A truly large pile of drivel

From: "Mike Hulme" <m.hulme@uea.ac.uk>
To: <t.d.davies@uea.ac.uk>, <c.bentham@uea.ac.uk>, <p.jones@uea.ac.uk>, <j.palutikof@uea.ac.uk>, <p.liss@uea.ac.uk>, <r.k.turner@uea.ac.uk>, <j.darch@uea.ac.uk>, <a.watkinson@uea.ac.uk>, <k.brown@uea.ac.uk>, <parryml@aol.com>
Subject: national climate change centre meeting - documents
Date: Sun, 3 Oct 1999 22:19:48 +0100
Cc: <m.hulme@uea.ac.uk>

Dear All,

Here are some notes and suggestions for our national climate centre meeting
on Monday morning (1000hrs). A suggested agenda of the main points we need
to cover is in this email. The attached document has three components (also appended as text to the email):

A suggested Outline Bid structure with some comments/questions
A draft of a possible 600-word opening statement
A draft of the six (from original four) research challenges (ca. 2,400 words)

We really need to aim to get a first full draft of the bid out to our Partners by late Wednesday this week, thus allowing 7 days for iterations.

Mike

NCCC: UEA Working Group Meeting, 4 October

Suggested Agenda

1. The research challenges (draft attached)

2. RD and Schneider (?)

3. The Assessment Panel; key issues for Schellnhuber

4. The structure of the outline proposal (see attached suggestion)

5. The name of the Centre

6. Timetable for submission (8 working days left)

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Outline Proposal
Suggested Contents – cf. invitation to bid

Opening Statement (500 words)

Who are the co-applicants?
Hulme, Davies, Jones, Liss, Palutikof, Parry, Turner, Watkinson, Brown? Allen, Arnell, Berkhout, Bristow, Cannell, Choularton, Halliday, Jenkins, Kohler, Launder, Markvard, Reynard, Shepherd, Shackley? – is this too many?

The strengths of the UEA-led Team (1000 words)
- being drafted by UMIST

Research Director 100 words

Management team, structure, strategy (500 words)
Advisory Board - Hasselmann, Rotmans, McQuaid, Mary Archer (Chair of National Energy Foundation), Basil Butler (RAE), Wigley, and named others?
Management Team, Programme Leaders,
What building do we use? – and a suggested physical presence at Southampton
and UMIST

Initial research plan/agenda - the Challenges (2000 words)
0-order draft (attached)

How will we achieve - integration, collaboration, exploit results, attract funding? (500 words) (this might be folded into the discussion of the strengths of the UEA Team)

integrated research
formal or informal integration; IAMs are one way, but I'm not so keen on them. Some research themes may develop their own limited IAMs, e.g. optimal policy. Overall informal integration may be achieved through a common scenario approach/framework
collaboration in UK and abroad
establish MoUs with parallel centres abroad – RIVM (Neth.), PIK (Germany), ICIS (Neth.), MIT (US), Batelle (US), TERI (India), CICERO (Norway), etc. …….. Host an international conference early on to 'position' the UK NCCC in the wider field.
relevant and strategic research results and knowledge-transfer
establish regular policy briefings, both written and verbal, targeted at the business community; CBI link; UKCIP. Have a strong media presence, with a p-t communications person.
attract additional funding
may be not so easy, cf. UKCIP on impacts research have only been able to mobilise small amounts of money. Need some big corporate sponsors – what
do we say about this in the outline bid?. Appoint a p-t 'marketing' person (maybe the other half of communications).

Training strategy (250 words)
Ring-fence money for training/workshops/fellowships - how much?

Training not just for researchers, but also for managers in public/private sectors. These could be 1-day sessions, as well as longer 1-week courses (cf. the Harvard course), and also longer-term secondments.

Should also maximise our links with the B.Council and DfID to bring international scientists and policy-advisors into the loop. These people can act to facilitate the two-way flow and testing of ideas between UK and developing countries. Some of our research themes would have global dimensions – optimal policy, C sequestration, ……

UNESCO Southampton

Financial plan - salaries, equipment, sub-contracted research, collaboration expenses
- estimates from Trevor

Operations timetable - phases, etc.
- what ideas do we have for this?

Other contacts
institutions involved, but outside the bid
BRE, BAS, NRI, POL, LSHTM, AEA, Hadley Centre, UKCIP, etc.

other academic/user bodies who are relevant
RIVM, ICIS, TERI, RDBs, BP, Fuji, PowerGen, BP Solarex, ETSU/DTI photovoltaic test facility, Severn-Trent,

Appendix

1 page CVs for co-applicants
signed statement from institution(s)

[extraction of purpose from the RC's document …….. the integration of scientific research that will shape and underpin sustainable solutions to the climate change challenge].

Possible Opening Statement

The prospect of human-induced global climate change initially emerged as a
research challenge for the natural sciences. Since the causes of climate change are profoundly rooted in society and the consequences of climate change for society can only be understood through social and cultural insight, the social sciences have become increasingly engaged in the research effort. With attention now turning to 'solutions' to climate change, new climate change management strategies need identifying and promoting, need to be targeted at both mitigation and adaptation objectives, and need to embrace a full array of emerging policy instruments and engineering technologies. The participation of the engineering and technological sciences, alongside the environmental and social sciences, has therefore become critical to meet this rapidly evolving research agenda.

But climate change is not just intellectually embracing challenge. It is also an experiential one. Climate change is unique in that it poses questions on space and time scales over which individual humans

(especially space) and governments (especially time) are not used to thinking or do not find it easy to think. In this sense climate change is a problem of ultimate penetration and of ultimate connectivity; penetration, because we will all experience and react to climate change in some way, and connectivity, because emissions are driven by a global economy, because the response of the physical system is planetary, and because these social and natural systems are intimately co-evolving.

The intellectual and experiential challenges of climate change create a new and distinctive lens through which we can envision the future. These insights into the future - often termed scenarios - suggest to us various tools and instruments that may allow us to fashion and shape the future. This sets us out on a course of climate change management, an active and considered pursual of desirable long-term objectives. Establishing such objectives is essential in order to adequately define the 'problem' of climate change, and even more essential if 'solutions' to this problem are going to be designed. The prospect of climate change, at the very least therefore, forces us to think about what sort of future we regard as desirable.

The UEA-led Consortium sees the new national climate change centre as an exciting opportunity to build connected research structures and outputs that exploit partnerships between science and business, between the household and government, and between the UK and emerging parallel initiatives around the world. With a strong foundation of inter-disciplinary research, and through the engaging of both public and private organisations and of both governments and individuals, there is a real prospect that we can implement emerging 'solutions' to climate change and create new ones. These 'solutions' need to engage with both mitigation and adaptation objectives and, most importantly, need to recognise and function on a hierarchy of scales ranging from the household to the global. The UK climate change centre will be built around three key principles:

The deployment of practised, inter-disciplinary research teams, who have already pioneered new insights and approaches into the questions raised by climate change, but releasing them to explore novel approaches for thinking laterally across natural, social and engineering sciences.

The practising of an inclusionary process of research in which we explore - with their developers - ways of mobilising many of the new technologies, lifestyles, regulatory mechanisms that are emerging from our technological,
social and political cultures to allow us to manage climate change in the twenty-first century.

The establishment of a focal point in the UK and abroad for the open and constructive exchange of insights concerning climate change solutions across cultural divides - public-private, households-corporations, North-South.

These three key characteristics - a research programme, an engagement with
stakeholders, and an educational/opinion-shaping role - are the three central elements of the new centre as proposed by the UEA-led Consortium.
[Given the essential need for integration in all three of these elements, we propose the centre by called the "UK Centre for Integrated Climate Change Studies" (UK CICCS)]. The rest of this outline proposal will demonstrate, in an indicative rather than an exhaustive way, how we would operationalise these principles in terms of both management and research ideas. [refer to our conceptual schematic here or later?]

Proposed Challenges to be included in the Outline Bid

Draft, Mike Hulme, 2 October

[It may be worth including some examples of key stakeholder/client interests under each of these. These six research challenges are exemplars, for the outline proposal, of the thinking behind our bid. Each of them may potentially involve all of the Centre's Partners - and numerous organisations beyond - and each of them are therefore integrating activities. Each of these Challenges, if developed into Research Programmes, would have a Programme Leader, appointed from within the Consortium, and accountable to the Centre's Management Team. Each of the

Challenges should be able to be contextualised by our (revised) conceptual schematic of the process of integration - if we are still going to show this.]

Challenge 1: Carbon Management

Carbon management poses two fundamental questions. Given a continuing pre-dominance of fossil carbon fuels how can we combust less (the energy efficiency question) and given that a proportion of this combusted carbon will enter the atmosphere how can we sequester larger volumes within the biosphere and oceans (the carbon sequestration question)? In thinking about improving our management of carbon, the Centre will address both these questions.

Combined heat and power plants and decentralised energy generation for energy intensive industries are areas where technology can make a considerable contribution to emissions reduction. Locations and markets where investment in these technologies is both politically and economically feasible need to be identified. For LDCs, the provisions of the Kyoto Protocol for Joint Implementation are relevant here. Supplementary engineering challenges in this area include energy storage systems, fuel cell and novel transportation technologies.

Research should also be directed to the identification of business opportunities in the mitigation of climate change. This would involve a process of identifying 'climate change markets' where UK products and technologies could be supplied. One potential growth area is that of the use of modern, cheap control technology to optimise the performance of household energy management systems. Where growth markets are identified, suitable technology and service products can be developed. Business could be approached for ideas through the DTI-funded liaison officer. This work would also inform development and aid policy within the UK government. We would also draw upon the extensive experiences of UK agencies involved in delivering 'win-win' energy and waste minimisation programmes (such as Energy Efficiency and Environmental Technology Best Practice Programmes, Ground Work Trust, Business Links, and so on). Other country

experiences
would also be useful input, for example the highly effective programmes of boosting company productivity by reducing greenhouse gas emissions developed in the USA.

The introduction of the climate change levy in March 2001 will be analysed by the Centre in terms of its effectiveness at delivering emission reductions and its costs/benefits to a range of units (firms, sectors, regions, nationally). In addition, the introduction of voluntary agreements for some companies in return for a reduction in the levy charged
will be analysed along similar lines. The DTI-ACBE led initiative on voluntary use of tradeable emission schemes will provide important empirical evidence on the relative costs of achieving given emission reductions by a taxation scheme compared to emissions trading.

While conventional carbon sequestration technologies are not considered a
long-term solution to climate change, there is nevertheless a need to research the most efficient ways of implementing such technologies and also
a need to research new, longer-term sequestration technologies through bio-engineering and deep ocean sinks. The Centre will explore the feasibility of both these latter two technologies, in collaboration with the John Innes Centre for the bio-engineering. [We may only have 30 years to get some 'emergency' carbon sequestration techniques sorted out under the scenario that we don't manage to get enough CO2 emissions reduction.]
A mixture of methods and tools will be required to evaluate sequestration options - life-cycle costing and LCA, environmental impact analysis, technological assessment, public acceptance, etc. Some work on biomass sequestration may also be needed to feed into the global assessments/evaluation of this option. Given the sensitivity of this issue under the terms of the Kyoto Protocol, the UK government needs excellent advice on methods, assumptions, pitfalls, etc.

[Links outside the Centre to: JIC, many others …….

Challenge 2: The Renewables Challenge

A parallel challenge to that of carbon management is how to stimulate and release the full potential for zero- or low-carbon renewable energies?

This therefore is the third strand of the strategy to meet and surpass the carbon emissions reduction obligations placed on developed nations by Kyoto. There are a number of research questions related to this Challenge that again require engagement by the engineering, environmental and social science communities within an integrated framework. Too much work to date has compartmentalised the three perspectives.

The EU has a target of 12 per cent of primary energy to be met from renewable energy by the year 2010. Meeting such a target, let alone moving beyond it, has major implications for the electricity delivery systems in the UK. How to get this much renewable energy - from intermittent sources – linked, delivered and purchased by customers? Engineers and economists need an opportunity to explore the long-term implications of such policy objectives. Related questions concern the landscape and infrastructural implications of an expanded uptake of biofuels in the UK.

Many renewable technologies appear in various EPSRC research programmes, but they need to be brought together to produce scenarios whose emissions and life-cycle costs can be assessed in a common framework, thus enabling more practical advice and comment on energy policy debates. Some of these scenarios could be taken further in the form of pilot-demonstration projects.

There needs to be mechanisms established for the better integration of architectural design with renewable energies, e.g. solar and wind. The design of these new technologies needs explicitly to consider the architectural consequences for domestic, commercial and industrial structures. Partners who are directly involved in delivering design solutions in this area will be invited by the Centre to establish 'demonstration' projects to explore how successful such solutions are in practice. [can we give some specific examples of Partners and projects here?]

One of the obstacles to the more rapid exploitation of wind energy in the UK relates to landscape value and aesthetics. This is an issue that needs the interaction of design technologists and social scientists - including psychologists - to explore cultural and behavioural limits to new renewable

technology uptake. We propose that the visualisation facility of the Centre be exploited to research these issues through involving the wider community.

[Links outside the Centre to: ……

Challenge 3: Singularities, Non-Linear Changes and Extreme Events

The climate system is generally assumed to be 'well-behaved'. Certainly, much of the scenario and impacts work assessed by the IPCC (and that has therefore fed through into climate policy) has assumed conditions of relative regularity in future climate. However, not only does the climate system possess the potential for rapid, singular changes (i.e., a complex, non-linear system being rapidly forced), but recent research has shown using theoretical models and palaeo-evidence that such potential changes can be and have been realised. Elsewhere, thresholds and sensitivities of natural/social systems to changing frequencies of extreme weather events induce additional non-linearities in the environmental responses to climate change. There are also singularities and non-linear processes operating in the social/political drivers of climate change - for example, political or economic 'shocks' that may fundamentally and rapidly re-direct our technological/economic futures away from 'conventional' pathways.

A particular Challenge to be addressed by the Centre will therefore be how such potential for non-linear behaviour - in both climate and non-climate systems - can be both modelled and introduced into scenario exercises. Recent work with reduced-complexity models has shown the potential to model such non-linear behaviour in a quasi-stochastic manner and such modelling work will be developed by the Centre. A corollary of this is to better understand how such abrupt changes should be assimilated into decision-making frameworks and policy analysis. This requires the involvement of risk theoreticians and risk analytic tools. The possible interactions between these two complex non-linear systems - the climate and the social - is of particular importance. For example, an abrupt climate change or a string of short-term weather extremes can radically influence perceptions amongst the business community and politicians and lead to sudden shifts in policy, investment flows, etc. The implications of such singular behaviour for vulnerability and adaptation strategies have not been well explored. This kind of analysis would be important to many

commercial sectors, which are highly concerned about the unexpected and about extremes. This is an inter-disciplinary Challenge the Centre will be uniquely well-placed to address.

[Links outside the Centre to: POL, Hadley Centre, PIK, ……..

Challenge 4: Managing the Coastal Zone

There are many geographic domains where climate change poses particular problems for the management of natural and social assets - coasts, uplands, cities, river basins, etc. We propose that the Centre should pay particular attention to one such domain, since these provide physical entities within which many of the issues of climate change vulnerability and adaptation play out in a given context of local/regional governance. We suggest that the coastal zone best epitomises this challenge of integrating our social, environmental and engineering knowledge. A unique feature of the interaction between climate change and the coastal zone is the very long time-scales over which sea-level rise impacts will materialise - of all the impacts of climate change these are least amenable to mitigation and therefore where appropriately designed adaptation strategies are most needed.

Research is first needed to improve our understanding of the threats posed by climate change, most notably changing storm-surge frequencies along the UK coast and changes in estuarine hydrology and ecology. This will involve coupled high resolution ocean-atmosphere modelling, estuarine economic/ecological modelling, and the assimilation of such modelling results into a risk analysis framework.

Designing an array of possible management options for the coastal zone needs to involve economists, ecologists, marine scientists, and coastal engineers. A range of options from 'hard' engineering solutions to managed retreat need identifying. The desirability of any one or combination of these management options for the coastal zone can then only be evaluated following an understanding of the value of the coastal environment and the

services it delivers. Such valuation needs to be a fully participatory process involving local communities, local government, landowners, NGOs,
and national regulatory bodies. We propose the Centre plays an active role in bringing together insights from integrated modelling exercises and from stakeholder participatory exercises, thus enabling better public participation in the policy-forming process (see integration methodologies - Challenge 6). This role would involve novel visualisation techniques of coastal environments to exploit both modelling results and individual perceptions of coastal landscape value.

[Links outside the Centre to: EA/MAFF, NGOs/Conservation, LAs, Railtrack,
construction companies, ……

Challenge 5: Beyond Factor 4

There is a growing body of opinion that in order to mitigate climate change, or even to adapt to it, significant changes in current patterns of consumption, and therefore lifestyle, are necessary. This raises the question of how to direct consumption of goods and services towards more
sustainable paths. The scale of the Challenge here suggests that we need to go well beyond Factor 4 - doubling wealth, halving resource use.

One unsolved dilemma is that of expanding car use for personal transportation. The psychology, behavioural sociology and economics of people's use of cars is reasonably well understood. What needs to be researched are methods to manage the ever-increasing demand for travel, especially car and air travel, that ranges from taking the children to school, to car-based salespeople, to international business and holiday travel. Research will also be needed into managing the overturning of the vehicle stock and transport infrastructure under conditions of novel transportation technologies - infrastructural inertia is an obstacle to new technology uptake.

The concept of a low consumption household is a further desirable objective
which is easy to state and not straightfoward to achieve. This way of analysing human activity is inherently interdisciplinary and looks at the activities of a household - housing, domestic appliances and services, transport needs, consumption, work and leisure time use, waste

generation and recycling - in terms of the interactions between them. For example, housing choice is partly determined by the work/leisure split, which then determines the demand for transport; consumption generates waste and also contributes to energy demand. Another important example is that of home insulation. The UK has a poorly insulated housing stock and even new housing could be built to much higher standards of energy efficiency. Research, in conjunction with the construction industry, is needed into the adoption of new building standards and (politically acceptable) economic incentives for low-energy housing is needed. This is especially relevant given the current debate about the millions of new households predicted for the UK in the next 20-30 years and the greenfield/brownfield land use argument.

Partners who are directly involved in delivering sustainable solutions will be involved in setting up 'demonstration' projects to explore how successful such methodologies are in practice. For example, the Centre will explore whether 'climate-friendly' households can be demonstrated in practice. Partners could include Going for Green, National Centre for Business and Ecology, Forum for the Future, Sustainability Northwest, United Utilities, Eastern Group, Anglian Water and other water companies, etc.

[Links outside the Centre to: …….

Challenge 6: Integration Methodologies

An important methodology which provides insights into the dynamics of climate and social change, but which has not yet been fully developed for the UK is that of integrated assessment. Integrated assessment encompasses formal modelling approaches and more participatory and qualitative explorations of the future. Integrated modelling includes both reduced-form models and complex systems models. All integrated assessment is built around the concept of scenarios, used either in the more traditional role of 'what-if' or in a 'back-casting' role. While integrated assessments of climate change have developed substantially over the last decade, few have embraced the engineering community to explore

the feasibility of pathways with rapid uptake of new technologies. The Challenge for the Centre will be to develop further existing modelling and participatory approaches for integrated assessment and apply them to the five research Challenges identified above.

The integrated modelling framework that is required to address these concerns is obviously extremely difficult to imagine. Recent advances based on complex systems modelling do, however, suggest how such frameworks may be achieved (e.g. NEXSUS, ESRC Priority Network). These are constituted of a spatial hierarchy of nested models representing the possible behaviours of complex social, economic, ecological, and technological systems at different spatial and temporal scales of resolution. They can explore the possibility of emergent behaviour at larger scales, as well as the effects of micro-responses and adaptations at smaller ones. In order to address the issues raised by climate change and its associated impacts and responses, considerable development of this framework would be necessary.
However, without it, there seems little prospect of providing a rational basis for the assessment of possible climate policies or actions.

The Centre will also develop parallel research into participatory approaches for the development of integrated scenarios of the future. This will include the public perception of environmental risks caused by climate change; peoples actions in response to these perceptions is also important.
Identification of suitable scenarios for presentation in participative experiments on public/corporate response would involve the physical sciences in co-operation with engineers, political scientists, psychologists and economists. Methods include surveys, focus groups, citizens juries and stakeholder workshops. [CSERGE/UMIST developing these ideas; use the ICER Visualisation Laboratory]. More in-depth empirical research could be undertaken to understand better individual and organisational decision-making on climate change related issues, such as energy consumption, transport choices, and so on. This activity would have the objective of developing methodologies for assessing the public response to the particular problems identified in the Carbon Management, Renewables and Factor 4+ Challenges above. Through interactions with business it

may
also open up the possibility of 'design-oriented scenarios', i.e., in which the scenario identifies a need for a new kind of product/process design in response to a prospective future socio-political change.

[Links outside the Centre to: other process modelling centres, ULYSSES, ……..

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