

## Risk, Precaution and Power: stakeholder communication in the politics of technology

presentation to conference on 'Strategies for Risk Communication  
Evolution, Evidence and Experience', Montauk, Long Island, 17 May 2006

- 1: Risk as Politics
- 2: The Limits to Risk Analysis
- 3: Precaution and Rigour
- 4: Engagement and Politics
- 5: Practical Implications for Communication

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## Risk and Evolution of Technology

Economics, history, social science:

Show path-dependent 'lock-in' to poor choices

VHS and Betamax

... Windows software...

Narrow Gauge Railways

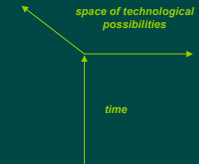
... rail and road ...

QWERTY keyboards

... light water reactors ...



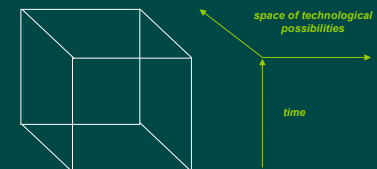
## Risk and the Evolution of Technology



Technology is a wonderful thing !

- many different pathways ...
- fertile with creativity and choice ...

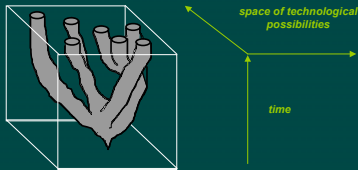
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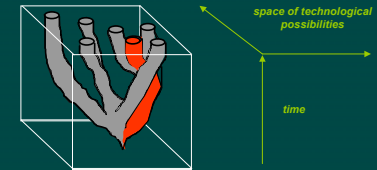
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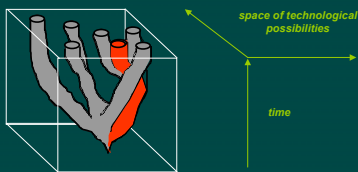
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## Risk and the Evolution of Technology



not all possibilities can be fully realised in globalised markets  
outcomes driven by necessity, chance and the exercise of power

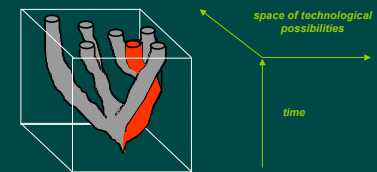
## Risk and the Evolution of Technology



not all possibilities can be fully realised in globalised markets

- eg: centralised thermal power / distributed renewable energy  
industrial GM agriculture / locally marketed low-input farming  
chlorinated plastics / recycled materials and energy  
private fossil-fuel cars / electric public transport  
IP-intensive medicine / community-based public health

## Risk and the Evolution of Technology



not all possibilities can be fully realised in globalised markets  
outcomes driven by necessity, chance and the exercise of power  
debates over 'risk' conceal a "hidden politics of technology"

## 'Baby-talk' on Innovation and Risk

"[we need] more **pro innovation** policies in the European Union..."

*UK Chancellor, Gordon Brown,  
26 January 2004*



"[there is] an **anti-technology** culture in the UK ... a **pro-technology** culture must be created..."

*UK Council for Science and Technology,  
February 2000*

No distinctions ... no alternatives ...

... no politics ... no choice ! **denies the 'genius of technology'**

## Risk and the Politics of 'Sound Science'

" ... this government's approach is to make decisions on GM crops on the **basis of sound science.**"

*UK Prime Minister, Tony Blair,  
House of Commons,  
10 November 2003*



Science as a substitute for politics

**Power denies role for contending interests, values, choices...**

## The Limits to 'Sound Scientific' Risk Assessment

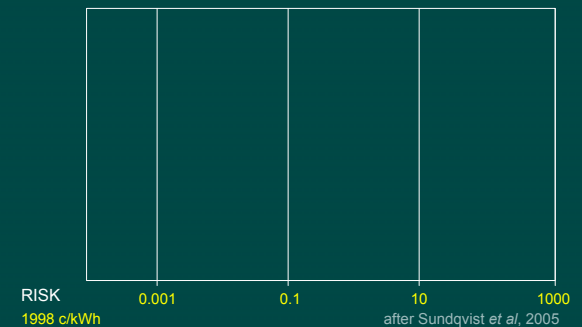
Quantitative risk assessment appears precise, but is sensitive to framing

RISK  
as 'externality' (1998 c/kWh)

after Sundqvist et al, 2005

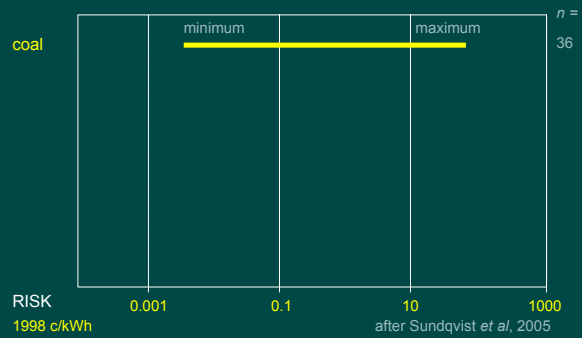
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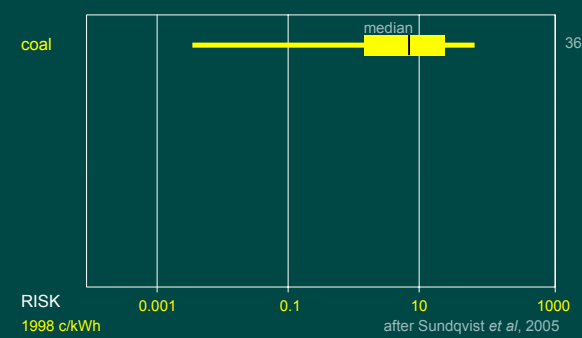
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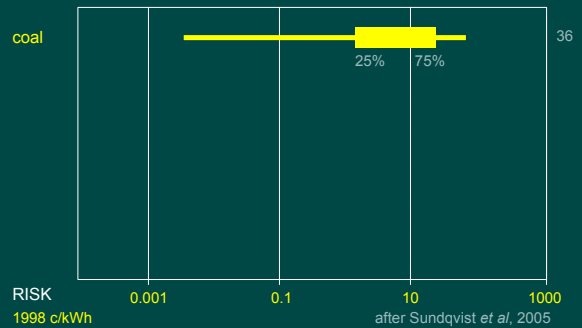
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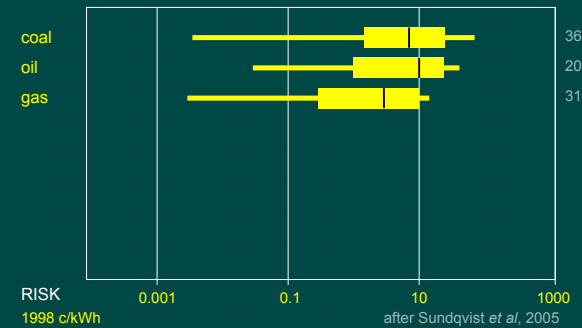
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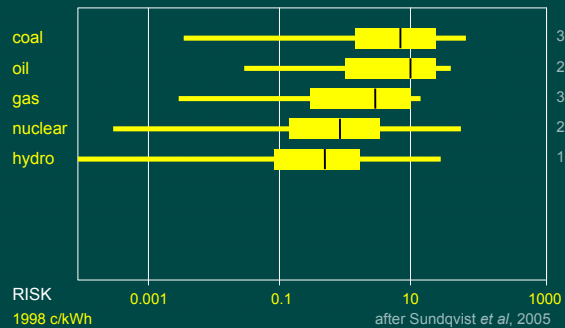
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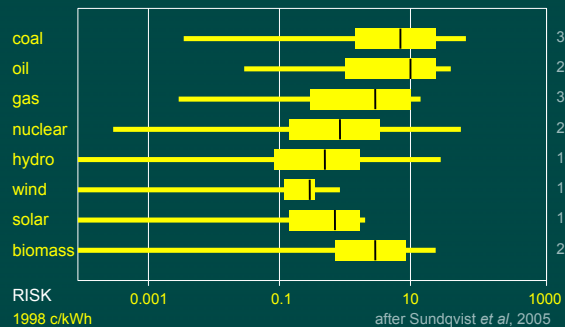
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## The Nature of 'Framing'

Some dimensions of 'framing' in risk assessment

setting agendas	defining problems	characterising options
posing questions	prioritising issues	formulating criteria
deciding context	setting baselines	drawing boundaries
discounting time	choosing methods	including disciplines
handling uncertainties	recruiting expertise	commissioning research
constituting 'proof'	exploring sensitivities	interpreting results

eg: nuclear addressed in terms of climate change / security / sustainability  
GM addressed in terms of safety / environment / agronomics / industry

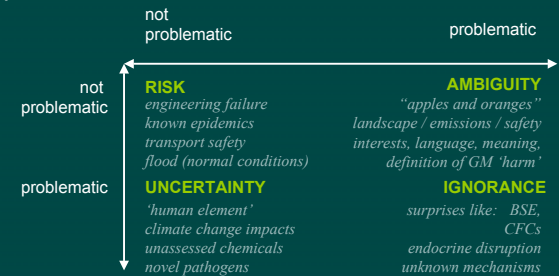
All analysis requires framing ... all framing involves value judgements

'sound science' and expertise give different answers to different questions  
... we should be as rigorous about validating the questions as the answers

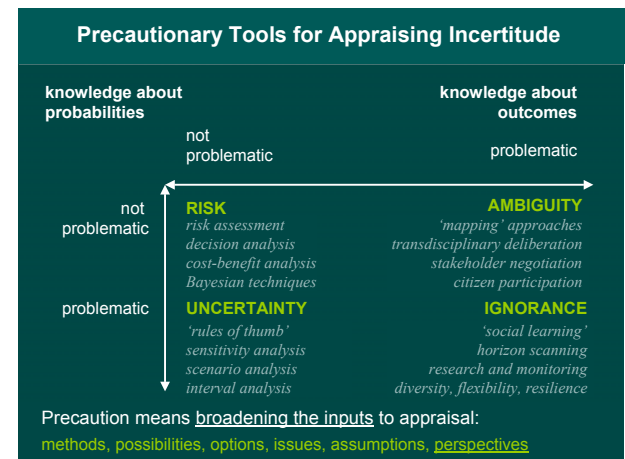
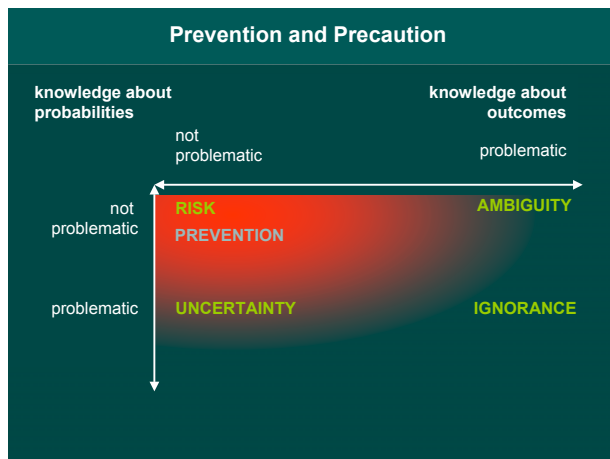
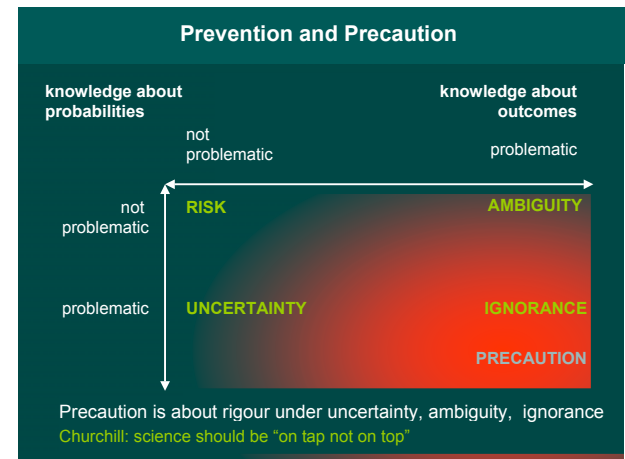
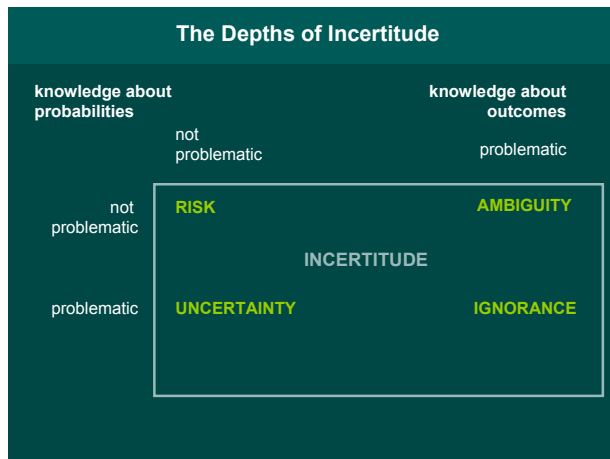
## The Limits to Narrow Risk Assessment

knowledge about probabilities

knowledge about outcomes



Risk assessment limits are practical, methodological and theoretical  
Arrow's Nobel Prize shows 'sound scientific' policy is an oxymoron !



## Precaution: communicating beyond 'the principle'

" Where there are *threats* of *serious* or *irreversible* damage, lack of *full scientific certainty* shall not be used as a reason for postponing *cost-effective* measures to prevent environmental degradation "

*Principle 15, 1992 Rio Declaration*

Like risk assessment, precaution is an incomplete 'decision rule'  
 threat? seriousness? irreversibility? full scientific certainty? cost-effective?  
 Prompts unfavourable comparison with 'sound scientific' approaches  
 (eg: risk, cost-benefit, decision, life cycle, environment impact analysis)  
 Major international political tensions: Kyoto, WTO, GM, Chemicals  
 In terms of communication, precaution and risk assessment in same boat

## Analysis and Communication

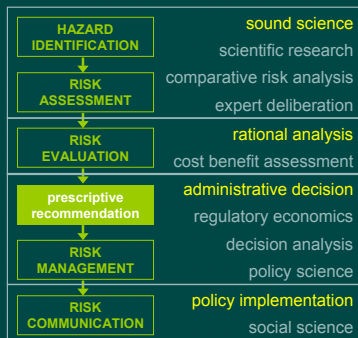
Traditional Idea

Emerging Picture



## Analysis and Communication

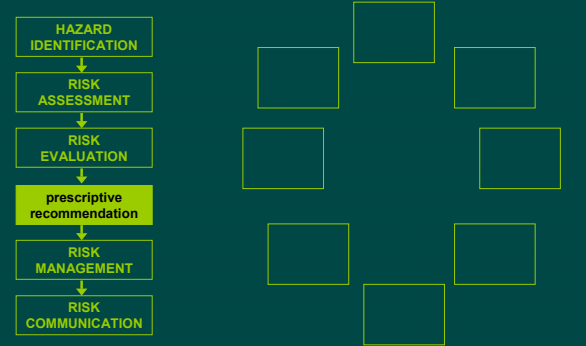
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## Analysis and Communication

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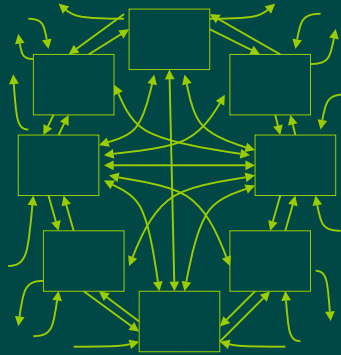


## Analysis and Communication

Rigid Decision Rules



Broad-based Process



## Analysis and Communication

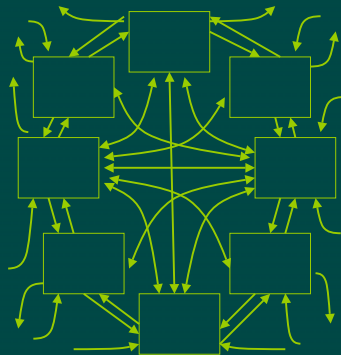
Rigid Decision Rules

**sound science?**  
 scientific research  
 comparative risk analysis  
 expert deliberation

**rational analysis?**  
 cost benefit assessment

**administrative decision?**  
 regulatory economics  
 decision analysis  
 policy science

Broad-based Process

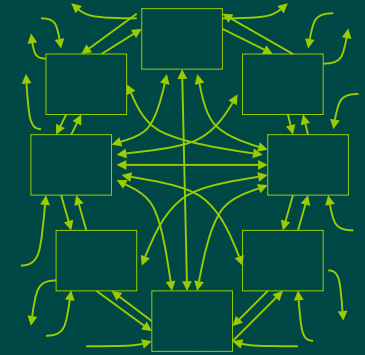


## Analysis and Communication

politics and communication

social science  
 political science  
 social psychology

Broad-based Process



## Analysis and Communication

Rigid Decision Rules

**PRECAUTIONARY PRINCIPLE**

*"Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation"*

restricted to risk management

**NOT** bans for particular technologies, let alone technologies in general

Deliberate Broad-based Process

**PRECAUTIONARY APPRAISAL**

**Concrete implications**

- extend scope of appraisal
- more humility on science
- be pro-active about power
- deliberate over proof
- strategic view of alternatives
- public engagement in science

relevant also to risk appraisal

## Precaution as Rigour in Appraisal

(after EEA, 2001)

extend scope	additive, cumulative, synergistic effects; life cycles, compliance real world effects of CFCs; MTBE, PCBs as 'closed systems'
be humble on science	sensitivities & proxies: mobility, persistence, bioaccumulation omission of persistence in organochlorines, MTBE, CFCs
be active in research	prioritise open monitoring & surveillance & targeted experiment neglected: TBT, BSE; no monitoring: asbestos, benzene, PCBs
deliberate over argument	levels of proof, responsibility for analysis, burden of persuasion Swann committee on antimicrobials, 1967 later ignored
view alternative options	pros, cons, justifications for range of options & substitutes ALARA, BAT, BPM – ionising radiation, fisheries, acid rain
transdisciplinary learning	collect all relevant knowledge, beyond the 'usual suspects' MTBE / engineers; BSE / vets
engagement in appraisal	provides independence on interests and robustness on values BSE, benzene, DES, asbestos, acid rain, fisheries

## Communication, Engagement and Politics

### Contrasting pressures and rationales

(cf. Fiorino, US NRC)

#### Normative Democratic

the 'right thing to do' in a democracy

- about process: equity, inclusion, empowerment  
(even if 'ineffective' or 'inefficient' according to incumbent interests)

#### Instrumental

expedient means to some particular end

- about narrow interests: trust, credibility, acceptance, "sedation"  
(offers justification and blame management in decision making)

#### Substantive

improves general 'robustness' of policy advice

- about broad consequences: low harm, high benefit, sustainability, precaution  
(provides rigour on framing assumptions as well as evidence and analysis)

More broad-based 'precautionary appraisal'  
is a substantive reason for engagement

## 'Opening Up' Risk and Technology Policy

Conventional appraisal: 'narrow' inputs and 'closed' outputs to policy

For example:

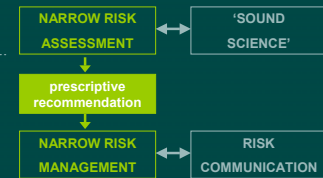
"sound science dictates..."

...GM is acceptable"

...nuclear is best"

...this plant is safe"

...ban this chemical"



Conventional policy appraisal aims at 'closing down' decisions

'inputs' to appraisal draw on narrow 'sound science'

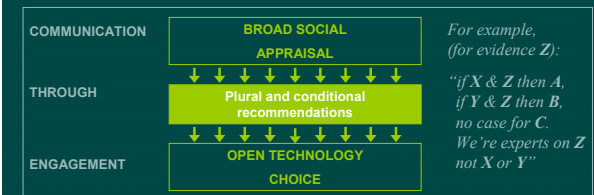
'outputs' to policy delivered as prescriptive recommendations

sensitive to framing and exercise of power

true both of analytic and participatory approaches: eg. consensus conference

## 'Opening Up' Risk and Technology Policy

'Broaden' inputs to appraisal and 'open up' outputs to policy debate



'Opening up' outputs to policy improves robustness and accountability

inputs to appraisal draw on broader precautionary approaches

outputs to policy delivered as 'plural and conditional' advice

rigour on questions, values and interests as well as evidence and analysis

many practical methods: eg. sensitivities, scenarios, maps, minority views

## Broadening & Opening Appraisal: a practical example

mapping scientific appraisals of GM crops  
(MCM study for Unilever 'Round Table', 1999)

organic  
low input  
conventional  
GM crops

organic  
low input  
conventional  
GM crops

high risk low  
←————→

risk as 'multi-criteria performance'

## Broadening & Opening Appraisal: a practical example

mapping scientific appraisals of GM crops  
(MCM study for Unilever 'Round Table', 1999)

(cf. precision of expression versus scale of ambiguity)

safety advisor



risk as 'multi-criteria performance'

## Broadening & Opening Appraisal: a practical example

mapping scientific appraisals of GM crops  
(MCM study for Unilever 'Round Table', 1999)

(cf. overlapping uncertainties, ambiguous and conditional prescriptions)

environment advisor



high risk low  
←————→

risk as 'multi-criteria performance'

## Broadening & Opening Appraisal: a practical example

mapping scientific appraisals of GM crops  
(MCM study for Unilever 'Round Table', 1999)

(cf. uncertainties and ambiguities, conditionality of GM, positive organic / low input)

industry scientist



high risk low  
←————→

risk as 'multi-criteria performance'

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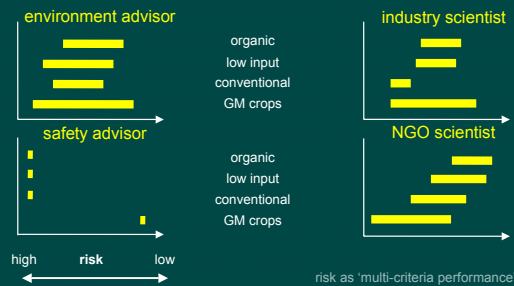
(cf: overlapping uncertainties, ambiguous prescriptions, conditionality of organic / GM)



## Broadening & Opening Appraisal: a practical example

mapping scientific appraisals of GM crops  
(MCM study for Unilever 'Round Table', 1999)

(overall: poor conventional baseline, poor voluntary controls, generally positive organic)



## Broadening & Opening Appraisal: including citizens

Mean intervals:

17 Specialists

8 BC1 Men



- clear underlying picture of convergence
- picture broadly sustained across six different specialist groupings
- remarkable similarity to citizen panel appraisals (eg: men's BC1 Panel)

## Conclusions: communicating the real politics of risk

Evolutionary insights apply to technology and institutions as well as to risk  
Open technological futures are subject to power and so a matter of politics

Language of 'sound science' in risk communication denies this reality  
Undermines rigorous science and democratic accountability alike

Broad-based precautionary appraisal simply recognises this reality  
Addresses uncertainty, ambiguity and ignorance as well as risk

Public engagement not about 'education', 'trust' or 'political correctness'  
Rigour in appraisal of values and interests as well as data and analysis

There are many practical ways to implement this in policy making  
'Opening up' engagement, 'mapping' analysis, 'plural' policy advice

Rare chance to address both scientific rigour and democratic accountability

**Andrew Stirling** is a senior fellow and senior lecturer at Science and Technology Policy Research (SPRU) at the University of Sussex. Stirling holds a master's degree in archaeology and social anthropology from Edinburgh and a D.Phil. in science and technology policy from the University of Sussex. His research focuses on risk and the dynamics of technology choice, critical policy analysis, ecological economics, the precautionary principle, risk and uncertainty analysis, decision analysis, multi-criteria mapping, technology policy, citizen participation, sustainability, and technological diversity and resilience. Stirling has published dozens of papers and monographs in scholarly journals and three books on risk research, energy policy, ethics, and the precautionary principle as applied to disparate subjects ranging from genetically modified crops to regulation of the electricity supply industry. He has served on a variety of policy advisory bodies, including the European Commission's Energy Policy Consultative Committee, the UK Advisory Committee on Toxic Substances and Genetic Modification Science Review Panel, the European Commission's Expert Group on Science and Governance and the Science Advisory Council of the UK Department of Environment Food and Rural Affairs. Stirling has also worked as a disarmament activist and board member for Greenpeace International.