

INFERA MEDOT EMR Rail Project

Methodology and Approach	Current Status/Baseline & Problem to be Addressed	Change to Baseline/Alternatives	Type of Impacts	Population Affected by Impacts	Economic Benefit	Summary of Results	Tab in BCA
This Project will have numerous benefits to weigh against costs in this BCA analysis. Due to the increased maintenance costs associated with the further deterioration of the rail line should the Project not be completed, we have included the net maintenance savings as a benefit. Temporary slow orders are currently placed on sections of the track deemed too unsafe to travel across at high speeds due to maintenance conditions. Should the Project be completed, all temporary slow orders will be lifted and the benefits have been recorded. The net benefits of eliminated truck traffic are weighed against the increased rail traffic. Additionally, the net reduction in emissions, fuel consumption, and lives saved are among the benefits recorded. All dollar amounts are in 2021 dollars unless otherwise noted. All future dollar amounts are discounted back to 2021 dollars at a 7% NPV. The period of analysis extends 30 years past the first year of operation, <i>terminating in 2052.</i>	The Project consists of improving rail lines in eastern and central Maine along Eastern Maine Railway's ("EMR") mainline operating from Brownville Junction, Maine, in the central part of the state to Vanceboro, Maine and the Canadian border, continuing into Atlantic Canada and the Port of Saint John. It is the state's only east-west rail line linking Maine and the New England Region to New Brunswick, Canada and export trade with that region. Improvements will also be made to the mainline operating north from Brownville Junction northeast to Millinocket, Maine, and the forest and farming regions of the state. The Project consists of improving old and worn 100lb jointed rail and replacing it with new, modern and heavier 115lb continuous welded rail. This will improve safety and reliability needed to support today's heavier freight cars and longer trains. Further railroad deterioration would result in speed and capacity degradation, as well as increased harmful emissions and truck crash risk. The project mitigates these risks and enables the exclusive direct rail connection for intermodal traffic from the eastern and midwestern U.S. and eastern	The rail replacement will be able to consistently handle 286k railcars at Class III speeds over the long term. The alternative would involve permanent speed restrictions, diminished railcar capacity, and traffic decline, inevitably leading to increased truck traffic on regional interstates and local rural roads.	Sustaining railroad speed and capacity affects forest product producers, which hold significant importance in Maine's economy (accounting for approximately 4% of jobs). This situation also affects their customers, as both existing and potential customers are presently compelled to transport freight using trucks. This adds supply chain expenses to manufacturers, an inefficient resolution that places strain on numerous rural communities and the environment.	Populations positively affected by the Project include participants in the forest products industry, as they will be able to maintain the connection of their products to other markets via a reliable rail system. The Project will make the railroad much safer, support good paying jobs throughout Maine and New England, decrease the number of trucks on rural roads, reduce the potential for roadway crashes and railroad derailments and help Maine meet its CO2 emissions goals.	The public value of the Project at a discounted rate of 7% is 9.3/1	On a discounted rate of 7% the project yields benefits of almost \$3.9 Billion from truck elimination, reduced maintenance, locomotive engineer time savings, reduced emissions of various kinds.	"BCA Summary"

INFRA MEDOT EMR Rail Project

7% NPV Summary		
	Costs	Benefits
CAPEX	\$57,271,081	
Maintenance		\$66,245,809
Travel Time Savings		\$3,664,999
Truck Elimination		\$3,879,862,955
Rail Cost Baseline	\$385,677,854	
CO2 Savings (@3% disc)		\$169,655,766
TOTAL	\$ 442,948,935	\$ 4,119,429,529
Benefit-Cost Ratio	9.30	

Item	% of Benefits
Maintenance	1.6%
Travel Time Savings	0.1%
Truck Elimination	94.2%
CO2 Savings	4.1%

A	B	C	D
Year	Calendar Year	Capital Cost	7% NPV
0	2021		
1	2022		
2	2023		
3	2024	\$ 19,358,008	\$ 15,801,900
4	2025	\$ 19,358,008	\$ 14,768,131
5	2026	\$ 19,358,008	\$ 13,801,992
6	2027	\$ 19,358,008	\$ 12,899,058
7	2028		
8	2029		
9	2030		
10	2031		
11	2032		
12	2033		
13	2034		
14	2035		
15	2036		
16	2037		
17	2038		
18	2039		
19	2040		
20	2041		
21	2042		
22	2043		
23	2044		
24	2045		
25	2046		
26	2047		
27	2048		
28	2049		
29	2050		
30	2051		
31	2052		
32	2053		
33	2054		
34	2055		
35	2056		
36	2057		
			\$ 57,271,081

Year	Calendar Year	Maintenance Costs (\$ per 100 EA per year)		Net Maintenance (2000-2040)		7% NPV
		Maintenance Costs (2000-2024 per year)	Maintenance Costs (2025-2040 per year)	Net Maintenance (2000-2040)		
0	2021					
1	2021					
2	2021					
3	2021					
4	2021					
5	2021					
6	2021					
7	2021					
8	2021					
9	2021					
10	2021					
11	2021					
12	2021					
13	2021					
14	2021					
15	2021					
16	2021					
17	2021					
18	2021					
19	2021					
20	2021					
21	2021					
22	2021					
23	2021					
24	2021					
25	2021					
26	2021					
27	2021					
28	2021					
29	2021					
30	2021					
31	2021					
32	2021					
33	2021					
34	2021					
35	2021					
36	2021					
37	2021					
38	2021					
39	2021					
40	2021					
41	2021					
42	2021					
43	2021					
44	2021					
45	2021					
46	2021					
47	2021					
48	2021					
49	2021					
50	2021					
51	2021					
52	2021					
53	2021					
54	2021					
55	2021					
56	2021					
57	2021					
58	2021					
59	2021					
60	2021					
61	2021					
62	2021					
63	2021					
64	2021					
65	2021					
66	2021					
67	2021					
68	2021					
69	2021					
70	2021					
71	2021					
72	2021					
73	2021					
74	2021					
75	2021					
76	2021					
77	2021					
78	2021					
79	2021					
80	2021					
81	2021					
82	2021					
83	2021					
84	2021					
85	2021					
86	2021					
87	2021					
88	2021					
89	2021					
90	2021					
91	2021					
92	2021					
93	2021					
94	2021					
95	2021					
96	2021					
97	2021					
98	2021					
99	2021					
100	2021					
101	2021					
102	2021					
103	2021					
104	2021					
105	2021					
106	2021					
107	2021					
108	2021					
109	2021					
110	2021					
111	2021					
112	2021					
113	2021					
114	2021					
115	2021					
116	2021					
117	2021					
118	2021					
119	2021					
120	2021					
121	2021					
122	2021					
123	2021					
124	2021					
125	2021					
126	2021					
127	2021					
128	2021					
129	2021					
130	2021					
131	2021					
132	2021					
133	2021					
134	2021					
135	2021					
136	2021					
137	2021					
138	2021					
139	2021					
140	2021					
141	2021					
142	2021					
143	2021					
144	2021					
145	2021					
146	2021					
147	2021					
148	2021					
149	2021					
150	2021					
151	2021					
152	2021					
153	2021					
154	2021					
155	2021					
156	2021					
157	2021					
158	2021					
159	2021					
160	2021					
161	2021					
162	2021					
163	2021					
164	2021					
165	2021					
166	2021					
167	2021					
168	2021					
169	2021					
170	2021					
171	2021					
172	2021					
173	2021					
174	2021					
175	2021					
176	2021					
177	2021					
178	2021					
179	2021					
180	2021					
181	2021					
182	2021					
183	2021					
184	2021					
185	2021					
186	2021					
187	2021					
188	2021					
189	2021					
190	2021					
191	2021					
192	2021					
193	2021					
194	2021					
195	2021					
196	2021					
197	2021					
198	2021					
199	2021					
200	2021					
201	2021					
202	2021					
203	2021					
204	2021					
205	2021					
206	2021					
207	2021					
208	2021					
209	2021					
210	2021					
211	2021					
212	2021					
213	2021					
214	2021					
215	2021					
216	2021					
217	2021					
218	2021					
219	2021					
220	2021					
221	2021					
222	2021					
223	2021					
224	2021					
225	2021					
226	2021					
227	2021					
228	2021					
229	2021					
230	2021					
231	2021					
232	2021					
233	2021					
234	2021					
235	2021					
236	2021					
237	2021					
238	2021					
239	2021					
240	2021					
241	2021					
242	2021					
243	2021					
244	2021					
245	2021					
246	2021					
247	2021					
248	2021					
249	2021					
250	2021					
251	2021					
252	2021					
253	2021					
254	2021					
255	2021					
256	2021					
257	2021					
258	2021					
259	2021					
260	2021					
261	2021					
262	2021					
263	2021					
264	2021					
265	2021					
266	2021					
267	2021					
268	2021					
269	2021					
270	2021					
271	2021					
272	2021					
273	2021					
274	2021					
275	2021					
276	2021					
277	2021					
278	2021					
279	2021					
280	2021					
281	2021					
282	2021					
283	2021					
284	2021					
285	2021					
286	2021					
287	2021					
288	2021					
289	2021					
290	2021					
291	2021</					

A	B	C	D	E	F
Year	Calendar Year	Locomotive Trips Per Year (6 trains per day)	Time Savings Per Trip due to maintained speed (minutes) of 40 mph vs. 25 mph and/or 10 mph	Total Travel Time Savings (Locomotive Engineer) (\$57.40/person-hour)(per January 2023 BCA Guidance) hours saved/year*57.40*2 (engineers per locomotive)	7% NPV
0	2021				
1	2022				
2	2023				
3	2024				
4	2025				
5	2026				
6	2027				
7	2028	2,190	106	\$ 443,239	\$ 276,027
8	2029	2,190	106	\$ 443,239	\$ 257,969
9	2030	2,190	106	\$ 443,239	\$ 241,093
10	2031	2,190	106	\$ 443,239	\$ 225,320
11	2032	2,190	106	\$ 443,239	\$ 210,580
12	2033	2,190	106	\$ 443,239	\$ 196,804
13	2034	2,190	106	\$ 443,239	\$ 183,929
14	2035	2,190	106	\$ 443,239	\$ 171,896
15	2036	2,190	106	\$ 443,239	\$ 160,650
16	2037	2,190	106	\$ 443,239	\$ 150,141
17	2038	2,190	106	\$ 443,239	\$ 140,318
18	2039	2,190	106	\$ 443,239	\$ 131,139
19	2040	2,190	106	\$ 443,239	\$ 122,559
20	2041	2,190	106	\$ 443,239	\$ 114,541
21	2042	2,190	106	\$ 443,239	\$ 107,048
22	2043	2,190	106	\$ 443,239	\$ 100,045
23	2044	2,190	106	\$ 443,239	\$ 93,500
24	2045	2,190	106	\$ 443,239	\$ 87,383
25	2046	2,190	106	\$ 443,239	\$ 81,666
26	2047	2,190	106	\$ 443,239	\$ 76,324
27	2048	2,190	106	\$ 443,239	\$ 71,331
28	2049	2,190	106	\$ 443,239	\$ 66,664
29	2050	2,190	106	\$ 443,239	\$ 62,303
30	2051	2,190	106	\$ 443,239	\$ 58,227
31	2052	2,190	106	\$ 443,239	\$ 54,418
32	2053	2,190	106	\$ 443,239	\$ 50,858
33	2054	2,190	106	\$ 443,239	\$ 47,531
34	2055	2,190	106	\$ 443,239	\$ 44,421
35	2056	2,190	106	\$ 443,239	\$ 41,515
36	2057	2,190	106	\$ 443,239	\$ 38,799

\$ 3,664,999

Segment	# of Miles	Current Speed (MpH)	New Speed (MpH)
Mattawamkeag Sub	103.5	25	40
	0.5	10	40
Millinocket Sub	10.6	25	40
	26	10	40
Total	140.6	70	160

Current Time Across (Mins)	New Time Across (Mins)	Time Saved (Mins)	Total Time Saved (Mins)	Number of Trains
248.4	155.25	93.15	95.4	4
3	0.75	2.25		
25.44	15.9	9.54	126.54	2
156	39	117		
432.84	210.9	221.94	221.94	6

Total Number of Minutes Saved	Weighted Average
381.6	95.4
253.08	126.54
634.68	105.78

C																												
Calendar Year	Estimates begin to accrue in 2028	Number of Carloads	Average Miles of Rail Traveled	Gross Ton Miles C*P*1 (135 FT Fuel + 31 GT Empty/2) Average Weight of Railcars in a Round-Trip Move	Cost of Lives Due to Rail Accidents (1/100000000* 47*511.80 (Per RCA Guidance)	Congestion cost per ton mile (5.0003)(P* 0003)(CBO Social Cost Pricing in Freight Transportation, 2014 https://www.cbo.gov/sites/default/files/11/1101/congress-2013-2014/presentation/49838-socialcost-pricing/freighttransportation_0.pdf, page 2) (*1.15 to put into 2021 \$)	Highway maintenance costs per ton mile (5.0085 per ton mile) (P* 0006)(CBO Social Cost Pricing in Freight Transportation, 2014 https://www.cbo.gov/sites/default/files/11/1101/congress-2013-2014/presentation/49838-socialcost-pricing/freighttransportation_0.pdf, page 2) (*1.15 to put into 2021 \$)	Gallons of Fuel Needed (Average Fuel Consumption per Carload + 9 Gallons)	Price/Gallon of Diesel Fuel (U.S. Energy Information Administration as of 08/07/2023, Held Constant to be Conservative)	Fuel Cost (\$/T)	Rail Noise (\$/0.41 per Rail Mile)	Nox Emissions Reduction (T*9.191 g/mile*lb. Conversion Rate/2000 (Short Tons Conversion Rate)/(Table A-6 Value) (per USDOT Mar-22 BCA Guidance)	Particulate Matter Savings (T* 21.6g/mile*lb. Conversion Rate/2000 (Short Tons Conversion Rate)/(Table A-6 Value) (per USDOT Mar-22 BCA Guidance)	Sulfur Oxide (T* 0.097 g/mile*lb. Conversion Rate/2000 (Short Tons Conversion Rate)/(Table A-6 Value) (per USDOT Mar-22 BCA Guidance)	Net Costs (G+L+M+N+O+P)	7% NPV												
0	2021																											
1	2022																											
2	2023																											
3	2024																											
4	2025																											
5	2026																											
6	2027																											
7	2028	14,469	882	11,039,872	927,349,240	\$	612,271	\$	319,935	\$	639,871	130,217	\$	4.24	\$	551,467	\$	452,635	\$	1,846,166	\$	2,199,356	\$	15,834	\$	5,817,730	\$	3,622,990
8	2029	29,550	877	22,255,199	1,859,436,728	\$	1,234,273	\$	644,956	\$	1,289,911	265,953	\$	4.24	\$	1,126,311	\$	912,463	\$	3,990,904	\$	4,504,344	\$	114,698	\$	11,892,993	\$	6,916,010
9	2030	44,122	874	33,187,722	2,787,768,662	\$	1,840,591	\$	961,780	\$	1,921,580	398,900	\$	4.24	\$	1,089,343	\$	1,360,697	\$	6,093,868	\$	6,824,046	\$	174,261	\$	17,974,787	\$	9,777,066
10	2031	58,795	873	43,847,044	3,693,363,336	\$	2,431,796	\$	1,270,892	\$	2,541,384	529,171	\$	4.24	\$	2,261,941	\$	1,797,735	\$	8,040,371	\$	9,031,787	\$	230,397	\$	23,717,099	\$	12,079,906
11	2032	72,988	872	54,243,888	4,556,486,616	\$	3,008,366	\$	1,573,888	\$	3,143,976	656,893	\$	4.24	\$	2,781,842	\$	2,221,999	\$	9,947,087	\$	11,153,536	\$	284,779	\$	29,399,708	\$	13,967,930
12	2033	86,906	870	64,385,038	5,408,418,761	\$	3,570,844	\$	1,865,904	\$	3,721,809	782,153	\$	4.24	\$	3,312,420	\$	2,619,823	\$	11,850,906	\$	13,238,927	\$	338,024	\$	34,906,945	\$	15,499,101
13	2034	97,896	874	73,271,052	6,154,863,952	\$	4,063,662	\$	2,123,421	\$	4,246,842	890,792	\$	4.24	\$	3,750,105	\$	3,024,150	\$	13,436,398	\$	15,066,094	\$	384,676	\$	39,685,096	\$	16,486,203
14	2035	108,497	877	81,893,386	6,878,876,386	\$	4,541,696	\$	2,373,112	\$	4,746,455	976,472	\$	4.24	\$	4,135,393	\$	3,357,547	\$	15,017,054	\$	16,838,367	\$	429,837	\$	44,319,901	\$	17,188,022
15	2036	119,889	880	90,252,236	7,581,187,848	\$	5,005,389	\$	2,615,110	\$	5,231,020	1,069,281	\$	4.24	\$	4,528,406	\$	3,700,342	\$	16,550,193	\$	18,557,511	\$	473,832	\$	48,815,662	\$	17,699,042
16	2037	128,812	882	98,362,261	8,262,429,966	\$	5,455,171	\$	2,850,538	\$	5,703,077	1,159,306	\$	4.24	\$	4,909,662	\$	4,032,853	\$	18,037,386	\$	20,225,080	\$	516,399	\$	53,176,551	\$	18,012,738
17	2038	136,515	883	106,228,966	8,923,424,800	\$	5,893,460	\$	3,078,516	\$	6,157,892	1,246,631	\$	4.24	\$	5,279,480	\$	4,365,888	\$	19,479,961	\$	21,842,632	\$	557,899	\$	57,456,613	\$	18,172,464
18	2039	147,026	885	113,859,709	9,564,215,539	\$	6,314,603	\$	3,299,654	\$	6,599,380	1,331,335	\$	4.24	\$	5,638,204	\$	4,668,248	\$	20,879,263	\$	23,411,639	\$	597,760	\$	61,598,522	\$	18,386,522
19	2040	157,055	886	121,261,110	10,185,964,816	\$	6,725,163	\$	3,514,159	\$	7,028,317	1,413,498	\$	4.24	\$	5,986,166	\$	4,971,722	\$	22,236,583	\$	24,933,585	\$	636,620	\$	65,489,839	\$	18,108,486
20	2041	165,911	887	128,441,257	10,789,065,565	\$	7,123,352	\$	3,722,238	\$	7,444,455	1,493,197	\$	4.24	\$	6,323,689	\$	5,266,092	\$	23,553,183	\$	26,409,872	\$	674,313	\$	69,110,502	\$	17,921,488
21	2042	174,501	888	135,450,611	11,374,072,101	\$	7,509,591	\$	3,924,951	\$	7,848,139	1,570,505	\$	4.24	\$	6,651,087	\$	5,551,630	\$	24,836,288	\$	27,841,871	\$	719,876	\$	71,095,486	\$	17,653,483
22	2043	182,833	889	142,161,035	11,943,536,964	\$	7,884,251	\$	4,119,827	\$	8,239,654	1,645,493	\$	4.24	\$	6,968,662	\$	5,828,602	\$	26,099,079	\$	29,230,909	\$	746,341	\$	76,727,844	\$	17,318,485
23	2044	190,915	889	148,713,797	12,491,958,908	\$	8,247,667	\$	4,309,726	\$	8,618,452	1,718,231	\$	4.24	\$	7,276,710	\$	6,097,266	\$	27,279,204	\$	30,578,277	\$	786,743	\$	80,251,887	\$	16,928,776
24	2045	198,754	890	155,069,975	13,025,877,894	\$	8,600,181	\$	4,493,928	\$	9,087,856	1,788,288	\$	4.24	\$	7,575,517	\$	6,307,869	\$	28,436,282	\$	31,885,224	\$	814,113	\$	83,689,185	\$	16,499,097
25	2046	206,319	891	161,235,446	13,543,729,110	\$	8,942,119	\$	4,677,604	\$	9,549,228	1,857,238	\$	4.24	\$	7,865,360	\$	6,610,614	\$	29,566,892	\$	33,152,862	\$	845,462	\$	86,964,488	\$	16,078,817
26	2047	213,735	891	167,215,906	14,046,143,684	\$	9,273,799	\$	4,845,020	\$	9,931,839	1,921,614	\$	4.24	\$	8,145,507	\$	6,855,856	\$	30,665,584	\$	34,382,668	\$	877,879	\$	90,200,291	\$	15,532,064
27	2048	220,890	892	173,017,109	14,533,417,127	\$	9,595,520	\$	5,014,036	\$	10,028,072	1,988,009	\$	4.24	\$	8,419,220	\$	7,083,701	\$	31,727,871	\$	35,575,483	\$	908,335	\$	93,319,641	\$	15,017,864
28	2049	227,830	892	178,644,188	15,006,111,766	\$	9,907,607	\$	5,177,109	\$	10,254,217	2,050,473	\$	4.24	\$	8,683,751	\$	7,324,412	\$	32,739,252	\$	36,732,613	\$	917,877	\$	96,345,412	\$	14,490,563
29	2050	234,560	892	184,102,454	15,464,606,166	\$	10,210,822	\$	5,335,289	\$	10,503,578	2,111,062	\$	4.24	\$	8,940,347	\$	7,548,201	\$	33,780,171	\$	37,854,833	\$	946,533	\$	99,260,468	\$	13,950,334
30	2051	241,093	893	189,396,973	15,909,345,735	\$	10,503,956	\$	5,488,724	\$	10,727,449	2,169,833	\$	4.24	\$	9,189,245	\$	7,765,276	\$	34,731,067	\$	38,943,482	\$	994,329	\$	101,127,335	\$	13,416,176
31	2052	247,427	893	194,632,056	16,340,743,116	\$	10,788,783	\$	5,637,056	\$	11,275,113	2,226,842	\$	4.24	\$	9,430,676	\$	7,975,839	\$	35,672,833	\$	39,999,473	\$	1,021,291	\$	104,888,893	\$	12,872,525
32	2053	253,171	893	199,514,160	16,758,198,375	\$	11,060,061	\$	5,783,524	\$	11,563,847	2,282,140	\$	4.24	\$	9,664,863	\$	8,180,095	\$	36,586,347	\$	41,023,783	\$	1,047,444	\$	107,567,584	\$	12,342,426
33	2054	259,331	894	204,346,433	17,160,100,871	\$	11,333,053	\$	5,921,860	\$	11,843,919	2,335,779	\$	4.24	\$	9,892,026	\$	8,378,204	\$	37,472,455	\$	42,017,365	\$	1,072,813	\$	110,165,916	\$	11,811,609
7% NPV								\$9,734,879			\$19,469,758						151,045,591									\$	385,677,854	

A	B	C	D	E	F	G	H
Year	Calendar Year	CO2 Metric Ton emissions/year by rail (using UP's Carbon Calculator) (See "Carbon Calculator" tab for sample calculation)	CO2 Metric Ton emissions/year if forced to use truck alternative (using UP's Carbon Calculator) (See "Carbon Calculator" tab for sample calculation)	Net CO2 Metric Ton emissions/year (D-C)	Damage Cost per Metric Ton of CO2 (per Jan-23 BCA Guidance)	CO2 Costs (E*F)	CO2 Costs Discounted @ 3% Avg SCC
0	2021						
1	2022						
2	2023						
3	2024						
4	2025	39,693.95	169,323.25	129,629	\$ 59.00	\$ 7,648,128.59	\$ 6,795,263
5	2026	39,693.95	169,323.25	129,629	\$ 60.00	\$ 7,777,757.89	\$ 6,709,162
6	2027	39,693.95	169,323.25	129,629	\$ 61.00	\$ 7,907,387.19	\$ 6,622,312
7	2028	39,693.95	169,323.25	129,629	\$ 62.00	\$ 8,037,016.48	\$ 6,534,830
8	2029	39,693.95	169,323.25	129,629	\$ 63.00	\$ 8,166,645.78	\$ 6,446,826
9	2030	39,693.95	169,323.25	129,629	\$ 65.00	\$ 8,425,904.38	\$ 6,457,754
10	2031	39,693.95	169,323.25	129,629	\$ 66.00	\$ 8,555,533.68	\$ 6,366,121
11	2032	39,693.95	169,323.25	129,629	\$ 67.00	\$ 8,685,162.98	\$ 6,274,347
12	2033	39,693.95	169,323.25	129,629	\$ 68.00	\$ 8,814,792.27	\$ 6,182,518
13	2034	39,693.95	169,323.25	129,629	\$ 69.00	\$ 8,944,421.57	\$ 6,090,716
14	2035	39,693.95	169,323.25	129,629	\$ 70.00	\$ 9,074,050.87	\$ 5,999,017
15	2036	39,693.95	169,323.25	129,629	\$ 72.00	\$ 9,333,309.47	\$ 5,990,696
16	2037	39,693.95	169,323.25	129,629	\$ 73.00	\$ 9,462,938.76	\$ 5,896,991
17	2038	39,693.95	169,323.25	129,629	\$ 74.00	\$ 9,592,568.06	\$ 5,803,661
18	2039	39,693.95	169,323.25	129,629	\$ 75.00	\$ 9,722,197.36	\$ 5,710,766
19	2040	39,693.95	169,323.25	129,629	\$ 76.00	\$ 9,851,826.66	\$ 5,618,359
20	2041	39,693.95	169,323.25	129,629	\$ 78.00	\$ 10,111,085.25	\$ 5,598,263
21	2042	39,693.95	169,323.25	129,629	\$ 79.00	\$ 10,240,714.55	\$ 5,504,889
22	2043	39,693.95	169,323.25	129,629	\$ 80.00	\$ 10,370,343.85	\$ 5,412,205
23	2044	39,693.95	169,323.25	129,629	\$ 81.00	\$ 10,499,973.15	\$ 5,320,250
24	2045	39,693.95	169,323.25	129,629	\$ 82.00	\$ 10,629,602.45	\$ 5,229,060
25	2046	39,693.95	169,323.25	129,629	\$ 84.00	\$ 10,888,861.04	\$ 5,200,581
26	2047	39,693.95	169,323.25	129,629	\$ 85.00	\$ 11,018,490.34	\$ 5,109,216
27	2048	39,693.95	169,323.25	129,629	\$ 86.00	\$ 11,148,119.64	\$ 5,018,761
28	2049	39,693.95	169,323.25	129,629	\$ 87.00	\$ 11,277,748.94	\$ 4,929,242
29	2050	39,693.95	169,323.25	129,629	\$ 88.00	\$ 11,407,378.24	\$ 4,840,679
30	2051	39,693.95	169,323.25	129,629	\$ 88.00	\$ 11,407,378.24	\$ 4,699,689
31	2052	39,693.95	169,323.25	129,629	\$ 88.00	\$ 11,407,378.24	\$ 4,562,805
32	2053	39,693.95	169,323.25	129,629	\$ 88.00	\$ 11,407,378.24	\$ 4,429,907
33	2054	39,693.95	169,323.25	129,629	\$ 88.00	\$ 11,407,378.24	\$ 4,300,881
							\$ 169,655,766

Held the damage cost per metric cost constant onwards as no further data was available

UP's Carbon Estimator

	Intermodal	Forest Products - Mattawamkeag	Forest Products - Millinrocket	Other
Carloads (Input in UP's Carbon Calculator)	1000	1000	1000	1000
Origin	Little Rock, AR	Little Rock, AR	Little Rock, AR	Little Rock, AR
Destination	Houston, TX	Houston, TX	Houston, TX	Houston, TX
Commodity (Input)	Intermodal	Lumber	Lumber	Fertilizer
Carbon Footprint By Rail (Metric Tonnes CO ₂ e)	260	160	160	150
Carbon Footprint By Truck (Metric Tonnes CO ₂ e)	640	640	640	640
Carbon Footprint per carload	0.26	0.16	0.16	0.15
Carbon Footprint per truck	0.64	0.64	0.64	0.64
Rail Volume & Mileage				
Number of Rail Units (Avg. Annual Delta during the Project Life)	129140	14400	16945	7348
Carbon Footprint - Rail	33576	2304	2711	1102
Comparable Truck Volume				
Number of Trucks (1:1 for Intermodal, 3.5:1 for Other Categories)	129140	50401	59307	25719
Carbon Footprint - Trucks	82650	32257	37956	16460

Note: Estimates use system averages; level of precision results in limitations for formal reporting. Act

Carbon Emission Estimator

If you shipped **1000** truckloads of **Intermodal** from **Little Rock, AR** to **Houston, TX**...

By Rail

The estimated carbon footprint would be:

260

Metric Tonnes CO₂e

By Truck

The estimated carbon footprint would be:

640

Metric Tonnes CO₂e



Choosing Union Pacific would reduce your carbon footprint by:

380 Metric Tonnes CO₂e

Reduction in Carbon Footprint Would Be Equivalent to:

Carbon removed by

Carbon removed by

GHG emis

81
ACRES
of U.S. forests.

9,728
TREE SEEDLINGS
grown for 10 years.

instead

39,694 Annual tons of carbon produced by rail traffic

169,323 Annual tons of carbon produced by truck alternative

ual emissions and savings may vary based on routing and other factors. Union Pacific's fuel consumpt

Carbon Emission Estimator



If you shipped 1000 truckloads of Fertilizer from Little

By Rail

The estimated carbon footprint would be:

150

Metric Tonnes CO₂e

E

The estimated c

Metric

Choosing Union Pacific wou

490 M

Reduction in Carbon Fo

ssions avoided by recycling

Carbon removed by

Carbo

132

TONS OF WASTE

of sending it to a landfill.

104

ACRES

of U.S. forests.

12

TREES

grown

tion rate is applied to other carriers' miles for interline moves. One-way shipments only; does not include

From **Rock, AR** to **Houston, TX**...

By Truck

carbon footprint would be:

640

Metric Tonnes CO₂e



Carbon Emission Estimator

If you shipped **1000**

By Rail

The estimated carbon

151

Metric Tonnes CO₂e

You could reduce your carbon footprint by:

489 Metric Tonnes CO₂e

Your footprint Would Be Equivalent to:

Carbon removed by

GHG emissions avoided by recycling

Carbon removed by

2,544

SEEDLINGS

planted for 10 years.

171

TONS OF WASTE

avoided instead of sending it to a landfill.

104

ACRES

of U.S. forest

clude backhaul or empty positioning. Greenhouse Gas equivalents are estimates based on Environm

mator

3 truckloads of **Fertilizer** from **Little Rock, AR** to **Houston, TX...**

ail

Footprint would be:

0

Metric Tonnes CO₂e

By Truck

The estimated carbon footprint would be:

640

Metric Tonnes CO₂e



Choosing Union Pacific would reduce your carbon footprint by:

490 Metric Tonnes CO₂e

Reduction in Carbon Footprint Would Be Equivalent to:

oved by

Carbon removed by

GHG emissions avoided by recyclin

4
S
rests.

12,544
TREE SEEDLINGS
grown for 10 years.

171
TONS OF WASTE
instead of sending it to a landfill.

ental Protection Agency calculations



Commodity	2018	2019	2020	2021	2022
Automotive	259	328	799	2,197	2,093
Forest Products	15,527	16,581	14,998	17,992	16,785
Grains & Fertilizers	378	287	403	600	1,101
Intermodal	775	496	6,027	10,964	72,701
Metals & Minerals	3,956	4,093	3,242	3,095	3,589
Petroleum & Chemicals	2,733	3,834	4,540	4,657	4,917
	23,628	25,619	30,009	39,505	101,186

Commodity	2018	2019	2020	2021	2022
Agriculture	206	270	239	148	245
Forest Products	13,029	14,237	15,620	14,985	13,111
Metals & Minerals	71	81	83	91	80
Other	81	71	102	8	3
Petroleum & Chemicals	144	154	166	165	154
	13,531	14,813	16,210	15,397	13,593

Commodity	2018	2019	2020	2021	2022
Forest Products	7,874	9,786	10,787	10,059	9,127

Note: There are forest products that go over the Millinocket sub and then continue down the Mattawamka

Commodity	2018	2019	2020	2021	2022
Intermodal	775	496	6,027	10,964	72,701
Forest Products - Mattawamkeag*	11,590	11,688	9,605	12,963	12,222
Forest Products - Millinrocket*	9,092	9,344	10,227	9,956	8,548
Other**	7,828	9,118	9,574	10,961	12,182
Total	29,285	30,646	35,432	44,843	105,652

*Subtracted half of the double counted loads from the Millinrocket and Mattawamkeag rows

** Includes Agriculture, Grains & Fertilizers, Metals & Minerals, Petroleum & Chemicals

	Intermodal	Forest Products - Mattawamkeag*	Forest Products - Millinrocket *	Other
2021	10,964	12,963	9,956	10,961
2022	72,701	12,222	8,548	12,182
2023	75,558	12,337	10,502	12,563
2024	166,228	12,708	10,818	12,983
2025	364,372	13,089	11,142	13,417
2026	364,372	18,470	23,115	13,866
2027	364,372	27,081	31,865	14,330
2028	364,372	27,893	32,821	14,810

2029	364,372	28,730	33,806	15,307
2030	364,372	29,593	34,821	15,822
2031	364,372	30,481	35,866	16,355
2032	364,372	31,395	36,941	16,908
2033	364,372	32,336	38,049	17,478

Mattawamkeag Sub						
2023	2024	2025	2026	2027	2028	2029
2,093	2,198	2,308	2,423	2,544	2,671	2,805
17,992	18,532	19,088	29,637	46,639	48,038	49,479
1,101	1,134	1,168	1,203	1,239	1,276	1,314
75,558	166,228	364,372	364,372	364,372	364,372	364,372
3,589	3,697	3,808	3,922	4,040	4,161	4,286
4,917	5,065	5,217	5,374	5,535	5,701	5,872
105,250	196,854	395,961	406,931	424,369	426,219	428,128

Millinocket Sub						
2023	2024	2025	2026	2027	2028	2029
493	508	523	539	555	572	589
16,157	16,642	17,141	34,282	51,423	52,966	54,555
180	185	191	197	203	209	215
6	6	6	6	6	6	6
184	190	196	202	208	214	220
17,020	17,531	18,057	35,226	52,395	53,967	55,585

Cars on both Mattawamkeag Sub and Millinocket Sub						
2023	2024	2025	2026	2027	2028	2029
11,310	11,649	11,998	22,334	39,117	40,290	41,498

eg sub

Consolidated Car Data						
2023	2024	2025	2026	2027	2028	2029
75,558	166,228	364,372	364,372	364,372	364,372	364,372
12,337	12,708	13,089	18,470	27,081	27,893	28,730
10,502	10,818	11,142	23,115	31,865	32,821	33,806
12,563	12,983	13,417	13,866	14,330	14,810	15,307
110,960	202,736	402,020	419,823	437,647	439,896	442,215

Total
44,843
105,652
110,960
202,736
402,020
419,823
437,647
439,896

442,215
444,607
447,073
449,616
452,235

2030	2031	2032	2033
2,945	3,092	3,247	3,409
50,964	52,493	54,068	55,689
1,353	1,394	1,436	1,479
364,372	364,372	364,372	364,372
4,415	4,547	4,683	4,823
6,048	6,229	6,416	6,608
430,097	432,127	434,222	436,380

2030	2031	2032	2033
607	625	644	663
56,192	57,878	59,614	61,402
221	228	235	242
6	6	6	6
227	234	241	248
57,253	58,971	60,740	62,561

2030	2031	2032	2033
42,743	44,025	45,346	46,706

2030	2031	2032	2033	2021-2033 CAGR
364,372	364,372	364,372	364,372	33.9%
29,593	30,481	31,395	32,336	7.9%
34,821	35,866	36,941	38,049	11.8%
15,822	16,355	16,908	17,478	4.0%
444,607	447,073	449,616	452,235	

MPDG - INFRA funding request: Eastern Maine Railway Freight Resiliency and Efficiency Project

Budget in Dollars												
Design is complete at the 100% level												
Funding Source	Rail Funding Amount	Ballast Funding Amount	Surfacing Funding Amount	Welding Funding Amount	Crossties Funding Amount	Grade Crossings Funding Amount	Turnouts Funding Amount	New Track Funding Amount	Delivery/Freight Funding Amount	Contingency Funding Amount	Administration Funding Amount	Total Funding
MPDG Funds:	\$ 26,648,309	\$ 1,487,775	\$ 673,930	\$ 3,499,875	\$ 9,899,247	\$ 1,800,000	\$ 675,000	\$ 360,000	\$ 210,000	\$ 905,083	\$ 300,000	\$46,459,218
Other Federal Funds:	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Non-Federal Funds:	\$ 17,765,539	\$ 991,850	\$ 449,286	\$ 2,333,250	\$ 6,599,498	\$ 1,200,000	\$ 450,000	\$ 240,000	\$ 140,000	\$ 603,388	\$ 200,000	\$30,972,812
Total:	\$ 44,413,848	\$ 2,479,625	\$ 1,123,216	\$ 5,833,125	\$ 16,498,745	\$ 3,000,000	\$ 1,125,000	\$ 600,000	\$ 350,000	\$ 1,508,471	\$ 500,000	\$ 77,432,030

% of Total Project Cost												
	Rail	Ballast	Surfacing	Welding	Crossties	Grade Crossings	Turnouts	New Track	Delivery/Freight	Contingency	Administration	Total Funding
Total:	57%	3%	1%	8%	21%	4%	1%	1%	Less than 1%	2%	1%	100%

Budget in Percentages												
Funding Source	Rail Funding Amount	Ballast Funding Amount	Surfacing Funding Amount	Welding Funding Amount	Crossties Funding Amount	Grade Crossings Funding Amount	Turnouts Funding Amount	New Track Funding Amount	Delivery/Freight Funding Amount	Contingency Funding Amount	Administration Funding Amount	Total Funding
MPDG Funds:	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%
Other Federal Funds:	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Non-Federal Funds:	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%
Total:	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Census Tract(s):	Area of Persistent Poverty	Historically Disadvantaged Community	Project Cost per Census Tract:
9609	N	Y	\$ 14,710,756
9608	Y	Y	\$ 774,250
285	Y	Y	\$ 2,322,751
290	Y	Y	\$ 11,613,755
265	Y	Y	\$ 10,839,504
255	Y	Y	\$ 10,839,504
9529	N	Y	\$ 6,194,002
9551	Y	Y	\$ 16,259,256
300	N	Y	\$ 3,878,252