

## Santee Cooper IRP | Public Stakeholder Meeting #5

2023-04-19, 1:00 pm EDT

*This Q&A Summary documents the questions and comments that were asked, and the responses that were provided in the Q&A window during the IRP meeting. The questions and written answers are generated by the Zoom platform. The live answers are transcribed from the recording and are an attempt to capture each as closely as possible, as it was provided. All live answers have been edited for readability and may have been reordered to connect conversations. [Square brackets] are used to identify post-meeting amendments or restated questions and material references.*

#	Question, Follow-on Questions, Comments or Input	Asked by	Response Type	Answers
1	Good Afternoon, my name is Findlay Salter and I am here with Anthony Sandonato and O'Neal Morgan participating on behalf of the South Carolina Office of Regulatory Staff along with our colleagues from J Kennedy and Associates, Leah Wellborn, Evelyn Menendez and Phil Hayet.	Findlay Salter	written Rahul Dembla	Good Afternoon Findlay and team. Thanks for joining.
2	<p>We are grateful to Santee Cooper for pulling everyone together today for discussion on their Integrated Resource Plan.</p> <p>I want to let everyone know that even though we are here participating in this stakeholder session and future sessions this does not represent an agreement on the positions discussed.</p> <p>ORS is tasked by statute to represent the concerns of the using and consuming public with respect to public utility services, regardless of the class of customer, and preservation of continued investment in and maintenance of utility facilities so as to provide reliable and high-quality utility services.</p> <p>When this matter is brought forward before the Public Service Commission ORS will review all information presented and draft its position with its statutory requirement as a guide.</p>	Findlay Salter	written Mollie Gore	Thank you for being here Findlay and team
3	Just for Stakeholder understanding, is Santee Cooper saying that Central fully agrees with the contract interpretation on this slide?	Ben Garris	written Rahul Dembla	hi Ben, I should not speak for Central but we shared the content (including the slide discussed by John) with their staff earlier this week. They did not object to the content.

4	<p>I would like an explanation and factual statistics on how Santee Cooper came to the conclusion on how solar is less expensive than using our natural resources (which you claim are carbon emissions)? If you follow the government standards... that alone should be a red flag! They are not helping us... they are pushing global control! This is part of the globalist agenda to control the masses and I pray you people wake up and stand up for what is right and just so that our children and grandchildren have a chance to succeed in this incredibly unstable environment! Unfortunately most corporations are paid off by the government to push their corrupt agendas! These companies are in it for themselves... not the consumer! The Bottom line is profits based on greed! Do your research consumers! Solar is NOT THE WAY TO GO! If there are several weeks of cloudy days, rain, etc... we are up the creek without a paddle and the boat will sink! GOD HELP US!</p>	Maria Morais	written Mollie Gore	<p>Maria, today's presentation will include information on our analyses of all resources. I hope that information will help address your concerns.</p>
	Well stated. Thank You.	John McKenna		
	Well stated was meant for comment by Maria Morais.	John McKenna		
	Thank you John! We are the minority and it's time to stand up against these monopolized companies as well as our blessed nation! I for one will NOT ROLL OVER AND PLAY DEAD! I pray many God fearing, God loving citizens will stand up against these globalists and companies that monopolize the markets!	Maria Morais		
5	ALL EMPTY WORDS!	Maria Morais	written Peter Claghorn	Thanks Maria - your opinion is noted
6	Does Central's decision to opt-in or opt-out affect the results of the IRP in any way? Or is this decision made only when a specific resource is being procured, and thus would not impact the planning process?	Jonathan Ly	live Stewart Ramsay	Just a clarification - does Central's decision to opt in or opt out, have an impact on the results of the IRP analysis? Do I understand that correctly?
			live John Painter	They really have to be taken into account. Whether they alter the decisions that are made through the IRP analysis, it depends on their resources and what the studies show. But they definitely are a consideration that just must be taken into account. Did that answer your question Stewart?

<p>live Stewart Ramsay</p>	<p>I think so. And I asked it because Jonathan Ly had asked a question, "does Central's decision opt in or opt out reflect the results of the IRP in any way? Or is the decision only specific resource being procured?" And I think you answered it, it depends on what their resource decision is but it certainly has to be taken into consideration and understood so that it can be analyzed appropriately to see whether it has an impact or not.</p>
<p>live John Painter</p>	<p>And by way of further illustration on that point, for some time, studies have shown the need for a combined cycle resource to meet load economically and reliably and to integrate solar resources. If Central's decision about non-shared resources was to participate with Santee Cooper in a natural gas combined cycle resource, it may not change the planning very much at all. But it certainly has to be taken into account. You know, but they can make other decisions that do change the planning. Okay. But there's a whole host of considerations. Some of them uncertainties, some of them must considers, some of them competing, most of them manageable with a lot of thought and consideration. And they're listed here. Another consideration is a lot of work is going on in the state to promote economic development. And there's the hope and the promise that there will be some new loads as a result of that. And the point there isn't to have new load the point there is the benefits of economic development throughout the state of South Carolina. But Santee Cooper certainly wants to be there to do its part in making that a reality. And that has to be considered in what Santee Cooper is doing. Over the last two years, there's been a period of tremendous uncertainty regarding renewable resource costs. Two years ago, we all could have said, you know, we have a pretty strong view that it'll be within a tolerance of x and y of this amount, a lot of uncertainty that's been caused by supply chain and import issues. And how all that will shake out is still unknown. We're in a period of a lot of shift in societal views, governmental views, governmental policy toward greenhouse gases, renewables and electric uses. And it's changing very rapidly, and that needs to be considered. With that comes the desire to implement as much renewable resources as possible, but they're intermittent, or energy limited resources.</p>

			<p>So that alters the considerations in planning rather dramatically, and it needs to be taken into account carefully, if Santee Cooper is to achieve their goal of the most cost effective, lowest risk portfolio that achieves a reliable system. There's heightened concerns about system resiliency in light of extreme weather events that affected South Carolina last winter, or this past winter and, and in other places in in the United States. We're in a record period of inflation, a lot of concern about the economy. That balances against the thought that maybe we'll have significant new loads due to economic development, which one of those pressures is going to win out is not clear to anyone. On top of it, three, four years ago, there were a lot of opportunities to buy power in the market. Those are tightening, the markets are tightening and there's fewer opportunities. So all in all Santee Cooper's planning is happening in a period of rapid change, significant considerations that are unusual for a utility to have to deal with. And it may be that all of the these considerations are more obvious, and that they're always there, but they're very obvious and in the forefront right now, and they have to be addressed and all that Santee Cooper is doing Stewart, that that's those are the comments I had.</p>
		<p>live Stewart Ramsay</p>	<p>Yeah. So I just wanted to clarify one thing. So any one of those things we've probably seen before. It's that constellation of them happening all at the same time is the part that's unusual and creating the complexity. Is that a fair observation?</p>
		<p>live John Painter</p>	<p>I think that's right. In addition to the high profile nature of all of those considerations, we've always thought about all of those considerations in planning. But at this point in time, each one of them has got a very high profile at the forefront of people's thoughts and it demands careful consideration in the planning process.</p>
<p>Thanks for addressing my question. As a follow-up, does Santee Cooper assume that Central will either opt-in or opt-out by default?</p>	<p>Jonathan Ly</p>	<p>Rahul Dembla</p>	<p>Jonathan, that's a good question. As John mentioned non-shared resources are "generally" dispatched in a pooled manner to serve the combined system. Future resources identified in portfolio to optimally serve our combined system is not impacted by opt-in/out. That decision impacts who will own/finance these future resources. Let me know if you further questions.</p>
<p>Thanks for the explanation, Rahul. That clarifies my question at this time.</p>	<p>Jonathan Ly</p>		

7	<p>Given the earlier discussion on the differences between S-C and IOUs, how does Santee Cooper approach the decision of which discount rate to use in the NPV analysis? While Santee must go to the capital market for investments just like an IOU, discount rates also reflect the appetite for risk and short term vs long term benefit value preferences of the source of capital. Since Santee does not have shareholders, that source of capital is ratepayers. Ratepayers are likely to have a lower discount rate (societal rate at 2-3%) than the frequently used weighted average cost of capital (6-7%), and therefore place a higher value on long term benefits like reducing carbon. Has Santee Cooper considered using a societal discount rate in its NPV in scenario analysis?</p>	Jake Duncan	written Jonathan Nunes	<p>Santee Cooper's cost of capital does reflect a considerable discount relative to IOUs, both due to the tax exempt nature of the majority of its debt issuance and lack of shareholder return element. Hence, the NPV rate is considerably lower than an IOU would typically reflect. Santee Cooper has not considered using a societal discount rate for the IRP.</p>
	<p>Thanks for the answer. What is the discount rate used in the NPV?</p>	Jake Duncan	written Jonathan Nunes	<p>5.25% for discounting future costs For the CO2 cost sensitivities, we are using CO2 cost estimates reflecting a 3% and reflecting a 5% discount rate. Thanks for the questions, Jake.</p>
			written Jonathan Nunes	<p>Jake - It's important to recognize as well the increase in interest rates and inflation that we've seen over the last couple of years. This resulting increase in interest rates impacts multiple aspects of the IRP.</p>
8	<p>Regarding the interruptible load curtailments information in the context of the reserve margin study shared earlier this week, do these curtailment metrics represent only physical-only curtailments, or do they also include economic curtailments. If these curtailments are for physical curtailments only, are there similar metrics for economic curtailments?</p>	Jonathan Ly	written Nick Wintermantel	<p>The curtailments in the reserve margin study represent emergency curtailments only.</p>
	<p>Thank you, Nick. For clarification, that would represent physical curtailments only, is that correct? Has Astrapé also modeled economic curtailments, or was that outside the scope of the reserve margin study?</p>	Jonathan Ly	written Nick Wintermantel	<p>That is correct. The interruptible resources were modeled very last in the dispatch stack even behind market assistance within the reserve margins study (so available for emergencies). Economic curtailments were not part of the scope of the study.</p>
	<p>Thank you again for the explanation, Nick. I think that answers all my questions on this issue at this time.</p>	Jonathan Ly		
9	<p>Mollie with all due respect... Santee Cooper has monopolized the market in SC as well as Duke Energy in NC. That alone says it all!</p>	Maria Morais	written Mollie Gore	<p>Maria, thank you for your opinion - it is noted.</p>

10	Regarding the NREL 2022 Q 1 cost benchmark that was used to adjust renewable prices upward by 15% or more: is that benchmark a longterm price forecast (like the ATB) or is it a short term price update reflecting current maraket conditions?	Eddy Moore	written Jonathan Nunes	Hi, Eddy. It is short-term, reflecting market conditions in the preceding several months. However, certain of the conclusions are likely to influence the following year's ATB. In addition, certain market indicators have suggested that conditions impacting renewable costs in the upward direction worsened considerably as the year progressed.
	No doubt higher pricing got worse as the year progressed I am asking if that observed current market condition was used to substantially increase assumed longterm prices a decade and more out.	Eddy Moore	written Jonathan Nunes	Essentially, yes. However, we follow the downtrend reflected in the ATB projections such that capital costs pick up a decline in real \$\$ throughout the study horizon, a fairly steep decline through 2030.
12	Hi Bob, are those average ELCC or marginal ELCC value?	Ryan Deyoe	live Bob Davis	I don't know off the top of my head. My guess is just looking at them, I believe that those are average, cumulative. Okay. In fact, it says on the title, excuse me, no, those are cumulative effect of load carrying capability. So as you add resources, this is the amount you would get out of that total amount installed.
11 /RH	Bob, could you discuss how the DR MPS results are being utilized in the analysis?	Findlay Salter	live Bob Davis	The evaluation is prepared. We're looking at both energy efficiency and demand response as a resource effectively. We're running separate optimization portfolio optimizations, assuming the levels of energy efficiency and demand response are available, so that we can understand how this would affect our resource portfolio selection. And also investigating the costs that were simulated through those evaluations for both energy efficiency and demand response on the available technology.
13	Did you all forget what happened in Texas when they had the severe ice/snow storm? Hmm...No electricity, no heating or anything else. No wind, no energy folks! I for one say ... get a wood burning stove and a gas stove. It's essential!	Maria Morais	live Bob Davis	Well, I mean, having a recent event obviously, heightens awareness. And so it's certainly on everybody's mind. And I think it's possible in your planning to make normalized assumptions on weather and assume that those were adopted. And then when you do get an extreme event coming along, it certainly makes you you sit up and recognize where the extreme events and how far off perhaps the normal projections you may be under some extreme events,Santee Cooper takes its obligations to maintain and serve a reliable system very, very seriously. I think you'll find that most utilities do not play fast and loose with the reliability of their system to make sure they have enough resources to serve.

				<p>That said, when we perform an IRP, we're looking more on an average or more typical basis. So we are looking at hourly profiles, for instance, for solar. We are examining an hourly dispatch of the system and assuring that there's enough storage in place for those portfolios that have heavy implementation or heavy reliance on renewable resources to make sure that there's enough storage to get us through the hourly profiles, the periodicity that we have on on events that that are included within our profile that we're modeling we happen to be using a load profile from 2019. So really not any major extreme events, but there are normal weather conditions, peaks and valleys and longer duration events. I will say that it is part of Santee Cooper's ongoing assessment of renewable resources and portfolios that are heavy in renewables, to make sure that we have a good understanding of how extreme events may affect decisions to rely on those type of portfolios. So when we're looking at, for instance, a portfolio that's heavy solar, heavy wind, heavy battery, and less reliance on more traditional resources that operate on fossil fuels, where fuel supplies can be more readily available and dependable. We do recognize that we need to look at that harder. There's additional evaluation that's needed. We need to look at some factors such as the how extreme these events can be, how long they last, what level of resources or storage might be needed in order to get us through those longer duration events to make sure that Santee Cooper will have a robust and viable system to serve and make sure that customers don't go dark like we saw in Ercot and other places.</p>
			<p>live Stewart Ramsay</p>	<p>And Is that Is that why you were looking at the addition of oil as a backup?</p>
			<p>live Bob Davis</p>	<p>Yes, that is, actually. Having oil on site to run, not just peaking units, which is more normal to have dual fuel capabilities for them because you normally do not buy firm gas to backup peaking assets. So you need some form of backup fuel for operation but also for the combined cycle. Combined cycles many times they're not dual fuel. They're usually only gas fueled. But we want to consider the fact that, if we're heading into an extreme weather event, can we switch over to a an alternative fuel in case the natural gas system becomes unavailable or unusable during some of these extreme winter events? It's not usually a condition in summer, that's usually a different issue, but definitely under the winter events.</p>

			live Stewart Ramsay	Okay, and correct me if I'm wrong, but you know, you were talking about the metrics. The second half of this presentation when we get back from break is pretty heavy into the metrics, right?
			live Bob Davis	Yes. However, I will say the overall reliability metric is one we're still working on. And this management for extended events, having resources close to load, having resources that are sufficiently capable, many of these issues we're talking about right now are very difficult to evaluate. And on a detailed basis for resource planning, they, many times take sub-hourly simulation, which many times is beyond the scope of our traditional IRP planning process. So we recognize it's an analysis that has to occur, but won't necessarily be filed with the IRP this go round. But recognizing that Santee Cooper is going to continue to work on this issue as we move forward.
14	Will there be any discussion on Santee Cooper RFP for renewables in the coming year (Solar in particular) or expectations of non renewables generation closures?	Ben Evans	written Rahul Dembla	Ben, IRP discussion today will focus on analytics and role (magnitude) of solar in our IRP. There is a separate proceeding ongoing (Competitive Procurement of Renewable Energy or CPRE). Solar RFP will follow PSC's approval of our CPRE program.
	Great, Thank you	Ben Evans		
15	Are/Were RICEs considered for future capacity?	Carlos Chavez	written Matt Eckhart	Hi Carlos. Yes, RICE is included as an option in the optimization modeling.
	Happy to help with RICE solutions.	Carlos Chavez	written Jane Campbell	Thank you Carlos! Feel free to share any information you have on the forum.
16 /17	since Santee Cooper seems set on transitioning to so called renewables will these renewable components be made in America?	John McKenna	written Jane Campbell	Thank you, John. Santee Cooper must competitively bid renewable projects. Developers will determine how they source their materials, but certainly there may be incentives for American made components that would help a developer provide a lower cost solution.
18	How much Co2e reductions should we expect by 2030 from a more current basis (2022 basis)?	Chad Kidwell	written Jonathan Nunes	I don't have 2022 data handy., but certainly a great deal of reduction in CO2 emissions has been accomplished relative to 2005, on order of 35%. Hence, if by 2030 our projections show a 55% reduction, that is consistent with a somewhat smaller reduction relative to 2022. The reason for the comparisons to 2005 is that this year is a common basis for such comparisons in the industry.



	Thank you as this helps understand how "stretchy" this ambition is. From roughly 35 to 55% yet to deliver.	Chad Kidwell	written Jonathan Nunes	Agreed...it will get progressively more challenging (and costly) to chip away at CO2 emissions.
19	Bob, For Portfolio Expansion Optimization could you restate how many typical weeks per year you are using? i.e. seasonal typical weeks or monthly?	Findlay Salter	live Bob Davis	So we're running 12 typical weeks each year of the study period. And I haven't mentioned it previously, our study period is 2023 through 2052. So a 30 year study period.
20	maybe take off mute ?	Findlay Salter	live Stewart Ramsay	So Finley, if you've got a question, feel free. If other people if you if you've got a question, let me know.
RH	Hey, guys, it's Findley Salter, from the ORA. I do appreciate the more deliberate and in slower pace today, I think it's appreciated that you give us some time to digest some of these complex ideas, especially with the timing, and I also want to express a big thanks to the Santee Cooper team for having this session. I know y'all didn't necessarily have to do that, prior to the filing. And it was not in the plan for a period of time. I think it's good for all the stakeholders to understand this. And I think it's shows the level of commitment to the public. I think I had someone else on my team that might want to come off mute. And I just think that that may be a good opportunity here, if we want to get some open conversation here.	open mic Findlay Salter	Stewart Ramsay	So just tell me the name and we'll stay with it. I've got to do them one at a time. I think it's just a function of the technology. And while while we're doing that, Timothy Haynes asked a question, Bob, a comment was made about natural gas not being available, I think that was in the context of winter storms, but the follow up is what is the current reliability of the gas supply?
21	A comment was made about natural gas not being available. What is the current reliability of the gas supply?	Timothy Haynes	live Bob Davis	So I can say that during this most recent storm event, Santee Cooper did not have any issues with gas supply from the pipelines, it was fully available. They did not have conditions that have resulted in that. In fact, when Astrapé ran their reserve margin study, we went back and looked at that to see whether there were any events in recent history that would suggest that we have concerns about cold weather events, either the hardness of the existing generating assets, or the availability of fuel supply, and we saw none. So it's important to recognize that fact. The issue is that we want to make sure that we remain that way, and the future conditions don't change. That we have a system, and that any portfolio we come away with, is able to achieve the same level of reliability that we've been lucky enough to achieve in the past.

RH	<p>Hey Stewart, Anthony Sandonato. All right, with ORS. This goes back to kind of the process, Bob, that you were just talking through. I just wanted a little bit more clarity on the preferred portfolio. And I think you guys may cover this in future slides. But from what I'm seeing on slide 24, it looked like you did these four optimized portfolios, and then based on that, you guys are going to put together a preferred portfolio? Or is the preferred portfolio and other one that's optimized based on outputs from these four?</p>	<p>open mic Anthony Sandonato</p>	<p>live Bob Davis</p>	<p>I would describe it this way, we develop some some standard portfolio strategies or scenarios that we're evaluating. And based upon the results we see from that, it can help us inform a preferred portfolio. I'll keep in mind that really what we're always addressing within an IRP is, what are those initial decisions that have to be made today, those critical decisions that we need to get nailed down today, because they're very time sensitive. So, if we're heading forward with a combined cycle, we really need to get moving on that sooner rather than later in order to manage procurement, fuel supply, permitting, environmental, additional engineering reviews, etc. So those are kind of critical events. The same can be said for combustion turbine, although there may be a little bit more flexibility there. We may have more flexibility when we deal with certain technologies like batteries, the permitting process is less significant. We are perhaps not as constrained on time for those events. But that said, we learn from these four primary portfolios that we run.</p> <p>We run those through sensitivities for fuel, CO2 emissions load, which helps us understand the sensitivity of a given decision for a given resource, and how that may affect our results. And then we look at this preferred portfolio, it is really representative of an action plan.</p> <p>What do we believe our most critical decisions need to occur in the near term? What additional resources could we add perhaps that are a little more flexible than dealing only with certain types of resources that may come out of the specific portfolios? What flexibility do we have with timing of resource decisions regarding retirements, and additions? And as John Painter pointed out, also, considering how Central's NSR and unshared resources may affect the overall portfolio, we have to think about all those issues, as we are developing a plan.</p> <p>To answer your specific question, what we do is we lock down many of those initial decisions based upon what we've learned from our primary portfolio evaluations. And then we do reoptimize to allow the end of the portfolio to be optimized. So we aren't trying to predetermine how many batteries do we need in 2044. for instance. We allow the model to re-optimize to find the optimum mix of resources beyond those initial shorter term decisions.</p>
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<p>Hey, thanks. Thank you, Bob. And then, when you said that, you're looking at the different portfolios to develop that action plan. One of the things that we've been strong advocates of here at ORS is a short term action plan in an IRP planning process. And when you're locking down kind of those decisions in your short term action plan, would you say that's a three year five year, or are we talking longer term?</p>	<p>open mic Anthony Sandonato</p>	<p>live Bob Davis</p>	<p>Well, I think Santee Cooper looking at an announced Winyah retirement in 2029 would suggest that we are right at that seven year window, and with some assets like combined cycles, you need a significant amount of time to get through that permitting and approval process. So I think it depends on specifically what type of resources we're talking about. Large fossil resources, longer and batteries, perhaps much shorter.</p>
<p>Okay, thank you very much, Bob. That's all I have for now.</p>	<p>open mic Anthony Sandonato</p>		
<p>RH Well, thank you, Stewart, can you hear me? I am Dick Storm. I've worked in the power business for 50 years or so. And you guys look like you're pretty much along the path, you're going to go net zero by 2050. You're going to retire coal plants. Looks like Winyah is well on the way to being gone. You're already talking about retiring Cross. I have seen the rest of the world, including some states, in America, like Hawaii, and California, and Texas, and even North Carolina over Christmas that have had blackouts. And Hawaii has I think 45 cent kilowatts. They went to the Green New Deal several years ago. They recently retired all their coal. They only had 180 megawatts at Barbara's Point, but they shut it down. And that locked them into the highest electricity costs in America. Why? Because they back it up with diesel fuel when the wind is not blowing and the sun is not shining. You folks seem to be on this path. You've got Nucor, you've got Century Aluminum. You're trying to attract other industrial customers, and everybody in the world that has gone the renewable path, including Denmark, Germany, the UK, Texas and California have seen exceptional rates. The Wall Street Journal and other folks publish renewables are the cheapest available, and they talk in terms of nameplate capacity, but intermittent power generators only generate when nature allows it. So I see you destroying the 90 year great history that Santee Cooper has had on having abundant, reliable, low cost electricity, the kind of reliability that attracted Alcoa to come here before they sold their plant to Century and Nucor to build their plants.</p>	<p>open mic Dick Storm</p>	<p>live Rahul Dembla</p>	<p>Hello Dick. Rahul Dembla. I think your comments are... I hear you. I just want to clarify a few things you said. There's been a lot of discussion during this presentation about reliability and resiliency. And those are very, very important metrics in this evaluation. I think one thing I want to clarify, and maybe John and Bob will chime in as well, is that this slide has these titles, the net zero future call retirements, these are no decisions. I think how Bob tried to explain this was that we are running these four different strategies, one of which is actually required by law for us to run and include in the IRP for example, net zero. That's not a decision to move towards net zero. It's just a case we have to run. And then we take the results of all these different strategies and some sight cases. And then we say hey, now we have looked at the cost of each of these options, but we've also paid a lot of attention to the reliability and resiliency aspects of each of these portfolios and strategies. Now, how do we construct a preferred portfolio, which could be neither of these. It would draw lessons from all of these analytical metrics and runs and try to put forward a reasonable, least cost, least risk portfolio that makes sense for our system and for South Carolina. And so I'm not disagreeing with the concerns you raised. Reliability and resiliency is very important. Cost is very important. Environmental impacts are very important. And we have to balance all of these without sacrificing reliability. That is the brief response Dick.</p>

	Anyway, I'm extremely troubled. And I see us going down the path of Denmark, the UK, and Germany and Hawaii, for that matter. So anyway, it looks like the decisions made. And I'm very sad for my grandchildren. I'm very sad for America to see you closing the door on coal when it's the most reliable power generator and you've got a great history of reliability.			
	Just one more point, South Carolina, is 55% nuclear across our state. Many of those nuclear plants are over 50 years old, and some of the permits are going to expire in the 2030s. Central gets low cost electricity with a good agreement with Duke Energy. When Duke has relicensing of Oconee and Robinson, the chances of them selling the power to us is very good. But it's likely to be at a very different price than what you could generate the power yourself with Cross or even the Pee Dee coal plant that is sitting in warehouses that in my opinion, the Pee Dee plant should be built. But anyway, you've got to learn from other people's experiences. And there's a lot of them out there, like Germany, the UK, Denmark, Maui, Hawaii Electric, California, and Texas. And I hope you'll take into consideration that those people went through processes like this as well. And when a winter storm came or a summer heatwave came, they got really serious problems. And we have, you know, demand response, which is rationing. But anyway, I've expressed my concerns. I appreciate you listening to me.	open mic Dick Storm	live Rahul Dembla	Thank you, Dick, we will pay attention to everything going on in the neighboring states and in Germany and other countries. And we learn from that, but thank you.
	Thank you, Sir.	open mic Dick Storm		
22	Will my monthly bill increase due to transitioning to renewables?	John McKenna	written Rahul Dembla	John, our IRP will identify the least cost/least risk portfolio under a range of future assumptions. A low cost portfolio (which will include include diverse resource including renewables) will translate to lower bill impact. A discussion of average bill impact will be included in the IRP.
	So I can expect my costs to go down. Thanks Rahul.	John McKenna		
23	Will SC conduct competitive all-source RFPs for all identified resource needs in order to comply with Act 90 obligations?	Chip Estes	written Jane Campbell	Thank you, Chip. Our understanding is that Act 90 does not require competitive all-source RFPs for all identified resource needs.

24 /RH	<p>Could I be taken off mute for a few questions?          Can you hear me? Okay, on page 24. I just wanted to go through the this a little bit and tie this with page 25. On the on the steps you go through economically optimize, I wanted to ask, in that case, Winyah's retirement date was selectable in the optimization. Is that correct? Or was it locked at year-end 2028? I thought I'd picked up that case was selectable ... the retirement date.</p>	<p>open mic          Philip Hayet</p>	<p>live          Bob Davis</p>	<p>No, across all four of the quadrants that you're seeing there, the Winyah retirement is a predefined assumption. Santee Cooper's Board announced that a while back as an underlying assumption for future direction for the utility,</p>
	<p>That's what I thought that's why I was trying to get picked up on something. Each one of these is going to lead to a build plan, through the optimization, by using 12 typical weeks per year through the optimization, no commitment logic, integration, cost modeling. Then when you get the result of that, you mentioned that there will be a two step process. So then when you get the result of that, then you move into the production costs modelling, correct? Now in the production cost modeling, this is where you go through the matrix analysis to do the different scenarios of fuel costs? And I don't have them all at the moment.</p>	<p>open mic          Philip Hayet</p>	<p>live          Bob Davis</p>	<p>No, that's fine. CO2, fuel, load. Load actually requires an optimization for incremental generation expansion, but essentially, we're running through our sensitivities, essentially stress testing the portfolios</p>
	<p>And when you're doing that, now, you're doing hourly analysis. You're modeling, no longer the integration costs, because now you're letting the modeling impact operating reserves. Tell me if this is true or false? As you add battery resources or solar resources you have additional needs for spinning reserves. Is the model automatically adding in changing the levels of spinning reserve requirements that you need on the basis of the amount of solar that has been added by the case, so that if you have more solar being added in the case of proposed in, it's going to then determine a higher level of spinning reserve requirement that you need to account.</p>	<p>open mic          Philip Hayet</p>	<p>live          Bob Davis</p>	<p>So, point of clarification, we're getting down in the weeds here, but just a point of clarification. Batteries actually provide operating reserves. Solar and wind are those that may require additional spinning reserve obligations. We have not modeled those incremental reserves. When you get to a planning level like we are right here, the nuances that you would have to go through to re-optimize the dispatch simulation to benchmark spinning reserve violations for each one of our portfolios under each sensitivity case is rather extreme. It's beyond the scope of what you're typically going to do in an IRP. We know that that it is an analysis that needs to be prepared at some point in time in order to validate as we move forward with a resource plan. If we do end up looking at at heavy implementation of solar resources, then we recognize these are additional studies that we need to do to make sure that we have our operating reserves depicted correctly when we run our evaluations. But at this point in time, we have not incorporated those incremental reserves in the model.</p>

			<p>This model Encompass as well as the Plexus model that is used by others. Neither one of them will simulate operating reserves, the incremental need for operating reserves in a dynamic fashion. So we would have to iterate to find the solution. And you know, if we had a couple of years to perform this analysis, we might consider that but there's just not enough time and a typical IRP process to get over that. I just wanted to educate those on the phone here, what we're talking about.</p>
<p>Yeah, again, I'm not suggesting a flaw, I'm just trying to get to that. So if you have a case of solar that has 5000 megawatts versus a case, a build case, that has a 3000 megawatts of solar, when we are treating it with integration costs in the modeling of the expansion plan analysis, we were penalizing one case over the other, which I agree with, penalizing it for the fact that it does cause higher levels of integration costs to the system. If you have that now as two separate build plans, one that had 5000 one that 3000 I guess you're still capturing the costs, because of the modeling to meet your operating reserve requirement, but its not a function of the 5000. It's 3000.</p>	<p>open mic Philip Hayet</p>	<p>live Bob Davis</p>	<p>Correct. It's modeling the capital cost, the investment or the dedication or commitment that PPA costs for the renewables that we have to make in order to meet that overarching obligation to serve load in a reliable fashion. So it's factoring that into the mix of resources in the portfolio. But when it comes to the actual dispatch, it may or may not. Now I will say, this that usually on those portfolios that have heavy resources, two things to look at. You can look back at the Astrapé study that when a new combined cycle comes online, like we've modelled for most of the portfolios in the early timeframe, when the new combined cycle comes online, we can actually serve the the cost of integration goes down significantly from where we are today, utilizing the Winyah assets and before we install, new combined cycle, new peaking assets. So that is one thing I'll say, having those those resources in place as part of the portfolio, improved system reliability. Additionally, if you look at some of the more extreme, I don't mean that in a pejorative way, but if you look at some of the portfolios where we look at large levels of renewables, large amounts of solar and wind for the no fossil generation case or the net zero case, what we also see being added is a large quantity of batteries. More so than, in some cases, which you need to actually serve capacity obligations. So we aren't minimizing the installation of batteries to just meeting our reserve margin, we're actually installing additional batteries in order to move energy from renewable resources from one time period to another. We're meeting capacity, of course with those battery resources, but we're moving energy around. And once you get sufficient batteries up in your system, your cost of integration go down.</p>

				So there's an argument that can be made that the natural addition of batteries within a portfolio in order to manage the energy being produced from solar and wind resources, and move that energy to other time periods, brings along with it, those batteries bring along with it additional operating reserves. So I want to caution you to thinking that or are suggesting that the evaluation doesn't fully capture all the operating reserves. I agree that we that it deserves additional attention and evaluation. But I would suggest that the portfolio's themselves are probably not far off from from where we may be. Even with that additional evaluation.
	I think you hit it on the nail as to what my concern was. Okay, well, thank you very much.	Philip Hayet open mic		
25	Could you please provide a little more detail in how Santee Cooper will optimize EE / DR? Specifically, what is being evaluated (e.g. prescribed levels? something else?) and how are they being modeled/optimized with respect to supply resources? Thanks	Forest Bradley Wright	written Jonathan Nunes	Hi, Forest. Demand-side resources are imposed on the simulation, such that the remaining resource needs are optimized recognizing the difference in load and DR available. Resulting costs can then be compared, including the costs of the differing demand-side resource mix. Does that make sense?
RH	Alright, I asked the question in chat, and I appreciate there was a response, but maybe that could be added to that. So Bob earlier noted that energy efficiency and demand response will be optimized in the portfolio. And I was just hoping that you could provide a little bit more explanation of the approach being used there. Specifically, can what levels of demand side management are being evaluated? Are they prescribed levels? Is it something else? And just how is the modeling or optimization being done with respect to supply side resources?	open mic Forest Bradley Wright	live Bob Davis	Sure, and I apologize, I don't have super intimate knowledge of this, but I'll be happy to take a stab at it. There were two separate evaluations that were prepared for Santee Cooper. By Resource Innovations, which is a DSM consultancy firm. They looked at the various levels of technical and achievable potential for Santee Cooper for both energy efficiency levels, as well as the demand response levels. We took the results of those that were performed, and what I might describe as a traditional manner, where we're looking at what is the cost effectiveness of installing a demand side program versus avoided costs, both from an energy and capacity value basis, and including system losses and transmission impacts. And then we looked at the implementation plans that came out of that for both energy efficiency, as well as DR. There was not only a medium case forecast, but there was a high forecast for each of those as well as a low forecast for each of those. And we utilized those scenarios, the low, medium and high cases for the energy efficiency and DR.

				We utilized those within our IRP portfolio evaluation to examine portfolios, how the implementation of those quantities of the technical and achievable potential are captured for those megawatts and megawatt hour reductions and then we model those as a modification to our load and our capacity and resource needs, and then evaluate the change in the portfolio versus the cost that might be encountered for those same demand side programs.
	That helps, thank you.	open mic Forest Bradley Wright		
26	So there's an argument that can be made that the natural addition of batteries within a portfolio in order to manage the energy being produced from solar and wind resources, and move that energy to other time periods, those batteries bring along with it additional operating reserves. So I want to caution you to thinking or are suggesting that the evaluation doesn't fully capture all the operating reserves. I agree that it deserves additional attention and evaluation. But I would suggest that the portfolio's themselves are probably not far off from where we may be, even with that additional evaluation,	Bill Barnes	written Jonathan Nunes	Hi, Bill. We believe that the fuel forecasts that underpin the IRP reflect some growth in LNG export demand. Certainly the EIA's Annual Energy Outlook does. The latest AEO reflects nearly a doubling of LNG exports over the next decade or so. The high and low cases provide some variations around this growth as well.
36	Thank you.	Bill Barnes		
27	Are the portfolio results that show a 1,359 MW CC built in 2029 assuming that no shared CC is built with DESC given the shared resource amount would be approx. 600-700 MW split for santee cooper.	Ryan Deyoe	written Rahul Dembla	Thanks, Ryan. The IRP will determine how much CC capacity in aggregate will be appropriate for the system. The work and diligence with DESC will continue following IRP's filing to determine how will meet our need and benefit from our collaboration with DESC (potential to optimize transmission / natural gas infrastructure needs and economies of scale).
	How much of the opted-out cooperative load is considered part of "the system" being met by the CC "capacity in the aggregate," please?	Eddy Moore	written Rahul Dembla	hi Eddy, opted out cooperative load will be met with pooled resources. IRP will include a case with Central's non-shared resource PPAs and letting the model inform us how best to meet the rest of system need. Central has indicated a portion of their non shared resource will be through participation in a potential future NGCC.



28	Bob, you mentioned that gas supply was fine during Elliott: does this mean there is adequate in-state pipeline capacity plus interstate firm gas transmission available to serve the economically optimized portfolio? If not, what geographic areas would need pipeline upgrades please?	Eddy Moore	written Jane Campbell	Eddy, this is an important point.
			written Jane Campbell	During Winter Storm Elliot, gas was being supplied off Transco. We did not experience any interruptions during the event. For in state service closer to our load center, however, you have to look at Carolina Gas Transmission - CGT - and they do not have enough excess capacity to support a new NGCC without upgrades. The area/pipes needing upgrades would depend upon where a new facility would be sited.
29	By optimizing first around four scenarios and then doing production cost fuel sensitivities, does this mean that there is no capacity expansion portfolio optimized around the possibility of the high fuel forecast?	Eddy Moore	written Jonathan Nunes	That is correct for the analyses we have performed to date. The purpose of the sensitivities is to understand the sensitivity of any particular resource plan to variations in future conditions v. our best available assumptions today. However, we are considering some side cases for optimization, which may include such a high fuel cost case. Thanks, Eddy.
	The obvious point being that the optimal high fuel cost portfolio may also be robust for lower fuel costs, or vice versa, but if there is no optimal portfolio for high fuel, you will not know how much fuel cost could be avoided.	Eddy Moore	written Jonathan Nunes	While that is essentially true, the high fuel case is widely viewed as lower probability. Hence, it would not make sense to move toward a plan on that basis. However, we understand the concern.
30	Could you discuss how was santee cooper modeled Central's partial load is it relates to the proposed nonshared resource 2029 and beyond?	Findlay Salter	written Rahul Dembla	Central has opted out but the load will be served by pooled resources. There is no change in underlying combined system load that needs to be planned for in the IRP. But we need to consider the Central's non-shared resources that will meet a portion of combined system load.
	Thanks Rahul, So the central proposed NSR(s) will be fixed resource additions?	Findlay Salter	written Rahul Dembla	After full IRP unconstrained analysis, we will determine a portfolio which will add Central's PPAs as fixed resources. There are future components in Central's NSR (e.g, portion of CC or storage), which are not contracted at this time. We will let the analytics validate these resources. This work is still in progress. Note that we do not have complete information about Central PPAs (such as fixed cost) so it may be difficult to compare with other scenarios and sensitivities but we will do our best to answer questions we are getting from stakeholders.

			written Rahul Dembla	Findlay, I also want to emphasize that we will not fix Santee Cooper's NSR. We will let the analytics guide us and update our NSR as needed to comply with PSC approved portfolio. This is a commitment we had made at the onset of issuing PSR (that we will remain flexible and not make capital commitments until IRP process plays out)
31	I assume that the study includes all of the new industrial production capacity that is coming on line over the next several years? We have Redwood Materials, SHM medical devices, Scout and about 15 billion dollars of recently announced wins for the South Carolina economy.	Brian Sauter	written Carl Ciullo	Good afternoon Brian, We are very excited about the economic growth in South Carolina. When forecasting load, we have made sure to account for load uncertainty by building High and Low cases to capture unexpected growth or decline. Referring back to slide 28, the red dotted line represents new industrial customers that have a reasonable chance of becoming customers served by Santee Cooper. Furthermore, the solid red line represents the High Case Load Forecast, which is what we are evaluating as a sensitivity, and which incorporates even more future industrial load than the new industrial customers being considered at this time.
32	Is the optimized resource portfolio on slide 30 based on the medium EE/DR case?	Forest Bradley Wright		
	Adding to my previous question, could you please indicate what level of EE/DR was used for each of the four optimized portfolios? Thank you	Forest Bradley Wright	written Matt Eckhart	Hi Forest. All of the portfolios shown in the presentation today are based on the medium EE/DR case.
	So are the high and low EE/DR levels modeled as sensitivities to each of these?	Forest Bradley Wright	written Matt Eckhart	The high and low sensitivities for EE/DR will be modeled for the Economically Optimized Portfolio
	Has that analysis not yet been run? And given their premises for accelerated coal retirement, avoiding new fossil fuels, and achieving net zero evaluating the high level (at least) of EE/DR for the other scenarios would presumably be constructive. Can that be done?	Forest Bradley Wright	written Jonathan Nunes	That analysis is currently in process. As I mentioned on the other thread, we will clarify when we get to that point of the presentation. Stay tuned...
33	just to clarify the histogram on page 28 is showing the existing system supply, not the preferred portfolio	Findlay Salter	written Jonathan Nunes	That's correct. It reflects the current supply/demand outlook with no new major resources and the retirement of Winyah along with some oil CTs..

34	How is Santee Cooper accounting for forthcoming environmental regulations? Is Santee using a proxy to account for the costs associated with the proposed ELG rule	Justin Somelofske	written Jane Campbell	Santee Cooper will be in compliance with all environmental regulations. The 2020 ELG Rule is in effect now, and Santee Cooper is proceeding with implementation of treatment facilities at our coal plants to ensure this. We are aware that the ELG Rule is being rewritten and are closely following the Rule and the recently issued draft to determine if different actions are warranted. The current spending is considered to be a "sunk" costs and does not impact the IRP analysis.
	Thank you. To clarify, when you say "current spending" you are referring to the costs required for compliance with the 2020 ELG Rule? Correct? Are the costs of compliance for the 2020 ELG Rule attributed for both the Winyah and Cross plants in the IRP analysis?	Justin Somelofske	written Jane Campbell	Yes - we are proceeding with efforts to comply with the 2020 ELG Rule at both Cross and Winyah, and what I labeled "current spending" probably should have been labeled currently planned spending. This is going to occur regardless of what the IRP portfolio is, so was not included in the IRP analysis. We did elect to pursue the "VIP" membrane technology at Cross, but the lower cost "Best Available Technology" at Winyah. This will allow us flexibility to delay the retirement of Winyah if necessary - should the COD of new resources require it, or if it is needed to support higher load on the Santee Cooper system. This also gives us opportunity to collaborate with Dominion on a potential joint build if that makes sense for our system.
35	Can you discuss any issues of capturing the value from battery storage shifting solar energy between the day when unit commitment or chronology isn't maintained in the optimization problems?	Ryan Deyoe	written Jonathan Nunes	I'm not sure I'm quite following the question...The optimization does not reflect commitment so the BESS value may be impacted, but the full production cost simulation will capture this value...hence the NPV power costs will correctly value the BESS variations. Does that get at the question?
	I'm trying to understand whether the value of the battery storage asset is being fully realized in the expansion optimization. Issues that arise with expansion modeling for battery storage is that the benefit of shifting energy from solar production hours to peak or off peak hours is missed. This understates the value storage contributes to achieving a lowest cost NPV portfolio which the model targets.	Ryan Deyoe		
	The full production cost model will show that, but the issue stems from the portfolio being optimized from the beginning.	Ryan Deyoe		

	Typically there are modeling approaches to simplify chronology within an expansion model yet maintain chronology to some extent.	Ryan Deyoe	written Jonathan Nunes	Certainly, the simplified dispatch in the optimization runs will certainly capture energy arbitrage. It always surprises me how close the results of such simplified dispatch runs get to full chronology. The BESS resources capture an estimate of the benefits of effectively moving solar production to non-solar hours.
			written Jonathan Nunes	We do maintain chronology to some extent through typical day simulations.
			written Jonathan Nunes	Meaning that the typical day simulations reflect 24 hrs...hence capture the impacts of the diurnal solar production pattern, which the BESS resources can take advantage of.
	Ok thank you for the clarification.	Ryan Deyoe		
37	Can you expand on what capacity factors you are seeing for the combined cycles later in the study period?	Ryan Deyoe	written Matt Eckhart	Hi Ryan. The capacity factors for combined cycles will vary depending on the Portfolio that is being evaluated. Under the Economically Optimized Portfolio, the combined cycle typically operates in the 75-85% range.
38 /RH	Can you expand on what is contributing to High GHG rate on no new fossil?	Jalen Brooks-Knepfle	live Bob Davis	Keep in mind that no new fossil case continues to include the Cross coal resources. So even though we're retiring Winyah In 2029, we still have the Cross resources which contributes significantly to the system. Additionally, we aren't adding any natural gas resources under that portfolio. So, we still have the coal unit. We still have the existing gas units and what will happen under that case is under very high CO2 prices. Because there is still coal generation it does have an adverse impact on that portfolio strategy. And to tell you the truth, that is the reason for us running it that way. We wanted to understand what happens if we head down a path where we never touch another renewable asset again. Is that really the best strategy to achieve our CO2 reduction?
			live Stewart Ramsay	So did that answer the question Jalen?
	Yes, it did. Thank you.	open mic Jalen Brooks-Knepfle		
39	In Santee Coopers past 2020 IRP, a substantial amount of off-system purchases were identified in the capacity stack. How do these results compare as it relates to reliance on off system energy purchases?	Findlay Salter	live Bob Davis	You know, Findlay, I don't have the same recollection as you. So I'm a little hesitant to respond to the first part of your question regarding the IRP, I don't really recall that we relied upon capacity purchases within the 2020 IRP.

			live Stewart Ramsay	Okay, so maybe take a look at that question. offline and and get back to, and what about the other part of the question, modeling other selectable renewable resources beyond PPAs.
40	Has Santee Cooper modeled other selectable renewable resources beyond PPA (i.e. BTA, ATA, or Utility Self Build)?	Findlay Salter	live Bob Davis	So we've looked at that, and we haven't modeled it, but we've rationalized that whether this is a self build resource from Santee Cooper's perspective, or whether it's a PPA that we purchase from another party, we're liable to see generally the same cost. We're incorporating the full IRA benefits for the entire study period. Keep that in mind. We are not modeling a phase out of the the IRA tax benefits in the mid 30s. Whether this is a self build by Santee Cooper or whether it's a PPA, it's not liable to have a material impact on the portfolio. You're liable to get the same generally consistent costs between those two cases. Santee Cooper will of course be looking at and intends to conduct them, once its competitive procurement process is approved by the PSE, intends to evaluate renewable assets and we'll look at self build options. I think we have the potential for some self build options perhaps in Community Energy areas under the the IRA. So mean that that remains Energy Community areas sorry, I misspoke. And to the extent that those exist, for instance, that we could repurpose retired Winyah site you for new solar assets and new battery assets, we'll certainly be looking at that within our future portfolios and following any kind of RFP processes that are conducted for new assets.
43	At the beginning of this section, you were discussing your modeling of fixed costs in the different scenarios. Can you repeat your assumptions and how they were different across scenarios? I might have mis-heard you, but I am curious how that impacts the total NPVRRs if you modeled fixed costs differently across scenarios.	Devi Glick	live Bob Davis	So capital costs and fixed O&M, obviously will change for a given portfolio, will change with the resource mix. So I assume you aren't asking that, you're asking whether there are discrete differences in the cost as we move from one portfolio to the next or across sensitivities. Within the results you're seeing today, these all assume the same dollar per kW capital costs dollar, per kW year fixed O&M cost for each of the new resource additions and same pricing for batteries and renewable assets. for that matter. There are no changes in assumptions. We do have and will prepare a side case for the IRP analysis and report that considers and looks at what if capital costs are different? How does that affect the portfolio decision?

41	On this slide, are the fuel price and CO2 price sensitivities ever "paired"? For example, was there a high fuel/high CO2 case? Or were all sensitivities treated in isolation to measure each variable individually?	Jonathan Ly	live Bob Davis	Jonathan we've only looked at the individual fuel sensitivities and the individual CO2 sensitivity. We have not done the compound evaluation. It's actually gets down to a time required to complete all analysis type of consideration. Certainly know that there could be some combinations of events that could occur, but we felt it was important to consider the sensitivities in isolation because that does help you understand how a change in a given assumption will affect the cost or the value of one portfolio versus another.
	That seems like a reasonable approach. Thank you for the explanation.	Jonathan Ly		
42	How does Santee Cooper consider the need to potentially decarbonize the approximately 2-4 GW of gas resources built across these portfolios?	Ryan Deyoe	written Rahul Dembla	Ryan - these runs are not a preferred portfolio. Just analytical runs to draw conclusions from. How the eventual preferred portfolio impacts emissions will be a very important metric (in addition to cost, reliability). Also note that emissions will be driven by overall portfolio (versus one resource). For example NGCCs and CTs will help us retire coal and integrate large amounts of solar.
	I'm more so getting at the effects of long-term planning today and the eventual goal of reaching net zero in 2050. I recognize that the run shown today reaching net zero by 2050 does build gas, but are the remaining emissions netted out with credits?	Ryan Deyoe	written Rahul Dembla	We have run a net zero case to comply with the requirement in legislation. Where Bob summarized the results, it states intermediate targets and getting to 90% by 2050 and relying on offsets (credits) for last 10%. I hope that's responsive to your question.
44	I am asking about Fixed O&M costs that are referenced on slide 29 not new resource capital costs	Devi Glick	live Bob Davis	So the only fixed O&M costs for existing resources that change across the cases are the fixed open O&M associated with the Cross resource. That unit does have if you retire does have a reduction in fixed cost or avoided fixed costs associated with that asset.
45	Are the high and low EE/DR levels modeled as sensitivities to each of these? Where do those cost impact findings appear?	Forest Bradley Wright	written Rahul Dembla	On a later slide, we will identify that the DSM sensitivities are still being worked on. We are working on the DSM variations to understand their impact on the NPV power costs across the portfolios. Does that get at it?
			written Jonathan Nunes	We'll clarify this point when we get there to be sure.
46	Did you say diversity was measured by MW, or by MWh please? Isn't energy a better basis because capacity means such different things for different resources?	Eddy Moore	live Bob Davis	That's right. We're looking at both measurements. You know, we debated back and forth is one better than another, we believe that they're both important.

47	<p>For solar additions, can you discuss the 300MW per year limit? Also, 300MW for 2026-30 equals 1500MW, which is less than the 2.3GW identified for 2029 on slide 30. Can you expand on this discrepancy? Thank you.</p>	Hamilton Davis	live Bob Davis	<p>I would refer you to the Astrapé' cost of solar integration study at that point in time. We're talking about in the neighborhood of \$9 a megawatt hour or so there's been identified through that study as the cost of integration, before and after, Winyah is retired, versus after Winyah is retired with a combined cycle to assist system operations and reliability. So what we're trying to do is not get too far ahead of ourselves on the solar implementation. This is a subjective assumption that we would incorporate within our preferred portfolio. Like I said, if you purely optimize the model doesn't install any solar until 2029, and then it lumps in 2300 megawatts, like was suggested, all in one year. And technically there's physically no way to accommodate that and integrate that into your system overnight. So we do need to stage it in over time. The reason for the smaller quantities we do in our preferred portfolio would show a step up to those larger quantities by 2031 is really to accommodate and manage the implementation over time. We aren't trying to limit as much as we're just recognizing there's a much higher cost of integration until we get new assets online.</p>
48	<p>My understanding from previous slides is that Winyah is only modeled as operated through 2028. Based on the preferred portfolio presented what would be the additional cost to operate Winyah through 2030? If this option is pursued will that cost be incorporated into the preferred portfolio NPV reported in the IRP?</p>	Findlay Salter	live Bob Davis	<p>So, obviously, the dispatch cost of the asset are incorporated within the evaluation. And so when we move from one portfolio to another portfolio, obviously, the cost of coal, the cost of operating when you access, is all naturally incorporated within the dispatch simulation. Currently, Winyah and its board and working with Central has committed to proceeding with the best available technology options for ELG at Winyah. We believe the time required to permit and construct these facilities could meet the 2025 compliance deadlines, and then would allow us the flexibility to continue to consider Winyah as a resource option, over a relatively short or near term period of time. I think there is significant concern regarding the amount of new loads that are being announced as potentially coming to South Carolina that will need reliable capacity and reliable resources to serve that load. So until we know a little bit more about that, having the Winyah resource with the ELG investment provides essentially an insurance policy. It provides the both Santee Cooper and Central the opportunity to take a breath and identify whether the resource can be retired as it's currently scheduled, or whether a delay in that schedule might actually be a very good idea in order to give a little bit more time to plan those resources.</p>

				<p>Additionally, as I mentioned, there may be some significant opportunities to jointly develop new resources with Dominion. Dominion has announced, as identified, they really don't have a capacity need to 2031 so if we'd like to take advantage of those opportunities, then we have to identify and achieve a way to to delay our need for new capacity until that same 2031 deadline. So both of those things are, and this kind of gets back to where John was discussing earlier, there's a lot of moving parts here right now, a lot a lot of pieces that create some uncertainty with regard to the timing of events for Santee Cooper. We believe that delaying Winyah for a couple of years is is the best alternative today. And to get to your question regarding the cost, the decision on the the BAT technology for ESG at Winyah has been made and is moving forward if there are incremental costs on top of that, and any kind of fixed O&amp;M associated with continuing to operate Winyah, those would be incorporated in the analysis under the preferred portfolio.</p>
			live Stewart Ramsay	Rahul, is there anything you wanted to add on that?
			live Rahul Dembla	Oh, I think Bob covered it pretty well, I think we'll remain flexible. I think having this ESG investment in one year gives us that flexibility and to manage the load that we are seeing on our system and navigate other dynamics about this. I just wanted to clarify, which I believe Bob did in the end that the PD of the portfolio will include all the costs, not just the dispatch costs, but any O&M and other costs. So it can be a realistic representation of extending Winyah.
49	Is there any reason why CC natural gas is advantageous for reducing integration costs of solar vs CTs	Jalen Brooks-Knepfle	live Bob Davis	Hours of operation. So typically you need that load following capability for solar or the the entire time it's running. So you could potentially manage with your CTs primarily in the early morning ramp periods in the late evening ramp periods, and hope that you could utilize your existing assets to model or manage for the intermittency during the middle of the day, that the combined cycle is going to do a better job of that.



50	<p>What modeling analyses will you perform to look at retiring Winyah in 2030. Will you do optimization studies, and will you consider still retiring in 2028 but getting some type of short term capacity resource to carry you through 2030 when a shared resource could be added.</p>	Philip Hayet	live Bob Davis	<p>I think all options are on the table with regard to optimizing the specific date for Winyah. I think we've got this opportunity for 2031 to be the right date for an extension and that gets the timing of the Dominions announced need for new capacity. With regard to technically what occurs during the 29-30 timeframe, there's nothing to say that we can't go ahead and retire Winyah at the end of 2028 and replace that with another asset, either a short term purchase or some other decision. From a pure IRP modeling standpoint, though, we don't have pricing for what that asset would look like. We don't have an RFP on the street today that would say, okay, you can replace 1100 megawatts at this price. There, are significant studies that would need to take place, not only an RFP for that short term transaction, if it were available at that magnitude, which is I gotta tell you, that magnitude is unusual. But also we've got the issue of potential transmission upgrades. Where's that power coming from? If it's not available in system or in the state of South Carolina, it's got to come from an external partner, likely either Duke or Southern Company within their service areas. And at the quantities and megawatts that we're talking about here, it could result in some transmission upgrades, which are currently unknown and difficult to quantify without study.</p>
51	<p>Did Santee Cooper consider managing solar integration with battery storage resources instead of the CC? Results from the solar integration study pointed to batteries providing significant benefits as well.</p>	Ryan Deyoe	live Bob Davis	<p>Well, I think if you look at the Astrapé study, you'll see that the batteries are on par with the combined cycle. So let me say we are not limiting the batteries to meeting that obligation. It just so happens that in our portfolio optimization, the model sees the combined cycle, the number of hours that it can operate, it's not just capacity. It's not just its ability to help integrate solar. It's also its ability to operate at a relatively high efficiency and avoid the operation of the Cross unit. We're avoiding some significant cost of energy from coal operation by having that combined cycle in place. So there are multiple reasons, multiple value streams associated with a combined cycle. We certainly are not disallowing or discounting the ability of the batteries to provide the same capabilities that we see for the combined cycle.</p>

	I meant this in regard to limiting early years of solar builds (300 MW/yr) until the CC is built.	Ryan Deyoe	live Bob Davis	It's part of the considerations, it's part of the discussion to have those batteries in place in the early years also. And under that type of configuration, we would have batteries online early on as soon as 2029 to help satisfy part of the capacity requirements and help manage for intermittency on the solar resources, having those batteries in place to begin with (and that's kind of what's identified here on the last bullet on this slide. I am not sure I got to that point.) Having those battery resources in place can impact the economic decision with a combined cycle. We haven't seen it push that combined cycle completely off the page or out of the picture, but it certainly is considered as a factor when looking at our optimized portfolios.
52	Does the ELG insurance policy at Winyah cost around \$90 m?	Eddy Moore	written Jane Campbell	ELG compliance costs, while significant, are not included in the IRP evaluation - they are considered sunk costs. Due to compliance deadlines and timing, they will be spent regardless of the selected portfolio. In addition, we are following the development of a revised Rule and will evaluate that impact once it is finalized - likely in 2024.
53	Regarding Central's decision to opt out. How will you conduct modeling under the case that Central opts out and does joint participation in a resource, vs opt out and they provide their own resources.	Philip Hayet	written Rahul Dembla	Philip, the modeling will determine the optimal portfolio to serve pooled combined load. If portion of that portfolio in CC, a portion of that resource could be Central's non-shared resource such that the costs of that resource do not flow through Santee Cooper.
54	Rahul, regarding a previous response to my question on modeling Central's NSR. Why does Santee Cooper need Central's fixed costs if they are borne by central and forced in?	Findlay Salter	written Rahul Dembla	In all scenarios presented by Bob today, PV costs shown include costs borne by all customers of the combined system (Central and Santee Cooper's customers). NSR analysis to determine portfolio impact could be done without fixed cost information but will not be able to report complete costs or compare with any other scenario/sensitivities. We will do the best with the information we have.
RH	I'm just curious. So you guys using the the cumulative or average ELCC in your model then? That's what you guys are using for battery storage, or for all resources are you using marginal like differentiating...	open mic Ryan Deyoe	live Bob Davis	We're using marginal and incremental. But we are modeling tranches of battery addition so that we're installing up to you know, 500 megawatts at a much lower ELCC than you would install, say, between 15 hundred 2,000 megawatts of battery. So we're following the scale and the curve that you see there, but we are modeling on a marginal or incremental ELCC basis for each new tranche that's coming online.

	Gotcha. Okay. Thank you. Would you guys be willing to send that chart out as well?	open mic Ryan Deyoe	live Bob Davis	Yeah. I think it may be posted already on the Forum. I'll check with Will and those that are managing that and see if we've already got it out there.
RH	Hey, just follow up on the on some of the Winyah discussion is what I heard, from Santee Cooper that the investment decision and the best available technology for ELG compliance that Winyah, is that being treated as sunk cost across all portfolios? That's part one of the question. And also for that cost and considering the future operation of Winyah, in to 2030. I'm not sure I quite understood the response to Phil's question on any optimization, I think what I heard was that the decision was being driven by when Dominion was needing the combined cycle. But I don't know if I caught beyond that, if there was any plans to perform future evaluations or assessments on the viability of operating Winyah considering there's going to be a pretty substantial investment in a fairly short window of future operation under what we've discussed today.	Findlay Salter open mic	live Rahul Dembla	Findlay, this is Rahul. I think part of the response to that question is that we have, you know, made the best available technology option for the 2020 ESG rule. So, because those investments will be planned and made right now, it would be treated as sunk cost in the IRP analytics, because, again, that would be would be sunk cost by the time. Now, the that gives us options, I think that the state is seeing a lot of load, a lot of economic development, and it's priority for us to be prepared to serve it. We have to have this option open that's important to us. Now, I think we are shifting the timing of the retirement and likely in this preferred portfolio by a couple years. You know, working with Dominion is one consideration, a big part of the consideration is the high load situation you're facing. But I think the priority would still be to begin retiring coal and diversifying the portfolio as early as it makes sense. So now, any future decision or change in timing to retire Winyah would then consider that what was the load that actually materialized is the replacement capacity in place, because reliability is critical, right? And then make that decision based on it. I think following this IRP, we may have to take on evaluating in detail what the Cross retirement looks like, because it's again, it's 2400 megawatts, it has significant transmission implications and replacement capacity implications. So when we do that, we'll take a look at what our options are. But again, I would say the priority is just to prepare ourselves for a future where carbon tax may be coming. And given the fact that we right now have 70% of our capacity coming from coal, I think it is strategically important to diversify away from coal gradually and responsibly. So yeah. I know you asked a few things and I don't know if that was responsive to all of them. But please ask if I did not address some of those.
55	So the decision around investing in the BAT for Winyah has been made ahead of IRP approval? Just want to confirm.	Jalen Brooks-Knepfle	live Stewart Ramsay	Jalen, did that answer your question on the decision around BAT?
	Yes, thank you.	open mic Jalen Brooks-Knepfle		

RH	I actually would like to hear an answer to John's question, because I don't think that specific question was answered. So are you moving forward with the BT by 2025? Is that going to be implemented?	open mic Justin Somelofske	live Rahul Dembla	I think, Justin that's the plan right now. But again because is a sunk cost, this is not being analyzed in this IRP. But I do understand that there is some uncertainty and the rule is being revisited. So I think there's a team here that's looking at it. But that's the plan today, unless something changes because of that rule modification.
	Okay, thank you.	open mic Justin Somelofske		
RH	On the no new fossil? Is it just land based wind that's being built? Or is that offshore wind? Sorry, have you already mentioned that	open mic Ryan Deyoe	open mic	We allow the offshore wind, again, based predominantly on the ENREL numbers. It's just not finding that as a resource that's selectable over the other alternatives that are available in the mix.
	Gotcha. So that portfolio is kind of showing, and I know it's not finalized or anything, but it's kind of showing winds ELCC's what, like 20% 30%. So it's kind of showing that batteries and solar is negligible. So batteries, plus a bit of wind basically replaces Winyah in terms of firm capacity, but then afterwards, because of how big Cross is, it's kept around in the model.	open mic Ryan Deyoe	live Bob Davis	Part of the problem was this when we ran that case, if we retire Cross, we don't allow any new fossil builds, you actually end up with a problem that is even more difficult to solve in a net zero case, because of the quantity of capacity that we're trying to replace there. So we felt that it was a good idea to kind of change that portfolio up to provide some useful information, instead of creating a case that would be very difficult to solve for and might have limited utility within the overall IRP. So that was a good reason for doing them.
	Sorry, I just had a quick follow up. So then in comparison to the net zero, it's economically more optimal to not build that battery storage, and solar and wind by 29, whatever the phase is as well.	open mic Ryan Deyoe	live Bob Davis	And keep in mind, what we're doing there under the net zero case is we are looking at a means or a method to achieve our CO2 targets to 70% by 2030, and 90% reduction from 2005 levels by 2050. So we can achieve that by building the combined cycle and some turbines. That combined cycle and turbine offers us some reliability, the ability to manage some of the renewable assets, without needing to satisfy all of our capacity requirements under that case with battery, for instance, to replace both both Winyah and Cross. And at the end of the day, it is a cheaper alternative, a cheaper portfolio to have that combined cycle installed, even though it will have lower and lower utilization over time, but to have it as a component of the portfolio for utilization in the early years as a transition to a more heavy, renewable generation dispatch long term to meet the CO2 targets.
	Gotcha. And Stewart let me know if someone else has a question. But how low does that utilization get on the combine cycle?	open mic Ryan Deyoe	live Bob Davis	I was afraid somebody might ask me that question, and I don't have it at my fingertips. So I apologize.

	Gotcha. But in the optimal one, I think somebody mentioned it was 70 to 80%.	open mic Ryan Deyoe	live Bob Davis	For the combined cycle under the economically optimized case, it hovers a little bit below 70%, somewhere in that range, pretty close to 70%.
	But relative to 90% reduction by 2050.	open mic Ryan Deyoe	live Bob Davis	It's going to be a lower capacity factor.
	Well, yeah, I'm just trying to get a feel for that. I appreciate it. If you guys posted that on the forum as well like the Combined Cycle utilization across each one of these years across each four of the portfolio's. Would you guys be able to do that?	open mic Ryan Deyoe	live Bob Davis	I think we could. Obviously, I will say that will come out in the IRP in just a matter a week
	I right, fine. I guess it can wait. Just kidding. Yeah, I'm just curious to get a sense for that. Because obviously like to have only 10% of your or 10 90% of your emissions reduced and still have three gigawatts of gas on the system built on the system, not including what's existing. I would imagine that running fairly sparingly, but I guess we'll see in the IRP by that timeframe.	open mic Ryan Deyoe	live Bob Davis	I'll see what we can dig into and find easily.
	Sure. Thank you. Appreciate it. That's it for my questions on that.	open mic Ryan Deyoe	live Bob Davis	
RH /56	To further clarify the Winyah ELG is the BAT pathway being utilized by Santee Cooper Conventional or VIP technology? I'm a little confused based on the recent NPDES permit	open mic Findlay Salter	open mic	So I'm gonna let Jane respond via chat, unless she can respond live
	That's fine. She can just respond in the chat. I was looking for information. Some follow up. Thank you.	open mic Findlay Salter	written Jane Campbell	Thanks! Yes - the current plan is to install BAT under the 2020 Rule at Winyah. The NPDES permit is still in draft and I understand another draft will be issued from DHEC to incorporate these plans. Complicating this is that the EPA is rewriting the Rule - so we are monitoring this closely to see how it may impact our path forward, but we are hearing that this rewrite will not be finalized until at least 2024.
57	Is Santee unique in being able to add generation anywhere in the state? I'm curious if there are any unique advantages Santee Cooper has as a state owned utility in regard to capitalizing on federal funds like the energy community tax credit adder	Jalen Brooks-Knepfle	written Jonathan Nunes	Santee Cooper has some overall advantage in resource development due to tax-exempt financing. However, w.r.t. tax credits, Santee Cooper is at a disadvantage for developing assets on its own as tax-exempt financed resources get a 15% reduction in the tax credit benefits.

				<p>Importantly, as Rahul suggested, renewable developers likely have a large advantage related to the scale of their activity. Such development is inherently risky, and the tax credit element creates some risk as well. It's certainly something we continue to look at, particularly as Treasury guidance is released. We expect that renewable developers will take advantage of tax credits in the procurement processes we expect to conduct in the future.</p>
			<p>live Bob Davis</p>	<p>We are not aware of anything specific. the the IRA obviously does include some fairly significant increases on tax credits that could be available for energy communities. And those energy communities, or technically the census region where you're retiring coal facilities, recently retired coal generating power plants, have retired tired plus the neighboring or surrounding census region. So it's certainly something that we're interested in and looking at. We would certainly recognize that through any RFP process and and suggest or recommend some some opportunities for development either directly at a retiring coal resource site or in the surrounding areas. So we are certainly interested in that. But that's all under the IRA. With regard to specific tax credits that may be available to Santee Cooper, as a state owned entity, Rahul you may be able to answer but I'm not aware of anything.</p>
			<p>live Rahul Dembla</p>	<p>I think what the IRA did is level the playing field. So the tax incentives that were available to private developers can now be monetized by Santee Cooper directly. So that gives us one more procurement option. And I think, as Bob discussed, I think it does not really change the resource direction, because materially, we were capturing those credits to the private developers. And now we can do so directly. So that gives us a lot of options in the procurement process, and we will look at that. But I think besides that the only other advantage is that unlike the taxable developers, we do have access to tax exempt financing. And if we self build and are able to capture the tax credits, like under the IRA, we'll have to then work with the tax council to figure out how much tax at some financing we can capitalize on. So that that work is yet to be done.</p>

				<p>I think there is some haircut you have to take as my understanding for the tax exempt financing, but you can still capture some of both of these. So I think there shouldn't really be a analysis we will do during procurement. What is the price we are getting from private developers. And if Santee Cooper self builds, what it's really going to cost. A lot of solar developers bring other value, like their supply chain relationships and scale. Everything will be considered in what the least cost option is, for Santee Cooper. Again, our decision will be based on cost - net costs - in a net of all credits.</p>
58	Will Santee Cooper be sharing the workpapers supporting the preliminary results and observations prior to the filing of the finalized IRP?	Jonathan Ly	written Mollie Gore	Jonathan, we are not planning to share any workpapers prior to the finalization and the filing the IRP with the Commission on May 15.
	Understood. Thank you!	Jonathan Ly		