

## **A funny thing happened on the way to the future**

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Jim Dator  
Hawaii Research Center for Futures Studies  
Department of Political Science, UHM

In my talk today, I want to spend a little time at the beginning explaining my own personal odyssey concerning the future of energy, not to brag--indeed, you will soon see that I have been a complete failure--but to ask why anyone thinks we will respond to the apparent challenges now any better than we did in the 1970s when energy was, for a brief while, our obsession, and mine.

Although I first visited Hawaii in 1960 while I was on my way to teach in Japan for six years, I came to Hawaii for good in August 1969. The planning committee of the Governor's Conference on the Year 2000 was just beginning its work, and I was asked to be an advisor to it. That proved to be a life-changing experience. I had sort of "invented" futures studies while I was in Japan. I went to that country to try to learn why it had modernized so much more quickly and easily than had other nonwestern nations, and in the process I discovered a lot about social change. However, I actually taught the first officially-recognized university course on futures studies at Virginia Tech in 1967. So I came to the UH in part to teach futures studies, along with Japanese politics and quantitative methods.

But the Hawaii 2000 activities of 1969 and 70, and following, changed my focus entirely to futures studies. During the first several years I was here, I visited most communities on all islands many times. I met with scores of groups and many thousand people as part of my work with the Hawaii 2000 activities. It was a wonderful introduction both to Hawaii, which I doubt anyone else has ever matched, and to involving one's academic interests directly in the lives of so many ordinary citizens, something which few scholars ever have a chance to do, whatever their specialty.

A futurist needs to have academic grounding in something--in my case, it is political science--but she also needs to know as much as she can about absolutely everything. I was not and am not a specialist on energy, but I have had to think about it a lot over the years since it is such an important aspect of all futures.

I also had the exceptional opportunity in January 1970 to address a joint session of the Hawaii State Legislature and talk with them about looming problems and opportunities. My discussion of energy then was not in terms of supply but of the environmental and human effects of burning fossil fuels. I tried to get the Legislature, and general public, to begin to think about possible global warming and sea-level rise as a consequence of burning oil and coal.

I also felt, and feel, that the worst thing you can do with oil is to burn it--it is so important as a feedstock for plastic and other materials. And it very plainly is a finite substance that took nature millions of years to produce while humans are burning it and as a consequence, rapidly and unintentionally changing the biosphere to which we are biologically and socially adapted, in a mere two hundred years. Our profligate use of oil I took and take to be one of the many and

among the worst examples of the inability of humans to behave ethically towards future generations of humans or of any other life form.

Finally, because sources of oil in the continental US were at or nearing exhaustion, and because other sources lay either in environmentally-damaging places (like off-shore or in the Arctic) or in politically-unstable places like the Middle East, Africa and Russia, decreasing America's use of oil seemed to make complete sense to me in 1970.

I also knew then that there were many other alternatives to oil, some (at the time) actually competitive with oil in certain situations. I also was very much of a high tech optimist then, and had that reputation around town: I frequently was pitted against "environmentalists" such as Jan Newhouse and other local and international pundits who were proclaiming woe and doom if we did not change our ways. Not me. I naively argued that all sorts of new nonpolluting and renewable energy sources, as well as high tech devices that needed less energy, would soon come online, thus easily replacing oil before it ran out, as any fool could see it eventually would (though no sage could say exactly when it would, and so, rather than developing and implementing the new technologies, as I was sure we would since I assumed we were intelligent and ethical people, most folks concluded either that oil would somehow last until they died, or that new energy sources would somehow magically emerge just in the nick of time to save humanity from a dark and immobile future. So, not to worry, though I did!

Just for the record, so you will know I am not making this all up, here is a list of some of the things I was personally involved in that either were solely focused on energy futures, or for which energy was a significant component:

In addition to the talk for the joint legislative session and scores of talks everywhere as part of the Hawaii 2000 project, I ran a two-day seminar "On Planning" which the President of the Senate, David McClung, and probably the major political leader in futures thinking in the state until his untimely death in 1975, required all members of the Hawaii State Senate attend in November 1971. Alternative energy and transportation were among the main points of discussion.

I created a true multimedia presentation--meaning not boring Powerpoint involving multiple slides and film images with an integrated narration and soundtrack--on "Quality Growth and Hawaii's Futures" for the ECOPUSH Conference, sponsored by the UH College of Engineering under the leadership of Dean John Shupe in 1973, and widely shown throughout the state after the conference.

Dean Shupe also put me on the Advisory Committee for establishment of the Natural Energy Institute in the College of Engineering in 1974.

During the summer of 1974, Pat Takahashi, Professor of General and Civil Engineering (and an early leader in the Natural Energy Institute), and I were responsible for running "Earth 2020," a public lecture series and a teachers' institute for Hawaii high school and college teachers on problems of planetary management that was sponsored by NASA.

During 1974-76, I spent two years in Canada, at the University of Toronto--as a visiting professor in Industrial Engineering, of all things--and with TVOntario, as head of their Futures Project, producing audiovisual material for the nationwide "Conserver Society" Project led by the Science Council of Canada. The Conserver Society project was a courageous, extensive, but brief attempt by Canada to transform itself from being a "Consumer Society" into a Conserver Society.

While I was there, I also worked closely with the Arthur Porter and the Royal Commission on Electric Power Planning, creating for them a multimedia presentation on "Ontario's Energy Futures," in 1976, and another more ambitious multimedia presentation after I returned to Hawaii in 1977 titled "When the Bulge Hits the Dip". That focused on the unpleasant impending collision between the then-emerging baby-boom generation--the bulge--and the looming energy shortfall that we now call "Peak Oil".

While in Canada, I also produced a three-hour television special for the Royal Commission on Electric Power Planning, shown over TV Ontario in 1976, called "Energy Energy". It included two hours of produced programming about energy supply and demand, and ended with a live hour during which an electronic simulator, created by the US Atomic Energy Commission to depict the social and environmental consequences of different assumptions about energy supply and demand, responded to suggestions phoned in from the audience. It turned out that, according to the simulator, energy demand either would outstrip energy supply, or else intensive energy use would result in life-ending global warming, in the early decades of the 21<sup>st</sup> century--even if one assumed heavy reliance on atomic energy, which of course is what the Atomic Energy Commission was promoting.

Yes, you heard it right: no matter what either the energy experts or ordinary citizens suggested, the world's economy and/or biosphere collapsed about 2020-2030, according to the AEC's own simulations.

By the way, I have been trying recently to locate information about that AEC energy simulator, but can't find any. If anyone knows, please tell me. I thought Dennis Pirages was in back of it, but he swears to me he was not. **IT WAS LEE SCHIPPER I NOW KNOW.**

When I returned to the University of Hawaii, I continued to work with Pat Takahashi and others, and even taught on the radio a UH course in Spring 1980 on "Energy and the Way We Live." Among other things, students had to assess their energy use and devise ways significantly to reduce that use for their final project. I recall plans from several school teachers for saving energy in their schools, and from the person responsible for washing the city's buses on how to save energy in that operation.

I was also involved in the creation of PICHTR--the Pacific International Center for High Technology Research--and was the Director of what was grandly called the International and Education Division from 1980-1987, initially hoping to study the social implications of OTEC in small Pacific Island communities. But of course, no one but a few maniacs were interested in OTEC by the mid 1980s, and so I turned my attention at PICHTR to telecommunication needs of small, isolated Pacific island communities.

And the final bit of history I want to report--and it is indeed strange for me as a futurist to spend so much time in this personal history, but I do have a point I am making here--I was a consultant in 1979 and 1980 to the New Zealand energy commission while they were developing a report on "Energy and the Future of New Zealand". They were using an alternative futures method, they said, and so wanted a specialist in alternative futures to advise them.

However, all of the scenarios they sent me assumed continuing rapid rise in the price of oil, since that was New Zealand's--and the world's--experience since 1973: annual double-digit increase in the price of oil. I warned them that any good alternative futures exercise must have scenarios based on substantially different assumptions about all relevant variables. At least one scenario

should assume oil prices would drop, I argued. They refused to do that, saying it was "unrealistic" to make such an assumption.

However, between the time they finished their report and had sent it to the printers, the price of oil began falling so dramatically that they stopped the presses and added a little note at the very end of the report acknowledging that their report was worthless since all of their scenarios assumed what was already not happening. Indeed, prices of oil basically fell for the next twenty years, from 1981 through 2002. This, of course, had the opposite unfortunate effect of making everyone believe that prices would continue to be low, as the SUV lunacy clearly manifest, which, we now see, was as false as the earlier assumption of endlessly rising prices.

On the point of the SUV, I might mention in passing that I spoke out several times in public when our governor and his wife acquired SUVs as the official State, and their private, vehicles, arguing they, of all people, should set a better example for the public, because, by flaunting SUVs, they were indeed setting an example for the rest of us which was bad.

However, having worked in the futures field for many years, I have learned that humans have an almost irresistible tendency to believe that the future will be a continuation of whatever is happening now--not just with oil, but in every aspect of life. And yet "continuation" is not always the case. Nonetheless, this assumption and the fact that most strategic plans by government, industry, and universities are made on it, is a major reason why we are in so many messes now in so many areas.

On the other hand, WHY energy prices suddenly went down, and stayed down, for twenty years, after having suddenly risen for ten years, is a very interesting question.

I suspect you have heard, and will hear, many different answers to that question from the various speakers in this forum. That is why it is good you have social scientists like Chris Grandy and myself--strongly differing though we do--mixing it up with you scientists and engineers. Each academic specialty looks at and thus sees different chunks of the world, though as a futurist, I have to try to understand something about all pieces of it to some extent.

Chris Grandy and other believers in the fantasyland called "the economy" say that oil prices are, or should be, determined by the operation of free markets. As you heard from Chris, they believe that if you leave energy supply up to the market everything will be OK. We will have plenty of oil until we don't, at which time the resulting high price of oil will motivate people to come up with new, efficient and affordable alternatives. Or else they won't. And if they don't, that won't be the fault of the economy or the economists. It will be because people don't actually behave rationally, as economists assume they do, all behavioral evidence and modern advertising to the contrary notwithstanding.

Many of you guys are energy experts, scientists, and engineers. I suspect you see the rising and falling of oil prices and supplies as having something to do with the scientific and the technological ability to find, extract, refine, and deliver oil, on the one hand, and with the funding or lack of it for research and development of other energy alternatives on the other.

I, being a political scientist, am absolutely convinced it is because of ideology and resulting private and public policies. Let me give you an historical example of what I mean.

The Conserver Society activities in Canada and similar conservation and energy source transformation policies in the US were specifically attacked and killed by heavily funded and

very skillful advertising and propaganda campaigns orchestrated by people who felt their immediate interests and fortunes were under attack. You see, environmentalists and other energy-alarmists initially and suddenly got the upper hand in the late 1960s and very early 1970s with the publication of various books and reports. The most powerful of these was *The Limits to Growth* in 1972. It was based on fears for the future expressed by the Italian industrialist Aurelio Peccei, founder of the Club of Rome, in his earlier book titled, *The Chasm Ahead*, and then skillfully modeled and effectively displayed by Dennis and Donella Meadows, of Dartmouth, using an early computer simulation program developed by Jay Forrester of MIT called "System Dynamics" which, Forrester claimed, revealed the counterintuitive behavior of systems.

It was the first time that anyone had used a computer simulation to try to convince large numbers of people throughout the world--not just in the US--to embrace a specific policy. At that time, most people understood that computers were gigantic and infallible electronic brains that spoke, and could only be spoken to, in a thick German accent. As a consequence, most people were inclined to believe, since they could not understand, whatever a computer said. So almost everyone in the world knew about the *Limits To Growth* and the fact that it forecast global collapse by the early 21<sup>st</sup> century unless major changes in population growth, economic growth, and energy use were quickly undertaken.

In my experience, almost no one not alive in the 1970s knows of the *LTG* now. Is that the case here?

Well, the Meadows re-analyzed their work and published a 20 year assessment in 1992, after years of environmental action and inaction, which they titled *Beyond the Limits*. That pretty much says it all, though they still urged us to action. More recently, in 2002, they published *LTG: A 30 year update* in which they bravely still attempted to put a smiley face on an utterly grim future.

But the powers that be were not going to go silently into that good night. The *LTG*, Paul Ehrlich's *Population Bomb* concerns, and most dramatically Gerald Barney's *Global Report to the President* (meaning to President Carter) distribution of which was specifically banned by the incoming president, Ronald Reagan, were all cleverly and effectively attacked and killed by the efforts of the very famous futurist, Herman Kahn, and his Hudson Institute in a series of books, publications, educational materials widely distributed to schools, and talks with politicians and economic decision-makers.

How they did this is something I have studied and written about extensively over the years. It is an example of one kind of futurists being much more successful, in terms of political and economic influence, than another kind.

But wait, there is more. Herman Kahn's Hudson Institute spawned the Heritage Foundation which some of you will recognize was the major think tank that invented and perpetuated the stories deftly told with powerful consequences by Ronald Reagan from 1980 onwards.

The date is important because the early 1980s were not only the time when oil prices suddenly went down, but also when the US transformed from being the major creditor nation in the world--the nation to whom the rest of the world owed money--into the major debtor nation--the nation who owes the most money to the rest of the world, a ranking we still hold now, though our levels of debt are orders of magnitude higher than they were when Reagan began the trend, and almost exponentially growing.

But I need also to remind you that there is yet another futures think tank involved here: The New American Century Foundation. This is also the spawn of both the Heritage Foundation and the Hudson Institute, and in the dark days of Clinton's presidency, it issued a signed manifesto outlining how to capture the presidency, congress, and the courts. The manifesto then suggested many of the specific acts and policies brought to you by the current administration from 2000 to the present, including those in the arena of energy. All of the signers of the 1997 manifest hold, or held, top positions of power in the Bush administration, from VP Cheney on down.

No doubt the magic of the marketplace and the facts of energy science and engineering matter, but in my opinion, ideology and well-funded political actions are the main reasons we are in the situation we are in now.

But what actually is the situation we are in now? For every geophysicist who tells you we are rapidly approaching, if not already past, peak oil there is an economist telling you the market will take care of everything and a nuclear engineering telling you atomic power is the way to go or that coal can be scrubbed clean for centuries.

I personally am very uncertain that the so-called "free market" will solve the problem. Indeed, I think the ideology of the free market is a significant contributor the problem. If any of you happened to be listening to HPR a week or so ago you might have caught me saying that the neoliberal economy, especially its American version, is one gigantic Ponzi game--a pyramid scheme, which, like all such schemes, works very well for those who first got into the system--*as long as the system grows*. So neoliberal capitalism knows only one thing--to keep the economy growing: to use more resources, produce more goods, build more hotels, bring in more tourists, enrich the rich and immiserate the poor, world without end

So I am worried about peak oil, and I blame Manfred Zapka, whom you have already heard, for my worries. In my opinion Manfred is a bit too certain about what lies ahead. While I am less certain than he, I do find his evidence sufficiently compelling that I would rather act on his assumptions than not.

I have a poster in my office that refers to global warming but works for peak oil as well. It says:

*"If we act as if it matters, and it doesn't matter, then it doesn't matter, but if we act as if it doesn't matter, and it matters, then it matters."*

I think it matters.

But I also fear it is too late. Thirty years ago, when we were first made aware of "the chasm ahead" I wasn't worried at all because we had time to do the right things. Now I am not so sure we have the time we need even if we knew for sure what the right thing to do was, and were to begin doing it.

Moreover, I am concerned not only about peak oil, but also about a lot of other "peaks", such as "peak food"--the fact that most of the world basically eats oil, and is always only a few months away from global starvation. As oil becomes more expensive and scarce, so will food--especially for us in Hawaii who couldn't feed ourselves very long with what is grown here and what we already have stored here.

And I also worry about peak potable water, generally considered to be the most obvious and important resource we are in serious and imminent danger of running out of, not only in the world but here in Hawaii as well.

Or peak plastic, since, as I mentioned previously, we are highly dependent on carbon for so many synthetic materials.

And in general, underlying all of this, I am worried about net energy. Manfred has deeply impressed upon me the fact that it takes energy to produce and distribute energy, and certainly to find and make available new energy sources. So far, most of the current alternatives to oil are so dependent on oil themselves, if you reckon it carefully, that they are not net energy producers. This also will obviously be the case for any new energy alternatives for quite a while. More than anything else, I worry that we may not have enough energy left to bring fully-replaceable, renewable, and nonpolluting energy sources online before our current sources are exhausted.

In addition to my work here at UH, I also teach at the International Space University in Strasbourg, France. I have been teaching courses on designing governance systems for Mars, on space ethics, and on various other social and political issues related to space for years. I really REALLY want to go to Mars and other spots in the solar system. As a consequence, I consult with various folks throughout the global space community about that.

Recently, however, I have been trying to get the space community to do two things in regard to energy. One is to calculate how dependent on oil space activities currently are and what we might do as competition for oil becomes fierce. Could we expect scarce oil to flow to space uses, given the current lukewarm support for space activities, at least in the US? I think not.

So the second thing I try to get the space folks to do is to use the oil and other energy sources we have now to develop energy sources from space for Earth. There have been a lot of space energy schemes in the past, and some of them have been pretty scary and enormously expensive. But if we can't come up with some energy source that rivals oil in abundance and ease of use, our space program may die before we can even leave the cradle.

Finally, I am absolutely amazed that we in Hawaii are not totally hysterical about our future energy prospects. We, almost uniquely, are foolishly dependent on oil--a foolish dependence because in the 1980s we CHOSE to change our economic system and to buy into the global Ponzi game instead of going ahead developing OTEC, wind, solar, wave and (dare I say it?) geothermal. It is disgraceful and a true sign of my incompetence that after all the work I have outlined before by myself and others, we are so fully dependent on oil now, given all of the alternatives lying around us that we have refused to develop. Rather we persist in the belief that economics determines everything, including whether people on these islands will live or die. Speak of your faith-based initiatives! Belief in the saving power of economics as currently understood is the most tenuous.

And yet we in Hawaii seem to be very calm indeed. I understand that 30-40 people attend these discussions, but that only 4 of the participants are students. Well, if most students don't worry, why should I? It certainly is your future we are talking about, and not mine.

But maybe I am totally misguided once again. Maybe I should trust those who say we have nothing to fear but fear itself.

So I summarize and end my talk today with two brief alternative futures before us.

One future offers some combination of the following hopeful statements about our energy futures:

1. We are not running out of easily recoverable oil any time soon. So stop worrying about that and continue making sure that the global economy keeps burning the oil we have in order to produce the wealth to do the research and development necessary to find and exploit new sources of oil the Earth abundantly has, and to research and develop effective alternatives to oil when the time comes. Anything that slows down the economy--such as conservation--would be a stupid mistake. We must keep growing rapidly.

2. Research and development is happening on alternative energy resources now with sufficient speed and we will have comparable sources well before oil runs out or gets too expensive.

3. The oil companies began buying up the patents on new energy technologies back in the early 1970s during the first oil crisis, and have continued to do so. Hence, when the time comes--and it is not now--they will whip out those patents and begin developing alternative energy sources well before we begin to suffer from lack of oil.

4. Since God is on our side, a major technological breakthrough will occur just in the nick of time--cold fusion perhaps, or we will learn how to tap energy from one of the alternate universes that string theory is yammering on about, or the Rapture will occur during the next Middle-East Crisis. Or something. Humans, and especially we American variants of it, have always prevailed when push comes to shove, and we will again. Have faith and move on.

Another future is built on one or another of these gloomy arguments about the future of energy supplies:

1. Even if we have plenty of oil, extracting and burning it is devastating an already dangerously devastated planet. We must stop oil--and other fossil fuel--consumption as soon as we possibly can. So we must take drastic and immediate conservation measures now while we also ramp up funding for alternative renewable and clean sources.

2. Oil is finite. We know that. There are honest differences about where peak oil lies; whether it is now, impending, or already past. Given the profound consequences as the end of oil approaches, it makes total sense to accept that and to begin to formulate and then to follow policies that have minimum current disruption with maximum long-range positive effect.

3. We are in or past peak oil. Any new oil discoveries will take a long time to develop, will be very expensive to develop, will have devastating environmental and cultural effects, and will only fuel our future for an additional few years anyway. Soon there will be no new meaningful oil deposits to find. So stop wasting time and money on looking for new oil and start a Manhattan Project-scale effort at conservation, utilization of existing alternatives, and the search for new and better alternatives.

4. Humans are shortsighted, egotistical, Earth-eating scum. Fuck off and die, Earthlings, and leave the world to the rest of God's creatures.

So, what which future do you believe? Will the real energy future please stand up?