

UNCOVERING MULTI-LEVEL GOVERNANCE AND POLICY IDEA TRANSFER IN ENERGY POLICY USING TOPIC MODELLING ON LARGE POLICY CORPUSES

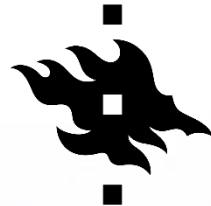
ARHO TOIKKA & KAROLIINA ISOAHO
UNIVERSITY OF HELSINKI
ISEE 2016



HELSINGIN YLIOPISTO

RESEARCH QUESTION

- How to measure policy change?
- How does the European Union discuss energy policy?
- How do activist citizens discuss energy policy?
- Are these similar or different?



EUROPEAN ENERGY POLICY CORPUS

- Current analysis: 615 European Union policy documents
 - Legislation, regulation, plan, road map, implementation etc.
 - 4 to 1200 pages, 500 to 500 000 words each
 - Total 4.5 million words (~5 * everything Shakespeare wrote)



EUROPEAN COMMISSION

Communication from the Commission

**ENERGY FOR THE FUTURE:
RENEWABLE SOURCES OF ENERGY**

White Paper for a Community Strategy
and Action Plan

COM(97)599 final (26/11/1997)

FACEBOOK CORPUS

- *New Energy Policy* Facebook Group
 - 5000 discussion threads, 70000 messages



HELSINGIN YLIOPISTO

TOPIC MODEL

Latent & modelled

Topic #1
word 1, prob
word 2, prob
..
word n, prob

Topic #2
..

Topic #3
..

Observed

Document #1

Document #2

Document #3

Document #4



HELSINGIN YLIOPISTO

Overall structure

Topics and technologies

Document relations

Topic relations

THE 2 TOPIC MODELS

- Preprocessing
 - Remove stopwords, numbers, etc.
 - EU: unit of analysis: document, no stemming
 - FB: unit of analysis: discussion thread, stemmed
- Fit using R packages topicmodels
 - Topic number selection by interpretability at 10, 15, .., 50
 - EU: 30 topics
 - FB: 20 topics



EXAMPLES: EU FOSSIL TOPICS

Natural gas transport	Nuclear waste	Coal & oil fuel	Natural gas
capacity	waste	coal	gas
gas	nuclear	energy	analysis
project	fuel	resources	cost
projects	spent	production	quality
interconnection	management	technology	Ing
new	safety	development	supply
pipeline	directive	european	costs
baltic	disposal	research	demand
infrastructure	national	well	natural
electricity	storage	figure	

EXAMPLES: FB FOSSIL TOPICS

Oil & gas	New Nuclear (Pyhäjoki)	New Nuclear (Olkiluoto 3)	Nuclear waste & risk
Oil	Russia	Come	Nuclear
Gas	Fennovoima	Do	Problem
Finland	Fortum	Must	Risk
Biogas	Finland	Nuclear plant	World
Fuel	Project	Project	Reactor
Sweden	State	French	Nuclear plant
Production	Money	End	Future
Natural gas	Company	Arava	Nuclear waste
Energy	Rosatom	Reactor	Radiation
Use	Shareholder	Power plant	Fukushima

EXAMPLES: EU RENEWABLE ENERGY TOPICS

Transport biofuels	Renewable project funding	Biomass	Building renovation
biofuels	energy	biomass	buildings
emissions	projects	heat	energy
renewable	renewable	values	building
production	support	plants	renovation
use	eur	emissions	heating
fuel	will	plant	residential
oil	project	table	heat
change	development	electricity	construction
directive	funding	production	consumption
gas	investment	power	efficiency

EXAMPLES: FB RENEWABLE TOPICS

Biomass	Wind power	Wind power subsidy	Housing and heating	Cars
Forest	Wind power	Wind power	Heat pump	Cars
Finland	Finland	Electricity	Heat	Electric car
Use	Power plant	Finland	House	Tesla
Peat	Wind power plant	Government	Energy	Time
Timber	Built	Subsidy	Saving	Yet
Pear	Meter	Market	CHP	All
Everything	Human	Euro	Heat	Traffic
Emission	Also	€mwh	Good	Lots
Biomass	Same	Money	Future	Just
Coal	Noise	Tax	Temperature	Future

EXAMPLES: EU METATOPICS

Emission reporting	Legalese	Policy integration
carbon	member	energy
emissions	states	european
may	shall	will
management	article	commission
use	state	member
energy	competent	states
report	ensure	market
risk	appropriate	cooperation
scenario	protection	security
assessment	directive	policy
production	information	development

EXAMPLES: FB METATOPICS

Analysis	International context	On arguments	Meta
Year	Germany	What	Energy Policy
Time	Renewables	Article	Group
Calculation	Finland	Issue	Good
Yet	Energy	Say	Discussion
Production	China	Me	Public
Years	Emission	Discussion	Parties
Then	Nuclear	How	Finland
Future	Goal	Truth	Interest
Number	Emissions	All	Report
Analysis	Coal	Interesting	Politicians

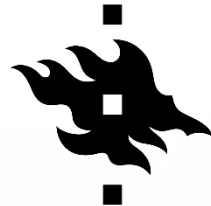
SUMMARY

- The two corpuses represent a similar split into topics defining technologies and corpus-specific metaspeech
 - 1) Technology topics overlap, but localized vocabulary
 - 2) Technologies vary in their associated metatopics
 - 3) 'Missing' topics indicate controversy

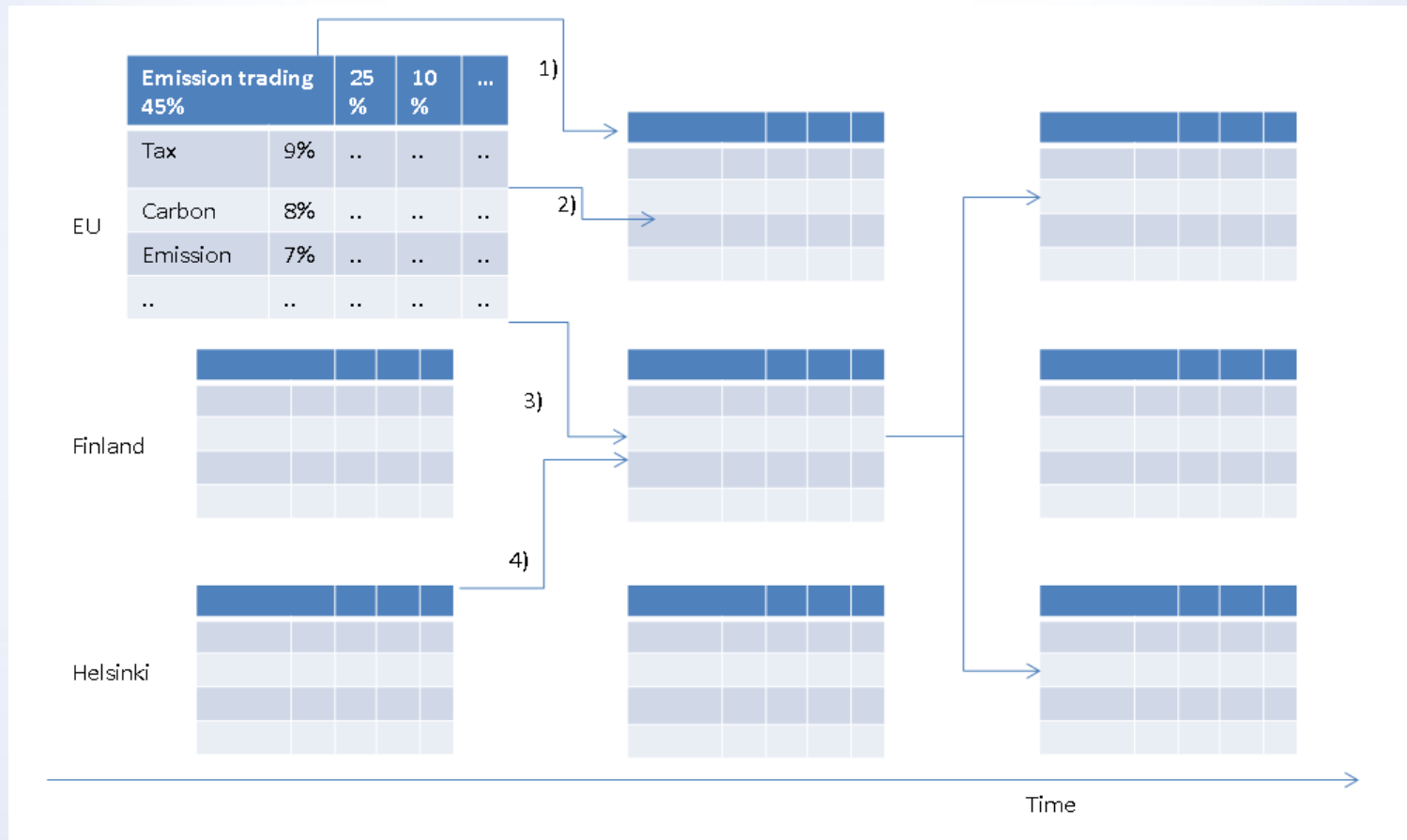


DO TOPICS HAVE A SOCIAL SCIENTIFIC INTERPRETATION?

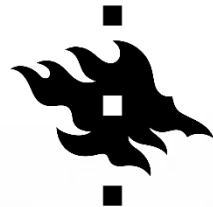
- As frames?
 - Set of discursive cues that suggest a particular interpretation of a person, event, organization, practice..
- As discourses?
 - The abstract whole that allows for words to assign meaning
- As institutions?
 - Rules that prescribe who can ('t) do what when?



MULTI-LEVEL GOVERNANCE IN A TOPIC MODEL



THANK YOU!



HELSINGIN YLIOPISTO