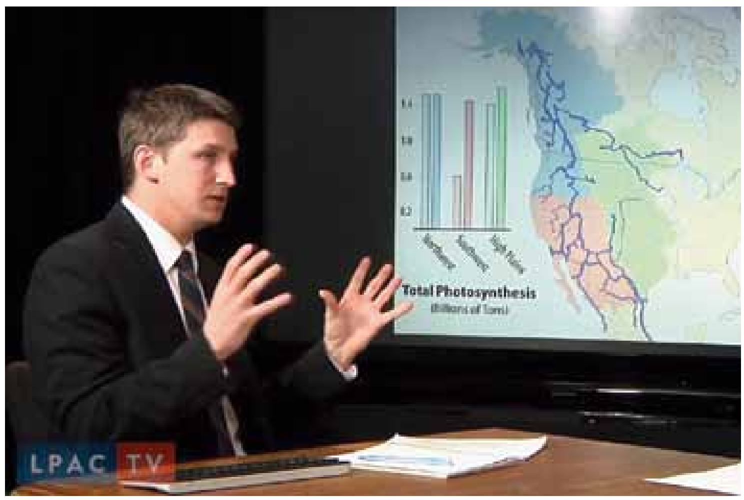
THE SUN IS GETTING LAZY

Mankind Can Now Control The Global Water System

The LaRouchePAC New Paradigm for Mankind Weekly Report for July 9, 2014 was hosted by Megan Beets, and joined by Ben Deniston and Liona Fan-Chiang, all of the LPAC Basement Science Team.

Beets began by establishing the context for the discussion within the recent weeks' acceleration of the breakdown of the British Empire system, and the coming into being of a potentially new world system. She then turned the discussion over to Ben Deniston. The video is posted at www.larouchepac.com.



LPAC-TV

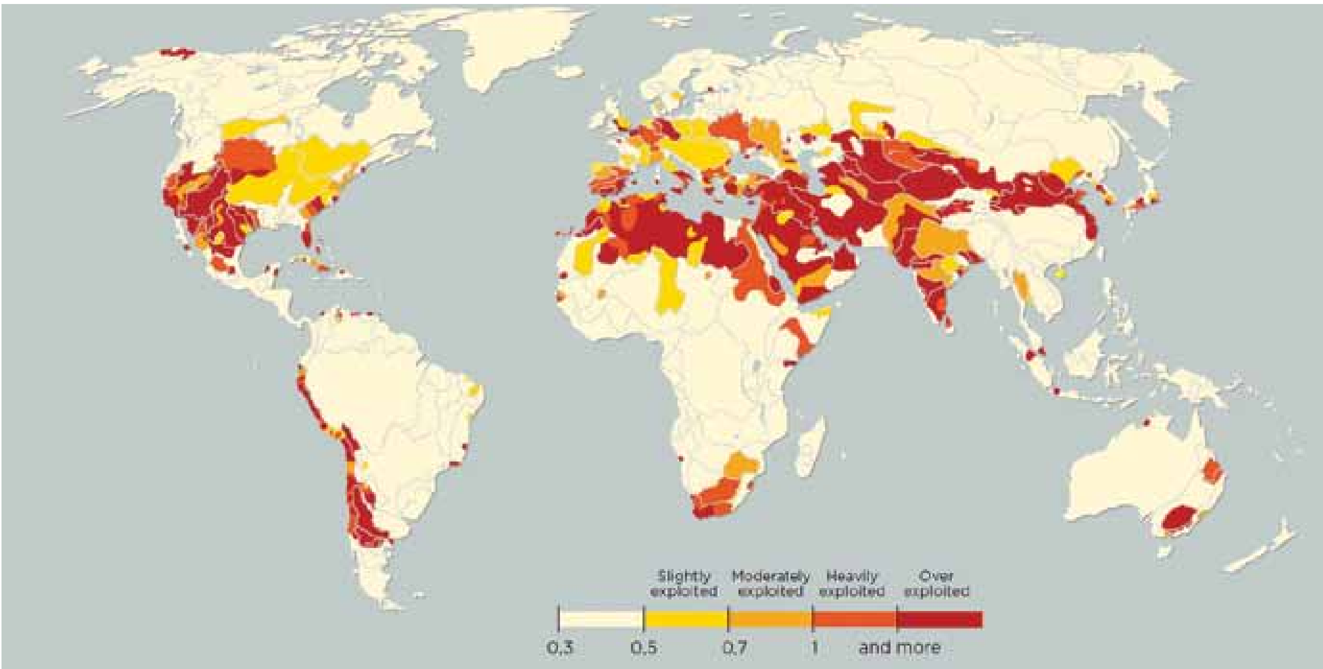
Ben Deniston: "We have an indication that mankind can begin to actually modulate and manipulate flows of moisture in the atmosphere, and we can begin to control when it falls and where it falls. . . ."

Ben Deniston: Today, I want to discuss getting more at some of the implications of Lyndon LaRouche's Four Laws,[1] because as you said, we have the growing potential for a completely new system. There's already recognition and motion around the world that what's happening now doesn't work, this system is a genocidal system, the people running it are trying to accelerate the genocide to keep their system, and it's the potential for something completely new.

I think it's critical to keep coming back to Lyn's "Four Laws," that policy as a whole, because I found, just in talking with the population generally, people in D.C., and frankly even a lot of scientific layers, so-called scientists, that the level of thinking is way too small. A lot of these people have been too practical, too small in their thinking, and it's because people have been conditioned in 40 years of the zero-growth system. We haven't done anything; you know, we landed on the Moon in the '60s and then, what since? People have just accepted—now it's been generations of this, so people have grown up in this; they've grown up in the idea of no growth, no progress, etc.

1. See EIR, June 13, 2014.

FIGURE 1
Global Water Stress Indicator (WSI) in Major Basins



UNESCO

So, what Lyn is putting on the table, and the role of our organization is absolutely critical I think, in pushing the frontiers to where mankind can and must go in response to this crisis. In his Four Laws, he talks about Glass-Steagall, number one, which has to be coupled, number two, with a national banking system; that needs to happen immediately; then, issue credit to grow the economy, Federal credit for a major rebuilding of the U.S. economy, major jobs program, is the third point; and the fourth point he talks about is the need for a fusion driver program.

The Global Water Crisis

So I'm going to come back to that fourth point, from the standpoint of the water crisis, which is a subject we've discussed a lot, and I want to start with a global overview of the water crisis. Because despite what some Congressmen have said, water is a single, global system. In response to some of our organizing in Washington, D.C., one Congressman said, "well, I think we need to solve the California water crisis with California water." But where does California water come from? It doesn't come from California. It comes from the whole Pacific Ocean; it comes from the whole global system. So there's a lot of need for better scientific understanding of what we're talking about here.

So Mr. LaRouche has repeatedly emphasized, the water system is a single, global system; you have regional components, and you can look at the interaction of components, but we're at the stage now when you start looking at it as a single, planetary system.

The crisis, I think most people have an intuitive sense, is pretty staggering. I mean, you have 2.5 billion people without access to sanitation because they don't have standard, enough regular water supply: 2.5 billion people, it's a huge figure. Here's one map that just shows the water basins, the river basins, where you have what they call "water stress"—the water supply available in these regions is not enough to support the human economic activity occurring in those regions (**Figure 1**). So this gives a general, quick image of where a lot of the crisis is—and it's major. You can see, it covers much of the world.

At the same time, there are figures saying that about 800 million people don't have access to water at all, clean drinking water. Now, Mr. LaRouche's intelligence magazine, *EIR, Executive Intelligence Review*, has looked at that a little more closely and their view is that, if you set the standards a little bit higher, about actually having access to water in your home in a reliable way, something you'd expect as a modern standard of living today, it's more like 4 billion. So you might have some well plunked down in the middle of some village, or maybe on the outskirts of some village, and people would say, "Okay, all those people in that village now have access to water"—but they have to spend all their time carrying it back and forth. So, around 4 billion people with a lack of access to reliable, clean, safe water in their homes, 4 billion—it's a huge number; 2.5 billion without access to sanitation.

I was looking at some other figures: about a quarter of the current water use comes from groundwater, about one-fourth the global water use, something in that range. Different organizations might have different estimations, but something around that figure. Now some groundwater supplies are fine, they get recharged with rainfall and there's nothing wrong with using it. In other regions, the rate of refilling of groundwater can be relatively slow, and you have a major, building crisis, where a number of regions are drawing down the water at a faster rate than it's being replenished. So these represent potential major crisis points, because the rate of activity of the groundwater cycle is not quick enough to sustain the growing rate of human economic activity.

And then we have also discussed, specifically, the crisis in the West; in California, we have a major drought right now. It's getting worse. The Central Valley groundwater, for example, the aquifer there is depleting, and it's probably going to deplete faster because there's not as much rainwater in river flows. Here's an image of the snowpack in Winter, where a lot of the freshwater comes from (**Figure 2**). This was taken by some NASA observations: January 2013; January 2014. So, it's *quite* dramatic, the lack of snowpack [in 2014] that provides much of the freshwater for California.

FIGURE 2
California Snowpack in Northern California and Nevada

NOAA

Because of this, then, people are going to be forced to either abandon agriculture, not have enough water, or be forced to go from accelerated use of the groundwater in the Central Valley Aqueduct, which has already been consistently depleting, year, after year, after year; they're going deeper and deeper and deeper to get the water. So it's a major crisis.

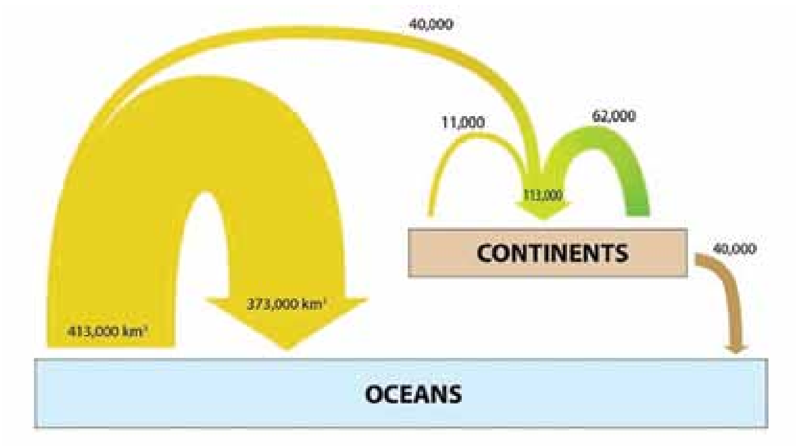
And just in the past couple weeks, there's been a lot of hope that some coming weather pattern changes might help break the drought, specifically the El Niño effect, where you have a periodic cycling of warm ocean water, which tends to bring more moist air and rainfall to certain regions of the United States. And a lot of people have been hoping very much that a big El Niño will help break the drought. And at this point, no one's going to sit here and forecast exactly what's going to happen, but the most recent signs are now that the El Niño is weakening. It's actually a weak El Niño, so the probability of it bringing a lot of water is significantly reduced.

So the point is, this is a major crisis globally. We've discussed a lot the crisis in California, Texas, and the West, and there's no immediate sign that it's going to be alleviated, just on natural conditions. So this is what we're facing.

The Terrestrial Water Cycle

Now, Mr. LaRouche has said, what we have to do is go to a higher energy-flux density program. We need to increase the energy-flux density of the U.S. economy and the economies globally, to ensure that mankind can manage and control the water cycles and the water systems needed to sustain human life. And we've been discussing this, and working this through, and as we cited in Mr. LaRouche's four-point program, his Four Laws, all of these policies should be subsumed and seen from the standpoint of the scientific work of Vladimir Vernadsky, in looking at the role of mankind as a more powerful force than the biosphere, and a more powerful force than the Solar System as a whole, potentially, in

FIGURE 3
Terrestrial Water Cycle



LPAC

the near future.

And what I'm going to get at, in looking at how mankind has to go into the future by addressing this water crisis, is mankind beginning to take over the role of the Sun on the planet Earth; that mankind must actually rise to the level of the activity of the Sun itself in terms of having that level of influence and control over the global water system on the planet.

So now, to get into that, we have to have a sense of the top-down view of the global water system. So here is a schematic of what I would call the terrestrial water cycle (**Figure 3**), because as soon as you're talking about water, you have to start talking about cycles and processes that have cyclical characteristics; it's not just a resource you're using. All of the water supplies on land are not just stores, they're cycles, they're processes. And all of the activity on land, all of the snowpack, the precipitations, the lakes, the rivers, the groundwater, all of it depends, ultimately, on the evaporation of ocean water, and the precipitation of that evaporated ocean water over the land.

And this is a schematic, where the width of the arrows is all to scale, to show the yearly average flows of these different water systems for the planet as a whole. So the Sun evaporates a huge amount of water from the ocean, but then, as you can see, the vast majority of it just then falls right back into the ocean. On average, about 10% of this water evaporated from the ocean precipitates, or falls as rain or snow over land, over the continents. And that becomes the basis for the entire terrestrial water cycle thus far.

Once the water's on land, you have a very significant factor, which is the role of plant life itself. Once the water's on land, some of it will evaporate again and fall again as rain, so you can see this kind of added cycle, here on the left; but an even bigger factor is the role of plants directly, in kind of boosting the cycle, taking water that was brought onto land, utilizing some of it in photosynthesis, but then putting water back up into the atmosphere, to fall again as rain on land. And it's only recently that there have been some really authoritative studies on this, and those studies indicate that plants actually play the largest role, so far, in creating rainfall and precipitation on land. Over half of all the precipitation, on average, over the continents, we can attribute to plant activity.

So it's a very significant factor; all these values here are given in cubic kilometers per year, and you can see the relative values of the different ones.

And then the cycle, quasi-cycle, closes off with the ocean run-off and outflow of water back into the oceans. Which as you can see here, generally matches the input. Evaporation of ocean water participates in continental cycles, gravity brings it back down into the ocean, you kind of have the concept of a closed system. It's obviously not this simple, but this is just to give an idea.

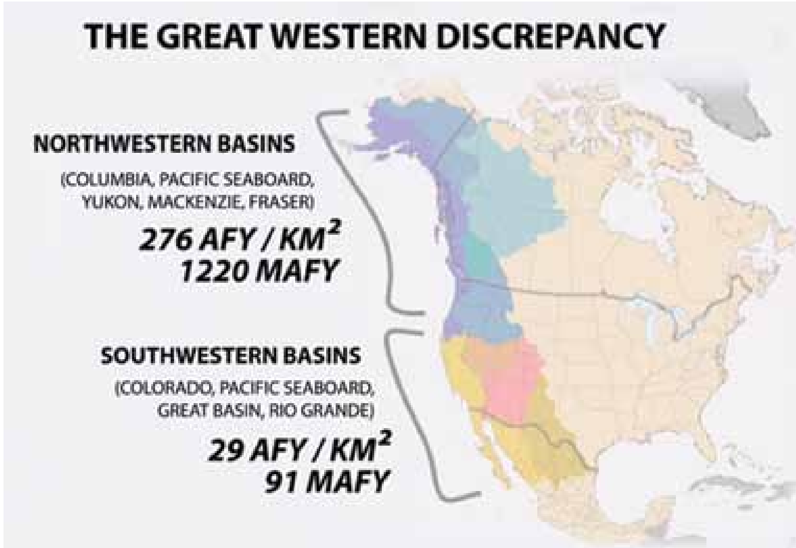
Now, mankind so far has played a significant role, when mankind is allowed to, and is not held back by imperial systems and environmentalists—mankind has played a significant role in improving and managing these existing cycles, taking the existing role of solar activity in putting moisture into the continental system and improving what that water does while it's there. And the highest expression of this that I've seen, is the design for the NAWAPA system, which is something that fully could have happened, but was blocked from ever being developed by the whole environmentalist paradigm shift (see http://larouchepac.com/infrastructure).

Keep this idea of an input/output cycle in your mind, for a second; you're looking at water going in, and then participating in the terrestrial cycles on the continents, and then flowing out. We want to pose the question of what does it do when it's there, because if it's not doing anything, there's no point to the cycle. And, how do we improve what it does, how do we make it more productive?

Case Study: North America

The continent of North America is an interesting case study, because you have what we've been discussing a lot on this show, which is a major crisis now—a dramatic discrepancy in the water availability in the western half of the continent (**Figure 4**). Not to get caught up in these figures in particular, but, if you divide the northern half of the West and the southern half of the West, and you just look at how much water is available, you can see that the total water flow, precipitation and river run-off—you measure it by run-off—the output in the northern half is about 10 times higher than the southern half, including in per-area terms. So the amount of water availability in the North, per sq km, or per mile, is about 10 times what's available in the South. So you have this huge discrepancy in the natural state of the water system of the North American continent.

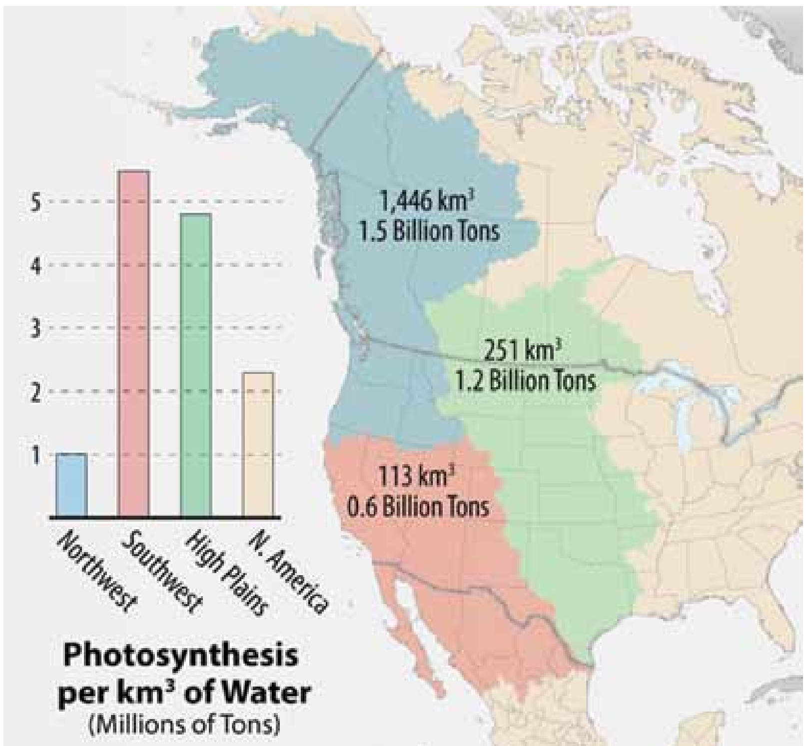
FIGURE 4
The Great Western Discrepancy



LPAC

So what we want to look at then, is how productive are these systems from that standpoint (**Figure 5**). We were playing around with some figures, and just to give, frankly, what amounts to a "back of the envelope" calculation—but the right order of magnitude and concepts—we were comparing the amount of water flow to the amount of productivity of that water, the amount of photosynthesis, the amount of creation of new plant life, which is one of the critical functions of water in the whole biosphere system; so that seems like a decent proxy to measure the productivity of water.

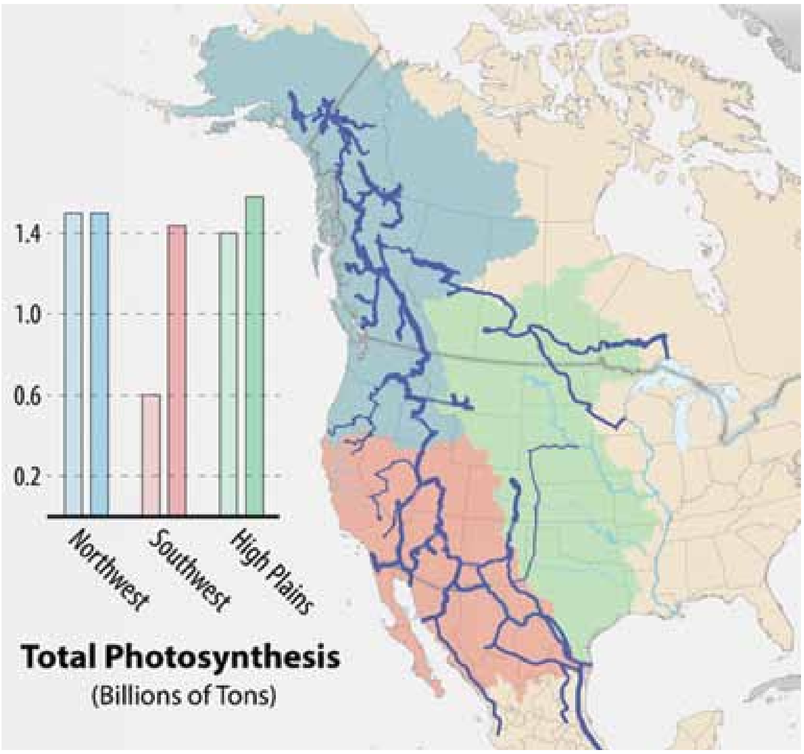
FIGURE 5



LPAC

And what we found is that the Northwest, this northern half that we were just referencing, which has 10 times the water availability of the Southwest, has a relatively very low amount of productivity per amount of water. The absolute values are given on the map, and the photosynthesis per amount of water is given on the chart on the left there. So, you can see the blue area of the Northwest is about 1 million tons of plant life, of new biomass, of new photosynthesis per cubic km of water flow. Those are the terms of measure, and the point is the relative comparisons: Where the Northwest is only 1, the Southwest is over 5 times higher. The water is actually 5 times more productive in the Southwest, than in the Northwest, and humans have a huge influence in

FIGURE 6



LPAC

that, through irrigation, through management. This is an example of managing an existing water cycle and improving the use and productivity of that existing cycle.

And you can see that also, if you take the continent as a whole, North America, the Northwest is still less than half of the productivity of the whole continental system, and much of this is because of the temperature and because of the sunlight, and also because a lot of the water falls right along the coast and runs off into the ocean. So the amount of water going up there is just not able to do a whole lot; it's too cold a lot of the time, you're at a higher elevation, so you don't get as much sunlight. So overall, the thing is relatively much less productive, per amount of water, than the continent as a whole, and especially than the Southwest.

So this is an interesting way to look at the proposal of the NAWAPA system, done in the '60s, which was to, with river diversion systems, divert 10-15% of some of these rivers up north, down into the Southwest, into the central part of the country (**Figure 6**). And this, I think, represents the highest level of managing an existing water cycle that anybody's proposed and developed in depth and had some real motion and some potential of actually becoming a reality.

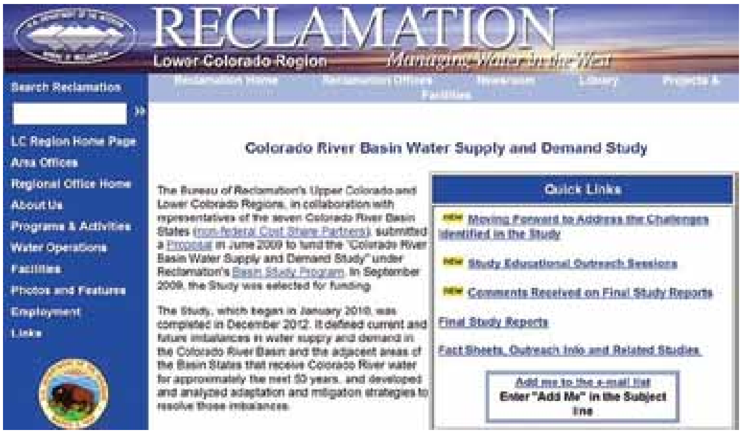
And from the standpoint of the productivity measurements we were just talking about, if you take the amount of water that NAWAPA calls for, and if you bring that into the Southwest, we can now assume that that water will have the same productivity as Southwest water, which was five times higher. And then, again, it will exit the system, instead of running off in the North, it runs off in the Southwest, so it reenters the ocean. So without changing the fundamental input/output flow of our general concept here, we can actually increase the productivity of our entire continental water cycle, by these rough, first-order measurements, by 10-15%, which is pretty damned good if you're talking about an entire continental system.

This typifies the scope of managing an existing water cycle system: You have an entire continent; you look at the entire precipitation input, where it goes and the output of an entire continental system, and you say, how do we maximize the productivity and what this water does while it's in the system? Frankly, it'll probably be even better than these very rough, initial measurements, because this will bring new plant life; new plant life will increase the precipitation, as we saw—in the earlier graph, the plant life is one of the biggest factors in increasing the water cycle. So this represents a top-level concept of managing an existing water cycle.

'The West Without Water'

But, in discussions over the past couple of months, when we really started to get a serious sense of how bad the crisis in the West is, and started to look at some additional factors, Mr. LaRouche put on the table the challenge of going to a higher level than this. Because everything I've discussed so far has some really specific assumptions being imposed on the way I presented this right here; we're assuming some very big things which you can't necessarily take for granted. The main thing is, all of this assumes you're dealing with pretty much a fixed system. All this is assuming that you have these standard input/output values, that maybe they change a little bit year to year, but you're assuming you can have a standard average for the whole system. You're assum-

FIGURE 7



Bureau of Reclamation

ing that the precipitation patterns, the amount of rainfall in the Northwest, the amount in the Southwest, is relatively fixed and stable.

But we are beginning to realize that's absolutely not the case: Just take the Colorado River, for example: I just saw this study from a couple of years ago, from the Bureau of Reclamation, where they're looking at the water flow of the Colorado River (**Figure 7**). And they said, if you take the period from 1900-2000, this is a period when the major water projects in the West were built, and this is the period when you had the discussion of how to allocate the Colorado—how much to California, how much to Mexico, how much to Arizona, etc.—they were dealing with a flow of the Colorado of about 20 cubic km per year. If we didn't take any of the water at all, that's how much would flow out into the ocean. So they measure it in terms of that; but obviously, we take a lot of it, and at this point, it doesn't even reach the ocean most of the time. But the flow of the Colorado represents about 20 cubic km/year; that's the average they measured between 1900 and 2000.

But then, if they looked at between 2001 and 2011, this recent decade, it's only 15 cubic km/year—that's 25% less. This is a river basin that supports 16,000 sq km of irrigation, that supports 40 million people. And all of a sudden, this past decade, the water availability in this river basin is 25% less than what it had been over the past century! That's a very significant factor, especially for a region that's already stressed, and doesn't have enough water to start with.

Now, this coheres with something that has come up in a recent book, called *The West Without Water*, where a couple of professors looked at the long-term records of the water availability in the West, and by a number of different proxy records and investigations, they came to the conclusion that the water availability in California and the West over the past century has actually been much higher and much more stable, than a much longer period in the past couple thousand years. And that this Colorado example might be a perfect illustration of the type of thing we're talking about, where, when we built our irrigation systems, when we built our dams, our reservoirs, we built under the assumption that we had a certain availability. But it turns out, just by natural fluctuations, the value actually fluctuates much more, and we could have periods of much less, and prolonged periods of much less.

So, already, we know we can't just take the standard assumption that this is a fixed system, that how we've experienced it is how it's going to be in the future, and that we can just operate off that alone.

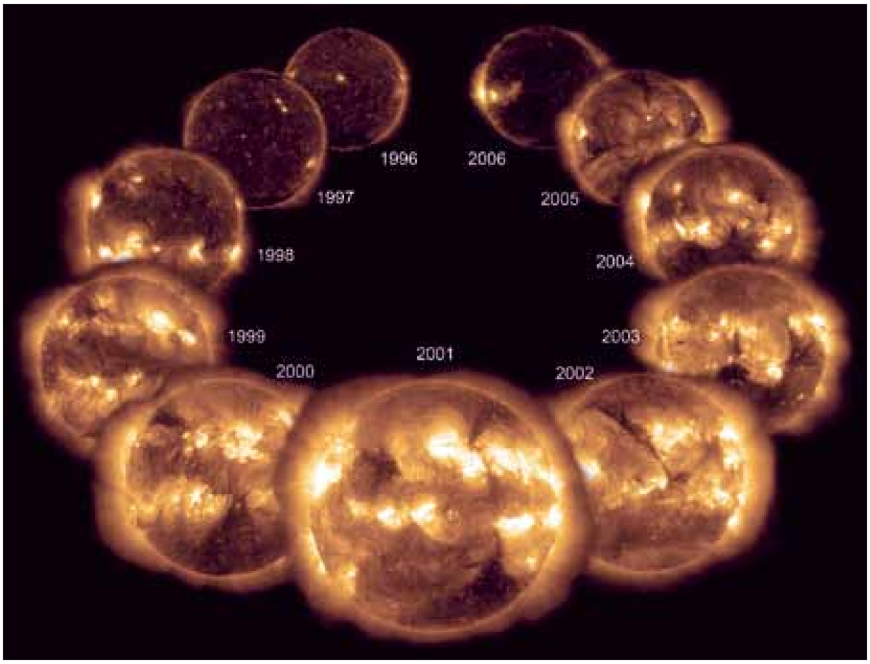
The Sun's Effect on Water Cycles

One of the major factors driving the changes of climate and precipitation patterns, is that pesky little thing out in the distance there, the Sun, the driving force of the whole Solar System. As we saw in the conceptual infographic at the beginning (Figure 3), the Sun drives the entire precipitation cycle. The entire continental water cycle is driven by solar activity. Plants may increase it, they may boost it, but if the Sun wasn't providing the initial input, they wouldn't be able to do anything. So it makes a lot of sense to ask, when the Sun changes, what is that going to do to our water cycle? What is that going to do to the precipitation patterns? What's that going to do to water availability?

We've gone through this in some shows in the past, so I'm not going to take too much time to go into details, but we know the Sun changes a lot. We know the Sun changes on a roughly decadal cycle, every 11 years or so (**Figure 8**). That's your standard, what we refer to as the solar cycle. But we also know that over a longer period, say, the past thousand years, as represented in this graph (**Figure 9**), the Sun goes through decadal changes over a series of many decades and over centuries. So, whereas each 11 years or so, you have one cycle of more activity/less activity, over a longer period, how active any of those cycles are, changes a lot.

We can measure that by records left by the amount of cosmic radiation, galactic cosmic radiation, coming

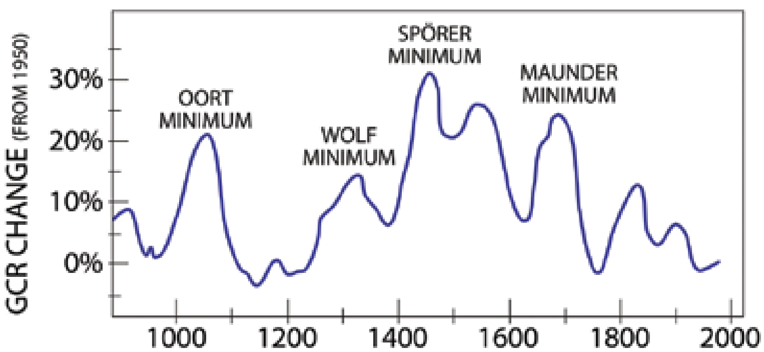
FIGURE 8
The Solar Cycle



NASA

Eleven years in the life of the Sun, spanning most of solar cycle 23, as it progressed from solar minimum (upper left), to maximum conditions, and back to minimum (upper right) again, seen as a collage of ten full-disk images of the lower corona.

FIGURE 9
The Sun's Cycle Over 1,000 Years



LPAC

Changes in records of galactic cosmic radiation provide an important indication of solar activity.

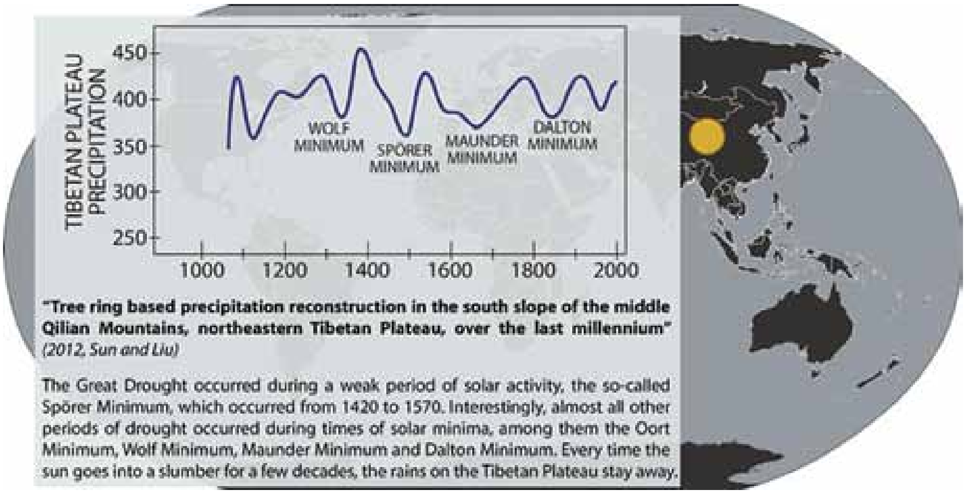
from outside of our Solar System. The amount of that radiation coming from the galaxy, into our Solar System is affected by how active the Sun is. When the Sun is less active, the magnetic field is not as strong, and it doesn't shield this galactic cosmic radiation coming into the whole Solar System, including intersecting the Earth. So during periods of low solar activity, we have increased effects of cosmic radiation, so that's what they're measuring here.

So what you have, is a series of these minimums. The most famous one is the Maunder Minimum, whereas when we look at the record of the galactic cosmic radiation, we see that it spiked, it went way up, which tells us that the Sun must have been less active, to allow more of this cosmic radiation to come in. And we see that that's happened periodically, every 200-400 years or so, you tend to get these periods of very low solar activity. These are generally called "Grand Minimums"—the Maunder Minimum, the Spörer Minimum, the Wolf Minimum, the Oort Minimum, these are a series of major solar minimums, and they've occurred over the past thousand years.

Now, what's come out in a series of studies, is that corresponding to these periods of "Grand Minimum" low solar activity, you do see significant changes in the precipitation patterns, in the global water/moisture cycle. Just to pull out a few of these, here's an example of precipitation in the Tibetan Plateau, measured against these solar cycles (**Figure 10**), and you see, every time you have one of these major minimums, you get a major drop in the amount of precipitation measured by these records in this one location in China.

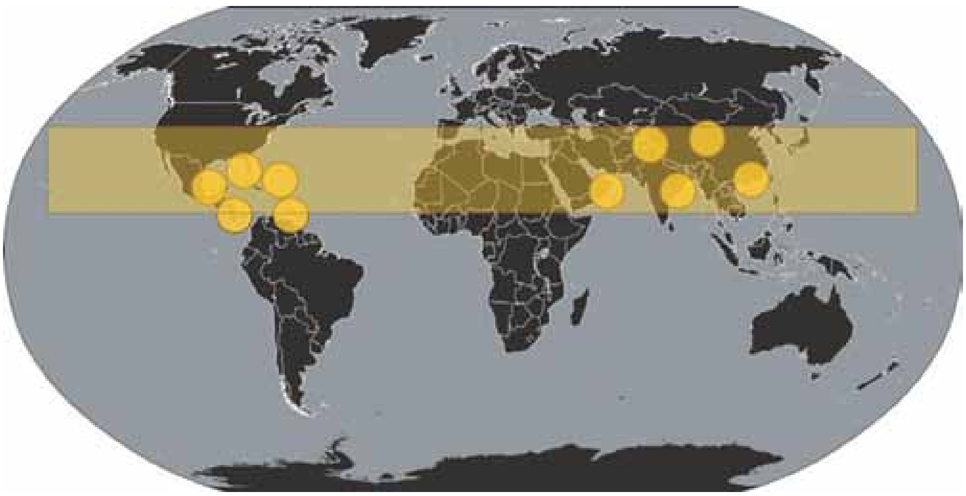
You have multiple other studies, looking at other regions in Asia and South Asia, also showing a similar thing: During this Maunder Minimum period, this most recent period of major solar weakening, you had a weakening of the monsoon, less precipitation, less water available, corresponding to lower solar activity. Similar things measured in the Yucatan Peninsula, increased drought, less water available, during the Maunder Minimum period. Multiple other studies in the Caribbean and Central American regions, three other studies looking at different areas, again, showing the same thing, drier conditions generally corresponding to this weak solar activity period.

FIGURE 10
Tibetan Plateau Precipitation and Solar Activity



LPAC

FIGURE 11
Low Water Flow in Several Regions During Weak Solar Activity



LPAC

And then just a quick plotting of a number of these studies (**Figure 11**): Here you have 5, 10 studies in different regions of the planet, all corresponding to lower water flow, drier conditions during periods of weak solar activity. Other regions of the globe—I'm not going to go into all the details here—show different responses: In the north, it tends to get colder during periods of low solar activity. Multiple studies, Russia, England, Europe, all indicate cooling during weak solar activity. In the Equator, specifically, there are studies that indicate you might get more rainfall. So some people theorize that perhaps, for some reason, during periods of weak solar activity, the atmosphere system isn't able to move tropical moisture north and south as much, into the subtropics, which is indicated by this yellow band here.

That's one theory, there might be more things involved; but the point of all this is, we have these records of the West in California, we just talked about the Colorado River being 25% less than it was—this is all during a period when the Sun hasn't been doing a whole lot of changing. Now we have indications that the Sun very likely could be heading into a major weakening period, of the type we haven't seen in least 200 years, perhaps of the type we haven't seen in 400 years. And we have many indications that this type of major solar weakening does have dramatic effects on the precipitation patterns, on moisture flows, on temperature, on climate.

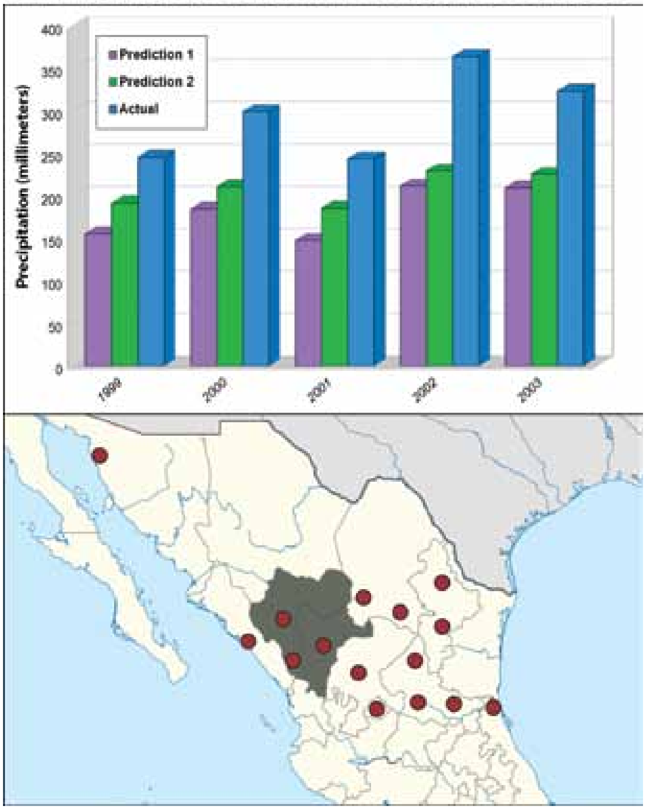
So we are very, very far from a fixed system we're dealing with. We can't just take some fixed value of input/output, some fixed idea of where the water falls and where it doesn't, and just build a system simply off that. Because we have indications that these things change, they can change dramatically, and they can change on a timescale of decades.

Weather Modification/Ionization

So we need to go, as Mr. LaRouche challenged the "Basement" team, to a higher level of addressing the global water crisis. And we've gone through some of this—I'm going to do this kind of quickly—but one major thing is, weather modification with these ioniza-

FIGURE 12

ELAT STATIONS & PRECIPITATION IN DURANGO



LPAC

tion technologies. We went through this in detail a few weeks ago in a couple of these shows,[2] but there are systems that have operated in Mexico for a number of years which have significantly increased the rainfall, through a method of increasing the ionization of the atmosphere, a process that was able to help draw in moisture from over the oceans, and induce atmospheric moisture to condense and form as rainfall (**Figure 12**). We've had significant evidence that these things have been quite successful in Mexico over the past decade.

There were smaller-scale, but very significant studies done in Australia, with similar technologies, which showed that you can increase the precipitation with these types of systems. Another company, Meteo Systems, has done similar activity in the United Arab Emirates, and also recently there have been some papers on new activity in Israel with these types of systems.

So we have an indication that mankind can begin to actually modulate and manipulate flows of moisture in the atmosphere, and we can begin to control when it falls and where it falls, which obviously would be a critical handle on the types of changes that we were just talking about. If we can't assume that the natural precipitation patterns and moisture flows are going to remain the same, but that they're going to vary with solar activity, and vary with other natural fluctuations, then how can we give mankind a grasp and influence over controlling where those moisture cycles go? Controlling where the precipitation patterns occur? And we definitely have at least one avenue to investigate with these ionization technologies.

There are more things that should be looked into: It should be put as a real challenge to nations, if we're going to have security over our water, we need to begin to look at how to have an influence on climate, on precipitation, on weather, beyond just playing around with cloud seeding, but looking at more interesting—specifically in the electrical and ionization direction—you're looking at more of these electrical and magnetic properties that you can begin to play with.

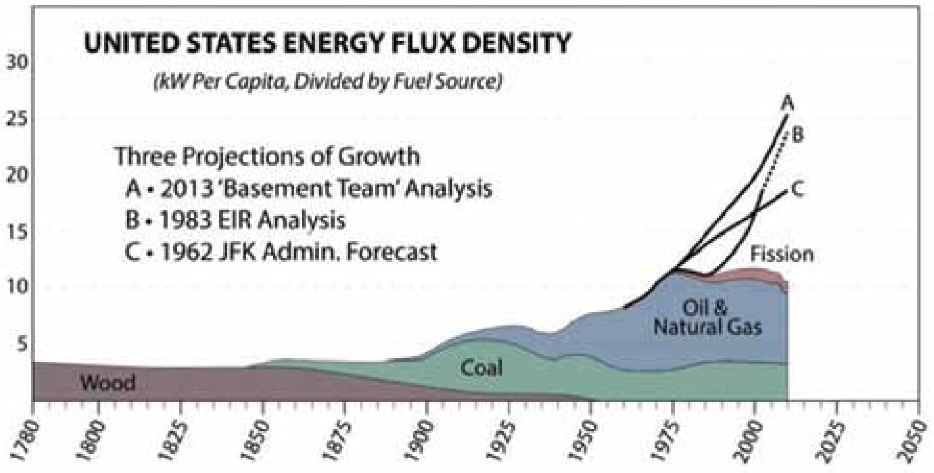
Energy Flux-Density and Desalination

The other significant input that will have to be dramatically accelerated, is desalination, converting salty ocean water to freshwater. Now, again, we live in a context where there have been 40 years of no progress. Kennedy was talking about major desalination systems, large-scale systems, saying with nuclear power desalination, we could begin to address all of our problems with these things. That was just cut off, and we've sat with no progress for 40 years. So, unfortunately much of the discussion around desalination is very pessimistic, "it's too expensive, it's too energy-intensive, it's too difficult," which is just a load of junk.

I was looking at, again, some back-of-the-envelope calculations, and one way to look at this, is with Mr. LaRouche's concept of energy-flux density, and one way you can look at the energy-flux density of a national economy, is by the power per capita, the energy consumed per year per person, average for your whole nation. This doesn't just mean how much energy do I use in my home every day? It means, how much energy is used to power the industries, to provide the food, to transport my food, to power the servers that my computers use? How much energy is used for the national economy as a whole, and then, what's the per-capita value of that?

2. See "Beyond NAWAPA: Controlling the Weather: Ionizing the Atmosphere," *EIR*, May 30, 2014; and New Paradigm, May 14, 2014.

FIGURE 13



LPAC/Phillip Kauffman and Arquimedes Ruiz-Columbié, "Artificial Atmospheric Ionization: A Potential Window for Weather Modification," 2008.

And we've seen, over the history of the United States, for example, with the succession of higher levels of energy sources, with more energy-dense forms of fuels, we've seen this continual growth in the energy use, in the power per capita of the U.S. economy.

But then again, as we just discussed, you see the stagnation, the flat-lining, and the collapse, starting around 1970, when nuclear power was not allowed to be developed, and fusion power was suppressed, dramatically. So, instead of the natural growth process which should have and would have occurred, we've had this flat-lining. Here's an example of a few projections of the energy-per-capita growth estimated by the Kennedy Administration (**Figure 13**), the "C" value, there; our own estimate of "A," if we had a full fission and then a full fusion driver-program, we would expect something more in the range of 20-25 kW per capita, now we're at 10. *Executive Intelligence Review* did a study which showed similar results around the '80s, when they were looking at what would the SDI, Mr. LaRouche's Strategic Defense Initiative program, have done to drive the whole economy forward?[3]

So if you look at energy-flux density, energy per capita, you look at where we are now, and where we should be, and where we need to go in a healthy, growing economy, and then, if you look at desalination from that standpoint, it's actually relatively little. We're now at about 10 kW per capita, 10,000 W per capita. If we were to provide all of our water use with desalination—everything except for cooling of power plants, because you wouldn't need [freshwater] just to cool power plants—but water use for mining, for industry, for agriculture, all agricultural water use, water use for your domestic and public supplies; all of the water use in the United States could be provided with about 325 W per capita for desalination. Right now, we're at about 10,000 W, or 10 kW; this would be about 325 W per capita, so one-thirtieth of our current per-capita energy use.

To put that into perspective, we have a total use of 10,000 W per capita; we average about 3,000 W per capita use, just for transportation, on average. So what we accept as the regular cost of moving ourselves around, moving our food around, just transportation needs, is almost a third of our per-capita energy use as a national economy. If we wanted to provide all of our current water use from desalination, it would be one-tenth of that.

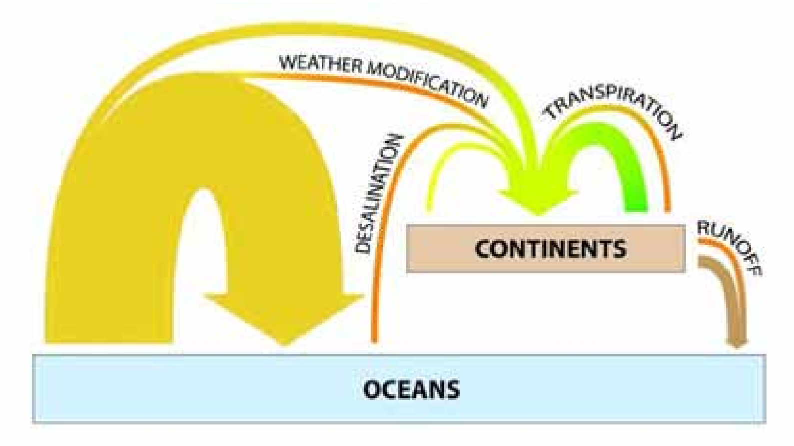
So when you look at these relative scales, it's not necessarily a whole lot. And obviously, we don't need to replace all of our water use with desalination, that's not what we're saying we need to do, but just to put it into perspective; relative to even the existing levels it's not necessarily a whole lot. If we'd gone to 15, 20, 30 kW per capita, with a full-fission/full-fusion economy, you could physically afford these types of things. Your relationship to natural resources is completely different: We're now at an energy-flux density level of our national economy where you can afford, on a large scale, to provide water to do these types of things, with desalination, with weather modification, with these types of systems.

Mankind Taking on the Role of the Sun

We went through a lot of specifics here, but the point is, *this is mankind, really taking over for the role of the Sun, on the planet Earth.* That's what we're talking about; that is, I think, how Vernadsky would look at it, if he were alive today, examining this. He would say: With desalination, and with weather modification, we're looking at mankind actually creating his own

3. "The Economic Impact of Relativistic Beam Technology," June 15, 1983; EIR Research Inc.

FIGURE 14
Man Creates New Terrestrial Water Cycles



LPAC

cycles, which didn't exist before. And you can see it illustrated in a kind of cartoonish way here (**Figure 14**), a very significant principle. As we saw before, the entire continental water system is solely powered by the Sun. And as we then developed, that's not constant, that's changing, that fluctuates; it fluctuates in quantity, it fluctuates in distribution, so it's not a fixed input/output system, it's a changing system.

So if mankind is going to take over for the role of this weakening Sun—the Sun's getting lazy, wants us to pick up the slack a little bit—the noösphere needs to come into action, to ensure that the global terrestrial water cycle is robust, accelerating, developing and productive, we can do that with weather modification and desalination. We're actually increasing the input into the continental system. With weather modification, we're actually drawing in moisture from over the oceans, which wouldn't precipitate over land normally, and we can bring it over land, we can increase the input into the terrestrial system. With desalination, we're even going in some degree a step further. The Sun itself is doing desalination all the time, by evaporating the water; we can begin to provide our own power source to do that ourselves, creating a whole new cycle.

And then, with this type of activity and with good management of these cycles, you increase the plant life, you increase the precipitation that plants provide, you can overall then increase the productivity and the activity of these existing cycles.

And then, obviously, all that is going to increase the run-off—this is not just use, this is a cyclical system. And quite frankly, the Colorado River *should* be running off into the ocean. It should be taking salts and stuff from the soils; it should be flowing into the ocean again. The Rio Grande River should be flowing into the ocean again—these river systems, we're just tapping them out, and taking out all the water, and it's not reaching the ocean again; that's not something we should just leave as is. But the solution is not to stop using the water. The solution is for mankind to play the role as a creative force, for the noösphere to act in augmenting and creating new cycles that will support the Colorado, that will support the Rio Grande.

And again, really, this is quite literally, mankind taking on the role of the Sun. This is mankind as a creative force on the planet, the power of human thought, the power of human culture; Vernadsky called human culture a new form of energy in the biosphere on the planetary system. By employing this higher capability, mankind is quite literally beginning to take over for the Sun in controlling these types of systems.

And then, as we've discussed a lot, it obviously doesn't end on Earth. Moving out into space, asteroid defense, beginning to manage these pesky asteroids and comets. This is mankind beginning to play the role that had been solely given to the Sun in the past, and now mankind is beginning to exert himself as a solar force, so to speak, on the level of stars, on the level of suns. And I think it's no coincidence that this also corresponds with, and is powered by, going to a fusion economy, harnessing the power of the Sun with fusion, in a controlled way, on Earth.

So our challenge, I think, is to put this level of thinking on the table: We're facing a breakdown of the existing system, but especially in the United States, people have been so conditioned to thinking so small—you know, we could see the collapse of the United States just by letting people follow their own assumptions at this point. The oligarchy's created itself in the way people think, and if we don't attack that, and don't challenge people around these ideas of environmentalism, the Green ideology, the hatred of people actually taking an active role in improving and developing the planet, we're not going to have a recovery in the United States. These other nations might move forward, but we're going nowhere but down at this point.

And so, I think our role is critical in challenging

LPAC-TV

Liona Fan-Chiang (center): "Most people think of the drought situation as just having 'less water,'" instead of seeing it as determined by global, and even galactic processes. Megan Beets is on the right.

people with the top-down conception of what is, as Mr. LaRouche put in this Four Laws presentation, from the scientific perspective of Vernadsky, what is mankind's role and mission on the planet, over the coming generations and beyond, into the Solar System. So this water example is just one aspect, one critical illustration of this more general principle.

Vernadsky: The Age of the Noösphere

Liona Fan-Chiang: It actually is a little worse than you have posed it, because rather than just a fixed cycle, most people think of the whole drought situation, for example, as just having "less water." Even what you presented of the global system is already bigger than what most people think of.

And so, being able to think of themselves as being able to control that, is already pretty big. But, of course, the main point is that the global system is not isolated. It is a very small part of a huge Solar System, which gets all of its energy from the Sun, and the galaxy, possibly.

And so, yes, it is the ability to control it as a system, but I think the point that you're making, the point that you elaborated at the end, *is* the main issue, which is our own conception of ourselves. And using that, having the right conception, to the point where it creates the necessity for development. I'm not sure exactly what to say about the fact that our own visionaries right now, don't have a very far vision!

Megan Beets: Very near-sighted.

Fan-Chiang: Yes, they're very near-sighted. And even the ones that think very, very far out in time, are still taking a linear extrapolation of the type of growth we have now and extending that. Or even something that we had previously, and extending that. But that type of extrapolation doesn't have a principle behind it, it doesn't have a principle of what mankind's existence is actually for.

And that's not something that's very simple. It is something that has to be continually investigated, and I'm not going to say that I know what that is. But I do know that what we've discussed is on a much, much higher level than a lot of people who should be investigating that exact question, especially people who are leaders in society [are looking at]. If you're a leader of society and you don't know what society's purpose is, that is a problem!

Beets: Yes, I was just thinking about the work of Vernadsky: He died right about the end of World War II, and in 1945, he writes a very small work called, "Some Words on the Noösphere"—something along those lines. Now, you think, after World War I, most of the culture, and Vernadsky himself, were *reeling* from the destructive power that man was able to exert for the first time, with the technological capability of that war. And then, what was continued in World War II. Most of the European and world population was entering a real period of cultural pessimism.

Now, Vernadsky says, okay, however, this is a sign that for the first time, man is able to exert powers on a planetary level, demonstrates to me that we've entered the age of the noösphere. And what he means by the "age of the noösphere," is that the thoughts and the work of civilization, of mankind, for the first time, are becoming the dominant force which is organizing the growth of the biosphere on the planet.

And Ben, you exhibited that beautifully, between the two graphics: first the graphic where the Sun is the main driver of the water cycle (Figure 3), and then in the second one, where you begin to see man accelerating the water cycle (Figure 14). This is exactly how Vernadsky concluded that you have to measure the development of the biosphere, and then of man's activity. He points out that the action of life on the material of the planet over time has been to accelerate the movement of materials through the different metabolic cycles, and that over evolutionary time, the rate of movement of materials, and hence the state of organization of the biosphere, has been increasing. And he points out that for the first time, with man, you see the rate of increase within a single generation, because of the activity of technology, because of the activity of science.

And that's exactly what you see with the example of the water cycle, that man accelerates the change in the development of the biosphere. And Vernadsky concludes, even in this period of great trauma to civilization, this is the natural role of mankind, this is the state of nature, and that the development of the biosphere had been vectored toward creating a creature such as mankind, that could actually begin to exert scientific thought as the dominant force over—it wasn't limited to the planet, but the planet and beyond.

It seems like, in that sense, the water cycle example is very good, but it's slightly deceiving, because it's not just increasing the water cycle, because we can also desalinate water internally.

Deniston: Sure.

Fan-Chiang: And also moving the weather, moving the water within the land. But the other aspect, is this idea of creating a state of organization that's higher. Because that is really the qualitative, or even the quantitative aspect, of why we do these things, or why those are considered higher order processes.

The History of Life

Deniston: Yes, it sustains a higher anti-entropic stage. And you look at the history of life—it's a great example of this: You have an increase in the biogenic migration of atoms, you have an increase of the carbon cycle, you have an increase in the oxygen cycle. You have an increase in the energy use per organism. But the point of all that is to support a whole higher-level system, more advanced organisms, more developed animals, leading up to the ability to create a system which could support, then, a form of willful, creative expression, qualitatively different than the animals, which is human activity.

But, yes, one of the biggest things that people have difficulty with, is what Mr. LaRouche put in this four-point memo quite explicitly, which is that mankind is the measure of the Earth and the Solar System, that we have to govern our actions by measuring what are the needs and activity in relationship of the noösphere to the biosphere and the Solar System as a whole. And if you ever try and take it any step lower than that, you're not going to be able to define competent policy; you're not going define, with any competent scientific basis, what's appropriate and right for the actions of nations and economies.

Fan-Chiang: Right, because you're always going to be influenced externally without knowing it.

Deniston: Right.

Fan-Chiang: Yes, it does seem like, even this example, taking control of the water cycle would be a prelude, a necessary one, to space development. Because now you're taking on even a larger system. I mean, obviously understanding this system requires a Solar System view, but once you try to take on the Solar System, then you have to take a galactic view.

Deniston: Yes, absolutely.

Beets: I like this point that you guys are both making about man taking over the role of the Sun. And it really does neatly draw together this whole period from the Renaissance until now, in which you had the emergence of the system of nation-state governments, in the Renaissance because of the work of Cusa and then the following work of Kepler, for the first time, man was able to conquer the Solar System with his mind, and actually turn the movements of the stars and the planets and the Sun into a single system which was created as a thought of man, and which was valid, over which he could potentially exert power, and now we see—if we survive this current political period!—we see the potential of man, physically taking over the role of the Sun, physically controlling the Sun and taking over, becoming more powerful in his implementation, in his administration of those functions of the Sun, than the Sun itself.

And then, obviously, as you said, as soon as we do that, what does it imply? The galaxy, the entire galactic system that encompasses the Sun. And I think that just does really neatly draw this whole period together, because in that whole historical development, you also had the emergence of the system of nation-state governments, which was then oppressed by this oligarchical empire system that we're fighting today.

And if man can get free of this empire system of the current British Empire, and fully manifest this nation-state government in a world system of nation-state governments which are actually oriented toward this development of the Solar System, *that's* the natural condition of man. The Empire's unnatural, and the natural condition of man is to do exactly what we've been discussing today.

Deniston: Absolutely.

Beets: Okay. I think that's a good place to leave it for today.