A Comparative Analysis of Utility Rate Forecasting: The Cape Coral Experience[1]

Introduction and Background Information

Cape Coral, founded over 40 years ago, is described as the largest and most successful master-planned community in the country. Prior to incorporation in 1970, city designers carefully planned the location of streets, canals, parks, public areas, transportation routes, commercial zones, and industrial parks. The emphasis was always on assuring that commercial and residential growth remained orderly, controlled and balanced. Cape Coral has grown dramatically since its incorporation. In 1960 there was virtually no population. The city's metropolitan market area grew seven times faster than the national average in the 1980s. By 1995, the population had risen to approximately 85,000. Today, it is the most populous Florida Gulf Coast city south of Tampa. With approximately 30,000 of 135,000 building parcels occupied, the city has tremendous room for future growth.

The tremendous growth of Cape Coral has presented city administrators with numerous management challenges. Among them is that of maintaining city-owned reliable water, wastewater, and reuse (irrigation) systems that deliver a high-quality product. At the same time, these systems must also be responsive to consumers, protect the environment, and ensure that the community remains self-sufficient. Coupled with this mandate is the maintenance of financial viability of the community by implementing an effective ad valorem tax structure, debt levels, user fees, and other revenue sources that are equitable and affordable to the community (Raftelis Environmental Consulting Group, Inc., 1995).

In 1991, the city of Cape Coral hired an engineering firm to conduct a utility rate update for the city water and wastewater utility system. According to the 1991 rate study, based on account data provided by the city, water accounts were predicted to reach 28,979 and wastewater accounts 23,088 in 1992. The city reported that actual water accounts for 1992 reached 37,098 while wastewater accounts rose to 23,705. The study predicted that the city would make $15,470,594 during that first year. Actual revenues were $15,406,209. The difference of $64,385 that first year was insignificant. However, the larger question is how revenues could be short at all when actual accounts appeared to exceed predicted accounts by a significant margin.

The problem worsened in the second year as the real impact of a faulty forecast was realized. Projections for that year called for 35,327 water accounts and 25,009 wastewater accounts. City statistics for 1993 revealed that actual water accounts reached 38,315 while sewer accounts rose to 23,342. Projected revenues for 1993, based on the rate study were $19,147,161. Actual utility revenues were $15,406,209, representing a difference of $3,740,952. Again, actual accounts appeared to exceed predicted accounts and, given the wide range of error in estimating revenues, there was substantial reason to doubt the ability of the forecasting study to accurately estimate utility revenues.

In 1994, city staff determined that the account data utilized in the 1991 study were flawed and corrected the account totals for future use. As evidence of how far the data

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were off, the 1991 study had predicted that the city would have 37,044 water accounts and 39,933 wastewater accounts in 1994. Using the 1994 adjusted data, the prediction was for 28,891 water accounts and 17,344 wastewater accounts. The actual figures for 1994 were 28,152 water accounts and 16,203 wastewater accounts. The inflated rate study projected $24,228,719 in utility revenues for 1994. Actual revenues realized were $14,523,876, almost $10 million below the expected total.

Four issues contributed to the forecasting model used in the study producing inaccurate projections: (1) the city was installing 14 square miles of sewer system that was completed behind schedule; (2) the city was installing an irrigation system to homes. These accounts were added at a slower than anticipated pace; (3) the growth rate for the city was anticipated to continue at the 8% level experienced in the 1980s. In fact the rate dropped to approximately 3%; and (4) the data provided by the city for water and sewer accounts were inaccurate.

The combination of erroneous data, slower than expected growth rate, slower than projected wastewater construction, and delays in securing irrigation connections created revenue flow problems for the city. Compounding the issue was the fact that city planners budgeted with the projected figures. In 1994, the city of Cape Coral budgeted almost $1.6 million more than actual revenues. The 1991 rate study, in its executive summary indicated that, “from projections of revenues and expenses at existing rates, the water system appears to be self-sufficient only through Fiscal Year 1992 in terms of meeting its operating revenue needs from the standpoint of debt coverage.” As later facts became known, this turned out to be a true statement. Clearly the efficiency and effectiveness of the rate study were handicapped by the data used and thus by the forecasting model developed.

Correcting Faulty Forecasting

Clearly, results from the 1991 rate study were flawed, leading to significant underestimating of revenues for city water, wastewater, and irrigation programs. Growth in government means changes in processes and structure. While Cape Coral accomplished this strategically with forward thinking innovations such as a $21 million Water Reclamation Plant, a $125 million Gravity Sewer Project, and a $100 million Dual Water System, the city’s data collection system was not as responsive. In 1991, as the rate study was being conducted, the city realized that its computer system would be the key to a cost-effective solution to problems already identified with information processing, data collection and full integration of systems. A proposal was presented to the city Council to replace the WANG VS100 with an IBM AS400 and a fully integrated database provided by Harward Technical Enterprises (HTE). The AS400 and the HTE software were chosen in 1992, but the implementation process extended into 1994.

The city’s first Business Manager was hired in January 1994. At that time, the utility module was not converted from the WANG system to the HTE system. A new utility rate study was commissioned in early 1994, but not completed until December of that year. Once completed, the new rate study was rejected by the city Council after many sessions of heated public debate. The discrepancies noted between the 1991 rate study and current data in 1994 proved to be confusing to citizen groups and City Council members. Basically, conversion of the WANG system to HTE highlighted data problems

that contributed to inaccurate forecasting during the previous study. The business manager assumed responsibility for data conversion. It was apparent at an early stage that the HTE system was an outstanding system that would accomplish everything that the city needed in the area of data storage, management, and security. However, the HTE system was only as good as the data provided by the city and the previous system. Therefore, the first element of conversion became an analysis of data and processes. Through this process, several areas of concern developed.

In 1991, there were few processes in place that involved users in the storage and manipulation of data. This resulted in responsibility for data being maintained at a centralized level with few measurements in place for data accuracy. Additionally, property changes were the responsibility of Lee County. The county utilized a good system for joining and dividing property. However, once the action was accomplished, the county transferred the changes on a weekly basis to the city for inclusion in their database. There was no process in place for the data to be entered in the city's database; therefore, each week the data held by the city of Cape Coral were deteriorating.

Also in 1991 there was no accounts receivable database available for a water assessment. Citizens paid as they were connected and the results were logged, but not maintained so that they could be queried or analyzed. Several accounts, totaling approximately $65,000 were not billed for their annual payment. In 1993, some 24 months later, the properties involved were assessed liens by the city but still not billed. In 1994, the accounts were billed by the incoming business manager. However, due to the liens not being placed until 1993, several properties had new owners. This caused a huge customer service problem. Additionally, the absence of a database resulted in several homes being missed and not connected as legally required by city ordinance.

Finally, in 1991, water and wastewater accounts and housing units were tracked by a report from the WANG system. Though this report was difficult to read, the 1991 report relied primarily on this historical data for its forecasting model. This customer data obtained from internal records proved to be the Achilles heel of the rate study. Data retrieved from historical files indicated that over time, city staff had erroneously transposed units and accounts. Each dwelling is considered a unit, while only the metered accounts are measurable for revenue purposes. The reporting system used by city staff consisted of reports from various internal forms that were consolidated in the Customer Service Department on a written monthly report.

Compounding the issue was the fact that these reports to management were simply compiled on the monthly reporting sheet and then filed. Without the benefit of a spreadsheet, it was easy for management to miss the transposition of erroneous data. This caused customer complaints and data that were virtually useless for planning purposes. Since the reports were filed and not followed on a spreadsheet, the significant difference in the number of units was not discovered until the city converted to the new computer system in 1994.

The 1991 rate study predicted that the city would experience a 20% reduction in water consumption due to the implementation of Water Independence for Cape Coral, the earlier report commissioned in 1988. This projection was built into the model, but did not compensate for erroneous data provided by the city. In 1994, the city business manager analyzed six months of water usage for the first 10,500 customers receiving the dual water system. This review determined that in a six-month window, 9,500 users having

irrigation in 1994 and no irrigation in 1992 consumed 203 million fewer gallons of potable water. With a city average of 207 million gallons per month, this constitutes two full months of water and wastewater revenues with only 33% of the potential users connected. While this variable was considered, its effects on new irrigation revenues were considered to be minimal. Further analysis of accounts in preparation for the 1994 rate study revealed inaccuracies in approximately 8,000 water accounts and 5,000 wastewater accounts.

In 1991, the city was structured for a centralized information system division that allowed no ownership of data by the individual departments. The MIS manager and two programmers managed the WANG system. This was a system of centralization by necessity. The COBOL programming required to provide reports was complicated and cumbersome. While department managers controlled input through account entry at the various service counters, very little control over or responsibility for data was provided to department managers. Therefore, many of the data entry requirements fell on the MIS division. Managers requiring reports would request the necessary data through the programmer and wait on results. Due to the complexity of the COBOL programming, managers had to assume that the programmer understood the requirements.

In 1991, responsibility for data and processes was placed at the lowest level rather than with senior management. The engineering firm was provided data by a divisional supervisor based on reports provided by the MIS division. Measurement and accuracy checks were not in place at higher levels of the organization.

The rate study conducted in 1994 was ultimately rejected in the face of problems realized with the earlier study. In addition to inaccuracies identified in the data provided for the 1991 study, citizens blamed city officials for delays in ongoing projects and voted the 1994 study down.

Conclusion

Due to the public hearing process, the city of Cape Coral learned a valuable lesson about accurate forecasting. The 1991 rate study produced a false target resulting in overspending by city government and the need for a utility hike in 1994. Inaccurate data and the inability to explain the deficiencies, led to mistrust of government staff and the voting down of the 1994 rate study.

During the public hearings, citizens were blaming everything from expensive supplies to government corruption as the problem. Laubach (1995) wrote an article titled "city Utilities Losing $200,000 a Month" in which a quote from then Public Service Director places the blame for the losses with the predictions made for the 1991 utility rate study and delays in the wastewater project. The debate over utility rates resulted in demands by City Council members for audits of the entire system. City Council voted to delay any rate increase until a determination of cause could be established.

Overall, pitfalls in forecasting brought budget deficits, audits, citizen committees, and criticism from the city Council and the public. Along the way, resignations were tenured, thousands of dollars were spent, and trust in city staff was diminished. Following good management principles in the forecasting of utility rates would have precluded or minimized this problem.

Discussion Questions

1. **After reading this case, what processes would you implement if you were the City Manager for Cape Coral?**

2. **What implications does the failure of the utility rate study in 1995 have for the City in regards to immediate impact?**

3. **What were the problems with the initial forecast and what would you suggest to improve the forecast for future rate studies?**

4. **What would you suggest that the City do for the future? How can this problem be avoided?**

References

Hartman & Associates, Inc. (1995). "City of Cape Coral: Water and Wastewater Annual Report Fiscal Year 1995", Hai Project No. 96-347.00, Fort Myers, FL.

Laubach, D., "City Utilities Losing $200,000 a Month", Cape Coral Daily Breeze, (February 15, 1995).

Raftelis Environmental Consulting Group, Inc. (1995), "City of Cape Coral: Performance Audit of Utilities Division", Charlotte, NC.