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Bioenergy policy challenges

ALL Energy
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- Committee on Climate Change
- CF
- Centre for Process Intensification
- C-Tech innovation
- Department of Energy & Climate Change
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- Future Blends
- Greenacres Energy
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- BioGas Hochreiter UK
- Biomass Energy Centre
- Danish Teknologik Inst.
- Drax
- LCA Works
- Wyse Group
- Unicorn Power Ltd

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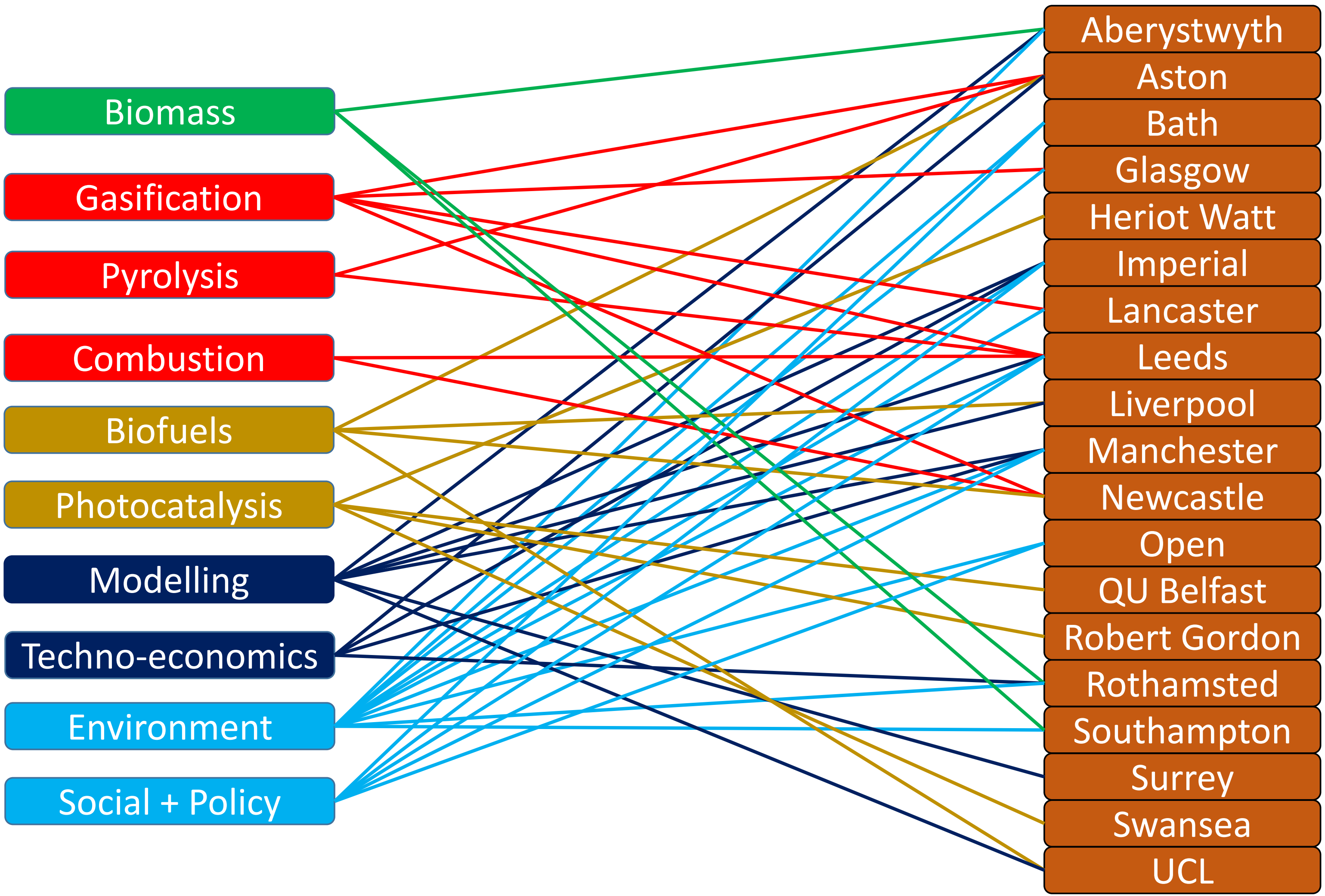
Hub activities



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Policy framework

- Global - IPCC UNFCCC Framework – greenhouse gases
- European – Renewable energy sources, renewable fuels, fuel quality
- National – Renewable energy action plans,
- UK – Bioenergy strategy, RO, RTFO, Banding of the RO, double-counting, RHI

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UK bioheat policy

- CfD pot 2 includes biomass CGP
- RHI – Biogas (biomethane injection adn biogas combustion)
- RO – Biomass CHP, EfW CHP
- Climate Change Levy – applied to non-domestic gas consumption0 excluding energy intensive industries

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Bioenergy policy-science interface

- Searchinger
- Gallagher
- ILUC
- GHG's
- Global - IPCC UNFCCC Framework – greenhouse gases
- European – Renewable energy sources, renewable fuels, fuel quality
- National – Renewable energy action plans,
- UK – RO, RTFO, Banding of the RO, double-counting, RHI

Updating to reflect emerging knowledge - complex instruments

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Key bioenergy policy challenges

1. Uncertainty
2. Boundaries
3. Land
4. Interfaces
5. Timing
6. Biogenic-fossil distinction

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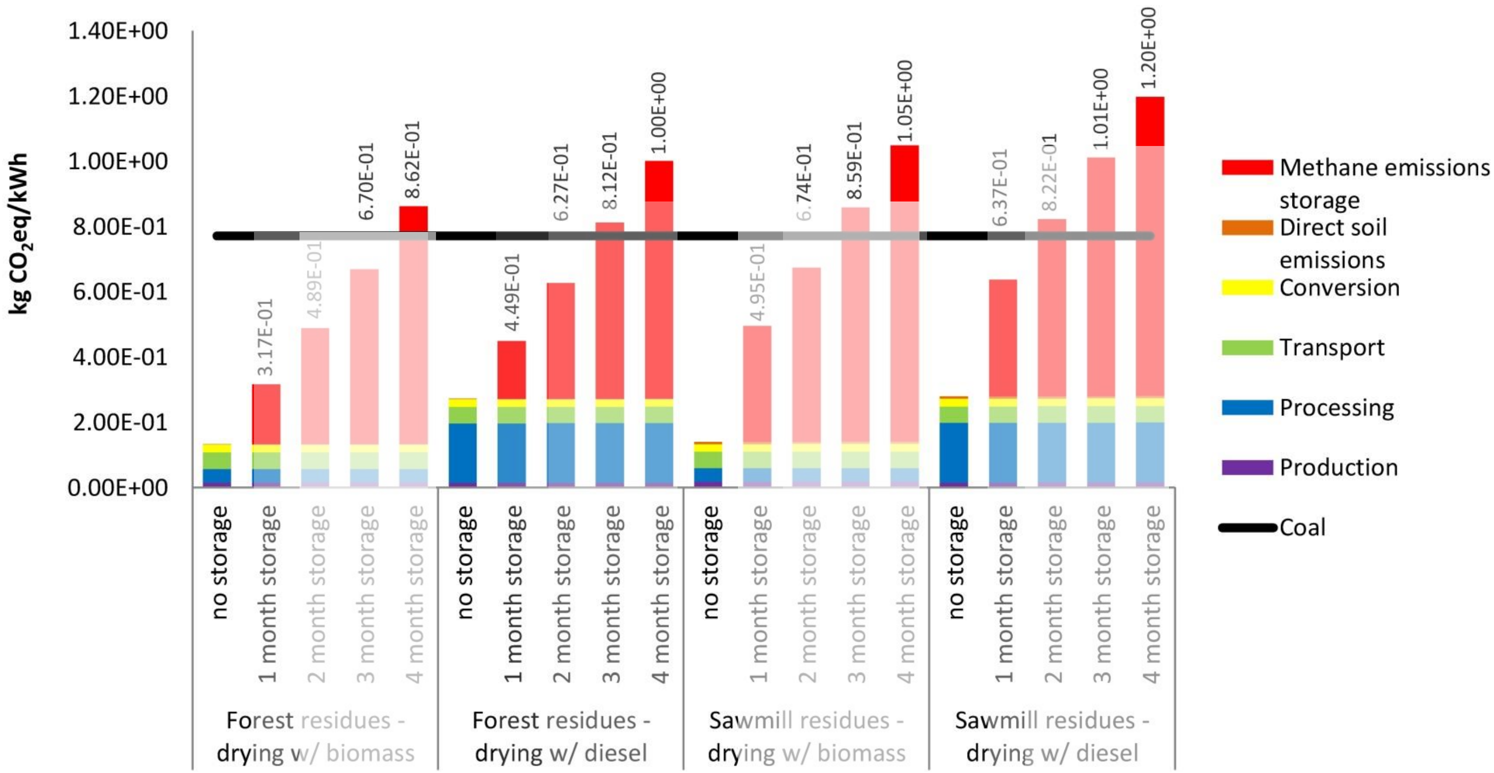
1. Uncertainty can drive real increases in GHG emissions



Röder et al., "How certain are greenhouse gas reductions from bioenergy?": Life cycle assessment and uncertainty analysis of a forest residue-to-electricity supply chain", Biomass and Bioenergy 2015

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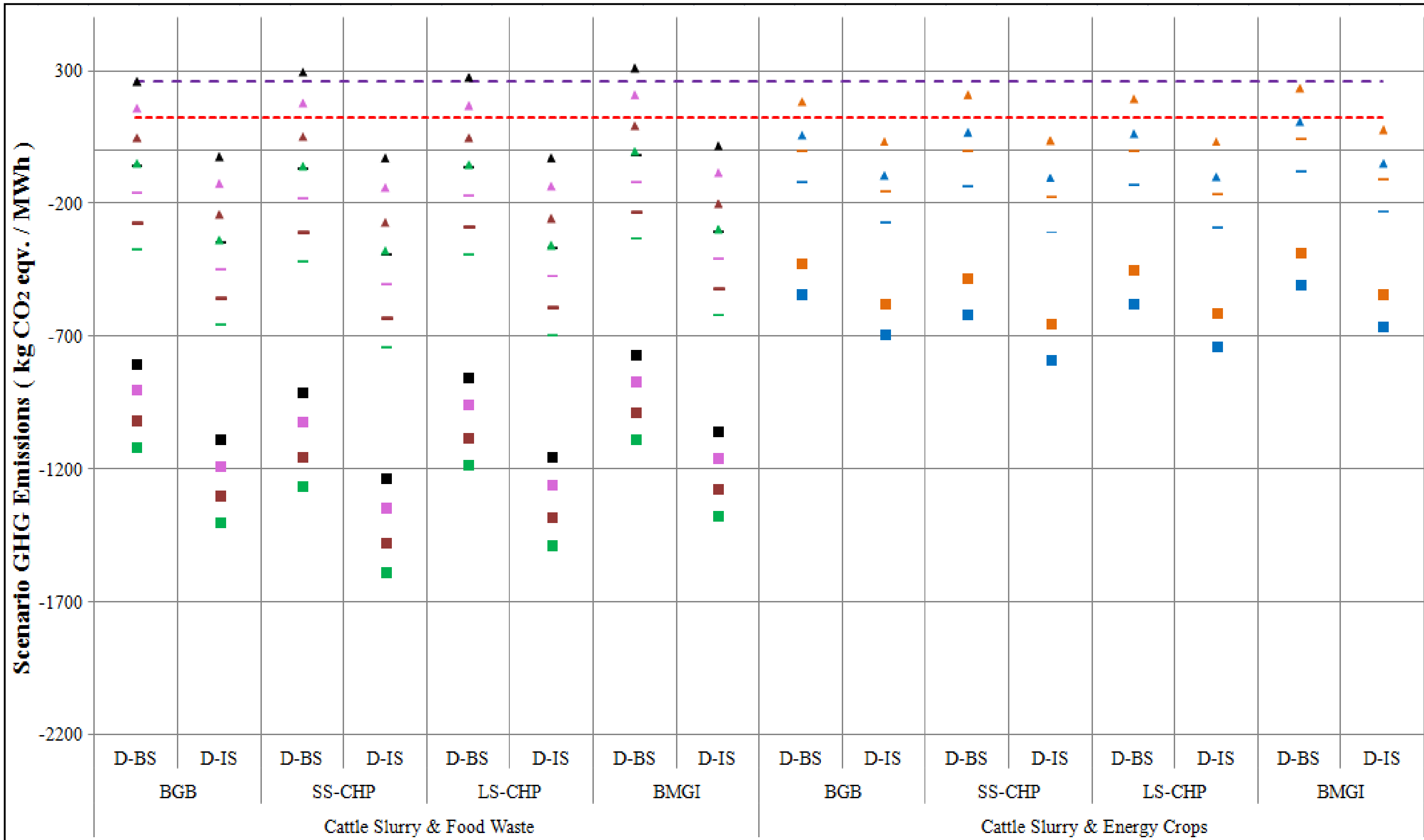
UK Cattle Slurry - AD Heat Bioenergy Pathways



Analysis Comparators:.		
Red dashed line	Sustainability Target	Comparator, the UK's heat bioenergy GHG intensity target ($CO_2^{eqv.}$ / MWh) [20].
Purple dashed line	Natural Gas GHG Impact	Comparator, the GHG intensity ($CO_2^{eqv.}$ / MWh) of generating heat from natural gas [16].

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Dealing with uncertainty

- Market based quotas – strong incentives for low cost solutions
- Price instruments – higher planning security for investors and control for policy makers
- Sustainability integration
- Hybrid measures e.g. Price ceilings, quantity constraints, adjustment processes
- Need to go beyond deployment support – wider innovation policy mix
- Not possible to accurately benchmark categories of biomass resource by their potential GHG performance.
- Possible to identify specific processes/activities that enhance or reduce the GHG performance of a given bioenergy pathway.

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2. Boundaries

- Policy aims to maximize GHG reductions
- Legislation aims to standardize comparisons
- Need to be very clear on objectives
- Different LCA "questions" require different scope and methodologies

Thornley et al., "Maximizing the greenhouse gas reductions from biomass: the role of life cycle assessment": Biomass and Bioenergy 2015

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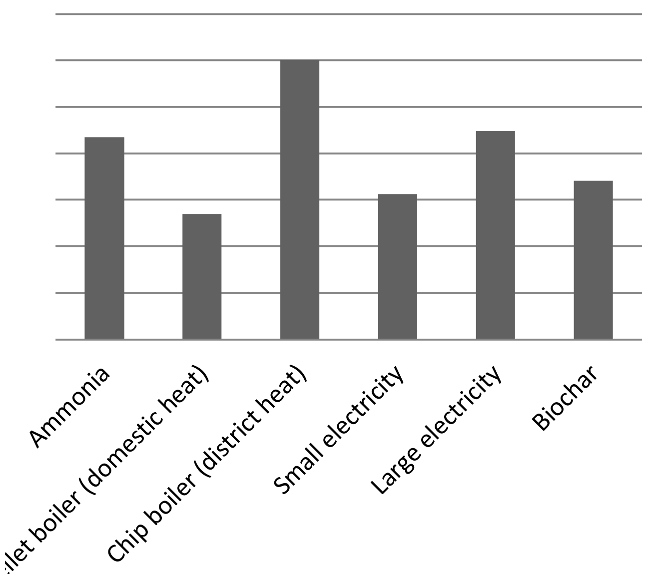
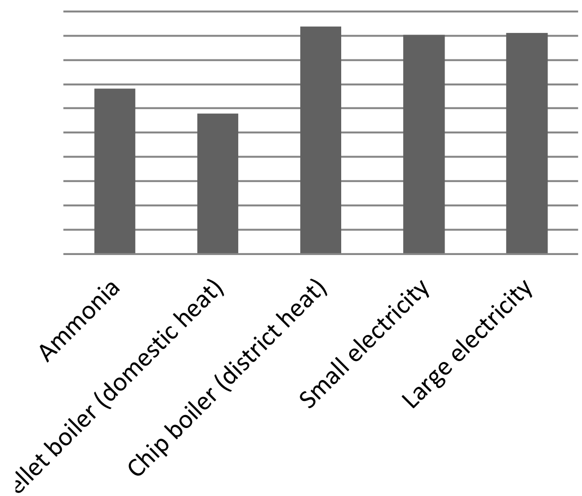
Different bioenergy systems preferred for different policy objectives

Greenhouse gas reductions per unit of biomass



Relative greenhouse gas reductions (%)



Thornley et al, Maximizing the greenhouse gas reductions from biomass: the role of life cycle assessment, October 2015

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3. Land interfaces

- A significant source of supply chain GHG emissions
- Not relevant for other energy systems
- Uncertainty, multifunctionality, food-fuel interfaces

Thornley et al., “Maximizing the greenhouse gas reductions from biomass: the role of life cycle assessment”: Biomass and Bioenergy

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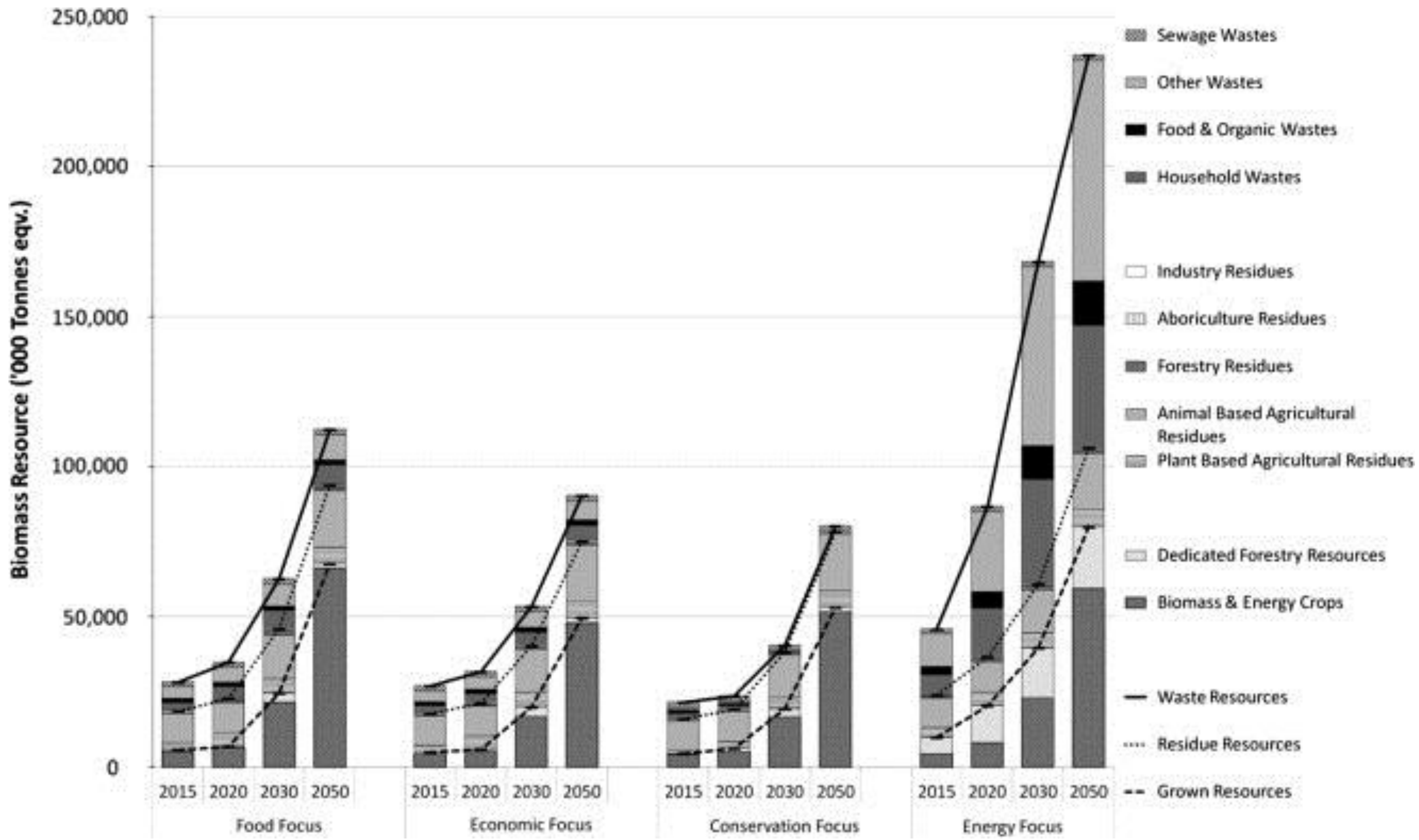
4. Interfaces with other systems



Welfle A., Gilbert P., Thornley P., Securing a bioenergy future without imports, Energy Policy, vol 68, 2014

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Scope of policy instruments

- Policy instruments that “reach” the key variables/drivers
- The importance of counterfactuals and avoided emissions – beyond regulation/policy?

5. Temporal aspects

- – Sequestration/release balance
- – Appropriate time period for assessment

6. Biogenic and fossil carbon

- Sequestration/release balance
- Additionality of sequestration/biomass resource

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Policy suggestions 1

1. Uncertainty
- Address gaps in scientific knowledge
- Implement hybrid instruments
- Regular review with commitment constraints

2. Boundaries
- Be clear on objectives!
- Count GHG’s & reward reductions!
- Combine high level consequential LCA with legislative standards

Policy suggestions 2

3. Land interfaces

- Target worst practices e.g. Slurry management
- Target preferred counterfactuals e.g. Off gas grid

4. Interfaces

Be aware that reductions may manifest in other systems

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Policy suggestions 3

5. Timing

We should have started sooner!?

Recognize benefit of bioenergy – sequestration now; release later

6. Biogenic-fossil distinction

Spurious?

Importance of additionality

Low carbon energy good, but not the same as reducing GHG's

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www.supergen-bioenergy.net

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