

*Table AR-1
Transmission System Additions – Asset Renewal Line Work*

System Additions	Projected In-Service Year	Planning Zone	Need Category	Cost Estimate - Refer to Funding Project and Sum of Total (2010-2019) in Asset Renewal Financial Table
Rebuild Plainfield-Chaffee Creek 69-kV line Y-90	2010	1	Improve condition and increase reliability performance of existing line	F1699
Rebuild Auburndale-Sigel 69-kV line Y-107	2010	1	Improve condition and increase reliability performance of existing line	F1732
Rebuild Mauston-Hilltop 69-kV line Y-89	2010	1	Improve condition and increase reliability performance of existing line	F2345
Rebuild Deer Trail-Whitcomb 69-kV line Y-86	2011	1	Improve condition and increase reliability performance of existing line	F2410
Rebuild Wautoma-Berlin 69-kV line Y-95	2011	1	Improve condition and increase reliability performance of existing line	F2386
Re-insulate Winneconne-Berlin 69-kV line Y-80	2012	1	Improve condition and increase reliability performance of existing line	TBD
Re-insulate Harrison-Iola 69-kV line Y56 CWEC Iola Tap	2013	1	Improve condition and increase reliability performance of existing line.	F2999
Rebuild North Point-Rocky Run 115-kV line T-20	2016	1	Improve condition and increase reliability performance of existing line.	TBD
Rebuild Wautoma-Portage 69-kV line Y17	2017	1	Improve condition and increase reliability performance of existing line	TBD

Table AR-1
Transmission System Additions – Asset Renewal Line Work (continued)

System Additions	Projected In-Service Year	Planning Zone	Need Category	Cost Estimate - Refer to Funding Project and Sum of Total (2010-2019) in Asset Renewal Financial Table
Planning to reconfigure with Fairwater/Ripon to North Randolph, 69-kV line Y26	2018	1	Improve condition and increase reliability performance of existing line	TBD
Rebuild Whiting Avenue-Plover 115-kV line B-106	2019	1	Improve condition and increase reliability performance of existing line	TBD
Replace select poles on Coyne-Saratoga 115-kV line T-72	2020	1	Improve condition and increase reliability performance of existing line	TBD
Replace select Poles Petenwell – Saratoga 115-kV line X-43	2020	1	Improve condition and increase reliability performance of existing line	TBD
Replace select Poles Coyne-Plover 115-kV line J-114	2020	1	Improve condition and increase reliability	TBD
Re-insulate top phase and add additional arresters on Chandler-Forsyth 69-kV line (Chandler line)	2010	2	Improve condition and increase reliability performance of existing line	F2786
Improve clearances, install arresters on portions of line, replace select components on Roberts-9 Mile 69-kV line 6952	2011	2	Improve condition and increase reliability performance of existing line	F3007
Re-insulate and improve grounding on Munising-Forsyth 138-kV line (Munising 138 line)	2012	2	Improve condition and increase reliability performance of existing line	F2985

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Transmission System Additions – Asset Renewal Line Work (continued)*

System Additions	Projected In-Service Year	Planning Zone	Need Category	Cost Estimate - Refer to Funding Project and Sum of Total (2010-2019) in Asset Renewal Financial Table
Reinsulate, add arresters, replace select poles on Munising-Gwinn 69-kV line (Autrain line)	2013	2	Improve condition and increase reliability performance of existing line	F2986
Reinsulate, add arresters, replace select poles on Blaney Park-Munising 69-kV line (Inland line)	2014	2	Improve condition and increase reliability performance of existing line	TBD
Re-insulate Portage-9 Mile 69-kV lines 6901/6902	2014	2	Improve condition and increase reliability performance of existing line	TBD
Re-insulate and install arresters on KI Sawyer-Gwinn 69-kV line (Sawyer line)	2014	2	Improve condition and increase reliability performance of existing line	TBD
Install new cross arms on Atlantic-M38 69-kV line (Atlantic 69 line)	2014	2	Improve condition and increase reliability performance of existing line	TBD
Replace select poles and cross arms on Rexton-Hiawatha 69-kV line ESE_6908	2015	2	Improve condition and increase reliability performance of existing line	TBD
Replace underground cable on Magazine-Nine Mile/Three Mile 69-kV line ESE_6903	2015	2	Improve condition and increase reliability performance of existing line	TBD
Replace select poles and re-insulate Conover-Mass 69-kV line 6530	2018	2	Improve condition and increase reliability performance of existing line	TBD
Replace select poles and re-insulate Powers-Chalk Hill 69-kV line 6910	2018	2	Improve condition and increase reliability performance of existing line	TBD
Replace one circuit with new 3C XPLE submarine cable on McGulpin-Straits 138-kV line 9901	2020	2	Improve condition and increase reliability performance of existing line	TBD

Table AR-1
Transmission System Additions – Asset Renewal Line Work (continued)

System Additions	Projected In-Service Year	Planning Zone	Need Category	Cost Estimate - Refer to Funding Project and Sum of Total (2010-2019) in Asset Renewal Financial Table
Replace one circuit with new 3C XPLE submarine cable on McGulpin-Straits 138-kV line 9903	2020	2	Improve condition and increase reliability performance of existing line	TBD
Rebuild Miner-Hillman 69-kV line Y-130	2010	3	Improve condition and increase reliability performance of existing line	F2346
Rebuild Forward-Rock Branch 69-kV line Y-135	2010	3	Improve condition and increase reliability performance of existing line	F1715
Rebuild Boscobel-Gran Grae 69-kV line Y-40	2010	3	Improve condition and increase reliability performance of existing line	F1444
Install "Bird-be-Gone" Dam Heights – Portage 69-kV line Y16	2010	3	Improve condition and increase reliability performance of existing line	F2949
Rebuild Stage Coach-Spring Green 69-kV line Y-62	2011	3	Improve condition and increase reliability performance of existing line	F1656
Install anti-galloping and grounding improvements on Columbia-South Fond Du Lac 345-kV line W5	2011	3	Improve condition and increase reliability performance of existing line	F2994
Rebuild Pardeeville Tap-North Randolph/Rio 69-kV line Y-64	2011	3	Improve condition and increase reliability performance of existing line	F2389
Rebuild Dane-Dam Heights 69-kV line Y-8	2012	3	Improve condition and increase reliability performance of existing line	F1602
Replace underground cable on East Towne-Sycamore 69-kV line 6987	2012	3	Improve condition and increase reliability performance of existing line.	F2995

*Table AR-1
Transmission System Additions – Asset Renewal Line Work (continued)*

System Additions	Projected In-Service Year	Planning Zone	Need Category	Cost Estimate - Refer to Funding Project and Sum of Total (2010-2019) in Asset Renewal Financial Table
Replace underground cable on East Towne to Sycamore 69-kV line 6988	2012	3	Improve condition and increase reliability performance of existing line.	F2995
Replace underground with overhead cable on Pheasant Branch-West Middleton 69-kV line 6963	2012	3	Improve condition and increase reliability performance of existing line	TBD
Rebuild Kirkwood – Trienda 138-kV line X-52	2012	3	Improve condition and increase reliability performance of existing line	F2726
Rebuild Doylestown – Rio Pumping station 69-kV line Y20	2013	3	Improve condition and increase reliability performance of existing line	TBD
Rebuild Rubicon-Concord 138-kV line 9061	2013	3	Improve condition and increase reliability performance of existing line	TBD
Rebuild Darlington-Hillman 138-kV line X-14	2016	3	Improve condition and increase reliability performance of existing line	TBD
Rebuild Portage-Dam Heights 69-kV line Y16	2018	3	Improve condition and increase reliability performance of existing line.	TBD
Rebuild Eden-Hillman 69-kV line Y105	2018	3	Improve condition and increase reliability performance of existing line.	TBD
Replace underground cable on Stagecoach-West Middleton 69-kV line 6927	2019	3	Improve condition and increase reliability performance of existing line	TBD
Re-insulate South Fond du Lac-Edgewater 345-kV line W1	2010	4	Improve condition and increase reliability performance of existing line	F2765

*Table AR-1
Transmission System Additions – Asset Renewal Line Work (continued)*

System Additions	Projected In-Service Year	Planning Zone	Need Category	Cost Estimate - Refer to Funding Project and Sum of Total (2010-2019) in Asset Renewal Financial Table
Install “Bird-Be-Gone” Crivitz – Pioneer 69-kV line E-83	2010	4	Improve condition and increase reliability performance of existing line	F3020
Replace shield wire on Stiles-Pulliam 138-kV lines KK64441-64451	2011	4	Improve condition and increase reliability performance of existing line	F2383
Reconductor project Glenview – New Holstein 69-kV line J-140	2012	4	Improve condition and increase reliability performance of existing line	TBD
Rebuild Finger Road-Highway V 69-kV line U-47	2014	4	Improve condition and increase reliability performance of existing line	TBD
Replace the submarine cable on First Avenue-Redwood 69-kV line T-46	2015	4	Improve condition and increase reliability performance of existing line	TBD
Rebuild Neevin-Butte Des Morts 138-kV line 43021	2015	4	Improve condition and increase reliability performance of existing line	TBD
Rebuild Sawyer-Dykesville 69-kV line DYKY21	2016	4	Improve condition and increase reliability performance of existing line	F2801
Rebuild Sunset Point-Mears-Woodenshoe-Neevin 138-kV lines A-79, MCRG21 and 80952	2016	4	Improve condition and increase reliability performance of existing line	TBD
Rebuild Highway V-Oak Street 69-kV line Z-26	2016	4	Improve condition and increase reliability performance of existing line	TBD

*Table AR-1
Transmission System Additions – Asset Renewal Line Work (continued)*

System Additions	Projected In-Service Year	Planning Zone	Need Category	Cost Estimate - Refer to Funding Project and Sum of Total (2010-2019) in Asset Renewal Financial Table
Rebuild Manrap-Wesmark 69-kV line R-44	2016	4	Improve condition and increase reliability performance of existing line	TBD
Rebuild Danz-Finger Road 69-kV line L-64	2016	4	Improve condition and increase reliability performance of existing line	TBD
Replace underground cable on University-Danz Avenue 69-kV line O-15	2017	4	Improve condition and increase reliability performance of existing line	TBD
Rebuild Butte des Morts-North Appleton 138-kV line 6853	2017	4	Improve condition and increase reliability performance of existing line	TBD
Rebuild Pioneer-Sobieski 69-kV line E-83 Tap	2018	4	Improve condition and increase reliability performance of existing line	TBD
Rebuild Sobieski-Bayport 69-kV line T-98	2018	4	Improve condition and increase reliability performance of existing line	TBD
Rebuild Custer-New Holstein 69-kV line P-68	2019	4	Improve condition and increase reliability performance of existing line	TBD
Rebuild Goodman-Caldron Falls 69-kV line J-88	2019	4	Improve condition and increase reliability performance of existing line	TBD
Replace select poles on Howard-Pulliam 138-kV line D-82	2019	4	Improve condition and increase reliability performance of existing line	TBD

*Table AR-1
Transmission System Additions – Asset Renewal Line Work (continued)*

System Additions	Projected In-Service Year	Planning Zone	Need Category	Cost Estimate - Refer to Funding Project and Sum of Total (2010-2019) in Asset Renewal Financial Table
Replace underground cable on Erdman-Lodestar 138-kV line X-48	2019	4	Improve condition and increase reliability performance of existing line	TBD
Rebuild Finger Road – Canal 69-kV line J-10	2020	4	Improve condition and increase reliability performance of existing line	TBD
Replace underground cable on Edgewater-Erdman 69-kV line Y-31	2021	4	Improve condition and increase reliability performance of existing line	TBD
Re-insulate Racine-Somers 138-kV line 1645	2012	5	Improve condition and increase reliability performance of existing line	F2697
Re-insulate Racine-Kenosha 138-kV line 1651	2012	5	Improve condition and increase reliability performance of existing line	F2693
Replace shield wire on Tosa - Butler 138-kV line 5061	2013	5	Improve condition and increase reliability performance of existing line	TBD
Replace shield wire on Tosa – Bluemound 138-kV line 5041	2013	5	Improve condition and increase reliability performance of existing line	TBD
Replace shield wire on Butler – Tower#4291 138kV line 3443	2013	5	Improve condition and increase reliability performance of existing line	TBD
Rebuild St. Martins-Edgewood 138-kV line 3013	2014	5	Improve condition and increase reliability performance of existing line	TBD
Rebuild and add breaker on Edgewood-Mukwonago 138-kV line 671K61	2014	5	Improve condition and increase reliability performance of existing line	TBD

*Table AR-1
Transmission System Additions – Asset Renewal Line Work (continued)*

System Additions	Projected In-Service Year	Planning Zone	Need Category	Cost Estimate - Refer to <i>Funding Project and Sum of Total (2010-2019)</i> in Asset Renewal Financial Table
Rebuild Hartford-St. Lawrence 138-kV line 8031	2014	5	Improve condition and increase reliability performance of existing line	TBD
Rebuild Cooney-Concord 138-kV line 9042	2015	5	Improve condition and increase reliability performance of existing line	TBD
Rebuild Summit -Waukesha 138-kV line 7021	2015	5	Improve condition and increase reliability performance of existing line	TBD
Rebuild Albers-Paris 138-kV line 3124	2016	5	Improve condition and increase reliability performance of existing line	TBD
Rebuild Summit-Merrill Hills 138-kV line 3551	2017	5	Improve condition and increase reliability performance of existing line	TBD

Table AR-2
Asset Renewal Transformer Replacements

System Upgrade	Projected In-Service Year	Voltage	Planning Zone	Need Category	Cost Estimate – Refer to <i>Funding Project</i> and Sum of Total (2010-2019) in Asset Renewal Financial Table
Council Creek T31	2010	138/69-kV	1	Improve condition, reliability	F2340
North Fond du Lac T31 and T32	2010	138/69-kV	4	Improve condition, reliability	F2343
Ellinwood T2	2011	138/69-kV	4	Improve condition, reliability	F2024
Aurora T3	2011	138/69-kV	1	Improve condition, reliability	F2419
Bluemound T3	2011	230/138-kV	5	Improve condition, reliability	F2604
Bluemound T1	2012	230/138-kV	5	Improve condition, reliability	F2799
Edgewater T31 and T32	2012	138/69-kV	4	Improve condition, reliability	TBD
Atlantic T1	2013	138/69-kV	2	Improve condition, reliability	TBD
Lancaster T31	2013	138/69-kV	3	Improve condition, reliability	TBD
Fitzgerald SS – relocate system spare	2013	345/138-kV	4	Reliability	TBD
Replace two transformers	2014	138/69-kV	various	Improve condition, reliability	TBD
Replace one transformer	2014	345/138-kV	various	Improve condition, reliability	TBD
Replace two transformers	2015	138/69-kV	various	Improve condition, reliability	TBD
Replace two transformers	2016	138/69-kV	various	Improve condition, reliability	TBD
Replace one transformer	2016	345/138-kV	various	Improve condition, reliability	TBD
Replace two transformers	2017	138/69-kV	various	Improve condition, reliability	TBD
Replace two transformers	2018	138/69-kV	various	Improve condition, reliability	TBD
Replace one transformer	2018	345/138-kV	various	Improve condition, reliability	TBD
Replace two transformers	2019	138/69-kV	various	Improve condition, reliability	TBD

*Table AR-2
Asset Renewal Transformer Replacements*

System Upgrade	Projected In-Service Year	Voltage	Planning Zone	Need Category	Cost Estimate – Refer to <i>Funding Project</i> and Sum of Total (2010-2019) in Asset Renewal Financial Table
Replace two transformers	2020	138/69-kV	various	Improve condition, reliability	TBD
Replace one transformer	2020	345/138-kV	various	Improve condition, reliability	TBD

Table AR-3
Transmission System Additions – Asset Renewal Circuit Breakers

System Additions	Projected In-Service Year	Planning Zone	Need Category	Cost Estimate - Refer to Funding Project and Sum of Total (2010-2019) in Asset Renewal Financial Table
Circuit breaker replacements	2010	Various	CT deficiency, Control scheme incompatibility (2 units) 69 kV	Various
Circuit breaker replacements	2010	Various	End of life, parts obsolescence (1 unit) 69 kV	Various
Circuit breaker replacements	2010	Various	Mechanism design issues (2 units) 69 kV	Various
Circuit breaker replacements	2010	Various	Type S bushings (1 unit) 69 kV	Various
Circuit breaker replacements	2010	Various	Type U bushings (22 units) 69 kV	Various
Circuit breaker replacements	2010	Various	End of life, part obsolescence (4 units) 138 kV	Various
Circuit breaker replacements	2010	Various	Type U bushings (15 units) 138 kV	Various
Circuit breaker replacements	2010	Various	CT deficiency, control scheme incompatibility (3 unit) 230 kV	Various
Circuit breaker replacements	2010	Various	Type U bushing (5 units) 230 kV	Various

*Table AR-3
Transmission System Additions – Asset Renewal Circuit Breakers (continued)*

System Additions	Projected In-Service Year	Planning Zone	Need Category	Cost Estimate - Refer to Funding Project and Sum of Total (2010-2019) in Asset Renewal Financial Table
Circuit breaker replacements	2010	Various	EPA SF6 emission reduction (2 units) 345 kV	Various
Circuit breaker replacements	2011	Various	Mechanism design issues (5 units) 69 kV	Various
Circuit breaker replacements	2011	Various	Type U bushings (17 units) 69 kV	Various
Circuit breaker replacements	2011	Various	End of life, parts obsolescence (2 unit) 138 kV	Various
Circuit breaker replacements	2011	Various	Type U bushings (15 units) 138 kV	Various
Circuit breaker replacements	2011	Various	Ratings (5 units) 69 kV	Various
Circuit breaker replacements	2011	Various	End of life, parts obsolescence (4 units) 69 kV	Various
Circuit breaker replacements	2012	Various	Type U bushings (37 units) 69 kV	Various
Circuit breaker replacements	2012	Various	Ratings (6 units) 69 kV	Various
Circuit breaker replacements	2012	Various	Mechanism design issues (1 units) 69kV	Various

System Additions	Projected In-Service Year	Planning Zone	Need Category	Cost Estimate - Refer to <i>Funding Project</i> and <i>Sum of Total (2010-2019)</i> in Asset Renewal Financial Table
Circuit breaker replacements	2012	Various	Type U Bushings (9 units) 138kV	Various
Circuit breaker replacements	2012	Various	Planning stability issues (3 units) 138 KV	Various
Circuit breaker replacements	2012	Various	Ratings (2 units) 138kV	Various
Circuit breaker replacements	2013	Various	Type U Bushings (12 units) 69kV	Various
Circuit breaker replacements	2013	Various	Planning stability issues (1 units) 69 KV	Various
Circuit breaker replacements	2013	Various	Type S bushings (1 unit) 69 kV	Various
Circuit breaker replacements	2013	Various	Type U Bushings (4 units) 138kV	Various
Circuit breaker replacements	2013	Various	End of life, part obsolescence (6 units) 138 kV	Various
Circuit breaker replacements	2013	Various	EPA SF6 emission reduction (2units) 345 kV	Various

*Table AR-3
Transmission System Additions – Asset Renewal Circuit Breakers (continued)*

System Additions	Projected In-Service Year	Planning Zone	Need Category	Cost Estimate - Refer to Funding Project and Sum of Total (2010-2019) in Asset Renewal Financial Table
Circuit breaker replacements	2014-2020	Various	End of life, parts obsolescence (8 units) 69 kV	TBD
Circuit breaker replacements	2014-2020	Various	Mechanism design issues (53 units) 69 kV	TBD
Circuit breaker replacements	2014-2020	Various	End of life, parts obsolescence (17 units) 138 kV	TBD
Circuit breaker replacements	2014-2020	Various	Over duty rating (8 units) 138 kV	TBD
Circuit breaker replacements	2014-2020	Various	Type U Bushings (1 units) 138kV	TBD
Circuit breaker replacements	2014-2020	Various	Bushing flange oil leak (27 units) 345 kV	TBD
Circuit breaker replacements	2014-2020	Various	EPA SF6 emission reduction (5units) 345 kV	TBD
Circuit breaker replacements	2014-2020	Various	End of life, parts obsolescence (8 units) 345 kV	TBD

Table AR-4**Summary of Cancellations, Deferrals, Changes, Possible Changes and New Projects for the 2010 10-Year Assessment**

PROJECTS CANCELED	Former In-Service Date	Planning Zone	Reason for Removal
Shield Wire Replacement Norwich - 43rd St. Terminal 138-kV NWHG61	2012	5	Project no longer needed.
Shield Wire Replacement Tosa- Granville 138-kV 3452	2013	5	Project no longer needed.
PROJECTS DEFERRED	New Date	Planning Zone	Reason for Deferral
Rebuild and reconductor 20th Street - Sauk Trail 138-kV line X-37	2010	4	Project scheduling. Original date 2009.
Rebuild Whitcomb - Deer Trail 69-kV line Y-86	2011	1	Project scheduling. Original date 2010.
Rebuild Stage Coach - Spring Green 69-kV line Y- 62	2011	3	Project scheduling. Original date 2010.
Rebuild Dam Heights - Dane 69-kV line Y-8	2012	3	Project scheduling. Original date 2010.
Re-insulate Iola-Harrison 69-kV line Y-56 CWEC Iola Tap	2013	1	Project scheduling. Original date 2012. Possible earlier in service date.
Rebuild Concord- Cooney 138-kV line 9042	2015	5	Asset condition. Original date 2014.
Rebuild Paris – Albers 138-kV line 3124	2016	5	Asset condition. Original date 2018.
Rebuild Woodenshoe - Mears 138-kV line A-79	2016	4	Condition assessment. Original date 2012.
Rebuild Mears- Sunset Point 138-kV line MCRG21	2016	4	Condition assessment. Original date 2012.
Rebuild Oak St. - Hwy V 69-kV line Z-26	2016	4	Project scheduling. Original date 2013.
Rebuild West Mark - Manrap 69-kV line R-44	2016	4	Project scheduling. Original date 2013.
Rebuild Dykesville - Sawyer 69-kV line DYKY21	2016	4	Project scheduling. Original date 2015.
Rebuild Dam Heights - Portage 69-kV line Y-16	2018	3	Project scheduling. Original date 2013.
Rebuild Sobieski - Pioneer 69-kV E-83 Tap	2018	4	Project scheduling. Original date 2016.
Rebuild Bayport – Sobieski 69-kV line T-98	2018	4	Project scheduling. Original date 2016.

Table AR-4**Summary of Cancellations, Deferrals, Changes, Possible Changes and New Projects for the 2010 10-Year Assessment**

OTHER PROJECT CHANGES AND POSSIBLE CHANGES	Date	Planning Zone	Nature of Change or Update
Rebuild Darlington – Hillman 138-kV line X-14	2016	3	Asset condition assessed in 2010.
NEW PROJECTS	In-Service Date	Planning Zone	Reason for Project
Install Bird-be -Gone Dam Heights - Portage 69-kV line Y-16	2010	3	Project identified due to unknown forced outages.
Install Bird-be -Gone Crivitz - Pioneer 69-kV line E-83	2010	4	Project identified due to unknown forced outages.
Rebuild Kirkwood - Trienda 138-kV line X-52	2012	3	Asset condition and reliability.
Thermal Re-rate Project Glenview - New Holstein 69-kV line J-140	2012	1	Asset reliability.
Shield Wire Replacement Butler - Str#4291 138-kV line 3443	2013	5	Asset condition. May be part of Smart Grid Initiative.
Rebuild Doylestown – Rio Pumping Station 69-kV line Y20 (Doylestown - Str#320)	2013	3	Asset condition and reliability.
Rebuild Finger Road – Canal 69-kV line J-10	2020	4	Possible asset renewal project.
Replace select poles Petenwell – Saratoga 138-kV line X-43	2020	1	Possible asset renewal project.
Replace select poles Coyne – Plover 115-kV line J-114	2020	1	Possible asset renewal project.