

## **IBM AND THE FUTURE OF ENERGY**

**FREEMAN:** Welcome to an IBM podcast on the Future of Energy. I'm Tod Freeman. The next five years will be pivotal for the energy and utility industry. Consumers are no longer content to be recipients of energy, they want more choices about how they buy it, how they manage it, and the impact energy production has on the environment.

Joining us today are three guests. First is Mark van den Berg, a venture capitalist with Vantage Point Venture Partners. Vantage Point's portfolio includes clean tech startups focused on renewable energy, transportation and water. Mark, thanks for joining us today.

van den BERG: Thanks, Tod. It's a pleasure to be here.

**FREEMAN:** Allan Schurr is Vice President Strategy and Development for IBM's energy and utilities industry, a 25-year veteran of the energy industry, Allen has held management and executive positions at Pacific Gas and Electric and ITron. Allan, welcome.

**SCHURR:** It's nice to be with you today, Tod.

**FREEMAN:** Finally, from IBM's Venture Capital Group, co-founder and director of strategy, Drew Clark. Drew is spending a lot of time these days focusing on clean tech. Drew, thank you for joining us.

**CLARK:** My pleasure, Tod.

**FREEMAN:** Allan, let's start with you. When it comes to energy, how will our homes get smarter in the future? What will we be able to do differently?

**SCHURR:** Well, Tod, today consumers really have almost no information about how they use energy, where they use it and when they use it, and that's a real disadvantage in how they can manage for lower bills and even reduced environmental impact. So in the future consumers will have much more information and really be able to make much better decisions to save money.

**FREEMAN:** Are consumers asking for this, or is this industry-led?

**SCHURR:** It's a combination of both consumers wanting to take more control over a bill that they've never really felt they had control over. And utilities needing consumers to be more involved in making decisions to help reduce load growth on the grid and increase energy efficiency.

**FREEMAN:** According to the National Venture Capital Association, clean tech has come from out of nowhere to now what is the number three overall investment area for VCs. Drew, what do you attribute this to?

**CLARK:** what we're really seeing is nothing short of a huge burst of energy on the part of the VCs. Something like \$3.4 billion went into clean tech kinds of investments last year.

And that's about a 50 percent jump over the year before which was also at record levels. I think what's most interesting, actually, is the fact it's not only a phenomenon here in Silicon Valley and across the U.S., but we're seeing the same kinds of signs in other geos. We're seeing it across Europe. We're seeing it in China. So this is truly a global trend.

**FREEMAN:** I want to touch for a moment on some of the cleaner renewable energy sources. For example, solar and wind. We're seeing a lot more hybrid cars on the road and consumers are beginning to fill their cars more and more with ethanol. Where do you see this trend going over the next couple of years. And, Mark, let's go ahead and start with you on this.

**van den BERG:** Certainly the one interesting aspect of clean tech investing and the public's desire to participate in more of a cleaner energy economy is driven by more than one factor. So we've seen, obviously, the current energy economics, if you've been to the pump lately.

The emerging economies in Asia creating tremendous demand. And, additionally, the demand for portability and advances in efficiency. Climate change and then, lastly, and maybe as importantly, the need for energy independence.

I think what's been actually quite intriguing and surprising to us at Vantage Point is how innovative people have gotten in business models that support the renewable energy space. So whether it be solar or wind or alternative transportation, creative financing proposals, various shared ownership community solar models, things like that have popped up all over the place. It's been very surprising to us.

**FREEMAN:** What does the increased focus on energy and clean tech mean for the consumer?

**CLARK:** Today, one of the things we're starting to see is kind of a shift in investment trends, moving from the supply side to increasingly focusing on the demand side. And that really means areas like so-called smart grid. It means making the grid more intelligent.

It means more intelligence over the entire network. So it kind of thinks about the consumer, for example, as an intelligent node on that network. So the consumer is ultimately going to benefit from a lot of this intelligence.

It's going to result in greater control over your energy dollars. It's going to result in a better relationship with your energy supplier, utility in this case, and probably result in a lot of cost savings eventually in terms of the consumer actually actively getting involved in the conservation of energy.

**FREEMAN:** Allan, I just want to ask you a follow-up question on that since you're involved in smart grid and the intelligent utility network. Can you paint a picture for me of what that will look like for the consumer in their home in the next couple of years?

**SCHURR:** There are a couple of aspects that are really different from today's world. The first one is that when there's a power outage today the utility is usually waiting for consumers to call in and report that outage.

But in the future the utilities may even call the consumer and tell them that we're aware of your outage and here's an estimated restoration time. We think that that is a big shift in the way customer service will occur around one of the most problematic aspects of utility service.

I think just as likely, in the future, instead of getting a bill that gives the consumer just a total aggregate amount of energy they consumed over a month or so, they'll start seeing line item details about where that energy was consumed, how much their refrigerator costs them, how much their heating and cooling cost them.

And even provide information to the consumer about whether there's an energy efficient alternative that could help reduce their bill if they decided to check the box and maybe pay for a replacement of that appliance.

FREEMAN: Mark, let me ask you a question. We talked about the smart grid and the bigger picture of energy and utility and how that is changing. But when it gets down to the home, the daily day-to-day use of electricity and how we view power in the house, do you see that changing in the next couple of years or is that changing now?

van den BERG: The management of our power or electricity, I think, will take on a whole new level of sort of IT kind of control.

Once we begin to measure things and we have standards that can interface to our appliances, I would expect that we might have a world where our smart white appliances might shop on the grid for the best utility rate. And our appliances may actually, under some direction from the homeowner, be able to create their own sort of energy networks inside the home.

CLARK: One of the other trends we're also starting to see is increased use of intelligent sensors throughout the network. And we're certainly seeing it in the energy efficiency area in terms of huge power uses which are the data centers that power a lot of the information, not only around the network but across all of the big facilities like Google, for example.

I think what we're going to start to see is more widespread use of intelligent data sensors. And then, of course, that's going to generate a great deal more data and information and require a lot more information management capability to make sense out of all of this data.

SCHURR: All these new technologies are doing nothing less than providing for consumers in households, the same kind of sophisticated management capability that college campuses and office buildings have had but in fact scaled down to a home automation capability for the consumer that allows them to automate decisions around using energy much smarter. And wireless sensors and local area networks and Internet access are all those piece parts that make all this activity possible.

van den BERG: I think there's some other technology drivers that are going to influence the way we manage our energy around the grid.

The first is the idea that most of the states in North America have developed renewable portfolio standards. And so centralized renewable power that's dispatchable is not

always consistent. So that intermittency is something that the grid needs to respond to.

A second, but corollary phenomena, is that with the onset of grid parity dispatchable solar power, we see many residences in the United States actually becoming small independent power producers themselves.

And as they start producing their own power and as other technologies come to allow them to start measuring their own power, they're going to want a lot more control.

**FREEMAN:** So we've been talking a lot about the U.S. here. But obviously there's a global sea change occurring here in how we view and use energy. Any trends in other countries worth noting.

**SCHURR:** Tod, the U.S. is not alone in this and yet it has a different main focus than some other countries. When we look at Asia, in particular Japan, Korea, China, there's been a significant amount of investment into smart grid technologies for reliability reasons.

They're very focused on the industrial complex and making sure that power is affordable and reliable for manufacturing.

In Europe, there has been a significant deployment of advanced meters, particularly in Italy and many other countries are looking at very large deployments. But most of their focus is on operational efficiency with those smart meters.

The U.S. has really confronted a different problem and are merging all three, or all of the technologies of reliability, plus operational efficiencies with demand efficiency.

**CLARK:** I think one of the other areas we haven't really touched on yet that we're starting to see progress in is advanced water management. We're really seeing some of the countries where they have the most acute problem take some leadership in terms of essentially guiding their own destiny. By that I mean providing some very clever, very innovative solutions at kind of point of consumption.

For example, in water filtration. Even advanced water management in terms of security for water supply. So I think we're going to learn a lot from working with innovators around the world and in many of these countries who are providing kind of this unique innovation that perhaps is driven by the acuteness of the problem.

**van den BERG:** I think we talked earlier about the myriad of economic drivers for this clean tech investing cycle that we're in. You can compound that with the idea that our infrastructure is aged and it's due for an upgrade.

And I think if you look at it from the lens of venture capital and you can see the number of interesting ideas and technologies that are being funded and developed I think it can point to a future where the consumer is going to largely benefit tremendously in advances in efficiency, advances in our ability to manage the grid, advances in transportation, advances in clean water, both in the developed countries as well as in the newly developing countries I think there will be great opportunity for this clean tech marketplace to really take hold.

One fun example I always talk about with my kids is the idea that if you're not going to

go to work on a Saturday that the dryer that's drying all the soccer uniforms is going to pull its energy from the plug-in hybrid in the garage which will then later be recharged from the solar panels on the roof as opposed to tapping the electricity grid for all of its power. So I think in the modern home of the future we'll manage our energy in a completely different way.

FREEMAN: Allan, we're going to end with you. Lots of good ideas, but how do we make this all happen.

SCHURR: Well, how to make it happen is we think the utilities play a very important part of catalyzing these markets. They're one of the primary stakeholders in all of this. They're the number one emitter of carbon pollution into the world.

They have the primary responsibility for generating and delivering power to consumers. And so utilities need to and are building the economic arguments for making very large investments in technologies that can improve the operation of their system and deliver these kinds of benefits to consumers.

There are examples where the progress is very rapid and the policymakers, the state and federal regulators, even around the world, are now bought into the concept of this vast modernization of the network having a much greater intelligence level associated with it. And it's profound.

FREEMAN: Drew, Allen and Mark, great insights and thank you again for spending some time with us today.

van den BERG: Enjoyed it.

SCHURR: Pleasure to be here.

CLARK: Thanks again.

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