

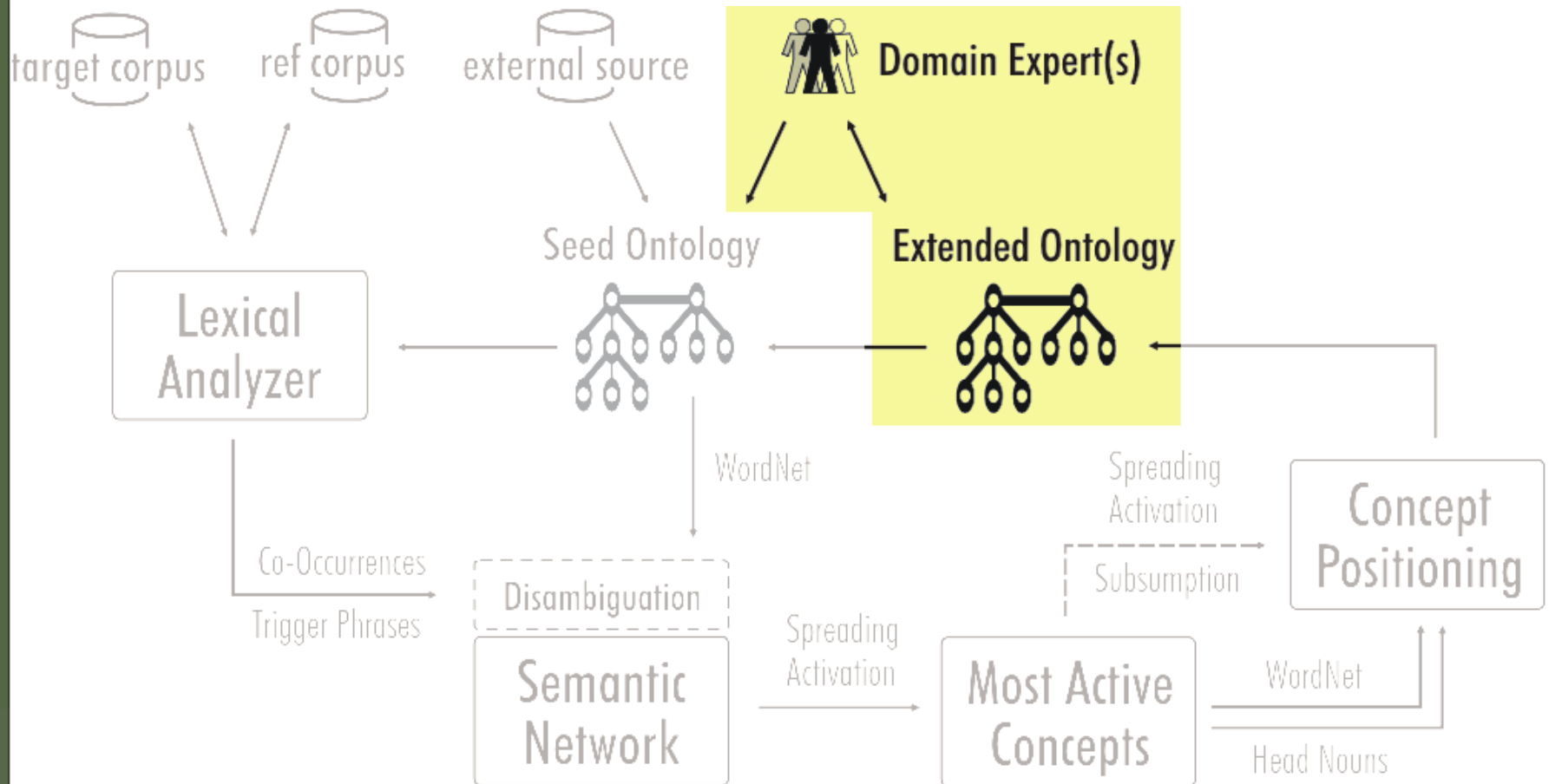
Semi-Automatic Ontology Extension Using Spreading Activation

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- **Ontology Extension**
- **Technical Design**
 - **Corpus creation** 
 - **Analysis methods**
 - **Co-occurrence, Trigger Phrases, WordNet**
 - **Concept selection and positioning**
 - **Spreading Activation**
- **Results**
- **Outlook**

- **Ontologies : support shared understanding**
- **Specific Domain Ontologies:**
 - **Creation: laborious process**
 - **Domain vocabulary develops**
 - **Ontology extension / refinement required**
- **Spreading activation: integrate different methods**
 - **co-occurrence, trigger-phrases, lexical dictionary, subsumption)**

Overview: Technical Design



Sentence Level

- **Renewable** (2 942 000)
- **Energy** (401 000)
- **Energy Sources** (229 000)

...

- **Reducing Renewable** (5000)
- **Shareholder Money** (5000)
- **Range Types** (5000)

Page Level

- **Renewable** (174 000)
- **Energy** (97 000)
- **Emissions** (28 000)

...

- **Funding** (1600)
- **Wilderness** (1500)
- **Framework Convention** (1500)

Trigger Phrases:

- Methane **IS A** greenhouse gas
- Energy sources **LIKE** gas, crude oil...

WordNet:

- Lexical dictionary
- Disambiguation (**Vector Space Model**) required

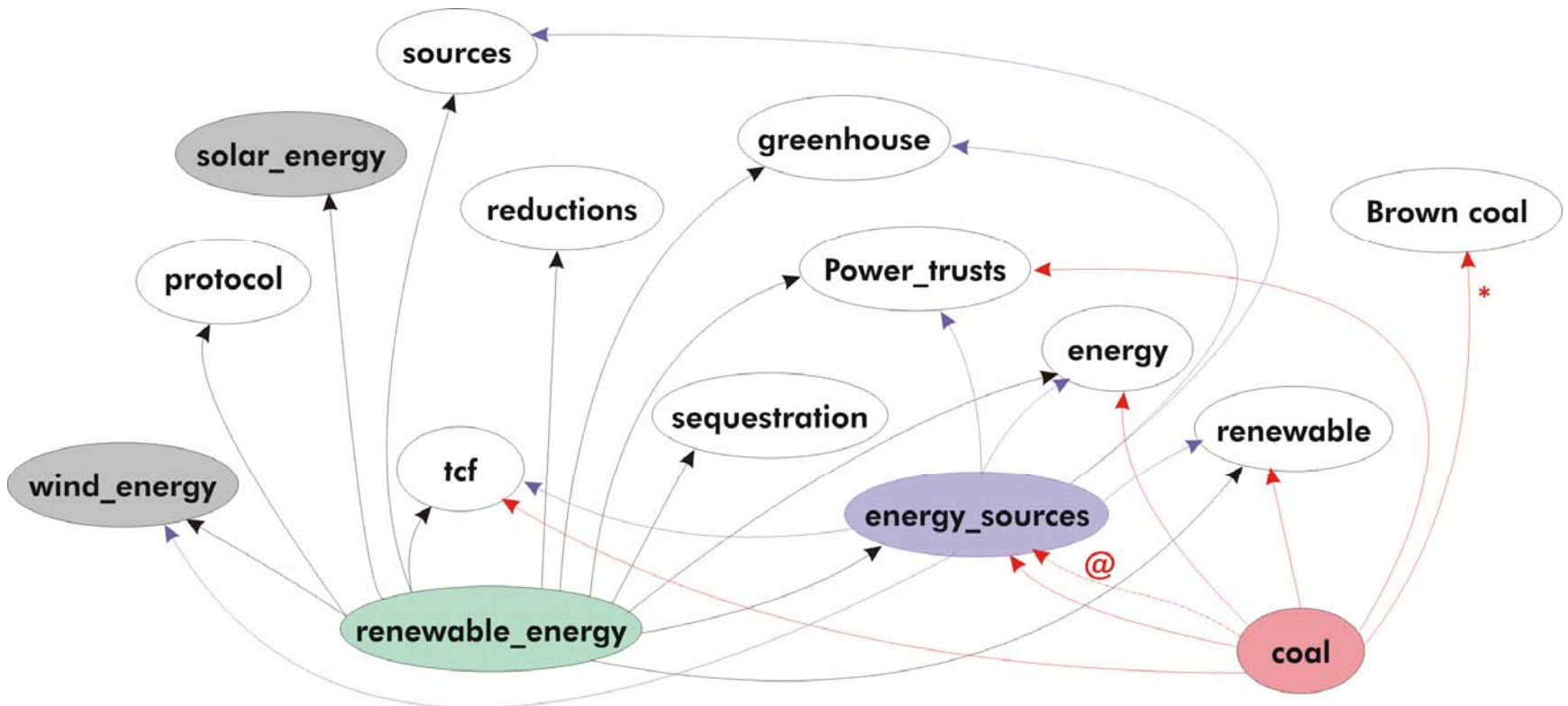
Trigger Phrases

- Mining Company
- Raw Materials
- Fossil Fuels
- ...
- Environment ministry
- Social Forum
- Warming danger

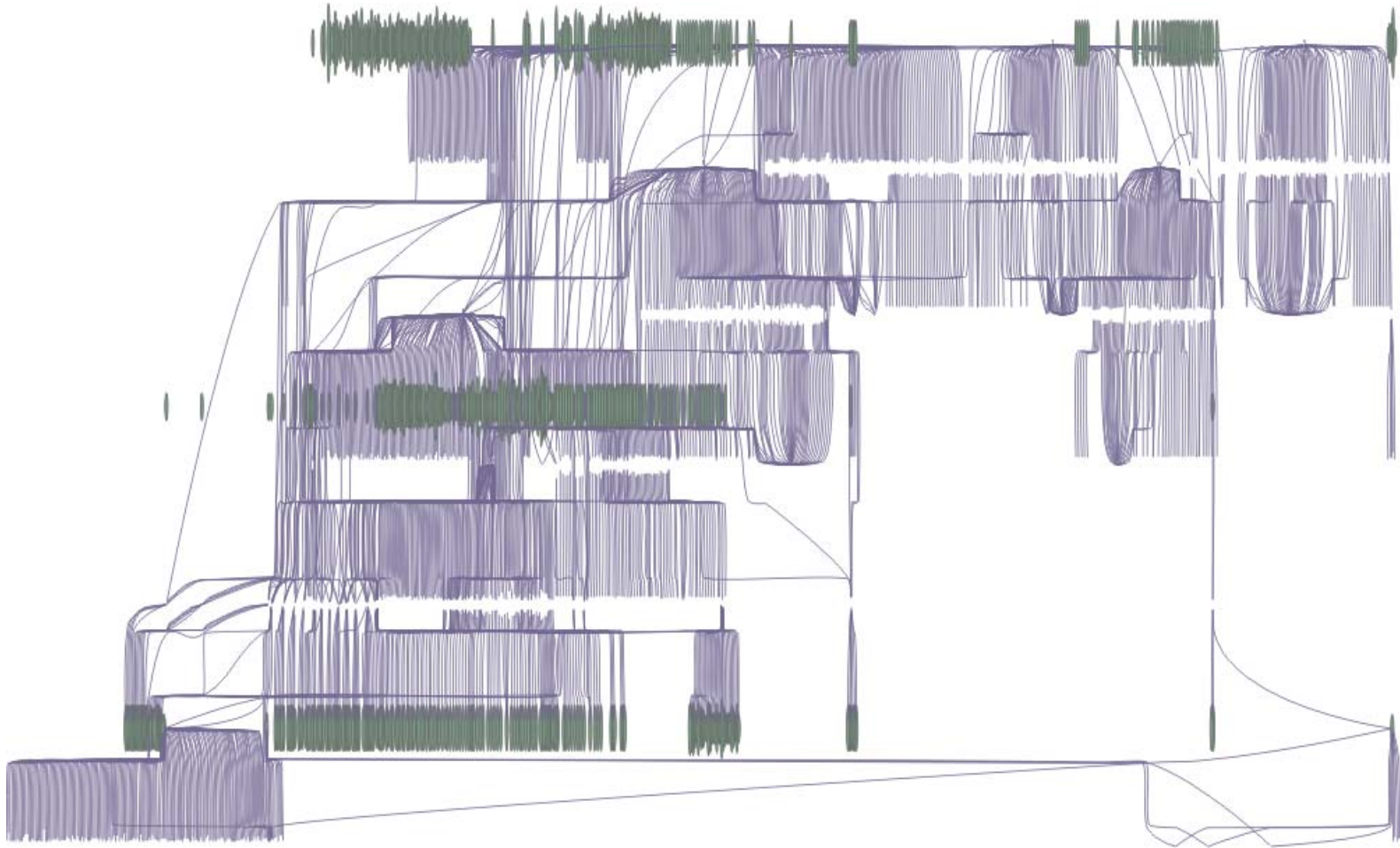
Wordnet

- Hyponyms :
 - Anthractice
 - Steam Coal
 - Brown Coal
- ...
- Synonym/Hypernyms
 - Sense 1: Fossil Fuel, Vegetable Matter
 - Sense 2: Ember, Coal

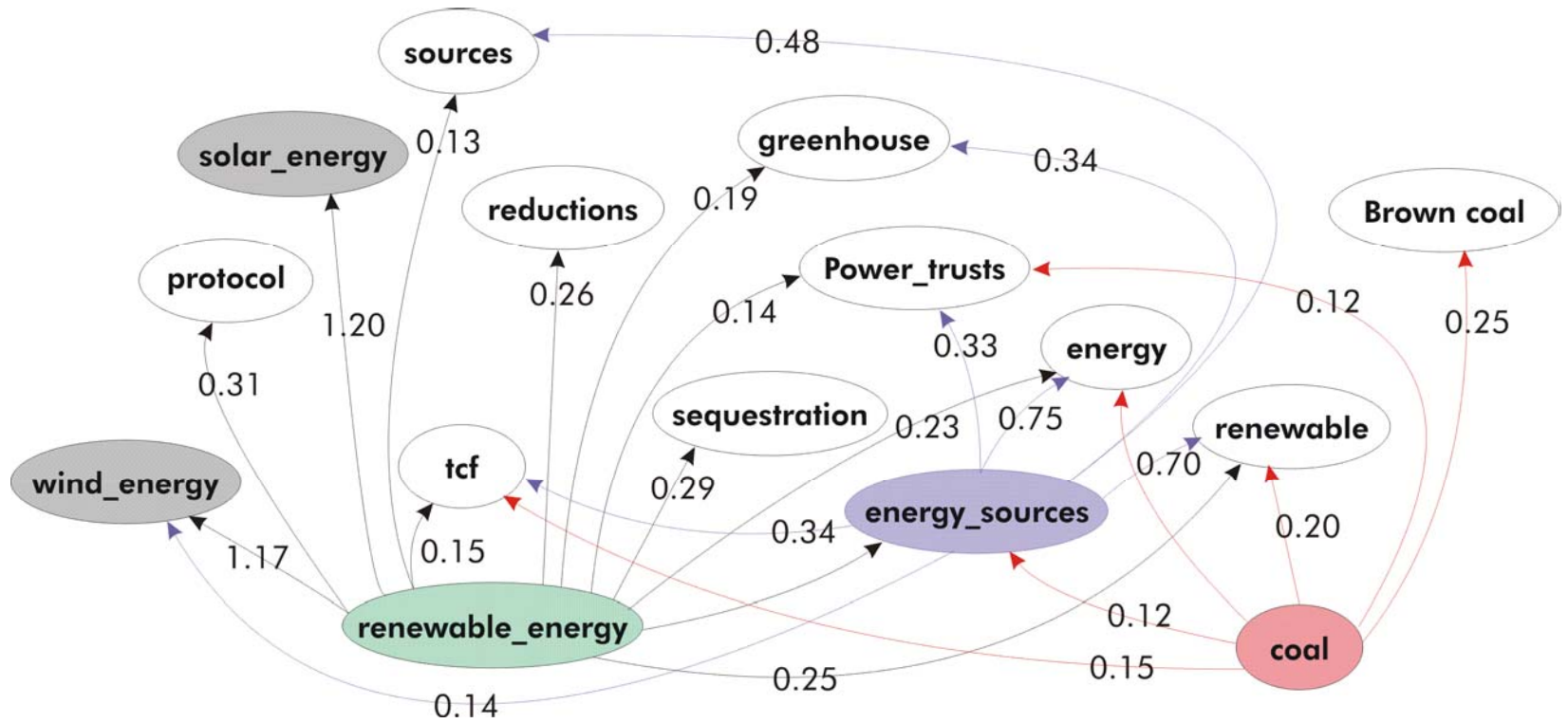
Combining Data: 1. Semantic Network



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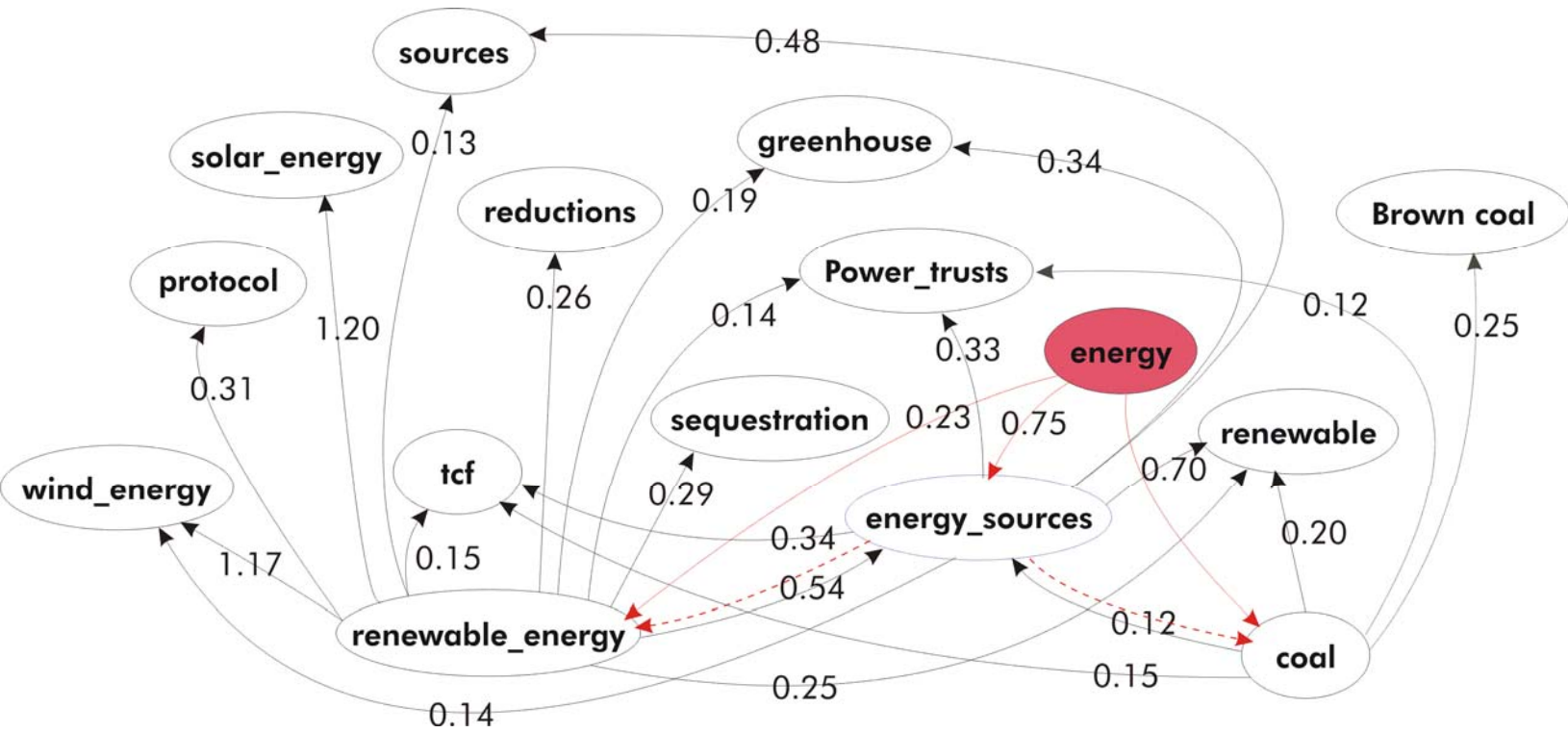


Combining Data: 2. Spreading Activation

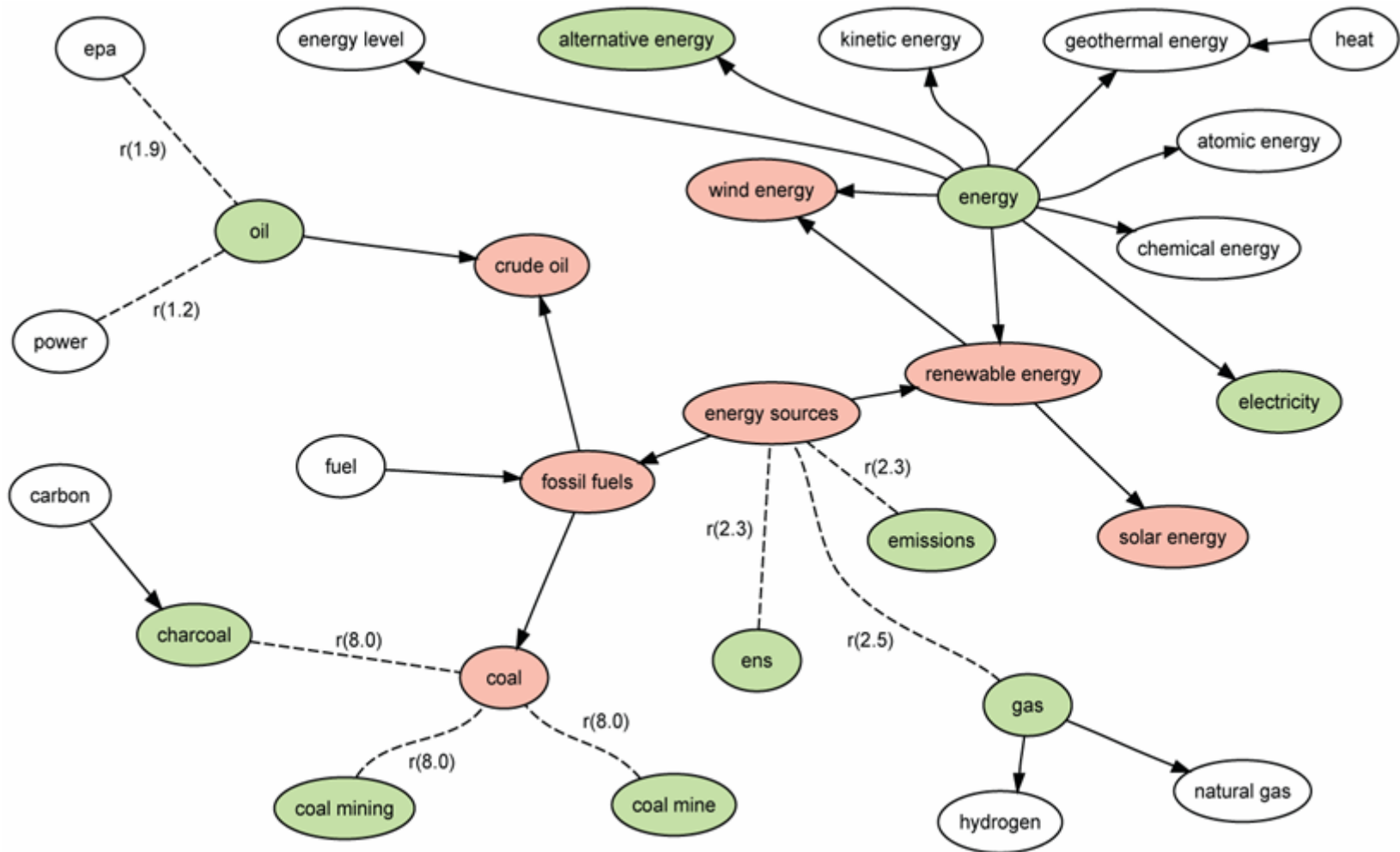


- **Head Nouns:**
 - Renewable Energy, Solar Energy → Energy
- **WordNet:**
 - Electricity → Energy
- **Spreading Activation**
 - closest related Node
→ no type of the relationship
 - Type: Subsumption: $P(x | y) > 0.8$ and $P(y | x) < 1$

New Nodes Positions



Result: Extended Ontology



- **Transformation: better defined heuristics**
- **Multicorpus Analysis**
- **Integration into the IDIOM Project**
Information Diffusion across International Online Media
 - Track the diffusion of Web Content.
 - Visualisation of Semantic Structures
 - Automated Ontology Extension



