The U.S.-India Nuclear Deal and Iran (Interview with Arjun Makhijani)

The Rediff Interview/Dr Arjun Makhijani [1]

India should choose Iran, not US

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Dr Arjun Makhijani, president of the Institute for Energy and Environmental Research and one of the leading technical nuclear experts in the United States, believes that even if India gets everything it wants under the US-India civilian nuclear agreement signed by President George W Bush and Prime Minister Manmohan Singh on July 18, it would still be only a tiny fraction of the oil and gas it could obtain from Iran to meet India's growing energy needs.

It is not, Dr Makhijani argues, therefore worth jeopardizing India's relationship with Iran by voting with the United States against Tehran at the International Atomic Energy Agency.

Dr Makhijani, a PhD specialising in nuclear fusion, has since 2004 served as one of the principal members of a team providing technical support to the President-appointed Advisory Board on Radiation and Worker Health. He has also served on the Radiation Advisory Committee of the US Environmental Protection Agency from 1992 to 1994 as well as several other scientific advisory committees.

He has authored, solo or as part of a collaborative effort, numerous reports and books on energy and environmental issues. He was principal author of the first study of the energy efficiency potential of the US economy published in 1972, and principal editor of Nuclear Wastelands: A Global Guide to Nuclear Weapons Production and Its Health and Environmental Effects, published by MIT Press in July 1995, which was nominated for a Pulitzer Prize by MIT Press.

He has also on numerous occasions testified before the US Congress, and has appeared on ABC World News Tonight, the CBS Evening News, National Public Radio, CNN, BBC, C-SPAN, and CBC.

Dr Makhijani spoke to India Abroad's Managing Editor Aziz Haniffa in Washington, DC.

You and your organisation have done extensive technical research on nuclear energy and civilian nuclear reactors. What is your take on the US-India civilian nuclear agreement?

First of all, it is not as yet an agreement, since there will be many obstacles in the US Congress as you know. Secondly, even if it is approved by Congress, it is not going to make a material difference to India's electricity scene.

If you look at India's electricity goals, which is 20,000 megawatts by 2020, the whole of the nuclear

energy sector will at best contribute 10 to 12 percent of the total requirement even if everything goes as planned.

For this, India seems to be giving up, or at least jeopardising, a much larger and more sure source of energy, one that could provide electricity more competitively than nuclear, which is natural gas from Iran. So it (the US-India nuclear deal) does not look like a very good deal, even just on economic terms, never mind the other political or strategic considerations.

You said nuclear energy will by 2020 fill maybe about 12 percent of India's energy needs. Currently, the nuclear component contributes three percent.

It is about three percent now, (but) in fairness, in the first few decades, India's nuclear energy sector had many serious problems leading to chronic underperformance and high cost. In the last few years, the performance of the nuclear energy sector has considerably improved. But it still remains — for the effort, economic as well as political that has been put into it — a very low figure. The damage from under-performing nuclear plants in the electricity sector has not been properly assessed in India.

Can you give me concrete examples of under-performing nuclear power plants?

For example, the Rajasthan nuclear power plants, which were chronically under-performing in the 1980s and 1990s, were in the context of the electricity sector overall, quite weak. And so when you have important power plants that go down or offline most of the time or much of the time, what happens is that it has a disproportionate impact on industry.

It's not like a light going off in the house when the electricity goes out, and when it comes back on the light just comes on. These plants have to be started up very carefully, and with a certain procedure that is very costly and lengthy. So the impact of an under-performing and unreliable nuclear energy sector on Indian industry has been very significant.

The most important thing in the electricity sector in India is not the cost of electricity — it's the unreliability of electricity. And, the fact that power is unreliable in India is one of the reasons that China gets a lot more investment despite higher costs. If you look at where corporations invest abroad, they don't invest in the cheapest labour places or even necessarily in places where they have more skilled labor, they invest in places where they can surely perform their jobs.

That is why Indian software is not a very big deal — they can invest there because the performance of the software sector does not depend that much on large scale electricity supply. You can have emergency generators; it's not costly to do that. But the performance of a heavy industrial sector does depend on large scale supply of electricity. So it's very damaging to have the kind of lackadaisical approach to electricity that we have in India.

But isn't this an argument that the Indian government itself is making, that it has to get the power sector going if the economic growth rates are to be maintained? And that in order to do that, addressing the acute energy needs is imperative and one way of doing it is to generate nuclear energy?

The power sector is much more than a set of generating plants. You have to look at the whole sector. The sector has four different pieces in it. It has a generating side of course, without which there is nothing — you have to have generation. But it doesn't have to be all centralised generation.

Some of it can be medium-scale and some of it can be small-scale, and it has to be connected together in a sensible way. The second thing is the transmission infrastructure.

The third thing is the distribution infrastructure, and the fourth thing is the consuming equipment — and they are all integral to the power sector.

I'll give you an example. I was part of the US Presidential Energy Mission to India in 1994, as an adviser, because I know the Indian energy sector as well as the US energy sector. I had no business interests. I was just invited, and I saw the Enron project as a looming disaster even at the time. But of course, who was listening?

I visited power plants of the National Thermo Power Corporation of India at the time and was quite impressed by how well it was run, except one thing — and it was not a problem in the power plant. It was a problem in the power sector. I noticed that something called the power factor was very low, which means that you are not using your generating capacity very well.

You get a low power factor if your transmission and distribution infrastructure is weak and more importantly, if your consuming equipment is of poor quality, specially your fluorescent lamps and your electricity motors.

So I pointed out that improving power can be done relatively cheaply and easily, and instead of rushing to import more generation at very high prices from contractors like Enron, why not first improve the power factor and increase India's effective generating capacity by 5 percent — for a couple of hundred dollars a kilowatt, instead of a couple of thousand dollars a kilowatt, which is what nuclear energy will cost. But no one was interested.

It's much more sexy and attractive to invite foreigners to build power plants than it is to do it with domestic resources that are easily available within India's own infrastructure. By the way, I also found that the National Thermo Power Corporation was doing a great job, and I did not see why India necessarily needed to import so much equipment when there is so much domestic industrial capacity — Bharat Heavy Electricals — and the capacity to build power plants in the National Thermo Power Corporation.

I was very impressed with the laboratory as well as the industrial infrastructure in India, but it is not used well.

So what are you suggesting in lieu of nuclear reactors?

If there were standards for electric motors in terms of their performance, if there were standards for fluorescent lamp ballasts — if we attended to the power factor, then we would be in a better position. The other thing is, we have large transmission and distribution losses. Some of it is theft, but I think less of it is theft — theft has also become a convenient excuse for bureaucrats. I believe a lot of it is the poor

infrastructure.

Because of unreliable electricity, a lot of people buy their own generator sets. This is very, very wasteful of capital. The local generation should be tied up to the grid and if that is done, our transmission and distribution losses would go down quite a bit. So India must adopt a grid approach, and Western countries will move there eventually.

It is very costly to do it here because the infrastructure is so big here. So instead of importing larger and larger power plants — nuclear power plants, which are the largest of all power plants, which puts a strain on the transmission infrastructure — India would do well to have 100 and 200 megawatt natural gas-fired power plants which would strengthen the infrastructure and reliability, apart from cost considerations.

So I don't believe the power sector has been well thought through. There is an ideological commitment to nuclear energy and this is an expression of ideology, not an expression of power sector interests.

Are you totally against nuclear energy and India's efforts to enhance its output in cooperation with the US?

I believe you have to evaluate every technology on what it is going to give you. There is a case to be made for nuclear energy in large countries like the US or India or any other large country. In small countries, there is not so strong a case — nuclear power plants are just too big.

But you must ask yourself why you want a particular type of power plant and where it fits into your infrastructure.

I believe in a situation like India's, there are a number of disadvantages. I don't like nuclear energy from a number of difference points of view. The first is that it is relatively high cost. I would like it because it has zero greenhouse emissions at first approximation, and that's a very big advantage of nuclear energy.

But for a country like India, there are a number of disadvantages even if you disregard proliferation. The most important consideration is reliability.

If you build a 100 megawatt power plant and have too many of them, when one of them goes offline, the reliability problems ripple through the infrastructure and your power sector will tend to go down, your electricity supply will tend to go down more often. This is the calculation that is not being done in India.

Reliability is not in the centre of Indian power centre considerations, and surprisingly so, because reliability is the number one problem in India.

You spoke about the quest for nuclear energy in India being part of an ideological drive. Is it, in your opinion, an ideological drive that spans the whole gamut of the overall US-India strategic partnership?

I don't believe it is ideological in terms of the US-India relationship, because that is what India wanted to do — cement the US-India relationship, and it seems to have given up quite a lot in the process. I think India wanted two things from the US — nuclear power and support for a UN Security Council seat. I don't

think the US is ever going to support another Security Council member with a veto.

The nuclear energy deal itself is going to be very tough and many of India's friends in the US Congress are asking questions.

The ideological commitment to nuclear energy goes back to a different era. It goes back to two things — one of which was a kind of ideological disease that was pretty much global, centred in the United States and the Soviet Union, which is that nuclear energy is going to be a magical energy source that is going to solve all of mankind's problems.

So the ideological commitment, vis-à-vis India, goes back to the 1940s with Homi Bhabha and (Jawaharlal) Nehru who wanted India to be among the leaders in industry, in science, technology and they, like in many developing countries, many newly independent countries, felt that the prestige associated with the symbols of modernity were going to put countries on the map.

India, of course, had global ambitions in this regard and there was no technology that was more a symbol of modernity than nuclear energy.

So there has been a kind of glamour about being like the Americans and the British, and I understand that. But this idea of technological imitation as a road to greatness… I believe it is the root of this ideological problem. It is actually leading India down the wrong road and compromising India's future as an industrial power.

You have said that even if the agreement is ratified by Congress, nuclear power will provide only a tiny fraction of India's energy requirements. You've also made the argument that in the final analysis, India would be giving up so much. What would India be giving up?

India has jeopardised its relationship with Iran. And not only that — you know, Petroleum Minister Mani Shankar Aiyar has been making great efforts, and I believe rightly so, throughout the West Asian and Central Asian region for India to make agreements on the energy questions, that will ensure long-term oil and gas supplies to India.

I believe the Iranian natural gas deal — both the liquefied natural gas and the pipeline — are linchpins of this whole strategy, partly for geographical reasons and partly for strategic and economic reasons, because they are the closest and cheapest deals. Iran, I believe, has the second largest natural gas reserves in the world. Natural gas, in my opinion, should be a priority fuel for two things — for electricity generation and for transportation.

As we know, the cities of Mumbai and Delhi have been transformed in terms of pollution by the use of natural gas in buses, taxis and so on. And, beyond that, I believe if India took some leadership in the transportation area, instead of thinking that nuclear energy is going to give it technological leadership, India could truly become a technological leader in the world, say in various approaches to magnetic levitated trains, advanced hybrid car technology that is powered by natural gas, things like that.

I believe India could have a transportation sector that would be much more economical of oil and gas if it went to hybrid natural gas powered vehicles. For this as well as for the electrical sector, Iranian gas

supplies would create a potential much larger than 20,000 megawatts of electricity India requires, not to talk of the 5,000 to 7,000 megawatts the Indian government may get from the United States. So the natural gas quantities available from Iran are much, much larger in terms of energy supplies than nuclear power would be from the United States.

So your argument is jeopardising this relationship with Iran for the sake of US nuclear power reactors is too great a sacrifice?

There is also a strategic consideration that India should have learnt from the Tarapur experience, which is that Tarapur was in the context of another period in which India and the United States were supposedly sweethearts, and fuel was promised for this.

Then India did something that the United States did not like, though we know that what India did in 1974 was triggered by something the US did — the US sent the aircraft carrier Enterprise, armed with nuclear weapons, to the Indian Ocean during the India-Pakistan war in 1971 and threatened India.

I believe this was one of the factors that led to the Indian nuclear test (in 1974). But in Washington, not only did it never enter the debate, many of the leaders in the nonproliferation community are not even conscious of the fact that India's decision to go nuclear was in good part prompted by a US nuclear threat to India. They have never taken any responsibility for it, and they have never, therefore, taken any responsibility for cutting off the fuel supply to Tarapur.

It is said there are no permanent friends, only permanent interests, and this certainly applies to all of the great powers. The Indian leadership is now behaving as if this sort of cozy sweetheart relationship is going to go on forever and that the Americans are going to be in some way a reliable partner, more reliable than the Iranians.

I would say if you strip away all of the ideological considerations and ask yourself who has a greater interest in making sure that India gets what it wants, I believe today, among all of the actors, there is no party with a greater interest in making sure that India gets what it wants than Iran.

The plans that Mr Aiyar has been putting into place are very visionary and they are being, I would say, grievously compromised by things like the IAEA vote. Specifically, if India votes with the United States to refer Iran to the UN Security Council, I believe it will kill the India-Iran deal.

Leave the politics aside for now; in tangible terms, how does the supply of natural gas from Iran compare with nuclear energy generated in India with the help of US-supplied nuclear reactors?

Currently, the spot market prices for natural gas are $13 to $14 per million BTU (British Thermal Unit). Iranian gas by pipeline via Pakistan would be delivered to India in the vicinity of $3.5 to $4 per million BTU. This is not only much less than world prices, but at that price you can generate electricity more cheaply and that will create a much more reliable power sector in India than through nuclear power plants.

It is not that all the natural gas should be used for electricity, but just making a comparison on that basis alone — leaving aside the consideration that it would promote peace with Pakistan – the Iran deal could be

the centrepiece of a very large project that I believe India needs to lead in, which is the economic integration of West, Central and South Asia.

Could you speak about the safety factor of nuclear reactors? Do you believe India has taken the required protections against the possibility of nuclear accidents and disasters, in light of investigative reports of problems at some of India's nuclear plants?

Those kinds of investigative reports do make one very uneasy. I have not independently investigated them, but I do believe that many of these reports should be given more credence from official authorities than they have been. Fortunately, India has not had a major accident, even on the scale of Three Mile Island which was much, much less than say Chernobyl.

I can say from the US experience that the safety in the US nuclear sector has depended very critically on how open it is to outside intervenors — that is, in the 1960s, the power plants that were being built here were not very safe. Many did not have secondary containment, their emergency core cooling systems were not very well designed.

Three Mile Island could have been a much worse disaster had there not been whistle-blowers and hearings in which the Union of Concerned Scientists, an independent non-profit, was very critical of how the emergency core cooling systems were designed. As a result of that, the whole thing was revamped

There has been some openness in the Indian nuclear energy sector in the last few years. They do publish some environmental information prior to projects. But I have been dismayed by three things.

First of all, the amount of information is sorely deficient. Much more details need to be available to the public. The idea that the public cannot discuss atomic energy issues, which is in the Indian laws, is obsolete and detrimental to safety. It's not like publishing bomb designs, which is proper to be kept secret.

The second thing is, this kind of information should be thoroughly integrated into the environmental assessments. I looked at the environmental assessment of the Breeder Reactor Project, which is being built at Kalpakkam, and I found it was very thin.

And in the third sector, the Indians are learning an unfortunate lesson from the Americans, in that we have an environmental impact process here, but for the most part it has been perverted over the years — the establishment decides what it wants to do and the environmental impact statement becomes pro forma.

However in the US system, there is some check on that, because the public can take the government to court. I believe the environmental impact process in India should be deepened with a much greater commitment to taking independent steps.

India has a great tap of technical and engineering and scientific expertise. It should take advantage of that and encourage independent thought to make whatever is done — whether it is in coal or gas or oil or nuclear — as safe as it can possibly be made.

There is always a resource constraint, but within those constraints, it has to be open to independent criticism. We (the Institute for Energy and Environmental Research) produce technical studies all the time, and we have a very good record because we send our reports for review to people we know may not agree with our conclusions and then we take their criticisms very seriously.

This is what is needed in the Indian energy sector as a whole, not just in the nuclear sector. India has, for many decades, paid an extremely heavy price for a wrong-headed development of the power sector that is focused on more centralised generation to the exclusion of the other two pieces — strong emphasis on the consumption and distribution side. Not that we don't need more centralisation — we need large-scale power plants in India.

I am not saying small is beautiful. (But) India should have a mix of large, medium and small plants that are integrated. Indian electricity planning overall, I believe, has been far too focused on large-scale generation and on imported generation, neither of which I believe are strategically very good as the basis for planning.

With regard to the requirement by the US that India separate its civilian and military nuclear facilities in a credible manner and put it under international safeguards, do you think this is viable?

I believe for the Indians to have submitted to this with the United States at this time is not very strategically or politically appropriate, specially if India aims to continue as a leader in the non-aligned world. It would be throwing away that leadership for something I don't believe it's going to get from the United States.

In recent years, the United States has given up its own leadership in regard to civilian facilities and nuclear weapons materials because it is currently making Tritium for its nuclear weapons program in civilian reactors of the Tennessee Valley Authority. Moreover, the United States is not itself open to IAEA inspections.

India should exercise its leadership to make the nuclear playing field level for everybody. I am not particularly for nuclear development in Iran or the US or anyplace else because of all the reasons I've told you. However, I believe it is very corrosive for India to be promoting what it not so long ago called nuclear apartheid.

I was very saddened to read a comment from some official, a year or two ago, that Indians no longer talk about nuclear apartheid because India is now part of the club. This is a very, very corrosive idea.

India should talk about nuclear apartheid with the idea of getting rid of it, and leading the way in its best traditions; India should be pressuring the nuclear weapons states to get rid of the bombs. Unfortunately, the present direction of leadership in this arena, I believe, is going to be very detrimental for the country.

What India should do is publish a strict set of criteria, which will make the nuclear energy field in regard to proliferation equal throughout the world. If there are going to be inspections, then let them be universal. If there are going to be Additional Protocols of the IAEA inspections, let them also be universal.

Notes:

1. This article originally appeared at rediff.com. Courtesy India Abroad and rediff.com ? Return