

OpenEI | OPENENERGYINFO

(OpenEI.org)



NREL/PIX 17613

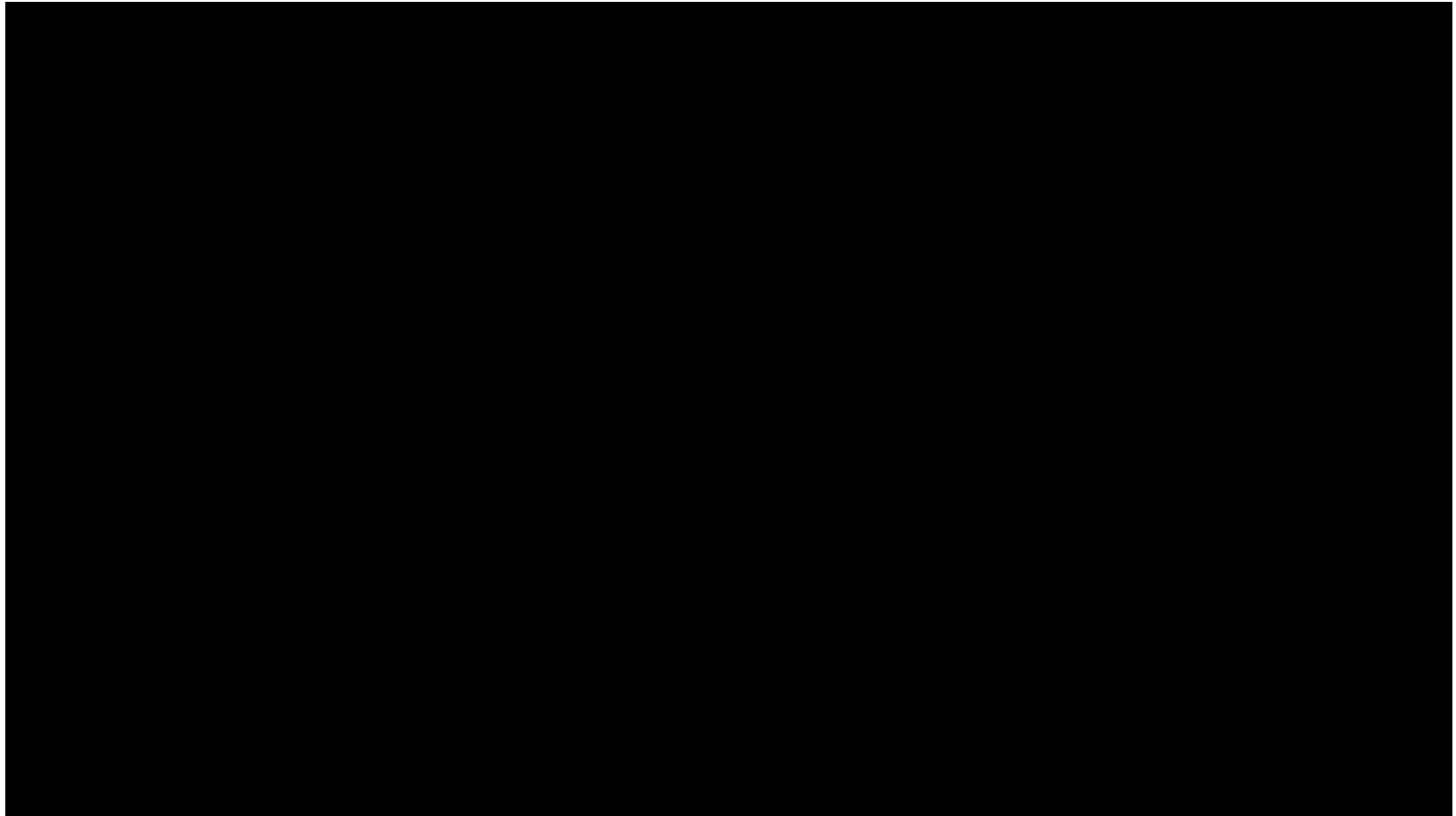
Debbie Brodt-Giles  
Open Government  
Summit  
January 25, 2012

Open Energy Information - Facilitating  
access, use, and contribution of worldwide  
energy data and information

# Overview

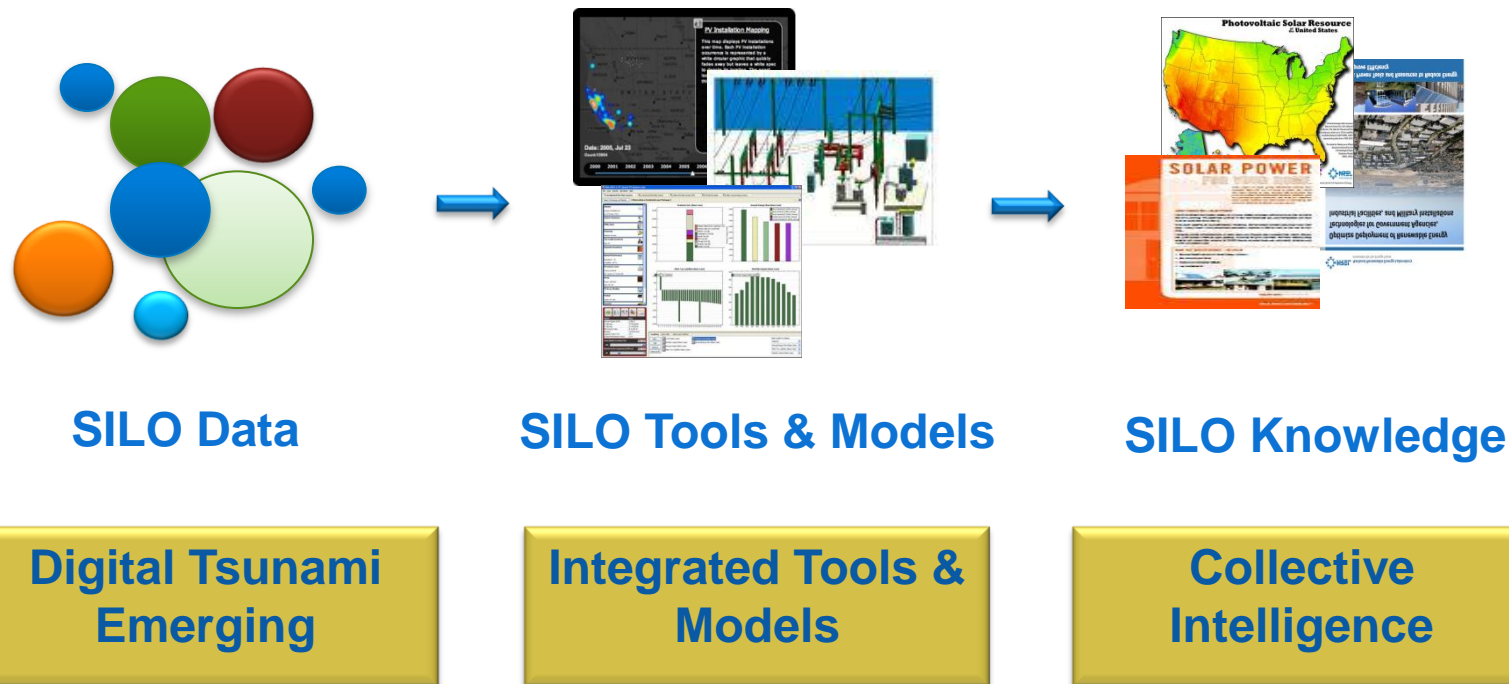
- Opportunity for shared energy information
- Strategic direction
- Alignment with the White House Open Government Initiative
- Collaborative approach
- Linked open data standards
- Features and unique attributes
- Statistics
- OpenEI data in action

# Video





# The Collaboration Challenge



*We tend to gravitate to familiar SILOS.*

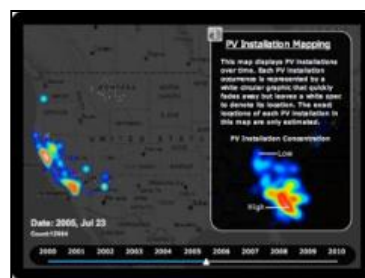


# What type of data are we talking about?

## Energy Data



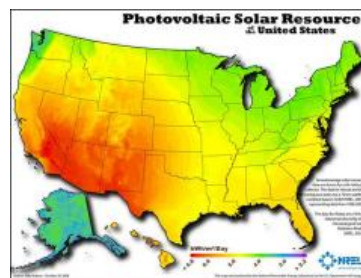
## Energy Tools



## Energy Docs



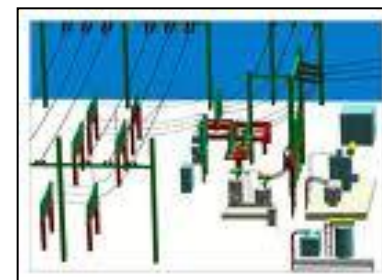
## Energy Maps



## Education



## Energy Models



*Published collective intelligence of the community*

# OpenEI Strategy

Catalyze the collection of the world's energy information to advance the adoption of renewable energy, fuel innovation and better inform energy decisions of policy makers, researchers, investors, and consumers



Linked Open Data for  
Improved access to energy-  
related information



Assessments of  
information quality &  
provenance



Easy, legal, & scalable  
data sharing and ratings



Services for application  
development & derived  
data knowledge



Community support for  
contributions and  
collaboration



Crowdsourced  
Dataset Generation

# Open Government Initiative

## *Government should be transparent.*

Transparency promotes accountability and provides information for citizens about what their Government is doing. **Information maintained by the Federal Government is a national asset.** My Administration will take appropriate action, consistent with law and policy, to **disclose information rapidly in forms that the public can readily find and use.** Executive departments and agencies should harness new technologies to **put information about their operations and decisions online and readily available to the public.** Executive departments and agencies should also **solicit public feedback to identify information of greatest use** to the public.

## *Government should be participatory.*

Public engagement enhances the Government's effectiveness and improves the quality of its decisions. **Knowledge is widely dispersed in society,** and public officials benefit from having access to that dispersed knowledge. Executive departments and agencies should **offer Americans increased opportunities to participate** in policymaking and to provide their Government with the **benefits of their collective expertise and information.** Executive departments and agencies should also **solicit public input** on how we can increase and improve opportunities for public participation in Government.

## *Government should be collaborative.*

Collaboration actively **engages Americans in the work** of their Government. Executive departments and agencies should **use innovative tools, methods, and systems to cooperate among themselves,** across all levels of Government, and with nonprofit organizations, businesses, and individuals in the private sector. Executive departments and agencies should **solicit public feedback to assess and improve their level of collaboration** and to **identify new opportunities for cooperation.**

Source: White House Memorandum on Transparency and Open Government, January 29, 2009





# Notable Quotes



“This information platform will allow people across the globe to benefit from the Department of Energy’s clean energy data and technical resources. The true potential of this tool will grow with the public’s participation – as they add new data and share their expertise – to ensure that all communities have access to the information they need to broadly deploy the clean energy resources of the future.”

**Dr. Steven Chu, Secretary of Energy**  
<http://energy.gov/news2009/8381.htm>










“Wow ... Energy linked data portal”

**Tim Berners-Lee, Inventor of the World Wide Web**  
[http://twitter.com/timberners\\_lee/status/7062198463](http://twitter.com/timberners_lee/status/7062198463)

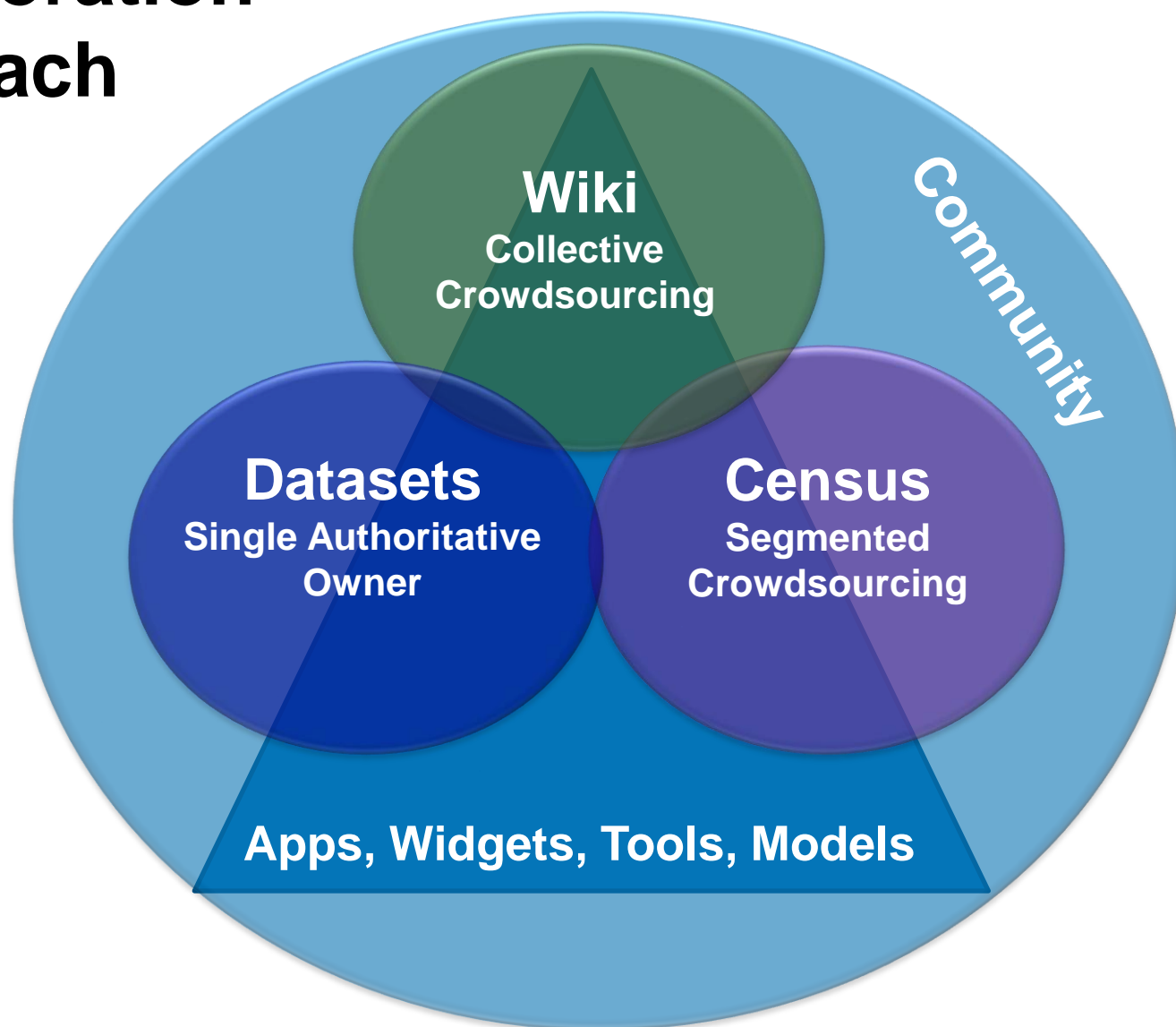


“Love that DOE is doing OpenEI.org”

**Tim O'Reilly, Web 2.0 Pioneer and Founder of O'Reilly Media**  
<http://twitter.com/timoreilly/status/11792155576>

	<b>Collective</b> <i>"The Wiki Way"</i>	<b>Segmented</b> <i>"The Census Model"</i>	<b>Authoritative</b> <i>"Single Owner"</i>
<b>Create</b>	<b>World</b>	<b>Varies</b>	<b>World</b>
<b>Read</b>	<b>World</b>	<b>Varies</b>	<b>World</b>
<b>Update</b>	<b>World</b>	<b>Owner</b>	<b>Owner</b>
<b>Delete</b>	<b>World</b>	<b>Owner</b>	<b>Owner</b>
<b>Granularity</b>	<b>Element</b>	<b>Element</b>	<b>Item</b>
<b>Examples</b>	  	 	 

# Collaboration Approach

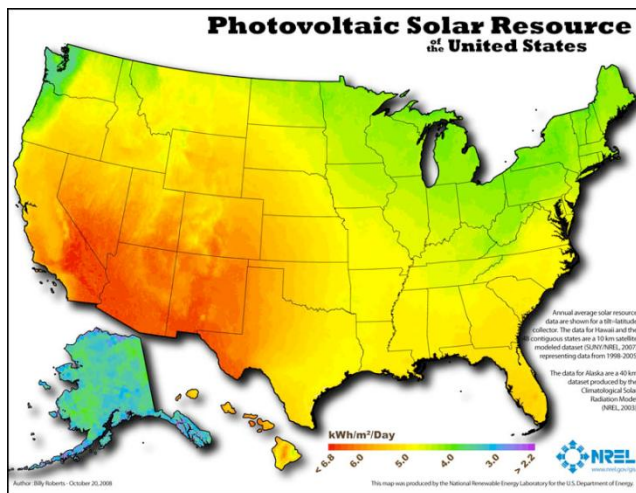








# Leveraging and Linking Existing Data



Name	Size	Last Modified
<a href="#">SUNY_098052455.csv.gz</a>	572 KB	3/5/07 12:00:00 AM
<a href="#">SUNY_098052465.csv.gz</a>	570 KB	3/5/07 12:00:00 AM
<a href="#">SUNY_098052475.csv.gz</a>	571 KB	3/5/07 12:00:00 AM
<a href="#">SUNY_098052485.csv.gz</a>	569 KB	3/5/07 12:00:00 AM
<a href="#">SUNY_098052495.csv.gz</a>	569 KB	3/5/07 12:00:00 AM
<a href="#">SUNY_098052505.csv.gz</a>	568 KB	3/5/07 12:00:00 AM
<a href="#">SUNY_098052515.csv.gz</a>	569 KB	3/5/07 12:00:00 AM
<a href="#">SUNY_098052525.csv.gz</a>	570 KB	3/5/07 12:00:00 AM
<a href="#">SUNY_098052535.csv.gz</a>	570 KB	3/5/07 12:00:00 AM
<a href="#">SUNY_098052545.csv.gz</a>	570 KB	3/5/07 12:00:00 AM
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<a href="#">SUNY_098052565.csv.gz</a>	571 KB	3/5/07 12:00:00 AM
<a href="#">SUNY_098052575.csv.gz</a>	570 KB	3/5/07 12:00:00 AM
<a href="#">SUNY_098052585.csv.gz</a>	570 KB	3/5/07 12:00:00 AM
<a href="#">SUNY_098052595.csv.gz</a>	570 KB	3/5/07 12:00:00 AM

**Data Upload:**

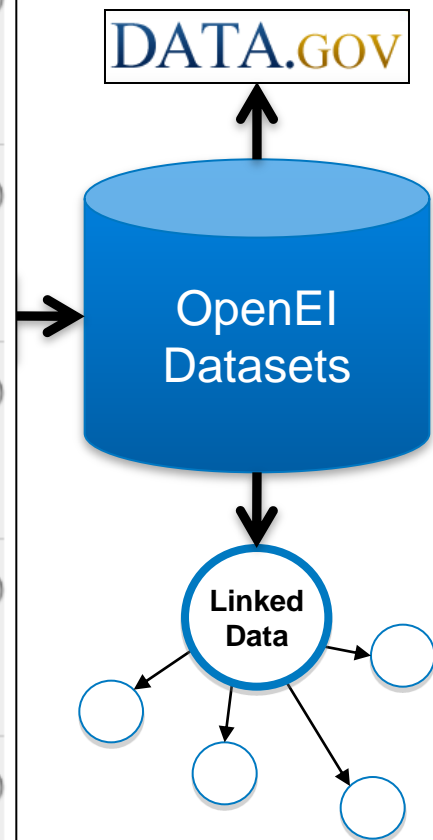
Choose File No file chosen Upload  
 Maximum Filesize: 256 MB  
 Allowed Extensions: txt zip xml csv xls xlsx

Choose File No file chosen Upload  
 Maximum Filesize: 256 MB  
 Allowed Extensions: txt zip xml csv xls xlsx

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 Maximum Filesize: 256 MB  
 Allowed Extensions: txt zip xml csv xls xlsx

Choose File No file chosen Upload  
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 Allowed Extensions: txt zip xml csv xls xlsx

Choose File No file chosen Upload  
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 Allowed Extensions: txt zip xml csv xls xlsx



# What is Linked Open Data?



Typical Websites Without Linked Open Data



With Linked Open Data

# Linked Open Data on OpenEI

- more than 55,000 content pages
- more than 600 downloadable datasets
- regional gateways on a variety of energy-related topics

*Check out our Country Pages to see linked open data in action!*

The screenshot displays the OpenEI website interface. At the top, there's a navigation bar with 'OpenEI | OPENENERGYINFO' and a user login 'Welcome Jweers | Log out'. Below this is a secondary navigation bar with 'Wiki', 'Datasets', and 'Linked Data'. The main content area is titled 'India: Energy Resources' and features a map of India with various energy resource indicators. To the left, there's a 'Browse By Region' section with a world map. Below the main map, there's a section for 'Energy Maps featuring India' with three thumbnail images of solar resource maps. On the right side, there's a 'Country Profile' table with the following data:

Country Profile	
Name	India
Population	1,028,610,328
GDP	\$1,843,000,000,000
Energy Consumption	19.95 Quadrillion Btu
2-letter ISO code	IN
3-letter ISO code	IND
Numeric ISO code	356
UN Region <sup>[1]</sup>	Southern Asia
<b>OpenEI Resources</b>	
Energy Maps	72 view <a href="#">↗</a>
Tools	20 view <a href="#">↗</a>
Programs	43 view <a href="#">↗</a>
Energy Organizations	63 view <a href="#">↗</a>
Research Institutions	2 view <a href="#">↗</a>
<b>References</b>	
CIA World Factbook, Appendix D <sup>[2]</sup>	

Below the profile table, there's a '2 News Articles' section with the following items:

- India makes a sizable investment in Hydro
- India taps into its massive solar potential

At the bottom of the page, there's a brief description of India: 'India, officially the Republic of India; see also the official names of India, is a country in South Asia. It is the seventh-largest country by geographical area, the second-most populous country with over 1.2 billion people, and the most populous democracy in the world.'



# Featured LOD Functionality

## Reegle Policy and Regulatory Overview

The screenshot illustrates the LOD (Linked Open Data) functionality on the OpenEI website. The main page, titled "India: Energy Resources", features a map of India and a sidebar with navigation options like "Country", "Population", "GDP", "Energy Consumption", etc. A zoomed-in view of the "reegle Policy and Regulatory Overview" page is shown on the right, highlighting specific data points and text.

**reegle Policy and Regulatory Overview** [3] [edit]

**India Policy and Regulatory Overview** ▲

**Extend network** [edit]

Population Access to Electricity (2008): 64.5%

Rural: 52.5%  
Urban: 93.1%

The Integrated Energy Policy states that "Access to electricity is very uneven. Around 57% of rural and 12% of urban households i.e. 84 million households (over 44.2% of total) did not have electricity in 2000. Even those who have access to electricity suffer from shortages and poor quality of supply. Unscheduled outages, load shedding, fluctuating voltage and erratic frequency are common. Consumers and the economy bear a large burden of the consequences of this poor quality of supply." Currently, some 404.5 million people do not have electricity. The majority of electricity transmission infrastructure is operated at 132 kV or above, and five regional grids serve the country, connecting the Northern, Southern, Western, Eastern and North-Eastern regions.

**Energy procedure** [edit]

The policies and plans are developed on a five-year basis, apart from the annual plans. Each department/ ministry prepares plans, which go as inputs to the 'Five Year Plan' prepared by the Planning Commission of India. The government is also developing a scheme for energy efficiency trading as part of its National Action Plan on Climate Change. Under the proposed scheme of Perform, Achieve, Trade (PAT), specific industries would be required to commit to energy-intensity reductions, and the government will give trading certificates to entities successful in meeting their goals. Penalties for non-compliance are mentioned under the proposed plan, but not mandated. Ultra Mega Power Projects (UMPP) are a series of ambitious power projects planned by the Government of India. The ultra-mega-power projects, each with a capacity of 4,000 MW or above, are being developed with an aim to bridge the current supply gap. The UMPPs are seen as an

# Behind The Scenes, LOD at Work

**India: Energy Resources**  
From Open Energy Information

Country Profile	
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Population	1,028,610,328
GDP	\$1,843,000,000,000
Energy Consumption	19.95 Quadrillion Btu
2-letter ISO code	IN
3-letter ISO code	IND
Numeric ISO code	356
UN Region <sup>[1]</sup>	Southern Asia

**OpenEI Resources**

Energy Maps	72 view
Tools	20 view
Programs	43 view
Energy Organizations	63 view
Research Institutions	2 view

**References**

- CIA World Factbook, Appendix D<sup>[2]</sup>

**2 News Articles** [edit]

- India makes a sizable investment in Hydro
- India taps into its massive solar potential

**43 Programs** [edit]

- UNEP-Low Carbon Transport in India
- WRI-India-Measurement and Performance Tracking (MAPT) Initiative
- Ecofys-India-Quantifying Emission Reduction Opportunities in Emerging Economies
- ESMAP-India-Options for Low Carbon

reegle profiles are consumed in real time using SPARQL

use of semantic concepts allows the correct profile to be pulled

SPARQL

**reegle Policy and Regulatory Overview** [3] [edit]

**India Policy and Regulatory Overview** [edit]

**Extend network** [edit]

Population Access to Electricity (2008): 64.5%

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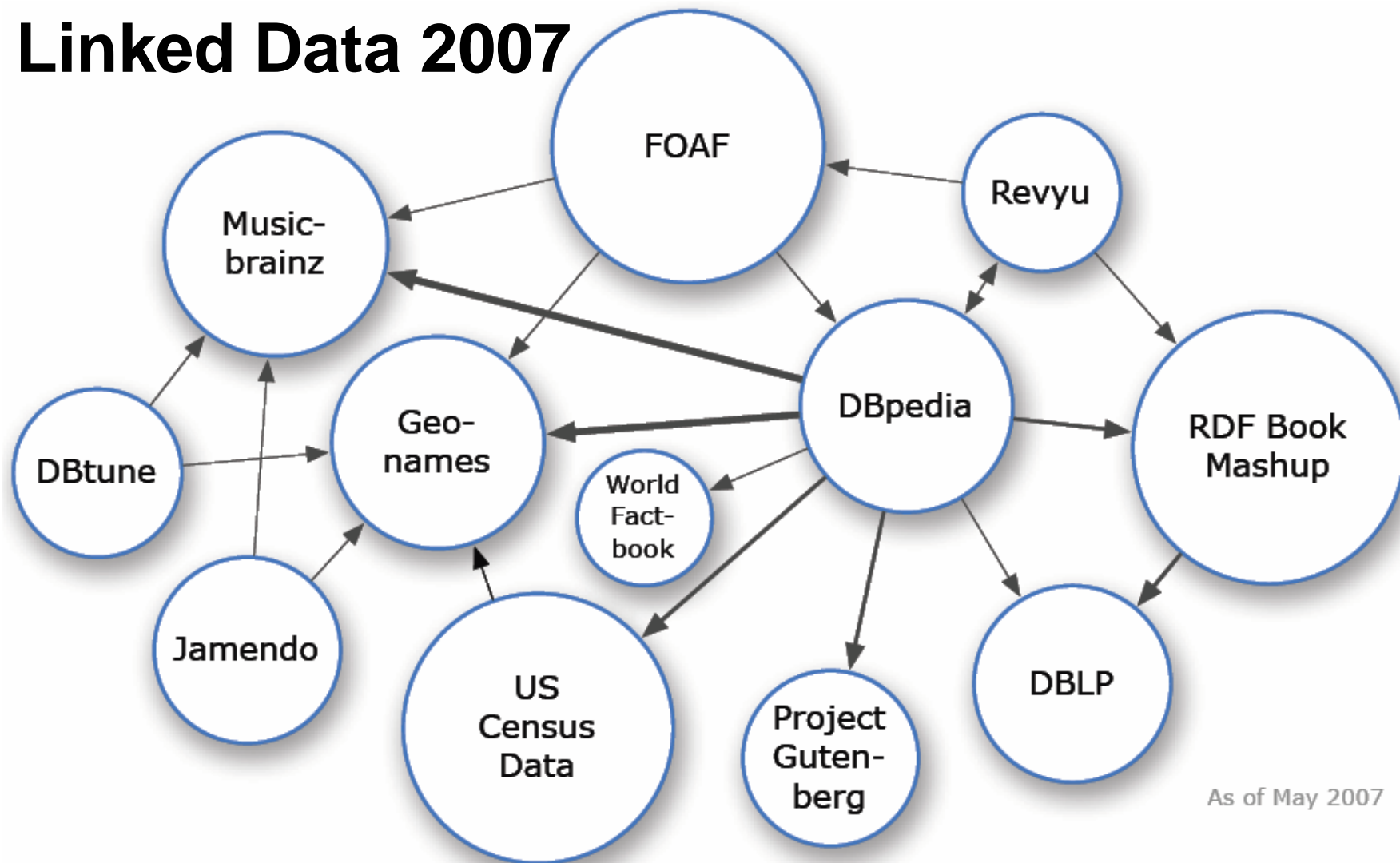
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- SPARQL Endpoint
- Print page
- Contact reegle

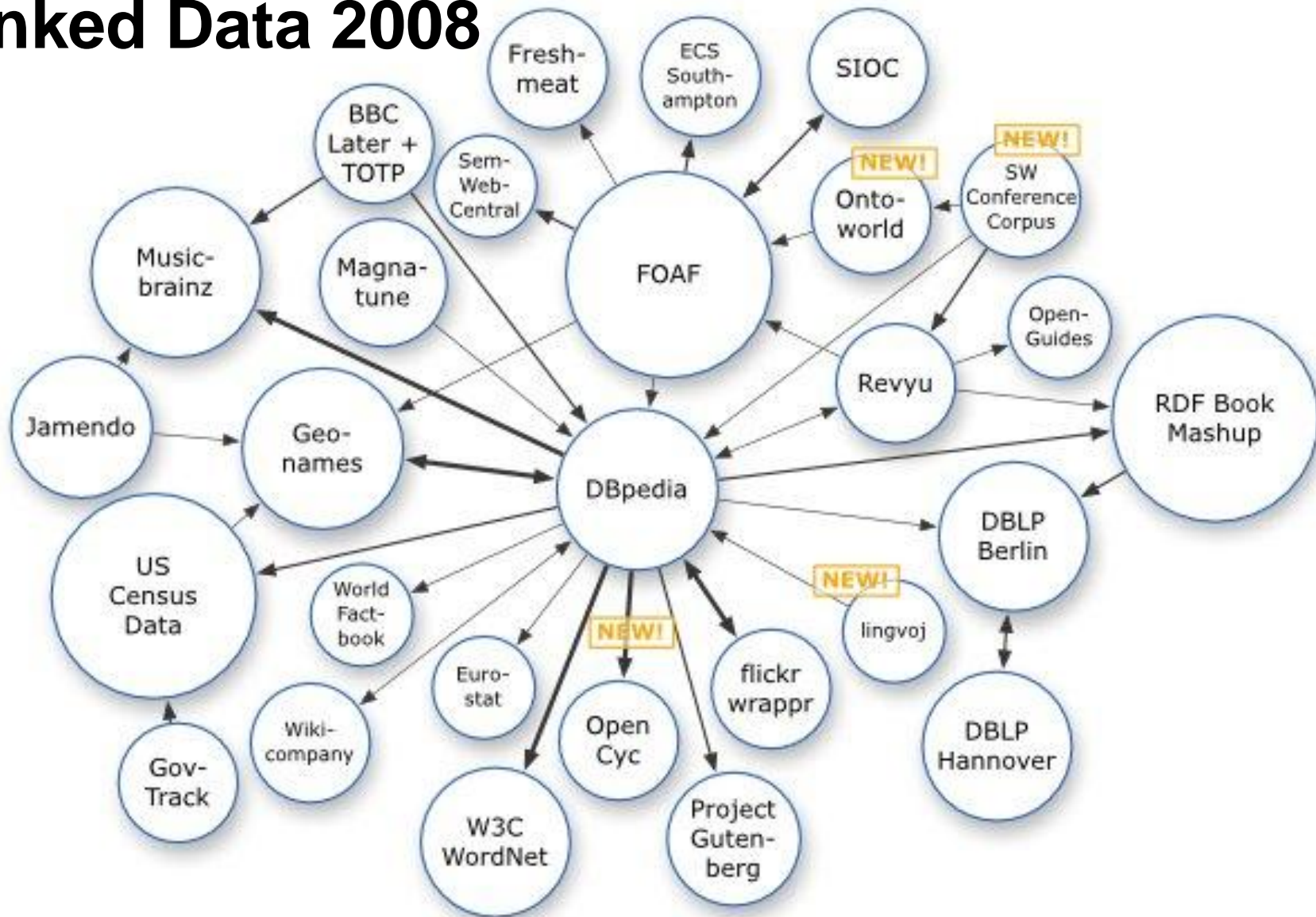


# Linked Data 2007

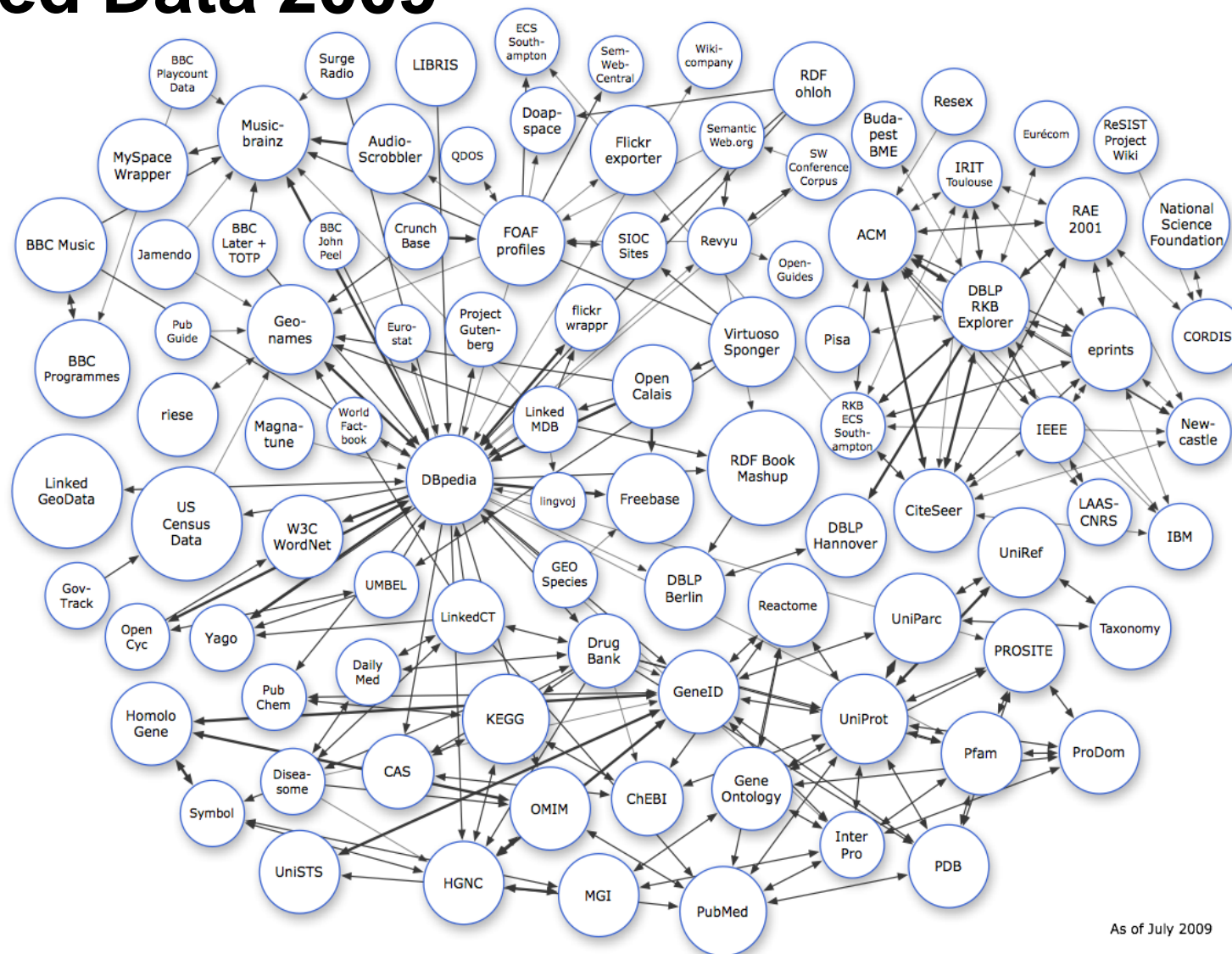


As of May 2007

# Linked Data 2008



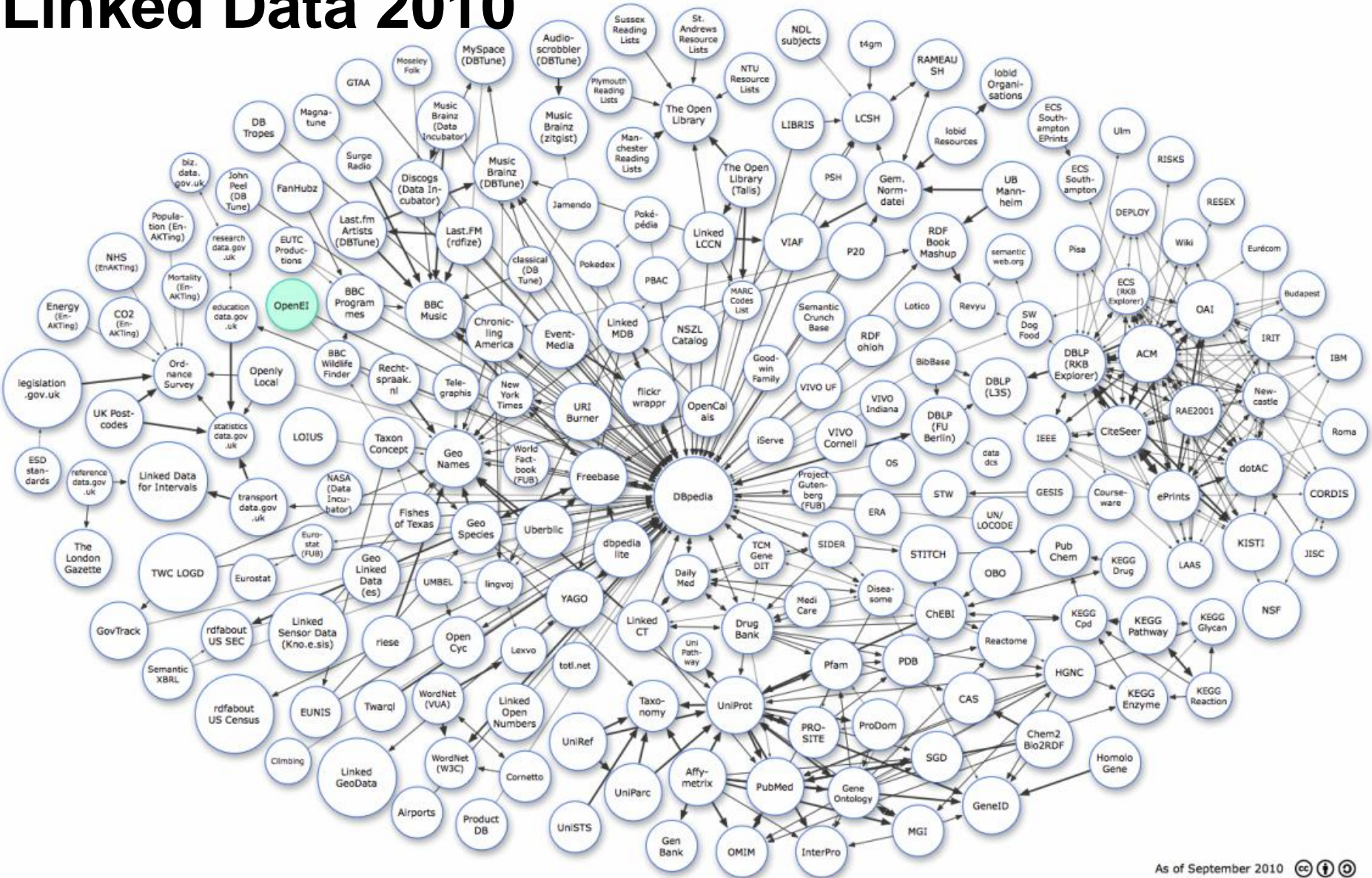
# Linked Data 2009



As of July 2009



## Linked Data 2010



As of September 2010 CC BY NC ND

# Unique Attributes

Publicly accessible text and information

<http://openei.org/wiki/Gateway:Solar>

Easy formats to read and sort

[http://openei.org/wiki/List\\_of\\_Companies\\_in\\_Solar\\_Sector](http://openei.org/wiki/List_of_Companies_in_Solar_Sector)

Visual mapping of data

[http://openei.org/wiki/Map\\_of\\_Solar\\_Power\\_Plants](http://openei.org/wiki/Map_of_Solar_Power_Plants)

Geographic boundary analysis

[http://openei.org/wiki/California's\\_12th\\_congressional\\_district](http://openei.org/wiki/California's_12th_congressional_district)

Collaborative, forms-based authoring

[http://openei.org/w/index.php?title=Advanced\\_Energy&action=formedit](http://openei.org/w/index.php?title=Advanced_Energy&action=formedit)

Facility to link external information

<http://openei.org/wiki/Wyoming>

Ability to track changes

[http://openei.org/w/index.php?title=Main\\_Page&action=history](http://openei.org/w/index.php?title=Main_Page&action=history)

Downloadable spreadsheets of information

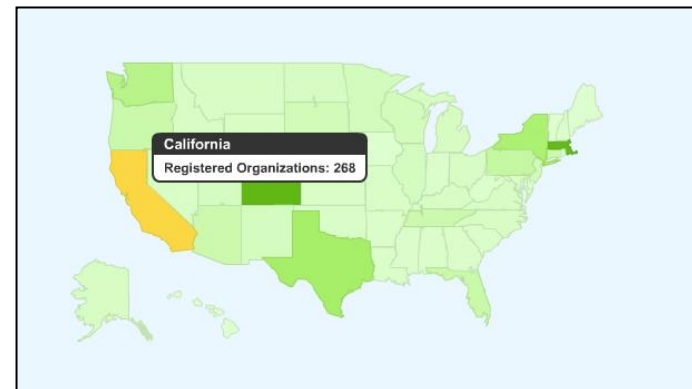
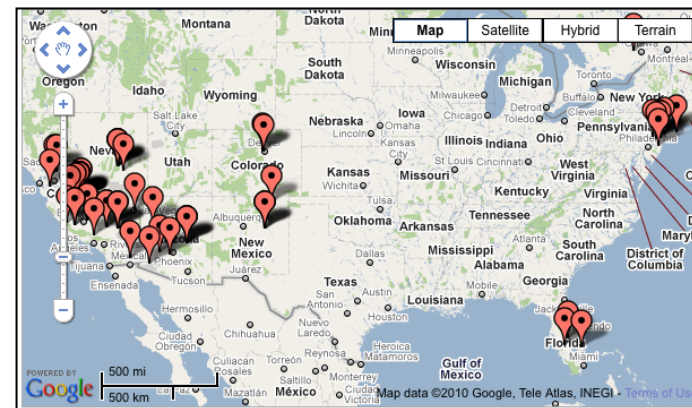
[http://openei.org/wiki/List\\_of\\_Companies\\_in\\_Solar\\_Sector](http://openei.org/wiki/List_of_Companies_in_Solar_Sector)

Machine-readable data services

<http://openei.org/sparql>

Companies in the Solar sector: [Download CSV](#)

Company	Address	Place	Zip	Product	Website	Region
1st Light Energy, Inc.	3224 McHenry Ave Suite F	Modesto, California	95360		<a href="http://1stlightenergy.com">http://1stlightenergy.com</a>	Southern CA Area
21-Century Silicon, Inc.	1681 Firman Drive, Suite 103	Richardson, Texas	75081-1881	Solar Grade Silicon >99.9999% purity	<a href="http://www.21-CenturySilicon.com">http://www.21-CenturySilicon.com</a>	Texas Area
4th Day Energy	30886 River Belle	Tollhouse, California	93667	Solar electric systems	<a href="http://www.4thdayenergy.com">http://www.4thdayenergy.com</a>	Southern CA Area
A1 Sun, Inc.		Berkeley, California	94707	solar energy systems	<a href="http://www.a1suninc.com/home.html">http://www.a1suninc.com/home.html</a>	Bay Area
A10 Power	775 E. Blithedale Ave., #125	Hill Valley, California	94941	Solar Financing and Integration	<a href="http://www.a10power.com">http://www.a10power.com</a>	Bay Area
ABC Solar, Inc.	24454 Hawthorne Blvd	Torrance, California	90505	Solar power systems, products	<a href="http://www.abc-solar.com/">http://www.abc-solar.com/</a>	Southern CA Area
AC Solar Inc	P.O. Box 128	Florence, Colorado	81226	Solar and wind sales for residential	<a href="http://www.acsolar.com/">http://www.acsolar.com/</a>	Rockies Area
ACME solar works	20738 Brown Lane	Summerdale, Alabama	36580	Solar power systems, products	<a href="http://www.acmesolarworks.net/">http://www.acmesolarworks.net/</a>	
AEE Solar	1155 Redway Drive PO Box 339	Redway, California	95560		<a href="http://www.aeesolar.com/">http://www.aeesolar.com/</a>	Bay Area







- ✓ **Transparent**
- ✓ **Participatory**
- ✓ **Collaborative**