



# Progress, Innovation & Transformation

what are the practical implications of ways  
in which knowledges shape political action?

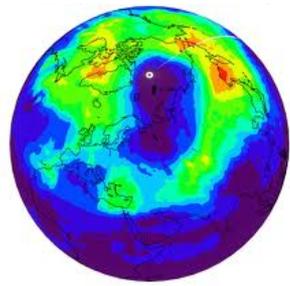
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[www.steps-centre.org/](http://www.steps-centre.org/)  
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[www.multicriteria-mapping.org](http://www.multicriteria-mapping.org)  
[www.sussex.ac.uk/spru/people/peoplelists/person/7513](http://www.sussex.ac.uk/spru/people/peoplelists/person/7513)

for EU-SPRI Winter School,  
SPRU, Sussex University  
16<sup>th</sup> January 2017

# The Founding Political Myth of Modernity: Progress

How has it been possible to resist so strongly, moves in more sustainable directions?

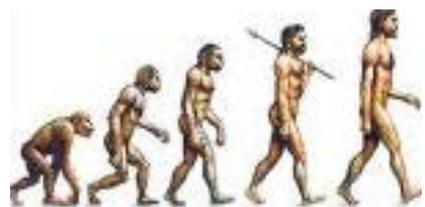


# The Myth of Progress

All societies have constituting myths



synthetic biology



*“we'll restore science to its rightful place”...*



*“Our hope ... relies on scientific and technological progress”*



*“One can not impede scientific progress.”*

PROGRESS



TECHNOLOGY



SCIENCE

Lisbon Strategy for: *“pro-innovation action”*



*“... the Government's strategy is ... pro-innovation”*



*...“history is a race to advance technology”*  
*“strives to stay in the race”*  
*“give technology the status it deserves”*



# The Myth of Progress

in one-track progress:  
“there is no alternative”



*“we'll restore science to its **rightful place**”...*



*“Our **hope** ... **relies on** scientific and technological **progress**”*

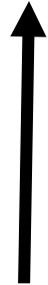


*“One **can not impede** scientific progress.”*



synthetic biology

PROGRESS



TECHNOLOGY



SCIENCE



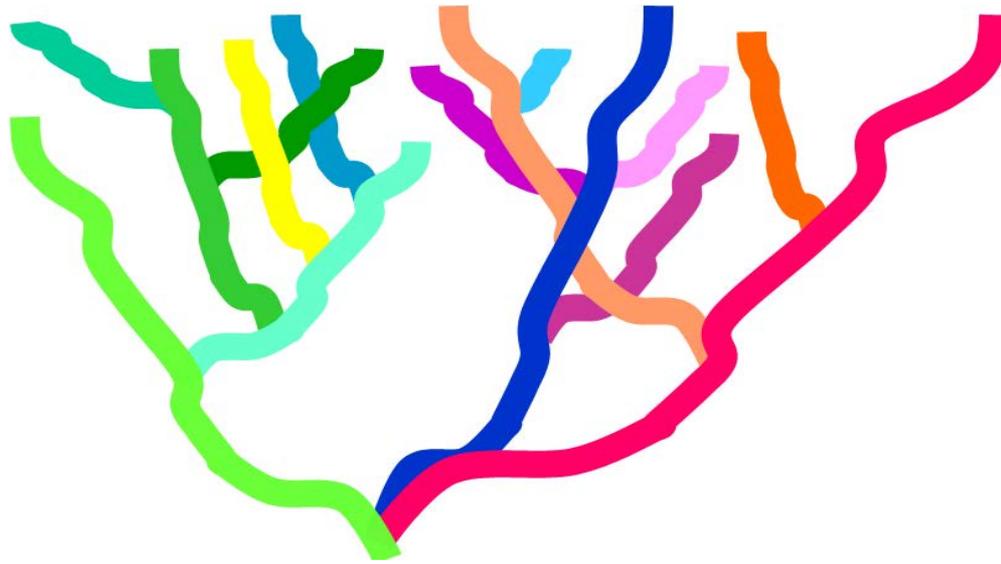
So even academic analysis restricts attention to:

- how much?*
- how fast?*
- what risk?*
- who's ahead?*

Misses out:

- which way?*
- what alternatives?*
- says who ?*
- why?*

# Deconstituting the Myth of Progress



# Deconstituting the Myth of Progress

many alternative infrastructures for 'the' zero carbon transition ...



carbon capture



grassroots renewables



nuclear power



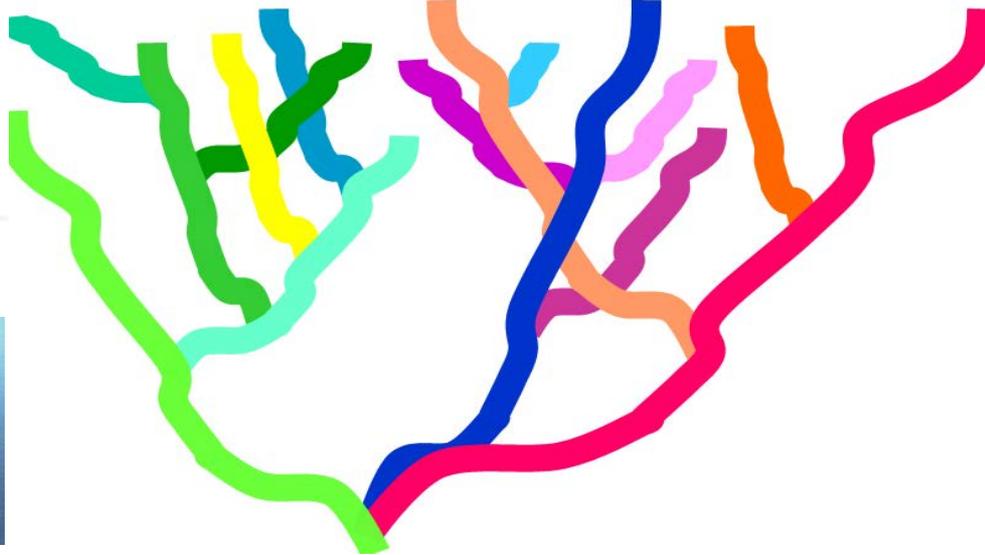
offshore wind



marine energy



reorganised services



bioenergy



ocean "eco cities"



centralised solar

divergent branching social and technological innovation pathways

... choice is about democratic politics, not technical management

# But the Myth is Reconstituted by Closure

... 'closed down' by incumbent institutional pressures



carbon capture



grassroots renewables



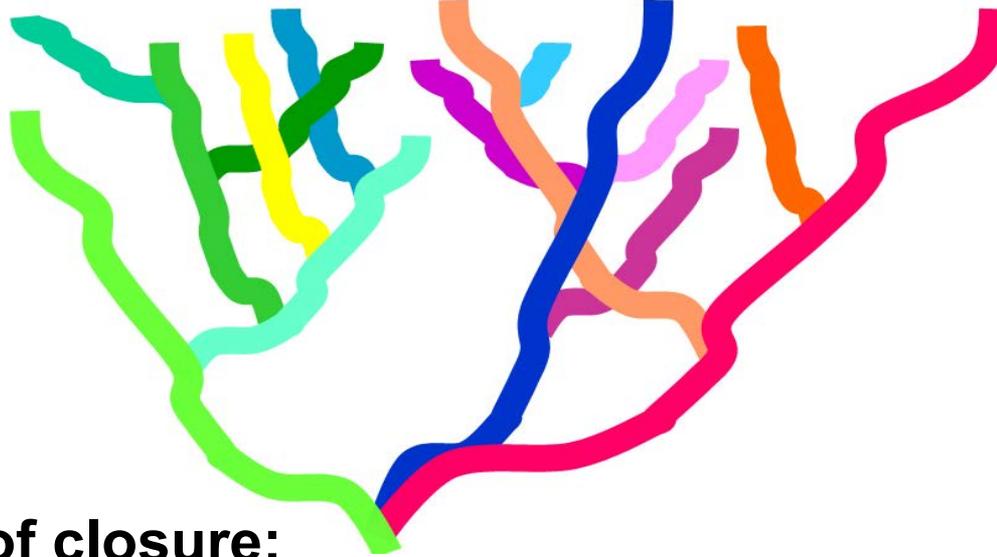
nuclear power



offshore wind



marine energy



bioenergy



centralised solar

Many drivers of closure:

Social science points to:

shaping (Bijker, 85)  
expectations (Brown, 03)

co-construction (Misa, 03)  
imaginings (Jasanoff, 05)



# But the Myth is Reconstituted by Closure

... 'closed down' by incumbent institutional pressures



grassroots renewables



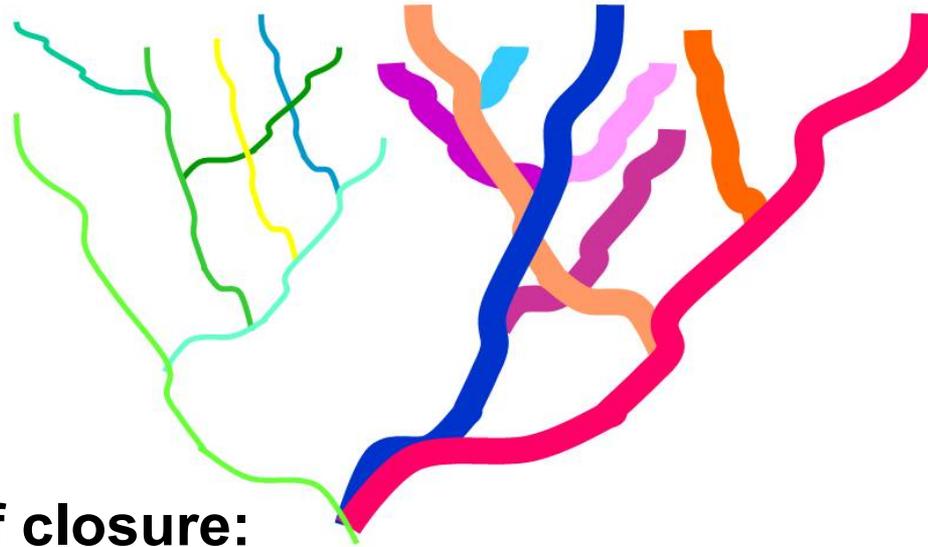
nuclear power



offshore wind



marine energy



bioenergy



centralised solar

Many drivers of closure:

History points to:

contingency (Mokyr, 92)

path-dependence (David, 85)

momentum (Hughes 83)

path creation (Karnoe, 01)



# But the Myth is Reconstituted by Closure

... 'closed down' by incumbent institutional pressures



nuclear power



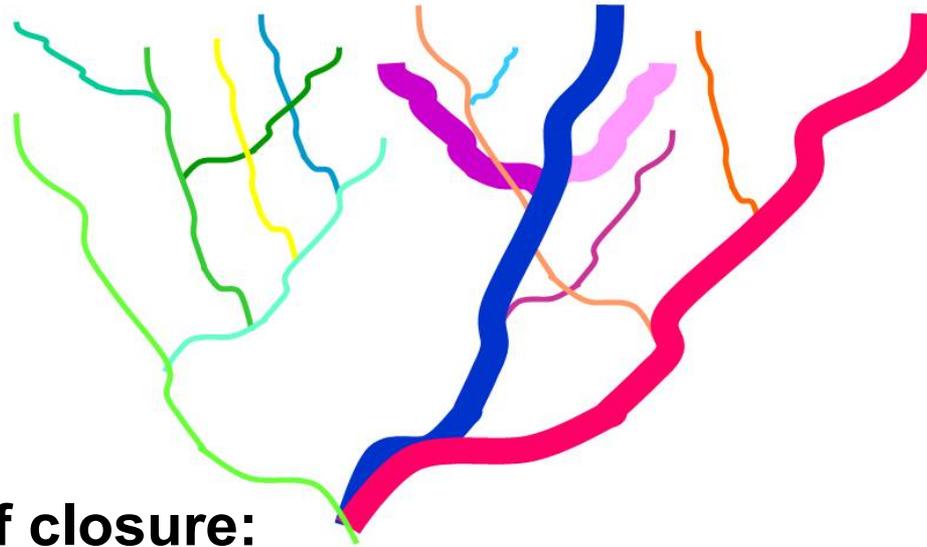
offshore wind



marine energy



bioenergy



Many drivers of closure:

Politics points to:

autonomy (Winner, 77)  
entrapment (Walker, 01)

closure (Feenberg, 91)  
alignment (Geels, 02)



# But the Myth is Reconstituted by Closure

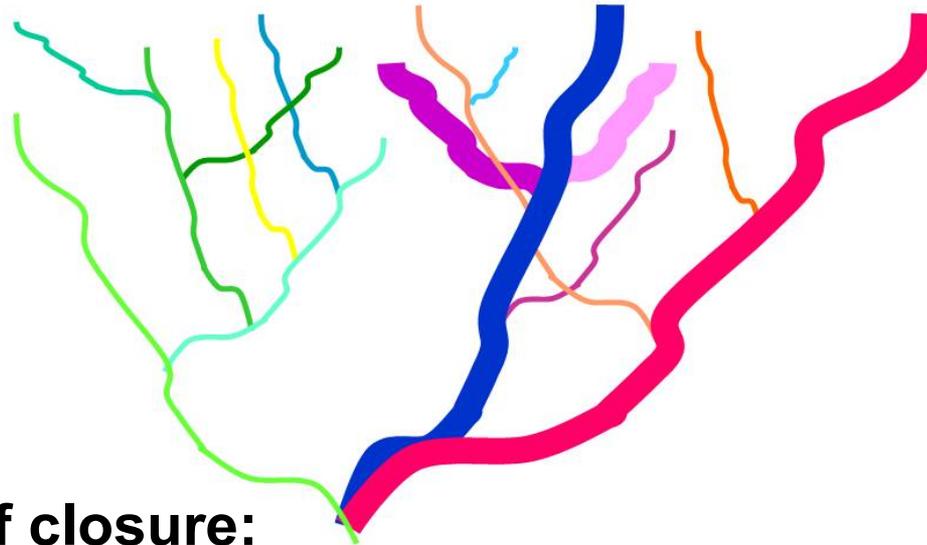
... 'closed down' by incumbent institutional pressures



nuclear power



offshore wind



Many drivers of closure:

**Economics points to:**

homeostasis (Sahal, 85)  
regimes (Nelson & Winter, 77)

lock-in (Arthur, 89)  
trajectories (Dosi, 82)

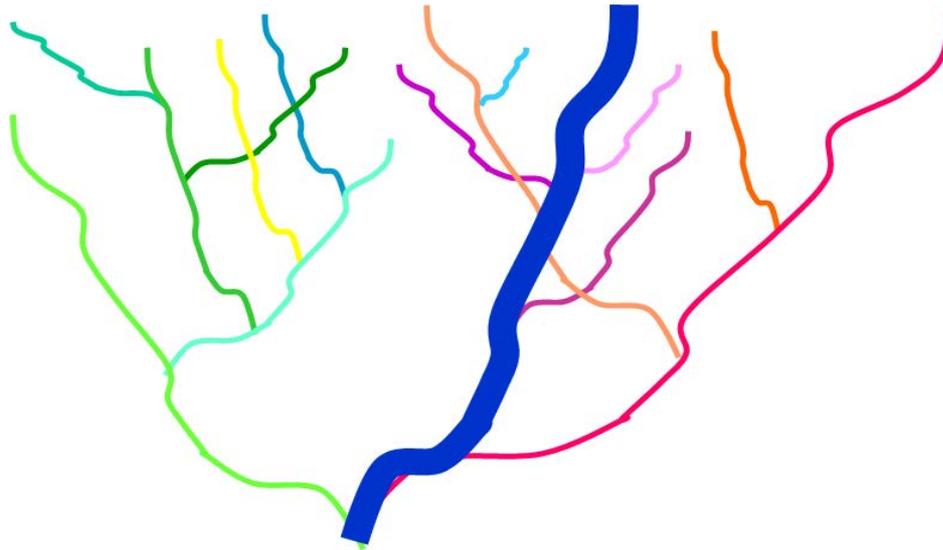


# But the Myth is Reconstituted by Closure

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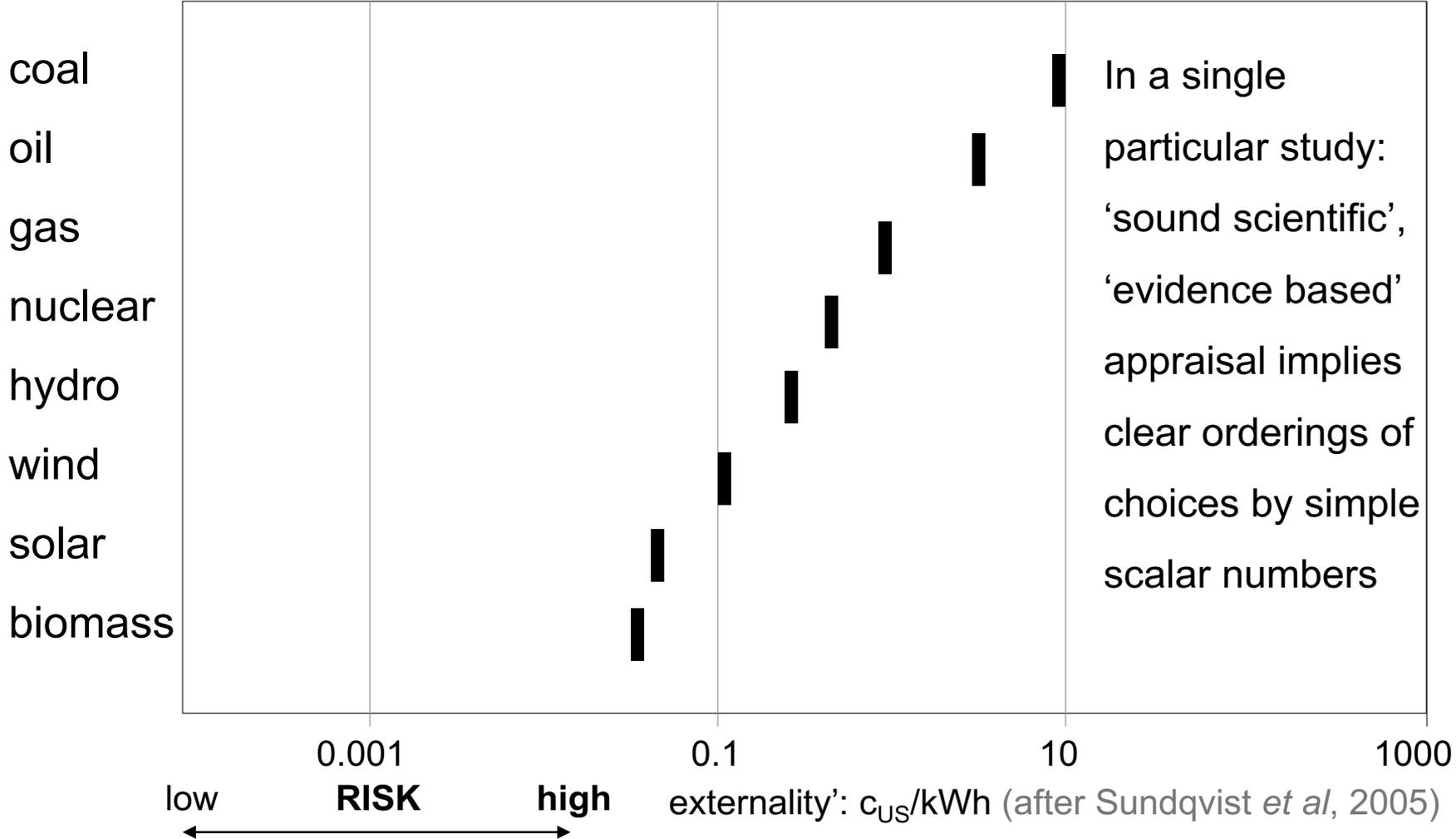
nuclear power



Not all that is scientifically **realistic**, technically **practicable**, economically **feasible**, socially **viable**, will be historically **realisable**

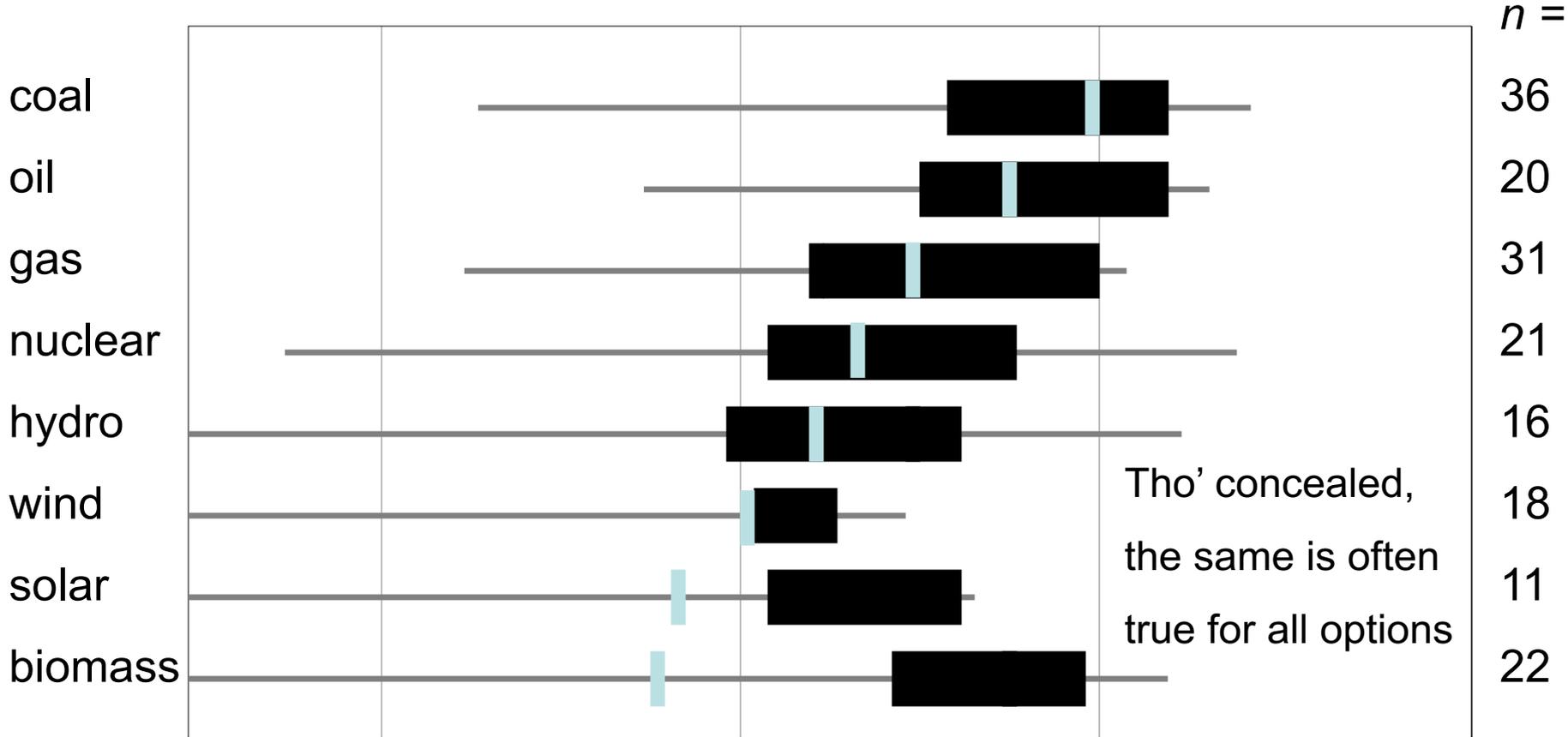
# Some of Most Potent Closures are in Knowledge

For example, singular aggregated notions of ‘sound scientific decisions’ or ‘evidence based policy’ – eg: most mature field of energy regulation



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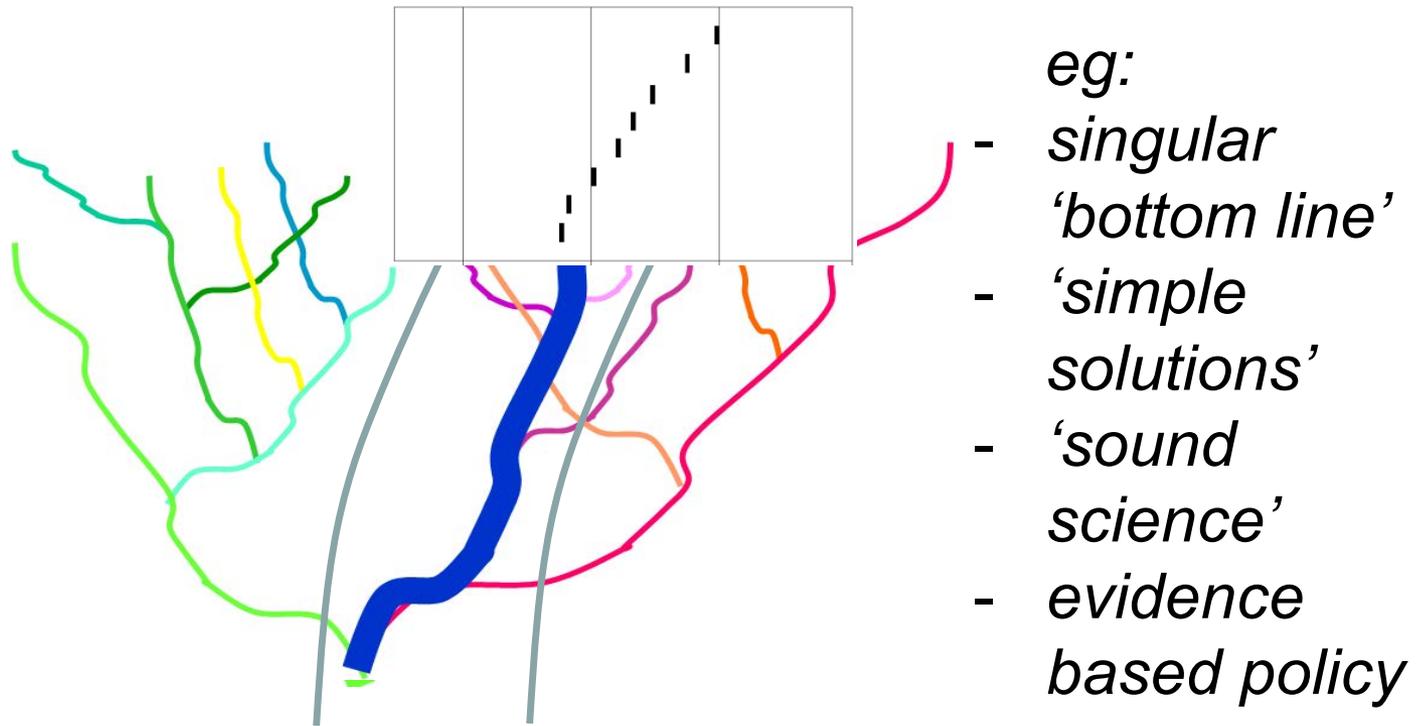


Tho' concealed,  
the same is often  
true for all options

...‘science based’ quantification can be used to justify any choice

# Some of Most Potent Closures are in Knowledge

Simplified instrumental assessment...

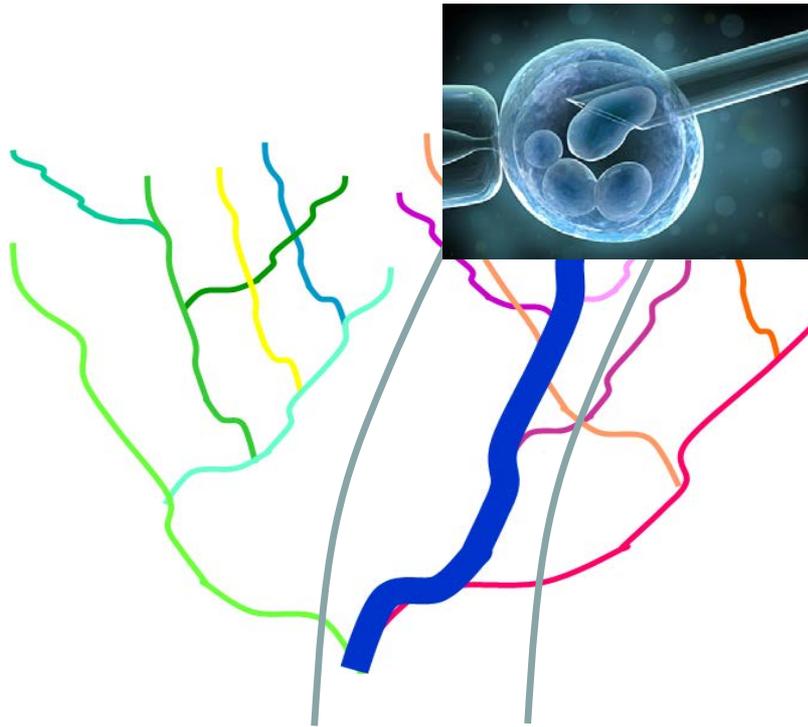


Subverting appreciations for complexity, uncertainty, context-sensitivity, multiple framings and diverse options

# Many Pressures Act to Close Down Knowledge

Commitments to Incumbent institutions and technologies...

- *eg: primacy of reductionism even in basic science*



- *techno-fixes*
- *supply control*
- *product mixes*
- *IP intensity*
- *securitisation*
  
- *big pharma*
- *agri-biotech*
- *nuclear power*

# Many Pressures Act to Close Down Knowledge

Underspecified 'smart' or 'responsible' innovations...



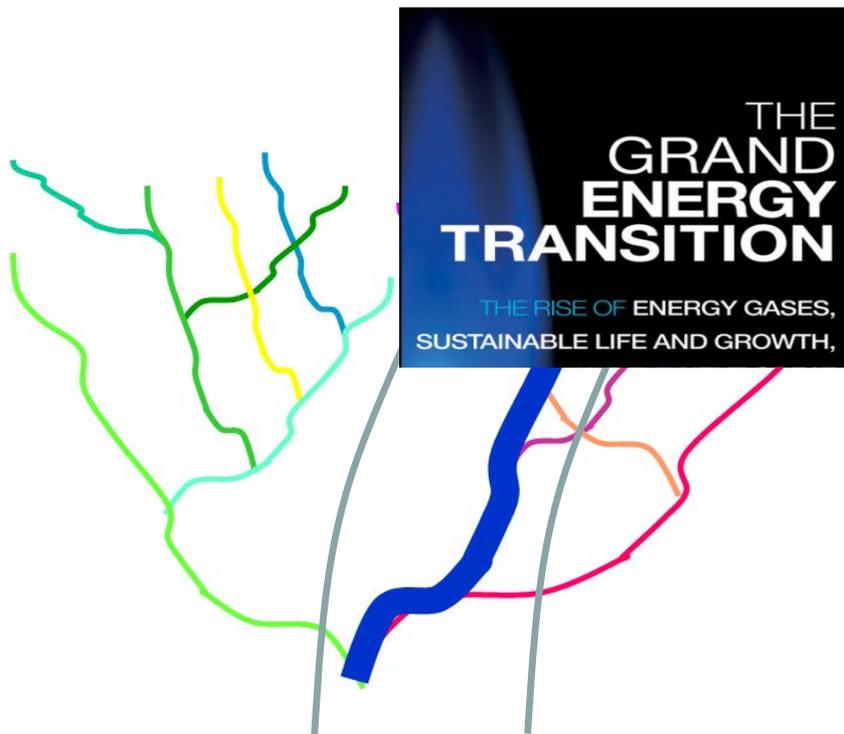
largest single sector for global public funding of RD&D remains military

eg:

during USAF bombing of Iraq: a university-based RRI project focused on improving ejector seats for taller pilots

# Many Pressures Act to Close Down Knowledge

Singular top down visions for ‘the sustainability transition’



- *models*
- *missions*
- *handbooks*
- *manuals*
- *“road maps”*



Implementing  
the EU Energy  
Roadmap 2050:  
At what cost  
and at  
what speed?

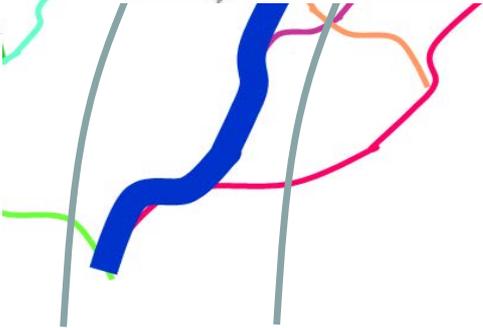
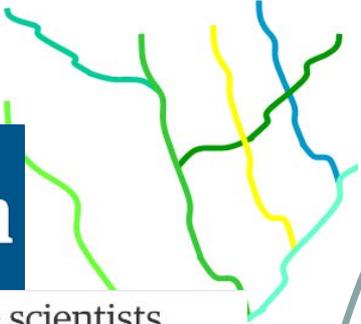
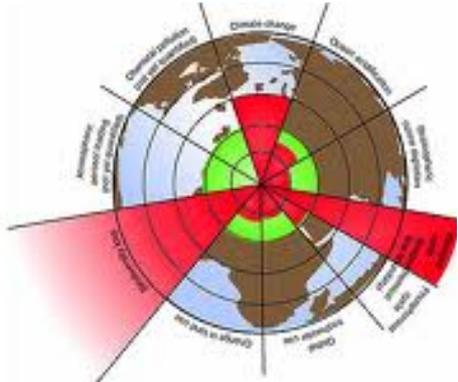
# Many Pressures Act to Close Down Knowledge

## Anthropocene “planetary management” ...

*“non-negotiable”  
“control variables  
of the Earth”*

*“absolutely no  
uncertainty” ...  
“no compromise”*

*humanity as a  
“control force”*



**theguardian**

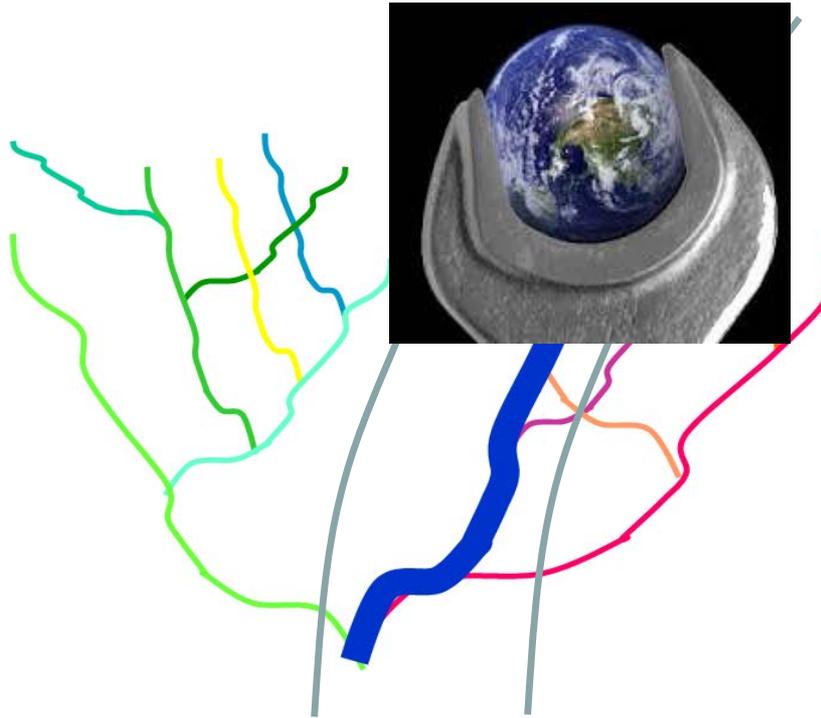
The Anthropocene epoch: scientists declare dawn of human-influenced age

Experts say human impact on Earth so profound that Holocene must give way to epoch defined by nuclear tests, plastic pollution and domesticated chicken



# Closure is Reinforced by Many Pressures

A 'control discourse' leading to planetary geoengineering?



*maintaining  
“optimal  
Holocene  
conditions”*

*is climate challenge  
about abating human  
assaults on the Earth  
or modulating “control  
variables” of “planetary  
systems” like global  
temperature?*

# Need to Open Up New Shaping Knowledges

**One that highlights complexities, ambiguities, uncertainties;  
that politics is inherent also to knowledge & academic study;**



***and roles for collective agency, political struggle and choice***

# Sustainability: a 'civilizing effect of hypocrisy'?

2015 framework is ambitious... *"leave no one behind"*



17 goals; 169 targets; 304 indicators; 196 countries over 15 years;  
enables more vibrant accountable politics of care for people and planet

# Sustainability: not Policy; Political Collective Action

social equality

human wellbeing

ecological integrity



Constituting knowledges and actions are founded in **equal social relations**

Understandings of new hopeful visions of **alternative directions** for progress

Driven by **decades of collective struggle** by grassroots social movements

**Strongly resisted** by elite science and incumbent governance institutions



# Sustainability: not Policy; Political Collective Action

Brundtland (1987)  
codified challenge  
for elite institutions  
of global governance



**Meeting the needs of the present, without compromising the ability of future generations to meet their own needs**



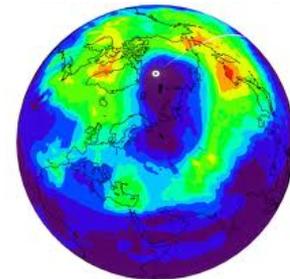
Provide normative guides for accountability in driving directions of social progress

Emphasising consistently throughout, importance of:  
“effective citizen participation”  
and “greater democracy”

# Sustainability: not Policy; Political Collective Action



Even the most specific environmental issues, all initially **vigorously resisted**  
pesticides... asbestos... radiation... lead... carcinogens... CFCs... EDCs...



# Sustainability: not Policy; Political Collective Action



And innovations now mainstream were initially excluded and suppressed  
organic farming... wind turbines... super-efficiency... closed cycle production...



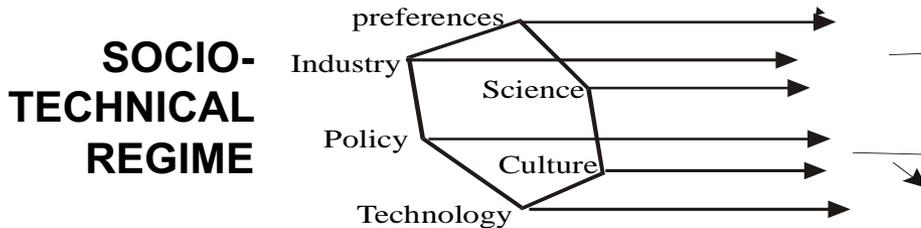
Constituting problems & solutions both of Sustainability & the Nexus  
depend on asserting alternative knowledges and visions

# **'Control' Implications in Some Ideas of 'Transition'**

—————▶ Time

**storylines in knowledge > seeing like power > controlling actions**

# 'Control' Implications in Some Ideas of 'Transition'

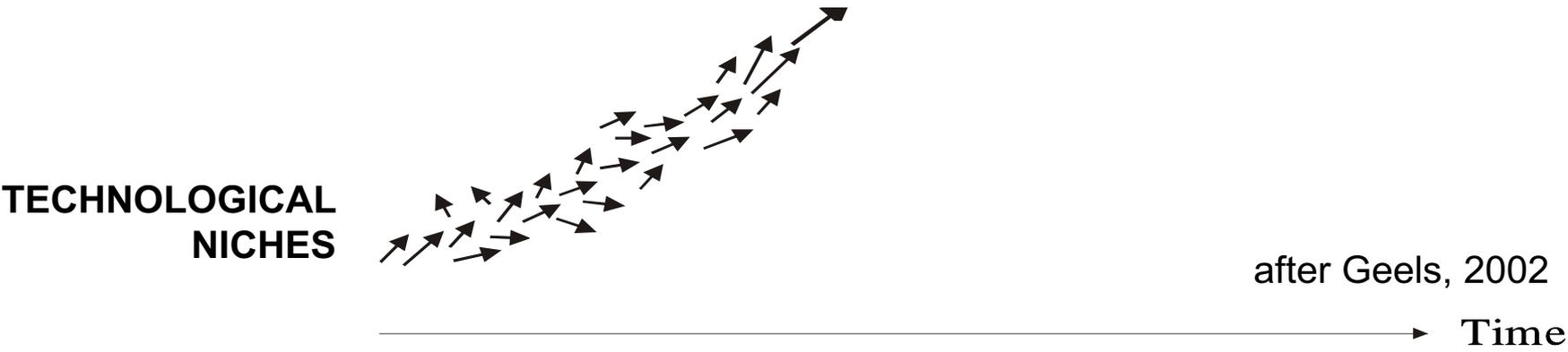
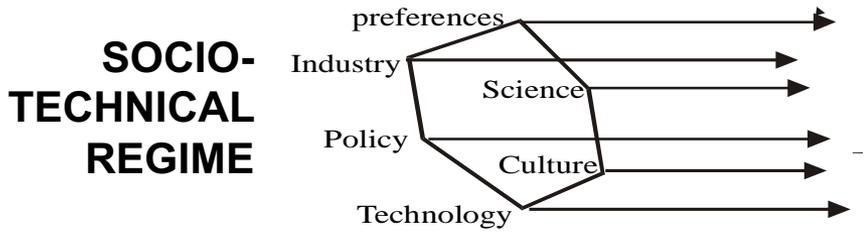


after Geels, 2002

—————> Time

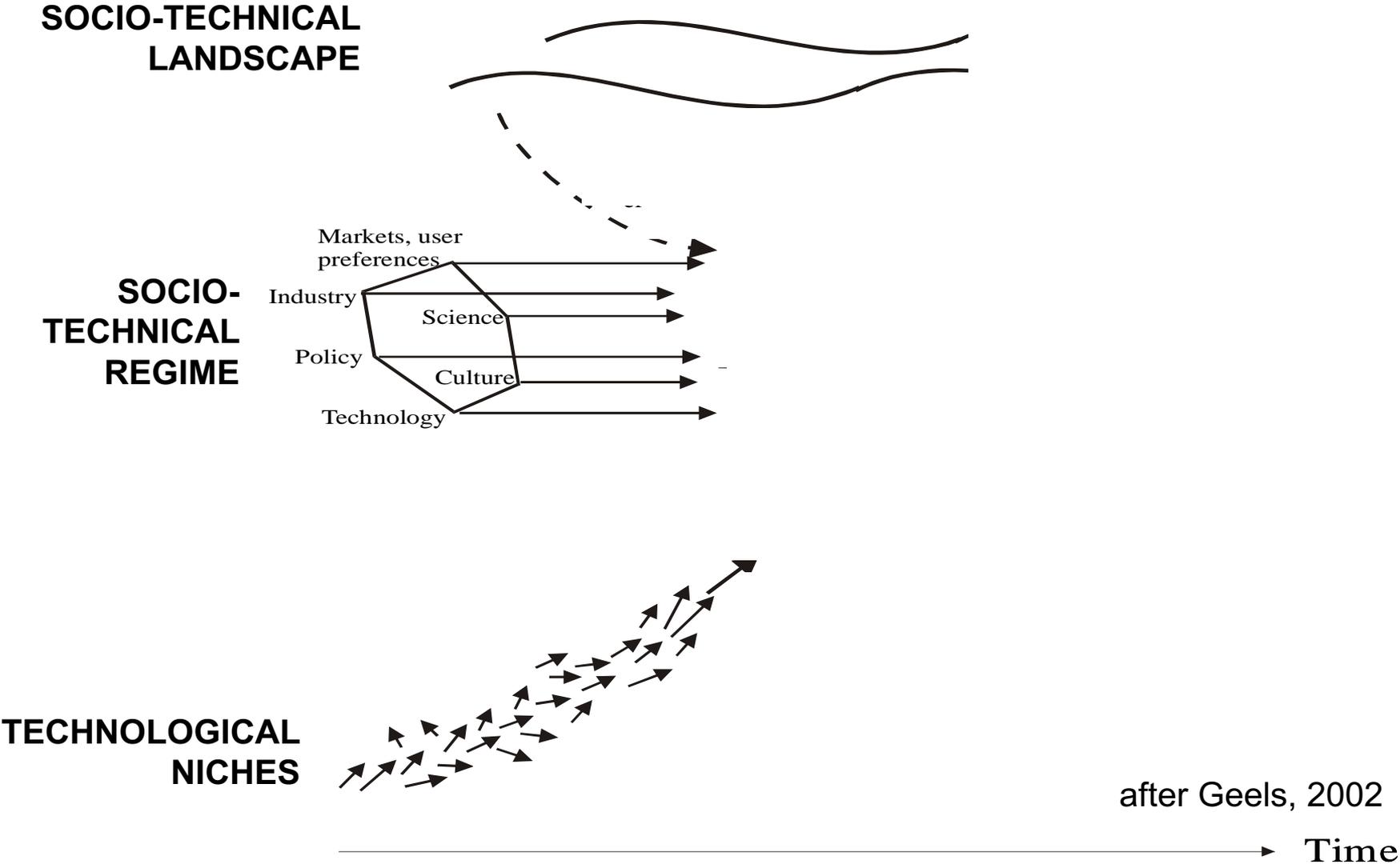
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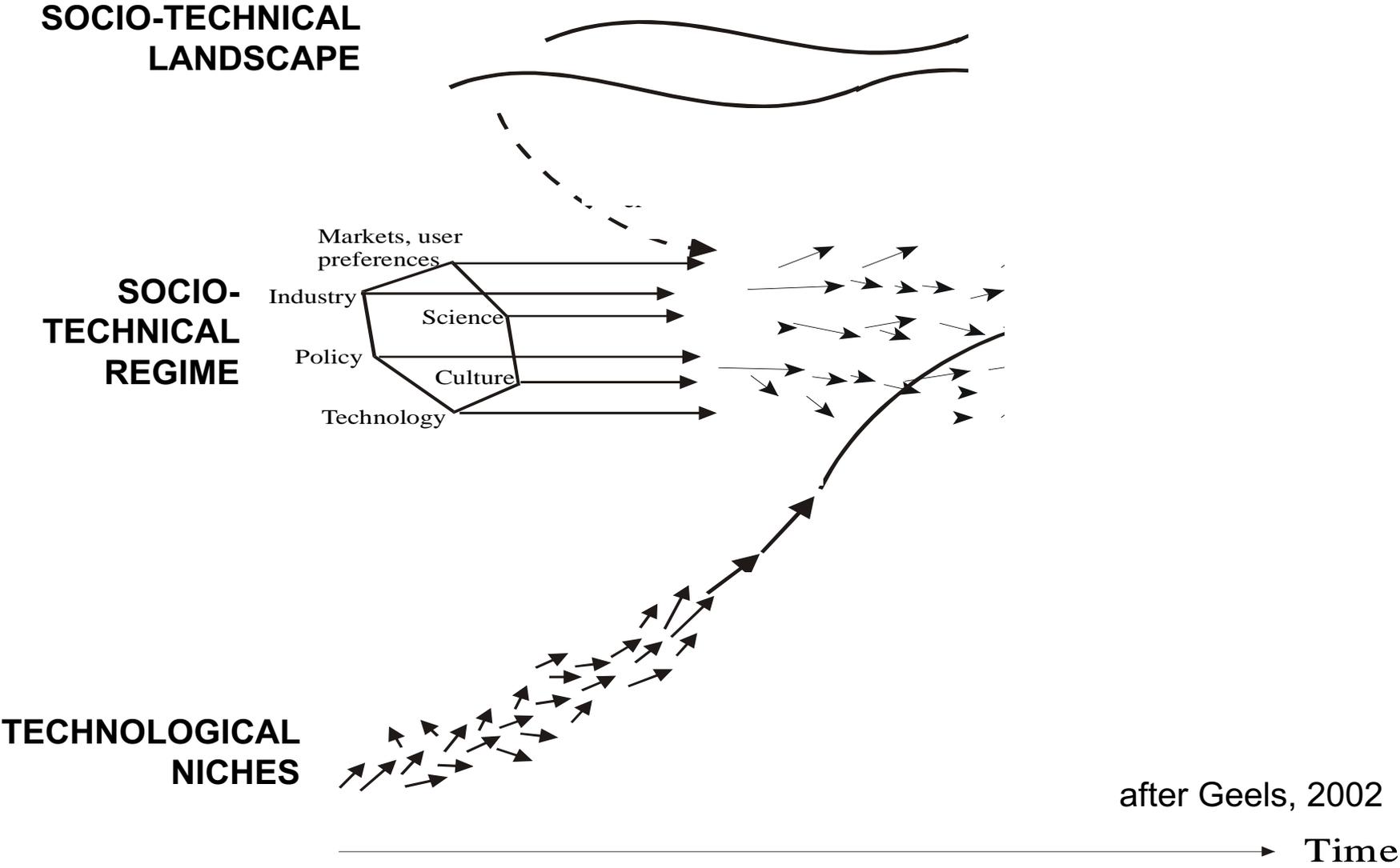
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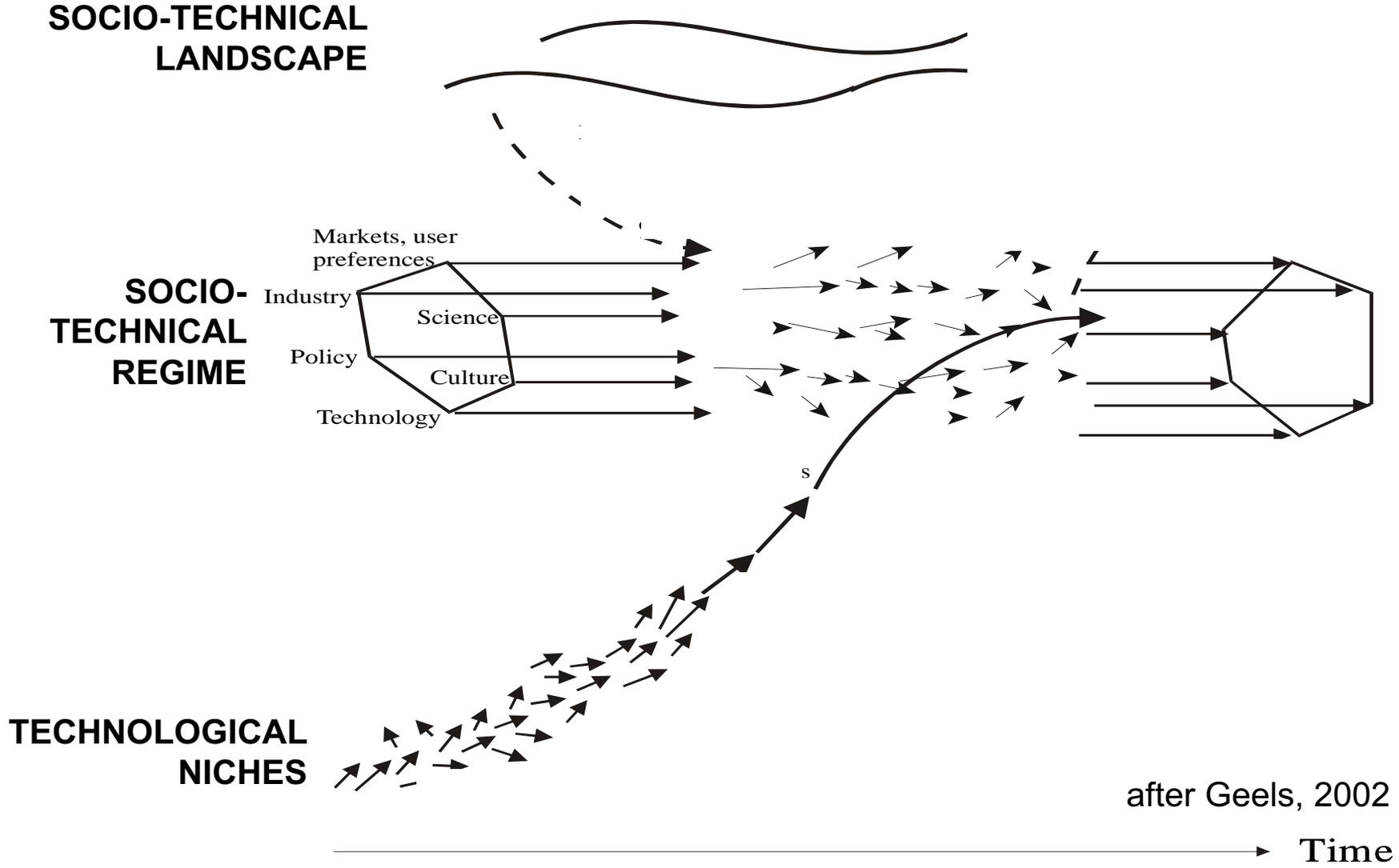
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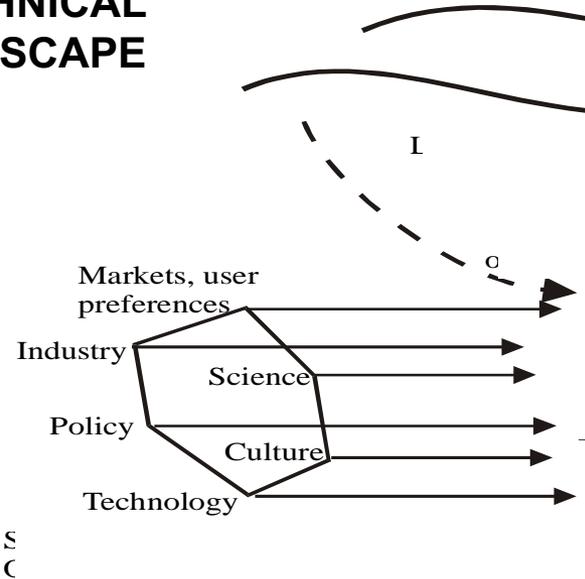
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# 'Control' Implications in Some Ideas of 'Transition'

**SOCIO-TECHNICAL  
LANDSCAPE**

**SOCIO-  
TECHNICAL  
REGIME**



**Separates and sequences  
knowledge and action**

**Takes 'eagle-eye view', rather  
than 'toad-eye view'**

**Vulnerable to misplacedly  
concrete categories**

**Causal explanation not  
appreciative understanding**

**Presumes normativity of a  
singular transition**

**Inadvertently perpetrates  
conventional fallacy of control**

# New Myths for New Moves? **Culturing Transformations**

SOCIO-TECHNICAL  
LANDSCAPE

SOCIO-  
TECHNICAL  
REGIME



From vertical social control in neatly scaled policy grids (seeing like power)

to collective action by distributed nonscalar (rhizomic) political compasses

TECHNOLOGICAL  
NICHES



# Unscaled Metastable Relations: Discursive-Cognitive

narratives (Aristotle)

worldings (Spivak)

grand narratives (Lyotard)

imaginaries (Sarte)

archetypes (Jung)

social imaginaries (Lacan)

archetypal patterns (Frye)

master narratives (Foucault)

sociotechnical imaginaries (Jasanoff)

political myths (Tudor)

story arcs (Campbell)

metanarratives (Lyotard)

technoscientific  
imaginaries (Marcus)

policy discourses (Hajer)

story lines (Eliade)

motifs (Aarne)

counternarratives (Bamberg)

rivalling narratives (De Witt)

molecular narratives (Danto)

sense structures (Schutz)

minimal narratives (Prince)

# Unscaled Metastable Relations: Techno-Institutional

technological being (Heidegger)

technological regimes  
(Nelson & Winter)

sedimented  
knowledge  
(Berger)

entrenched systems  
(Collingridge)

technological frames (Bijker)

autonomous technique (Ellul)

dominant designs  
(Anderson & Tushman)

technology paths (Hillman)

innovation avenues (Sahal)

locked-in markets  
(Arthur)

megamachine (Mumford)

history-dependent paths  
(David)

autonomous systems (Winner)

technological trajectories  
(Dosi)

large scale systems (Hughes)

sociotechnical regimes (Schot & Kemp)

created paths (Garud & Karnoe)

networked trajectories (Kilduff & Tsai)

entrapped institutions (Walker)

sociomaterial pathways  
(STEPS)

obdurate configurations (Hommels)

# Resonating Unscaled Metastable Relations

technological regimes)  
worldings  
narratives  
entrenched imaginaries  
technology frames  
sedimented grand narratives  
knowledge  
social imaginaries (Lacan)  
archetypal patterns  
dominant designs  
technology paths)  
innovation avenues  
sociotechnical imaginaries  
political myths  
locked-in markets  
megamachine  
history-dependent paths  
metanarratives  
autonomous systems  
chaos scientific imaginaries  
policy discourses  
large scale (Fisher)  
sociotechnical regimes  
created paths  
counternarratives  
networked trajectories  
rivaling narratives  
entrapped institutions  
molecular narratives  
sociomaterial pathways  
sense structures  
elaborate configurations (minimal narratives)

# Condensing Sociomaterial Rhizomic Structuration

technological regimes)  
technological being  
entrenched trajectories  
technological frames  
grand narratives  
knowledge  
social imaginaries (top-down)  
archetypal patterns  
dominant designs  
metanarratives (paths)  
innovation avenues  
sociotechnical imaginaries  
political myths  
locked-in markets  
mega-machine  
history-dependent paths  
metanarratives  
autonomous systems  
technoscientific imaginaries  
policy discourses  
large-scale systems  
sociotechnical regimes  
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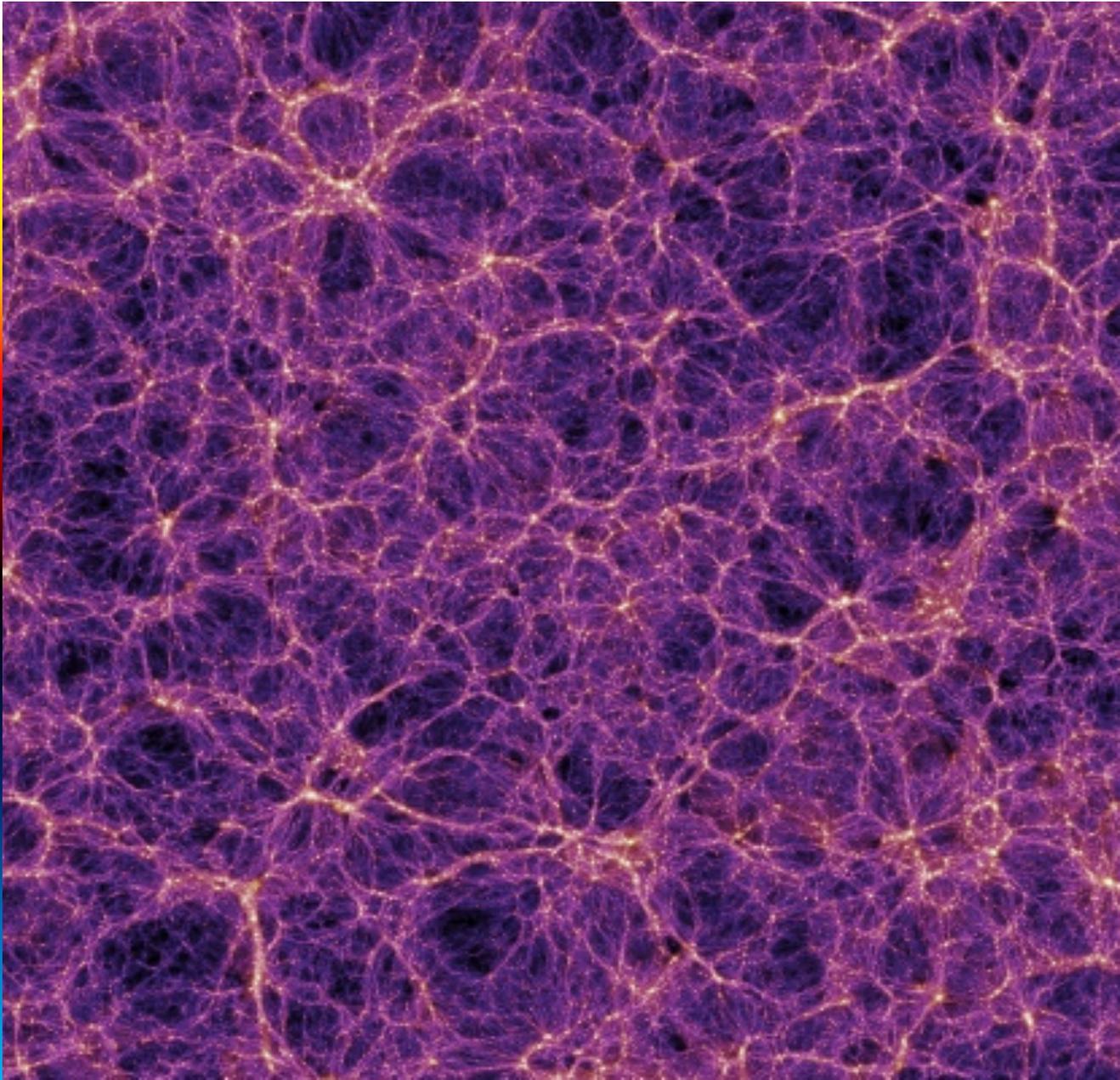
# Condensing Sociomaterial Rhizomic Structuration

**INTENSITY OF STRUCTURATION**

**agency aligning  
structure**

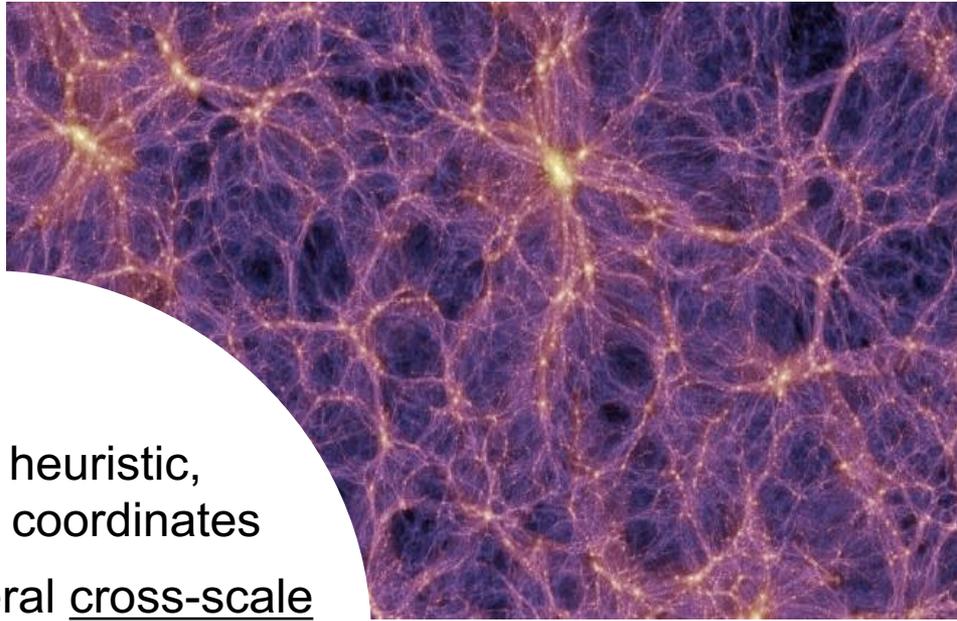
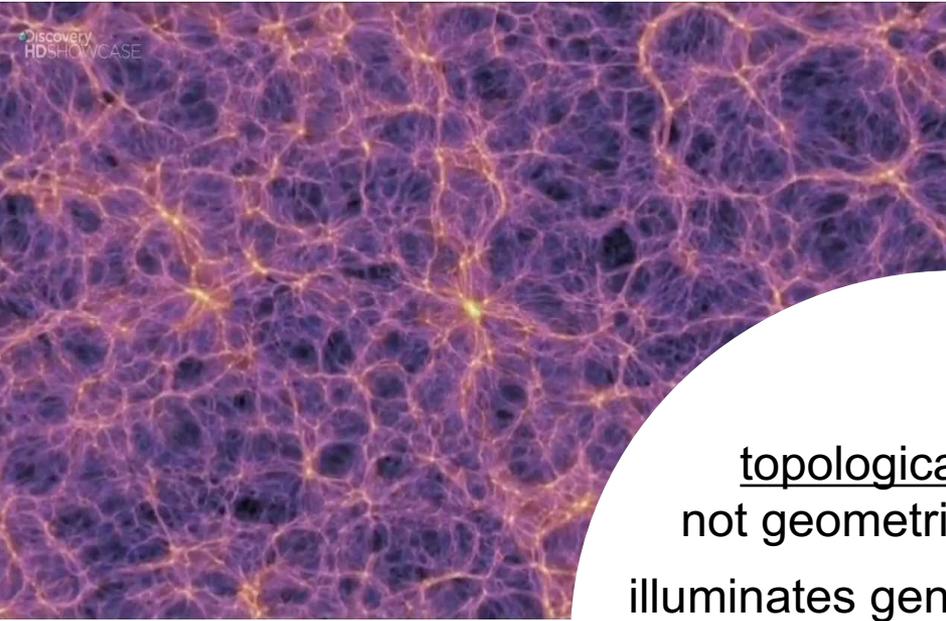
**agency & structure  
not aligning**

**structure  
aligning agency**

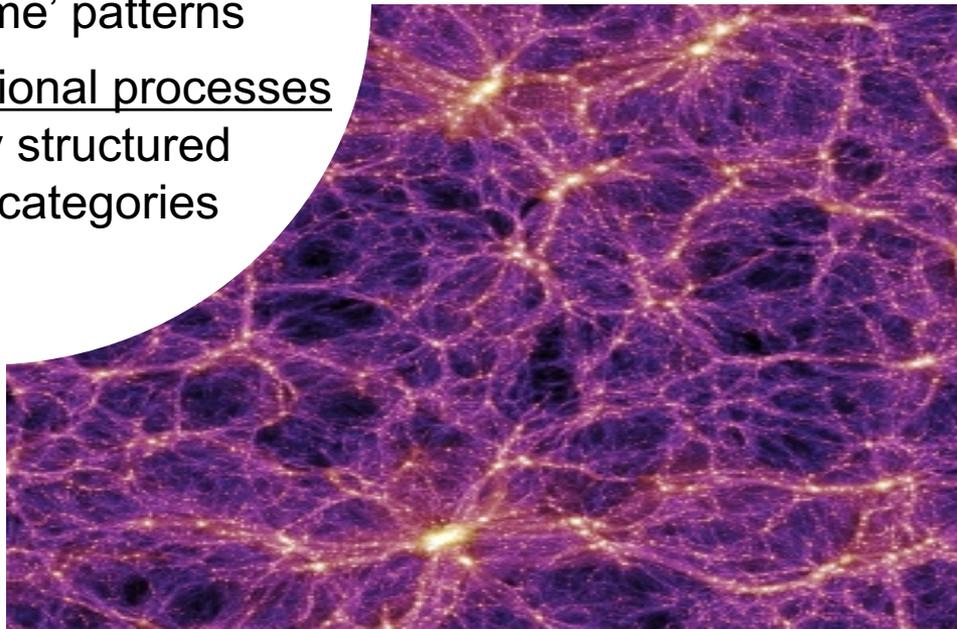
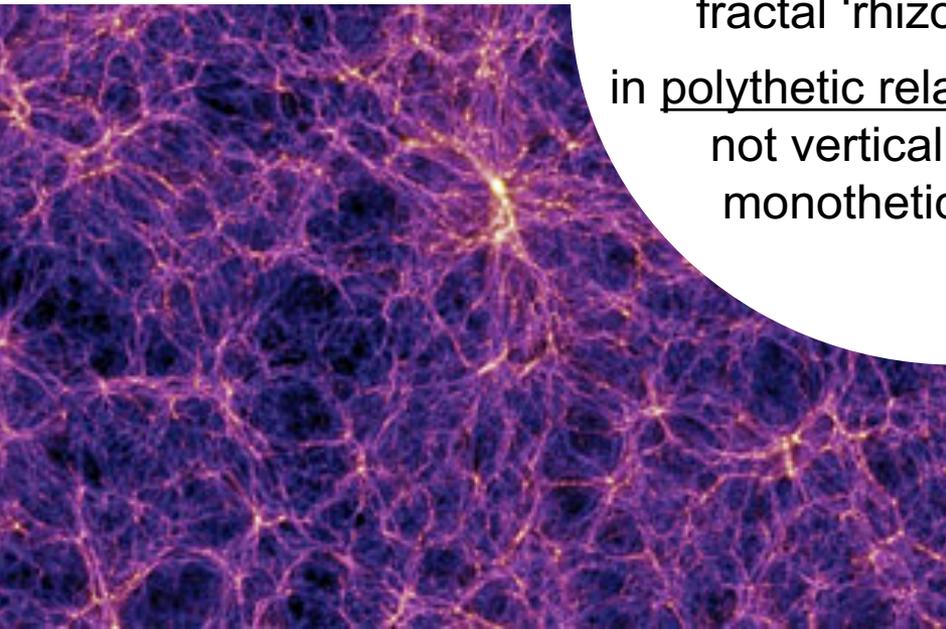


# “Sociomaterial Structuration”

in other subjective / objective contexts



topological heuristic,  
not geometric coordinates  
illuminates general cross-scale  
fractal 'rhizome' patterns  
in polythetic relational processes  
not vertically structured  
monothetic categories



# Culturing Transformation by Many Knowing Doings



**By riffing mutual alignments in structure and agency: murmurations (dissent)**



# Culturing Transformation by Many 'Knowing Doings'

challenge  
incumbency

balance  
needs bias

talk about  
power

look at  
alternatives

'risk' is  
fairness

ends not  
means

use Trojan  
horses

political  
judo

relations not  
categories

play the ball  
not the player

try for  
edge balls

care not  
control

keep it  
complex

toads not  
birds

# German Energiewende and UK Nuclear Renaissance

## Nuclear discontinuity more likely in UK than Germany

- 1) General market-state conditions in the two countries;
- 2) Comparative degrees of penetration (thus influence) of nuclear power in the electricity generating mix;
- 3) Strengths of nuclear engineering, manufacturing and equipment supply and associated industrial lobbies;
- 4) Relative magnitudes and costs of available national renewable resource potentials;

## Nuclear discontinuity as likely in UK as Germany

- 5) Scale of national industrial capacities and interests set to benefit from renewable energy supply;

## Nuclear discontinuity more likely in Germany than UK

- 6) Relative scales of military-related nuclear activities and associated industrial interests;
- 7) Relevant characteristics of general national political institutions and elite cultures;
- 8) Broader presence and activity levels of relevant social movements.

**“Destructive Re-creation” of pre-existing structures...**



# Emancipating Progress – Transforming Democracy



**Recognise knowledge and action are co-constituting**

**Take toad-eye view, engaging phenomena not perspective**

**Avoid misplacedly concrete categories**

**Aim to understand appreciatively, not explain causally**

**Plural rhizomic politics, not singular scaled policy frames**

**Mutual solidarities of care not hierarchical fallacies of control**

# Emancipating Progress – Transforming Democracy



look at  
alternatives

use Trojan  
horses

balance  
needs bias

**Knowledge is action**

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**Toad not eagle view**

**No misplaced  
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