Case 44

Sunnyside – Up or Not?

Sunny Acres was a desert, then a retirement community, and now it may be becoming a high-tech oasis. If community boosters and the local university can be believed, then Sunny Acres will be to genetic engineering what Silicon Valley and Route 128 are to computers. Sunny Acres may also simply remain a small city with more industry, but still focused on being a retirement community.

The planning staff of the regional public utility commission has described these possibilities as {0%, 3%, or 5%} annual growth with ascribed probabilities of {.2, .5, and .3} respectively. Unfortunately, over the utility commission's standard 30-year study period, the low and high population estimates vary by a factor of 4.3. This variation is a key difficulty for the commission in minimizing the cost of reliable service to the area's population.

One of the questions that the commission must face is how to charge for the cost of capital facilities. If the annual cost is level, then users in early years pay at a higher rate than users in later years. Alternatively, if the commission sets rates based on a level cost per user-year, then "repayment" of capital costs will be very slow initially. In fact, the payments in early years will probably not even be enough to cover the interest on the initial investment.

In this dry area, the largest costs are associated with dams and other water-diversion projects. In addition, these "generation" projects have large up-front costs and fixed capacities; thus, it is for these projects that the uncertainty is of the most concern. Local distribution/collection trunks for sewer, for water, for power, and for electricity are more easily expanded for incremental population increases (tied to new construction). However, a major dam, once the size is chosen and the dam is built, can only be expanded at great cost, if at all.

For example, consider a water-diversion tunnel and aqueduct that are proposed for Sunny Acres. This project will cost $600 million, which will be spread uniformly over a 4-year construction period. When the water project comes on line, there are expected to be 250,000 users in Sunny Acres. Its design is linked to the high growth estimate, so its capacity is adequate for the 30-year horizon. The physical lives of the tunnel and aqueduct should exceed 100 years.

Once it is in operation the annual costs for pumping (including periodic pump replacement and upgrading) will be a function of the growing annual volume. However, these costs can easily be tied to the number of users in each year, so there is little controversy over the correct computational method. These variable costs will simply be added to the capital costs.

Recommend a policy on capital costs for the utility commission, and compare its advantages and disadvantages with other possibilities. Assume that the interest rate is 9% for all calculations.

Option

To simplify the case, students might consider only one pricing alternative and/or one growth rate scenario.

Suggestions to the Student

1. Assume the utility commission uses a level cost per user-year. Now compute the *capital* cost per user under each of the three growth scenarios. Compare the average of these three costs per user-year with a cost based on an average growth rate. Is one value better than the other? Why?

2. Use the cost/user-yr for the average growth rate. Now compute the year of maximum "indebtedness," which is the year when user charges equal interest payments, and the year when 50% of the initial bond amount has been paid off.

3. Assume the utility commission uses serial maturity bonds so that the total paid off each year is constant. This means that the charge/user-year decreases as the

population increases. Compute the capital cost per user-year over the 30 years under each growth scenario.

4. What are the political advantages and disadvantages of each policy? If growth is different than "expected," then what are the risks of each policy?