

Power Finance & Risk



Wind Repowering Roundtable 2019

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NOTE FROM THE EDITOR

In the first ten years of the 21st century, wind generation capacity in the U.S. grew from 2.5 GW to more than 40 GW.

Many of the projects dating from that time are located in prime areas of wind resource but are fitted with equipment that has long since been surpassed as the technology has evolved, making them obvious candidates for repowering.

By coincidence—or could it be by design?—these vintage projects are reaching this age at precisely the time when the federal tax incentives for wind generation are being phased out, creating a sense of urgency and adding impetus to the effort to finance the replacement turbines.

This state of affairs has created a huge opportunity for investors to acquire seasoned assets and breathe new life into them, significantly enhancing their value, which in turn creates opportunities for financial and legal advisers, consultants, lenders, tax equity investors and a range of other service providers.

ArcLight Capital Partners was one of the first private equity fund managers to seize the opportunity when it acquired several projects dating from the early 2000s from Infigen Energy in 2016 to create Leeward Renewable Energy.

Under ArcLight's ownership, Leeward repowered the first two phases of Sweetwater Wind in Nolan County, Texas, which have a combined capacity of 136 MW following the upgrade, and the

50.4 MW Mendota Hills project near the towns of Compton and Paw Paw, Ill., with tax equity from GE Energy Financial Services and Citi. ArcLight then sold the whole portfolio to OMERS Infrastructure Management in 2018.

In many ways, financing a wind repowering project is not that different to financing a greenfield wind farm, but sponsors and lenders do not want to be caught out by those crucial differences. Experienced wind project lenders are scrutinizing independent engineers' reports with renewed vigor.

How does a repowering qualify for renewed tax credits? What about renewable energy certificates? Will the project meet corporate power procurers' criteria for 'additionality' even if the project's generation capacity is not increased?

For an in-depth discussion of these and other vital questions concerning wind repowerings in the U.S., look no further than this fascinating roundtable report, in which we have brought together some of the brightest and most experienced finance, development and investment officials and legal advisers to share their insights.

Richard Metcalf

Editor

Power Finance & Risk

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SPEAKERS STANDING

Maureen Leddy, project manager, **NYSERDA**
Brooks Friedeman, director, **Clearway Energy Group**
Jessica Shor, senior finance manager, **Enel Green Power North America**
Steve Porto, principal, **Ares Management**
Shravan Bhat, reporter (moderator), **PFR**

SPEAKERS SEATED

Simon Stevens, counsel, **Akin Gump**
Jonathan Word, director, **Eolus North America**
Georges Arbache, senior V.P., **Jefferies**

PFR: When is the best time to repower a wind farm? Is there an optimal time? What do offtakers say when you have those conversations?

Steve Porto, Ares Management: I think they'd say, "Yes, if you lower my price 50%." I think the timing question for PPAs revolves around if you're contractually permitted to repower under your existing PPA, which I think is relatively rare. That's great because that PPA is probably seven to 10 years old, and probably at a much higher price than the market right now. If that's not the case, then certainly that's a negotiation with them to determine if they are interested in more megawatt-hours.

You know the phrase 'blend and extend.' You can lower the price and go for a longer term. As far as the best time to repower, I think as you're approaching that 10-year mark, particularly because you're doing the 80/20 math, and you've got to value the retained components. The older the project, the easier that 80/20 math is. So, it's a balance between that 80/20 math and what's going on with your PPA.

Brooks Friedeman, Clearway Energy: I was going to say probably year nine, assuming it's a 20-year PPA. Working with an existing offtake, in any way possible, is definitely a better option than trying to go blend and extend. We've had to do it both ways recently but, for the most part, we found a combination of utilities signing up for caps. We're not going to produce more in exchange for keeping the revenue rate the same. I think that's the good outcome, but we've been able to do it. We've been very careful with handling certain availability calculations within a PPA.

Jessica Shor, Enel Green Power: Is there an assumption that you're heading into a period of major component maintenance? Is that a factor at all in the timing?

Friedeman, Clearway: Yes, for some of our projects with a little higher capacity factor than we might have thought they were going to have in the beginning, there's been a very natural point. You've got a bunch of gearboxes that are going to be coming up for replacement in the next year or two. If we're going to

be spending money, we might as well do the whole thing.

Simon Stevens, Akin Gump: Exactly, and then at the same time you can also realize other gains such as new equipment warranties that reduce your operational risks and stabilize expenses.

Friedeman, Clearway: Yes, definitely the equipment side of things has played into our decisions on prioritizing which is going first.

PFR: From a geographic perspective, will we see the most repowering activity happening where there is already a lot of wind deployed? Are there any hot spots, geographically, that we should watch out for?

Shor, Enel: I think the ones we've seen coming onto the market are mostly Texas, New York and California. Texas seems to be the most popular, partially just because of the permitting aspect there. It's much easier to repower a project in Texas than it is in somewhere like California.

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PFR: Why's it harder in California?

Shor, Enel: Just the number of regulations and permitting makes the market in Texas more suitable for these projects.

Stevens, Akin Gump: Texas is relatively friendly. You do of course have certain issues. One that we have seen are railroad crossings. Crossings can create downtime issues but the impact is generally localized, so these are not major gateway issues like the bigger permitting issues that are more common in other states. Overall it's a pretty positive environment.

Porto, Ares: There are typically limited county-level permitting requirements in Texas. Pretty much everywhere else you go in the U.S., you've got to go through a county commission process to get approval to build a wind farm. You generally don't have that in Texas. The other major thing that makes Texas interesting is the interconnection queue. You can go through an interconnection in Texas in 12 to 18 months. In **MISO** right now, that's two-and-a-half or three years.

Jonathan Word, Eolus North America: With that being said, I think that this is one of the big benefits of doing a repower versus a greenfield development because even in California, a lot of it depends on what the existing land use and permitting status is of the existing operating asset. In some cases, it may be an administrative process actually if it's already zoned wind land, and it's already gone through an initial CEQA back when the original project was built. You may get an exemption for the otherwise arduous process that a new project would have to go through.

Shor, Enel: I think the other aspect is that a lot of the projects in California are slightly older than they are in the rest of the country, so you might be looking at a repower where you're replacing basically everything from the foundation up, including the tower, as opposed to some of the projects that are maybe only nine or 10 years old, where you might have the flexibility of just replacing the rotor and leaving the towers in place.

PFR: Have there been any power markets that you've seen in the repowering space that have been especially supportive or difficult?

Friedeman, Clearway: ERCOT has been a good spot for it. There are various projects we've had just recently where you use a little bit of hole on your offtake, and it's nice to be in a liquid market. You can get a financial offtake, get just enough to get your tax equity deal done, and move on. Having that ability is very helpful.

Porto, Ares: I don't think that's any different for repower versus new building for us. There aren't any repower specific incentives in the various power markets that I'm aware of.

Stevens, Akin Gump: That's one of the interesting things about repowering from the legal perspective: it's somewhere between a new project and an existing project. Repowering is not necessarily that much of a shortcut. This depends a lot on whether you're talking about an owner repowering its own project which it knows intimately versus the acquisition of an existing project. Anyone who has ever been involved in a project acquisition knows that diligence can be a big job for you and your lawyers and engineers—and so also sometimes can be fixing what you find after you buy it.

In addition, you can't assume that what worked technically and legally before will work for a repowered project. So, for example, if you put in a higher tower, you're going to have to see whether you need FAA clearance, or a new bird study or other new or revised permitting requirements. Just because you've got a wind turbine at *this* level doesn't necessarily mean it's going to work at a higher level. Or the roads for the original project may not be adequate for larger equipment required for a repowering. You have to expect to need new studies and not to always be able to just dust off the old ones.

Implementation may also be tricky. PPAs may have to be amended—which is never easy to do without opening up issues like price that the generator may not want to discuss. So might other contracts. Landowner issues can be interesting as well. You may have landowners who have to be approached for



"I've seldom received the amount of questions or had it be so clear that bankers are actually reading I.E. reports."

Brooks Friedeman, Clearway Energy Group

amendments or new estoppels. "Ah, what's that going to cost?" So, all of these issues come into the calculation.

PFR: Would you want to see the PTC extended for wind repowering specifically? And do you think we might see it?

Georges Arbache, Jefferies: I think just from an industry standpoint, for PTCs and ITCs generally—I might be controversial—I think they should go away completely because the LCOEs have come down so much in the last five years that, in most markets, renewables generally are competing with conventional generation. As a support mechanism 10 years ago, it was important to actually accelerate the deployment of renewables, but now we're at a point where they're competing against conventional gen.

We're seeing PPAs being signed in the high \$20/MWhs for wind and solar. That's competitive with gas, for example. Some of the latest procurements show adders for storage on par with gas. So, I think generally the industry has benefited from the ITCs and PTCs, but it's time to remove the structure and complexity, and the capital structure inefficiencies that come with tax equity.

I'll caveat that with two things. One, for repowering, and two, for offshore. I think offshore, the LCOEs haven't come down... yet. So, having a supportive framework to enable offshore to really take off, the way that it has in Europe, is a good thing. For repowerings, we've done a lot of analysis on different portfolios and projects and the kicker

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that incentivizes investors to do repowerings comes from multiple value levers, but one of them is actually the PTCs. A large part of the returns that are being captured by investors come from the PTCs for repowerings.

So, it would be good to see a big wave of repowerings across the U.S. It's good for the industry. It's good for the grid. It's good for the environment. I'd like to see the PTCs extended for those two things.

PFR: If you were to try and add on storage onto a wind farm as you do the repowering, would you want to see some kind of tax credit for the storage?

Arbache, Jefferies: Yes and no. Some of the pricing we're seeing for storage is crazy. Some of the projects might never get built because people are just playing the cost curve, like they did with solar five years ago. They're basically saying, I have a 2022, 2023 COD project. I don't have to start procuring for my equipment a year or six months before the NTP date. So, I'll basically make a bet on where costs are going to be.

People are definitely doing that. You can do that if you're a large European. You can do that if you're someone that has close ties to a vendor. But it's a pretty big bet that you're making. Despite that, some of the pricing we're seeing for storage is pretty aggressive.

Porto, Ares: But the incredibly low-priced storage is, in part, because it's connected to solar. When you charge a battery with solar, you get the ITC on the battery. So, it is benefitting from that incentive.

Word, Eolus: At the end of the day, that's what wind is competing against right now: solar plus storage. As long as ITC is available for storage integrated with solar, then if you want a level playing field, at least for the interim, it wouldn't hurt.

In terms of PTC, I agree. I think that the boom-and-bust cycle of the PTC has done the most damage to the stability of the market, and the suppliers also capitalize on that. At the end of day, if the wind industry is going to continue, and the PTC completely goes away, then something has to reset if the suppliers are going to stay in business.

The prices are going to have to adjust, as

well as all the ancillary services that complement the industry. Either it's permanently in place or it's not in place at all, but that type of stability is much needed for the industry. I think when the day comes where solar and storage are competing head-to-head directly with wind and storage on a level playing field, then it's going to be a much easier market to operate in.

Friedeman, Clearway: I think you're bang on. The OEMs have played that game very well with pricing. They know that everyone has to procure their equipment before a certain date in advance of a phase-down or a cliff of the PTCs. Their supply chains fill up, and then if you're not a large developer, or if you haven't had an existing long-term relationship with the OEMs, it's pretty challenging to actually get a spot in the queue. If you do, you end up paying a little bit more than you should.

Shor, Enel: I think as long as you have the PTCs, there's so much gymnastics you have to do when you're planning your repowering scope, to make sure that it qualifies and that it's going to pass muster with the tax counsel. We analyze dozens of scenarios for our repowerings to figure out exactly which ones optimize the returns and lower the tax risk.

You take away the PTCs and tax equity, and then you just get the same cost-benefit analysis you have with any major repair, which is: what's the cost you're putting in? What are the increased revenues you're getting out of it? That just really simplifies things and probably, honestly, leads to the scope that's the best for the long-term operations of that project.

PFR: Interesting. I almost wish we had a tax equity investor here to make their case...

Porto, Ares: I'm a recovering one...

Stevens, Akin Gump: There is no doubt that the PTCs and tax equity have really driven the market—in positive ways, but also perhaps in some negative ways. Regulatory uncertainty has been a negative but I think we also have to be honest that the PTC has always generated some negative public perceptions. It is never a great thing for any industry, frankly, to be facing any political headwinds, and in the long run I think it is going to be net positive to

be freed from some of them here. I also think that going back on the commitments that the industry made at the time the phase down was implemented would be harmful.

It's better to focus on looking forward to how the industry will transition, and I think repowering is going to be increasingly a part of the mix. Until the 80/20 test, the PTC overwhelmingly encouraged new development but not necessarily the intensive exploitation of the best resource. The post-PTC world may be more balanced.

PFR: What percentage of wind deployment over the next couple of years do you think will be repowerings versus greenfield projects?

Porto, Ares: My guess is 20% to 30%.

Friedeman, Clearway: I don't want to put a number on it. I don't disagree with yours, but I think we'll always be looking at the pipeline that we've got going. There will always be one or two actively ongoing. So, it will be at least a material part of our business on the one side.

PFR: Looking at tax equity, the investors that are there for repowerings, is it more or less the same game as you're seeing for greenfield projects? Are there different investors? Are the same investors asking for slightly different terms?

Friedeman, Clearway: I think it's the same group of investors, but a smaller sub-set of



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Jessica Shor, Enel Green Power North

them. I think the ones that we've been able to speak to and get comfortable with it have been able to execute deals pretty much at par with a greenfield. I think that it's just a smaller group.

PFR: Why is it a smaller group?

Friedeman, Clearway: I think, for 2020 especially, they get to hunt other options. I think where we've seen a big distinction is on the 80/20 side of things. If you're leaving just the tower and foundation behind, you'll find a few more people who are willing to be comfortable with that. But if it's a situation where it's just the rotor and this and that, they're like, "I don't want to figure this out".

If you're going to show them an 80/20 and say, "Guys, this is going to be 5% or 6% clean cut," I think that investor pool opens up. I think the other thing is that some of these repowerings are pretty big sites compared to what's happening in greenfield, so the people who like writing bigger checks have gravitated towards them.

Shor, Enel: Yes, I would second most of that. I actually think it's interesting what you said about the bigger projects, because we repowered our first project last year, and we're doing our second one this year, both of which were sites of about 50 MW. So, much smaller. We were looking at check sizes of about \$20 million as opposed to \$300 million for our new projects. You're putting in the same amount of work for the investor to deploy a tenth of the capital. So we've basically been considering

them as pilot projects for the larger repowerings we have coming up. So on the one hand, for a new, smaller investor trying to get in, funding a smaller project could be an attractive way to enter the market. But the other side is that repowerings tend to be more complex than a new project, so it definitely favors the investors that have the relationships and have the market knowledge.

Word, Eolus: Also, given that complexity, I think what's been seen is that a lot of the repowers that have been done have been done by the larger, more prominent firms. The other part is, whether it's a pre-existing relationship with a large IPP, or a developer that already has a portfolio of projects that they're able to wrap a smaller 50 MW project into, and have that efficiency. Whereas other smaller developers, given some of the risk components around the 80/20, may have a harder time selling a small project that's a repower versus a large project that's a greenfield. But I definitely agree that the complexity of the repowers is significant. So, it's not for everybody.

PFR: What have been the biggest kinds of challenges and learnings from the 80/20 qualification experience?

Stevens, Akin Gump: We need an accountant here! Valuation is a really key issue.

Friedeman, Clearway: I think we've learned that having the I.E. work very closely with the accounting firm to make sure they really understand, technically, what is staying, what is going... I think maybe a lesson learned there, talking about refurbishing certain parts instead of replacing or scrapping them, or, "maybe we're going to keep that gearbox for another project," is: No, don't. It's getting scrapped. It's going away. The cleaner the story in terms of what's happening to the equipment that's leaving, certainly, the better.

Stevens, Akin Gump: Right. It can be tricky to establish that no more than 20% of the value of the repowered turbine, tower and pad is existing costs. The cleanest way to justify your fair market value is acquisition of an existing project in an arms' length purchase. That's very, very clean but often, of course, not possible. Otherwise you get into valuation

issues that can be much trickier to ensure will pass IRS muster.

Shor, Enel: We've been looking at the same thing. I think what happens a lot of the time is that these parts that are being removed are often on the books for a higher value than the appraiser attributes to them. So, if you are looking to dispose of those used components in a way that mitigates the book loss that you take on them, you have to be careful about selling them for more than they've been appraised for.

If your appraiser says it's worth \$10,000 and that's what you're basing your 80/20 on, but you sell it for \$50,000, suddenly that is a great market point for a new basis for your 80/20, and you have to make sure that what you spend is still supported by that. I think the other big thing that we've learned is that the 80/20—once you agree on a valuation—is just simple math whether or not you pass that rule. But there are other factors you have to consider beyond the 80/20. You still need economic substance to the repowering beyond just requalifying for PTCs, so you also need to look at things like whether or not you're materially increasing the output of the project and whether or not you're extending the useful life. Those are the kinds of things that separate a true repowering from just major repairs.

Stevens, Akin Gump: The economic substance test is another issue that can keep tax equity out. It's not clean cut the way the 5% safe harbor is and tax equity has to be particularly concerned. They have to ask, "are

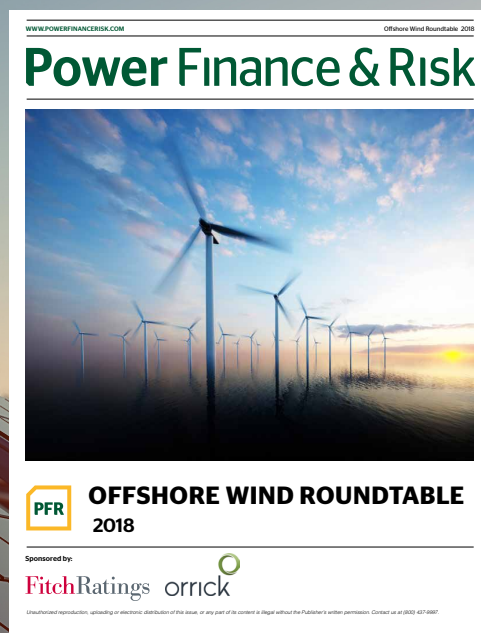
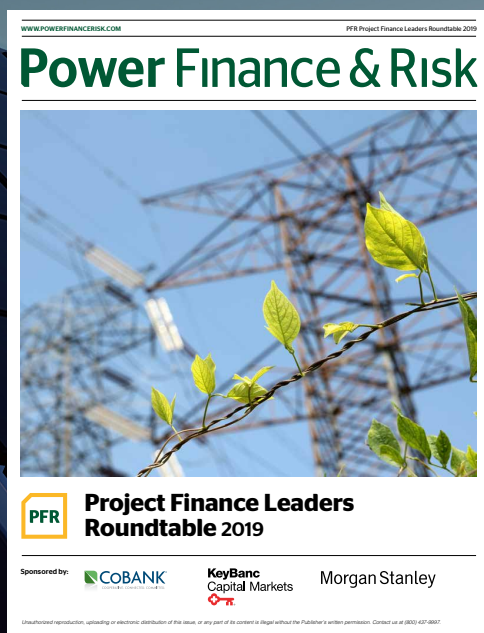


"There's an hourglass that only has so many grains of sand in it before the time is out for the useful life of this equipment."

Jonathan Word, Eolus North America

PFR 2020 ROUNDTABLE CALENDER

Each roundtable panel will be organized and moderated by the *PFR* editorial team. Sponsors can help set the agenda with suggestions that dig deep into the topic. All logistics will be organized by *PFR* including venue, refreshments, lunch and photographer. *PFR* will first publish the roundtable report in an issue of *PFR Weekly* (print and digital editions). *PFR* will then host a copy of the roundtable report on the Power Finance & Risk website and will promote the report to the *PFR* audience using print, email, digital and social media platforms to encourage on-demand viewing and download.



We invite you to review the topics we plan to address over the balance of the coming year:

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| • Tuesday 14 January : | Project Finance Leaders Annual Roundtable 2020 |
| • Thursday 06 February : | Project Finance and M&A Deals of the Year 2019 - Seminar |
| • Thursday 12 March : | Project Finance Law Roundtable |
| • Tuesday 07 April : | Distributed Solar Finance |
| • Tuesday 12 May : | Financing Energy Storage |
| • Tuesday 09 June : | North America Thermal Power Finance |
| • Tuesday 14 July : | Mid-Year Review of 2020 Power Finance Deals/Trends in North America |
| • Tuesday 04 August : | Private Placements in Power Finance |
| • Tuesday 15 September : | Power Project Finance - Latin America |
| • Tuesday 13 October : | Offshore Wind Finance |
| • Tuesday 10 November : | Offtake and Hedge Roundtable |
| • Tuesday 08 December : | Solar Securitization Finance |

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we doing this just for tax purposes?” It’s one of these holistic tests that are very hard for people to get their arms around.

PFR: How has it worked in practice from what you’ve seen?

Shor, Enel: Among our common investors, we’ve worked with the same group for many years, so we know which investors are more or less willing to take tax versus commercial risk. We know which investors our projects might be better or worse suited for. But it also involves a lot of in-depth and ongoing discussions with our tax counsel and their tax counsel and the principals at the banks, just to really understand exactly what we’re doing and make sure that we’re all aligned on the scope.

Word, Eolus: I think there are some general questions from the industry, where it becomes apparent that it’s important to distinguish between a partial repowering and a complete decommissioning. Because in a complete decommissioning in California, as you referred to, where projects were built in the 80s, you can’t use the old equipment.

It’s essentially just the land and the underlying electric infrastructure that you’re able to use, and transmission rights, land rights, etc. The process of repowering, although there’s a conversion process that you have to go through with the ISO, once you actually get to the 80/20 test, it’s relatively fact-based. This is particularly the case if you’re doing a safe harbor of your PTC based on 5%, then it’s really just the facts and the numbers, and



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Maureen Leddy, NYSEDA

there’s probably less of a guarantee that has to be behind that from the sponsor because it’s a pretty straightforward replacement. Whereas if it’s a complex, partial repowering, and you’re really intertwining existing infrastructure with new equipment, then it becomes more for the attorneys to get their head around, and the tax equity.

PFR: What is the oldest wind farm in New York? Do you know?

Maureen Leddy, Nyserda: There are some small projects that are reaching the twenty-year mark but the first project of significant size was Maple Ridge, which went into operation in 2006. There was a flurry of activity around that time with just over a gigawatt being installed before 2010.

PFR: I guess in your neck of the woods, you’re having similar discussions with people. What are you hearing on that front in terms of, when is it a full decommissioning? When is it a repowering? What constitutes a refurbishing?

Leddy, Nyserda: Our point of view is around the eligibility for the REC and compliance market here in New York. That’s really where we’re looking at it from. I’m not sure how that factors into your calculus when you’re looking at evaluating a repowering. But in New York now, a return to service is 48 months out of service. If you shut it down for 48 months and turn it back on, you’re considered a brand-new project. But that’s a very long time to sit idle. Other than that, it’s really only this incremental generation that has compliance value. But we also recognize that best use of the land is really important, and the existing interconnection and how the permitting is going to work. It’s interesting to hear, “it has to happen,” and maybe not all of the original wind projects were in the most optimal sites in terms of the resource, but they probably were the better tier.

As we start getting more aggressive in our goals with renewable energy, and our emission reduction goals here in New York, we have to take a hard look at making sure those sites can contribute and that it’s sensible how we are valuing the renewables reinvestment and repowering. We know that the rules as

they’re structured now are not incentivizing repowering. It’s not making an economic case, and there’s definitely projects that would do it if that value was there more strongly.

What about a new-technology tower that can access greater resource and a larger turbine, more generation? That’s what we want to see. We want the resource to be developed as best it can so that it’s contributing to New York, to meet New York’s goals, not leaving the state or getting into a bidding war with other markets in terms of the REC value.

Friedeman, Clearway: No, I take your point. That’s the beauty of repowering. It gives you the opportunity to put the best equipment at the sites we know are the best. Our strategy has always been to list prioritizations in close concert with the O&M group. What needs help? If you think of a third of the gearboxes that are going to be on their way out in a couple of years...

Stevens, Akin Gump: There definitely are underperforming projects, and they may be underperforming projects on good sites. So, that would be the sweet spot for repowering. Logically the older sites are most likely the better sites, and with those projects aging out, I think a wave of repowering is very likely. Our choice is you either just give up on prime sites, or you repower the existing sites to fully exploit them.

Porto, Ares: What we acquired last year in our repowering are **Clipper** turbines, which have really underperformed at the three sites. We had three sites with great, proven wind resource, and it was relatively easy to make the repowering case.

PFR: One of the trends that we keep hearing about is the safe harboring of components, and this then leading to the wind turbine makers ‘horse trading’ projects for components and turbines. What has actually happened on that?

Friedeman, Clearway: I think there is a lot of it. There’s going to be more of it. It goes back to the projects that deserve to be repowered and, frankly, some really need the 2020 100% PTCs. Others can wait. There is safe harbored equipment. It’s there. So, I think the projects

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Jonathan Word, Eolus North America

that need to find it with a good developer are going to get it. The J.V. structures are being used and it will be used.

Word, Eolus: In this, the developers are horse traders more than the OEMs, and the OEMs may facilitate some stuff behind the scenes. But it's the developers that need to find a place for their equipment that they took the risk on, so I think it's actually an important part of the industry. Some entities with larger balance sheets are able to take more risk than others, so there's a complement for different co-development and partnerships to take place.

But with that being said, there's an hourglass that only has so many grains of sand in it before the time is out for the useful life of this equipment. So, unfortunately, it's not indefinite.

Arbache, Jefferies: That's exactly right. It's the developers that are basically horse-trading. The OEMs have been quite smart about how they have assessed repowering. They know their turbines really well, where they've been put, who owns the project. They have a very comprehensive list. **Vestas, Siemens Gamesa, GE and Suzlon** all have repower kits, and they have been trying to find ways to obviously put more of those into the market.

They've gone through all the projects that are potential candidates for repowerings, and then sometimes they're run by some of these smaller guys. So, to your point about the OEMs putting equity into projects, Vestas has been doing this behind the scenes for years to try and help some of the smaller guys, who don't have a balance sheet, secure equipment,

move the projects along. It's the grease in wheel in the development process for them. So, I wouldn't be surprised to see more of these structures, just with the smaller guys.

PFR: Let's move on to the debt side. Where has debt been pricing for wind repowerings? What have the terms of that been? Has it been mostly construction debt with a little bit of term debt?

Friedeman, Clearway: Everything we've done to date has just been construction debt. We don't see the need to have it on as term. But in terms of sizing and pricing, in pricing, well inside of Libor plus 100. All of the terms are substantially similar if not a little better than greenfield.

PFR: Is there a premium on the pricing to greenfield or not?

Friedeman, Clearway: It would be the same, or less even. We're showing them a track record at the site. Any sort of boogeyman development problems probably would have already popped up. I think the other thing in terms of having comfort is that there's skin in the game. For somebody like Clearway, who owns the project and is going to reinvest or repower, that's a lot more skin to have in the game than a few points of equity. So, I think there's more aggressiveness on the gearing side as well.

PFR: Is there any construction risk that's unique to repowerings? How are those being priced?

Stevens, Akin Gump: There are some additional practical concerns. You're to some extent decommissioning at the same time as you're building. You've got to get that timing right to do it efficiently. For example, if you are taking a blade off, you need a crane to do that and you also need a crane to install the new blade. Ideally you want to use the same crane but you might have a gap of time between removal and installation. Likewise, more moving parts may mean more lay down areas, again because you've got more going on.

From a lender perspective though, none of this is an issue *per se*. Lenders will talk to the I.E., review the documents and stress the model. They're just going to want to know that there's a plan in place and that the economics and the engineering plan will match what is required.

Porto, Ares: They'll dig into the technical specifics because on a new-build project, typically, that turbine's an evolution from a previous version and there's type certifications. You've got to get those here, but some of these configurations have really never been done before. So, the I.E.s will dig into it, and, ultimately, the lenders are a bridge financing to a tax equity takeout, so lenders are very focused on if there's any repower-specific conditions precedent to tax equity funding. If there's not, it becomes a process of making sure everyone's comfortable with the I.E. report.

Stevens, Akin Gump: We have seen some issues that can be surprising. For example,

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"Texas has benefited greatly through lower power prices, landowner royalties and property tax payments which are in part subsidized by the entire nation via the federal PTC."

Steve Porto, Ares Management

where you mix old and new equipment or construction the developer will not always get full warranty comfort from the manufacturer the way they may be accustomed to receiving it in new builds—even in some cases where the manufacturer doing the repowering also did the original installation. There may be reluctance to stand behind warranties that can be impacted by equipment or pads that are a number of years old and that may not have been designed for a larger turbine. You can't really assume that anything just carries over unchanged without doing full diligence on it.

Friedeman, Clearway: And if you try, it bites you.

Shor, Enel: Not a shortcut you want to take.

Friedeman, Clearway: I've seldom received the amount of questions or had it be so clear that bankers are actually reading I.E. reports. Because they're actually studying something that's there. Every single tower, every single foundation is photographed, studied, analyzed, whereas with a greenfield it's, "we're going to put a new one of those in there," and they say, "okay."

PFR: On the debt side, the coverage ratios and the tenor of debt, are those different at all for repowerings?

Porto, Ares: I don't think I've seen any difference between new build and repowering as far as the pricing in terms of term debt. It's mostly driven by the contracted profile or

uncontracted profile of the cashflows.

Friedeman, Clearway: I think that's right. We've put in place a cash equity bridge loan as well, in addition to the tax equity bridge loan. They'll do the same term of analysis they will for anything else, just a one-year P99, make sure you're going to cover it.

PFR: What does the capital stack look like post-COD for the post-repowering in terms of how much is tax equity and how much is cash equity?

Friedeman, Clearway: It's 65% tax equity, but that will vary depending on the cash equity structure.

PFR: Sixty-five percent tax equity and the remaining 35% is cash equity?

Friedeman, Clearway: Yes. It varies by site and structure.

PFR: And then I guess as the PTC goes off, the projects that we will see going forward in the next few years, that shortfall will be made up with term debt?

Friedeman, Clearway: Debt's pretty cheap right now. It's hard to see it not being replaced by some amount of debt.

PFR: Where is term debt at the moment?

Porto, Ares: For long-term busbar PPAs, I think in the earlier years it's probably Libor plus 150 bp to 200 bp with periodic step-ups. That's my experience.

Word, Eolus: My understanding is that the market has likely compressed quite a bit recently. So that's probably coming down from those numbers, but still significantly higher than construction debt.

PFR: Let's move onto the offtake. What are the hedges like that you're seeing for wind repowerings?

Word, Eolus: I don't see why there's any difference *per se* between a repower and a greenfield project on the offtake side because, essentially, it's what is your cost of electricity?

Where is the project located? And how much does it cost to deliver that power to your point of delivery? It's the same fundamentals that any project has to go through.

PFR: What if, let's say, you had a vintage wind farm, the interconnection was for 50 MW, and you repower it now, and to the extent you can scale that up, the output might change. Does that have an impact on the basis risk?

Shor, Enel: Our experience so far has been that when we repower, we're not actually increasing the capacity of the turbines. We're just increasing the output. So, if you have a GIA [generator interconnection agreement] that's for 100 MW, our nameplate capacity is still 100 MW. It's just that we're generating a higher net capacity factor out of that. We haven't yet experienced a project where we need to go back and reopen that GIA.

PFR: What about the new RECs that you would be increasing? How easy is it to recontract those or to find offtakers?

Word, Eolus: I think it still depends on, do you have 15 years life left on a project? Or do you now have 30? So, it's a matter of how much are you able to guarantee in terms of an offtake contract. It's coupled with, how much are you increasing the useful life of the project? And then from the same analysis that goes into any type of project, what type of term are you willing to commit to, based on your



"There is no doubt that the PTCs and tax equity have really driven the market—in positive ways, but also perhaps in some negative ways."

Simon Stevens, Akin Gump

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"It's the developers that are basically horse-trading. The OEMs have been quite smart about how they have assessed repowering."

Georges Arbache, Jefferies

confidence level and risk assessment of the life remaining on the project?

PFR: I want to ask about corporate offtakers. Is the appetite for a repowered wind farm the same as it is for greenfield?

Shor, Enel: We haven't seen much interest. I think the barrier is that they can't claim additionality for a repowered wind farm. They're not able to say that they caused this renewable plant to come on the grid. That seems to be a really big concern of the corporates.

Stevens, Akin Gump: But if you had increased capacity, you could, in theory. Also, if it's associated with more RECs, there's an argument there.

Shor, Enel: My understanding of how the additionality works is it's not black and white. It's a lot of gray area, and it's just how conservative they want to be with those claims. Our experience so far is that our offtakers tend to be fairly conservative about what they're claiming additionality for.

Word, Eolus: We recently executed a PPA for a repower with a *Fortune* 10 corporate. I think it varies. Do they have very strict sustainability goals where additionality is important? Or are they driven by economics? If it's driven by just the bottom line, then ultimately it's a matter of what price per megawatt-hour are you able to commit to.

But with that being said, again it goes back to the caveat on whether it is a partial repower

or is it a full repower. From our perspective, with a project that we've recently contracted, it's essentially a complete new build. I think that a corporate, from that perspective, would still be able to assess that as, "you're building a new project based on the content of what you're replacing."

PFR: Are there issues of basis risk that you've come up against while doing repowerings?

Friedeman, Clearway: We've certainly had some basis risk to have to sell people. I think it was not a particularly different challenge than it would be with a new build. For the most part, we're dealing with legacy busbar PPAs. The basis risk is hopefully a hole-plugging exercise and not a material part of the story.

PFR: Maureen, talk to us a little bit about what you're seeing in New York. I was looking through the New York wind map, and a lot of the wind farms I saw have CODs in the first decade of the century, so, prime candidates for repowering. You liaise with the developers, with the REC markets. What kinds of conversations are you seeing in that space?

Leddy, Nyserda: There is interest by the state in examining repowering for some of the legacy wind, and I think it follows the additionality concerns of the corporate offtakers, of the motivation for doing so by the project developer. Are you repowering this project simply to get a new contract with the state? It was proposed in 2016 that repowering projects would be eligible to create compliance RECs by meeting certain criteria, 15% increase in the output, things like that.

There was criticism saying that for the projects where that state had invested in the operating project, repowering is encouraging owners to abandon otherwise useful operating projects simply to enter into a new contract with the state and that's an inefficient use of public funds. So, I think it is critical to understand, is it at the end of its useful life? Is it at a point where it's decommissioning time? Knowing that sweet spot of where you've actually gotten all the value you can out of the asset, and that repowering is going to extend the useful life is very important. It's

knowing when it's the right time for all of the different reasons, that this is the best investment from the state side, from the investor's side, and that you're going to get more generation out of it.

And you're going to benefit a community that's supportive of hosting a wind project because they've lived with it. They've experienced the benefits of hosting the project. You're going to continue to get value out of the investment in the interconnection. So, that's what we struggle with, trying to find that point of saying, this makes sense now for the state to get behind repowering as an investment equivalent to a brand-new project.

Stevens, Akin Gump: I'm curious about the community impact and acceptance issues. A lot of repowerings result in a significantly fewer number of turbines on the site, bigger ones maybe, but fewer. How do people in the communities that host wind projects see that?

Leddy, Nyserda: In my experience, a lot of the concern from a community point of view is just the unknown. Once they've lived with the project, they realize that a lot of that scary stuff didn't happen. I don't think the height issue is such a big deal. But what they do care about is the property tax revenue that they generate from the project, or the PILOT revenue. As long as that's going to stay valuable at a consistent level, that's I think the only concern.

Stevens, Akin Gump: Of course that might not be totally stable because you may have landowners who were previously hosting a turbine on their land, and who no longer are hosting one in a repowering scenario. Or the number of acres required may be less. You're going to have a little bit of change there.

Porto, Ares: As a New Yorker, I hope the state moves soon because we can benefit from the federal tax subsidies which are socialized across the nation. Otherwise, it will just be through REC contracts. Texas has benefited greatly through lower power prices, landowner royalties and property tax payments which are in part subsidized by the entire nation via the federal PTC.

Word, Eolus: That's an important thing to distinguish. Are you talking about an unbun-

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dled REC project, where there's really no additionality of contract term or new capacity? Or are you talking about the ability to enter into a long-term contract, which either enhances an existing project and gets the most value out of it, or you're allowing financing to occur for a new-build project?

So, it's really the long-term contract that's enabling the additionality of more megawatt hours. Whereas an unbundled REC contract is a project that's not showing much of a commitment from the corporates, the state or the municipals because it's just procuring an unbundled REC, where they're not really receiving the benefit. They're just getting the green credits that they're buying a REC, which really isn't doing that much good for anybody except for the existing operating project.

It would be interesting to hear from those that are repowering: What has been the single most important lesson learned from the repowering process in terms of whether it's interconnection, permitting or financing? What's been the most important factor for hurdles with financing as it's applied to specific projects that they're working on?

Shor, Enel: We did our first repowering last year. One of the main themes that I got out of this conversation was, once a repowering project is COD, it's basically the same as a new build. But the difference is really in the diligencing and the structuring that you do before then.

That's a longer process and you really need a handle on what's been happening with the project in the past. For us, the project that we repowered was 17 years old. So, we were physically going into our basement and getting boxes of files that hadn't been digitized, and having an intern scan them in to put them in the data room for our financing. It was not what I would call a shortcut to our financing. But we definitely learned a lot along the way.

Porto, Ares: The two major considerations are the 80/20 test and foundations. In our case, we acquired the three projects from a third-party. The 80/20's a little bit easier because you can make an argument that our purchase price was an arm's length valuation. When we use that number on our 80/20, it works. That was a great fact to have and was a shortcut to much longer conversations about replacement costs less depreciation and the DCF approach. The



"For PTCs and ITCs generally—I might be controversial—I think they should go away completely because the LCOEs have come down so much in the last five years that, in most markets, renewables generally are competing with conventional generation."

Georges Arbache, Jefferies

third-party acquisition helped.

Friedeman, Clearway: And you're using new turbines, right?

Porto, Ares: Yes, the existing turbines are Clipper and we're repowering with Vestas 2.2 MW 110s. On foundations, lots of time was spent studying them. We had I.E.s doing what's called a finite element analysis. It's a detailed model that evaluates the physical characteristics and response of the foundation to internal stresses resulting in a projection for overall fatigue. In our case, because the Clipper turbines at these sites had had some challenges, there had been some considerations around the towers themselves that we needed to study.

Arbache, Jefferies: Did you guys have an EPC that backstopped the analysis and basically said, we're going to stand behind this?

Porto, Ares: Vestas is acting as the EPC and then a ten-year O&M contract.

Arbache, Jefferies: So, if the turbine fell over, you'd be compensated for loss of revenue?

Porto, Ares: I don't want to share too much here about the details of our contract but I can tell you how we think about the risk. We think about the risk and mitigating it three ways: First, it's just doing your diligence, making sure you know everything you can know and you're using credible I.E.s. The second is contractually trying to make sure you've

structured around it the right way and that there's an appropriate allocation of risk. Third, which is the Alamo in my mind, is just building contingency into your pro-forma. We like to think we did all three and that's how we got comfortable with it.

Stevens, Akin Gump: From a lender perspective, whereas they might normally be worried about finger-pointing between a BoP contractor and a turbine installer, in repowering, reused foundations are going to be long out of warranty—so there isn't going to be a BoP contract to absorb that part of the risk. The lenders are instead looking basically to the owner to potentially pick up the slack. I don't think it's going to be a problem necessarily, but there's going to be more analysis, and more reliance on the I.E.

Porto, Ares: That's where the capital structure is important. Our construction lenders are looking towards our tax equity to take them out. So, they're very focused on, "did tax equity review the I.E. report? Could there be any issue in the bring-down of the I.E. report at funding?" So, they got comfortable that there wouldn't be. Once we hit COD, the construction loan is repaid and we're operating; it's us and tax equity. Tax equity is generally in a protected position given their investment being yield-based. If the project underperforms they will sweep cash if you go past the 10-year flip or whatever you've sized to. There are other ways they are protected from underperformance including a reduction in pay-go payments. ■