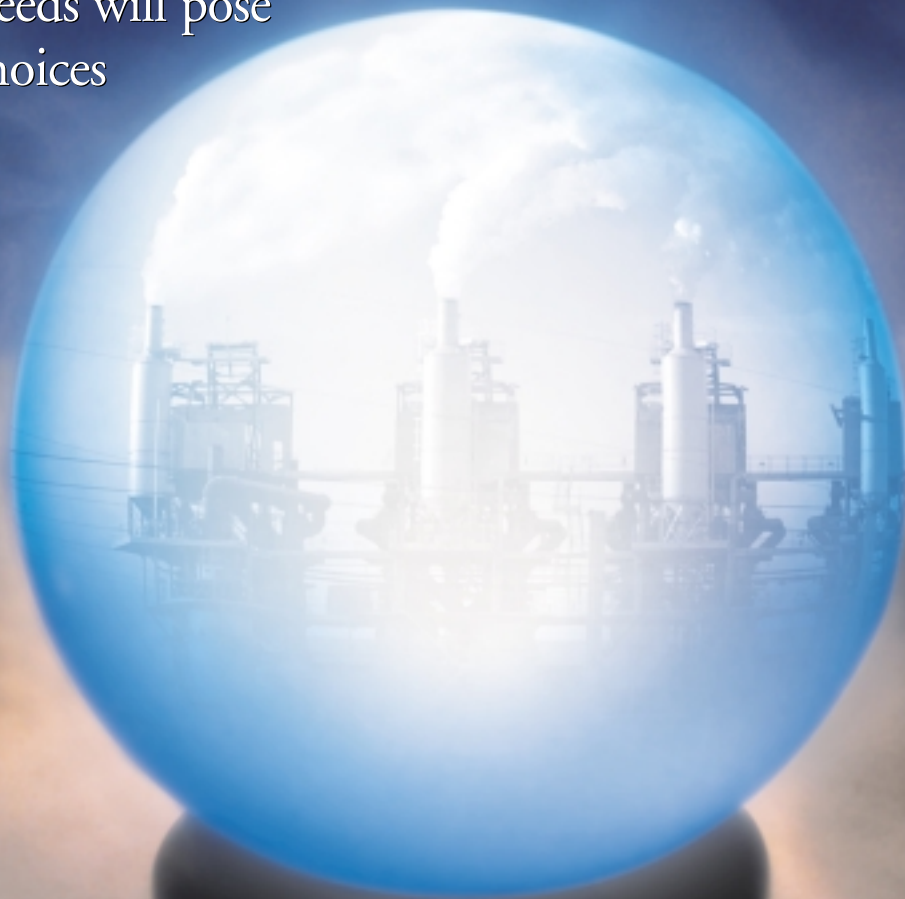


**ROUNDTABLE**

# The Future of Generation

Meeting tomorrow's  
power needs will pose  
tough choices



**BY MICHAEL T. BURR**

“I have seen the future, and it doesn't work.”

Journalist Robert Fulford wasn't thinking about the power-generation industry when he coined this oft-quoted expression. But he almost could have been.

Generators are being squeezed by an array of powerful forces, including the country's insatiable thirst for energy, rising concerns about global warming and other environmental issues, and an increasingly volatile world stage. No silver-bullet solution exists to deal with this array of forces, but companies and policy-makers are pursuing a combination of policy and technological measures that show promise.

Which solutions will be most effective is a subject of great controversy, and provides the context for *Fortnightly's* 2004 Generation Roundtable. We assembled a group of executives and analysts representing various perspectives on power generation, and asked them to predict the future for *Fortnightly* readers. Their insights suggest that the future indeed will work because it must, but making it work well—*i.e.*, affordably, cleanly and reliably—won't be easy.

## SEEKING BALANCE

**Fortnightly:** What are the prevailing trends regarding demand growth? How long will the current oversupply situation persist?

**John Young, President, Exelon Generation:** The entire economic evaluation of generation in the United States is coming to a head over the next few years. Following 9/11, the country and the industry experienced low single-digit growth, from 1 percent to just under 2 percent. Now some regions are seeing 2 percent to 3 percent growth. That's a big improvement. Along with that, in the generation business we are seeing a good number of retirements of old, inefficient or environmentally challenged assets. So the supply side is starting to shrink, and we are starting to see growth return.

We now expect the average reserve margin to come back into equilibrium by 2007, rather than after 2010 as some previously projected. On a national basis, we might see reserve margins return to their old 15 percent mark over the next four to five years.

But where and when generation needs to be built will continue to unfold on a regional and sub-regional basis. Various regions will return to equilibrium earlier, and some a lot later. The further south and west you go, the stronger the economic recovery has been. The Northeast has been growing slower than the Southeast and Southwest. Texas is growing faster than Chicago, but Chicago is growing as well.

**Norrie McKenzie, Vice President of Business Development, Southern Co.:** Entergy's region has a significant over-build situation, with probably 35 percent or higher reserve margins. For it to come back any time in the foreseeable future, you need 5,000 MW to 10,000 MW of retirements. Will that capacity be retired? I don't know.

**John Buehler, Managing Director, Energy Investors Funds:** We see steady demand growth in the United States over the next 15 years, out to 2020. We're buying time by building new transmission systems, but some opportunities are opening up for what we used to call IPPs, and that we now just call energy companies.

**Pete Cartwright, CEO, Calpine:** We have more bidding opportunities today than we have ever had, by far. We are pursuing something like 27,000 MW of opportunities.

California is far and away the hottest market. We are really in short supply in California. But Texas is always a good market, and with direct open access we continue to see an attractive future in Texas. New York also clearly needs power.

**Fortnightly:** What directions do you see environmental regulations heading?

**Howard A. Learner, Executive Director, Environmental Law & Policy Center:** The peculiar grandfathering provisions of the Clean Air Act have created an unequal playing field in favor of coal-fired power plants. Old coal plants that

were expected to die their death under the Clean Air Act have continued to operate for three decades. Their owners desire to run them as cheaply and as hard as possible to make money off them before they shut them down.

Part of the problem is that public policy hasn't caught up with modern technology. Over time, modern, cleaner energy technology will begin driving public policy.

The United States cannot stay out of step with the rest of the world forever. The science of global warming is no longer seriously in dispute. The debate now is what to do about it. American energy companies are divided. Some are stepping forward and others are not. We think those that step forward will have an advantage by addressing the issue sooner.

The fact is, whether the United States ratifies the Kyoto Protocol or not, multinational companies will be forced to reduce their carbon emissions because of requirements being applied in Europe and other parts of the world. Those companies will demand a level playing field and will make sure they get credit for being early adopters.

If most of the rest of the world is adopting carbon reductions, eventually the U.S. will have to follow.

**Cartwright, Calpine:** I'm convinced there will be increasing pressure on CO<sub>2</sub>, whether in the form of a carbon tax or emissions trading or something else that brings the United States into the whole global warming picture. It's going to happen. If the federal government doesn't take the lead, we'll see more state-level action to push emissions controls.

We are trying to promote the concept that improving the efficiency of gas-fired generation is the same as adding emission-free capacity. We have a program to improve the heat rate of gas-fired power plants, through new component designs and through optimizing operations across our fleet of power plants. That is establishing a strong position for our company.

**Blake Geoghagan, Principal, Deloitte Consulting:** There will be increased focus on carbon emissions. Many organizations are positioning themselves to have better performance on emissions in general. TVA undertook a huge project to install scrubbers on their facilities, and Southern Co. is doing the same.

**McKenzie, Southern Co.:** We have a well thought-out plan to spend money wisely to clean up plants that are needed to serve load. We're spending significant dollars, and complying with all the laws and regulations. At the Bowen plant in Cartersville [Ga.], we are spending half a billion dollars on environmental controls.

**Gary L. Hunt, President, Global Energy Advisers:** Even a delayed implementation of the Kyoto Protocol has the practical effect of shutting down almost half of the coal-fired generation in America to comply. That is a profound outcome. It could undermine our energy security dramatically by making us more dependent on natural gas and imported LNG, in order to replace that coal-fired generation.

**Randall Swisher, Executive Director, American Wind Energy Association:** The cost of taking action [to reduce carbon emissions] has been exaggerated. There are about a zillion things that can be done to control carbon that are not big-ticket items, such as installing more windpower and other renewable energy, and more energy efficiency. The horror stories we've heard in terms of cost are simply scare tactics, bearing no resemblance to reality. There's no reason we can't identify a series of least-cost solutions. Policymakers should set the targets, and then stand back and let the private sector make decisions about how to achieve them. It's been demonstrated how creative the American free-market system is at finding least-cost solutions.

**Fortnightly:** What other major factors are affecting the power industry's direction?

**Swisher, AWEA:** Some elements of our current national energy policy are suicidal in nature. When you look at our dependence on imported fossil fuels, we have to look at the steps we can take to reduce that insecurity. Domestic resources like renewable energy make a lot of sense from that perspective.

**Hunt, Global Energy Advisers:** We've been focusing on the interplay of supply/demand fundamentals and where the industry might go, considering the changing nature of fuels, environmental considerations, and security uncertainties. In our *Electric Power Horizons* study, we built three alternative scenarios for the energy industry's future, out to 2020. For example, in the "terrorism and turmoil" scenario, we see an uncertain environment with economic dislocations that could take 10 years to overcome. There is much reason to worry about our security issues, with respect to high-profile, high-value targets.

## THINKING GREENER

**Fortnightly:** What role will renewables play in the future? Some states have set a target to have 20 percent or more of



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their electricity supplied by renewable sources in the foreseeable future. Are such figures realistic?

**Swisher, AWEA:** It is feasible both in terms of the size of the resource that is available and the economics of windpower. Wind power now provides more than 20 percent for Denmark and regions of northern Spain and Germany.

It hasn’t happened here in the United States yet because the economics had to be right. We’ve seen the cost of wind power decrease dramatically to the point where new wind generation with the production tax credit comes in around 3 cents a kilowatt hour. The cost depends on the speed of the wind and other things, but it can be cost-competitive with new coal or gas generation.

Over the past five years, installed wind power capacity has grown by an average annual rate of 28 percent, and we expect double-digit growth to continue indefinitely into the future.

**Learner, Environmental Law & Policy Center:** We are not suffering from an absence of good wind power opportunities in the United States. We need the public policy initiatives to tap them and use them.

**Buehler, Energy Investors Funds:** Renewables absolutely

will have an increasing market share in the next 10 years. The combination of wind, geothermal, solar, and hydropower will grow, in some cases doubling in size. New York plans to have 25 percent of its electricity supplied by renewables within a decade. That’s a meaningful target.

**Young, Exelon:** I think there will be a lot of action on renewables. The momentum is too great to slow that down. What’s up for debate is the reality of what part it can play in our future. Is it 3 percent or 20 percent?

When we deal with wind power, the footprint it requires, the way it interacts with the system, how you transmit it to load centers, economic impacts ... these are all questions that need to be answered. But there is a business there, and some big money is starting to pursue it.

**Cartwright, Calpine:** We don’t want to be naysayers. In fact, arguably we are the largest producer of renewable megawatt-hours in the country. It’s all geothermal. We are looking at wind power and trying to find the right thing to do, the reasonable economic business decision. But I will say that Jimmy Carter set a target to have 10 percent of the country’s energy coming from solar by the year 2000. Today, 0.7 percent is solar. In general, it’s easier to set a target than it is to achieve it.

## KING COAL RETURNS

**Geoghagan, Deloitte:** Twenty percent is a huge amount of capacity. The capital required to deploy something like that is high compared to the benefits received. I don't know who will step up to do it. Even tax incentives won't be enough.

**Fortnightly:** What about nuclear power, then? Will we be building new nuclear power plants in the coming decade?

**Geoghagan, Deloitte:** I'm a fan of nuclear power. Unless we find another way to deal with carbon emissions, my opinion is that nuclear power will be the answer for the next 25 years.

The big stumbling block is what to do with the radioactive waste. If we could solve that problem, nuclear power would come back into favor. Also we need to find a way to build nuclear power plants a little less expensively than in the past.

**Cartwright, Calpine:** I think there is a future for nuclear, but it is a long time away. I hope there will be some prototype nuclear development, but we won't see any new commercial nuclear plants in the 10-year time frame.

We have to recognize that in today's society, there's no one ready to take on the risk and cost of building nuclear power plants. We've heard numbers like \$500 million just to get a permit for a new nuclear plant. That's a lot of money at risk.

When nuclear power first got started, it was seen as the wave of the future. We had companies like GE and Westinghouse competing for that business, and making heavy commitments with fixed-price turnkey contracts that kick started the industry. There's no one around to do that today. So the second round of nuclear power won't occur for maybe 15 years.

**Buehler, Energy Investors Funds:** Clearly people are inventing new paradigms for the next generation of nuclear power in the United States. As a matter of science, we can't afford not to continue the research toward building a better nuclear power plant. It is cleaner than any fossil methods and can produce huge amounts of power from relatively small stations. Therefore it can be located near load centers.

But a big impediment today is terrorism. Nuclear power faces a conundrum. Can we overcome the NIMBY and disposal issues in an era of terrorism?

**Young, Exelon:** The nuclear power industry is spending hundreds of millions of dollars to respond to homeland security concerns. A lot of that is being borne on the backs of ratepayers, but not for plants that aren't in a regulated structure. That eats into the margin of a non-regulated generator.

**Fortnightly:** In the near- and mid-term future, gas and coal seem likely to remain our most important fuels. What will happen to prices for gas and coal, as power demand grows?

**Buehler, Energy Investors Funds:** A ridiculously high percentage of what's been built in the past several years is gas-fired. It's a depleting resource, and is in shorter supply than coal. Over the next several years, we will see a rededication to building larger coal-fired power plants. They will be more environmentally benign than old coal plants, and will help alleviate the need for instant sourcing of gas.

On the gas side, you will see more dollars invested in importing LNG and in gas transportation and storage. You'll see increasing pressure on Congress to open up the east face of the Rockies to drilling.

**Hunt, Global Energy Advisers:** Coal prices traditionally have been much more stable and less volatile than gas prices have been. We've seen a fair amount of consolidation in the coal mining business, and that certainly has led to firming up of coal prices.

But coal reserves are abundant. We have something like 250 billion tons of coal in the United States, which is 200 years of supply at today's production levels. We are not running out of coal, but coal prices are high and are likely to remain high because of production levels.

We are seeing coal prices being pegged to gas prices. They tend to move more in tandem than they did in the past. The coal guys are trying to play in that market more effectively than they have in the past, when coal prices were tied to long-term contracts and you didn't have price volatility associated with them.

**Young, Exelon:** Looking into the future, international economic drivers—especially involving China and India—will have a tremendous impact on what we are seeing in oil prices, and increasingly that will affect our gas prices as well. It's no secret we are starting to stretch our gas resource and transportation. Siting LNG regasification facilities will be troublesome from an environmental and security standpoint. All those things will have an impact.

**Fortnightly:** What technology developments will be most instrumental in the future of power generation?

**Learner, Environmental Law & Policy Center:** The big

winners will be renewables and energy efficiency. The fastest and cheapest way to reduce carbon emissions – and also to lighten the load on the transmission grid – is to improve energy efficiency, with more efficient lighting, motors, air conditioning, and refrigeration.

**Young, Exelon:** Technology hasn't advanced as fast as it could, partly because we kept energy prices low in this country for a long time. As high as they seem today, they are still a relatively stable part of our economy. That has not encouraged investment in new technologies for conservation or load management.

But with \$50-a-barrel oil and high gas prices, we are seeing renewed interest in the demand side of the equation. Someday we'll see the ability to shape loads at the local level such that existing transmission and generation assets can go a lot further than they do today. It will allow distributors to provide lower-cost electricity.

**Cartwright, Calpine:** We'll see some IGCC [integrated gasification-combined cycle] plants going online in the next five years or so, and if they are successful there will be more.

**McKenzie, Southern Co.:** Having coal gasification capacity in front of the country's 200,000 MW of combined-cycle capacity would allow the flexibility to switch between coal and gas. That would be a different world than the one we are in today. In 10 years, with LNG infrastructure in place globally, and with commercialized coal gasification capacity in place, we could see gas at \$3 [per MMBtu] again.

We are excited about the award we received from the Department of Energy to pursue a coal gasification project in Orlando. It will be a commercial demonstration of our gasification technology. My hope for Southern Company is that by the 2013 to 2015 time frame, we will be putting gasifiers in front of our existing combined-cycle units.

## SHARPER PENCILS

**Fortnightly:** Who will build and own the next generation of power plants? Will progress toward competition continue or stall out? Will a new, more viable merchant power business model emerge?

**Cartwright, Calpine:** The situation now is very different from what it was a few years ago. I don't think there will be a significant number of new power plants built on speculation

as they were several years ago. But we are seeing more load-serving entities issuing RFPs for long-term commitments of power capacity, with an average life of about 7 years. That allows us to project finance.

The bottom line is the contract must be with a creditworthy entity, and the terms must support financing. The banks have been very interested in competing for business when you have a good contract and a good project.

**Hunt, Global Energy Advisers:** We see continued pressure for direct access. Even with the calamity we had in the California energy crisis, industrial customers are saying they see opportunities for savings and they don't want the door to close.

**Buehler, Energy Investors Funds:** The free market got stalled because of bad regulation in California, but that was a one-off problem. We will continue to deregulate.

Some people may focus on building regional portfolios of merchant assets or acquiring regional portfolios of distressed assets. We have issues, however, about whether you can leverage a distressed merchant asset, and how you can hedge against price fluctuations in the forward cost of power. You need an appropriate supply-demand relationship.

But the competitive market continues to produce the lowest-cost and most efficient power plants. That will continue.

**Geoghagan, Deloitte:** The key is asset valuation. But I think there will continue to be a market for merchant power, once we get over the shock of Enron and Dynegy and other organizations that failed. Some are doing it aggressively. It's smart to buy plants for dimes on the dollar, and turn them into profitable merchant plants.

Competition is good and we need it. We just have to get the structure correct. When you have regulated companies building things on a cost-plus basis, there is no incentive to be innovative or increase productivity.

**McKenzie, Southern Co.:** Retail customers have benefited from the wholesale IPP business, because IOUs have had to compete with them in that arena. Now when an IOU does a self-build option, it is at a very attractive cost. We've had to compete against IOUs in Florida, and they have really sharpened their pencils.

The ultimate result is savings for retail customers. ■

*Michael T. Burr is Fortnightly's editor-at-large, and is a consultant and writer based in Minnesota. Email him at [mtburr@intersect.com](mailto:mtburr@intersect.com)*