

Measuring Industrial Modernity, 1900-2020

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There are too many slides here. Can you just show me the main results?

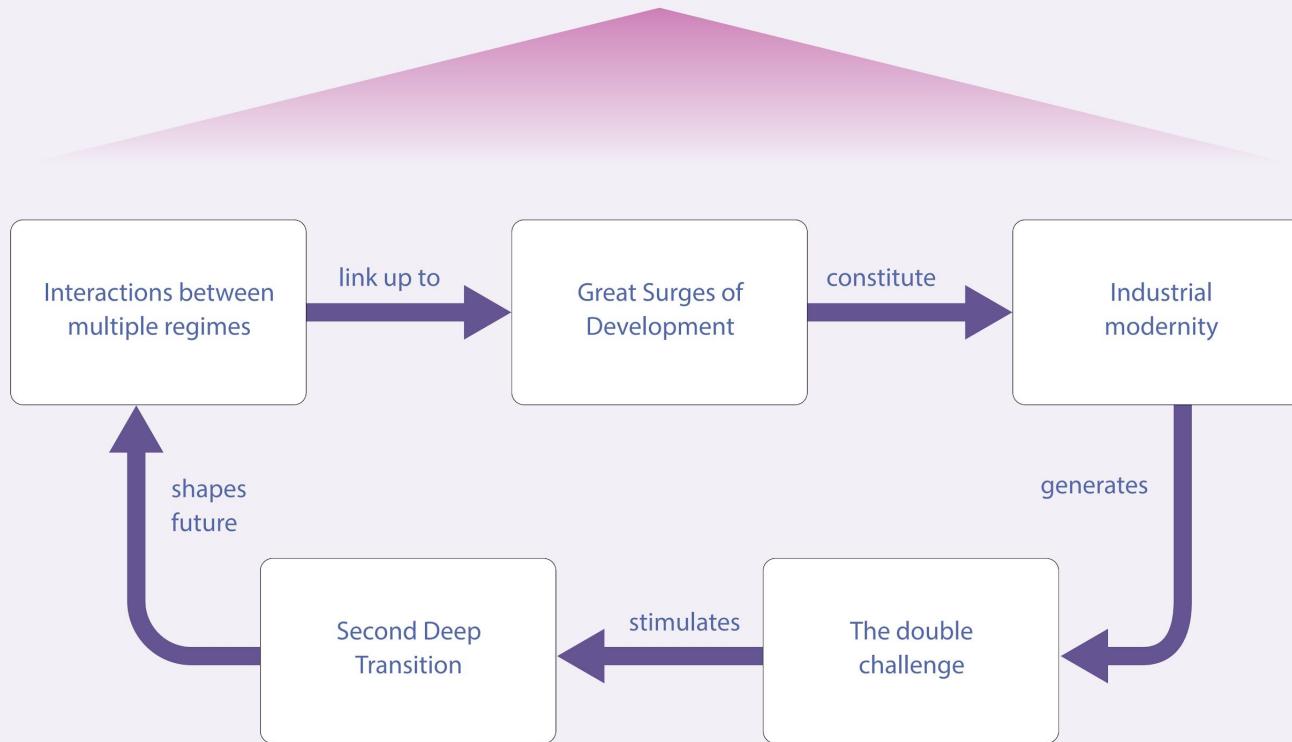
- OK then, here goes:
 - Text mining: 26, 30-32
 - Institutions: 37-39, 41-44
 - Energy production: 47-56
 - Summary: 58



Industrial modernity and Deep Transitions

- Existing theory (Kanger & Schot, 2019):
 - Industrial modernity: a macro-level selection environment built up through successive great surges of development
 - A collection of most durable rules, generating various long-term trends and persistent problems of industrial societies (see Kanger & Schot, 2019: 12, for a full list)
 - Rules challenging industrial modernity have emerged from the 1970s as an historical undercurrent
- However, to date there have been no attempts to provide an empirical measurement of industrial modernity

Co-evolution of the three in a specific direction is the First Deep Transition



Deep Transitions framework

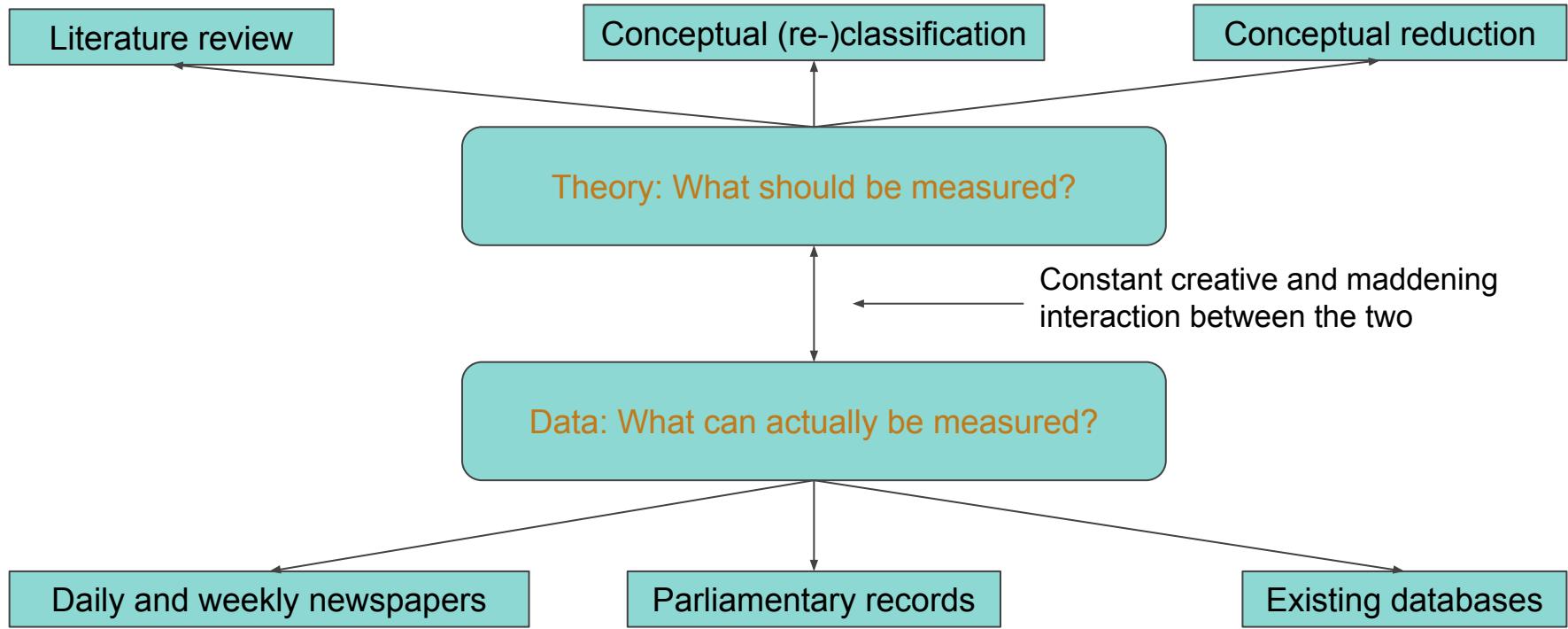
Deep Transition: series of connected and sustained fundamental transitions of a wide range of socio-technical systems in a similar direction



Measuring industrial modernity

- Ongoing project funded by the Estonian Research Council “Reshaping Estonian energy, mobility and telecommunications systems on the verge of the Second Deep Transition” (2019-2023)
- WP2 of the project focuses on the following questions:
 - What are the characteristic features of industrial modernity?
 - Is it possible to detect a rupture in these features?
 - Time-frame: 1900-2020
 - Coverage:
 - Pilot: 4 countries selected mainly on the grounds of data availability (Australia, Estonia, Germany, Soviet Union/Russia)
 - Ultimate aim: global + country-level profile for Estonia

Overall approach





Industrial modernity redefined

- Original definition of industrial modernity too focused on rules (downplaying the role of ideas and resources) and various societal domains (downplaying the “industrial” part of modernity)
- A new, clarified definition:
 - Industrial modernity is a socio-material structure encompassing the domains of natural environment (as a source of inputs), science, technology and innovation
 - It is composed of foundational beliefs and assumptions, a set of guiding rules and a specific material base
 - It characterizes almost any socio-technical system in almost any industrial society to date



Industrial modernity in a nutshell

- A very crude summary:
 - Industrial modernity =
 - Environment as a blind spot +
 - Unqualified belief in the benefits of science and technology
- These two features should be reflected in
 - Ideas: how we think about environment, science, technology and innovation
 - Institutions: how we regulate our interactions with nature, conduct of science, and technological innovation
 - Practices: how we actually use natural resources, scientific knowledge and various technologies



Industrial modernity: some more specific features

	Environment	Science	Technology & Innovation
Ideas	<ul style="list-style-type: none">- Separation between Nature and Society- Instrumental view of Nature- Belief in the limitless availability or substitutability of resources	<ul style="list-style-type: none">- Assumption that basic science is inherently unpredictable- Assumption that science is inherently objective- Belief in societal progress through the application of science	<ul style="list-style-type: none">- Assumption that the development of basic R&D is inherently unpredictable- Assumption that technologies are inherently neutral- Belief in societal progress through the application of technology
Rules	<ul style="list-style-type: none">- Prioritization of „societal“ over „environmental“ concerns	<ul style="list-style-type: none">- Technocracy: governance should be based on expert rule, making „objective“, „neutral“ and „rational“ decisions	<ul style="list-style-type: none">- Tendency to regulate the volume and speed rather than the direction of innovation- Largely reactive approach to the consequences of innovation
Practices	<ul style="list-style-type: none">- “Mineral”, fossil fuel based and linear economy	<ul style="list-style-type: none">- Increasing application of scientific knowledge to technological innovation	<ul style="list-style-type: none">- Increasing societal dependence on various socio-technical systems



A brief detour

- What are the advantages of this approach over existing ones?
 - In existing approaches there has been a tendency to focus either on
 - One domain, e.g. Running (2012) on relations between environmental values and experienced environmental disasters
 - Observed impacts (=practices), e.g. socio-metabolism (Haberl et al., 2019), planetary boundaries (Steffen et al., 2015a; O'Neill et al., 2018), great acceleration (Steffen et al., 2015b)
 - Text mining of newspapers and parliamentary records can potentially compensate for the relative lack of long-term comparative data on ideas (and, to a lesser extent, on institutions)



The basic hypothesis

- Some of the preconditions of the Industrial Revolution include the Enlightenment mentality, aggressive and risk-taking entrepreneurial spirit, relative lack of intervention to entrepreneurial activities by the church and the government, politics of enclosure etc. (Stearns, 2013)
- Some of them date back to the 16th century, i.e. long before the initiation of the Industrial Revolution and even longer before the global impacts of this revolution became manifest
- Therefore, if we only focus on the observable practices of industrial modernity we might miss that it has been in the process of hollowing out for some time
- This leads to the basic hypothesis: the hollowing out of industrial modernity is a time-lagged process where ideational changes precede institutional ones which, in turn, precede changes in practices



Basic methodological strategy

- “Business as usual” vs. “signs of hope”
 - Attempt to identify a long-term trend characterizing a particular feature of industrial modernity
 - Attempt to isolate a sub-trend in this overall trend indicating a possible rupture in this feature
- Example:
 - Theoretical category: increasing techno-dependence of industrial societies
 - “Business as usual”: increasing number of patents per capita
 - “Signs of hope”: increasing number of green patents per capita
- Note: it is important to keep in mind that “signs of hope” may be far from sufficient for indicating a change in the magnitude of the 2nd Deep Transition (e.g. increasing share of renewables vs. absolute decrease in energy consumption)



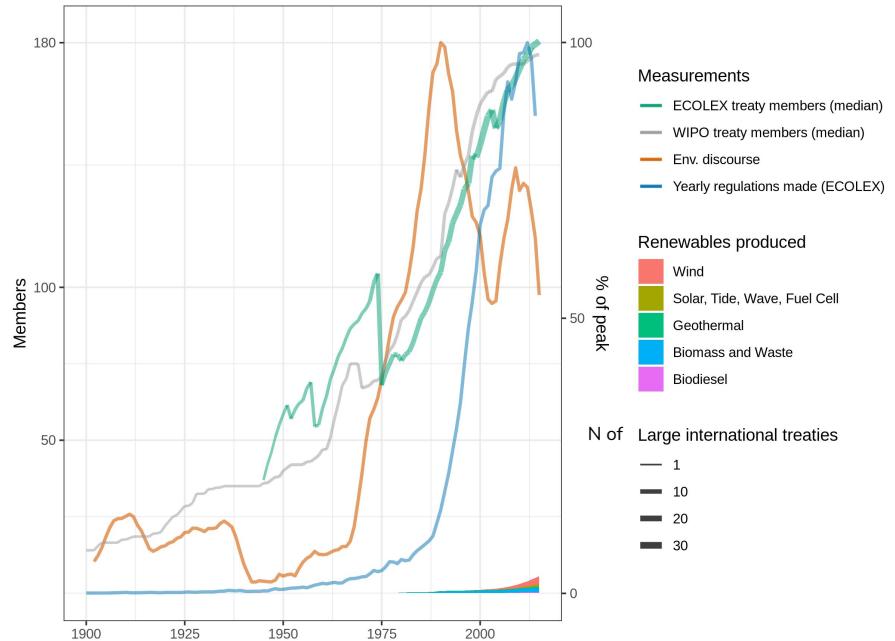
What can we measure

	Sources	Environment	Science	Technology & Innovation
Ideas	Newspapers	<ul style="list-style-type: none">- Presence of env, sci, tech topics in discourse (should reflect interests)- Mixing of env+sci, sci+tech, env+tech (predict increased mixing)- Sentiments on each (predict increased worry on each), also Env in WVS		
Rules	Party platforms, Parl. records	<ul style="list-style-type: none">- Env, sci, tech in party platforms (MANIFESTO)- Env, sci, tech in parliamentary records, state gazettes		
	Databases, Surveys	<ul style="list-style-type: none">- More and stronger “Eco”-laws (ECOLEX)	<ul style="list-style-type: none">- Technocratic Mentality Index (WVS), proxies in “Expertise” in parliamentary records	
Practices	Databases	<ul style="list-style-type: none">- Resources use per pop (GMF, YSTAFDB)- Renewable energy production (Shift)	<ul style="list-style-type: none">- Environmental topics in science, engineering (Microsoft Academic, Ulrichsweb)	<ul style="list-style-type: none">- “Green” patents vs all patents. Spread of “green tech” vs other tech (WIPO, PATSTAT)

Comparisons of timelines

Long-term timelines from various sources could allow us to consider relations between ideas, rules, and practices, and env, sci, tech.

- Example on the right shows growth in
 - environmental discourse (AUS+GER) (red),
 - local environmental regulations (blue),
 - membership in large international environmental treaties (green)
 - global proportion of renewables in energy production (small bit on the bottom)
 -
- A lag is visible between them:
- Discourse -> Regulations -> Practice ?



Country-level measurements: Australia and Germany

Satellites for nature protection

A USTRALIA is joining an international project using satellite information to study environmental change.

Australia's part in the study, known as the International Land Cover Change Project, will produce a set of

cies, town planning authorities, and environmental protection bodies throughout the world.

Research organisations from France and the USSR will join with CSIRO to cooperate on the Land Cover Change Project, with each organisation exam-

Sat 21 Oct 1989 / Page 6 / Kakadu issue reflects need for scientists

Kakadu issue reflects need for scientists

The reason the Federal Government cannot make up its mind on mining in Kakadu National Park is because it has sacked the environmental scientists it needs for advice, according to Australia's main scientists' union.

Dr David Widdup, executive direc-

Now Australia simply did not have the strong scientific base it needed to make decisions on

Mon 30 Dec 1988 / Page 4 / SCIENCE Technolog

SCIENCE

Technology is 'threatening man's life'

Thu 11 May 1989 / Page 5 / Forestry debate tonight

Forestry debate tonight

Top speakers from the forestry industry and environmental groups will lock horns tonight at the Australian National University in a debate over the future of the south-east forests.

The executive director of the National Association of Forest Industries, Robert Bain, will take part in the debate, along with the

director of the Total Environment Centre, Mike Dunphy, and the national liaison officer of the Wilderness Society, Dr Judy Lambert.

The debate, which will produce a set of resolutions, will start at Melville Hall at the ANU at 7.30pm. Admission is free and the public is welcome.

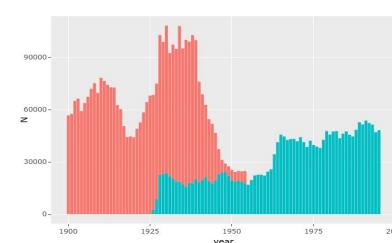
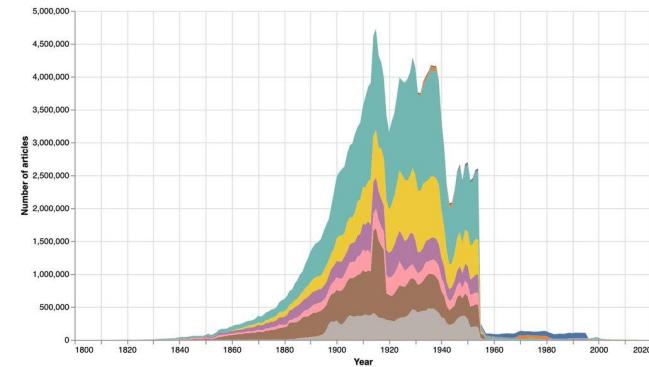
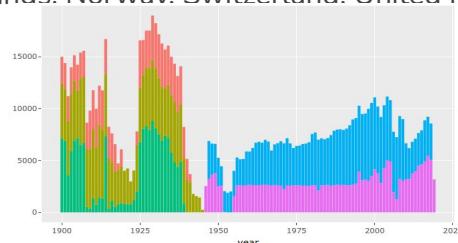
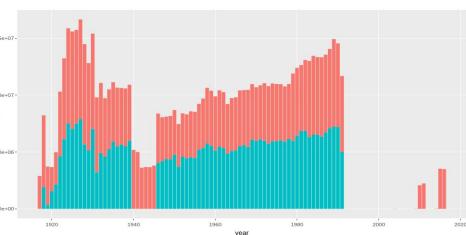
DALLAS, Texas, Sun- (AAP)—A panel of experts in environmental science warned yesterday that the "unanticipated" hazards of spreading technology threatened man's continued exist-

ence of the centre of the biology of natural systems at Washington University in St Louis.

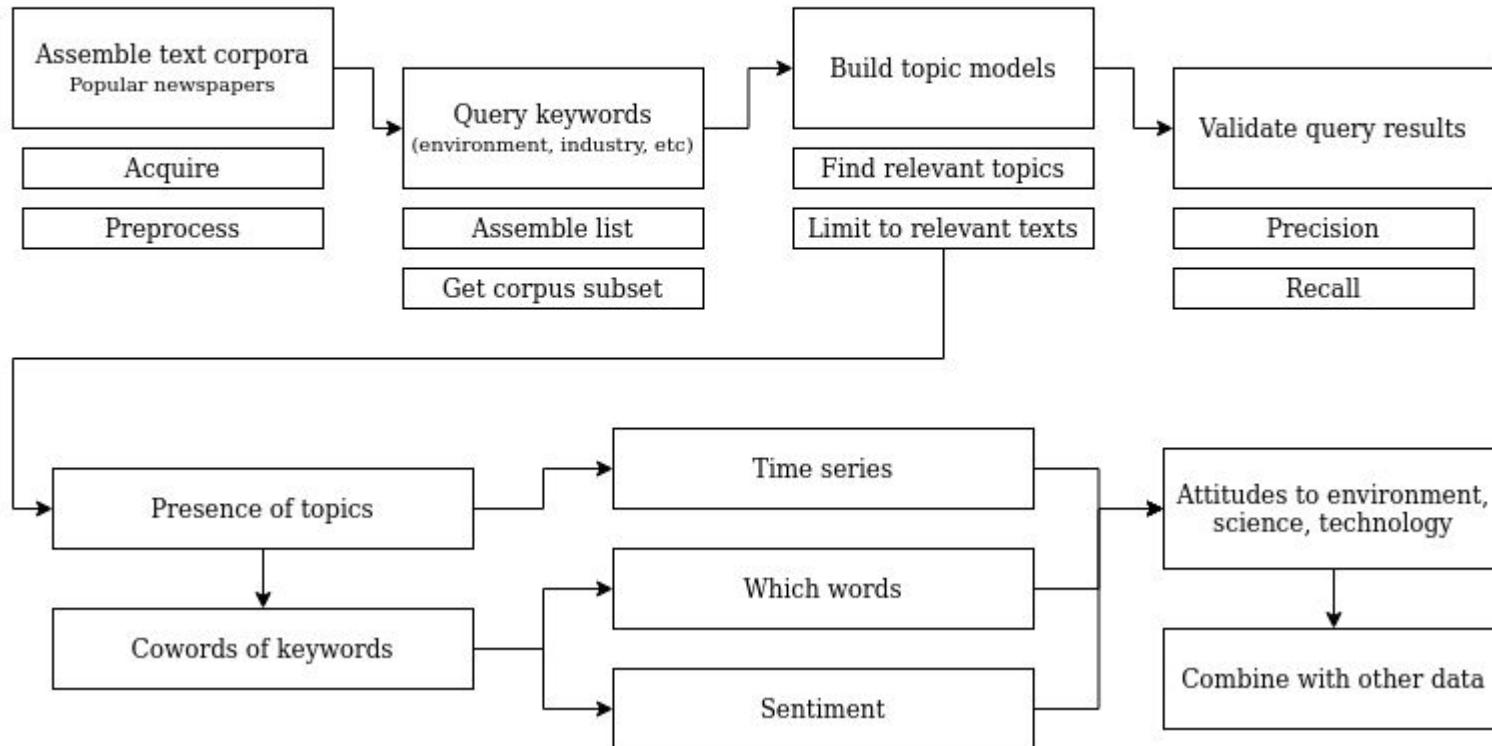
The use of nuclear reactors must be evaluated in light of "hidden costs" to human health from the release of iodine-131, a radioactive substance.

Sources

- A major challenge:
 - Acquiring long-term archives of text that span the century
 - Copyright + digitization priorities + service providers make this difficult (larger universities have somewhat better access)
- As a result study focus driven by data availability, and the multiple sources are patched together. The analysis made are subject to fluctuations and quality of the data sources.
 - Pilot: Australia, Estonia, Germany, Russia/USSR
 - In sights: Netherlands. Norway. Switzerland. United Kinadom



Textmining workflow





Method: Thematic queries

Abstract and general keywords,
assembled by local experts.

Environment

Nature
Environment

Science

Science
Discovery

Technology

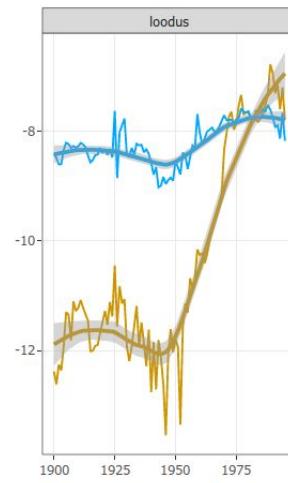
Technology
Industry
Innovation
Invention

Technologie
Technik
Industrie
Gewerbe
Erfindung
Innovation
Erneuerung
Entwicklung

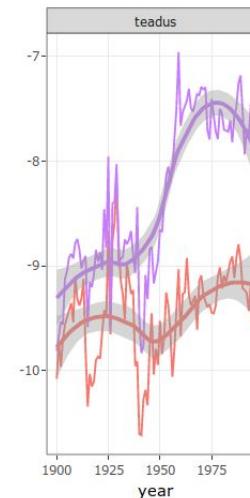
Umwelt
Natur

Wissenschaft
Forschung
Entdeckung
Erkenntnis

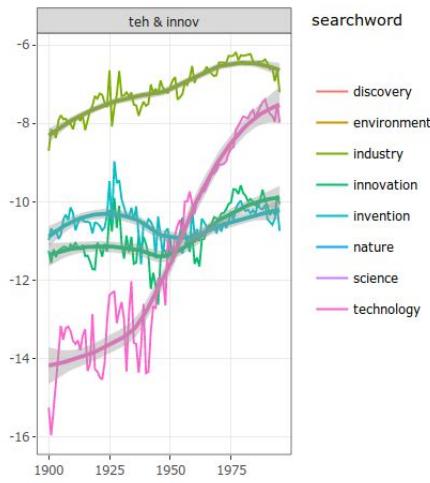
Environment



Science



Technology



Example search results (log-frequency) of the selected keywords in Environment, Science, Technology for Australian newspapers 1900-1995. The results are raw query results, not yet cleaned to exclude false positives.

Example trends only.



Problem with abstract keywords

Queries get a lot of false positives:

- “human nature”, “delicate nature of this correspondence”, “the nature of football”
- “child’s growth environment”, “political environment”, “current societal climate”

Problems persist in each language, but are unique to them.

A solution:

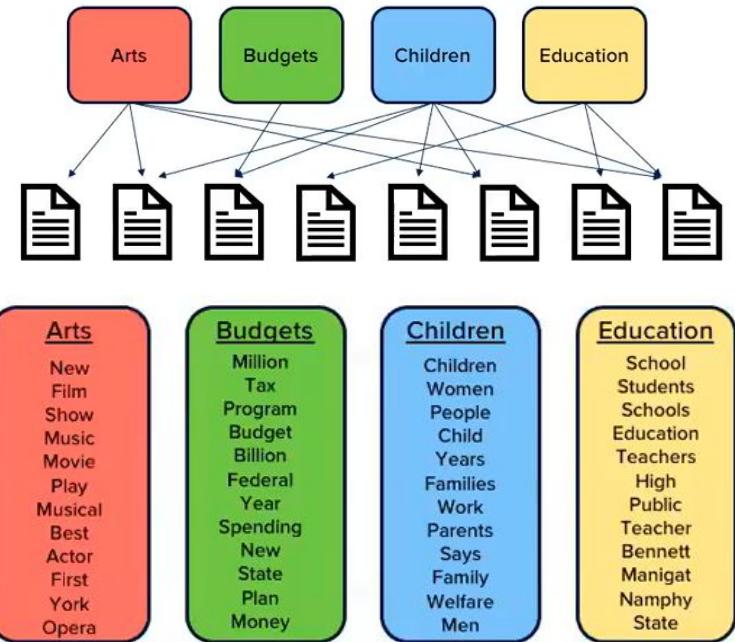
- build topic models on keyword results
- keep only results that are topically related enough.



Method: Topic-modelling

Topic-modelling as a text mining technique to distribute words into clusters, based on which words co-occur within texts.

In principle these word clusters show thematic units within these texts (one text usually has multiple topics), but it can be a noisy process.

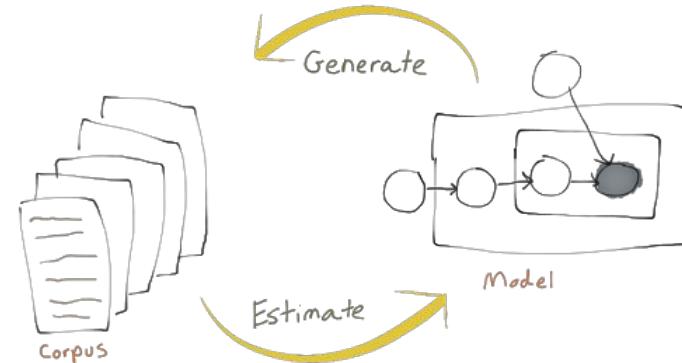




Method: Topic modelling

The process works by generating and iteratively improving the model based on the texts.

Topics created will only be clusters of co-occurring words that can repeat across clusters. The labeling will be done by a human.

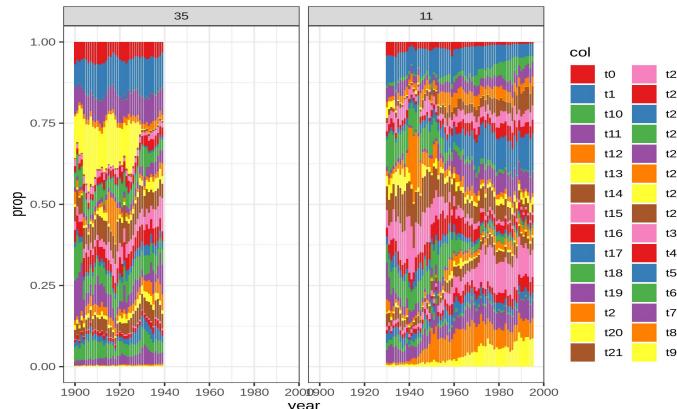


Topic 1		Topic 2		Topic 3	
term	weight	term	weight	term	weight
game	0.014	space	0.021	drive	0.021
team	0.011	nasa	0.006	card	0.015
hockey	0.009	earth	0.006	system	0.013
play	0.008	henry	0.005	scsi	0.012
games	0.007	launch	0.004	hard	0.011



Topic models

We built topic models on query results, and labelled the topics as relevant to the query.

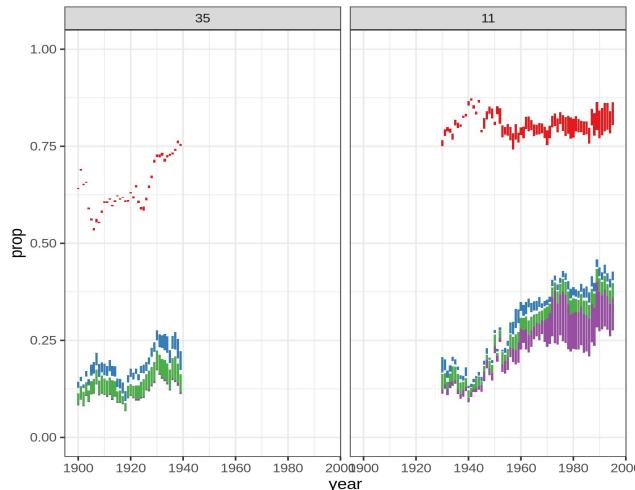


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14	0.04493	system research science year energy computer scientist wor
15	0.05379	health hospital medical disease doctor people patient drug ye
16	0.04416	film art work play music theatre artist year exhibition miss pic
17	0.11109	australia australian government service public people canber
18	0.05072	government bill party state minister member labour house pa
19	0.07269	book life story write author man year woman work world time
20	0.02721	play team game match player win club ball score good sport
21	0.1092	act union board state work public committee report commissi
22	0.05654	british britain war london germany german government coun
23	0.05338	court police case justice charge evidence act defendant law i
24	0.02889	church god man life christian world christ people day bishop
25	0.08724	nbsp sydney day year sir hold miss meeting member night ye
26	0.06861	foi hir und mid tin tho tile lie fion nnd ait ind tint ill iii the nat
27	0.04011	plant tree bird grow soil flower garden good fruit year water fi
28	0.0181	race horse win club handicap run time year good day event c
29	0.0736	water river island south sea day land year north fish mile find



Method: Query refinement via topic models

Then, we kept only the articles that had the sum of these topics above a threshold (20%).
This left us with about 10% of query results.



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29	T		
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- t14
- t27
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- t3
- NA

topic words:

- 12 school child education student year university work teacher v
- 13 tho aro havo moro ono wero tbo nnd thoy wear been ther o th
- 14 system research science year energy computer scientist wor
- 15 health hospital medical disease doctor people patient drug y
- 16 film art work play music theatre artist year exhibition miss pic
- 17 0.11109 australia australian government service public people canber
- 18 0.05072 government bill party state minister member labour house pa
- 19 0.07269 book life story write author man year woman work world time
- 20 0.02721 play team game match player win club ball score good sport
- 21 0.1092 act union board state work public committee report commissi
- 22 0.05654 british britain war london germany german government coun
- 23 0.05338 court police case justice charge evidence act defendant law j
- 24 0.02889 church god man life christian world christ people day bishop
- 25 0.08724 nnbsp sydney day year sir hold miss meeting member night y
- 26 0.06861 foi he und mid tin tho tile lie fiom nnd aie ind tint ill iii the nat
- 27 0.04011 plant tree bird grow soil flower garden good fruit year water fi
- 28 0.0181 race horse win club handicap run time year good day event c
- 29 0.0736 water river island south sea day land year north fish mile find



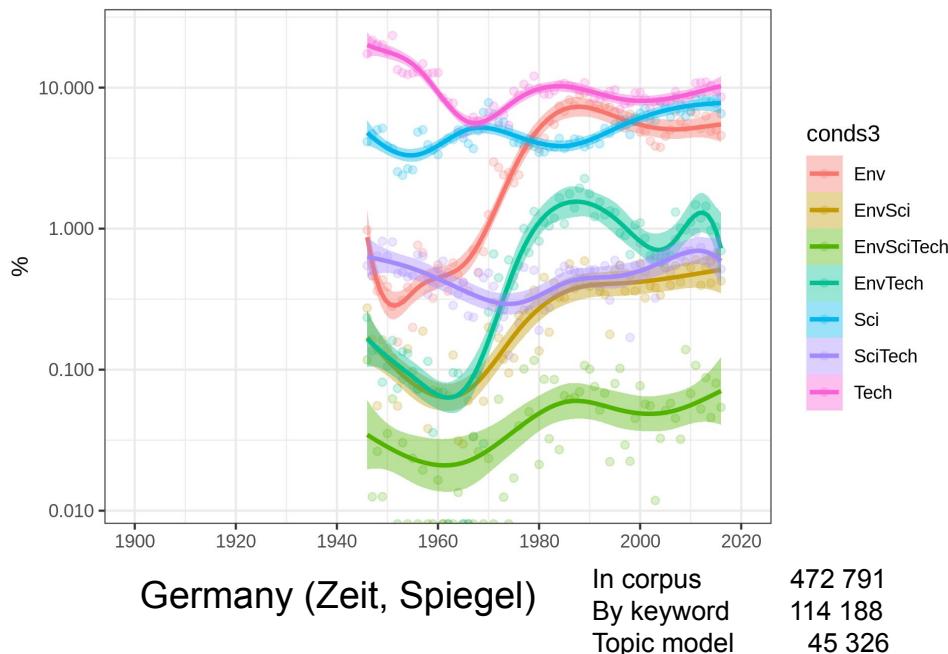
Method: Co-occurring themes

One signal to trace is the presence of the three topics in discourse (Env, Sci, Tech on the graph).

Another signal is the copresence of topics (EnvSci, SciTech, EnvTech, EnvSciTech) within articles. The coupling of topics would show non-independence of the areas: e.g. technologies discussed must consider also the environmental impact.

Query results (% of corpus).

Cleaned via topic models. Text size $300 < x < 20,000$ chars.

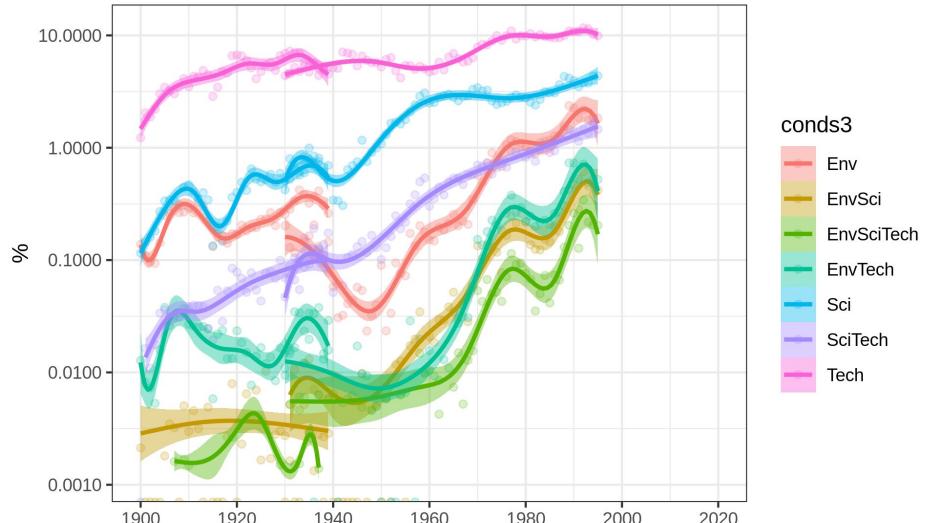




Results (preliminary)

Query results (% of corpus).

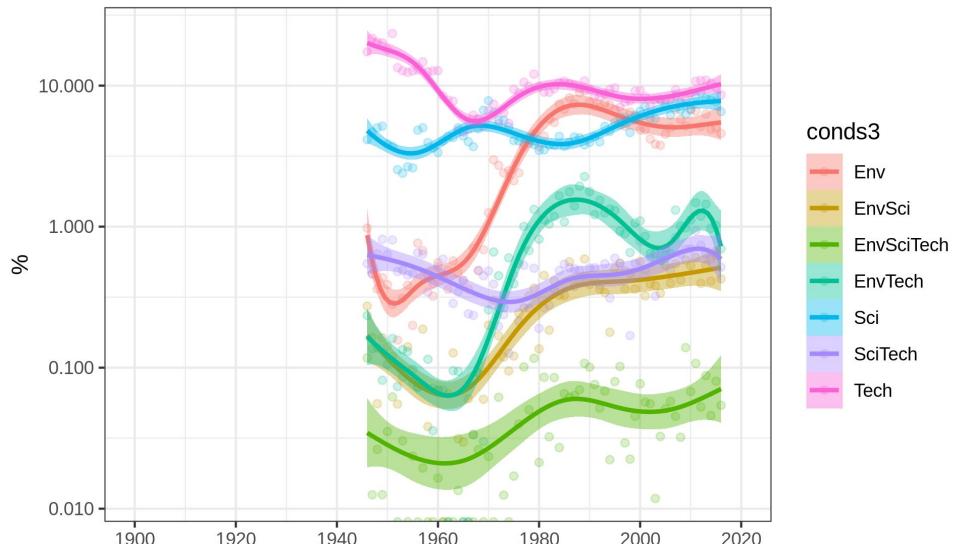
Cleaned via topic models. Text size $300 < x < 20,000$ chars.



Australia (SMH, CT)

Query results (% of corpus).

Cleaned via topic models. Text size $300 < x < 20,000$ chars.



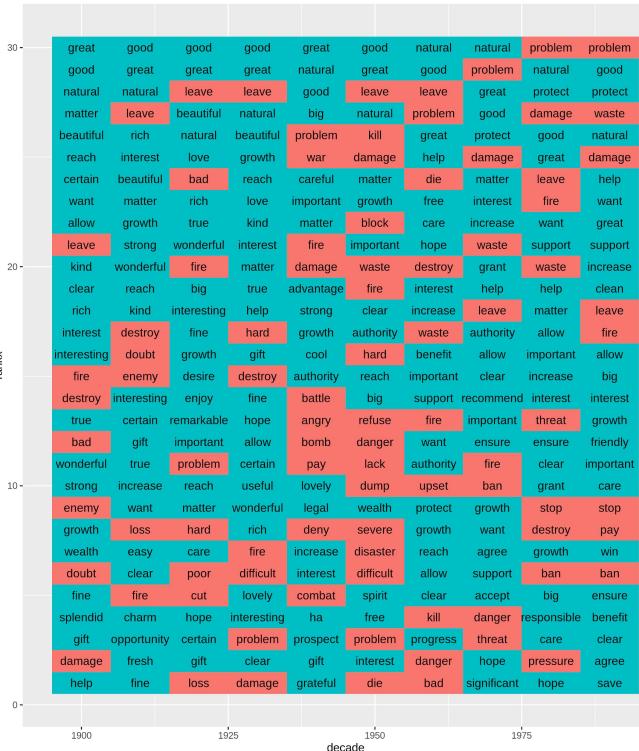
Germany (Zeit, Spiegel)

Method: Coword analysis

From search keywords,
we can take neighboring +/-10, +/-25 words.

- What are they?
- Which words are embedded between similar cowords?
- What is their sentiment?

Example plot: Cowords for “nature/environment” in AUS
Top 30 sentiment-words by decade, colored by sentiment





Method: Sentiment analysis

- In principle, it is possible to detect sentiment in texts => We could detect people's attitudes towards Environment, Science, Technology in text archives
- Methods: word, bigram or sentence based
- Problems:
 - Sentence models do not work well with OCR + newspaper texts
 - Sentiment lists very general (e.g. "warming" +2 positive),
 - Could build custom lists, but difficult to do separate for each language
- Solutions:
 - Look at smaller context, only adjectives

Example sentiment detection (Bitext tool)

I ¹ really enjoyed using the ¹ Canon Ixus in Madrid on March 4. The ² Panasonic Lumix ² is a bit disappointing, but the ³ Canon ³ camera is ³ not bad ³ at all. All I want when taking photos is point it and then just press the button. For only 200 dollars, a ⁴ really fair ⁴ price, this ⁵ camera ⁵ is ⁵ perfect ⁵ for me. Besides, I have had a ⁶ good ⁶ customer ⁶ service ⁶ experience ⁶. ⁷ John Faraday ⁷ was ⁷ very nice!



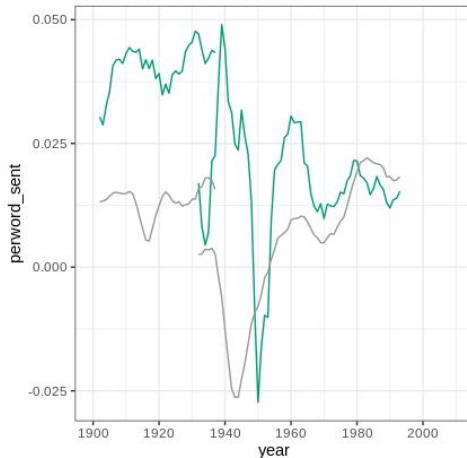
Results (experimental)

All words in thematic articles (Australia)

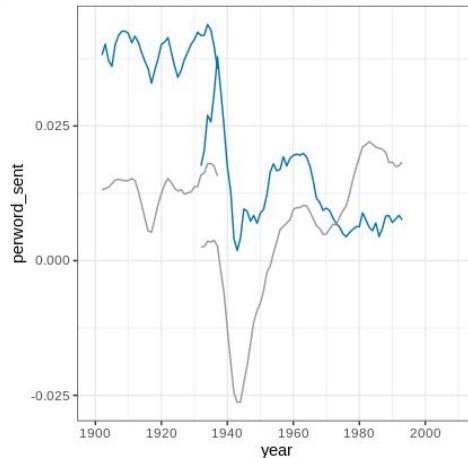
How positive/negative are ALL WORDS articles about 1) Env, 2) Sci, 3) Tech? Cf. all the other texts (grey)

Note the WW2 dip.

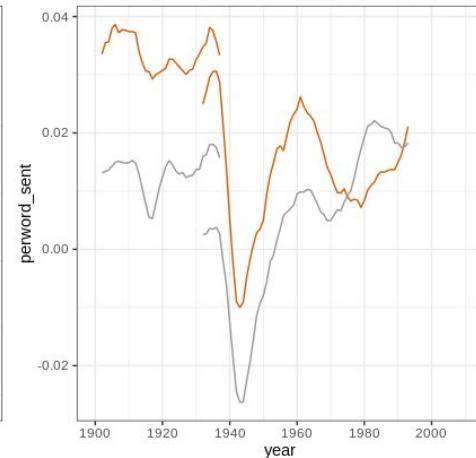
Sentiment score per word (>0 = positive).
Cleaned via topic models. Text size $300 < x < 20,000$ ch



Sentiment score per word (>0 = positive).
Cleaned via topic models. Text size $300 < x < 20,000$ ch



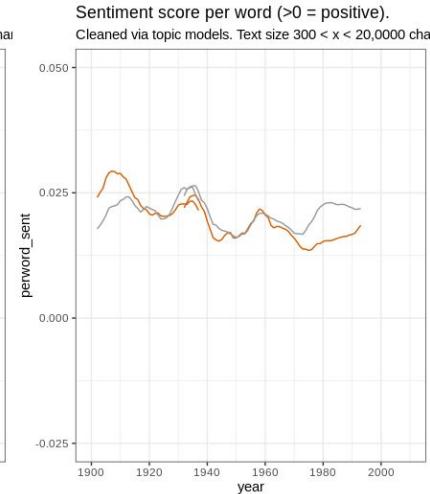
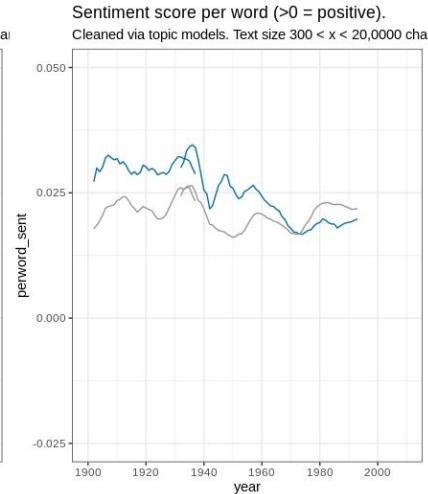
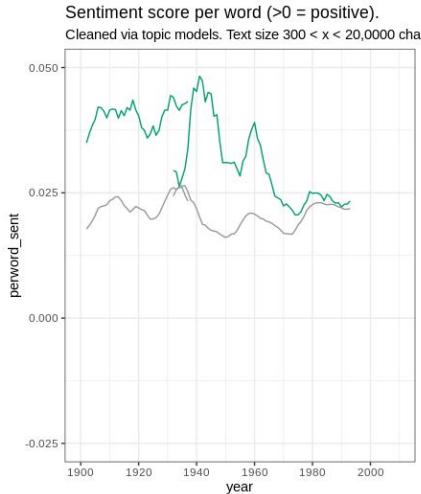
Sentiment score per word (>0 = positive).
Cleaned via topic models. Text size $300 < x < 20,000$ ch



Results (experimental)

Adjectives in thematic articles (Australia)

How positive/negative are ADJECTIVES in articles about 1) Env, 2) Sci, 3) Tech? Cf. all the other texts (grey)
WW2 dip is no longer there for adjectives.

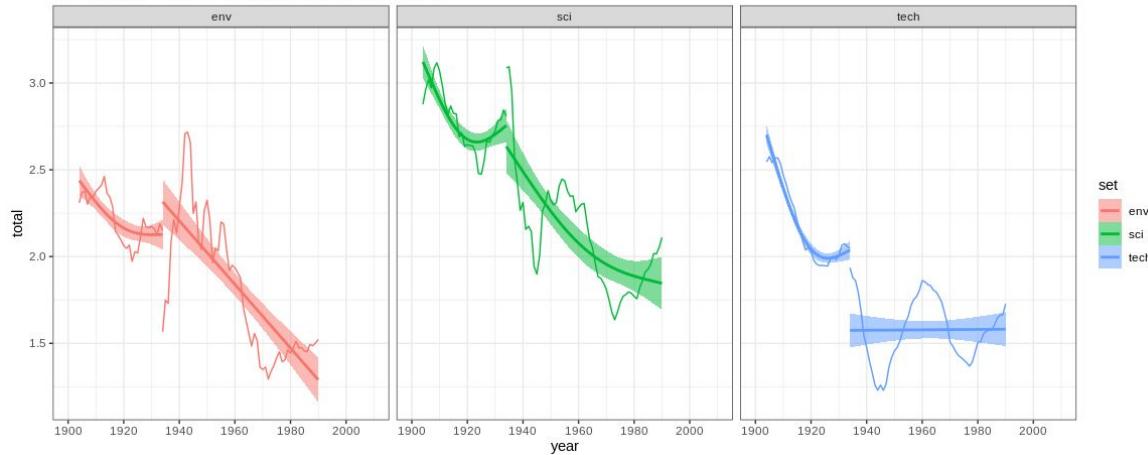




Results (experimental)

Sentiment + cowords + adjectives:

Mean sentiment in +/-10 word context from keyword, goes down for Env and Sci, is low for Tech.
(But: studies have found that sentiments vary over long time for stylistic reasons too)

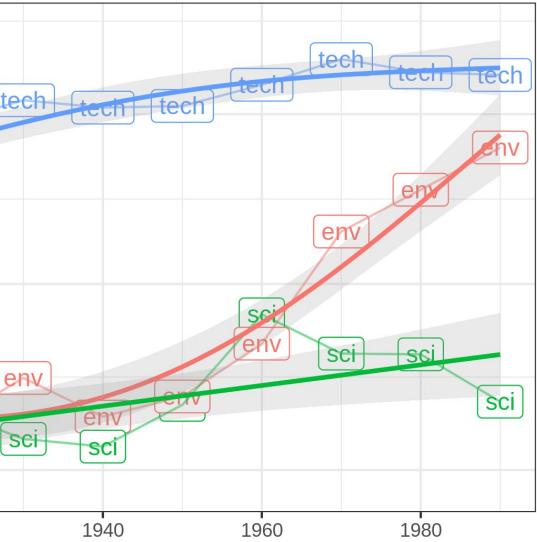




Results (experimental)

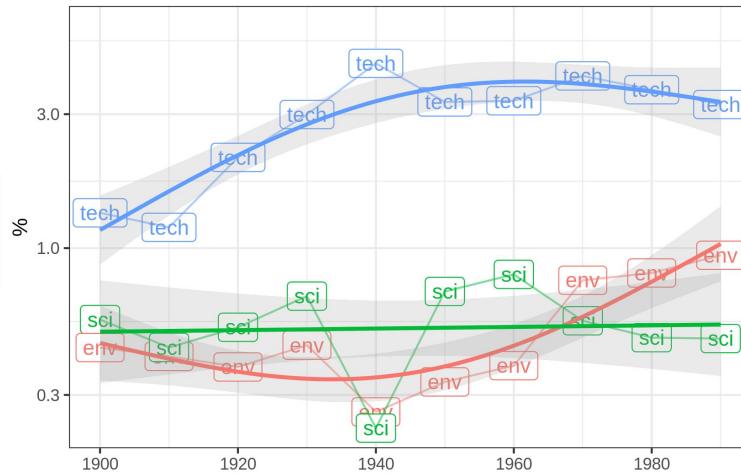
ics

tech keywords in +/-10 word distance
occurrences by decade.



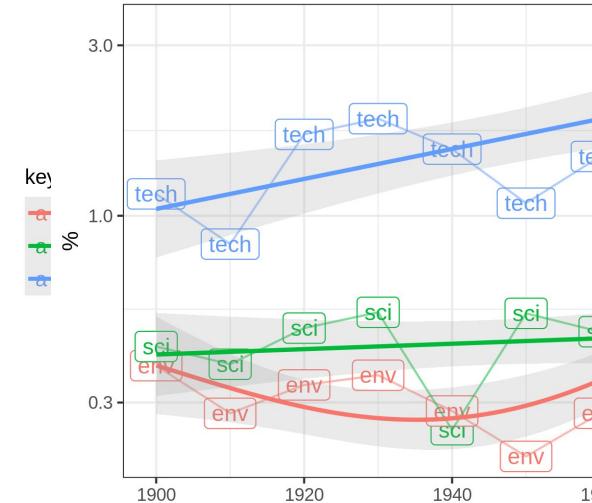
NEED ja topics

Occurrence of EnvSciTech keywords in +/-10 word distance
as % of NEED occurrences by decade.



BELIEVE and topics

Occurrence of EnvSciTech keywords in +/-10 word distance
as % of BELIEVE occurrences by decade.





Rules and institutions

An important factor in people's behaviours and ideas is the set of rules, regulations and institutions that guide and sanction it.

This is discussed in political debates.

Also visible directly in laws and regulations directly. Some large historical databases exist for it, that allow an approximate overview of long-term global trends.





ECOLEX database

- 174,120 entries on international treaties, regulations, court decisions, spanning 1789 to 2020.
- Aimed to be comprehensive: e.g. includes country constitutions if they contained paragraphs on ecological management.
- Information on all countries, annotated for keywords, subjects entries etc.

Home About ECOLEX Take a tour Contact Language: English ▾

The gateway to environmental law

Search in record and full text

Search

Treaties (2179) Treaty decisions (13053) Legislation (156296) Jurisprudence (2592) Literature (40660)

Reset all filters

Common filters

+ Subject

+ Keyword

+ Country/Territory

+ Geographical Area

+ Language

Year / Period

From 1789 To 2019

174120 results found. Show only Treaties | Treaty decisions | Legislation | Jurisprudence | Literature

Sorted by most recent | Sort by least recent

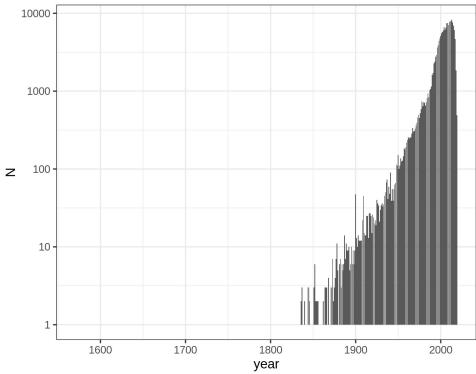
Luonnon suojeleyhdistys Tapiola Pohjois-Savo — Kainuu ry
Jurisprudence | International court | Finland | Oct 10, 2019
Keyword: Endangered species, Protection of species, Transboundary movement of waste, Protected fish species, Protected animal species, Trade in species, Protection of habitats, Protected plant species
Source: UNEP, InforMEA

Decabromodiphenyl ether
Decision CRC-15/2 – Active | Rotterdam Convention | Oct 8, 2019
Source: UNEP, InforMEA



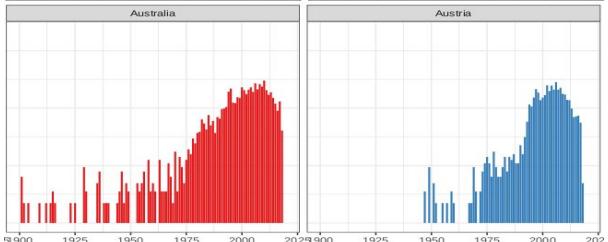
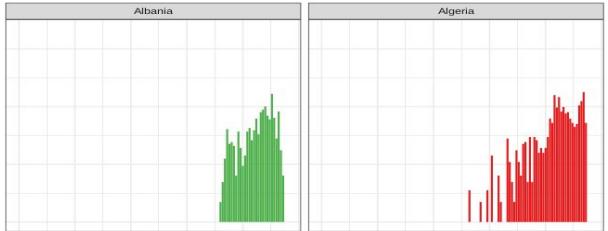
Example data in ECOLEX

Entries in ECOLEX by date

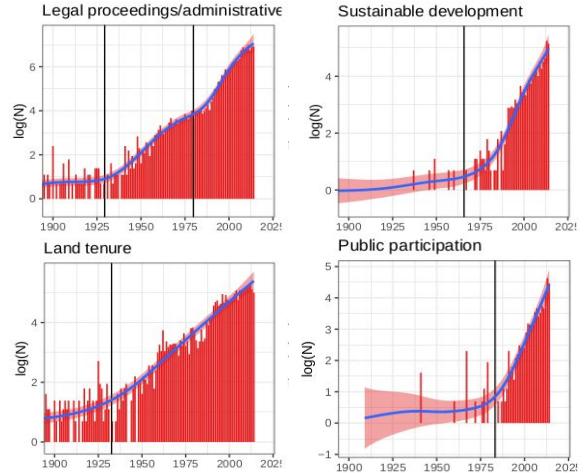


Environmental law shows exponential growth since inception (log-scale. Top right)

The adoption varied by country and issue (general issues and larger countries leading).



N of legislation/regulations adopted by country



N of legislation/regulations adopted by keyword (log scale)



Keywords on environmental laws

Keyword, data_available = 161113, types = 479

29389 Institution
17583 Authorization/permit
17554 International trade
17232 Legal proceedings/administrative proceed
16892 Inspection
16276 Offences/penalties
16094 Food quality control/food safety
13482 Internal trade
12098 Hygiene/sanitary procedures
11930 Pests/diseases
11871 Pollution control

11491 Marine fisheries

11401 Registration

10347 Transport/storage

9875 Animal health

9801 Data collection/ref

9541 Standards

Subject, data_available = 173469, types = 16

26802 Food & nutrition
24356 Wild species & ecosystems
21758 Fisheries
20315 Livestock
18466 Cultivated plants
18443 Environment gen.
16782 Land & soil
15047 Water
14855 Agricultural & rural development
11681 Waste & hazardous substances
9445 Forestry
8191 Energy
6998 Sea
6412 Air & atmosphere
5084 Mineral resources
812 Legal questions

A	B	C
1 keyword	N keyword_annotation	
2 Institution	29215 general frameworks	
3 International trade	17427 special topic	
4 Authorization/permit	17426 general frameworks	
5 Legal proceedings/administrative proceedings	17122 general frameworks	
6 Inspection	16778 general frameworks	
7 Offences/penalties	16120 general frameworks	
8 Food quality control/food safety	16013 special topic	
9 Hygiene/sanitary procedures	12052 waste/pollution	
10 Pests/diseases	11860 special topic	
11 Pollution control	11820 waste/pollution	
12 Marine fisheries	11425 special topic	
13 Registration	11354 general frameworks	
14 Transport/storage	10295 special topic	
15 Animal health	9802 special topic	
16 Data collection/reporting	9763 general frameworks	
17 Standards	9514 general frameworks	
18 Agricultural development	9147 special topic	
19 Certification	8710 general frameworks	
20 Packaging/labelling	8663 special topic	
21 Subsidy/incentive	8370 general frameworks	
22 Enforcement/compliance	8257 general frameworks	
23 Policy/planning	7924 general frameworks	
24 Protected area	7510 sustainability	
25 Plant protection	7491 sustainability	
26 Basic legislation	6597 general frameworks	

Are there trends in what the laws were about?

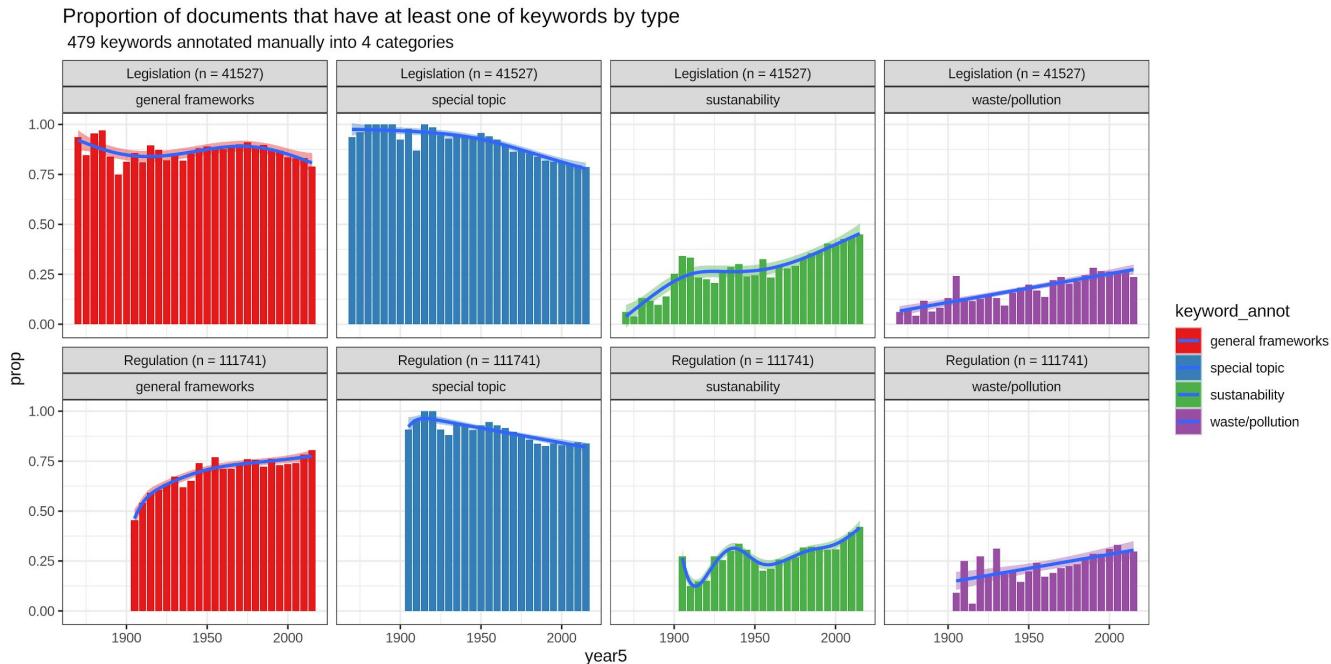
We annotated all 479 keywords on whether it was 1) preventative/sustainability related, 2) damage control/waste management, 3) a special topic (e.g. air, agriculture, animals) or 4) a general theme (e.g. "legislation", "institution").

Each law can have several keywords and thus several categories, we measured how many entries had at least one keyword of the 4 types.

(Results on next slide)

Annotated keywords over time

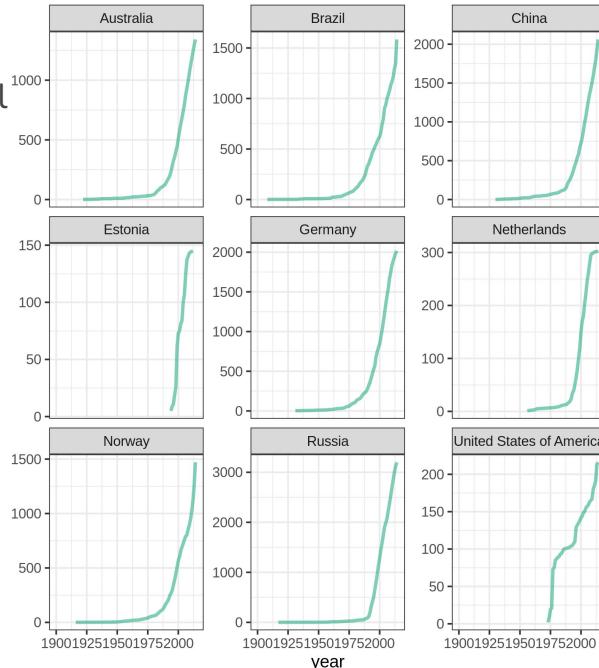
A gradual growth of avoidance-directed “sustainability” topics and problem-solving “waste/pollution” can be seen over 20c in country legislation and regulation.



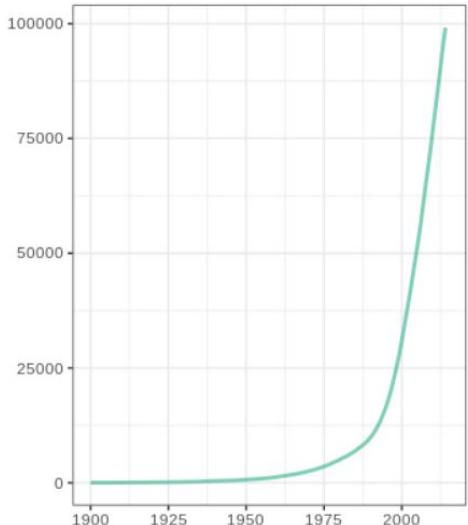
Regulations within countries

Adoption of environmental regulations intensified in 1990s in most countries.

Cumulative number of environmental regulations adopted (selected countries).



Cumulative number of environmental regulations adopted (global).





Expansion of global environmental treaties

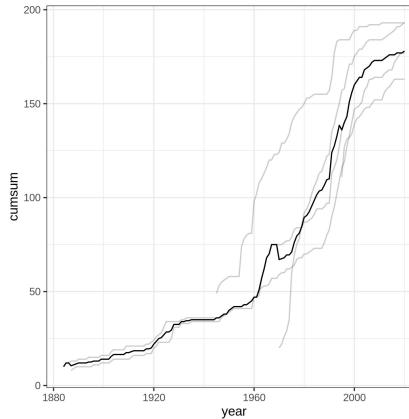
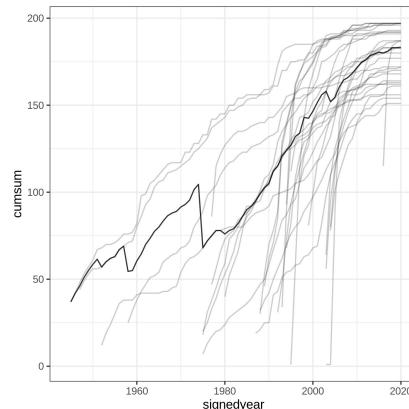
International treaties provide a background for individual countries, including almost all countries by now..

Major int. environmental treaties have roots in 1940-1950s with gradual growth in membership

In 1990s and early 2000s a great number of such treaties is added, with most countries joining almost instantly.

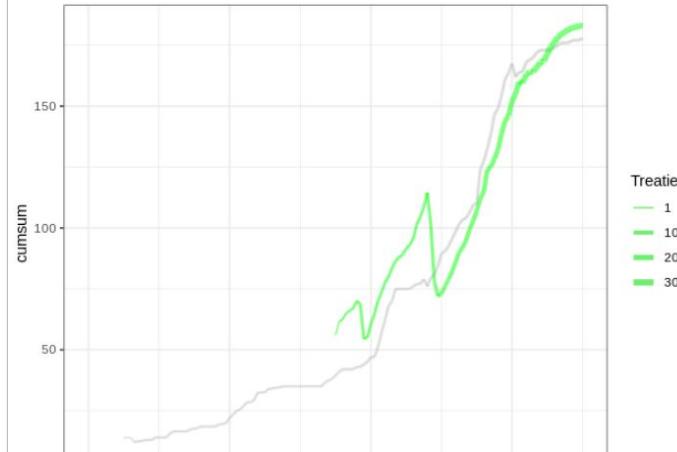
Environmental treaties seem to mirror the process of globalization (e.g. see intellectual property treaties for comparison)

The pace of joining international treaties has increased more recently



Cumulative number of members in major international environmental treaties (n countries > 150)
Median in black. Source: ECOLEX

Env. vs IP treaties median comparisons
Line thickness shows number of treaties
Sources: ECOLEX, WIPOLex



Cumulative number of members in major international intellectual property rights treaties (n countries > 150)
Median in black. Source: WIPOLex



The Manifesto Project

The Manifesto Project has gathered the policy positions of over 1000 parties in 56 countries (mainly from post-WWII era).

We used the parties' policy positions as proxies for possible changes in the regulation of environment, science, technology and innovation

The website features a top navigation bar with links for INFO, DATA, CORPUS & DOCUMENTS, TUTORIALS, manifestoR manifestata API, PUBLICATIONS, LOGIN, and SIGNUP.

Project description

The Manifesto Project provides the scientific community with parties' policy positions derived from a content analysis of parties' electoral manifestos. It covers over 1000 parties from 1945 until today in over 50 countries on five continents. The DFG-funded MARPOR project continues the work of the Manifesto Research Group (MRG) and the Comparative Manifestos Project (CMP). On this website you find the Manifesto Project Dataset containing the parties' policy preferences generated by the project. You also find coded and uncoded election manifestos of the parties in the dataset as well as information and links to many applications for the dataset, related projects and publications etc.

[read more](#)

The graph displays the left-right spectrum of German political parties over time. The Y-axis ranges from -50 to 50. The X-axis shows years from 1990 to 2005. The SPD (red line) shows a significant shift from approximately -40 in 1990 to 25 in 1995, then fluctuates around 0. The CDU/CSU (black line) starts at 25 in 1990, peaks at 30 in 1995, and then declines to 0 by 2005. The FDP (yellow line) remains relatively stable between 0 and 10. The B90/Gruene (green line) and PDS/Link (purple line) show minor fluctuations, generally staying below 10.

Left Right of German Parties

Jirka Lewandowski (1989-2019)

Obituary of Jirka Lewandowski – Bidding farewell to a bright and warm-hearted colleague and friend

[read the obituary](#)

News

(2020-04-16) Government Declaration Dataset from MPPI online

- The Government Declaration Dataset originally published with MPPI is now also available on our website. Check it out [here](#). It contains content analytical data from government declarations in 111 countries between 1945 and the 1980s.

(2019-12-19) Job Offer Research Fellow

- We have a job offer for a new research fellow position starting in March 2020. You find the call here: <https://www.wzb.eu/en/jobs/research-fellow-frw> (english PDF, german PDF). The application deadline is 27.01.2020. If you have always been wondering why a specific election is

Tweets (@manifesto_proj)

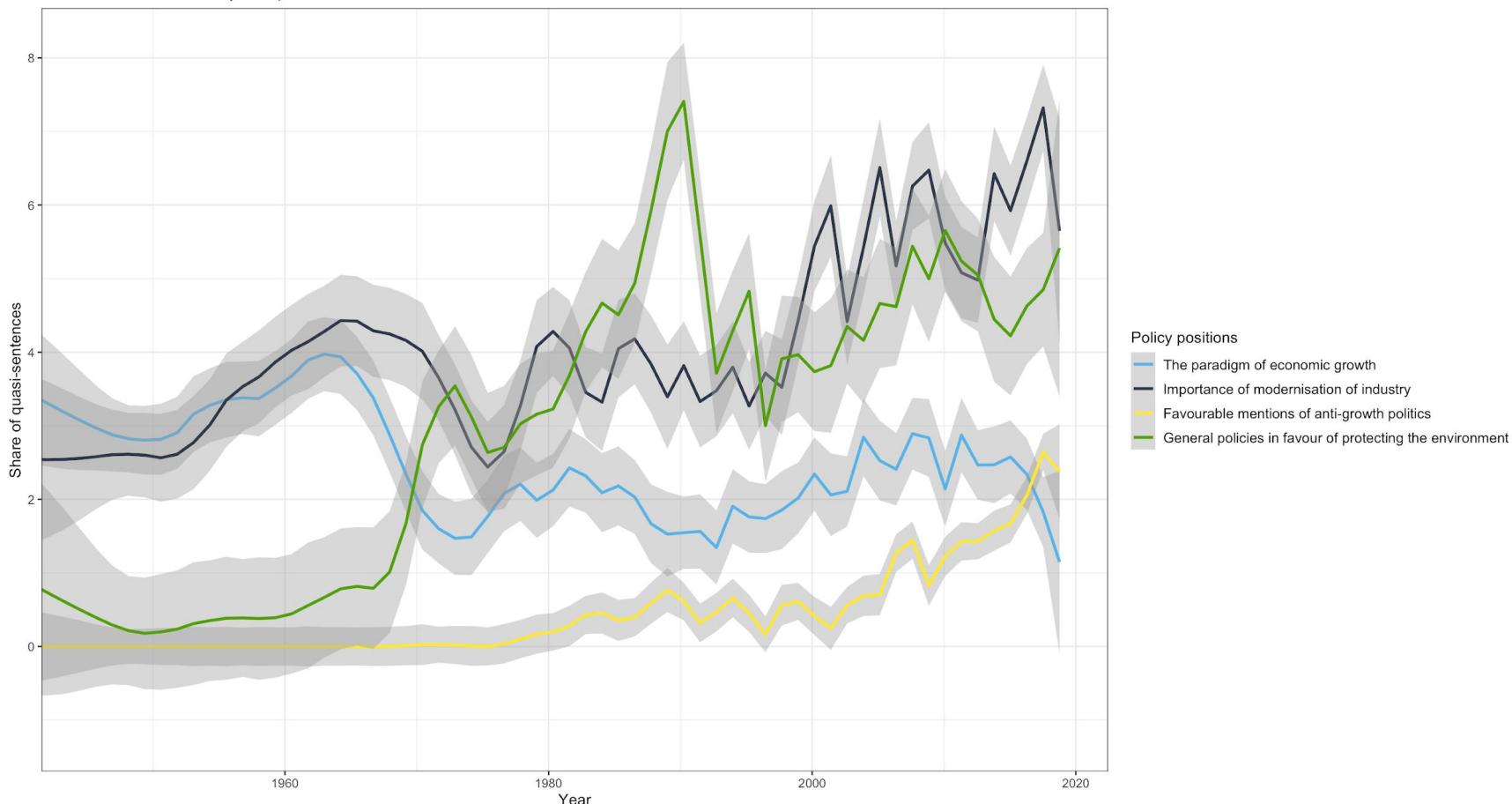
1839

2020-04-16 12:12 2

Something for data gourmets: You can now download the government declaration dataset, a classic that was originally published with MPPI (on a CD). If you are interested in policy preferences of governments you should definitely take a look: <https://manifesto-project.wzb.eu/information/documents/gdds>

Aggregate trend of the policy positions of 56 countries (1945-2018)

The policy positions of 56 countries on economic growth, technology and infrastructure, anti-growth economy, and environmental protection derived from a content analysis of parties' electoral manifestos.

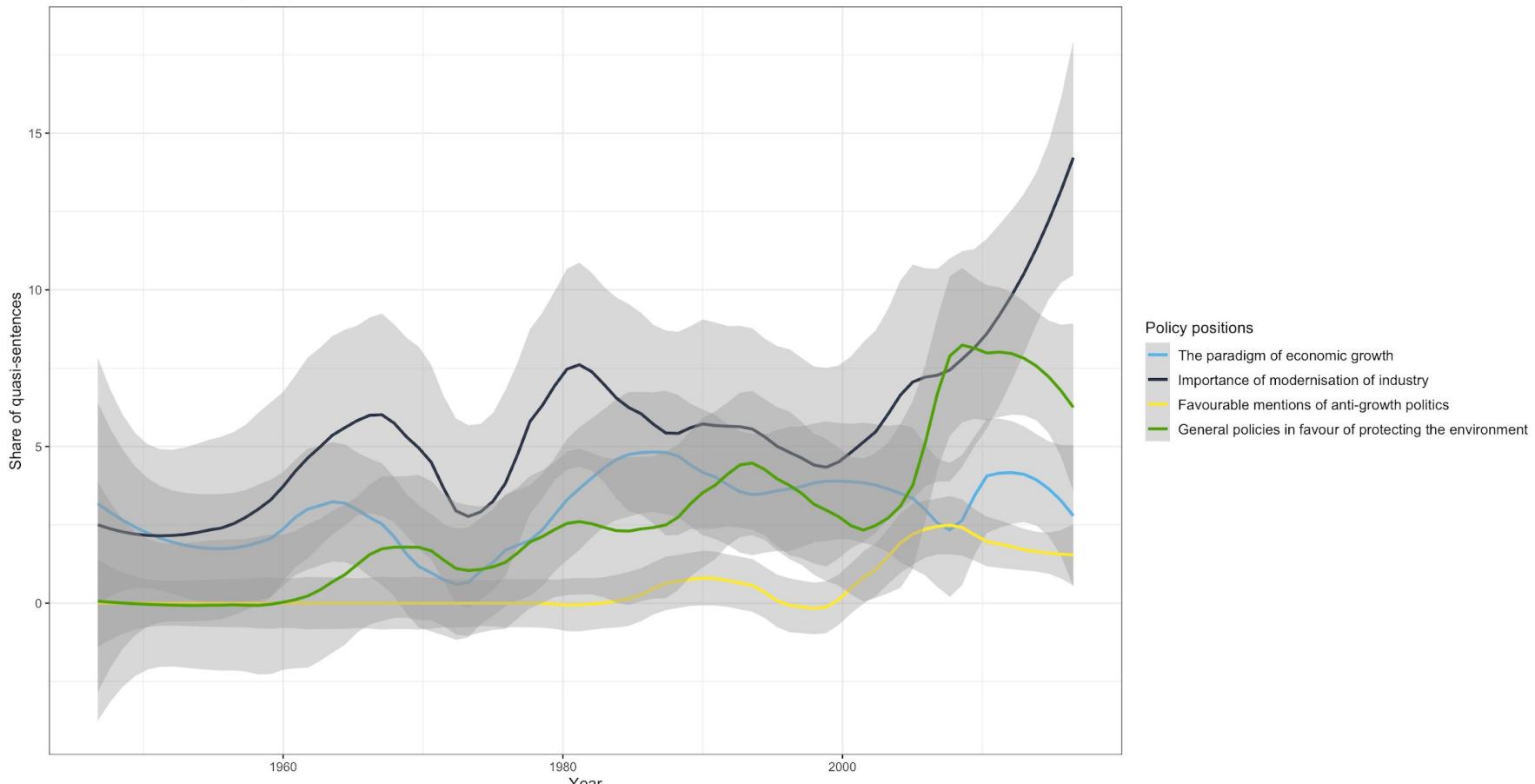


A quasi-sentence is the general coding unit of the Manifesto Project. A quasi-sentence is a single statement.

Data source: The Manifesto Project (<https://manifesto-project.wzb.eu/datasets>)

Australian policy positions (1946-2016)

Australian policy positions from 1946 to 2016 on economic growth, technology and infrastructure, anti-growth economy, and environmental protection derived from a content analysis of parties' electoral manifestos.



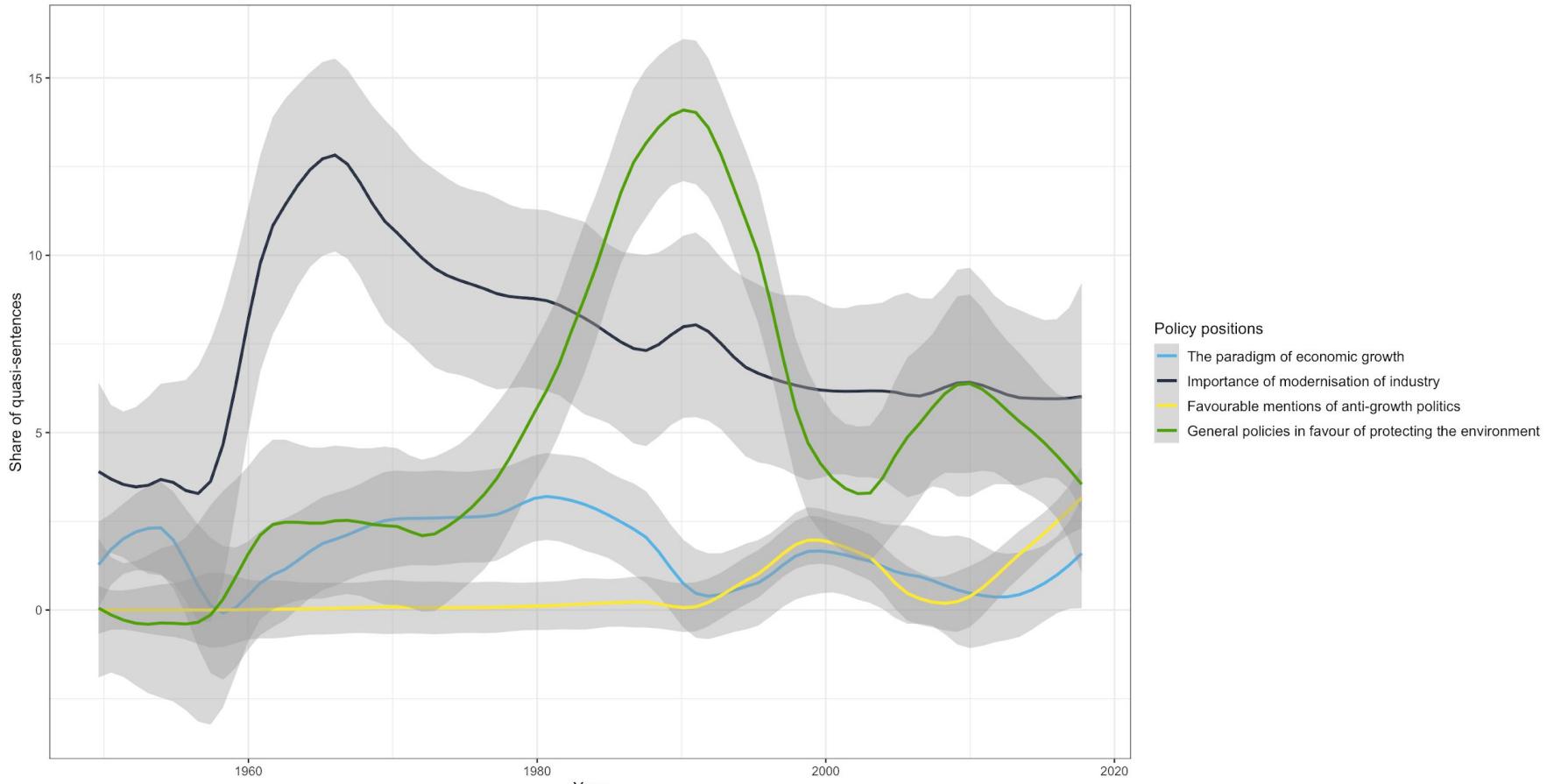
LOESS curve fitting method with a span of .3 was used to smooth the data.

A quasi-sentences is the general coding unit of the Manifesto Project. A quasi-sentence is a single statement.

Data source: The Manifesto Project (<https://manifesto-project.wzb.eu/datasets>)

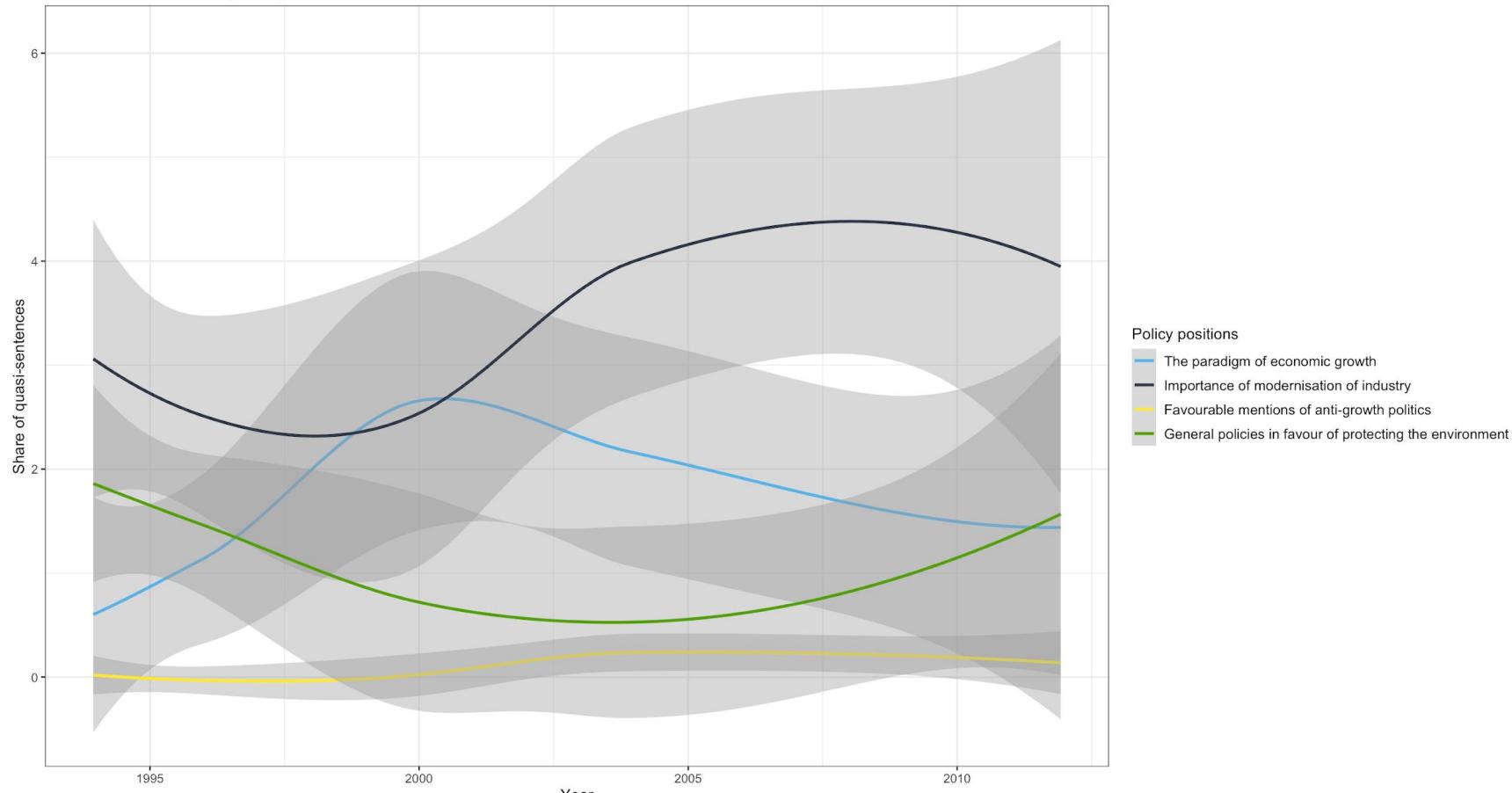
German policy positions (1949-2017)

German policy positions from 1949 to 2017 on economic growth, technology and infrastructure, anti-growth economy, and environmental protection derived from a content analysis of parties' electoral manifestos.



Russian policy positions (1993-2011)

Russian policy positions from 1993 to 2011 on economic growth, technology and infrastructure, anti-growth economy, and environmental protection derived from a content analysis of parties' electoral manifestos.



LOESS curve fitting method with a span of .9 was used to smooth the data.

A quasi-sentences is the general coding unit of the Manifesto Project. A quasi-sentence is a single statement.

Data source: The Manifesto Project (<https://manifesto-project.wzb.eu/datasets>)



Practices, resources

Resources are scarce; it's better if we use energy generated by wind instead of dinopower. But are we there just yet?

We analyse energy production as part of the resource profile of industrial societies.

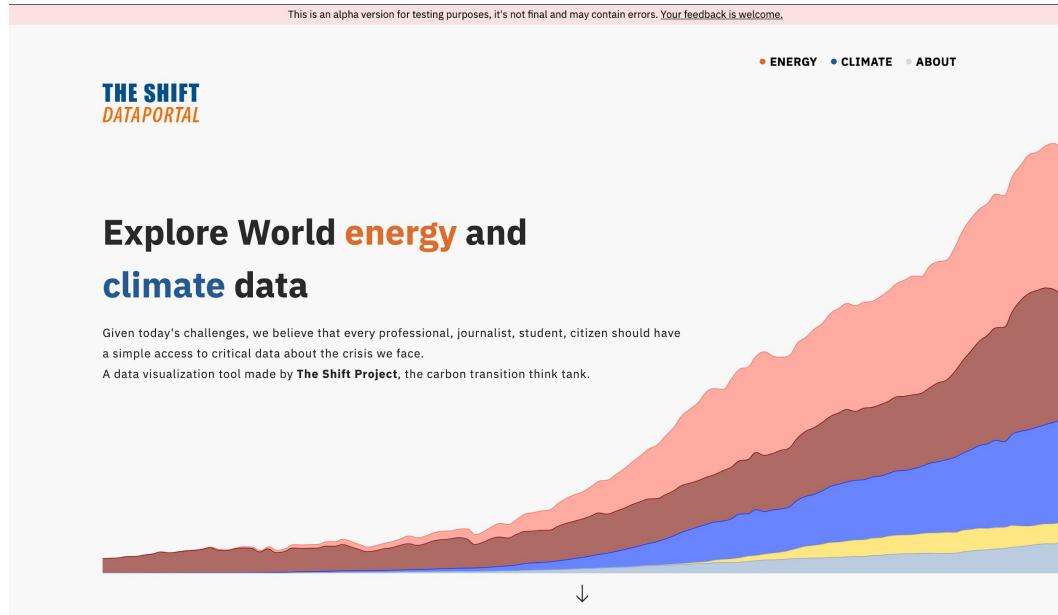




The Shift Project

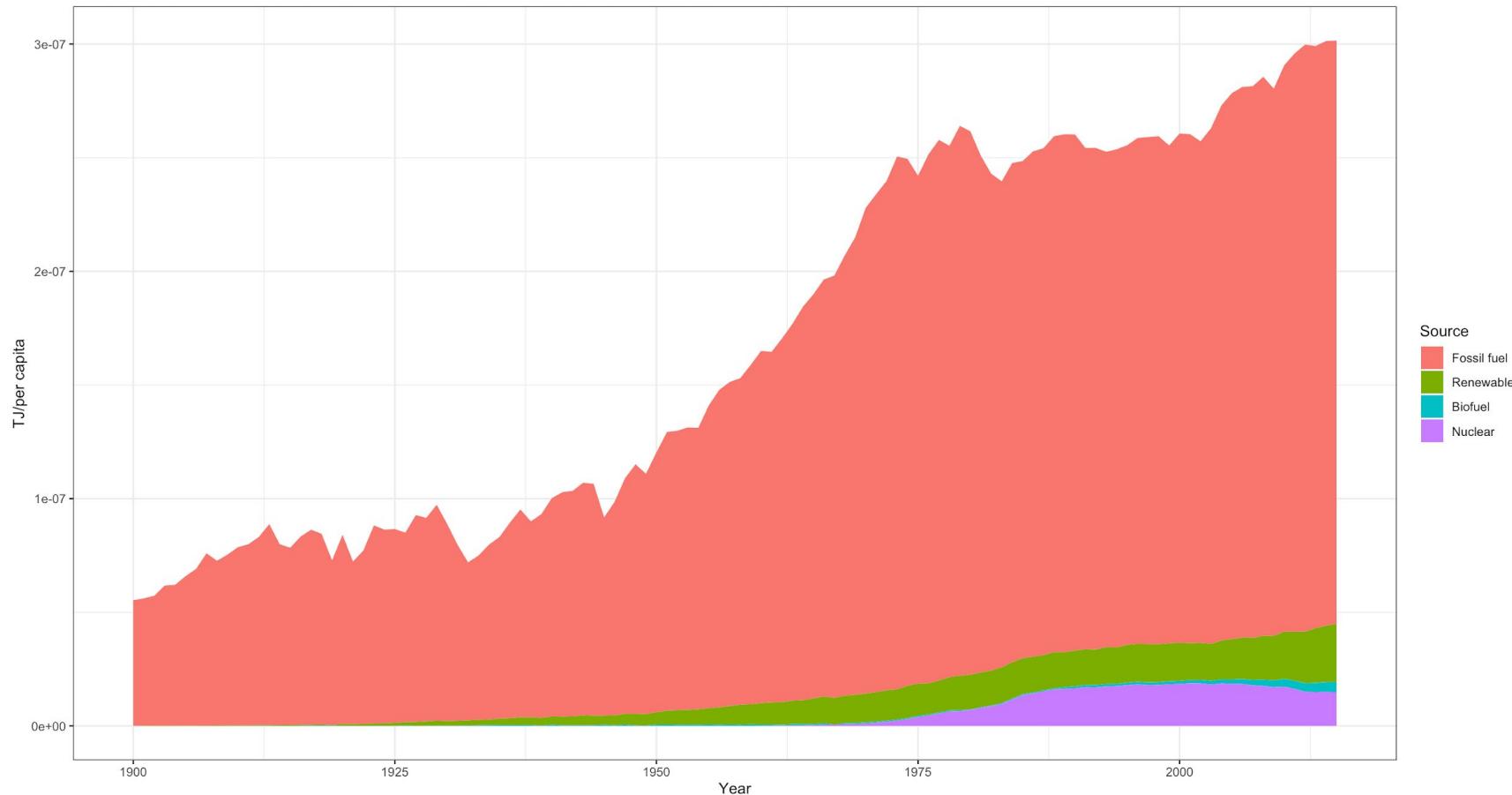
Using different data sources (US EIA Historical Statistics, Etemad & Luciani, World Bank, etc), The Shift Project has combined a database on primary energy production (among other things).

They were kind enough to let us use it to see how the energy sources used for energy production have changed globally from 1900 to 2016.



Global per capita energy production (1900-2016)

Total global energy production per year by energy source* measured in terajoules (TJ) from 1900 to 2016.



*The energy sources are grouped by point of source; additionally taking into account if the energy source is combustion-based and if/how the energy source is replenished.

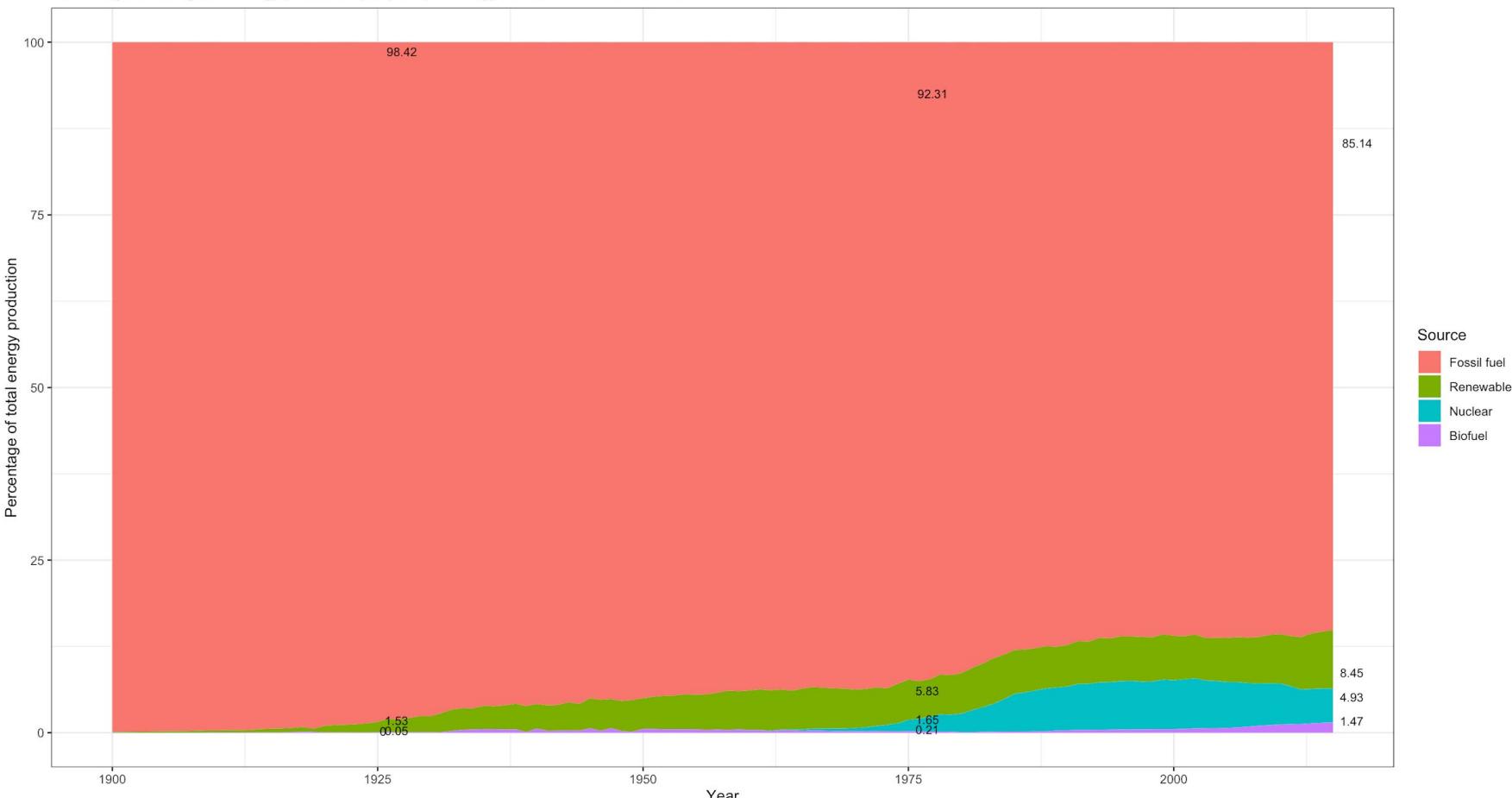
BFossil fuels: oil, coal, gas. Renewables: geothermal, hydroelectricity, solar, tide, wave, and fuel cell, wind. iofuels: biodiesel, biomass and waste, peat, fuel ethanol. Nuclear: nuclear.

Data source: The Shift Project (<https://theshiftdataportal.org>)

Data source for population data: Our World in Data (<https://ourworldindata.org/world-population-growth>)

Percentage of global energy production by source (1900-2015)

Percentage of total global energy production per year per energy source* from 1900 to 2015.



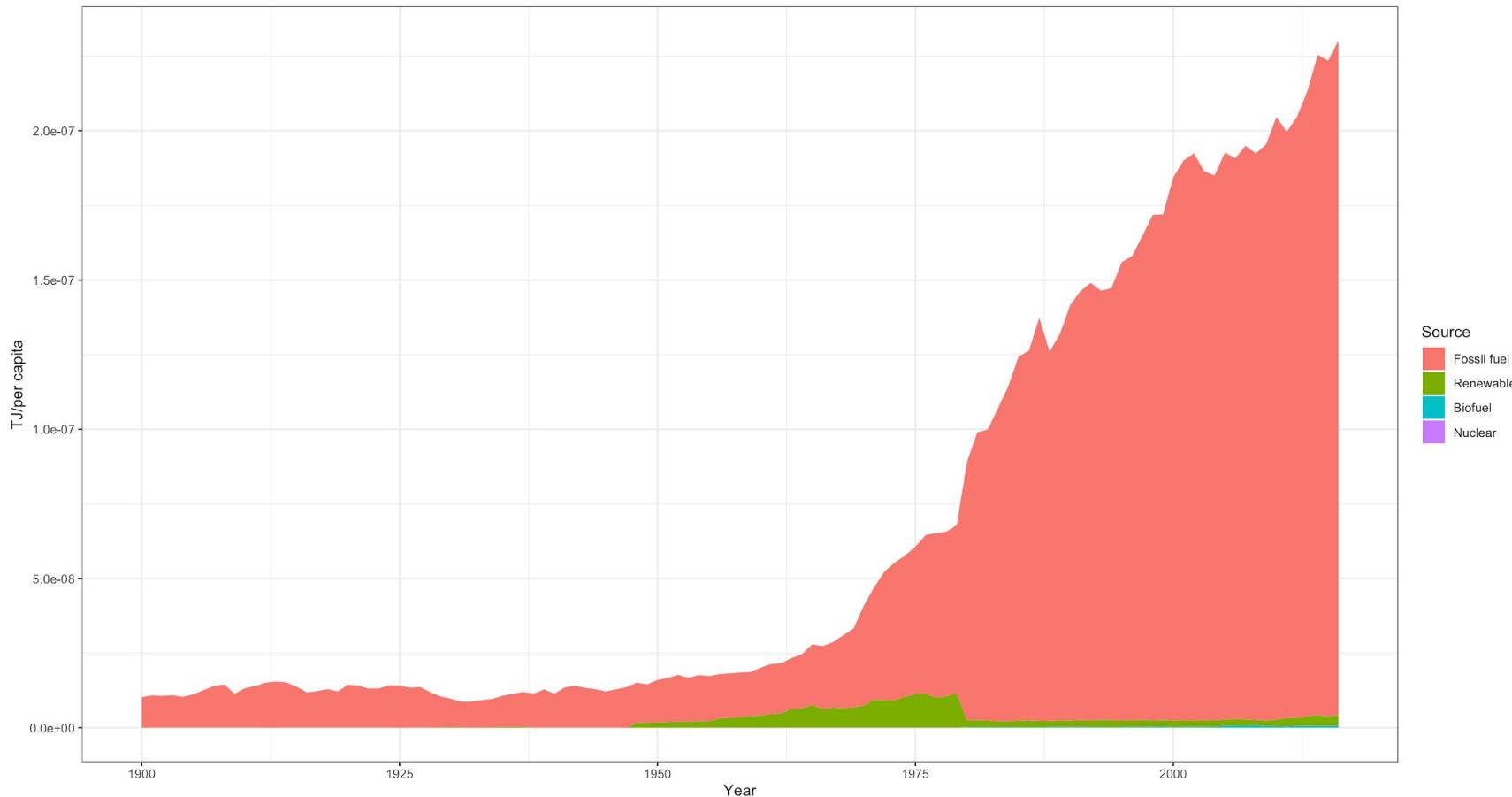
*The energy sources are grouped by point of source; additionally taking into account if the energy source is combustion-based and if/how the energy source is replenished.

Fossil fuels: oil, coal, gas. Renewables: geothermal, hydroelectricity, solar, tide, wave, and fuel cell, wind. Biofuels: biodiesel, biomass and waste, peat, fuel ethanol. Nuclear: nuclear.

Data source: The Shift Project (<https://theshiftdataportal.org>)

Australia: Per capita energy production (1900-2016)

Total energy production per year by energy source* measured in terajoules (TJ) in Australia from 1900 to 2016.



*The energy sources are grouped by point of source; additionally taking into account if the energy source is combustion-based and if/how the energy source is replenished.

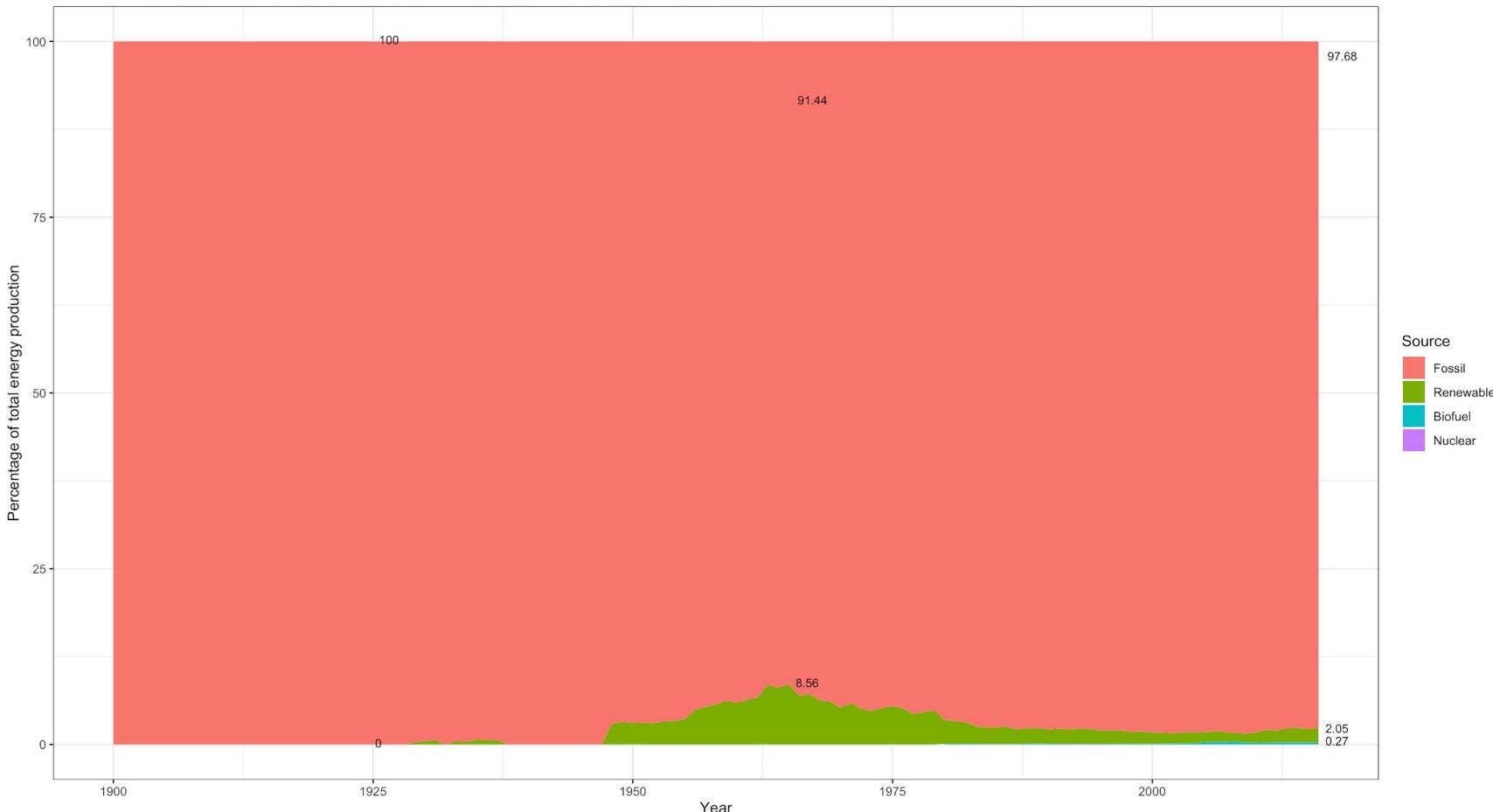
BFossil fuels: oil, coal, gas. Renewables: geothermal, hydroelectricity, solar, tide, wave, and fuel cell, wind. Biofuels: biodiesel, biomass and waste, peat, fuel ethanol. Nuclear: nuclear.

Data source: The Shift Project (<https://theshiftdataportal.org>)

Data source for population data: Our World in Data (<https://ourworldindata.org/world-population-growth>)

Australia: Percentage of energy production by source (1900-2016)

Percentage of total energy production per year per energy source* in Australia from 1900 to 2016.

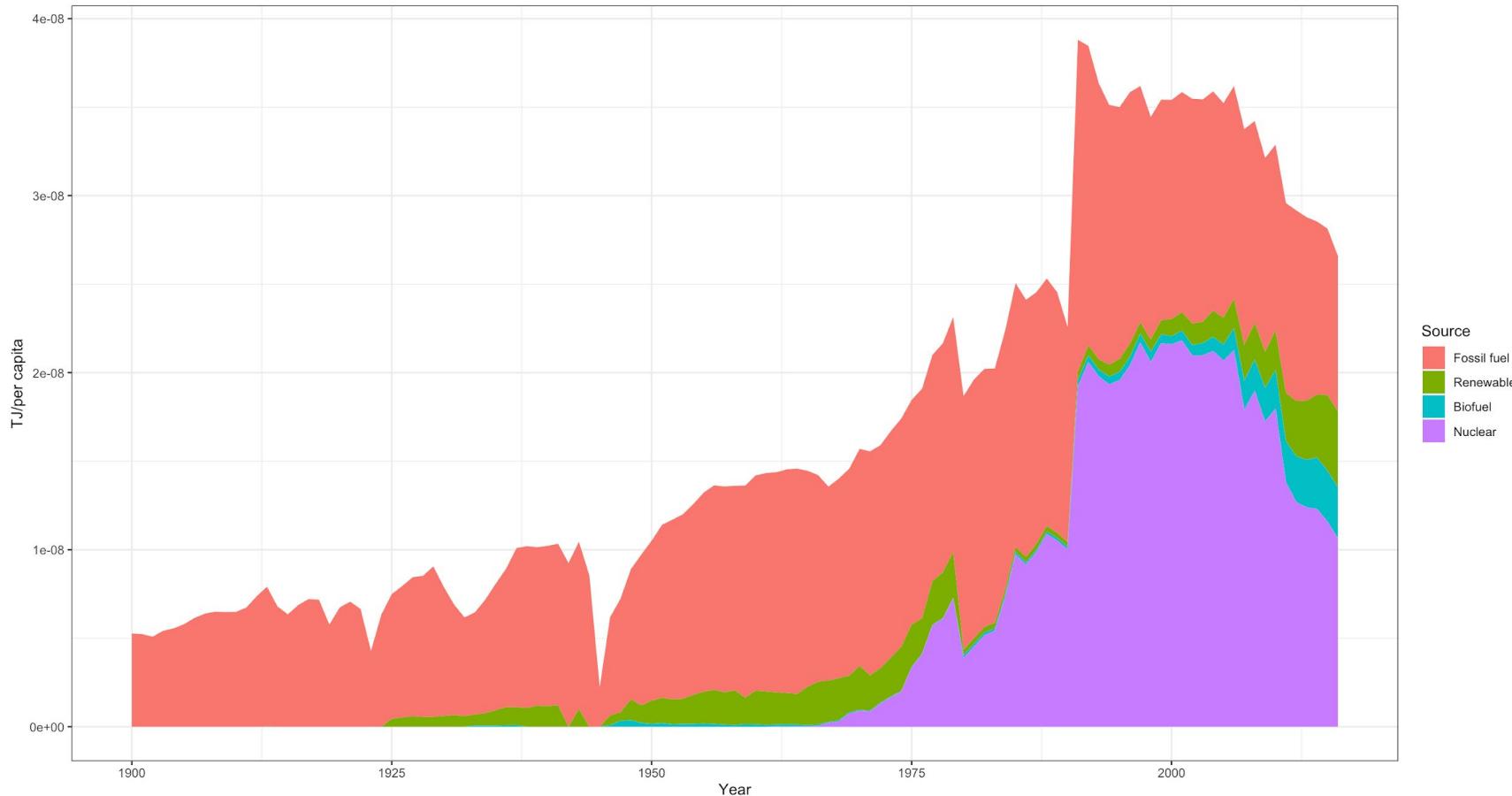


*The energy sources are grouped by point of source; additionally taking into account if the energy source is combustion-based and if/how the energy source is replenished.

Fossil fuels: oil, coal, gas. Renewables: geothermal, hydroelectricity, solar, tide, wave, and fuel cell, wind. Biofuels: biodiesel, biomass and waste, peat, fuel ethanol. Nuclear: nuclear.

Germany: Per capita energy production (1900-2016)

Total energy production per year by energy source* measured in terajoules (TJ) in Germany from 1900 to 2016.



*The energy sources are grouped by point of source; additionally taking into account if the energy source is combustion-based and if/how the energy source is replenished.

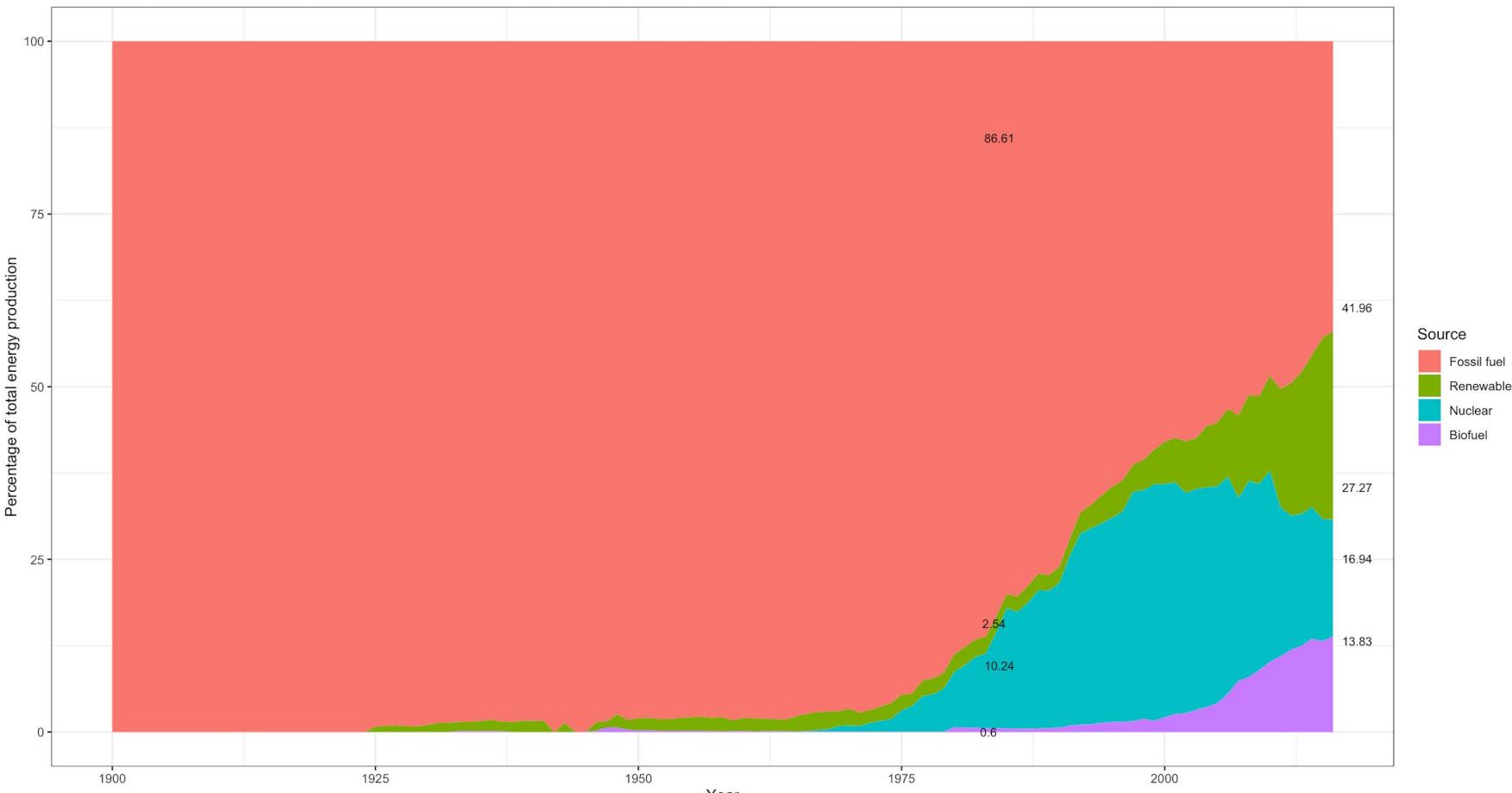
BFossil fuels: oil, coal, gas. Renewables: geothermal, hydroelectricity, solar, tide, wave, and fuel cell, wind. Biofuels: biodiesel, biomass and waste, peat, fuel ethanol. Nuclear: nuclear.

Data source: The Shift Project (<https://theshiftdataportal.org>)

Data source for population data: Our World in Data (<https://ourworldindata.org/world-population-growth>)

Germany: Percentage of energy production by source (1900-2016)

Percentage of total energy production per year per energy source* in Germany from 1900 to 2016.



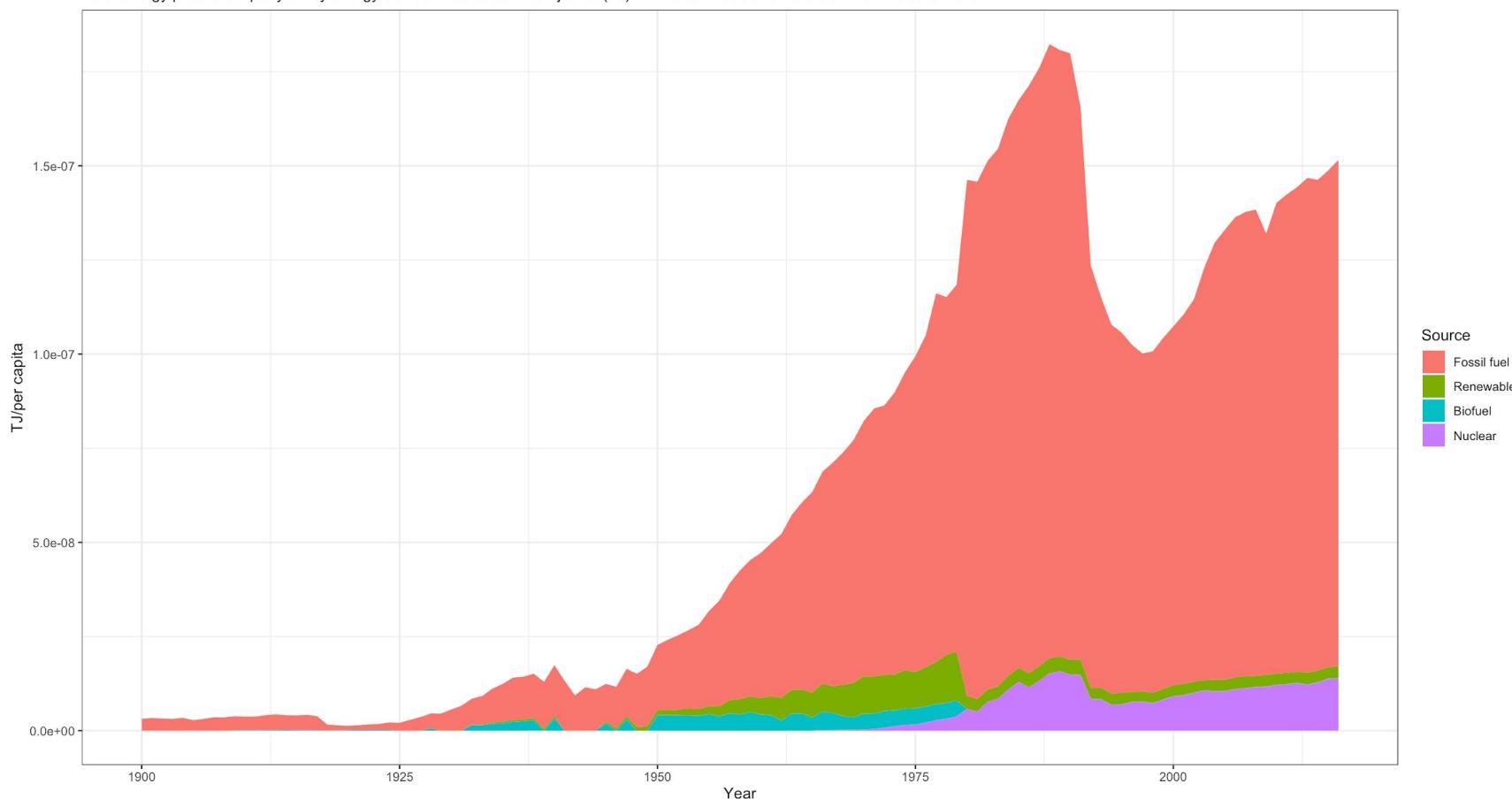
*The energy sources are grouped by point of source; additionally taking into account if the energy source is combustion-based and if/how the energy source is replenished.

Fossil fuels: oil, coal, gas. Renewables: geothermal, hydroelectricity, solar, tide, wave, and fuel cell, wind. Biofuels: biodiesel, biomass and waste, peat, fuel ethanol. Nuclear: nuclear.

Data source: The Shift Project (<https://theshiftdataportal.org>)

Russian Federation & USSR: Per capita energy production (1900-2016)

Total energy production per year by energy source* measured in terajoules (TJ) in Russian Federation & USSR from 1900 to 2016.



*The energy sources are grouped by point of source; additionally taking into account if the energy source is combustion-based and if/how the energy source is replenished.

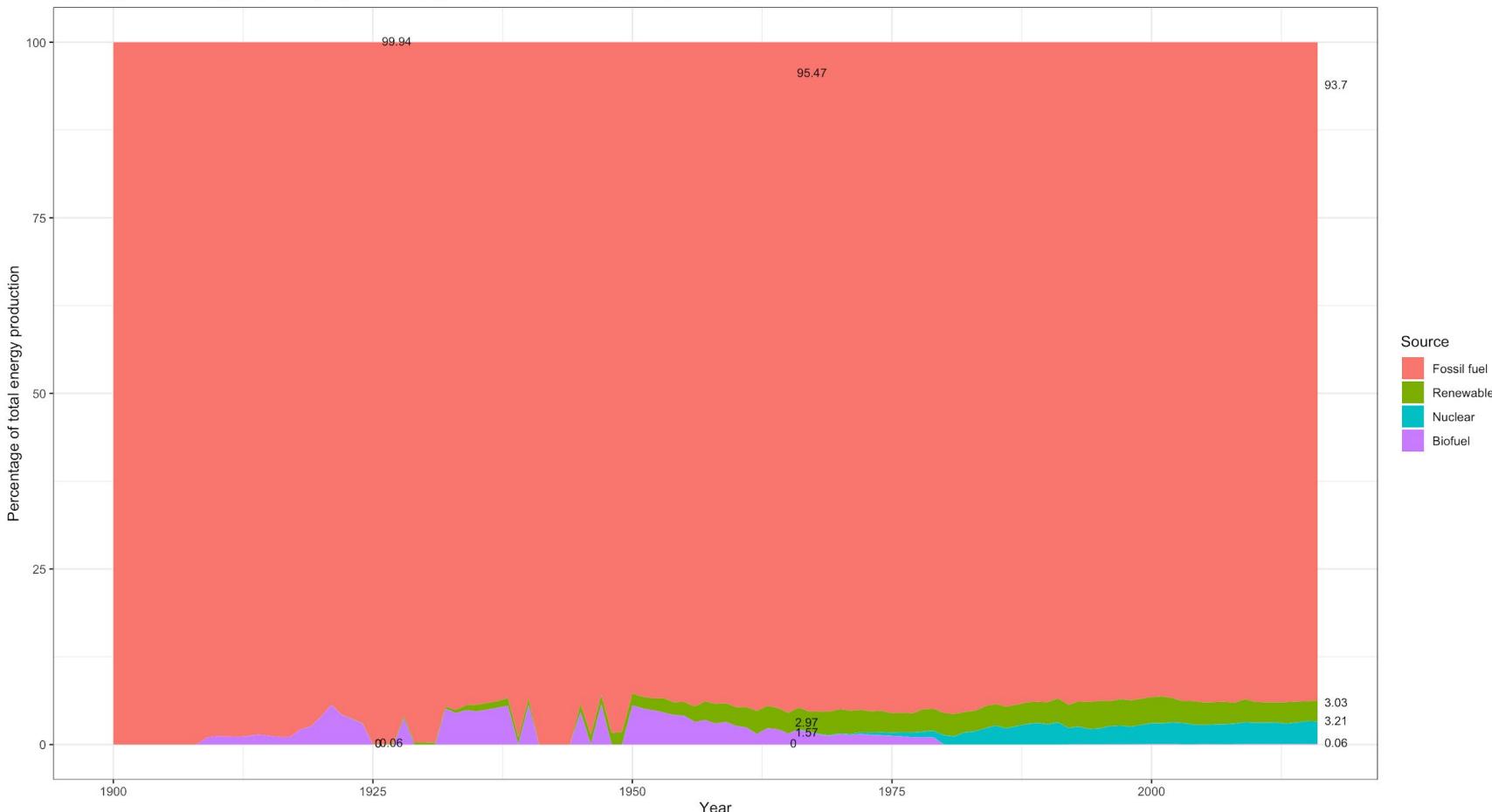
BFossil fuels: oil, coal, gas. Renewables: geothermal, hydroelectricity, solar, tide, wave, and fuel cell, wind. Biofuels: biodiesel, biomass and waste, peat, fuel ethanol. Nuclear: nuclear.

Data source: The Shift Project (<https://theshiftdataportal.org>)

Data source for population data: Our World in Data (<https://ourworldindata.org/world-population-growth>)

Russian Federation & USSR: Percentage of energy production by source (1900-2016)

Percentage of total energy production per year per energy source* in Russian Federation & USSR from 1900 to 2016.

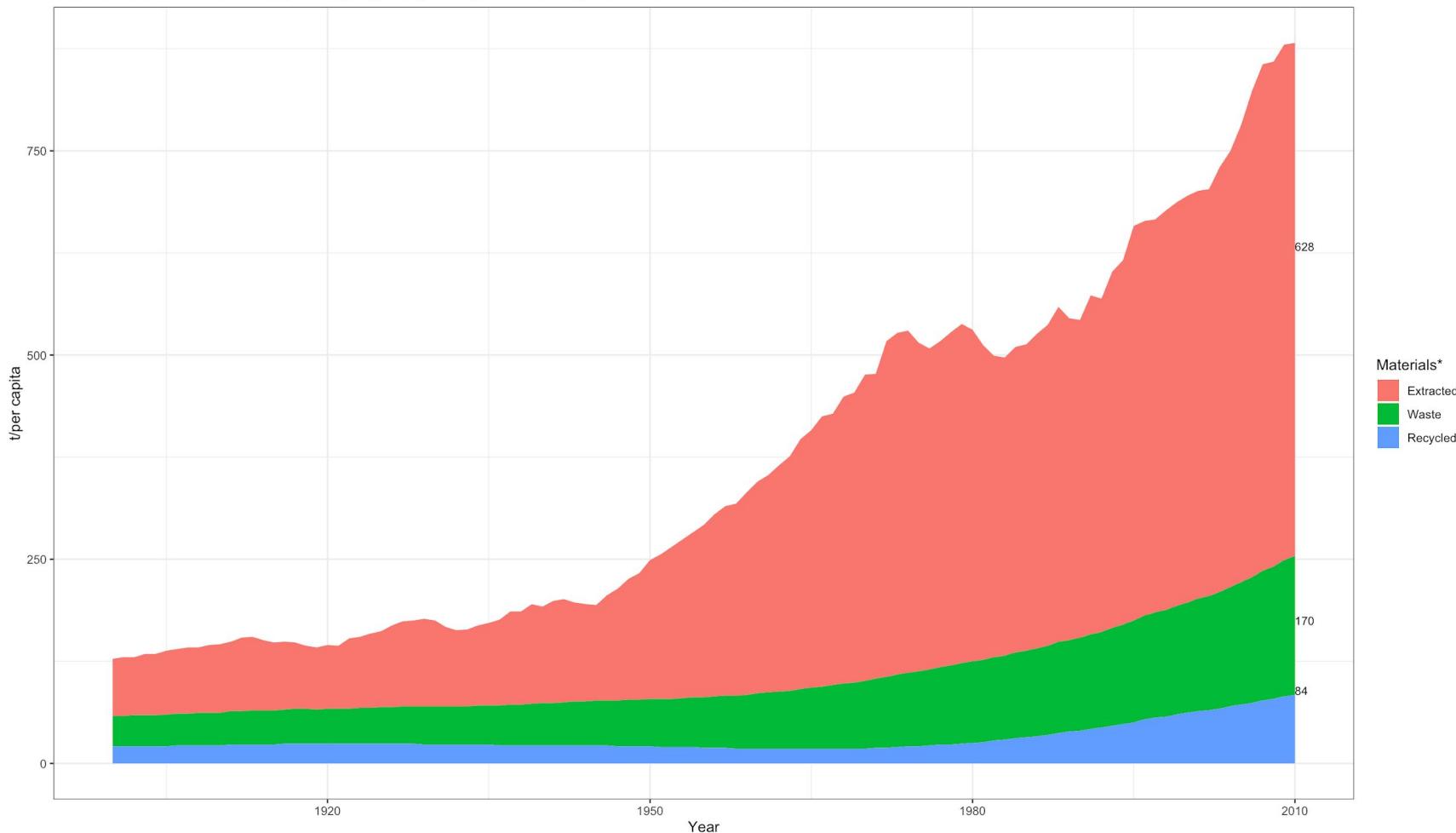


*The energy sources are grouped by point of source; additionally taking into account if the energy source is combustion-based and if/how the energy source is replenished.

Fossil fuels: oil, coal, gas. Renewables: geothermal, hydroelectricity, solar, tide, wave, and fuel cell, wind. Biofuels: biodiesel, biomass and waste, peat, fuel ethanol. Nuclear: nuclear.

Global extraction, waste, and recycling of engineering materials (1900-2010)

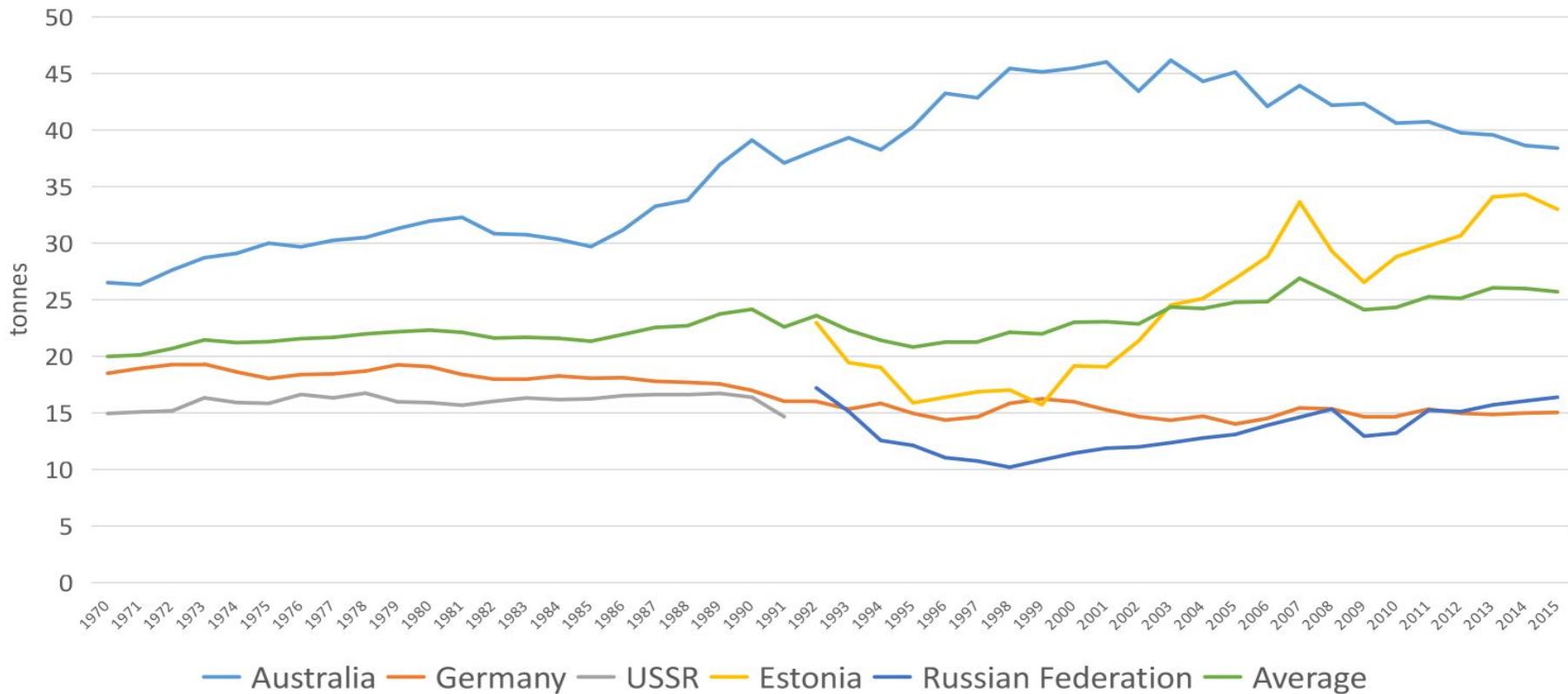
Global per capita extraction, waste, and recycling of engineering materials measured in tons from 1900 to 2010.



*The engineering materials accounted for are: aluminium, asphalt, bricks, concrete, copper, iron/steel and other metals and minerals, paper, plastics, sand and gravel, wood and dry mass.

Data source: Krausmann et al. (2017), DOI: <https://doi.org/10.1073/pnas.1613773114>

Domestic material consumption per capita, per year

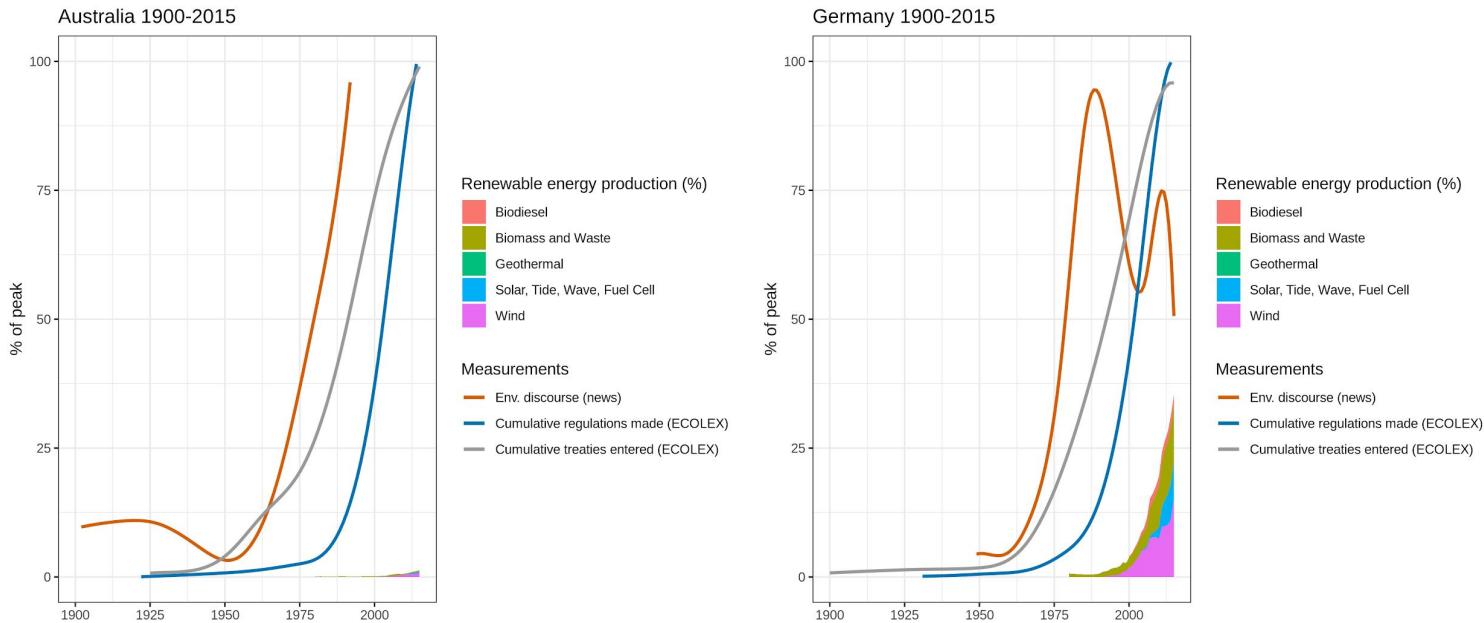


Total amount of material directly used in an economy, i.e. domestic extraction plus imports minus exports
UN Environment International Resource Panel Global Material Flows Database.

Summary

Ideas, rules, practices

Combined graph of discourse, regulations and energy production, Australia and Germany.
Lag in discourse -> regulation -> practice visible. (Smooth lines show GAM fit.)





Summary

Country-level findings:

- Industrial modernity as a socio-material landscape with varying degrees of “thickness”: a great degree of heterogeneity (expected), country-level historical knowledge required to give meaningful interpretation of the findings
- Surprise: economic growth not that much present in the political platforms of parties: anti-growth and sustainability themes starting to dominate in recent years
- Both Australia and Germany: the curve for entering global treaties precedes the growth of national environmental regulations - difference between goals and means of getting there?

Aggregate findings:

- Very-very-very (if not even very-very-very) tentative evidence of a time-lag between ideas, institutions and practices (e.g. data on ideas is only based on some Australian and German sources)
- Industrial modernity might be in the process of hollowing out but we need to look for this in the right places, i.e. beyond observable practices



Outstanding issues

Works in progress - working on data quality, inference validity, and workflow standardization (required for upscaling and establishing international networks of collaboration)

Data access: large text-mining corpora are easy to access for large universities, near-impossible for small ones (read: helping hands are much needed :)

Data availability: often unclear whether it exists at all or how to assemble it (e.g. WIPOLex covers intellectual property, ECOLEX covers environmental regulation but what is the equivalent for the scientific dimension of industrial modernity?)

Interpretation: often the main question is what exactly do the results actually show? Do they really illustrate continuities/discontinuities in industrial modernity or something else?

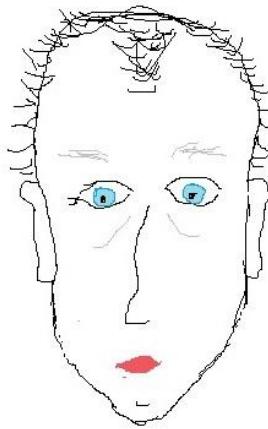
Lack of expertise: interpretation of results from various countries and domains requires expertise in different domains. Such an expertise is near impossible to have in a small team



Team

Making so many squiggly lines can tough for one person, thus making them – and thinking about them – is a team effort.

Starting from the middle: Laur Kanger,
Kati Orru, Silver Sillak, Anna-Kati Pahker,
and Peeter Tinit



Measuring Industrial Modernity, 1900-2020

Peeter Tinit, Anna-Kati Pahker,
Laur Kanger, Kati Orru, Silver Sillak

20.05.2020 (10-min overview)





Measuring Industrial Modernity

Deep Transitions:

- A long-term continuity in sociotechnical systems building up as Industrial Modernity,
- And, possibly, another **Deep Transition out of it**, happening now.

Our aim:

- Measure the extent of Industrial Modernity in 1900-2020
- Look for possible signs of rupture in it (“signs of hope”)



Organization

Working as part of larger project

“Reshaping Estonian energy, mobility and telecommunications systems on the verge of the Second Deep Transition” (2019-2023) at the University of Tartu, Estonia.

Theoretical work, data collection and analysis.

- How do we operationalize Industrial Modernity?
 - What are the features? How can we find them in data?
- Get and analyse the data
 - Consider any and all data sources!!!
- Theory <-> Data



Operationalizing Industrial Modernity

We follow the features in [Kanger & Schot, 2019](#) (Table 2, also slide 8 in extended slides), e.g.

- Belief that societal problems can be solved primarily with science & technology
- Belief in the limitless supply of natural resources (given science & technology)
- Belief that social issues trump environmental issues in urgency

In a nutshell:

- Environment as a blind spot +
- Unqualified belief in the benefits of science and technology



Ideas, rules, and practices

The socio-technical system, as we see it, can be characterized by ideas, rules, and practices.

- Ideas: how we think about environment, science, technology and innovation
- Rules: how we regulate our interactions with nature, conduct of science, and technological innovation
- Practices: how we actually use natural resources, scientific knowledge and various technologies



Measuring Industrial Modernity

How can we measure people's faith in technological progress? Or whether they consider nature as a mere instrument to their will?

- There are surveys. For one, since 1983 World Value Survey records answers to similar topics.
 - But we expect important changes to have happened before then. Most such surveys got started only then.
- Complement with text datasets and text mining methods
 - Digitized newspapers 1900-2020 give an insight into popular beliefs.



The study

- Use text mining and data aggregation to formulate approximate timelines
 - Look at timing and general trends
- Coverage:
 - Pilot: 4 countries (Australia, Estonia, Germany, Soviet Union/Russia)
 - Ultimate aim: global + country-level profile for Estonia
- Time-frame: 1900-2020
 - A rupture since 1970s?
 - Timelines in ideas vs rules vs practices



Text mining

Mining historical newspapers

- Look for environment, science, technology.
 - How many articles?
 - Are they optimistic or pessimistic?
 - Do they discuss Environment with Industry/Technology? Or are they separate?

Keyword queries

- > topic model filters
- > keyword contexts

Satellites for nature protection

AUSTRALIA is joining an international project using satellite information to study environmental problems.

Australia's part in the study, known as the International Land Cover Change Project, will produce a series of reports in book, video and compact disc form, demonstrating the use of earth observation satellite data (com-

cies, town planning authorities, and environmental protection bodies throughout the world).

Other countries from France and the USSR will join with CSIRO to cooperate on the Land Cover Change Project, which will be examining a different region of the world.

The Australian Space Office, of the Department of Industry, Technology

DALLAS, Texas, Sunday, (AAP)—A panel of experts in environmental issues warned yesterday that the development of spread technology threatens man's continued ex-

istence. The biology of natural systems will be studied at Washington University in a debate over the future of the south-east forests.

The executive director of the National Association of Forest Industries, Robert Bain, will take part in the debate, along with the

Kakadu issue reflects need for scientists

a set of resolutions, will start at Melville Hall at the ANU at 7.30pm. Admission is free and the public is welcome.

Kakadu issue reflects need for scientists

the debate, which will produce

Top speakers from the forestry industry and environmental groups will lock horns tonight at the Australian National University in a debate over the future of

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Data sources

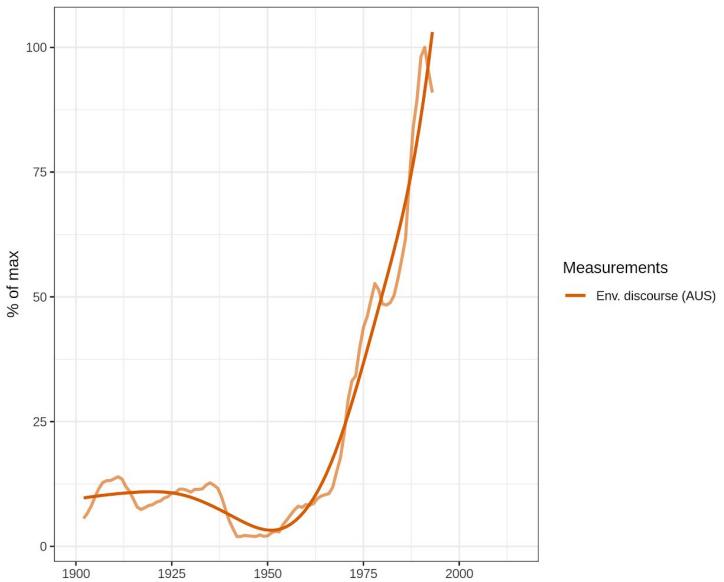
- For ideas:
 - Popular newspapers (triangulate with surveys)
- For rules & regulations:
 - Politics: MANIFESTO party platforms
 - Laws: ECOLEX environmental laws and regulations
- For practice
 - Energy production & Material use: The Shift data; Material Flow Accounting
 - Science & technology: environmental topics in publications, proportion of green patents

(More on slide 12 in extended slides)

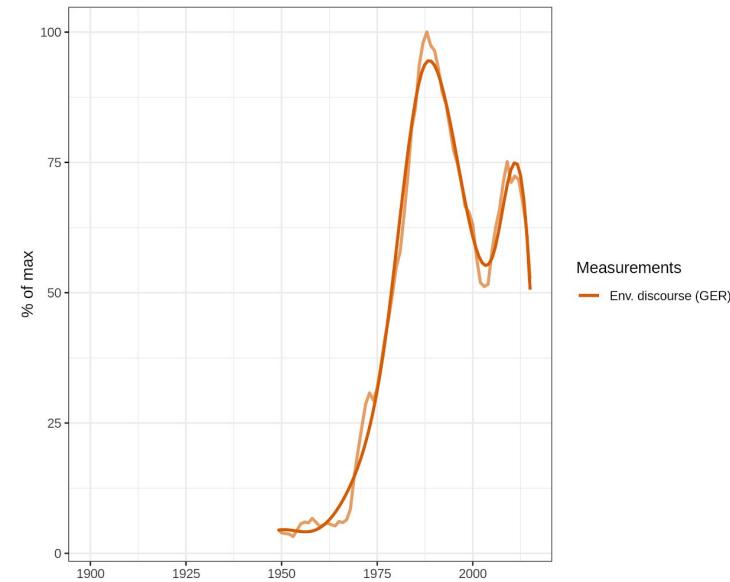


Ideas

Australia 1900-2015

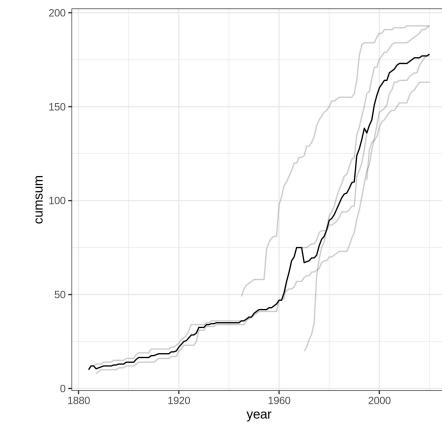
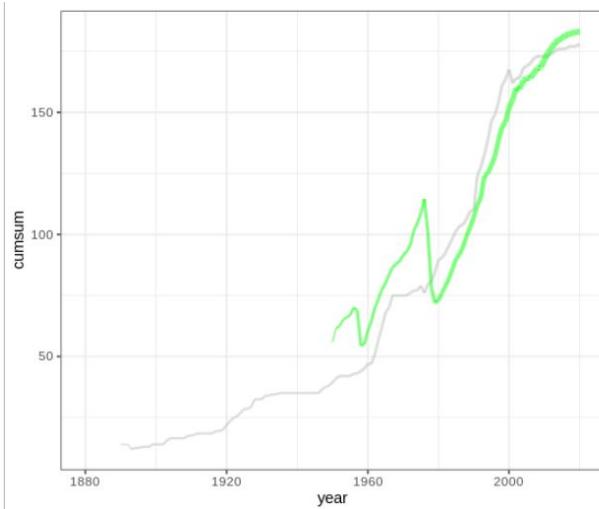
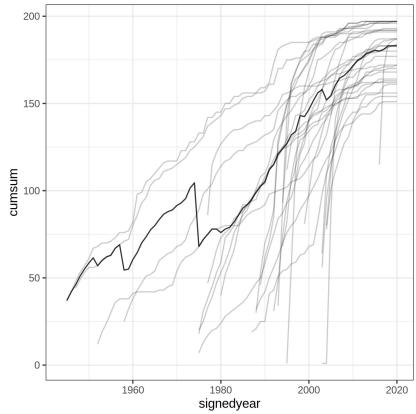


Germany 1900-2015



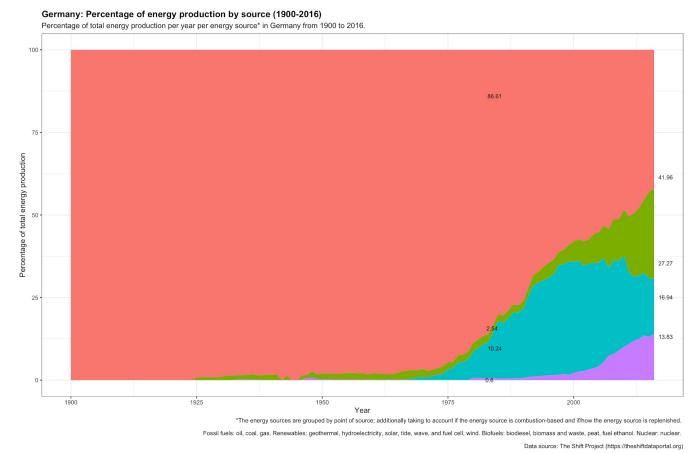
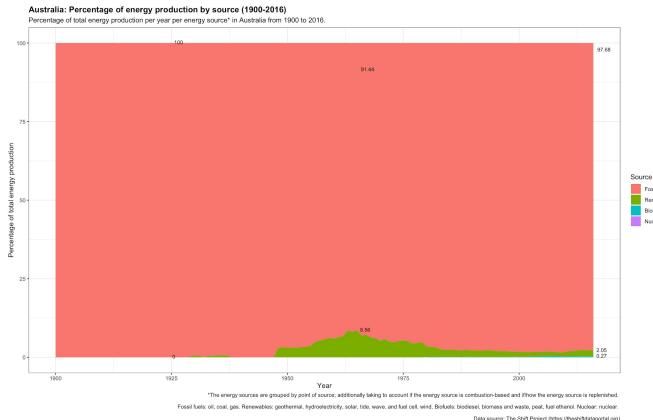
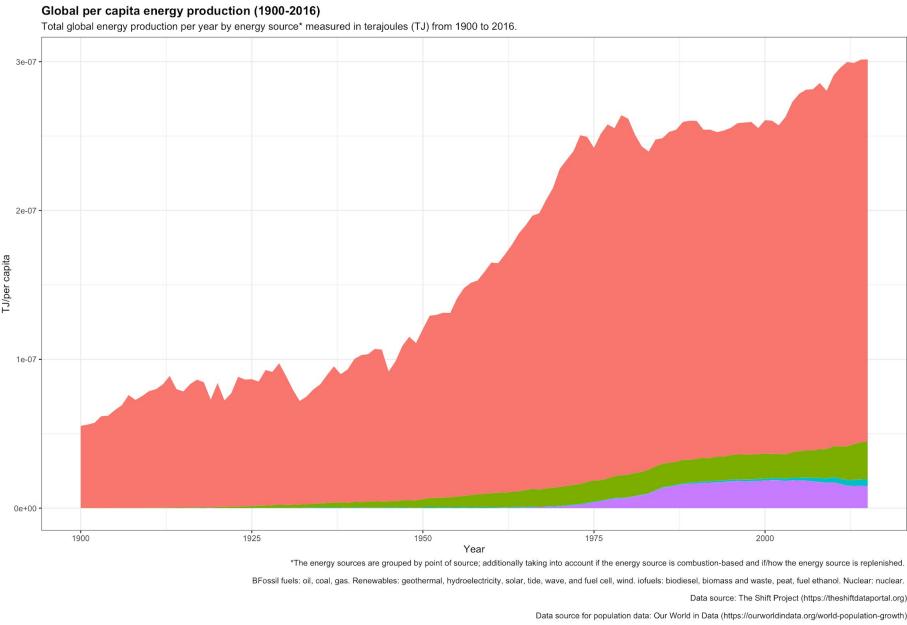


Laws



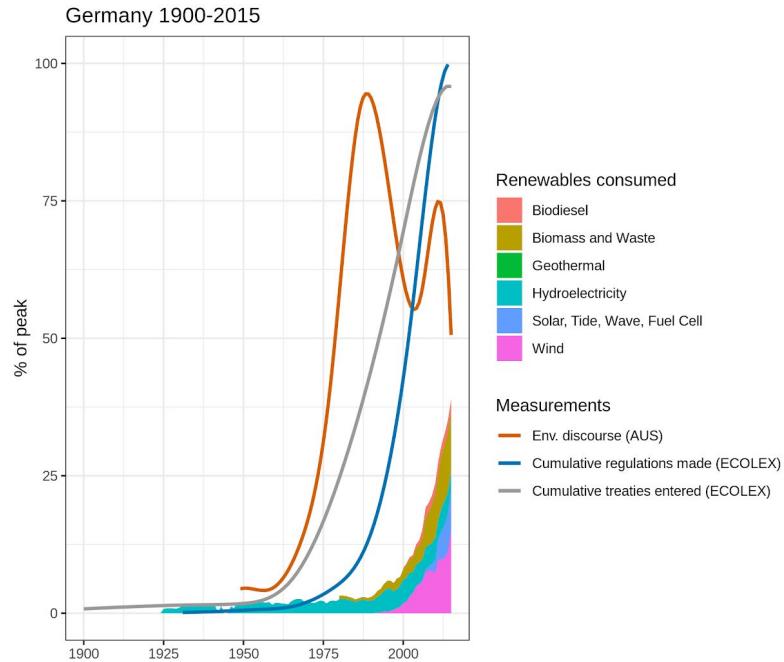
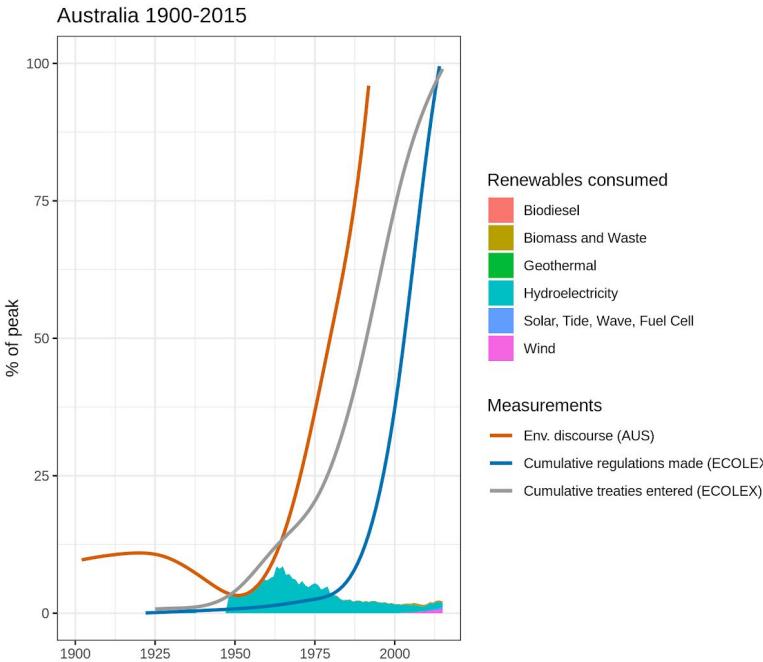


Practices





Combining timelines





Main challenges

Data availability

Data access (!!!)

Operationalization, confounds

Domain expertise



Summary

Measuring Industrial Modernity 1900-2020

- Theory <-> Measurements <-> Data
- Long-term approximate timelines
- Questions:
 - “Signs of hope” vs “business-as-usual”
 - Interactions between ideas, rules, and practices.
 - A potential lag: ideas -> rules -> practices ?



Thank you

Join us in the upcoming session



Measuring Industrial Modernity, 1900-2020

Peeter Tinit, Anna-Kati Pahker,
Laur Kanger, Kati Orru, Silver Sillak

20.05.2020 (10-min overview)





Operationalizing Industrial Modernity

Industrial Modernity

- = ideas, rules, resources
- = a socio-material structure encompassing the domains of natural environment (as a source of inputs), science, technology and innovation
- = environment as a blind spot + unqualified belief in science and technology

We are trying to measure the extent of Industrial Modernity 1900-2020

- Look for possible ruptures or “signs of hope”



Features of Industrial Modernity

(Environment, Science, Tech & Innov) x (Ideas, Rules, Practices)

Adapted from [Kanger & Schot, 2019](#) (Table 2, more examples on slide 8 in ext. slides)

	Environment	Science	Technology & Innovation
Ideas	- Belief in the limitless supply of resources	- Belief in societal progress through the application of science	- Belief in societal progress through the application of technology
Rules	- Prioritization of „societal“ over „environmental“ concerns	- Technocracy: governance should be based on expert rule	- Largely reactive approach to the consequences of innovation
Practices	- “Mineral”, fossil fuel based and linear economy	- Increasing application of scientific knowledge to technological innovation	- Increasing societal dependence on various socio-technical systems



Measurements

	Sources	Environment	Science	Technology & Innovation
Ideas	Newspapers	<ul style="list-style-type: none">- Presence of env, sci, tech topics in discourse (should reflect interests)- Mixing of env+sci, sci+tech, env+tech (predict increased mixing)- Sentiments on each (predict increased worry on each), also Env in WVS		
Rules	Party platforms, Parl. records	<ul style="list-style-type: none">- Env, sci, tech in party platforms (MANIFESTO)- Env, sci, tech in parliamentary records, state gazettes		
	Databases, Surveys	<ul style="list-style-type: none">- More and stronger “Eco”-laws (ECOLEX)	<ul style="list-style-type: none">- Technocratic Mentality Index (WVS), proxies of “Expertise” in parliamentary records	
Practices	Databases	<ul style="list-style-type: none">- Resources use per pop (GMF, YSTAFDB)- Renewable energy production (Shift)	<ul style="list-style-type: none">- Environmental topics in science, engineering (Microsoft Academic, Ulrichsweb)	<ul style="list-style-type: none">- “Green” patents vs all patents. Spread of “green tech” vs other tech (WIPO, PATSTAT)

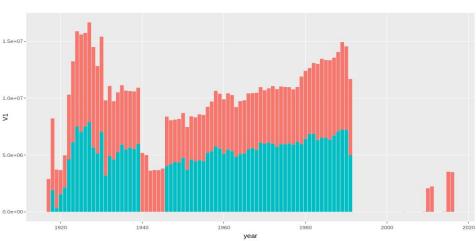


The study

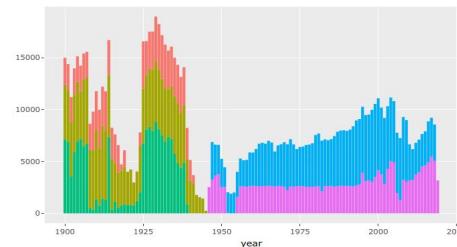
- Use text mining and data aggregation to formulate approximate timelines
 - Look at timing and general trends
- Coverage:
 - Pilot: 4 countries (Australia, Estonia, Germany, Soviet Union/Russia)
 - Ultimate aim: global + country-level profile for Estonia
- Time-frame: 1900-2020
 - A rupture since 1970s?
 - Timelines in ideas vs rules vs practices

Digitized newspapers

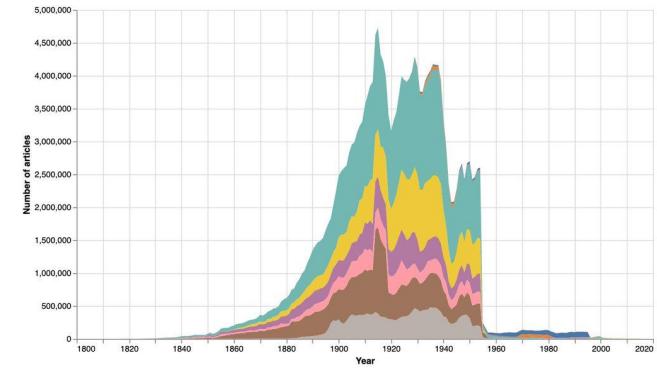
- Papers
 - Pilot: Australia, Germany, Estonia, USSR/Russia
 - Extension: Netherlands, Norway, Switzerland, UK
 -
- Based mostly on data availability!
 - Patchy digitization, closed collections, (language skills)
- Need to combine and mix multiple sources



Russian/Soviet news(Pravda, Izvestija)



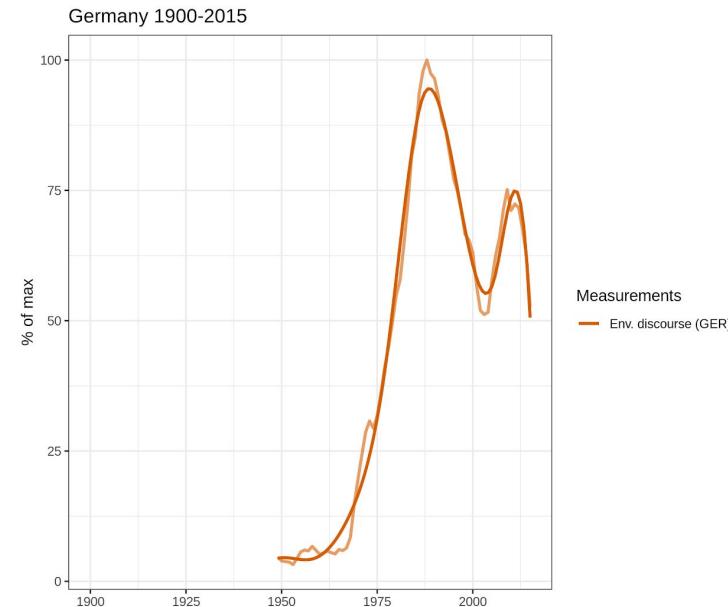
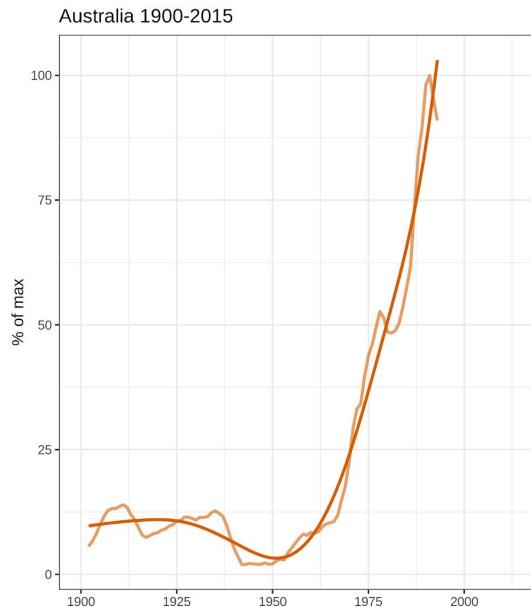
German news (Hamburg news, Zeit, Spiegel)



Australian news (Sidney MH, Canberra Times)



IDEAS: Discourse on environmental issues

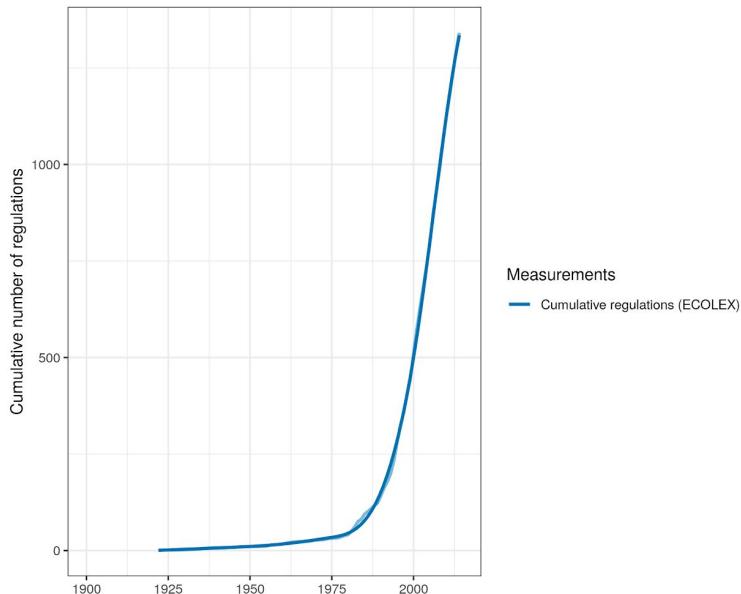


Newspaper data - mixed collections. (Prevalence of environment-focussed articles in newspapers.)

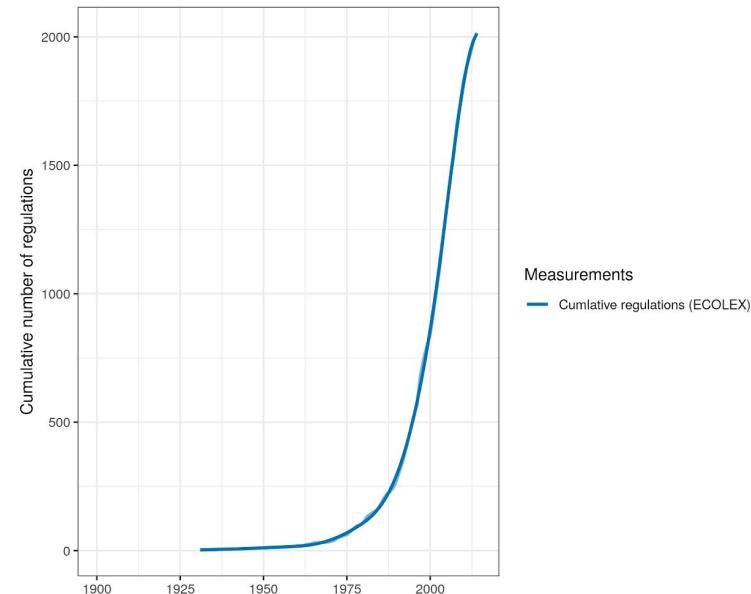


RULES: Cumulative environmental regulations

Australia 1900-2015



Germany 1900-2015

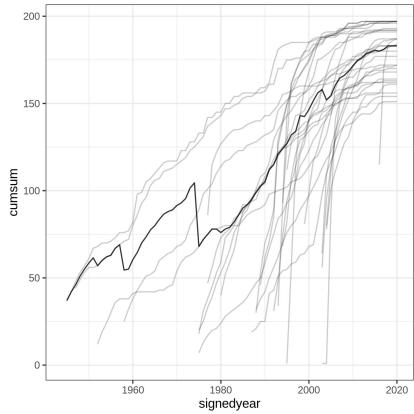


ECOLEX database of environmental law. (Country-specific regulations.)

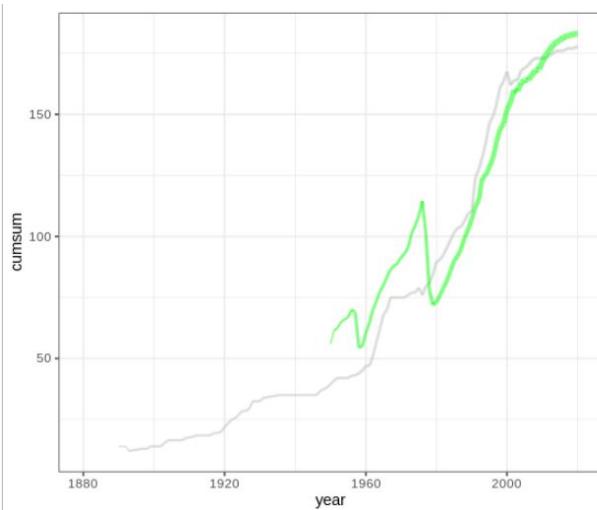


RULES

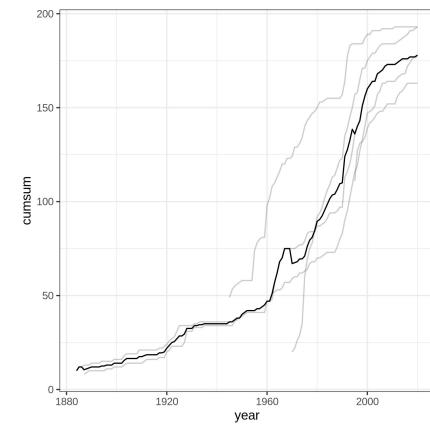
International environmental treaties



Cumulative number of members in major international **environmental treaties** (n countries > 150). Median in black.



Env. vs IP treaties **median comparisons**
Line thickness shows number of treaties



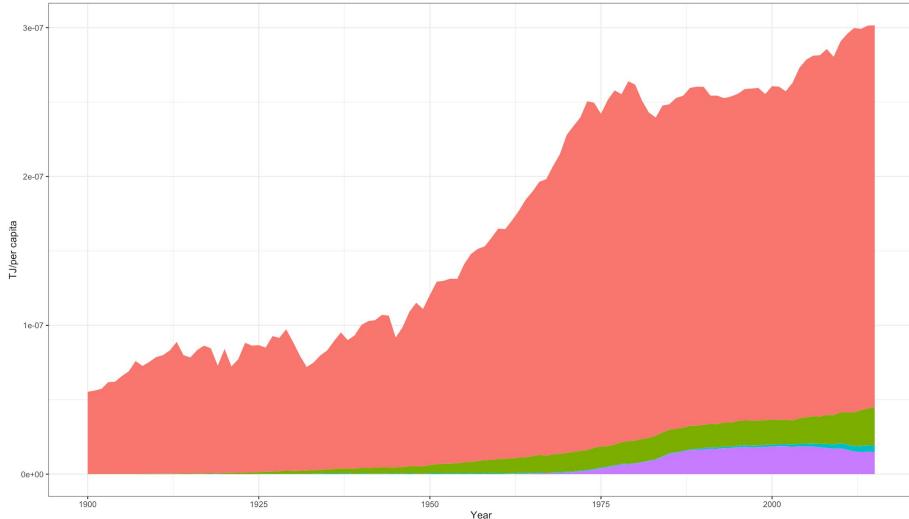
Cumulative number of members in major international **intellectual property rights treaties** (n countries > 150). Median in black.



PRACTICES: Energy production

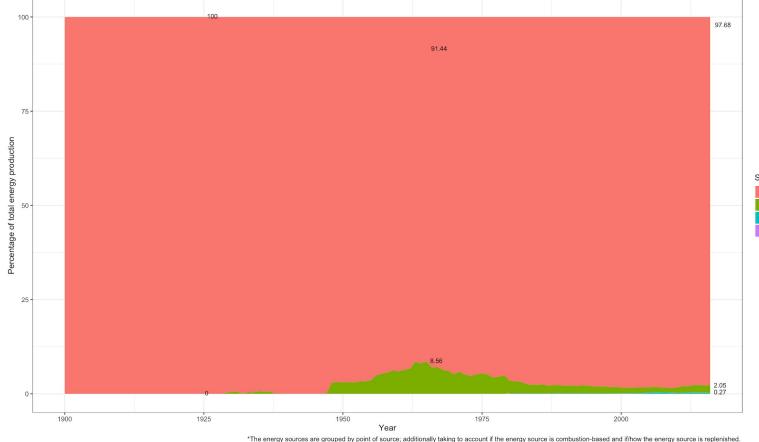
Global per capita energy production (1900-2016)

Total global energy production per year by energy source* measured in terajoules (TJ) from 1900 to 2016.



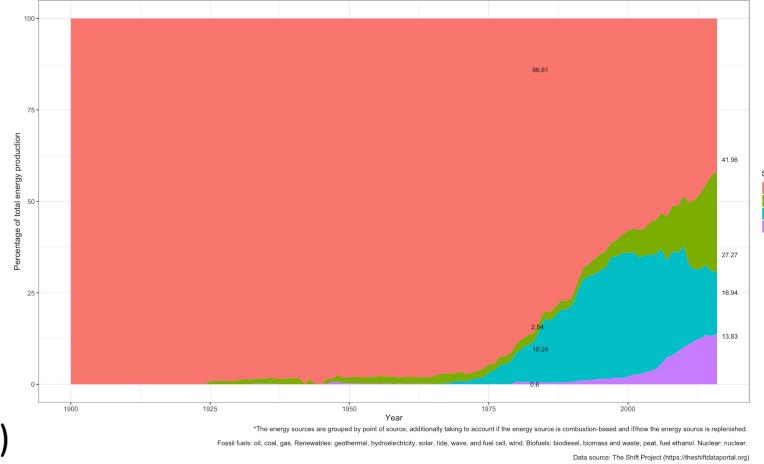
Australia: Percentage of energy production by source (1900-2016)

Percentage of total energy production per year per energy source* in Australia from 1900 to 2016.



Germany: Percentage of energy production by source (1900-2016)

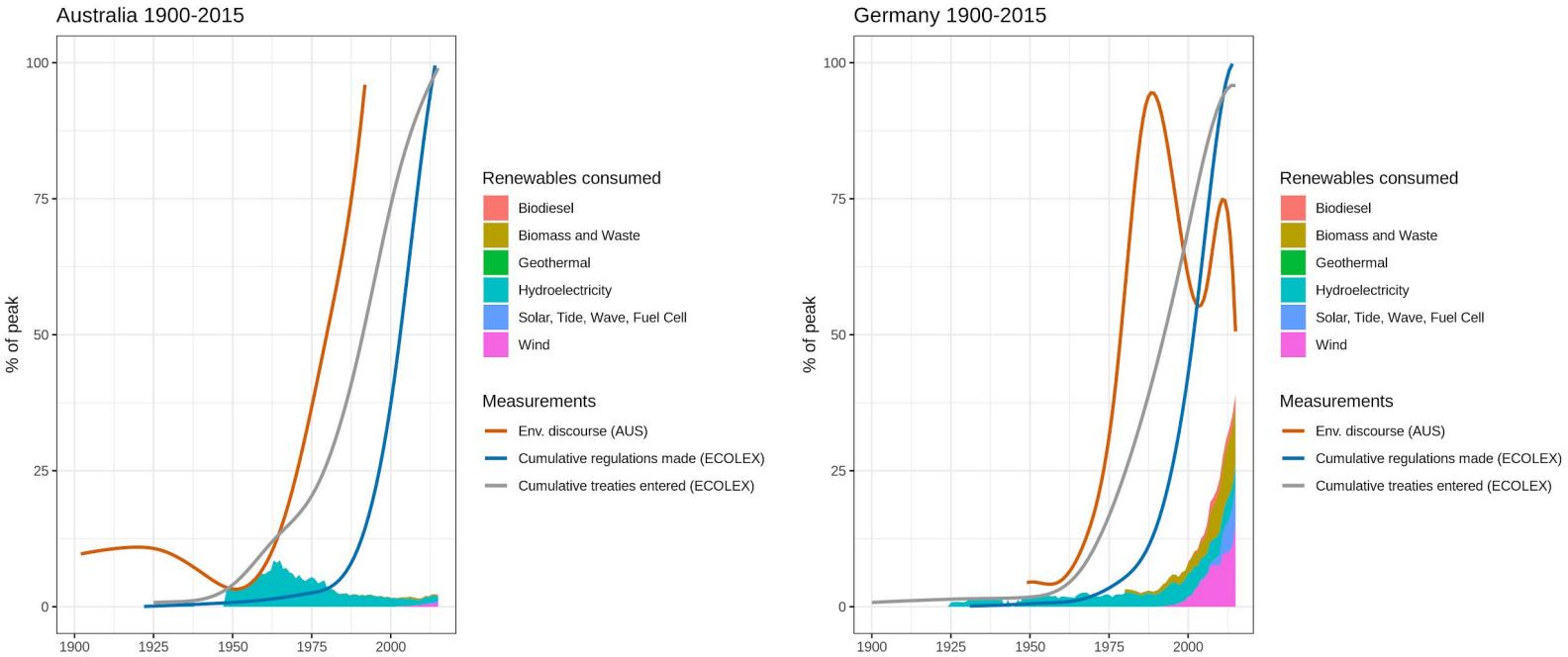
Percentage of total energy production per year per energy source* in Germany from 1900 to 2016.



The Shift Project. (Energy production per capita and proportions.)



Combining timelines



Combined graph: News, ECOLEX regulations, ECOLEX treaties, SHIFT energy production



Main challenges

Data availability

Data access (!!!)

Operationalization, confounds

Domain expertise



Thank you

Join us in the upcoming session!



“Reshaping Estonian energy, mobility and telecommunications systems on the verge of the Second Deep Transition” (2019-2023)
University of Tartu, Estonia.