

# **Recovering the Price of Partnership: Capital Cost Recovery Methods in Water Purchasing Agreements**

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The attached paper represents work done by UNC Chapel Hill Master of Public Administration student as a class project. It is not a formal report of the School of Government, nor is it the work of School of Government faculty.

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## **Executive Summary**

In North Carolina, water partnerships are commonly formed through water purchasing agreements. Partnership, however, comes with a price. This capstone questions, "How do utilities in North Carolina recover capital costs through water purchasing agreements?" Is a minimum purchase of water required? Are capital costs dealt with up-front or annually? Utilizing research and data collected by the Environment Finance Center<sup>1</sup> in addition to a review of water purchasing contracts, this analysis details the different strategies for capital cost recovery and their implementation in North Carolina.

## **Introduction**

The most common type of water partnership in North Carolina is a water purchasing agreement or contract between two or more utilities. This research focuses on water purchasing contracts, also known as wholesale agreements, in which one utility sells a certain quantity of water to another utility over an established period of time. This partnership can be helpful for both the buyer and seller<sup>2</sup>. Buyers cover short or long-term water deficits while sellers gain revenue from excess capacity. These agreements have different strategies enabling water providers to recover costs from their water purchasers, ranging from a simple uniform rate per 1000 gallons to more complex arrangements that involve capital contributions, block structures, up-front payments or minimum purchase requirements<sup>3</sup>.

Providing water is a capital intensive exercise, as much as 50% of the costs associated with water connections can be debt service, and capital costs are not always considered in the agreements. For example, if Utility A sells water at the rate of \$3.00 per 1000 gallons to Utility B without any caveats, Utility B could unexpectedly stop purchasing water from Utility A or purchase water from another utility that offers a cheaper rate. If this nightmare scenario happened to a smaller utility, the unrecovered capital costs could easily send them underwater. This scenario highlights the importance of carefully considering how capital costs are to be recovered.

The three main explicit cost recovery strategies are up-front capital contributions, recurring capital charges and minimum purchase requirements. Up-front capital contributions are one-time payments made at the beginning of the contract. Recurring charges are annual or monthly payments for capital expenses that are separate from the water commodity rate. Minimum purchase requirements bind the purchaser to pay an established minimum amount, regardless of consumption. Another non-explicit method to recover capital costs is to roll them into the wholesale water rate without a minimum purchase agreement with the hope that enough water is sold to recover capital costs. Including capital costs in the wholesale rate is often difficult because rates are highly visible and seemingly high rates may become politicized<sup>4</sup>. While this capstone does not examine water rates, it is important to note that rates sometimes end up as the sole method of capital cost recovery.

This capstone studies the prevalence of use of these capital cost recovery methods and tries to identify factors that might influence their use. The research will be useful to municipal water providers, water industry professionals and other water policy analysts who are considering these partnerships, revisiting contracts or conducting research (Appendix D).

## **Methodology**

The Environmental Finance Center (EFC) maintains database files containing information from the Local Water Supply Plans (LWSP) and Public Water Supply Section (PWSS) of the North Carolina Department of the Environment and Natural Resources (NC DENR). Information on water purchasing agreements originates from the EFC's combined database of PWSS and LWSP data. The total number of active water purchasing agreements listed by this EFC database is 223. Through previous endeavors, the EFC collected 51 electronic and hard copies of these

agreements, representing 23% of the total. Only water purchasing agreements currently active as of 2009 are included, excluding defunct agreements and emergency sales agreements.

In order to focus the study, analysis concentrates on three cost recovery strategies previously identified by the EFC, the minimum purchase requirement, a recurring capital charge and an up-front capital contribution<sup>1</sup>. My capstone does not treat these strategies as mutually exclusive by default or assume that one of the three must be selected in any given contract.

The analysis tested whether there were differences in use of the various capital techniques based on the following variables (described fully in Appendix A):

- **Rates:** How they are set, structured, adjusted
- **Size of Utility:** Seller, Purchaser
- **Contract Structure:** Length of Contract, Use of Standard Form

Statistical tests of differences were done using chi-square tests. Statistical significance was tested at the 95% threshold, represented by a p-value of 0.05 or lower. (Appendix C).

## Limitations

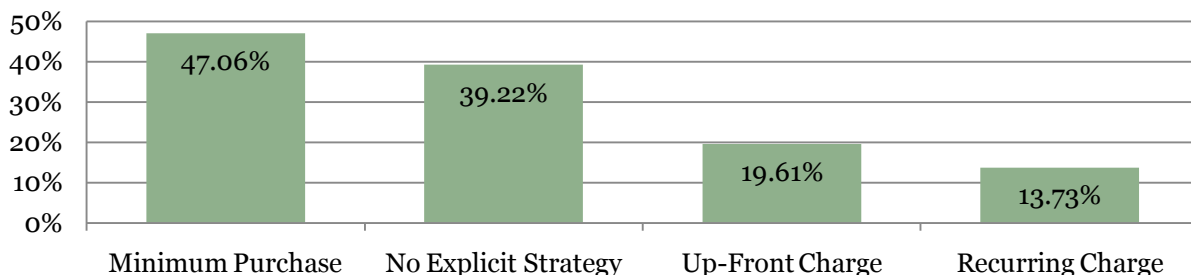
The databases through which the total pools of agreements were ascertained, the PWSS and LWSP, may be incomplete. The databases may exclude newer agreements or lack information that was never submitted to NC DENR. The information from these databases is as of FY2008-2009. The sample pool of 51 contracts is not random but rather a convenient sample, based on contracts gathered as part of research initiatives and therefore the results are representative of the 51 contracts not the larger statewide pool. The low use of particular variables and strategies in the sample. Without a detailed survey, it is impossible to declaratively determine all of the interests that surround the construction of an agreement.

## Results and Analysis

### Summary Analysis

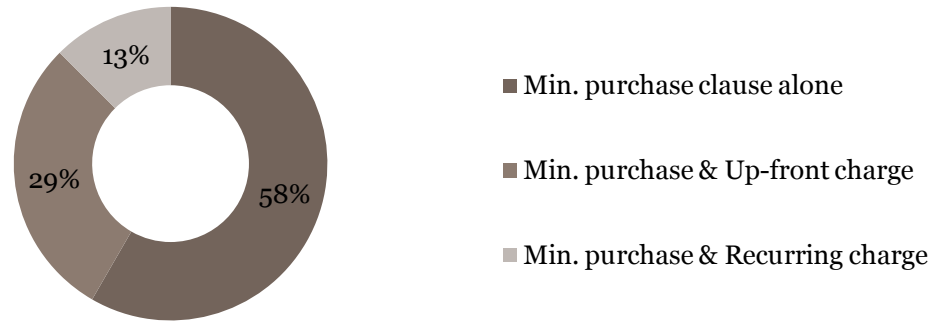
The sample of 51 contracts represents partnerships involving 89 unique utilities and about 23% of pool of 223 agreements identified within the EFC database. Of the three capital cost recovery methods being examined, the minimum purchase requirement is by far the most common. Graph A shows the number of contracts using each strategy, including those using no explicit strategy.

**Graph A: Use of strategies within sample**



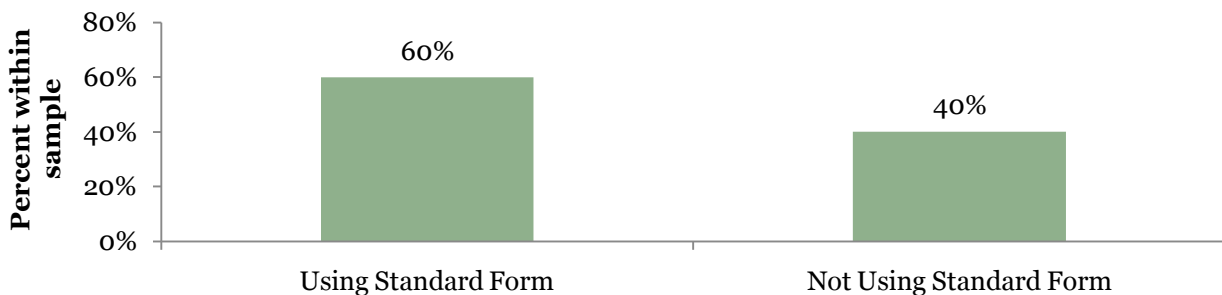
Within the sample, contracts with up-front capital contributions do not use recurring capital charges; the two strategies appear mutually exclusive. However, contracts using minimum purchase requirements sometimes also have up-front or recurring charges. Graph B shows this strategy overlap.

**Graph B: Minimum Purchase Clause Use**



Some contracts use a simple, standardized form, put together by the USDA first in the 1970's, with one update in the 90's. While many contracts use language almost identical to the standard forms, within this capstone only contracts clearly marked as USDA forms are counted as standard forms. A conjecture is that agreements using the standard form will not commonly use any of the three capital cost recovery methods because the short and simple forms do not include space for the entry of any innovative clauses. Twenty contracts do not use any strategy. Graph C affirms that the majority of these contracts using no strategy also use USDA forms.

**Graph C: Contracts with no explicit strategy**



Factors influencing choice of strategy

This analysis examined contracts with minimum purchase requirements, recurring capacity charges, up-front capital contributions and no strategy to determine whether use varies based on different factors. Each strategy was tested against all variables, including other strategies.

Table 1 below summarizes statistically significant correlations discovered through chi-square analysis; the highlighted cells represent particularly relevant findings.

<b>Table 1: Statistically significant correlations found</b>				
	<b>Min. purchase</b>	<b>Recurring charge</b>	<b>Up-front charge</b>	<b>No Strategy</b>
<b>Minimum Purchase</b>		-	More likely to use‡	
<b>Recurring Charge</b>	-		Less likely to use†	
<b>Up-front Charge</b>	More likely to use†	Less likely to use†		
<b>Standard Form</b>	<b>Less likely to use †</b>	<b>Less likely to use†</b>	<b>Less likely to use‡</b>	<b>More likely to use‡</b>
<b>Uniform / Variable Rates</b>	More likely to use‡ (variable rates)	-	More likely to use‡ (Variable rates)	Less likely to use‡ (Variable rates)
<b>Original Rates - Retail</b>	-	-	Less likely to use‡	More likely to use‡
<b>Rate Adjustments</b>	-	-	More likely to use† (retail based)	-
<b>Length of Contract</b>	<b>More likely to use‡ (shorter length)</b>	<b>More likely to use† (shorter length)</b>	-	<b>Less likely to use‡ (shorter length)</b>
<b>Size of Buying Utility</b>	-	-	-	-
<b>Size of Selling Utility</b>	<b>More likely to use† (Smallest &amp; Largest utilities)</b>	<b>More likely to use† (Largest Utilities)</b>	-	<b>More likely to use‡ (Medium utilities)</b>

† P-Values of 0.05 or lower, statistical significance of 95% or higher

‡ P-Values of 0.01 or lower, statistical significance of 99% or higher

The results above confirm the hypothesis that contracts using standard USDA forms are less likely to use any of the three main cost recovery strategies. In fact, no contract using a standard form uses a recurring charge or an up-front charge and only four use minimum purchase clauses.

When a contract is shorter than 40 years, recovering capital costs seems to be of higher concern. The correlation of length of contract to the use of a minimum purchase requirement and recurring charge may also be related back to standard forms. Standard forms rarely prescribe lengths of less than 40 years. Within the sample, only 2 out of 16 contracts using standard forms had a length shorter than 40 years (Appendix B).

Given the lack of correlation to the use of any strategy, the size of the purchasing utility appears unrelated to the choice of any strategy. The seller's size correlates to the use of two of the three explicit capital cost recovery strategies and to the use of no explicit strategy. The smallest selling utilities may use a minimum purchase agreement alone, while the largest selling utilities are more likely to use both a minimum purchase agreement and a recurring charge. The correlation of no explicit strategy to medium selling utilities implies that they may choose to roll capital into the wholesale rate.

While the analysis revealed some correlations to how rates are originally set, structured and adjusted, it is difficult to explain these some of these relationships. Future research may reveal more through explanations for these correlations (Appendix D). One possible explanation for the use of variable rates in contracts with a minimum purchase may be to guarantee that the base block, or lowest rate tier, is sold. For example, if the contract stipulates the first 100,000 gallons

of monthly costs \$1000, by setting a minimum purchase requirement at 100,000 gallons, they would guarantee at least \$1000 in revenue.

## **Conclusions**

### Size matters, if you're the seller

Analysis revealed that only the size of the selling utility correlates to the use of capital cost recovery strategies. The relevance of the seller's size and lack of relevance of the purchaser's size is likely also embedded in the asymmetrical nature of these agreements, with typically larger utilities selling water to small utilities. Given their investment in the infrastructure behind these water connections, it makes sense that the primarily the seller would be concerned with capital cost recovery. The use of an explicit capital cost recovery method can also help the seller avoid political scrutiny by separating capital expenses in order to lower the wholesale water rate for the buyer.

### Standard form use reduces explicit capital cost recovery strategies

Contracts using the standard USDA 442 forms, some from the 1970's, are not likely to use any of the three explicit cost recovery methods. Absolutely no up-front or recurring charges appear in contracts using standard forms. Despite an update in the 1990's which allows the entry of a minimum purchase clause, few select to use this strategy. This capstone has shown that contracts using the standard form typically do not include any of the three recovery techniques. The language of the standard forms may limit the use of these explicit techniques even more than this capstone suggests, as many contracts use nearly or completely identical language without using the standard form itself.

The "fill-in-the-blank" approach leaves little room for variation. Capital costs, if recovered, are most likely accounted for in the wholesale rate. This approach leaves selling utilities exposed to becoming politicized if rates are too high or exposed to heavy debt repayment if the buying utility abruptly drops usage.

### Minimum purchase requirements are multi-purpose

Using a minimum purchase clause doesn't exclude the use of other cost recovery methods in the same fashion as recurring and up-front charges. On the contrary, roughly 40% of the time, agreements with a minimum purchase requirement also used other capital cost recovery strategies as well. The minimum purchase requirement can also guarantee capital costs are recovered if the contract length is for a shorter span of time than the 40 year term.

The prevalence of the minimum purchase requirement becomes evident in the fact that newer versions of the standard USDA form allow the entry of the clause. The minimum purchase requirement is a very common, useful and easily implemented capital cost recovery strategy. It is simple enough to be used by even the smallest selling utilities. Given these findings, the presence of a minimum purchase requirement can be seen as a marker for innovation beyond the framework of the standard contract template.

## Appendix A: Variables

Variable	Description	Source
PWSID	The numeric code assigned to each provider	PWS <sup>1</sup>
System Name	The name of the water provider with any municipal title separated by a comma (Exe: Chapel Hill, Town of)	PWS <sup>1</sup> , EFC <sup>2</sup>
Contractual Capacity	The maximum capacity of the agreement in Mgd <sup>3</sup> . This figure represents either the maximum capacity explicitly stated within the contract	PWS <sup>1</sup> , EFC <sup>2</sup> , Contracts
Actual Average Daily Use	The amount of water actively flowing through the connection established under the contract in Mgd <sup>3</sup> . My study only includes connections that have some amount of active flow.	PWS <sup>1</sup> , EFC <sup>2</sup> , Contracts
Original Agreement Date	The original year in which the agreement became active, written in full form (1976, 1990, 2001, etc)	EFC <sup>2</sup> , Contracts
Contract Length	The length of the original contract in years. This variable is not altered to reflect changes in any subsequent updates or contract renewals.	PWS <sup>1</sup> , EFC <sup>2</sup> , Contracts
Expiration of Agreement	The current expiration date of the agreement, this includes any renewals or updates collected by one of our sources. The date is written in full form (1976, 1990, 2001, etc).	PWS <sup>1</sup> , EFC <sup>2</sup> , Contracts
Uniform or Variable Rate	<p>A nominal variable that is coded as either “Uniform” or “Variable”.</p> <p>Uniform is defined as having one, flat rate for the water sold through the contract (IE: \$3.50 per 1000 gallons).</p> <p>Variable is defined as any variation other than a single rate. This could manifest as a tiered structure (\$2.50 per 1000 gallons up to 50,000 gallons, then \$3.50 thereafter) or as a base block for which a set charge is assessed (\$25.00 for the first 100,000 gallons, then \$3.50 thereafter). A base block is not a minimum purchase requirement because you are not legally bound to purchase the base block.</p>	Contracts
Minimum Purchase	<p>A nominal variable coded as either “Yes” or “No”. This represents whether or not the contract includes an explicit minimum purchase clause.</p> <p>A minimum purchase clause is an established block of water that must be purchased, whether or not the water is used. This creates a minimum amount of</p>	Contracts

	revenue that the seller will collect from the buyer per billing cycle.	
Original Rate Function of Retail	<p>A nominal variable coded as either “Yes” or “No”. This represents whether the original rate charged in the contract is set in relationship to the seller’s retail rates.</p> <p>A “Yes” would indicate at least one of the following to be true:</p> <ol style="list-style-type: none"> <li>1) The initial rate charged in the agreement is equal to the sellers rates, (the buyer might be charged the “outside” rate, commercial rate, inside rate, etc)</li> <li>2) The initial rate is a set at a function of the seller’s retail rates (150% of the inside rate, 90% of the outside rate, etc).</li> <li>3) The initial rate is locked lower or higher than the seller’s retail rates (“The rate shall be more than the inside rate but less than outside rate”, etc)</li> </ol> <p>A “No” indicates no relationship to seller’s retail rates.</p>	Contracts
Rate Adjustments	<p>A nominal variable that describes how future adjustments to the rate are determined. The options are “Retail”, “CPI” or “Other”.</p> <p>“Retail” denotes that adjustments to the initial wholesale rate will be made in relation to increases in the seller’s retail rate (IE: Increases to the wholesale rate might be pegged to increases in the outside rate).</p> <p>“CPI” denotes that adjustments to the initial wholesale rate will be made in relation to increases in inflation as measured by the CPI (Consumer Price Index).</p> <p>“Other” denotes any other approach for calculating rate adjustments other than in relation to retail rates or the CPI. It also functions as the “default” variable if no adjustment rationale is given.</p>	Contracts
Recurring Capital Charge	<p>A nominal variable coded as either “Yes” or “No”. This variable determines whether or not some form of capital charge or capital contribution was required. A capital charge would be separate from the wholesale rate. The charge must occur on a regular cycle to</p>	Contracts



	qualify as a recurring capital charge, otherwise it qualifies as an “Up-front capital contribution” (one-time payment).	
Charge Frequency	An interval variable representing the frequency of the recurring capital / capacity charge in months. The entry of “0” equates to “N/A”	Contracts
Up-front Capital Contribution	A nominal variable coded as either “Yes” or “No”. This variable depicts whether or not an up-front capital contribution is levied on the water purchaser by the seller. To qualify as an “up front” contribution, the payment must not be reoccurring (otherwise it falls under the “Recurring Capital Charge” variable). However, it is important to note that, an up-front capital charge and recurring capital charge are not mutually exclusive.	Contracts
Customers	The number of customers served by the utilities. There are separate variables for provider A (the Seller) and provider B (the buyer).	PWS <sup>1</sup> , EFC <sup>2</sup>
Size Category	The size category of the utility, based on the number of customers. There are separate variables for provider A (the Seller) and provider B (the buyer). The 6 ranks for category went from smallest to largest, with the following ranges:  1_Very_Small: 0 - 1000 2_Small: 1001 – 3500 3_Medium: 3501 - 9999 4_Large: 10,000 – 49,999 5_Very_Large: 50,000 – 99,999 6_Massive: 100,000+	PWS <sup>1</sup> , EFC <sup>2</sup>
Standard Form	A nominal variable coded as either “Yes” or “No”. This variable determines whether the form represents standard water purchasing contract forms published by the US Department of Agriculture. There are two variations of the standard form, the FHA-442 (an older form, published in the 70’s) and the newer RD-442-30 (first published in 96 with an update in 99).  Despite the updates, the differences between the versions are very slight, with the only key difference being the newer RD forms have sections which would allow for the entry of a “minimum purchase	Contracts

	<p>agreement”, if so desired.</p> <p>My definition of what constitutes as a “Standard Form” is strict. The form must be clearly labeled as “FHA-442” or “RD-442-30” to be granted a “Yes”. Some other forms contain almost all of the standard form language; however, if they are not clearly marked as such, they receive a “No”.</p>	
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<sup>1</sup> Public Water Supply Section of the North Carolina Department of Environment and Natural Resources

<sup>2</sup> The Environmental Finance Center at the UNC-Chapel Hill (includes personal research on EFC’s behalf)

<sup>3</sup> Million Gallons (of Water) per Day

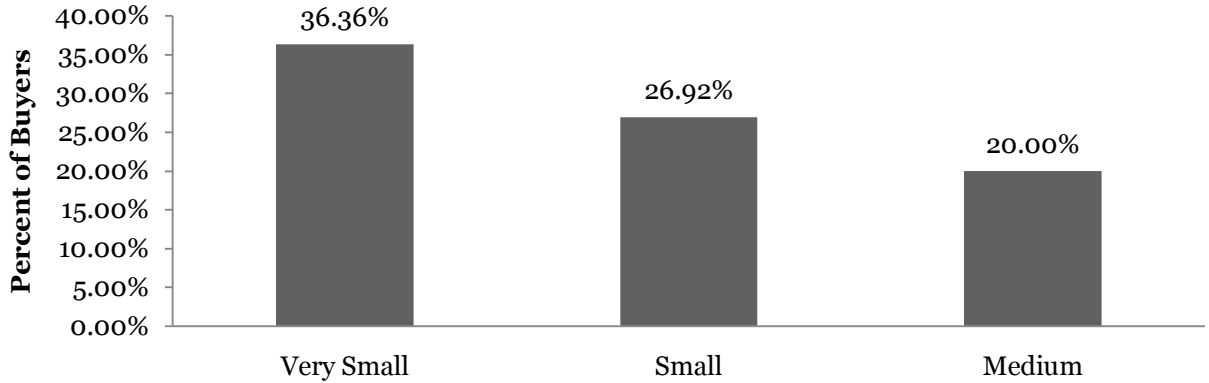
## Appendix B: Summary Data

Distribution of Variables within the Sample			
	Variable	Number in Sample	As % of Sample
<b>Strategies</b>	Minimum purchase clause	24	47%
	Up-Front capital charge	10	20%
	Recurring charge	7	14%
<b>Contract Structure</b>	Standard form	16	31%
	Length of 40 years	40	78%
	Length of less than 40 years	11	22%
<b>Rates: Establishment, structure and adjustment</b>	Original rate set as a function of the retail rate	23	45%
	Uniform rates	43	84%
	Variable rates	8	16%
	Retail based adjustments	25	49%
	CPI based adjustments	1	2%
	Other based adjustments	24	47%

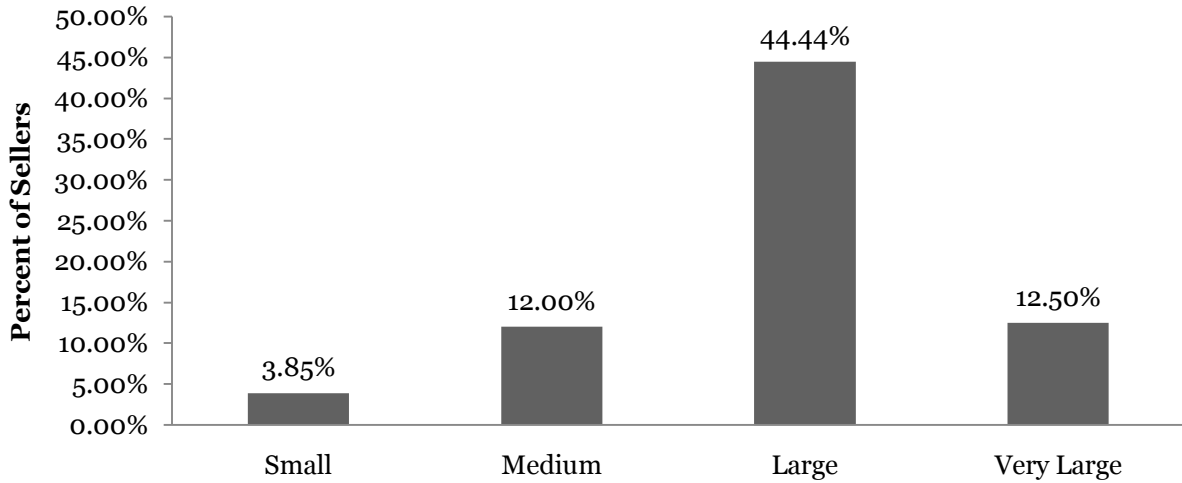
Sums of studied water use (in MgD)			
	Sample	Total†	Sample as % of Total
<b>Average Daily Use</b>	40.529	164.489	24.64%
<b>Contractual Capacity</b>	65.324	286.266	22.82%

†Total represents the 223 agreements listed in the EFC database

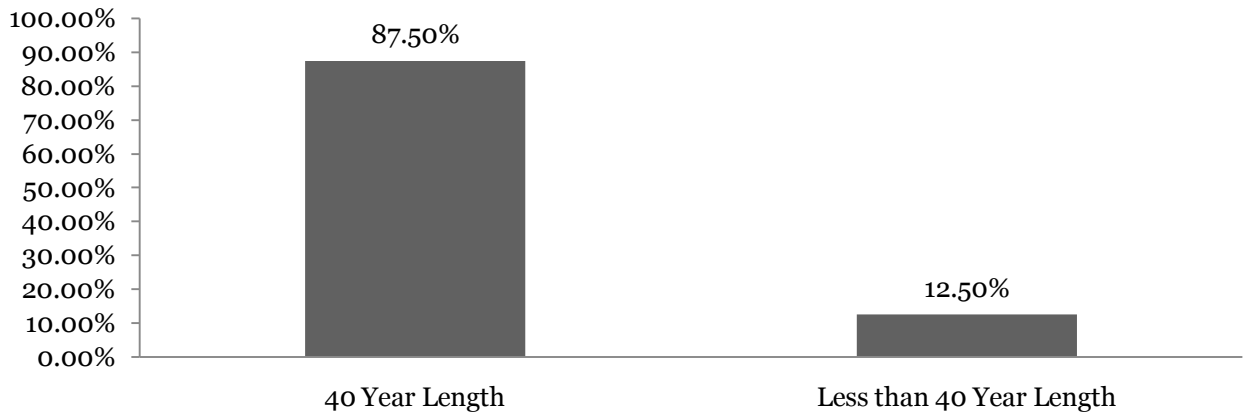
## Buyers use of Standard Forms



## Sellers use of Standard Forms



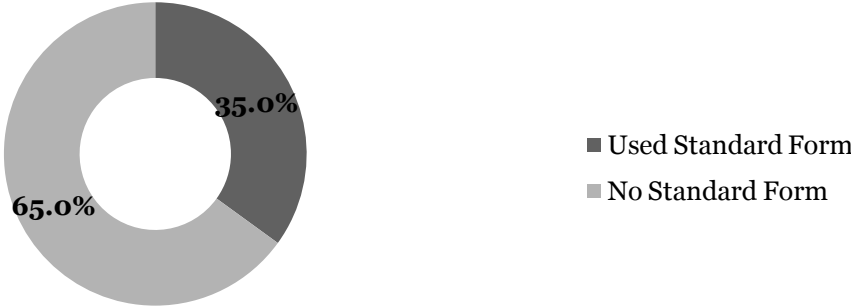
## Use of Standard Forms by Length



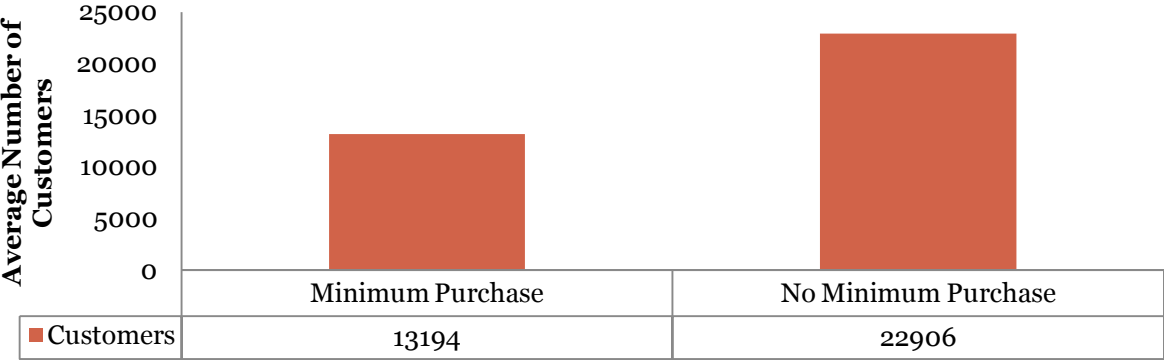
### Standard Form Use in Contracts with less than 40 Year terms



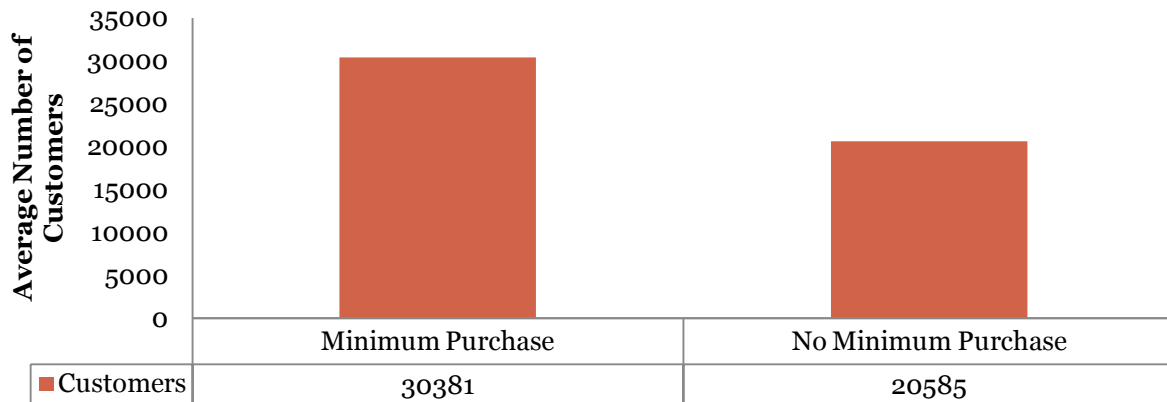
### Standard Form Use in contracts w/ 40 year terms



### Seller - Customers vs. Minimum Purchase



## Buyer - Customers vs. Minimum Purchase



### Appendix C: Chi-Square Analysis

Below is a template for my Microsoft Excel Chi-Square analysis.

Variable #1		Variable #2
Yes† (Actual)	No† (Actual)	
Cell 1 Value	Cell 3 Value	Yes†
Cell 2 Value	Cell 4 Value	No†
Variable #1		Variable #2
Yes (Expected)	No (Expected)	
Sum(Cell 1:Cell2)* ((Sum(Cell1:Cell3) / Sum(Cell1:Cell 4))	Sum(Cell3:Cell4)* ((Sum(Cell1:Cell3) / Sum(Cell1:Cell 4))	Yes
8.784313725	19.21568627	No
<b>Chi Test (P)</b>	CHITEST(ActualValues,ExpectedValues)	
<b>Chi Inverse</b>	CHIINV(ChiTestValue, Degrees of Freedom)	
<b>Chi Distribution</b>	CHIDIST(ChiInvValue, Degrees of Freedom)	

† Yes and No are interchangeable with other descriptions of options, such as “Uniform” and “Variable”.

### Appendix D: Ideas for Future Research

As I developed this analysis, I found myself thinking of ways in which future analysis could expand upon my research or look into connections that I did not have the time or capacity to explore. This list is not all inclusive, as it is possible that there are permutations that I have not conceptualized.

- A broader study of water purchasing agreements in NC, including all 223 active contracts
- A detailed analysis of standard forms, surveying why they are used by utilities.
- A more rigorous study of the existing contracts, expanding the variables and performing a wider series of statistical analysis. Ensure most recent copies of contracts are collected.

- A comparative study of water purchasing agreements, looking into practices in neighboring states (GA, TN, SC, VA, etc) or regionally (entire Southeast).
- Case studies on select partnerships of particular interest, interviews with individuals who used uncommon cost recovery strategies
- An examination of the financial impact caused by selecting any one of these methods or a combination of methods.
- Interviews or survey methods could be used to collect information on how inter-utility water agreements are used and why they were created (in response to what)

## Appendix E: References

<sup>1</sup> Environmental Finance Center. Interlocal Agreement Guidelines: Crafting Interlocal Agreements. Accessed September 14, 2009. <http://sogweb.sog.unc.edu/blogs/efc/>

<sup>2</sup> Miller, Ellen G.; Tatham, Elaine; Hall, Susan. Wholesale Contracts: A Resource Option. American Water Works Association. Vol.88 Iss.11, November 1996, Pg 46-56.

<sup>3</sup> Stedman, Lis. Structuring Tariffs: Getting the most from water rates. International Water Association. Water Utility Management International. June 2009. <http://www.iwaponline.com/wumi/00402/0020/004020020.pdf>

<sup>4</sup> Hall, Susan; Miller, Ellen G. Wholesale Contracts -- Making Sense of Buy-Sell Agreements. American Water Works Association. OPF, Vol. 25 Iss. 2, February 1999.

<sup>5</sup> Wilson, Karen Crimino. Kannapolis officials say Salisbury is overcharging for water. Independent Tribune. Published June 7, 2009. Accessed January 15, 2010. <http://www2.independenttribune.com/content/2009/jun/07/kannapolis-officials-say-salisbury-overcharging-wa/news-local/>

## Appendix F: Acknowledgements

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