Interview: Linden Blue

The Modular HTR: 'Its Time Has Come'

Linden Blue is vice chairman of General Atomics in San Diego, where he is responsible for the development of the advanced gas-turbine modular helium reactor (GT-MHR). General Atomics, which has a wide range of high-technology projects, has been involved with the development of HTRs for more than 50 years.

Blue was interviewed by Marjorie Mazel Hecht on Oct. 27, 2008. He discussed the economics of the HTRs, and the manufacturing capability that exists now to mass-produce them. Excerpts follow; the full interview will appear in the Fall 2008 edition of 21st Century Science & Technology.

Historically we've gotten our economics in nuclear by making the plants bigger and bigger, and getting "the economies of size scale." But the reality is that everything we have in life that is, let's say, economical, has gotten that way because it's *mass-produced.* Everything from coffee cups to cars. There are no exceptions that I can think of right now.

Obviously, we're not going to produce nuclear reactors in the numbers that we've produced cars, but perhaps a better analogy would be airplanes, which are produced in serial production, in relatively low numbers. The learning curve gets the costs down through serial production. I think it's possible that if you get the right sized gas reactor, you can have these produced in quantities where you get all the benefits of mass production, with favorable learning curves.

Said another way, there are two ways to get economy: One is to make the reactors bigger and bigger, which seems to have reached the point of diminishing return, and the other way is through mass-production....

We simply have to build a demonstration reactor. And then once it is demonstrated, and once people understand that it's real, and they see the economics of it, and see the safety of it, then there will be just overwhelming demand for it. That's the kind of challenge or problem that every manufacturer loves to see. It's a lot easier to produce things in quantity, than it is by single units.

So, getting the money matched with the technical capability and getting the first one built is what it's all about....

I believe that the first module could be built for between $600 million and $1 billion. That's my estimate. There are some estimates that are higher, but I think that when you apply manufacturing disciplines to it, and keep things simple, that would probably be a realistic number.

When you get into mass-production and come down the learning curve, I think you're looking at less than $2,000 per kilowatt, or about $200 million for a 100-megawatt reactor. Right at the moment, that's actually a lot better than the big light-water reactors. At that kind of a rate, you really have something that is very economical.

The other thing that the world is going to see is more electric vehicles, and this kind of reactor would be an ideal way of producing electricity to power electric vehicles. Essentially, you could fill your electric tank at home at night for the equivalent of 75 cents per gallon; that's really attractive. Many people who are now paying $3 to $4 per gallon would be overjoyed to be able to charge their cars at night for 75 cents per gallon of gas equivalent....

Basic Energy for Production

Modern industrial societies need power, lots of it. Solar will come along; wind can provide a little bit. But the heavy lifting can only be done by hydrocarbons or nuclear....

It's basic production, not paper streams of profit. It's adding basic energy for production. Building such plants would put a lot of people to work. It would obviously do good things for the construction industry. It would have a huge effect throughout the economy to have a major surge in building these plants, and it would save the $7 billion a day that has been going from the industrial world to the oil producers....

Technology is a wonderful thing! People invent better things to solve problems. And this is exactly what's happened here. Over this 50-year period, the reactor design has improved dramatically. We've made mistakes, and we've cured them. And now we have something that is so safe, and so economical and so efficient, and so non-polluting, that it's time has come.