Santee Cooper IRP | Public Stakeholder Meeting #2

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, as closely as possible, each as it was provided. All live answers have been edited for readability. [Square brackets] are used to identify post-meeting ammendments.

#	Question	Asker	Response Type	Answers, Follow-on Questions, Comments, Input
1	Good morning, my name is Findlay Salter and I am here with Anthony Sandonato and Jeffery Gordon participating on behalf of the South Carolina Office of Regulatory Staff along with our colleagues from J Kennedy and Associates, Ben Pfeffer and Phil Hayet. We are grateful to Santee Cooper for pulling everyone together today for discussion on their Integrated Resource Plan. 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. 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.	Findlay Salter	written	Findlay, thank you and welcome to you and your colleagues. We appreciate your presence and participation. Looking forward to a good day.
2	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.	Findlay Salter	written	Thanks Findlay
3	Will Santee Cooper be sharing an updated version of the diagram on Slide 18 with the revised 2022 forecast when it is finalized?	Jonathan Ly	written	Hi, Jonathan. Yes. We will update the stakeholders on the load v. resources balance outlook when the new load forecast is available. We expect to do this in the next meeting in a month or so.
		Jonathan Ly		Thanks for the notice!
4	Does Santee Cooper plan to evaluate hybrid solar plus storage plants? In particular, DC coupled solar and storage arrays?	Ryan Deyoe	written	Hi, Ryan. We have not made a definite decision in this regard. We are concerned about having the ability to use storage for multiple use cases, which may be limited under this configuration. If you have definite thoughts in this regard, feel free to provide them in this QA thread. Thanks.

		Ryan Deyoe		That's a good point. If taking advantage of the ITC allows a hybrid plant to be built you can actually charge up to 25% of the time from the grid, which allows for additional flexibility in dispatching the solar and storage components separately, especially when solar is not generating. In addition to this, the ITC constraint rolls off after 5 years, where the flexibility can be fully realized. The bonus for a DC coupled system is that you can oversize the solar component and 'clip' excess solar generation and charge directly into the storage unit while still sending energy to the grid during solar generation times. So it wouldn't be an either or option for providing energy to the grid versus charging the battery on high solar output hours.
			written	Thanks, Ryan. That makes a lot of sense. We've been considering these same issues.
5	Smart, Flexible Demand Response Systems, and Virtual Power Plants are becoming VERY economical.	Keith Thomson	written	Thank you for your feedback, Keith. We recently implemented a DERMS system to learn about and support these DER opportunities.
6	Related to resource addition options. How is Santee accounting for gas pipeline and transmission studies related to a new CC or CT plant being developed? Are these costs accounted for in the IRP process for considering those projects?	Ryan Deyoe	written	That is correct Ryan; we will conduct site screening analysis that will include transmission and gas infrastructure etimates. The PVRR of portfolios presented will include these costs.
7	On the demand side I would add looking at new programs and policies to encourage C&I self gen.	John Brooker	written	Thank you, John. We are currently evaluating demand response opportunities for commercial. We also currently offer a menu of energy efficiency measures for commercial customers. Industrials persue their own energy efficiency and demand response efforts.
				Thanks, Steven. With this I mean examining how Santee Cooper's policies and contracts with commercial and industrial customers can be changed to encourage these customers to utilize DERs.
		R Taylor Speer		There are many C&I customers that are clamoring for the ability to self generate a portion of their electricity demand. The current solar tarrifs and fees are inadequate to support significant on-site solar and/or storage. Santee Cooper needs to be more supportive of medium to large scale behind-the-meter DERs in both their distribution systems and their customer's distribution systems. The lack of existing solar in the C/I space is not due to lack of customer interest. If more support was provided greater adoption would ensue.
				The last comment was from Don Zimmerman

			written	R Taylor Speer, our commercial and industrial customers are seperate rate classes and have different program and rates to support demand response and energy effeciency. We are always interested in hearing new ideas for how we can better help customers meet their renewable energy initiatives where we find mutual benefit. Historically, renewable energy projects on the customer side of the meter have been developed when economics support investment.
		John Brooker		Thanks for your help with this Chad, this seems like a good item that we could connect on as a subgroup outside of this forum if that works for you?
			written	John, thank you for the idea of a subgroup. We will take this under consideration.
8	My concern after 2028 is the replacement of Dispatchable, reliable, low cost generation Coal plants with intermittent Non-Dispatchable solar generation. Especially concerning if Duke does not secure nuclear plant operating license extensions for Robinson and Oconee #3. I understand that these current licenses currently expire 2030 & 2033. They are nearby on the Grid, and SC total generation is over 55% nuclear. So, if these are lost it will leave a large void in generation for the state.	Richard Storm	written	Thanks for the insights, Richard...a key concern for us and the state.
9	Our major concern is that an investment in combined cycle technology could easly turn out to be stranded economically by the time it is operational and become a drag throughout the 2030's and 2040's. This comment concerns both the load forecast and the evaluation of options: the load forecast for 2040 is very uncertain. But if Santee Cooper chooses a combined cycle plant to meet its 2028 needs, it will be an irrevokable decision. With technology shifting faster than ever before (batteries, small nukes, solar perovkites), it is particularly important to put some value on the risk of tying Santee Cooper in a 2028 investment to relying heavily on gas in 2040.	Eddy Moore	live answered by Bob Davis	Eddy you bring up an excellent point. And obviously, when you run IRP's you struggle with this. I mean, one of the reasons we're running the sensitivities we are, including both fuel pricing, load sensitivities, and specifically the approach that we're utilizing here, where we establish a plan and then test it under a variety of sensitivities, is so that we can examine that decision under a variety of unanticipated future conditions. So we can say okay, well, if we do have low load, if we do have high fuel prices, would this resource still be the best decision. So testing those initial decisions, weighing the risk across the various input assumptions are certainly a component and something that we want to extract from our evaluation of the portfolio.

				I'd also like to suggest that our intent is to examine not just what we might call a conventional or traditional resource plan with a combined cycle, but also to look at a multitude of different resource planning strategies. So we'd be looking at meeting CO2 by some additional requirements of coal resources, and not just the wind resources, but also the the Cross resources in the early timeframe. We'd be looking at achieving a net-zero portfolio by 2050. And obviously, under that case, whether the combined cycle has as a contributing factor to a net zero portfolio or not, will be a key issue that will be examined by comparing and contrasting the results we see across these different portfolios. So we certainly understand your question, Eddie. We intend to incorporate a long enough study period within our analysis to attempt to capture the full capital cost / stranded cost of these assets. So we hope by the time we get to the end of the study that we've addressed the concern that you're raising.
10	Is Net Zero Carbon a final goal? Is it a state law? Many people, including me, believe it to be political, not environmentally driven.	Richard Storm	written	Act 90 requires Santee Cooper to study a net zero portfolio; this portfolio will inform the decision on a prefered resource portfolio.
				Thank you for your thoughts on this topic.
				Hope the study is fair and based on sound engineering. Especially important if the neighbors nuclear plants are not provided operating license extentions. Dispatchable generation is important. My last check on battery storage in the U.S. largest is about the size of Winyah but only lasts for a few hours.
			written	Yes this is our intent.
11	Rotary telephones, manual typewriters, slide rules and graph paper, drafting tables, incandescent bulbs, and other historic market winners became outdated in their turn. Change happens and acceleration, systems integraton, and stacked values produce savings and benfits that are greater than the sum of their parts. Keep trying to get better.	Keith Thomson	written	Keith, thanks for that. The only constant is change...

12	Also, this point was raised before: so far, Santee Cooper has looked at EE/DR for its retail territory, which is a relatively small part of its load. Santee Cooper should consider actively promoting EE/DR among its wholesale customers by partnering with them.	Eddy Moore	live augmentation of question by Stewart Ramsay	But he was also talking about a point that he or somebody else raised before about Santee Cooper looking at EE/DR. For its retail territory, which is a small part of its load. And Santee Cooper should consider actively promoting EE/DR. Among its wholesale customers by partnering with them. So I think you know, as you think about your how you were going to look at the sensitivities, I think making sure that we're looking at the sensitivities on EE/DR. as well. And no, I know Patricia will talk about that a little bit more today. But I think those those things. So let's just make sure that we bring that all back in together when we're we're talking when we're discussing the various sensitivities. I think you answered the question. Well, so if you know, what about fuel prices going in this direction, what about greater levels of EE or greater levels of DR. Or, or stronger partnering with commercial or wholesale customers? So I just want to make sure we got that in
			live answered Bob Davis	Point taken
			written	We appreciate your observation. We welcome hearing your suggestions as to how this could work.
13	Vanry, please clarify in your answer whether Santee will have input on Central's load forecast. There is some uncertainty as to whether Santee will only attempt impose EE/DR on it retail customers.	R Taylor Speer	written	Hi R Taylor, Santee Cooper and Central meet several times throughout the year to discuss and review the load forecast; furthermore, Santee Cooper has two consultants who review and provide comment on the Central Load Forecast. With regard to EE/DR, Central is very active and emphasizes EE/DR amongst their member cooperatives. Their specific programs can be found in their IRP, which can be found on Central’s website.

14	This may be addressed later, but are Santee fuel price scenarios accounting for potential sustained $7 gas, or more broadly, what do the "high" gas price sensitivities look like? Also, how has the medium or "reference" gas price outlook changed? There is certainly a precendent based on current conditions for considering the financial impact and cost of natural gas projects under a constrained natural gas supply condition where fuel costs could be high for months or years on end as production must ramp up in the face of ESG pressures to curtail additional fossil fuel investments. You got the name right :)	Ryan Deyoe	live answered Bob Davis	Our intent is to draw from two fuel price forecasts - fundamental long term forecasts that we're going to average together for evaluating the current portfolios - at least one of those is the EIA forecast. So we're going to utilize the reference case, and the low and the high oil and natural gas supply cases [from the AEO forecast]. I can tell you that that low natural gas supply case, which is based upon no aggressive increase in exploration and development and new E&D technology, for natural gas is a fairly high case. I think it would address pretty close to the concerns that you had. So I'd ask you to hold that a bit, or to look ahead in the presentation, if you've downloaded a copy of it, and see whether that might address your concerns when we get there.
			written	Bob will address some of this live now and will discuss it a bit further on later
15	I have quite a few questions on the portfolio simulation/optimization process, so please take your time when answering them. Feel free to respond later as necessary, such as on the forum when it goes live.	Jonathan Ly	written	Thanks...I think we're trying to hit them to some degree now but we will get to that material just after lunch I think.
16	Please identify all the variables that will be included in the portfolio optimization process and the range of assumptions. For each of these variables, please also provide the source reference.	Jonathan Ly	live answered Bob Davis	Yeah, I would ask you, Jonathan, to kind of hold on to that concept. Again, we're at a state where we're really discussing methodology, overarching sources, and we would appreciate your feedback on alternatives. So that's kind of where we're headed with this. I think when we identify the key sources that we'll be looking at, and again, we'll be presenting that later this afternoon. I think that might key up some additional comments or feedback from you if you have some alternatives.
17	Is Santee Cooper willing to share with stakeholders these assumptions and their derivation in live Excel format with all formulas intact?	Jonathan Ly	written	Santee Cooper will share assumptions once finalized; the exact format may vary across assumptions and has not yet been determined.

18	How is Santee Cooper modeling the wholesale market? What are the assumptions about availability and amount of capacity? Are market prices fixed or variable?	Jonathan Ly	live answered Bob Davis	So while it might be appropriate to look at economy purchases and being able to lean on the market from the standpoint of resource planning, as Stewart suggested, and may be appropriate in some market structures across the country. What we're finding here -- and the precedent of this has been set by the IOUs, Duke and Dominion, here in South Carolina, and we intend to follow also~~,~~ -- is to look really at more of an isolated case. So we're looking at what Santee Cooper needs to build or to purchase within its local jurisdiction in order to serve requirements in the future. And when I say build, by the way, I don't mean just conventional traditional technologies, but that can also just easily be renewable technologies and battery storage. So don't think that I'm heading down the path of we're going to build new units, and that's the only thing we're focused on. There are also some unique characteristics that we have in the Santee Cooper system that kind of requires that. Santee Cooper has built up its transmission grid over time in order to the support the load characteristics of the region, and given the general location of the existing generating assets. Santee Cooper does not have a large and in fact it has no 500 kV transmission system within its service territory. What that means is we are somewhat limited in our ability to import and to purchase large quantities of power without localized generation support throughout the system. So that is a key consideration that we have to take into consideration as we perform our RFP process.

19	Does the plan to optimize the resource expansion portfolio using only base case assumptions imply that Santee Cooper will produce only one portfolio?	Jonathan Ly	live answered Bob Davis	We are encouraging the stakeholders to give us some ideas on portfolios. Our intent is to actually think about at least three if not more themes that would be appropriate for evaluating portfolios. So we have what I might call an "all-in" economic type of portfolio where we're looking at any resource that would prove economically viable and Jonathan, you're right, kind of under a base case set of assumptions. So that could be traditional resources, renewable resources, battery storage, etc. We then will be also evaluating a case with a heavy coal retirement we're looking to retire all the coal resources on the Santee Cooper system. No coal generation within the mid-30s timeframe. That will provide some significant insight into various replacement strategies, as well as emission profiles under that no coal type case. The third case is a net-zero by 2050 case, we'll be looking at and soliciting feedback from the stakeholders with, "Well, what should be our intermediate targets, we intended to model a mass based target simulation under that and optimized to keep our emissions under certain levels?" So that that evaluation will achieve certain targets over time, in order to meet our net-zero requirements by the 2050 timeframe. Thinking about and looking at the results across those three portfolios should give us enough range of cases and insight to evaluate not only different strategies with regard to building a traditional profile, but also other profiles or portfolios that we can then test through sensitivity assumptions. And I would remind people that the key issue we're trying to evaluate here with an IRP is, if we make a decision today or in the near term with regard to our next resource decision, which is really focused on the replacement of the retiring of the Winyah coal units. What happens? And is that decision a good decision with regard to if conditions change in the future? So if fuel prices are different than expected, if CO2 regulations are different than expected, if load is different than expected, how does that decision fold up for that next resource? So the IRP is really focused on let's identify the most optimum plans to meeting that next resource need and then testing it or stressing it to evaluate under multiple future conditions.
20	Has Santee Cooper considered developing optimized portfolios under different sensitivity assumptions to evaluate alternative portfolios?	Jonathan Ly	answered live in question 19	

21	Has Santee Cooper given thought to incorporating stochastics and randomness into its sensitivity modeling? This could be a way to keep the number of sensitivities you need to run in check.	Ben Pfeffer	live answered Bob Davis	Ben, I appreciate it, and have done my own fair share of probabilistic and stochastic simulations in the past. We are somewhat tied to what's required by the law here in the state of South Carolina. And not only that, but precedent. We've had precedent that's already established by Duke and Dominion within the IRP filings, we've got the ORS responding, and other stakeholders responding to that approach. We've got the PSC approvals of those IRPs and approaches. So we are somewhat structured with regard to how we get things done. I would also suggest that when you think about at least the four sensitivities that we're required to model by law, and if we consider all the possible combinations, four to the third power of different combinations here, we're up at 81 different sensitivities alone. And if we add multiple portfolios on top of that, for evaluation, we soon end up with hundreds and hundreds of cases that need to be evaluated. If we then add stochastics on top of that. (And I know, Ben, that's not exactly what you were saying.) But if we add stochastics into the situation, we can end up with a fairly significant problem to evaluate and to find solutions. Keep in mind the Santee Cooper staff is not as extensive as we might see it other utilities, and we're trying our best to accommodate within the timeframe and the resources we have available.
22	Have you determined how you will model gas prices or will that be a subject on which you will receive input as to methodology and assumptions prior to the draft?	John Burns	written	Hi, John. Certainly, taking input is why we're here today. Let us know either via the QA thread or by raising your hand what thoughts or ideas you have. It may be most helpful to wait for that material a bit later if you can...slide 70 or so hits this topic.
		John Burns		great thanks. sorry to jump the gun
23	Sorry, but the computer I'm currently on is not equipped with a mic.	Jonathan Ly	written	Thanks Jonathan and thanks for the great questions
24	He doesn't have a mic with this computer	Ryan Deyoe	written	RIght...we're trying to sort that out.
25	Jonathon typed that he has no mic	Dennis Boyd	written	Right...we're aware. We're working on it.
26	Sorry, didn't mean to raise my hand	Ryan Deyoe	written	No worries!

27	It seems like assessing larger transmission builds to allow for greater interchange with neighbors may be an alternative to building additional generation. Transmission is quickly becoming viewed as a capacity resource among other things. This is especially relevant given the recent FERC NOPR.	Ryan Deyoe	live answered Bob Davis	I'm not the transmission expert. And I have to say that our transmission subject matter expert is not in the room today. So this is a more complicated subject. And I don't want to misspeak in this regard. I can generally say that, given the fact that Santee Cooper does not have a 500 KV system in place, that we are looking at extremely long timeframes to upgrade the system in order to accommodate what was suggested. Our current thought is that it will be less expensive - it's also a very expensive proposition - it will be less expensive to identify a combination of alternatives that may include some transmission, as well as some new facilities in order to maintain system stability.
			live response by Stewart Ramsay	Bob maybe I can suggest that we we make sure that in the next meeting, we talk about how the possibility of leveraging transmission is is going to be taken into consideration.
			live answered by Bob Davis	Sure, yeah, I think that's a fair statement
				Apologies that I don't know how to turn my mic on in this Zoom format!
			written	Thank you for the input and feedback. We will be sure to address in our next meeting.
				Sounds good, I know it's a big question. Considering benefit/cost ratios I think reviewing the FERC NOPR and additional work regarding Multi-value benefits can show that transmission (while expensive) can produce a wide variety of benefits that when considered holistically will show the investment is overwhelmingly positive.
28	You will probably cover this later, but is there any discussions and serious work in restarting the Summer Units 2 & 3 construction? TVA did a successful restart of Watts Bar nuclear Unit construction after many years of non activity. If Zero carbon is important, then nuclear is the most proven and Dispatchable fuel. Summer #1 operating permit expires, I believe in 2042. Think licese extention likely as it has been well run, but maybe not, depending on NRC.	Richard Storm	written	Richard, we are not considering a Summer 2-3 restart, because it would be cost-prohibitive. We will be considering small-scale nuclear power options.
			written	Richard, to your point on the Summer 1 license, Dominion Energy South Carolina is the operator of that unit and they have submitted a notification of their intent to seek a license extension application beyond 2042.

				Thank you Mollie. Nuclear is in fact, the most productive, highest capacity factor carbon free generation that is proven, robust and reasonable cost. It is very sad about the mismanagement of construction on Summer 2 & 3. That was a very good plan for the state of SC before the management implosion of SCE&G.
			written	Richard, thank you for your comment and for participating in this process.
29	Thank you! That was very helpful.	Jonathan Ly	written	Your welcome. Thank you for the input and feedback.
30	Will the economically optimized resource plan preclude the constraints in the other two scenarios? It seems to me that the economically optimized resource plan very well could include retiring all coal by the mid-2030s and/or reaching net-zero by 2050.	Chris Carnevale	live answered Bob Davis	Our intent for that economically justified plan would be to retain the coal units at this time. We feel by modeling those two portfolios [economic expansion portfolio and coal retirement portfolio] side-by-side and reporting on those two cases, we'll be able to understand not just under base case assumptions, but also under sensitivity case assumptions, how those two portfolios compare. So we are not going to be modeling options for coal retirements as part of the economically justified plan, again, hoping that those two portfolios and comparing those two portfolios will provide the same answer. With regard to CO2 reductions, we intend to simulate that. If the model wanted to pick solar and battery implementations as the solution to achieve the most economic plan, there is certainly nothing restricting it in the model from making that selection. So we intend to give it the full variety of options. We just don't intend to model the coal retirements as an option that can be selected because we believe those two portfolios will provide us the same information.
31	With the Ford F150 Lightning and the Chevy Silverado rapidly scaling EVs, everything is about to change for working people, business fleets, and others making rational choices to respond to changing markets.	Keith Thomson	written	Thanks Keith, That's a useful resource for a technology we are thinking hard about how to incorporate into forecast and planning.

	"Bidirectional plug-in electric vehicles (PEVs) present immense potential for increasing the country's energy security, resilience, economic vitality, and quality of life while supporting the electrical grid. A bidirectional EV fleet could serve as both a sustainable mobility option as well as an energy storage asset that sends power back to everything from critical loads and homes to the grid. A bidirectional fleet could also create new revenue opportunities for EV owners or fleets." https://electricenergyonline.com/article/energy/category/ev-storage/143/956280/department-of-energy-announces-first-of-its-kind-collaboration-to-accelerate-vehicle-to-everything-technologies.html			https://www.fermataenergy.com/news-press/is-vehicle-to-everything-charging-ready-for-prime-time
32	Will the first (economically optimized) resource plan hard-code existing resources or will they be subject to economic retirement?	Eddy Moore	live answered Bob Davis	Eddy, just to let you know we are looking at, and it's a requirement for filing within the IRP, a remaining economic life for the resources. And we will be reporting that and hopefully rolling that out at our next stakeholder meeting. So we'll have an opportunity to discuss it. But I can generally say that the the Cross units, with reasonable maintenance, can be maintained as well as the Rainey combined cycle and turbines can be maintained over the study period and can continue to operate. Even if under some scenarios, the renewable assets can become the predominant energy supply, those resources can still be maintained for backup reserves capacity, etc., without significant expenditures and complications. There are some other assets on the Santee Cooper system, there's a group of older turbines at Myrtle Beach and Hilton Head, that we're still looking at internally to see whether we would model those as continuing through the entire study period or not. And there's also, obviously, the Cross coal units (approximately 2000 megawatts plus of resources at the Cross site) that we would be simulating as retired under at least one of the portfolio cases.
33	Has there been though about net zero CO2e rather than just CO2? This would cover methane emissions and upstream impacts of specific infrastructure.	John Brooker	written	Thanks, John. This is something we have been thinking about and monitoring the planning efforts of Duke and Dominion in this regard. We're looking for input in this regard, so let us know your thoughts here in this forum if possible. Thanks.
34	thought*	John Brooker		Got it.
35	https://www.fermataenergy.com/news-press/verizon-ventures-invests-in-fermata-energy-to-support-scaling-of-vehicle-to-everything-v2x-technology	Keith Thomson	written	Keith, Thank you for that link.

				The most innovative, cost-effective, integrated systems are coming to market the fastest. Your Team's adaptability and agility is your most valuable resource.
			written	Keith, we would agree that the team's adaptability and agility is critical.
36	Excellent white paper (Feb. 2022) covering high-case scenarious for DERs -- INTEGRATING DISTRIBUTED SOLAR AND STORAGE: THE KEYSTONES OF A MODERN GRID [https://www.communitysolaraccess.org/resources/]	R Taylor Speer	written	Thank you for sharing, Taylor. We look forward to reviewing.
37	We always want to hear from Mike!	Eddy Moore	live answered by Stewart Ramsay	Oh, you had my hopes up Mike! And I just have to say Eddy says we always want to hear from Mike
RH	Okay. Just on the central, I think a little bit more information on the central and how it's going to work exactly. So let's say they they decide to opt out, they build their own resource, you're gonna still study every written pro tip, every option that you could possibly have it, but it might be a smaller resource that's needed, obviously, if they opt out and they build their own resource. So it may not be the combined cycle, it might be something else. But if they decide to opt in, then maybe it makes sense to build the larger units. I'm just trying to understand how all that works if they opt out if they opt in. And your intention is just a study at all. All possibilities. Is that what you're saying?	Philip Hayat	raised hand / open mic	
			live answered by Bob Davis	Philip I may have reworded it slightly, but I think you hit the nail on the head. So that's exactly right. At this point in time, we do not know, and neither is Central obligated to tell us at this point, what their decision might be for future resources. So at this point in time, we are kind of considering all possible options. If and when we reach a timeframe in the Fall, where we understand and have more information about the decisions for Central, it obviously could modify our IRP approach - not necessarily the approach - but the portfolio's that we're evaluating if Central were to decide to do a non-shared resource. If It looks like the parties are working together, and it appears that the larger resources or accommodating a larger resource in the portfolio is still within the interest of all parties~~,~~ (which is Santee Cooper's current position and opinion, and all analysis we've done to this point in that direction), then -the parties would move forward with jointly developing a new resource or resources.
		Philip Hayat		Okay, thank you.

38	Could you elaborate a bit on how the Opt-Out affects considering a 2x1 NGCC build at all?	Ryan Deyoe	live answered by Bob Davis	You're absolutely right. If they opt out and decide to build their own resources, then Santee Cooper will be looking at a smaller obligation. There are certain contractual limitations or ranges on which Santee Cooper can come back with its own non-shared resource, and within certain ranges in order to fill its own load ratio share. It's not like we're limited to, you know, 302.5 megawatts that we have to build or anything along those lines. We have a little bit of flexibility with regard to what can be developed.
		Dennis Boyd		Central does have to give an answer in 180 days of their NSR, should they go that way
			live answered by Bob Davis	Obviously, if they opt out, then we're looking at a smaller facility that Santee Cooper would build for it's non-shared resource. You're correct,-it's 180 days under the contract when Central has to provide notification. If they decide to opt out, then we'll be looking at that smaller asset. We would hope, and we're anticipating and we're certainly working in that direction. Should it look like the best opportunity is for the parties to jointly develop and plan for a new resource, then we'd hoped we'd have that information earlier. And then we can move ahead with developing a joint resource.
				DOES have to give an answer
			live answered by Stewart Ramsay	Yeah, and Dennis just clarified, I obviously read it wrong. Central does have to give an answer in 180 days. So I may have said does not. Okay, so that adds a little bit of complexity to the work that's in front of you and the team. Sort of a little bit of an uncertainty. Which I know you're, you're used to dealing with Bob. So, John, John Brooker has as a question in the spirit of keeping all options alive is there a timeline for additional non CC PSRS to be proposed.
39	In the spirit of keeping all options alive, is there a timeline for additional non-CC PSRs to be proposed?	John Brooker	live answered by Bob Davis	At this point in time, the PSR is set due to the contractual language between between parties. Santee Cooper has stated multiple times and continues to accommodate this view, should we get through the IRP, and should that IRP identify a different portfolio than what's currently been proposed by a PSR, and we all agree that it's the most economic thing to do, then that would effectively replace what we're currently planning to do and have announced under the combined cycle. Just a second Rahul is going to add something here

			live answered by Rahul Dembla	I just wanted to add to that, that the timing of the proposed shared resource is really when we begin implementing a resource. The reason we issued a proposed shared resource for a natural gas combined cycle was, because it takes a long time seven or eight years. There are many other resources in the portfolio. For example, in 2020, we did a proposed shared resource for a solar resource. And we've already signed contracts for that solar. What Bob said, was accurate. However, as we go to the IRP process and the new load forecast, there are more resources in that roadmap, the timing of the proposed shared resource will just depend on when we need to need to begin implementation. Until that time it it remains a part of an adaptable, flexible resource map. So if there is a resource, a solar resource needed, which takes two years to implement, we will likely issue that leading up to that two years ahead of time. So I just wanted to make that distinction there. It's a overall portfolio. So when we proposed an NGCC, it was just one part one component of many, many elements in that resource roadmap that included storage, solar, other elements, but it was really dictated by the timing, because it takes a long time to implement a natural gas resource.
				Great, thank you Rahul and Bob.
			written	Sure, John. Thanks for the good question.
40	Regarding the topic of stochastics in analysis I would like to emphasize that including some sort of stochastic view of natural gas prices (ranging from low to very high or seasonal fluctuations) can show a range of costs associated with reliance on commodities. For example, a long-term solar PPA at $30/MWh is not going to cause 100 M$ plus budget over-runs due to fuel price exposure.	Ryan Deyoe		This one is less of a question haha, just more of a comment on the benefit of stochasticity providing a range of values within a managable set of macro scenarios.
			written	Ryan - Agreed that solar PPA energy would be more stable across NG price scenarios. We will certainly capture this factor in our uncertainty analysis, recognizing that the capital costs are subject to some uncertainty.
RH	Speaking about the proposed natural gas combined cycle, I was wondering if you guys would be providing an update on the ongoingFEED study for the natural gas pipeline? Is that coming later on in the presentation? Or? Could you give us a quick update on that?	Anthony	raised hand / open mic live answered by Rahul Dembla	It's the FEED study, conducted by Carolina Gas is subject to a nondisclosure agreement. So, it did study, conducted a risk analysis on the routes and paths for a natural gas resource. We will take the findings from it and incorporate this into our sighting analysis for the IRP 2023. But it did confirm the feasibility of the path we were looking at and provided the risks related to that. I think I'm maybe limited to that at this point.
			open mic	Okay, so it has been completed, but is just subject to confidentiality.

			live answered by Rahul Dembla	I would explain it as a desktop analysis that they conducted with the help of several experts and consultants. I think that the study is completed, yes, given the scope. It was a three or four months study, but that does not mean I believe that the work ends. We will and Central will continue the dialogue with the pipeline companies and keep learning refining from this field study. So I will be building on it. It does not end. And here I wanted to just make that point as well.
			open mic	Okay, thank you very much.
41	did the results of the FEED study impact any cost assumptions?	Findlay Salter	live answered by Rahul Dembla	The FEED study itself is more of a risk and route analysis. Having said that, we have had some dialogue with the pipeline company since. There will be implications on cost. As you learn more about risks and route, the costs will be tweaked. Also those estimates were old so it will take into account, recent inflationary pressures and CGT will have other comps and work they would have done so they'll take learnings from other projects they performed and translate that into the cost estimates for this. So the short answer is yes, there will be implications on cost and we will, when we perform sighting analysis for the IRP 2023, we will take those new inputs into account.
			live answered by Bob Davis	Rahul, let me add to that. You'll find that we do have an assumption in the in the presentation with regard to what we intend to model for firm transportation rates. We recognize that this is not an insignificant component of our overall study. And we are we intend to fully recognize an appropriate cost to secure or the costs associated with pipeline upgrades in order to manage for new natural gas product facilities.
42	If a stakeholder signs a confidentiality agreement, can we get the study?	Eddy Moore	written	The FEED study is not a Santee Cooper study. This would be a question for Carolina Gas Transportation.
43	Would the pipeline project require FERC approval?	Eddy Moore	live answered by Bob Davis	Yes.
44	If there is a non disclosure agreement regarding the natural gas pipeline (is this the proposed replacement for Winyah Generating Station), how will the impacted community learn of the risks associated with a natural gas pipeline? This is confusing.	Marilyn Hemingway	written	Marilyn, the FEED study is not a Santee Cooper study. This is a question for Carolina Gas Transportation.
		Marilyn Hemingway		who paid for the study?
			written	Central and Santee Cooper are the parties to that study and as such are obligated to pay for it.

45	Fuel cost in my experience is about 75% of the cost of generation for coal plants, about 90% of the cost of production for Natural Gas Combined Cycle plants. Therefore, volatile fuel costs drastically impact production cost of Bulk Power. Keeping reliable coal generation seems very important to control cost excalation, as well as keeping Dispatcahble power for night time and reliable power to Industrial customers..	Richard Storm	live answered by Bob Davis	I would agree with you. One of the key concerns that I think Santee Cooper has in this overall study is making sure that whatever portfolios we come up with, do provide reliable service. To replace the coal assets is not a cheap undertaking. It's not that they don't have their own costs and their own fuel and O&M related costs. It's just the adding new resources to replace large base loaded assets is not an inexpensive enterprise. So it is a key consideration. We hope that the sensitivities and scenarios that we are proposing for portfolios will allow us to fully investigate the implications associated with coal retirement decisions.
46	How will shorter term costs be weighed against longer term costs in the net-zero by 2050 scenario? In particular, it is widely recognized in the transition to 100% clean energy, the final portion (maybe 10, 15, or 20 percent) of generation is less economically feasible today than the first 80-90 percent, although emerging technologies will lower those costs and make the transition more feasible in decades to come. How will that be accounted for?	Chris Carnevale	written	Excellent question.
			live answered by Bob Davis	Great question, and and I don't have an answer for you. We would encourage you guys to provide some indicative sources on that subject. One of the ways that we intend to manage that, of course, is by looking at a net-zero portfolio. So we recognize that that last 3, 5, 10, 15% [of offsets are needed], depending on which expert you talk to, to achieve a CO2 net-zero type of portfolio, and a true zero type of portfolio is at this point in our projections cost prohibitive. So how do we achieve that last percentage of CO2 reductions? We can assume some increasing or improving technological capabilities with things like carbon capture, hydrogen production, hydrogen fuel delivery systems, can help us get to that last percentage, and we certainly do not intend to inflate the cost of those assumptions in order to devalue that portfolio. But we would encourage you to provide some insight or your own sets of assumptions. We're certainly, just like every other entity that's trying to evaluate this, casting about looking for good sources on that key input. We're running a present value analysis too which tends to discount later year cost versus initial cost. So that's obviously a given.
47	As a primary source of economic and community resilience, national security, and job growth your work is very important. Thank you for the process you are demonstrating. Russia doesn’t know it, but it just made a strong case for local energy https://microgridknowledge.com/russia-natural-gas-local-energy/	Keith Thomson	written	Thank you for the information, Keith. We look forward to reviewing.

48	Is the assumption that 100% of the CC will be covered by firm transportation?	Mike Lavanga	live answered by Bob Davis	That's our intent. We do not want to go open into reliability situations.
49	Regarding Minmax risk analysis, we have seen suggestions of minmax by intervenors in the past, but we are not constrained to it. The stakeholder process is an appropriate place to discuss potential alternatives to assessing risk.	Findlay Salter	live answered by Bob Davis	Hey, fine comment. I will say that the precedent has been set in South Carolina, both Duke and Dominion, and effectively the ORS is recommending it. So, I would, and I know, Finley, you are ORS if I'm getting the right person here. So we're certainly open to discussing this and understanding what the recommendations are, not necessarily recommendations, but what, and I'll say recommendations, what recommendations might be available from the ORS and what you might help us support within a regulatory environment. So we'd certainly be open to those discussions.
50	How are potential ELG ruling changes affecting costs for compliance at the Cross Generating Station? Costs for the Winyah VIP compliance estimates were quoted around $150-250 million, is this the same for Cross if it is forced to opt for VIP compliance or the retirement by 12/2028 option?	Ryan Deyoe	written	Cross is not pursuing a retirement compliance path. Costs for ELG compliance at Cross are expected to be similar to those quoted for Winyah.
				Gotcha, so Cross will either maintain it's standard compliance pathway or, depending on the ELG changes, adopt a low utilization or VIP pathway to maintain operation.
			written	Basically. Right now Cross is pursuing standard compliance, but also evaluating the VIP technology. Low utilization is not an option for Cross or Winyah. We don't know what a rewritten rule is going to contain.
51	But is it about Winyah Generating Station?	Marilyn Hemingway	written	Marilyn, Winyah Generating Station is a coal station. The study evaluates alternative gas routes, including the Winyah area.
52	How do I get in touch with Carolina Gas Transportation	Marilyn Hemingway	written	Marilyn, here is their website: https://www.bhegts.com/our-businesses/CGT
53	Will the heavy coal retirement scenario have benchmark targets for emisssions, like the net-zero scenario? Or just benchmarks for coal generation?	Chris Carnevale	written	Hi, Chris. I think the answer is generally no. However, emissions will certainly be a metric we will evaluate across the portfolios and sensitivities. Hence, the coal retirement scenario would likely produce far lower emissions than some other portfolios across most sensitivities.
		Chris Carnevale		Thanks, Jonathan.

54	Thank you for your time and effort for this presentation. I need to leave for another commitment this afternoon, but have enjoyed your candid and professional responses. Best wishes for success in preparing the IRP. Like someone else noted, the world events in Europe should be a wake up call on the importance of secure and Regional energy supply. I believe that Santee-Cooper is a state of SC Treasure and that the organization should remain strong, independent and use proven reliable fuels, including coal, gas and nuclear for at least 60% of generation capacity. I have submitted questions on requesting fuels used during the coldest and hottest days and these will return. Renewables have their limits and so do batteries. Have a great day and thank you again.	Richard Storm	written	Richard, thank you for joining us and we hope you will remain engaged throughout the process.
MORNING BREAK				
55	Stewart, do you have a break schedule? Thank you.	R Taylor Speer		Yes we do. We are reconvening at 11:15
		R Taylor Speer		I meant for the day. Thank you.
			written and live answered by Stewart Ramsay	Sorry I misunderstood the question. We have break now until 11:15AM. We break again at Noon for lunch (one hour) and at 2:15 for 15 minutes "I think I discussed this in the last meeting, we broke one of the reasons I decided or we called the break early and this one was a little bit longer as given the nature of the topics. We know that a lot of people don't have the entire day available to them. And so they come in and out of these IRP meetings based on the topics that are being presented, and so I really try to stick very close to the schedule that's included with what's posted so that people who are planning on being in the conversation for say, load forecasting, etc, don't come back in and and find that we're already three quarters of the way through and that they've missed the part of the conversation that they were looking forward to most. So we tried to build a little bit of slack into the schedule to make sure that we're not running over sections. But we'll always look to reconvene at the time in the schedule.
56	I just want to check my understanding of the Central Opt-Out and, if I am right, clarify for the group. Cetral had 120 days to opt-in or opt-out of the plannned shared resource (PSR). That 120 days was due yesterday and they opted out. The end of the 120 days and the declared opt-out started the 180 day period for Central to come up with an alternative to	Dennis Boyd	written	Hey Dennis. Central's delivered the opt out notification yesterday (few days ahead of 120 days from PSR issuance). They now have 180 days to provide non shared options. We can still participate in the same resource, however Central's share of the resource will be their non-shared portion.

	their portion of the needed capacity. So, the 180 day cloack started ticking yesterday. Central can, however, still decide to share the resource anytime during this 180 days or propose their own wasy to make up their capacity.			OK Thanks
57	We did answer that firm transportation will be utilized in event the NGCC is built. Will the gas be 100% hedged as it is with the existing NGCC?	Dennis Boyd	written by Rahul Dembla	Once the resource is completed and part of our portfolio, our fuels group will include it in our dispatch and hedning program.
				Thanks Rahul
58	Fine for follow up later: Is the home shell efficiency assumption based upon actual measured data and if not what is the source?	Eddy Moore	live answered by John Hutts	Well, yes, more and more the information we've gleaned from previous surveys, are home types, and size of home. The information on structural efficiencies, we don't have access to that type of detail specific to Santee Cooper. So we're using EIA's projections of structural efficiencies as a proxy, which is fine. Nationally, construction trends are most likely common across the country and the building structures in South Carolina are probably similar to the many codes and improvements and efficiencies that we see in other areas.
59	Leadership from our Armed Services is compelling: Army to equip all bases with microgrids by 2035 as part of carbon-free electricity goal https://microgridknowledge.com/army-microgrid-climate/	Keith Thomson	written	Keith - Thanks for the link.
		Keith Thomson		U.S. Army Moves Forward with Renewable Energy Project at Fort Sill, Oklahoma https://www.army.mil/article/256191/u_s_army_moves_forward_with_renewable_energy_project_at_fort_sill_oklahoma
60	How much do the declines in electric appliances in favor of gas affect Santee Cooper's projected load?	Chris Carnevale	written	Chris, This is difficult to actually quanitify in terms of "how much." We can estimate for a follow up, but that isn't something we have available right now. We can say that the shift from electric to gas in new homes is significant and likely one of the biggest drivers in the decline in average use per customer.
		Chris Carnevale		Thanks, Carl.
61	https://www.energystar.gov/products/most_efficient/central_air_conditioners_and_air_source_heat_pumps	Keith Thomson	written	Thanks Keith.

62	Ease of interconnection will improve adoption of customer-sited solar and solar+storage. See the linked whitepaper.	Donald Zimmerman	written	Thank you, Donald. We look forward to reviewing the information.
63	https://energystorageinterconnection.org/wp-content/uploads/2022/03/BATRIES-TOOLKIT-FINAL-3.28.22.pdf	Donald Zimmerman	written	Thank you, Donald. We look forward to comparing this to what we currently do.
64	"Eaton has taken an “Everything as a Grid” approach to the energy transition that creates energy hubs with flexible electrical systems—transforming infrastructure for electrification. Solutions include photovoltaic (PV) inverters, electric vehicle (EV) charging systems, and distributed energy resource (DER) management software, among other things." https://www.powermag.com/electrification-ignites-debate-over-future-of-energy/	Keith Thomson	written	Keith - appreciate the link.
65	Roanoke Electric Cooperative to Pilot Cutting Edge Vehicle-to-Grid Technology https://nccleantech.ncsu.edu/2020/12/04/roanoke-electric-cooperative-to-pilot-cutting-edge-vehicle-to-grid-technology/	Keith Thomson	written	Thanks for the information, Keith. Some of the links you have sent appear to be similar or the same as what you provided last meeting. Please be assured we have reviewed that information and it is part of our record.
66	Is there consideration of time of use charging rates for customers to incentivize charging in off peak times? It seems an important factor people will make or smart charging cars will be able to curtail charging until off peak times rather than just charging during peak energy use times.	Ryan Deyoe	written	Thanks for the question, Ryan. Santee Cooper is in the process of developing multiple experimental EV rates to incentivize charging during off-peak periods.
67	Debunking the top 10 electric vehicle myths in law enforcement https://www.police1.com/patrol-cars/articles/debunking-the-top-10-electric-vehicle-myths-in-law-enforcement-ZS6aznRjxfRNTHZp/	Keith Thomson	written	Thanks, Keith. We'll take a look.
68	Doesn;t the assumption of growth in rooftop assume no changes to incentives or economics that might lead to greater adoption by customers?	John Burns	written	Hi John, We do not incorporate changes in state or national policy, nor significant changes in economics. We rely on EIA's reference case for the growth assumption, which is updated annually; therefore, we will incorporate changes in the industry as they materialize.
		Donald Zimmerman		That is exactly the problem. The current rates / fees are not supportive of customer-sited DER. The desire is significantly greater than the implementation due to the poor economic return of the current programs
		Eddy Moore		Carl, I think what John meant was potential incentives or tariff changes from Santee Cooper itself.

		John Burns		yes. It seems this locks in a low demand which is artificially low and which can be improved through proper incentives / tariffs
			written	Thanks for your comments. Our solar rate structure is designed to avoid cross-subsidization and recover the fixed facilities cost for equipment needed to reliably serve the customer. However, Santee Cooper offers both a solar PV incentive and residential PV loan program that help improve the economics of PV installations.
69	Electric Ford F-150 Lightning: Here's how much money it saves over gas https://www.foxnews.com/auto/electric-ford-f-150-lightning-money-saves-gas	Keith Thomson	written	Thx. I think the economics of EVs is captured in the projections we are relying on. We will review.
70	The Public Service Commission of South Carolina recently rejected modeling, exclusively, small residential systems, as a metric for forecasting all solar, including C&I solar. Will Santee model larger systems?	R Taylor Speer	written	Good afternoon Taylor, Thank you, that's good information. Can you please identify the docket number?
				Yes, the information is contained within the order than came from DESC's net metering docket. I believe 2020-229-E. I will follow-up.
			written	Thank you Taylor
71	Montgomery County is embracing microgrids to improve the resiliency of public facilities https://www.montgomerycountymd.gov/DGS-OES/Microgrids.html Montgomery County has installed a Microgrid Project at Montgomery County's Public Safety HQ https://www.montgomerycountymd.gov/DGS-OES/MGP-PSHQ.html Montgomery County's Microgrid Electric Bus Depot Under Construction https://microgridknowledge.com/brookville-bus-depot-microgrid/	Keith Thomson	written	Thanks for the information, Keith.
72	Despite challenges, Duke and Honeywell pursue community microgrids in a big way https://microgridknowledge.com/community-microgrids-duke-honeywell/ Duke Energy Adds Microgrids to Its Grid Edge Plans (2014) https://www.greentechmedia.com/articles/read/duke-energy-adds-microgrids-to-its-grid-edge-plans Energy Resiliency: Clean Energy Microgrid Solutions https://sustainablesolutions.duke-energy.com/solutions/energy-resilience/microgrids/	Keith Thomson	written	Thanks for the information, Keith.

73	Excellent presentation! Thanks Greg!	Keith Thomson	live answered by Stewart Ramsay	Greg, you had a a comment from Keith Thompson said excellent presentation. Thanks, Greg. So that, that might be a nice way to send us all off to lunch.
LUNCH BREAK				
74	Yes, the information is contained within the order than came from DESC's net metering docket. I believe 2020-229-E. I will follow-up.	R Taylor Speer	written	Ok. Thanks, Taylor.
75	I have a dental appointmentr and have to go. THANKS	Dennis Boyd	written	Ok...thanks for participating.
76	Does Santee Cooper intend to have a working sub-group to discuss development and enhancements to Demand Response Interruptible Power programs to support the IRP?	Steven Castracane	written	Santee Cooper is considering technical workshops where appropriate. Santee Cooper currently has multiple non-firm rate options and we intend to model these as a resource in the 2023 IRP.
				Ok, thanks. Given the gap between load and available generation shown in the chart, along with planned growth in renewables, it will be important to consider how existing non-firm programs will be critical, and if new or enhancements to those are needed.
			written	Absolutely. Thank you for the input Steven
77	Motivating Question: To what extent can demand response mitigate the increasing variability and uncertainty associated with variable generation? Demand response • Low capital cost • Uncertain opportunity cost • New communication and control technologies □ Potential depth of deployment? □ Ability to provide reserves and absorb curtailment? Analogy with Storage Increasing VG Penetration https://www.nrel.gov/docs/fy20osti/70500.pdf	Keith Thomson	written	DR is definitely a useful peaking resource, recognizing that some DR has limitations regarding timing and some uncertainty in the amount of impact. Some DR has significant capital costs too. However, Santee Cooper views it as a key part of the portfolio and is working hard to get DR implemented, in addition to the interruptible contracts it has in place. We'll check out the article as well. Thanks, Keith.

78	WRT solar rates ... cost shift is often sited as a reason to implement rate plans that are not economically viable. The cost shift to non-participants has been shown to be inconsequential for low adoption rates as we have here in SC. The solar rate plans for both residential and C/I customers must be updated to reflect this reality. This has been demonstrated in testimony during the recent DESC net metering docket and has been supported through anayisis by Lawrence Berkely National labs:	Donald Zimmerman	written	Hi Donald, thanks for your question. our rate strucures are currently frozen through 2024 as a result of a legal settlement (Cook). While our rates team can conduct pilots, we cannot raise or change rates until then. Preceding our next rate adjustment you can expect that our rates team will conduct robust engagement and we will address this and other related questions at that time.
79	https://eta-publications.lbl.gov/sites/default/files/lbnl-1007060-es.pdf		written	Got it. Thank you, Donald.
80	Demand destruction = Negawatts!	Keith Thomson	written	Certainly! Avoiding inefficient demand is a key element of our resources.
81	What about commercial LEDs beyond the retail linear market such as: parking garage, high-bay lighting, outdoor lighting, etc? Also how about RTU (rooftop HVAC) on leased commercial spaces?	Eddy Moore	written	Thank you, Eddy. The measures you listed have been included in many of the historic programs and are reflected in the numbers presented.
		John Burns		Could probably turn the lights down in one WINGS or EAGLES store and save a bundle. (That's a joke, but has some roots in truth)
82	Businesses understand investments in higher productivity and profitability.	Keith Thomson	written	Sure...historically, the commercial class more readily appreciates the payback opportunities of energy efficiency. The industry sees that and accounts for that in our DSM programs and incentive planning.
83	Homeowners and property managers are leaving savings and return on investments leaking out of their buckets. Education and market creation for new opportunities are great ways to increase aggregated savings to stakeholders.	Keith Thomson	written	Thank you, Keith. Marketing and customer engagement has been a key objective for our programs. We are open to hearing recommendations to engage customers further.
84	if you have a high percentage of rentals and transient residents, you could probably set up remote settings more easily with less pushback from those in the home. If I go to a beach house and I'm not allowed to set the thermostat lower than 73 in July, I'm not that upset about it. It just is what it is.	John Burns	written	That's an interesting suggestion and perhaps an open opportunity with technology. It's uncertain how much of an issue this is but something to look into. Let us know if you are aware of any studies or programs/pilots in this regard. Thanks, John.
		John Brooker		I was curious if this barrier also might present an opportunity for a special suite of EE/DSM programs tailored to the hospitality industry in Santee Cooper's territory. Maybe with the right stakeholders in the room some programs could be developed. When it comes to hotels maybe Santee Cooper could provide rebates or assistance for hotels that undergo an Energy Savings Performance Contract. Maybe specific smart thermostat programs for short term rentals. Just some brainstorming here.

			written	Thanks for the comments, John. If you are aware of any programs or pilots that other utilities are doing in this area, we would be happy to take a look at that information. Our market potential study reflects the difficulty of getting significant savings from renters. We will continue to research ways to create energy efficiency measures that can help historically underserved market segments.
85	I will look. It was just a thought from my own personal experience as a tourist.	John Burns	written	Ok. Thanks. We'll note it as well.
86	Lessons from the California Demand Response Potential Studies and Flexible Demand Appliances https://efiling.energy.ca.gov/GetDocument.aspx?tn=236084&DocumentContentId=69086	Keith Thomson	written	Thank you, Keith. We look forward to reviewing.
87	"Across the U.S., utilities are testing distributed energy resources (DER) for grid management through residential programs designed to take advantage of battery storage and encourage off-peak electricity consumption. DER programs are underway to incentivize battery acquisition, rooftop solar and off-peak electric vehicle charging and electric water heater use. State policies and growing consumer demand have led to more DER programs and regulatory actions such as Federal Energy Regulatory Commission's Order 2222 that allows aggregators to participate in wholesale markets. The benefits of DER include improving grid resiliency and reliability, reducing costs for residential and business customers while offsetting new generation, transmission and distribution investment costs." https://www.power-grid.com/der-grid-edge/utilities-pilot-der-programs-to-shave-peaks-reward-customers/	Keith Thomson	written	Thank you, Keith. We have implemented a DERMS to support the research and adoption of DERs. We look forward to reviewing.
88	Crossing EV barriers with microgrids and managed charging Crossing EV barriers with microgrids and managed charging – pv magazine USA (pv-magazine-usa.com)	Keith Thomson	written	Thanks Keith, we look forward to reviewing.
				https://pv-magazine-usa.com/2022/02/16/crossing-ev-barriers-with-microgrids-and-managed-charging/
89	Great presentation, and demonstration of continuous improvement. Keep climbing. I have to jump off. Let us know if we can help.	Keith Thomson	written	Thank you Keith, appreciate your input!

90	In addition to federal EV funds, are there any federal funding opportunities to promote customer energy efficiency?	Eddy Moore	written	Thanks for the question Eddy. We are not currently pursuing any federal funding opportunities for customer energy efficiency. We would be happy to hear about any federal funding you are aware of that we should be pursuing.
				This might be applicable: https://www.energy.gov/bil/energy-efficient-transformer-rebates.
91	What is DERMS? Distributed energy resource market study?	Chris Carnevale	written	Hi Chris, a DERMS is a distributed energy resource management system. Santee Cooper implemented a DERMS in late 2021.
				Thanks, Claire.
92	Would the estimated premium on firm gas supply be affected by Central's answer on the PSR?	Chris Carnevale	written	Great question, Chris. Answer is that 'it depends'. It depends on Central and Santee Cooper's choice of non-shared resources and what impact it has on gas volume needed to be firmed up. It may have no impact in a scenario where we participate in a same resource (same volume of agregate gas FT commitment). We will consider this in our evaluation.
				Thanks, Rahul.
93	Given that assumptions are not yet finalized, is Santee Cooper willing to consider a case in which there is no price on CO2 as a base case?	Jonathan Ly	live answered by Bob Davis	We have not yet decided what our base case is for CO2 assumptions. I think any group of knowledgeable people on the subject could sit around a table and argue reasonably for different sets of assumptions or what we might consider a base case. What we do plan on doing for our CO2 cases are modeling a zero cost case, I'll call that the low case for the moment. So no CO2 cost. So we'll know across our runs and sensitivities, perhaps our base case will be assuming a zero CO2, we'll have a medium cost CO2, likely largely tracking what we're seeing from the other utilities filing an IRP in South Carolina, and we'll have a high CO2 case, probably more in line with something along the lines of what we're seeing from legislation and other IRPs throughout the country.
				Thank you!
94	The nuclear unit also helps fill pumped storage: is the pumped storage unit operated only for the benefit of DESC, or is it operated partly to serve Santee Cooper needs?	Eddy Moore	written	Eddy, Santee Cooper does not have any owenership interest in the pumped storage unit located adjacent to the V.C. Summer Unit 1. Only the nuclear unit is under Santee Cooper's partial ownership.
95	Has Santee Cooper assessed additional capacity from SEPA?	Chris Carnevale	written	If additional SEPA capacity becomes available we will assess. Thank you for your question!

		Chris Carnevale		Thanks, Chad.
96	Why only 4 hour bess? Why not long duration 8-12 hours?	Nathan Adams	written	This is something on which we are still considering. Certainly, for the lower CO2 cases, we will likely need longer duration BESS. However, we are not sure these will be required or economic for most cases. Let us know your thoughts in this regard. Thanks, Nathan.
				Most other utilities, particurlarly those in this region are specifically modeling multiple durations of BESS to examine their relative value.
		John Burns		This issue has been extensively reviewed and testified to in the Duke IRP proceeding
			written	Sure...we've been following the IRP proceedings and will take it under advisement and will follow up in the next session with takeaways.
97	Why only self own on BESS?	Nathan Adams	written	We talked about this a bit earlier in the QA. Generally, we are concerned about ensuring availability of the BESS for multiple use cases rather than being potentially limited to PPA terms, which may limit the operating flexibility of the BESS. Again, I do not think we are set on this path, so looking for feedback. Thanks.
98	When ATB is used, which ATB scenario/s is/are used (conservative, moderate, or advanced)?	Chris Carnevale	written	Thanks for the question. No final decision has been made, we are leaning toward the moderate.
				Thanks, Eileen.
99	Will solar PPA contracts avoid being priced at what Santee Cooper would have paid for alternate supply (i.e. coal or nat gas units)?	Steven Castracane		In other words, to avoid similar issues some supplies are arguing with current contracts.
			written	Hi Steven, Solar PPAs will be competitively procured consistent with Act 90 renewable procurement requirements. At this stage we are trying to come up with good assumptions based on what we know today and precedence.
				please let me know if i misunderstood your question
				Hi Rahul. Thanks. I may be mixing between solar procured through market purchases and Solar PPA. I apologize if this is the case. I believe a current provider of solar power is now seeking Santee Cooper to pay the higher price that you would have been paid from other generation sources, especially as nat gas prices are high, rather than the solar power cost. My question is while competitively procured can this risk be mitigated from future purchases and PPAs as it plans to grow in the IRP?

			written	Steven, in our experience as well as our recent RFP, we expect long term fixed price type PPAs. They may hav escalation however not subject to market fluctuations based on commodity (gas) prices. Is that responsive?
			written	Regarding mitigating the counterparty performance risk, we will seek to include appropriate security postings and do a qualitative analysis includign past track record before awarding contracts
100	Will Santee Cooper consider a solar+battery configuration? If so, how will these be modeled since solar will be modeled as a PPA and batteries will be modeled as owned resources?	Jonathan Ly	written	We plan to model both solar and battery the details of the modeling are to be determined.
		John Burns		CCEBA also encourages this. PPA Solar+Storage can provide a resource that can help the utility manage variability
			written	Thank you for this information.
101	Further to the self ownership only question, you seem to be fine with potentially tolling a combined cycle so why not a bess?	Nathan Adams	written	Nathan - we will certainly evaluate build vs PPA for BESS.
102	It might be worthwhile to consider a PPA with a solar + storage asset. There are significant benefits to solar when paired with storage that would make those PPA contracts more flexbile and beneficial to the grid.	Ryan Deyoe	written	Thank you for this input, we will consider it.
103	Can PPAs be written in a way that ensures batteries are operated in a way that compliments renewables / fits Santee Cooper's needs?	John Brooker		
		Nathan Adams		THe modern battery tolling agreement specifically leaves all dispatch up to the utility. No different than a gas plant tolling agreement.
			written	John and Nathan - i agree with you both. Yes the PPAs can be structured to accomlish our needs. Depends on market however flexibility / dispatchability will likely come at a premium. And we will certinaly consider tolling / PPA arrangement vesus self-owned when we begin procurement.
AFTERNOON BREAK				
104	Does Astrape incorporate any economic evaluation measures or cost-based considerations in its reserve margin studies? Or are the planning reserve margin based purely on reliability metrics (1-in-10 LOLE)?	Jonathan Ly	written	Astrape uses variability in GDP within its load forecast error projection; otherwise the study is based purely on reliability considerations.
				Thank you for the confirmation!
105	When will the PRM study be complete?	Mike Lavanga	written	Santee Cooper's goal is to have this completed by the next stakeholder meeting where assumptions will be finalized.
106	Ok - thank you	Mike Lavanga	written	Your welcome. Thanks for your interest.

107	If the PRM study shows that Santee Coopre should have a higher, or lower, reserve margin than it currently has, will Santee Cooper modify its reserve margin consistent with the study results in the near-term? Or is this study only for long-term planning/IRP purposes?	Mike Lavanga	written	Santee Cooper is committed to reliability. Once the study is completed; we will develop an implementation plan in the near term to ensure reliability.
			written	If the study results in a change to Santee Cooper's reserve margin it will be included as an assumption in the 2023 IRP.
108	What are the assumed import/export limits in Astrape's PRM study?	Jonathan Ly	live answered by Nick Wintermantel	Yeah, unfortunately, I don't have the numbers in front of me. But we've kind of been going back and forth with with Santee Cooper on these values. You know, we've come up with a couple of different sources, it's always difficult to get a simultaneous import limit into Santee Cooper. And so we've looked at historical data, trying to understand what is the most that's ever come in. There's also a confidential SERC report. So the SERC has done some resource adequacy work and come up with some transmission assumptions as well. And so through a combination of those two, that's how the final values have been developed. What we see though, and I think it's important to understand, so most of the risks that we see in the study, at least to date has been in the winter. And what we see is that the transmission is not the limiting factor in the southeast region, it's really the capacity on the other side. And so whether we increase that transmission line significantly or not, we don't really see a huge impact. It's more that it's just cold in the entire region. Everybody's looking for capacity. And that's the type of event that we see.
				Thanks again!
109	Got it - thank you.	Mike Lavanga	written	Your welcome, we appreciate your interest.
110	Just curious, will the PRM report highlight differences in PRM needs dependent on modeling neighbors or modeling Santee as an island?	Ryan Deyoe	written	The study will, for information, look at results if Santee Cooper was an island. While this result may influence the outcome the modeling that considers neighboring utilities and the impacts on reliability will be the primary driver.
111	Again here, you have unnecessarily limited yourself to 4 hour batteries for ELCC		written	Santee Cooper intends to model longer-duration BESS within the IRP. We have utilized 4-hour BESS for purposes of the ELCC studies to efficiently manage the scope of these studies. We intend to utilize industry studies to develop assumption for longer-duration BESS for use in the IRP.
112	Why not evaluate other durations for ELCC?	Nathan Adams	written	See prior response/thread.
113	We appreciate the wide ranging presentations and will submit further questions/observations in writing.	Eddy Moore		Thank you Eddie! Please remember to use the Stakeholder Feedback Forum that will be live in about 1 week.

114	Will Q&A posted here being uploaded to the forum?	Steven Castracane	live answered by Stewart Ramsay	Absolutely. So the the Q&A , not only the the written Q&A , there were some of the questions that were were asked that were answered live. We'll do our best to do a faithful transcription of those. We might omit a few UM's and OH's, I know, I put those in there. But yes, that that will be uploaded to the site and be available for you all along with the presentations, etc.
115	Thanks!	Steven Castracane	live answered by Rahul Dembla	I know it's three past 3pm on a Friday afternoon, I just wanted to take a minute to thank everyone this is, you know, it's been a lot of time spent on this. And I've been observing the Q&A and the session,and I've responded to some questions myself. I'm here with Bob and the rest of the Santee Cooper team. The level of engagement and the questions we've seen, it's impressive, so I really wanted to thank everybody for taking the time for this very good session. So thank you, and have a have a nice weekend, everybody.
116	Thank you for the thorough presentation today, Santee Cooper team!	Findlay Salter	written	Thank you for your participation.
117	Thank you for the great presentation and for all the time you've taken to address all of our questions thoroughly.	John Brooker	written	Thank you for your interest.
118	Thank you for hosting.	Chris Carnevale	written	Thanks for your participation.
119	Thank you.	John Burns	written	Thank you for your interest.