

RATIONAL MIDDLE. NET ZERO

ELECTRIFYING AMERICA

EPISODE TRANSCRIPT

Dr. Kenneth Medlock, III:

When you think about the sources of emissions from fossil fuels, it's really combustion. To drive our cars, to run our power plants, to heat our homes.

Julie Cohn:

If we want to end that or at least dramatically reduce it, we have to think about other ways to do the same thing that we're doing right now with those hydrocarbons. Electrification offers a really ideal pathway for doing that, because we know how to use electricity for moving vehicles. We know how to use electricity to heat our homes, turn our lights on and run our machines.

Dr. Peter Fox-Penner:

Clean electricity is going to play a pivotal role in the clean energy future. No one has a scenario that gets us to a decarbonized energy system without a great expansion of carbon-free electricity.

Julie Cohn:

Back in the 1800s, numerous inventors were tinkering with electric power, electrification, developing batteries, light bulbs, so on and so forth. A few were really focused on how to make this a saleable product.

Dr. Peter Fox-Penner:

Thomas Edison and Westinghouse developed the technology that allowed electricity networks to be created. Gradually, private companies started offering electricity service to homes and to factories. Many power plants were connected to stronger and stronger, larger and larger networks.

Julie Cohn:

The acceleration really continued throughout the century. For example, federal investment in dams and big power lines linking generation facilities and distributing energy further.

Dr. Peter Fox-Penner:

The change was really revolutionary. Households were transformed. Factories would triple or quadruple their output overnight. We eventually created a single grid across North America.

Dr. Michael Webber:

The National Academy of Engineering put out a report a decade or so ago where they declared that the grid was the single most important invention of the 1900s. They've also suggested that remaking the grid will be the most important engineering achievement of the 2000s as well. Electrification is one of the key strategies for getting to net zero, and there are two reasons for this. The first reason is electricity is almost always more efficient than using heat-based processes. The other reason why electrification is important is because the power sector can decarbonize so easily. By electrification, we get efficiencies in the economy and decarbonization. It's like a win-win.

Todd Snitchler:

That's forcing consumer behavior to change. It's forcing generator behavior to change. It's driving investment dollars into different types of resources. What was once a grid that was dominated by coal fire generation, the balance being nuclear with some modest amounts of natural gas, has now flipped. Across the country, on average, natural gas is the largest generating resource across the country. Coal has dropped. Nuclear has held pretty steady. You've seen a rapid increase in the amount of renewals that have been deployed.

Dr. Peter Fox-Penner:

We have real progress going on the sources of power. What I do worry about is the difficulties in creating enough infrastructure to balance and deliver that power.

Julie Cohn:

The grid as it exists today doesn't have enough capacity, isn't in the right locations and may not be in good enough shape to support the electrification people envision for the future. If we are imagining a future in which we are relying almost exclusively on renewable resources, and we still want to live where we live and go where we go, we are going to need to reconsider where our power lines are, how much electricity they carry, and where they go? If you look at maps of where the wind energy is in our country and where there's lots and lots of sun, it tends to show places like the Panhandle of Texas, the Midwestern plain states. If you look at where our populations are located, we're not necessarily in those places.

Todd Snitchler:

If you have a high availability of renewable resources in the upper Midwest, say that's a great wind resource, you need wires to be able to move it to load centers like cities and urban communities that are going to consume that energy.

Joy Ditto:

Just getting those in the ground and getting the permits that are required from an environmental standpoint and other legal standpoints, can take 9-10 years in some cases. Some of them have to do with laws on the books and permitting. Others have to do with the not in my backyard syndrome that we all experience. That's just human nature. We have property rights. We have landowners. We have concerns around Native American rights. I mean, there are all of these things that are legitimate.

Dr. Michael Webber:

If we're going to make our entire economy depend even more on electricity than it does today, then we really need the electricity to be reliable. It needs to be there when we need it. The state or the power sector in the United States is that it's more fragile than we want it to be. We saw this in winter storm year in Texas in 2021, Hurricane Sandy in the northeast in 2012, the wildfires in California over several years. If we have to turn it off to prevent a wildfire or it turns off because the weather is cold, then we have other risks that happen. We start to lose our medical care system and people die. People die from the cold. There are problems with getting our water treated and clean. We can't preserve our food. There's all sorts of problems with the economy if it depends on electricity and electricity is not there when we need it.

Dr. Kenneth Medlock, III:

You think about reliability in a different way when you put that into frame. You think about, "Look, there is a social cost associated with not being able to provide power to the grid." And so, you need to have backup sources of generation available on that grid so that you can manage that. Maybe it's natural gas, maybe it's battery capacity. I mean, who knows? Maybe it's nuclear or maybe it's something we haven't even thought up yet. But if we're going to make these choices to go all electric and only renewables, we've got to pay for the backup too.

Joy Ditto:

I think there's this balancing act to be had as we want to accept in the electrification of the transportation sector and of other parts of our economy, like the building sector. We want to continue to get less carbon intense over time. But if we try to do two months at once, we could get to a point where we're having reliability concerns. We could also impact the affordability of electricity.

Todd Snitchler:

Consumers are willing to pay something. The number changes based on where they are relative to income level. There are a lot of early adopters who are very much willing to adopt the electric vehicles. They have a charging station, because they're agnostic to their bill. Their utility bill comes and they pay it. Then, you have folks who are working to make ends meet, and they're very concerned about whether or not they can afford to pay their electric bill. There are some questions about equity and how we're going to ensure that the public will support it and can afford to pay for it as we look at medium to longer term planning.

Dr. Kenneth Medlock, III:

Electrification has been growing. Today, the rate of electrification in the United States is higher than it was in 1970. We are moving in that direction already. However, to get from where we are today to a point where everything is electrified is a Herculean lift. The amount of infrastructure that needs to be developed, the amount of offsets, if we talk about nature based solutions to carbon dioxide for the fossil resources that remain on the grid, the amount of carbon capture that has to be installed and developed, it's staggering.

Joy Ditto:

But it's going to be hard. Again, a lot of different components are going to have to come together. Industries, support from government. We have seen some progress being made, frankly, in a bipartisan way. That's heartening.

Todd Snitchler:

We have the technology and the ability to get most of the way there. The question will be, where does the aspirational goal of emissions reductions meet the willingness of the public to pay and the ability for the system to be converted to that future state with a different set of resources operating in a little different fashion than it does today?

Dr. Peter Fox-Penner:

The industry's future has been this bright only once, and that was at the turn of the century when electricity reinvented people's lives and reinvented our economy. Now, electricity is half the climate solution and going through a giant renaissance of decarbonizing and doubling its reach. Now, there's lots of other really, really important work to do for the climate solution in every industry. But it is great to see the new sense of mission in the electric power sector.