Electrical Substations

Tags
homeland security, homeland defense, emergency response, name, substations, transformers, electricity, power, voltage, kilovolts, energy infrastructure, address, transmission

Summary

This feature class/shapefile is for the Homeland Infrastructure Foundation Level Database (HIFLD) (https://gii.dhs.gov/HIFLD) as well as the Energy modelling and simulation community.

Description

This feature class/shapefile represents electric power substations primarily associated with electric power transmission. In this layer, substations are considered facilities and equipment that switch, transform, or regulate electric power at voltages equal to, or greater than, 69 kilovolts. Substations with a maximum operating voltage less than 69 kilovolts may be included, depending on the availability of authoritative sources, but coverage of these features should not be considered complete. The Substations feature class/shapefile includes taps, a location where power on a transmission line is tapped by another transmission line. The following updates have been made since the previous release: 6,359 features added.

Credits

Oak Ridge National Laboratory (ORNL), Los Alamos National Laboratory (LANL), Idaho National Laboratory (INL), National Geospatial-Intelligence Agency (NGA) Homeland Security Infrastructure Program (HSIP) Team

Use limitations

None (Public Use). Users are advised to read the data set's metadata thoroughly to understand appropriate use and data limitations.

Extent
West -165.430395 **East** 145.716048
North 65.006606 **South** 13.292483

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

Topics and Keywords

CONTENT TYPE Downloadable Data

Citation

TITLE   Electrical Substations
PRESENTATION FORMATS   digital map

Resource Details

DATASET LANGUAGES   English (UNITED STATES)
SPATIAL REPRESENTATION TYPE   vector
PROCESSING ENVIRONMENT   Version 6.2 (Build 9200) ; Esri ArcGIS 10.7.1.11595
CREDITS
  Oak Ridge National Laboratory (ORNL), Los Alamos National Laboratory (LANL), Idaho
  National Laboratory (INL), National Geospatial-Intelligence Agency (NGA) Homeland
  Security Infrastructure Program (HSIP) Team

ARCGIS ITEM PROPERTIES
  NAME   Substations
    * ACCESS PROTOCOL   Local Area Network

Extents

EXTENT
  GEOGRAPHIC EXTENT
    BOUNDING RECTANGLE
      EXTENT TYPE   Extent used for searching
      WEST LONGITUDE   -165.430395
      EAST LONGITUDE   145.716048
      NORTH LATITUDE   65.006606
      SOUTH LATITUDE   13.292483
      EXTENT CONTAINS THE RESOURCE   Yes

EXTENT IN THE ITEM'S COORDINATE SYSTEM
  WEST LONGITUDE   -165.430395
  EAST LONGITUDE   145.716048
  SOUTH LATITUDE   13.292483
  NORTH LATITUDE   65.006606
  EXTENT CONTAINS THE RESOURCE   Yes

Resource Constraints

CONSTRAINTS
  LIMITATIONS OF USE
    None (Public Use). Users are advised to read the data set's metadata thoroughly to
    understand appropriate use and data limitations.

Spatial Reference

ARCGIS COORDINATE SYSTEM
  TYPE   Geographic
  GEOGRAPHIC COORDINATE REFERENCE   GCS_WGS_1984
  * PROJECTION   WGS_1984_Web_Mercator_Auxiliary_Sphere
  COORDINATE REFERENCE DETAILS
    GEOGRAPHIC COORDINATE SYSTEM
      WELL-KNOWN IDENTIFIER   4326
      X ORIGIN   -400
      Y ORIGIN   -400
      XY SCALE   999999999.99999988
      Z ORIGIN   -100000
      Z SCALE   10000
      M ORIGIN   -100000
      M SCALE   10000
      XY TOLERANCE   8.983152841195215e-09
      Z TOLERANCE   0.001
      M TOLERANCE   0.001

HIGH PRECISION true
LEFT LONGITUDE -180
LATEST WELL-KNOWN IDENTIFIER 4326
WELL-KNOWN TEXT GEOGCS["GCS_WGS_1984",DATUM["D_WGS_1984",SPHEROID
["WGS_1984",6378137.0,298.257223563]],PRIMEM["Greenwich",0.0],UNIT
["Degree",0.0174532925199433],AUTHORITY["EPSG",4326]]

REFERENCE SYSTEM IDENTIFIER
  VALUE 4326
  CODESPACE EPSG
  VERSION 6.14(3.0.1)

Spatial Data Properties

VECTOR
  * LEVEL OF TOPOLOGY FOR THIS DATASET geometry only
  GEOMETRIC OBJECTS
    FEATURE CLASS NAME electric_substation_hifld_v4
    * OBJECT TYPE point
    * OBJECT COUNT 75328

ARCGIS FEATURE CLASS PROPERTIES
  FEATURE CLASS NAME electric_substation_hifld_v4
    * FEATURE TYPE Simple
    * GEOMETRY TYPE Point
    * HAS TOPOLOGY FALSE
    * FEATURE COUNT 75328
    * SPATIAL INDEX TRUE
    * LINEAR REFERENCING FALSE

Distribution

DISTRIBUTION FORMAT
  NAME File Geodatabase Feature Class

Fields

DETAILS FOR OBJECT electric_substation_hifld_v4
  * TYPE Feature Class
  * ROW COUNT 75328
  DEFINITION
    Attribute fields were populated using sources identified in the SOURCE field for the period
    covered in the Time Period metadata and other open source data. For string and date
    data types, NOT AVAILABLE values denote missing data that was not present in the
    source data. For numeric data types, -999999 denote missing data that was not present
    in the source data. However, the missing data may be present in other sources not yet
    discovered and used in the creation and/or maintenance of this dataset. These records
    may be populated with valid information in future update cycles.

  DEFINITION SOURCE
    Originator 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 ID
* ALIAS   ID
* DATA TYPE   String
* WIDTH   10
* PRECISION   0
* SCALE   0
FIELD DESCRIPTION
   Unique ID for each feature. ID values are unique to this dataset ONLY and may have
   changed from the previous versions of the dataset, and/or change in a future version of
   the dataset.

DESCRIPTION SOURCE
   Originator defined

FIELD NAME
* ALIAS   Name
* DATA TYPE   String
* WIDTH   80
* PRECISION   0
* SCALE   0
FIELD DESCRIPTION
   Feature name.

DESCRIPTION SOURCE
   The responsible organization as identified in the SOURCE field.

FIELD CITY
* ALIAS   City
* DATA TYPE   String

* WIDTH   60
* PRECISION   0
* SCALE   0
FIELD DESCRIPTION
   City name.

DESCRIPTION SOURCE
   The responsible organization as identified in the SOURCE field.

FIELD STATE   ▶
* ALIAS   State
* DATA TYPE   String
* WIDTH   2
* PRECISION   0
* SCALE   0
FIELD DESCRIPTION
   State abbreviation (United States and its Territories); Province abbreviation (Canada)

DESCRIPTION SOURCE
   The responsible organization as identified in the SOURCE field.

NAME OF CODELIST   Two–Letter State and Possession Abbreviations
SOURCE   United States Postal Service (https://www.usps.com)

CODED VALUES
NAME OF CODELIST   Two–Letter State and Possession Abbreviations
SOURCE   Canada Postal (https://www.canadapost.ca)

CODED VALUES
NAME OF CODELIST   Two–Letter State and Possession Abbreviations
SOURCE   Correos de Mexico (http://www.sepomex.gob.mx)

FIELD ZIP
* ALIAS   ZIP Code
* DATA TYPE   String
* WIDTH   13
* PRECISION   0
* SCALE   0

FIELD DESCRIPTION
Zip Code (5 digit); Postal Code (Canada; 6-digit).

DESCRIPTION SOURCE
The responsible organization as identified in the SOURCE field.

CODED VALUES
NAME OF CODELIST   US Postal Zip Codes
SOURCE   United States Postal Service (https://www.usps.com)

CODED VALUES
NAME OF CODELIST   Canada Postal Codes
SOURCE   Canada Postal (https://www.canadapost.ca)

CODED VALUES
NAME OF CODELIST   Codigos Postales de Mexico
SOURCE   Correos de Mexico (http://www.sepomex.gob.mx)

FIELD TYPE
* ALIAS   Type
* DATA TYPE   String
* WIDTH   60
* PRECISION   0
* SCALE   0

FIELD DESCRIPTION
Specific categorical breakdown for the feature.

DESCRIPTION SOURCE
Originator defined

LIST OF VALUES
VALUE   DEAD END
DESCRIPTION   Termination of a transmission line
ENUMERATED DOMAIN VALUE DEFINITION SOURCE   Originator defined

VALUE   RISER
DESCRIPTION   A structure that connects an overhead line to an underground line.
ENUMERATED DOMAIN VALUE DEFINITION SOURCE   Originator defined

VALUE   SUBSTATION
DESCRIPTION   Facilities and equipment that switch, transform, or regulate electric power.
ENUMERATED DOMAIN VALUE DEFINITION SOURCE   Originator defined

VALUE   TAP
DESCRIPTION   Location where power on a transmission line is tapped by another transmission

line.
ENUMERATED DOMAIN VALUE DEFINITION SOURCE   Originator defined

VALUE   NOT AVAILABLE
DESCRIPTION   Please see "Entity Type Definition" section
ENUMERATED DOMAIN VALUE DEFINITION SOURCE   Originator defined

FIELD STATUS
* ALIAS   Status
* DATA TYPE   String
* WIDTH   60
* PRECISION   0
* SCALE   0

FIELD DESCRIPTION
Operational status of the feature.

DESCRIPTION SOURCE
The responsible organization as identified in the SOURCE field.

LIST OF VALUES

VALUE   IN SERVICE
DESCRIPTION   Operational
ENUMERATED DOMAIN VALUE DEFINITION SOURCE The responsible organization as identified in the SOURCE field.

VALUE   INACTIVE
DESCRIPTION   Not operational
ENUMERATED DOMAIN VALUE DEFINITION SOURCE The responsible organization as identified in the SOURCE field.

VALUE   PROPOSED
DESCRIPTION   Proposed
ENUMERATED DOMAIN VALUE DEFINITION SOURCE The responsible organization as identified in the SOURCE field.

VALUE   UNDER CONST
DESCRIPTION   Under construction as of the publication date
ENUMERATED DOMAIN VALUE DEFINITION SOURCE The responsible organization as identified in the SOURCE field.

VALUE   NOT AVAILABLE
DESCRIPTION   Please see "Entity Type Definition" section
ENUMERATED DOMAIN VALUE DEFINITION SOURCE   Originator defined

FIELD COUNTY
* ALIAS   County
* DATA TYPE   String
* WIDTH   20
* PRECISION   0
* SCALE   0

FIELD DESCRIPTION
United States and its Territories county name and legal/statistical area description (county, borough, parish, municipality, census area); Canada (province, territory)

DESCRIPTION SOURCE
Oak Ridge National Laboratory

FIELD COUNTYFIPS
* ALIAS   County FIPS
* DATA TYPE   String
* WIDTH   13
* PRECISION   0
* SCALE   0

FIELD DESCRIPTION
US County Federal Information Processing Standards (FIPS) Code (5 digit); Canada
Standard Geographical Classification (SGC) Code (7 digit)

DESCRIPTION SOURCE
Originator defined

CODED VALUES
NAME OF CODELIST   2010 FIPS Codes for Counties and County Equivalent Entities; Standard
Geographical Classification 2011; INEGI National Geostatistical Framework
SOURCE   FIPS/Census (http://www.census.gov/geo/reference/codes/cou.html); Statistics
Canada (http://www.statcan.gc.ca/pub/92-195-x/2011001/other-autre/sgc-cgt/sgc-cgt-
eng.htm); Marco Geoestadistico Nacional
(http://www.inegi.org.mx/geo/contenidos/geoestadistica/default.aspx)

FIELD COUNTRY
* ALIAS   Country
* DATA TYPE   String
* WIDTH   3
* PRECISION   0
* SCALE   0
FIELD DESCRIPTION
Country Code (3 character).

DESCRIPTION SOURCE
Originator defined

CODED VALUES
NAME OF CODELIST   Geopolitical Entities, Names, and Codes (GENC) Standard
SOURCE   National System for Geospatial Intelligence (NSG) Standards Registry
(https://nsgreg.nga.mil/genc/discovery)

FIELD LATITUDE
* ALIAS   Latitude
* DATA TYPE   Double
* WIDTH   8
* PRECISION   0
* SCALE   0
FIELD DESCRIPTION
The angular distance north or south from the equator on the earth's surface.

DESCRIPTION SOURCE
Originator defined

RANGE OF VALUES
MINIMUM VALUE   13.292483
MAXIMUM VALUE   65.006606
UNITS OF MEASURE   Decimal Degrees

FIELD LONGITUDE
* ALIAS   Longitude
* DATA TYPE   Double
* WIDTH   8
* PRECISION   0
* SCALE   0
FIELD DESCRIPTION
The angular distance east or west from the prime meridian on the earth's surface.

DESCRIPTION SOURCE
Originator defined

RANGE OF VALUES
MINIMUM VALUE   -165.430395
MAXIMUM VALUE   145.716048
UNITS OF MEASURE   Decimal Degrees

FIELD NAICS_CODE

* **ALIAS** NAICS Code
* **DATA TYPE** String
* **WIDTH** 6
* **PRECISION** 0
* **SCALE** 0

FIELD DESCRIPTION

The North American Industry Classification System (NAICS) code is the standard used by Federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy.

DESCRIPTION SOURCE

Originator defined

CODED VALUES

NAME OF CODELIST North American Industry Classification System, 2017
SOURCE US Census (http://www.census.gov/eos/www/naics/)

FIELD NAICS_DESC

* **ALIAS** NAICS Description
* **DATA TYPE** String
* **WIDTH** 50
* **PRECISION** 0
* **SCALE** 0

FIELD DESCRIPTION

The North American Industry Classification System (NAICS) definition is the standard used by Federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy.

DESCRIPTION SOURCE

Originator defined

CODED VALUES

NAME OF CODELIST North American Industry Classification System, 2017
SOURCE US Census (http://www.census.gov/eos/www/naics/)

FIELD SOURCE

* **ALIAS** Source
* **DATA TYPE** String
* **WIDTH** 250
* **PRECISION** 0

* **SCALE** 0

FIELD DESCRIPTION

Original source used to identify geospatial location and/or attribution for the feature. Frequently used sources include ESRI's World Imagery Service.

DESCRIPTION SOURCE

Originator defined

FIELD SOURCEDATE

* **ALIAS** Source Date
* **DATA TYPE** Date
* **WIDTH** 8
* **PRECISION** 0
* **SCALE** 0

FIELD DESCRIPTION

Date of the source, or, if not available, the date the originator accessed the source.

DESCRIPTION SOURCE

Originator defined

RANGE OF VALUES

MINIMUM VALUE 01/01/1996
MAXIMUM VALUE 06/23/2020
UNITS OF MEASURE Date

FIELD VAL_METHOD
* ALIAS Validation Method
* DATA TYPE String
* WIDTH 100
* PRECISION 0
* SCALE 0
FIELD DESCRIPTION
Methodology used to validate geospatial location of the feature.

DESCRIPTION SOURCE
Originator defined

LIST OF VALUES
VALUE IMAGERY
DESCRIPTION The best available imagery used to determine the location.
ENUMERATED DOMAIN VALUE DEFINITION SOURCE Originator defined

VALUE IMAGERY/OTHER
DESCRIPTION Imagery and supplemental open source information used to determine the location.
ENUMERATED DOMAIN VALUE DEFINITION SOURCE Originator defined

VALUE OTHER
DESCRIPTION Open source information used to determine the location.
ENUMERATED DOMAIN VALUE DEFINITION SOURCE Originator defined

VALUE UNVERIFIED
DESCRIPTION Feature could not be located or the feature has not yet been validated.
ENUMERATED DOMAIN VALUE DEFINITION SOURCE Originator defined

FIELD VAL_DATE
* ALIAS Validation Date
* DATA TYPE Date
* WIDTH 8
* PRECISION 0
* SCALE 0
FIELD DESCRIPTION
Date when geospatial location was last validated for the feature.

DESCRIPTION SOURCE
Originator defined

RANGE OF VALUES
MINIMUM VALUE 04/14/2014
MAXIMUM VALUE 06/23/2020
UNITS OF MEASURE Date

FIELD LINES
* ALIAS Number of Lines
* DATA TYPE Double
* WIDTH 8
* PRECISION 0
* SCALE 0
FIELD DESCRIPTION
Number of transmission lines that are linked to the substation.

DESCRIPTION SOURCE
Originator defined

RANGE OF VALUES

MINIMUM VALUE   0
MAXIMUM VALUE   30

FIELD MAX_VOLT
* ALIAS   Maximum Voltage (kV)
* DATA TYPE   Single
* WIDTH   4
* PRECISION   0
* SCALE   0
FIELD DESCRIPTION
   Maximum voltage of all Transmission Lines that feed into the substation

DESCRIPTION SOURCE
   Originator defined

RANGE OF VALUES
   MINIMUM VALUE   3

   MAXIMUM VALUE   1000
   UNITS OF MEASURE   Kilovolt (kV)

FIELD MIN_VOLT
* ALIAS   Minimum Voltage (kV)
* DATA TYPE   Single
* WIDTH   4
* PRECISION   0
* SCALE   0
FIELD DESCRIPTION
   Minimum voltage of all Transmission Lines that feed into the substation

DESCRIPTION SOURCE
   Originator defined

RANGE OF VALUES
   MINIMUM VALUE   3
   MAXIMUM VALUE   765
   UNITS OF MEASURE   Kilovolt (kV)

FIELD MAX_INFER
* ALIAS   Maximum Infer.
* DATA TYPE   String
* WIDTH   13
* PRECISION   0
* SCALE   0
FIELD DESCRIPTION
   Indicates whether or not MAX_VOLT was inferred using one of the methods outlined in
   the Process Description.

DESCRIPTION SOURCE
   Originator defined

LIST OF VALUES
   VALUE   Y
   DESCRIPTION   Voltage was inferred
   ENUMERATED DOMAIN VALUE DEFINITION SOURCE   Originator defined

   VALUE   N
   DESCRIPTION   Voltage was not inferred
   ENUMERATED DOMAIN VALUE DEFINITION SOURCE   Originator defined

   VALUE   NOT AVAILABLE
   DESCRIPTION   Please see "Entity Type Definition" section
   ENUMERATED DOMAIN VALUE DEFINITION SOURCE   Originator defined

FIELD MIN_INFER
* ALIAS Minimum Infer.
* DATA TYPE String
* WIDTH 13

* PRECISION 0
* SCALE 0
FIELD DESCRIPTION
Indicates whether or not MIN_VOLT was inferred using one of the methods outlined in the Process Description.

DESCRIPTION SOURCE
Originator defined

LIST OF VALUES
VALUE Y
DESCRIPTION Voltage was inferred
ENUMERATED DOMAIN VALUE DEFINITION SOURCE Originator defined

VALUE N
DESCRIPTION Voltage was not inferred
ENUMERATED DOMAIN VALUE DEFINITION SOURCE Originator defined

VALUE NOT AVAILABLE
DESCRIPTION Please see "Entity Type Definition" section
ENUMERATED DOMAIN VALUE DEFINITION SOURCE Originator defined

OVERVIEW DESCRIPTION
ENTITY AND ATTRIBUTE OVERVIEW
The entity and attribute information provided here describes the tabular data associated with the data set. Please review the detailed descriptions that are provided (the individual attribute descriptions) for information on the values that appear as fields/table entries of the data set. Please see the "Processing Steps" section for further methodology. For string and date data types, NOT AVAILABLE values denote missing data that was not present in the source data. For numeric data types, -999999 denote missing data that was not present in the source data. However, the missing data may be present in other sources not yet discovered and used in the creation and/or maintenance of this dataset. These records may be populated with valid information in future update cycles.

ENTITY AND ATTRIBUTE DETAIL CITATION
Oak Ridge National Laboratory

Metadata Details

METADATA LANGUAGE English (UNITED STATES)
SCOPE OF THE DATA DESCRIBED BY THE METADATA dataset
SCOPE NAME dataset

LAST UPDATE 2020-06-23

ARCGIS METADATA PROPERTIES
METADATA FORMAT ArcGIS 1.0
STANDARD OR PROFILE USED TO EDIT METADATA FGDC
METADATA STYLE FGDC CSDGM Metadata

CREATED IN ARCGIS FOR THE ITEM 2022-05-24
LAST MODIFIED IN ARCGIS FOR THE ITEM 2022-05-25

AUTOMATIC UPDATES
HAVE BEEN PERFORMED Yes
LAST UPDATE 2022-05-25