



Endorsed by the Energy 2050 conference in Stockholm 19–20 October 2009

## Global climate change is essentially a global energy change

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The World community is facing a challenge of historic proportions to work towards a new energy paradigm. A deliberate and controlled reduction of the CO<sub>2</sub> emissions must be an essential objective of the future global energy policy for several reasons having in mind that fossil reserves of oil and gas are being depleted at an accelerating rate. Not only the climate effects of fossil fuel burning but also other environmental and health effects are full of risks. We ask the policy makers assembled in Copenhagen to take note of the following points:

- 1. Time is of the essence for radical urgent changes to the global energy system.** The world has been increasingly powered by fossil fuels over the last 150 years and now this trend will have to be reversed in a much shorter time period. Huge changes that will affect and concern society and individuals will have to take place in a well thought-out manner. The political decisions made over the next few years will profoundly affect future generations.
- 2. Life cycle analyses and ecological economics are essential prerequisites for future policy thinking.** Human energy activities must be developed so that land, water and air are not drastically affected. All future energy options should rely on sustainable fuel and construction materials which are in principle recyclable or durable. The future challenges cannot be met by providing more energy and resources and then wasting them due to an inefficient use. Efforts for increased efficiency would make more credible all the other efforts for a transition to emission-free energy production taking into account all the externalities, including environmental and social impacts. So far the global economy has not been willing to cost the depletion of natural resources or the detrimental effects on the environment of production, distribution and consumption of energy. These factors must be included since economic criteria guide policy makers and business people.
- 3. Agriculture production should be used primarily for food while avoiding global deforestation and maintaining biodiversity.** Even with such restraints a lot of bio-energy can be extracted from residues and organic waste. The 9–10 billion people expected in 2050 will need food with an energy content of about 10 000 TWh per year (2 500 kcal/person/day). Several times more energy, today of fossil origin, has to be provided for food production and distribution.
- 4. Electricity will have to become the major energy carrier in the future** since most of the non-fossil energy sources provide electrical energy. Electricity converts to mechanical motion with nearly 100 % efficiency, compared to perhaps 25 % for combustion. Therefore significant savings can be achieved, for example, by replacement of combustion engines with electric motors.
- 5. Investment in energy research and development is crucial** if we are to achieve the emergence of a sustainable energy system beyond the fossil-energy era. Activities in the energy sector should be coordinated worldwide in order to avoid a future crisis, and technically advanced countries have a particular responsibility. It is important to make a full system analysis of the energy sector and to have realistic estimates of time scales, costs, environmental effects and the adaptability of various energy systems. A more direct exchange of information between policy makers and scientists is of vital importance and will help to speed up matters.

On behalf of the Energy Committee  
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Chairman