interest rate, discounting inflation, is only 2%—could mean that workers will receive a smaller pension than they would have received under the previous scheme. The government is using this as a pretext to "attack" the problem by allowing the funds to be invested in higher yield—but much riskier—instruments.

An 'Argentina-Style' Crisis

As the problems afflicting the system accumulate, the desperation of the neo-liberal managers of the economy grows. Thus, they are attempting to silence the opposition by holding up the bogeyman, that the cause of Argentina's problems (and potentially Mexico's) is its fiscal deficit and a non-renegotiable debt. "However," argues Banco de México Governor and former Zedillo Finance Minister Guillermo Ortiz, the ultimate cause of Argentina's problems is that "the politicians did not come to any agreement." Thus, says Ortiz, the urgency of Mexico's Congress approving a fiscal reform to increase government income, and an energy reform to increase foreign investment.

By refusing to recognize that the bankruptcy of Argentina, Turkey, Poland, and of the United States itself, is a reflection of the overall bankruptcy of the global financial and economic system, these neo-liberal managers will end up dooming Mexico to collapse, with or without the "fiscal reform" they hold so dear.

Interview: Satoru Ohtake

Japan Urges U.S. To Rejoin Fusion Project

In July 2001, Japan, the European Union (EU), Russia, and Canada completed the design for the International Thermonuclear Experimental Reactor (ITER). While the United States was a founding partner in ITER in the 1980s, in 1998, it withdrew from the program. Thermonuclear fusion promises an unlimited supply of energy, and requires an aggressive international effort to become reality. Marsha Freeman interviewed Satoru Ohtake, Director for Fusion Energy, Ministry of Education, Culture, Sports, Science, and Technology on Dec. 5, at the Japanese Embassy, during his trip to Washington to discuss ITER with U.S. energy officials.

EIR: What is the purpose of your visit to the United States?

Ohtake: I came into this position of Director of Fusion Energy in mid-July, and have worked since then mainly on ITER. It is necessary to secure large-scale resources and a fixed, rigid international framework for that program. The discussion in Japan about whether or not to participate in ITER or, furthermore, to host the experiment, is continuing, and in that discussion, the attitude of the United States is very important.

As you know, ITER has been in preparation for a very long time, about 15 years, from the very initial stage. For the past nine years, the countries concerned have carried out the preparatory study and conceptual design activity, leading to an engineering design. These nine years ended in July, and the engineering design is completed. The United States initially was a member, but unfortunately three years ago there was some discussion in the United States and there was a misunderstanding or conceptual change there, and the U.S. got out of the circle, in 1998. Now, ITER is ready to come up to the full-fledged phase of construction. At this time I think it is necessary to come to the U.S. and discuss with the people concerned, the U.S. reentering the project.

EIR: Why is it important that the United States rejoin the ITER project?

Ohtake: Because regarding ITER, we—meaning Japan, the European Union, Russia, and Canada—are quite ready and confident and have enough engineering technology back-

ground to realize ITER now. But it is an international program, so if the United States reentered ITER, it would be more, or really, international. Also the United States is an old colleague in our ITER club, so we will discuss it with our colleagues in the United States. That is my intention in coming here.

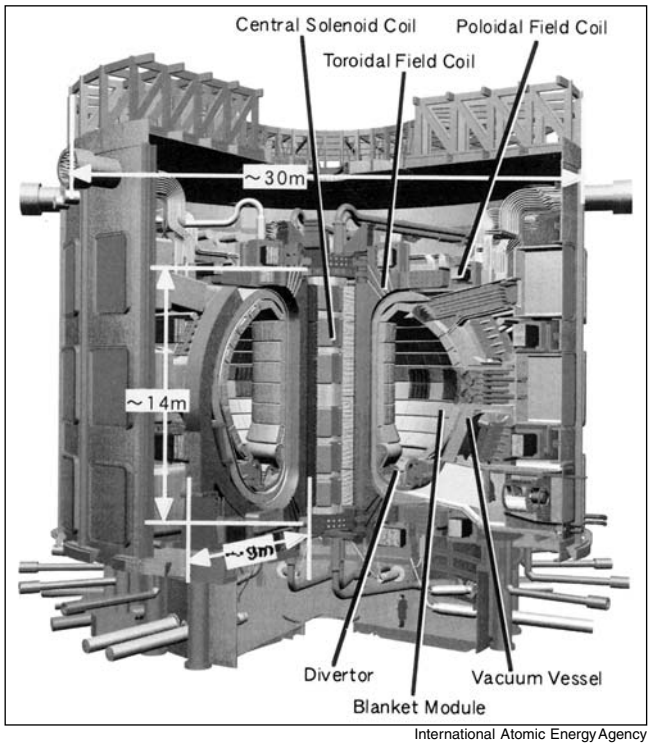
EIR: It is my understanding that ITER will be built in a way similar to the International Space Station, where there will not be cash contributions, but contributions in kind, in components and manpower. Do you have an idea yet of what different countries would be contributing to ITER?
Ohtake: Actually, the concept of the construction of ITER is that we think of the contributions in two ways—contributions in cash, and contributions in kind. For management matters, it is necessary to have cash for implementation and organization. We are going to set up an international legal body for ITER; so for the management and day-to-day business, it is necessary to have cash contributions.

Regarding the construction itself, we will contribute in kind, which means, for example, that some country will contribute the magnets. For the time being, the three major ITER parties can take care of all of the parts of ITER, but if we have some other parties join ITER, we would rearrange the share of each of the partners and the newcomers could contribute in kind, as well.

The negotiations just started last November, so we don't know in detail about these cost-sharing matters yet. At this time, it is possible to discuss only the very initial sharing of contributions. I think that, in the United States, you have very good industrial potential, and I think if the U.S. decides to reenter, your country would find some parts that are interesting to industry, and it would be very good for ITER itself.

EIR: The Japanese plan, then, is to try to encourage the United States to reenter. But it seems to me that the partners are making a commitment to go ahead and construct ITER, even without the United States. Is that the case?
Ohtake: Frankly, U.S. reentry is quite important, but not conditional. It would be better, but is not inevitable. After the U.S. got out of ITER, the remaining major parties—our engineers and researchers—made a great effort to downsize ITER [in cost] and carried out the task of the engineering design activity. We are very confident that they can do the work of ITER for the time being.

What is more important is that after constructing ITER, we will have a burning plasma, and this is an essential and important step to make nuclear fusion into a source of energy. We can share this goal with all of the international partners who have the potential to carry out this kind of scientific and engineering work. We are open to every country and also to the United States, especially, because we are old partners, and there is no doubt that the United States has a top, world-class fusion potential. So we encourage them to reenter. It is up to the United States to decide, but what we can do is encourage.



International Atomic Energy Agency

The International Thermonuclear Experimental Reactor is slated to begin construction in 2003. Its purpose will be to produce a burning plasma, and to make sure of the possibility of fusion as an energy source.

EIR: Are there other countries that have expressed an interest in participating in ITER?
Ohtake: Yes. China showed an interest in ITER first, and Korea expressed an intention to participate. China shows a very apparent interest. We are glad to have a sign or proposal from other countries to get into ITER, because they can contribute real work. Each members has to contribute. It is necessary to have some statement from the newcomers, a commitment.

EIR: If they wanted to enter at this time, going into the construction phase, how could they contribute?
Ohtake: If they do not have the potential to contribute hardware, cash is also needed. Each member has to contribute hardware or cash. They would enjoy participating in the learning phase. And in the operational phase, they will have a chance to do experiments.

ITER will produce a burning plasma continuously for several minutes or several hours. It will be the first time for us to have a fusion system on the ground. Scientists, or researchers, and engineers would like to do experiments. From the scientists' point of view, they want to know what is going on in a burning plasma, which is a complex system, quite different from the elementary particle question, or something

like that. It's a very huge, complex system.

From the engineering side, they would like to know how to produce energy from the burning plasma, using some apparatus for exchanging the energy of the fusion neutrons, to produce high-pressure water, which will require some intermediate process. ITER is an engineering reactor, so the goal is not to make energy on a full scale, but some engineering phase or trial to make boiling water will be carried out, and in some case, we can produce a small generation of power.

EIR: What is the schedule now for ITER?

Ohtake: The schedule for ITER now is that we have to make the so-called joint implementing agreement between the parties. This is the legal framework, which will provide the duties and rights of the parties. This work will continue up to the end of 2002. In order to finalize the draft of the joint implementing agreement, it is necessary for us to decide a site, and we are scheduled to decide in the middle of 2002, in May, or a little later.

As you know, Canada has already offered a candidate site, and Europe is finishing a technical assessment of Cadarache, in the south of France. Spain, an EU member, has given a very preliminary intention to invite ITER there. Their technical assessment is not finished, just their intention was shown.

In Japan, we have finished the domestic site assessment, which is a technical assessment, but we haven't yet confirmed a conclusion about a site, as the Japanese government hasn't yet decided on a formal position in ITER. The discussions are now continuing on whether we will be hosting ITER, but we have finished the technical assessment of the sites.

Three prefectures (we have 47, like your states) offered, or showed an intention, to host ITER. They were Hokkaido, Ibaraki, and Aomori. After the technical assessment, Ibaraki and Aomori are eligible for the building of ITER. So we have, at least, in Canada, the Clarington center; one in France; maybe Spain; and two eligible sites in Japan. Now that we have at least three candidates, we can discuss making a joint site assessment and discuss cost sharing. Then we will finalize the agreement. In some countries, the agreement will need to be ratified, like a treaty.

We hope to start the construction phase in 2003. It will take two years to establish the international organization to carry our the construction, operation, and decommissioning of ITER. The construction will take ten years.

EIR: Why will it take that long?

Ohtake: Because there are many high-technology parts, such as the toroidal magnets. There are 19 such superconducting magnets, which require new materials. Making the superconducting wire takes a lot of time and is very difficult. It has a complex structure. In Japan we have a stellerator machine, which has a very long helical magnet, and to wind up this magnet takes two years. Then the magnet will have to be tested, and finally it will come to ITER.

The construction process can possibly be shortened by two or three years. Then we are in the operational phase, for at least 20 years. For the first 8-10 years, we will be "warming up" ITER. First, there will be experiments introduced with a simple hydrogen plasma, in order to test and condition the metal machines. Then, they will introduce the deuteron, or double hydrogen. Finally, they will introduce deuterium and tritium to produce the real fusion phenomenon. Then they will start real engineering and science experiments.

For example, we will introduce a new type of blanket, which will be used to pull energy from the burning plasma and convert the neutron energy into high-pressure boiling water. Or we can use the fusion neutrons to make tritium. Fusion neutrons can be used together with the light metal lithium, and you have tritium. That is one of the advantages of fusion, that it can produce energy and its own fuel. We will have about ten or more years of energy experiments. Engineers and scientists will get the results and we will have enough experience to transfer it to the energy-producing machines from the experience on ITER.

EIR: There is concern in the U.S., that if money is spent on international collaboration, there may not be funds for a robust domestic fusion effort. How is this viewed in Japan?

Ohtake: We have the same issues in Japan. After the reform last January, almost all of the fusion programs in Japan are under the supervision of my office, in the Ministry of Education. This allows us to organize all of Japan's fusion resources.

The real problem is that there are limited resources, which we must know how to allocate properly. ITER is an international, single-purpose machine. Its major purpose is to produce a burning plasma, and to make sure of the possibility of fusion as an energy source. That is the major purpose of the machine—not science.

It is necessary to maintain good potential fusion science research in Japan, for two reasons. First, because compared to the United States, in Japan our energy problem is very serious. We have no petroleum sources, as you do in Alaska, or Texas, so energy is quite an important issue. Even if ITER is a great success, we need a domestic fusion energy system. Our energy security in Japan won't be solved just by ITER, so we need to have our own fusion system in Japan.

Second, ITER is a very long-term project. As I joke, when ITER is finished, I will be retired. So we must continue to secure good human resources and personnel regarding fusion research in Japan: Scientists will work on ITER, carry out good experiments, and then return to Japan and advance the results in the research in many ways. We need top-level plasma machines in institutions in Japan, in parallel with ITER. We must maintain plasma science.

In many institutes and in universities, there are small plasma machines in Japan. It is apparent that it is not realistic to have ITER in addition to all these small machines all over Japan. So we started discussing our plasma science programs with all the university directors of fusion science, and how to improve Japan's domestic fusion program. We have six or

seven mid-size or large-scale machines now in Japan, but, probably in the future, we will have three or four advanced top-class machines, and all the universities and laboratories will cooperatively use these machines. For very small machines, it's okay to have many, because they do not cost much, so they will maintain these machines using research grants.

Some middle-scale machines, if they would like to keep them, will be only "out of fashion," and not be involved in the top-level research, so they have to change. They can share time on the top-class machines, which is also done with accelerators. I have been discussing this with many university professors, and they are now aware of the situation. The Japanese economic situation is *so* bad, it is not easy to have so many devices, or a plentiful budget from the finance authorities for the fusion programs. We should have the best use of the limited budget to maintain fusion research.

EIR: What kind of financial commitment would be required for Japan to host ITER?
Ohtake: During the construction phase of ITER, the peak in the annual budget for the host country will be about $400 million. The total ITER cost will be 1.2 trillion yen, or about $10 billion, over 35 years. This includes, in the final five years, the cost of decommissioning. The host country, if it is one of the three major partners, would be responsible for 50% of the total budget. This breaks down in the following way.

During construction, the cost-sharing will be divided into two parts: first, the non-common part, which means the buildings and infrastructure, which the host country should provide. The second, common part, is made up of the components, such as the magnets, which the participants will bring to ITER, with the fabrication work done in the participating countries. The non-common infrastructure part should be about 20-25% of the total construction cost. It means that the rest, about 75-80%, is the common part, to be shared by the major partners. If there are three partners, the host country will share 25% of the common part, or the hardware, and also be responsible for the 25% of total cost that is the non-common part, or 50% of the total.

One problem in the Canadian proposal, is that Canada is not willing to pay the total of the non-common part cost, I've heard. The resources are not enough to take care of all of the non-common part.

If Japan were to host ITER, at some time in the construction phase, it would cost $400 million for the peak funding year, which would compare to the $200 million that should be budgeted for the domestic program every year. So we need to add double to our resources, to host ITER. I am looking into using some of the resources in the Atomic Energy Utilization Program, which has a huge annual budget of $3 billion this year, under the Ministry of Education. Within that $3 billion, we are trying to reshuffle that program, which funds our nuclear projects and accelerators, and squeeze out $400 million for the peak funding year of the ITER fusion program. And it should be possible to secure the $400 million in addition to the $200 million. It is worth a try.

EIR: When will Japan decide if it will participate in the construction phase of ITER, and offer a site to host the project?
Ohtake: Japan is still discussing this. The Atomic Energy Commission has decided on participation, and now the supreme advisory board, which is chaired by the Prime Minister, the Council for Science and Technology Policy, is discussing it. They have issued an interim report. They recognize the importance and meaning of ITER, but will want to be convinced about its cost-benefit. Participation is assured, but hosting ITER costs double the resources, so they will think about it. If there is additional money, they will say yes, but the current situation is very severe, so they are doing everything imperfectly.

I hope that they will come to the conclusion that Japan will be hosting ITER. I feel fusion is a very difficult program. We need to have the experience of a burning plasma, and then be sure it is a good candidate for a future energy source. We have to pass this very high-level challenge.

EIR: People here often say to scientists, "You have been working on fusion research for 30 years, and we still do not have it. Why do you still keep doing it?"
Ohtake: In the case of fusion energy, people don't know very much about it. In Japan, the case is the same. Fusion is something like a mirage, because some of the researchers said in the 1970s that in 30 years, you can have energy. Now 30 years have passed, but still we say, 30 years from now. Some of the leading politicians in Japan say this, so we have been discussing this. We do not have so many possible energy choices. Of course, we have some renewable sources like solar energy or hydrogen. But solar energy is not a large-scale energy source. It should be a local, complementary energy source, but it is not possible to replace oil-burning systems, or coal systems, or nuclear fission reactors with it.

Hydrogen should be a secondary energy, like gasoline for cars, because it is necessary to have a strong electricity source, or hugely powerful source of high temperature to produce the hydrogen. So fusion is one of our future choices. That is why we pursue this possibility. It costs a lot, I know, but if we can be successful with a burning plasma, a very convincing new alternative will be assured.

EIR: In the United States, fusion research has received very little funding or public attention. How would participating in ITER help that situation?
Ohtake: ITER is a great international, and very encouraging, endeavor. If we introduce the question of U.S. participation, we can reinvigorate the discussion in the United States. I think we are ready, in any case, to start to build ITER. But for fusion science, for all human beings, it is better for the United States to participate. The United States' potential to carry out fusion research should be reinvigorated, and it will be of great help for all human beings. That is what I honestly feel.