THE HONOLULU RESOURCE RECOVERY FACILITY
PROCUREMENT: A CASE STUDY IN RISK
REDUCTION AND RISK ALLOCATION

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ABSTRACT

This paper describes the HPOWER procurement process for selection of a contractor for the design, construction, and operation of a resource recovery facility in Honolulu. Modelled on a two-step competitive bid procedure used in U.S. armed services procurement, the HPOWER procurement process is an instructive case study in the reduction and allocation of risk from the feasibility study stage to bid acceptance. Key risk factors are discussed and their reduction and allocation are defined.

INTRODUCTION

On October 16, 1980, the Honolulu Program for Waste Energy Recovery (HPOWER) passed a significant milestone in the procurement of a resource recovery facility. On that date, HPOWER received two bids, one from a joint venture of Combustion Engineering, Inc. and AMFAC, Inc. (CE/AMFAC) and one from UOP, Inc. (UOP). This event represents a successful conclusion to the procurement process under the legal requirements for competitive bidding in Hawaii, even though project continuation has been delayed by a newly elected administration.

Most resource recovery projects in the United States that are planned by government are procured through competitive negotiations, which allow selection of a contractor based upon proposal factors other than price. Considerable flexibility can be accorded to offerors in structuring their proposals. In a competitive bid situation, it is imperative that all offerors' proposals be essentially equivalent except for proposed price. Price thus becomes the crucial criterion for selection. This approach has an inherent drawback in the resource recovery industry: the variety and complexity of technology being offered by diverse companies makes it exceedingly difficult to reduce those proposals to essentially equivalent terms in a conventional competitive bidding process. Finding a rational alternative procedure was a real challenge for both government and industry involved in the Honolulu project.

This paper describes the process by which a resource recovery facility full service contractor was selected for the HPOWER project. The key to success was the use of a two-step competitive bidding process modelled on one developed for the armed services for procurement of complex technological services and equipment. The conduct of the procurement using the two-step competitive bid process as it was actually employed for the HPOWER project was motivated by an overriding consideration: namely, reducing and allocating the risks associated with Honolulu's acquiring a resource recovery facility. In this paper, the author illustrates how the conduct of the procurement actually accomplished that risk reduction and risk allocation. Risk management should always be a major objective of any procurement.
LEGISLATIVE INITIATIVES TO EFFECT CHANGES IN LAW TO ALLOW COMPETITIVE NEGOTIATIONS AND OTHER RISK REDUCING OPTIONS

Hawaii law as interpreted by the state Attorney General does not permit negotiated procurement. On the Honolulu Project, serious efforts were made to obtain special authorization to use a negotiated procurement method. These efforts included the introduction of proposed legislation in early 1978 and the conduct of briefing sessions for House and Senate leaders. Since these and other steps were not successful, it was necessary for Honolulu to devise a procurement process that would meet the requirements of Hawaii and Honolulu law and provide for negotiations of complex technical and responsibility/risk sharing arrangements between Honolulu and private firms bidding on the project. The procurement process selected was based on the two-step formal advertising method provided for in the Federal Armed Services Procurement Regulations (ASPR). Although the failure to enact the legislation desired represented a setback at the time, it can be argued, in retrospect, that the political leaders reduced the risk of adverse electorate response for making exceptions for one particular project. Political risk was reduced further by exactingly high standards by the project proponents in the conduct of the two-step formal advertising method. Those high standards included full documentation of detailed objective standards against which each proposal was compared and documentation to each offeror as to its failure to meet those standards if found unacceptable. In short, the constraints of state law pushed the City and County of Honolulu toward an inventive accommodation of the statute's requirements so as to provide many of the benefits of competitive negotiations and yet maintained the discipline associated with competitive bidding.

The upshot was a better process in that the best features of both types of procurement were retained.

In addition to this initiative, legislation was introduced to obtain greater control of the flow of solid waste by giving counties within Hawaii the right to direct the disposal of solid waste and to permit the issuance by counties of Pollution Control Revenue Bonds (PCRB). The latter measure was enacted in the 1978 legislative session, and the former in 1979. Control of the waste stream reduced the risk that insufficiency in the volumes of waste might at times jeopardize the revenue flow essential to the project's economic feasibility. On its part, the PCRB law allowed for greater private sector involvement in the project and thereby increased the potential for private equity capital. The consequence was the potential for reduced financial investment and risk to the public developing entity (i.e., the City and County) by a reduced debt obligation.

PREPARATION AND ISSUANCE OF THE REQUEST FOR PROPOSALS

Subsequent to the unsuccessful attempts to modify existing law to allow for competitive negotiations, the City, with the assistance of its technical and financial consultants, prepared an RFP which employed a two-step formal advertising method of procurement, following the armed forces' procurement model. This two-step process allows for complex technologies to be competitively bid without the need for detailed and complete engineering specifications. Conceptually, the process requires that only firms submitting acceptable technical proposals may submit bids in the price competition. The first step of the two-step procurement is the determination of acceptable technical proposals. The second step is the receipt of competitive bids from those firms that submitted acceptable technical proposals.

For HPOWER, the process was refined to eliminate or reduce certain risks perceived to be problems by the project proponents. The first step of the two-step competitive procurement was further divided into a Step IA and Step IB. Step IA called for receipt of qualifications statements from those firms that were interested in the HPOWER procurement. The criteria for successfully passing this step were that the firms be of sufficient financial strength to handle a project expected to be in the $100 million dollar range and also that these firms offer a technically proven resource recovery system. Net assets, total assets, operating ratios, debt to equity and other financial barometers were examined and if found to exceed $100 million by at least a factor of two, the firm was generally found to be financially acceptable. Thus, the risk of obtaining a financially weak company as the full service contractor for HPOWER was reduced and the City would not be accepting the risks associated with unproven technologies. Step IB called for receipt of technical proposals in response to
functional specifications from those firms qualified in Step IA. The technical proposals were to be completed to a 30 percent design level and were subjected to a procedure for refining the proposals and revising the specifications to come to acceptability.

Step II was the receipt of pricing proposals from those firms whose technical proposals were found acceptable in Step IB. Pricing proposals were required to include the capital cost for design and construction of the facility, the operations and maintenance costs for twenty years, and guarantees as to recovered energy and materials. Accordingly, a complex computation was required to determine what constituted the winning bid. A formulation of the price competition was included in the RFP, although the details of the computational procedure were modified during the procurement. The formula that was used for the actual bid comparison is attached as Exhibit A.

STEP IA - QUALIFICATIONS OF PROSPECTIVE OFFERORS

Subsequent to the July 1977 issuance of the RFP, fifteen firms or combinations of firms submitted their qualifications to the City for the HPOWER project. The major criteria for acceptability of the firm in this step of the procurement were the financial strength of the firm and the history and experience of the process being offered. The financial strength criterion was designed to assure the decision makers that only firms of demonstrable financial capability, commensurate with the magnitude of the HPOWER project, would be allowed to offer technical proposals to the City. This then had the effect of reducing the financial risk to the City by promoting the selection of a contractor who would be able to complete the resource recovery system proposed — a contractor who had, in short, shown full financial wherewithall to carry the project through to a successful conclusion. The technical experience criterion for the process was designed to assure the decision makers that commercially proven technology (not demonstration and prototype equipment) would be offered to the city for the HPOWER facility. This criterion acted to reduce the risk that the City might be induced to invest millions of dollars in unproven technology. Of the 15 firms submitting qualifications to the City for the HPOWER project, only ten of those were found acceptable and allowed to proceed to Step IB. The major criteria used are included in Exhibit B.

STEP IB - TECHNICAL PROPOSALS

Of those firms whose qualifications were found to be acceptable to the City in Step IA, five submitted proposals for complete resource recovery systems. Occidental Resource Recovery Systems, Inc. withdrew its proposal shortly after submitting it on the required date (August 15, 1979). The four firms that remained in the competition were: CE/AMFAC, UOP, Teledyne, and Raytheon.

During this stage of the procurement, the project proponents sought to reduce the risk to the City by providing technical specifications and spelling out the degree of detail required in the proposals. On many other resource recovery projects, the level of detail required in the technical proposal has been minimal, just enough to understand the bare essentials of what a firm was proposing. In the HPOWER procurement, a thirty percent (30%) design was required for the proposals and the evaluation team examined these proposals correspondingly. Since the procurement method required systems to be (as nearly as possible) technically comparable at a functional level, the specifications were translated into minimum criteria (as contained in Exhibit C) that had to be met for the proposal to be acceptable. The combination of the minimum criteria and the 30 percent design submittal insured reduction of the risk that the City would obtain a system (albeit at a lower cost) in the final bidding step that had less than expected performance. That system would not have been selected if the same performance for each system had been required in this step. This is the “apples and oranges” comparison that every procurement office seeks to avoid. All decisions by the evaluation team were made keeping this in mind.

Examples of risk areas that were scrutinized were:

1. Availability of the facility determined by maintenance schedules, forced outage rates, and spare parts inventory.
2. Health hazards from dust, odors, and vectors.
3. Assurance of revenues based upon efficiency of operations, availability, storage capacities, and design and construction of the facilities.

The process was designed to give each firm offering a system two acceptance opportunities:

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first, to upgrade their system to meet the criteria or, second, to convince the evaluation team of the desirability of altering the criteria. Three firms were found acceptable in all respects and allowed to enter the next phase of the project. These were CE/AMFAC, UOP, and Teledyne.

CONTRACT WORKSHOPS

The three firms and the City scheduled a series of contract workshops to hammer out the contractual principles by which the facility would be designed, constructed, and operated. Putting contract principles into a common form ensured that the risks the City would be accepting would be more or less the same irrespective of the individual contractor. The three firms then would be able to bid for their proposed acceptable system to a common contract differing only in the technical details for their design.

A major task issue at the first workshop involved the concept of a full service resource recovery contractor, as defined by the City. That definition included complete services from the prime contractor (i.e., the proposer selected in the procurement) for design, construction, and operation from contract award through to completion of twenty years of operation. This concept had informed the RFP, the proposed contracts as revised, and the project proponents' representations to the elected officials of the City. It was designed to insulate the City from the risk of bringing multi-party suits in the event of problems during this twenty-three year contract period. The City required that it would be dealing with a single responsible entity. Thus, when one of the firms (Teledyne) with an acceptable technical proposal demanded (under threat of withdrawal from the process) an alteration of this relationship for the construction of the facility for the firm's continued participation, the City faced a dilemma. The tradeoff was the risk of reducing to only two the number of potential bidders. With only two bidders left, the subsequent withdrawal of either would force the City into a sole source procurement with the attendant loss of leverage. The decision was made to accept the risk of having only two potential bidders. Teledyne then withdrew from the procurement.

The contract workshops were structured as simultaneous negotiations with the remaining two bidders. Contract negotiations are, by their nature, the allocation of the risks associated with the undertaking — in this case, the design, construction, and operation of the resource recovery facility. The risks that were allocated included the following matters.

1. Force Majeure — The city accepted all the financial implications caused by events of Force Majeure. The major controversy in this area involved the definition and scope of what constitutes events of Force Majeure. Exhibit D contains the definition as included in the bid document.

2. Performance — The selected Contractor was to take the major risk of the facility's failure to meet performance specifications. Reduced revenues and reduced capital cost to the Contractor (in the event that efficiency or throughput were less than specified in the contract) were acceptable to both potential bidders.

3. Schedule — The contract provides for delay penalties payable by the contractor to the City if the contractor fails to meet the schedule. These penalties, however, reimburse the City for only about one fourth of the loss that may be incurred. The risk of financial loss from delay is thus a shared risk.

4. Cost — Costs greater than the bid prices adjusted by specified inflation indices would be absorbed by the Contractor. Those prices, as bid and adjusted for by the inflation indices, were absorbed by the City.

5. Debt Impact — Both firms pressed for access to the City's General Fund for payment of operating costs in the 20 year operation period. A novel method of establishing a Special Fund that received all revenues and was capitalized initially by a portion of the bond issue assured the Contractor that it would be paid and yet insulated the City from direct recourse. Had direct recourse to the General Fund been allowed, the entire 20 year operation cost would have been considered debt of the City.

Throughout the negotiations, other less important impasses developed besides the above. These were invariably solved by innovative risk sharing proposals or the City's finding some permissible method of accepting a risk that the private sector could not accept. The perceived need for competition in the final step to reduce the risk of a greater cost was always a serious tradeoff considered.

CONCLUSION

The bids received on October 16, 1980 justified the risk allocations negotiated in the procurement in that both bids, fostered by competition, were
well within the range of acceptability as defined in the earlier feasibility study. The feasibility study had made a recommendation that the procurement process would determine the actual costs which could only be estimated by the City and its consultants. The very favorable net tipping fees that the City expects for the project are a measure of how fully the goals of the procurement process were achieved. The major milestones for the procurement are provided in Exhibit E. Representatives from all major City departments were required at various phases of the project and were responsible for providing a comprehensive and unified City posture for the project. The total resources needed for this project were about the equivalent of six or seven full time professional people employed from the start of the project through receipt of bids on October 16, 1980.

EXHIBIT A

BID CALCULATION FORMULA (SIMPLIFIED)

\[
\text{Bid} = \frac{1}{20} \sum_{q=1}^{20} (1.07)^q (\text{Tipping Fee})
\]

\[
\text{Tipping Fee} = (\text{Costs} - \text{Revenues}) \div 561,600 \text{Tons}
\]

\[
\text{Costs} = \text{Capital Cost} + \text{Operations Cost Escalated to the qth Year}
\]

\[
\text{Revenues} = (\text{Guaranteed Production of Products}) \times (\text{Hawaiian Electric Company Projection for Electricity Value Using City's Assumed Escalation Rate to qth Year})
\]

\[
\text{Capital Cost} = (\text{Capital Recovery Factor}) \times (\text{Bond Issue})
\]

\[
\text{Bond Issue} = \frac{(\text{CPB})(0.07 + \text{EF})}{1 - \text{UC} - (\text{SIPDC}) (\text{ENF})}
\]

Where:
- \( \text{CPB} \) = Construction Price Bid
- \( 0.07 \) = Factor for City’s Costs to Supervise Contract
- \( \text{EF} \) = Escalation Factor Based Upon Drawdown Schedule and City’s Inflation and Earnings on Unexpended Construction Funds Assumptions
- \( \text{UC} \) = Underwriting Costs as a Percent of Bond Issue
- \( \text{SIPDC} \) = Semiannual Interest Payments During Construction as a Percent of Bond Issue
- \( \text{ENF} \) = Earnings Factor on Unexpended Funds Needed for Semiannual Interest Payments

EXHIBIT B

CRITERIA FOR ASSESSING OFFEROR QUALIFICATIONS IN STEP IA OF THE HPOWER PROCUREMENT: EVALUATORS SCORED SUBMISSIONS AS ACCEPTABLE OR UNACCEPTABLE

FINANCIAL

- Ability to meet daily operating contingencies
- Access to additional capital (e.g., credit rating, debt/equity ratio)
• Ability to survive long-term contingencies as indicated by net worth, profits, long-term debt, etc.
• Ability to undertake additional projects (e.g., current backlog)
• Experience in solid waste and resource recovery
• Prospects for bonding during HPOWER
• Commitment of senior management to HPOWER

MANAGEMENT
• Significance of resource recovery to total organizational structure
• History of corporate success (e.g., date of established profits)
• Background in resource recovery
• Appropriateness of corporate structure to control and responsibility
• Skills and experience of corporate staff
• Sufficiency of skills and experience to construct and operate plant of size proposed
• Adequacy of corporate marketing arrangement to resource recovery products
• Background in dealing with resource recovery products
• Experience and responsibility of marketing staff

PROCESS TECHNOLOGY
• Degree of proven readiness of proposed process
• Sufficiency of operating experience of process
• Prior demonstration at greater than 10 tons per hour
• Achievement of at least seven consecutive days of operation in most recent twelve months
• Sufficiency of process descriptions and data available (e.g., recovery rate, composition of products, energy and materials balance, environmental requirements)

LOCAL FEASIBILITY
• Local markets for products of resource recovery as evidenced by letters of interest
• Match of products in quality and quantity to markets requirements
• Characteristics of proposed site in area, access, land use, and availability
• Relationship with established, responsible local firm

EXHIBIT C

CRITERIA FOR ASSESSING TECHNICAL PROPOSALS IN STEP IB OF HPOWER: EVALUATORS SCORED SUBMISSIONS AS ACCEPTABLE OR UNACCEPTABLE

TECHNICAL SYSTEM
1. Design
   • Process demonstrated as state-of-the-art
   • Equipment adequacy and system integration

2. Availability
   • Backup systems
• Storage capacity (for refuse delivered in spite of mechanical failure)
• Scheduled and unscheduled downtime
• Maintenance approach (attitude toward preventive maintenance; plans for parts inventory)

3. Energy and Materials Balance
• Energy output/input
• Materials balance; weight and volume reduction (residue remaining for landfill)
• Extent of materials recovery (types and quantities/per ton refuse input)
• Use of supplemental fuels (fossil fuels or electric power per ton of refuse processed)

4. Market Compatibility
• Quality (salability) of recovered energy, materials, and residue
• Compliance with market requirements (product specifications, delivery, schedules, compliance with market requirements)
• Ability to meet changes in market demands

5. Adaptability
• Expansion capability (to meet future incremental disposal needs)
• Additional materials recovery (ability to add recovery subsystems if new materials markets develop)
• Waste types and variations (tolerance for variation in MSW waste stream and ability to handle other wastes, e.g., sludge or animal waste)
• Energy market change (responsiveness to energy market changes by alteration in energy product)

SYSTEM MANAGEMENT
Method of planning, organizing, and controlling the project—including interrelationships with subcontractors.

1. Management Concepts and Policies
• Corporate commitment and level of control
• Understanding of responsibilities and authority
• Budget controls and reporting

2. Design, Engineering, and Construction Personnel
• Identification and commitment of key personnel
• Qualifications and experience (including subcontractors)
• Definition of responsibilities

3. Operating Personnel
(Identical to Item 2 immediately above)

4. Marketing
• Evidence of successful marketing efforts (letters of interest and agreements to purchase recovered energy and materials)
• Qualifications and experience of marketing personnel
• Future plans for marketing new products
5. Schedule
   • Completeness and clarity of project master plan
   • Reasonableness of schedule and milestone identification
   • Progress controls and reporting

6. Financial strength of parent company and subsidiaries with respect to a 20-year project

ENVIRONMENTAL IMPACTS

1. Architectural Site Design and Aesthetics
   • Professional capabilities and experience of architects
   • Aesthetics of site layout, landscaping, structure
   • Adequacy of site in acreage for facility, parking, vehicle storage
   • Impact of plant on surroundings (compatibility of exterior design)

2. Air Quality Impacts
   • Stack emission compliance with applicable standards
   • Dust and odors
   • Control measures

3. Water Impacts
   • Water use in plant operation
   • Quality/quantity of effluents
   • Treatment/disposal provisions (predischarge water treatment; sludge disposal)

4. Noise and Traffic Impacts
   • Community and in-plant noise (truck traffic; plant operation)
   • Noise control measures
   • Traffic handling at site

5. Health and Safety
   • Residue storage and disposal provisions (vermin and vector control)
   • Plant health and safety measures (operational and equipment safety features; fire and explosion control; personnel safety)

EXHIBIT D

"Force Majeure" shall mean any act or event which has had, or may reasonably be expected to have, a material adverse effect on the rights or obligations of the parties under this Contract or a material adverse effect on the Facility or the Site, or the construction, operation, ownership or possession thereof, if such act or event is beyond the reasonable control of the party relying thereon as justification for not performing an obligation or complying with any condition required of such party under this contract, such acts or events to include but not to be limited to the following: (a) an Act of God such as a cyclone, earthquake, flood, landslide, lightning, abnormal storm, typhoon, tsunami, impassable roadways or other cataclysmic phenomenon of nature; (b) explosions; (c) fires; (d) an act of the public enemy, war, blockade, insurrection, riot, general unrest or restraint of government and people, civil disorder or disturbance
or similar occurrence; (e) governmental preemption of materials in connection with a national emer­
gency; (f) power or other utility failure; (g) strikes or walkouts; (h) delays of subcontractors or suppliers
solely as a result of a Force Majeure event, as defined herein to the extent substitute supplies, equipment
or services are not reasonably available; (i) the order, judgment or other official governmental action of
any federal, state, local or foreign court, administrative agency, governmental office or body; provided,
however, that the contesting or failure to contest such order, judgment or action, in good faith, shall not
be considered as overriding any event of Force Majeure; (j) suspension, termination, interruption, denial
or failure of renewal or delay in approval of any permit, license, consent or authorization; or (k) any
change in or changes in interpretation of any federal, state or local law, ordinance, code, regulation or
court order concerning the design, construction and operation of the Facility from those as interpreted
or otherwise in effect on _______ 19 ______.

EXHIBIT E

CHRONOLOGY OF EVENTS IN SOLID WASTE MANAGEMENT PLANNING ON OAHU

JUNE 1969

A Preliminary Draft of the Hawaii State Plan for Solid Waste Management, prepared by the Environ­
mental Health Department, School of Public Health, University of Hawaii under the auspices of the
Hawaii State Department of Health, is submitted. Preparation of this report was financially assisted by a
Federal Grant from the EPA, Office of Solid Waste Management Programs.

MAY 1971

Act 112 of the 1971 Section of the Legislature of the State of Hawaii is approved, appropriating
funds to the State Office of Environmental Quality Control (OEQC) to examine the feasibility of solid
waste recycling.

JULY 1971

Solid Waste Management Plan for City and County of Honolulu – Supplement to Hawaii State Solid
Waste Management Plan, Metcalf and Eddy, Inc. is issued. Funded in part by a Federal Grant from EPA,
Office of Solid Waste Management Programs, this study was administered by the Hawaii State Depart­
ment of Health.

DECEMBER 1971

The Hawaii State Plan for Solid Waste Management, prepared by the Environmental Health Depart­
ment, School of Public Health, University of Hawaii in conjunction with the Hawaii State Department of
Health is issued. This document was funded through a Federal Grant from the EPA, Office of Solid
Waste Management Programs.

JUNE 1974

Act 247, State Environmental Policy, is approved by the Legislature of the State of Hawaii placing
the State on record as encouraging recycling of solid wastes.

FEBRUARY 1975

The Eighth State Legislature approves House Concurrent Resolution 49, directing the Hawaii OEQC,
with the aid of a task force, to prepare and submit to the next session of the Legislature a recommended
organizational structure to effect resource recovery from solid wastes in the State of Hawaii.

FEBRUARY 1975

Feasibility of Power Generation from Solid Wastes on Oahu by Sunn, Low, Tom and Hara, Inc.,
Metcalf and Eddy, Inc., is completed. This study was jointly sponsored by the City and County of Hono­
lulu, Amfac, Inc., and Hawaiian Electric Company.
NOVEMBER 1975

The Council of the City and County of Honolulu adopts Resolution 271 directing that the Department of Public Works pursue the recovery of energy and materials from solid wastes by selecting proposals from the private sector to construct and/or operate a resource recovery facility.

APRIL 1977

MITRE Feasibility Analysis examines technical, siting, and procurement options for a Honolulu resource recovery plant. System is found feasible.

JULY 1978

RFP is advertised and issued to more than 50 prospective contractors. Qualifications packages are received from 15 firms in Step IA of the procurement in September 1978. Hearings follow in November and December. Eleven firms are judged qualified to submit technical proposals.

AUGUST 1979

Five firms qualified in Step IA submit Step IB Technical Proposals. Notification of proposal deficiencies subject to remedy is made in October and December. Results are announced in January 1980: three firms are qualified to enter price bids in Step II.

FEBRUARY 1980

Contract workshops to allocate risks are held with eligible bidders. These last until September 1980. One eligible firm withdrew.

OCTOBER 1980

Bids are received from two firms. These are validated and subjected to sensitivity analysis. C E/AMFAC is judged to be preferred bidder.

KEY WORDS
Full Service
Legal
Life Cycle Costing
Municipality
Performance
Procurement
Request for Proposal