THE ECONOMICS OF RESOURCE RECOVERY  
IN AUBURN, MAINE

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This is an interesting and valuable paper, particularly for a small municipality considering a waste-to-energy plant. Unfortunately, it does not have any real experience included. The spread of potential costs to the city from a negative $9.49/t, to a positive $13.20/t, makes general planning, based on this data, extremely difficult. This is particularly true when the current perceived cost of alternative disposal is not included. Hopefully, the authors will include actual figures to date in their portion of this discussion volume.

There are specific points that are instructive or must be considered by other cities in their planning. Perhaps the first of these is a small, but critical, point. In their six specific reasons for implementing the project, four are related directly to the landfill as a disposal means. Disposal of waste is a service function a city must perform that has certain demands. One of the reasons relates to a regional socioeconomic concern that is providing support to Pioneer Plastics so that they may be more competitive and have better reasons to remain in Auburn. This is of great importance to the city, but is not a necessary service provided by the city, nor really very easily quantifiable to the economic desires of the city. One is economics of disposal defined in the paper as “the possibility... was cost effective... over its life cycle...” Yet this latter business concern was “the bottom line” requirement for the decision to proceed.

What does this mean? Why is it important? In many localities, the specific reasons are the same, but the desire to absolutely provide the service function of waste disposal leads to facilities that are oversized. There are instances where plants were constructed with a 400 ton/day (TPD) design capacity expecting to have 200 TPD throughput (50 percent of design) and actually experiencing 100 TPD throughput (25 percent of design). Using Auburn numbers, examine the changes. Auburn is paying capital and interest of $373,490 on a $3.4 million loan with an average throughput of 160 TPD (80 percent of the 200 TPD design capacity) for 260 days/year. Thus, the plant must earn about $9.00/t to pay debt service. If the plant operated at 50 percent capacity, it would have to earn $14.36/t and at 25 percent $28.73/t respectively.

Note also that as throughput decreases, so does the energy production and, therefore, income from energy also decreases. Again, the Auburn figures are instructive. Examining Table 4 Initial Economics, reveals that the only change between having a cost of a minus $9.49/t at the plant, and having to pay $13.20/t to the plant, is whether or not excess steam can be sold.

The lesson is obvious. Do not spend more capital than necessary for either waste disposal or for production of more energy than the market can absorb.
Auburn chose to make their decision based on life cycle economics. They also chose to repay debt by making uniform payments on debt principal each year (of $170,000) and declining payments of interest. This, in effect, front loads the project when, as in most businesses, it is least economic. An alternative would be to repay a levelized annual cost for principal and interest. Then the payments would be $299,790 per year for a $3.4 million debt at 6.28 percent interest. This would improve first year economics by $1.80/ton, but of course at a future expense. Over the life of the loan, the total principal and interest paid is about $570,000 more than the uniform principal payments chosen. Thus, the most economic life cycle repayment method was chosen at the expense of higher early year payments. Where decision making is based on first cost, which is more common in local governments, then levelized debt service is to be preferred.

As a small project, Auburn could afford to use its General Obligation Bond authority. Thus, bond repayment is secured by the general tax revenues of the city. In other cases, cities chose to use revenue bonds for such projects and project revenues are used to secure bond repayments. Revenue bonds have higher interest rates that might average 2 percent more in interest rate than general obligation bonds and require that both working capital and debt reserve be added. Working capital provides cash to pay operating expenses until payments are received for waste disposal and energy sales. The billing schedules are not indicated in the paper. However, if Auburn should transfer funds into the project at the beginning of a quarter, collect other cities disposal fees monthly, and pay Consmat at the end of the quarter, they might just avoid the need for working capital.

Debt reserve has been provided within the Pioneer Plastics contract. Should the plastics plant be closed, they will pay the remaining principal and interest. The contracts with other communities for disposal service should be mentioned. Seven options were offered, although only two, Options B and C were utilized. Of those options, according to the author’s verbal presentation, Option B, a 20 year fixed cost, was selected. This option has no risk and is easily understood. Option B has a very modest risk and the potential for very high payoff. For instance, if the Auburn costs for the first year of operation is $6.50/ton as expected, in year 2, those cities will save $2/ton over Option B. The critical point is that Auburn assumed all the local government risk, yet has not passed that risk on to other cities using the facility. Of course, it also must be noted that Auburn avoided many of the most serious risk elements, namely, performance risk which is properly passed to the system vendor and long term energy market risk which has been passed to Pioneer Plastics in the form of a guarantee from Pioneer to pay remaining principal and interest should they cease to purchase energy. This coverage is not so certain as one might think since Pioneer could also choose to “take and pay” for the minimum amount of steam guaranteed by their contract.

In summary, this is an instructive project, it is very economic and has good risk coverage. However, one must recognize that those economics flow principally from the general obligation bond issue (as much as $6/ton decrease) and secondarily from the government grants ($1.10/ton decrease). The risk is appropriately shared by the local government sponsor, the vendor/operator and the energy buyer. Each has his income stream to cover his risk. However, the other local government users should assume more risk for the benefits they receive.

Perhaps the authors will report some actual results of the plant at the 1984 conference. If they do, hopefully, they will isolate and report on the change in disposal costs due to modified collection vehicle operations costs that relate to the new plant. These costs would include the change in vehicle mileage costs that develop because a landfill substitute was either closer or farther from the centroid of collection and more importantly, the change of maintenance costs because the vehicles now travel over paved areas to disposal in lieu of travel over a landfill.