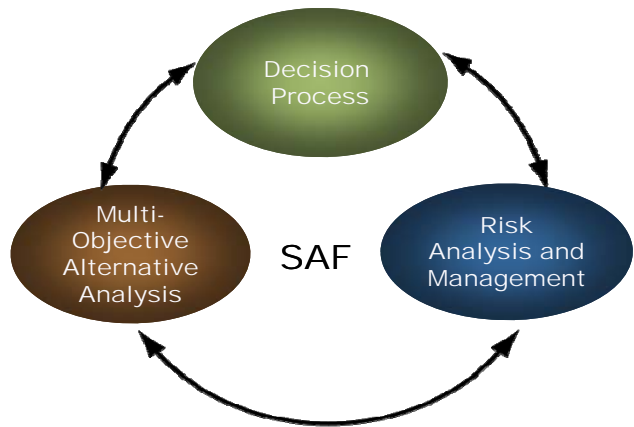


# Value Model and Risk Analysis of Residuals Management Options

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This memorandum provides draft objectives hierarchy and performance scales for analyzing site and treatment alternatives for the County of Hawai'i Integrated Solid Waste Management Plan. This information will be used to help the County decide on a residuals management option that best meets its economic, social, and environmental objectives while considering key risks and uncertainties.

Our approach to helping the County make this decision is part of the sustainability assessment framework (SAF) used by CH2M HILL on complex, public infrastructure projects. This process started by exploring the objectives that may be important to making this decision at the December 2008 and February 2009 solid waste advisory committee (SWAC) meeting. The approach taken in this analysis for assessing multiple objectives is called value modeling<sup>1</sup>. Value modeling is a quantitative technique for making decisions that involve multiple financial, environmental, and social objectives that is based on the principles of multi-attribute utility theory<sup>2</sup>.



## Value Modeling

Value modeling proceeds through a series of defined steps. To clarify the discussion of steps in this introduction, a simple example is developed. The steps, illustrated in Exhibit 1, are:

*Establish the decision goal*

*Identify and specify fundamental objectives*

*Develop performance measures to assess project performance against objectives*

*Add technical detail to the performance measures, and assign scores to the performance measures*

*Assign weights to the objectives*

*Score alternatives*

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<sup>1</sup> Also known as multi-criteria decision analysis. The specific technique used is called SMARTS, the Simple Multi-Attribute Rating Technique with Swings.

<sup>2</sup> Keeney, Ralph L. and Raiffa, Howard. Decisions with Multiple Objective. Cambridge University Press. 1976.

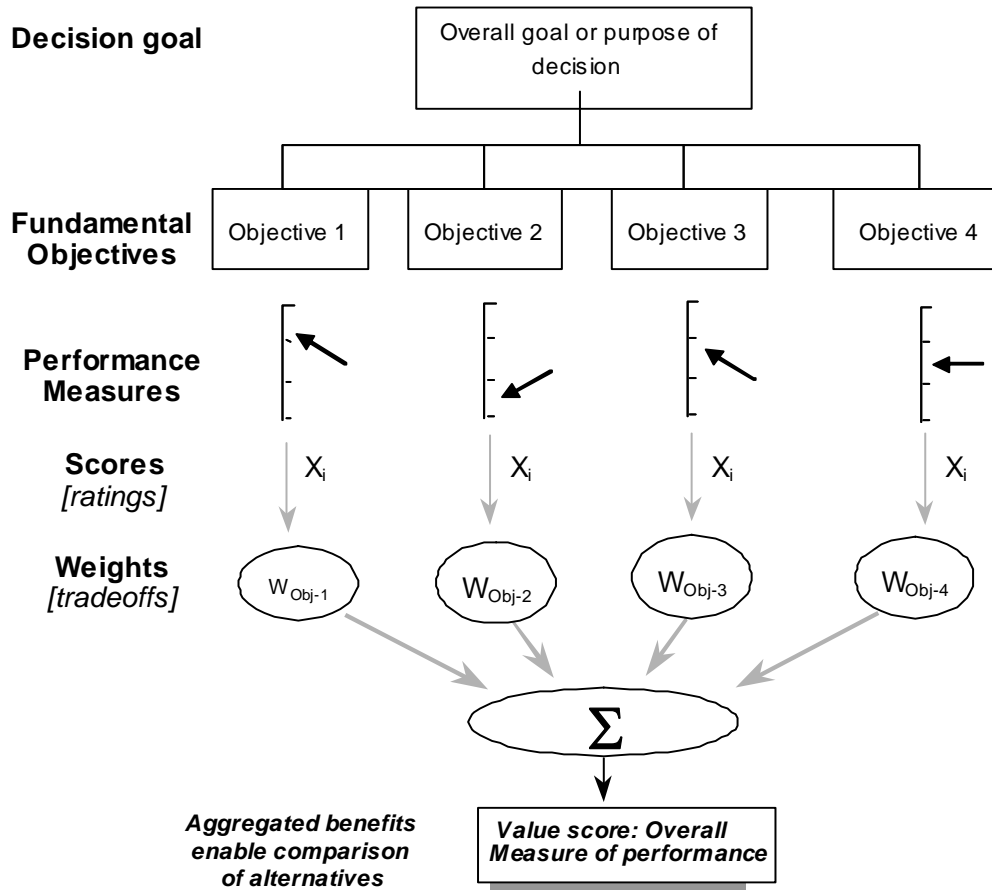
Calculate total value scores and conduct a sensitivity analysis

These steps are discussed in detail in the following sections.

**EXHIBIT 1**

**Generalized Representation of Value Modeling**

See text for discussion of the figure.  $X_i$  represents the score of alternative "i" on the given objective. Weights are the relative importance assigned to each objective.  $\Sigma$  is the rule for aggregating scores.



**Decision Goal**

The decision goal is the overall purpose of the evaluation, or what is to be accomplished by making a decision. It should clarify what is included and excluded from the scope of the evaluation. In this analysis, the decision goal is to: "select the preferred method for managing residuals after reduction, reuse, and recycling both in the short-term and in the long-term."

**Objectives, and Criteria**

Objectives are the important aspects of a decision that are arrived at through careful thinking about issues. Fundamental objectives are the most basic elements in the model. They are also referred to as evaluation criteria and may be further characterized by the development of sub-criteria, which ultimately produces an objectives hierarchy.

## Performance Measures

Once the objectives are fully developed and the decision-maker(s) agree that they fully represent the important issues in the problem, performance measures are required to determine how well alternatives perform against the objectives. Performance measures may be quantitative or qualitative, depending upon the objective and the availability of data for each measure. The objectives hierarchy and performance measures for this analysis are shown in Exhibit 2.

### EXHIBIT 2 Objectives Hierarchy and Performance Scales

**Decision Context:** Select the preferred method for managing residuals after reduction, reuse, and recycling both in the short-term and in the long-term

#### Key Assumptions

- All options are operated in compliance with applicable laws and regulations
- All options have the same level of up-front reduction, reuse, and recycling

Objectives Hierarchy	Performance Measure
1. Minimize long-run life-cycle cost	System average per-ton cost in FY 2008
2. Protect public health and the environment	
A. Minimize greenhouse gas production (from process and/or vehicles)	Change in annual MTons Carbon Equivalent
B. Minimize other harmful air emissions (from process and/or vehicles)	1-5 Scale
C. Minimize water pollution	1-5 Scale
D. Promote worker and public safety	1-5 Scale
3. Minimize social impacts	
A. Minimize proximity impacts (e.g., traffic, noise, odor)	1-5 Scale
B. Provide local jobs	Added jobs
C. Promote environmental justice	1-5 Scale
4. Accommodates future reductions in residuals and changes in composition (i.e., no put-or-pay)	1-5 Scale

Note that the costs measured are “system average per-ton cost in FY 2008”. This includes the cost of disposal and any added transportation costs beyond current conditions. It does not include costs for administration and recycling, which are assumed to be fixed for the purposes of this analysis. The costs also reflect the system average so that if costs are varied for East Hawai`i, the effect on total system costs, which include costs for West Hawai`i will be less than if only East Hawai`i costs were reported. In this way, a valid comparison of the costs of alternatives can be presented. It should be noted that the costs shown are planning-level, conceptual costs. Actual costs would vary depending on many factors.

Greenhouse gas production was estimated as the change in annual metric tons of carbon from current conditions. These were estimated using the US EPA WARM model, adjusted for changes in transportation from County transfer stations to the recovery or disposal facility. Jobs are an approximation of changes in the number of full-time equivalent employees that would be needed to operate the alternative compared to the existing system. All other performance measures were constructed scales where the worst possible outcome was given a score of one, and the best possible outcome a score of five. Note that this doesn’t mean that there will always be one alternative with a score of one and one with a score of five: some objectives do not vary appreciably and thus have scores clustered around the midpoint of the range (i.e., a score of three).

## Alternatives

Alternatives are the actions that may be taken to accomplish objectives. A well-considered value model includes a complete set of alternatives. Care must be taken not to exclude or overlook alternatives that might meet the stated objectives. For this analysis, a series of alternatives were developed from the options presented in the draft Residuals Management section of the ISWRP Update. The following seven alternatives are investigated in this analysis:

1. Waste-to-Energy Facility for East Hawai`i; Ash and Bypass Materials to SHSL
2. Waste-to-Energy Facility for all County Residuals; Ash and Bypass Materials to WHSL
3. One or More Modular Waste-to-Energy Facilities in Rural Areas; Ash and Bypass Waste to SHSL and WHSL
4. Develop Mechanical-Biological Treatment (MBT) Facility at the SHSL and/or WHSL Sites
5. Expand SHSL for East Hawai`i residuals, and use WHSL for West Hawai`i residuals
6. Close SHSL and landfill all County Waste at the WHSL
7. Bale and Barge East Hawai`i Waste and utilize WHSL for West Hawai`i residuals

## Weighting Objectives

Some objectives may be more or less important than other objectives. Different stakeholders faced with the same problem may have different underlying value systems, and, therefore, may have a different sense of what’s most important in the given problem.

This leads to the concept of “weighting” objectives. Assigning weights to objectives is a subjective exercise based on the values of the stakeholder(s). This was accomplished during the February 2009 SWAC meeting, where a trained facilitator led SWAC members through an exercise to think clearly about the relative importance of different values. Weighting was done after the performance measures have been developed, so SWAC members could include in their consideration the extent to which the full set of alternatives vary in performance. Technically, the weight assigned to an objective is a measure of its relative contribution to the decision goal as it is varied from the lower end of its measurement scale to the upper end of that scale.

Weights were assigned by first rank ordering each objective in a particular level of the hierarchy from “most important” to “least important”. Then weights were assigned that reflect the relative importance of each objective. These weights were then converted to a 0-1 scale regardless of the method used to obtain weights. The weights developed for the objectives are shown in Exhibit 3.

Because the weights are inherently subjective, SWAC members had different opinions about the relative important of objectives. For a few objectives, consensus was difficult to achieve, thus the sensitivity of results to changes in weights was explored for costs, greenhouse gas emissions, and worker safety.

**EXHIBIT 3**  
Weights

**Decision Context:** Select the preferred method for managing residuals after reduction, reuse, and recycling both in the short-term and in the long-term

<b>Objectives Hierarchy</b>	<b>Weights</b>	<b>Percent</b>
1. Minimize long-run life-cycle cost	85	23.0%
2. Protect public health and the environment	100	
A. Minimize greenhouse gas production (from process and/or vehicles)	90	6.8%
B. Minimize other harmful air emissions (from process and/or vehicles)	80	6.0%
C. Minimize water pollution	90	6.8%
D. Promote worker and public safety	100	7.5%
3. Minimize social impacts	90	
A. Minimize proximity impacts (e.g., traffic, noise, odor)	85	8.1%
B. Provide local jobs	80	7.6%
C. Promote environmental justice	90	8.6%
4. Accommodates future reductions in residuals and changes in composition (i.e., no put-or-pay)	95	25.7%
<b>Total</b>		<b>100.0%</b>

## Scoring Alternatives

Rating or scoring alternatives is the process by which the performance measurement scales are applied to the alternatives. Each alternative is scored to determine the extent to which that alternative meets each objective.

The scores and the rationale for each constructed scale are shown in Exhibit 4. After scoring, each performance measure is arithmetically transformed to a scale of zero-to-one. For example, if a cost scale ranging from \$1,000 to \$2,000 were converted to a zero-to-one scale, then \$1,000 would rate a “one” on the new scale; \$2,000 would rate a “zero;” and \$1,500 would rate a 0.5. This zero-to-one scale described above implies a linear relationship between cost and value. This means that increasing cost from \$1,000 to \$1,500 is as important as increasing cost from \$1,500 to \$2,000. The two incremental changes are of equivalent value. Scales can also be nonlinear when changes along the scale have different degrees of importance.

**EXHIBIT 4**  
**Scores and Scoring Rationale for Residuals Management Alternatives**

**Decision Context:** Select the preferred method for managing residuals after reduction, reuse, and recycling both in the short-term and in the long-term.

**Key Assumptions**

- All options are operated in compliance with applicable laws and regulations
- All options have the same level of up-front reduction, reuse, and recycling

Objectives Hierarchy		Performance Measures	Scores						
			1. Waste-to-Energy Facility for East Hawai'i; Ash and Bypass Materials to SHSL	2. Waste-to-Energy Facility for all County Residuals; Ash and Bypass Materials to WHSL	3. One or More Modular Waste-to-Energy Facilities in Rural Areas; Ash and Bypass Waste to SHSL and WHSL	4. Develop Mechanical-Biological Treatment (MBT) Facility at the SHSL and/or WHSL Sites	5. Expand SHSL for East Hawai'i residuals, and use WHSL for West Hawai'i residuals	6. Close SHSL and landfill all County Waste at the WHSL	7. Bale and Barge East Hawai'i Waste and utilize WHSL for West Hawai'i residuals
1.	Minimize long-run life-cycle cost (per-ton disposal cost 2008 net of any changes to transfer station or trucking operations)	System average per-ton cost in FY 2008	\$87	\$100	\$65	\$185	\$64	\$69	\$83
2.	Protect public health and the environment								
A.	Minimize greenhouse gas production (from process and/or vehicles, change from existing disposal system)	Change in annual MTons Carbon Equivalent	-22,887	-59,759	-1,596	-120,006	0	244	31,265
B.	Minimize other harmful air emissions (from process and/or vehicles)	1-5 Scale	2.0	1.0	2.5	5.0	3.0	2.5	4.0
C.	Minimize water pollution	1-5 Scale	2.5	4.5	2	3.5	1	3	4
D.	Promote worker and public safety	1-5 Scale	1.5	1	1.5	1	3	2	2
3.	Minimize social impacts								
A.	Minimize proximity impacts (e.g., traffic, noise, odor)	1-5 Scale	3.5	3.5	2	1	3	2	4
B.	Provide local jobs	Added jobs	15	23	-5	43	5	0	0
C.	Promote environmental justice	1-5 Scale	3.5	2.5	2	3.5	3	2	3.5
4.	Accommodates future reductions in residuals and changes in composition (i.e., no put-or-pay)	1-5 Scale	1.5	2	2.5	2.5	5	5	4

EXHIBIT 4 (CONTINUED)

Scores and Scoring Rationale for Residuals Management Alternatives

Objectives Hierarchy	Rationale						
	1. Waste-to-Energy Facility for East Hawai'i; Ash and Bypass Materials to SHSL	2. Waste-to-Energy Facility for all County Residuals; Ash and Bypass Materials to WHSL	3. One or More Modular Waste-to-Energy Facilities in Rural Areas; Ash and Bypass Waste to SHSL and WHSL	4. Develop Mechanical-Biological Treatment (MBT) Facility at the SHSL and/or WHSL Sites	5. Expand SHSL for East Hawai'i residuals, and use WHSL for West Hawai'i residuals	6. Close SHSL and landfill all County Waste at the WHSL	7. Bale and Barge East Hawai'i Waste and utilize WHSL for West Hawai'i residuals
1. Minimize long-run life-cycle cost (per-ton disposal cost 2008 net of any changes to transfer station or trucking operations)	Estimated cost	Estimated cost	Estimated cost	Estimated cost	Estimated cost	Estimated cost	Estimated cost
2. Protect public health and the environment							
A. Minimize greenhouse gas production (from process and/or vehicles, change from existing disposal system)	Estimated emissions	Estimated emissions	Estimated emissions	Estimated emissions	Estimated emissions	Estimated emissions	Estimated emissions
B. Minimize other harmful air emissions (from process and/or vehicles)	Truck fuel use similar to today; some air process air emissions	About 24,000 additional gallons of fuel (if sited at one of the landfills); Highest air process emissions	About 13,000 gallons less truck fuel use; some air process emissions (least of all WTE options)	Truck fuel use similar to today; relatively little harmful process air emissions	Truck fuel use similar to today; Some volatile organic compounds from landfilling	About 24,000 additional gallons of fuel; Some volatile organic compounds from landfilling	About 7,000 additional gallons of fuel use; fewest landfill emissions
C. Minimize water pollution	Reduced reliance on landfilling in East Hawai'i	Reduced reliance on landfilling in both East and West Hawai'i	Small reduction in landfilling	Reduced reliance on landfilling in both East and West Hawai'i; Stormwater and process water must be controlled	Highest reliance on landfilling	Reduced reliance on landfilling in East Hawai'i	Reduced reliance on landfilling in East Hawai'i
D. Promote worker and public safety	Some added risk to worker safety from boilers and process equipment	Some added risk to worker safety from boilers and process equipment	Some added risk to worker safety from boilers and process equipment	Some added risk from process equipment	Similar to today	Slight reduction of risk from consolidating operations at landfill with less rainfall	Slight reduction in risk from bale and barge versus in-county landfill
3. Minimize social impacts							
A. Minimize proximity impacts (e.g., traffic, noise, odor)	Reduced proximity effects assuming sited at SHSL site	Reduced proximity effects assuming sited at the SHSL or WHSL site	Added proximity effects associated with modular facility	High risk of noise and odor regardless of where sited	Similar to today	Added trucking through communities already opposed to waste transportation	Fewer proximity impacts than current system
B. Provide local jobs	About 15 more jobs than today	About 23 more jobs than today	About 5 fewer jobs than today (less trucking)	About 43 more jobs than today	About 5 more jobs than today	Similar to today	Similar to today
C. Promote environmental justice	Slightly better than today because less material to landfill; Assumes plant is sited at SHSL	Potentially worse depending on location of the new facility	Potentially worse depending on location of the new facility; Definitely would have a facility in a new location	Somewhat better than today because less material to landfill; assumes facilities are located at existing landfill sites	Similar to today	Potentially worse than today because of added trucking	Possibly better than today because less waste landfilled in the County
4. Accommodates future reductions in residuals and changes in composition (i.e., no put-or-pay)	Poor. Relatively poor economies of scale with facility sized for East Hawai'i would make aggressive waste reduction extra expensive	Poor. Maybe not as bad as East Hawai'i WTE because facility could be sized larger and still be compatible with relatively aggressive waste reduction	Somewhat poor—plant sizing would make aggressive waste reduction a problem in areas in vicinity of the WTE facilities	Somewhat poor—significant capital expense, and more contaminated recyclables	Good. Relatively low capital, thus compatible with aggressive reduction in waste requiring disposal	Good. Relatively low capital, thus compatible with aggressive reduction in waste requiring disposal	Relatively good assuming contract can be developed without a "put or pay" provision

## Calculating Total Value Scores and Sensitivity Analysis

The total value score for each alternative is calculated as a weighted averaging process in which the scores are weighted by the value weights and summed for each alternative. Sensitivity analysis is then conducted to test the sensitivity of the results to changes in weights. The results of the analysis are shown in Exhibits 5 through 10, which show the results in the following ways:

*Exhibit 5: Summary scores in total and by main objective*

*Exhibit 6: A bar chart showing the summary scores*

*Exhibit 7: A bar chart showing the detailed scoring of protecting public health and the environment*

*Exhibit 8: A bar chart showing the detailed scoring of minimizing social impacts*

*Exhibit 9: A scatter diagram plotting non-cost value versus cost*

*Exhibit 10: Sensitivity analysis of the results to changes in weights*

As shown, the following three alternatives are rated significantly higher than the other four alternatives:

*Alternative 5: Expand SHSL for East Hawai`i residuals, and use WHSL for West Hawai`i residuals*

*Alternative 7: Bale and Barge East Hawai`i Waste and utilize WHSL for West Hawai`i residuals*

*Alternative 6: Close SHSL and landfill all County Waste at the WHSL*

Further, in most of the sensitivity analysis, the alternatives also ranked in the order shown, i.e., Alternative 5, expanding the SHSL, was the highest rated alternative followed by Alternatives 7 and 6.

## Interpreting Results

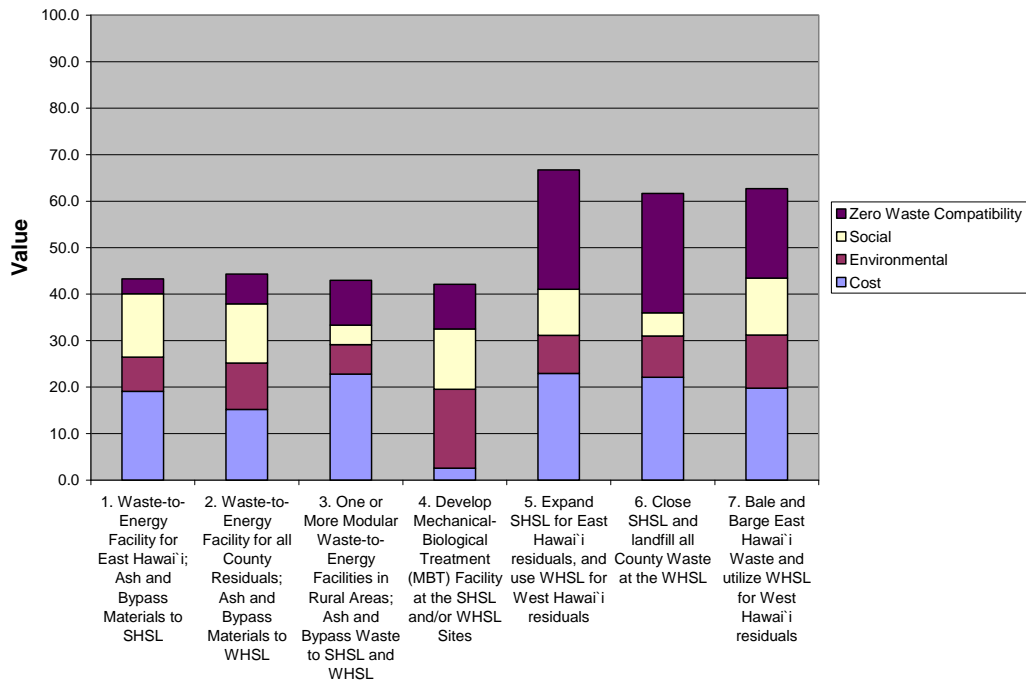
The results of any value modeling analysis are best regarded and applied as *decision aids*. Results should inform rather than dictate the decision. The analysis provides a way of organizing and comparing complex information. To the extent the decision-maker(s) believe that the objectives hierarchy represents the important issues, the weights and performance measures are appropriate, and the scores are accurate, they may be confident in the results.

Also, sensitivity analysis often provides insights. If the results of the model do not change unless there are substantial changes in weights, then the decision-maker(s) may be confident in the results. If the results do change, further reflection about scales, weights, and objectives will help illuminate the tradeoffs faced by decision makers.

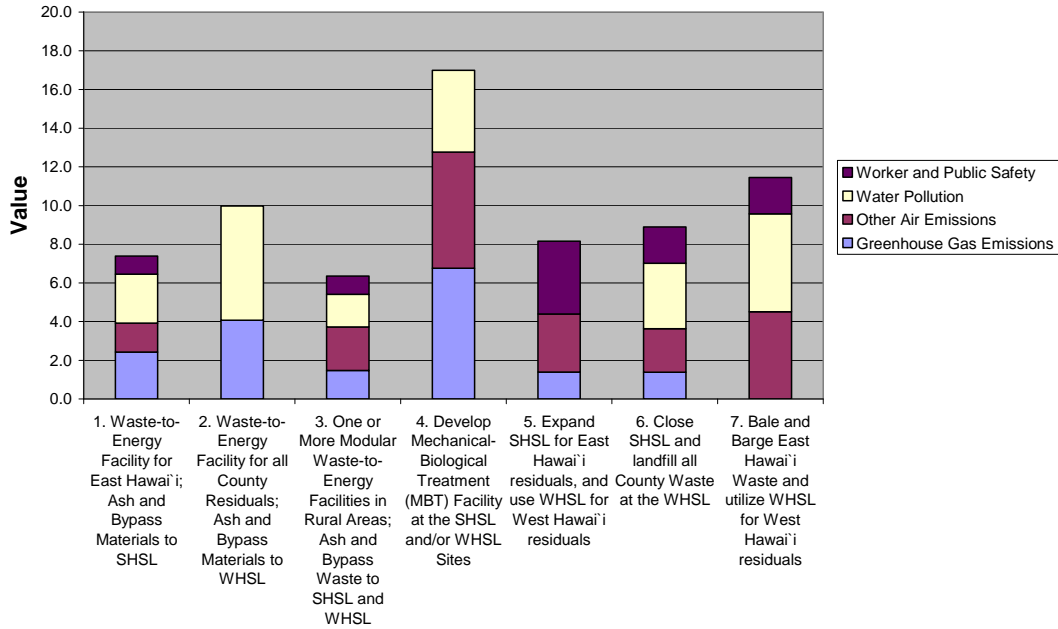
EXHIBIT 5  
Value Scores for Residuals Management Alternatives

Objectives Hierarchy	Value Scores						
	1. Waste-to-Energy Facility for East Hawai'i; Ash and Bypass Materials to SHSL	2. Waste-to-Energy Facility for all County Residuals; Ash and Bypass Materials to WHSL	3. One or More Modular Waste-to-Energy Facilities in Rural Areas; Ash and Bypass Waste to SHSL and WHSL	4. Develop Mechanical-Biological Treatment (MBT) Facility at the SHSL and/or WHSL Sites	5. Expand SHSL for East Hawai'i residuals, and use WHSL for West Hawai'i residuals	6. Close SHSL and landfill all County Waste at the WHSL	7. Bale and Barge East Hawai'i Waste and utilize WHSL for West Hawai'i residuals
<b>Total Score</b>	<b>43.3</b>	<b>44.3</b>	<b>43.0</b>	<b>42.1</b>	<b>66.7</b>	<b>61.7</b>	<b>62.7</b>
1. Minimize long-run life-cycle cost	19.1	15.2	22.8	2.5	23.0	22.1	19.8
2. Protect public health and the environment	7.4	10.0	6.3	17.0	8.2	8.9	11.4
3. Minimize social impacts	13.6	12.7	4.2	13.0	9.9	5.0	12.2
4. Accommodates future reductions in residuals and changes in composition (i.e., no put-or-pay)	3.2	6.4	9.6	9.6	25.7	25.7	19.3

EXHIBIT 6  
Total Value Scores



**EXHIBIT 7**  
Value Scores for Public Health and the Environment



**EXHIBIT 8**  
Value Scores for Social Impacts

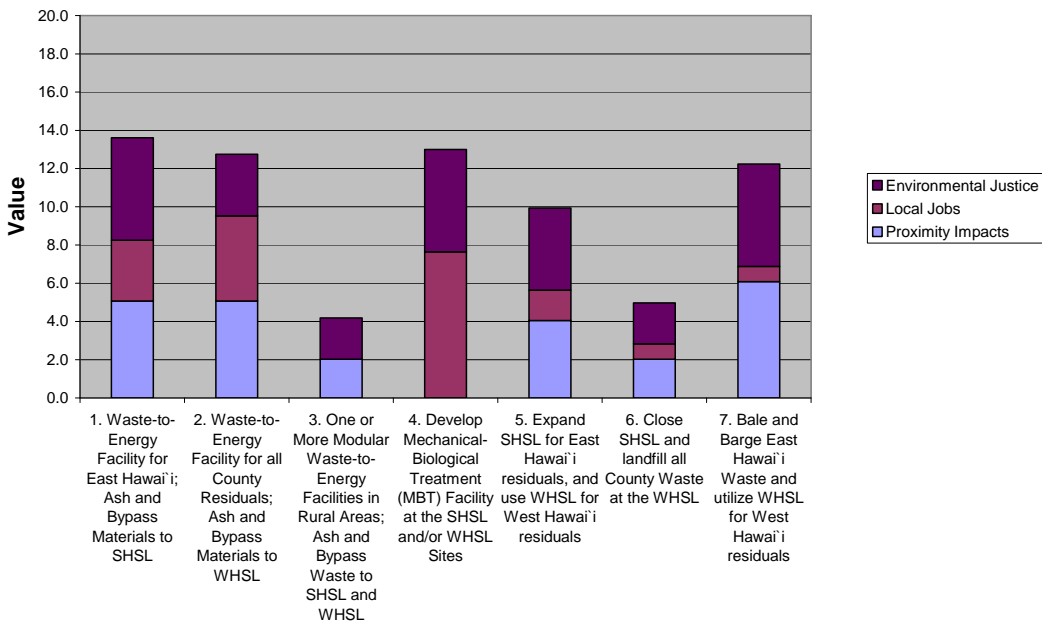


EXHIBIT 9  
Value Excluding Cost

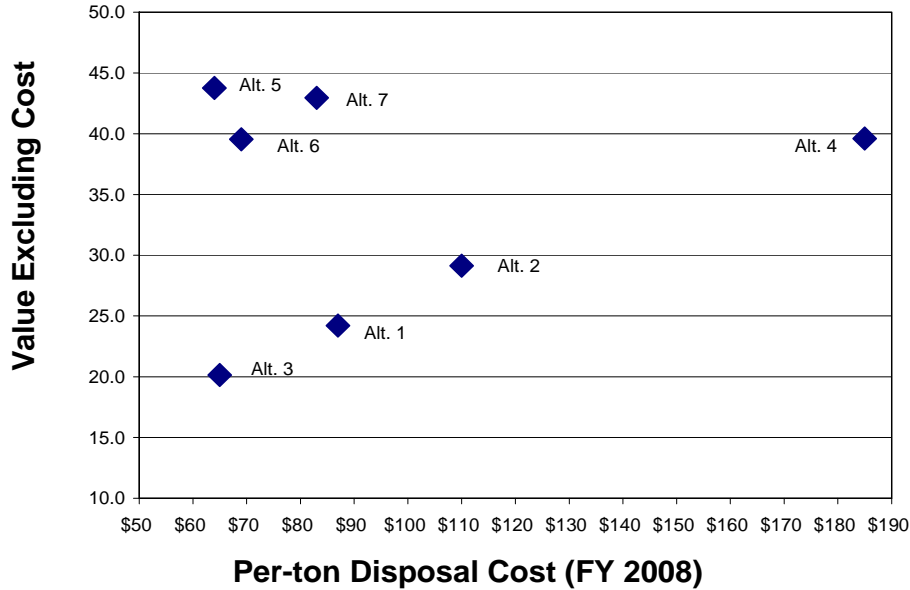


EXHIBIT 10  
Sensitivity Analysis  
*Scores with Changes in Weights*

Changes in Weights	Value Scores						
	1. Waste-to-Energy Facility for East Hawai'i; Ash and Bypass Materials to SHSL	2. Waste-to-Energy Facility for all County Residuals; Ash and Bypass Materials to WHSL	3. One or More Modular Waste-to-Energy Facilities in Rural Areas; Ash and Bypass Waste to SHSL and WHSL	4. Develop Mechanical-Biological Treatment (MBT) Facility at the SHSL and/or WHSL Sites	5. Expand SHSL for East Hawai'i residuals, and use WHSL for West Hawai'i residuals	6. Close SHSL and landfill all County Waste at the WHSL	7. Bale and Barge East Hawai'i Waste and utilize WHSL for West Hawai'i residuals
Baseline	43.3	44.3	43.0	42.1	66.7	61.7	62.7
GHG = 15	42.7	42.7	43.1	39.5	67.4	62.5	65.7
Worker Safety = 50	44.0	45.9	43.4	44.9	65.9	62.0	63.5
Cost = 200	52.7	49.5	56.3	34.8	74.6	69.9	68.2
Cost = 50	39.1	42.1	37.1	45.4	63.3	58.0	60.3
Zero Waste Compatible - no put or pay = 60	42.3	44.0	37.0	46.3	59.0	53.1	58.6

Rank Order with Changes in Weights (1 = Highest Scoring Alternative)

Changes in Weights	Rank Ordering of Value Scores						
	1	2	3	4	5	6	7
Baseline	5	4	6	7	1	3	2
GHG = 15	6	5	4	7	1	3	2
Worker Safety = 50	6	4	7	5	1	3	2
Cost = 200	5	6	4	7	1	2	3
Cost = 50	6	5	7	4	1	3	2
Zero Waste Compatible - no put or pay = 60	6	5	7	4	1	3	2

## Risk

When developing an objectives hierarchy for a value modeling analysis, one must decide whether all risks should be accounted for as objectives, or in a separate accounting of risk. There is no “right answer” in how to account for risks. In the value model discussed above, some of the objectives have an element of risk included such as water pollution potential from landfills, but in general, most of the objectives are not specifically focused on risk. Thus, it is important to consider if there are any risks not included in the value model analysis. In this case, there is one important risk that should be investigated:

- *Can the alternative be implemented with confidence at the estimated cost i.e., what is the uncertainty surrounding the cost of each alternative?*

A qualitative rating of the risk associated with each alternative (Exhibit 11) and a discussion of the implementation and cost uncertainty of each alternative follows.

EXHIBIT 11  
Qualitative Cost Implementation Risk Rating of Alternatives

Alternative	Risk
1. Waste-to-Energy Facility for East Hawai`i; Ash and Bypass Materials to SHSL	Low-Moderate
2. Waste-to-Energy Facility for all County Residuals; Ash and Bypass Materials to WHSL	Low-Moderate
3. One or More Modular Waste-to-Energy Facilities in Rural Areas; Ash and Bypass Waste to SHSL and WHSL	Low-Moderate
4. Develop Mechanical-Biological Treatment (MBT) Facility at the SHSL and/or WHSL Sites	High
5. Expand SHSL for East Hawai`i residuals, and use WHSL for West Hawai`i residuals	Moderate
6. Close SHSL and landfill all County Waste at the WHSL	Low
7. Bale and Barge East Hawai`i Waste and utilize WHSL for West Hawai`i residuals	Moderate

The costs estimated for the waste-to-energy (WTE) alternatives (1, 2, and 3) are fairly certain. The cost for the distributed system (Alternative 3) is uncertain because of the potential for challenges in siting, constructing, and operating a small plant in a remote location. However, the distributed model included only one small facility so potential cost increases wouldn't have a great impact on the total system. The larger WTE systems envisioned in Alternatives 1 and 2 have relatively certain costs. However, all three of these alternatives are likely to face tremendous implementation difficulties as witnessed by the recent challenges faced by the County to obtain public and political consensus for the proposed waste reduction facility for East Hawai`i, which is represented as Alternative 1.

Alternative 4, developing two mechanical-biological treatment facilities, has considerable cost and long-term feasibility risks. As discussed in Appendix B, there are many examples in

North America where such plants have failed because of odor or operational/cost issues. The facilities are complex and require a high level of operational expertise. The likelihood that costs could be substantially higher than shown are relatively high. This alternative carries the highest level of risk of all alternatives.

Alternative 5, expanding the SHSL, is not without risk. The cost estimate shown assumes a successful outcome of the State Land Use Boundary Amendment and County Change of Zone processes, completion of the Environmental Impact Statement, and resolution of Department of Health permitting issues at the SHSL site. It assumes that the proposed use of constructed wetlands for leachate treatment can be permitted with the state and work as engineered. Should difficulties arise with this option, residual waste could be hauled to the WHSL or baled and barged with a relatively small loss of capital investment. Thus, there is moderate risk associated with this alternative.

Alternative 6 has relatively low risk compared to the other alternatives. The sort station at the SHSL could be used to transfer waste into larger transfer trucks and hauled to the WHSL, which has many years of capacity. Thus the technical risks of this alternative are low. The main risk associated with this alternative is the challenge of gaining public and political acceptance for transporting waste from East Hawai`i to West Hawai`i. This alternative has been proposed before and has faced strenuous opposition from persons and businesses along the transportation route.

Alternative 7, baling and barging waste to the U.S. Mainland should be technically feasible, but there is no working system at this time for baling and barging residual waste from Hawai`i to the U.S. Mainland. One advantage of this alternative is that the County would not have to invest significant capital expense for implementation. Should it prove to be infeasible, the County could truck waste to West Hawai`i on relatively short notice at relatively modest cost. But, the disruption and bad press of the potential failure of this (or any alternative) should be considered.