Linked Open Data in Use
Linked Open Data in Clean Energy & for Sustainable Development
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Linked Open Data in Clean Energy
Potentials, Benefits, Real World Examples

reegle.info – we are open!
The data hub for clean energy & sustainable development

(Linked Open) Controlled Vocabularies
What is this & what is this good for?!

Linked Open Vocabularies in Use
Open Data, Examples & Outreach
Electricity Generated from Renewable Sources

Percent of gross electricity consumption
LOD in Clean Energy

Energy Statistics

Europe

Electric power consumption (kWh per capita) 2009

Source: Statistics - Worldbank

SEMANTIC WEB COMPANY
reep renewable energy & energy efficiency partnership
LOD in Clean Energy
LOD in Clean Energy

OUR PAST

Burning fossil fuels such as coal, gas and oil have dramatically increased the amount of carbon dioxide in the Earth's atmosphere and temperatures are rising. As the world's need for energy will grow, the dependency on non-renewable energy sources must decline.

OUR FUTURE

Clean energy (any source of energy that causes little or no harm to the environment) needs to be the main source of energy in the future. If policies that are currently under consideration take effect, we can begin to increase the supply of clean energy by 2030.

RESOURCES
1. Global Warming (www.climatechange.net)
2. Clean Energy (www.cleanenergy.gov.uk)
3. Policies under consideration: Based on a plausible post-2012 climate policy framework to stabilize the concentration of global greenhouse gases at 450 ppm CO2 equivalent (2010 IEA Key World Energy Statistics pg. 48)
4. World Energy Supply Data (www.worldenergystat.org)
5. Other includes combustible renewables and waste, geothermal, solar thermal, tide, wave, etc.

http://awesome.good.is/transparency/web/1012/energy-submissions/linda-nakanishi/flat.html
It is often difficult to explain …

- Held a workshop for decision-makers in the clean energy field in Abu Dhabi, Jan 2012

- Published book 'Linked Open Data: The Essentials'

Why LOD in Clean Energy

Without Linked Open Data

- Stores all information in its own database
- Other sites have similar design pattern => Duplication of effort and information
- Both sites responsible for updating information => Potential for online community to be presented with conflicting information

Source: Jon Weers, NREL
Without Linked Open Data

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Using data from another site requires you to download a copy of it to install into your database.
Why LOD in Clean Energy

Without Linked Open Data

- Stores all information in its own database
- Other sites have similar design pattern => Duplication of effort and information
- Both sites responsible for updating information
  => Potential for online community to be presented with conflicting information

If the original site updates its data, the two sites become out of sync. How does the online community know which site is more accurate?
Why LOD in Clean Energy

With Linked Open Data

- Datasets are shared behind the scenes => Each site can focus on key data and import supplemental data
- Imported data updates automatically => Provides users with consistent information across multiple sites
- Other Websites can consume LOD resources to present new content in exciting and unanticipated ways

Source: Jon Weers, NREL
Why LOD in Clean Energy

With Linked Open Data

- Datasets are shared behind the scenes
  => Each site can focus on key data and import supplemental data

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  => Provides users with consistent information across multiple sites

- Other Websites can consume LOD resources to present new content in exciting and unanticipated ways

Data is shared at the database level. Updates to a linked database appear instantly on partner sites.

Source: Jon Weers, NREL
Why LOD in Clean Energy

With Linked Open Data

- **Datasets are shared behind the scenes**
  => Each site can focus on key data and import supplemental data

- **Imported data updates automatically**
  => Provides users with consistent information across multiple sites

- **Other Websites can consume LOD resources** to present new content in exciting and unanticipated ways

Third party websites can combine (or “mashup”) linked open data to form innovative content, or new data.

Source: Jon Weers, NREL
Summary: Why LOD in Clean Energy

There is a need to focus efforts
• We want to display all relevant information about a topic but need to focus on providing only the information we are subject matter experts.

We need to avoid replication
• Re-using existing datasets avoids replication of work already done and saves costs.

We want to reduced maintenance and effort
• Updates to linked open data are propagated instantly.

Our aim is to move towards semantic linkages and interoperability
• Concepts become part of the semantic web
  • Data mash-ups and utilizations never before imaged
  • SPARQL queries can span multiple data sources.
Well established information gateway for high quality information on renewable energy, efficiency and climate compatible development.

More than 220,000 users per month.

Data portal data.reegle.info launched in 2011

Available as Linked Open Data:

- key datasets including energy statistics
- over 1,700 stakeholders worldwide
- extensive glossary enriched with DBpedia linked data
- country energy profiles including policy & regulation data

http://www.reegle.info

... a LOD producer and consumer
Clean Energy Information
http://reegle.info

Open Data Portal
http://data.reegle.info
Controlled Vocabulary – what is this?

SKOS (Thesaurus)

• W3C Standard since 2009
• Based on Semantic Web standards
• Open for linking with additional linked data
What are the Benefits

• Simple but powerful model of a terminology ( = vocabulary)
• Offering semantics = meaning, thereby enable interoperability
• To put things in context by a semantic layer
• Easy to realise multilingualism ( = translated vocabularies)
• Provide common understanding
  – Different terminology used but 1 meaning (e.g. synonyms)
  – Same terminology used but different meaning (e.g. Apache)
Controlled Vocabularies - Use Cases

What is it good for – Use Cases

- Powerful categorisation and tagging mechanisms
- Powerful multilingual (semantic) search applications
- Thereby connecting islands (e.g. open data catalogues)
- Smart Glossary Services for better common understanding
- Linked Open Data publishing for re-use of a vocabulary
- Creating network effects by using same vocabularies
- Precise recommender services
Do controlled vocabularies matter?

.. why we use SKOS thesauri to optimise our services & system

Important Services

For what applications

Importance of SKOS

Can enterprises benefit of linked data

Read all survey results
Controlled Vocabularies & Open Data

Open Data in Use

- Strong need for standardisation
- Strong need for interoperability
- Strong need for multilingual solutions
- Strong need for cross catalogue search

Furthermore

- Publish and re-use of linked open vocabularies = open data
Examples: Linked Open Vocabularies

reegle.info clean energy portal - http://www.reegle.info/glossary

Wolters Kluwer Germany - http://vocabulary.wolterskluwer.de/

Education Service Australia - http://scot.curriculum.edu.au/

Geological Survey of Austria - http://resource.geolba.ac.at/

Coming soon: World Bank
## Test GUI Results

### Extracted Concepts

<table>
<thead>
<tr>
<th>Concept</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>photovoltaic power</td>
<td></td>
</tr>
<tr>
<td>concentrated solar power</td>
<td></td>
</tr>
<tr>
<td>wind</td>
<td></td>
</tr>
<tr>
<td>IRENA</td>
<td></td>
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<td>biomass</td>
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<tr>
<td>bioenergy</td>
<td></td>
</tr>
<tr>
<td>forestry</td>
<td></td>
</tr>
<tr>
<td>clean energies</td>
<td></td>
</tr>
</tbody>
</table>

### Synonyms:
- CSP, concentrating solar power,

### Associated Top Concepts:
- solar thermal
- renewable energy - sources, generation and components

### Containing Concept Schemes:
- Renewable Energy Thesaurus

### URI:
http://reegle.info/glossary/1367
Infos & Kontakt

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