ESTABLISHING A FAIR PRICE FOR STEAM FROM A RESOURCE RECOVERY FACILITY

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Discussion by

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This paper provides an excellent discussion of steam contracting understanding and philosophy for resource recovery projects, or for projects, which are to provide steam from alternative or less traditional fuel sources. I commend the author on this contribution to a most critical aspect of putting together a viable resource recovery program.

A few of the key points made need to be re-emphasized nonetheless:

1. The deal struck must yield the maximum benefits to both parties. As municipal solid waste disposal has a negative value, and the fuel displaced an increasing cost, a wide margin for bargaining and sharing of the benefits exists. 2. The terms of the contracts must be understood well before design and project financing is approached. The contract must reflect the interests of both the solid waste disposal facility and the energy user. Often times, the final terms of the contract may need to be reviewed in consideration of the type of financing approach taken. 3. Downtime and operating losses should be taken into account in the economics of the project. 4. A reserve fund ought to be established to finance construction of additional facilities to use the steam or to make facility design changes due to process improvement or new regulations. 5. Steam value should be pegged to the value of the fuel displaced. Keep the user’s facility capital and operating costs out of the formula. It will be in the interests of both parties to set a pricing formula which provides for an increasing benefit to the user. Additionally, the user’s financial stability will be important to the stability of the solid waste project. The user’s primary interest in energy is to have a reliable source of supply which has a predictable and relatively stable cost. Tying the cost of steam to consumer or wholesale indices, therefore, can be considered.

A few points need to be considered by the author. 1. Tipping fees for disposal of solid waste should always be included in the economic statement as one of the revenue sources. 2. The value of electricity in such projects is changing as a result of Federal PURPA requirements and state Public Utility Commission policies. The supply of marginal power and purchase of same by utilities is gaining favorable values. These extra revenues can be of particular benefit to a project’s economics when electricity is cogeneraled with steam production and use. 3. The author only referred to fuel oil. Other fuels (e.g., coal and gas) should also be referenced in such discussions. Although these fuels are not yet as expensive, their relative value is increasing and similar refuse-to-steam projects have moved forward displacing those fuels.
An excellent paper and an important topic. It is a pleasure to offer comments to supplement and reinforce the author’s.

**COGENERATION**

For potential cogeneration applications, it may be worth noting that the incremental capital cost for adding cogeneration is probably one-fourth to one-half of the capital cost of even large scale straight electrical generation. Thermal efficiency is twice as good. Forced outage rates for generation equipment are less than 0.5 percent. With institutional barriers against cogeneration fading, any new steam from waste facility should very seriously consider cogeneration.

**CONDENSATE RETURN**

Condensate should be returned whenever possible. However, quality of monitoring is almost mandatory and treatment may be necessary. It should be realized that the existing quality of off-premises condensate may deteriorate if the user no longer has the quality control incentives associated with his own stream production operation requirements.

**CONTRACTURAL PROVISIONS**

Contractual considerations and options are very well covered. In general, the approach to price can be either based on cost or value (or a combination). Generally, financing is simpler on a cost/cost escalation approach but marketing is simpler on a value basis. Values basis marketing is likely also to yield the highest long-term revenues.

**SUMMARY AND CONCLUSIONS**

The author’s last paragraph cannot be over emphasized. Marketing agreements in the early stages of a project are of utmost importance.

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This paper presents a useful review of most of the major issues involved in the increasingly important area of marketing refuse-derived energy. As the author notes in his Introduction, such revenue is a key element of financially attractive resource recovery operations. I would disagree with Mr. Rose, however, that the projected tipping fees “must be less than the cost of any available alternate method of disposing of solid wastes” (my emphasis). In Camp Dresser & McKee’s project for Oakland County, Michigan, for example, the County and many of its municipal governments have formally adopted a pro-resource (energy) recovery posture with explicit recognition of the probability that costs will be higher.

Mr. Rose aptly notes that the minimum tipping fee is obtained when the facility is operated “at or near the maximum possible throughput rate”. This is followed by the suggestion of a ‘put-or-pay’ disposal contract approach. In the Oakland County project, CDM has recommended a variation on this theme which we have called the ‘Base-Load Concept’. For Oakland, we have recommended: (1) underbuilding the (initial) incineration capacity; (2) operating the incineration system at design capacity at all times except for maintenance outages; and (3) using a landfill for the portion of raw refuse which cannot be burned and for excess refuse when units are out of service. By this means maximum use is made of capital-intensive and operating cost intensive resources albeit at a cost of reduced steam supply reliability.

Mr. Rose observes that electricity is generally the least desirable energy product; requiring additional capital investment and commanding the refuse. It is worth noting, however, that acceptance of electricity is required of utilities in accord with the Public Utilities Regulatory Policy Act, Section 201 although the price paid may be limited to the fuel energy equivalent (or other measure of ‘avoided cost’) experienced by the power company system.

Mr. Rose comments in his discussion of Steam System Reliability that “the price for the steam will generally be pegged to the price of fuel oil”. While CDM has also found this to be true in many parts of the Northeast U.S., our work in the Mid-
west, South and Far West (where cheaper natural gas or coal are commonly used) has shown that less favorable price relationships can exist. Each project situation must, therefore, be evaluated in context with the local energy market.

In discussing the Value of Steam to the Customer, Mr. Rose recommends that energy cost inflation to the steam buyer should be reduced by indexing the steam price at a rate "less than the increases in the Consumer Price Index". I sharply disagree with him in this since: (1) at project initiation there is (presumably) a margin of benefit to the user sufficient to make participation attractive without future bonuses; and (2) the resource recovery system owner has taken on the lion's share of risk and should reap the rewards if, indeed, his 'product' becomes more valuable. At best, in my opinion, the steam user should continue to pay a unit price linearly scaled to alternative energy costs.

Mr. Rose's review of escalation in steam pricing to reflect changes in general price levels recommends against a pricing formula which incorporates escalating factors for a variety of cost elements. My experience with commercial steam suppliers (particularly where the supplier is the sole steam source for the user) is that such carefully inflation-protected contracts are common and are good business. Again, why should the investor (often the public) carry all the risk?

Mr. Rose does not bring up a point which, for some situations, may be important: the potential that the steam user may close up shop and move away, go bankrupt etc. leaving the town with a costly waste management system. Where possible, therefore, protection against such events should be written into the contract, siting should be such that one or more customers are within economical steam piping range or, and ideally, the resource recovery plant should serve a multi-client steam distribution system.

In closing, I would commend the paper to those considering resource recovery. Realistic evaluations of the magnitude of resource recovery energy revenues are vital to sound municipal decision-making.

Discussion by

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Mr. Rose has pointed out some of the basic economic facts of life in his paper. First, front-end money or a tipping fee is necessary in this business. Second, just as long term commitments are necessary for revenue bond financing, similarly long term commitments in the form of contracts for energy are necessary to venture financing.

This paper does state the case well for addressing the institutional factors in a resource recovery venture prior to site or facility design.

AUTHOR'S REPLY

The author wishes to express his appreciation to the thoughtful comments made by the various discussers of this paper.

To Harvey Gershman

Mr. Gershman's point that the sale of electricity is becoming more attractive as a result of PURPA requirement has some validity. My understanding of these requirements is that utilities will have to pay for the full value of electricity delivered to their grid by cogeneration systems and cannot penalize these systems by excessive demand charges and reliability requirements. How this will work out in the case of resource recovery facilities that are delivering electricity to the grid at all times has not yet been demonstrated. My intent was to show that the value of any electricity produced off-peak is related to the lowest fuel costs incurred by the receiving grid. My use of fuel oil as a reference energy cost was made in the interest of keeping the discussion simple and did not imply that for any specific project, other fuels might have to be considered in the economic analysis. Finally, I agree that the user's capital and operating costs should be kept out of the pricing formula. However, tying the cost of steam to a consumer or wholesale price index rather than a fuel cost can be a powerful incentive to a prospective user to sign up for an extended term.

To F. Bruce Pyle

Mr. Pyle's comment on the need for quality control of condensate is well taken, since a deterioration of condensate quality will of necessity result in additional costs for the resource recovery facility. Thus it is necessary to monitor not only quantity and temperature of the returned condensate, but its chemical quality as well.
Mr. Niessen questioned my statement that tipping fees must be less than alternate disposal costs. Since the ultimate decisions on resource recovery are mostly made in the political arena, it is not only unavoidable but perhaps even essential that factors which are not easily quantified in monetary terms enter into the decision process. Thus the acceptance of higher costs by a public body is a recognition that the balance sheet does not always reflect all of factors that must be considered in a public decision. I also agree with Mr. Niessen’s suggestion that the construction of resource recovery facilities be staged so that a completed plant is immediately utilized to its full design capacity, and that the economics will generally favor using a landfill for excess refuse or during temporary outages rather than providing spare incinerator capacity. As I indicated in my response to Mr. Gershman’s comments, my point was that the concept of stabilized energy costs may turn out to be more of an inducement to a potential user than the immediate savings, and that having a long-term steam contract is by itself a stabilizing factor as far as the system owner is concerned. The problem of a steam user defaulting is of course a serious one, and the only real protection lies in selecting a steam customer with a minimum likelihood of defaulting. I don’t know if multi-client systems are a realistic answer to this problem. In most cases, there is no choice but to design the system to provide optimum service to your principal customer.

Again, my thanks to all of those who took the time to review my paper and submit discussions.