

D I A L O G U E

Energy and the Environment: Challenges in a Changing World

Summary

U.S. energy requirements, policy, and regulations are changing rapidly. Numerous large-scale energy projects are underway, and generation, supply, and distribution infrastructure is evolving at an unprecedented rate. With these shifts, the focus has turned to energy transmission and pipelines, including regulatory updates, stormwater and erosion and sedimentation control requirements, environmental impact analysis and permitting, and construction monitoring. On January 29, 2019, ELI and AECOM co-sponsored a seminar where leading experts explored these changes and challenges in energy transmission. Below, we present a transcript of the discussion, which has been edited for style, clarity, and space considerations.

Richard DeCesar (moderator) is Vice President of Midstream & Pipelines in the Oil & Gas Market Sector, Design & Consulting Services Group at AECOM, a multinational engineering firm.

Bernie Holcomb is a Vice President with AECOM.

Annie Jones is the Attorney-Advisor in the Office of Energy Infrastructure Security at the Federal Energy Regulatory Commission.

Jim McElfish is a Senior Attorney and Director of the Sustainable Use of Land Program at the Environmental Law Institute.

Chris Miller is President of the Piedmont Environmental Council.

Richard DeCesar: Welcome to today's event, co-sponsored by the Environmental Law Institute (ELI) and AECOM. We will start off by introducing our panelists.

Bernie Holcomb, my co-worker, is a Vice President with AECOM. He's a recognized permitting expert with our company, and he has more than 35 years of experi-

ence in managing complex natural gas and utility infrastructure projects.

Jim McElfish is a Senior Attorney and Director of the Sustainable Use of Land Program at ELI. Jim's research focuses on development choices and their links to land use, water resources, biological diversity, and infrastructure policies.

Chris Miller is the President of the Piedmont Environmental Council (PEC). Chris is responsible for the overall management and strategic planning for PEC, including its land conservation program, habitat restoration, rural economics, energy policy, land use policy, and smart growth in transportation policy.

Annie Jones is the Attorney-Advisor of Security in the Office of Energy Infrastructure Security at the Federal Energy Regulatory Commission (FERC). Annie has 12 years of energy and infrastructure, security law, and regulation experience.

Our topic is energy requirements, policy, and regulations that are changing rapidly in the United States. Numerous large-scale energy projects are underway and, as such, energy generation and supply distribution infrastructure is changing at an unprecedented rate. With such shifts across the energy sector, the focus now turns especially to energy transmission including regulatory updates, emerging complex stormwater and erosion and sedimentation control requirements, environmental impact analysis and permitting, and environmental construction monitoring.

Today's panel includes leading experts who will explore these changes and challenges in energy transmission, environmental protection, compliance, permitting, and solutions implemented, with a special focus on pipelines. After the panelists finish their presentations we will take questions.

Looking first at the market size for pipelines, estimates range that over the next five years there will be between \$45 billion per year and \$80 billion per year spent on developing pipelines in our country. It equates to about 100,000 miles of pipelines that are expected to be built between

now and 2035. This pipeline development is spread almost evenly between natural gas pipelines and pipelines that will carry liquid hydrocarbons such as crude oil, gasoline, and natural gas liquids.

So, what are some of the changes in this industry? There are a lot of technology changes, with experience in geographic information systems (GIS), global positioning satellites (GPS), and a lot more, as well as horizontal directional drilling. These technology changes have facilitated pipeline routing techniques to help us in the industry to avoid impacting resources.

In addition, the regulations are changing constantly. The amount and quality of information required to improve pipelines increases every year. There's also a greater emphasis on cumulative impacts. We've seen an increase in the environmental monitoring required for infrastructure. The opposition to pipelines has become much more organized, and more stringent state regulatory requirements were passed.

What are some of the challenges that go with these changes? In part, we have put more emphasis on acquiring the social license to build pipelines. We must raise the bar regarding safety and environmental performance to instill confidence in our industry. We're constantly trying to balance landowner preferences with avoidance of environmental impacts.

From my perspective, pipeline development is necessary for the United States to maximize the economic and security benefits represented by the energy resources contained in the various shale formations we have in the country. This development needs to occur in a safe and environmentally responsible way. I will turn it over to our first panelist, Annie Jones.

Annie Jones: I'm going to start with the typical FERC disclaimer that I'm here presenting my own views and that my views are not necessarily those of the Commission or any individual Commissioner or other members of the organizations that I'm involved with.

I want to provide a rough overview of the different types of infrastructure jurisdiction that the Commission has. I'll start by giving a brief introduction to what FERC is, and then I'll talk about physical and cybersecurity as it relates to those different infrastructure types and the different ways that the Commission works to promote security.

A little bit of background on me: I started at the Commission in the Office of General Counsel in our Energy Projects Office. I was there for 10 years working on hydroelectric natural gas and liquefied natural gas (LNG) project development. In the past two years, I've moved to our Office of Energy Infrastructure Security, which I'll talk a little bit more about.

So, what is FERC? FERC is a federal agency that is administratively under the U.S. Department of Energy (DOE). However, we act in accordance with our mandate as an independent, bipartisan agency. Our Commissioners are nominated by the president and confirmed by the U.S. Senate for staggered five-year terms. We're currently led by

Chairman Neil Chatterjee. The Chairman is a Commissioner who is then designated by the president to be Chairman. No more than three Commissioners can come from any one political party. The Commission acts in a quasi-judicial role, and that has implications for how we're able to interact with parties once a proceeding becomes contested. Once that happens, then our ex parte rules go into effect.

I'm going to focus on our Natural Gas Act¹ authority since we are looking at pipeline matters. The Natural Gas Act gives the Commission authority to regulate the transportation of natural gas in interstate commerce. That includes natural gas pipelines, storage facilities, and LNG facilities. We certify the construction and operation of those facilities, including storage and LNG facilities upon finding of public convenience and necessity. We also must approve the abandonment of those facilities once they have been closed.

On the market regulation side, we ensure that the rates, terms, and conditions of service are just and reasonable and not unduly discriminatory. Finally, the Natural Gas Policy Act² gives the Commission additional authority to regulate intrastate gas pipelines that operate in interstate commerce.

I want to lay out the different areas that we work in and the different things we take into account. I do want to note that we have undergone a review of the Commission's 1999 policy statement regarding certification of new natural gas pipeline facilities.³ Under the Natural Gas Act, we make our public convenience and necessity determination based on that policy statement.

Backing up, as projects are under development, we have broadly four stages of the process that projects go through. The first stage is the one where the Commission is mostly not involved, and that's the feasibility assessment.

The next stage is the pre-filing consultation, and that's where the Commission's work begins. That's where project sponsors, stakeholders, and Commission staff consult to identify environmental and engineering issues. The sponsors gather information. They develop their draft application, and Commission staff reviews and comments on project design and the draft application.

The third stage in the process is the application review. This is where the application comes to the Commission and it starts its more formal review process. We solicit comments and interventions from outside parties and the Commission's staff prepares and issues our environmental documents for the project. Then, the final step is the agency decision where, based on the record, the Commission makes a finding on the public need for the infrastructure.

Briefly, our National Environmental Policy Act (NEPA)⁴ process represents our staff's independent analysis. It evaluates the applicant's proposed avoidance and minimiza-

1. 15 U.S.C. §§717 et seq.

2. 15 U.S.C. §§3301 et seq.

3. FERC, CERTIFICATION OF NEW INTERSTATE NATURAL GAS PIPELINE FACILITIES: STATEMENT OF POLICY, 88 FERC ¶ 61227 (1999), *clarified*, 90 FERC ¶ 61128, *further clarified*, 92 FERC ¶ 61094 (2000), *available at* <https://www.ferc.gov/legal/maj-ord-reg/PL99-3-000.pdf>.

4. 42 U.S.C. §§4321-4370h, ELR STAT. NEPA §§2-209.

tion and mitigation measures. It discloses environmental impacts to the public and provides an opportunity for public comment. It also considers the alternatives to the proposal and it provides the staff's recommended mitigation for consideration by the Commission.

This is a very multidisciplinary process. We cooperate with a variety of agencies, including the U.S. Army Corps of Engineers (the Corps), U.S. Department of the Interior, U.S. Department of Transportation, U.S. Environmental Protection Agency, and frequently the states as well.

A couple updates: in the summer of 2015, the Fixing America's Surface Transportation Act⁵ was passed. The Act covers infrastructure projects that exceed \$200 million. It establishes the Federal Infrastructure Permitting Improvement Steering Council. The council establishes targeted permitting goals for the infrastructure categories and has developed a permitting dashboard to track them.

The April 9, 2018, "one federal decision" policy⁶ covers projects that have multiple federal authorizations and a single environmental impact statement (EIS), plus a two-year project goal. The whole process is designed to have concurrent evaluation by federal agencies as opposed to sequential evaluation. Thus, everyone's working on it at the same time to avoid duplication of effort.

I mentioned our updates to the 1999 certificate policy statement. On April 19, 2018, we issued a notice of inquiry⁷ asking for stakeholder perspectives on whether and, if so how, we should revise our approach. Specifically, we sought information on our methodology to determine whether there's a need for the project, our consideration of the potential exercise of eminent domain, and our evaluation of the environmental impact of the proposed project. Unfortunately, I can't provide an update on the timing of the Commission taking action on this, but it is still under review.

Now to shift focus. That was the natural gas side of our jurisdiction. I'll note that under Part I of the Federal Power Act,⁸ the Commission also has authority over the licensing of nonfederal hydroelectric projects. I'm not going to get into that too much, but the Commission does have jurisdictional authority over the primary transmission line from the hydroelectric project to the interconnection.

Under Parts II and III, the Commission regulates corporate activities and transactions such as mergers. We oversee accounting by public utilities. We oversee the prohibition on energy market manipulation. And we oversee the reliability of the power system through our oversight of the development and approval of compliance and mandatory reliability standards.

I'll offer a brief look at cybersecurity and physical security of energy transportation and infrastructure. In 2017, the Defense Science Board noted that over the next decade the offensive capabilities of our most capable adversary nations are likely to far exceed our ability to defend critical key infrastructures. It suggested that owners and operators of these facilities are going to need additional cost recovery mechanisms to address those threats, and also indicated that additional information-sharing mechanisms to address those threats will be necessary.

On the physical security side, a 2018 report from the Congressional Research Service⁹ noted that the U.S. Congress continues to be concerned about the state of the physical security of our electric grid, and that they are asking for additional focus on the implementation of oversight, cost recovery, hardening and resilience, and the improvement of the quality of threat information.

When it comes to cybersecurity, the federal oversight of natural gas pipelines is under the Transportation Security Administration within the Department of Homeland Security (DHS). They have authority to set regulatory requirements for pipelines, although to date they have issued only voluntary guidelines. Those were just recently updated.¹⁰ The Commission's authority is largely on the incentive side—so incentivizing cybersecurity investments.

The Commission on the electric side has a dual approach to infrastructure security. We have the Office of Electric Reliability that oversees the standards side. And then the office I'm part of oversees the voluntary and collaborative best practices aspect.

Section 215 of the Federal Power Act authorized the Commission to approve and enforce reliability standards, which is basically a requirement approved by the Commission to provide for the reliable operation of the bulk power system, and that does include cybersecurity protections.

Our Office of Electrical Reliability oversees our critical infrastructure protection (CIP) reliability standards development and implementation. Basically, it takes assets and breaks them into three different categories of risks. So, you have low-, medium-, and high-risk categories. The requirements then are based on the level of risk. Examples of the types of controls that are required through our CIP process cover physical security, information protection, personnel and training, incident reporting, and recovery plans.

The office that I am in, the Office of Energy Infrastructure Security, was established in 2012 in response to these fast-moving threats that we were seeing. The three prongs are sharing threat information, analyzing the vulnerabilities and risk, and then helping develop advanced mitigation strategies. That extends to all of the different infrastructure

5. Pub. L. No 114-94, 129 Stat. 1312 (2015) (codified at 16 U.S.C. §§824 et seq.).

6. Memorandum of Understanding Implementing One Federal Decision Under Executive Order 13807 (Apr. 9, 2018), *available at* <https://www.whitehouse.gov/wp-content/uploads/2018/04/MOU-One-Federal-Decision-m-18-13-Part-2-1.pdf>.

7. Certification of New Interstate National Gas Facilities, 163 FERC ¶ 61042 (2018) (Notice of Inquiry); 83 Fed. Reg. 18020 (Apr. 25, 2018).

8. 16 U.S.C. §§791-828c.

9. PAUL W. PARFOMAK, CONGRESSIONAL RESEARCH SERVICE, NERC STANDARDS FOR BULK POWER PHYSICAL SECURITY: IS THE GRID MORE SECURE?, C(2018), *available at* <https://fas.org/sgp/crs/homsec/R45135.pdf>.

10. TRANSPORTATION SECURITY ADMINISTRATION, PIPELINE SECURITY GUIDELINES (2018), *available at* https://www.tsa.gov/sites/default/files/pipeline_security_guidelines.pdf.

types that the Commission is involved with—electric and oil, natural gas and hydroelectric facilities.

A big part of what we do is work to help conduct open and classified briefings through our partnerships with DOE, DHS, the Nuclear Regulatory Commission, the Federal Bureau of Investigation, and the Office of the Director of National Security. We work to provide targeted threat briefings for the different infrastructure types. We help facilitate security clearances for chief executive officers of different entities with facilities that we know to be critical from a defense perspective.

Functionally, one of the biggest parts of our workload in our office is conducting voluntary architecture assessments. We have teams that are sent to companies who volunteer to have us come out. This is different from a reliability audit; it is all voluntary and collaborative. We go out and take a look at their whole system comprehensively, and provide recommendations based on what we're seeing and what we know the threats to be. We do a lot with information-sharing, both with the National Cybersecurity & Communications Integration Center (NCCIC) at DHS and with the Electricity Information Sharing and Analysis Center, which is the information-sharing and gathering part of the North American Electric Reliability Corporation.

We also work on security issues with states, since bad actors don't respect how our country has decided to divide jurisdiction between federal agencies and state agencies. So it's really important that we help states try to get up to speed on cybersecurity. We have generated best practices guides for states. We have conferences with different state utility commissioners. And we frequently are asked to present on panels that are directed at states that are trying to wrap their heads around security concerns.

I do want to talk briefly about the Commission's resilience proceeding, to put our actions in that area in context. In the 1970s, we had several statutory and regulatory developments that basically changed the vertically integrated utilities to the competitive electric markets that we have today. With that, it's been decades of sort of recalibrating how we're looking at things. The goals of our resilience proceeding are to develop a common understanding among FERC, the industry, and others as to what resilience means and what it requires, to understand how each regional transmission organization (RTO) assesses resilience for its geographic footprint, and to then use that information to evaluate whether additional FERC action is going to be needed.

Finally, I want to mention that we just finished the process where we were asked to report to Congress on electric transmission and investment incentives and rate treatments on how the Commission can encourage efficient investments. We identified lots of different ways that we provided incentive-based rate treatments where we, for example, allow 100% of construction work in progress and pre-commercial costs, allowing utilities to start recovering costs even before their project is built, and accelerated depreciation of capital investments and single-issue rate-

making so companies don't necessarily have to come in for a full rate case to recover costs associated with particular security investments.

In 2001, we did issue a policy statement¹¹ on extraordinary expenditures necessary to safeguard the national energy supply. This was following the events of September 11. We issued a policy providing assurance that the Commission will approve applications to recover prudently incurred costs aimed at recovering security investments.

I'm going to leave it at that.

Bernie Holcomb: I've got two parts to my presentation that I was asked to speak on. I'm only going to give you the thumbnail sketch of both of them because we basically could spend days to weeks talking about emerging changes and what's going on with stormwater and erosion and sediment control issues across the nation, as well as internationally. Because of the linkage of stormwater and erosion control to the permitting, I was also asked to give an overview and update on environmental impact analysis, permitting challenges, and some of the solutions that we're working on collaboratively between different government organizations and agencies, public groups, and the like as we move forward.

I'm going to share from my perspective. I'm an ecologist by training. I've been working in the field for more than 35 years. Basically, I didn't start working with the utility natural gas industry until the late 1980s, when the wetlands regulations changed and the Corps got involved with some of the new regulations for Clean Water Act (CWA)¹² §404 and the litigation. Then my technical expertise was needed with wetlands and, before I knew it, I was doing pipelines on a pretty regular basis because you have to get pipelines from point A to point B. And there's no way you can get there without going through wetlands, water bodies, and floodplains.

That introduced me to a whole different world as I was going along working with not only the regulators on how to do that, but also with the construction personnel, the pipeline designers, the engineers, as they're putting things forward to look at the full life cycle. Often, when we're working on something, we see a snapshot. We hear one sound bite in the media. But we don't realize that some of these pipelines were built during World War I and World War II and are still functioning, that they were put in place without any environmental controls per se and then have just been upgraded over the years as things have moved forward. It's also important that we kind of take a step back and take a deep breath sometimes and try to understand where we've been, what we're doing now, and where we're going.

I think a lot of people believe it's all or nothing. But if you go to some of the natural gas facilities with their pipelines, compressor stations, metering and regulating

11. *Extraordinary Expenditures Necessary to Safeguard National Energy Supplies*, 96 FERC ¶ 61299 (2001) (Policy Statement).

12. 33 U.S.C. §§1251-1387, ELR STAT. FWPCA §§101-607.

facilities, and the like, you're going to see they've got solar panels and fields on-site. So, they're integrating the different resources as they go along for renewables as part of their overall program as they move forward.

Some of the topics I'll cover will hit on things that I've been studying or working on with the Southern Gas Association (SGA) over the past two years. I also had the benefit of being on some of the FERC 101 and 201 panels for environmental education and training on FERC for the Interstate Natural Gas Association of America (INGAA), where we're taking on some of these topics and having seminars for a broad range of agencies to bring them up to speed on what's going on from an industrial perspective.

What I'd like to address right off the bat is some of the recent climate change and storm events that have occurred. There's a linkage here if you look at the regulations and you look at the changing storm events. What are the design standards for putting these facilities in place? What are they from a federal perspective? What are they under the state regulations? What are they under the county soil erosion control guidelines? What are they under the local planning and zoning? These pipelines go through all the different types of jurisdictions, which are quite a bit different. When I first started out, a lot of times you had to do this for the one- to five-year storm event, this for the 10- to 20-year storm event, and plan ahead for maybe a 100-year storm event as you're going along.

Now, two hot-button issues. You can hardly pick up a paper without seeing something about inadvertent returns and sinkholes. That links in to why aren't there more studies, why isn't more being done? And it involves getting our people access so we can go out there and do the necessary geotechnical studies and engineering studies to design more detailed controls as we're going forward. Then again, it's looking at how that links in with adequate area for staging, temporary construction workspace, and permanent right-of-way. It's a balance working with the regulators and technologies on that as well as the industry from their perspectives.

Just to highlight—everybody's living it right now—but if you just start looking at this, last year alone we had five extreme rain events where they were defined as 1,000-year rainfall metrics east of the Rockies. This was between January and September 2018. That's unprecedented. That's a heck of a lot of water. How many of the states have 50% to 75% more rainfall than average in the past year? What we are designing for and what's occurring outside is out of balance right now.

You can't always design and build to a 1,000-year event. The public would not accept those kinds of rates as you're going forward. So, there's got to be some balance in there communicating between the regulators, the scientists, and the industries when we're addressing these kinds of extreme ranges that we're seeing over the past couple of years. We have to help. We're designing to the regulations—a regulation, for example, on what the zoning requirements are in the different areas we have. It doesn't matter if you're look-

ing at the utility industry or you're looking at roadways or looking at something else, they're experiencing the same kind of challenges with the great amounts of water that we have out there.

Inadvertent returns and sinkholes are hot topics. People are very passionate about it in residential areas. But the one thing I notice that seems a little bit out of balance is that it's been going on for probably a long time. It's going on with all of our transportation projects, all of our water projects, all of our sewer projects. But that doesn't seem to always get the attention of the media for immediate repairs.

I know one instance in the Greater Philadelphia area, where they had a water main break. There was a lot of karst, a lot of limestone, in the area, and it dissolved underneath it. They'd taken out the roadway system and all the infrastructure for more than a city block. It's been almost a year and still they cannot restore it back to functioning order.

It's not pointing the finger in any one direction. It's just part of the construction process and engineering design. We all have to step back and make sure that we're designing for these occurrences, that we're taking into consideration what is karst, what is limestone? How does that have a play in what we're doing through that?

In looking at the coverage of pipelines, there's a big misunderstanding of what an inadvertent return is. A lot of people are reporting it as a spill event. It gets a lot of attention. There's a lot of panic out there. What are you spilling? What's in this water? Where is it going? Is it affecting my drinking water? Is it affecting my health, or my school, or my children, the residential areas you're going through?

Again, it's one of those things where you have to peel the onion a little bit. It's to understand what you're talking about. And right now, sound bites just aren't doing it. People have to look at what's involved with that and come to an understanding that there are problems out there that have to be addressed. Not every company and construction work is doing it perfectly as we go out there. But in the past year, I've tracked several of them that have been in the press a lot. There had been a lot of really bad issues with construction slumps, inadvertent returns, and sinkholes.

But then there's another one that is less than a few miles away, the same length, and it's gotten through all of that construction and implementation and monitoring without getting a notice of violations. If they had an issue, they were prepared. They were tackling it correctly. They were addressing it.

It's a little bit of a yin and yang when you're looking at these things. You've got to have the right players doing the appropriate studies to evaluate and see where they're going and to be prepared for a storm event. Or to be prepared if there's a frac-out or inadvertent return on a project.

Related to that, one of the key things that we keep saying is that we've got to conduct the studies to evaluate and determine the indicators of potential failure locations. If you're not allowed access to property, if you're not allowed to get out there and go on people's property to evaluate, you can't tell if it's the right location or not. You're relying on

geologic mass. You're relying on local infrastructure data, on past things that had gone on in the area. And there's a bit of a disconnect whereby people think if we stop them from doing the studies, we're going to stop the project.

But what ends up is if things get out of balance there, if we do the studies and we're planning ahead for it, then we can decide whether or not we need to move that pipeline away from that location because we know where there's a limestone outcrop. We'll know where existing sinkholes underneath the ground exist that people haven't seen and evaluated yet. So again, it's a balancing situation.

I grew up on a farm, and my dad had pipelines going through the back side of it. His concerns were not what effect is it going to have on productivity, but what is it going to do to the land there. Yet, if you allow the necessary studies to be done, you can ameliorate a lot of those construction issues and you can plan for construction and mitigation.

Similarly, it's important to monitor the equipment in the surrounding area during drilling operations. There is a huge disconnect on some of that going in. One of the first directionals I did years ago was over a very sensitive water body and associated wetland—it was nationally ranked. Before we even got out there, we got all of the permits and approvals. We also did comprehensive and formal training with the construction crews on the environmental structures that were going to be involved.

We made sure to staff 24/7, until they got through that area, and that there were floodlights set up in the area where we were doing the construction so that if something happened at night it was immediately known. There were stockpiles of equipment to capture should a release event occur; we trained the people running the equipment on the importance of watching the pumping gauges for pressure changes. And if there was a subtle variation, they immediately were on it to see whether they needed to shut down the pumping fluid and operations.

Those were simple steps, but if they are not incorporated in the planning, the overall permitting and approval process, and training as you go along, then you can have something that goes south and people don't know they've had a release so they're not able to shut down the fluids and to control things as they're going along.

Verifying the pollution control equipment tanks with personnel on-site is huge, very important for any kind of project where you have to do returns. I can't say it enough—it's important to be working collaboratively. We can't be constantly against one another. You have to work with the regulatory agencies, the emergency personnel, the people that are out there to communicate and help them understand what you're doing. This is new to them. Many of them have never seen the type of equipment that is used to put in a large pipeline. They're not familiar with the pipeline terminology. So, sometimes they're like ships passing in the night; they're not communicating effectively. But if you sit down and work on that, you can make big changes and get more understanding so that you can more properly

site, more properly regulate, more properly construct, and then have the necessary mitigation enhancement measures as you move forward.

Sinkholes are another thing that's been popping up a lot. They're out there right now. They're underground. In some areas, if you walk the line, you can see a cone-shaped divot and know something's going on in that area. Other times, it may be a flat pasture or open area and you won't think there are sinkholes, but they can be down 10 feet, 20 feet, or even down 100 feet. Introducing more water to that system expands the potential that a sinkhole is developing and will break out at the surface. Again, studying, understanding, and doing the right geotechnical studies can notably reduce those areas, and having the right equipment on hand will aid in evaluating what stretch of pipe can be used.

I was surprised that in some areas where these sinkholes are, the way they're formed in geology is that you can actually have a gap there of more than 90 feet and the pipeline integrity is not impacted. You don't come up with those numbers if you're not doing studies, if you're not evaluating what's going on and you're looking at the different types of pipe and the strength of the pipe as you're constructing going forward. It goes back to the importance of getting the studies out there.

One area that's seen a lot of attention in the past couple years is eminent domain. It comes in two phases when you're going through. Initially, the land agents that are working with the utility companies go out and ask for just survey permission. Can we work with you to get survey permission to look at this land that we want to cross through? If they say hell no, and they put up barriers or they call the attorneys in and they won't let you go out there to survey, then you can't do the geotechnical studies. You can't look for rare and threatened and endangered species. You can't flag the wetlands. All of that defers to using remote sensing data. Scientific studies have been done in the area by the U.S. Geological Survey or the state geological surveys. It's good data, but it can't summarily replace the benefits of getting out there on the ground and in person.

Stopping the pipeline by saying no to the studies isn't the right way to do it. Let us get out there and do the studies. Let us work with the landowners and the different communities to study what's going on out there. And then at that time you can design your project accordingly, relocate, or put an alternate into consideration. That's why we work with FERC. There's a huge section of their resource reports that's dedicated just to alternative analysis to avoid sensitive areas, from socioeconomic concerns, to wetlands, to drinking water supplies—a wide compendium of resources.

I'm going to go into environmental impact assessment and permitting and the linkages between them, because all of those studies that we do go right into environmental impact assessments. A lot of folks don't realize that, yes, were doing an impact assessment for FERC, but quite often, we're doing it for public utility commissions. We're doing it under state environmental impact processes. We're

doing it under some of the cities and townships that have environmental impact processes. So again, there's multiple layers of review. You want to start on day one doing good scientific studies that are valid and reproducible and that can be incorporated into all the different types of permits and approvals that are out there.

The list of different studies basically goes A to Z, soup to nuts. You're looking at everything nowadays. During some of the recent INGAA and SGA meetings as well as working with FERC and some of the other state agencies, we ask what are the key things of concern right now? What are the issues coming up you're seeing either lawsuits on, challenges on, or lots of public comments coming in and getting filed? And, basically, they run the gamut from determining if there is a real need for the project, to alternatives, and so on, as you go through the process. I want to focus on a couple of those key processes that I think are getting a lot of attention. And we need to really up our game on the permitting side and in communications with FERC and other agencies.

One key is project need. It used to be really straightforward. When I started working in this area, you might have a utility client that had a customer that wanted more gas on a firm uninterruptible supply so that they could meet their winter heating demands for their different subdivisions in a geographic area. But that paperwork was there and documented and put together in the right form and put through FERC. They could check the box. They could evaluate it. It went through their evaluation process and could be confirmed.

Now, it's branching out. It's gotten involved with more of a wider range of participants. There are challenges between those that are directly impacted by the construction of a pipeline facility, whether it's the pressure station, meter regulator, or pipeline, and those that are receiving the gas. There's a disconnect there because they start talking about the benefits going outside of the region of those people being impacted.

Yes, we're getting tax benefits from the pipeline being constructed in this area. Yes, we're getting jobs, but the endgame is that gas is going to a different community, region, or state to support the utility infrastructure. They don't like that. And they don't understand that a lot of this has been going on for well over 50 years. They weren't aware of it in the way they are now through social media and the press. So, it's having to communicate that early and often and getting a balance between the purpose and value and need for that, for supply, and who gets the benefit of it and how. There's an overriding public interest in the necessity for the pipeline, which is the key thing that's pertinent in their mandate.

What is the impact of the project? We're seeing a lot of comments and questions coming in challenging FERC, challenging the environmental studies that were done for a project—looking at climate change, looking at greenhouse gases. And instead of working at the area now where the compressor station wants to move the gas, where the proj-

ect actually is, they're looking at the endpoint receivers. Who's getting the benefit of the gas: the power companies, the industrial concerns that want that gas for processing petrochemicals, or something else? So, it's expanding the envelope of what has been traditionally in FERC's purview and jurisdiction under their Resource Report 9 for air emissions and now going outside of that region from the project itself.

There is a recognition of the impact of social media. I'll be honest, this has been my nemesis over the past couple of years. I can go to an agency meeting and we come in and brainstorm and get together and agree on a path forward. And before I can commute back to my office, it's out in the air. It's on all sorts of different nongovernmental organizations (NGOs) and agency sites, and challenges to what was said and they haven't even seen anything yet. Nothing has been written. Nothing is published. They're going by verbal communication and often it's miscommunication or disinformation on studies. I can understand their passion and not liking certain types of industry, but you've got to base it on facts. You've got to know what is actually being said at some of those meetings.

Police departments are sick and tired of, as they say, "false" reports of criminal trespass, of people being on a property even when they're not. That's taking away from their public service to protect when they're called out on false events.

The U.S. Court of Appeals for the District of Columbia (D.C.) Circuit has used the word "frivolous" a number of times for some of the lawsuits filed against pipelines to try and stop them or to appeal what's going on or slow down the proceedings. Again, it's taking up court time. It's important that we recognize some of the events that are going on, and you can appreciate people's passion and interests, but there's got to be a balance there in order to allow the natural processes to proceed on a timely and orderly basis. You can't have meetings with FERC or the agencies hijacked away from the landowners and abutters by people that just want to stop that type of industry.

And another thing, there is drowning in form letters and paperwork. At some recent projects I had in Pennsylvania, I was getting threats from people who were opposed to the project. And it goes out in the media and all that stuff that comes in has to be numbered, has to be identified, has to be evaluated, has to be answered as part of the process.

The last item I want to hit on is documentation, documentation, documentation. We've got to have the facts, the real facts. We've got to work with the agencies. We've got to track everything from the communications whether federal, state, county, or local as we're going through. We've got to make sure everything is recorded between the agencies and the meeting minutes. The minutes go up and they're reviewed and signed off on. You get the agency's concurrence so it's a factual and solid document. And then all of the different concerns identified can be addressed as you're going through the process, because you lose trust if you're not going through that step.

Chris Miller: It's actually the rational side of the environmental conservation movement that wants to make sure more facts are on the table and that the process is more deliberative. We've been working together on that.

I work for the Piedmont Environmental Council. We have been around since 1972. Our service area is on the Virginia-Piedmont between the Potomac River and the James River watersheds. Basically, the east slope of the Shenandoah area and Blue Ridge Mountains. A lot of stuff passes through us, so we've become quite familiar with the major forms of infrastructure, whether it be highways, railroads, high-voltage electric transmission, gas, or other hydrocarbon pipelines, both in actual projects and in the process of policy, planning, and permitting.

I offer the perspective of someone who's on the ground and in the way. We're not beneficiaries of any of these projects. We're the people that Bernie is so concerned about because we have concerns about the balance between public values of conservation and other community values and the overwhelming interest in the market for energy. That said, we keep coming back to, what's the real market for energy? What's the necessity from a public standpoint? What's the commercial goal? There's some tension over that when you get to the critical issue of eminent domain and the condemnation not only of private values but more importantly of public values.

What we're conserving in these areas are public conservation values that represent several state and local policies. They're not the personal concerns of the individual landowners. They're actually the collective will of our communities. They're just as valid as the Natural Gas Act or Natural Gas Policy Act. It's a much more interesting question than I think Bernie has presented, and I want to keep coming back to that.

We have a very simple process in our organization. We try to engage people, make them aware of what's going on, give them information, and empower them to act as individuals in those communities. We also act as an organization—everything from participating in local planning and zoning all the way through filing briefs in the U.S. Supreme Court. So, we're familiar with the entire political and legal systems of the United States and even some of the international treaties that might apply. It's a fun job.

This is the conservation work that represents a public-private partnership between 3,000 or 4,000 families in the state of Virginia and the localities in Virginia and the federal government. These are conservation easements donated by landowners where the public conservation values are protected. The land stays in private ownership. It represents 410,000 acres as of 2016. It's very significant, probably the most successful public-private partnership in conservation in the United States, maybe the world, because of the diversity of people who are participating. Each of these easements has to be consistent with local comprehensive planning. And each of it is part of a larger mission that we have of protecting about a million acres, about 50% of the land area.

If you're familiar with the biologist E.O. Wilson, 50% is the baseline for species diversity and habitat availability for species diversity, if we're going to avoid large-scale extinction.¹³ You can argue about what 50% is the most important to protect, but the goal of having open spaces is something that is starting to become much larger scale than I think people are aware of. It's not just parks. It's working lands. It's land that people live on and use. But the idea that we have to have open spaces for the health of the world is a growing area of research and I think more and more confirmation that it has to be of that scale.

The other thing I want to say about the million acres is that it's five times the size of the Shenandoah National Park. So, as an expression of public will, it's quite phenomenal. Shenandoah Park was condemned from the landowners against their will. The conservation easements have been donated voluntarily, so they reflect a much different approach to that large-scale conservation.

There is a form of infrastructure we're watching, which is the co-location of a fiber optic network with electric transmission because that's what's attracting data centers. And with it, a demand for land for utility-scale solar. So we take the pressure off the gas guys. The biggest land consumption use is actually renewable energy and it's something that we're concerned about and we consider the "impact zone."

In Virginia, there's a policy to site 5,000 megawatts of renewable energy. If they do that with the current photovoltaics technology, that's about 30,000 to 60,000 acres of land. So you get the really interesting questions about where the best place is for that? Where are the least impacts? How do you evaluate that? There is no process. There is no federal oversight. There's no state oversight really. It raises some interesting questions, especially by comparison with gas pipelines. And then I think the point about the level of interest being unusual, we wish the same attention could be paid to these large land-consuming activities not because they're bad or good, but because we have to understand what the impacts are. We have to address them in an appropriate fashion.

Why do people care? Listen, you can imagine, if you have a 200-foot structure built through your farm, it catches your attention. These are not insignificant infrastructure whether the right-of-way is 300 feet or 400 feet, if you have electric transmission or a compressor station, it changes the rural environment and it changes the suburban environment people care about.

The rights-of-way are easily identifiable from space. I always laugh at the discussion about cybersecurity because the sites that are attacked are so visible. The physical security of the gas pipeline and transmission network is laughable. It just is. It's so easy to access and it is so vulnerable. You're going to work with cybersecurity and not on the

13. Candice Gaukel Andrews, *Half Earth: Could Setting Aside 50 Percent of the World for Wildlife Really Work?*, WWF, Sept. 23, 2014, <https://www.nat-hab.com/blog/half-earth-could-setting-aside-50-percent-of-the-world-for-wildlife-really-work/>.

physical issues of a huge grid that moves electrons over such a vast area? It has to go to a more decentralized system or you are not going to address the security issue in a meaningful way.

People need to understand that utility-scale solar is huge. There is a 150-acre site in Fauquier County right where we work. It was sited in an area planned for industrial use. It's adjacent to a natural gas fusion plant. It had a lot of community support. It was sited reasonably easily because it is in the right location. But it's pretty close to an area of historic battlefields and farmland, so it's getting right to the edge of where you're going to have opposition.

These are big facilities that people care about. Just down the road in Spotsylvania, there's a proposal for a 6,200-acre site between Chancellorsville and the Wilderness Battlefield, both national parks. That's catching some attention. Is that an impervious surface? Is that something that's worthy of evaluation for the runoff it might generate? These are the kind of things that don't actually happen unless the community activists and organizations get involved, because the overwhelming pressure is to get these things sited and permitted and moved forward. So gas pipelines, they are not insignificant. They crisscross the state. Spectra went away but we still have the Mountain Valley Pipeline (MVP) and the Atlantic Coast Pipeline (ACP).

One of the things I want to talk about are those three issues that were raised about the need, the standards and design, and the process for the permitting. So we go to the need question. Population growth in the United States is essentially flat at an annualized rate. Per capita in energy consumption, I think, the U.S. Energy Information Administration confirms it's steadily declining and continues to decline. And the good news is that, as a society, we're increasingly efficient, with flat or declining energy demand. Yet, the utilities constantly forecast the need for more infrastructure because of the growth in energy consumption.

Dominion Power, which is the dominant monopoly in Virginia, has for the past 10 years forecast 10% to 15% growth in peak power demand, and for 10 years has been wrong. This year, the State Corporation Commission rejected their integration resource plan as simply false and unsubstantiated. For the first time, the Commission denied Dominion Power's overall technology and infrastructure plan for lacking any basis in reality. That's a pretty phenomenal thing in a state where they're the largest political contributor as an industry and have dominated politics.

So, what the regulator is trying to say is we have to ask the question if this is necessary. This is where FERC really has fallen apart because all they're looking at is the individual pipeline. They refuse to do an analysis, to compare, to look at groups of pipelines together to see if there's a cumulative effect, a cumulative need that is worthy of trying to figure out the best possible option. Instead, what they're doing is they're saying let the market decide which goes forward.

The market has proven to not be particularly good at making those choices, so we may be in a process of overbuilding infrastructure because the incentives that have been set up by the Natural Gas Act and Natural Gas Policy Act encourage that investment. There's a guaranteed rate of return that is passed on to the ratepayers and there's really no risk. Once you get that FERC approval, once you get that public utility approval, you're kind of out of the woods as to whether or not there's actually a commercial need for the project. And what's at risk is the loss of all these resources, forest fragmentation on a big scale. This is what's happening as a result. Large tracts of land are being opened up, and you have to ask for what purpose.

As for design standards, the issue was raised on how could we have known that there was going to be dramatic rainfall in Virginia in 2018. Meteorologists were forecasting a trough coming off the Gulf Stream into Virginia for at least three months prior to March. Starting in January, they said there's a climatic disturbance that's going to create a very interesting weather pattern this summer. They actually predicted and forecasted what happened, and the industry made no adjustment nor did the regulators. They said why are you going to make sure our permit ought to take all this into account? We don't need individualized reviews. We don't need to look at particularized weather conditions. We'll just use those averages and we'll all be fine.

Then, the results were horrible. The results on the ground during construction for MVP and ACP are horrible. There's sedimentation in all sorts of streams that have previously been pristine. It was all predicted by the meteorological forecasters and nothing was adjusted by either the regulators or the developers.

So, as we go through some of these decisions, they were often premature, mainly because Virginia endorsed these projects before there was any review at all. The state said they're great, they're what we need, we've got to move forward, we will permit them. It wasn't a fair process from the start, from the perspective of the affected communities. Mitigation deals were cut before the impact studies were complete. That's tough. They negotiated hard for what they got, but they agreed to it before the analysis was complete, before the reviews were complete.

As a result, we're dealing with a landscape that has been damaged. The issue of necessity is still being tested and the mitigation may or may not have been sufficient to deal with those predicted impacts. But we all predicted that this was going to happen. Then it did. We still had regulators saying, well, it's unfair to the applicants to have to take into account predicted rainfall. I don't know how you process that. It doesn't seem fair. And then when you're using eminent domain to do that, that's when you get the kinds of oversight by communities—what you're calling interference—but it's people exercising their property rights. I think that's a pretty fundamental issue in American jurisprudence and constitutional law to try to address an imbalance that has in fact favored the industry in very

dramatic ways. So, that's where the emotion comes from. That's where the concern comes from. That doesn't solve the problem.

What we've really been focused on is to try and figure out a better way to analyze this. We focused on getting better about it. What's a better process? We think FERC ought to do a programmatic EIS within geographic areas where they have multiple current proposals. They can do comparative analysis. We think there ought to be a review of design standards to deal with the unique characteristics of forest environments, steep mountainsides, the large forest areas. And we think that mitigation ought to be based on a full evaluation of the public values that are federal, state, and locally defined. We've made some recommendations about that. Those are things that are in litigation and we will see.

When we argued about this over the National Interest Electric Transmission Corridor, DOE said that there was no need to do a programmatic EIS. We sued, along with some others, and the U.S. Court of Appeals for the Ninth Circuit ruled that DOE violated the law in not performing a programmatic EIS.¹⁴ So, you can assert that there's not a requirement to do these reviews and we have the right to challenge that. We think it would be better if you did it voluntarily. NEPA is very permissive. You can do as much as you want. It's up to you as an agency. The more you do, the less conflict you'll have down the road.

So, you go through that whole question, and you get to mitigation. How do you offset the impacts of the things that are truly necessary and are in the public interest but still have an impact? You need to have a much more transparent and open way of evaluating that. PEC, as part of a group with a lot of federal and state conservation agencies in the Chesapeake Bay region, commissioned a report by ELI¹⁵ to really look at all these processes, to look at the state planning for conservation and for energy and to recommend a better way.

I hope this gives you a different perspective than you might have had otherwise.

Jim McElfish: As a reminder, ELI is a non-litigating, non-advocacy organization in the environmental field. We were pleased to work with the Chesapeake Conservation Partnership on the project that Chris referred to and what I'll be referring to in light of the remarks today.

Basically, we're looking at opportunities to improve the evaluation and permitting of large energy facilities. We're focused on pipelines, to some extent on electric transmission, but also on other large-scale operations like solar and wind facilities.

What we're dealing with is a transformation in the energy economy. We're trying to apply old laws and existing policies to deal with the transformation. And we're not necessarily that good at it in some ways. The context is we have pipelines and more pipelines. We have them in new places. The development of Marcellus and Utica Shales has made Pennsylvania once again the second-largest energy producer in the country, reclaiming the role that it had 125 years ago.

There are more electric transmission projects—partly based on forecasts—because where power is being generated is in different places, or in different forms. We're trying to bring in energy from other parts of the country from large-scale wind farms or solar plants. This is producing lots of issues with landowners and the local governments and state governments that are not used to doing it, obviously.

Our current approach to these facilities—and I'm painting with a broad brush here—has been largely a set of one-off decisions that you apply for the appropriate set of permits or certificates of public convenience and necessity. And each agency stays in its own lane. And they are often dealing with federal processes, state agencies, departments of conservation and recreation and natural resources, or the state environmental regulatory agency that deals with water, that are each dealing with their own set of permits and the processes that are largely reactive to proposals by an applicant's and proponent's investments. It's not like government agencies are sitting around trying to figure out what's the next big thing.

But the result has been a set of processes that are to some degree largely opaque to the public. Or there's a whole set of permits and even state agencies aren't often entirely aware of what's going on and where all of the moving parts are. Mitigation is to some degree—although informed by an EIS or environmental assessment, where there is one—ad hoc and driven by the depth of the proponents' pockets and their willingness to come to agreements.

Therefore, what we suggest is that that we need a better approach. One better approach is that the government agencies, and I put this on the state agencies to a significant degree, must make effective use of the tools that they have to define important landscapes and watersheds and figure out what it is that we need to apply the greatest level of security. What are the crown jewels? One of the other things we're willing to consider in this kind of approach, is can we define some landscape objectives in advance of proposals that we can predict will come?

An element of the better approach writ large is to change the conceptual approach to permitting. Currently, we have the set of stovepipe permitting. Each agency stays in its own lane. And it's kind of like, okay, you've got the stream crossing. You have standard mitigation for a stream crossing and mitigating foot-for-foot, acre-per-acre. And after crossing a state forest, we have an approach that says if you're taking away the state forest you will pay us a certain amount of money. What we need to do is look holistically, not what ad hoc mitigation might consist of, and see that

14. *Cal. Wilderness Coal. v. U.S. Dep't of Energy*, 631 F.3d 1027 (9th Cir. 2011).

15. ELI, OPPORTUNITIES TO IMPROVE LANDSCAPE-SCALE MITIGATION FOR ENERGY PROJECTS IN THE CHESAPEAKE REGION (2018), *available at* <https://www.eli.org/sites/default/files/eli-pubs/linear-projects-final-report-november2018.pdf>.

this permitting process is actually linked one to another. The applicants need to see this and understand this sort of regulatory agency permitting process.

The Chesapeake Bay Conservation Partnership is a broad coalition of conservation agencies and NGOs. We formulated a set of ideas or ways to get ahold of this holistic approach. I'm going to single out a few of the areas that are of particular interest.

One is CWA §401 water quality certification. This is a section of the Act that says where there's a federal approval or a federal investment, then the states have the opportunity to determine whether the proposal will or will not cause a violation of state water quality law. And, in most instances, this has just evolved into a federal entity saying, if I ask, the states will say, yeah, we'd be ready. As long as they get the appropriate set of state permits under the usual state conditions.

But in fact, §401 has a lot of possible reach. Section 401 could look into the purposes and the policies of state laws that apply, where there may not be a numerical water quality standard, but can still be used by a state to require a deeper look or further role for mitigation.

Can you define landscape-level mitigation according to a set of rigorous standards after alterations to uplands? You don't care just about stream crossings, because what happens in the upland also affect the waters of the state. Although there are rigorous, reproducible ways of predicting how much effect the removal of 25 acres of forest and swamp will have, we'll still have an impact on rivers and streams.

The science is capable of doing this. Virginia actually looked in advance at these proposals and put out an upland §401 policy just to put upland pipeline developers on notice that the state is not going to look only at the usual permit conditions, but take this into account as well.¹⁶ It's a little fuzzy but it had gone far beyond what other states are doing.

Chris alluded to nationwide permits or programmatic general permits, and these are instances that are typically used for small activities with small footprints and small impacts. When you aggregate them across a large landscape, that might not and probably is not an appropriate use for these programmatic nationwide permits.

We talked a bit about the FERC process, that the agency has total control of its own NEPA compliance and analysis. But there is this opportunity for input by any person for NEPA final comments. These are by any persons or state resource agencies to the extent they have information or data about the crown jewel landscapes or areas of particular conservation concern. To the extent they have reproducible methodologies that they can apply consistently, they have

more of a chance that FERC analysts will pay attention to something that the applicant might have said it couldn't take into account.

Annie also referred to the 1999 natural gas pipeline policy, which was issued at a time when there wasn't much of an expectation for new natural gas and it didn't really include elements like natural resource protection. There wasn't much concern about eminent domain because we just weren't doing a whole lot of new pipelines. So, I think it's a good thing that they opened the comment period. It closed last summer. Things have gone silent. So, let's hope perhaps that some of these issues are percolating.

For their part, state public utility commissions have primary jurisdiction dealing with the siting of electric transmission. They have many of the same concerns. State laws are all over the place. How can you give consistent content to standards like "minimum adverse environmental impact" or giving "due consideration" to esthetics? There are ways to do this and it can't help you to be reactive. Another approach is the states can adopt statewide mitigation policies—a reality for mitigation other than for "waters of the United States." We could do sequencing—avoid, minimize, and compensate—for things other than wetlands; we could apply that to forests or prairie ecosystems.

There are approaches to doing this. The very sophisticated Natural Heritage Programs can, at least around the country, define and prioritize their habitats. There are ways of connecting state wildlife action plans prepared at great expense by all the states and updated at great expense, through these kinds of proposals that these are connected to.

I'll spend some time on forest conservation that Chris alluded to. The typical approach is that if it's not a state or federal forest, then we're not that worried about it because it's not legally protected in most places. Nevertheless, important ecosystem functions will be performed by intact mature forests for migratory birds or for habitat diversity.

So, we should be able to account for not only direct impacts—such as we've taken so much for the right-of-way—but for indirect impacts. For example, we're removing three of the largest intact forest areas in the eastern Piedmont with our proposal, there are ways of dealing with this.

I want to commend the Virginia Department of Conservation and Recreation that prepared an analysis of the ecological integrity scores of forest patches throughout the Commonwealth.¹⁷ They calculated direct impacts on each of these (how much forest area they're removing) and then indirect impacts (fragmentation calculated by a number of things). Then they applied those numbers, which are larger than the impact numbers you will get just by saying how many acres or square feet you're removing. They applied them to those categories—from this outstanding

16. Guidance Memorandum (No. GM17-2003) from Melanie D. Davenport, Director, Division of Water Permitting, Virginia DEQ, on Interstate Natural Gas Infrastructure Projects—Procedures for Evaluating and Developing Additional Conditions for Section 401 Water Quality Certification, to Division and Regional Directors (May 19, 2017), *available at* <http://www.deq.virginia.gov/Portals/0/DEQ/Water/Pipelines/GuidanceMemoGM17-2003Section401WaterQualityCertification.pdf>.

17. See Virginia Forest Conservation Partnership, *Assessing Impacts of Large Development Projects on Core Forest* (Powerpoint 2018) (on file); *see also supra* note 15, at 64-67.

intact forest down to consistently graded third-generation scrub-land—which we hope will persist. All to come up with a set of reproducible methodology, calculable mitigation—approaches that they then used as the baseline for the negotiation with the pipeline developers. It was all factored into—with more or less success, depending on your point of view—the large effective approaches.

One last thing about it, quoting Chris, conservation easement lands are pretty important because a lot of land that looks like it's perfect for pipelines, transmission, solar farms, and the like, all this is under agricultural easement. It's under recreational easement. It's under various forms of conservation.

States can adopt laws and policies dealing with the kind of scrutiny they go through before those easements can be condemned by a grant of your state authority. While they may not be able to prevent a condemnation under federal authority or state authority, they may also be able to define compensatory mitigation so they're not into a square-footage kind of approach, because the value of a historical conservation easement is not simply the number of feet occupied by a pipeline, but a larger area.

The better approach is trying to look holistically in advance, look larger, and understand the impacts and ways that I think are compatible with what I heard Bernie saying. Maybe we will find these grounds. But it would sure help us by FERC revising its natural gas policy.

Richard DeCesar: Thank you, Jim, and all the panelists. There is time for a couple of questions.

Audience Member: I'm with two organizations, one of which focuses on energy-efficient buildings. I think of the world in terms of city blocks. Nobody is taking a clean-slate approach because of the design of the 21st century grid. It's just that we've got the grid and we better adapt to it. There's something missing in not doing that. Today, is there any opportunity to take a fresh approach to the grid so that could inform the decisions that we want to adopt?

Chris Miller: The only planning that's really being done is by the utilities themselves, which are increasingly commercial organizations, not utilities, so it gets tricky. And then the RTOs are places where planning occurs. It's pretty much a closed shop. You have to get clearance to be part of the process. And they don't do environmental impact analysis, so the planning is in a vacuum and that comes later. The response to that is coming out of the states where there's been a push for legislation to allow for community-scale utilities, where something like the county of Arlington will go back to developing its own utility that will have its own sources of power and its own approach to the grid. The dominant monopolies are fighting that tooth and nail. The whole industry that FERC regulates is based on large-scale vertically integrated companies, and the idea of mov-

ing to a decentralized system that would actually probably be more resilient and secure given the challenge of both cyber and physical threats is resisted by the actors who dominate the current process.

Audience Member: Is there any way around that?

Chris Miller: Yes, with state legislatures. It's like a form of gerrymandering for environmental laws, instead coming out of the states and counties. It's not coming out of the federal government.

Audience Member: What are the differences going forward to study natural gas pipelines and renewable energy in terms of solar and wind for both the issues that may arise as well as the potential opportunities? Do they require the same frameworks?

Chris Miller: It's a very challenging question. I think what we've skirted over today is that we actually operate under a lot of different statutes. So, natural gas, electricity, siting of generation versus siting of transmission are completely different. Sometimes it's regulated by the federal laws, and sometimes it's at the state level. In some states, there is no state regulation, so it's regulated at the local level. I think again the answer to your question is it all depends on what state you're talking about and actually what site you're talking about.

Bernie Holcomb: There is variability on all levels—federal, state, regional, county, local, city. You have six fingers in the pie so to speak. Some don't contribute at all; some areas you can go in and all six of them will have an opinion on some type of environmental review process. But very few states that I'm aware of integrate them across all those different levels.

Chris Miller: But take the issue of the signing of the new rules in particular. State policy says 5,000 megawatts. We know how many acres that requires roughly, because the efficiency of solar panels is about one megawatt to seven to 10 acres, so you can do the math.

Then, the question is, where is the best 30,000 to 60,000 acres to site those with the least amount of impact? That's where we jump in. They keep doing that analysis. FERC doesn't encourage it. It doesn't matter what the state did. The federal analysis is zero. The state agency is looking at these on a case-by-case basis, not from an integrated perspective like Jim talked about. And the localities have never regulated them in the past. They have no idea what a thousand-acre solar farm looks like or what the issues are. So, they're very frequently searching around for some ideas about how they might address it, and that's not a good system.

There's a lot of places where you can make improvements, and I think it starts with the federal agencies and

the state agencies. They do have a larger-scale perspective being willing to take on some of this alternative analysis upfront, so it's programmatic EIS. That's where we could get a lot of this information on the table and make better decisions and decide.

Audience Member: I have a question regarding this disconnect between the state, the city or the rural communities, and the federal government. What do you think would be the solutions to integrate processes, review policies, or to create regulations? Will there have to be more interactions between additional organizations or some more innovative solutions? Any ideas on that barrier?

Chris Miller: One thing suggested a decade ago is that DOE should sponsor studies by the RTOs to do environmental impact assessments in the planning process as opposed to in the project review process. We've given them a lot of authority to do system design and market design. We've given them no direction to look at the consequences that has outside of the energy arena, and I think that's one area to look at.

What we've encouraged the state of Virginia to do is to have a holistic view of everything itself, so that's been a matter of both executive order and legislative proposals to try to have a more integrated planning process. Then the local-level organizations like ours worked with localities to give them the best information we can get through the GIS mapping that is available from other sources, to show them how to analyze these things.

One of the things that Jim's report references is a collaborative effort by the Chesapeake Conservation Partnership to integrate the data layers from eight federal agencies, five states, and everybody else who wants to contribute so that there's a common data set that we can all look at, including the project developers, to do the work of avoiding the main impacts upfront.

Integrating those data sets between federal agencies took four years because of a whole lot of barriers. There's some silo issues and other things. Getting all these states and getting all the data has taken more time. And then you have to also go through the process of digitizing things that haven't been digitized. But historical maps are there. So, there's a lot of work that can be done, but it is achievable and makes a huge difference and it leads to a better outcome.