
Interview

Iran's former atomic power chief talks about energy and development policy

The following interview with Akbar Etemad, former President of Iran's Atomic Energy Organization, was conducted on Nov. 13, 1981 by Ceceilia Soto de Estévez, Director of the Mexican Fusion Energy Association (AMEF).

Estévez: At yesterday's forum the Iranians' program was challenged as a waste of money and something useless for the Iranian economy. What are your thoughts about that?

Etemad: I think the program is best assessed through the global approach of a society. If a society decides not to have any progressive activities, not to conform to the increasing needs of the population, and not to go into a process of development and modernization, of course they do not need too much energy, and in that case I would say that the nuclear program of Iran is not needed.

But this was not the choice of the Iranian people before the uprising. We were striving very strongly to get developed, to develop our industry, our social services, and our capabilities to face our future needs, in the field of energy and in the field of industry.

I would say that by the time the storm was gathering in Iran for an uprising, the economy of that country was one of the soundest in the world. We had a high rate of growth; our internal industry had an output of \$20 billion of goods, which is very high. I don't think that this is the case in 95 percent of the developing countries. We had a relatively high standard of living in Iran. The continuation of that needed energy. Now some people argue that Iran is a resource-rich country in energy and that the nuclear program was not quite justified.

The justification is very easy. First of all, if you want to go into massive production of energy, and you get into the development of new technologies, everybody agrees that these technologies have a long lead time. It takes at least a few decades to bring it to real fruition and to make a credible contribution to the needs of the country. The nuclear program of Iran was not intended just to bring nuclear energy inside the country in the very near future, although this was a part of the program. The main intention was to prepare the country to have access to nuclear technology with a large nuclear power program.

By the end of the century, the intention was that when the oil reserves would be exhausted, or diminished, at least to the level of our internal consumption (the forecast was that Iranian oil production would drop after the 1990s and would meet only the level of our internal consumption), nuclear energy would have to come into the picture of the energy development program of Iran. This fact did not exclude gas, which exists as a resource in Iran, but we thought that after oil we would have to rely on gas and nuclear, and both would be necessary for the Iranian pattern of development.

The other rationale behind the Iranian nuclear power program is that a nuclear program is at the beginning a very time-consuming and capital-consuming problem. One of the problems that most developing countries are facing now is that they do not have the capital for investment possibilities. In fact, the running cost of nuclear power plants is very low, but the capital investment is very high. Now, we thought that at a time when Iran was in a position to provide for the capital formation of the energy sector, the best choice was to go for nuclear. Later, we would never have been in a position to do it, or it might have been more difficult. I can use the example of Pakistan, or Turkey or other countries, which are willing to go for nuclear, but which are stuck by the fact that they are not in a position to provide for the investment.

The other point is that the development of industrial activities in Iran had brought the sophistication of technology in the country to such a level that we thought we could afford to have nuclear technology without too much fear of not being able to face the problems of nuclear energy. The four or five years during which we were active in this field had given the evidence that this was the kind of problem that the Iranian economy and our capital could manage.

These are the rationales behind the nuclear option of the Iranian government of that time. I think this was a very wise option and I think that if we had to do it again, we would.

Estévez: There are views that the Iranian nuclear program intended to use the nuclear plants as a vector for



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forming new industrial regions, and helping agriculture. Have you any thoughts on that?

Etemad: Yes, of course. One of the particular aspects of Iran is that we have a very large country, and that country is not developed all over. There are regions in Iran which have not been developed due to lack of energy and water. Most of the time these two constraints go together in Iran. Most of the regions around the Persian Gulf are regions where water does not exist, and population is very scarce, and there was no development during the last 20 years. One of these interesting places is Bushir where we started to build the first nuclear power plants. The capacity of these two nuclear power plants is 2,400 megawatts. It was designed so that the whole region would receive electricity from these nuclear plants. Then, we realized that electricity alone would not be enough to develop that region.

We came into a larger program, which was to create a complex organization for the development of that region. The population at that time was 100,000 people, and it was intended to get it up to 600,000. These 600,000 people were needed for agricultural activity, to provide food, industrial activity, and also the normal activity of a city, social activity and so on. All of that needed nuclear energy, water and a lot of imagination.

Then we decided that we have got to provide this region with water. As we were going to have a tremendous amount of power at our disposal, we decided to

couple a very large nuclear desalination plant with the nuclear power plant in order to get steam from the nuclear power plant for desalination purposes. This desalination plant was under construction when the uprising came.

The capacity of the desalination plant was 200,000 cubic meters per day, of drinking water. That makes a river, in fact, at a very low cost, because the power which was being taken from the nuclear power plant was a degraded power, in steam. The contribution of that steam to the other power of that nuclear plant was not important. I would say probably something in the order of 13 megawatts would have been taken from the nuclear plant in order to go through the process of desalination.

With abundant energy (electrical) and water, we tried to visualize other industries we would have to bring in. Fisheries, for example, would be of great importance because in the Persian Gulf we have a lot of seafood—shrimp, fish, and so on. A large organization could be established in order to exploit the possibilities of the sea. Agricultural activities could be promoted because the soil is fertile and the only problem was the shortage of water.

Of course, agricultural activities based on desalinated water are not the normal kind of agriculture; it has to be a very intensive kind of agriculture in order to have an economic yield of credible measure. Plans were being prepared to establish integrated agricultural/industrial activity in that part of Iran mostly related to food products, as I have mentioned in the case of fisheries, in the case of cash crops, and a great many other activities. One of them would have been the establishment of an aluminum smelter in the south of Iran. We were importing aluminum at that time and the cost of importing aluminum is very high. With a population of 600,000 people well taken care of in problems of energy and water, this could have been one of the best examples of a daring and courageous development in a part of the country where ten years ago there was nearly nothing.

Estévez: Can you develop some more about the desalination process itself? What was the technique to be used?

Etemad: This was a normal flash distillation of water, with the input of steam from the nuclear power plant, and intake of water from the sea, the Persian Gulf, and the evaporation of water, and then condensation. This is a well-known technology now, but this was the first time that we tried to couple it with a nuclear power plant.

Estévez: The cost per meter, you said, was 50 cents?

Etemad: According to what I remember now, the various evaluations at that time showed that the cost of a cubic meter of water would have been less than 50 cents (American), which would have been much less than the cost of water right now in the southern area.

Estévez: It was challenged today that in yesterday's forum the Iranian nuclear power program was something that was going to subject the country ideologically and promote dependency. What are your thoughts on that?

Etemad: I think that for any country that is going for technological development, of course there is a certain degree of dependency. I can give you the example of Japan and Germany, which have been very dependent on technology since the war. In fact, Japan has imported all its technology. In the beginning, as everybody knows, Japanese-made products on the market were copied from what existed in other countries. Then they learned little by little and they made better things, and now they have the market.

Germany, a very highly industrialized country, was not active in the field of nuclear energy until the late 1950s, and when they started to go into that field, they were far behind the other countries. But, they started to transfer the technology, they entered into agreements with other countries, and little by little they became more or less independent in that field.

But still, neither Germany nor Japan is independent in the sense that these people mean. They have to import fuel for their nuclear plants. The enrichment services for both Japan and Germany are being done outside their countries. These countries are not scared of having that degree of dependence regarding other countries, because we are right now going into the age of interdependency. As the economy of a country gets more and more complicated, I think the idea of self-sufficiency and complete independence is becoming irrelevant.

Countries should be in a position to have a good bargaining position with these other countries, and the bargaining position means that you have to give something. I think this fear of not being in a position to bargain with these other countries is a lack of confidence on the part of a nation. Closing the door to new technologies does not enhance that situation. I think Iran was getting dependent on technology not only in the nuclear field, but in all fields we were to some extent dependent on other countries. All the developing countries are dependent. I can give you the example of South Korea and Taiwan, two small countries with no resources. They have also followed the line of Japan, bringing in technology while still remaining dependent on large technologies coming from outside. Nevertheless, they manage to have a very high standard of living, and a very fruitful and extensive industry and they are exporting a lot of goods.

Estévez: What were the training plans that you had?

Etemad: From my last answer we can conclude that real dependence of poor or developing countries is the lack of knowledge of basic research, of the basic matters necessary to develop their countries. So in making plans

according to this energy project, in the fields of research on atomic energy, maybe plasma physics, the fields of science are the key points of the dependency of the developing countries, also the training or educational aspects of these research plans.

Frankly speaking, I have to tell you that what frightened everybody in the world was not that we were building nuclear plants; everybody knew that. But the training of people, research and development, that was what frightened the world, because we were really taking care of that very seriously. More than 2,500 people were in the process of getting some kind of training in September 1978. This training was from the highest level of scientific research, down to training of operators for the nuclear power plant and so on. This program was getting more and more developed; we had our own school in the organization for training operators and technicians.

In the field of research and development, we had a research center in Teheran where something like 700 people worked. Of these probably 150 were professional scientists. The figures are approximate. That center was mostly devoted to fundamental research in nuclear reactor physics; we had a very good program in fusion, which was going on very successfully. We had various programs on laser development. The program in Teheran was going on in a research facility that was very well established and equipped. I think that the only part of the program which is [still] going on is that research center. I say it is going on because the equipment is there and the people are there. The other center which was needed was mostly tied to the problems of technology transfer, more power development and development of techniques for manufacturing of fuel and so on. We had planned to establish this center in Isfahan and that center was half finished. But after the uprising I heard that the center was transferred to Teheran where it was temporarily established, in order for the buildings to be finished in Isfahan. But if it is working, I do not know.

The objective of creating that center was that it would have at least 1,000 people there with 300 professionals working in Teheran or getting training outside Iran in various countries. The most important part of their task would have been maintenance of nuclear power plants, interventions when there was something wrong, and mostly the nuclear fuel cycle. We would have taken care of the problems of the nuclear fuel cycle from the beginning to the end.

That would have been a technological center. The first one was a scientific center. We think that with all that infrastructure we could have taken care of the problems of creating a certain know-how within the country, not to be very, very dependent which is, in fact, not good. To be always in a bargaining position, you have to yourself know enough about the technology. That was going to be achieved.