U.S. Department of Energy - Energy Efficiency and Renewable Energy
Wind and Water Power Program - Wind Powering America

New Wind Resource Maps and Wind Potential Estimates for the United States

Date: 2/19/2010

Accurate information about the wind resource and the wind energy potential in each state is required for federal and state policy initiatives that will expand the use of wind energy in the United States.

The new resource maps and wind potential tables were developed through a collaborative project between the National Renewable Energy Laboratory (NREL) and AWS Truewind, LLC, of Albany, New York. The resource maps for the contiguous United States, and separately for each state, show the predicted mean annual wind speeds at 80-m height. Presented at a spatial resolution of 2.5 km (interpolated to a finer scale for display), they are derived from 200-m resolution maps developed by AWS Truewind for the windNavigator system® (http://navigator.awstruewind.com).

Areas with annual average wind speeds around 6.5 m/s and greater at 80-m height are generally considered to have suitable wind resource for wind development. NREL has conducted a preliminary review and validation of the AWS Truewind's 80-m map estimates for 19 selected states (6 Western states, 6 Midwestern states, and 7 Eastern states) based on tower measurements at heights of about 50 m and above from more than 300 locations.

AWS Truewind also developed a national dataset of estimated gross capacity factor (not adjusted for losses) at a spatial resolution of 200 m and heights of 80 m and 100 m. NREL estimated the windy land area and wind energy potential in various capacity factor ranges for each state and the entire contiguous United States, using the gross capacity factor data. The table (Excel 108 KB) lists the estimates of windy land area with a gross capacity of 30% and greater at 80-m height and the wind energy potential from development of the "available" windy land area after exclusions. These areas are generally considered to have suitable wind resource for wind development. The "Installed Capacity" is the potential megawatts (MW) of rated capacity that could be installed on the available windy land area, and the "Annual Generation" is the estimated annual wind energy generation in gigawatt-hours (GWh) that could be produced from the installed capacity. NREL reduced the wind potential estimates by excluding areas unlikely to be developed such as wilderness areas, parks, urban areas, and water features (see Wind Resource Exclusion Table in the Excel file for more detail).

NREL also produced graphs showing the wind resource potential above a given gross capacity factor at both 80-m and 100-m heights. The wind potential graph for the contiguous United States is available (PDF 106 KB) Download Adobe Reader. Additional wind potential graphs and tables are included for each state.

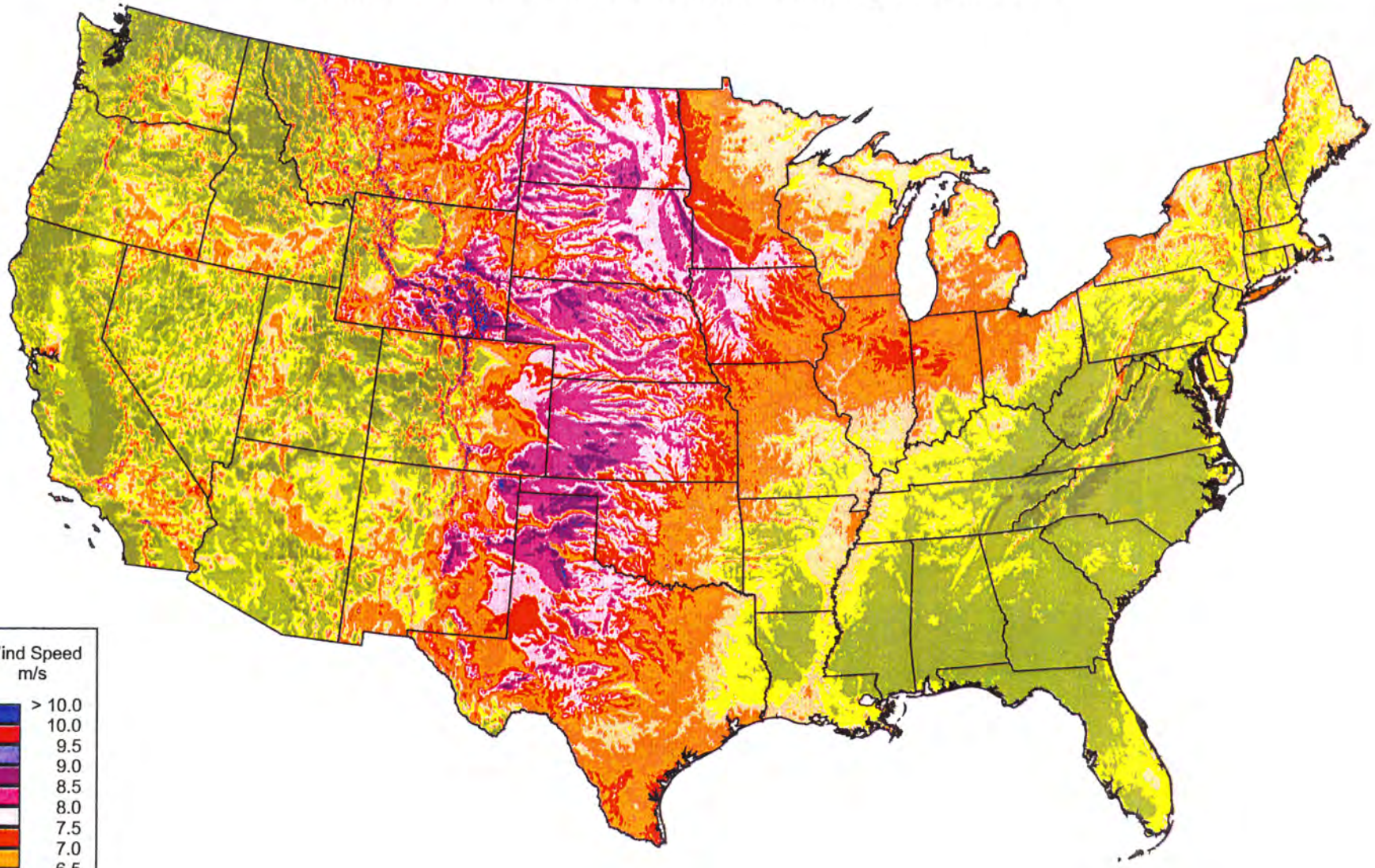
This is the first comprehensive update of the wind energy potential by state since 1993. NREL has worked with AWS Truewind for almost a decade on updating wind resource maps for 36 states and producing validated maps for 50-meter height above ground. U.S. Department of Energy's Wind Powering America project supported the mapping efforts.

More Information

- **State Wind Resource Estimates Webinar**
  The National Renewable Energy Laboratory hosted a one-hour Webinar to discuss the new wind potential estimates and maps. Audio and text versions of the Webinar are available.

This information was last updated on 2/19/2010

United States - Annual Average Wind Speed at 80 m



Wind Speed
m/s

- > 10.0
- 10.0
- 9.5
- 9.0
- 8.5
- 8.0
- 7.5
- 7.0
- 6.5
- 6.0
- 5.5
- 5.0
- 4.5
- 4.0
- < 4.0

Source: Wind resource estimates developed by AWS Truewind, LLC for windNavigator®. Web: http://navigator.awstruewind.com | www.awstruewind.com. Spatial resolution of wind resource data: 2.5 km. Projection: Albers Equal Area WGS84.

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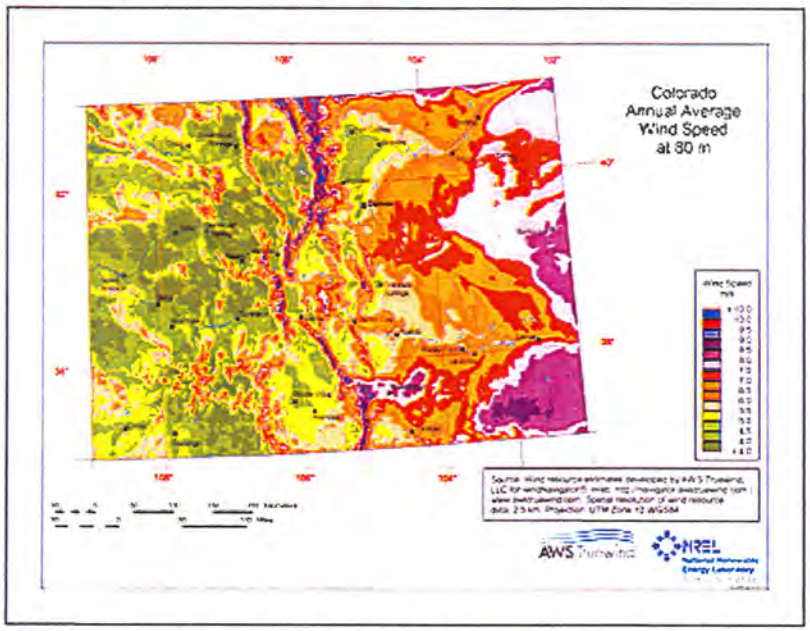
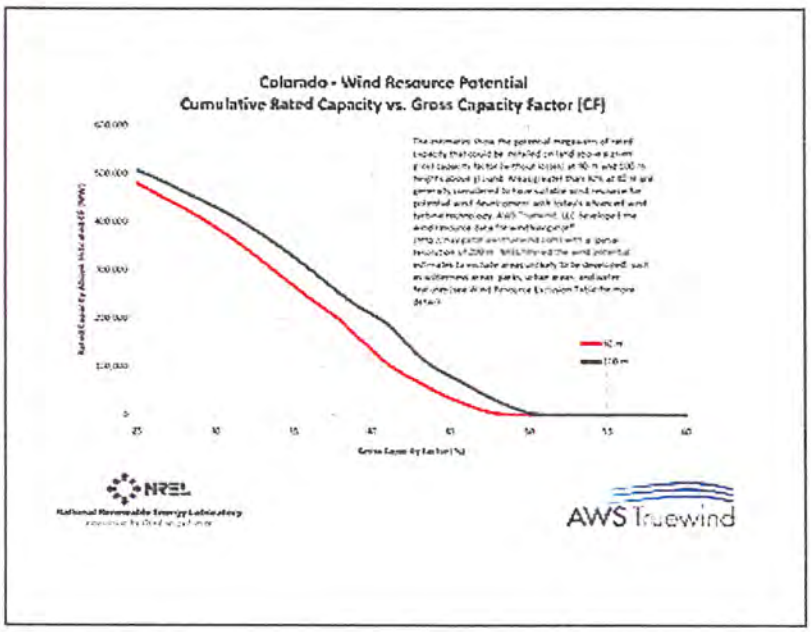
Colorado Wind Map and Resource Potential

The Department of Energy's Wind Program and the National Renewable Energy Laboratory (NREL) published a new wind resource map for the state of Colorado. The new wind resource map shows the predicted mean annual wind speeds at 80-m height. Presented at a spatial resolution of 2.5 km (interpolated to a finer scale for display). Areas with annual average wind speeds around 6.5 m/s and greater at 80-m height are generally considered to have suitable wind resource for wind development.



This Colorado wind map shows the wind resource at 80 meters. You can view a larger version or download a printable map (PDF 1.6 MB) Download Adobe Reader.



The chart shows the potential megawatts of rated capacity above a given gross capacity factor (without losses) at 80-m and 100-m heights above ground. You can view a larger version or download a printable map (PDF 104 KB) Download Adobe Reader.

Additionally, a national dataset was produced of estimated gross capacity factor (not adjusted for losses) at a spatial resolution of 200 m and heights of 80 m and 100 m. Using AWS Truewind's gross capacity factor data, NREL estimated the windy land area and wind energy potential in various capacity factor ranges for each state. The table (Excel 108 KB) lists the estimates of windy land area with a gross capacity of 30% and greater at 80-m height and the wind energy potential from development of the

"available" windy land area after exclusions.

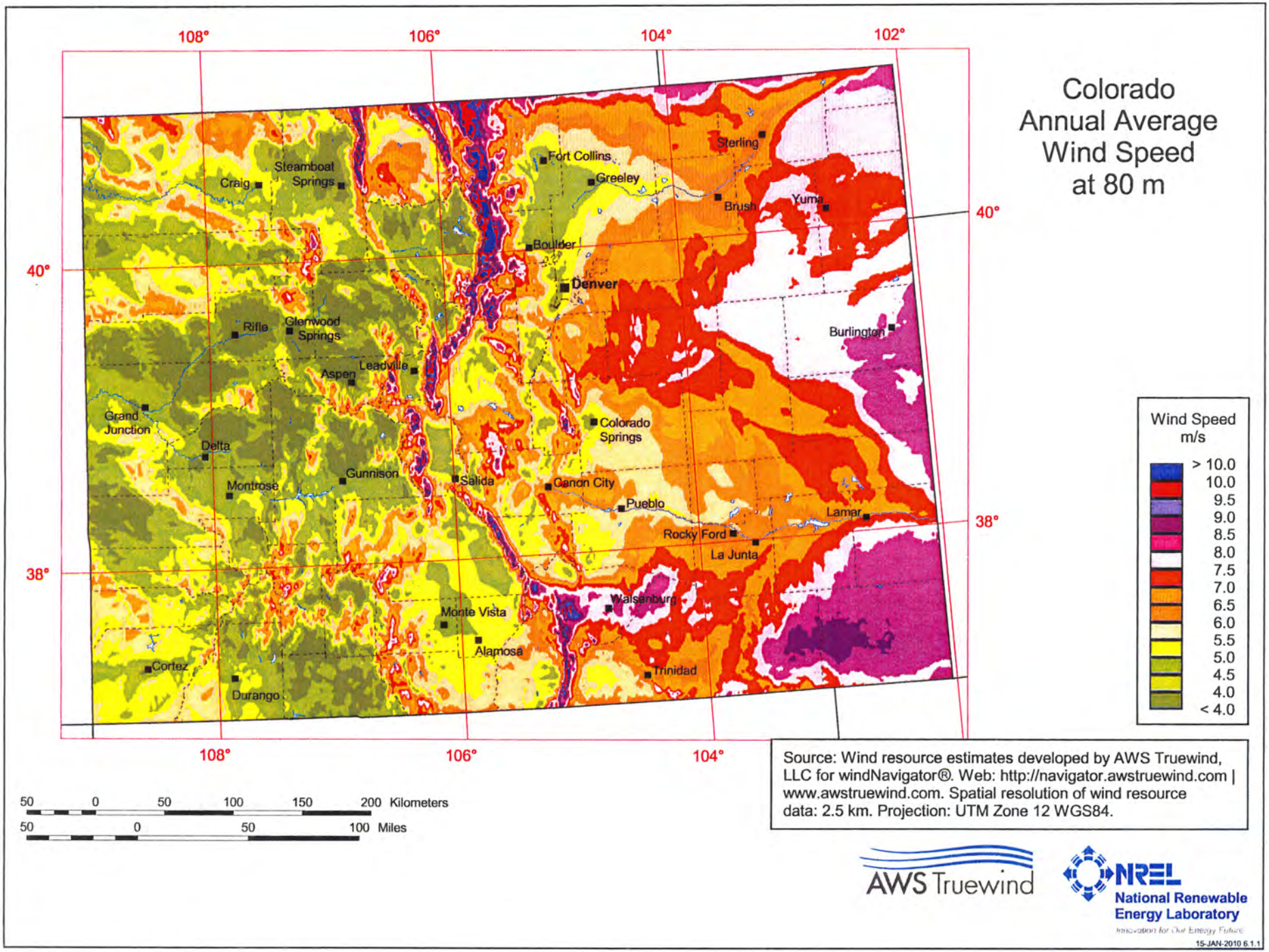
The "Installed Capacity" is the potential megawatts (MW) of rated capacity that could be installed on the available windy land area, and the "Annual Generation" is the estimated annual wind energy generation in gigawatt-hours (GWh) that could be produced from the installed capacity. NREL reduced the wind potential estimates by excluding areas unlikely to be developed such as wilderness areas, parks, urban areas, and water features (see Wind Resource Exclusion Table for more detail). Additional wind potential tables (Excel 208 KB) are included for various capacity factor ranges.

The chart to the right shows the wind resource potential above a given gross capacity factor at both 80-m and 100-m heights for Colorado.

These maps and wind potential estimates resulted from a collaborative project between the National Renewable Energy Laboratory and AWS Truewind of Albany, New York. This is the first comprehensive update of the wind energy potential by state since 1993. NREL has worked with AWS Truewind for almost a decade on updating wind resource maps for 36 states and producing validated maps for 50-meter height above ground. U.S. Department of Energy's Wind Powering America project supported the mapping efforts. The Colorado 50-meter wind map is still available.

Note: Wind resource at a micro level can vary significantly; therefore, you should get a professional evaluation of your specific area of interest.

If you have a disability and need assistance reading the wind map, please email the Webmaster.



Source: Wind resource estimates developed by AWS Truewind, LLC for windNavigator®. Web: http://navigator.awstruewind.com | www.awstruewind.com. Spatial resolution of wind resource data: 2.5 km. Projection: UTM Zone 12 WGS84.

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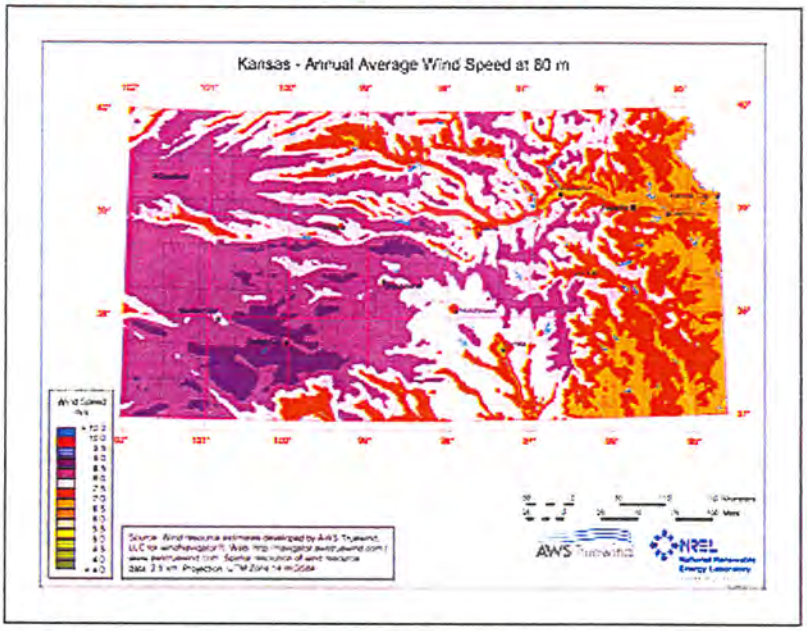
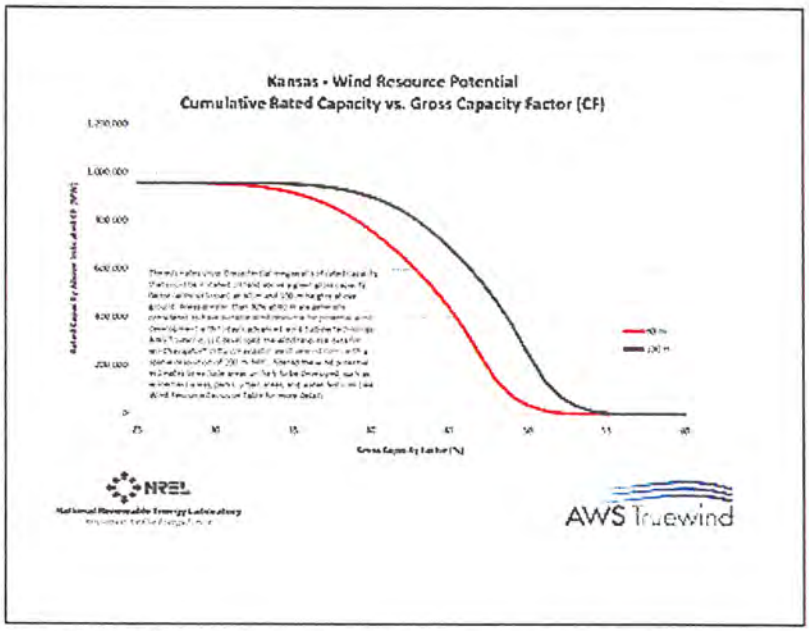
Kansas Wind Map and Resource Potential

The Department of Energy's Wind Program and the National Renewable Energy Laboratory (NREL) published a new wind resource map for the state of Kansas. The new wind resource map shows the predicted mean annual wind speeds at 80-m height. Presented at a spatial resolution of 2.5 km (interpolated to a finer scale for display). Areas with annual average wind speeds around 6.5 m/s and greater at 80-m height are generally considered to have suitable wind resource for wind development.



This Kansas wind map shows the wind resource at 80 meters. You can view a larger version or download a printable map (PDF 573 KB) Download Adobe Reader.



The chart shows the potential megawatts of rated capacity above a given gross capacity factor (without losses) at 80-m and 100-m heights above ground. You can view a larger version or download a printable map (PDF 104 KB) Download Adobe Reader.

Additionally, a national dataset was produced of estimated gross capacity factor (not adjusted for losses) at a spatial resolution of 200 m and heights of 80 m and 100 m. Using AWS Truewind's gross capacity factor data, NREL estimated the windy land area and wind energy potential in various capacity factor ranges for each state. The table (Excel 108 KB) lists the estimates of windy land area with a gross capacity of 30% and greater at 80-m height and the wind energy potential from development of the

"available" windy land area after exclusions.

The "Installed Capacity" is the potential megawatts (MW) of rated capacity that could be installed on the available windy land area, and the "Annual Generation" is the estimated annual wind energy generation in gigawatt-hours (GWh) that could be produced from the installed capacity. NREL reduced the wind potential estimates by excluding areas unlikely to be developed such as wilderness areas, parks, urban areas, and water features (see Wind Resource Exclusion Table for more detail). Additional wind potential tables (Excel 208 KB) are included for various capacity factor ranges.

The chart to the right shows the wind resource potential above a given gross capacity factor at both 80-m and 100-m heights for Kansas.

These maps and wind potential estimates resulted from a collaborative project between the National Renewable Energy Laboratory and AWS Truewind of Albany, New York. This is the first comprehensive update of the wind energy potential by state since 1993. NREL has worked with AWS Truewind for almost a decade on updating wind resource maps for 36 states and producing validated maps for 50-meter height above ground. U.S. Department of Energy's Wind Powering America project supported the mapping efforts. The Kansas 50-meter wind map is still available.

Note: Wind resource at a micro level can vary significantly; therefore, you should get a professional evaluation of your specific area of interest.

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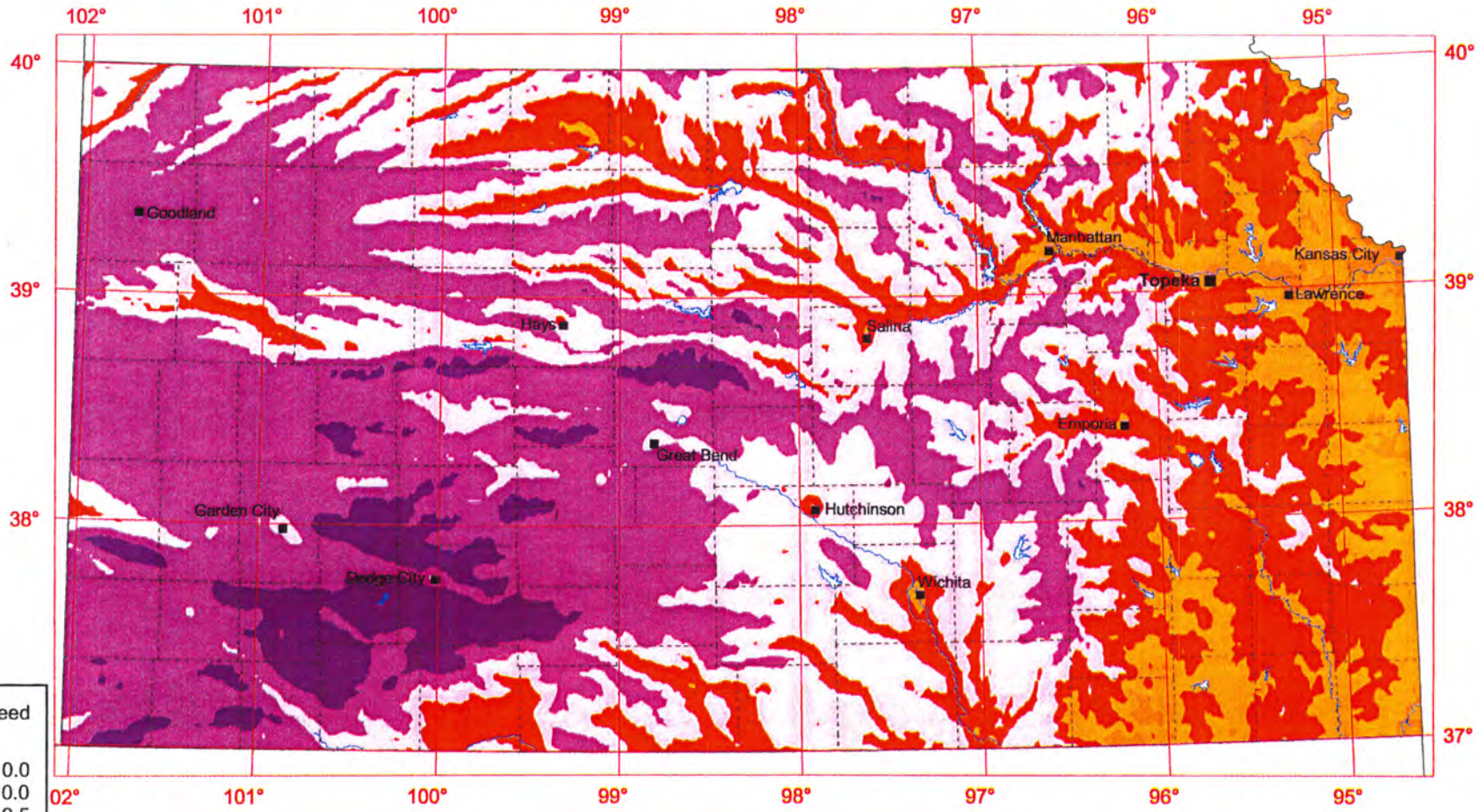
Kansas - Annual Average Wind Speed at 80 m



Wind Speed m/s

- > 10.0
- 10.0
- 9.5
- 9.0
- 8.5
- 8.0
- 7.5
- 7.0
- 6.5
- 6.0
- 5.5
- 5.0
- 4.5
- 4.0
- < 4.0

50 0 50 100 150 Kilometers

25 0 25 50 75 100 Miles

Source: Wind resource estimates developed by AWS Truewind, LLC for windNavigator®. Web: http://navigator.awstruewind.com | www.awstruewind.com. Spatial resolution of wind resource data: 2.5 km. Projection: UTM Zone 14 WGS84.

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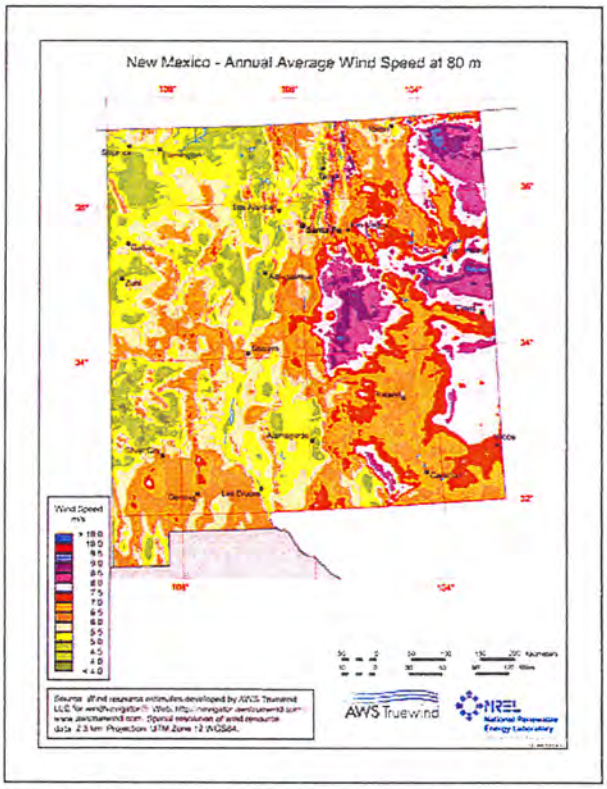
New Mexico Wind Map and Resource Potential

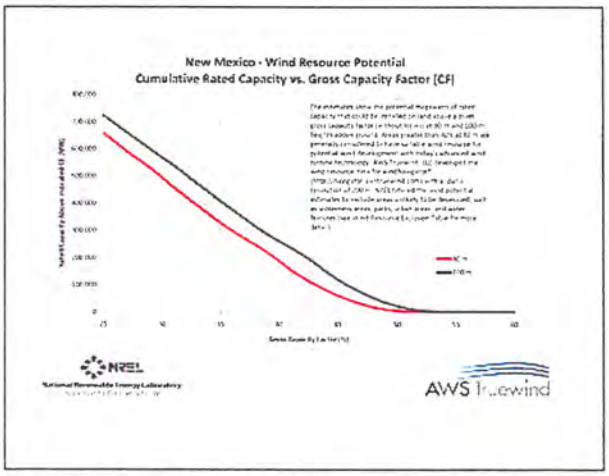
SHARE

The Department of Energy's Wind Program and the National Renewable Energy Laboratory (NREL) published a new wind resource map for the state of New Mexico. The new wind resource map shows the predicted mean annual wind speeds at 80-m height. Presented at a spatial resolution of 2.5 km (interpolated to a finer scale for display). Areas with annual average wind speeds around 6.5 m/s and greater at 80-m height are generally considered to have suitable wind resource for wind development.

Additionally, a national dataset was produced of estimated gross capacity factor (not adjusted for losses) at a spatial resolution of 200 m and heights of 80 m and 100 m. Using AWS Truewind's gross capacity factor data, NREL estimated the windy land area and wind energy potential in various capacity factor ranges for each state. The table (Excel 108 KB) lists the estimates of windy land area with a gross capacity of 30% and greater at 80-m height and the wind energy potential from development of the "available" windy land area after exclusions.



This New Mexico wind map shows the wind resource at 80 meters. You can view a larger version or download a printable map (PDF 868 KB) Download Adobe Reader.



The chart shows the potential megawatts of rated capacity above a given gross capacity factor (without losses) at 80-m and 100-m heights above ground. You can view a larger version or download a printable map (PDF 105 KB) Download Adobe Reader.

The "Installed Capacity" is the potential megawatts (MW) of rated capacity that could be installed on the available windy land area, and the "Annual Generation" is the estimated annual wind energy generation in gigawatt-hours (GWh) that could be produced from the installed capacity. NREL reduced the wind potential estimates by excluding areas unlikely to be developed such as wilderness areas, parks, urban areas, and water features (see Wind Resource Exclusion Table for more detail). Additional wind potential tables (Excel 208 KB) are included for various capacity factor ranges.

The chart to the right shows the wind resource potential above a given gross capacity factor at both 80-m and 100-m heights for New Mexico.

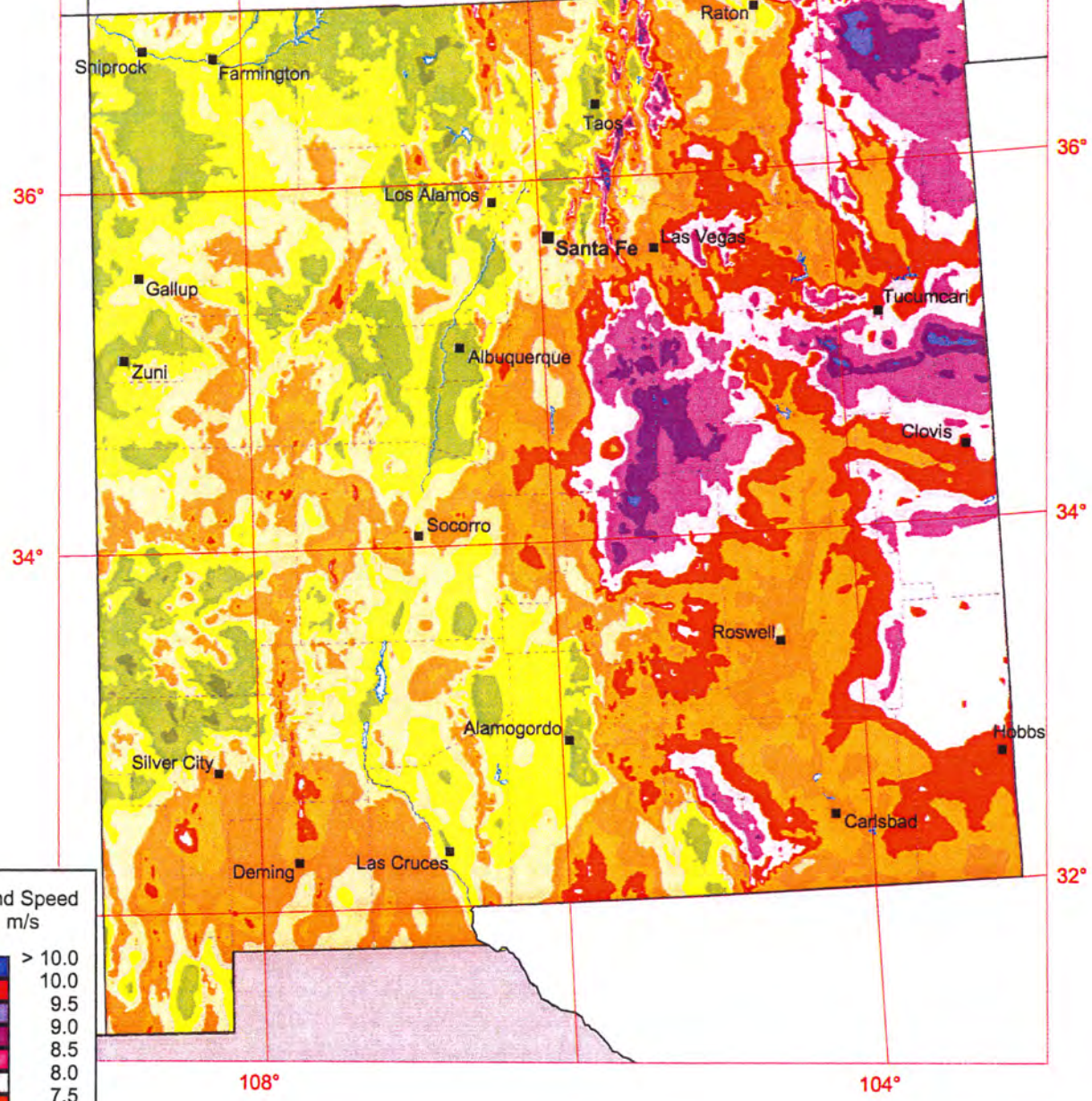
These maps and wind potential estimates resulted from a collaborative project between the National Renewable Energy Laboratory and AWS Truewind of Albany, New York. This is the first comprehensive update of the wind energy potential by state since 1993. NREL has worked with AWS Truewind for almost a decade on updating wind resource maps for 36 states and producing validated maps for 50-meter height above ground. U.S. Department of Energy's Wind Powering America project supported the mapping efforts. The New Mexico 50-meter wind map is still available.

Note: Wind resource at a micro level can vary significantly; therefore, you should get a professional evaluation of your specific area of interest.

If you have a disability and need assistance reading the wind map, please email the Webmaster.

Printable Version

New Mexico - Annual Average Wind Speed at 80 m



Wind Speed m/s

> 10.0
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
< 4.0

50 0 50 100 150 200 Kilometers

30 0 30 60 90 120 Miles

Source: Wind resource estimates developed by AWS Truewind, LLC for windNavigator®. Web: http://navigator.awstruewind.com | www.awstruewind.com. Spatial resolution of wind resource data: 2.5 km. Projection: UTM Zone 12 WGS84.

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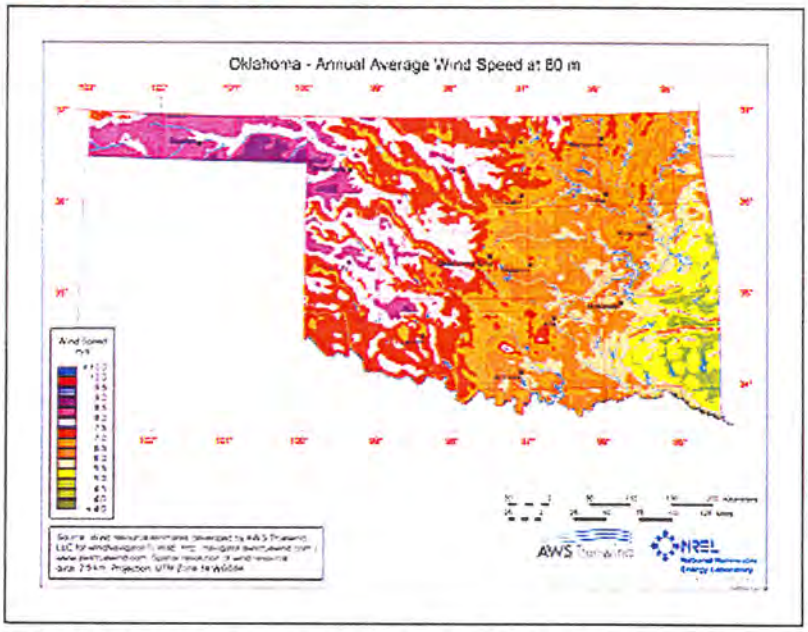
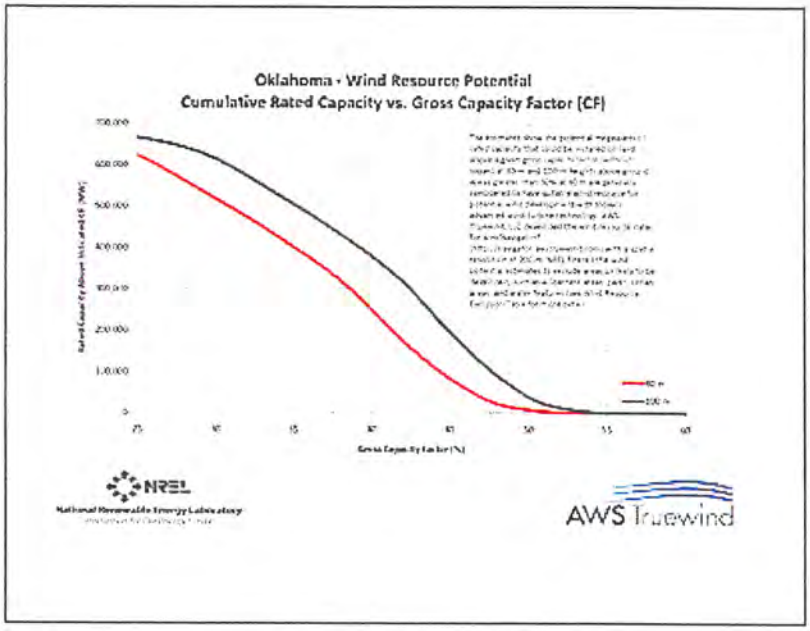
Oklahoma Wind Map and Resource Potential

The Department of Energy's Wind Program and the National Renewable Energy Laboratory (NREL) published a new wind resource map for the state of Oklahoma. The new wind resource map shows the predicted mean annual wind speeds at 80-m height. Presented at a spatial resolution of 2.5 km (interpolated to a finer scale for display). Areas with annual average wind speeds around 6.5 m/s and greater at 80-m height are generally considered to have suitable wind resource for wind development.



This Oklahoma wind map shows the wind resource at 80 meters. You can view a larger version or download a printable map (PDF 1.1 MB) Download Adobe Reader.



The chart shows the potential megawatts of rated capacity above a given gross capacity factor (without losses) at 80-m and 100-m heights above ground. You can view a larger version or download a printable map (PDF 105 KB) Download Adobe Reader.

Additionally, a national dataset was produced of estimated gross capacity factor (not adjusted for losses) at a spatial resolution of 200 m and heights of 80 m and 100 m. Using AWS Truewind's gross capacity factor data, NREL estimated the windy land area and wind energy potential in various capacity factor ranges for each state. The table (Excel 108 KB) lists the estimates of windy land area with a gross capacity of 30% and greater at 80-m height and the wind energy potential from development of the

"available" windy land area after exclusions.

The "Installed Capacity" is the potential megawatts (MW) of rated capacity that could be installed on the available windy land area, and the "Annual Generation" is the estimated annual wind energy generation in gigawatt-hours (GWh) that could be produced from the installed capacity. NREL reduced the wind potential estimates by excluding areas unlikely to be developed such as wilderness areas, parks, urban areas, and water features (see Wind Resource Exclusion Table for more detail). Additional wind potential tables (Excel 208 KB) are included for various capacity factor ranges.

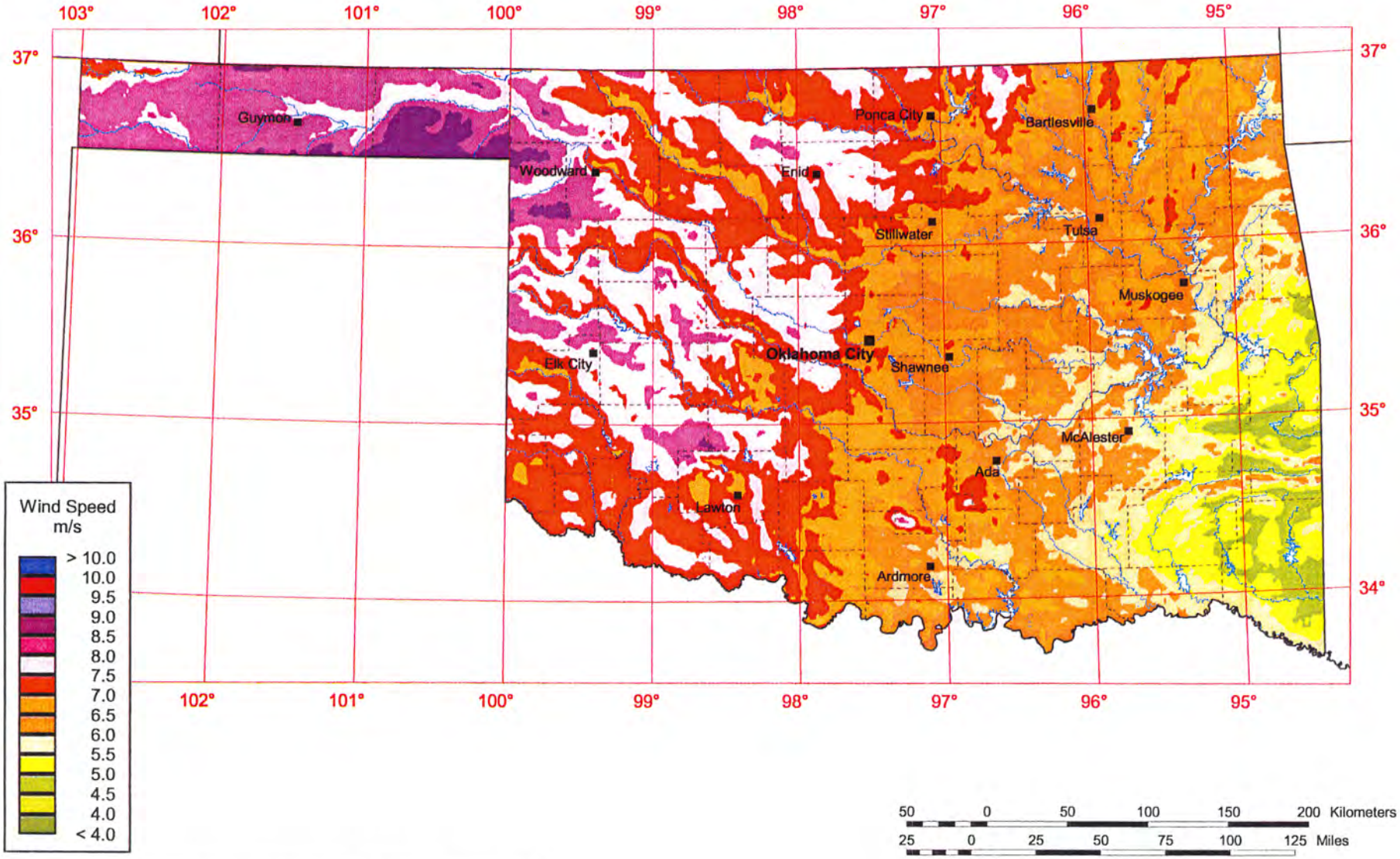
The chart to the right shows the wind resource potential above a given gross capacity factor at both 80-m and 100-m heights for Oklahoma.

These maps and wind potential estimates resulted from a collaborative project between the National Renewable Energy Laboratory and AWS Truewind of Albany, New York. This is the first comprehensive update of the wind energy potential by state since 1993. NREL has worked with AWS Truewind for almost a decade on updating wind resource maps for 36 states and producing validated maps for 50-meter height above ground. U.S. Department of Energy's Wind Powering America project supported the mapping efforts. The Oklahoma 50-meter wind map is still available.

Note: Wind resource at a micro level can vary significantly; therefore, you should get a professional evaluation of your specific area of interest.

If you have a disability and need assistance reading the wind map, please email the Webmaster.

Oklahoma - Annual Average Wind Speed at 80 m



Wind Speed m/s

> 10.0
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
< 4.0

50 0 50 100 150 200 Kilometers

25 0 25 50 75 100 125 Miles

Source: Wind resource estimates developed by AWS Truewind, LLC for windNavigator®. Web: http://navigator.awstruewind.com | www.awstruewind.com. Spatial resolution of wind resource data: 2.5 km. Projection: UTM Zone 14 WGS84.

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U.S. Department of Energy - Energy Efficiency and Renewable Energy
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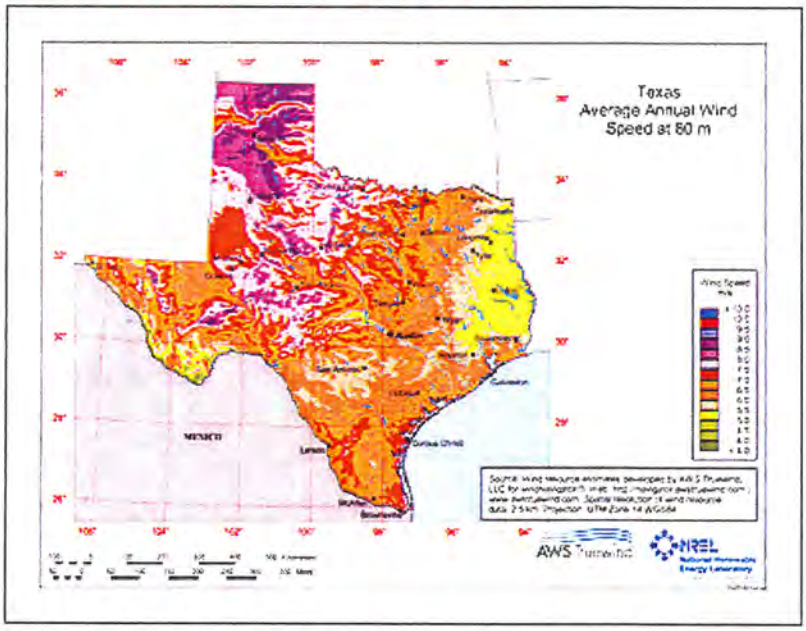
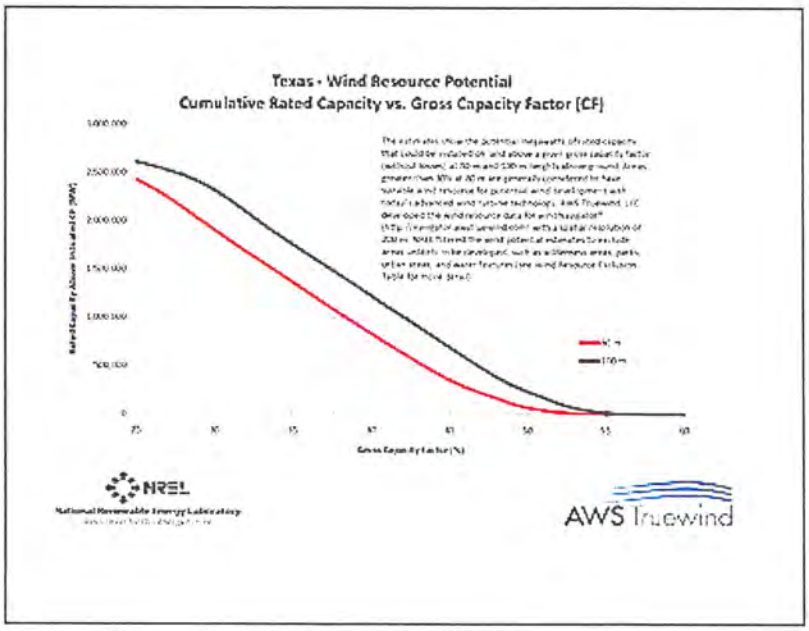
Texas Wind Map and Resource Potential

The Department of Energy's Wind Program and the National Renewable Energy Laboratory (NREL) published a new wind resource map for the state of Texas. The new wind resource map shows the predicted mean annual wind speeds at 80-m height. Presented at a spatial resolution of 2.5 km (interpolated to a finer scale for display). Areas with annual average wind speeds around 6.5 m/s and greater at 80-m height are generally considered to have suitable wind resource for wind development.



This Texas wind map shows the wind resource at 80 meters. You can view a larger version or download a printable map (PDF 3.7 MB) Download Adobe Reader.



The chart shows the potential megawatts of rated capacity above a given gross capacity factor (without losses) at 80-m and 100-m heights above ground. You can view a larger version or download a printable map (PDF 105 KB) Download Adobe Reader.

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The chart to the right shows the wind resource potential above a given gross capacity factor at both 80-m and 100-m heights for Texas.

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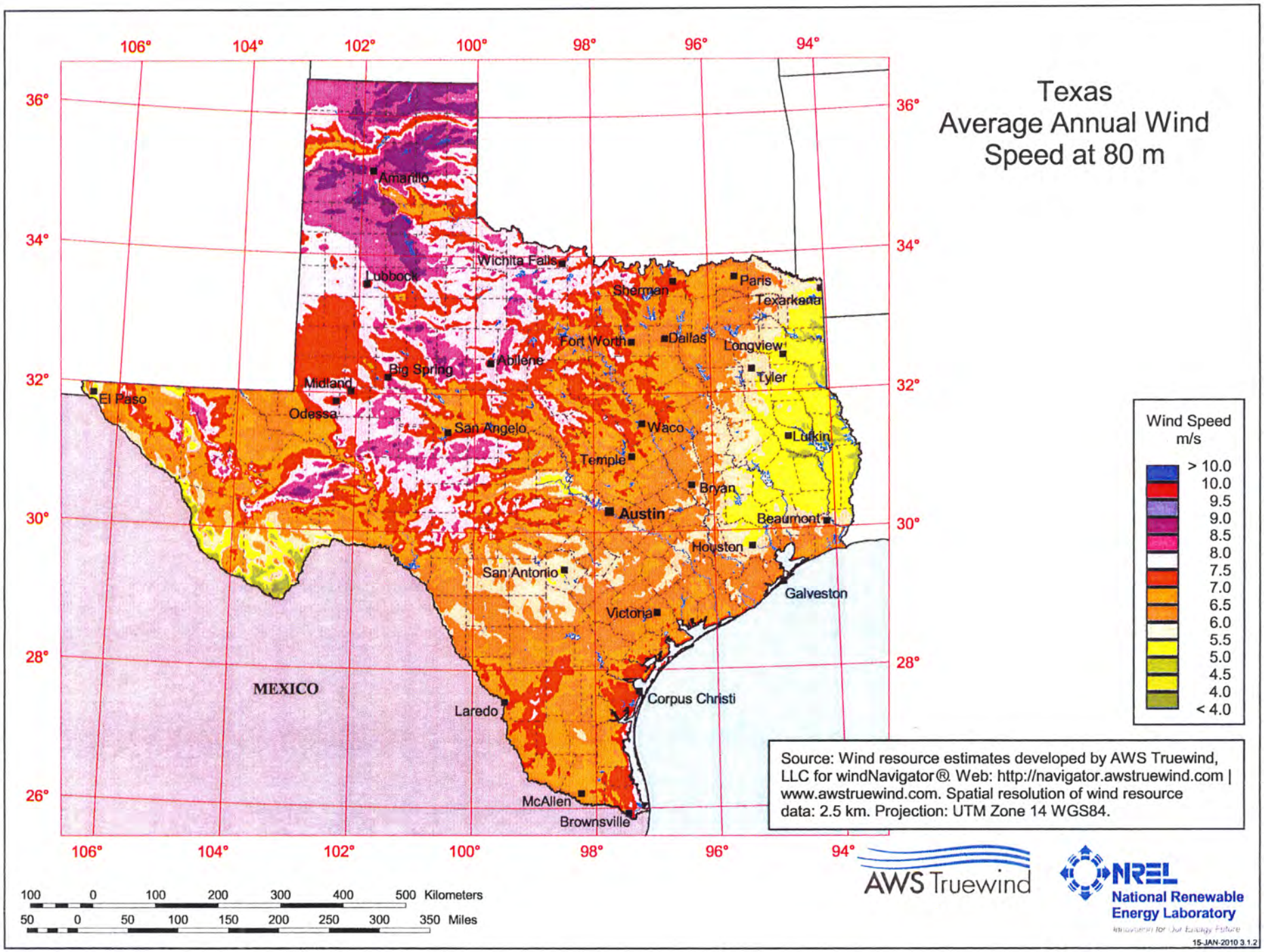
Texas
Average Annual Wind
Speed at 80 m
106°
104°
102°
100°
98°
96°
94°
36°
34°
32°
30°
28°
26°
Amarillo
Wichita Falls
Lubbock
Sherman
Paris
Texarkana
Fort Worth
Dallas
Longview
Big Spring
Abilene
Tyler
Midland
El Paso
Odessa
San Angelo
Waco
Lufkin
Temple
Bryan
Austin
Beaumont
Houston
San Antonio
Galveston
Victoria
MEXICO
Corpus Christi
Laredo
McAllen
Brownsville
Wind Speed
m/s
> 10.0
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
< 4.0
Source: Wind resource estimates developed by AWS Truewind, LLC for windNavigator®. Web: http://navigator.awstruewind.com | www.awstruewind.com. Spatial resolution of wind resource data: 2.5 km. Projection: UTM Zone 14 WGS84.
100 0 100 200 300 400 500 Kilometers
50 0 50 100 150 200 250 300 350 Miles
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NREL
National Renewable
Energy Laboratory
15-JAN-2010 3.1.2