It’s our great pleasure today to have our speaker, Ruth Santiago from Comite Dialogo Ambiental. Also as a renowned lawyer and environmental health advocate,

Ruth is a resident of the municipality Salinas in Puerto Rico, where she has worked with community and environmental organizations, fisheries associations and many other groups over the past 30 years on projects ranging from a community newspaper to a rooftop solar energy pilot project.

So she has helped the establishment of broad alliances to prevent the water pollution from landfills, power plant emissions and the discharges and the coal combustion residual waste.

Mrs. Santiago earned degrees from the Lehigh University and at Columbia Law School.

She is also the recipient of the Sierra Club’s - [Whitney] We maintain the pace but I expect peace to actually increase. - Whitney, if you can mute yourself, thank you.

Yes, I’m sorry.

Mrs. Santiago is also the Sierra Club’s 2018 Robert Bullard Environmental Justice Award awardee.

So without further ado, please join me in welcoming Ruth for giving her presentation.
Hello, everyone.

Thank you, Dr. Chen and doctors Du Brow and for all of the students and others who are tuning in to this meeting. I’m happy to be with you and I’m so glad that you’re interested in the environmental justice, climate justice and health issues here in Puerto Rico. And so what I’ll do now is I’ll pull up my presentation with some slides I have prepared just to facilitate the talk. Okay. Here we go. So I hope, can everyone see that okay?

- Y es. - Okay, great.

So this is obviously a talk about what we’re working very intensely on and for the transformation in Puerto Rico of the energy system or the electric system in particular, and the environmental and racial justice implications, public health implications of the current system we have. But first I’m gonna go actually to what our community-based and civil society based solutions are for achieving environmental and racial justice in public health.

Justice, you can say as well. Well, I love to show this map because sometimes people don’t really know
where Puerto Rico is. And so you can see here it’s in the Caribbean Sea and it’s called the smallest of the larger Antilles and the largest of the smaller Antilles. And it’s a relationship on energy issues throughout the whole Caribbean which I’ll discuss a little bit later.

So as I said, I wanna go to the positive aspect here first. I’m sort of using this terminology about a Green New Deal and applying it to the local context to talk about the work that I’m doing with not only Comite Dialogo Ambiental but other community, environmental, civil society groups in general, which I’ll show you in a little while the list of at least the founding organizations. So basically, we are proposing community empowerment through participation in the electric system as what are known as prosumers, not just passive consumers, but communities people being able to participate in the electric system as producers.

And that usually means with rooftop solar, and often coupled with battery energy storage systems. And although we have been working for quite a few years on this proposal, obviously with Hurricane Maria.
in September of 2017 and other so-called natural disasters. And I say so-called, because hurricanes of course are natural phenomena, but we know that they are being aggravated. They’re becoming more intense and more frequent with the climate crisis. So what happened, especially after Hurricane Maria although it’s happened for the past 30 years that I can recall is that the electric grid, what what was known as the transmission and distribution system, T&D system, was totally impacted, brought down and was not able to transmit or distribute power throughout the island. And so there were many lessons that we learned one of them was certainly that communities must become energy literate and can actually implement measures to mitigate, to some extent, the damages related to these centralized fossil fuel-based energy systems that we see that prevails here in Puerto Rico. So communities should be active participants. And our public utility, which is known as PREPA needs...
a radical transformation, both in terms of the technology that it uses and as to its governance, to be more representative of the civil society sectors here in Puerto Rico. And then of course, after every major disaster declaration or situation that has happened here in Puerto Rico, and as Puerto Rico is a territory of the United States, And by the way, we are, Puerto Ricans are American citizens, US citizens. The federal agencies came in, both the Federal Emergency Management Agency and Housing and Urban Development, to provide funding which did not materialize. And to a large extent, especially the more permanent repairs reconstruction funding has not yet arrived even. So we are proposing that when these funds do arrive, do get actually transferred to the government of Puerto Rico, that, and prior to that transfer, the federal government earmark those funds so that the public utility, PREPA, works with organized communities and local renewable energy contractors to totally transform
the way that our electric system is built, and do so in a way that permits energy participation by prosumers, I should say, communities, and we call that energy democracy. And if anyone is interested in collaborating, we do need help in convincing FEMA and HUD to earmark those funds and basically enable the transformation of the electric system to a prosumer friendly approach, as opposed to the centralized approach that I’ll talk about later and you’ll see some of the slides and see what I mean. So, one of the reasons why we are proposing primarily rooftop or onsite solar, battery energy storage systems, energy efficiency programs and energy literacy programs is because the groups, including Comite Dialogo Ambiental, but also many other groups, have participated as what are known as interveners, in a process called the integrated resource plan for PREPA, Puerto Rico Electric Power Authority.
And so many jurisdictions have these very intense planning processes for the future of the electric grids in their respective jurisdictions. So I’m pretty sure Connecticut has one, but, I shouldn’t say, but many, many jurisdictions have public utility commissions. They might call them something different. Sometimes they’re called public service commissions, et cetera, that require electric companies to submit to them the planning for say, maybe the next 20 years, the period can vary. But it’s to try to determine what the energy needs will be in a certain timeframe. Although usually there’s like an action plan for the first five years and the document obviously can be revised in three years sometimes. That’s the case here. And as it’s a pretty sophisticated process that requires a lot of inputs in terms of demand projections, energy demand projections, evaluating the current fleet, determining new technologies, forecasting fuel prices, et cetera, just population trends, just a lot of inputs in order to come out, and modeling, to determine what the best mix
of energy infrastructure or programs. It can be non-wire alternatives which if you wanna get into that, we can talk about those, but basically we participated in this process, both in the first one and now on the second proceeding and discovered that PREPA’s contractors, Siemens Industry, actually found that onsite, customer-sited alternatives, that’s basically rooftop solar. Could be micro wind as well. Customer-sited alternatives are the most economic option in Puerto Rico for energy generation. And it would be significantly lower than the total rate that PREPA would charge rate payers if say, we did business as usual. But it’s something that we never understood in this process was that in fact, in spite of the fact that rooftop solar was by its own admission, the PREPA’s contractor, Siemens Industry, saying this is the cheapest way, at the end of the 20-year planning period, they only included about 10% of onsite or customer-sited solar or energy generation in the generation mix at the end of the planning period. So this made no sense to us.
And that’s why we’ve been working very hard to actually push this alternative and steer away from the other things that I’ll show you a little further along, and we have lot of support for that, and not the least of which is a recent National Renewable Energy Labs study that indicates that Puerto Rico has four to five times the rooftop potential or residential solar potential than the actual demand on the island. And that over a decade ago, faculty at the University of Puerto Rico said pretty much the same thing and coined this phrase about the rooftop resource. Any of you who’ve been here or know anything about Puerto Rico is as you saw on the map, it’s a limited geographic extension but very sprawling kind of development. You might call it the LA model of development. Sprawling housing projects and the commercial centers. And so there’s lots of rooftop space here. And what we’ve also been able to show is that renewables plus storage can supply even the critical energy needs. That is hospitals, first responders, water supply, et cetera.
And that coupled with energy efficiency programs, smart metering, demand response time reviews can even reduce further the need for energy generation.

I’m sorry for all this wording on the slide. So basically, let’s see, did I jump? Okay, where am I here? Okay.

So yeah, this is a simple sort of representation of what we’re saying. People can now participate in energy generation. And at the community level, it’s even better because we can have micro grids in case for whatever reason, given rooftops are not appropriate.

And so this is another way to explain basically the same thing. We’re really talking about beyond technology. A technological change. This is not just a techno change, not just going to renewables. Not all renewables are sustainable, we posit. Because first of all, we are not in favor necessarily of land-based renewable energy systems and actually don’t favor that for many, many reasons. And we do believe that it’s more sustainable to use existing structures and not impact open land.
or ecologically sensitive areas or agricultural land.

I know California has a similar provision about protection for agricultural lands.

And we do favor, as I mentioned, community shared solar so that the socioeconomic benefits of this generation is received by the communities.

And it entails citizen empowerment. Coupled with this technology to achieve social and environmental justice.

And so this is the actual site for our civil society proposal. It's called Queremos Sol. We want sun is the translation.

And the groups, the founding groups are down here. And they include not just community environmental groups,

but also you will see that the PREPA, the largest PREPA union is here.

The Professional Workers Association, faculty members at the University of Puerto Rico,


Alright, so that was the...

I wanted to put the solutions first. I think it's important that people know that we have a very viable alternative that we've studied very closely and are convinced that it can be implemented.
But, now bringing you back to where we are, we have in Puerto Rico about 97% fossil fuel generation in terms of energy supply. Part of that is a coal burning power plant called AES. It’s headquartered in Arlington, Virginia. The full name is Applied Energy Systems, but the plant here is called AES Puerto Rico. And it’s been a very problematic operation both in terms of an environmental, health and racial aspects and I’ll explain why. I’ll start this with a trip that we participated in to Colombia, South America, which happens to be the fifth largest exporter of coal in the world. And they export just all over. Turkey, Ireland, Puerto Rico, the US everywhere. And we actually visited El Cerrejon in La Guajira, which is one of the largest open pit mines in the world. But a lot of the coal that is burned here by the AES plant and here in southeastern Puerto Rico is, it comes from El Cesar in Colombia as well. And so these are... As you can see, transnational companies, like really big names in the energy field. BHP Billington, Anglo American, Glencore.
Those are European, but previously it was ExxonMobil that was operating at Cerrejon.

And they pay royalties to the Colombian government but the impacts have been just terrible in terms of public health there and displacement of the Wayuu and Afro-descendant communities. Many of the communities claim there've been no previous consultation or informed consent in order to use their lands, their water, the water resources that we saw, and I'll show you a photograph terribly impacted.

And in addition to that, when we visited the mine and all of the open pits, we saw that there's a lot of water usage to do a lot of dust control at the mine. And yet outside in the towns nearby, people often do not have running water. So terrible environmental justice issue there. And this is the smallest open pit mine, El Tajo Patilla, they call it.

And Dr. Hilda Lorenz and I participated in this meeting with a group called witness for peace organized by Dr. Aviva Chomsky. And so this is one of the tributaries to Rio Rancheria that we saw.
a couple of years ago on our trip, and that has now been...
It was in the process. There was an ongoing controversy about whether the mine could change the course of this tributary and it did,
that was impacted by the mining operations. And so people understandably are very concerned about their lack of access to water.
You can see in the sign. It says, "We’re defending our access to water.” And the mining companies basically are the primary culprits for the lack of access to water in Colombia, in those mining communities.
So let’s get back to Puerto Rico.
And you can see, this is sort of a picture of the trajectory of the hurricanes in the past. I think this is the past 100 years.
And they all usually come in through the east and then go out through the west.
And the next slide will show you what that means in terms of the electric system.
So these are the major electric lines. I’m here in Salinas and AS is here in Guayama. This is southwestern Puerto Rico.
And what you can see, these big, blue lines, they’re high voltage transmission lines.
So Puerto Rico has a peculiarity that most of its energy generation is on the southern coastal. You see those big numbers, those are the big power plants. And most of its energy demand is on the north coast. In the San Juan Metro area and other places in the north. And so these lines, think of it again, are impacted constantly, not just after Hurricane Maria. by hurricanes coming in and taking down in part, usually it was in part, right after... I mean, I don’t wanna go into all the detail, but Hurricane Hugo on, part, always part of these lines were impacted. And Hurricane Maria was, well, it’s sort of unique in that everything went down. So we were 100% without power. So basically what we see is that the current electric system is very centralized transmission distribution, lots of fossil generation. PREPA owns about 4,630 megawatts of fossil generation and about 100 megawatts of hydroelectric. but only about 60, maybe even less are functional in the hydro generation. PREPA also has contracts.
What they call power purchase and operation agreements with private companies.

One is called EcoElectrica.

It’s a gas-fired power plant in southwestern Puerto Rico.

And I mentioned AES, which I’m gonna get into more detail further along.

is a coal burning power plant.

Also PREPA has some renewable energy projects,

very small amount that it has power purchase and operation agreements with.

Problem with these projects are not just the land requirements involved, but also that they depend on this vulnerable centralized transmission and distribution system, because they’re sited far away.

from the the man center.

So where the energy is needed.

So they were also out of service after the hurricane.

And, but there is some... this has increased probably about 100 megawatts

of installed, distributed or onsite generation.

And that held up the best after the hurricanes.

And we need to realize that energy demand in Puerto Rico

is decreasing constantly.
And it is now, right now, it’s under 2000 megawatts.
And in the summer, it goes up a little bit more,
but as you can see, we have about three times
the installed generation capacity as the demand.
So this is sort of a pie chart that I prepared
talking about our energy mix showing,
and then what Siemens Industry
along with PREPA were proposing.
And it’s basically this.
It’s a huge rollout of what is known as
natural gas.
Otherwise, methane gas.
And the gas as you know, is largely,
the gas boom is largely a result of the fracking industry
that especially has started.
Or since I guess about the early 2000s
just took off in the States and elsewhere now.
So there’s fracking in a lot of other countries as well
and so basically a glut of fracked gas
that is being pushed onto places like Puerto Rico,
Jamaica, other places in the Caribbean,
Mexico, Latin America in general.
And this was part of Siemens’ plans
Siemens and the government of Puerto Rico plan
in the IRP to build all of these terminals,
both offshore, onshore, LNG terminals.
And the reason why it’s liquified natural gas is because you probably all know that gas in its liquid state is a smaller volume. A lot smaller, takes up a lot less space and that’s how they can transport it to the Caribbean and other places. 

But so that was the plan. And also you probably all know that Puerto Rico was even before the hurricane in the midst of an economic and fiscal crisis, in addition to the climate crisis. We’ve also had earthquakes and now of course, the COVID pandemic. And unfortunately we have not been able to respond to all of these crises due in large part to the development policies that have been implemented since the late 1940s, starting with what was known as Operation Bootstrap, which centered on incredibly generous corporate tax exemption policies at every level.
It was at the Puerto Rico state level, municipal, just all kinds of tax breaks to entice foreign corporations, mostly US-based corporations, a lot of Canadian as well and European corporates interests coming in to invest in Puerto Rico. And that was also coupled by even federal tax exemptions, what was known as the IRS code section 936, although it had different iterations. But basically the idea was to attract these industries and have them create jobs locally and alleviate poverty but it didn’t work. And so we still have currently about a 46% poverty rate and a very high unemployment rate. And in Salinas here in southeastern Puerto Rico, Salinas, Guayama, Arroyo, it’s even higher. It’s much higher. The median household income here is about one third that of the US, and yet we pay the second or third highest electric rates of any US jurisdiction. And the government is heavily indebted. Has a huge debt, which you may know has led to a bankruptcy type case for the Puerto Rico government.
And it’s coupled with an emergency management and bankruptcy provisions. And there’s been mass migration. About some 100,000 people, mostly working aged people. And lots of professionals, doctors. About some 100,000 people, mostly working aged people.

And so what we’re seeing, especially in this region in southeastern Puerto Rico known as the Guayama region is even higher poverty rates and unemployment rates. Schools and hospital closings. So then, sorry, the name of the statute is PROMESA, the Puerto Rico Oversight Management and Economic Stability Act. There’s been no economic stability. It’s just leading to poverty as the sign says. (speaking in foreign language) And so those statistics that I mentioned in terms of southeastern Puerto Rico are one part of the environmental justice problem here. The other part of the environmental justice problem here that most of the two most contaminating power plants on the island are located in this region, in Guayama region here in southeastern Puerto Rico.
And they are, as I mentioned, the AES coal-burning power plant, and the largest electrical complex in Puerto Rico, the Aguirre Power Complex. So they are one and two in terms of toxic emissions. And you’ll see something else about AES in the coming slides. So obviously, coal combustion from the AES plant includes CO2 emissions, mercury, many other heavy metals. But in addition to that, people are also impacted. And very few people think about the energy water nexus, but it’s very critical here because AES extracts water from what is known as the South Coast Aquifer. That South Coast Aquifer is the sole source of potable water for tens of thousands of people. And then in addition to that, AES discharges, for a while, it was supposed to be a zero water discharge facility but it was actually from the beginning illegally discharging contaminated water into the bay. And it also has contaminated the South Coast Aquifer, not only extracting water but also contaminating the water with coal ash waste.
or formerly known as coal combustion residuals.

Because this plant, incredibly has no disposal facility

for the millions of tons of coal ash waste

that it generates or it has generated.

It’s about 300,000 a year.

This is the slide.

So if you look at this photograph on the left here,

my left, I hope it’s your left.

This is coal ash waste.

And as you can see, it’s going into a storm water system.

And that means, of course, that other water bodies

will be contaminated with this coal ash waste.

So coal ash waste or coal combustion residuals

are basically a...

What’s left after burning coal.

And because it’s inorganic, are the heavy metals

and the radioactive isotopes

and that’s what coal ash waste is.

And by the way, this is a huge problem

in the States as well.

Because as you can see, about 100 million.

That’s even with the closure of all the coal plants,

of many coal plants in the States

there’s still quite a few operating

and they generate about 100 million tons of coal ash waste.
Some of it is used, what they call as a beneficial product. And some of it is encapsulated in gypsum board. But a lot of it, most of it is either disposed in impoundments which leach the contaminants into other water bodies or at waste hills, which if not properly lined and managed can also leach. So that, as I said, that the AES plant here generates. And this is what it looks like. And this coal ash mountain was exposed, is constantly exposed to the hurricane winds or just regular Caribbean breeze. And also, especially after, during the hurricanes, it gets dispersed quite a bit. And so this is the sort of the detail of the kinds of things that we found in a test of the coal ash waste here on the AES coal ash. So you can see these are pretty hefty, heavy metals of concern. Arsenic, barium, boron, manganese, selenium, vanadium, among other elevated levels of metals and alpha particles. And so it is, it does include radioactive materials. And so the reason why this has been happening
in the States for over a century and here in Puerto Rico since the AES plant opened up was because the test that was used to determine the leaching potential of coal ash waste, that is the ability to release these heavy metals into the environment, was for many years not the right test. And so this new test is, we were able to get the coal ash here tested with this new framework, which does determine the leaching capacities of this coal ash waste into groundwater surface, superficial water into the land. And so what happened as a result of all of these investigations is that we were able to get the University of Puerto Rico Graduate School of Public Health do two epidemiological studies. And they both basically confirm that the communities in Guayama closest to the AES coal plant have multiple times the incidence of respiratory disease, cardiovascular diseases, cancers obviously, and even spontaneous abortions, more so than the control community in northeast Puerto Rico, not impacted by the coal ash waste. And so, as I said, that the coal industry
for a very long time has promoted the so-called beneficial use.
They even call it, they give it these really cute names.
like Agremax here in Puerto Rico, and in Florida, I think it’s called easy...
I’m sorry, I forget what it is but the coal industry has really marketed its coal ash waste very well.
But as you can see in the photograph,
this is a housing development that was being built.
I talk about sprawling housing construction here.
Here is an example, but it was filled with coal ash waste, coal combustion residuals.
And during the construction,
all of the fuel treated dust was constantly in the air.
And it was used primarily in flood prone areas above the sole-source aquifer in proximity to wetlands.
and ecologically sensitive areas.
And also heavily populated areas.
because Puerto Rico is one of the most heavily populated places in the world.
And this, by the way is also a very big problem in India,
in many other places.
So, it has led to unsustainable development and impacts to, for example, mangrove, canals, et cetera.
And this, in the photograph you can see, this was a storm water retention pond built with coal ash waste. So obviously this leeches into the water. That connects with the groundwater and also discharges into a nearby river. So this is getting to be a very widespread problem. So we do now have a law to prohibit the use of the coal ash waste as film material and for these uses. But it is very much a race to the bottom phenomenon, where industries or jurisdictions both in the US and globally seek to attract low cost. And I put that, you know, within air quotes. Low cost, except the externalities are very high cost. And then, so this is a classic definition of environmental injustice that jurisdictions that have the ability to regulate do not exercise or do not implement those protective elements. There’s lax enforcement and really insufficient resources on the part of the government to enforce any existing provisions. And so you see more and more of it. This is what we call environmental and racial injustice. That was actually in the photograph.
A child playing among a pile of coal ash waste and heavy metals and radioactive materials. And so that coupled, this disproportionate impact and burden on people, coupled with the environmental justice criteria that include a higher than average or higher than the Puerto Rico average Afro-descendant community, closing of hospitals and the high poverty rates creates a situation where people are unjustly burdened.

But as I said, the AES corporation actually marketed this coal ash and created a sham recycling operation till about, as I recall, 2012.

And we are getting some kind of regulation now. As I mentioned, there is a law that was passed last year and we’re awaiting a regulation to prohibit the use of the unencapsulated use of coal ash waste. And this is just citing authorities about how political bodies like municipal governments have what is known as the police power to safeguard the health and welfare of residents. And of course, there’s this problem with federal preemption and which set of laws will actually apply.
And in effect, although we’ve gotten about, I think it was about 15 municipal ordinances out of the 78 municipalities here in Puerto Rico had passed provisions to prevent the use of coal ash waste. Basically, that was preempted later on. But then we got the law passed that prohibits the use of the coal ash waste. And that’s just like citing the Resource Conservation Recovery Act that the states within the federalism system, and Puerto Rico for that purpose is considered a state, are not prohibited from either the state or its political subdivisions. That is like the municipalities, counties, etcetera. from imposing stricter requirements on these kinds of operations, such as, including site selection and imposing regulations. But of course, the regulatory and litigation costs are high in order to achieve the kinds of provisions that are protective of human health and the environment. And so it puts the burden on environmental justice communities and state governments or local government entities.
So now, I'm jumping over to the Dominican Republic just because I wanted to close the circle about how we saw in Colombia, the extraction process going on. Here in Puerto Rico, it’s the combustion of the coal that creates a coal ash waste and all of the emissions and water contamination, et cetera. What happened with the coal ash waste in Puerto Rico was that it was taken to the Dominican Republic, to a place called Arroyo Barril and people were told that they could use this as film material, or they can use this as construction material within their own homes. And apparently did so. And suddenly, children were born with defects. As you can see in the photo, the child is missing his arms. And there were quite a few cases that were brought and ultimately settled by AES. This is the first settlement agreement when AES was sued by the government of Dominican Republic. And then let’s go to another island in the Caribbean that is trying to move away from fossil fuel generation. And I really liked what...
This was a conference I attended on the climate crisis. And the message that they were transmitting is that the key to success was that energy prices in the US Virgin Islands were high, but they are no higher than what energy prices should be if the external costs of burning fossil fuel, pollution, climate change, and health impacts are considered. Okay, so this is a symbolic protest that was held here in Puerto Rico after hurricane Maria. The shoes represent people who passed away as a result of not having electric power. And that number is disputed but it’s anywhere between about 3000, 5000 people that died. And so, I wanna emphasize that when we talk about the transformation that’s needed here in Puerto Rico, it’s not just about not burning fossil fuels. It’s also about not transmitting energy long distances because as we said, these transmission systems...
and distribution systems are vulnerable and can, even with renewable energy projects being, say, down here in Southern Puerto Rico, they need to be transmitted. And so that’s why we talk about onsite and rooftop solar as being a better solution. And because these transmission systems lose energy on the way, and also are very expensive and represent sort of an opportunity cost against actually onsite energy generation, which by definition has to be cleaner so as not to impact public health. And so that I think is the issue. Should we be rebuilding with the existing centralized fossil fuel system? Or can we convince FEMA, HUD and the federal government to allow for onsite generation. Rooftop solar primarily coupled with battery energy storage systems and thereby protect public health here. And that I think is all. And if you have any questions, please feel free. Thanks, Ruth. This is very wonderful presentation. And you talk about the environmental and racial justice not just within Puerto Rico but also in the frontline communities in Colombia.
and also in the Dominican Republic. So a lot of powerful messages here. I do have a lot of questions students already submitted. And for all the audiences, if you have questions, please type in your questions in the chat box. So Ruth, you mentioned about the coal ash waste and how it could be, you know, during the hurricane, during the big storms, the ashes can flood into the water, and this makes no doubt that the coal ash waste are very vulnerable to this climate disaster. For the students that are actually wondering, a lot this clean energy options like the solar, roof solar energy projects. Have you considered how that this new renewable energy system, the resistance to the climate disasters in particular, the hurricanes? Okay, well, if I’m understanding correctly, so, are you saying how resistant are rooftop solar installations to the climate, to the increased hurricanes? Well, what we found is that they do pretty well because... I don’t have official data, but it’s between five and 10% of the panels were impacted by the hurricane. as opposed to 80% of the transmission system.
And the interesting thing about panels. One, is they can be hardened to withstand very strong winds.

Second, because of the latitude where we are, especially here in Puerto Rico, they’re almost flat.

They don’t need that 45 angles, as you know, further a jurisdiction further in the north.

And third, people here even have contests to take down their panels and see how fast they can do it.

So I’ve heard 20 minutes for a very smaller rate.

We also promote very smaller rates for critical needs within the household, like four to six panels and batteries.

And so they can be taken down as well. So there are many options.

And like I said, even what we saw is that solar farms and wind farms did not hold up during the hurricane.

as well as the panels on rooftops. For example, there was a wind farm on the eastern coast of Puerto Rico, which no longer exists.

It was called Punta Lima. The hurricane took it away.

And the panels on the east coast there also would severely damaged.

But yeah, the rooftop holds up pretty well.
I think, yeah, that’s very promising and very interesting. That is great news to the transition. This second question the students are kind of wondering is regarding the renewable energy. Here, we’re mostly talking about the solar energy, but have you, could you give us more information regarding other types of renewable energy like the tide power or other, like offshore wind power?

Right. Yeah. We’ve discussed that a lot of those other options. Offshore wind largely has the problem with the hurricanes. I think jurisdictions that are prone to hurricanes would be probably better served by systems that don’t have these vertical structures because they are impacted by hurricanes. And as you know, even the hurricanes now are even reaching the northeast US. So I don’t know how well offshore wind is gonna hold up to that. That remains to be seen. That on the one hand. In terms of tidal energy, there’s an experiment going on right now in southeastern Puerto Rico offshore.
I don’t know too much about it, but I am concerned and I think those of us who are in the environmental field are concerned about impacts to the water column, because a lot of the reproduction of marine species like egg larvae, egg and fish larvae and eggs can, I think be impacted by a manipulation of the water from the shallow, sorry, the bottom part of the ocean to the top. And I think that’s how basically it works. So I think that might create some unexpected impacts in the marine environment. So that also to me is a question mark. Yes, we do need to consider not just human health but also like the coastal environmental ecosystems. So another question from the audience is, I was going to ask how much interconnectivity there is in support of Puerto Rico’s advocacy as part of global advocacy. I’m not sure it’s a question or just a comment. Okay. Well, in terms of this, for example, the work that we’ve done on coal,
anti-coal combustion and especially coal ash waste work,
it is almost on a global scale.
We have been working with groups throughout the US.
We were actually part of a listserv throughout the US.
I think there are people from other countries as well,
we’ve done, had some connections, as I said,
with the Dominican Republic, Colombia, Virgin islands,
here in the Caribbean basin area,
and some experiences in other countries as well,
on especially the coal ash waste issue.
It’s a huge problem.
It’s like the asbestos of our time
in terms of the implications that it has
for dispersing into air, water, land
and affecting public health.
In terms of renewable energy,
also, we’re linked with groups throughout the States
and a little bit now with groups in the Dominican Republic.
Yeah.
- Yeah. So, yeah.
Since we’re talking about like the kind of connection
with the mainland, there’s one question from the students.
Is particular interested about,
after the major storms, Hurricane Maria, lots of interests from the mainland paid to Puerto Rico especially after the Green New Deal. So do you feel that there are more positives that come out of this increased attention from the mainland, the politicians and the public or the other way? - Okay. Certainly. Puerto Rico after Hurricane Maria became a better known place. I’ve often been to places where... I’ve put the map on my slide there because I’ve been to places where people don’t really know what or where Puerto Rico is. People in the States often, especially before the hurricane, did not know that Puerto Rico was part of the United States. That happened to me quite a lot. Yes. So this attention, this renewed attention, I think is largely positive. I think people have good faith in the States and the Puerto Rican diaspora were life savers after the hurricane because the government did not respond. And people, we were in touch with so many people
938 00:53:58.020 --> 00:53:59.880 and groups throughout the States
939 00:53:59.880 --> 00:54:01.890 that were trying to help the situation
940 00:54:01.890 --> 00:54:04.790 and in the solar energy field,
941 00:54:04.790 --> 00:54:09.260 not just in terms of providing, first being,
942 00:54:09.260 --> 00:54:14.260 the first provision of food and clean water and
943 00:54:14.330 --> 00:54:19.330 but also bringing in more and more of the
944 00:54:19.540 --> 00:54:22.090 So, I think it’s definitely positive.
945 00:54:22.090 --> 00:54:25.400 Now, I should say, there’s this one negative
946 00:54:25.400 --> 00:54:29.040 And it was the natural gas industry.
947 00:54:29.040 --> 00:54:33.270 The LNG industry also came in right after
948 00:54:33.270 --> 00:54:36.350 And you saw that Siemens Industry map
949 00:54:36.350 --> 00:54:39.950 talking about building all of this LNG infras-
950 00:54:39.950 --> 00:54:40.930 on the island.
951 00:54:40.930 --> 00:54:44.770 And there has been, there is sort of a battle
going on
952 00:54:44.770 --> 00:54:47.260 for the electric system here,
953 00:54:47.260 --> 00:54:51.250 to rebuild it either as it was with so-called
954 00:54:51.250 --> 00:54:55.230 and undergrounding versus what we are
955 00:54:55.230 --> 00:54:59.070 in Queremos Sol, which is a civil society,
956 00:54:59.070 --> 00:55:03.573 prosumer oriented, energy democracy focus.
957 00:55:04.830 --> 00:55:05.880 - Ruth, thanks, yeah.
958 00:55:05.880 --> 00:55:10.880 I think regarding the gas energy alternative
959 00:55:11.250 --> 00:55:13.970 on the fracking way is another heated topic,
960 00:55:13.970 --> 00:55:18.090 which hopefully will help some other speakers
961 00:55:18.090 --> 00:55:19.540 cover this in the future.
962 00:55:19.540 --> 00:55:22.130 But I do have another question from the
963 00:55:22.130 --> 00:55:24.620 audience,
So, Kyle, do you want to ask yourself.
- Sure, I'm happy to ask.
- I was kinda curious.
- We talked a lot about solar energy and that being a perfect renewable energy,
- but I'm also curious,
- what happens to the local food waste in Puerto Rico?
- And if that is being reused,
- if it's going to compost, anything like that.
- I'm particularly interested in turning food waste into renewable energy, and then also a nutrient dense liquid plant fertilizers that can be used again for crops or hydroponics instead of creating new land for agriculture and things like that.
- Okay, thanks for the question, Kyle.
- Yeah, we have a huge problem here with our landfills.
- The first environmental case I ever worked on back in the '90s was what would have been the largest landfill here.
- It was again over the South Coast Aquifer.
- So we were totally against creating a big hole in the earth to potentially contaminate the water supply.
- And we worked for many years at Comite Dialogo Ambiental and many, many other groups.
I have worked for the reduction, reuse or recycling programs and composting, of course. It has not been successful at all. I have to say in all honesty that we have a law with very ambitious goals that have not been achieved. It’s a fiasco. There’ve been numerous waste energy projects proposed here that basically involve some kind of some incineration or paralysis of those materials, that have been not acceptable to civil society groups. In fact, one of the co-founding groups of Queremos Sol, it’s called, Coalicion Anti-Incineracion, anti-incineration coalition. They have been very active in fighting that sort of thing. I don’t know enough about the technologies for waste management or... Yeah. Bio energy programs. I confess, I don’t know enough about those. In fact, I wanna say something interesting though. On Thursday, I think it is, Yale is having a conference or we’re having this little symposium or discussion between groups from Puerto Rico and Cuba.
And in the materials that the Cuban contingent sent, they apparently do a lot of that composting and biofuels but I don’t know. I’m gonna learn, so sorry about that. Thanks, Ruth. Thanks, Ruth.

I think we are almost on time and I do have one final question from the audience

is regarding other system of renewable energy.

you’re talking about these projects. Are they facing oppositions from the coal plants in Puerto Rico? What about the political atmosphere there? Obviously, students are also kind of wondering this.

So, the coal plant issue is, right now, it’s the the most known, well-known environmental issue and problem in Puerto Rico. And there’ve been massive mobilizations and all kinds of laws and regulations and just everything possible that fortunately all of Puerto Rico has basically joined in this fight. And so there’s a law that require, and in the IRP, in fact, the Integrated Resource Plan that I mentioned.
that we were a part of,

it states that the coal burning power plant

has to shut down by 2027,

because that’s when the power purchase

and operation agreement ends.

And actually the groups want to shut it down
before then.

So there has been quite a lot of opposition
to the coal.

And what we’re saying is that instead,

we can use massive rooftop solar installation

to substitute that plant and other plants as
well.

And we are seeing, for example,

there is also an ongoing privatization process

of the Puerto Rico Electric Power Authority.

And the company is a conglomerate

between Quanta Services and ATCO which,

one is a US and one is a Canadian company

that put together something called Luma
Energy

in order to operate the transmission

and distribution system here.

And they are very much against onsite solar,

because their business is to keep

those long distance transmission

and distribution lines going

and take all those federal funds to do...

I call it trickle down energy.

When you do long distance transmission
distribution,

you’re doing indirectly what you can do more
efficiently.
with onsite generation, rooftop solar.
And, but so yes, we’re seeing resistance
from the big gas and oil and Siemens Industry
that sells big combined cycle generators
and Luma Energy and just the usual fossil fuel
and centralized generation companies.
Yeah, thank you for sharing this perspective.
So with that, I think we can end today’s seminar.
So once again, thank you, Ruth
for giving this excellent presentation.
Very much appreciate.
And thank you all for coming on this thing at the end.
- My pleasure.