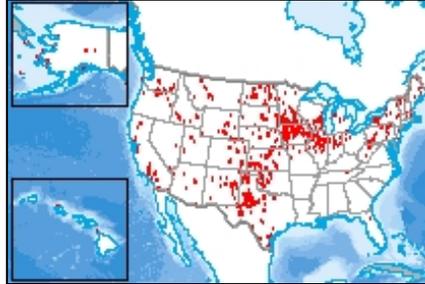


WindFarm - USGS Energy Resources Program



Tags

utilities, Communications, structure, turbine, wind, shapefile, dataset, data set, wind farm, windfarm, wind facility, wind turbine, geospatial datasets, energy, GIS, renewable

Summary

The purpose of this information is to provide a publicly available spatially-referenced, national dataset of onshore industrial wind turbine locations and their technical specifications.

Description

This data set provides industrial-scale onshore wind turbine locations, corresponding facility information, and turbine technical specifications, in the United States to March 2014. The database has nearly 49,000 wind turbine records that have been collected, digitized, locationally verified, and internally quality assured and quality controlled. Turbines from the Federal Aviation Administration Digital Obstacle File, product date March 2, 2014, were used as the primary source of turbine data points. Verification of the position of turbines was done by visual interpretation using high-resolution aerial imagery in ESRI ArcGIS Desktop.

Turbines without Federal Aviation Administration Obstacle Repository System (FAA ORS) numbers were visually identified and supplemental points were added to the collection. A locational error of plus or minus 10 meters for turbine positions was estimated. Wind farm facility names were identified from publicly available facility data sets. Facility names were then used in a web search of additional industry publications and press releases to attribute additional turbine information (such as manufacturer, model, and technical specifications of wind turbines). Wind farm facility location data from various wind and energy industry sources were used to search for and digitize turbines not in existing databases. Technical specifications assigned to were based on the make and model as described in literature, in the Federal Aviation Administration Digital Obstacle File, and information from the turbine manufacturers' websites. Some facility and turbine information did not exist or was difficult to obtain. Thus, uncertainty may be present. That uncertainty was rated and a confidence was recorded for both location and attribution data quality.

Credits

Federal Aviation Administration (FAA) Digital Obstacle File, http://tod.faa.gov/tod/public/TOD_DOE.html; wind turbines from FAA product that reflects changes from January 6, 2014, to March 2, 2014, were used as a base digital file

Use limitations

none

Extent

West -171.713077 **East** -67.807000

North 66.839901 **South** 18.964696

Scale Range

Maximum (zoomed in) 1:5,000

Minimum (zoomed out) 1:150,000,000

ArcGIS Metadata

Topics and Keywords

- * CONTENT TYPE Downloadable Data

Citation

TITLE WindFarm - USGS Energy Resources Program
PRESENTATION FORMATS * digital map

Resource Details

DATASET LANGUAGES * English (UNITED STATES)
SPATIAL REPRESENTATION TYPE * vector
* PROCESSING ENVIRONMENT Microsoft Windows 7 Version 6.1 (Build 7601) Service Pack 1; Esri
ArcGIS 10.3.0.4322
CREDITS

Federal Aviation Administration (FAA) Digital Obstacle File,
http://tod.faa.gov/tod/public/TOD_DOF.html; wind turbines from FAA product that reflects
changes from January 6, 2014, to March 2, 2014, were used as a base digital file

ARCGIS ITEM PROPERTIES

- *NAME windmill_windmotor_site_windfarm_usgs_v2

Extents

EXTENT

GEOGRAPHIC EXTENT

BOUNDING

RECTANGLE

EXTENT TYPE Extent used for searching

- *WEST LONGITUDE -171.713077

- * EAST LONGITUDE -
67.807000

- *NORTH LATITUDE
66.839901

- *SOUTH LATITUDE
18.964696

- *EXTENT CONTAINS THE RESOURCE Yes

EXTENT IN THE ITEM'S COORDINATE SYSTEM

- * WEST LONGITUDE -
19115012.326520

- * EAST LONGITUDE -
7548240.740789

- * SOUTH LATITUDE
2150779.939581

- * NORTH LATITUDE
10110595.841106

- * EXTENT CONTAINS
THE RESOURCE Yes

Resource Constraints

CONSTRAI

NTS

LIMITATI

ONS OF

USE

none

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 -22041545.367140558
Y ORIGIN -33272760.666300893
XY SCALE 135368852.55357128
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 8.2.6

Spatial Data Properties

VECTOR

- *LEVEL OF TOPOLOGY FOR THIS DATASET geometry only
- #### GEOMETRIC OBJECTS
- FEATURE CLASS NAME windmill_windmotor_site_windfarm_usgs_v2
 - *OBJECT TYPE point
 - *OBJECT COUNT 48976

ARCGIS FEATURE CLASS PROPERTIES

- FEATURE CLASS NAME windmill_windmotor_site_windfarm_usgs_v2
- *FEATURE TYPE Simple
- *GEOMETRY TYPE Point
- *HAS TOPOLOGY FALSE
- *FEATURE COUNT 48976
- *SPATIAL INDEX TRUE
- *LINEAR REFERENCING FALSE

Distribution

DISTRIBUTION FORMAT

- * NAME File Geodatabase Feature Class

Fields

DETAILS FOR OBJECT windmill_windmotor_site_windfarm_usgs_v2 ►

- *TYPE Feature Class
- *ROW COUNT 48976

DEFINITION

Onshore Industrial Wind Turbine Locations for the United States to March 2014

DEFINITION SOURCE

Producer-Defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section

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
data type of geometry, automatically generated by Arc Map
- DESCRIPTION SOURCE
ESRI
- DESCRIPTION OF VALUES
data type of geometry
- FIELD

unique_id

- *ALIAS unique_id
- *DATA TYPE Double
- *WIDTH 8
- *PRECISION 0
- *SCALE 0
- FIELD DESCRIPTION
unique, stable object number for cross-reference
- DESCRIPTION SOURCE
USGS
- DESCRIPTION OF VALUES
object unique identification number
- FIELD

site_name

- *ALIAS site_name
- *DATA TYPE String
- *WIDTH 254
- *PRECISION 0
- *SCALE 0
- FIELD DESCRIPTION
name of wind energy generation facility
- DESCRIPTION SOURCE
Producer-Defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section
- DESCRIPTION OF VALUES
name of wind energy generation facility, USGS derived the name based on common usage in EIA and WENDI facilities dataset, as well as other publications available in a web search
- DESCRIPTION OF VALUES
unknown, unknown County #, or unknown General Area name, indicates that the author was unable to determine a facility name from any of the above sources, or where individual facilities overlapped and it was not possible to attribute individual turbines to distinct facilities
- FIELD

total_turb

- *ALIAS total_turb
- *DATA TYPE Double
- *WIDTH 8
- *PRECISION 0

*SCALE 0

FIELD DESCRIPTION

total number of turbine points within the data set with the same unique site_name;
number of turbines in a facility (decommissioned turbines were split out)

DESCRIPTION SOURCE

range is 1 from the least amount of turbines to 3084 which is the largest number of turbines in a facility. Some of the larger numbers may include more than one facility and are actually in an area that was named "unknown" due to a difficulty in discerning distinct facilities.

RANGE OF VALUES

MINIMUM VALUE 1

MAXIMUM VALUE 3084

FIELD on_year

*ALIAS on_year

*DATA TYPE String

*WIDTH 254

*PRECISION 0

*SCALE 0

FIELD DESCRIPTION

online year

DESCRIPTION SOURCE

Producer-Defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section

DESCRIPTION OF VALUES

year that the facility began generating, based on information from press releases and facilities shapefiles; multiple years indicate the project spanned multiple years, contained multiple phases of development, or became online within that time-frame; formatted as (year1)_(year2)_(year3)

DESCRIPTION OF VALUES

unknown value indicates the author was unable to determine the year

FIELD year_range

*ALIAS year_range

*DATA TYPE String

*WIDTH 254

*PRECISION 0

*SCALE 0

FIELD DESCRIPTION

Whether the on_year is a range

DESCRIPTION SOURCE

Producer-Defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section

LIST OF VALUES

VALUE no

DESCRIPTION online year does not span multiple years (is not a range) and the facility became online within a single year

ENUMERATED DOMAIN VALUE DEFINITION SOURCE Producer-Defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section

VALUE yes

DESCRIPTION online year spans multiple years, project spanned multiple years, contained multiple phases of development, or the distinct year is unknown and the facility became online within the timeframe

ENUMERATED DOMAIN VALUE DEFINITION SOURCE Producer-Defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section

VALUE unknown

DESCRIPTION value indicates the author was unable to determine the year

ENUMERATED DOMAIN VALUE DEFINITION SOURCE Producer-Defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section

FIELD

on_year_s

*ALIAS on_year_s

*DATA TYPE Double

*WIDTH 8

*PRECISION 0

*SCALE 0

FIELD DESCRIPTION

online year single

DESCRIPTION SOURCE

Producer-Defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section

DESCRIPTION OF VALUES

earliest possible year the facility began generating, based on information from press releases and facilities shapefiles; the lower year of on_year when it is a range

DESCRIPTION OF VALUES

-99999 value indicates the author was unable to determine the year

FIELD

total_cpcy

- *ALIAS total_cpcy
- *DATA TYPE Double
- *WIDTH 8
- *PRECISION 0
- *SCALE 0

FIELD DESCRIPTION

sum of MW_turbine with the same unique site_name (decommissioned turbines were split out)

DESCRIPTION SOURCE

-99999 value indicates no information found, no facility site determination. The range is producer-defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section

RANGE OF VALUES

MINIMUM VALUE 0.002

MAXIMUM VALUE 662.5

UNITS OF MEASURE megawatts

FIELD MW_turbine

- *ALIAS MW_turbine
- *DATA TYPE Double
- *WIDTH 8
- *PRECISION 0
- *SCALE 0

FIELD DESCRIPTION

power generation capacity of each individual turbine in Megawatts based on industry turbine technical model specifications or other sources (press releases or permitting agencies)

DESCRIPTION SOURCE

-99999 value indicates no information found, no facility site determination. The range is producer-defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section

RANGE OF VALUES

MINIMUM VALUE 0.002

MAXIMUM VALUE 3.6

UNITS OF MEASURE megawatts

FIELD decommiss

- *ALIAS decommiss
- *DATA TYPE String
- *WIDTH 254
- *PRECISION 0
- *SCALE 0

FIELD DESCRIPTION

whether or not the turbine decommissioned

DESCRIPTION SOURCE

Producer-Defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section

LIST OF VALUES

VALUE no

DESCRIPTION turbine is not known to be decommissioned, is visible in the aerial imagery, and publications confirm the same

ENUMERATED DOMAIN VALUE DEFINITION SOURCE Producer-Defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section

VALUE yes

DESCRIPTION includes both image verified removed turbines and ones no longer in service

based on publications

ENUMERATED DOMAIN VALUE DEFINITION SOURCE Producer-Defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section

FIELD **type_tower**

- *ALIAS **type_tower**
- *DATA TYPE String
- *WIDTH 254
- *PRECISION 0
- *SCALE 0

FIELD DESCRIPTION

tower feature as visually verified; structural characteristics of the tower

DESCRIPTION SOURCE

Producer-Defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section

LIST OF VALUES

VALUE monopole

DESCRIPTION monopole tower, single tubular column structure with nacelle and blades

ENUMERATED DOMAIN VALUE DEFINITION SOURCE Producer-Defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section

VALUE trestle

DESCRIPTION trestle tower, lattice type tower structure with nacelle and blades

ENUMERATED DOMAIN VALUE DEFINITION SOURCE Producer-Defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section

VALUE pad only

DESCRIPTION pad only, no tower present, probable new installation turbine pads

ENUMERATED DOMAIN VALUE DEFINITION SOURCE Producer-Defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section

VALUE small monopole

DESCRIPTION small monopole turbine, as visually identified in imagery by turbine spacing/structure, FAA _AGL or total_ht than 100 feet or 30.5 meters

ENUMERATED DOMAIN VALUE DEFINITION SOURCE Producer-Defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section

VALUE small trestle

DESCRIPTION small trestle turbine, as visually identified in imagery by turbine spacing/structure, FAA _AGL or total_ht less than 100 feet or 30.5 meters

ENUMERATED DOMAIN VALUE DEFINITION SOURCE Producer-Defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section

VALUE small generator

DESCRIPTION building mounted small wind energy generators - generally at an airport or business

ENUMERATED DOMAIN VALUE DEFINITION SOURCE Producer-Defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section

VALUE unknown

DESCRIPTION unidentified, unseen on imagery, or unknown turbine specifications

ENUMERATED DOMAIN VALUE DEFINITION SOURCE Producer-Defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section

FIELD **model**

- *ALIAS **model**
- *DATA TYPE String
- *WIDTH 254
- *PRECISION 0
- *SCALE 0

FIELD DESCRIPTION

manufacturer's model name of each turbine, for example 1.5SLE, V100_1.8, Z50, etc., as collected from publications, may vary based on source

DESCRIPTION SOURCE

Producer-Defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section

LIST OF VALUES

VALUE name of the model

DESCRIPTION

86,1.0SLE,1.5_74,1.5_77,1.5_82,1.5S,1.5SE,1.5SL,1.5SLE,1.5XLE,1.6_100,1.6_82.5,1.68_82.5,1.6XLE,1.7_100,1.85_87,2.3_100,2.5_120,2.5MW,23_160,250_

-

2,MS2,MWT100_2.4,MWT1000,MWT1000A,MWT102_2.4,MWT600,MWT92_2.4,MWT95_2.4,N100,N1000_54,N1000_59,N117,N43,N54,N60,N90,NM44_750,NM48

ENUMERATED DOMAIN VALUE DEFINITION SOURCE Producer-Defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section

VALUE unknown

DESCRIPTION no information found, no facility site determination

ENUMERATED DOMAIN VALUE DEFINITION SOURCE Producer-Defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section

FIELD **manufac**

- ***ALIAS** manufac
- ***DATA TYPE** String
- ***WIDTH** 254
- ***PRECISION** 0
- ***SCALE** 0

FIELD DESCRIPTION

name of the turbine manufacturer for each turbine point

DESCRIPTION SOURCE

Producer-Defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section

LIST OF VALUES

VALUE name of the manufacturer

DESCRIPTION AAER,Acciona,Aeronautica,Alstrom,Atlantic Orient,AWE,Bergey Energy,BHD,Boeing,Bonus,Bora,China Creative Wind,Clipper,Danwin,DeWind,ECO,Elecon,Emergya Wind Technologies,Endurance,Enertech,Enron,Entegrity,Evance,EWT,Flowind,Fuhrlander,Gamesa,GE,Gol dwind,Guodain United Power,Harbec,Howden,Hyundai Heavy Industries,HZ Windpower,Kenersys,Kenetech,Leitwind,Mitsubishi,NEG Micon,Nordex,Nordic,Nordtank,Northern Power Systems,Polenko,PowerWind,REpower,Samsung,Sany,Seaforth Energy,Siemens,Silver Eagle,Sinovel,Siva,Skystream,Suzlon,Tacke,Turbowind,UMPI,Unison,unknown,Vensys,Vestas,W.E. G.,Westinghouse,Wind Energy Solutions,Wind World,Windmaster,Windmatic,Windspire Energy,Xzeres,Zond

ENUMERATED DOMAIN VALUE DEFINITION SOURCE Producer-Defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section

VALUE unknown

DESCRIPTION no information found, no facility site determination

ENUMERATED DOMAIN VALUE DEFINITION SOURCE Producer-Defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section

FIELD **total_ht**

- ***ALIAS** total_ht
- ***DATA TYPE** Double
- ***WIDTH** 8
- ***PRECISION** 0
- ***SCALE** 0

FIELD DESCRIPTION

height of entire wind turbine from ground to tip of a vertically extended blade above the tower, including hub (if available), based on industry technical specifications, in meters

DESCRIPTION SOURCE

-99999 value indicates no information found, no facility site determination. The range is producer-defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section

RANGE OF VALUES

MINIMUM VALUE 12

MAXIMUM VALUE 178

UNITS OF MEASURE meters

FIELD **tower_h**

- ***ALIAS** tower_h
- ***DATA TYPE** Double
- ***WIDTH** 8
- ***PRECISION** 0
- ***SCALE** 0

FIELD DESCRIPTION

height of the tower only, based on industry technical specifications of the turbine model

DESCRIPTION SOURCE

-99999 value indicates no information found, no facility site determination. The range is producer-defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section

RANGE OF VALUES

MINIMUM VALUE 18

MAXIMUM VALUE 120

UNITS OF MEASURE meters

FIELD blade_l

*ALIAS blade_l

*DATA TYPE Double

*WIDTH 8

*PRECISION 0

*SCALE 0

FIELD DESCRIPTION

length of the blade from industry specifications when provided or one half of the diameter when not provided

DESCRIPTION SOURCE

-99999 value indicates no information found, no facility site determination. The range is producer-defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section

RANGE OF VALUES

MINIMUM VALUE 1.8

MAXIMUM VALUE 58.7

UNITS OF MEASURE meters

FIELD rotor_dia

*ALIAS rotor_dia

*DATA TYPE Double

*WIDTH 8

*PRECISION 0

*SCALE 0

FIELD DESCRIPTION

rotor diameter, based on industry technical specifications of the turbine model

DESCRIPTION SOURCE

-99999 value indicates no information found, no facility site determination. The range is producer-defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section

RANGE OF VALUES

MINIMUM VALUE 3.7

MAXIMUM VALUE 120

FIELD

rotor_s_a

*ALIAS rotor_s_a

*DATA TYPE Double

*WIDTH 8

*PRECISION 0

*SCALE 0

FIELD DESCRIPTION

rotor swept area in square meters: $\text{Pi} * r^2$, calculated as $3.14159 * (([\text{rotor_dia}] / 2) * ([\text{rotor_dia}] / 2))$

DESCRIPTION SOURCE

-99999 value indicates no information found, no facility site determination. The range is producer-defined, by the USGS.

RANGE OF VALUES

MINIMUM VALUE 10.87

MAXIMUM VALUE 11309.71

UNITS OF MEASURE square meters

FIELD lat_DD

*ALIAS lat_DD

*DATA TYPE Double

*WIDTH 8

*PRECISION 0

*SCALE 0

FIELD DESCRIPTION

the current latitude of the turbine point, in decimal degrees calculated in Arc Map

DESCRIPTION SOURCE

USGS

RANGE OF VALUES

MINIMUM VALUE 18.964696

MAXIMUM VALUE 66.839901

UNITS OF MEASURE decimal degrees

FIELD long_DD

*ALIAS long_DD

*DATA TYPE Double

*WIDTH 8

*PRECISION 0

*SCALE 0

FIELD DESCRIPTION

the current longitude of the turbine point, in decimal degrees calculated in Arc Map

DESCRIPTION SOURCE

USGS

RANGE OF VALUES

MINIMUM VALUE -171.713077

MAXIMUM VALUE -67.807

UNITS OF MEASURE decimal degrees

FIELD state

*ALIAS state

*DATA TYPE String

*WIDTH 254

*PRECISION 0

*SCALE 0

FIELD DESCRIPTION

state in which the turbine is located, 2 letter standard state postal abbreviation

DESCRIPTION SOURCE

Producer-Defined by the USGS using the National Atlas shapefile

CODED VALUES

NAME OF CODELIST FIPS US state codes / US postal codes (this field uses the standard postal codes, which is a two-letter abbreviation for the state or province)

SOURCE <http://www.itl.nist.gov/fipspubs/fip5-2.htm>

FIELD county

*ALIAS county

*DATA TYPE String

*WIDTH 254

*PRECISION 0

*SCALE 0

FIELD DESCRIPTION

county where the turbine is located, no abbreviations

DESCRIPTION SOURCE

Producer-Defined by the USGS using the National Atlas County shapefile

CODED VALUES

NAME OF CODELIST county name from the National Atlas

SOURCE Producer-Defined by the USGS using the National Atlas State shapefile

FIELD conf_attr

*ALIAS conf_attr

*DATA TYPE Double

*WIDTH 8

*PRECISION 0

*SCALE 0

FIELD DESCRIPTION

confidence in turbine attributes; facility names (site_name) were used in a web search of industry publications and press releases to identify manufacturer, model, and technical specifications of turbines for attributing. Please note that turbine information was not field verified.

DESCRIPTION SOURCE

USGS

LIST OF VALUES

VALUE 0 = no confidence

DESCRIPTION no facility data, no name, nothing in publications

ENUMERATED DOMAIN VALUE DEFINITION SOURCE USGS

VALUE 1 = partial confidence

DESCRIPTION incomplete information or discrepancies across data sources or other discrepancies found, usually explained in comments field

ENUMERATED DOMAIN VALUE DEFINITION SOURCE USGS

VALUE 2 = full confidence

DESCRIPTION consistent information across multiple data sources (note: nothing field verified)

ENUMERATED DOMAIN VALUE DEFINITION SOURCE USGS

FIELD conf_loc

- *ALIAS conf_loc
- *DATA TYPE Double
- *WIDTH 8
- *PRECISION 0
- *SCALE 0

FIELD DESCRIPTION

confidence in turbine location; turbine points from FAA were visually verified using aerial imagery. In some cases, the imagery was taken prior to final

turbine installation, so the analyst only saw the turbine pad or tower. In other cases, imagery was not yet available for new facilities and we used the FAA turbine locations with no visual validation. Please note, the location of the turbine was not field verified.

DESCRIPTION SOURCE

USGS

LIST OF VALUES

VALUE 0 = no confidence

DESCRIPTION nothing on image, never built, previously removed, or tower location needs newer imagery; for example, turbine built in 2013 but latest available imagery is 2011 or image has clouds

ENUMERATED DOMAIN VALUE DEFINITION SOURCE USGS

VALUE 1 = visual interpretation partial confidence

DESCRIPTION image shows a developed pad with concrete base and/or turbine parts on the ground

ENUMERATED DOMAIN VALUE DEFINITION SOURCE USGS

VALUE 2 = visual interpretation full confidence

DESCRIPTION image shows an installed turbine or a tower with or without blades, the tower is at least partially installed, crane and other equipment may be present

ENUMERATED DOMAIN VALUE DEFINITION SOURCE USGS

FIELD

WENDI_name

- *ALIAS WENDI_name
- *DATA TYPE String
- *WIDTH 254
- *PRECISION 0
- *SCALE 0

FIELD DESCRIPTION

facility name based on WENDI (Wind Energy Data and Information) data

DESCRIPTION SOURCE

USGS derived from the no longer funded nor available WENDI

LIST OF VALUES

VALUE name

DESCRIPTION facility name from WENDI data

ENUMERATED DOMAIN VALUE DEFINITION SOURCE Producer-Defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section

VALUE unknown

DESCRIPTION no facility data from WENDI, or unable to link to WENDI because of different turbine counts, different online dates or other discrepancies

ENUMERATED DOMAIN VALUE DEFINITION SOURCE Producer-Defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section

FIELD

EIA_name

- *ALIAS EIA_name
- *DATA TYPE String
- *WIDTH 254
- *PRECISION 0

*SCALE 0

FIELD DESCRIPTION

facility name based on EIA (Energy Information Administration) data

DESCRIPTION SOURCE

USGS derived from 2012 EIA-860 dataset, <http://www.eia.gov>

LIST OF VALUES

VALUE name

DESCRIPTION facility name from EIA data

ENUMERATED DOMAIN VALUE DEFINITION SOURCE Producer-Defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section

VALUE unknown

DESCRIPTION no facility data from EIA, or unable to link to EIA because of a difference in turbine counts and/or online dates or other discrepancies

ENUMERATED DOMAIN VALUE DEFINITION SOURCE Producer-Defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section

FIELD

FAA_jdate

*ALIAS FAA_jdate

*DATA TYPE Double

*WIDTH 8

*PRECISION 0

*SCALE 0

FIELD DESCRIPTION

FAA Julian date, date of notification/permit, USGS removed any alpha characters

DESCRIPTION SOURCE

FAA Digital Obstacle File https://nfdc.faa.gov/tod/public/TOD_DOF.html -product March 2, 2014

LIST OF VALUES

VALUE -99999

DESCRIPTION no data found from FAA

ENUMERATED DOMAIN VALUE DEFINITION SOURCE Producer-Defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section

RANGE OF VALUES

MINIMUM VALUE 1988074

MAXIMUM VALUE 2014059

UNITS OF MEASURE year day format , for example 2013200 - is the two hundredth day of year 2013

FIELD FAA_AGL

*ALIAS FAA_AGL

*DATA TYPE Double

*WIDTH 8

*PRECISION 0

*SCALE 0

FIELD DESCRIPTION

FAA height of turbine tower and extent of rotor, from FAA DOF, AGL = Above Ground Level elevation; provided from FAA in feet, USGS converted to meters by dividing the feet by 3.28

DESCRIPTION SOURCE

FAA Digital Obstacle File https://nfdc.faa.gov/tod/public/TOD_DOF.html - product date March 2, 2014

LIST OF VALUES

VALUE -99999

DESCRIPTION no data found from FAA

ENUMERATED DOMAIN VALUE DEFINITION SOURCE Producer-Defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section

RANGE OF VALUES

MINIMUM VALUE 3.66

MAXIMUM VALUE 178.34

UNITS OF MEASURE meters

FIELD FAA_ORS

*ALIAS FAA_ORS

*DATA TYPE String

*WIDTH 254

*PRECISION 0

*SCALE 0

FIELD DESCRIPTION

FAA unique identifier for each turbine from FAA Digital Obstacle Files (FAA DOF); identifier with the first two digits indicating a state, then a dash, with a sequential number following; 'unknown' records are not part of the FAA/DOF and can be considered USGS turbine add-in features

DESCRIPTION SOURCE

FAA Digital Obstacle File https://nfdc.faa.gov/tod/public/TOD_DOF.html - product date March 2, 2014

DESCRIPTION OF VALUES

FAA's unique identifier for turbines or 'unknown'

FIELD [image_name](#)

- *ALIAS [image_name](#)
- *DATA TYPE [String](#)
- *WIDTH [254](#)
- *PRECISION [0](#)
- *SCALE [0](#)

FIELD DESCRIPTION

source of temporal imagery used for visual analysis

DESCRIPTION SOURCE

Producer-Defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section

LIST OF VALUES

VALUE [NAIP](#)

DESCRIPTION [USDA/NRCS/datagateway](#) - <http://datagateway.nrcs.usda.gov/>

ENUMERATED DOMAIN VALUE DEFINITION SOURCE [Data Gateway, USDA](#)

VALUE [DigitalGlobe](#)

DESCRIPTION [Digital Globe server](#) - <https://EVWHS.digitalglobe.com>

ENUMERATED DOMAIN VALUE DEFINITION SOURCE [Digital Globe](#)

VALUE [Bing Maps Aerial](#)

DESCRIPTION [ESRI ArcMap Base maps](#), available from [ESRI ArcMap 10.0](#)

ENUMERATED DOMAIN VALUE DEFINITION SOURCE [Microsoft Bing Maps](#)

VALUE [USGS EDC SDDS](#)

DESCRIPTION [Ortho Imagery from EROS data center server](#)

ENUMERATED DOMAIN VALUE DEFINITION SOURCE [Producer-Defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section](#)

FIELD [image_year](#)

- *ALIAS [image_year](#)
- *DATA TYPE [String](#)
- *WIDTH [254](#)
- *PRECISION [0](#)
- *SCALE [0](#)

FIELD DESCRIPTION

image year (if available) used to positionally verify turbines; year of National Aerial Imagery Program (NAIP) ortho images (<http://datagateway.nrcs.usda.gov/>)

DESCRIPTION SOURCE

Producer-Defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section

LIST OF VALUES

VALUE [year available for NAIP](#)

DESCRIPTION [National Aerial Imagery Program \(NAIP\)](#); county based aerial imagery orthophoto mosaics from [USDA/NRCS/NAIP](#), <http://datagateway.nrcs.usda.gov/>

ENUMERATED DOMAIN VALUE DEFINITION SOURCE [Producer-Defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section](#)

VALUE [unknown](#)

DESCRIPTION [No year recovered for Bing Maps Aerial, Digital Globe, or USGS_EDC_SDDS](#)

ENUMERATED DOMAIN VALUE DEFINITION SOURCE [Producer-Defined, by the USGS. Please see Source under Methods and Process Description in the Data Quality section](#)

FIELD [comments](#)

- *ALIAS [comments](#)
- *DATA TYPE [String](#)
- *WIDTH [254](#)
- *PRECISION [0](#)

*SCALE 0

FIELD DESCRIPTION

data developer comments to aid in attribution or further explanations

DESCRIPTION SOURCE

Author

DESCRIPTION OF VALUES

data developer comments to aid in attribution or further explanations; such as: small turbine, not visible, seen only on Google Earth, not identified, facility phase undetermined, multiple phases, catastrophic failure, equipment on ground, no turbine, no development, or unsure of facility, etc.

Metadata Details

*METADATA LANGUAGE English (UNITED STATES)

SCOPE OF THE DATA DESCRIBED BY THE METADATA * dataset

SCOPE NAME * dataset

*LAST UPDATE 2016-08-31

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 2016-08-12 10:22:43

LAST MODIFIED IN ARCGIS FOR THE ITEM 2016-08-31 12:52:13

AUTOMATIC UPDATES

HAVE BEEN

PERFORMED Yes

LAST UPDATE 2016-08-31

12:51:07