



ACADEMIA ENGELBERG

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# **Workshop Renewables Protocol**

**Speaker: Aldo Steinfeld**

**Rapporteurs: Susanne Vögeli & Chin-Yunn Yang**



## Participants & Their Interests

1. Swiss engineer working in Germany: types of energy they shall use
2. Science editor from Sonntagszeitung Zürich
3. Press ETHZ: clearer picture on the conclusions of Mr. Steinfeld's presentation in plenum
4. Physicist from the Swiss Study Foundation
5. Jurist: potentials for energy usage
6. Employee of the Swiss Study Foundation: the main obstacles, be it social or political, to realize the 1000x1000km<sup>2</sup> work area
7. Worked 15 years at the strategic development at Alstrom: looking for solutions
8. Engineer at an electric power plant, later engaged in projects in Africa/Asia, now teaching at FH Burgdorf and Luzern: new technological solutions
9. Retired officer from Swiss re: how can we shorten the time span for implementation → why not faster? Is it a communication problem?
10. ETH student: solar & wind energy application for Switzerland
11. Director of the Sustainability Institute in USA: rapid implementation for solar energy in the building industry
12. Freelance journalist: finding a bridge between citizens & politicians who should show the citizens what they can contribute and what the citizens must ask to ensure sustainable development
13. Member of the Board of Association of Shareholders, consulting companies regarding sustainable development: can capitalism be tamed to become more social and ecological?
14. Participant who is concerned about environment à la "Environment does not need us, but we need the environment"



## 1<sup>st</sup> Part - Technical Issues Related to Renewables

**Question 1:** If we can transport solar energy, why should we not transport electricity instead?

**Answer:** the transportation of electricity depends on the distance. To transport electricity from Spain to Switzerland, we experience an energy loss of 20%, but the loss can be avoided when transporting chemical fuels, which is converted solar energy. In addition, chemical fuels allow the storage and usage of energy according to the demand regardless of the circumstances. However, if, at the end, you need electricity, it may make sense then to transport the electricity, but if the distance is very long, you would need to transform electricity into chemistry to avoid a large amount of energy loss. Hence, you would have to decide the form of energy for transportation case by case.

**Question 2:** Why is the technology of solar chimney not flying even though it seems to be very attractive?

**Answer:** Mr. Steinfeld answered that the conversion of efficiency with this technology is very low (the area needed for energy production is thus much bigger). So, efficiency is one important parameter in the economic calculation. He, however, did not know why this technology was not realized even though they had tried it out in Spain. According to someone in the workshop, the problem is that competition is rising among the various types of renewable technologies; all the money is now going into some research programs in wind powering while others have problems to become attractive enough to get money.

**Question 3:** Now we've only been talking about the large scale solar energy powering, but what about the small scale one in the form of heat collector, which is the most efficient solar energy?

**Answer:** First of all, we have to be very careful about mixing up 1kW of electricity and 1kW of heat, which are two different things. Solar energy is an improved technology and ready to be implemented, but why don't we see a lot of the solar collectors? Well, there are a lot of solar collectors in Greece, and in Israel the installation of solar collectors is even mandatory. In countries with solar resources it is implemented in great quantities. But here in Switzerland, we don't have as good of a solar resource. Hence, we would need to install a



storage toll in between (e.g., part of the house being used as a boiler) which is expensive. That is the reason why in countries with less hours of sunshine, solar collectors are not attractive enough. Plus, we in Switzerland would also need a building permit.

**Conclusions for the First Part:**

Form the point of view of technology, there are some renewable energy sources that have been great sources of energy, e.g. wind, solar heating, and hydro. The other technologies, such as solar electricity and bio fuel still need heavy improvements. They have come up with some solutions, but there is still much room for improvement with regard to efficiency, components, and reliability. One important thing to take into consideration is that solar could potentially close the energy gap coming up in the coming years. Solar fuels are also in the position to provide the storage and transportation of solar energy.

**2<sup>nd</sup> Part of the Discussion****Non-Technical Issues Related to Renewables**

This part should focus on economical, political, and social aspects, and here is what was discussed:

Light oil is running out in approximately 60 years, which is why petrochemical industries are not interested in investing into other types of energy supply because, in their eyes, light oil will still last for quite a long time. The problem is that although we have plenty of heavy and crude oil around (in Venezuela, for example) – it is light oil that will run out – the cost for refining these sources will be much higher than investing into renewables. The question here is what is so bad about the price of energy becoming twice or three times higher than now. This is exactly how the petroleum industry thinks.

But there is also a problem of CO<sub>2</sub> emission that they do not touch upon. So, one should rather ask about what amount of price increase would make people start to feel hurt. Is a five times higher price still acceptable? This seems to be a moral question since values are attached to this question. A suggestion coming from one participant was to execute a system of punishment and compensation ( e.g., for those who don't have a car), but this idea has already been rejected by the Swiss parliament.



How can we accelerate the implementation process of renewable energies? Someone thought that this is driven by consumers who buy the least expensive. Another argument for implementing solar energy is because we would then not depend on the two sources of energy supply in Saudi Arabia and Russia anymore. Mr. Steinfeld now proposed two kinds of solutions to the implementation problem.

1. Increasing the price of fossil fuel (i.e., punishing fossil fuel use).
2. Through law enforcement (which would also increase employment).

The best example is Germany's wind powering industry which is booming because of political decision making. However, Mr. Steinfeld added that at the end, it is always the customer who has to pay. Some inputs from other participants were that in Kanton Aargau (Switzerland), they can voluntarily buy 1 kW PV power for 1 SFr. In the city of Zurich, you automatically receive the most expensive electricity bill. If you don't say anything, you pay that most expensive bill. Mr. Steinfeld thought that this can simply be called ignorance (from the view of the consumers), but it is an excellent beginning.

He then used bio food to compare to the situation of renewable energies. In the past, only a few were going to the bio food corner of the supermarket, and were ready to pay more. Now, everyone goes there because they realize that there is added value behind. The added value behind the energy use is not as clear as food, but he believes that people will become aware of it in the future. The difficulty behind the food and energy comparison lies in the fact that the quality of energy does not depend on the way it is produced, a participant added, it is a "can we invest or are ready to pay to have a better environment" issue. The citizen does not want to pay the consequences for the environment.

According to another participant, wrong messages about renewables have been and still are being circulated in society, namely that is much more expensive than conventional energy, which is not necessarily the case since by investing into and using renewables we can also reduce a lot of energy