Bedded Salt Formation

**Tags**
Geology, Bedded Salt, Formation, Compressed Air Energy Storage, CAES, Air, High Pressure, United States, North America

**Summary**
Bedded salt formations can be used in Compressed Air Energy Storage (CAES) systems. Electricity is used to inject high pressure air into these underground bedded salt formations. CAES uses off-peak generation to compress air adiabatically — using coolers to remove the heat caused by compression — into a reservoir located either below-ground (focus of this effort) or aboveground. When the peak builds, the compressed air is released (much like the water in a pumped hydro system), heated (the exhaust from a standard combustion turbine) and passed through an expansion turbine to drive the generator. When demand for electricity is high, the high pressure air is released from the underground cavern and used to help power natural gas-fired turbines. When demand is low or the generation potential is high, utilities can run compressors and pump air into a cavern or vessel at 750 psi. When the price of electricity goes up - the compressed air is preheated (with a natural gas fired burner) and the air is then used. The pressurized air allows the turbines to generate electricity using significantly less natural gas, in most cases as little as 1/3 the natural gas that would otherwise be required. CAES is also appropriate for load-leveling because it can be constructed in capacities of a few hundred MW and can be discharged over long (4-24 hours) periods of time. The most typical plant size demonstrated to date is around 220 MW with multiple units constructed when greater generation is required.

**Description**
The geographic location of possible bedded salt formations in the United States.

**Credits**

**Use limitations**
Acknowledgment of the Cavern Roof Stability for Natural Gas Storage in Bedded Salt Report and Oak Ridge National Laboratory.

**Extent**
- West: -114.120906
- East: -73.705601
- North: 50.470852
- South: 23.787366

**Scale Range**
- Maximum (zoomed in): 1:5,000
- Minimum (zoomed out): 1:50,000,000
### ArcGIS Metadata

#### Topics and Keywords

**THEMES OR CATEGORIES OF THE RESOURCE** boundaries, location

**CONTENT TYPE** Downloadable Data

**EXPORT TO FGDC CSDGM XML FORMAT AS RESOURCE DESCRIPTION** No

**PLACE KEYWORDS** United States, North America

**THEME KEYWORDS** Geology, Bedded Salt, Formation, Compressed Air Energy Storage, CAES, Air, High Pressure

#### Citation

**TITLE** bedded_proj

**PUBLICATION DATE** 2012-07-05 00:00:00

**PRESENTATION FORMATS** digital map

#### Citation Contacts

**RESPONSIBLE PARTY**

**ORGANIZATION’S NAME** Oak Ridge National Laboratory

**CONTACT’S ROLE** originator

#### Resource Details

**DATASET LANGUAGES** English (UNITED STATES)

**DATASET CHARACTER SET** utf8 - 8 bit UCS Transfer Format

**SPATIAL REPRESENTATION TYPE** vector

**PROCESSING ENVIRONMENT** Microsoft Windows 7 Version 6.1 (Build 7600) ; ESRI ArcGIS 10.0.4.4000

**CREDITS**


**ARCGIS ITEM PROPERTIES**

**NAME** bedded_proj

**SIZE** 0.005

**LOCATION**

**ACCESS PROTOCOL** Local Area Network

#### Extents

**EXTENT**

**GEOGRAPHIC EXTENT**

**BOUNDING RECTANGLE**

**EXTENT TYPE** Extent used for searching

**WEST LONGITUDE** -114.120906

**EAST LONGITUDE** -73.705601

**NORTH LATITUDE** 50.470852

**SOUTH LATITUDE** 23.787366

**EXTENT CONTAINS THE RESOURCE** Yes

**EXTENT IN THE ITEM’S COORDINATE SYSTEM**

**WEST LONGITUDE** -1243583.473524
Resource Points of Contact

POINT OF CONTACT
  INDIVIDUAL’S NAME Olufemi A. Omitaomu
  ORGANIZATION’S NAME Oak Ridge National Laboratory
  CONTACT’S POSITION Research Scientist, Critical Infrastructure and Climate Change Research
  CONTACT’S ROLE resource provider

CONTACT INFORMATION
  PHONE
    VOICE 1-865-241-4310
    FAX 1-865-241-6261

ADDRESS
  TYPE postal
  DELIVERY POINT One Bethel Valley Road, P.O. Box 2008, MS-6165
  CITY Oak Ridge
  ADMINISTRATIVE AREA TN
  POSTAL CODE 37831-6165
  COUNTRY US

Resource Maintenance

RESOURCE MAINTENANCE
  UPDATE FREQUENCY not planned

Resource Constraints

CONSTRAINTS
  LIMITATIONS OF USE
    Acknowledgment of the Cavern Roof Stability for Natural Gas Storage in Bedded Salt Report and Oak Ridge National Laboratory.

Spatial Reference

ARCGIS COORDINATE SYSTEM
  * TYPE Projected
  * GEOGRAPHIC COORDINATE REFERENCE GCS_North_American_1983
  * PROJECTION NAD_1983_Lambert_Conformal_Conic
  * COORDINATE REFERENCE DETAILS
    PROJECTED COORDINATE SYSTEM
    X ORIGIN -35214300
    Y ORIGIN -28218500
    XY SCALE 127891215.42584959
    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
    WELL-KNOWN TEXT PROJCS["NAD_1983_Lambert_Conformal_Conic",GEOGCS
REFERENCE SYSTEM IDENTIFIER

* VALUE 0

Spatial Data Properties

VECTOR
* LEVEL OF TOPOLOGY FOR THIS DATASET geometry only

GEOMETRIC OBJECTS
* FEATURE CLASS NAME bedded_proj
* OBJECT TYPE composite
* OBJECT COUNT 13

ARCGIS FEATURE CLASS PROPERTIES

* FEATURE TYPE Simple
* GEOMETRY TYPE Polygon
* HAS TOPOLOGY FALSE
* FEATURE COUNT 13
* SPATIAL INDEX TRUE
* LINEAR REFERENCING FALSE

Distribution

DISTRIBUTION FORMAT
* NAME Shapefile

TRANSFER OPTIONS
* TRANSFER SIZE 0.005

Fields

DETAILS FOR OBJECT bedded_proj
* TYPE Feature Class
* ROW COUNT 13

FIELD FID
* ALIAS FID
* 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
**FIELD Description**
Feature geometry.

**DESCRIPTION SOURCE**
ESRI

**DESCRIPTION OF VALUES** Coordinates defining the features.

**FIELD Id**
- **ALIAS** Id
- **DATA TYPE** Integer
- **WIDTH** 6
- **PRECISION** 6
- **SCALE** 0
  **FIELD DESCRIPTION**
  Attribute ID

**FIELD Perimeter**
- **ALIAS** Perimeter
- **DATA TYPE** Double
- **WIDTH** 19
- **PRECISION** 0
- **SCALE** 0
  **FIELD DESCRIPTION**
  Perimeter

**FIELD Area**
- **ALIAS** Area
- **DATA TYPE** Double
- **WIDTH** 19
- **PRECISION** 0
- **SCALE** 0
  **FIELD DESCRIPTION**
  Area

**OVERVIEW DESCRIPTION**
ENTITY AND ATTRIBUTE OVERVIEW The data was generated by georeferencing image (static) data areas from multiple sources.

**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** 2012-07-05

**ARCGIS METADATA PROPERTIES**
- **METADATA FORMAT** ArcGIS 1.0
- **METADATA STYLE** ISO 19139 Metadata Implementation Specification

**STANDARD OR PROFILE USED TO EDIT METADATA** FGDC

**CREATED IN ARCGIS FOR THE ITEM** 2012-04-23 14:13:06
**LAST MODIFIED IN ARCGIS FOR THE ITEM** 2012-07-05 00:11:70
AUTOMATIC UPDATES
HAVE BEEN PERFORMED Yes
LAST UPDATE 2012-04-26 11:20:21

Metadata Contacts

METADATA CONTACT
  INDIVIDUAL'S NAME Keven Hlava
  ORGANIZATION'S NAME Argonne National Laboratory
  CONTACT'S POSITION GIS Assistant/Specialist
  CONTACT'S ROLE point of contact

  CONTACT INFORMATION
  PHONE
    VOICE 1-630-252-0060

  ADDRESS
    TYPE both
    DELIVERY POINT 9700 South Cass Avenue, EVS/Bldg 240
    CITY Argonne
    ADMINISTRATIVE AREA IL
    POSTAL CODE 60439
    COUNTRY US
    E-MAIL ADDRESS khlava@anl.gov

Metadata Maintenance

  MAINTENANCE
    UPDATE FREQUENCY not planned

Thumbnail and Enclosures

  THUMBNAIL
    THUMBNAIL TYPE JPG

FGDC Metadata (read-only)