



ELECTRONICALLY FILED April 1, 2013

Faith Huntington  
Director of Electricity and Natural Gas Utilities  
Maine Public Utilities Commission  
State House Station 18  
Augusta, ME 04333-0018

Re: Bangor Hydro Electric Company Chapter 330, §8(A), Annual Filing of Schedule of Transmission Line Rebuilding or Relocation Projects

Dear Ms. Huntington:

Pursuant to Chapter 330 of the Rules of the Maine Public Utilities Commission, Bangor Hydro Electric Company hereby submits its schedule of transmission line rebuilding, relocation and construction projects for the next five years.

Included in this filing is the identification of all planned transmission projects 34.5kV or greater that change the electrical characteristic or rating of a portion of the transmission system. This includes all new construction or reconductoring of any transmission line. New transmission substations or additions to transmission substations that add line terminations or increase line ratings are also included.

Please feel free to contact Kendra Overlock at (207)973-2895 or me at (207)973-2898 should you have any questions regarding this filing.

Sincerely,

A handwritten signature in blue ink, appearing to read "Brad A. Borman".

Brad A. Borman  
Senior Regulatory Attorney

BAB:sm  
Enclosure

## Summary of Proposed Potential Transmission Projects - Bangor Hydro

Identification	<u>Lines 51 &amp; 93 Rerate</u>	<u>Rebel Hill Switching Station 2013</u>	<u>BHE MPRP - Orrington Cap Bank &amp; 115kV</u>
Project Type	Rebuild/Rerate	Substation	Substation
Reason for Need	Increased line rating required for Downeast system load growth per system studies for both MPRP and the Keene Road projects.	Downeast transmission loop and protection system upgrade requires a new 115kv switching substation at Rebel Hill. Also requires fiber along Line 66 from Graham Sub to Rebel Hill.	Termination equipment for CMP's 115kV line (MPRP project). Breakers have already been installed. Miscellaneous work to terminate the new line in 2014. Project includes BHE purchase of 115 kV Lines in Orrington see CMP CPCN MPUC Docket 2008-00255. Future filing in late 2013 for MPUC approval of BHE purchase of line.
Location	Otis to Deblois	Otis	Orrington
Length	25 miles	-	-
Year Originally Constructed	1956	1956	-
Voltage Level	115kV	115kV	115kV
Existing Conductor	4/0 ACSR	795 ACSR	-
New Conductor	795 ACSR	795 ACSR	-
Existing Struction Material and Design	Wood Pole H-Frame	AirBreak Switches	-
Peak Load	32.3MVA	-	-
Estimated Cost (fully burdened)	\$17,500,000	\$9,300,000	\$11,800,000
Next most likely alternative	Alternative considered was replacing and/or raising existing structures to meet the re-rate requirements while still keeping the existing 1956 4/0 conductor.	Defer substation and protection upgrade. Operate the downeast transmission lines as 2 radial lines with reduced reliability.	N/A
Generators Impacted/Description of Impact	There are five (5) non-affiliated generators and two(2) affiliated generators (indicated with an *) already online or in the ISO-NE generation queue that would use this new path (in parallel with the new Downeast line) to access the ISO New England electricity market.	none	New 115kV line south of Orrington could allow improvements to all generators in BHE territory by providing an additional path to export.
	Existing generators are Indeck 6 and Bull Hill Wind*, and generators currently in the queue Maine East Wind are Hancock Wind*, Downeast Wind, Passamaquoddy Wind and Jonesport Wind. This rerate project improves conditions for all generators by allowing more generation to be dispatched at any point in time.		

## Summary of Proposed Potential Transmission Projects - Bangor Hydro

Identification	<u>BHE MPRP - 345kV</u>	<u>Chester SVC</u>	<u>Keene Rd. Expansion for Oakfield Wind</u>
Project Type	Substation	Substation	Substation
Reason for Need	Termination equipment for CMP's 345kV line (MPRP project). Breakers have been installed and the line will be connected in April 2013. Includes BHE purchase of 345 kV line in Orrington. CPCN approved MPUC Docket 2008-00255, sale of line to BHE approved MPUC Docket 2012-00559	Existing SVC Control system was installed in 1989. Support and parts are no longer available. Pool Transmission Facility (PTF). BHE / CMP / Chester SVC affiliate transaction approved in MPUC Docket 2012-00514	To accommodate the 115kV line interconnecting the new Oakfield Wind project. Bangor Hydro's portion of the project is to expand the 345kV bus and interconnect the project with a new 345kV breaker.
Location	Orrington	Chester	Chester
Length	-	-	-
Year Originally Constructed	-	1989	-
Voltage Level	345kV	345kV	345kV
Existing Conductor	-	-	-
New Conductor	-	-	-
Existing Struction Material and Design	-	-	-
Peak Load	-	-	150MVA
Estimated Cost (fully burdened)	\$16,020,000	\$8,030,000	0
Next most likely alternative	N/A	Defer project and accept risk.	N/A
Generators Impacted/Description of Impact	All generators in the BHE territory will be impacted similarly. The second 345kV line south of Orrington will increase the ability of generation to export.	none	Dedicated feed to the new Oakfield generator. All costs paid by the generator.

## Summary of Proposed Potential Transmission Projects - Bangor Hydro

Identification	<u>Orrington 345 KV Breaker (KR)</u>	<u>KR Transformer Addition</u>	<u>L7 Rebuild ROW</u>
Project Type	Substation	Substation	Rebuild/Rerate
Reason for Need	Breaker addition in series with 396-1 required by ISO New England at Orrington due to issues discovered as part of the Keene Rd operating study.	Line 63 is a 115kV line feeding the Northern Division from Keene Rd to Chester Substation. This project would allow the division to be fed following an outage of line 63. It will also mitigate an overload on one of the two Chester 115kV/46kV transformers following a contingency.	Pole condition and conductor size.
Location	Orrington	Chester	Orono
Length	-	0.4 mi	1,000 feet
Year Originally Constructed	-	-	1964
Voltage Level	345kV	46kV	46kV
Existing Conductor	-	-	4/0 ACSR
New Conductor	-	795ACSR	559 AAAC
Existing Struction Material and Design	-	-	Wood Pole Crossarm
Peak Load	-	28MVA	25.3MVA
Estimated Cost (fully burdened)	\$1,672,000	\$3,200,000	\$109,734
Next most likely alternative	N/A	Alternative would be building a new 115kV line parallel to Line 63 and also ensuring the diesel generators at Medway are licensed and able to run when needed.	Run line to failure with line loading limit or increase the cost of the rebuild by relocating Line 7 to roadside in downtown Orono.
Generators Impacted/Description of Impact	none	Minor impact to existing small hydro generating units at Medway and W. Enfield, allowing them to stay on line following a contingency.	Minor impact to existing small hydro generating units at Milford. Last section of 4/0 ACSR conductor being removed will increase the capacity of the line slightly (from 28.8MVA to 36.4MVA)

## Summary of Proposed Potential Transmission Projects - Bangor Hydro

Identification	<u>L75 &amp; BW3 Rebuild ROW</u>	<u>L8 Reconductor - Green Point ROW</u>	<u>L8 Rebuild - Elm to Parkway So</u>
Project Type	Rebuild/Rerate	Rebuild/Rerate	Rebuild/Rerate
Reason for Need	Rebuild due to pole condition.	Higher Line 8 rating required for 46kv Bangor Area Loop during Line 9 outage. Relocation out of Industrial Yard also required for safety and reliability.	Line condition and required Line 8 rating increase due to overload during Line 9 outage. Increased separation from Line 9 or relocation to roadside also required for working clearance and reliability.
Location	Bangor	Brewer	Brewer
Length	4,400 feet	4,000 feet	1 mile
Year Originally Constructed	1959	1953	1953
Voltage Level	46kV	46kV	46kV
Existing Conductor	3/0 ACSR	266 ACSR	266 ACSR
New Conductor	795 ACSR	795 ACSR	795 ACSR
Existing Struction Material and Design	Wood Single Pole Crossarm	Wood Single Pole Crossarm	Wood Single Pole Crossarm
Peak Load	15.4MVA	38.6MVA	38.6MVA
Estimated Cost (fully burdened)	\$175,000	\$519,144	TBD
Next most likely alternative	Defer and accept increased risk	Rebuild in existing location that runs through a salvage yard without improving safety. Run line to failure with the existing line load limit and reduced reliability.	Run the line to failure with reduced operating options by keeping the existing line rating. Rebuild inplace with substandard seperation from Line 9 which limits working clearance and reliability.
Generators Impacted/Description of Impact	none	none	none

## Summary of Proposed Potential Transmission Projects - Bangor Hydro

Identification	L85/87 Rebuild, Chester to Lincoln	<u>L13 Rebuild Roadside Section</u>	<u>L19 Rebuild from ROW - Pembroke</u>
Project Type	Rebuild/Rerate	Rebuild/Rerate	Rebuild/Rerate
Reason for Need	Line 87 transmission line overload with loss of line 85. Pole condition is also an issue on both Line 85 & 87, along with separation from line 85 in locations.	Condition of poles and conductors has led to reduced reliability. Increased rating on Line 13 will provide additional system backup.	L19 has a 2 mile section in the ROW just before Pembroke S/S. Access to this section of line has been a problem in the past. Also, the conductor and some pole plant has reached end of life.
Location	Chester to Lincoln	Hancock & Franklin	Pembroke
Length	1.5 miles	7 miles	10,000 feet
Year Originally Constructed	1960	1958	1957
Voltage Level	46kV	34.5kV	34.5kV
Existing Conductor	3/0 ACSR	3/0 ACSR	4/0 ACSR
New Conductor	795 ACSR	795 ACSR	795 AAC
Existing Struction Material and Design	Wood Single Pole Crossarm	Wood Single Pole Crossarm	Wooden Poles
Peak Load	18.9MVA	12.2MVA	6.2MVA
Estimated Cost (fully burdened)	TBD	TBD	\$454,394
Next most likely alternative	Build additional 46kV line from Chester to Lincoln	Run to failure and increase expense from customer damage due to underbuild contacts.	Defer project and accept risk
Generators Impacted/Description of Impact	Minor impact to existing hydro generation at W.Enfield.	none	none

## Summary of Proposed Potential Transmission Projects - Bangor Hydro

Identification	<b>MDI New Transmission Line Crooked Rd.</b>
Project Type	<b>Build</b>
Reason for Need	<b>Second transmission feed to Bar Harbor is required to improve reliability and serve load growth in downtown and at The Jackson Lab.</b>
Location	<b>Bar Harbor</b>
Length	<b>8 miles</b>
Year Originally Constructed	<b>-</b>
Voltage Level	<b>34.5kV</b>
Existing Conductor	<b>-</b>
New Conductor	<b>795 AAC</b>
Existing Struction Material and Design	<b>-</b>
Peak Load	<b>32.3MVA</b>
Estimated Cost (fully burdened)	<b>TBD</b>
Next most likely alternative	<b>Upgrade the existing Line 22 feeding Bar Harbor while energized without building a second feed or routing the new line along the longer more costly Rt 3 option.</b>
Generators Impacted/Description of Impact	<b>none</b>

**Transmission Line Loading (based on a projected growth from the 2010 Transmission Needs Assessment Analysis)**

Line No.	From	To	Nom. Voltage	Conductor	Length (mi.)	Sum. Norm. Rating (MVA)	Summer Peak Hour Loading (N-1)	Contingency	Notes
390	Orrington	Baileyville	345kv	1192 ACSR	84.4	1773	1000 max	S366	Loading managed by ISO
246	Orrington	Veazie	115kv	2-795 ACSR	7.25	457	294.4	L248	Light load, high gen
248	Orrington	Veazie	115kv	795 ACSR	7.25	229	220.8	L246	Light load, high gen
249	Orrington	Veazie	115kv	795 ACSR	7.25	229	220.8	L246	Light load, high gen
65	Orrington	Bucksport	115kv	795 ACSR	5.36	229	124.1	S205	
205	Orrington	Bucksport	115kv	795 ACSR	5.36	229	124.1	S65	
247	Orrington	Orrington	115kv	266 ACSR	4.07	39	25	none	
60	Orrington	Ellsworth Falls	115kv	795 ACSR	20.67	229	99.6	L66	
66	Veazie	Clifton	115kv	795 ACSR	13.41	173	103.5	L60	
51	Clifton	Township 16	115kv	4/0 ACSR	14.9	32	32.3	L57	Planned reconductor 2013
93	Township 16	Deblois	115kv	4/0 ACSR	10.71	32	32.3	L57	Planned reconductor 2013
52	Deblois	Columbia	115kv	795 ACSR	9.15	229	32.3	L57	
61	Columbia	Jonesboro	115kv	4/0 ACSR	12	32	25	L59	Possible rerate 2014 - wind gen
67	Clifton	Ellsworth Falls	115kv	795 ACSR	13.07	173	74.1	L60	
68	Ellsworth Falls	Ellsworth Falls	115kv	266 & 795 ACSR	0.59	115	55.4	L57	
57	Ellsworth Falls	Trenton	115kv	795 ACSR	14.3	229	54.7	L68	
58	Ellsworth	Sullivan	115kv	795 ACSR	22.45	229	32.7	L51	
59	Sullivan	Columbia	115kv	795 ACSR	21.7	229	35	L51	
59	Columbia	Columbia	115kv	266 ACSR	3.63	89	40	L51	Possible rerate 2014 - wind gen
69	Columbia	Harrington	115kv	266 ACSR	0.66	89	16.1	L61	
64	Veazie	Chester	115kv	2-795 ACSR	43.48	375	220	Keene T1	voltage limited rating
63	Chester	Chester	115kv	795 ACSR	0.37	68	42.6	W.Enf. Gen	
62	Chester	TA R7 Wels	115kv	795 ACSR	17.26	229	126	none	

- Loading on the Bangor Hydro 115kv and above circuits were based on local transmission criteria. Some of these lines will also fall under NERC reliability criteria and subject to N-1-1 and stuck breaker evaluations.

**BANGOR DIVISION -** Projected growth rate 0.86% per year

1	Veazie	Ellsworth Falls	46kv	4/0, 266,312,336,795	23.2	28	13.2	Boggy T1	
5	Veazie	Old Town	46kv	336 H, 336, 556H, 559	10.75	35	27.1	none	
7	Veazie	Milford	46kv	4/0, 266, 336, 556H	10.56	28	25.3	L83	2013 plans
8	Veazie	Hampden	46kv	266, 556H, 795, 750UG	7.69	34	38.6	L9	2013 plans
9	Veazie	Brewer	46kv	795 ACSR	6.68	72	57.8	L83	
70	Veazie	Bangor	46kv	559AAAC, 795ACSR	8.48	53	21.3	L71	
71	Veazie	Bangor	46kv	556H, 559, 795	4.89	52	48.4	L72	will monitor
72	Veazie	Bangor	46kv	556H, 559, 795	4.89	52	48.4	L71	"
50	Bangor	Corinth	46kv	3/0 ACSR, 795	15.24	25	13.4	L81	
74	Corinth	Milo	46kv	266 ACSR	17.64	34	10.3	L50	
73	Bangor	Bangor	46kv	3/0, 266 ACSR	3.41	25	23.4	L70	evaluating
75	Bangor	Bangor	46kv	3/0 ACSR, 336H	3.18	25	15.4	L78	
76	Brewer	Bangor	46kv	336, 556H, 795	0.83	46	32.2	L8	
77	Hampden	Hermon	46kv	556H, 795, 600UG	4.68	46	17.7	L70	
78	Bangor	Hermon	46kv	795 ACSR	6.41	72	25.9	L77	
79	Bangor	Bangor	46kv	795 ACSR	1.34	72	15.4	none	



Line No.	From	To	Nom. Voltage	Conductor	Length (mi.)	Sum. Norm. Rating (MVA)	Summer Peak Hour Loading (N-1)	Contingency	Notes
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**HANCOCK DIVISION -** Projected growth rate 1.21% per year

2	Ellsworth	Trenton	34.5kv	266, 312, 336, 336H, 559	8.43	27	20.8	Trenton T1	
10	Ellsworth Falls	Sedgewick	46kv	1/0 ACSR, 4/0, 336, 336H, 559, 795	23.73	19	11.6	none	
11	Ellsworth Falls	Hancock	34.5kv	795 ACSR	6.48	37	22	Trenton T1	
12	Ellsworth Falls	Ellsworth	34.5kv	477 ACSR	2.55	30	27.6	Trenton T1	will monitor
13	Hancock	Sullivan	34.5kv	3/0, 556H, 795	16.4	18	12.2	Tunk T1	
17	Sullivan	Cherryfield	34.5kv	266, 336H, 559, 795	11.1	27	12.2	Tunk T1	
18	Cherryfield	Harrington	34.5kv	266, 336H	7.11	27	12.2	Tunk T1	
22	Bar Harbor	Bar Harbor	34.5kv	1/0, 336, 336H	6.26	14	14.4	none	one section 1/0 replace w/BH
24	Sullivan	Gouldsboro	34.5kv	266 ACSR	6.48	27	5.6	L15	
28	Hancock	Trenton	34.5kv	3/0, 266, 312, 336, 336H, 350UG, 556H, 559	8.47	18	8.3	Trenton T1	
29	Mount Desert Island	Southwest Harbor	34.5kv	#2 ACSR, 1/0 AAAC, 336H	5.49	11	6.2	none	
32	Trenton	Bar Harbor	34.5kv	559, 1000MCM, 795	6.28	40	27.5	L48	
40	Bar Harbor	Northeast Harbor	34.5kv	#4 ACSR, 1/0 AAAC, 336, 336H, 795	5.95	8.6	2.8	none	
48	Trenton	Mount Desert Island	34.5kv	556H, 559, 795	7.39	36	28.1	L32	

**WASHINGTON COUNTY -** Projected growth rate 0.75% per year

3	East Machias	Jonesboro	34.5kv	266, 312, 336, 336H	8.32	27	14.5	L4	
4	East Machias	Jonesboro	34.5kv	336 AAC, 336H	9.65	27	14.9	L3	
14	Jonesboro	Columbia Falls	34.5kv	#4, #6, 1/0, 336, 336H	10.11	8	4.6	L16	
15	Harrington	Gouldsboro	34.5kv	336, 336H	18.71	27	5.4	L24	
16	Harrington	Jonesboro	34.5kv	336, 336H, 556H	14.59	36	17.9	Washington Cty T1	
19	East Machias	Eastport	34.5kv	1/0H, 4/0, 336, 336H, 556H, 559	39.58	13	6.2	L20	
20	East Machias	Dennysville	34.5kv	#2, #4, #6, 336, 336H	24.38	8	6.2	L19	
21	Jonesboro	Machiasport	34.5kv	266 ACSR	9.61	27	0.8	none	
23	East Machias	Cutler	34.5kv	#4 cu, 1/0 ACSR, 336H	6.88	10	0.8	none	
25	Columbia Falls	Jonesport	34.5kv	#4, #6, 1/0, 336, 336H	13.04	8	2.9	none	
26	Whiting	Lubec	34.5kv	333Hendrix AAC	8.91	27	1.6	none	

**NORTHERN DIVISION -** Projected growth rate 0.3% per year

80	Milford	Enfield	46kv	4/0, 266, 336, 336H	23.11	28	8.8	L81	
81	Enfield	Milo	46kv	2A Cweld, 266, 336H, 559	18.52	19	11.3	L50	
82	Enfield	Howland	46kv	#2 cu, 1/0, 266	1.27	18	0.8	none	
83	Lincoln	Enfield	46kv	266 ACSR	12.11	36	7.6	W.Enf. Gen	
84	Chester	Medway	46kv	#2, 1/0, 4/0, 266, 336H	25.33	18	8	L86	
85	Chester	Lincoln	46kv	4/0 UG, 266 ACSR	1.87	28	21.6	L87	
86	Chester	Medway	46kv	266 ACSR, 336 AAC	15.79	36	6	none	
87	Chester	Lincoln	46kv	1/0 ACSR, 4/0 UG, 266 ACSR	1.87	19	18.9	L85	2013 plans
88	Medway	Millinocket	46kv	312, 336, 559	9.16	36	9.2	L89	
89	Medway	Millinocket	46kv	#2, 266, 336, 336H, 559	13.39	18	9.2	L88	
90	Chester	Chester	46kv	336 AAC, 336H AAC	0.81	34	2.2	none	

\*\* Thermal loading is just one factor in determining circuit capability. Voltage drop across the line and line condition must also be taken into account.

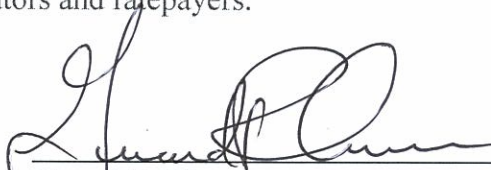
- Loadings based on Transmission Study results which are performed every 5 years. Loadings for years in between will be study loads increased by the projected growth rates.

STATE OF MAINE )  
 )  
COUNTY OF PENOBSCOT )


**AFFIDAVIT**

NOW, BEFORE ME, the undersigned authority, personally came and appeared, Gerard R. Chasse, who first being duly sworn by me, did depose and say:

1. I am President and Chief Operating Officer of Bangor Hydro Electric Company.
2. I have reviewed the Chapter 330 Report with the person(s) responsible for its development and affirm that the utilities have not planned or made any improvements to the transmission system with the intent of giving any existing or proposed generator preferential treatment nor with the intent of providing any ratepayer subsidy in terms of allocating the costs of any such improvements between generators and ratepayers.

  
\_\_\_\_\_  
Gerard R. Chasse  
President & COO

Subscribed and sworn to me this 1<sup>ST</sup> day of April, 2013.

  
\_\_\_\_\_  
Notary Public

**KAREN A. BELL**  
Notary Public • State of Maine  
My Commission Expires July 6, 2019

