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**Responding to Global Challenges**
**The Role of Europe and of International Science and Technology Cooperation**

# Energy and Climate Change in the EU
# The Role of Science and its Limitations

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## §1. Do we have today a shared narrative for Science and Technology?

In 2001 John Brockman invited 25 of the most prominent world personalities in almost every relevant field of scientific research to share their thoughts about the overall prospects of development in science and technology for the next fifty years (Brockman, 2002).

The contributions were aimed for the general public and written in a language that made sense even for readers without scientific background. The outcome was a splendid and inspiring book which, however, clearly shows the lack of a shared narrative framework for science and technology today. Instead of a common understanding of hopes and needs for science and technology, we witness separate and fragmentary statements, enthusiastically engaged in specific institutions, methodologies and “research cultures”. Among the different writers contributing for the Brockman’s project, excitement overcomes by far some more grim and critical prospects. New rapid expansive fields of research like biotechnology, nanotechnology or artificial intelligence offer the best example of extreme promethean enthusiasm regarding endless possibilities to improve the quality of human life..

Pluralism as a category describing the reigning status in science and technology today wasn’t the result of sheer postmodernism concepts, transferred from philosophy or literature to the realm of epistemology and to the study of science as a complex and sustained societal experiment. On the contrary, pluralism reflects a long trend in the history of science and technology, namely the loss of a common “world vision” (*Weltanschaaung*). The ideal of the “unity of science” remains today more like a moral reminiscence, still kept in some domains of basic teaching in science *curricula* at graduation level, than as a guidance value for interdisciplinary dialogue and even cooperation.

To address science and technology issues as a matter of public policy, both at national and European Union levels implies the understanding of the wide range of consequences deriving from the pluralistic features that are hegemonic in the field of technological and scientific research. We shouldn’t expect that the direct

actors of the technologic and scientific process should be in suitable conditions to give the more balanced and accurate advice in order to frame the best policy framework. More likely, direct actors will tend to emphasize the specific needs of their fields and demands of the research communities in which they are engaged. Both as individuals and as members of S&T institutions, they will tend to voice their interests, and to identify those interests with supposed global priorities. And this confusion between particular interests and broader needs is facilitated by the lack of a common vision regarding the future of society and the role of Science and Technology (S&T) in its fulfilment.

## §2. Which criteria would be most suitable to frame science & technology public policies?

The issues of International Science and Technology Cooperation are under the label of public policy at least from two different perspectives. First, they define goals for public spending (that can be escorted also by private funding, namely from the non-profit sector and Foundations) in S&T activities. Secondly, they are subordinate to evaluations in the realm of foreign policy. In the case of the European Union the situation is even more complex, given the fact that this domain is a shared competence between the Union and the Member-States, implying a considerable effort of dialogue and harmonisation on criteria, methods, targets and different types of instruments, namely financial ones.

The information filtered from experts and direct actors on science and technological activities is an essential step in the complex process of policy framing, although the evident (and less visible) limitations of its scope, given the pluralistic and fragmentary status of current research communities and institutions, as mentioned above. There is no such thing as S&T cooperation without the contribution of the scientific community, as there is no warfare without the involvement of armed forces. However, neither the military nor the scientists are more entitled to define the strategic or the science & technology policies, than those political institutions that have sufficient legitimacy to perform that task on behalf of the community and in representation of the public good.

The core of public policy is the selection of priorities. So, the right question for international S&T Cooperation is about the best ways of choosing priorities.

I would like to suggest the following criteria to facilitate the mission of setting priorities:

1. Priorities should reflect critical and crosscutting areas and domains. They should tackle issues with a teleological (or finalist) intrinsic feature in order to find positive solutions to problems, affecting the engine of society and undermining its peaceful progress.

2. Priorities should be considered as a challenge deserving attention from every epistemological perspective, urging multidisciplinary cooperation and cross-fertilisation. They should encourage networking and an efficient organization of skills and competences in multinational, pan-European and trans-European projects.
3. Priorities need to be coherent with the overarching goals of European Union policies. They should establish synergetic connections with them, deepening simultaneously the knowledge basis where they are grounded.
4. Priorities should be able to provide services of universal value, reinforcing the global trust in the European Union as a benign and peaceful actor in the international system.

## §3. Why should the energy and climate change domains rank among the top priorities for international science & technology cooperation?

It’s virtually impossible to find another global subject that fits so dramatically well within the grid of the criteria suggested above.

Climate change is *the* teleological issue of our century (at least). It reflects a global tipping point, in which humankind did already cross the hidden red line that separates *using* nature and ecosystems from *reshaping* nature and ecosystems in a way that nobody is in condition to foreseen with even a low degree of certainty.

The severity of climate change in the long run was reinforced in the Intergovernmental Panel on Climate Change (IPCC) 4th Assessment Report (2007). Before that crucial research outcome from the most complex scientific network ever established in world history, the alarm of climate change rang already through the works of Sir Nicholas Stern (*The Economics of Climate Change*, 2006) and Al Gore (*An Inconvenient Truth*, 2006). Sir Stern focused on climate change under the perspective of economics, and his major conclusion was received by many as terrible and unexpected bad news: “Climate change is the greatest market failure the world has ever seen, and interacts with other market imperfections.” On the other hand, the former Vice-President of the United Sates, Al Gore, launched a personal crusade around the world, using a book and a movie as weapons, underlining the global danger for the global human society and the Earth as a whole deriving from climate change, which he named, sound and clear as “the planetary emergency of global warming.” Besides Stern and Gore we may identify a prolific set of works combining energy, environment and societal decline and collapse, elaborating from different angles the darker sides of our human prospect under the shade of the global environmental crisis (Brown, 2003; Diamond, 2004; Heinberg, 2003 and 2004; Kunstler, 2005; Lovelock, 2007).

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Climate change risks the inner structures of the international system fabric, and puts a real danger to a fair balance among nations and to social cohesion within countries. Being a global environmental threat, climate change acts at the same time as a trigging factor to overall strategic instability. According to a study of the British Ministry of Defence, climate change ranks as the first of “three pervasive Ring Road Issues, followed immediately by “globalization” and by “global inequality” (UK Ministry of Defence, 2007). In the same line of thought, the German Advisory Council on Global Change alerted to the conflict potential contained in a feeble or faulted climate protection policy: “If climate protection policy fails and these efforts are not made, it is likely that from the mid 21st century local and regional conflicts will proliferate and the international system will be destabilized, threatening global economic development and completely overstreching global governance structures.”, (WBGU, 2007).

Shifting from diagnosis to therapy, we may witness that the European Union role lies in the current international landscape as the unchallenged champion of the need to fight seriously against climate change. Since the March 2007 European Council, the Union has a long run strategy, both inwards and outwards. The EU decided to combine energy policies (the major cause in the human induced climate change process) and climate policies in order to reach a long set of strategic goals. They comprise both internal and external aims and targets. They envision fostering a kind of “ecological modernisation”, shifting ways of production, selling and consumption of energy, helped by the strength of leadership through example to bring together the world community, including the United States, and rapid emerging economies like China, India and Brazil to a new international climate protection regime, avoiding a chaotic gap, or an inefficient puzzle of unilateral national or regional targets after the end of the Kyoto Protocol timeframe (2008-2012).

The rationale for the EU to combine energy and climate change policies is based on:

- Environmental reasons.
- Strategic reasons: autonomy, self-reliance, influence in world system, capacity of initiative.
- Security reasons: avoiding insecurity of supply, preventing scarcity and conflict[1].

[1] In a summary view, the aims of the EU, concerning the Energy and Climate Change strategy are the following:

- Post Kyoto targets for 2020:
  - Reduction of 30% GHG emissions by developed countries in comparison to 1990 levels.
  - Endorse already now an EU commitment to achieve, in any event, at least a 20% reduction of GHG by 2020 compared to 1990
- Internal Electricity and Gas Markets:

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## §4. What are the main obstacles we have to overcome in order to have adequate international science & technology cooperation?

Climate change is now again in the first pages of the mass media. However, the intensive media coverage of issues connected with our changing planet only puts more emphasis on the sharp difference between public voicing of concern and really steps done in the right direction of greenhouse gases mitigation and strong adaptation measures.

According to a recent report from the International Energy Agency (IEA) the situation of global investment in new and/or alternative sources and modes of energy production is rather disappointing, taking into consideration the grim scenarios for the next quarter of century: “Given the scale of the energy challenge facing the world, a substantial increase is called for in public and private funding for energy technology research, development and demonstration, which remains well below levels reached in the early 1980s (International Energy Agency, 2007: 52)”.

How can we explain this deep gap between our explicit vision of the world (its trends and problems) and the lack of adequate action, namely at the scientific and technological level? We need to bear in mind that science as a societal process is driven by many strong non-cognitive forces: financing constraints; personal narratives and expectations; vested interests; political agendas. From its birth in Modern Ages, science was asked to produce technical operational solutions to marketplace oriented demands. Embedded in the *a priori* optimism of Founding Fathers like Bacon and Descartes, science was organised as an hedonistic enterprise, aimed to provide useful services, comfort for consumers, increase of power for States, added value for shareholders, neglecting the need to take into consideration “small details” and “externalities”, like those connected with environmental damage and human health risk. The need for a strong and legally binding precautionary principle lies, precisely, in the trend for neglecting costs and risks located in the heart of scientific and technological research (Gee, 2001).

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➢ Ownership unbundling: to separate supply/generation interests from network companies.

➢ A European Network of independent regulators [ERGEG].

• Energy Efficiency and renewable goals:

➢ Endorse the objective of saving 20% of the EU’s energy consumption in a cost-efficiency manner by 2020 as presented in the Commission Energy Efficiency Action Plan.

➢ Endorse the binding targets of 20% for the share of renewable energy in overall EU energy consumption by 2020 and 10% minimum biofuels.

• Scientific framework and objective data

➢ To avoid an increase of global temperature beyond 2ºC, above pre-industrial age.

Neither the specific scientific agendas nor the immediate marketplace needs are in position to supply the sufficient impetus to put science in the right track to face major challenges. Historically speaking “big science” projects are a kind of a State driven monopoly, as illustrated by the two more visible American examples of the 1940s (the Manhattan Project) and the 1960s (“the race to the Moon” project). To give a prominent degree of priority to energy and climate change as priority fields for international scientific and technological effective cooperation will imply also the need to understand that around the world we find, even within the realm of science and technology communities, different sets of values and rather diverse cultural landscapes. The first obstacle to remove, if the international cooperation is to become successful, is to get rid from the illusion of consensus. “Climate change”, still today, receive a different semantic context, according to the diversity of political, cultural and societal frameworks. A well structured and better managed international cooperation scheme, pulling forces and skills together, will be the result of a long and strenuous process, not the beginning of it.

**§5. What is the job to be done?**

If we wish to use a short slogan, we could say that the huge task ahead of us lies in the aptitude to find the narrow window of opportunity that will allow humankind to shift from a TAU (Technology as Usual) model to a ATP (Accelerated Technology Path) model (Richels and Blanford, 2007).

In a sheer list of things-to-be-done this job could appear like this:

1. Filling the gaps in crucial information on the Earth System (global).
2. To raise awareness and promote capacity building (global). The Interface between science and society, if a reasonable degree of social mobilisation and political legitimacy is to be achieved, remains absolutely crucial (Pereira, Vaz and Togneli, 2006).
3. To integrate energy/climate change in a more realistic and less *Realpolitik* driven model of international relations (e.g. with USA).
4. To improve cap-and-trade mechanisms after 2012 (Kyoto countries and USA, Australia).
5. Development of clean technologies, renewable sources, CCS (Carbon Capture and Storage) (e.g. China and India). This area is deemed crucial, as we may see in recent documents published by the European Commission.
6. Promoting energy efficiency (global).
7. Integrating adaptation in land use management and urban development (global).
8. Adapting Biodiversity policies to Climate Change (e.g. Brazil and many Least Developed Countries).

The enunciation is far from being exhaustive. Many of the most difficult issues are hidden in the preparatory work that needs to be performed in order to

achieve the minimal requisites to even approach the possibility of managing those tasks. An example: how are we getting to dialogue on an effective basis with China, when the level of scientific cooperation, channelled through universities is extraordinary low, when compared with the dense cooperation between Chinese and American academic and research institutions?

Two remarks are, however, decisive to put the tasks of international science and technology cooperation in its right context. The first one reminds us of the urgency and severity of the challenges that we are facing. The crossroads of a true “ingenuity gap”, to take a famous formula from Thomas Homer-Dixon: “We are indeed in a race between hard imaginative thinking – or what I call ingenuity – and the ever expanding complications of our world. And in too many critical places, and on too many critical issues we’re losing the race” (Homer-Dixon, 2003). The second one, echoes in our own intellectual tradition as Europeans. Being a task of public policy, international cooperation in science and technology should, nevertheless, be able to maintain effective boundaries between politics and the core of science (the search of “factual truth”). Quoting Hannah Arendt: “And it is only by respecting its own borders that this realm [political sphere], where we are free to act and to change, can remain intact, preserving its integrity and keeping its promises. Conceptually, we may call truth what we cannot change; metaphorically, it is the ground on which we stand and the sky that stretches above us.” (Arendt, 1993: 263-4), Indeed, if science is going to help humanity in this crucial transition towards survival through a more sustainable way of life, we will need to keep open the doors and windows of free criticism, in order to timely evaluate the steps done, correcting mistakes and improving the right achievements.

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