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# ROLES FOR REFLECTION & RESPONSIBILITY IN THE BIOSCIENCES

The case of (advanced) biofuels

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# Managing Socio-Ethical Aspects (UK)

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1. Self-regulation

2. Educate

3. Dialogue & Participation

4. Reflection & Responsibility

1960

1985

2000

2004

# Hard & soft tools, common goal

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build more reflective capacity into the practice of science

(Wilsdon, Wynne & Stilgoe 2005)

"[these approaches] should be reflexive, participatory, and facilitate the opening up of the innovation process to modulation and adaptive management

(Owen & Goldberg 2010)

...they seek to enable a range of actors ... to help shape the trajectory of innovation and, where possible, to keep them open to alternative pathways.

(Marris & Rose 2010)

more proactive approach to societal issues that emphasizes not only the study of ethical, legal and social issues but the integration of social science research and public interventions into the R&D process

(Fisher & Mahajan 2006)

to build into the R&D enterprise itself a reflexive capacity ... elicits more knowledge of evolving stakeholder capabilities, preferences and values, and allows modulation of innovation paths and outcomes in response to on-going analysis and discourse'

(Guston & Sarewitz, 2002)

# Changing research governance (UK)

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- Increasing funding of collaborative research
- Increasing reference to reflection
- BBSRC & EPSRC Public Dialogue on Synthetic Biology
- EPSRC Experiments with Responsible Innovation
- RCUK Concordats (Research Integrity & Public Engagement)
- Royal Society – ‘Open Science’
- BIS Code of Practice

If we accept these developments at face value, what can the case of biofuels, a controversial agricultural biotechnology, tell us about their potential and limits more generally?

# Pass notes: biofuels

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## 1. The practice:

- Historical and current rationales
- National / governmental scale

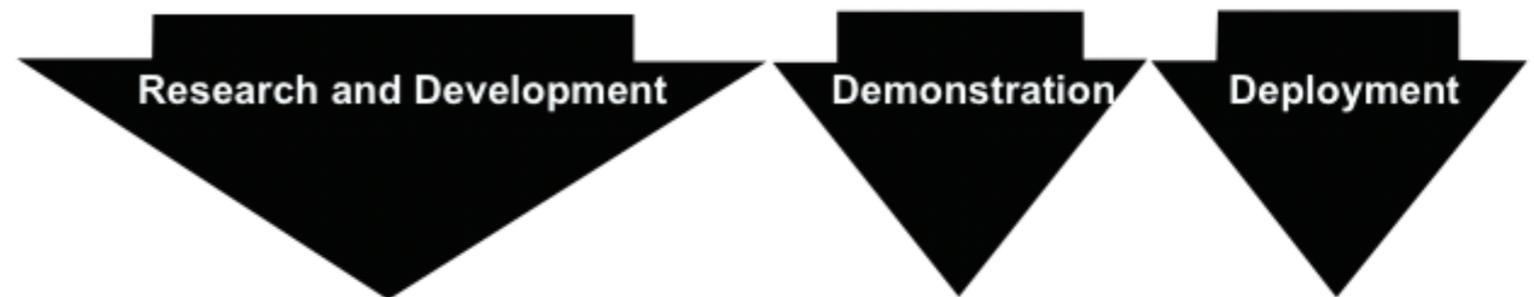
## 2. Set of Technologies: established – emerging



# Pass notes: Funding landscape (UK)



## THE PUBLIC FUNDING LANDSCAPE FOR ENERGY TECHNOLOGIES IN THE UK



**Energy Research Partnership**  
-advises on strategy

**UKERC**- networking, landscaping, outreach, integrating research

**Research Councils** underpinning and pre-competitive research

**EU Framework Programme**

**Energy Technologies Institute**  
from 2007

**Technology Strategy Board**  
from 2007

**Devolved Administrations**

**Carbon Trust**

**Government capital grants**

**Environmental Transformation Fund**  
from 2008

**Devolved Administrations & RDA funding**

**EU Joint Technology Initiatives**

**Carbon Trust**

**EU Emissions Trading Scheme**

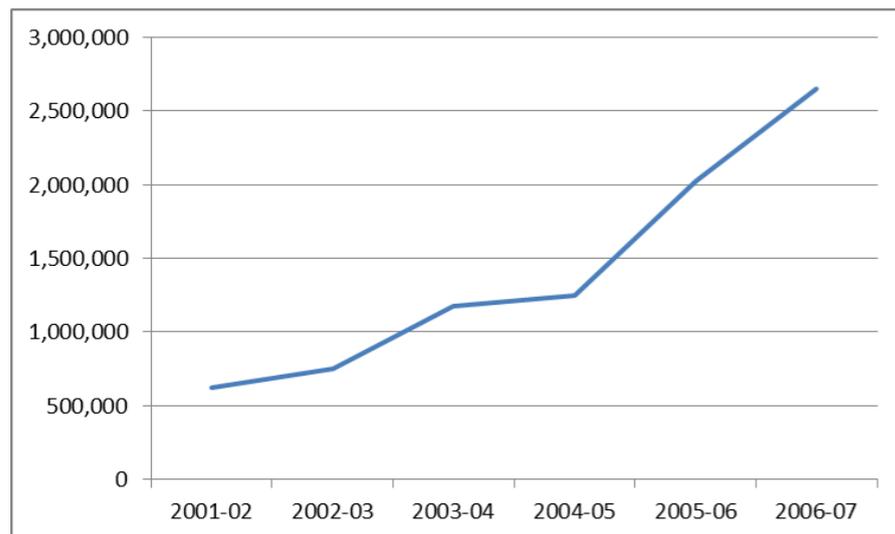
**Supplier Obligations**  
(inc Renewable Transport Fuels Obligation from 2008)

**Devolved Administrations & RDA funding**

**Other policy support**  
eg fiscal measures

**Non-financial Government policy framework**  
eg actions to overcome barriers to deployment barriers

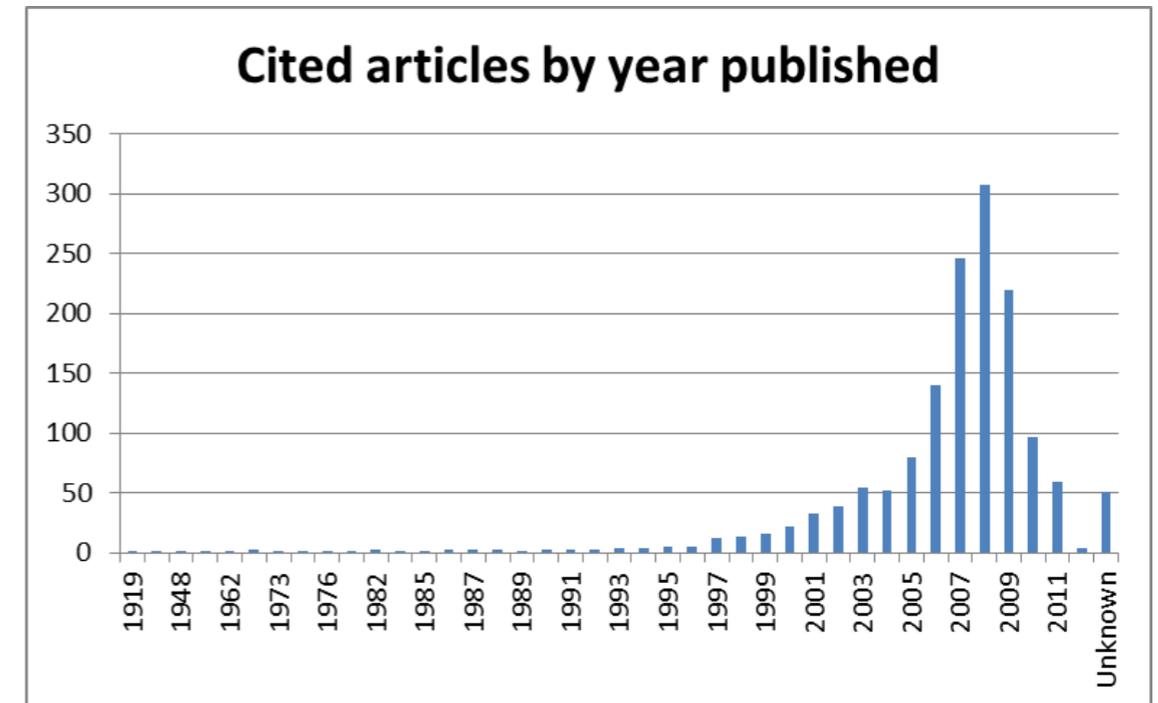
**Carbon Trust**



Research council expenditure on bioenergy (£s)

# Pass notes: Socio-Ethical Controversy

Although there may be agreement that it is technically possible to divert large areas of land to biofuels production, there is considerable dispute over whether such switches should be encouraged by subsidies through preferential tax treatment relative to petroleum-based products. There are also potential concerns over the wider implications of substantial expansions in the amount of agricultural land used for biofuel crops.



# Consequences: Current landscape

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"the food versus fuel debate essentially killed off any investment in the UK into first generation R&D, which is a problem when trying to get companies to invest because they see them as having a lower risk threshold"

Interview, Professor (Energy)

"BBSRC should seek to diversify its portfolio of fundamental, underpinning research to focus more on next generation sources..."

BBSRC Bioenergy Support Strategy 2012

"Ensuring that bioenergy is economically, environmentally and socially sustainable is core to the Centre's programmes. Life cycle analysis embeds this across the portfolio."

BBSRC Bioenergy Statement 2011

# The role of assessments in biofuels

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## Two questions:

- 1) What role can reflective and integrative tools play in addressing current and future socio-ethical issues as biofuel use evolves?
- 2) Specifically, what role can these tools play during the research phase for advanced biofuels?

# The role of assessments in biofuels

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## 1) Biofuels as Practice / socio-political project

Common issues raised with the production of biofuels:

- greenhouse gas balances of biofuel crops;
- impact on changing land use;
- water depletion;
- negative impacts on biodiversity and on soil quality;
- Inefficiency in relation to other forms of bioenergy (e.g. CHP);
- potential negative social and economic impacts on developing countries such as 'land grabs' and marginalisation of local communities;
- Technical questions about their energy balance.

“The only way you deal with that is through iterative debate and politics basically. Because we don't have a sort of fixed rule that deals with that.”

Interview, Policy Analyst, Environmental NGO

“So is that my responsibility? Hmm, well, yeah probably not...scientists ought to be able to defend what they're doing. You can't foresee every outcome of your research and probably we shouldn't be expected to foresee every outcome of our research.”

Interview, Professor (Biochemistry)

# The role of assessments in biofuels

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## 2) Lab-level Responsibility & Capability

- Trajectories open / flexible
- Hype & Expectations
- Values explicit / transparent

## Individual researcher despair?

- Funding decisions / Agenda Setting
- National / International Policies



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Thanks for listening

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