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called water briefs that are shorter versions. There's a set of water data. This is the sixth

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cycle: evaporation, condensation, formation of clouds, precipitation, runoff. That is the climate cycle, and as we change the climate, which we're already doing, we will see more and more evidence of impacts of climate change on our water systems, and water managers are not prepared for that. At the same time, there's a whole new interest in the connections between the energy required for water -- it takes a lot of energy to produce, and move, and treat, and use water -- and that has associated, of course, with greenhouse gas emissions. And so, the integration of energy policy and water policy, in part to deal with this issue of climate change, is a whole new exciting area of research and of policy in the water area.

Of course, we use water to produce food. Eighty percent of the world's water, 75 percent of the world's water goes to produce food. We also use water to produce every industrial good -- widgets generically, semiconductors, automobiles, clothing. And as tensions over water grow, as conflicts over water grow, the chal

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of the industrial revolution here. This is the climate problem in a single curve. It's that exponential growth in CO₂.

So, here's another curve. Exponential growth, followed by a peak, followed by a decline in something, and we see this in all sorts of examples in our day to day lives and our national and international economy. And this is why we talk about peak oil. The debate about peak oil started many, many, many years ago with a guy named M. King Hubbert who proposed that we were going to see a peak of oil. He wrote about this, I think, in the 1960s. U.S. production of oil peaked in 1970. There it is. The big debate now about peak oil is when we're going to see a peak in global production of oil, not if. It's a nonrenewable resource. We will eventually reach a peak in global production. I don't want to get into a debate about that, but that's what this is about. And here's the curve for oil.

Here's the Dow Jones Industrial Average from 2002 to 2009, through the end of January. That's an ugly curve, isn't it? Here's herring catch; in theory, a renewable resource, fishers' resource, and similarly, Atlantic cod from 1950 to 2008, showing the peak in the production, our ability to harvest what was a renewable resource -- in theory, still is a renewable resource, if fishing pressure decreases. But, again, you can see these kinds of curves in our day to day lives, reflected in resource use, in our financial systems, our economies, in our daily lives.

This is called the logistics curve. For mathematicians, it's exponential increase followed by a leveling off, and then a leveling, a constant something over time. Here is U.S. market penetration of telephones in the United States. Exponential growth, except for the depression and World War II, but increased, and then leveling off as basically everybody had a telephone. And if you look at the same kinds of technological curves for VCRs and CD players and mobile telephones, they all follow this sort of exponential ramping up of demand, and then a leveling off as consumption gets satisfied. Now, sometimes they go down again when a technology disappears and is replaced. I think if you looked at the phonograph in our homes and some of those things, you would see a decline.

Here is total U.S. water withdrawals: exponential growth followed by a peak around 1975 or 1980, followed by a leveling off. And this is something in the water world that most people don't know, although I talk about it a lot, so if you've heard me talk about it -- if you've heard me talk, you've probably heard me talk about

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assessment, and it says there will be public participation in reviews in environmental impact assessments. It's quite remarkable. But it hasn't been as enforced to the extent it should be.

And ultimately, none of this works very well if our institutions are weak. We have a lot of different institutions. In China, there are 12 or 13 institutions at the national level alone that deal with water. In the United States, it's 18 or 19. We have the FDA that regulates bottled water, EPA regulates drinking water; Commerce and NOAA, which does research on climate change and water; Interior, which manages the bureau of reclamation and some of the dams; and the army corps of engineers; and the state department that does international foreign policy associated with economic development and water. I could go on and on. We don't coordinate our institutions very well. And one could also argue that within our institutions, management over water issues could be better. And not all water is national. A lot of water is very local. So, how do the national organizations work with the state organizations or the local organizations? We could do a lot to fix our water institutions.

In China, water laws are outdated and they're weak and they're inadequately enforced. I've mentioned this already, there are conflicts between national and provincial powers. There's little input from nongovernmental sources in China. Polluters face vague penalties. There are laws on the books for penalizing polluters, but the penalties are vague. Agencies' responsibilities and authorities conflict across different agencies. There is a heavy reliance on supply as the answer to China's water problems, rather than demand. And so we see the Three Gorges Dam being built, now it's finished, the biggest dam in the world. We see the South-North canal to move water from the southern part of the country to the northern part of the country, what will be the world's biggest water transfer system ever, if they finish it, at the cost of 30 or 40 or 50 billion dollars and untold ecological damage. They still have a supply focus in their policies. Pricing and market mechanisms are rare and inadequately applied in China.

Okay. There is a real water crisis. It's in different forms in different regions. We'll never run out of water, but we're past the point of peak water and peak ecological water in many regions and China's not alone. Excessive use of water or inadequate supply, is already constraining industrial production and growth in some regions and sectors. And to some degree, just to circle around here, this is what Davos was interested in. I don't know if they care about ecological water as much as they ought to. I don't know if they care about the human right to water as much as they ought to. But in places where industrial production is increasingly constrained by water quality problems, or availability of water, or water rights

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