Interview: Adm. Carlos Castro Madero

'Atomic energy is the motor for our economic growth'

The following interview with Admiral Carlos Castro Madero, the President of Argentina's National Atomic Energy Commission, was conducted by EIR*'s Latin America Editor Dennis Small on June 16, 1982 in Buenos Aires, Argentina.*

Small: Admiral Castro Madero, what are the basic elements of Argentina's nuclear plan?

Castro Madero: The nuclear plan was established in February 1979 and included construction of four heavy-water nuclear centers of 600 MW each, using natural uranium. The first would go into commercial operation in 1987, the second in '91, the third between '94 and '95, and the fourth in 1997. The plan also included installing all the facilities, or factories, needed to control the full fuel cycle. These four nuclear centers would be added to the Atucha I nuclear center of 368 MW which has been in operation since 1974, and to the nuclear center in Embalse which we hope to put in operation between the end of this year and the beginning of the next.

With this plan we hope, on the one hand, to complement our hydroelectric development. There is presently an underutilization of hydroelectric potential, and we hope to substitute the consumption of hydrocarbons with hydroelectricity and nuclear energy. At the moment, conventional thermal power accounts for 59 percent of total installed capacity, which includes primarily oil, gas, and also coal. We hope to reach the end of the century with a proportion of 70 percent hydroelectric, 15 percent conventional thermal, and 15 percent nuclear.

The nuclear plan also serves to prepare the nation so that, by the end of this century—when it is expected that the principal hydroelectric sources will already be under exploitation and we will have to turn to nuclear electric generation as the only alternative to continue to promote development—then these installations, which we hope will reach between 600 and 1200 MW a year, will enable us to face the new century with a high proportion of national participation in our nuclear industry.

The nuclear program also aims at maximum self-sufficiency in our use of nuclear energy. That is why we have chosen to use the natural uranium and heavy-water process, which does not require the costly and sophisticated process of uranium enrichment, but which will give Argentina access to the full fuel-cycle. Thus this nuclear program also provides both Argentine industry and engineering, which are two fundamental pillars for achieving self-sufficiency, a future and a continuity of action which are invaluable for these two private sectors to determine their own necessary levels of investment. All this, then, we hope will enable Argentina to reach the end of this century with the capacity to construct her own nuclear plants and to fuel them herself. Regarding the construction of nuclear plants, we believe we can achieve 100 percent capability in engineering, 100 percent in site preparation, 90 percent in actual construction, and 65 percent of the required electromechanic components. In this way we will be relatively free from possible pressures in the political field which would restrict our access to nuclear technology.

Small: There are people who say that the countries of the developing sector don't need nuclear energy. There are people who say that it is a luxury, that Argentina has oil and so doesn't need nuclear energy. Nonetheless, Argentina was the first country in Latin America to enter the nuclear age. Why?

Castro Madero: In Argentina we have given great importance to nuclear energy since this energy form first appeared. Recall the year 1955, when the first conference was held in Geneva, and where Argentina participated with various studies. There was at the time great optimism that nuclear energy could advantageously replace the traditional energy sources that had been used until that time—oil, coal, gas. With the passage of time this idea was confirmed, such that it motivated Argentina to continue developing her capabilities in the nuclear field. Then in 1968 we decided to install our first nuclear plant. That plant, which is Atucha I, has been functioning normally since June of 1974 and has demonstrated, first, how economical energy produced by nuclear means is, to the point that it is the plant that generates the cheapest electricity of all the installations in the country. Therefore, to say that nuclear plants are a luxury for developing countries is, I would say, a mistake.

I believe that the countries of the Third World have

an important responsibility to reduce consumption of hydrocarbons, since they are running out and are now going to cost more, and to utilize them instead exclusively for irreplaceable functions, such as in the petrochemical industry. On the other hand, nuclear energy, beyond cost comparisons, has significant other advantages in terms of developing human resources: it fosters a very large number of disciplines at the highest level, with which we can answer the training needs of our youth. At the same time, the nuclear sector enforces higher quality standards which will improve industry generally, which in turn is being translated into a greater reliability of the different components produced not only for the nuclear field but for other applications as well.

Small: Argentina, then, by committing itself to a nuclear plan for the future of the sort you have described, is asserting that its economic growth will move forward. It is saying that Argentina's idea is to industrialize and modernize itself for the 21st Century.
Castro Madero: That is the fundamental objective. A few years ago we forecast a 10 percent annual growth in demand for electrical energy. Those predictions were not fulfilled; we entered a recession. But I believe that period will reach its end and that Argentina necessarily will need a sustained growth in electricity demand, because it is a country with lots to do, with some very unpopulated areas. And I believe that to become a nation of relevance, of weight in this world, Argentina is going to need energy for its development

Small: Then what do you think of neo-Malthusian theories such as those of the Club of Rome?
Castro Madero: I understand that that study is a very pessimistic one. It is precisely technology which can provide solutions to many of these questions, that it is going to solve the problems that the book *Limits to Growth* poses.

Small: In other words, there are no real limits to growth?
Castro Madero: I, at least, don't see such limits. I certainly don't see them with the gravity they are posed there.

Small: Besides, after nuclear *fission* development, there will follow thermonuclear *fusion* power, the next technological leap forward.
Castro Madero: Of course. Nuclear fusion seems to be the definitive solution to the electricity problem, since its fuel source, isotopes of hydrogen, is found in infinite quantities in sea-water.

Small: Does Argentina have plans for fusion? Is research under way?
Castro Madero: Yes. We have a very modest nuclear fusion research program. We recognize that a huge quantity of money would have to be invested to play a relevant role in this. But we have experience in fission reactors; we have already trained teams of professionals so that, when fusion power becomes commercial and can be efficiently introduced as an energy source in Argentina, then we will have the specialists so that the country can make decisions based on its own criteria, adaptable to Argentine needs. Just as we chose the natural uranium route, which I consider a correct decision, will we also be able—through this group of professionals—to make similar decisions advantageous to the country.

Small: There is a theory which surfaced in the U.S. and has been widely circulated, stating that energy growth can be "de-linked" from economic growth generally.
Castro Madero: I believe, and all past experience proves this, that there is a direct correlation between economic growth and the consumption of electrical energy. . . .

Small: In the U.S. we have several serious problems in the nuclear field. One of these is the high interest rates and economic recession that have seriously damaged sectors such as nuclear. Another problem is the failure to export nuclear plants. And a third problem, which I would like you to comment on, is the ecology or environmentalist movement, the "green" movement.
Castro Madero: Fortunately, we have no such movements in Argentina, although we don't lack ecology groups per se. As far as I know, in Argentina we have had no problems with these groups, and I attribute this to two fundamental factors. One is that our nuclear plan has become a question of national pride, and people understand that this enables us to project ourselves towards advanced levels of technological development. And the second very important factor is that the National Atomic Energy Commission, aside from its regulatory functions, has maintained permanent contact with the ecology groups, with scientific groups, with groups of citizens in the areas where we installed the nuclear projects. And those groups have participated in ecological studies on how the nuclear installations affect the environment. Far from having them in the opposition, these groups support the development of nuclear energy.

I think that in other countries there is a component of the left in the ecology movements which is out to stop the growth of the West, and by presenting this in ecological garb they have achieved a certain success in turning public opinion against nuclear energy—which, among all the energy sources, is the least contaminating.

Small: What can you tell me of the nuclear waste question, which has caused so much alarm, and what are the

plans to solve this here in Argentina?

Castro Madero: Regarding the venting of radioactive wastes into the atmosphere, we do this at such diluted levels that they actually fall well below the minimally acceptable levels. Regarding highly active radioactive wastes, as you know they are handled through fuel reprocessing, or stored in underground containers. We think the most adequate means of treating radioactive wastes is, first, through reprocessing, and then vitrification, storing them in stable granite formations which are not affected by radiation. We have done studies throughout Argentina and have discovered some 200 such likely zones, of which we have chosen one in the province of Chubut. There we have already begun drillings to determine if the place is truly appropriate for storing highly active radioactive wastes. The moment we can set up a reprocessing plant in Argentina, the wastes can more conveniently be dealt with, again without any danger either for the population or for the environment.

Small: What are these reprocessing plans, and where do you hope to obtain this technology?

Castro Madero: We are in an advanced stage of construction of a reprocessing plant, I would say a pilot plant, through which we hope to acquire all the "know-how" required for reprocessing. It will perhaps be ready to enter into "cold" operation by next year, and into "hot" operation by the middle of 1984. With it we will reprocess the fuel elements of the first nuclear plants, and this will give us the basis, when the moment arrives, to build a larger plant. Reprocessing is what is called a "sensitive" technology, which no advanced-sector country will offer, and which we have therefore faced with our own capabilities.

We will continue going forward ourselves, given that it is a technology which has been available since 1955. Our country conducted its own study; we built an experimental plant and reprocessed some plutonium; and all this laid the basis for today facing the task of constructing this more significant pilot plant.

Small: What type of technological assistance has Argentina received for its nuclear program, and what do you think of the international environment regarding the development of nuclear energy?

Castro Madero: We have basically received technology from two sources. One is Canada, by which means we are constructing the nuclear plant at Embalse; and the other is Germany, through its KWU [Kraftwerk Union] company, which built Atucha I and is now jointly building Atucha II with us.

We have another source in the field of heavy water, which we get through the company Sulzer Suisse. Regarding the fabrication of fuel elements, we have a factory operating with German technology. Our plant for producing uranium dioxide is also of German origin.

We have been faced with difficulties in developing an independent nuclear program without getting tied up in treaties which we consider discriminatory, such as the Non-Proliferation Treaty, or which deprive us of freedom of action.

We truly believe that the policy followed by the industrialized countries—of denying technology transfer in specific areas such as reprocessing, or in demanding conditions beyond the normal safeguards that should accompany all transfer of technology—works against the very objectives they seek to achieve. Our position is that the best means to avoid proliferation is through the intensification of international trade, such that technology transfer is intensified, and that this technology transfer should be accompanied by safeguards of the International Atomic Energy Agency, creating a network of safeguards on all installations under development. Thus all the nuclear activities of a country would have great transparency.

All these restrictions and additional demands, what do they produce? That countries, like Argentina, must then decide to develop on their own account and at their own risk, certain technologies that escape the network of safeguards. This in turn shrouds the nuclear activities that develop in such countries, and thereby works against the very objectives pursued. Soon many countries will begin to build plants outside of all safeguards, and one will be unable to determine what they are up to.

Small: In other words, the non-proliferation movement leads to proliferation.

Castro Madero: I think that it leads precisely to proliferation. You can see that Argentina has its reprocessing plant, which is not under any safeguard, when, had it received aid from abroad, it would undoubtedly be under safeguards.

Small: Then what is the motivation of those people who use the argument of non-proliferation? Could it possibly be the same as the ecologists?

Castro Madero: I think there is a general idea shared by all of humanity, which is to avoid nuclear proliferation because it undoubtedly increases the risk that the world will be involved in nuclear war. But behind this idea, which I think the entire world shares, some hide their goals of political, military, and economic domination. Therefore by denying technologies, a gap in technological development between the developed and developing countries is maintained. Therefore, we developing countries are suspicious of the true motives behind the anti-proliferation measures.

Small: I would imagine that following the Malvinas crisis, this orientation of Argentina's has been strength-

ened, in the sense that it wants to be truly self-sufficient because it is not going to receive help from where it had hoped to receive it.

Castro Madero: Of course. In the light of this Malvinas war—which has put an entire system of concepts and international relations, as well as our internal ideas with respect to industry, in crisis—we have proven that our nuclear policies have been the most appropriate. Thus, a nuclear industry has been developed which has practically made the embargo measures taken by the European Community against our country useless. Being able to produce fuel inside the country is also comforting in that it cannot be used for political ends to pressure Argentina to subject its will to others. The fact that we have been very open about transfering nuclear technology to Latin American countries, means that we have in turn received strong solidarity. The same has been the case regarding our role in promoting nuclear energy in the Non-Alligned group. The fact that we did not sign the treaties to which so many countries of good faith adhere, has also proved us right, because signing such treaties would have prevented us, for example, from ever using nuclear submarines, as Great Britain did against our country. All of this shows clearly that this non-proliferation policy leaves the developing sector nations dangerously unprotected.

Small: What did you say in Vienna on this subject? And how do you respond to the charges that you are developing the atomic bomb?

Castro Madero: In Vienna I said that all the countries meeting there had formed the International Atomic Energy Agency whose objective was to accelerate the contributions of nuclear energy to the peace, well-being, and progress of humanity. That Argentina had fully adhered to this policy, in that all its relevant institutions are submitted to safeguards which obligate us not to use them for military purposes. That is to say, we cannot develop a nuclear submarine. Nonetheless, Great Britain did not hesitate to use nuclear energy to fuel submarines which gave them a significant war-fighting superiority—such that we have not been able to use our fleet.

Thus, this disadvantage is a consequence of the policy of non-proliferation. Therefore, I believe that what will happen is that the developing nations will grow increasingly skeptical, since non-proliferation measures are not intended for the stated high ideal of avoiding holocaust, but rather for the preservation of military, political, and economic domination. And I therefore explained that Argentina maintained its assumed commitments to not use nuclear energy [for military ends—ed.] in those installations where the commitment has already been made; but that in the future we will feel free of all commitments to not use nuclear energy for so-called permitted military ends, such as that of propulsion. This does not imply in any way that there is going to be [military—ed.] nuclear development; just that we will consider the possibility of developing a greater use of nuclear propulsion.

But with respect to the bomb, the Argentine position is clear. Our objective is a united America, an integrated America. And if a Latin American country develops a nuclear bomb, a nuclear artifact, this will undoubtedly produce suspicion or distrust among the countries of America, that would in turn lead to an arms race among the countries of Latin America. This arms race would only aggravate the problems of Latin American underdevelopment. Thus we firmly believe that [military—ed.] nuclear development would be totally negative for Latin America. It would give only an ephemeral advantage to those having nuclear development; because in two, three, or four years it would be progressively matched by the other Latin American countries, and would truly go against our development and would annul something which today is a privilege for this continent, which is the total absence of nuclear weapons.

Small: When you referred to the kind of international agreements that should exist to have technology transfer and transparency as well, this reminds me very much of Eisenhower's "Atoms for Peace" program. Are you referring to this?

Castro Madero: Of course. It was a golden era, Atoms for Peace, until India's explosion in May 1974. Then there was the promotion of commercial interchange in the nuclear field which helped all countries to have the possibility of access to a more rapid development of nuclear energy by sharing their experiences. Starting in 1974, when they had the explosion in India, which was not an explosion for bellicose ends, all sorts of restrictions began: the creation of the London Club, secret meetings in which they took measures of technology transfer to the detriment of the developing countries; and the creation of sensitive areas, where there is practically a ban on transfer of technology. And I reiterate that this translates into an increase in the technology "gap" which separates us from the industrialized countries.

Small: Do you have some message, some last words, to direct to the United States?

Castro Madero: I think that the role of the United States in nuclear development is relevant. I wish that the United States would reassume the leadership in the nuclear field which it once had, but that it has lost today. I believe that this loss will not only reflect on the United States, in terms of its own economic development, but will undoubtedly also reflect on all the developing nations, who will not be able to count on the possibility of scientific and technical advances that they could have made with the capability the United States has.