

Table PR-2  
Transmission System Additions for 2010

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional	Cost Estimate - Refer to <i>Funding Project</i> and <i>Sum of Total (2010-2019)</i> in <i>Financial Table</i>
Construct 69-kV line from new Warrens Substation to the Council Creek-Tunnel City 69-kV line	2010	2010	1	T-D interconnection	Planned	F2173
Install 2-8.0 MVAR capacitor bank at Indian Lake 69-kV Substation	2010	2010	2	reliability (B1)	Proposed	F2223
Install reactor at Straits Substation	2010	2010	2	reliability (B1)	Proposed	F2966
Uprate Y-61 McCue-Lamar 69-kV line to achieve 300 deg F line ratings and install 2-12.45 MVAR 69-kV capacitor banks at Lamar Substation	2008	2010	3	reliability (69B2)	Planned	F2324
Uprate the Royster Substation terminals	2010	2010	3	reliability (B2)	Planned	F2317
Uprate Y-61 Sheepskin-Dana 69-kV line to 95 MVA	2017	2010	3	reliability (69B2)	Planned	F1868
Uprate Y-40 Gran Grae-Boscobel 69-kV line to achieve a 99 MVA summer emergency rating*	2017	2010	3	reliability (B2, 69B2)	Planned	F1444
Construct a 138-kV bus at Pleasant Valley Substation to permit second distribution transformer interconnection	2010	2010	5	T-D interconnection	Planned	F2086

Table PR-2  
Transmission System Additions for 2010 (continued)

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional	Cost Estimate - Refer to <i>Funding Project</i> and <i>Sum of Total (2010-2019)</i> in <i>Financial Table</i>
Expand 345-kV switchyard at Oak Creek to interconnect one new generator	2010	2010	5	new generation	Planned	F1729
Construct second Shorewood-Humboldt 138-kV underground cable*	2012	2010	5	reliability (B2)	Proposed	F2487

Defined in Previous 10-Year Assessment
Revised in scope from Previous 10-Year Assessment
New to this 10-Year Assessment

Table PR-3  
Transmission System Additions for 2011

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional	Cost Estimate - Refer to <i>Funding Project</i> and <i>Sum of Total (2010-2019)</i> in <i>Financial Table</i>
Upgrade McKenna 69-kV 6.3 MVAR capacitor bank to 15.3 MVAR and upgrade Chaffee Creek 69-kV 8.1 MVAR bank to 14.4 MVAR	2011	2011	1	reliability (69B2, 69B3)	Proposed	F2519
Replace two overhead Blount-Ruskin 69-kV lines with one underground 69-kV line	2010	2011	3	Completion of earlier project per agreement with the City of Madison	Planned	F2628
Install 2-16.33 MVAR 69-kV capacitor banks at Spring Green Substation	2011	2011	3	reliability (A, 69B3)	Planned	F2327
Install 1-32.66 MVAR 138-kV capacitor bank at Femrite Substation	2011	2011	3	reliability (A, C5)	Planned	F2516
Install 1-32.66 MVAR 138-kV capacitor bank at Kegonsa Substation	2011	2011	3	reliability (A, C5)	Planned	F3008
Rebuild Y-33 Brodhead to South Monroe 69-kV line	2011	2011	3	reliability (B2, 69B2, 69B3)	Planned	F2526
Uprate terminal limitations at McCue for the Y-79 McCue-Milton Lawns 69-kV line	2011	2011	3	reliability (69B2)	Proposed	F2405
Rebuild 2.37 miles of 69 kV from Sunset Point to Pearl Ave with 477 ACSR	2011	2011	4	reliability (69B2, 69B3)	Planned	F1361

Table PR-3  
Transmission System Additions for 2011 (continued)

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional	Cost Estimate - Refer to <i>Funding Project</i> and <i>Sum of Total (2010-2019)</i> in <i>Financial Table</i>
Reconfigure Kewaunee 345/138-kV switchyard and install a second 500 MVA 345/138-kV transformer	2011	2011	4	reliability (C3), condition	Proposed	F2437

Defined in Previous 10-Year Assessment
Revised in scope from Previous 10-Year Assessment
New to this 10-Year Assessment

Table PR-4  
Transmission System Additions for 2012

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional	Cost Estimate - Refer to <i>Funding Project</i> and <i>Sum of Total (2010-2019)</i> in <i>Financial Table</i>
Construct 115-kV line from new Woodmin Substation to the Clear Lake Substation	2012	2012	1	T-D interconnection	Proposed	F2495
Install second 138/69-kV transformer and a 138-kV ring bus at Chandler Substation	2012	2012	2	reliability (69B3)	Proposed	F3040
Relocate Engadine 69-kV load	2012	2012	2	reliability (69B2)	Provisional	F3073
Upgrade 69-kV equipment at Delta Substation	2012	2012	2	reliability (C1), operating flexibility	Proposed	F3066
Rebuild part of the Y-8 Dane-Dam Heights 69-kV line*	2015	2012	3	reliability, asset renewal, potential T-D interconnection	Planned	F1602
Construct Canal-Dunn Road 138-kV line	2012	2012	4	reliability (69A, 69B2, 69B3, 69C3)	Planned	F1358
Install 100 MVA 138/69-kV transformer at Dunn Road	2012	2012	4	reliability (69A, 69B2, 69B3, 69C3)	Planned	F1358

Defined in Previous 10-Year Assessment
Revised in scope from Previous 10-Year Assessment
New to this 10-Year Assessment

Table PR-5  
Transmission System Additions for 2013

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional	Cost Estimate - Refer to <i>Funding Project</i> and <i>Sum of Total (2010-2019)</i> in <i>Financial Table</i>
Reconfigure Petenwell 138-kV bus	2013	2013	1	reliability (C1), operating flexibility	Provisional	F3046
Construct Monroe County-Council Creek 161-kV line and Timberwolf 69-kV switching station	2013	2013	1	economics, reliability (A, B2, C3)	Proposed	F2454
Install a 161/138-kV transformer at Council Creek Substation	2013	2013	1	economics, reliability (A, B2, C3)	Proposed	F2454
Uprate Council Creek-Petenwell 138-kV line	2013	2013	1	economics, reliability (B2)	Proposed	F2454
Install 2-16.33 MVAR 69-kV capacitor banks at Nine Springs Substation	2006	2013	3	reliability (69B2)	Proposed	F2088
Uprate Fitchburg-Nine Springs 69-kV and Royster-Pflaum 69-kV lines and move AGA load to the Royster-Femrite 69-kV line	2006	2013	3	reliability (69B2)	Proposed	F2088
Install a 138/69-kV transformer at Bass Creek Substation	2010	2013	3	reliability (69B2)	Planned	F1869
Uprate X-12 Town Line Road-Bass Creek 138-kV line to 300 deg F	2010	2013	3	reliability (69B2)	Planned	F1869

Table PR-5  
Transmission System Additions for 2013 (continued)

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional	Cost Estimate - Refer to <i>Funding Project</i> and <i>Sum of Total (2010-2019)</i> in <i>Financial Table</i>
Construct 345-kV line from Rockdale to West Middleton	2013	2013	3	reliability (B2, C5)	Planned	F1435
Construct a 345-kV bus and install a 345/138 kV 500 MVA transformer at West Middleton Substation	2013	2013	3	reliability (B2, C5)	Planned	F1435

Defined in Previous 10-Year Assessment
Revised in scope from Previous 10-Year Assessment
New to this 10-Year Assessment

Table PR-6  
Transmission System Additions for 2014

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional	Cost Estimate - Refer to <i>Funding Project</i> and <i>Sum of Total (2010-2019)</i> in <i>Financial Table</i>
Energize Hiawatha-Indian Lake at 138 kV	2014	2014	2	reliability (B2)	Provisional	F3068
Install power flow control at Straits 138-kV Substation	2010	2014	2	reliability (B1)	Provisional	F2894
Uprate overhead portions of Straits-McGulpin 138-kV circuits #1 & #3 to 230 F degree summer emergency ratings	2012	2014	2	reliability (B2)	Proposed	F2874
Rebuild Straits-Pine River lines 6904/5 for 138 kV and operate at 69 kV	2014	2014	2	reliability (B2)	Proposed	F2833
Uprate Munising-Seney-Blaney Park 69-kV line to 167 degrees F	2014	2014	2	reliability (69B2)	Provisional	F3071
Construct 18th Road-Chandler double circuit 138-kV lines and operate at 138/69	2014	2014	2	reliability (69B3)	Provisional	F3077
Construct 18th Road 138/69-kV Substation and install two 138/69-kV transformers	2014	2014	2	reliability (69B3)	Provisional	F3077
Install 1-8.16 MVAR 138-kV capacitor bank at 18th Road	2014	2014	2	reliability (69B3)	Provisional	F3077

Table PR-6  
Transmission System Additions for 2014 (continued)

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional	Cost Estimate - Refer to <i>Funding Project</i> and <i>Sum of Total (2010-2019)</i> in <i>Financial Table</i>
Rebuild the Y-119 Verona to Oregon 69-kV line	2008	2014	3	reliability, condition (69B3, 69C3)	Proposed	F2469
Install 3-75 MVAR capacitor banks at Bluemound Substation	2012	2014	5	reliability (B1)	Provisional	F2650

Defined in Previous 10-Year Assessment
Revised in scope from Previous 10-Year Assessment
New to this 10-Year Assessment

Table PR-7  
Transmission System Additions for 2015

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional	Cost Estimate - Refer to <i>Funding Project</i> and <i>Sum of Total (2010-2019)</i> in <i>Financial Table</i>
Replace Petenwell 138/69-kV transformer	2015	2015	1	reliability (A, 69B2)	Provisional	F3036
Upgrade 4.1 MVAR capacitor bank to 8.2 MVAR and install a new 8.2 MVAR capacitor bank at Ripon 69-kV Substation	2015	2015	1	reliability (69B2)	Provisional	F2477
Construct a 69-kV line from SW Ripon to the Ripon-Metomen 69-kV line	2015	2015	1	T-D interconnection	Provisional	TBD
Construct a new Arnold 345-kV Substation and install a 345/138-kV transformer	2015	2015	2	reliability (B1)	Provisional	F3080
Uprate 6927 West Middleton-Stage Coach 69-kV line to 106 MVA SE	2015	2015	3	reliability (69B2, 69B3)	Provisional	F3103
Replace two existing 345/138-kV transformers at Arcadian Substation with 1-500 MVA transformer	2010	2015	5	reliability (B3)	Provisional	F2539
Uprate Arcadian-Waukesha 138-kV lines KK9942/KK9962	2010	2015	5	reliability (B2)	Provisional	F2142

Defined in Previous 10-Year Assessment
Revised in scope from Previous 10-Year Assessment
New to this 10-Year Assessment

Table PR-8  
Transmission System Additions for 2016

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional	Cost Estimate - Refer to <i>Funding Project</i> and <i>Sum of Total (2010-2019)</i> in <i>Financial Table</i>
Replace existing 56 MVA Harrison 138/69-kV transformer with a 100 MVA transformer	2016	2016	1	reliability (A)	Provisional	F3063
Uprate Pine River-Nine Mile 69-kV line 6923 to 167 degrees F and Asset Renewal for 6921/3	2016	2016	2	reliability (69B2)	Proposed	F2836
Construct new 138-kV bus and install a 138/69-kV 100 MVA transformer at South Lake Geneva Substation	2016	2016	3	reliability (69B2)	Proposed	F2587
Construct new 138-kV line from North Lake Geneva to South Lake Geneva Substation	2016	2016	3	reliability (69B2), T-D interconnection	Proposed	F2587

Defined in Previous 10-Year Assessment
Revised in scope from Previous 10-Year Assessment
New to this 10-Year Assessment

Table PR-9  
Transmission System Additions for 2017

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional	Cost Estimate - Refer to <i>Funding Project</i> and <i>Sum of Total (2010-2019)</i> in <i>Financial Table</i>
Replace 138/69-kV transformer at Metomen Substation	2017	2017	1	reliability (A, 69B3)	Proposed	F1867
Uprate Castle Rock-McKenna 69-kV line	2016	2017	1	reliability (69B2, 69B3)	Provisional	F2491
Install a second 138/69-kV transformer at Wautoma Substation	2018	2017	1	reliability (A, 69B2)	Provisional	F2480
Construct 69-kV double-circuit line between McCue and Lamar substations	2017	2017	3	reliability (A, 69B2), economics	Provisional	F2558
Install 2-24.5 MVAR 138-kV capacitor bank and 1-18 MVAR 69-kV capacitor bank at Brick Church substation	2017	2017	3	reliability (69B2)	Provisional	F2404

Defined in Previous 10-Year Assessment
Revised in scope from Previous 10-Year Assessment
New to this 10-Year Assessment

Table PR-10  
Transmission System Additions for 2018

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional	Cost Estimate - Refer to <i>Funding Project</i> and <i>Sum of Total (2010-2019)</i> in <i>Financial Table</i>
Replace existing Caroline 115/69-kV transformer	2018	2018	1	reliability (69B3)	Provisional	TBD
Construct Fairwater-Mackford Prairie 69-kV line	2019	2018	1	reliability (69B2)	Provisional	F2105
Convert Necedah distribution substation from 69 kV to 138 kV	2018	2018	1	reliability (69B2, 69B3)	Provisional	F2560
Reconfigure the North Randolph-Ripon 69-kV line to form a second Ripon-Metomen 69-kV line and retire the circuit between Metomen and the Mackford Prairie tap	2019	2018	1	reliability (69B2)	Provisional	F2105
Rebuild Y-32 Colley Road-Brick Church 69-kV line	2013	2018	3	reliability (B2, 69B3, 69C5, C3), condition	Provisional	F1670
Install a second 100 MVA 138/69 kV transformer at Hillman Substation	2018	2018	3	reliability (69B2, 69B3)	Provisional	F0339
Install a second 138/69-kV transformer at Spring Green with a 100 MVA summer normal rating	2018	2018	3	reliability (69B3)	Provisional	F2445
Uprate Y87 North Monroe-South Monroe 69-kV line to 115 MVA SE	2018	2018	3	reliability (69B2)	Provisional	TBD

Table PR-10  
Transmission System Additions for 2018 (continued)

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional	Cost Estimate - Refer to <i>Funding Project</i> and <i>Sum of Total (2010-2019)</i> in <i>Financial Table</i>
Install 1-16.33 MVAR 69-kV capacitor bank at Verona Substation	2018	2018	3	reliability (A, B2, B3)	Provisional	F2520
Install 2-16.33 MVAR 69-kV capacitor banks at North Monroe	2018	2018	3	reliability (B2)	Provisional	F2472
Construct Spring Valley-Twin Lakes-South Lake Geneva 138-kV line	2018	2018	3 & 5	T-D interconnection, reliability (69B2)	Provisional	F2570
Construct second Dunn Road-Egg Harbor 69-kV line	2018	2018	4	reliability (69B2)	Provisional	F0181

Defined in Previous 10-Year Assessment
Revised in scope from Previous 10-Year Assessment
New to this 10-Year Assessment

Table PR-11  
Transmission System Additions for 2019

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional	Cost Estimate - Refer to <i>Funding Project</i> and <i>Sum of Total (2010-2019)</i> in <i>Financial Table</i>
Uprate Ripon-Northwest Ripon 69-kV line Y-93	2019	2019	1	reliability (69B2)	Provisional	TBD
Uprate Winneconne-Sunset Point 69-kV line Y-103	2019	2019	1	reliability (69B2)	Provisional	F3062
Install 1-8.16 MVAR capacitor bank at Boscobel 69-kV Substation and upgrade existing 5.4 MVAR bank with an 8.16 MVAR bank	2019	2019	3	reliability (69B2)	Provisional	F2518
Uprate the 6986 Royster to Sycamore 69-kV line to 115 MVA	2019	2019	3	reliability (69B3)	Provisional	F2471
Install 2-16.33 MVAR 69-kV capacitor banks at Eden Substation	2019	2019	3	reliability (A, B2)	Provisional	F2515
Install 4-49 MVAR 138-kV capacitor banks at Concord Substation	2021	2019	3	reliability (B2)	Provisional	F2489
Uprate Y159 Brick Church-Walworth 69-kV line to 115 MVA	2021	2019	3	reliability (69B2)	Provisional	F2153
Install 2-16.33 MVAR 69-kV capacitor banks at Dam Heights	2021	2019	3	reliability (69B2), asset renewal, potential T-D interconnection	Provisional	F2474

Defined in Previous 10-Year Assessment
Revised in scope from Previous 10-Year Assessment
New to this 10-Year Assessment

Table PR-12  
Transmission System Additions for 2020

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional	Cost Estimate - Refer to <i>Funding Project</i> and <i>Sum of Total (2010-2019)</i> in <i>Financial Table</i>
Construct Cardinal-Blount 138-kV line	2020	2020	3	reliability (C5)	Provisional	F2466
Install 2-16.33 MVAR 69-kV capacitor banks at Sun Prairie	2020	2020	3	reliability (69B2, 69B3)	Provisional	F2475
Install 2-12.25 MVAR 69-kV capacitor banks at Mazomanie Substation	2020	2020	3	reliability (69B2)	Provisional	F2517
Construct a Lake Delton-Birchwood 138-kV line	2022	2020	3	reliability (B2)	Provisional	F1638
Replace two existing 138/69-kV transformers at Glenview Substation with 100 MVA transformers	2020	2020	4	reliability (69B3)	Provisional	F2079
Upgrade Oak Creek-Pennsylvania 138-kV line	2021	2020	5	reliability (B2)	Provisional	F2473
Install 2-32 Mvar capacitor banks at Mukwonago 138-kV Substation	2021	2020	5	reliability (B2)	Provisional	F2493

Defined in Previous 10-Year Assessment

Revised in scope from Previous 10-Year Assessment

New to this 10-Year Assessment

Table PR-13  
Transmission System Additions beyond 2020

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional	Cost Estimate - Refer to <i>Funding Project</i> and <i>Sum of Total (2010-2019)</i> in <i>Financial Table</i>
Uprate X-67 Portage-Trienda 138-kV line to 373 MVA	2022	2022	3	reliability (69B2)	Provisional	F2092
Construct a Hubbard-East Beaver Dam 138-kV line	2022	2022	3	reliability (B2)	Provisional	F1640
Construct Shoto to Custer 138-kV line	2022	2022	4	reliability (69B2, 69B3)	Provisional	F2081
Install 138/69-kV transformer at Custer Substation	2022	2022	4	reliability (69B2, 69B3)	Provisional	F2081
Replace two existing 138/69-kV transformers at Sunset Point Substation with 100 MVA transformers	2024	2024	4	reliability (69B3)	Provisional	F2080
Construct a 345-kV bus, install a 345/138-kV 500 MVA transformer at North Randolph and loop the Columbia to South Fond Du Lac 345-kV line into the substation	2025	2025	3	reliability (B2)	Provisional	F2093
Increase ground clearance of M38-Atlantic 69-kV line from 120 to 167 degrees F and asset renewal	2009	TBD	2	reliability (69B2)	Provisional	TBD
Construct Gwinn-Forsyth second 69-kV line	2016	TBD	2	reliability (69B2)	Provisional	TBD
Uprate Columbia 345/138-kV transformer T-22 to 527 MVA	TBD	TBD	3	reliability (B3)	Provisional	F2135

Table PR-13  
Transmission System Additions beyond 2020 (continued)

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional	Cost Estimate - Refer to <i>Funding Project</i> and <i>Sum of Total (2010-2019)</i> in <i>Financial Table</i>
Reconductor Ramsey-Harbor 138-kV line	TBD	TBD	5	reliability	Provisional	TBD

Defined in Previous 10-Year Assessment
Revised in scope from Previous 10-Year Assessment
New to this 10-Year Assessment

Table PR-14  
Zone 1 Transmission System Additions

<b>System Additions</b>	<b>System Need Year</b>	<b>Projected In-Service Year</b>	<b>Planning Zone</b>	<b>Need Category</b>	<b>Planned, Proposed or Provisional</b>
Upgrade McKenna 6.3 MVAR capacitor bank to 15.3 MVAR and upgrade Chaffee Creek 8.1 MVAR bank to 14.4 MVAR	2011	2011	1	reliability (69B2, 69B3)	Proposed
Construct 115-kV line from new Woodmin Substation to the Clear Lake Substation	2012	2012	1	T-D interconnection	Proposed
Reconfigure Petenwell 138-kV bus	2013	2013	1	reliability (C1), operating flexibility	Provisional
Construct Monroe County-Council Creek 161-kV line and Timberwolf 69-kV switching station	2013	2013	1	economics, reliability (A, B2, C3)	Proposed
Install a 161/138-kV transformer at Council Creek Substation	2013	2013	1	economics, reliability (A, B2, C3)	Proposed
Upgrade Council Creek-Petenwell 138-kV line	2013	2013	1	economics, reliability (B2)	Proposed
Replace Petenwell 138/69-kV transformer	2015	2015	1	reliability (A, 69B2)	Provisional
Construct a 69-kV line from SW Ripon to the Ripon-Metomen 69-kV line	2015	2015	1	T-D interconnection	Provisional
Upgrade 4.1 MVAR capacitor bank to 8.2 MVAR and install a new 8.2 MVAR capacitor bank at Ripon 69-kV Substation	2015	2015	1	reliability (69B2)	Provisional
Replace existing 56 MVA Harrison 138/69-kV transformer with a 100 MVA transformer	2016	2016	1	reliability (A)	Provisional
Replace 138/69-kV transformer at Metomen Substation	2017	2017	1	reliability (A, 69B3)	Proposed

Table PR-14 (continued)  
Zone 1 Transmission System Additions

<b>System Additions</b>	<b>System Need Year</b>	<b>Projected In-Service Year</b>	<b>Planning Zone</b>	<b>Need Category</b>	<b>Planned, Proposed or Provisional</b>
Uprate Castle Rock-McKenna 69-kV line	2016	2017	1	reliability (69B2, 69B3)	Provisional
Install a second 138/69-kV transformer at Wautoma Substation	2018	2017	1	reliability (A, 69B2)	Provisional
Replace existing Caroline 115/69-kV transformer	2018	2018	1	reliability (69B3)	Provisional
Construct Fairwater-Mackford Prairie 69-kV line	2019	2018	1	reliability (69B2)	Provisional
Convert Necedah distribution substation from 69 kV to 138 kV	2018	2018	1	reliability (69B2, 69B3)	Provisional
Reconfigure the North Randolph-Ripon 69-kV line to form a second Ripon-Metomen 69-kV line and retire the circuit between Metomen and the Mackford Prairie tap	2019	2018	1	reliability (69B2)	Provisional
Uprate Ripon-Northwest Ripon 69-kV line Y-93	2019	2019	1	reliability (69B2)	Provisional
Uprate Winneconne-Sunset Point 69-kV line Y-103	2019	2019	1	reliability (69B2)	Provisional

Table PR-15  
Zone 2 Transmission System Additions

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional
Install 2-8.0 MVAR capacitor bank at Indian Lake 69-kV Substation	2010	2010	2	reliability (B1)	Proposed
Install reactor at Straits Substation	2010	2010	2	reliability (B1)	Proposed
Install second 138/69-kV transformer and a 138-kV ring bus at Chandler Substation	2012	2012	2	reliability (69B3)	Proposed
Relocate Engadine 69-kV load	2012	2012	2	reliability (69B2)	Provisional
Upgrade 69-kV equipment at Delta Substation	2012	2012	2	reliability (C1), operating flexibility	Proposed
Energize Hiawatha-Indian Lake at 138 kV	2014	2014	2	reliability (B2)	Provisional
Install power flow control at Straits 138-kV Substation	2010	2014	2	reliability (B1)	Provisional

Table PR-15 (continued)  
Zone 2 Transmission System Additions

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional
Uprate overhead portions of Straits-McGulpin 138-kV circuits #1 & #3 to 230 F degree summer emergency ratings	2012	2014	2	reliability (B2)	Proposed
Rebuild Straits-Pine River lines 6904/5 for 138 kV and operate at 69 kV	2014	2014	2	reliability (B2)	Proposed
Uprate Munising-Seney-Blaney Park 69-kV line to 167 degrees F	2014	2014	2	reliability (69B2)	Provisional
Construct 18th Road-Chandler double circuit 138-kV lines and operate at 138/69	2014	2014	2	reliability (69B3)	Provisional
Construct 18th Road 138/69-kV Substation and install two 138/69-kV transformers	2014	2014	2	reliability (69B3)	Provisional
Install 1-8.16 MVAR 138-kV capacitor bank at 18th Road	2014	2014	2	reliability (69B3)	Provisional
Construct a new Arnold 345-kV Substation and install a 345/138-kV transformer	2015	2015	2	reliability (B1)	Provisional
Uprate Pine River-Nine Mile 69-kV line 6923 to 167 degrees F and Asset Renewal for 6921/3	2016	2016	2	reliability (69B2)	Proposed
Construct Gwinn-Forsyth second 69-kV line	2016	TBD	2	reliability (69B2)	Provisional
Increase ground clearance of M38-Atlantic 69-kV line from 120 to 167 degrees F and minimum asset renewal	2009	TBD	2	reliability (69B2)	Provisional

Table PR-16  
Zone 3 Transmission System Additions

<b>System Additions</b>	<b>System Need Year</b>	<b>Projected In-Service Year</b>	<b>Planning Zone</b>	<b>Need Category</b>	<b>Planned, Proposed or Provisional</b>
Uprate Y-61 McCue-Lamar 69-kV line to achieve 300 deg F line ratings and install 2-12.45 MVAR 69-kV capacitor banks at Lamar Substation	2008	2010	3	reliability (69B2)	Planned
Uprate the Royster Substation terminals	2010	2010	3	reliability (B2)	Planned
Uprate Y-61 Sheepskin-Dana 69-kV line to 95 MVA	2017	2010	3	reliability (69B2)	Planned
Uprate Y-40 Gran Grae-Boscobel 69-kV line to achieve a 99 MVA summer emergency rating*	2017	2010	3	reliability (B2, 69B2)	Planned
Replace two overhead Blount-Ruskin 69-kV lines with one underground 69-kV line	2010	2011	3	Completion of earlier project per agreement with the City of Madison	Planned
Install 2-16.33 MVAR 69-kV capacitor banks at Spring Green Substation	2011	2011	3	reliability (A, 69B3)	Planned
Install 1-32.66 MVAR 138-kV capacitor bank at Femrite Substation	2011	2011	3	reliability (A, C5)	Planned
Install 1-32.66 MVAR 138-kV capacitor bank at Kegonsa Substation	2011	2011	3	reliability (A, C5)	Planned
Rebuild Y-33 Brodhead to South Monroe 69-kV line	2011	2011	3	reliability (B2, 69B2, 69B3)	Planned
Uprate terminal limitations at McCue for the Y-79 McCue-Milton Lawns 69-kV line	2011	2011	3	reliability (69B2)	Proposed
Rebuild part of the Y-8 Dane-Dam Heights 69-kV line*	2015	2012	3	reliability, asset renewal, potential T-D interconnection	Planned

Table PR-16 (continued)  
Zone 3 Transmission System Additions

<b>System Additions</b>	<b>System Need Year</b>	<b>Projected In-Service Year</b>	<b>Planning Zone</b>	<b>Need Category</b>	<b>Planned, Proposed or Provisional</b>
Install 2-16.33 MVAR 69-kV capacitor banks at Nine Springs Substation	2006	2013	3	reliability (69B2)	Proposed
Uprate Fitchburg-Nine Springs 69-kV and Royster-Pflaum 69-kV lines and move AGA load to the Royster-Femrite 69-kV line	2006	2013	3	reliability (69B2)	Proposed
Install a 138/69-kV transformer at Bass Creek Substation	2010	2013	3	reliability (69B2)	Planned
Uprate X-12 Town Line Road-Bass Creek 138-kV line to 300 deg F	2010	2013	3	reliability (69B2)	Planned
Construct 345-kV line from Rockdale to West Middleton	2013	2013	3	reliability (B2, C5)	Planned
Construct a 345-kV bus and install a 345/138 kV 500 MVA transformer at West Middleton Substation	2013	2013	3	reliability (B2, C5)	Planned
Rebuild the Y-119 Verona to Oregon 69-kV line	2008	2014	3	reliability, condition (69B3, 69C3)	Proposed
Uprate 6927 West Middleton-Stage Coach 69-kV line to 106 MVA SE	2015	2015	3	reliability (69B2, 69B3)	Provisional

Table PR-16 (continued)  
Zone 3 Transmission System Additions

<b>System Additions</b>	<b>System Need Year</b>	<b>Projected In-Service Year</b>	<b>Planning Zone</b>	<b>Need Category</b>	<b>Planned, Proposed or Provisional</b>
Construct new 138-kV bus and install a 138/69-kV 100 MVA transformer at South Lake Geneva Substation	2016	2016	3	reliability (69B2)	Proposed
Construct new 138-kV line from North Lake Geneva to South Lake Geneva Substation	2016	2016	3	reliability (69B2), T-D interconnection	Proposed
Construct 69-kV double-circuit line between McCue and Lamar substations	2017	2017	3	reliability (A, 69B2), economics	Provisional
Install 2-24.5 MVAR 138-kV capacitor bank and 1-18 MVAR 69-kV capacitor bank at Brick Church substation	2017	2017	3	reliability (69B2)	Provisional
Rebuild Y-32 Colley Road-Brick Church 69-kV line	2013	2018	3	reliability (B2, 69B3, 69C5, C3) condition	Provisional
Install a second 100 MVA 138/69 kV transformer at Hillman Substation	2018	2018	3	reliability (69B2, 69B3)	Provisional
Install a second 138/69-kV transformer at Spring Green with a 100 MVA summer normal rating	2018	2018	3	reliability (69B3)	Provisional
Uprate Y87 North Monroe-South Monroe 69-kV line to 115 MVA SE	2018	2018	3	reliability (69B2)	Provisional
Install 1-16.33 MVAR 69-kV capacitor bank at Verona Substation	2018	2018	3	reliability (A, B2, B3)	Provisional
Install 2-16.33 MVAR 69-kV capacitor banks at North Monroe	2018	2018	3	reliability (B2)	Provisional
Construct Spring Valley-Twin Lakes-South Lake Geneva 138-kV line	2018	2018	3 & 5	T-D interconnection, reliability (69B2)	Provisional

Table PR-16 (continued)  
Zone 3 Transmission System Additions

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional
Install 1-8.16 MVAR capacitor bank at Boscobel 69-kV Substation and upgrade existing 5.4 MVAR bank with an 8.16 MVAR bank	2019	2019	3	reliability (69B2)	Provisional
Uprate the 6986 Royster to Sycamore 69-kV line to 115 MVA	2019	2019	3	reliability (69B3)	Provisional
Install 2-16.33 MVAR 69-kV capacitor banks at Eden Substation	2019	2019	3	reliability (A, B2)	Provisional
Install 4-49 MVAR 138-kV capacitor banks at Concord Substation	2021	2019	3	reliability (B2)	Provisional
Uprate Y159 Brick Church-Walworth 69-kV line to 115 MVA	2021	2019	3	reliability (69B2)	Provisional
Install 2-16.33 MVAR 69-kV capacitor banks at Dam Heights	2021	2019	3	reliability (69B2), asset renewal, potential T-D interconnection	Provisional
Construct Cardinal-Blount 138-kV line	2020	2020	3	reliability (C5)	Provisional
Install 2-16.33 MVAR 69-kV capacitor banks at Sun Prairie	2020	2020	3	reliability (69B2, 69B3)	Provisional
Install 2-12.25 MVAR 69-kV capacitor banks at Mazomanie Substation	2020	2020	3	reliability (69B2)	Provisional
Construct a Lake Delton-Birchwood 138-kV line	2022	2020	3	reliability (B2)	Provisional
Uprate X-67 Portage-Trienda 138-kV line to 373 MVA	2022	2022	3	reliability (69B2)	Provisional

Table PR-16 (continued)  
Zone 3 Transmission System Additions

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional
Construct a Hubbard-East Beaver Dam 138-kV line	2022	2022	3	reliability (B2)	Provisional
Construct a 345-kV bus, install a 345/138-kV 500 MVA transformer at North Randolph and loop the Columbia to South Fond Du Lac 345-kV line into the substation	2025	2025	3	reliability (B2)	Provisional
Uprate Columbia 345/138-kV transformer T-22 to 527 MVA	TBD	TBD	3	reliability (B3)	Provisional

Table PR-17  
Zone 4 Transmission System Additions

<b>System Additions</b>	<b>System Need Year</b>	<b>Projected In-Service Year</b>	<b>Planning Zone</b>	<b>Need Category</b>	<b>Planned, Proposed or Provisional</b>
Rebuild 2.37 miles of 69 kV from Sunset Point to Pearl Ave with 477 ACSR	2011	2011	4	reliability (69B2, 69B3)	Planned
Reconfigure Kewaunee 345/138-kV switchyard and install a second 500 MVA 345/138-kV transformer	2011	2011	4	reliability (C3), condition	Proposed
Construct Canal-Dunn Road 138-kV line	2012	2012	4	reliability (69A, 69B2, 69B3, 69C3)	Proposed
Install 100 MVA 138/69-kV transformer at Dunn Road	2012	2012	4	reliability (69A, 69B2, 69B3, 69C3)	Proposed
Construct second Dunn Road-Egg Harbor 69-kV line	2018	2018	4	reliability (69B2)	Provisional
Replace two existing 138/69-kV transformers at Glenview Substation with 100 MVA transformers	2020	2020	4	reliability (69B3)	Provisional
Construct Shoto to Custer 138-kV line	2022	2022	4	reliability (69B2, 69B3)	Provisional
Install 138/69-kV transformer at Custer Substation	2022	2022	4	reliability (69B2, 69B3)	Provisional
Replace two existing 138/69-kV transformers at Sunset Point Substation with 100 MVA transformers	2024	2024	4	reliability (69B3)	Provisional

Table PR-18  
Zone 5 Transmission System Additions

<b>System Additions</b>	<b>System Need Year</b>	<b>Projected In-Service Year</b>	<b>Planning Zone</b>	<b>Need Category</b>	<b>Planned, Proposed or Provisional</b>
Construct a 138-kV bus at Pleasant Valley Substation to permit second distribution transformer interconnection	2010	2010	5	T-D interconnection	Planned
Expand 345-kV switchyard at Oak Creek to interconnect one new generator	2010	2010	5	new generation	Planned
Construct second Shorewood-Humboldt 138-kV underground cable*	2012	2010	5	reliability (B2)	Proposed
Install 3-75 MVAR capacitor banks at Bluemound Substation	2012	2014	5	reliability (B1)	Provisional
Replace two existing 345/138-kV transformers at Arcadian Substation with 1-500 MVA transformer	2010	2015	5	reliability (B3)	Provisional
Uprate Arcadian-Waukesha 138-kV lines KK9942/KK9962	2010	2015	5	reliability (B2)	Provisional
Construct Spring Valley-Twin Lakes-South Lake Geneva 138-kV line	2018	2018	3 & 5	T-D interconnection, reliability (69B2)	Provisional
Upgrade Oak Creek-Pennsylvania 138-kV line	2021	2020	5	reliability (B2)	Provisional
Install 2-32 MVAR capacitor banks at Mukwonago 138-kV Substation	2021	2020	5	reliability (B2)	Provisional
Reconductor Ramsey-Harbor 138-kV line	TBD	TBD	5	reliability	Provisional

**Table PR-19  
Identified Needs and Transmission Lines Requiring New Right-of-Way**

Identified need	Potential solutions	Approx. line mileage		System need year	Projected In-service year	Planning zone
		Total	New ROW			
T-D interconnection request	Construct 69-kV line from new Warrens Substation to the Council Creek-Tunnel City 69-kV line	4.5	4.5	2010	2010	1
T-D interconnection request	Construct 115-kV line from new Woodmin Substation to the Clear Lake Substation	7.5	7.5	2012	2012	1
relieve overloads or low voltages under contingency (B2, C5)	Construct 345-kV line from Rockdale to West Middleton	32.4	32.4	2013	2013	3
relieve overloads or low voltages under contingency (69B3)	Construct 18th Road-Chandler double circuit 138-kV lines and operate at 138/69	4	4	2014	2014	2
T-D interconnection request	Construct a 69-kV line from SW Ripon to the Ripon-Metomen 69-kV line	1.5	1.5	2015	2015	1
relieve overloads or low voltages under contingency (69B2), T-D interconnection request	Construct new 138-kV line from North Lake Geneva to South Lake Geneva Substation	3.4	3.4	2016	2016	3
relieve overloads or low voltages under contingency (69B2)	Construct Fairwater-Mackford Prairie 69-kV line	5	5	2019	2018	1
relieve overloads or low voltages under contingency (69B2)	Construct second Dunn Road-Egg Harbor 69-kV line	12.66	12.66	2018	2018	4
T-D interconnection request,relieve overloads or low voltages under contingency (69B2)	Construct Spring Valley-Twin Lakes-South Lake Geneva 138-kV line	24.0	15	2018	2018	3 & 5
relieve overloads or low voltages under contingency (69B2, 69B3)	Construct Shoto to Custer 138-kV line	6.9	6.9	2022	2022	4
relieve overloads or low voltages under contingency (B2)	Construct a Hubbard-East Beaver Dam 138-kV line	10	10	2022	2022	3
relieve overloads or low voltages under contingency (B2)	Construct a Lake Delton-Birchwood 138-kV line	5	5	2022	2020	3

**Table PR-20**  
**Transmission Line Rebuilds/Reconductors, New Circuits and Voltage Conversions on Existing Right-of-Way**

Identified need	Lines to be rebuilt/reconducted on existing ROW	Approx. mileage of rebuilt, reconducted or uprated lines	System need year	Projected In-service year	Planning zone
relieve overloads or low voltages under contingency (B2)	Construct second Shorewood-Humboldt 138-kV underground cable	0.75	2012	2010	5
Completion of earlier project per agreement with the City of Madison	Replace two overhead Blount-Ruskin 69-kV lines with one underground 69-kV line	2	2010	2011	3
relieve overloads or low voltages under contingency (B2, 69B2, 69B3)	Rebuild Y-33 Brodhead to South Monroe 69-kV line	18	2011	2011	3
relieve overloads or low voltages under contingency (69B3)	Rebuild 2.37 miles of 69 kV from Sunset Point to Pearl Ave with 477 ACSR	2.37	2011	2011	4
relieve overloads or low voltages under contingency (69A, 69B2, 69B3, 69C3)	Construct Canal-Dunn Road 138-kV line	7.64	2012	2012	4
relieve overloads or low voltages under contingency, asset renewal, potential T-D interconnection request	Rebuild part of the Y-8 Dane-Dam Heights 69-kV line	5	2015	2012	3
economics, relieve overloads or low voltages under contingency (B2, C3)	Construct Monroe County-Council Creek 161-kV line and Timberwolf 69-kV switching station	17.9	2013	2013	1
economics, relieve overloads or low voltages under contingency (C1)	Uprate Council Creek-Petenwell 138-kV line	32	2013	2013	1
relieve overloads or low voltages under contingency (B2)	Energize Hiawatha-Indian Lake at 138 kV	40	2014	2014	2
relieve overloads or low voltages under contingency (B2)	Rebuild Straits-Pine River lines 6904/5 for 138 kV and operate at 69 kV	25.3	2014	2014	2
relieve overloads or low voltages under contingency (69B2)	Uprate Munising-Seney-Blanney Park 69-kV line to 167 degrees F	52	2014	2014	2
relieve overloads or low voltages under contingency, replace aging facilities (69B3, 69C3)	Rebuild the Y-119 Verona to Oregon 69-kV line	11	2008	2014	3
relieve overloads or low voltages under contingency (69B2)	Uprate Pine River-Nine Mile 69-kV line 6923 to 167 degrees F and minimum Asset Renewal for 6921/3	16.4	2016	2016	2
relieve overloads or low voltages under contingency (A, 69B2)	Construct 69-kV double-circuit line between McCue and Lamar substations	4.0	2017	2017	3

**Table PR-20  
Transmission Line Rebuilds/Reconductors, New Circuits and Voltage Conversions on  
Existing Right-of-Way**

Identified need	Lines to be rebuilt/reconducted on existing ROW	Approx. mileage of rebuilt, reconducted or uprated lines	System need year	Projected In-service year	Planning zone
relieve overloads or low voltages under contingency (B2, 69B3, 69C5, C3) replace aging facilities	Rebuild Y-32 Colley Road-Brick Church 69-kV line	19.7	2013	2018	3
relieve overloads or low voltages under contingency (69B3)	Uprate the 6986 Royster to Sycamore 69-kV line to 115 MVA	3.35	2019	2019	3
relieve overloads or low voltages under contingency (C5)	Construct Cardinal-Blount 138-kV line	5	2020	2020	3
relieve overloads or low voltages under contingency (69B2)	Increase ground clearance of M38-Atlantic 69-kV line from 120 to 167 degrees F and minimum asset renewal	22	2009	TBD	2
relieve overloads or low voltages under contingency (69B2)	Construct Gwinn-Forsyth second 69-kV line	1	2016	TBD	2
relieve overloads or low voltages under contingency	Reconductor Ramsey-Harbor 138-kV line	8.4	TBD	TBD	5

**Table PR-21  
New Substations, Transformer Additions and Replacements**

Identified need	Potential additions or replacements	Transformer Capacity (MVA)		System need year	Projected In-service year	Planning zone
		Install	Replace			
relieve overloads under contingency (69B3)	Install second 138/69-kV transformer and a 138-kV ring bus at Chandler Substation	60	0	2012	2012	2
relieve overloads under contingency (C3), replace aging facilities	Reconfigure Kewaunee 345/138-kV switchyard and install a second 500 MVA 345/138-kV transformer	500	0	2011	2011	4
relieve overloads under contingency (69A, 69B2, 69B3, 69C3)	Install 100 MVA 138/69-kV transformer at Dunn Road	100	0	2012	2012	4
economics, relieve overloads under contingency (B2, C3)	Install a 161/138-kV transformer at Council Creek Substation	100	0	2013	2013	1
relieve overloads under contingency (69B2)	Install a 138/69-kV transformer at Bass Creek Substation	100	0	2010	2013	3
relieve overloads under contingency (B2, C5)	Construct a 345-kV bus and install a 345/138 kV 500 MVA transformer at West Middleton Substation	500	0	2013	2013	3
relieve overloads under contingency (69B3)	Construct 18th Road 138/69-kV Substation and install two 138/69-kV transformers	120	0	2014	2014	2
relieve overloads under contingency (B2)	Install 138/69-kV 150 MVA transformer at Nine Mile	150	0	2014	2014	2
relieve overloads under contingency (B2)	Install 138/69-kV 150 MVA transformer at Pine River	150	0	2014	2014	2
relieve overloads under contingency (A, 69B2)	Replace Petenwell 138/69-kV transformer	60	33.0	2015	2015	1
relieve overloads under contingency (B1)	Construct a new Arnold 345-kV Substation and install a 345/138-kV transformer	500	0	2015	2015	2
relieve overloads under contingency (B3)	Replace two existing 345/138-kV transformers at Arcadian Substation with 1-500 MVA transformer	500	672	2010	2015	5
relieve overloads under contingency (A)	Replace existing 56 MVA Harrison 138/69-kV transformer with a 100 MVA transformer	100	56	2016	2016	1
relieve overloads under contingency (69B2)	Construct new 138-kV bus and install a 138/69-kV 100 MVA transformer at South Lake Geneva Substation	100	0	2016	2016	35
relieve overloads under contingency (A, 69B3)	Replace 138/69-kV transformer at Metomen Substation	100	47	2017	2017	1
relieve overloads under contingency (A, 69B2)	Install a second 138/69-kV transformer at Wautoma Substation	100	0	2018	2017	1
relieve overloads under contingency (69B3)	Replace existing Caroline 115/69-kV transformer	60	33	2018	2018	1

**Table PR-21  
New Substations, Transformer Additions and Replacements**

Identified need	Potential additions or replacements	Transformer Capacity (MVA)		System need year	Projected In-service year	Planning zone
		Install	Replace			
relieve overloads under contingency (69B2, 69B3)	Convert Necedah distribution substation from 69 kV to 138 kV	N/A	N/A	2018	2018	1
relieve overloads under contingency (69B2, 69B3)	Install a second 100 MVA 138/69 kV transformer at Hillman Substation	100	0	2018	2018	3
relieve overloads under contingency (69B3)	Install a second 138/69-kV transformer at Spring Green with a 100 MVA summer normal rating	100	0	2018	2018	3
relieve overloads under contingency (69B3)	Replace two existing 138/69-kV transformers at Glenview Substation with 100 MVA transformers	200	116	2020	2020	4
relieve overloads under contingency (69B2, 69B3)	Install 138/69-kV transformer at Custer Substation	100	0	2022	2022	4
relieve overloads under contingency (69B3)	Replace two existing 138/69-kV transformers at Sunset Point Substation with 100 MVA transformers	200	142	2024	2024	4
relieve overloads under contingency (B2)	Construct a 345-kV bus, install a 345/138-kV 500 MVA transformer at North Randolph and loop the Columbia to South Fond Du Lac 345-kV line into the substation	500	0	2025	2025	31
relieve overloads under contingency (B3)	Uprate Columbia 345/138-kV transformer T-22 to 527 MVA	527	400	TBD	TBD	31

**Table PR-22  
Substation Equipment Additions and Replacements**

Identified need	Potential additions or replacements	Capacitor bank Capacity (MVAR)	System Need Year	Projected In-Service Year	Planning Zone
relieve overloads or low voltages under contingency (B1)	Install 2-8.0 MVAR capacitor bank at Indian Lake 69-kV Substation	16.33	2010	2010	2
relieve overloads or low voltages under contingency (B1)	Install reactor at Straits Substation	N/A	2010	2010	2
relieve overloads or low voltages under contingency (B2)	Uprate overhead portions of Straits-McGulpin 138-kV circuits #1 & #3 to 230 F degree summer emergency ratings	N/A	2012	2010	2
relieve overloads or low voltages under contingency (69B2)	Uprate Y-61 McCue-Lamar 69-kV line to achieve 300 deg F line ratings and install 2-12.45 Mvar 69-kV capacitor banks at Lamar Substation	24.9	2008	2010	3
relieve overloads or low voltages under contingency (B2)	Uprate the Royster Substation terminals	N/A	2010	2010	3
relieve overloads or low voltages under contingency (69B2)	Uprate Y-61 Sheepskin-Dana 69-kV line to 95 MVA	N/A	2017	2010	3
relieve overloads or low voltages under contingency (B2, 69B2)	Uprate Y-40 Gran Grae-Boscobel 69-kV line to achieve a 99 MVA summer emergency rating*	N/A	2017	2010	3
T-D interconnection request	Construct a 138-kV bus at Pleasant Valley Substation to permit second distribution transformer interconnection	N/A	2010	2010	5
accommodate new generation	Expand 345-kV switchyard at Oak Creek to interconnect one new generator	N/A	2010	2010	5
relieve overloads or low voltages under contingency (69B2)	Upgrade McKenna 6.3 MVAR capacitor bank to 15.3 MVAR and upgrade Chaffee Creek 8.1 MVAR bank to 14.4 MVAR	29.7	2011	2011	1
relieve overloads or low voltages under contingency (A, 69B3)	Install 2-16.33 MVAR 69-kV capacitor banks at Spring Green Substation	32.66	2011	2011	3
relieve overloads or low voltages under contingency (A, C5)	Install 1-32.66 MVAR 138-kV capacitor bank at Femrite Substation	32.66	2011	2011	3
relieve overloads or low voltages under contingency (A, C5)	Install 1-32.66 MVAR 138-kV capacitor bank at Kegonsa Substation	32.66	2011	2011	3
relieve overloads or low voltages under contingency (69B2)	Uprate terminal limitations at McCue for the Y-79 McCue-Milton Lawns 69-kV line	N/A	2011	2011	35
relieve overloads or low voltages under contingency (69B2)	Relocate Engadine 69-kV load	N/A	2012	2012	2
relieve overloads or low voltages under contingency (C1)	Reconfigure Petenwell 138-kV bus	N/A	2013	2013	1

**Table PR-22  
Substation Equipment Additions and Replacements**

Identified need	Potential additions or replacements	Capacitor bank Capacity (MVAR)	System Need Year	Projected In-Service Year	Planning Zone
relieve overloads or low voltages under contingency (69B2)	Install 2-16.33 MVAR 69-kV capacitor banks at Nine Springs Substation	32.66	2006	2013	3
relieve overloads or low voltages under contingency (69B2)	Uprate Fitchburg-Nine Springs 69-kV and Royster-Pflaum 69-kV lines and move AGA load to the Royster-Femrite 69-kV line	N/A	2006	2013	3
relieve overloads or low voltages under contingency (69B2)	Uprate X-12 Town Line Road-Bass Creek 138-kV line to 300 deg F	N/A	2010	2013	3
relieve overloads or low voltages under contingency (B1)	Install power flow control at Straits 138-kV Substation	N/A	2010	2014	2
relieve overloads or low voltages under contingency (69B3)	Install 1-8.16 MVAR 138-kV capacitor banks at 18th Road	8.16	2014	2014	2
reliability (C1), operating flexibility	Upgrade 69-kV equipment at Delta Substation	N/A	2012	2012	2
relieve overloads or low voltages under contingency (B1)	Install 3-75 MVAR capacitor banks at Bluemound Substation	225	2012	2014	5
relieve overloads or low voltages under contingency (69B2)	Upgrade 4.1 MVAR capacitor bank to 8.2 MVAR and install a new 8.2 MVAR capacitor bank at Ripon 69-kV Substation	12.3	2015	2015	1
relieve overloads or low voltages under contingency (69B2, 69B3)	Uprate 6927 West Middleton-Stage Coach 69-kV line to 106 MVA SE	N/A	2015	2015	3
relieve overloads or low voltages under contingency (B2)	Uprate Arcadian-Waukesha 138-kV lines KK9942/KK9962 (What the gens will they be available talk to WE)	N/A	2010	2015	5
relieve overloads or low voltages under contingency (69B2, 69B3)	Uprate Castle Rock-Mckenna 69-kV line	N/A	2016	2017	1
relieve overloads or low voltages under contingency (69B2)	Install 2-24.5 Mvar 138-kV capacitor bank and 1-18 Mvar 69-kV capacitor bank at Brick Church substation	67	2017	2017	35
relieve overloads or low voltages under contingency (69B2)	Reconfigure the North Randolph-Ripon 69-kV line to form a second Ripon-Metomen 69-kV line and retire the circuit between Metomen and the Mackford Prairie tap	N/A	2019	2018	1
relieve overloads or low voltages under contingency (69B2)	Uprate Y87 North Monroe-South Monroe 69-kV line to 115 MVA SE	N/A	2018	2018	3
relieve overloads or low voltages under contingency (A, B2, B3)	Install 1-16.33 MVAR 69-kV capacitor bank at Verona Substation	16.33	2018	2018	3
relieve overloads or low voltages under contingency (B2)	Install 2-16.33 Mvar 69-kV capacitor banks at North Monroe	32.66	2018	2018	3

**Table PR-22  
Substation Equipment Additions and Replacements**

Identified need	Potential additions or replacements	Capacitor bank Capacity (MVAR)	System Need Year	Projected In-Service Year	Planning Zone
relieve overloads or low voltages under contingency (69B2)	Install 1-8.16 MVAR capacitor bank at Boscobel 69-kV Substation and upgrade existing 5.4 MVAR bank with an 8.16 MVAR bank	10.92	2019	2019	3
relieve overloads or low voltages under contingency (A, B2)	Install 2-16.33 MVAR 69-kV capacitor banks at Eden Substation	32.66	2019	2019	3
relieve overloads or low voltages under contingency (B2)	Install 4-49 MVAR 138-kV capacitor banks at Concord Substation	196	2021	2019	35
relieve overloads or low voltages under contingency (69B2)	Uprate Y159 Brick Church-Walworth 69-kV line to 115 MVA	N/A	2021	2019	35
relieve overloads or low voltages under contingency (69B2)	Uprate Ripon-Northwest Ripon 69-kV line Y-93	N/A	2019	2019	1
relieve overloads or low voltages under contingency (69B2)	Uprate Winneconne-Sunset Point 69-kV line Y-103	N/A	2019	2019	1
reliability (69B2), asset renewal, potential T-D interconnection	Install 2-16.33 Mvar 69-kV capacitor banks at Dam Heights	32.66	2021	2019	31
relieve overloads or low voltages under contingency (69B2, 69B3)	Install 2-16.33 Mvar 69-kV capacitor banks at Sun Prairie	32.66	2020	2020	3
relieve overloads or low voltages under contingency (69B2)	Install 2-12.25 MVAR 69-kV capacitor banks at Mazomanie Substation	24.5	2020	2020	3
relieve overloads or low voltages under contingency (B2)	Upgrade Oak Creek-Pennsylvania 138-kV line	N/A	2021	2020	5
relieve overloads or low voltages under contingency (B2)	Install 2-32 Mvar capacitor banks at Mukwonago 138-kV Substation	64	2021	2020	5
relieve overloads or low voltages under contingency (69B2)	Uprate X-67 Portage-Trienda 138-kV line to 373 MVA	N/A	2022	2022	31