

## KNOWLEDGE MANAGEMENT: A NEW DEMAND FOR PUBLIC UTILITIES OF ELECTRIC DISTRIBUTION SESSION

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### INTRODUCTION

The objective of the present paper is to put forward – within the context of CIRED- our thoughts about the challenge that electric distribution and the electric industry, as a whole, are getting ready to face with respect to technological innovation and knowledge management, within the framework of the transformations that have been made and that are about to be made in the world, and taking into consideration the Argentine case, which has been a leading case.

In the decade of the '90's, Argentina disintegrated its Electric System vertically and horizontally and, in record time, this system was privatized.

During the first years after the privatization, companies became labor "exporters". Many jobs were reduced and eliminated, and the purpose sought – through the down-sourcing and outsourcing processes in the activities which were not part of their core business - was to cut down on costs. In a few words, during the '90's, no income was practically recorded for electric utilities. And the little income they did have had to do with new market needs, mostly being professionals from areas such as economy, law and marketing. Simultaneously, greater efficiency and effectiveness in private companies made it possible for them to render a better service to their users with less equipment. That is to say, it was possible for them to take advantage of their residual capacity and of the associated adjustment and productivity margin of the electric system, while maintaining and improving quality, without expanding it in a significant manner. This generated the disappearance of a large amount of companies devoted to electro-mechanic erections as well as of satellite service companies. The demand for consulting services also changed. From their original technical profile, they began to be required for advisory and orientation jobs in new managerial skills which the market, competition and the interpretation and application of the new regulation of activities - still a monopoly at that time.

The low appeal generated by engineering careers in university, in general, compared to other more conventional careers such as law or economics, together with the scarce demand for electric and electromechanical engineers, as well as the low salaries prevailing in the industry, produced a decline in the number of students being admitted into, and graduating from these fields of engineering. That is how we arrive in 2001 with an electric system one which was declining and with a large part of trained and specialized professionals at an age close to retirement. The well-known economic, political and social crisis in our country happened in that year. This event made most foreign companies leave the country-companies which had been supporting the systematic loss of knowledge and expertise seen at local level with the experience and knowledge of their home offices. The crisis also brought about migrations towards developed countries of a large amount of labor. Naturally, those with the highest qualifications were the ones who were in the best conditions to do so. A very large part of our young professionals looked for more promising horizons abroad.

After the serious crisis, ever since 2002, Argentina has begun to recover, growing at levels comparable to those seen in China. In order for this growth to be sustained, it will become necessary to strengthen the electric infrastructure of the country, for which purpose the country will have to count with trained and experienced professionals. It is our great challenge to develop the means to cover this gap in the shortest time possible.

### THE WORLD OF KNOWLEDGE

Nobody should be taken by surprise by the fact that we are talking about the economy of knowledge. Human inventiveness intervenes as an accelerating external factor in production and is today a central factor in the economy of countries.

In traditional economy, companies do not produce or market know-how, but obtain it, instead, from outside and use it in their processes for the production of goods. This knowledge is generated outside factories, during education processes and inside large research and development laboratories within universities. However, the Electric System features certain peculiarities which make it unique and different. In the first place, it is the most complex machine created by man. Secondly, each country and region has its own peculiarities, therefore it is not always easy and effective to use the same procedures which may work in other electric systems. In order to conceive, develop, build, operate and maintain an electric system, it is necessary to count with know-how which could have only be obtained throughout time. This know-how is neither the pure scientific discovery made in universities and research centers, nor the inert information that we find in the Internet. It is actually a combination of four types of knowledge which are added and combined in each individual in a different manner. Such types of knowledge are: scientific knowledge; know-how and experience; pure and hard information, and lastly, relational knowledge. The latter encompasses knowing who is who, who does what, and who to address if one wishes to know something specific. These four types of "knowledge" constitute a person's competence. Types of "knowledge" that have been acquired through traditional education, experience, within the family environment, the culture of a country, training, etc, which stand at the present day as the true wealth of companies. These types of "knowledge" are blended in the different learning processes.

### THE CHALLENGES WE FACE

In the first place, we find the needs. Argentina grows at an accelerated pace. However, it has an electric system that only manages to simply supply the current demand very tightly. And this as long as there are no elements (lines or generators) that are out of order or provided it has not been a year with low hydraulic levels. This confronts us with the impending need to have the electric system grow at an accelerated pace. Should this not happen, it will become the weak link in a chain of economic recovery in our country. In order to build this system, we should count as of today with professionals who are capable of thinking about, planning and structuring the evolution of the system. Unfortunately, this job has already begun and urgency has had it develop in an anarchical manner. The vertical process of disintegration and

privatization in the '90's left, in the market's hands, the process of planning for the electric system, with the state reserving for itself the creation of economic signals that might allow it to work properly. Such signals could not create a balanced system. High prices in the initial years produced an excessive development in generation. Then - a situation which has continued to the present date - low prices produced by an excessive offer led to a situation of insufficient investments in this part of the way, and there was, indeed, a deficit, which led to the decline pointed out which produced our current situation: that the system is in operation without any more reserves. The economic signals were not capable of driving the expansion of the transmission system either. Generally speaking, distribution turned out to be the most balanced part. However, the system as a whole has not developed hand in hand with the expansion seen in consumption. Faced with this situation, the state has taken up again, in an informal way, some roles which had been in the hands of the market. Thus, policies fostering a strong and controlling state mingle with those favoring a free market. In some cases, efforts become mutually sterile, in other cases, they are unnecessarily duplicated. These tasks are being carried out following the needs that need to be met, based on personal drives, political or corporate interests, which probably draws them apart from what is optimal. To this respect, it becomes necessary to set up a long-term policy that will make industry-specific decisions independent of any political renewals planned every four years.

Once the expansions have been agreed upon, which will probably be far from optimal -as we had anticipated-, professionals and companies will be needed, that will be capable of carrying out their construction. Finally, in the mid-term, professionals will be needed in order to acquire the knowledge of experts who operate and maintain the system and are close to retirement age, so as to replace them properly.

The offer of professionals is really very low and will remain so for a rather long period of time. In the first place, because there are very few professionals available, and those who are, do not count with the expertise and know-how needed. In the second place, because the natural market process that will solve this is far too slow. It will be necessary to wait for this lack of professionals to materialize into a salary improvement, something that will encourage young people to enroll for these university specializations. A

process that calls for 6 to 8 years before we can count again with newly graduated professionals.

### WHAT IS BEING DONE

In order to remedy this situation, efforts are being made in several directions:

- The association of transmitters, together with the Federal Council of Energy have begun to train professionals in the tasks of designing and building installations. This initiative was generated vis-à-vis a difficult and proven reference background: when the Federal Transmission Plan was launched, which drove the construction of transmission works that the market would have never, otherwise, undertaken, there was proof that there were not enough professionals for the construction project and that those available were at an average age of 65. Luckily, today, the cognitive reserve of elderly citizens is valued and professionals are not chosen so much for their age and graduate level, but for the added value that experience gives them: it will be possible in this way to carry out the needed and true intergenerational knowledge management. In this way, and resorting to the tools provided by the Internet, a Master's Program in lines and transformer stations was created. This allowed over 80 professionals to have the chance of being trained from their homes in these tasks. In addition, the interaction between teachers and students through the Internet, enabled the creation of a true exchange network. Those of us who have participated as teachers, continue to receive inquiries by our students.
- Interaction with universities. The association of transmitters produced, all along the year 2006, regional seminars jointly with universities. This enabled both areas to interact. The association of distributors has organized CIDEL, an international forum where people are invited to submit technical papers about the whole spectrum of the activity of electric distribution; this has had a very high level of response which shows, on the one hand, the great interest that Argentina creates due to its experience; and, on the other hand, the willingness of

professionals from several parts of the world, to be informed and updated and to submit their technological breakthroughs and experience in forums....

- The participation in National and International Conventions and Seminars. Such is the case of the continued and active Argentine participation in CIGRE and in CIRED.

### WHAT SHOULD CONTINUE TO BE DONE

Associations have taken the initiative of making this problem publicly known and of putting the various players in contact, by creating forums, specialized work groups, and by sponsoring Courses and seminars. In the case of distributors and transmitters, based on the non competitive nature prevailing among them, it is possible for such associations to carry out their cooperation and complementation activities in their corresponding responsibilities, both related to public service.

Knowledge, a highly valued and distinctive asset for competing companies, does not hold the same connotations in the case of distribution and transmission companies. This knowledge can be expanded and improved based on interaction and can be shared by all of the parties. Privatization initially made companies become closed within themselves. This could be true during the privatization process. Those that counted with the best methods and practices were able to obtain good advantage from lower costs and thus win bidding processes. Unlike what happens with material assets, knowledge is not only preserved when shared, but there are also many possibilities for it to be enhanced once it has been made known and shared by others. Users of immaterial assets such as knowledge, do not miss the chance of continuing to benefit from using it because they are making it publicly known and sharing it. Surprisingly enough, knowledge does not become impaired with use, on the contrary, its utilization typically contributes to its enhancement and improvement. Knowledge is an absolutely non depletable resource, that can be exploited for free and can accumulate indefinitely. We have a resource that is not spent or deteriorated with use, that is not depleted, that can accumulate indefinitely, and that can be improved to the extent that it is made known and spread. Unfortunately, despite such great possibilities, reality shows that we continue to apply, both to know-how and to knowledge, the same principles and criteria of

traditional economy related to the provision and utilization of rare and scarce assets. Nevertheless, today this no longer has any sense. Regulatory bodies have the objective to use yardstick competition among monopoly companies so as to induce the use of best practices. To share these criteria will allow each company to be nourished with best practices, without this becoming an unfavorable situation before other companies in the industry. It is also an important function of associations to create this awareness. It is important, also, for developed countries to contribute to make their experiences and know-how known, by participating in forums and in the different media that current communication systems allow for.

## CONCLUSIONS

Major changes in the energy industry are expected and most of them are related to distribution. It is necessary to work from large organizations, just like CIRED and CIGRE are doing in Europe, as well as EURELECTRIC and more recently, CIDEL in Argentina, so that all the sectors within the industry: distributing companies, regulators, market operators and manufacturers may meet this objective. The implementation of a large network, supported within a culture of collaboration and cooperation.

This development necessarily calls for a culture of shared knowledge. It will be necessary to count with a strong technological development and, doubtless, failures in experimentation will be absorbed by society as a whole, that will, in turn, enjoy the benefits generated by such developments..

Electric energy has been let free from market rules but distribution is a public utility for which the State is primarily responsible. This leads us to think that competitiveness might arise from related services, but not from the quality or price of services. **Nevertheless, a kind of virtuous circle will be verified: rates generate profits for companies, the later contribute with knowledge and a consumer society will receive quality and competitive price for production, as a benefit.**

The supply of energy is increasingly related to a "right to energy", be it in concentrated markets as well as in isolated populations. This shows the need for technological innovations aimed at reducing costs so as to expand the service to the whole population, with or without the capacity to

afford it. Consequently, we have to think that in the future it will be necessary to convey knowledge to a larger universe. This leads us again to the concept of shared knowledge. And this is no news, we only have to mention how a major technological breakthrough such as digital communication and image reproduction systems are tacitly supported on shared knowledge and on knowledge distributed by means of digital instruments in the areas where they are used. As we said earlier, the more knowledge is used, the more possibilities it has of being enhanced. If we relate it to economic theory, knowledge has to do with the law of growing efficiencies, because the more you use it and make it publicly known, the more valuable it becomes.

The first units of a knowledge product are necessarily more expensive, but as they start to be used, product units decrease their cost enormously. This leads us to assert that government and companies should foster and should invest in knowledge. This is a strategic resource of governments and of companies alike, and in the case of electric companies, it is an industry where knowledge is used in an intensive manner.

We invite CIRED, so that together with CIGRE and CIDEL in Argentina, they may begin to form a large network of institutions and professional associations of the electric industry, among whose objectives it will be possible to include a reduction in the knowledge asymmetries existing among countries; the possibility to actually make technological breakthroughs publicly known in extended markets, and sometimes physically and commercially integrated. In addition, we recommend creating a new category of "senior" papers so as to invite veterans to contribute with their ideas about knowledge management in the electric field.