USING NETWORKX TO 'VISUALIZE' CANADA'S LOW-CARBON ENERGY TRANSITIONS

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PYCONCA

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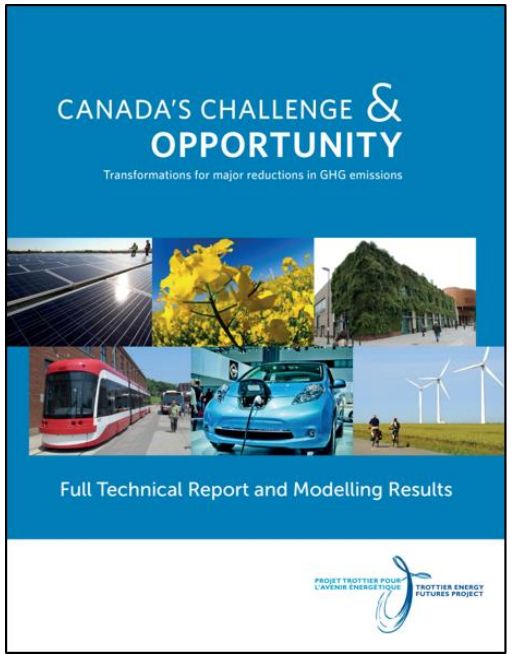
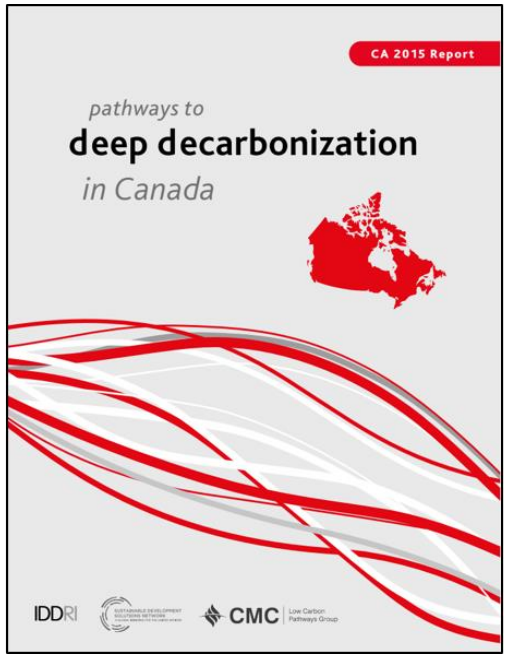
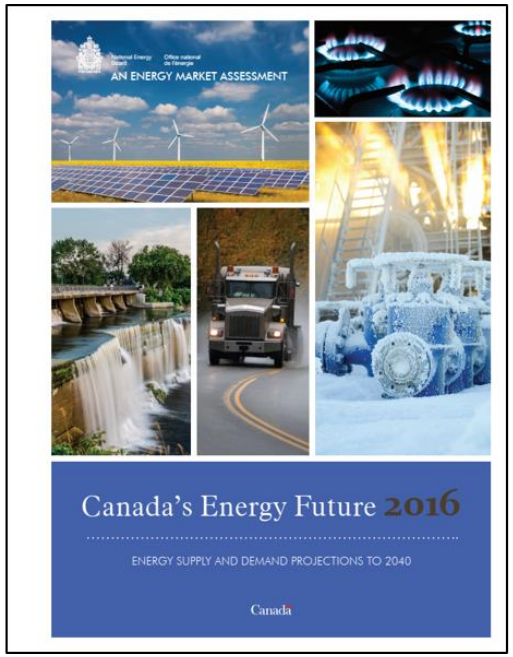
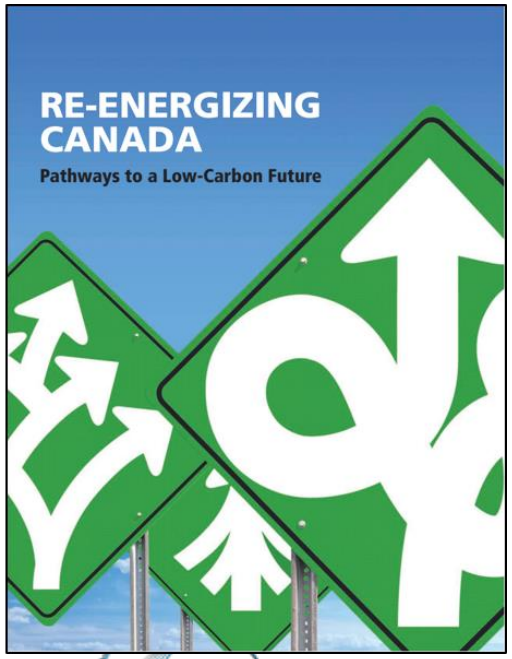
WHAT IS "LOW-CARBON ENERGY TRANSITION?"

FOUR ENERGY FUTURES REPORTS









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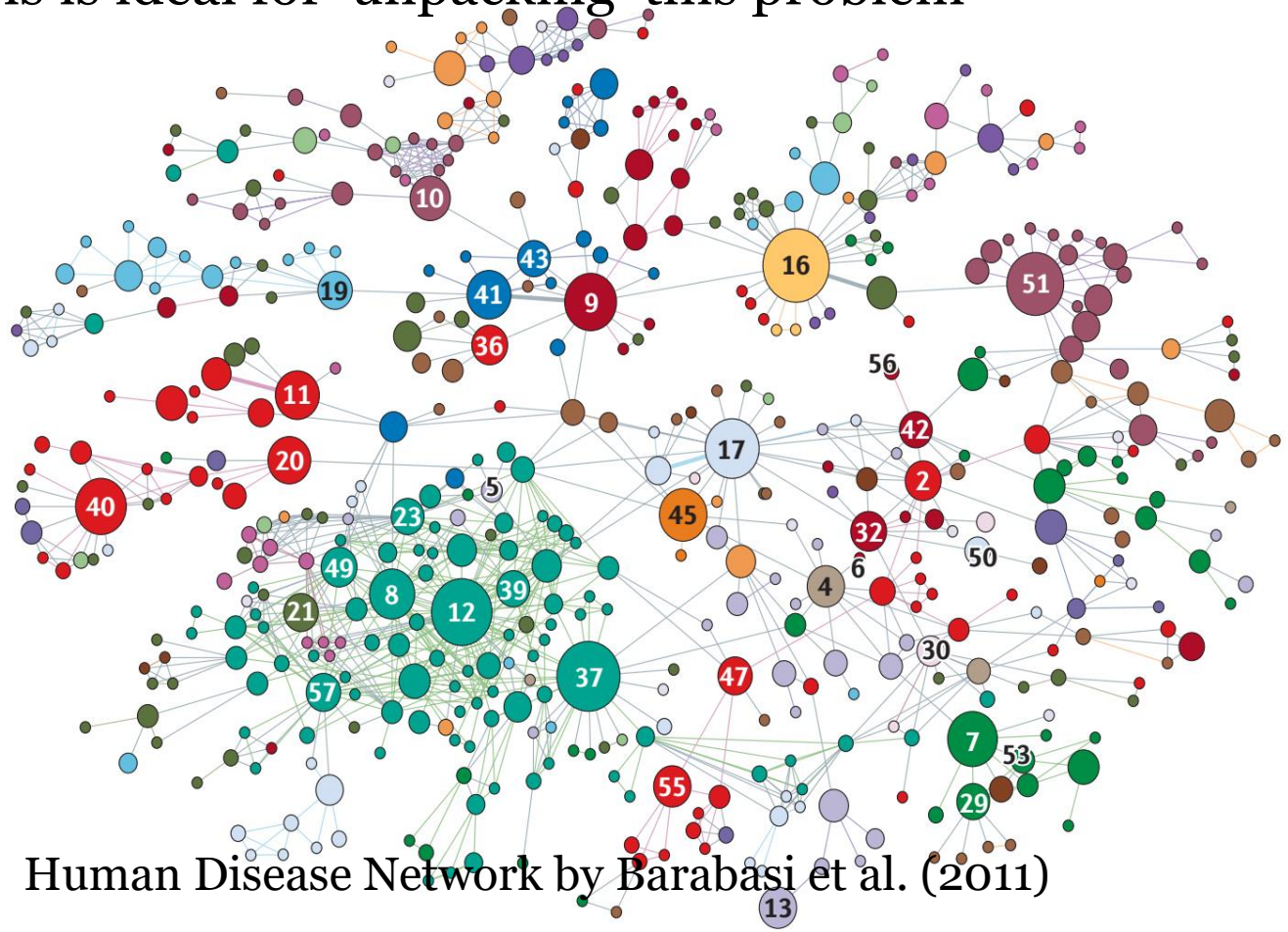
ANALYTICAL STEPS

- Network analysis is ideal for ‘unpacking’ this problem



Human Disease Network by Barabasi et al. (2011)

ANALYTICAL STEPS

- The analysis is implemented using NetworkX …

In [2]:
```
import networkx as nx
import community
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
%matplotlib inline
from matplotlib.patches import Polygon
```

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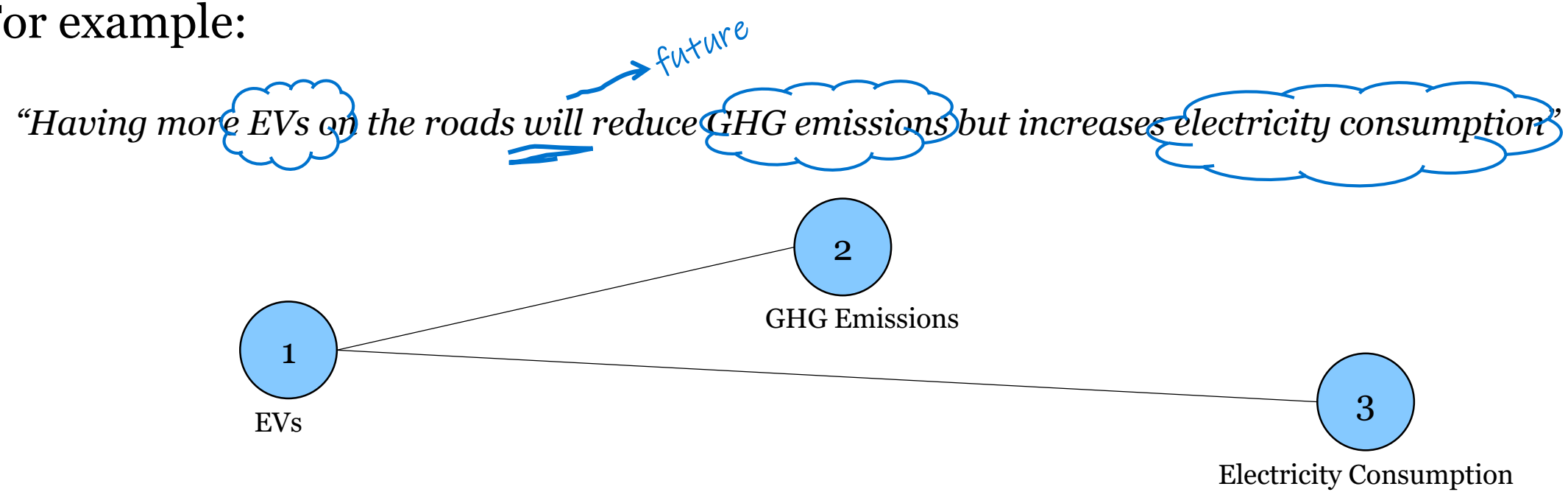
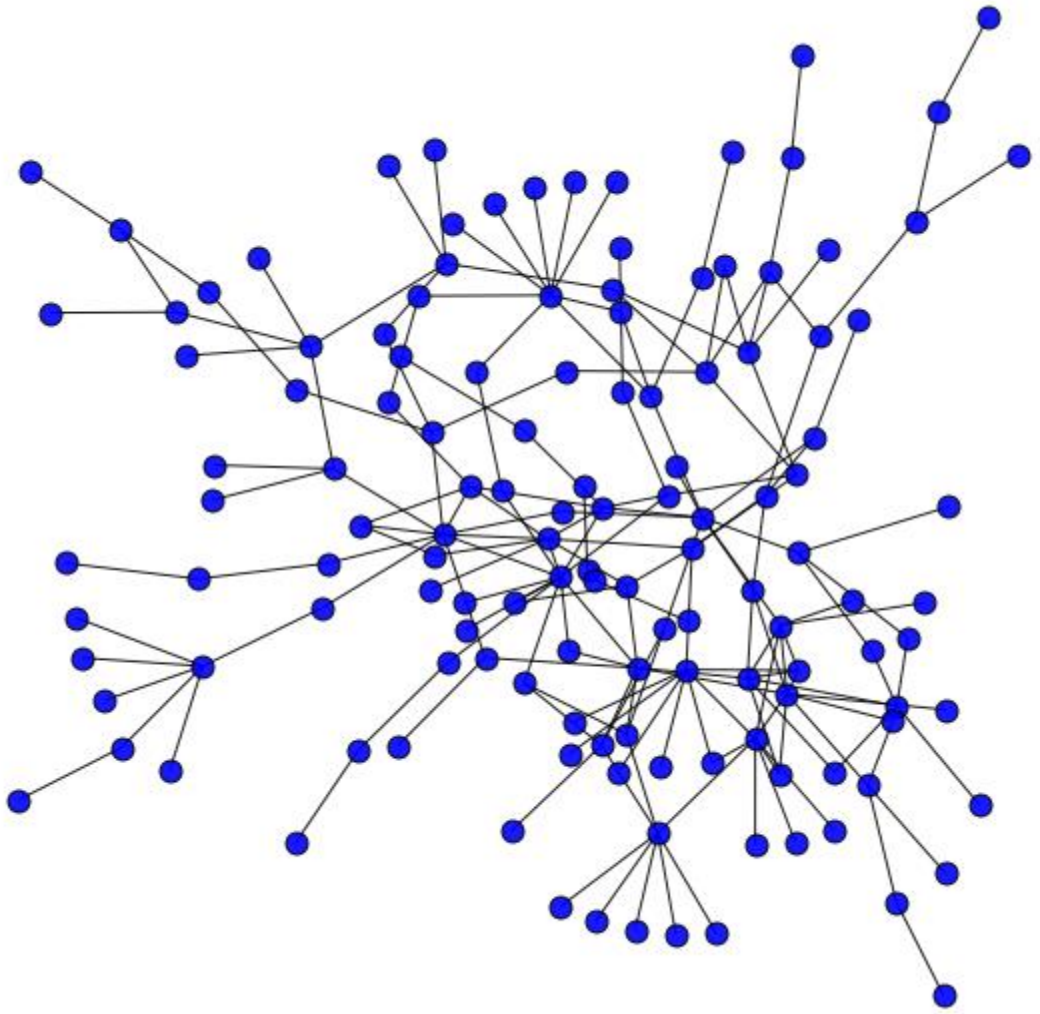
CREATING NODES AND EDGES

- Create a dataset from scratch…
- Read the reports line-by-line and extract statements…
- For example:



HARMONIZING FOUR CANADIAN ENERGY FUTURES: A MULTI-STUDY NETWORK



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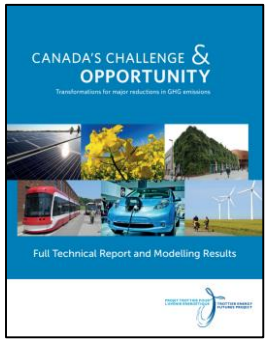
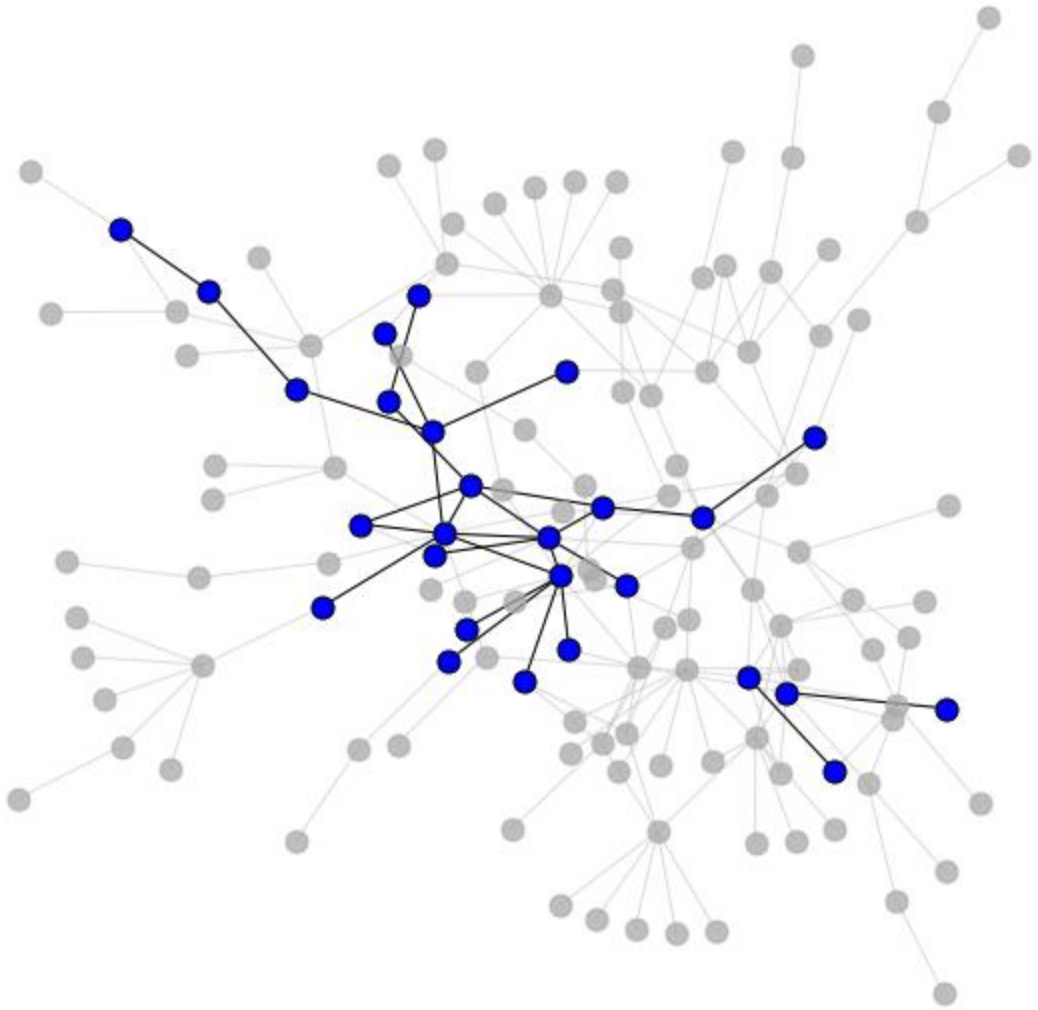
MULTI-STUDY NETWORK OF FOUR CANADIAN ENERGY FUTURES





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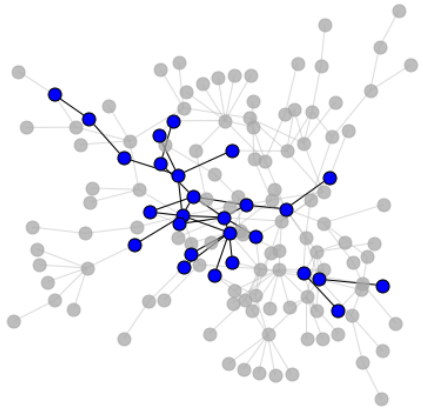
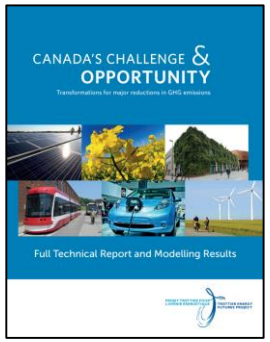
EXAMINE DIFFERENT PERSPECTIVES OF ENERGY FUTURES

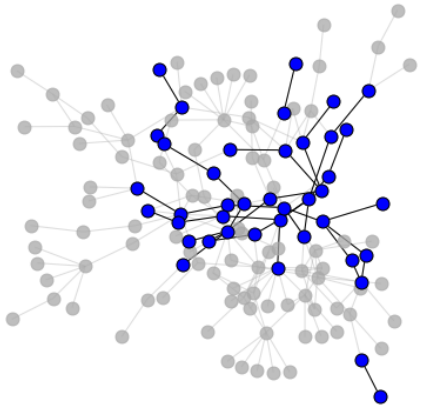
Trottier Energy Futures Project



1



Pathways to Deep Decarbonization in Canada



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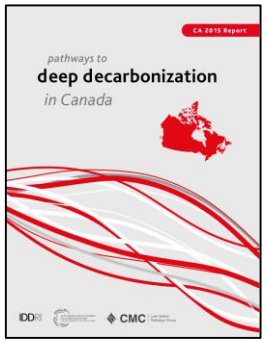
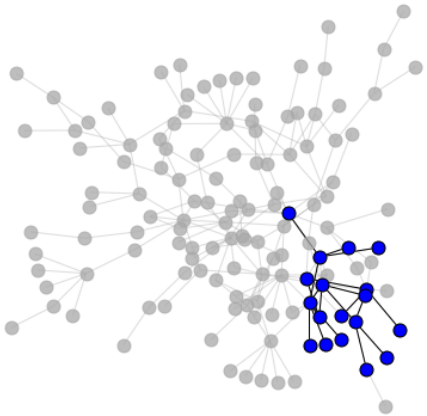


National Energy Board
Canada Energy Future 2016



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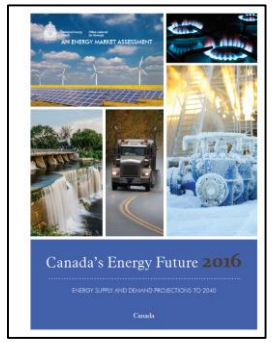
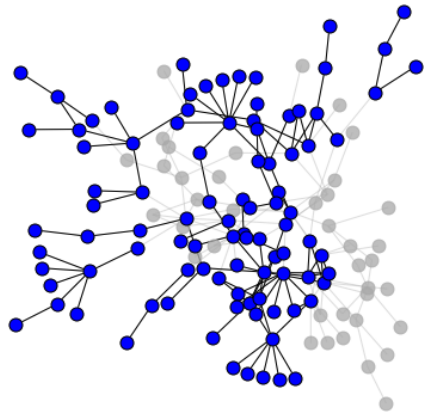


Re-Energizing Canada
Pathways to a Low-Carbon Future



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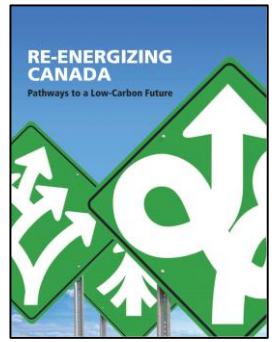
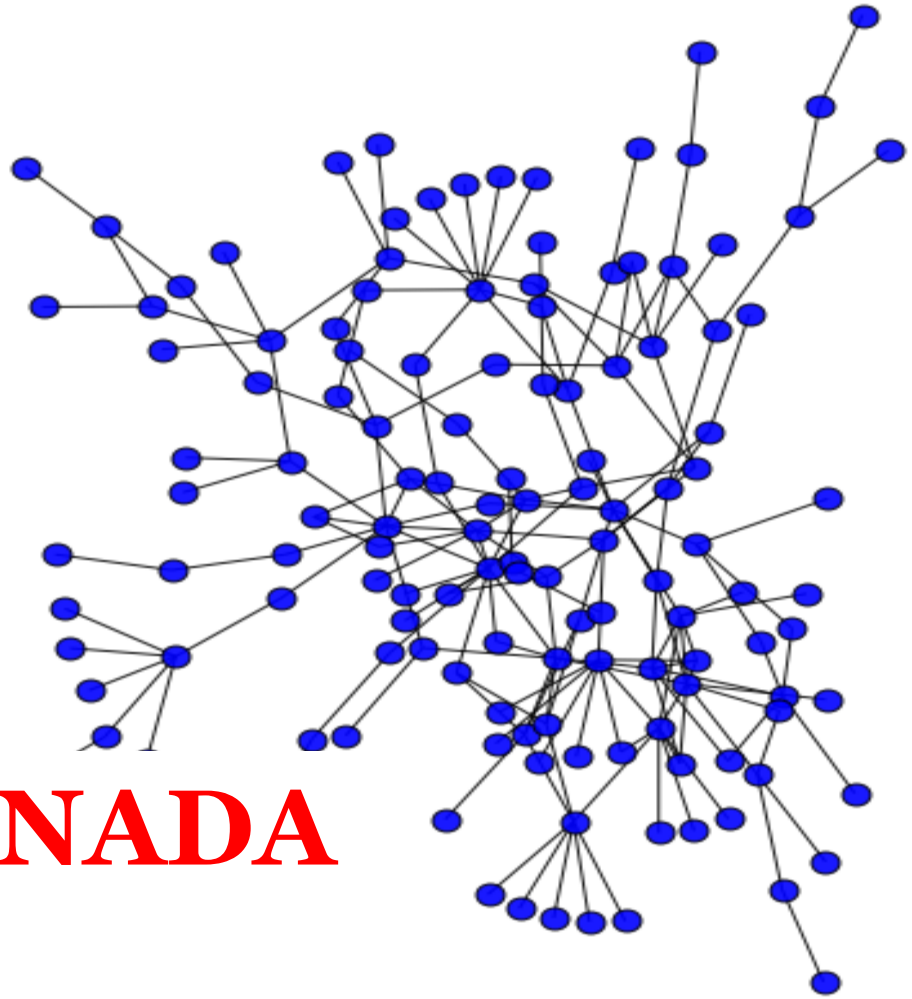
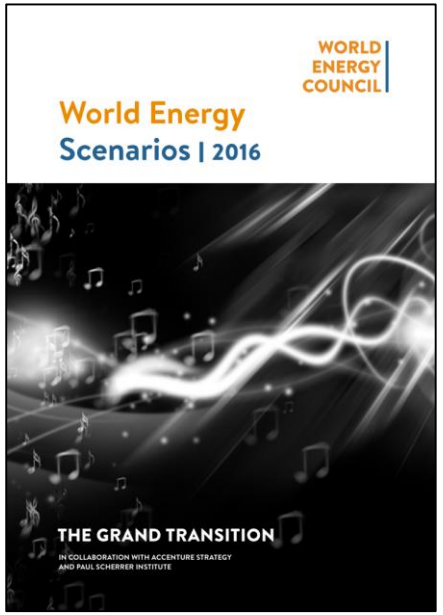


EXAMINE CROSS-SCALE CANADA/GLOBAL INTERACTIONS



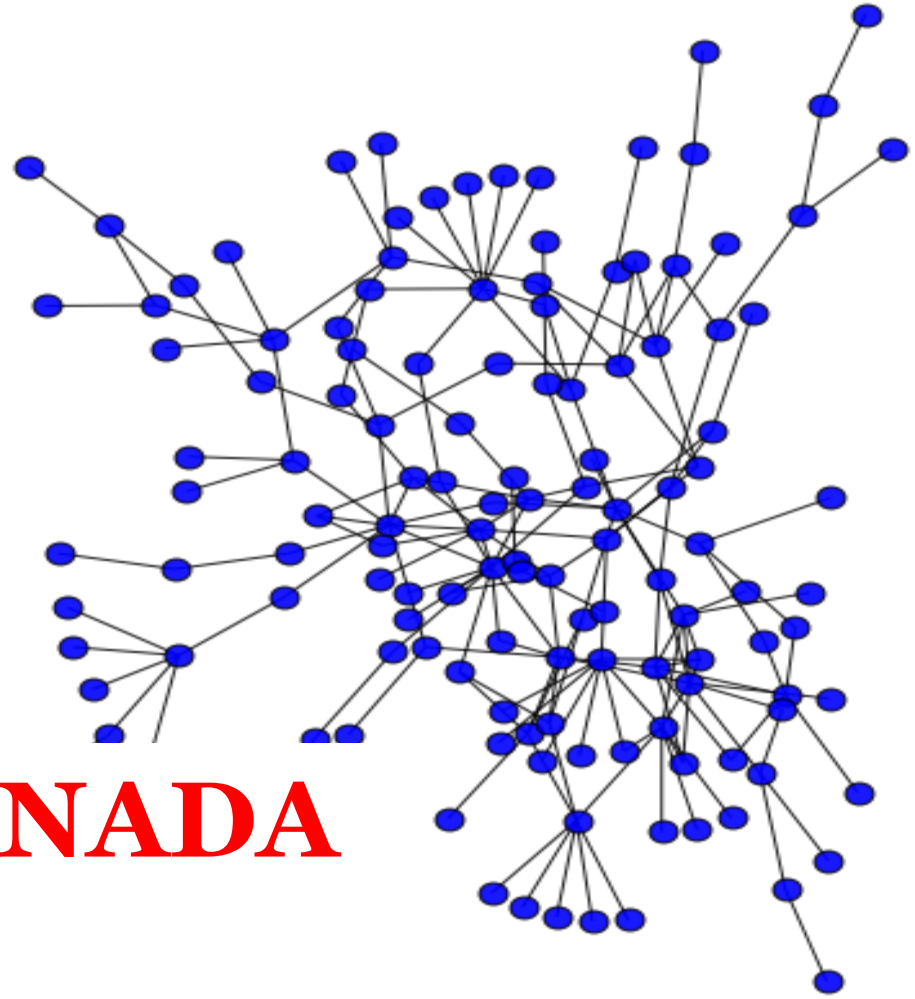
CANADA

+



GLOBAL

EXAMINE CROSS-SCALE CANADA/GLOBAL INTERACTIONS



CANADA

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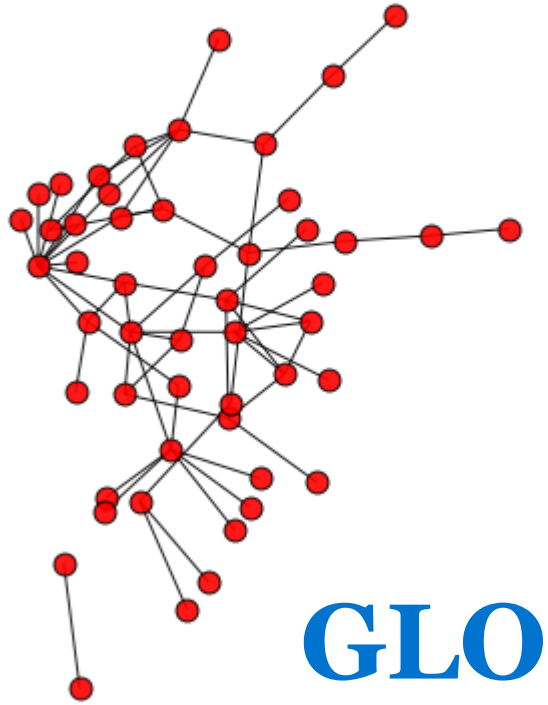
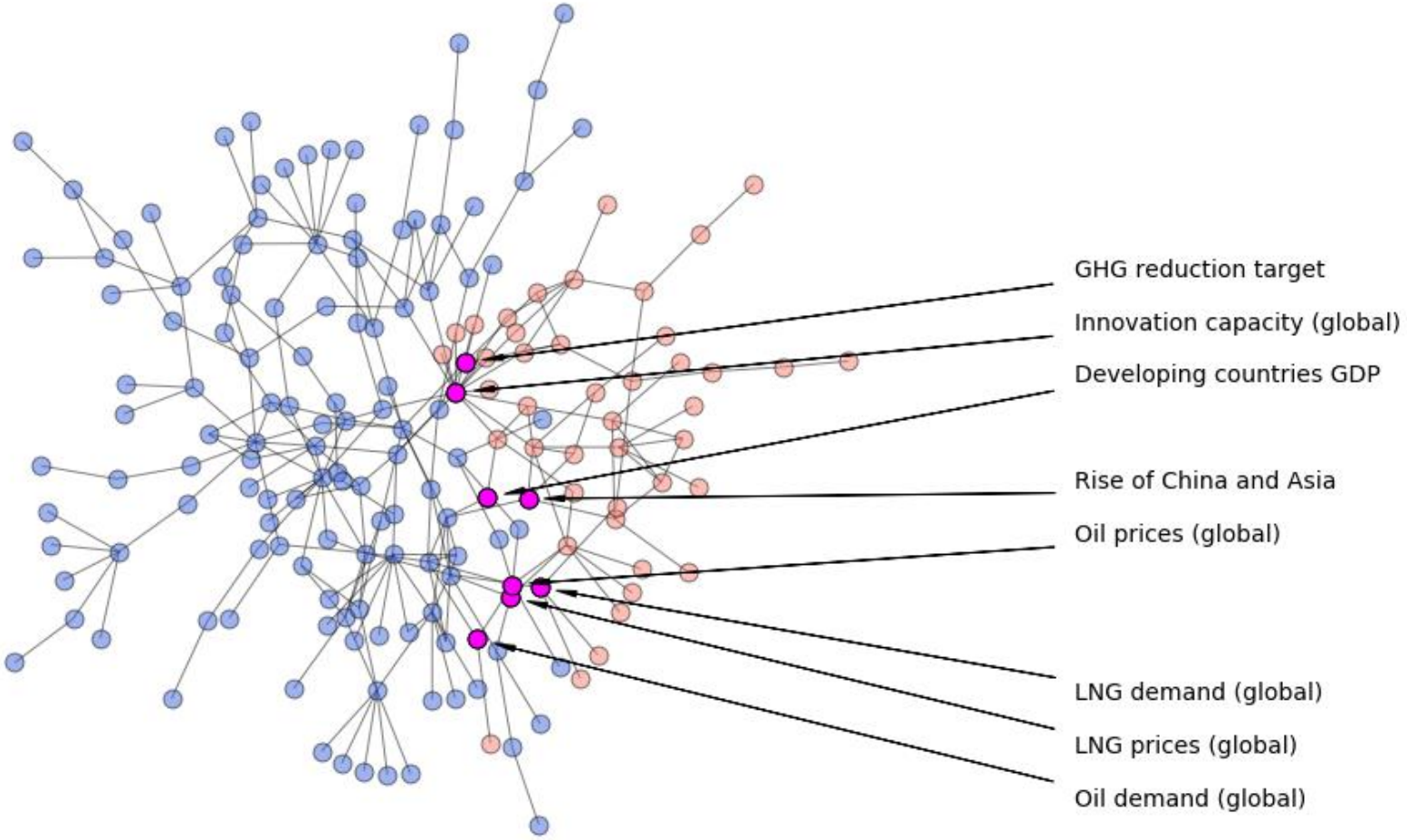


GLOBAL

EXAMINE CROSS-SCALE CANADA/GLOBAL INTERACTIONS



COMMUNITY DETECTION

- Understand a network at a modular level
- Nodes under the same community are well-connected to each other whereas nodes from different communities are sparsely connected
- Louvain method (Blondel et al., 2008) # pip install python-louvain (Do not use pip install community)

```
In [35]: partition_ca = community.best_partition(GSE4, randomize=False)
```

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COMMUNITY DETECTION FOR CANADA ENERGY FUTURES

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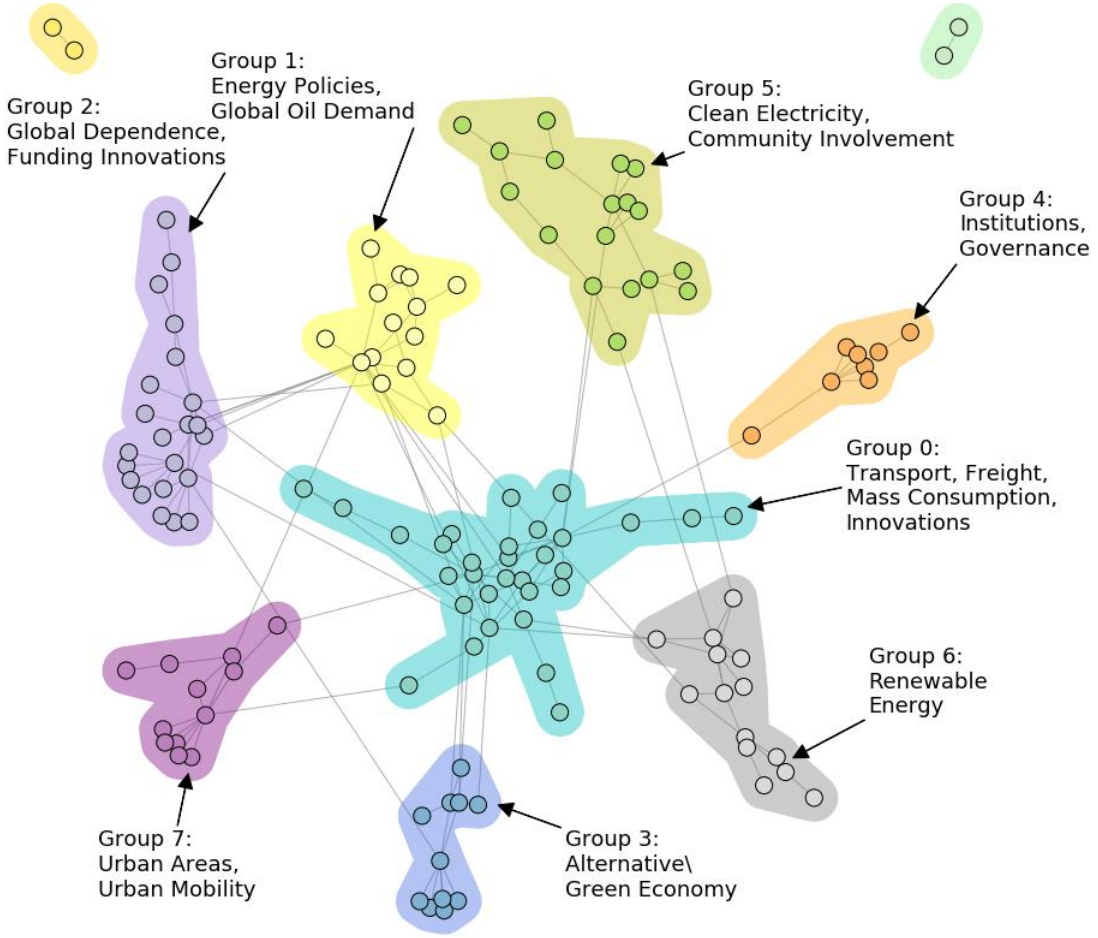
COMMUNITY DETECTION FOR CANADA ENERGY FUTURES



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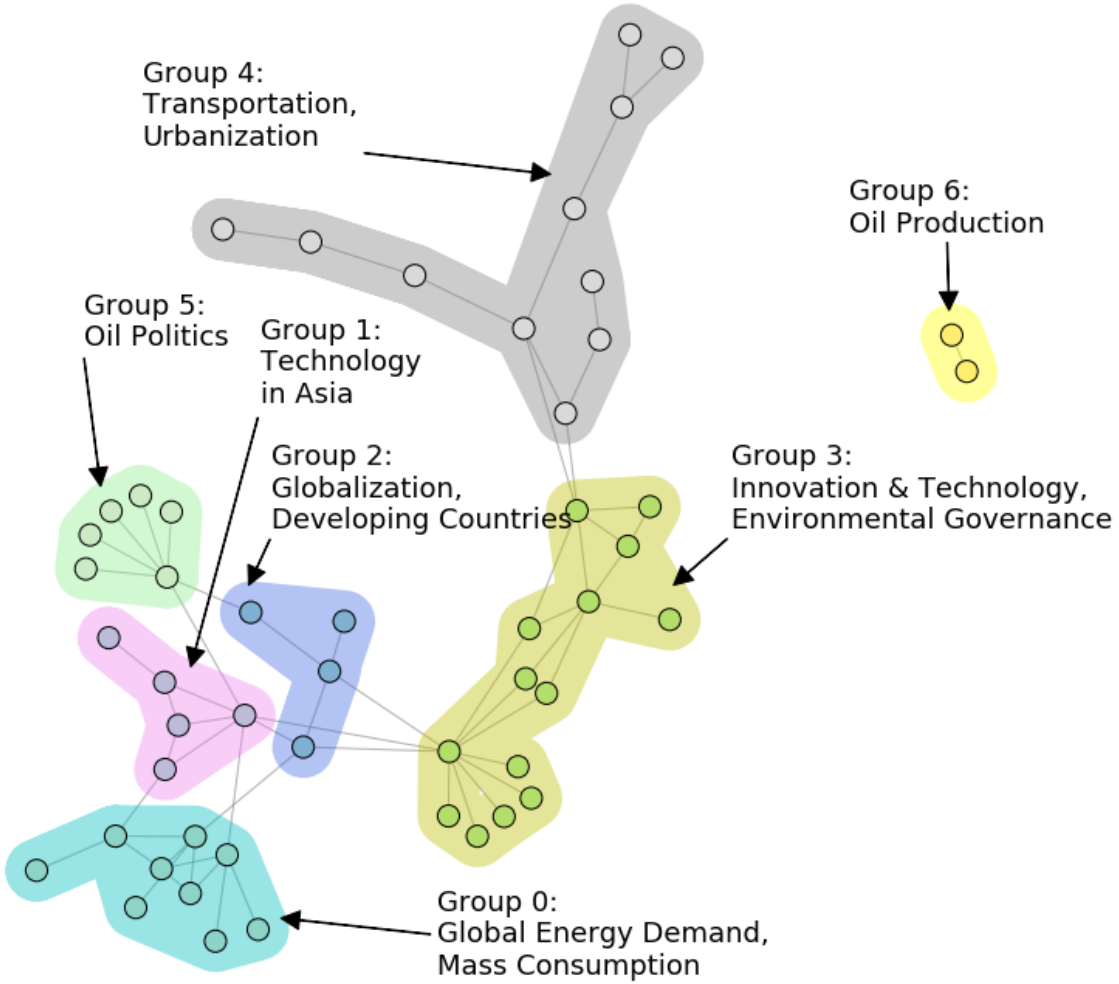
COMMUNITY DETECTION FOR GLOBAL ENERGY FUTURES



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TAKE AWAY

- Introduce wider analytical perspective
- Examine different perspectives of each study
- Examine interactions across scales
- Reveal modular structure of the network

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ACKNOWLEDGMENT

- Supervisor: Prof. Vanessa Schweizer (UofWaterloo)
- Special thanks to Prof. John McLevey (UofWaterloo)
- Research Funders Travel Award: ECC, NSERC and WICI

- Complete analytical steps posted at Github
  - **https://github.com/judekurn/energy-futures**
- **Follow me on twitter @JudeHKurniawan**

Thank You

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