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a challenge for European research

# Winning papers

26 - 28 May 2009  
Charlemagne, Brussels



The Scientific Committee is pleased to present the six winning papers of the competition that was launched in view of the conference "Sustainable development: a challenge for European research".

Papers were judged on novelty, relevance, technical and scientific quality, potential impact on research strategy, identification of R&D needs and clarity of presentation.

The authors of these papers have each been awarded a prize of EUR 1 000, by the European Climate Forum ([www.european-climate-forum.net](http://www.european-climate-forum.net)), an association of leading research institutes, businesses and NGOs.

In this brochure, you will find, for each paper, the photo and biography of each author, and the praise of the paper by a member of the Scientific Committee. The order of presentation should not be interpreted in terms of ranking: all the papers are equally excellent.

The papers are available on the conference website (<http://ec.europa.eu/research/sd/conference/>), and they will be published in the book produced out of the conference.

***Dealing with doom – tackling the triple challenge of energy scarcity, climate change and global inequity***



**Jos Bruggink** (1946) obtained his masters degree in econometrics at the Erasmus University Rotterdam and his Ph.D.

Degree in development economics at the University of Oregon (USA). He started his professional career in energy at Resources For the Future in Washington DC. In the late 1970's he returned to the Netherlands as energy policy analyst for the Energy research Centre of the Netherlands (ECN), where he became unit manager of ECN Policy Studies in 1989.

In 2004 he shifted back from management to research with a focus on long-term energy transitions, climate change policies and world energy markets and was appointed as a named professor at the Faculty of Earth and Life Sciences (Institute for Environmental Studies) of the Vrije Universiteit Amsterdam.

## PRAISE

In front of the challenges ahead of us, exhaustion of resources, pollution, climate change, war and violence, which are the inevitable consequences of ever increasing social inequalities, we are all – I dare to say- somewhat overwhelmed, including public authorities. Some –and I am one of them- are deeply skeptical regarding the ability of the market economy, to help us face these challenges, let alone not aggravating them. Others, be it by realism or by conviction, propose a future taking the market economy for granted, or at least unavoidable. Jos Bruggink, the author of the praised paper, is one of them. Although we may not have the same convictions, my praise, is deeply sincere, because his paper has very rare qualities.

Firstly, it distinguishes clearly the addressee of his message, public authorities, , instead of addressing an undetermined « we », mixing the minister and the unemployed, the owner and the one who cannot afford his/her rent anymore. Then, it does not consider public authorities as almighty. It is precisely because the market exists that goodwill will not make it, and that measures serving the common interest will most of the time have disappointing outcomes. If we have to live with the market, then let's take it seriously. Public authorities have to think strategically, and measure accurately the scope of their power. Consequently, Jos Bruggink is asking to the public authorities to be pragmatic and demonstrate self-control, i.e. not running all over the place, trying to solve all problems, or pretending to do so. This does not mean being powerless, but instead resisting to the illusory temptation of salvation, which is naturally growing from the feeling that we are doomed. Bruggink is asking to those governing us to resist presenting themselves as rescuers. He shows that sustainability “may have more to do with surviving doom smartly than with attaining salvation purposefully”. The world is not manageable, if that means that public authorities would be able – with global policies- to shape a sustainable future. . Globally, because our world is dangerous and uncertain, most well-meaning policies will be inefficient. It is up to the public authorities to determine which *aspects* of this world are accessible to shaping strategies.

This requires self-control. For instance, goes Bruggink, we know that climate change will lead to environmental disasters, but it does not yet have global economic consequences, and as long as this is the case, shaping strategies will not have lasting impacts. This means that –instead of going for direct, purposeful salvation- public authorities should aim at avoiding doom, that is adopt not shaping but hedging strategies. They should sequentially prepare for the time when, inexorably, some aspects of the situation will get bad enough for corresponding shaping strategies to become relevant. Take the common sense idea that the use of renewable and environmentally-friendly energy is urgent right now. It may well be. But, as long as their price is higher than the current dominant sources of energy, shaping measures aiming at their development and at stimulating their use will only have a reassuring, conscience-easing effect. However, we know that the time of shortage will come for fossil fuels, and that their price will inevitably go up. Therefore, what is required now is to get prepared, that is devote a massive research effort to be able –when the time has come- to switch to these alternative sources of energy.

The paper of Jos Bruggink well deserves the award it receives today because it clarifies what is demanded of those claiming that our world, dominated by the market economy, will survive disaster. Public authorities are forbidden to dream, or cling to the fiction that economic protagonists will serve the public interest. Instead they must demonstrate pragmatism, self-control, lucidity, strategic intelligence and courage.

**Isabelle Stengers**  
*Professor*  
*Université Libre de Bruxelles*

## ***The Value of Science and Technology studies (STS) to sustainability research in Europe – a critical approach toward synthetic biology promises***



**Eleonore Pauwels** is a doctoral student in the department of philosophy of science at the Université Libre de Bruxelles (ULB) and she benefits from the support of the Fonds National de la Recherche Scientifique (FNRS).

Since May 2008, she is also a visiting scholar with the Foresight and Governance Project at the Woodrow Wilson International Center for Scholars in Washington DC.

Her primary focus is a comparative and critical analysis of the EU and US approaches towards the societal governance of synthetic biology. She is also examining the challenges that new forms of biotechnology pose for political and public policy organizations, and the regulatory innovations that emerge alongside developments in cutting edge technologies. Her past research has included risk communication, citizen participation in technical controversies, and the epistemology of regulatory and social scientific experiments.

Eleonore holds a M.A. in European Public Policy and Politics awarded by *L'Institut d'études politiques de Paris* (IEP) and Bath University within the European American University Consortium. She pursued postgraduate studies at the College of Europe (Academic University Institute for Postgraduate European Studies, Bruges) where she completed a cursus in European Law and Regulatory Governance related to EU Research Policy. In 2006-2007, she was part of the Governance & Ethics Unit of the Directorate-General for Research at the European Commission.

## PRAISE

In this paper, Elonore Pauwels explores mutual interdependencies and potential synergies between theoretical insights and frameworks arising in the field of '*science and technology studies*' (STS) and research and policy making concerning the broad and pressing challenges of Sustainability. Looking at a particular case of an aspiring 'sustainable technology', *synthetic biology*, she successfully identifies and explores a number of highly relevant lessons for collaborative academic investigation and enlightened decision making alike.

Although vital in the face of challenging imperatives like global poverty reduction and climate change, Pauwels argues that notions of sustainability in areas like synthetic biology can sometimes be quite '*unreflexive*'. In other words, they may neglect the ways in which science (like other forms of knowledge) is not simply representing the natural world, but is also *shaped* by the social world. Accordingly, our knowledges are not just substantive but inherently *normative* – revealing as much about how we think the world ought to be as how it is. In short, Pauwels shows us how decades of empirically-grounded STS scholarship reveals our understandings of sustainability to be *co-produced* by both natural and social processes.

In a field like synthetic biology, the implications of this message are profound. Pauwels offers a sophisticated critical account of how the presumed 'sustainability' of specific applications or trajectories typically embody particular *values* and *assumptions* and obscure *uncertainties* and *ambiguities*. In this area – like others – she shows 'sustainability' is not simply 'out there', awaiting *hubristic* forms of *technological fix*. Instead, she explains how social processes of knowledge production yield notions of sustainability that favour particular imaginations and interests. It is not that these are necessarily 'wrong'. Rather, Pauwels demonstrates how STS analysis can add an essential *critical* dimension to conventional policy-oriented sustainability research. By focusing explicitly on conditions of *knowledge production*, we can hope to be more systematic about the *confidence* and commitment that we invest in such knowledge – and more rigorous in our attention to the policy implications.

A further strength of Pauwels paper, is that she focuses on practical *policy recommendations*. This is a discipline in which sustainability research is already often quite strong – and may indeed offer countervailing lessons for STS. Pauwels addresses the complex challenges with positive relish and enthusiasm. Using existing pioneering examples drawn from various fields, she shows how sustainability research might move from segmented multidisciplinary, through integrated interdisciplinary projects to truly '*transdisciplinary*' modes of *cooperative research* – involving alongside scientists not just STS scholars, but also wider stakeholders and social communities whose diverse understandings might help catalyse and inform more robust policy. There exist many frameworks for specialist reflection, public deliberation and citizen participation which may contribute to these aims. In the end, Pauwels makes the crucial observation that sustainability research is inherently *political* in nature. It is only by recognising – and even celebrating – this essential reality that we may do justice to the challenges. Pauwels is to be congratulated on helping to illuminate some ways to do this.

**Andrew Stirling**  
*Science Director*  
*SPRU – Science & Technology*  
*Policy Research*  
*University of Sussex*

## ***Integrated Climate Governance (ICG) and sustainable development***



**J. David Tàbara** is a senior researcher, professor qualified, at the Institute of Environmental Sciences and Technology of the Autonomous University of Barcelona.

Among some recent EU research projects he has been involved in: HARMONICOP ([www.harmonicop.uos.de](http://www.harmonicop.uos.de)), on social learning in river basin management in Europe, PEG (*Precautionary Expertise on GM crops, 2001-2004*; <http://technology.open.ac.uk/cts/peg>) on Precaution of agricultural GM crops risk assesment in Europe, SUSTAINABILITY A-TEST (*Sustainability Advanced Test; 2004-2006*; <http://ivm5.ivm.vu.nl/sat/>), on inventorying sustainability assessment tools, and MATISSE (*Methods and tools for Integrated Sustainability Assessment; 2005-2008*; [www.matisse-project.net](http://www.matisse-project.net)) which developed the approach for Integrated Sustainability Assessment (ISA). He has carried out research and published extensively on socioenvironmental theory and integrative environmental methods, with particular attention to questions of public perception, social learning, communication and public participation for sustainability.

At present, he works in the EU project ADAM (*Adaptation and Mitigation Strategies. Supporting European Climate Policy ADAM project*, [www.adamproject.eu](http://www.adamproject.eu)) and contributes to the Integrated Risk Governance Project ([www.irg-project.org](http://www.irg-project.org)) of the International Human Dimensions Programme on Global Environmental Change.

## **PRAISE**

Empirical evidence and scientific debate on climate change in these years have made more and more clear that adaptation and mitigation strategies cannot be based only on technological solutions provided by experts and expert systems. To be effective, these strategies need social and institutional innovation based on coordination and cooperation among individuals, communities and institutions, and integration of different forms of knowledge.

In order to obtain the necessary level of cooperation, a diffuse awareness of the impact of human activities on climate change needs to permeate individual and collective consciences, corporate responsibility and public bodies.

At present, this level of awareness is far from a sufficient level. Lack of communication between disciplines and administration bodies, reductionist approaches, consolidated uneven patterns of power and inadequacy of communication on these matters into the public sphere slow down the necessary change.

The paper of J. David Tabara, in the scientific committee's view, is an important contribution to a step forward in the process of creating this awareness.

The concept of Integrated Climate Governance, developed in Tabara's paper, is a valid attempt to address the problem of integration of policies dealing with climate change. The concept links together i) assessment of climate risks, ii) the design and implementation of policy instruments, and iii) the creation of communication, engagement and transformative learning capacities. Integrated Climate Governance is a normative tool that may help administrations at all level to define adequate climate strategies and may give useful inputs to research policy as well.

Among the points of interest of Tabara's paper, I would like to list:

- \* A holistic approach, looking at adaptation and mitigation of the effects of climate change mainly as a problem of transition from existing socioecological configurations to new ones;
- \* Focus on constraints and resistance to change and on processes rather than on solutions, and the thesis that solutions should emerge from bottom-up processes
- \* A key role given to knowledge in transition processes, as in the case of social and institutional learning, and the discussion on how knowledge is produced, appropriated and legitimated;
- \* The recognition of the issue of power distribution and inequality as relevant to the climate problem.

It is an honor and a privilege to convey to Mr Tabara, on behalf of the Scientific committee of the Conference, my warmest congratulations.

**Gianluca Brunori**  
*Professor*  
*University of Pisa*

## ***Sustainable development: responding to the research challenge in the Land of the long white clout, Aotearoa New Zealand***



**Richard Gordon**

Science General Manager, Environment & Society Group, Landcare Research, New Zealand

Richard leads a group of 140 scientists conducting integrative and multi-disciplinary research, science and technology focused on four outcomes of national (and global) significance:

- Sustaining land environments and their ecosystem services
- Climate change mitigation and adaptation
- Sustainability of cities, business and living
- Sustainable Maori futures

Richard trained in Natural Sciences at Cambridge University gaining a doctorate in 1981. He worked in agrochemical research and development in the UK and Japan before joining Landcare Research in New Zealand in 1995. He established the Institute's capability in Sustainable Business and Government, led the preparation of New Zealand's first corporate sustainability report (for Manaaki Whenua Landcare Research in 2000), and was a member of the first Stakeholder Council of the Global Reporting Initiative.

Richard is presenting a New Zealand perspective at the EU conference: *Sustainable Development, a challenge for European research*, in Brussels.

## PRAISE

This is a highly coherent, clearly presented arguments for a research policy. It presents an awareness of both the environmental and the economic context of the research, a clear focus on limited, high value-added, policy-relevant research, a set of well-conceived questions and an appropriate research practice that includes researchers and research users.

Every research funding agency is faced by the three questions that this paper answers, but rarely does one see such a clear, concise and coherent argument linking the answers given to them:

*1. What is the relevance of a Sustainable Development research agenda to the nation [...] in the face of a global economic crisis?*

“... Addressing the economic crisis may give us some of the tools we need to address a potentially greater environmental and social crisis looming in the next few decades as a result of climate change and the depletion of natural capital. It may help us to shift paradigms and improve governance systems for lasting benefit to society...”

*2. How may [...] investment in science and technology be guided so as to maximise the return to the nation?*

“... The public good research [...] fund[ed] must make a demonstrable contribution to outcomes of national value. Therefore it is targeted at projects that can show the pathway from research to such outcomes and a range of skills that are rarely explicitly included in project selection “*translation* [between the languages of science and users]; in *decision-making* [on research funding]; in *planning* [for the implementation of research findings and tools]; in *extension* [...] of research from case studies to the mainstream; and in *listening, evaluation* and *collaborative learning* about the impacts of the research in its social context”.

*3. What are priorities for investment in sustainable development research?*

In keeping with the fact that sustainability requires a fundamental change in culture and behavior, the focus of the funding is on *governance for sustainable development*, and in particular on the following issues:

- Futuring for [...] organisations to provide ‘agile’ responses to increasingly ‘wicked’ problems [that] are multi-dimensional, with messy solutions, in which uncertainty and risks are typically high, and often there is no “right” answer. Building multiple scenarios and assessing them against each other is one of the few ways forward in this domain.
- Resilience and adaptive capacity to withstand disruptions and/or adapt to large scale change with minimum loss of function. To build resilience and adaptive capacity, we need to understand what factors and processes make some settlements vulnerable to disruptions and rapid change while others can adapt.
- Post-regulatory governance for constrained natural resources can only be achieved through integration of social, environmental, economic and cultural dimensions, creating difficult issues around what is physically, legally, economically, and socially feasible, and then what is desirable, in the management of common resources.
- Inclusion of governance models from indigenous cultures that have a long history of co-evolution with the environment and are based on different social contracts than the ones that have generated the current, unsustainable situation.

Altogether, this research and research management agenda is in my opinion a model that other research funding agencies would do good to look at very closely.

**Sander van der Leeuw**  
*Professor*  
*Arizona State University*

## *A transition research perspective on governance for sustainability*



**Derk Loorbach** is a senior researcher and consultant at the Dutch Research Institute for Transitions (Drift) at the Erasmus University Rotterdam, where he received his PhD in June 2007.

Drift is a pioneering interdisciplinary institute that combines cutting edge research with close cooperation with policy and business to further sustainable development in practice. Central theme in Derks research is the development of the transition management approach as a new governance-model based on complex systems' thinking, governance theories and sociology.

It aims to facilitate and direct processes of societal change in the direction of sustainability through transition arenas and experiments. Derk is currently involved in various transition arenas, innovation programs and envisioning practices in areas or urban development, energy, health-care and housing. His research is seen as example of 'sustainability science', combining fundamental with action research to contribute to sustainable development in practice.



**Niki Frantzeskaki** was born in Chania, Crete-Greece in 1980 and graduated Environmental Engineering at TU Crete (Greece) in 2003.

Her master studies were realized at TU Delft (The Netherlands) where she graduated a Master of Science on Engineering and Policy Analysis. From 2006 until present, she is a PhD candidate on research of transition dynamics

## **PRAISE**

In this paper, Derk Loorbach and Niki Frantzeskaki present four main propositions for social transitions towards sustainability. They then use these propositions to define guidelines for the transition process.

The paper emphasises two key aspects of sustainability: complexity and uncertainty. In the last decade, these aspects have emerged as components of the “*resilience*” and “*transition*” approaches in policy research. The paper defines sustainability transitions as a continuous process of fundamental change that reorients and restructures a societal system towards a sustainable system.

Two branches of research on transitions may be identified: systems in transitions and transition management. Both branches apply a multi-level perspective of evolutionary theory. Transition management draws upon the multi-level perspective to develop a framework for analysis. Loorbak and Frantzeskaki's paper focuses on transition management, strongly linking the propositions that define the transition context to guidelines and then to clear research questions.

Re-thinking our conventional model of development is not easy and “*Sustainable Transitions*” research is an important approach aiming towards sustainable transformation. This transformation requires radical change in the way society takes decisions. Loorbak and Frantzeskaki's effort for presenting guidelines to react to the sustainability propositions is valuable and they should be congratulated on his effort to encourage research on sustainable transitions.

**Ana Iglesias**

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## ***Integrated water resource management: STRIVER efforts in four river basins to assess the current status and future possibilities***



**Per Stålnacke** (PhD) holds a permanent position as Senior Research Scientist at Bioforsk (Norwegian Institute for Agricultural and Environmental Research). He has an interdisciplinary Ph.D. degree in Water and Environmental Studies from Linköpings University, Sweden, in 1997; thesis title: Nutrient loads to the Baltic Sea.

Stålnacke has long-term experience in issues devoted to integrated water resources management with particular emphasis on studies of pollutant fluxes in river basins (from source to river mouth) and statistical analysis of historical environmental monitoring data. Stålnacke has developed statistical models for source apportionment of pollutants and time trend analysis. Besides in Norway, Stålnacke has considerable experience with working in the Baltic Sea Region particularly in the Baltic States, Poland and Russia, and since 2006 also in India, Vietnam and Cambodia.

Stålnacke is author or co-author of 39 publications in international periodicals (35) or other peer-reviewed publications (4). He has recently edited one internationally published book (Gooch, G.D. and Stålnacke, P (Eds.). 2006. Integrated Transboundary Water Management in Theory and Practice - Experiences from the New EU Eastern Borders. IWA Publisher). Stålnacke has a scientific interest to bridge the gaps between research and practical water management.

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## **PRAISE**

This paper, by a highly interdisciplinary, multinational team, describes and reflects upon sustainability challenges in the context of integrated water resource management (IWRM). The authors' analysis of these challenges, however, translates beyond the water context into useful insights for a much broader community of sustainability-oriented researchers.

Stålnacke and colleagues show the growing effectiveness of international knowledge exchange channelled through research collaborations between the EU and nations with rapidly growing economies (the project team is from Norway, Sweden, Italy, Spain, Scotland, Vietnam, and India). The team's diverse case studies reveal worldwide commonalities in managing the tensions between sustainability objectives, and they tell an encouraging story about mutual learning.

The project gives insights into how research can progressively evolve from concepts and ideals to effective practice. In documenting their IWRM experiences, the authors highlight the need for research to underpin the evidence base. For the focal topics of the STRIVER study (hydropower impact reduction, pollution, and the interactions of land-use change with water supply and demand), this requires fundamental process understanding, data for assessment, and conceptual tools or models to represent and project the dynamics of the river basin system. Highly technology- and data-intensive methods have become the norm for European IWRM, but they do not necessarily lead directly to more effective decision-making. This project has addressed this with a thoughtful pragmatism. In areas where these technical data needs could not realistically be met, the project investigated the extent to which river basin modelling tools developed in one area are translatable to others. Many of its key messages relate to the value – or indeed the critical importance – of stakeholder dialogues. The project evidence base includes expert judgment from local stakeholders, elicited and used in discursive and more transparent ways than in many previous impact assessment approaches. The project incorporated this knowledge resource in their development of research-informed tools and frameworks, allowing for more transparent and objective analysis. The international project also showcased and exchanged various elements of integrative good practice, hopefully encouraging better IWRM – and supporting better governance generally.

A key theme was the importance of partnerships for knowledge, both among the research team and between the researchers and the wider stakeholder communities. This project has demonstrated and documented the value of the participatory processes for sustainability. Translating what are often still notional rights of public engagement into real involvement can pay off in terms of fairness for local stakeholders as well as in efficiencies in multi-agency coordination and interaction, especially in trans-boundary water management settings.

The authors comment that the academic workshops provide territory for dialogues that is seen as politically neutral yet with a high degree of legitimacy and credibility. The role of research is seen here as much more than just about knowledge acquisition: there is a strong focus on integration and social learning in the context of complex often multi-organisational and international governance arrangements. Sustainability, as an ongoing learning process, is an arena where academics should be visible.

Finally, the project team have dealt with the need for a strategic synthesis of their efforts in technological and institutional innovations. They produced a series of Policy and Technical Briefs to communicate key messages from the research process, presented in forms that the stakeholders can easily understand, distributed through events, and translated into local languages. In this, and their reflexive attitude throughout this excellent paper, they provide a valuable exemplar for others engaging in research for sustainable development.

**Sarah Cornell**  
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