

# ‘Opening Up’ Sustainability:

transitions, transdisciplinarity & transformation

**Andy Stirling**  
SPRU & STEPS Centre  
University of Sussex

[www.steps-centre.org/](http://www.steps-centre.org/)  
[www.sussex.ac.uk/spru/](http://www.sussex.ac.uk/spru/)  
[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)

keynote talk to ‘environmental citizenship’ conference on  
*‘Trans-disciplinary conversations on transitions to sustainability’*  
University College, Cork, 5<sup>th</sup> September 2013

# Challenges of Sustainability

The human, physical and technical scales are unprecedented...

poverty / vulnerability

global inequalities

climate change

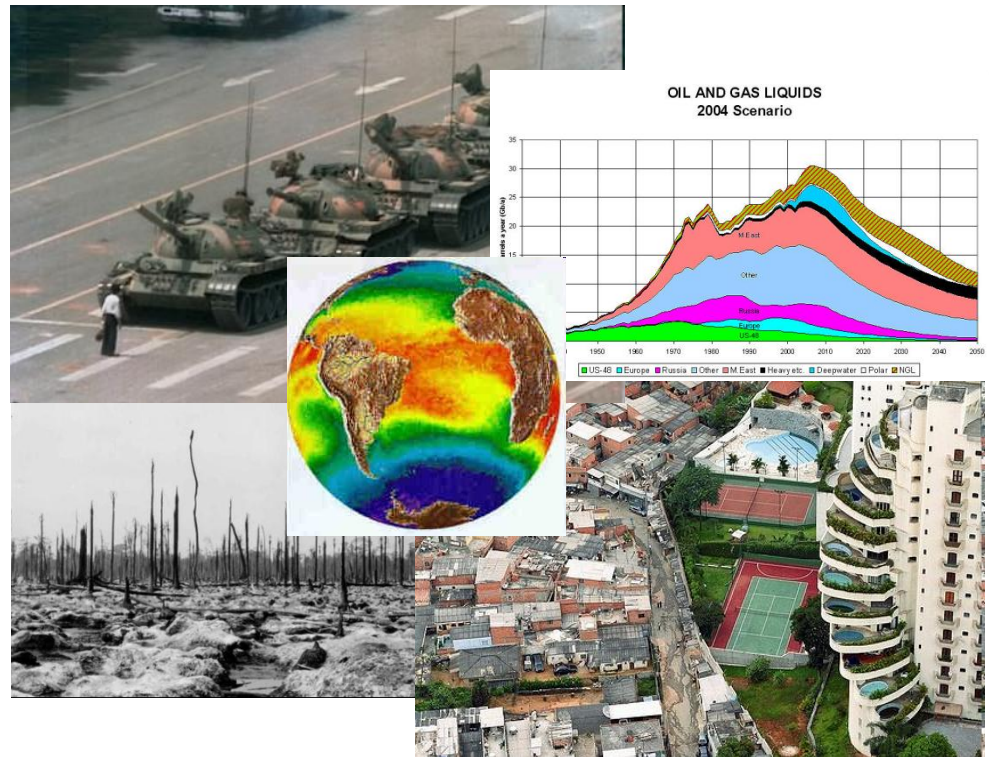
depleting resources

biodiversity loss

toxic pollution

technological innovation

geopolitical militarism

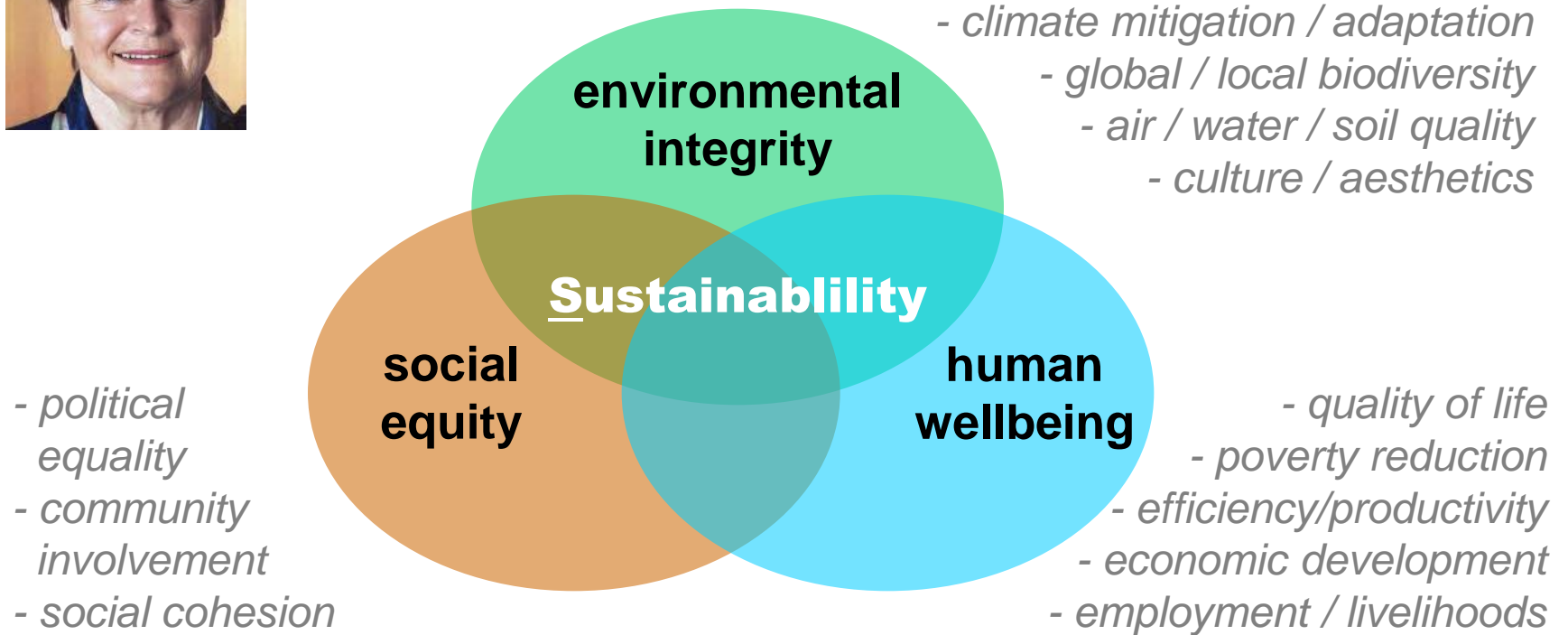


Invoked imperatives: mood of uncompromising gravity and urgency

# Governing for Sustainability



Brundtland (1987) codified key aims in global governance



sustained, developed and (tho' too slowly) variously realised in stages

Millennium Development Goals (2000; 2008; ... 2015) ... “seeing like a state” ...

needs: ‘political consensus’ ‘sound scientific policy’, ‘evidence based decisions’?

# But Sustainability is Political!

Emancipation

Equality

Ecology



Sustainability transcends old “**enlightenment**” notions of “**progress**”  
... as merely **emergent** outcome of **incumbent** markets and power structures  
... instead, **enables deliberate social agency** over **directions** of change

Result of **political struggle** by **social movements** resisted by elite governance



# Sustainability is Political!

Emancipation

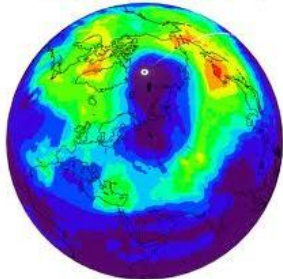


Equality



Ecology

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



# Sustainability is Political!

Emancipation

Equality

Ecology



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



# Sustainability is Political!

**Emancipation**

**Equality**

**Ecology**



**current recognition for Sustainability “problems” and “solutions”**

**are hard-fought results of radical critique and active political conflict**

**not consensual outcomes of mainstream science or governance ... but:**

**politics excluded in orderly ‘sustainable transition’ and ‘green innovation’**

# “Paradigm of Modernity”: singular vision of progress



synthetic biology

PROGRESS



TECHNOLOGY



SCIENCE



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



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



*“One can not impede scientific progress.”*

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”*





# Innovation: apolitical one-track 'race to the future'



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

Restricts attention to:

*how much?  
how fast?  
what risk?  
who leads?*

Misses out:

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

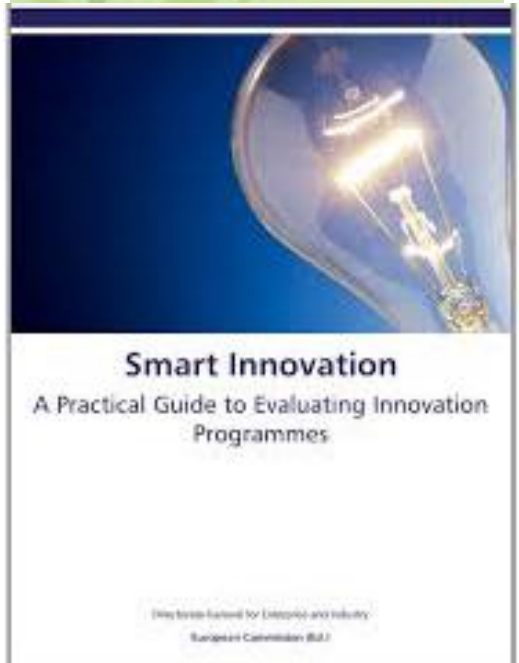
# 'Green'/'Smart'/'Inclusive'/'Responsible' Innovation?

without political institutions... rhetoric around business as usual



synthetic biology

PROGRESS



TECHNOLOGY



SCIENCE

# What is 'Sustainable' Innovation?

... in agriculture ...



marker assist



industrial hybrids



synthetic biology



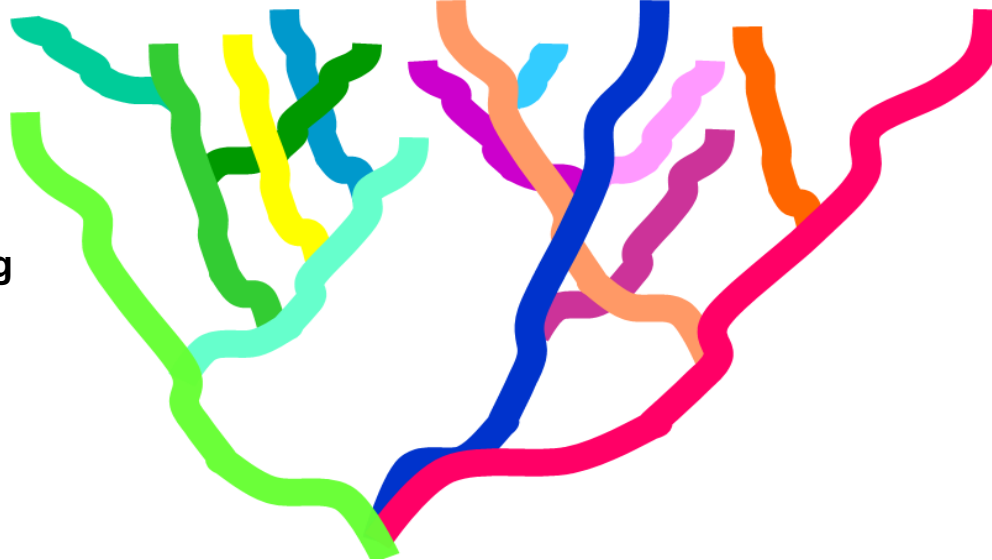
transgenics



cisgenics



participatory breeding



apomixis



open source sharing

**divergent branching social and technological innovation pathways**

**... alternatives are matters for political, not managerial, institutions**

# What is 'Sustainable' Innovation?

... in agriculture ...



industrial hybrids



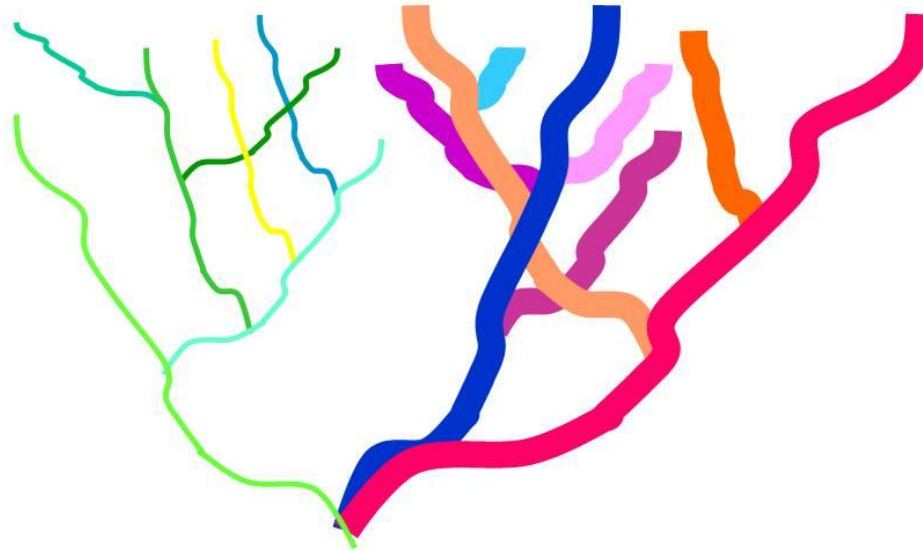
synthetic biology



transgenics



cisgenics



apomixis



**social  
studies:**

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

get politically closed down

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

# What is 'Sustainable' Innovation?

... in agriculture ...



synthetic biology



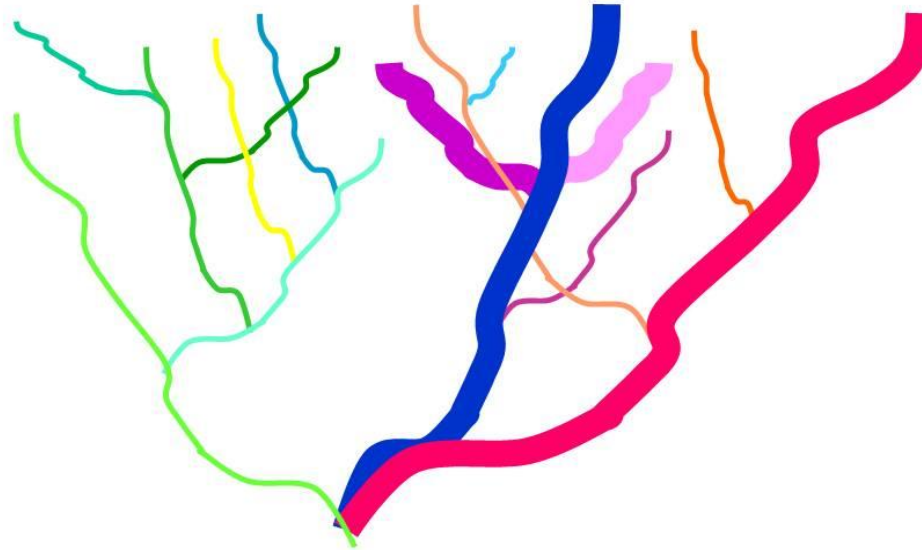
transgenics



cisgenics



apomixis



get politically closed down

history:

contingency (Mokyr, 92)  
path-dependence (David, 85)

momentum (Hughes 83)  
path creation (Karnoe, 01)



# What is 'Sustainable' Innovation?

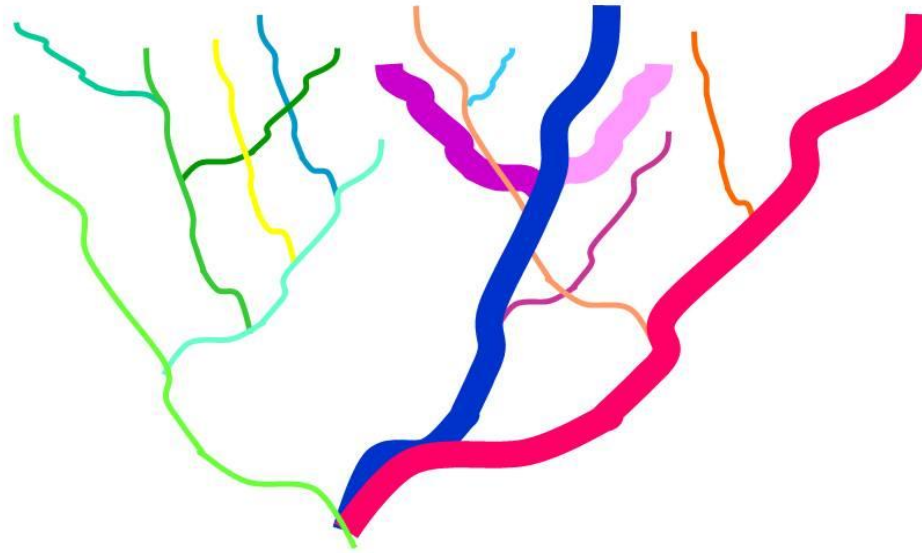
... in agriculture ...



synthetic biology



transgenics



get politically closed down



**philosophy:**  
**/politics**

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

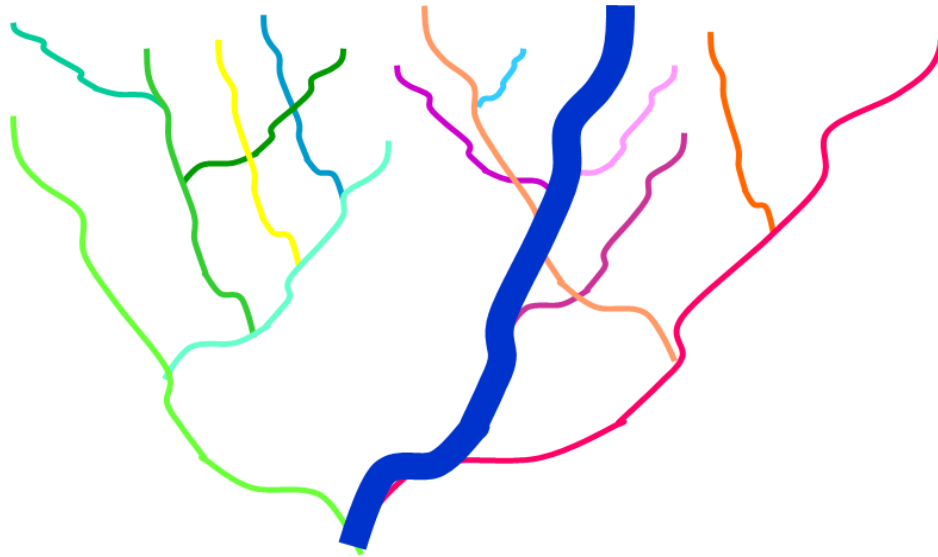
closure (Feenberg, 91)  
alignment (Geels, 02)

# What is 'Sustainable' Innovation?

... in agriculture ...



synthetic biology



get politically closed down

**economics:**

homeostasis (Sahal, 85)

regimes (Nelson & Winter, 77)

lock-in (Arthur, 89)

trajectories (Dosi, 82)

# What is 'Sustainable' Innovation?

... or in energy ...

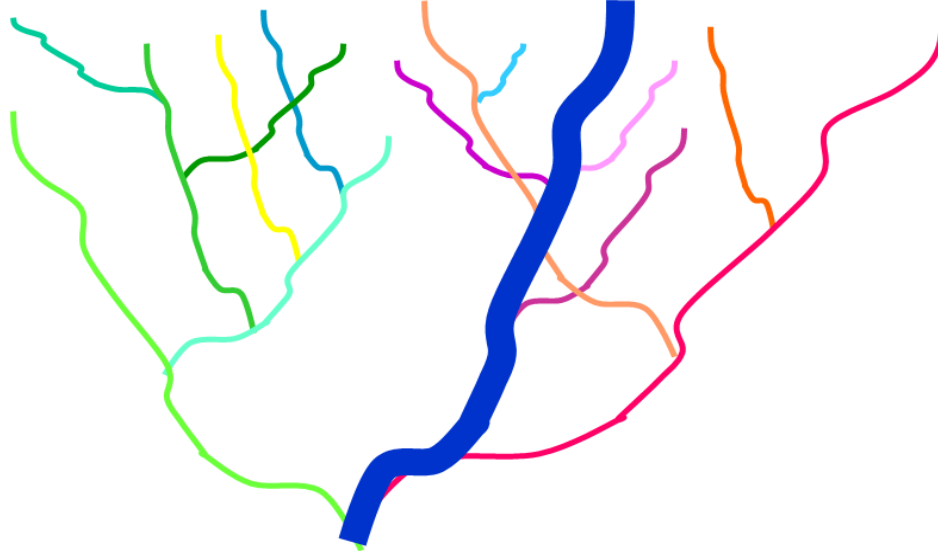


alternative pathways towards 'the zero carbon transition' ...



# So, Choice Gets Artificially Closed

... or in energy ...

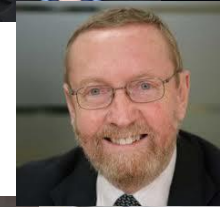
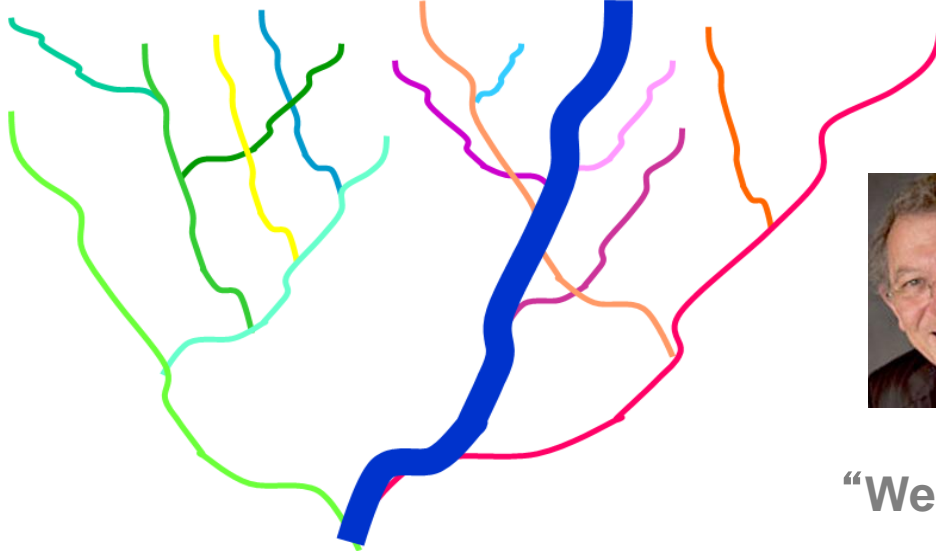


**alternative pathways towards ‘the zero carbon transition’ ...**

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

# So, Choice Gets Artificially Closed

Voices on all sides deny politics of alternatives... eg: government



‘Elite’ ‘green’ “no alternatives” rhetoric  
also miss the politics of direction

“We have no alternative  
to nuclear power ...

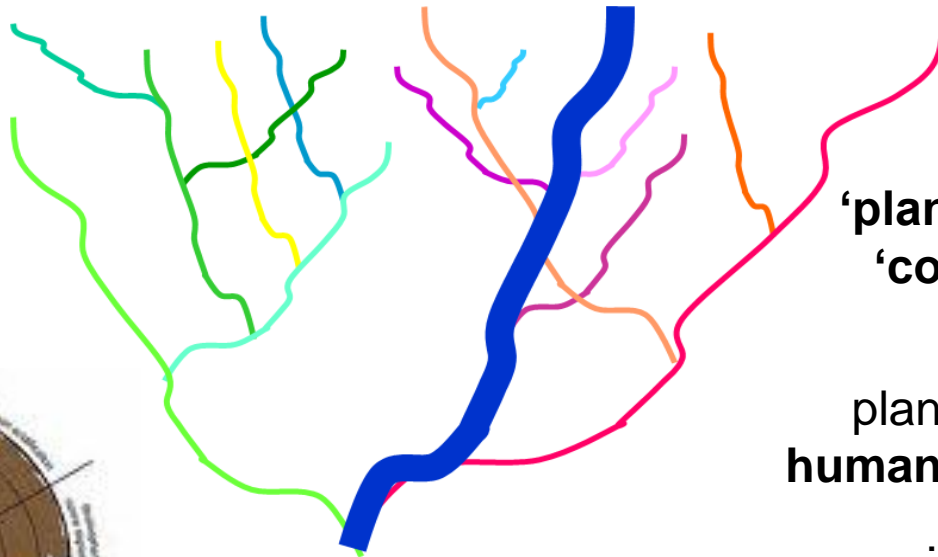
Nuclear because: “We  
need to do everything... ”

“We need to keep the  
nuclear option open”

# “Sustainability” as an ‘Apolitical’ Control Agenda

“more autocracy... more concentrated power... more control” ...

increasing visible in high-level ‘planetary management’ discourse :



‘Anthropocene’  
‘planetary boundaries’ and  
‘control variables’ define:

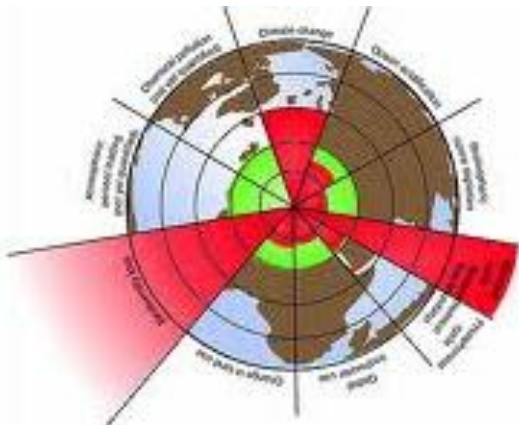
“...the **non-negotiable**  
planetary preconditions that  
**humanity needs to respect...**

...fear of “**catastrophe**”

...is “**non negotiable**”

...with “**absolutely no uncertainty**”

...brooking “**no compromise**”



**Danger of missing that gravity and urgency do not  
exclude uncertainty, politics or democratic choice**

# Apolitical control in 'Sustainability Transitions'

**SOCIO-  
TECHNICAL  
REGIME**

Markets, user preferences

Industry  
Science  
**technical regime**

*eg: nuclear power  
chlorine chemicals  
deepsea oil*



INTERNAL MOMENTUM IN A TECHNICAL REGIME  
Internal momentum increases

# Apolitical control in 'Sustainability Transitions'

SOCIO-TECHNICAL REGIME

Markets, user preferences

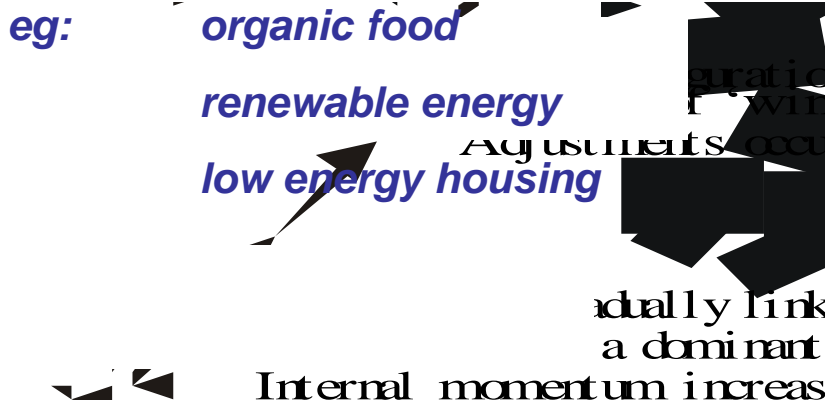
technical regime

Industry

Science

Socio-technical regime in  
On different dimensions

TECHNOLOGICAL NICHES



# Apolitical control in 'Sustainability Transitions'

SOCIO-TECHNICAL LANDSCAPE



SOCIO-TECHNICAL REGIME

Markets, user preferences

eg: *genetic modification*  
*air pollution*  
*nuclear weapons*

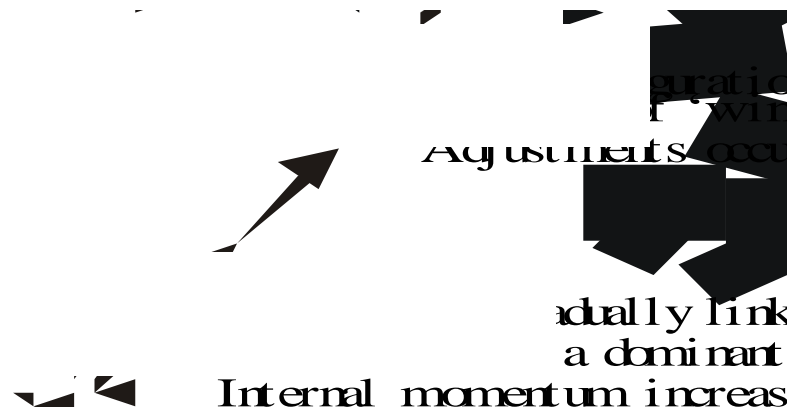
technical regime

Industry

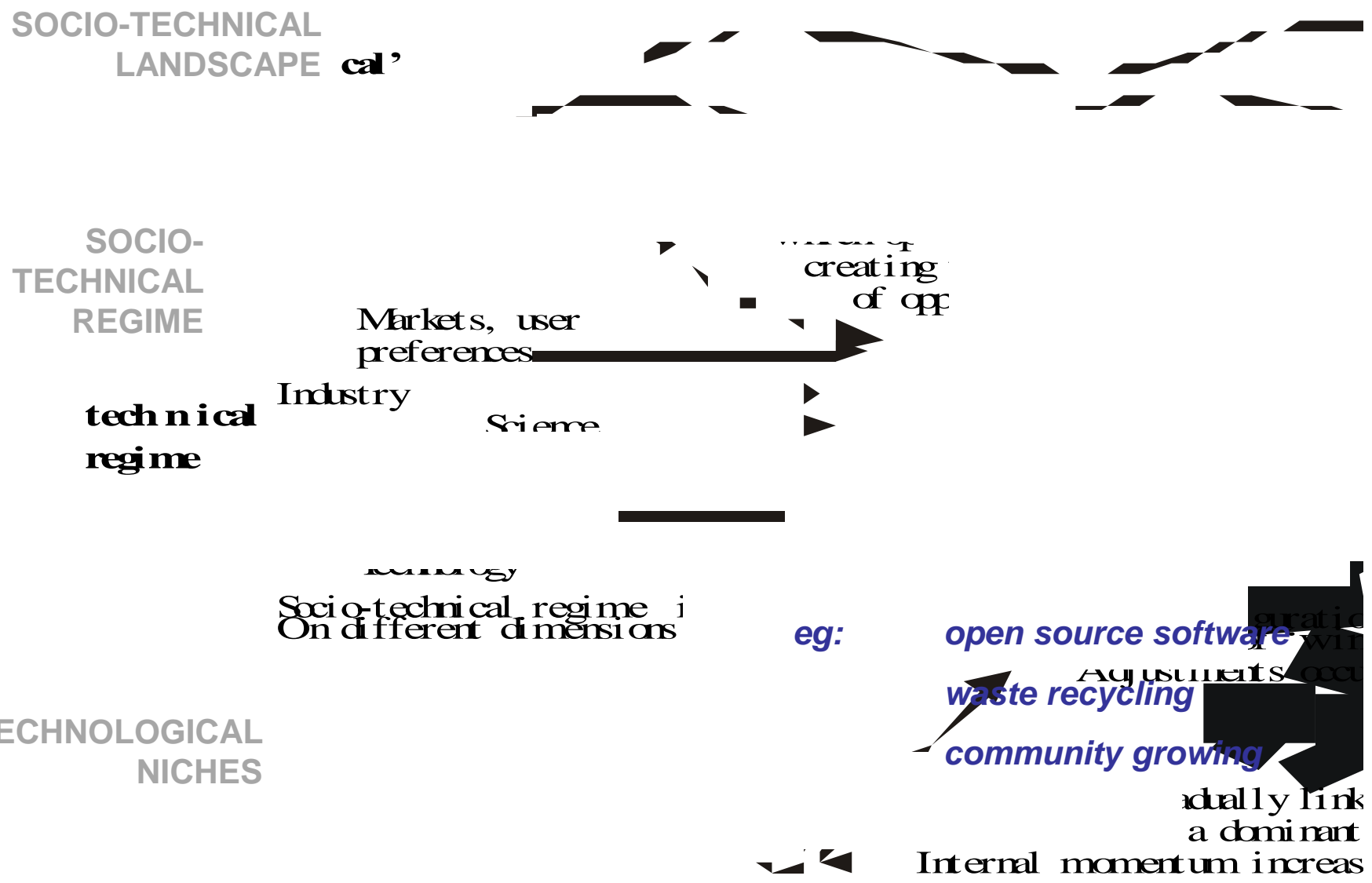
Science

Socio-technical regime i  
On different dimensions

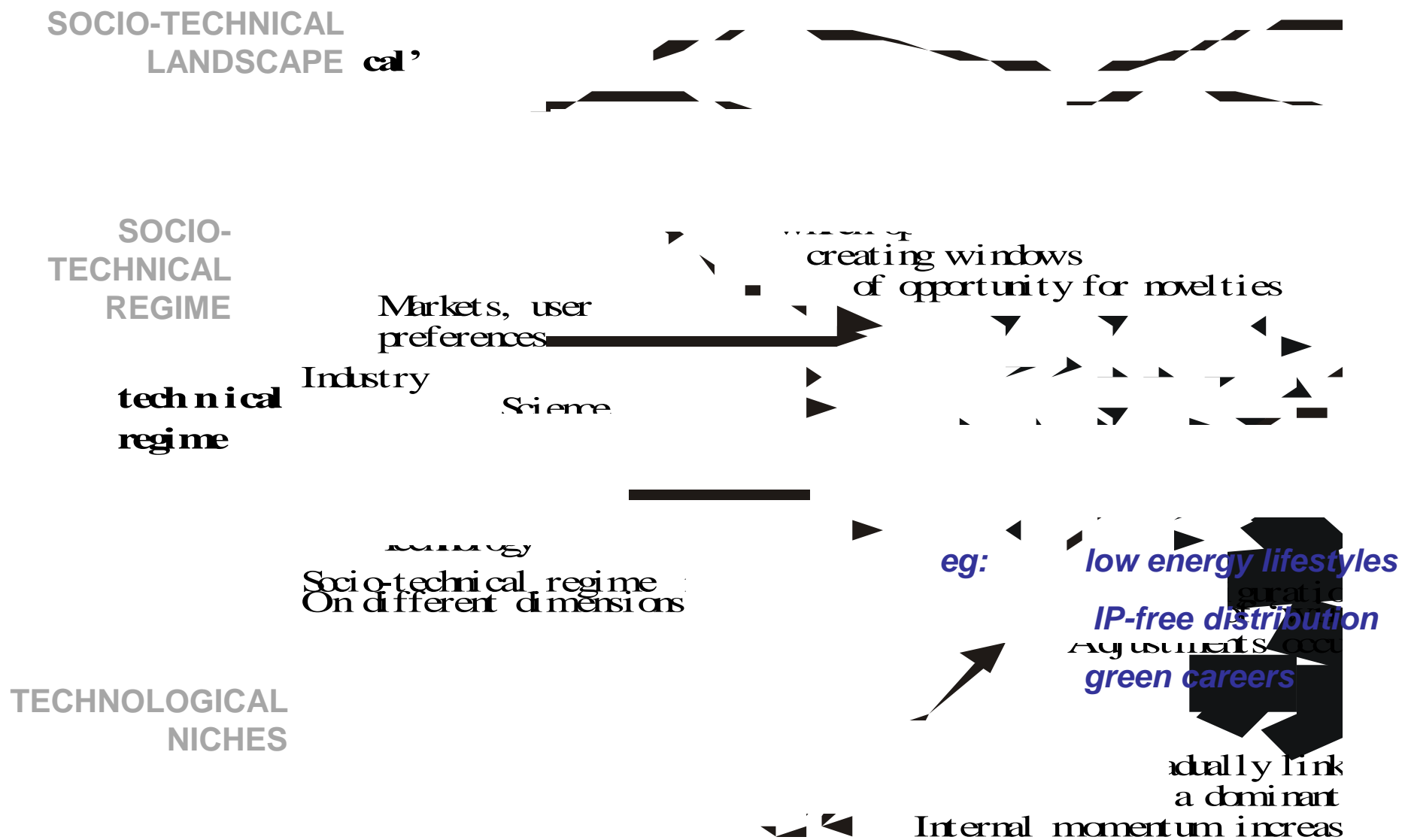
TECHNOLOGICAL NICHES



# Apolitical control in 'Sustainability Transitions'



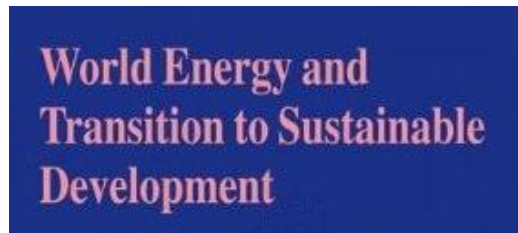
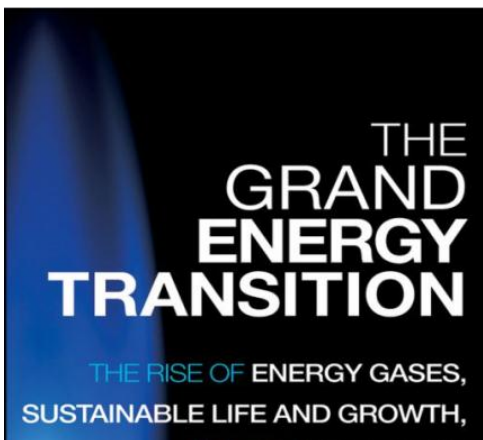
# Apolitical control in 'Sustainability Transitions'



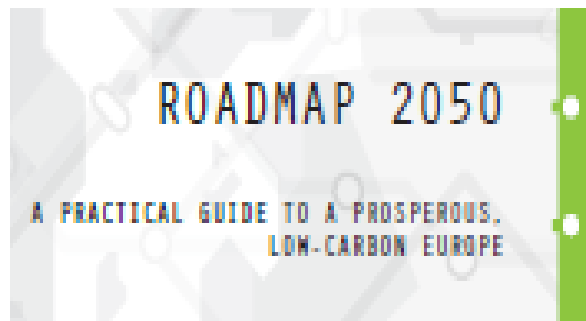
direction presumed, categories fixed, civil society neglected



# The 'Sustainability Transition'?



 HM Government  
**Enabling the Transition  
to a Green Economy:**  
Government and business  
working together



**The road to sustainable energy in Nigeria**



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

# The 'Sustainability Transition'?

**'Politics of direction'; tends to be airbrushed out...**

... questions restricted to technical matters of:

*how much? how fast? what risk? who leads?*

**Misses crucial political challenges over:**

*which way? what choices? says who ? why?*

**Roles for social movements**

restricted to instrumental support for  
securing trust, acceptance, compliance

Sidelines essential political roles for:  
creativity, criticism, contestation, dissent

**Excludes transdisciplinarity**



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

# “...Extinguishing Uncertainty...”

Sustainability increasingly uses language of ‘evidence based policy’

... scientific assessments of “risk”

....“speaking truth to power”

unproblematic

**RISK**

**eg:** *is this safe?*

*engineered components*  
*closed deterministic system*  
*high frequency incidents*  
*familiar contexts*

*is this safe enough?*

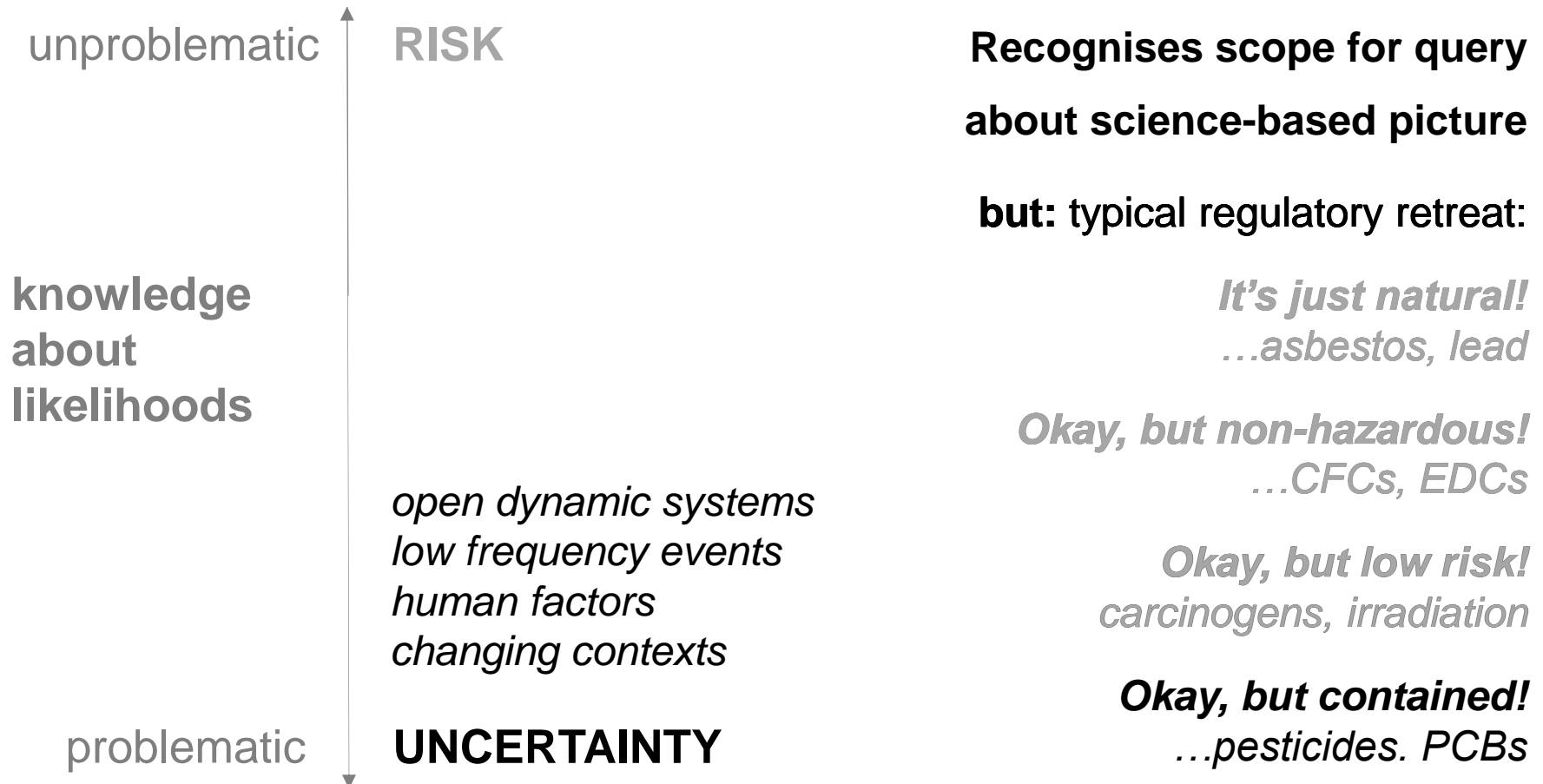
*what would be safest?*

*is this tolerable?*

**knowledge  
about  
likelihoods**

# “...Extinguishing Uncertainty...”

Sustainability increasingly uses language of ‘evidence based policy’



# “...Extinguishing Uncertainty...”

Sustainability increasingly uses language of ‘evidence based policy’

knowledge about possibilities

unproblematic

problematic



unproblematic

**RISK**

**AMBIGUITY**

*eg: what values of  
fairness, benefit, harm?*

*which alternatives  
would be best?*

*what kinds of societies do  
we want to live in?*

**Recognises scope for  
politics between contending  
meanings and visions**

**knowledge  
about  
likelihoods**

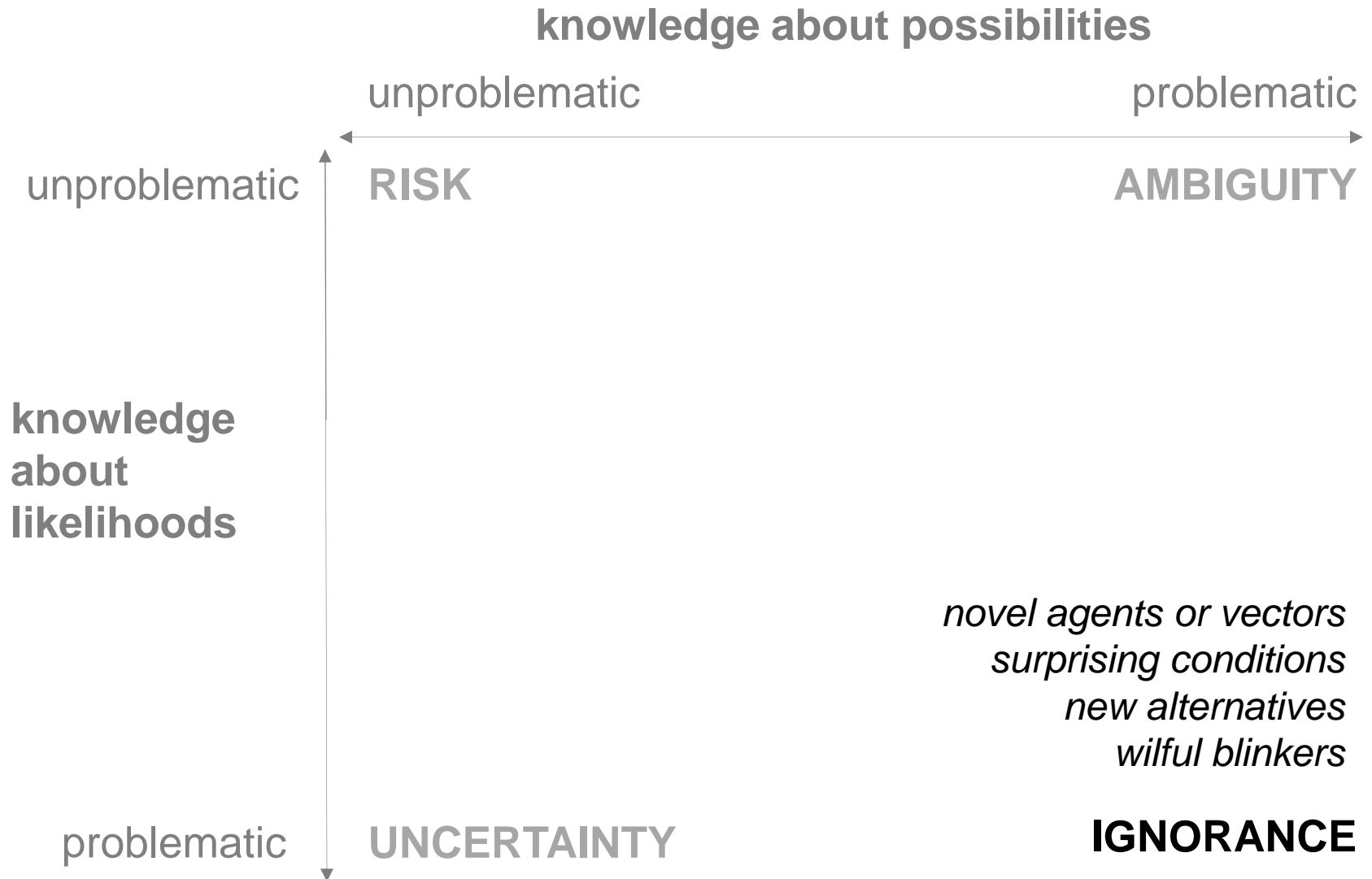
problematic

**UNCERTAINTY**

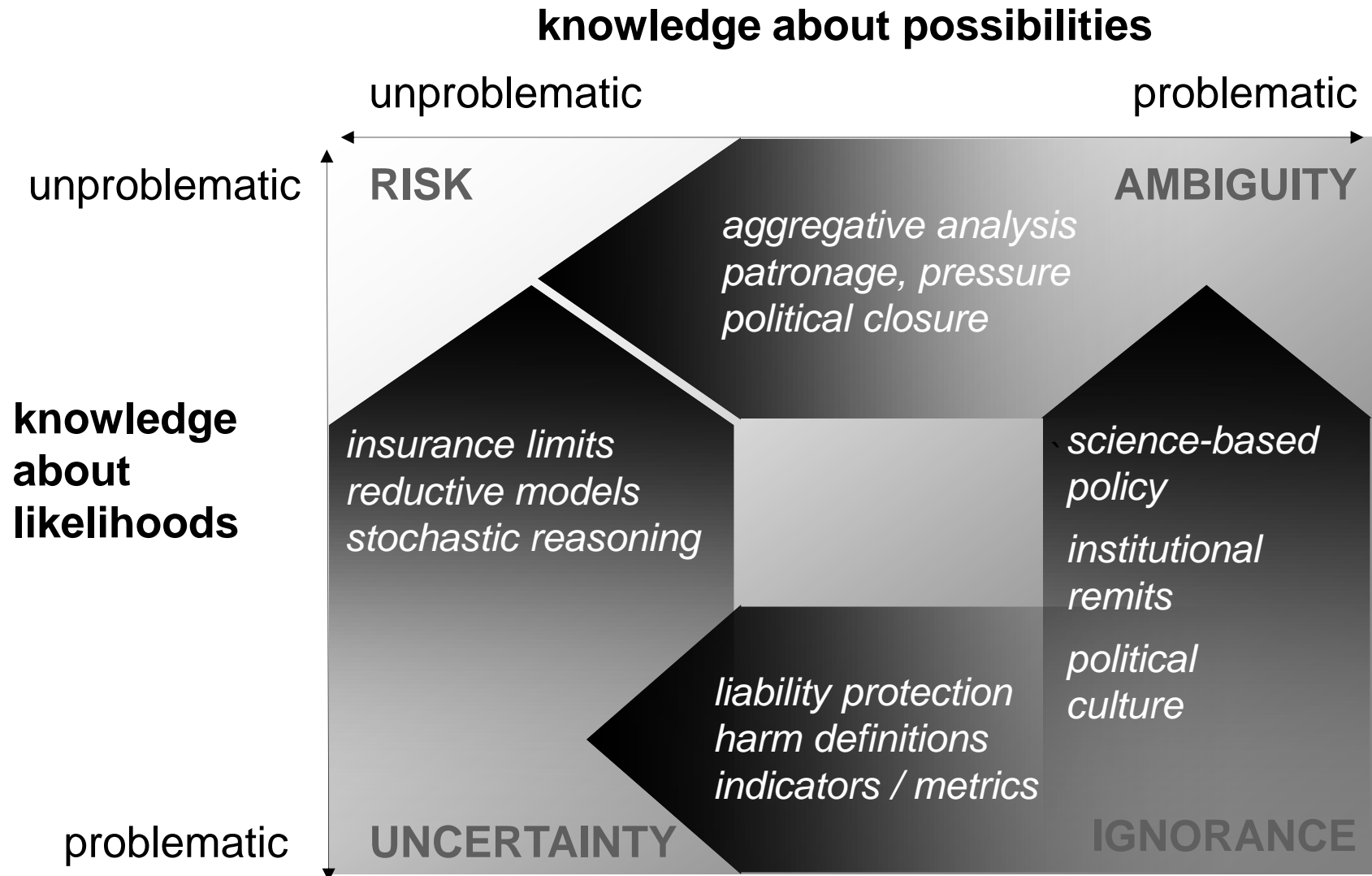


# “...Extinguishing Uncertainty...”

Sustainability increasingly uses language of ‘evidence based policy’

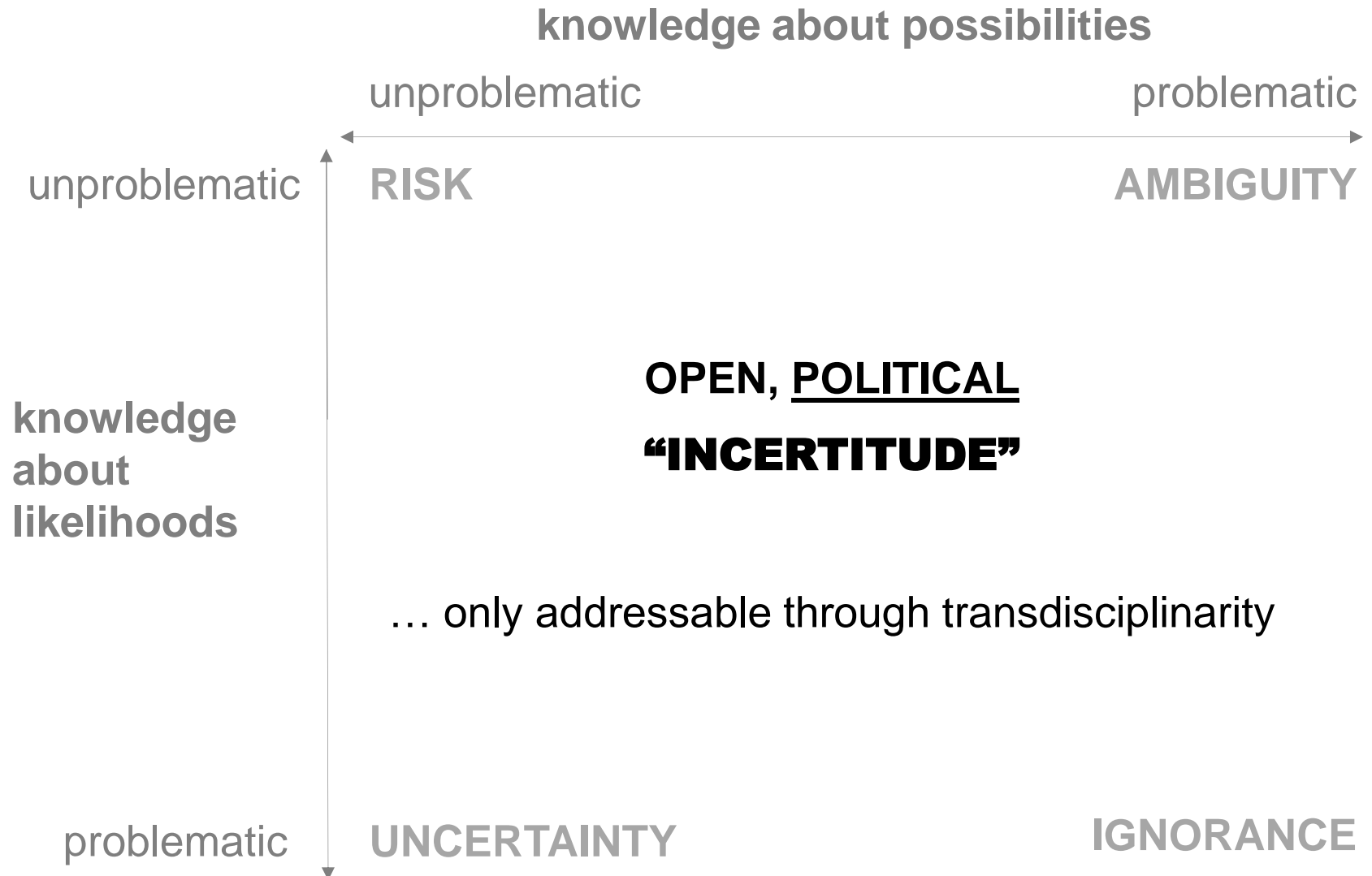


# The Closure of Knowledge



risk focus is shaped by power – Beck’s “organised irresponsibility”

# The Closure of Knowledge



- Socrates, Lao Tzu, Knight, Keynes, Shackle, Collingridge, Smithson, Ravetz, Wynne ...

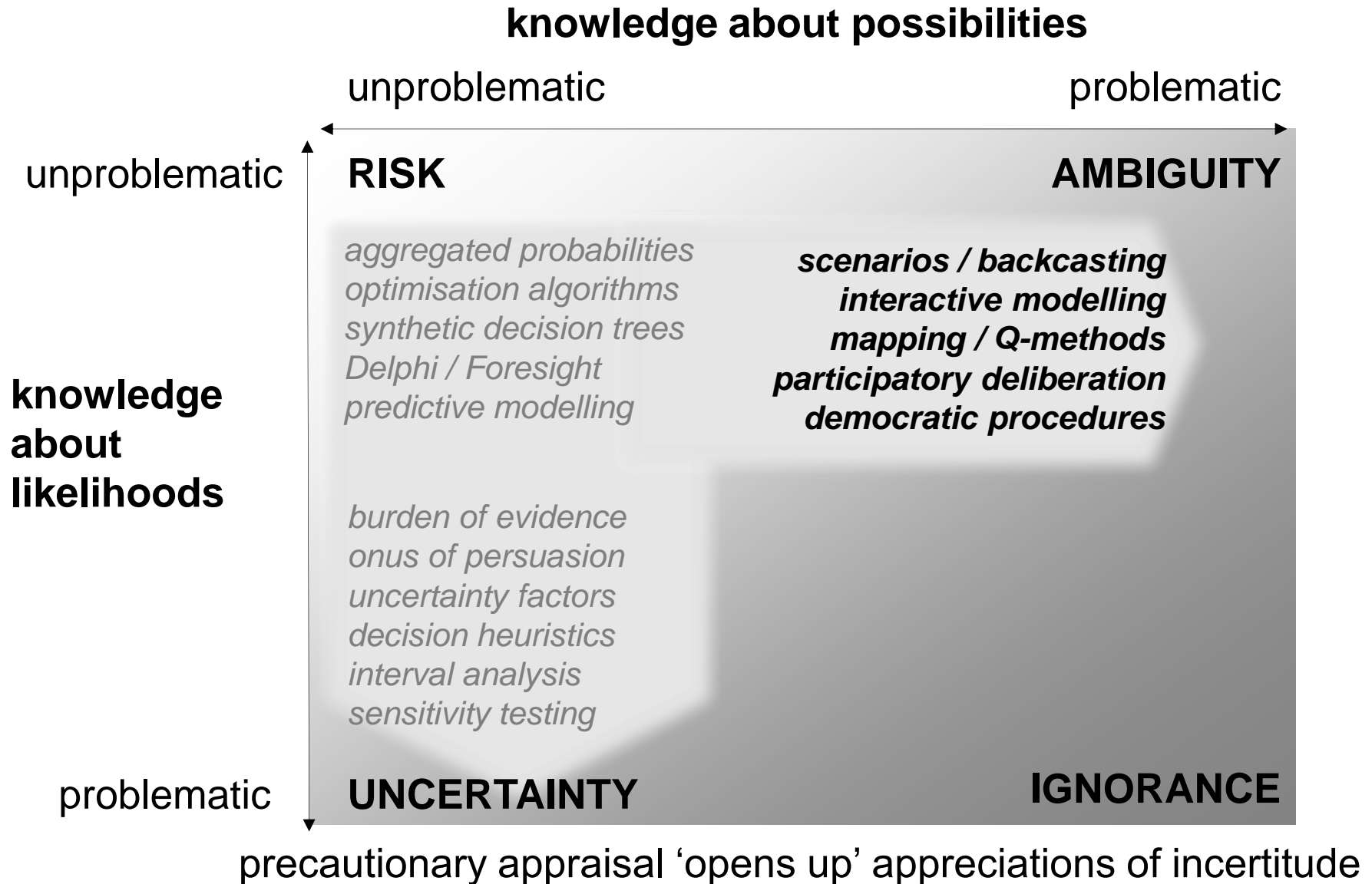






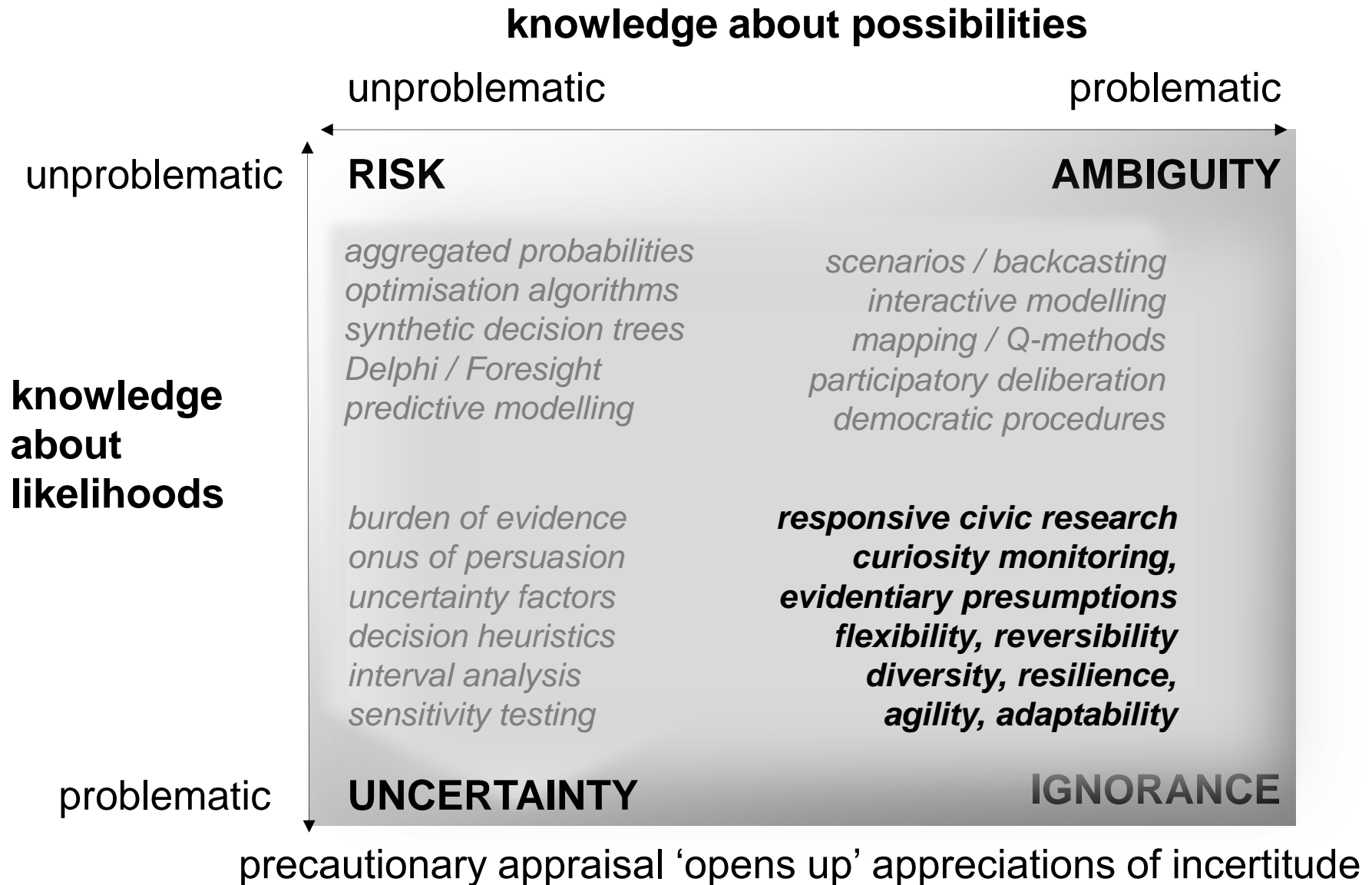
# Towards Knowledge Democracy

“Cinderella methods “ as ‘political judo’ for ‘opening up’ Sustainability



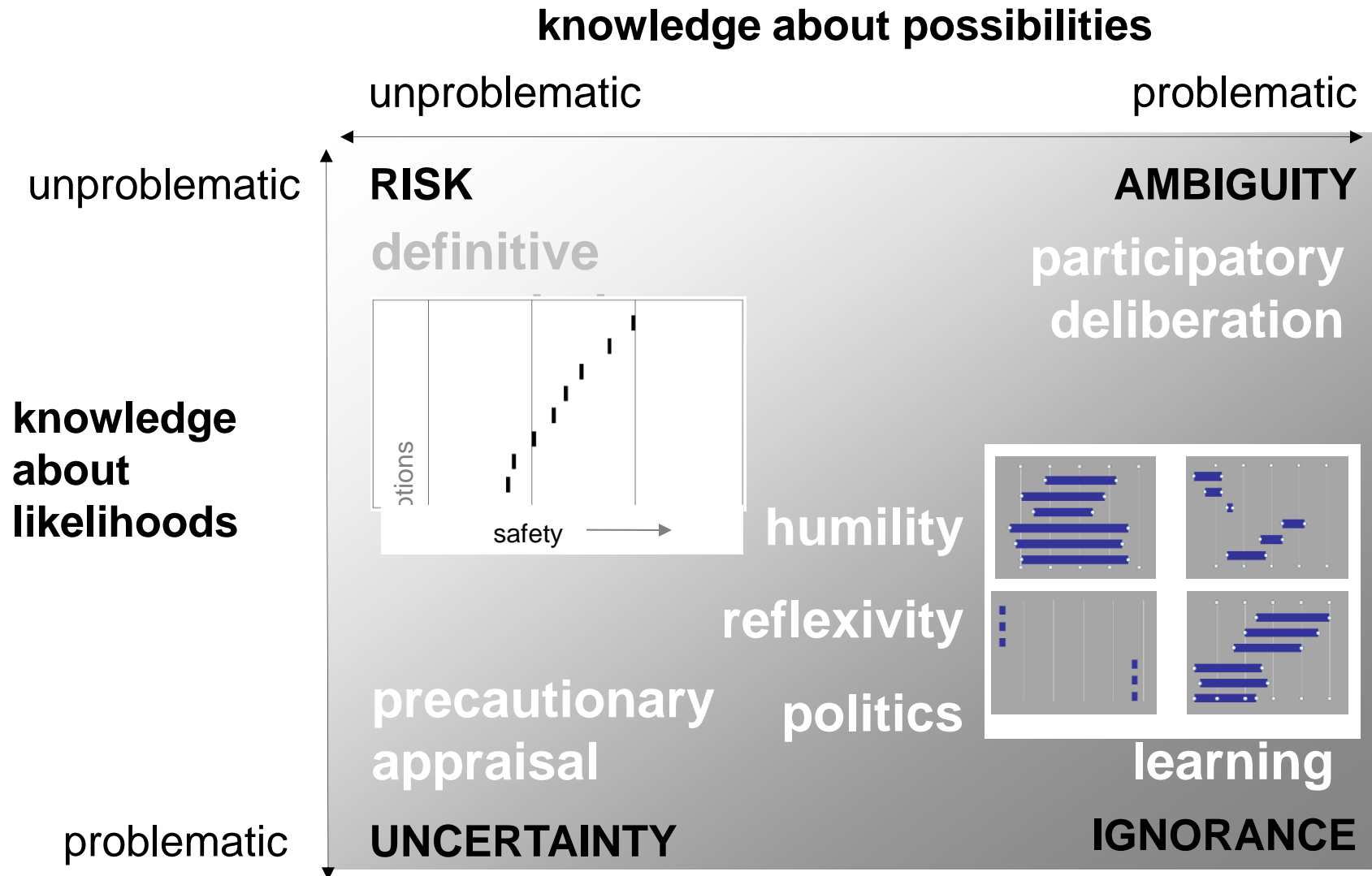
# Towards Knowledge Democracy

“Cinderella methods “ as ‘political judo’ for ‘opening up’ Sustainability



# Towards Knowledge Democracy

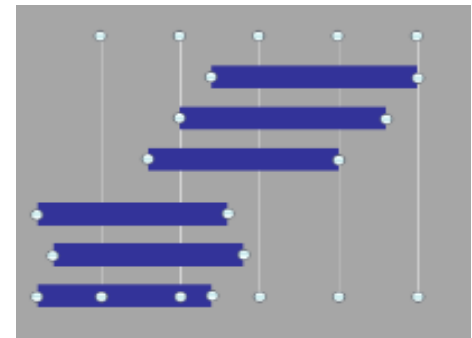
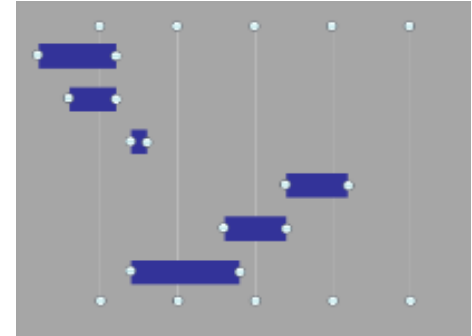
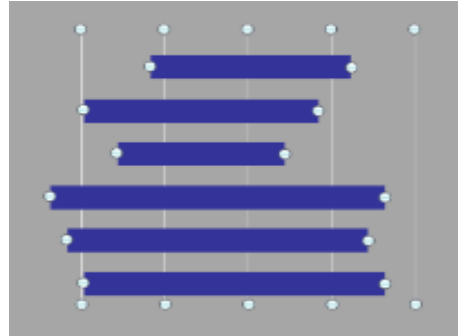
“Cinderella methods “ as ‘political judo’ for ‘opening up’ Sustainability



‘opening up’: options, issues, approaches, possibilities, perspectives

# Mapping the Politics of Green Futures

Methods like Multicriteria Mapping 'open up' the politics of innovation



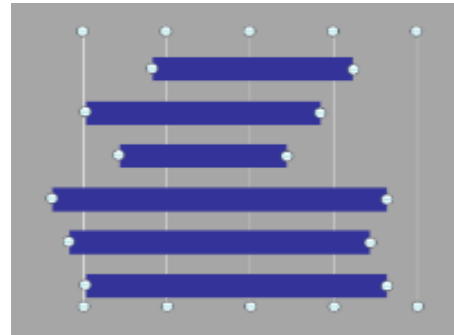
# Mapping the Politics of Green Futures

Methods like Multicriteria Mapping 'open up' the politics of Sustainability

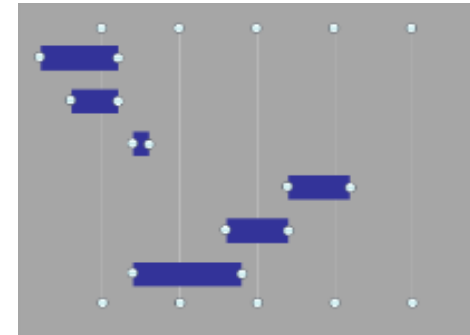


organics  
low input  
intensive  
GM 1  
GM 2  
GM 3

UK Government  
ecology advisor



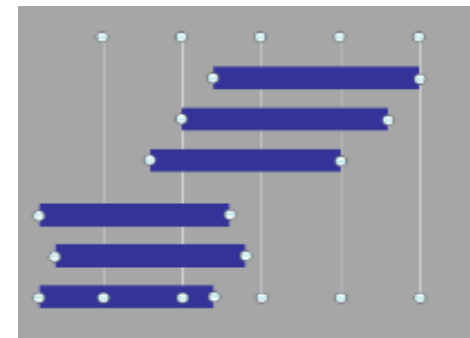
GM industry  
research executive



UK Government  
safety advisor



Green NGO  
scientist

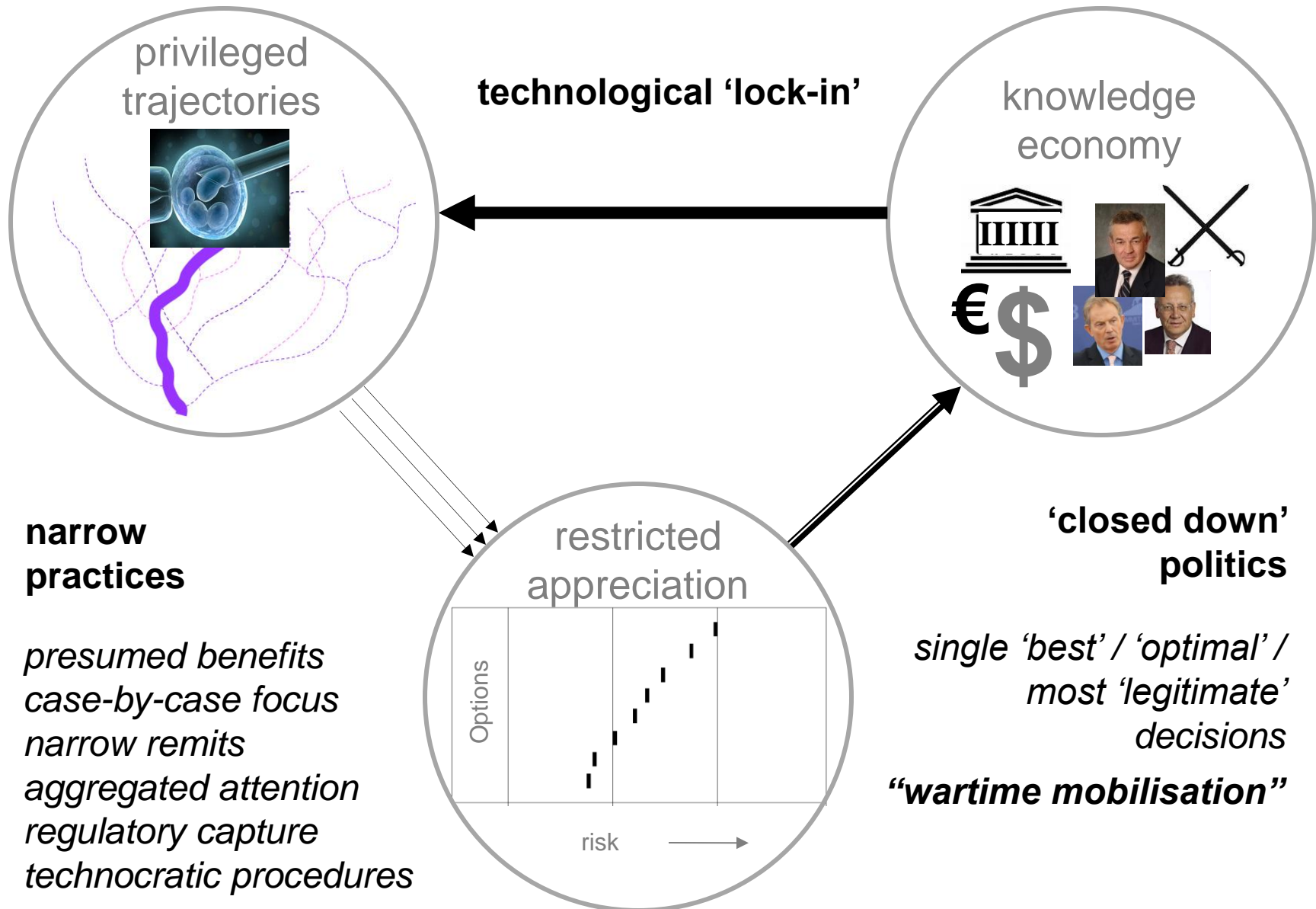


**Acknowledging:**

**assumptions, values, uncertainties in what is 'green'**  
'plural & conditional' approach is rigorous & democratic

# From the Green Transition to Innovation Democracy

institutions for nurturing politics of transdisciplinarity & transformation

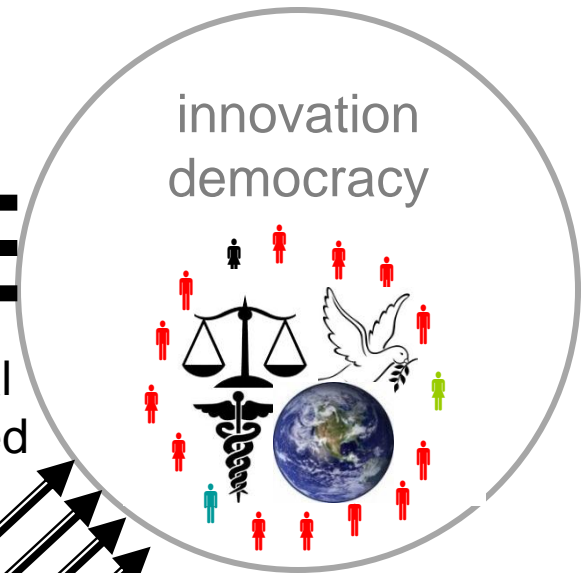




# From the Green Transition to Innovation Democracy

institutions for nurturing politics of transdisciplinarity & transformation

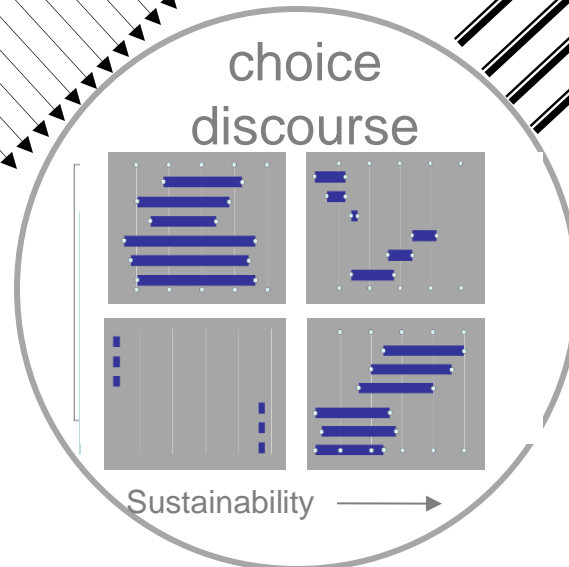
diversity  
reflexivity  
multivalence



From fear driven technical constraints to hope-inspired democratic choice

**broad-based practices**

*more options, issues, uncertainties, perspectives*



**'opening up' politics**

*acknowledge plurality and conditionality*  
**eg:** "numbers"  
"risks"  
"benefits"