



## Introduction to the Energy Session

### Introduction to the Special Session on Energy

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Without energy, there could be no life and no human civilization. With the world's growing population and increasing industrialization, the consumption of energy is rapidly reaching levels that cannot be sustained. The competition for energy has become a central issue of politics, war and peace. Moreover, by continuing to burn fossil fuels, we add to the green house gases in the atmosphere and endanger the earth's climate, long before the finite fuel supply is exhausted. We have been warned repeatedly of the perils of climate by experts in our academy.

What can we do for a sustainable future? How and to what extent can modern science and technology create new options? Can one perhaps use the energy stored in fossil fuels without increasing the CO<sub>2</sub> concentration in the atmosphere? What about nuclear power? Are there ways to produce nuclear fission energy without the risks of accidents or long-lived nuclear waste? Fusion energy has long promised an unlimited supply of clean energy. Is it technically and economically feasible to tame here on earth the fusion reactions that power the sun? Can renewable energies such as solar power or wind power make a difference? How can we deal with the large temporal fluctuations of such energy sources? What are the future prospects for better electrical batteries? What other options can we recognize? How much energy are we wasting in industrialized countries. How much could we save?

To stimulate discussions about such questions, I have been asked to organize this special session on energy. The members of our Pontifical Academy Carlo Rubbia, Klaus von Klitzing, and William Phillips have kindly offered to contribute. They will be joined by four guest speakers, Stephen Chu, Jean-Pierre Revol, Sibylle Günter, and Yi Cui, some of the world's leading experts on energy. We are grateful that they have agreed to come to Vatican City and share their insights at this Plenary Session of the Pontifical Academy.

The session will be opened by an overview given by Professor Stephen Chu, presently Professor at Stanford University, 1997 Nobel Laureate in Physics, and Secretary of Energy of the United States in the cabinet of Barak Obama from January 2009 to April 2013. Perhaps no one else has a broader or more insightful view of the issues involved.

Carlo Rubbia will give us his vision on the future of energy. Professor Rubbia is proposing novel methods of transporting energy from renewable sources over long distances and new ways to achieve a large reduction of CO<sub>2</sub> emission in the burning of fossil fuels.

Guest speaker Dr. Jean-Pierre Revol from CERN will present his proposal for sustainable Thorium fission energy.

Guest speaker Professor Sibylle Günter will talk about the prospects of fusion energy. Dr. Günter is managing Director of the German Max-Planck-Institute of Plasma Physics, the largest research institute of the Max-Planck Society with large laboratories in Garching and Greifswald devoted to the exploration of fusion energy.

Klaus von Klitzing, an expert in condensed matter physics, will speak about the future of solar cells and solar energy.

Guest speaker Professor Yi Cui, Stanford University, is an innovator and expert on novel nano-materials and perhaps the world's most highly cited researcher in his field. He will present his vision for energy storage in novel batteries.

Finally, Bill Phillips will discuss new ways of conserving energy or of using energy more efficiently

The session will conclude with a general discussion.