

Industry Transformation: A Colloquy on Energy Efficiency, the Smart Grid, and a New Regulatory Paradigm

With moderator **Vijay V. Vaitheeswaran**, Global Correspondent for *The Economist*, and panelists **Montek Singh Ahluwalia**, Deputy Chairman, Planning Commission of India; **Peter L. Corsell**, Chairman and CEO of GridPoint; **Hal Harvey**, CEO of Climate Works; **Georgina Kessel**, Energy Minister of Mexico; and **Jim Rogers**, Chairman and CEO of Duke Energy.

This is an edited version of a panel at the DOE-hosted “Clean Energy Ministerial,” held in Washington, D.C., on July 19 and 20, 2010.

Moderator: We have heard much about the opportunities in energy efficiency. We have seen the excellent work of the McKinsey Global Institute, debunking the myth that global efficiency doesn’t make sense. Tremendous opportunities have been outlined – a potential reduction of 23 percent in energy consumption in the U.S. by 2020, as compared with business as usual. Over a gigaton of greenhouse gas reductions, at a savings of \$680 billion. That’s the analysis coming forth from the most careful study in this area.

It sounds easy, right? Of course, anybody involved in energy efficiency knows it is not easy. It is the classic \$20 bill lying on the sidewalk. Economists like to joke that there couldn’t be a \$20 bill because someone would have picked it up. But the \$20 bill may be in the shape of nickels and dimes, and it takes efforts to pick them up. Maybe it doesn’t happen because energy isn’t priced correctly or because there are regulatory failures. So I would like our panel to jump in and talk about what are the obstacles, and what works.

BEST PRACTICES AND STANDARDS

Ahluwalia: In India we have a major program on standards and labeling which we started about four years ago. The idea was to take a lot of appliances and introduce a simple labeling system that would inform consumers what the relative energy efficiency of these different appliances was. That has been enormously successful; although the better-rated appliances cost a bit more, consumers on their own, without any government forcing, have responded to the labeling effort and moved upscale quite a bit.

We are also shifting from incandescent bulbs to CFLs – and ultimately to LEDs. The idea is to change all the light bulbs in India from incandescent to CFL. This year we think we are going to change 400 million bulbs. In about two years, it is our assessment that virtually all the bulbs in India will have moved from incandescent to CFL. The net result: an incandescent bulb produces ten lumens per watt. A CFL produces 70 lumens per watt. If we can take it up to LED – which is much more expensive, but maybe the cost will come down – the efficiency goes to 100 lumens per watt. The efficiency increase is at least seven-fold and could go to ten-fold.

Moderator: Hal Harvey, how do we make this happen? How do we get to best practices?

Harvey: Unfortunately the transfer of best practice ideas from jurisdiction to jurisdiction around the world, and even within a country, is painfully slow and very costly. The California building codes put into law 30 years ago cut energy consumption [in that sector] by 75 percent. But less than a third of American states have codes that are that good now. Within the United States, we've seen an abysmally poor transfer of that technology.

There are about seven realms in which performance standards can slash waste and save energy. The benefits are dramatic.

Think about appliance manufacturing, for example. Appliance manufacturers look to global markets. If they see one standard that's long-term and has a percentage incremental improvement, they know how to allocate capital and structure their R&D budgets. If it is happening across a dozen large markets, they can produce more efficient appliances and save a vast amount of money.

Moderator: Jim Rogers, you personally have been spending time in China. Is there a way to see what's happening in countries like China that has potential for forging a different path? And what do you see there at a corporate level that you can bring back to countries like the U.S.?

Looking at its automobile industry, China found that the best way to accelerate it to become global competitors in energy efficiency was to set strong standards.

Rogers: We've had a great experience in China, a great learning experience. We have several relationships with Chinese companies, and what is very clear is that they have a keen appreciation of the correlation between electrification of their country and prosperity. About 80 percent of their energy now comes from coal, but most of that has been in the industrial sector. Now, as they move more and more from rural to urban, they're starting to build entire new cities, and they will bring modern efficiencies to that development.

The other thing the Chinese appreciate – something I'm not sure we appreciate in U.S. or other developed countries – is that in the 21st century there is going to be a link between prosperity and energy efficiency. China is in a unique place to understand the correlation, and the way they're going about it, quite frankly, is achieving the best of both. One of the reasons we're doing business in China is not only to learn about scaling up, but because in an infrastructure business the real innovation comes in successive generations of implementation. It's not, as you might imagine, someone in Silicon Valley coming up with something that suddenly changes the world. It really is more about how you build infrastructure at a lower cost.

The Chinese recognize that energy efficiency will allow them to extend their prosperity into the 21st century.

Moderator: Hal Harvey, I know the work you did with China on the role of regulation in energy. Can you talk a little bit about the role of technology-forcing regulations? Industry tends to be a bit skeptical about this. What do the decades of experience on the ground with this show about the tradeoffs and about what works?

Harvey: The Chinese story on automobiles is quite interesting. About ten years ago the Chinese government was first considering efficiency standards for automobiles. It was in the early stages of air pollution standards. There was a study done by researchers at Chingua University and Harvard University of how standards affect the industry. What they found, which was not the conventional thinking, was that the best way to accelerate industries to become global competitors in energy efficiency was to set strong standards. At the time, China had a hundred auto manufacturers. It was highly disaggregated. They did not have a modern auto industry.

Since then we have seen the most dramatic transformation of that industry in history because they set strong standards and insisted that all joint ventures meet those standards. So Toyota or General Motors could no longer sell old factories or old technologies into China. They had to skip the dirty steps.

I will be curious to see how India and Mexico proceed with LEDs. This is a revolution in lighting and I predict those

markets will inspire a lot of new industry.

Rogers: Vijay, there is another important point here. The Chinese set pretty clear standards, and as technology evolves it evolves the standards. But they are in a situation where they are building new cities every year. We in the U.S. and in other parts of the world think in the context of retrofitting. Even there I think there's going to be huge learning for us to have a cost-effective, affordable approach to retrofitting to meet new standards.

Moderator: It's always cheaper to get it right the first time, isn't it? How do you deal with building efficiency?

Ahluwalia: Very important point – certainly in China and India. In India we've worked out a new code for energy-efficient buildings. And the interesting thing is we estimate that of the commercial buildings that will be in place in India by 2030 – reflecting our high growth rate – 70 percent of those have yet to be built. So we have this extraordinary opportunity that if you can put energy efficiency into the building codes from now to the year 2030, we would actually be able to have a much better system than if we had to do a lot of retrofitting. The building code itself we have drawn from Secretary Chu's former laboratory [Lawrence Berkeley Laboratory]. What is needed to get to a more energy efficient building?

Kessel: It's very important to introduce energy efficiency in the building codes. Even more important is a supervisory function, to make sure that the energy efficiency codes are really being built into the building.

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Moderator: I think in China the old adage is “the emperor is far and the mountains are high.” Standards may not be honored, in practice, without that kind of supervision.

SMART GRID AND REGULATORY REFORM

Moderator: Let me turn to Peter Corsell. We have talked a lot about efficiency. You are a Smart Grid expert, and your company, GridPoint, works on those issues. Can you tell me before we get into some of the dynamics of Smart Grid technologies and so on, is Smart Grid necessarily compatible with greater energy efficiency? What if it simply proves to be a cloak for building big, fat transmission pipes for running lots of inefficient coal plants? Is it clear that Smart Grid will lead to a more intelligent use of energy?

Corsell: I think that's a very fair question and I think the answer is undeniably yes. I see Smart Grid as a great enabler of efficiency – and more advanced methods of efficiency than we've seen in the past. There really are two Smart Grids. There's Smart Grid from the producer side, the utility side. And then there's the consumer side.

In the future, we may come to regard the smart device as the customer – consistent with the comfort, convenience, and criteria of the device’s owner.

We have this electricity system that is ubiquitous and reliable and affordable. It’s exactly what we bargained for a hundred years ago when that initial bargain was struck. Certainly in the U.S., the incentives follow that. Utilities have been incentivized to build infrastructure. What our system is not: It is not necessarily clean, nor is it efficient. Obviously what we are trying to do here now is keep reliable and affordable – but also make it smarter, greener and leaner, from fuel type to consumption type.

People don’t buy electricity. Consumers buy hot water, motive force, illumination. We buy services. The big promise in Smart Grid – it connects to energy efficiency – is giving consumers the visibility and control to better understand what they’re buying and be more efficient.

Moderator: Jim Rogers, Duke is regulated by a utility commission. You know how it works: Utilities are typically rewarded for building more power plants, for pushing more electrons out the door. So what about demand-side management? The more ambitious goals that Peter Corsell has put forward about a different kind of system,

with more distributed generation, and a focus on energy services rather than electrons – this is not how you are paid. Isn’t that true?

Rogers: Historically, our mission as utilities was to provide universal access. “Affordable” today means service at 1.9 percent of disposable income. “Reliable” today means available more than 99.9 percent of the time, and increasingly cleaner. That has been our mission. I think our mission today is to make the cleanest, most efficient communities in the world.

Not everybody today really understands Smart Grid. On the utilities side, it is making our distribution system digital, with two-way communications, able to predict outages, improve reliability, et cetera. But communication on the other side of the meter is really key. Peter Corsell and I were having this discussion before we came on. I believe that for utilities the customer in the future will actually be the smart device, because we will be able to send a signal to the device to facilitate the refrigerator operating appropriately, for example.

We may look back 10 or 15 years from now and say that what we do today is primitive in terms of energy efficiency if we can make it “back of mind.” It’s a change in our mindset to say that the device is really the customer – that is, communication with the device, consistent with the comfort, convenience, and criteria of the owner of the device.

Moderator: We have seen other challenges where societies have changed, for example, in smoking practices. Very difficult problem, right? Changing how people use energy is

another difficult problem. You need tools. You need rules. And you need social norms to change.

We've heard about rules and standards. But Hal Harvey, talk to me about social norms. How do we change behavior? Because there may be appliance standards and cleaner refrigerators available. There might be Smart Grid and metering. But maybe I can't be bothered. I'm lazy. I don't really focus on energy. I don't have an incentive to do so. How do you get the individual to take a little bit of ownership? What lessons have you learned looking at this?

Harvey: I would say, look at the character of not just the person but the entity. If we have an energy strategy that relies on average citizens on a daily basis to figure out time-of-use metering, and when to run their washing machine and when not, it is not going to work. But if you look at the motivations of society as a whole, you can get there. Back to the building code question. We can promulgate good building codes but will builders build good buildings? What is their incentive for doing so? Why should they change their practices?

I think the answer is in making sure that the motivations of the electric utilities are aligned with the builders. Utilities have 100 percent market access. They have armies of workers. They know how to deal with complicated contracts, and so on. When they have the proper incentives, they become the allies of efficient buildings. Similarly, the builders themselves – why should they change their practices? Because they are then playing on a

level playing field, instead of in the background sneakily putting in crappy windows and bad insulation and so on.

I guess how I would answer your question this way: Align the motivations with the character of either the industry or the individuals you are trying to affect. Don't expect heroic things from people on a daily basis. You won't get them.

Rogers: Vijay, let me intervene. The regulatory paradigm today in virtually every state rewards us for selling more kilowatt-hours. That's fine when the mission was to provide universal access. What needs to be changed, state by state, is this: We need to change the paradigm so we make as much money investing beyond the meter as we do on our side of the meter. We need to look at decoupling and formula rates.

Actually, I can envision a kind of Duke-Amazon, where we are giving customers a menu of what we pick as the best devices – the best toasters, best refrigerators. They'll

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have the electronic chips in them. They'll be the most efficient, and we'll give customers a discount, and tell them where they can buy it. That will make it happen.

Moderator: So you would cut through the clutter and let them share in the savings.

Here's a question from the audience that challenges a bit of what we've said so far. This questioner isn't persuaded. Efficiency standards alone won't drive enough change in consumption patterns needed to cut emissions and decrease use of fossil energy. How vital is a carbon price to drive efficiency improvement? In particular, they ask, will countries like India and Mexico be willing to adopt something like a carbon price to change and motivate behavior?

Ahluwalia: As a general proposition, I completely agree. Nobody will try to

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It's false to say prices must go up under carbon regulation.*

economize on energy if energy is cheap. Now, that's not an easy transition to achieve. As far as India is concerned, we did introduce a levy on coal, which is going to raise money, and that money is going to be put into a fund which will be used to subsidize clean energy. So we are using the price mechanism, making coal more expensive and the proceeds of that will go to subsidizing some of the things that we've talked about. We also raised petroleum prices only two months ago. It is politically difficult to do these things. I think it has to

be driven by a recognition that prices must reflect not just the apparent cost but also the hidden cost of certain kinds of energy.

Moderator: This is a huge issue, isn't it? A few months ago the International Energy Agency, in advance of the G20 summit, put out a report on global fossil fuel subsidies. They reckon it might be \$550 billion a year, most of it in developing countries that are given fossil fuel subsidies, often done in the name of the poor. My experience, having been born in India, having lived in Mexico and other places, is that there can be a middle class elite capture –

Ahluwalia: You shouldn't look at the absolute size of the subsidy. Look at the subsidy as a percent of GDP. I don't think as a percent of GDP it is necessarily that huge. I do agree that we need to phase it out. That's our official policy.

Kessel: I completely agree. I think we all need to phase out subsidies, particularly in the energy sector. That said, it is a difficult thing. I think also it is very important to have some kind of protection through targeted subsidies for the very, very low income families. That is something that we are pursuing in Mexico. We have a strategy to do that. And we hope that we will be able to phase out general subsidies and substitute them through targeted subsidies for the poor.

Rogers: We fought hard and we are still fighting hard to get a price on carbon in the United States. I think it is critical to have a cap and trade program so you have a price and you have a cap on emissions. But we sometimes fall into a trap. And the trap, is

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even if the price goes up – I dare say 95 percent of my customers don't know the kilowatt hour charge, but they know what their bill is. We seem to think by putting a price on carbon it is going to drive prices up for consumers. I believe when they look at their bill, if we have an aggressive energy efficiency program – if we have standards, if we do the retrofits – it is a false argument to say prices must go up. They may not, because I'm a believer in technology and standards. And I think the bill could actually go down, even with a price on carbon.

Moderator: This is actually what we've seen in other industries, isn't it, when we have seen disruptive innovation – changes in the regulatory regime as well as convergence of other technological actors. No disrespect to you, Jim, you are a pioneer in the utility industry. But the utility industry has not been the most innovative industry on earth, certainly not in the last few decades.

Of course, the industry's accomplishments have been extraordinary. But if you look at industry rates of investment – for example, in R&D, the electricity sector in the U.S. reinvests less than one-half of 1 percent [of revenue]. I think the point here is if we were to see other startup entrepreneurial firms that

might bring fresh capital and fresh ideas to the industry, could we perhaps see a change in how business is done?

Rogers: I think it goes to changing our mission. Our mission is to make our communities the most energy efficient in the world. We'll be competing with Mexico and India and China, or just name the country. Actually, Japan is the most energy efficient country in the world today.

But with competition and a change in the regulatory paradigm, so that we make money doing the things we've been talking about, I embrace what Peter Corsell is doing because he's bringing new ideas that will allow our customers to use energy in a more efficient way, which translates into a lower bill.

So Peter and I are allies. Our number one impediment to achieving this vision – which is comparable to the vision we achieved in the 20th century – is really convincing state regulators, and consumer advocates, and environmentalists, to change the regulatory paradigm. Give us the assignment. Our cost of capital is lower, and we'll make it happen.

Moderator: Peter, a question from the audience asks: What are the three critical moves to happen this year for a Smart Grid to progress?

Corsell: What must happen this year? Each of the last six years for me has been "this year." And next year will be "this year."

I think the core thing that we need to do, certainly in the United States, is look at the way utilities make money – what the mission

Target and Walmart and Whole Foods aren't waiting for utilities. Utilities now are not waiting. They're pushing their regulators to let them "catch up and lead."

is and what the incentives are. It is true that utility R&D spending, especially around distributed technologies, has been lower than it should be. But there's a reason for that. Utilities are not incentivized to leverage their ubiquitous presence. Utilities have the lowest cost of capital. They have all these customer relationships. To me it is not even a question of deregulation and regulation. It is giving regulated utilities the correct incentives so that energy efficiency can be real, measurable, verifiable, and utilities can make money being stewards of a clean and efficient network. The technology is here.

The consumers are not waiting. The Targets and the Walmarts and the Walgreens and Whole Foods and shopping malls are not waiting for utilities. And many of the utilities see that and are pushing their regulators and commissions to allow them to "catch up and lead." But it is very difficult for a utility to tell shareholders they must invest in energy efficiency when they get no reward for that. That's a societal trap we need to get out of.

Moderator: Does one of our government representatives want to talk about the question of changing how regulation is done

for utilities? It is a very technical point, but it seems to be fundamental in understanding how and why the \$20 bills are not picked up.

Ahluwalia: The point is very valid. You do need to devise a regulatory structure that would give utilities an incentive to do the right thing. In our case, many of our utilities being public sector, they do not making a profit anyway, so the whole idea of financial incentives causing them to do different things doesn't necessarily work.

But if you want to move toward more efficient use of energy, time-of-day metering is a pretty elementary thing to do. We are in a more primitive stage. It has happened for commercial users, not for households. No reason why it shouldn't because there are huge peaks, particularly in a hot country. And there is no reason why people should not – if you had a Smart Grid that would enable you to charge more when electricity is scarce – organize their lives to avoid that.

WHOSE SMART GRID?

Moderator: If we begin to add intelligence to the grid, who owns that intelligence? I'm thinking that the global economy is moving is to value knowledge, to value intangibles. When we look at this, who will own the intelligence and the intangible assets?

Rogers: Our customers only get 12 data points a year. If you put in a smart meter, they get thousands of data points. I believe that this information will be owned by both the utility and the customer under the right set of rules. The real challenge is: How do

you mine the data in a way to make smart decisions about technology, and do you understand the algorithms of usage of the different devices within the home? Because I envision the ability to write the software to optimize that usage. In fact, I would dare say that our business in the 21st century is to be an optimizer, not just of the grid but of every residential home and business, optimizing all the way from the device to the generating unit.

Corsell: I think that's absolutely right, and this is a big part of what we do at GridPoint. It's not settled as to what precisely is the customer's data and what is the utility's data. But we're all starting from a place where we have such inefficiency and lack of visibility. Customers will be grateful to be afforded additional visibility and control so that you will have smarter, more responsive buildings and usage.

What residential customers really want: The phrase is "set it and forget it." As Jim likes to say, they want to have it "back of mind." They really want a system in place that's going to be a smart, adaptive layer of intelligence over their home. They're not going to want to think about it and actively manage energy. Commercial customers are different. I think commercial enterprises may even be willing to spend serious money on this, because they may want to manage across regions, across utilities, across sites.

Moderator: There is a question about decoupling energy and productivity. For a developing country, of course, economic growth, poverty elimination, is a paramount

Residential customers really want to "set it and forget it." They won't want to actively manage their energy use.

concern. But what do you observe in terms of this decoupling, increasing efficiency of GDP in terms of energy? What role do you think is coming from just liberalizing the economy to foreign competition, for example, versus government standards?

Ahluwalia: I don't think the correct term is "decoupling." What is important to judge is, is the growth of energy proportionally less than the growth of GDP? In other words, is the energy intensity in GDP going down? The answer in India is it is definitely going down. India's energy intensity is actually lower than the OECD level, and declining. And we hope our GDP will grow between 8 and 9 percent. Well, energy should certainly not grow at 8 or 9 percent.

All these tools that we have been talking about – efficiency standards, building standards, regulation, and ultimately technology – will be needed to do this. Unless there is a growth in technology that allows us to use energy more efficiently, it won't happen. But I think the scope for increasing energy efficiency is very large.

WRAPPING UP

Moderator: Excellent. We're almost out of time, but I want to do a lightning round with

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my panelists, with short and sweet answers. In the spirit of this action-oriented first ministerial summit, I want to ask each of you: What's the single most useful idea that in the next 12 months to 18 months you would like to see the gathered government ministers and other experts pursue?

Corsell: National and federal leadership in reimagining the way utilities are regulated, so that energy efficiency is included rather than excluded from the economic equation.

Rogers: He just took mine. (laughter) What I want to be prepared to do is promote the electric vehicle and do it as an extension of our business. I like this idea of a Duke-Amazon, in terms of branding the most efficient products in the country, especially ones that have chips in them that communicate with us, and accelerating deployment of Smart Grid and efficiency..

Moderator: So you're seeing your own colleagues in the utility industry not just as sort of cozy incumbents, but maybe even some as the "disruptive innovators" of the future.

Rogers: Exactly.

Harvey: Product cycles for most goods are incredibly fast, three years, four years. Any company not at the cutting edge will lose market share. Product cycles in government standards and performance standards are abysmally slow –decades even. As long as that happens, we waste hundreds of billions of dollars per year. So what I would say is for the governments of countries to say, in five areas, "Get it right and do it now." And that's for appliance standards, fuel efficiency standards, building codes, utility regulations, industrial energy efficiency. It is not rocket science and the changes could be dramatic.

Ahluwalia: From a government perspective, I suggest it may be a mistake to be looking for a silver bullet. The real gains are in the large number of things to be done. Don't look down on them. You can collect a lot of little efficiencies all over the place. If all our agencies are working in different ways to get something done on energy efficiency you will get a much better impact than by concentrating on one thing.

Moderator: Rather than silver bullet, maybe we should think of it as many arrows in one's quiver.

Kessel: I think it is important to have a plan and get into action and use all the bullets or arrows that you can use in order to obtain your energy efficiency goals.

Moderator: I think that's a fitting end to this panel. If I may paraphrase, "Just do it." ■