

Goal 3: To understand the cumulative and indirect effects of energy technologies/ infrastructure over time on the full range of ecosystems services – underpinning, regulating, cultural and provisioning, addressing both economic and non-economic values.

2050 scenario – 80% emissions target

Energy missing from National Ecosystem Assessment (NEA) and its follow on phase¹; import linking of energy and ecosystem services communities.

Ideal 2050 – less about set of technologies more about:

- Scientifically led, evidence based, policies
- Attitude and cultural change. Wider community engagement and ownership.
- How and who and where
- Thinking needs to change – systems change

General Goal 3 discussion day 1

A lot of discussion just getting a handle on proposal, UK Energy Research Centre, Valuing Nature Network and understanding the Science and Implementations Plan and wider issues. Capacity building and agreement on terminology was considered a key first step to aid interdisciplinary working and derivation of a common language.

Generalised discussion on terminology and approaches. Goal 3 sits within Goal 1 and 2. It was raised that cumulative approaches should be up to global scale.

Suggested Approach:

It was raised that ecologists tend to use source and sink models, and that ecological models tend to be holistic and circular.

It was raised that energy models tend to be linear, for example the Sankey diagram which goes from resources to demand (benefits from energy - heating, transport).

It was agreed that a new conceptual framework would be necessary to fulfil the needs of the proposal. This would need to take the energy models and approaches and place them in a wider circular framework, including economic, ecological and social feedback loops. The NEA conceptual framework could be used as a basis for this. This framework should be set within a wider context of evidence and community acceptance.

Holistic planning / whole systems approaches needed - including wider infrastructure including roads. Shale gas is a key example for the need for this change in thinking.

Methods of achieving this:

Synergies and trade offs between energy and ecosystem services will become clearer through the use of the above framework.

Ecosystem service accounting: if done for every energy mix can enable trade-offs.

Foot prints: Centralised vs. de-centralised systems – how to measure?

¹ <http://uknea.unep-wcmc.org/Resources/tabid/82/Default.aspx>

Case studies – too big to deal with- focus on one ecosystem service. But then lose systems thinking, so care must be taken.

Use available research – build on this, rather than new research. Link in with previous – linking communities.

Overarching issues:

Thresholds / Tipping points: Economic, environmental and social. Particularly relevant to Goal 3. wind – birds and fish. Modelling needed to address this. Lots of uncertainty. e.g. PVA and collapse of bird species by multiple onshore wind.

Scenarios: Confusion over terms. Each community should use the others scenarios to ensure we learn more about each other's scenarios.

Scale: particularly important in this – requirement to do this on a global scale.

Uncertainty: Step change in uncertainty for goal 3. Environmental, economic and social. What can we do? Cumulative uncertainty renders. No money for primary research so can we do this at all? Do we have enough robust evidence to do this?

Demand: need for focus on this also, including building, access, heating, IT services.

Who should be involved in this process and who are the results aimed at.

How? Define role for modelling – clearly important aspect.

How to include climate change impacts and air pollution? Inclusion of atmosphere as an ecosystem is very important.

Interdisciplinary working – general issues and semantics:

Co-dependency of communities and need for common language agreed on by all.

Need to be realistic about what each community can achieve: particularly notable with tipping points.

Scenario vs. Pathways?

- 2 meanings of scenario: scenarios are model based, quantitative; others use scenario as narrative, qualitative.
- But pathway equally unclear, for example ecologists use this term in the sense of: Source-pathway-impact.

Indirect effects?

- Economic, social and environmental in nature.
- Are indirect effects price mediated? Inclusion of externalities?
- Unintended consequence? Or leakage, or unknown unknowns?

General Goal 3 discussion day 2

This session was aimed at discussing how the different goals would be linked and to begin to think how the proposal could be addressed.

Boundaries to research:

£1.9 million and 5 years; Plausible and useful; Students start Oct 2015.

Key points:

- Not reinvent the wheel– use new UK Energy Research Centre (UKERC) scenarios and existing methodologies and metrics. Use available skills sets and research base. Use of UKERC synthesis reports. Modelling approaches – secondary data and analysis.
- The first step of any proposal should be the development of the conceptual framework. How scenarios used in energy communities, and how in other communities, discuss and compare. Workshop may be a useful exercise to agree conceptual framework / model – to bring communities together.
- Bulge framework proposed – year 1 prep, year 2-4 PhD and post-doc, year 5, write up and policy influence
- A variety of options was proposed for the layout of the goals. Initially 1 and 2 were considered to run in parallel with 3 and 4 overlying these. However, it was also suggested that 1 should sit inside 2, with links to 3 with 4 providing an overarching role.
- Outcome “will” – establish energy services as key provisioning services? This should be a question to be explored, not an objective.

Skill sets to include:

System mapping: energy modelling; ES modelling, policy decision making; critical review / gap analysis; spatial thinking – flows and boundaries; trans disciplinary experience , learning and translation and communication; deliberative methods/ processes; perception; specialists also very important; need to ensure right mix of skills; systems thinking

PhD positions:

What would science / technical pathways PhD students be? The students could provide case study examples: Selected to cross cut all areas. Flexible – so as thinking evolved could alter. Align to institute. Links into NERC Doctoral Training Programme.

e.g. goal 2 integrating with Multi Regional Input-Output to look at international impact of supply chain

e.g. 2 River catchment – cumulative impacts of renewable energy and changes in energy demand

e.g. 3 valuation of natural capital