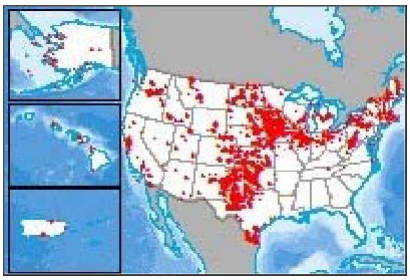
Wind Turbine - Existing



Tags

renewable, wind farm, wind, database, shapefile, verified, AWEA, national, United States, wind facility, turbine, energy, turbine characteristics, USGS, LBNL, USWTDB, wind turbine

Summary

The purpose of this information is to provide a regularly updated, publicly available, spatially referenced, national dataset made up almost entirely of utility-scale wind turbine locations and their technical specifications. An appropriate use of the data would be for scientific analysis, research or for general interest for the public. Identification of turbines that have been retrofitted, repowered, decommissioned, and/or removed is a continual ongoing effort; thus, the dataset may contain turbines that were previously verified and subsequently removed.

Description

This dataset provides locations and technical specifications of wind turbines in the United States, almost all of which are utility-scale. Utility-scale turbines are ones that generate power and feed it into the grid, supplying a utility with energy. They are usually much larger than turbines that would feed a homeowner or business. The regularly updated database has wind turbine records that have been collected, digitized, and locationally verified. Turbine data were gathered from the Federal Aviation Administration's (FAA) Digital Obstacle File (DOF) and Obstruction Evaluation Airport Airspace Analysis (OE-AAA), the American Wind Energy Association (AWEA), Lawrence Berkeley National Laboratory (LBNL), and the United States Geological Survey (USGS), and were merged and collapsed into a single data set. Verification of the turbine positions was done by visual interpretation using high-resolution aerial imagery in ESRI ArcGIS Desktop. A locational error of plus or minus 10 meters for turbine locations was tolerated. Technical specifications for turbines were assigned based on the wind turbine make and models as provided by manufacturers and project developers directly, and via FAA datasets, information on the wind project developer or turbine manufacturer websites, or other online sources. Some facility and turbine information on make and model did not exist or was difficult to obtain. Thus, uncertainty may exist for certain turbine specifications. Similarly, some turbines were not yet built, not built at all, or for other reasons cannot be verified visually. Location and turbine specifications data quality are rated and a confidence is recorded for both. None of the data are field verified.

Credits

Credit to cooperative agreement and collaboration between the U.S. Geological Survey, the Lawrence Berkeley National Laboratory, and the American Wind Energy Association to compile and release these data.

Use limitations

act of distribution constitute any such warranty.

Extent

West -171.713074 **East** 144.722656
North 66.839905 **South** 13.389381

Scale Range

Maximum (zoomed in) 1:5,000
Minimum (zoomed out) 1:150,000,000

ArcGIS Metadata

Topics and Keywords

* CONTENT TYPE Downloadable Data
PLACE KEYWORDS United States
THEME KEYWORDS renewable, wind farm, wind, database, shapefile, verified, AWEA, national, wind facility, turbine, energy, turbine characteristics, USGS, LBNL, USWTDB, wind turbine

Citation

TITLE Wind Turbine - Existing
PUBLICATION DATE 2020-01-01
PRESENTATION FORMATS * digital map
FGDC GEOSPATIAL PRESENTATION FORMAT Vector Digital Data Set (Point)

Citation Contacts

RESPONSIBLE PARTY
ORGANIZATION'S NAME Louisa Kramer
CONTACT'S ROLE originator

RESPONSIBLE PARTY
ORGANIZATION'S NAME James Diffendorfer
CONTACT'S ROLE originator

RESPONSIBLE PARTY
ORGANIZATION'S NAME Joseph Rand
CONTACT'S ROLE originator

RESPONSIBLE PARTY
ORGANIZATION'S NAME U.S. Geological Survey
CONTACT'S ROLE publisher

CONTACT INFORMATION
ADDRESS
DELIVERY POINT Denver, CO

RESPONSIBLE PARTY
ORGANIZATION'S NAME Hannah Hunt
CONTACT'S ROLE originator

RESPONSIBLE PARTY
ORGANIZATION'S NAME Ben Hoen
CONTACT'S ROLE originator

RESPONSIBLE PARTY
ORGANIZATION'S NAME Christopher Garrity
CONTACT'S ROLE originator

Resource Details

DATASET LANGUAGES English (UNITED STATES)
STATUS planned
SPATIAL REPRESENTATION TYPE vector
SUPPLEMENTAL INFORMATION
Some facility and turbine information on make and model did not exist or was difficult to obtain. Thus, uncertainty may exist for certain turbine specifications. Similarly, some turbines were not yet built, not built at all, or for other reasons cannot be verified visually. Location and turbine specifications data quality are rated and a confidence is recorded for both. None of the data are field verified.
* PROCESSING ENVIRONMENT Version 6.2 (Build 9200) ; Esri ArcGIS 10.6.1.9270
CREDITS
Credit to cooperative agreement and collaboration between the U.S. Geological Survey, the Lawrence Berkeley National Laboratory, and the American Wind Energy Association to compile and release these data.

ARCGIS ITEM PROPERTIES
* NAME windmill_windmotor_site_windfarm_usgs_v5
* ACCESS PROTOCOL Local Area Network

Extents

EXTENT
DESCRIPTION
ground condition

TEMPORAL EXTENT
BEGINNING DATE 1981-01-01
ENDING DATE 2019-12-04
EXTENT
GEOGRAPHIC EXTENT
BOUNDING RECTANGLE
WEST LONGITUDE -171.7131
EAST LONGITUDE 144.7227
SOUTH LATITUDE 13.3894

NORTH LATITUDE 66.8399
EXTENT
GEOGRAPHIC EXTENT
BOUNDING RECTANGLE
EXTENT TYPE Extent used for searching
* WEST LONGITUDE -171.713074
* EAST LONGITUDE 144.722656
* NORTH LATITUDE 66.839905
* SOUTH LATITUDE 13.389381
* EXTENT CONTAINS THE RESOURCE Yes
EXTENT IN THE ITEM'S COORDINATE SYSTEM
* WEST LONGITUDE -19115011.960228
* EAST LONGITUDE 16110452.372170
* SOUTH LATITUDE 1504253.414626
* NORTH LATITUDE 10110596.985745
* EXTENT CONTAINS THE RESOURCE Yes

Resource Points of Contact

POINT OF CONTACT
INDIVIDUAL'S NAME Ben Hoen
ORGANIZATION'S NAME Lawrence Berkeley National Laboratory
CONTACT'S POSITION Research Scientist
CONTACT'S ROLE point of contact

CONTACT INFORMATION
PHONE
VOICE 845-758-1896
FAX 510-486-6996

ADDRESS
TYPE postal
DELIVERY POINT 20 Sawmill Road
CITY Milan
ADMINISTRATIVE AREA NY
POSTAL CODE 12571
COUNTRY US
E-MAIL ADDRESS bhoen@lbl.gov

Resource Maintenance

RESOURCE MAINTENANCE
UPDATE FREQUENCY quarterly

Resource Constraints

LEGAL CONSTRAINTS
LIMITATIONS OF USE
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LIMITATIONS OF USE
Unless otherwise stated, all data, metadata and related materials are considered to satisfy the quality standards relative to the purpose for which the data were collected. Although these data and associated metadata have been reviewed for accuracy and completeness and approved for release by the U.S. Geological Survey (USGS), no warranty expressed or implied is made regarding the display or utility of the data on any other system or for general or scientific purposes, nor shall the act of distribution constitute any such warranty.

Spatial Reference

ARCGIS COORDINATE SYSTEM
* TYPE Projected
* GEOGRAPHIC COORDINATE REFERENCE GCS_WGS_1984
* PROJECTION WGS_1984_Web_Mercator_Auxiliary_Sphere
* COORDINATE REFERENCE DETAILS
PROJECTED COORDINATE SYSTEM
WELL-KNOWN IDENTIFIER 102100
X ORIGIN -22041257.77387803
Y ORIGIN -30241100

XY SCALE 144148035.89861274
Z ORIGIN -100000
Z SCALE 10000
M ORIGIN -100000
M SCALE 10000
XY TOLERANCE 0.001
Z TOLERANCE 0.001
M TOLERANCE 0.001
HIGH PRECISION true
LATEST WELL-KNOWN IDENTIFIER 3857
WELL-KNOWN TEXT PROJCS["WGS_1984_Web_Mercator_Auxiliary_Sphere",GEOGCS["GCS_WGS_1984",DATUM["D_WGS_1984",SPHEROID["WGS_1984",6378137.0,298.257223563]],PRIMEM["Greenwich",0.0],UNIT["Degree",0.0174532925199433]],PROJECTION["Mercator_Auxiliary_Sphere"],PARAMETER["False_Easting",0.0],PARAMETER["False_Northing",0.0],PARAMETER["Central_Meridian",0.0],PARAMETER["Standard_Parallel_1",0.0],PARAMETER["Auxiliary_Sphere_Type",0.0],UNIT["Meter",1.0],AUTHORITY["EPSG",3857]]

REFERENCE SYSTEM IDENTIFIER
* VALUE 3857
* CODESPACE EPSG
* VERSION 8.8(9.3.1.2)

Spatial Data Properties

VECTOR
* LEVEL OF TOPOLOGY FOR THIS DATASET geometry only

GEOMETRIC OBJECTS
FEATURE CLASS NAME windmill_windmotor_site_windfarm_usgs_v5
* OBJECT TYPE point
* OBJECT COUNT 63003

ARCGIS FEATURE CLASS PROPERTIES
FEATURE CLASS NAME windmill_windmotor_site_windfarm_usgs_v5
* FEATURE TYPE Simple
* GEOMETRY TYPE Point
* HAS TOPOLOGY FALSE
* FEATURE COUNT 63003
* SPATIAL INDEX TRUE
* LINEAR REFERENCING FALSE

Data Quality

SCOPE OF QUALITY INFORMATION
RESOURCE LEVEL dataset

DATA QUALITY REPORT - CONCEPTUAL CONSISTENCY
MEASURE DESCRIPTION
No formal logical accuracy tests were conducted.

DATA QUALITY REPORT - COMPLETENESS OMISSION
MEASURE DESCRIPTION
Data set is considered complete for the information presented, as described in the abstract. It is regularly updated and turbines will be added and removed over time, and characteristics might be altered over time as well. Users should be aware that the location data was based on a snapshot of time; turbines could have been removed after that time or built since the image date. None of the data are field verified.

DATA QUALITY REPORT - QUANTITATIVE ATTRIBUTE ACCURACY

MEASURE DESCRIPTION

Turbine data points were spatially verified in aerial imagery to confirm or edit their correct position. The map scale used while verifying and digitizing turbines depended on location, need, and imagery availability. Authors used aerial imagery with a typical assessment map scale of 1:2,000 to 1:5,000, none of the spatial verification was done at a map scale smaller than 1:5,000. Uncertainty may exist for certain turbine locations as indicated in confidence turbine location field (t_conf_loc). Uncertainty in turbine specifications was indicated in the confidence of attribute field (t_conf_atr).

DATA QUALITY REPORT - ABSOLUTE EXTERNAL POSITIONAL ACCURACY

DIMENSION horizontal

MEASURE DESCRIPTION

The wind turbine points were horizontally verified with aerial imagery as specified in the image source attribute. NAIP provides 1 meter ground sample distance orthoimagery to within plus or minus 6 meters to true ground at a 95-percent confidence level. The Bing Maps Aerial base maps and Digital Globe imagery have a variable resolution and accuracy based on image source, type, and location. The Bing Maps Aerial base maps horizontal accuracy for CONUS is estimated to be 0.3m to 0.03m. Digital Globe imagery is estimated to be 0.3m to 0.03m.

DATA QUALITY REPORT - ABSOLUTE EXTERNAL POSITIONAL ACCURACY

DIMENSION vertical

MEASURE DESCRIPTION

A formal accuracy assessment of the vertical positional information in the data set has either not been conducted, or is not applicable.

Lineage

PROCESS STEP ▶

WHEN THE PROCESS OCCURRED 2020-01-02

DESCRIPTION

Prior to steps listed below, US wind turbines were identified, mapped, and verified by USGS for a separate dataset: "Onshore Industrial Wind Turbine Locations for the United States to March 2014". A description of the process to develop that dataset can be found in the metadata file for that release (https://doi.org/10.5066/F7251G8Q). Building off this earlier effort, the following steps were taken to expand and update the United States Wind Turbine Database (USWTDB) with the collaboration between USGS, LBNL, and AWEA. Please note that some steps are iterated on a quarterly basis to keep the dataset current. (1) The March 2014 USGS dataset 48,956 turbines, 34,864 of which had unique FAA Obstacle Repository System (ORS) numbers was merged with (2) the LBNL wind turbine dataset. It had previously existed separately in house, and also had the FAA ORS number as well as many of the same fields as the USGS dataset. It was merged into the USGS dataset using the ORS number, bringing in LBNL fields and IDs. (3) Non-matching LBNL turbines were also added as LBNL only turbines. (4) The most recent FAA Digital Obstacle File (DOF) was downloaded and filtered for "windmills", and reprojected from WGS-84, as FAA provided it, to NAD-83 datum, the USGS and LBNL datum. These new coordinates were used later in the process. (5) The DOF dataset was then merged into the working USWTDB using ORS number, keeping new (non-matching) DOF Only turbines, and DOF variables (faa_aglht, faa_amslht, faa_asn, ylat, xlong). (6) The most recent FAA Obstacle Evaluation Airport Airspace Analysis (OE-AAA) file was downloaded and filtered for "windmills". (7) The OE-AAA dataset was merged into working USWTDB using Aeronautical Study Number (ASN) and preserved as the faa_asn attribute,keeping new (non-matching) turbines as OE only and OE-AAA variables (oe_builtdate, oe_appdate, oe_expdate, oe_comdate, notice of, status, dtrmntn, oe_aglht, ylat, xlong). (8) The latest AWEA WindIQ turbine dataset was downloaded. (9) A geospatial match between AWEA turbines and working USWTDB was performed using "geonear" command in Stata statistical analysis software and the following steps: [a] Save separate AWEA and working USWTDB datasets. [b] Run "geonear" command in Stata between the two datasets to determine and "match" nearest neighbors (i.e., these turbines are suspected to be the same turbine but from the two different datasets), and calculate the distance between them. [c] Calculate differences in installed year, hub height, rotor diameter, and total height between "matched" turbine pairs. [d]

Accept "match" (meaning assume they are, in fact, the same turbine) IF distance between pairs is zero (perfect geospatial match), OR distance between pairs is less than 100 feet (30.5 m) AND hub height, rotor diameter, and installed year are equal between the pairs. If the match criteria were not met, both turbines in the pair were saved for subsequent visual inspection and "manual" confirmation of match. Non-matching AWEA turbines are added to the dataset as AWEA-only turbines and all AWEA variables (turbine ID, p_year, t_cap, t_hh, t_rd, t_tth, ylat, xlong, t_manu, t_model, t_state, as well as other variables) were added to the dataset. (10) A hierarchy was developed because multiple datasets contain some of the same fields (e.g., t_ttlh was contained in USGS, LBNL, DOF, OE-AAA and AWEA datasets)Because LBNL and AWEA data are sourced from two high-quality sources (OEMs and developers) and reconciled to eliminate differences, LBNL data is the primary source for turbine attributes and turbine project characteristics, then AWEA, USGS, DOF, and finally OE-AAA. In the overwhelming majority of cases, differences between sources were minimal, but when discrepancies existed that order was used to populate fields. All fields that are missing from higher-order sources are populated from lower sources. (11) The working (i.e., fully merged) USWTDB was spatially joined with base layers via ArcMap in order to pin t_state, t_county and t_fips to turbine points. (12) Turbine points were selected by state, saved as an individual turbine file for each state, and distributed to authors for editing. (13) A basemap image from Digital Globe was added to the ArcMap project file. If Digital Globe imagery did not show a turbine installation, USDA/NAIP County Mosaic Orthoimagery Google Earth imagery was cross checked. Previous bing map image source was retained for some of the previous USGS data. (14) Turbine points were visually verified and edited/moved to the base of the turbine as needed with an estimated tolerance of 10 meters. (15) If the turbine data point was not seen on an image, the t_conf_loc was entered as 1. If the turbine point was in partial construction or with other doubts, the t_conf_loc was entered as 2. If a turbine was clearly seen on image, the t_conf_loc was entered as 3. Turbines that have not yet been visually verified are labeled with 0 in t_conf_loc. (16) Turbine points that had existed previously but were since decommissioned and removed were flagged as decommissioned and later removed (see step 20). (17) Duplicate turbine points (largely resulting from AWEA geospatial merge) were identified and t_img_date, and t_img_srce were attributed for each turbine. (18) Non-turbine points that had been assigned FAA Obstacle Repository System (ORS) numbers or were digitized in the process such as communications towers, meteorological towers, water windmills, power transmission towers, etc., were removed. (19) Edited wind turbine files for each state were merged into one single shapefile, turbines identified as duplicates were matched, all fields were collapsed into a single turbine observation, and duplicate points were removed. (20) Turbines flagged as decommissioned were removed. (21) QA/QC was conducted for spatial accuracy and attribution by a peer or a supervisor other than the author that initially completed the work. As noted above, steps 4-21 are repeated on a quarterly basis, using the most recent USWTDB as the starting point. (22) Starting with version 2_3, an additional attribute of the eia_id 860 plant code was added to allow users to correlate to EIA 860 data. The plant codes were initially matched to AWEA base data when available and provided by AWEA. The incomplete values were matched manually based on project name, year, turbine make/model, state, county, etc.

SOURCE DATA

DESCRIPTION

Source information used in support of the development of the data set.

SOURCE MEDIUM NAME hardcopy

SOURCE CITATION

TITLE Obstruction Evaluation Airport Airspace Analysis

ALTERNATE TITLES FAA OE-AAA

PUBLICATION DATE 2019-10-19

FGDC GEOSPATIAL PRESENTATION FORMAT Other

RESPONSIBLE PARTY

ORGANIZATION'S NAME FAA

CONTACT'S ROLE originator

RESPONSIBLE PARTY

ORGANIZATION'S NAME FAA

CONTACT'S ROLE publisher

CONTACT INFORMATION

ADDRESS

DELIVERY POINT Obstruction Evaluation Group

RESOURCE LOCATION ONLINE
LOCATION https://oeaaa.faa.gov/oeaaa/external/public/publicAction.jsp?action=showCaseDownloadForm

EXTENT OF THE SOURCE DATA
DESCRIPTION
ground condition

TEMPORAL EXTENT
BEGINNING DATE 1998-02-05
ENDING DATE 2019-10-18

SOURCE DATA
DESCRIPTION
Source information used in support of the development of the data set. Data is only for internal AWEA member use.

SOURCE MEDIUM NAME hardcopy
SOURCE CITATION
TITLE WindIQ
ALTERNATE TITLES AWEA WindIQ
PUBLICATION DATE 2019-10-31

FGDC GEOSPATIAL PRESENTATION FORMAT Other

RESPONSIBLE PARTY
ORGANIZATION'S NAME AWEA
CONTACT'S ROLE publisher

CONTACT INFORMATION
ADDRESS
DELIVERY POINT Available to AWEA members only

RESPONSIBLE PARTY
ORGANIZATION'S NAME American Wind Energy Association
CONTACT'S ROLE originator

RESOURCE LOCATION ONLINE
LOCATION https://www.awea.org/windiq

EXTENT OF THE SOURCE DATA
DESCRIPTION
ground condition

TEMPORAL EXTENT
BEGINNING DATE 1981-01-01
ENDING DATE 2019-09-30

SOURCE DATA
DESCRIPTION
Source information used in support of the development of the data set.

SOURCE MEDIUM NAME hardcopy
SOURCE CITATION
TITLE Form EIA-860 - Schedule 3 - Wind Technology Data
ALTERNATE TITLES EIA-860
PUBLICATION DATE 2019-09-03

FGDC GEOSPATIAL PRESENTATION FORMAT Digital and/or Hardcopy Resources

RESPONSIBLE PARTY
ORGANIZATION'S NAME EIA
CONTACT'S ROLE originator

RESOURCE LOCATION ONLINE
LOCATION https://www.eia.gov/electricity/data/eia860/

EXTENT OF THE SOURCE DATA
DESCRIPTION
ground condition

TEMPORAL EXTENT
DATE AND TIME 2019-09-03

SOURCE DATA ►
DESCRIPTION
Source information used in support of the development of the data set. Data is only for internal use.

SOURCE MEDIUM NAME hardcopy
SOURCE CITATION
TITLE LBNL Wind Turbine Database
ALTERNATE TITLES LBNL WTDB
PUBLICATION DATE
INDETERMINATE DATE unknown

FGDC GEOSPATIAL PRESENTATION FORMAT Other

RESPONSIBLE PARTY
ORGANIZATION'S NAME LBNL
CONTACT'S ROLE publisher

CONTACT INFORMATION
ADDRESS
DELIVERY POINT NOT APPLICABLE - LBNL internal data

RESPONSIBLE PARTY
ORGANIZATION'S NAME Lawrence Berkeley National Laboratory
CONTACT'S ROLE originator

RESOURCE LOCATION ONLINE
LOCATION NOT APPLICABLE

EXTENT OF THE SOURCE DATA
DESCRIPTION
ground condition

TEMPORAL EXTENT
BEGINNING DATE 1986-01-01
ENDING DATE 2016-12-31

SOURCE DATA
DESCRIPTION
Source information used in support of the development of the data set.

SOURCE MEDIUM NAME hardcopy
SOURCE CITATION
TITLE Digital Obstacle File
ALTERNATE TITLES FAA DOF
PUBLICATION DATE 2019-11-05

FGDC GEOSPATIAL PRESENTATION FORMAT Other

RESPONSIBLE PARTY
ORGANIZATION'S NAME FAA
CONTACT'S ROLE publisher

CONTACT INFORMATION
ADDRESS
DELIVERY POINT Aeronautical Information Services

RESPONSIBLE PARTY
ORGANIZATION'S NAME FAA
CONTACT'S ROLE originator

RESOURCE LOCATION ONLINE
LOCATION https://www.faa.gov/air_traffic/flight_info/aeronav/digital_products/dof/

EXTENT OF THE SOURCE DATA
DESCRIPTION
ground condition

TEMPORAL EXTENT
BEGINNING DATE 2019-09-09
ENDING DATE 2019-11-03

SOURCE DATA
DESCRIPTION
Source information used in support of the development of the data set.

SOURCE MEDIUM NAME hardcopy
SOURCE CITATION
TITLE Onshore Industrial Wind Turbine Locations for the United States to March 2014
ALTERNATE TITLES USGS 2014 Wind Turbine Locations
PUBLICATION DATE 2015-05-01

FGDC GEOSPATIAL PRESENTATION FORMAT Vector Digital Data Set

RESPONSIBLE PARTY
ORGANIZATION'S NAME U.S. Geological Survey
CONTACT'S ROLE originator

RESPONSIBLE PARTY
ORGANIZATION'S NAME U.S. Geological Survey
CONTACT'S ROLE publisher

CONTACT INFORMATION
ADDRESS
DELIVERY POINT U.S. Geological Survey - ScienceBase

RESOURCE LOCATION ONLINE
LOCATION https://doi.org/10.5066/F7251G8Q

EXTENT OF THE SOURCE DATA
DESCRIPTION
ground condition

TEMPORAL EXTENT
BEGINNING DATE 1981-01-01
ENDING DATE 2014-03-02

Distribution

DISTRIBUTOR
CONTACT INFORMATION
ORGANIZATION'S NAME U.S. Geological Survey - ScienceBase
CONTACT'S ROLE distributor

CONTACT INFORMATION
PHONE
VOICE 1-888-275-8747
ADDRESS
TYPE postal
DELIVERY POINT Denver Federal Center, Building 810, Mail Stop 302
CITY Denver
ADMINISTRATIVE AREA CO
POSTAL CODE 80225

COUNTRY US
E-MAIL ADDRESS sciencebase@usgs.gov

AVAILABLE FORMAT
NAME Digital Data

ORDERING PROCESS
TERMS AND FEES none

TRANSFER OPTIONS
ONLINE SOURCE
LOCATION https://doi.org/10.5066/F7TX3DN0

ONLINE SOURCE
LOCATION https://eerscmap.usgs.gov/uswtdb/

DISTRIBUTION FORMAT
* NAME File Geodatabase Feature Class

TRANSFER OPTIONS
ONLINE SOURCE
LOCATION https://eerscmap.usgs.gov/uswtdb/

ONLINE SOURCE
LOCATION https://doi.org/10.5066/F7TX3DN0

Fields

DETAILS FOR OBJECT windmill_windmotor_site_windfarm_usgs_v5
* TYPE Feature Class
* ROW COUNT 63003
DEFINITION
Table containing attribute information associated with the data set.

DEFINITION SOURCE
Producer defined

FIELD OBJECTID
* ALIAS OBJECTID
* DATA TYPE OID
* WIDTH 4
* PRECISION 0
* SCALE 0
* FIELD DESCRIPTION
Internal feature number.

* DESCRIPTION SOURCE
Esri

* DESCRIPTION OF VALUES
Sequential unique whole numbers that are automatically generated.

FIELD Shape
* ALIAS Shape
* DATA TYPE Geometry

* WIDTH 0
* PRECISION 0
* SCALE 0
* FIELD DESCRIPTION
Feature geometry.

* DESCRIPTION SOURCE
Esri

* DESCRIPTION OF VALUES

Coordinates defining the features.

FIELD eia_id
* ALIAS eia_id
* DATA TYPE Double
* WIDTH 8
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION
EIA identification for cross-reference to the EIA-860 data

DESCRIPTION SOURCE
https://www.eia.gov/electricity/data/eia860/

DESCRIPTION OF VALUES
number from EIA-860 data - plant code in the wind technologyy data spreadsheet, -9999 values in the shapefile and blank values in the csv were not part of the referenced dataset,

FIELD t_img_date
* ALIAS t_img_date
* DATA TYPE Date
* WIDTH 8
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION
date of image used to visually verify turbine location (note if NAIP is the image source the month and day were set to 01/01)

DESCRIPTION SOURCE
Producer defined

RANGE OF VALUES
MINIMUM VALUE 0
MAXIMUM VALUE 0
UNITS OF MEASURE date

FIELD t_rsa
* ALIAS t_rsa
* DATA TYPE Double
* WIDTH 8
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION
turbine rotor swept area square meters (m^2); -9999 values in the shapefile and blank values in the csv are unknown, calculated as 3.14159 (([rotor_dia] /2)*([rotor_dia] /2)

DESCRIPTION SOURCE
Producer defined

RANGE OF VALUES
MINIMUM VALUE 95.03
MAXIMUM VALUE 17671.46
UNITS OF MEASURE square meter

FIELD t_rd
* ALIAS t_rd
* DATA TYPE Double
* WIDTH 8
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION
turbine rotor diameter in meters (m); -9999 values in the shapefile and blank values in the csv are unknown

DESCRIPTION SOURCE
Producer defined

Range of values
Minimum value 11
Maximum value 150
Units of measure meter

Field t_cap
* Alias t_cap
* Data type Double
* Width 8
* Precision 0
* Scale 0
Field description
Turbine rated capacity in kilowatt (kW). The manufacturer's stated output power at rated wind speed. Data from AWEA, manufacturer data, and/or other internet resources; -9999 values in the shapefile and blank values in the csv are unknown

Description source
Producer defined

Range of values
Minimum value 50
Maximum value 6000
Units of measure kilowatt

Field t_model
* Alias t_model
* Data type String
* Width 254
* Precision 0
* Scale 0
Field description
turbine model - manufacturer's model name of each turbine

Description source
Producer defined

Description of values
E.g., 1.5SLE, V100_1.8, Z50, etc.; "missing" values in the shapfile and blank values in the csv are unknown

Field t_manu
* Alias t_manu
* Data type String
* Width 254
* Precision 0
* Scale 0
Field description
turbine manufacturer - name of the original equipment manufacturer of the turbine

Description source
Producer defined

Description of values
E.g., Vestas, Siemens, Suzlon, etc.; "missing" values in the shapfile and blank values in the csv are unknown

Field p_cap
* Alias p_cap
* Data type Double
* Width 8
* Precision 0
* Scale 0
Field description
cumulative capacity of all turbines in the wind power project, in megawatts (MW); -9999 values in the shapefile and blank values in the csv are unknown

DESCRIPTION SOURCE
Producer defined

RANGE OF VALUES
MINIMUM VALUE 0.05
MAXIMUM VALUE 495.01
UNITS OF MEASURE Megawatts

FIELD xlong
* ALIAS xlong
* DATA TYPE Double
* WIDTH 8
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION
current longitude of the turbine point, in decimal degrees calculated in Arc Map using GCS: North American 1983 (NAD 83)

DESCRIPTION SOURCE
Producer defined

RANGE OF VALUES
MINIMUM VALUE -171.713074
MAXIMUM VALUE 144.722656
UNITS OF MEASURE decimal degrees

FIELD t_conf_loc
* ALIAS t_conf_loc
* DATA TYPE Double
* WIDTH 8
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION
Level of confidence in turbine location, from low to high

DESCRIPTION SOURCE
Producer defined

LIST OF VALUES
VALUE 2
DESCRIPTION partial confidence: image shows developed pad with base and/or turbine parts on ground
ENUMERATED DOMAIN VALUE DEFINITION SOURCE Producer defined

VALUE 1
DESCRIPTION no confidence: nothing on image, image has clouds, never built, previously removed, needs newer imagery
ENUMERATED DOMAIN VALUE DEFINITION SOURCE Producer defined

VALUE 3
DESCRIPTION full confidence: image shows an installed turbine or tower being constructed, the tower is least partially present with neighboring turbine constructed
ENUMERATED DOMAIN VALUE DEFINITION SOURCE Producer defined

FIELD t_ttlh
* ALIAS t_ttlh
* DATA TYPE Double
* WIDTH 8
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION
turbine total height - height of entire wind turbine from ground to tip of a vertically extended blade above the tower. Computed as the hub height plus half of the rotor diameter, in

meters, when t_hh and t_rd are non-missing. Otherwise, the total height as provided by the FAA DOF or FAA OE/AAA is used, which can be considered a maximum height; -9999 values in the shapefile and blank values in the csv are unknown

DESCRIPTION SOURCE
Producer defined

RANGE OF VALUES
MINIMUM VALUE 26.7
MAXIMUM VALUE 198.1
UNITS OF MEASURE meter

FIELD faa_ors
* ALIAS faa_ors
* DATA TYPE String
* WIDTH 254
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION
faa unique identifier for each turbine for cross-reference to the faa digital obstacle files (faa dof)

DESCRIPTION SOURCE
FAA, https://www.faa.gov/air_traffic/flight_info/aeronav/digital_products/dof/

DESCRIPTION OF VALUES
identifier with the first two digits indicating a state, then a dash, with a sequential number following; "missing" values in the shapefile and blank values in the csv are ones with no known DOF identifier

FIELD case_id
* ALIAS case_id
* DATA TYPE Double
* WIDTH 8
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION
unique stable identification number

DESCRIPTION SOURCE
Producer defined

RANGE OF VALUES
MINIMUM VALUE 3000001
MAXIMUM VALUE 3096960
UNITS OF MEASURE 1

FIELD p_year
* ALIAS p_year
* DATA TYPE Double
* WIDTH 8
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION
Year the wind power project became operational and began providing power. In some cases, the year is estimated based on the year the turbine was erected, which will precede when it became operational, and sometimes fall in the preceding year; -9999 values in the shapefile and blank values in the csv are unknown

DESCRIPTION SOURCE
Producer defined

RANGE OF VALUES
MINIMUM VALUE 1981
MAXIMUM VALUE 2019

UNITS OF MEASURE Year

FIELD t_fips
* ALIAS t_fips
* DATA TYPE String
* WIDTH 254
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION
state and county fips where turbine is located, based on spatial join of turbine points with US state and county shapefile

DESCRIPTION SOURCE
U.S. Census

CODED VALUES
NAME OF CODELIST FIPS Code (5-Digit State &; County ID)
SOURCE US Census / US Postal Service (http://www.census.gov/tiger/tms/gazetteer/zips.txt)

FIELD t_county
* ALIAS t_county
* DATA TYPE String
* WIDTH 254
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION
county or county equivalent where turbine is located

DESCRIPTION SOURCE
U.S Census https://www.census.gov/geo/maps-data/data/cbf/cbf_counties.html

DESCRIPTION OF VALUES
County or county equivalent, based on spatial join of turbine points with US state and county shapefile

FIELD t_state ►
* ALIAS t_state
* DATA TYPE String
* WIDTH 254
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION
state where turbine is located

DESCRIPTION SOURCE
U.S Census https://www.census.gov/geo/maps-data/data/cbf/cbf_state.html

CODED VALUES
NAME OF CODELIST US Postal 2-Letter State
SOURCE US Census / US Postal Service (http://www.census.gov/tiger/tms/gazetteer/zips.txt)

FIELD p_name
* ALIAS p_name
* DATA TYPE String
* WIDTH 254
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION
name of the wind power project that the turbine is a part of

DESCRIPTION SOURCE
Producer defined

DESCRIPTION OF VALUES

Project names are typically provided to AWEA by the developer; some names are identified from other internet resources, and others are created by the authors to differentiate them from previous projects. If no project name can be identified via these methods, authors assigned one based on the county where the turbines are located.

FIELD p_tnum

* ALIAS p_tnum
* DATA TYPE Double
* WIDTH 8
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION

number of turbines in the wind power project

DESCRIPTION SOURCE

Producer defined

RANGE OF VALUES

MINIMUM VALUE 1
MAXIMUM VALUE 796
UNITS OF MEASURE Count

FIELD usgs_pr_id

* ALIAS usgs_pr_id
* DATA TYPE Double
* WIDTH 8
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION

unique, stable object number for cross-reference to a prior dataset

DESCRIPTION SOURCE

USGS https://doi.org/10.5066/F7251G8Q

DESCRIPTION OF VALUES

unique, stable object number for cross-reference to the USGS Onshore Industrial Wind Turbine Locations for the United States 2013 and 2014 products; -9999 values in the shapefile and blank values in the csv were not part of the referenced dataset

FIELD t_img_srce

* ALIAS t_img_srce
* DATA TYPE String
* WIDTH 254
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION

source of image used to visually verify turbine location

DESCRIPTION SOURCE

Producer defined

LIST OF VALUES

VALUE Bing Maps Aerial
DESCRIPTION ESRI ArcMap Base maps, available from ESRI ArcMap
ENUMERATED DOMAIN VALUE DEFINITION SOURCE Producer defined

VALUE NAIP
DESCRIPTION National Agriculture Imagery Program County Mosaics from https://datagateway.nrcs.usda.gov/
ENUMERATED DOMAIN VALUE DEFINITION SOURCE Producer defined

VALUE Google Earth
DESCRIPTION Google Earth
ENUMERATED DOMAIN VALUE DEFINITION SOURCE Producer defined

VALUE Digital Globe

DESCRIPTION Digital Globe EV WebHosting Imagery from https://www.digitalglobe.com/products/enhancedview-web-hosting-services
ENUMERATED DOMAIN VALUE DEFINITION SOURCE Producer defined

FIELD faa_asn
* ALIAS faa_asn
* DATA TYPE String
* WIDTH 254
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION
faa obstruction evaluation airport airspace analysis (oe-aaa) aeronautical study number (asn)

DESCRIPTION SOURCE
FAA, https://oeaaa.faa.gov/oeaaa/external/public/publicAction.jsp

DESCRIPTION OF VALUES
year-region-number-case type (faa regional boundaries id across the country such as: AAL, ACE, AEA, AGL, ANE, ANM, ASO, ASW, AWP, WTE and WTW) (case types: Nonrule Making Airport. (NRA), Nonrule (NR), or an Obstruction Evaluation (OE) study; "missing" values in the shapefile and blank values in the csv are those with no known asn value

FIELD t_conf_atr
* ALIAS t_conf_atr
* DATA TYPE Double
* WIDTH 8
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION
Level of confidence in the turbine's attributes, from low to high

DESCRIPTION SOURCE
Producer defined

LIST OF VALUES
VALUE 2
DESCRIPTION partial confidence: incomplete information or discrepancies across data sources or other issues found
ENUMERATED DOMAIN VALUE DEFINITION SOURCE Producer defined

VALUE 1
DESCRIPTION no confidence: no information found
ENUMERATED DOMAIN VALUE DEFINITION SOURCE Producer defined

VALUE 3
DESCRIPTION full confidence: consistent information across multiple data sources
ENUMERATED DOMAIN VALUE DEFINITION SOURCE Producer defined

FIELD ylat
* ALIAS ylat
* DATA TYPE Double
* WIDTH 8
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION
current latitude of the turbine point, in decimal degrees calculated in Arc Map using GCS: North American 1983 (NAD 83)

DESCRIPTION SOURCE
Producer defined

RANGE OF VALUES
MINIMUM VALUE 13.389381
MAXIMUM VALUE 66.839905

Units of measure decimal degrees

Field t_hh
* Alias t_hh
* Data type Double
* Width 8
* Precision 0
* Scale 0
Field description
turbine hub height in meters (m). Data from AWEA, manufacturer data, and/or other internet resources; -9999 values in the shapefile and blank values in the csv are unknown

Description source
Producer defined

Range of values
Minimum value 18.2
Maximum value 130
Units of measure meter

Overview Description
Entity and Attribute Overview
EntityandAttribute_DataDictionary.csv

Entity and Attribute Detail Citation
The entity and attribute information was generated by the individual and/or agency identified as the originator of the data set. Please review the rest of the metadata record for additional details and information.

Metadata Details ►

Metadata language English (UNITED STATES)
Metadata character set utf8 - 8 bit UCS Transfer Format
Scope of the data described by the metadata dataset
Scope name * dataset
* Last update 2020-03-25
ArcGIS metadata properties
Metadata format ArcGIS 1.0
Metadata style FGDC CSDGM Metadata
Standard or profile used to edit metadata FGDC

Created in ArcGIS for the item 2020-03-25
Last modified in ArcGIS for the item 2020-03-25

Automatic updates
Have been performed Yes
Last update 2020-03-25

Metadata Contacts ►

Metadata contact
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Organization's name U.S. Geological Survey, Southwest Region
Contact's position Research Ecologist
Contact's role point of contact

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