

**PUBLIC HEARING AFTER THE INTERNATIONAL SYMPOSIUM ON
ENERGY FROM MOVING WATER**

THE ROYAL SWEDISH ACADEMY OF SCIENCES

STOCKHOLM 13 NOVEMBER 2007

**SUMMARY OF THE PRESENTATION BY PROF. M. R. LLAMAS
ROYAL SPANISH ACADEMY OF SCIENCES**

TOPICS

- 1. USE OF ENERGY IN SPAIN: PRESENT AND NEAR FUTURE**
- 2. GLOBAL CHANGE AND CLIMATE CHANGE**
- 3. SUSTAINABLE CONSUMPTION AND PRODUCTION AS A
NECESSARY GOAL**

1. USE OF ENERGY IN SPAIN: PRESENT AND NEAR FUTURE

**These numbers have been obtained from papers presented in recent Conferences
organized by the Spanish Ministry for the Environment**

A) INSTALLED POWER (MW) (rounded figures)

	2006	2016 (prediction)
Hydraulic	14,000	14,000
Reversible hydraulic	3,000	7,000
Nuclear	8,000	8,000
Coal	11,000	8000
Fuel/Gas	7,000	virtually 0
Combined Cycle	16,000	30,000
Wind	11,000	29,000
Solar	100	5,000
Mini hydraulic	2,000	3,000
Biomass	500	3,000
Cogeneration	7,000	8,000

B) PRODUCTION (2006, GWh)

Hydraulic	29,300
Nuclear	60,100
Coal	69,300
Fuel/Gas	14,400
Combined Cycle	67,000
Wind	23,000
Other renewable	4,100
Other non-renewable	19,800
TOTAL	270,000

SOME SIGNIFICANT ASPECTS

- a) **In 2006 Wind energy was almost as important as hydraulic energy. Nobody did such prediction 15 years ago. The current prediction is that it will be duplicated in ten years.**
- b) **In 2006 solar energy was irrelevant but it seems that it will increase about 50 times in ten years.**

2. GLOBAL CHANGE VERSUS CLIMATE CHANGE

- Today there is a lot of noise about the potential climate change, mainly driven by Al Gore. The general emphasis is on the negative effects. Very few people are also considering the potential positive consequences: for instance more rain and hydropower in the Northern EU Member States. The estimation of the potential increase of solar energy in Mediterranean countries should be also considered in order to get a more realistic potential scenario. The increasing role of groundwater in order to mitigate the droughts may be also relevant.
- Nevertheless, perhaps the most important changes to be considered are the social and economic changes developed mainly in industrialized countries during the last half century.
- One of these relevant social changes is the decrease of the agricultural labour force without a parallel decrease in food and fiber production. For instance, in Spain in the last half century the agricultural labour has decreased from almost 50 percent of the whole labour force to less than 5 percent, but the agricultural production has increased substantially. Similar figures can be found in most of the industrialized countries.

- Other important aspect is the relevance of the tourism economic activity, which now, in most semiarid developed countries, is several times more important in economic terms and in jobs than agriculture. This is mainly so in the countries where the current climate change predictions foresee a decrease in precipitation.
- Most of the predictions on future global food scarcity assume that farmers in developing countries (e.g. India and China) are “mentally retarded” and they will not be able to use the new agricultural technology that has increased the productivity significantly in the agriculture of the industrialized countries. The data about the economic growth of India and China during the last decade seem to indicate that this assumption is not correct.

3. SUSTAINABLE PRODUCTION AND PRODUCTION AS A NECESSARY ETHICAL GOAL

University of Cambridge Professor Brian Heap already spoke on this topic in the **INTERACADEMIES PANEL (IAP) General Assembly held in Tokyo in 2000.**

In the International Symposium Water from Moving Energy the Indian Prof. Parikh, mentioned that the energy consumption per person in industrialized countries is about 10 to 20 times higher than the energy consumption per person in India and many other developing countries. Therefore, to emphasize the population growth of the planet as the main cause of global problems is a simplistic approach. In my opinion, this emphasis is not only meaningless but also misleading because it does not allow considering the solution of the problems in a realistic way. This solution is strongly related to the ethical concept of sustainable consumption and production that has to be enforced in the “rich countries”. Otherwise, the pressure to reduce the population growth in other countries has an immoral colonialist flavour.