

SOUTH CENTRAL/SOUTHWEST WISCONSIN AND NORTH CENTRAL ILLINOIS

Zone 3



Counties included in Zone 3 – South Central/Southwest Wisconsin and North Central Illinois

Columbia

Crawford
(southern portion)

Dane

Dodge

Grant

Green

Iowa

Lafayette

Jefferson

Richland

Rock

Sauk

Walworth

Winnebago, Ill.
(northern portion)

Transmission system characteristics in Zone 3

ATC delivers power in Zone 3 with various transmission facilities including:

- Columbia-North Madison 345-kV lines,
- Columbia-Rockdale 345-kV line,
- Paddock-Rockdale 345-kV line,
- Paddock-Wempletown 345-kV line,
- Rockdale-Wempletown 345-kV line,
- Rockdale-Cardinal 345-kV line and
- 138-kV facilities from the Nelson Dewey Power Plant, around the Madison area, and in the northwest and southeast portions of Zone 3.

Transmission system limitations in Zone 3

In our analysis of Zone 3, we identified low voltages, high voltages and transmission-facility overloads. Low voltages are located in the Verona, Lake Geneva and Hustisford areas. Several overloads on 138-kV and 69-kV facilities in Zone 3 are emerging concerns. The causes of these emerging issues include steady growth in certain areas, power plant retirements and different generation dispatch scenarios.

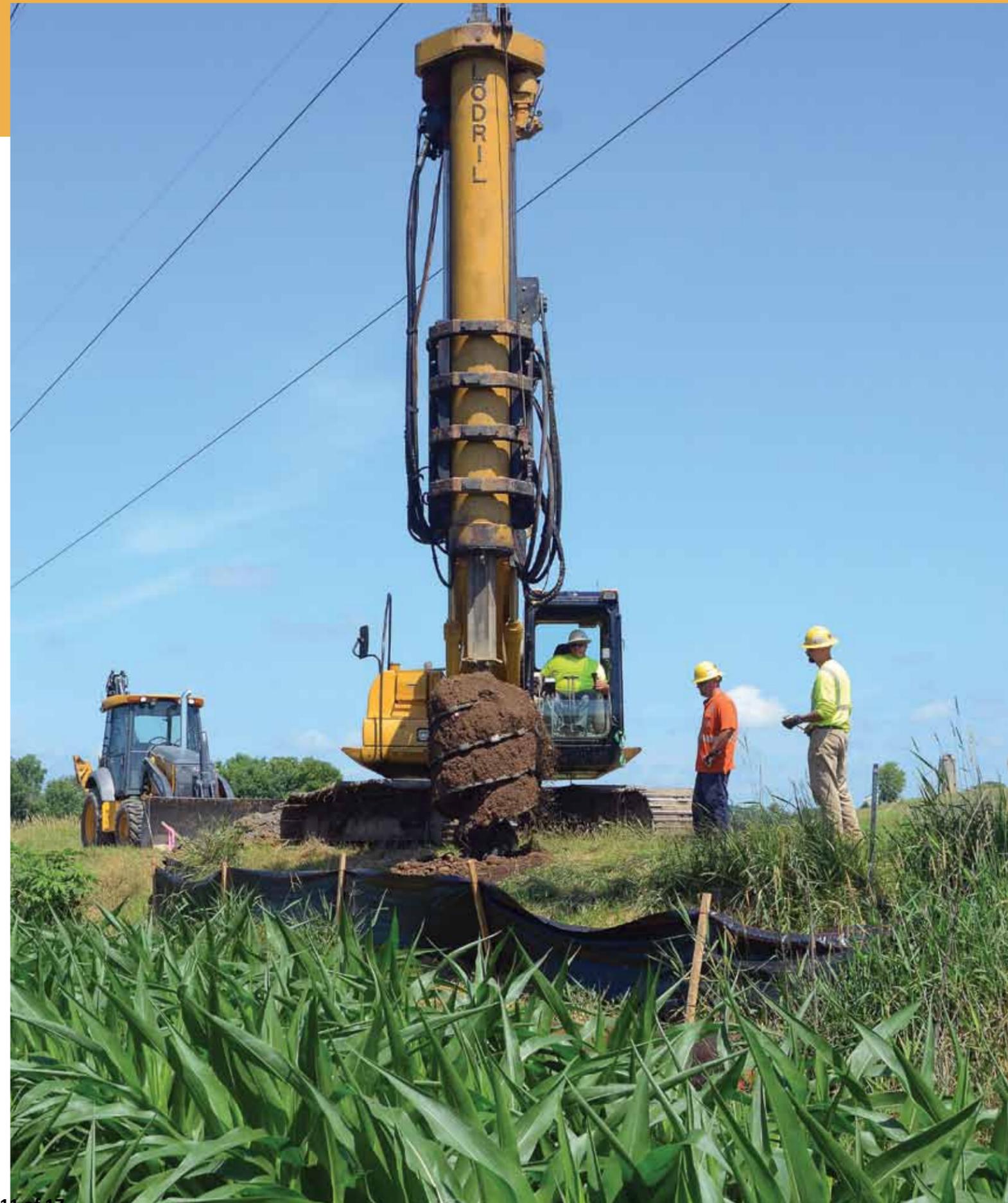
ELECTRIC SYSTEM OVERVIEW

Increases expected in population, employment

Population in Zone 3 is projected to grow about 0.9 percent annually between now and 2024, and employment is projected to grow about 1.4 percent each year for the same time period. Dane County is projected to realize the largest increase in population and employment.

Electricity usage

Electric load is forecasted to grow approximately 1.0 percent annually through 2025.



SOUTH CENTRAL/SOUTHWEST WISCONSIN AND NORTH CENTRAL ILLINOIS Zone 3



TRANSMISSION PROJECTS IN ZONE 3

The most notable planned, proposed and provisional network projects and asset renewal projects in Zone 3, along with their projected year of completion and the factors driving the need for the projects, are listed on page 23.

Lines of proposed projects on the map are for illustrative purposes only and do not reflect actual routes. For information on project status and routes, see atc-projects.com.

PROJECT DESCRIPTION	IN-SERVICE YEAR	NEED DRIVER
Planned Projects		
1 Colley Road-Brick Church 69-kV line	2018	Overloads, low voltages and condition
2 Badger Coulee: La Crosse area-North Madison-Cardinal 345-kV line construction	2018	Reliability, economics and public policy
3 Spring Valley-North Lake Geneva 138-kV line	2019	Overloads and low voltages, provide network service
Proposed Projects		
4 Cardinal-Hickory Creek	2020	Reliability, economics and public policy
Provisional Projects		
5 Cardinal-Blount 138-kV line construction	2029	Overloads and low voltages
Asset Renewal Projects		
6 Dam Heights-Dane 69-kV line re-route at dam	2015	Condition and performance
7 Concord-Rubicon 138-kV line rebuild (portion of Quad County Electric Reliability Project)	2016	Condition and performance
8 Dam Heights-Portage 69-kV line rebuild	2017	Condition and performance
9 Boscobel-Lone Rock 69-kV line rebuild	2019	Condition and performance

Additional projects may be found in the full 10-Year Assessment at atc10yearplan.com.

System Solutions Key

SUBSTATION KEY

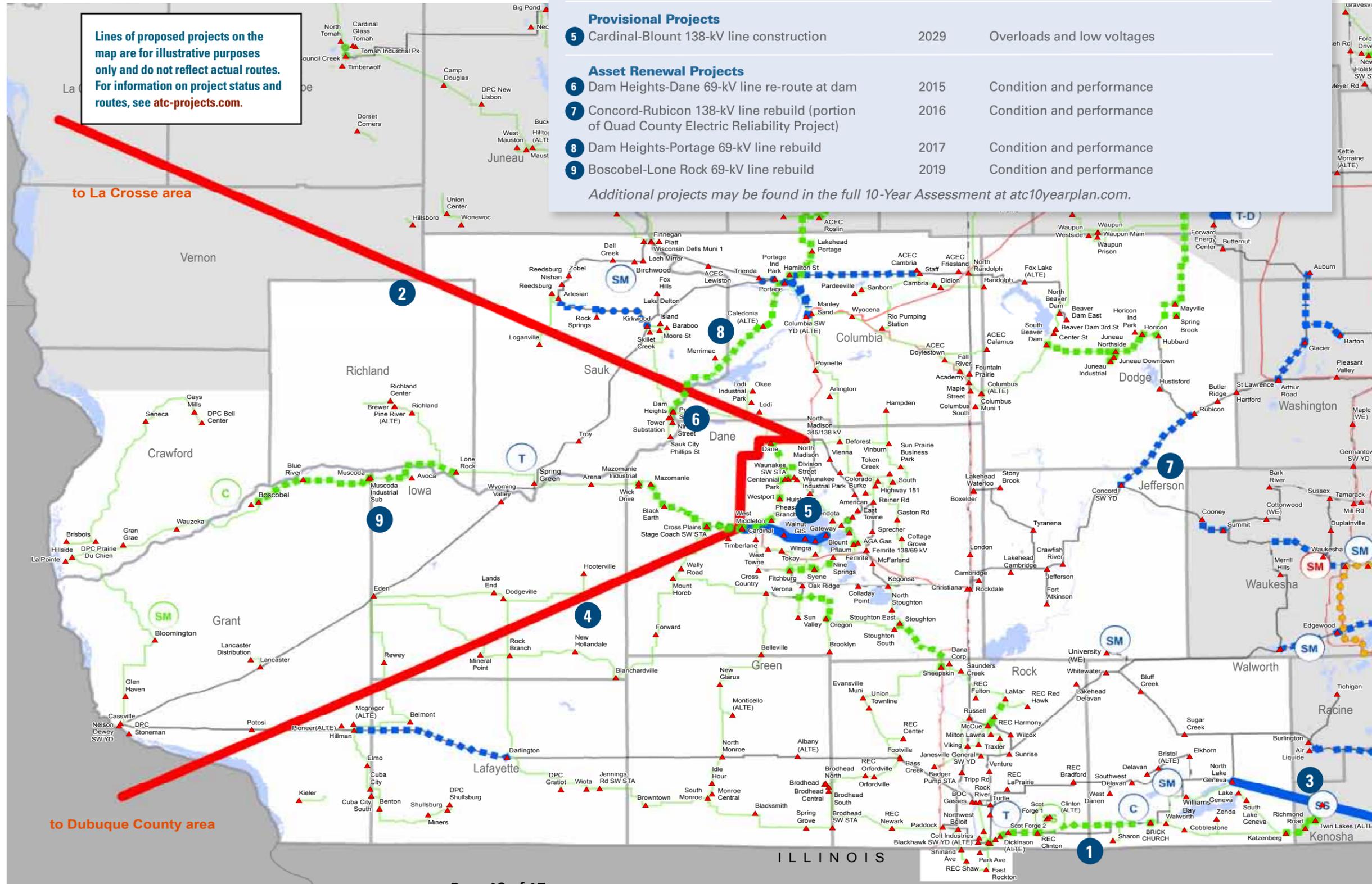
- SS** New substation
Supports transmission system expansion
- SM** Substation modifications
Upgrades equipment ratings to avert facility overloads
- T** Transformer
Supports local growth and improves voltage levels
- C** Capacitor bank
Relieves low voltages or high voltages
- T-D** T-D interconnection
Supports local growth

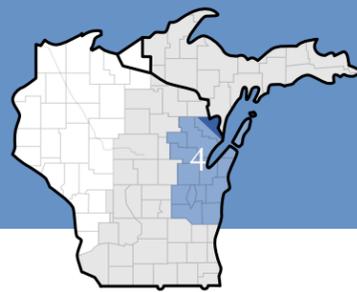
TRANSMISSION LINE KEY

- Red line: 345-kV transmission line
- Blue line: 115-, 138- or 161-kV transmission line
- Green line: 69-kV transmission line
- Blue dashed line: Rebuilt 115- or 138-kV transmission line
- Green dashed line: Rebuilt 69-kV transmission line
- Blue dotted line: 115- or 138-kV transmission line rating upgrade
- Green dotted line: 69-kV transmission line rating upgrade

EXISTING TRANSMISSION LINES KEY

- Green line: 69 kV
- Blue line: 115 kV
- Red line: 138 kV
- Pink line: 161 kV
- Yellow line: 230 kV
- Orange line: 345 kV





Counties included in Zone 4 – Northeast Wisconsin

- Brown
- Calumet
- Dodge
(northeastern corner)
- Door
- Fond du Lac
(eastern portion)
- Kewaunee
- Manitowoc
- Marinette
(southern portion)
- Menominee, Mich.
(southern portion)
- Menominee, Wis.
- Oconto
- Outagamie
- Shawano
(eastern portion)
- Sheboygan
- Winnebago
(eastern portion)

ATC delivers power in Zone 4 with various transmission facilities including:

- Four 345-kV lines extending from the Point Beach Nuclear Plant,
- Two 345-kV lines extending from the Edgewater Power Plant,
- Four 345-kV lines connecting the Gardner Park, Werner West, Morgan, and Plains Substations,
- Two 345-kV lines from North Appleton to Werner West and Fitzgerald,
- Three 345-kV lines connecting South Fond du Lac Substation to the Columbia, Edgewater and Fitzgerald Substations and
- A 138-kV network in the Fox River Valley/Green Bay area.

Transmission system limitations in Zone 4

In our analysis of Zone 4, we continue to monitor potential high voltages in the Outagamie and Calumet counties and impending low voltages in Brown County. In addition, other ongoing studies have identified several voltage and thermal limitations. The most severe limitations occur during both peak and off-peak periods.

ELECTRIC SYSTEM OVERVIEW

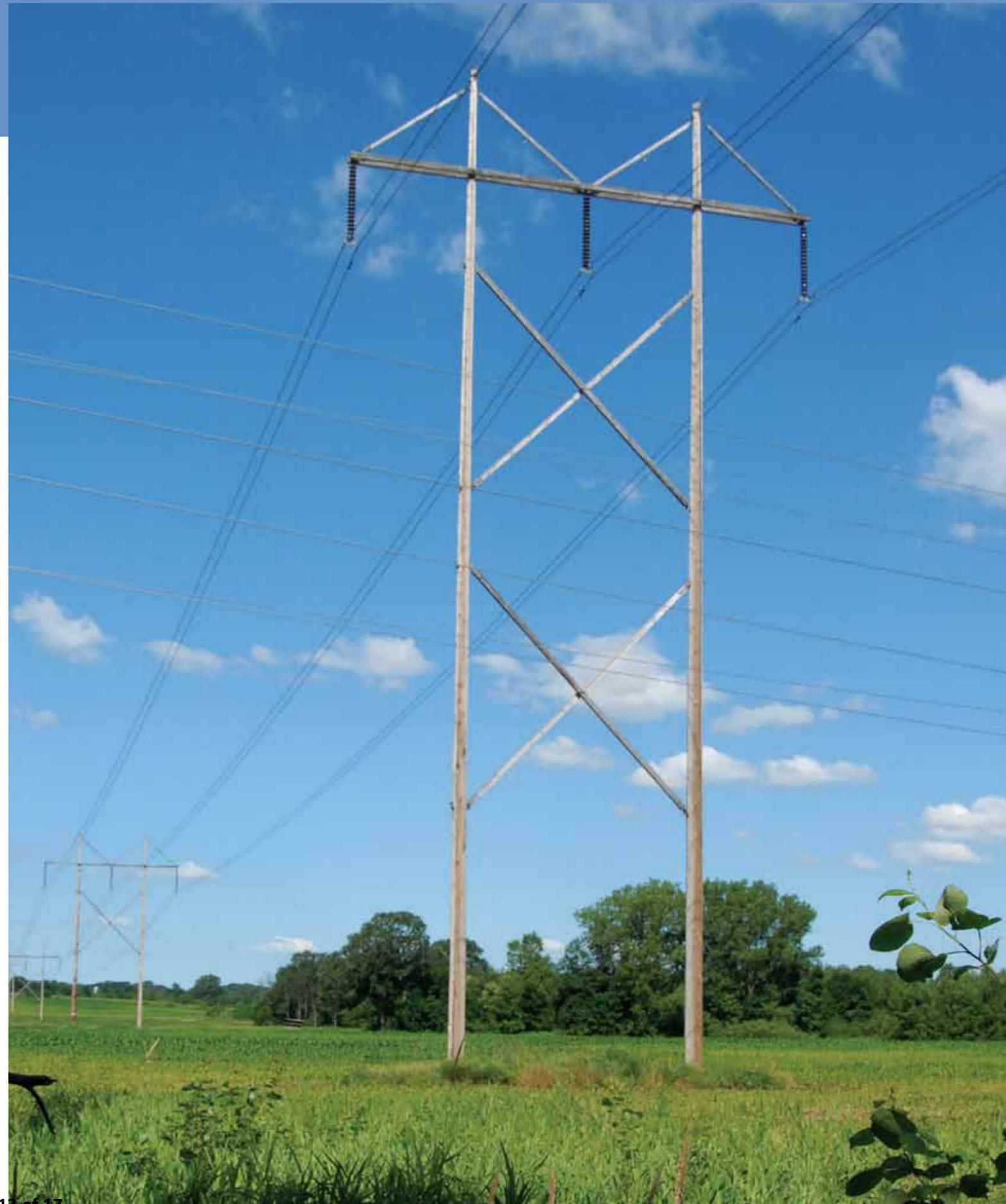
Increases expected in population, employment

Population in Zone 4 is projected to grow 0.7 percent annually between now and 2024. Brown County is expected to realize the largest increase in population. Employment is projected to grow 1.1 percent annually in the same time period, with the largest increase projected in Brown County.

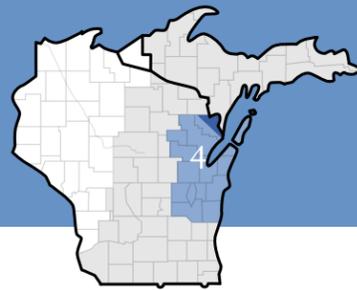
Electricity usage

Peak electric demand typically occurs during the summer months, although the northern portion of Zone 4 typically experiences nearly equal summer and winter peaks. Paper mills and foundries in the Green Bay and Appleton metropolitan areas are some of the largest electricity users in the zone.

Electric load is forecasted to grow at approximately 0.5 percent annually through 2025. Also, locally generated electricity is declining in the area with smaller, coal-fired generators most at risk. This includes generation owned by industries, municipalities and utilities.



NORTHEAST WISCONSIN Zone 4



TRANSMISSION PROJECTS IN ZONE 4

The most notable planned, proposed and provisional network projects and asset renewal projects in Zone 4, along with their projected year of completion and the factors driving the need for the projects, are listed below.

PROJECT DESCRIPTION	IN-SERVICE YEAR	NEED DRIVER
Planned Projects		
1 Pulliam-Glory Road 138-kV line conversion	2016	Overloads and low voltages
2 Iron Foundry 138/69-kV Substation construction and Glenview-Iron Foundry 69-kV line extension	2016	T-D interconnection Overloads and low voltages
3 Bay Lake: North Appleton-Morgan 345-kV and 138-kV line construction	2019	
4 Creekview Substation: 138-kV line construction to serve T-D interconnection	2017	T-D interconnection 2017
5 Branch River 345-kV Substation construction	2018	Accommodate new generation
Proposed Projects		
6 Ogden St.-Bayshore 69-kV line construction	2018	Provide network service
Provisional Projects		
7 Morgan-Thunder 138-kV project	2020	Overloads and low voltages
8 Morgan-Plains 345-kV loop into new Thunder 345-kV Substation	2020	Overloads and low voltages
9 Shoto-Custer 138-kV line	2022	Overloads and low voltages
10 Aviation-North Fond du Lac 138-kV line rebuild	2025	Overloads
Asset Renewal Projects		
11 Dyckesville-Sawyer 69-kV line rebuild	2016	Condition and performance
12 North Appleton-Butte des Morts 138-kV rebuild	2017	Condition and performance
13 Finger Road-Canal 69-kV line rebuild	2019	Condition and performance

Additional projects may be found in the full 10-Year Assessment at atc10yearplan.com.

System Solutions Key

SUBSTATION KEY

- SS** New substation
Supports transmission system expansion
- SM** Substation modifications
Upgrades equipment ratings to avert facility overloads
- T** Transformer
Supports local growth and improves voltage levels
- C** Capacitor bank or reactor
Relieves low voltages or high voltages
- T-D** T-D interconnection
Supports local growth

TRANSMISSION LINE KEY

- 345-kV transmission line
- 115-, 138- or 161-kV transmission line
- 69-kV transmission line
- Transmission line voltage conversion
- ▬▬▬ Rebuilt 115- or 138-kV transmission line
- ▬▬▬ Rebuilt 69-kV transmission line
- 115- or 138-kV transmission line rating upgrade
- 69-kV transmission line rating upgrade

EXISTING TRANSMISSION LINES KEY

- 69 kV
- 115 kV
- 138 kV
- 161 kV
- 230 kV
- 345 kV

