Office of Regulatory Staff

Renewable Energy:

An analysis of costs for South Carolina's Utility Sector

Submitted to the

Public Utilities Review Committee

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Introduction

The Public Utilities Review Committee ("PURC") asked the Office of Regulatory Staff ("ORS") to examine La Capra Associates' report, *"North Carolina's Renewable Energy Policy: A Look at REPS Compliance to Date, Resource Options for Future Compliance, and Strategies to Advance Core Objectives,"* ("La Capra Report") to evaluate the costs in the La Capra Report and apply such costs to South Carolina's utility sector. ORS compared costs for the six major forms of renewable energy covered in the La Capra Report, apart from operational costs[1] and the effects of North Carolina's Renewable Energy Portfolio Standards ("REPS") and Renewable Energy Credits ("RECs").[2] Our work enables one to translate the North Carolina data directly to South Carolina, while keeping in mind that individual projects' costs will vary, depending on transmission and site-specific issues. Additionally, ORS does not assume that South Carolina will adopt any of North Carolina's policies. With these starting considerations, ORS found two areas suitable for cost comparison purposes. The first is the cost of the various types of renewable generation; and the second is the impact upon state revenue collections due to tax incentives.

Renewable Generation Cost Comparison

To assess the possible costs of North Carolina renewable generation in the terms of South Carolina equivalent costs, ORS identified North Carolina's potential renewable resources in the La Capra Report that would best compare to South Carolina. These resources included: (1) Offshore Wind, (2) Onshore Wind, (3) Solar PV (Utility Scale), (4) Solar PV (Roof-top), (5) Co-Fired Biomass and (6) Dedicated Biomass. ORS accepted the assumptions in the La Capra Report and applied cost data from the Energy Information Agency ("EIA") to develop an equivalent South Carolina overnight

[1] ORS expects that the potential higher capacity factors for Offshore Wind in North Carolina could lower North Carolina's operational costs compared to South Carolina's.

[2] A plausible impact upon North Carolina itself would be hard to determine. As evidence of the difficulty in establishing the effects of North Carolina's policy, the La Capra Report on page 2 contains a chart that identifies 26.5% of generation resources for 2010-2025 used to comply with North Carolina REPS as "Out-of-state Unbundled RECs." The reference to RECs implies no attempt to measure the impact of out-of-state contractors or sub-contractors for various goods and services connected with implementing North Carolina's REPs, such as money paid to out-of-state producers of biomass or out-of-state evaluation services, to name only two.

cost[3]. Our analysis indicates that South Carolina's equivalent overnight cost from the same sources would be approximately $52.5 million – or 2% – greater than North Carolina's comparable overnight cost, which is entirely due to the higher cost for Offshore Wind in South Carolina, since the other costs are lower in South Carolina, but the La Capra Report indicates that Offshore Wind has far and away the largest potential. Table 1 on page 3 provides a detailed breakdown of these costs.

ORS also considered electricity generated from Landfill Gas but cautions that significant qualifications are necessary. These are necessary because: (a) the La Capra Report derives its North Carolina figures from combined North Carolina and South Carolina data; (b) there is volatility in costs; and (c) the EIA combines Municipal Solid Waste and Landfill Gas in its calculation of costs.[4] Also, ORS did not analyze the impact of operation and maintenance expenses since a valid basis for establishing a price differential between the two states does not exist.

[3] Overnight costs are defined as the present value of total capital costs including financing.
[4] Page 120 of the La Capra Report states, "For this analysis, landfills in both North and South Carolina were included;" on page 8 of EIA's report, "Updated Cost Estimates for Electricity Generation Plants: November 2010," a table shows a 210% variation in costs from 2010 to 2011 costs; the same table indicates that Landfill Gas and Municipal Solid Waste plant costs are combined and page 27 of EIA's "Model Documentation Renewable Fuels Module of the National Energy Modeling System" shows that Landfill Gas is a submodule that feeds into the MSW ("Municipal Solid Waste") database.

Table 1:

N.C.'s Overnight (Capital) Costs Converted to S.C. Equivalents

Resource Type	Capacity Factor	Modeled Project Size (MW)	Overnight Costs ($/KW)[1]	Overnight Costs at Modeled Size[1]	SC/NC Cost Ratio[2]	SC Equivalent
Wind						
On-shore	30%	100	$2,340	$234,000,000	0.991	$231,894,000
Off-Shore	37%	400	$4,800	$1,920,000,000	1.031	$1,979,520,000
Solar PV						
Utility Scale	15%	2	$3,400	$6,800,000	0.983	$6,684,400
Rooftop	15%	0.5	$3,600	$1,800,000	0.983	$1,769,400
Biomass						
Co-Firing	85%	20	$200	$4,000,000	0.984	$3,936,000
Dedicated[3]	85%	50	$3,343	$167,150,000	0.972	$162,469,800
TOTAL				$2,333,750,000		$2,386,273,600
Additional Overnight Capital Cost in South Carolina with Same Sized Modeled Projects						$52,523,600

Notes:

[1] Overnight costs are the present value of the capital costs, including financing costs, of building generation facilities.

[2] Source: U.S. Energy Information Agency's "Updated Capital Cost Estimates for Electricity Generation Plants: November 2010"

[3] Landfill Gas costs were not broken out separately, as discussed on page 2. Ignoring the problems discussed, the calculation is: N.C. Landfill Gas Overnight Costs at modeled size = $2,450 $/kW * 1,000 kW/MW * Modeled 5 MW size = $12,250,000; Differential Costs show S.C./N.C. Cost Ratio is 0.987; therefore S.C.'s cost would be $12,090,750 or $159,250 less than N.C.'s.

Revenue Impact Comparison

To assess the impact upon North Carolina's revenue collection due to tax incentives, ORS consulted the United States Department of Energy's Database of State Incentives for Renewables & Efficiency ("DSIRE") to determine what tax incentives North Carolina offers. The incentive ORS found and assessed is the North Carolina Renewable Energy Tax Credit. This tax credit is associated with investment in property for the generation of renewable energy. It is one of the longest standing incentives in North Carolina to promote renewable energy. The North Carolina law caps the credit at 35% of the investment in renewable resources, with additional dollar caps that vary with the

renewable resource. In 2010, there were $5,232,172 in credits taken and $32,394,525 in newly claimed property for generating renewable energy. Also, in 2010, there were 929 individuals and entities that claimed of the credit, of which 54 were corporate and 875 were individuals, including trusts. Corporate entities claimed about half of the credits and were responsible for about half of the new investments according to North Carolina's database. The database did not identify the type or relative proportions of renewable resource on which taxpayers took the credits.

In its consideration, ORS eliminated company incentives and the incentives of municipal suppliers because South Carolina may not be insulated from their effects and some benefits may accrue to the entity offering them, making costs difficult to calculate and to assign. Incentives offered by North Carolina Green Power were eliminated for the same reason and because their funding mechanism is from surcharges to bills. Lastly, ORS could not assess the Property Tax Incentive, because it is administered at the county level. Unfortunately, the data necessary to accomplish this task resides in the 100 counties of North Carolina and is not available in aggregate.

To assess the potential impact from the North Carolina Renewable Energy Tax Credit if applied in South Carolina, ORS multiplied the La Capra Report's model project size (MW), for each type of renewable resource, by the Overnight Cost per kW. This value was then converted to MW by multiplying by 1,000. The result shows the potential North Carolina renewable investments. To convert this number to expected renewable investments based on the dollar amounts of tax credits taken, ORS multiplied the potential investment by the cap rate of 35% and then compared the actual credits taken, $5,232,172, to the potential investments with the 35% cap. The result is a 0.64% Credit-taking Rate[5].

[5] The Credit-taking Rate is defined as the ratio of actual credits taken to potential investments with the 35% cap and is based on the best available information, which, as is discussed, does not include any breakout by type of resource in North Carolina's tax-credit data.

ORS did not apply the North Carolina dollar caps on the individual investments because the data on the credits taken in 2010 did not include breakouts by type of renewable resource.[6] Applying a population differential between Census Bureau estimates of North Carolina's and South Carolina's populations results in an expected revenue reduction in South Carolina of $2,535,369 as compared to the equivalent revenue reduction in North Carolina of $5,232,172. The South Carolina revenue would be further reduced by $7,243,910 if the 35% cap is removed.

ORS does not believe that this last number is realistic without an exact duplication of North Carolina's renewable tax credit because, currently South Carolina has a renewable tax credit with a floor instead of a cap, which aims to encourage the manufacturing of renewable energy equipment and facilities. ORS did not assess this program because 2011 was the first year that it was in effect, so there was no data yet available. The program applies only to businesses or corporations and the program's objectives differ from North Carolina's program. Moreover, South Carolina has a separate solar energy tax credit that had $383,446 worth of individual and corporate credits taken in 2011 for Tax Year 2010. Since the La Capra Report mentions solar water heating on page 101 but does not have a calculation of its Overnight Cost, ORS was not able to compare it to North Carolina.

Table 2 on the following page illustrates the calculations discussed in the prior paragraphs:

[6] ORS expects the individual project caps to play a role in the future. These caps include a maximum of $2,500,000 per business project and a limit for each credit taken to 50% of each taxpayer's state tax liability. As more information becomes available ORS recommends revisiting Line 14 of Table 2, which would need to be recalculated with additional limitations on potential project size.

Table 2:

Estimated Impact of the N.C. Renewable Energy Tax Credit and the Potential Impact if Applied to S.C.

Line No.	Resource Type	Modeled Project Size (MW)	Overnight Costs ($/kW)	Total $'s at Modeled Project Size	Modeled Project $'s at Actual Credit-Taking Rate[1, 2]
1	**Wind**				
2	On-shore	100	$2,340	$234,000,000	$524,618
3	Off-Shore	400	$4,800	$1,920,000,000	$4,304,561
4					
5	**Solar PV**				
6	Utility Scale	2	$3,400	$6,800,000	$15,245
7	Rooftop	0.5	$3,600	$1,800,000	$4,036
8					
9	**Biomass**				
10	Co-Firing	20	$200	$4,000,000	$8,968
11	Dedicated	50	$3,343	$167,150,000	$374,743
12	Totals			$2,333,750,000	$5,232,172
13	Credit Cap Rate			35%	
14	Maximum Credit [L12 x L13]			$816,812,500	
15	Actual Credits Taken			$5,232,172	
16	Credit-Taking Rate [L15 ÷ L14]			0.64%	
17	S.C./N.C. Census Estimated Population			48.46%	
18	S.C. Equivalent, with 35% N.C. Cap[2] [L15 x L17]			$2,535,369	
19	S.C. Equivalent, without 35% N.C. Cap[2, 3] [L12 x L16 x L17]			$7,243,910	

[1] Modeled Project $'s at Actual Credit Taking Rate is calculated by multiplying the "Total $'s at Modeled Project Size" by the Credit Cap Rate percentage [L13] and then by the Credit Taking Rate percentage [L16].

[2] There may be slight variances due to rounding.

[3] Based on actual Credit-Taking Rate; potential exposure is higher but difficult to estimate.

Summary

In summary, when compared to North Carolina, South Carolina investors would likely face an additional $52,523,600 - or 2% - in costs as shown on Table 1. Also, it should be noted that, from an economic perspective, a tax credit taken makes more money available in the economy and, to the extent that the money is spent in South Carolina, would benefit the South Carolina economy. Policymakers, however, would face a potential reduction in revenue of $7,243,910.