economic interest of the United States to foster greater efficiency in the use of available energy supplies and greater use of renewable energy technologies."[48] The New Hampshire legislature has found that "employing low emission forms of such technologies can reduce the amount of greenhouse gases, nitrogen oxides, and particulate matter emissions transported into New Hampshire and also generated in the state, thereby improving air quality and public health, and mitigating against the risks of climate change."[49] In Massachusetts, the public purpose and public interests include "the use of renewable energy by electricity customers in the commonwealth."[50] In Rhode Island, the General Assembly found that "(a) The people and energy users of Rhode Island have an interest in having electricity supplied in the state come from a diversity of energy sources including renewable resources; (b) Increased use of renewable energy may have the potential to lower and stabilize future energy costs; (c) Increased use of renewable energy can reduce air pollutants, including carbon dioxide emissions, that adversely affect public health and contribute to global warming."[51]

Hydro-Québec's hydroelectric generating facilities are such low-carbon, renewable energy sources, and the expansion of their use—which will be accomplished by this Project—will meet a public interest.

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[45] *See* RGGI News Release, *RGGI States Propose Lowering Regional CO_2 Emissions Cap 45%, Implementing a More Flexible Cost-Control Mechanism* (Feb. 7, 2013), *available at* http://www.rggi.org/docs/PressReleases/PR130207_ModelRule.pdf. In order for the updated RGGI requirements to take effect, the nine RGGI states, including all six New England states, will need to revise their CO_2 trading programs through their individual state-specific statutory and regulatory processes, and have such revisions take effect on January 1, 2014.

[46] *See* C.G.S.A. § 22a-200a.

[47] *See* M.G.L.A. 21N § 4(a).

[48] 42 U.S.C. § 12001(a).

[49] N.H. Rev. Stat. § 362-F:1.

[50] M.G.L.A. 23J § 9(d).

[51] Rhode Island Gen. Laws 1956, § 39-26-1.

C) Public interest in obtaining this low-carbon energy from Canada. Obtaining low-carbon, renewable energy from Canada is also a public interest. The New Hampshire Climate Action Plan specifically recommended the construction of high voltage transmission lines to bring hydropower and wind power from Canada as a complementary strategy to the development of non-carbon emitting sources of power in New Hampshire.[52] Consistent with the benefits from the Project as stated above, the New Hampshire Climate Action Plan recognizes that the importation of electricity from Canadian hydropower and wind resources "could provide new power sources to offset future local and regional growth and facilitate retiring or curtailing the operation of fossil fuel-fired plants in New England."[53] Similarly, the New England Governors' Renewable Energy Blueprint notes that New England's long history of collaborative working relationships with its Canadian neighbors will help it bring cost-effective, secure, low-carbon resources to the New England market and "it will make sense to expand our level of cooperation on energy development and trade, particularly with respect to accelerated commercialization of the vast amounts of on- and offshore renewable resources in the Northeast and in Eastern Canada."[54] By bringing low-carbon energy from Canada, the Project meets this public interest.

In sum, by bringing affordable low-carbon energy to the New England states, the Project reduces costs to ratepayers both from the development of more costly low-carbon energy and the continued use of traditional energy sources.

D) There is a public and national interest in increasing the reliability of electricity in New England. The public has a strong interest in the development of a reliable energy supply. In fact, the President recently noted (while discussing the public interest in a modernized grid), that improving energy reliability will allow the United States "to minimize power outages and manage cyber-security threats." [55] The Project will improve the reliability of electricity in New England, as the Federal Energy Regulatory Commission (FERC) recently found. FERC found, for example, that this Project "will reduce congestion between Quebec and New England and facilitate integration and delivery of low-cost hydro-electric power. In addition, we find that with the addition of hydro-electric power to the base case, the existence of the [Project] will help mitigate overloads."[56] FERC also found that the Project "will not only diversify New England's power supply mix, but it will also allow more energy imported from Quebec to be delivered during peak hours when marginal generation costs and market-clearing prices are highest."[57]

For all the reasons stated above, the Project satisfies the long-term needs of society as a whole; satisfies a need recognized as critical by both federal and state governments; addresses and promotes national energy goals; and reduces impacts and harms to the public. As such, the Project meets an overriding public need.

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[52] *See New Hampshire Climate Action Plan*, at 44 (Mar. 2009). *Available at* http://des.nh.gov/organization/divisions/air/tsb/tps/climate/action_plan/nh_climate_action_plan.htm.
[53] *Id.*
[54] *New England Governors' Renewable Energy Blueprint*, at 11, 40-41 (Sept. 15, 2009). *Available at* http://nescoe.com/Blueprint.html
[55] Presidential Memorandum – Transforming our Nation's Electric Grid Through Improved Siting, Permitting, and Review (June 7, 2013). *Available at* http://www.whitehouse.gov/the-press-office/2013/06/07/presidential-memorandum-transforming-our-nations-electric-grid-through-i
[56] *Northern Pass Transmission LLC*, 134 FERC ¶ 61,095 at P26, Dkt. No. ER11-2377-000 (2011). *Available at* http://nuwnotes1.nu.com/apps/financial/nuinvest.nsf/0/E12877EA184717EF8525783700662895/$FILE/February%2011,%202011%20FERC%20decision%20on%20Northern%20Pass%20TSA.pdf
[57] *Id.* at P40.

Together, these needs and interests constitute an overriding public need. The federal courts have recognized that certain public interests may be considered overriding. Like other public interests the federal courts have found to be overriding, increasing the use of low-carbon, reliable energy serves the long-term needs of society as a whole, and thus constitutes an overriding public need – a fact recognized by both the federal government, the states and courts. For instance, the Corps of Engineers' regulations recognize energy needs as a national interest that may be "of overriding national importance."[58]

Importantly, the public could be harmed without the Northern Pass' low-carbon energy. This potential for harm without the Project demonstrates that the Project meets an overriding public need. For example, if the New England states want to meet their statutory greenhouse gas targets without the Project, they would have to increase their use of other, significantly more expensive, low-carbon energy sources. Moreover, with the recently announced closing of Vermont Yankee in 2014, New England will lose 605 MW of current low-carbon nuclear power. And, due to similar economic factors, it is possible that other New England nuclear power plants could follow Vermont Yankee into retirement. In addition, if the New England states choose not to switch to other low-carbon energy sources, they may still need to build additional fossil-fuel power plants to satisfy future load growth and provide the same level of service from non-intermittent power sources. In addition to the costs of such plants, the production and burning of these fossil fuels would increase carbon dioxide emissions, which will "adversely affect public health and contribute to global warming."[59] Failing to cut carbon dioxide emissions will also cost the states and the public money. The Department of Energy recently concluded that the "social cost of carbon" has a 2015 value of between $12 and $109 per ton of CO_2 emitted.[60] Because approval of Northern Pass will result in the avoidance of up to 5 million tons of CO_2 each year, using the social cost of carbon measure, failure to approve the Project would result in lost benefits valued at as much as $60 to $545 million a year.

2. Lack of Feasible and Prudent Alternatives

The Forest Service does not define the meaning of the term feasible and prudent alternative. The same term "feasible and prudent alternative" has been examined by numerous courts under Section 4(f) of the Department of Transportation Act of 1966. Though not directly applicable, an examination of that same phrase in that different context demonstrates that an alternative that does not cross the AT is neither feasible nor prudent.[61]

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[58] *See* 33 C.F.R. § 320.4(j)(2); *see also Hoosier Environmental Council, Inc. v. U.S. Army Corps of Engineers,* 105 F.Supp.2d 953, 988 (S.D.Ind. 2000) (discussing regulation and stating "[t]he types of issues considered to be of overriding national importance include, but are not limited to, national security, navigation, national economic development, water quality, preservation of special aquatic areas with significant interstate importance, and national energy needs"). In addition, the Supreme Court has held that the implementation of statutes design to better meet energy needs, including by reducing energy costs, pursue an overriding public interest. *See First Iowa Hydro-Electric Cooperative v. FPC*, 328 U.S. 152, 171-74, 180 (1946) (holding there is an overriding public interest in implementing the Federal Power Act, whose goals included reducing energy costs).

[59] *See* Rhode Island Gen. Laws 1956, § 39-26-1(c); *see also id.* § 23-82-2(2) ("Climate changes pose serious health risks to humans, as well as danger to ecosystems worldwide").

[60] U.S. Government Interagency Working Group on Social Cost of Carbon, *Technical Support Document: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis under Executive Order 12866* at 3. (May 2013).

[61] *See Citizens to Preserve Overton Park, Inc. v. Volpe*, 401 U.S. 402 (1971), *overruled on other grounds*; *Safeguarding the Historic Hanscom Area's Irreplaceable Resources, Inc. v. F.A.A.*, 651 F.3d 202, 211 (1st Cir.

Feasibility is a matter of technical concern: under the Department of Transportation Act there is no "feasible" alternative if "as a matter of sound engineering," a highway could not be built along any other route. Further both as a matter of language interpretation and as used in the Department of Transportation Act context, prudence "involves a common sense balancing of practical concerns."[62]

An alternative route that does not cross the AT is neither feasible nor prudent. First, prudent alternatives must accomplish the purposes of the project.[63] Here the Project's purpose is to build and operate a participant-funded transmission line to deliver 1,200 MW of competitively priced, clean, low-carbon, base-load power (approximately 98 percent hydropower) from Québec to New Hampshire and the rest of New England. Any alternative that cannot accomplish the transmission of this clean power from Québec to New Hampshire is not prudent. This includes the other proposed transmission corridors listed in Alternative 11 (the Champlain Hudson Power Express, Northeast Energy Link, and the Vermont Transmission Corridor); the alternative energy projects and strategies listed in Alternative 12 (locally-based renewable energy projects, demand-side management, and natural gas-fired generation); and the no-action alternative because none of these will result in the transmission of clean hydroelectric power from Québec to New Hampshire.

Second, an alternative that creates more environmental impacts, particularly to parks and historic sites, cannot be prudent. In *Concerned Citizens Alliance v. Slater*, the Third Circuit Court of Appeals found that community and environmental disruption from additional construction associated with an alternative suggested that the alternative was neither prudent nor feasible.[64] Moreover, "[a]n alternate route that also impacts upon parks and historic sites is not an 'alternative to the use' of such property."[65] As noted above, an accumulation of such impacts rather than one overwhelming issue can make an alternative imprudent.[66] Pursuant to this standard, the Alternative Route Bypassing WMNF (Alternative 2) is imprudent because, as described in Item 13(b)(2), it crosses the AT as well—but with considerably

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2011)(analyzing term pursuant to Section 4f); *Neighborhood Ass'n of the BackBay, Inc. v. Federal Transit Administration*, 463 F.3d 50, 65 (1st Cir. 2006)(analyzing term pursuant to Section 4f). Under Section 4(f), the Secretary of Transportation may authorize use of federal funds to finance construction of highways through public parks only if no feasible and prudent alternative exists. *See* 49 U.S.C. § 303(c); 29 U.S.C. § 138(a).

[62] *Committee to Preserve Boomer Lake Park v. Dep't of Transportation,* 4 F.3d 1543, 1550 (10th Cir. 1993).

[63] *BackBay*, 463 F.3d at 65; *see also Committee to Preserve Boomer Lake Park*, 4 F.3d at 1551 ("Similarly, if an alternative does not satisfactorily fulfill the purposes of the project … then the alternative may be rejected"); *City of Bridgeton v. FAA*, 212 F.3d 448, 461 (8th Cir.2000) (an alternative "that does not effectuate the project's purposes is, by definition, unreasonable, and need not be evaluated in detail under 4(f)"); *Arizona Past and Future Found., Inc. v. Lewis*, 722 F.2d 1423, 1428 (9th Cir.1983) ("Alternatives that do not accomplish the purposes of the project may properly be rejected as imprudent.").

[64] *Concerned Citizens Alliance, Inc. v. Slater*, 176 F.3d 686, 704 (3d Cir. 1999).

[65] *Druid Hills Civic Ass'n, Inc. v. Federal Highway Admin*., 772 F.2d 700, 715 (11th Cir. 1985).

[66] *See Safeguarding the Historic Hanscom Area's Irreplaceable Resources*, 651 F.3d at 213 ("even if none of the factors cited by the FAA, standing alone, would justify its finding that adaptive reuse is imprudent, that finding would still be supported by the totality of the factors."); *see also Hickory Neighborhood Defense League v. Skinner*, 910 F.2d 159, 163 (4th Cir. 1990) (accumulation of problems may be sufficient reason to reject an alternative as imprudent); *Committee to Preserve Boomer Lake Park*, 4 F.3d at 1551 ("[a]lthough none of these factors alone is clearly sufficient justification to reject the alternatives in this case, their cumulative weight is sufficient to support the Secretary's decision."); *Eagle Foundation v. Dole*, 813 F.2d 798, 805 (7th Cir. 1987) ("It would be imprudent to build around the park if the Secretary were convinced that the aggregate injuries caused by doing so exceeded those caused by reducing the size of the park. Even a featherweight drawback may play some role.").

more environmental impacts than the Project without eliminating the already existing transmission line in the same corridor.

The alternatives that remain present serious technical problems that make them infeasible – namely: placing the line under the AT, placing the line underwater, placing the line under a highway ROW, or following the railroad ROW. A discussion of the feasibility and prudence of each of these alternatives follows:

a) Placing the transmission line under the AT

Placing the line under the AT would create a host of technical construction problems and environmental impacts to the WMNF.[67] It requires cable trenching or directional boring, which involves more extensive and permanent disruption of the affected National Forest land. It requires terrain that is accessible by large equipment along the length of the right-of-way and relatively flat terrain every 1,800 feet for splicing locations. And placing the line under the AT requires two transition stations, using slightly less than an acre apiece, in the vicinity of the AT crossing. These transition stations would not fit into the existing Corridor and would require additional clearing.

The disruption to the WMNF created by placing the line under the AT – including roads, large equipment, and potentially flattening areas – means the alternative is not prudent and feasible. Such disruptions can be contrasted with the minimal disruption that adding another line to an existing PSNH line crossing will create. Moreover, the potential technical construction problems and terrain requirements mean that, as a matter of sound engineering, it may not be feasible to construct the line under the AT.

b) Placing the transmission line underwater

As described in more detail in Item 13(b)(5), the underwater option is not technically feasible for the Project because the Connecticut River, the largest north-south waterway in the relevant area, which runs along the Vermont/New Hampshire border, can only be navigated by shallow draft vessels above Enfield, Connecticut. Such shallow draft vessels cannot accommodate the equipment needed to install an underwater cable. There is no alternative waterway.

c) Placing the transmission line under highway ROWs

The Project will involve one 2,300 foot segment mostly under a state highway and one 7.5 mile segment along several state and locally maintained roads where there is no clearly available alternative. These underground portions that Northern Pass is proposing will present some significant construction challenges. However, for the remaining portions of the northern route, there are no interstate highways the Project could utilize in New Hampshire along the proposed route between the international border crossing and the delivery point in Deerfield. Specifically, the location of I-93 in New Hampshire does not accommodate the needs of the Project. In particular, I-93 is not located anywhere close to the entry point of the power at the U.S./Canadian border in northern New Hampshire. Moreover, as described in Item 13(b)(6), constructing the transmission line under state and local highway ROWs present numerous technical and logistic challenges: these include the need

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[67] *See infra, Item 13(b)(4).*

for extended road closures for construction and the lack of bypass routes; the limited construction area available along many portions of the roadway, particularly in the Franconia Notch State Park; complex river and stream crossings and culverts; and disruption to the communities along the route. These challenges are so numerous as to make this alternative imprudent. And, again, this is an area where there is already an existing transmission line.

d) Placing the transmission line along the railroad ROW

Using the railroad ROWs in New Hampshire presents a number of legal and technical problems, as described in Item 13(b)(6). Most importantly for the portions of the route near WMNF, there are no continuous sections of railroad track in this area, including near the AT.

Item 14 — Similar Projects

Northern Pass has no pending applications for similar projects that may provide information to the Forest Service. Northern Pass, LLC is wholly owned by NU Transmission Ventures, Inc., which is, in turn, a wholly-owned subsidiary of Northeast Utilities, a public utility holding company. Northeast Utilities has another subsidiary, PSNH, which holds Special Use Permit WTM0759. Northern Pass proposes to construct the Northern Pass Transmission Line within the permit area described in Special Use Permit WTM0759 and within existing private easements held by PSNH. As noted in the Screening Submittal, location of the Northern Pass Transmission Line within that permit area will require relocation of the existing 115 kV transmission line within the Corridor. PSNH does not oppose such relocation, and Northern Pass will bear the expense and furnish the resources to effect the relocation. Northern Pass is not aware of any other similar projects across the WMNF.

Item 15 – Statement of Need/Public Benefit

1. Statement of Need

The purpose of the Project is to build and operate a participant-funded transmission line to deliver 1,200 MW of competitively priced, clean, low-carbon, base-load power (approximately 98 percent hydropower) from Québec to New Hampshire and the rest of New England, while maximizing use of existing private easements and other existing rights-of-way to the greatest extent practicable based upon considerations of public health, the environment, and reliability.

There is a clear public need in New England for this additional source of economic, low-carbon, base-load power, as described below in Item 15(3).

2. Costs of Project and Alternative

The portion of the Northern Pass Transmission Line Project through the WMNF is anticipated to cost $67.8 million. Northern Pass estimates that an alternative, undergrounding the Project through the WMNF, would cost at a minimum approximately five to ten times as much.[68] Given the construction environment within the WMNF, these costs would likely be at the higher end of that range.

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[68] *See* Edison Electric Institute, *Out of Sight, Out of Mind 2012*, at iv (Jan. 2013).

3. Public Benefits of Project

a) Public energy benefits

The Northern Pass will provide low-carbon, affordable energy to over 1 million homes. Moreover, the end user of the Project provides direct benefits to the public. The Project will benefit the public users of this public utility by improving New Hampshire and New England's fuel diversity mix and lessening dependence on natural gas by providing a reliable source of low-carbon energy at competitive prices for the long-term, and reducing risk to the available fuel supply to the electric generation fleet on very cold winter days.

b) Climate and environmental benefits

The Project will provide numerous climate and environmental benefits, as described below and in Item 13(c)(1). First, the Project will help satisfy the requirements and goals of several important state and regional climate policies, including:

- New Hampshire Climate Action Plan
- RGGI's greenhouse gas emissions reduction targets
- New England Governors' Renewable Energy Blueprint

The Project has other important benefits as well. For example, it will help to respond to the nearly 8,300 MW of potential coal- and oil-fired generation retirements that ISO-NE faces between now and 2020.[69] In addition, it will increase fuel diversity in New England, which has become increasingly dependent on natural gas for power generation. The region's heavy dependence on natural gas raises serious questions about the reliability of power delivery because the gas is also needed for home heating and industrial uses.[70]

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[69] *ISO New England's Strategic Transmission Analysis, New England Electricity Restructuring Roundtable: Generation Retirement Study & 2020 Resource Options,* at 4 (June 14, 2013), *available at* http://www.iso-ne.com/pubs/pubcomm/pres_spchs/2013/final_rourke_raab_061413.pdf.

[70] In testimony before the NH House Energy and Commerce Committee Subcommittee on Energy and Power on March 19, 2013, the President of ISO-NE pointed out that, without any unusual demand or weather conditions, in January and February 2013, the region experienced serious physical constraints in moving needed natural gas into the region and that wholesale electricity prices rose 100% and 300% respectively above 2012 levels for those months when generators could not get fuel to run. Testimony at 6, *available at* http://docs.house.gov/meetings/IF/IF03/20130319/100527/HHRG-113-IF03-Wstate-vanWelieG-20130319-U1.pdf. Commissioner Michael Harrington of the New Hampshire Public Service Commission explained that, during both months, New Hampshire "came very close" to having rolling blackouts "because of the natural gas shortages. David Brooks, *New England came close to 'rolling blackouts' in January and February snowstorms*, THE NASHUA TELEGRAPH, Mar. 17, 2013, *available at* http://nashuatelegraph.com/business/997183-464/new-england-came-close-to-rolling-blackouts.html. ISO-NE Internal Market Monitor, *2012 Annual Markets Report,* at 3 (May 15, 2013), *available at* http://www.iso-ne.com/markets/mkt_anlys_rpts/annl_mkt_rpts/2012/amr12_final_051513.pdf (explaining that "[t]he region's use of natural gas for about half its electric energy has revealed both operational difficulties in coordinating the purchase and delivery of the fuel that generators need each day and the potentially insufficient infrastructure to supply all the natural gas the region's residential, commercial, industrial, and electric sectors demand during peak periods.").

The region will derive still further benefit from the fact that the 1,200 MW of power that the Project delivers will be competitively priced. According to a 2010 report by Charles River Associates, the Project is expected to reduce the wholesale price of power throughout New England by between $206 million and $327 million annually.[71]

Power flows will be base-load, not intermittent in the way that wind and solar power are. Over the long term, the Project will also help to meet future load growth requirements, and it may avoid or defer the need to construct new fossil fuel plants and associated transmission projects that would otherwise be required to produce an equivalent quantity of reliable power.

In its various rulings on the Project, FERC recognized the important benefits the Project will provide. For example, FERC noted: "this Project does not limit competition; in fact, we find that it does the opposite and increases competition by offering New England customers an additional supply resource."[72] In a subsequent decision, FERC also recognized other benefits the Project will bring to the region, noting that it will "reduce[] price volatility and lower locational marginal prices (LMP) in New England."[73]

FERC also identified a number of specific benefits to the regional power grid. It noted, for example, that the Project "will reduce congestion between Quebec and New England and facilitate integration and delivery of low-cost hydro-electric power. In addition, we find that with the addition of hydro-electric power to the base case, the existence of the [Project] will help mitigate overloads."[74] Finally, FERC commented that the Project "will include making available up to 1,200 MW of hydro-electric power previously unavailable from Quebec. The [Project] will not only diversify New England's power supply mix, but it will also allow more energy imported from Quebec to be delivered during peak hours when marginal generation costs and market-clearing prices are highest."[75]

In its recent report titled "Quantifying the Value of Hydropower in the Electric Grid: Final Report," the Electric Power Research Institute (EPRI) noted that hydroelectric resources "contribute significantly to the reliability of the grid in terms of energy, capacity, and ancillary services."[76] Among the specific potential hydropower benefits the EPRI report identified are: addressing other generation and load variability; providing scheduling that helps to optimize energy and ancillary services; providing fast regulation response; and, as noted above, adding generation diversity. Northern Pass is able to contribute positively to the New England grid in each of these respects.

The Project's use of HVDC technology also offers important benefits. Because it is asynchronous with the AC portion of the grid, the DC link will provide system support and may be able

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71 *LMP and Congestion Impacts of Northern Pass Transmission Project*, at 31 (Dec. 7, 2010). *Available at* http://www.puc.nh.gov/Regulatory/CASEFILE/2010/10-261/TRANSCRIPTS-OFFICIAL%20EXHIBITS-CLERKS%20REPORT/10-261%202012-05-08%20EXH%20TRANSCANADA-5%20LMP%20AND%20CONGESTION%20IMPACTS%20OF%20NOTHERN%20PASS%20TRANSMISSION%20PROJECT%20FINAL%20REPORT.PDF.

72 *Northeast Utils. Serv. Co. & NSTAR Elec. Co.*, 129 FERC ¶ 61,279 at P 22(2009).

73 *Northern Pass Transmission LLC*, 134 FERC ¶ 61,095 at P 5(2011).

74 *Id.* at P 26.

75 *Id.* at P 40.

76 EPRI, *Quantifying the Value of Hydropower in the Electric Grid: Final Report*, at 2-4 (Feb. 2013), *available at* http://www.epri.com/abstracts/Pages/ProductAbstract.aspx?ProductId=000000000001023144.

to limit the effects of a cascading blackout. Under most operating conditions, it also experiences lower line losses (loss of power in the transmission process) over like distances compared to an AC line of similar voltage.

b) Economic and fiscal benefits

The Project will bring significant economic and fiscal benefits to New Hampshire both during its construction phase and throughout the period the Project is operational. The Project will create an estimated 1,200-1,500 New Hampshire jobs during project construction. Among the jobs that will be created are: construction and forestry jobs, as well as professional and technical services jobs.[77] New economic activity in retail, accommodation and food services and other sectors is also expected, adding approximately $56 million to $69 million annually to New Hampshire household earnings during the construction phase.[78] The Project will also reduce energy costs for New Hampshire customers, saving New Hampshire residential and business customers $20 to $35 million annually. This in turn is expected to result in the creation of an additional 200 jobs in New Hampshire each year the line is in operation.[79]

Once the Project is operational, it will add significantly to the tax base for both the State of New Hampshire and the 31 municipalities in which Project facilities will be located. Project property values will contribute approximately $28 million dollars in new tax revenues annually in the form of local, county, and state education taxes for the towns through which the line will pass. Over the 40-year life of the TSA with HRE, the added tax revenues to the state and local governments could total as much as $1.1 billion.[80]

Item 16 — Probable Effects on Population

Northern Pass has described anticipated impacts in the Screening Proposal. Northern Pass has endeavored to minimize impacts to social and environmental resources, while balancing the priorities of the communities, state and federal agencies, and environmental organizations. The preferred Northern Pass Transmission route uses the footprint of the existing utility corridors to the extent practicable, particularly in the WMNF. This minimizes the impact of the Project. As proposed, the Project would cross the AT within the WMNF at the location of an existing AT transmission crossing within the Corridor, thereby minimizing environmental, visual and recreational impacts to the trail. PSNH has an existing private easement for the Corridor in the location of that AT crossing, and Northern Pass

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[77] *Proposed Northern Pass Transmission Project Economic Impact Update: Estimated New Hampshire Jobs During 3 Year Construction Phase*, at 4 (Apr. 2011), *available at* http://www.northernpass.us/home/uploaded_file/Job_Impact_Study_April_2011_Final.pdf. The New Hampshire State Building and Construction Trades Council has stated that the Project will bring "overwhelming economic benefits to New Hampshire and countless local communities," and that "one of the biggest benefits of the Northern Pass project is its need for in-state labor…. New Hampshire's loggers, builders, equipment operators and laborers can all fill essential roles in the construction of the transmission line." Joe Casey, *Ignore the Northern Pass Fear and Rhetoric*, N.H. BUS. REV., Feb. 11, 2011, *available at* http://www.nhbr.com/February-11-2011/Ignore-the-Northern-Pass-fear-and-rhetoric/.

[78] *Preliminary Economic and Fiscal Impacts of the Proposed Northern Pass Transmission Project*, at 3 (Oct. 2010), *available at* http://www.northernpass.us/pdf/NH_Economic_Impact_Study.pdf.

[79] *Proposed Northern Pass Transmission Project Economic Impact Update*, *Estimated New Hampshire Jobs During 3 Year Construction Phase*, at 1 (Apr. 2011).

[80] This estimate assumes that tax rates remain at current levels.

anticipates it will be able to use that easement for its HVDC line under a separate arrangement with PSNH.

The Northern Pass project will have positive socio-economic effects. An estimated $28 million a year in additional tax revenues will come into New Hampshire, to towns that are struggling today to provide basic services. Those tax revenues can be used for schools, public safety, and to help maintain the infrastructure of New Hampshire. New Hampshire will also see additional positive economic benefits in the form of energy cost reductions. In fact, a study by Charles River Associates on the impact of the Northern Pass Transmission Line estimates a wholesale energy cost reduction to New England of $200-300 million (New Hampshire savings of $25-30 million).[81]

In addition the influx of money into New Hampshire generated by new jobs and companies that are drawn to the area for robust and renewable power will help stimulate the economy. The Project will also improve New Hampshire and New England's fuel diversity mix and provide a reliable source of low-carbon energy at competitive prices for the long-term, with enough renewable energy to power 1 million homes. According to the Charles River Associates report that was filed by Northern Pass with the Federal Energy Regulatory Commission in connection with the Project:

> New England relies very heavily on natural gas for its electricity supply: 32 percent of annual generation. More importantly, natural gas is on the margin during more than 60 percent of the pricing intervals. New England has little gas storage, and New Englanders also rely heavily on natural gas as a heating fuel, so there is a potentially serious risk to the available fuel supply to the electric generation fleet on very cold winter days. The [Northern Pass Transmission] Project would reduce the reliance on natural gas and so reduce the risk of service interruption to either heating or electric customers. Annually, the [Project] is expected to free up 24.7 TCF on natural gas to the New England market which will increase reliability in both the power and natural gas markets.[82]

The Charles River Associates report also concluded that the Project would displace less efficient and more polluting gas and oil fired steam generation plants. As a result of both the low-carbon energy that will be transmitted over the Northern Pass Transmission Line and the Northern Pass Transmission Line's ability to displace fossil fuel generation plants, the Project supports regional and state clean air goals and reduces greenhouse gas emissions and air pollution. It will reduce CO_2 emissions in New England by up to 5 million tons a year, equal to the annual emissions of nearly one million cars. Construction of the Project will increase the local tax base and provide approximately 1,200 jobs during construction. Further evaluation of socioeconomic effects will take place during the NEPA review process.

Item 17 - Environmental Effects

(a) **Air Quality**

The Proposed Use is unlikely to have any significant negative impacts on air quality. Though construction will result in some fugitive dust emissions, no significant air quality impacts are anticipated. The relocation of the existing helicopter pad will not result in an increase in use. The Northern Pass Project

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81 *LMP and Congestion Impacts of Northern Pass Transmission Project*, at 34 (Dec. 7, 2010).

82 *Id.*

will bring clean energy to the state, thereby substantially decreasing carbon dioxide emissions associated with other energy sources. Potential effects on air quality will be further evaluated during the NEPA review process.

(b) **Visual Impact**

As described in greater detail in Item 7(b), the Proposed Use is expected to have visual impacts within the WMNF. Northern Pass understands that visual impacts are a concern to the Forest Service and users of the WMNF. Northern Pass has taken significant steps to reduce the visual impacts from the transmission structures. The proposed location along an existing transmission line, as well as the existing tree cover and varied terrain, will help reduce the visual impacts. The current design through WMNF incorporates horizontal DC structures that utilize V-String insulators and vertical 115-kV structures for the relocated 115-kV line. These two structure configurations are similar in height. This design has allowed the project to move from proposed vertical structures on the DC line, which was commonly 110 feet in height, to the horizontal DC structure that is commonly 85 to 95 feet in height. Our current proposal places the shorter design DC structure and the relocated 115-kV structure within the existing 150 foot SUP area. This reduction in height on the DC structure should greatly reduce visibility in many areas of the WMNF.

The transmission line will cross the ATin one location. As discussed previously, this is not a new crossing – rather, Northern Pass has designed the Project so that the Project will cross at the same place as the existing PSNH line crossing the Appalachian Trail. This crossing will reduce visual impacts as compared to the alternative route bypassing the WMNF.

Northern Pass has completed six visual simulations within the WMNF. *See* Exhibit 7. The simulation locations for the Project were selected for several purposes to convey to the public what the Project will look like from key vantage points and public viewing areas in the WMNF. Members of the public, the Project team, and LandWorks (the Northern Pass visual impacts consultant) suggested the locations for these and other simulations located on Northern Pass's website.[83] They selected, among others, locations considered to have local, state or national significance as scenic or recreational resources and locations within conserved landscapes.

Northern Pass will next develop a visual impact assessment for the Project which will include those portions of the Project within the WMNF. Northern Pass has taken significant steps to reduce the visual impacts from the transmission structures and will continue to work with the Forest Service and other interested parties to minimize impacts to the WMNF and the AT. In addition, Northern Pass will work with the Forest Service to address the Scenic Integrity Objectives for the affected management areas.

(c) **Surface and Ground Water Quality and Quantity**

The Proposed Use is not expected to have any impacts to surface or ground water quality or quantity. The location of sensitive natural resources, including surface waters, wetlands, and other aquatic areas, as well as resource buffers such as Shoreland Protection zones, were identified during field investigations in 2010 and 2013. *See* Exhibit 13. The Project Team, which includes engineers, environmental scientists, construction personnel, erosion control specialists, and route planners, will

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83 *See* http://northernpass.us/visual-simulations.htm

collaborate during design to avoid and minimize potential impacts to surface or ground water quality from structure placement, permanent and temporary access routes, temporary construction work areas, and other components of the Proposed Use. Though soil disturbances will occur during construction, efforts will be taken to control erosion and runoff. Best Management Practices (BMPs), an Erosion Prevention & Sediment Control (EPSC) plan, a Spill Prevention, Control, and Countermeasure (SPCC) plan, and other measures will be employed to ensure water quality is protected.

(d) **The Control or Structural Change on Any Stream or Other Body of Water**

The Northern Pass Transmission line will cross Reel Brook in Easton; Eliza Brook, Harvard Brook and Boles Brook in Lincoln; and Crooked Brook, Pike Brook, and Gordon Pond Brook in Woodstock. At least 25 additional ephemeral and intermittent streams are crossed in these three towns, as well as Bog Pond. The Corridor in Easton, Lincoln, and Woodstock includes approximately 45.4 acres of wetlands, including 21 vernal pools. *See* Exhibit 13. These streams and wetlands are located within the existing PSNH ROW. Based on site reconnaissance, no streams are located adjacent to either helicopter pad A or helicopter pad B, however, helipad A appears to be proximate to wetlands. In the Stark portion of the WMNF, the ROW crosses 14 wetlands totaling 3.27 acres, 6 unnamed, intermittent or ephemeral streams, and 4 vernal pools. *See* Exhibit 13.

The conductor will span these resources overhead, thereby avoiding and minimizing most direct, permanent impacts. Temporary construction work pads and stream crossings will also be designed to minimize wetland and stream impacts. The planned construction methodology for the WMNF is proposed to be a combination of standard access construction and helicopter access construction. The access roads anticipated to be used within the WMNF are entirely along the existing ROW and will be generally located where the existing access roads are today. Typical access roads are proposed to be approximately 16 feet in width. The total length of access roads within the WMNF is proposed to be 10.5 miles. Access roads in upland areas would be proposed to remain at the end of construction to facilitate maintenance work after the initial construction is complete. There will also be several areas within the WMNF footprint that will be winter only construction (most notably the Bog Pond area in Lincoln) which will be done when the ground is frozen since they are not accessible to most construction equipment during unfrozen conditions. Work during frozen conditions will also help to minimize disturbances to wetlands and streams. If winter construction is not possible, all access through wetlands and streams will employ swamp mats or other approved BMPs. All access roads across wetlands and streams will be temporary and designed to minimize impacts and surface water disturbance.

New state stream crossing rules will apply to all streams and rivers that must be crossed by equipment. Certain waterbodies are provided with additional protection by law, including streams within the WMNF. All rivers and streams in the WMNF have been designated as Outstanding Resource Waters (ORW). Restoration design, monitoring and maintenance plans will be developed for all temporary impact areas in the WMNF in consultation with the Forest Service. Potential impacts to streams and other bodies of water will be further evaluated during the NEPA review process, and mitigation for unavoidable permanent impacts will be proposed.

(e) **Noise**

There will be some noise from the machinery used in the construction of the Proposed Use. The types of equipment used for this construction could consist of: pickup trucks, bucket trucks, backhoes, moveable

cranes, concrete mixers, bulldozers, jack hammers, or helicopters, among other construction vehicles. The sounds from this equipment will be temporary in nature during active construction of the Proposed Use. Most construction activities are expected to occur during the daytime and Northern Pass will work with the Forest Service to address any specific or special requirements regarding construction noise in the WMNF. During normal operation, specific routine maintenance activities, which are already occurring for the existing line, will continue, to support the monitoring and safe operation of the equipment. These activities will result in short term noise generation while the work is being performed. Those specific maintenance activities include:

- Patrol of lines (aerial and/or ground) each year for inspection of structures and conductor
- Patrol of lines (aerial and/or ground) each year for vegetation management inspection
- Patrol of lines (aerial and/or ground) after every operation (*i.e.*, line fault) if a specific cause is not known
- Trimming of vegetation on a three year cycle

(f) **The Surface of the Land, Including Vegetation, Permafrost, Soil, and Soil Stability**

The Proposed Use will have some impacts to the surface of the land, including vegetation and soil. While regular vegetation maintenance is already conducted in a substantial portion of the existing Corridor in Stark, Easton, and Lincoln, the Proposed Use will require some additional clearing and grading of the Corridor in order to construct, operate, and maintain the structures necessary to support the transmission line.

This clearing and grading will have minor and primarily temporary impacts to the soil and vegetation, and may affect below-ground archeological resources. An Archeological Phase IA Survey was completed within the transmission corridor. This survey revealed three areas of historic or Native American archeological sensitivity in Stark and Woodstock, two in Easton and the ATcrossing in Lincoln, as shown below in Table 1.

Further evaluation of these resources through a Phase IB survey is proposed. Compliance with Section 106 of the National Historic Preservation Act and coordination with the Archeologist for the White Mountain National Forest is ongoing.

Table 1. Areas of Archeological Sensitivity within the WMNF in the Towns of Woodstock, Easton, Lincoln and Stark.

Sensitive Area #	Cultural Affinity	Location	Approximate Dimensions (ft)*		Recommendations
			length	width	
Wood-1	Native American	South of Crooked Brook, north of slope	250	220	Phase I-B shovel test pits
Wood-2	Native American	South of Gordon Pond Brook	200	150	Phase I-B shovel test pits
Wood-3	Native American	North of Gordon Pond Brook	150	150	Phase I-B shovel test pits
East-1	Historic	South of NH Route 116	7000	150	Intensive walkover survey, continued archival research and Phase I-B shovel test pits
East-2	Native American	South of Wetland	200	150	Phase I-B shovel test pits
Linc-1	Historic	Appalachian Trail crossing	50	150	Photo documentation and Consultation with WMNF
Stark-1	Native American	East of Upper Ammonoosuc River, West of North Side Road	600	150	Phase I-B shovel test pits
Stark-2	Native American	East of North Side Road, West of steep slope	130	150	Phase I-B shovel test pits
Stark-3	Native American	West of Phillips Brook, East of Wetland	100	150	Phase I-B shovel test pits

** Dimensions within the town boundaries; may extend beyond the WMNF borders.*

Locations temporarily disturbed for the purpose of constructing the Project will be restored after construction is complete. The Corridor in Stark includes approximately 2.29 acres of wetlands, including four vernal pools. The Corridor in Easton, Lincoln, and Woodstock includes approximately 45 acres of wetlands, including 21 vernal pools. The proposed relocated helicopter pad will be located adjacent to the existing transmission line corridor in a currently forested area. Based on a field reconnaissance, there are two suitable helipad areas: Site A is located immediately adjacent to the existing helipad, and Site B is located approximately 400 feet northwest parallel to the edge of the ROW. Site A is located in close proximity to forested wetlands and would likely require a small amount of wetland fill associated with the gravel helipad as well as a larger area of forested wetland vegetation clearing to provide a safe take-

off/landing environment. Site B is located in forested upland areas and would not likely require any primary or secondary wetland impacts; however the site is considerably rougher with boulders and bedrock outcrops that would make construction of the helipad more difficult. These wetlands will be delineated using state and federal protocols in the near future. Since the existing helicopter pad within the corridor will no longer be accessible, the gravel materials on the surface would be transported to the new helipad location and reused, and the existing helipad area would then be restored concurrently with other restoration activities in the corridor. The locations for any emergency helicopter landing sites not yet identified would be surveyed for wetlands prior to construction and wetlands would be avoided to the extent practicable and to the extent not practical the impacts to wetlands would be minimized.

Northern Pass will design the transmission structures, temporary work areas, and temporary access roads to avoid and minimize impacts to wetlands, streams, and archeological resources wherever possible. In addition, Northern Pass will evaluate the use of additional construction methods that avoid or minimize impacts to soils. While roads within the Corridor will continue to be used for maintenance, most impacts will be temporary; after construction, Northern Pass will revegetate non-road areas disturbed during construction and stabilize soils in the corridor following approved Forest Service protocols. Northern Pass will minimize and mitigate permanent impacts where avoidance is not possible. As a result, little or no significant impacts to the land surface are anticipated. Northern Pass expects that additional, detailed analysis of upland, flood plain, wetland, and archeological impacts will occur during the NEPA review led by the DOE.

Item 18a – Habitat, Wildlife, and Special Status Species Effects

The Proposed Use is not anticipated to have any probable effects on populations of fish, plant life, wildlife, and marine life, including threatened and endangered species within the WMNF. The Northern Pass project team met with the Forest Service on June 23, 2010 to discuss Forest Service Sensitive (FSS) species and Forest Service survey protocols. Forest Service personnel indicated that the following FSS wildlife species should be considered for impacts from the Northern Pass Project: eastern gray wolf, eastern cougar, Canada lynx, Indiana bat, eastern small-footed bat, northern long-eared bat, northern bog lemming, bald eagle, Bicknell's thrush, peregrine falcon, common loon, osprey, pied-billed grebe, wood turtle, Brown's ameletus mayfly, third ameletus mayfly, White Mountain fritillary, and the warpaint emerald. Habitat assessments for the WMNF portion of the Corridor used for the Proposed Use were conducted on August 18-19, 2010 (Easton, Lincoln), July 24 –August 1, 2013 (Easton, Lincoln, Woodstock), and August 20, 2013 (Stark). The results of these surveys indicated that suitable habitat for the following FSS-listed species is present: grey wolf, eastern mountain lion, eastern small-footed bat, and northern myotis. Neither wolves nor mountain lions are currently known to be present in New Hampshire, and the proposed project is unlikely to alter the suitability of the habitat for either bat species. Abundant mature trees suitable for roosting by northern myotis and rocky out crops suitable for roosting by small-footed bats will continue to be present, as will foraging habitat (forest canopy, forest/ROW edge) for both species. Additionally, the habitat associated with the open water of bog pond may also provide resources for transient bald eagle, osprey, and common loon. However the Proposed Use will not have any effect on the suitability of these resources. Therefore, impacts to FSS wildlife species from the Proposed Use are unlikely.

Botanical work followed the WMNF protocol for conducting project-related botanical surveys for federally listed, proposed and candidate species, as well as species of concern, state listed, and non-native

invasive species. This included pre-field work to focus field investigations, such as review of United States Fish and Wildlife (USFWS) small whorled pogonia maps, New Hampshire Natural Heritage Bureau and Maine Natural Areas Program data, WMNF Regional Forester Sensitive Species lists, GIS maps, and interviews with knowledgeable persons. Prefield review identified several possible species/communities, including Pickering's reed bent grass (state watch species), and medium level fen/bog community. Botanical field investigations within the WMNF for rare, threatened or endangered (RTE) plant species were completed in the growing season. RTE species or exemplary natural communities were identified at approximately two dozen locations within the Corridor in Easton, Lincoln, and Woodstock. Botanical surveys of the ROW in Stark, and at the proposed helipad location are currently underway or planned.

While the Project may impact individual plant or animal species, no population effects are anticipated. The Project will not cross land that the USFWS has designated as critical habitat for any endangered species. There are currently no designated critical habitats for any species in the State of New Hampshire. Potential impacts to plant and animal life will be further evaluated during the NEPA review process. Northern Pass will continue to coordinate with the USFWS, U.S. Forest Service, U.S. Environmental Protection Agency, New Hampshire Department of Fish and Game, New Hampshire Department of Resources and Economic Development, New Hampshire Department of Environmental Services, and scientists from research institutions and environmental organizations, as well as others to ensure that potential impacts to threatened and endangered species and habitats have been carefully considered and avoided, minimized or mitigated.

Item 19 — Hazardous Materials

The Proposed Use would not produce hazardous materials, or require storage of hazardous materials within the WMNF. The Project will require the relocation and replacement of all portions of the existing 115 kV AC transmission line within the WMNF to provide space for the Northern Pass Transmission Line. The existing utility structures have been treated with creosote, an EPA-registered pesticide used as a wood preservative for above- and below-ground wood protection treatments, as well as for treating wood in marine environments. Creosote is regulated as a Resource Conservation and Recovery Act (RCRA) hazardous waste, but treated wood waste has not been classified as hazardous waste under the federal RCRA program. With relocation, disposition of the existing utility structures would be addressed in a manner consistent with all applicable legal requirements. Disassembly of the existing structures, or installation of new facilities, may also require the use of commercially available solvents (*e.g.*, WD-40). All use of such solvents would follow BMPs, as well as state and federal regulations for storage, transport, use, and disposal.

Item 20 — Submittal of Application

This Special Use Application is being filed with the Forest Supervisor. Because this Proposed Use involves an electric power transmission line with a capacity of 66 kV or higher, at the time the Forest Service accepts this as a formal application, it must forward a copy of this Application Amendment to the Secretary of Energy. Northern Pass notes that, because a Presidential Permit for the Northern Pass Project has been filed with its Office of Electricity Delivery and Energy Reliability, DOE is aware of the Northern Pass Transmission Line Project.