

## Natural Resources Line of Inquiry

### Lesson 1

#### Transcript of the video: “Why the US Isn’t Ready for Clean Energy” - Vox

Vox. (2021, September 21). *Why the US isn't ready for clean energy* [Video].

[https://youtu.be/s3ScJ\\_FwaZk?si=n7LoMWfM45kmYRbb](https://youtu.be/s3ScJ_FwaZk?si=n7LoMWfM45kmYRbb)

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The state of Vermont has one of the greenest grids in the U.S. Two-thirds of their electricity comes from renewable energy sources, like solar, wind, or hydroelectric plants. The current goal is to be at 75% by 2032, which is why it was pretty surprising when a new solar project here was denied. This area doesn't have a lot of people, but it does have plenty of potential for renewable energy. The power plants here, in addition to a regular power supply from Canada, already put about 450 megawatts of electricity onto the grid — and by grid, I mean these power lines — but the grid's capacity is around 450 megawatts, so the grid just wouldn't be able to handle any more power generated here.

If we want a greener future in the U.S., we'll need to build more renewable energy plants. But to actually use that electricity, we'll also need to build more of these. This is a map of where everyone in the continental U.S. lives, the density of each county. Here's New York City, LA, Chicago, and here's where every big power plant is currently. Appropriately, they tend to be where the people are. In Washington, D.C., where I live, we get nearly all our electricity from surrounding states' power plants — mostly nuclear and natural gas. Electricity goes from the power plant, through big high-voltage transmission lines, to a substation, where the electricity is dispersed onto smaller, lower-powered distribution lines, that send it into my house.

Like Vermont, D.C. also plans to be greener. The goal is to have 100% renewable sources making our electricity by 2032. It's part of a national goal, too. President Biden wants to reduce emissions in the U.S. 50% by 2030, with nearly half of U.S. power coming from solar plants by 2050. That means switching out those natural gas plants for wind turbines, coal plants for solar farms. Lowering emissions also means switching from gas cars to electric cars. Heating our buildings not with natural gas but with electric heat pumps; cooking on electric stoves. Basically, we're going to be using a lot more electricity, anywhere from 40 to 100% more than we currently use.

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So, back to the map. If we're going to replace all these polluting energy plants, we can't just build a wind turbine in their place. They need to be where it's, you know, windy. This is a model, created by Princeton, mapping out possible places in the continental U.S. where wind and solar projects could, in theory, be built. Aside from some offshore wind farms, it's mostly in the middle of the U.S.. Another study found that these states have most of the wind and solar potential, yet the people living there would only make up 30% of the electricity demand. In a decarbonized future, we're going to need to get electricity from here to here, and, we're going to move a lot of it. That's where high-voltage transmission lines come in.

ROB GRAMLICH: "I think the infrastructure is the most important thing. It doesn't get a lot of attention, but it really is the key. This is where the U.S. currently has high-voltage transmission lines. The Princeton model shows this is where new lines will need to be built if the U.S. uses all renewable energy by 2050, but it's not a simple process. Every wire in your house has plastic over it because if two electrical lines get too close ... But high-voltage power lines are the bare active wire. No plastic. They're insulated by the air. Basically, if they're kept far enough apart from each other, it's safe, but they also have to be kept far away from ... everything, trees included. This is actually how some of the California wildfires were started: Trees coming in contact with the super-big high-voltage transmission lines. And those are what we'll need more of as we lengthen the distance from energy source to energy need."

We'll also need to make many current ones even bigger because bigger means more power. Physically, the cables are thicker; the bigger the cable, the more power can run through them, and because they're bigger, they have to be really far apart for insulation, and built higher up. It makes them kind of a pain to build, partly because of how large they are, but also how much private land they have to cross.

GRAMLICH: "Very often, the developer can get 99% of the landowners to agree, but then there's that last 1%, and that can take forever, and can crater the whole thing."

So experts say we should start building now, even before we build the plants.

GRAMLICH: "You can do a generation project in a year, the transmission, three, if you're lucky, but it can go over ten. We don't want to do this in a reactive mode, where we build a lot of stranded generation. We want to proactively build the transmission to where we know the resources are, and the thing about wind and solar resources is, we know where they are."

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A greener grid in the U.S. means thinking nationally: Building more transmission lines, so when it's sunny in Arizona, it can power Chicago, and at night, Illinois wind can power Phoenix. To do that efficiently, the U.S. will need a new, interconnected, high-voltage grid. Princeton found it would take nearly \$320 billion in investments in the next 10 years. Almost as much as investments in solar and wind plants themselves. Congress is working on an infrastructure bill that contains some funding but really only a fraction of what's needed.

GRAMLICH: "I'm optimistic about our ability to do it because we have done it before. I am nervous about the execution, between legislation, regulation, and industry follow-through."

The U.S. is currently on track to have 42% of our energy come from renewables by 2050. If current proposals turn into real policy, we could be closer to 80%, but just making greener electricity isn't enough. We have to be able to move it.

GRAMLICH: "Transmission is important for the clean energy future. We're just not going to decarbonize without it."