

Creating the Infrastructure for Capacity Building in the use of Wind Energy

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Abstract

Capacity Building in the proper use of wind energy is a rather difficult task in developing countries not depending of the import from foreign markets of hydrocarbons. Even when the wind energy resources are important, both governments as different lobbies are reluctant to foster the use of this clean renewable primary energy. Awareness of coming energy crisis in the near future is often kept in secret and even suppressed by these sectors in order to maintain their prevailing privileges. The willingness of students to learn about this alternative energy resource is consequently diminished, as they do not see in this knowledge working opportunities for the near future, once they graduate. For all these reasons, the author points out the necessity of foreign assistance and aids, but properly canalized through NGOs, as the only envisaged way to short-circuit not desirable interferences.

Keywords: Capacity Building, Wind Energy, Difficulties.

1. Sustainable Human Development

This article is written from the perspective of the prevailing political and financial conditions in Argentina. It reflects all our mischief in the fascinating task of trying to introduce into the special mental structures of the persons acting at different places of the society, at different social levels, on different functions in the government, at different sectors in the educational field, to introduce in all of these structures our firm conviction that the way we are using energy all around the world currently will conduct us very soon to the collapse of our envisaged so-called Sustainable Human Development.

We understand this Sustainable Human Development as a process in which

- the direction of activities and investments,
 - the evolution and behavior of the institutions, and
 - the orientation of the engineering sciences
- concentrate their efforts in the improvement of the education, the health, the selection and use of any kind of resource in general and the energetic resources in particular. The main objectives consist in
- maximizing the economical productivity, the technological and energetic efficiencies, and their environmental harmonization, with the purpose of reaching satisfactory living conditions for all the people, with equity and freedom, and

- without affecting our capacities, neither those of the rest of mankind, nor those of our planet, with the wish of being able to keep, in the future, and for the future generations, the level of material, spiritual and ethical progress already attained.

This article reflects also the experience gained from eight years working in association with the former Carl Duisberg Gesellschaft (CDG) and later with the recently created Internationale Weiterbildung und Entwicklung gGmbH, INWENT.

In order to create conditions conducive to the development and application of renewable technologies in the future, CDG and the AAEE agreed, several years ago, to initiate a process of “capacity building”, that is, of forming human resources groups of highly trained professionals. The process of building such groups was designed to facilitate the development of renewable energy projects that could have strong positive influences on the local economy, as well as the environment. The foreseen goal was concerned to all the possible activities in the special field of an intensive use of wind energy and also its conversion into Hydrogen. The main idea was that Hydrogen could be used in a first stage as a storage device for wind energy and later, as an energy vector of this accumulated energy.

2. What do we have to deal with?

Modern life needs energy. Sustainable Human Development requires this energy to be as clean as possible and wind energy offers the possibility of generating clean electricity. While this energy is available in several regions of Argentina, there is a mismatch between continuity of supply and timing of wind power derived electricity and demand patterns, so effective storage is essential. Hydrogen obtained by electrolysis is a very suitable storage method in such circumstances and it is one that allows comparatively easy export of surplus capacity.

We try to be realistic in our goals, the principal of which can be simply stated as making a contribution to sustainable human development. Argentina has thirty-six million inhabitants, and, sadly, we do not have a clear idea of what can be done to improve the lot of some twenty million of them, because of their lack of education, poverty, and often, remote locations. However, creating conditions to help them to improve their lives remains a priority and the proper utilization of energy resources is highly important in achieving this objective.

It is worth remembering that in countries with relatively large reserves of natural gas, the incentive to develop wind farms and other sources of renewable energy is often weakened. Lobby groups, as well as Governments are not motivated to create significant impetus for such activities. Even more, in Argentina, as well as in several other countries all around the world, the idea of “Planning” is somewhat diffuse in the Government and in most cases, it is replaced by the need of finding rather short-term solutions for more acute problems.

That may be a real priority, but, if every time you are only prepared to be able to call the firemen for the next fire and never start planning actions to prevent as far as possible those coming fires, you will never be able to escape from that deadly “circulus viciosus”. By acting so, even in some cases, a certain level of corrupt public servants finds it of more interest searching for new applications of conventional energies rather than of renewable ones, as the possible personal benefits are much easier to obtain in the short term with the aid of the lobbies interested in the conventional resources. That is why the formation of further human resources groups in the field of renewables is very important, but at the same time, quite difficult to achieve. There is also a risk that the use of foreign funds to subsidise the process simply foments bureaucracy, much times infiltrated by former mentioned corrupt public

servants. Normally, for any new Government, even coming with the purest and best ideas, it is extremely difficult to disassemble existing working groups on the level of career functionaries. Unfortunately, such conditions are hereditary through centuries of former colonial administrations, whose main goal usually had been only the transfer of local resources to the motherland.

Another obstacle that usually appears is the legal framework created for the organization of the electricity market according to the prevailing use of conventional primary energy resources. These resources had been subsidised at the beginning and are still nowadays subsidised in an indirect way, as they are not punished by the social cost they causes. At the same time, Governments are reluctant to subsidise renewable energies, considering that that would mean a sort of privilege for these resources and therefore, could be interpreted as a juridical discontinuity.

On the other side, sometimes the developing countries indeed receive some subsidies from different international organizations or directly from some donor countries. The fact is that, unfortunately, if canalized through the existing administration, far too often it lends only to an increase of bureaucracy, and this monster speedy devours most of the obtained funds and in the best of the cases at usual only produces a very long and detailed paper listing all the possible measures that could be adopted in the future, and that is it.

3. Poverty and other structural conditionings

Developing countries also have at usual a great percentage of their inhabitants living under the poverty level, over 50% in many cases, and even important percentages living beyond the indigenous level. Of course, the first thing that must be attacked in those cases are all the possible ways to remediate as soon as possible that terrific situations. Lots of NGOs appears then doing their best to collaborate in this efforts, even sometimes collaborating with some governmental institutions (for instance, refer to the proceedings of the recent Seminar “Semi-Aridos Recursos Hídricos” that took place in Fortaleza, Brazil, last September, and read the presentation of the Argentinean INTA and its Plan Huerta). In those cases, guided by the best of their intentions, the ONGs teaches the poor how to implement and to use the most rudimentary tools for converting biomass, wind or sunshine to minimal amounts of needed energy, perhaps for battery charging or similar applications or at least, for cooking.

In these countries even it is normally quite difficult to incorporate in the studying-programmes of Universities or even of technical schools subjects like Installations with Renewable Energies. The author of this presentation experimented this at one of the Universities at which he is teaching: some sociologists elaborated an statistic that demonstrate that not a single one of the graduated worked in any employment dealing with these matters and consequently, suggested to eliminate this subject from the to be reformed study programme. It is well known that with statistics, if not adequately used, you can demonstrate almost anything; in this particular case, the statistic was performed consulting graduates that worked in the area of influence of that University, area in which due to its special characteristics, the use of renewables was of no interest in the factories in which the graduates worked. The graduated of sociology of the same university, not being aware of any subject dealing with energy, neither are aware of the critical energy situation our country is facing for the near future, as the Government, for different reasons we better do not analyse here, denies this coming energy crisis and presents it to the inhabitants as an invention of the press and

sectors of the opposition.... At this University, the author suggested to the Authorities in charge that they better, instead of suppressing renewable energy studies from the engineering carrier incorporate energy studying subjects in all of the other carriers at the same University, including Sociology. You can easily guess about what the response to this suggestion has been....

Perhaps one of the most important but ignored fact by the Government, by the Ministry of Education and by all the Authorities in charge at the different Universities and even technical Schools consists in their lack of awareness that nowadays, in a globalised world, nobody knows where the graduates are going to work in their professional life, at their home country or anywhere abroad. Wherever it would be, the knowledge of the proper use of energy will be a need for all of them, and they will be co-responsible of the proper choice of the primary energy they are going to implement.

4. How to start?

Therefore, the first step is perhaps the most difficult. How to start choosing and later forming people willing to use renewables? During the eight years of the AAEE's association with the CDG, an important group of people was trained to understand the scientific and technological principles governing the use of wind as an energy source. The training covered all the relevant aspects, such as wind measuring and mapping, wind converter design and maintenance, wind farm operation, management and economics. Special emphasis was given to technologies for hydrogen production using wind power as the primary energy source to produce electricity for electrolysis, and technologies for decentralized cogeneration of electricity and heat.

Several courses, interdisciplinary seminars and workshops and visits to wind farms & factories in both Argentina and Germany, helped the group to gain experience. They became familiar with the use of wind energy as a contribution to sustainable human development, while keeping an appropriate balance between Ecology and Economy. The results obtained gave us a strong belief that such initiatives could also be successfully implemented within similar social and political frameworks in many other countries.

As previously said, the first step is perhaps the most difficult. The question is: What is the best way of selecting suitable people to form these groups?

Certainly, as our own experience shows, it is not by means of advertisements in newspapers or announcements on the notice board at universities or technical schools. The Argentinean Wind Energy Association is a non-governmental, non-profit organization. Its board is mainly made up of professors from various Argentinean universities, all of them with wide experience of renewable energies.

Consequently, our first step was to introduce some elements to the graduate courses we run at universities and technical schools, about both the technical and human interdisciplinary requirements for the formation of such "enabling" groups. This encourages students to learn more about these aspects of their future professional activities and in this way, we usually identify a good number of students willing to learn more about it.

The second step consists of informal conversations with those students, to investigate how serious their interest is and to assess the time they have to invest in the activity. According to the number of promising students we identify after such conversations, we choose the universities and the technical schools where we will run the courses, which require 130 hours over Friday evenings and Saturdays. We would have already selected the appropriate professors and assistants for the task. So far, we have been able to conduct courses, including summer camps and the like, for the last eight years. After the final tests

and examinations, the best graduates go to Germany to broaden their experience, their “capacity building skills”, in research centres, wind farms and factories.

Unfortunately, problems tend to arise for the graduates once they return to our country. The current legal framework and the difficulty of finding profitable employment in wind energy in Argentina, is something that cannot easily be changed. The only hope we have is the possibility of introducing the concept of the “green price”, as is currently happening in some other countries. This seems a rather remote possibility, at present, in Argentina.

5. How to keep moving?

However, our opinion is that the real opportunity for more intensive future use of wind energy in Argentina lies on the GW level. By the early 2020s, we expect to be exporting wind energy to foreign markets in the form of liquid hydrogen. Research shows that far eastern markets could provide a large market. An installation in southern Patagonia, over an area of 1000 km², could export the daily energy equivalent of 48.000 barrels of oil, and possibly over 60,000 barrels, given the recovery of energy from the liquefaction process. This project is competitive with an oil price of US\$ 38 per barrel. But who would invest the large sums required in Argentina under the present circumstances, without adequate guarantees from our government?

The question is, what can we offer to the graduates in the meantime? How can we arrange matters so that after returning to their home country, they can actively participate in the implementation and development of renewables? How can we avoid the situation where a lack of employment opportunities in the discipline in which they have trained causes them to abandon Argentina for another country where they can apply the knowledge they have acquired? Or, deeply frustrated at the waste of their skills, just take work in an unrelated field, simply to earn a living?

Here, we need urgent help from the donor countries, the best from the EU due to their commitment to carry on with the compromise they have assumed with the Kyoto Protocol. And, we insist in this point, this help must be canalized through NGO's that have already demonstrated their ability and their ethics in administration of the transferred funds. There should be no open door for temptation for any bureaucracy; normally, they have all been readers and good pupils of Oscar Wilde, who pointed out very clearly that he could resist anything except temptation.

We have initiated several really interesting projects, for instance, energy conversion on Martín García Island, a National Reserve with some 200 inhabitants in the La Plata River. This is a Wind – Hydrogen – Fuel Cell energy system, which could be a prototype applicable to many other locations around the world. This project, funded by an international organization, could also be a training opportunity for our graduates. This Project has already awakened the interest of some private enterprises developing closed holiday resorts for exclusive communities in Northern Patagonia. There are many other possible prototype installations suitable for this purpose. In order for hydrogen to become a competitive energy carrier, experience and operating data need to be collected and disseminated through demonstration projects.

We will carry on with the important mission of capacity building in renewables, incorporating a third and very important element:- consumer education. We need help to clearly demonstrate the path from prototypes, through demonstration projects to commercialisation by means of integrated applications.

We need help to develop a framework that will enable capacity building in the new technologies to gain market penetration, within the broader context of future fuel and energy

strategies and policies. This should include the identification of suitable measures, such as financial incentives, education, fostering public-private partnerships and business development initiatives.

Certainly, it would be very easy for the whole process to become submerged under the weight and complexity of these problems and fail. But we know that, through our capacity building actions, we have the potential to contribute to a better world, right here and now.