APPENDIX I: PLANNING PROCESS AND SOLID WASTE ADVISORY COMMITTEE

The planning process included establishment of a Solid Waste Advisory Committee (SWAC). Members of the Committee were chosen to represent their area of expertise in solid waste management, to ensure that our process complemented the environmental efforts of their agency, and/or to represent their community. A list of the SWAC members is contained in Table I-1.

SWAC members were asked to assist with the Integrated Solid Waste Management (ISWM) Plan Revisions for the following reasons:

1. To provide the Department of Health (DOH) Office of Solid Waste Management (OSWM) with program information and solid waste expertise; and

2. To enhance effectiveness of the planning process by becoming advocates for the policies developed.

Each SWAC member was asked to review the state's ISWM Plan, developed in 1991. They then assisted in selecting topics to be researched for the Plan Revision. Input from the SWAC, identifying issues and helping with selection of topics, is contained in Appendix II.

From initial meetings, 18 topics were identified for further development as Discussion Papers (contained in Appendix III). The Discussion Papers were to provide descriptive, not prescriptive, information on the selected topics. These Discussion Papers were circulated among the SWAC members to stimulate discussion of various solid waste management issues. The discussions were intended to extract opinions, guidance, and suggestions regarding the topics.

Following review of the Discussion Papers, SWAC members identified priorities for further investigation and policy development. Criteria were defined for identifying priorities. The criteria, with key words in bold, were as follows:

1. **CONSISTENT** with the goals and objectives of the State Integrated Solid Waste Management Act.
   a. Protective of human health and the environment.
   b. Consistent with the solid waste management hierarchy.
2. **IMPLEMENTABLE** given current policies, technologies, economics and resources.
3. **EFFECTIVE** improvement in waste management practices.
4. Current **NEED** to address this proposed activity.

Once the priorities were identified through several iterations of multi-voting, six topic areas emerged. These six topics, which were expanded from the Discussion Paper format to a longer, more thorough treatment, are included in Chapter 3.0. The policy recommendations that resulted are included in Chapter 4.0.

Table I-1: Solid Waste Advisory Committee

Government Agency Representatives:	
Mr. David Goode	Deputy Director, Department of Public Works, County of Maui
Mr. Jiro Sumada	Deputy Director, Department of Public Works, County of Hawai'i
Mr. Troy Tanigawa	Engineer, Department of Public Works, County of Kaua'i
Ms. Wilma Namumnart	Planning Engineer, Department of Environmental Services, City & County Honolulu
Honorable Steve Holmes	Councilmember, Honolulu City Council
Honorable Ronald Kouchi	Councilmember, Kaua'i County Council
Honorable James Arakaki	Chair, Hawai'i County Council
Honorable Michael Davis	Councilmember, Maui County Council
Mr. Lou Erteschik	Liaison, State Department of Health, Director's Office
Mr. Lloyd Unebasami	Procurement Administrator, State Department of Accounting and General Services, State Procurement Office
Mr. Tadashi Yoshizawa	Building Engineer, State Department of Accounting and General Services, Public Works Division, Planning Branch
Ms. Gail Suzuki-Jones	Economic Development Specialist, State Department of Business, Economic Development and Tourism, Clean Hawai'i Center
Mr. Ed Henry	Planner, State Department of Land and Natural Resources, Land Management Division
Professor Halina Zaleski	Professor, University of Hawai'i, College of Tropical Agriculture and Human Resources
Commanding General	Marine Corps Base Hawai'i (Attention: Karen Gumtow, Code LE)
Non-Profit Organization Representatives:	
Ms. Barbara Bell	Executive Director, Recycle Hawai'i
Ms. Kat Brady	Member, Life of the Land
Mr. Gene Burk	Member, Hawai'i Hotels Association (with Starwood Hotels)
Mr. Terry Carroll	Director, Hawai'i Thousand Friends
Mr. Librado "Li" Cobian	Environmental Committee Member, General Contractors Association (with Island Demo)
Ms. Anna Hoover	Member, League of Women Voters
Mr. Randy Lau	Member, Building Industry Association of Hawai'i
Mr. Tom Reed	Board Member, Maui Recycling Group (with Aloha Recycling)
Ms. Jessie Weinberger	Member, Mililani Neighborhood Board

Table I-1: Solid Waste Advisory Committee *(continued)*

Private Business Representatives:	
Mr. Doug Baughman	Sales Manager, Maui EKO Systems
Mr. Alan Gottlieb	Treasurer, Hawaiian Earth Products
Mr. Joe Hernandez	Site Engineer, Waste Management, Inc.
Mr. Lelan Nishek	President, Kauaʻi Nursery & Landscaping
Mr. Jim Nutter	President, Island Recycling
Ms. Genevieve Salmonson	Vice President, Honolulu Recovery Systems (now Director, Department of Health, Office of Environmental Quality Control)

APPENDICES

APPENDIX I

PLANNING PROCESS AND SOLID WASTE ADVISORY COMMITTEE

APPENDIX II.1:
SUMMARY OF QUESTIONNAIRE RESPONSES

INTRODUCTION

A questionnaire was developed to solicit information on existing conditions, and on priorities for future program development from members of the Solid Waste Advisory Committee (SWAC), as part of the Integrated Solid Waste Management (ISWM) Plan revision. It was organized into the following sections: General Questions, Regulatory Issues, Environmental Issues, Waste Diversion, Infrastructure, Market Development, Economic Issues, Funding Issues, Public Education, and Solid Waste Program Priorities. Most questions were qualitative, and answered through short essays, and yes/no responses. In the last section, respondents were requested to rank the options on a scale of 1 to 10 (1 being high priority and 10 being low priority).

Of the 27 questionnaires distributed, 19 were returned, yielding a response rate of 70 percent. Respondents were from the government (47 percent; 26 percent were from county government), private business (32 percent), and non-profit environmental and community groups (21 percent). Staff from the Office of Solid Waste Management (OSWM) was not requested to complete a questionnaire. Responses were entered in an Excel database for review and comparison. A narrative summary of results follows.

RESULTS

The results were based on 19 responses, and not all respondents answered every question. This caused the situation where a minority (i.e., fewer than 50 percent) would voice an opinion on a matter, with the remainder voicing a different opinion or none at all. Therefore, when reporting that fewer than 50 percent held a particular opinion, it does not mean that greater than 50 percent held a different or opposing opinion. Keeping this in mind, summaries of trends are stated below for each section of the questionnaire. Generally, the strongest trends (i.e., those that had 42 percent or greater votes in agreement) are summarized.

In addition, county responses were examined where there were strong trends, or issues that were viewed as responsibilities of the counties. These were singled out since the counties have an important role in planning and implementing solid waste programs.

General Questions

The highest priorities for solid waste management were regarded to be recycling (53 percent favorable), education and promotion (32 percent), and illegal dumping and enforcement (32 percent). Aluminum recycling (53 percent), and greenwaste and composting (32 percent) were viewed as the most successful solid waste management programs.

Regulatory Issues

Only 32 percent felt that state and federal regulations were successful in reducing the impact of landfills, with another 32 percent being uncertain. Only 26 percent felt that the state was doing an adequate job implementing landfill regulations. Twenty one percent felt that unlined landfills should not continue operation, while 16 percent felt that they should.

Environmental Issues

Fifty eight percent believed that unlined landfills and illegal dumps should be a high priority environmental and public health issue. Fifty two percent felt that improved enforcement against illegal dumps and unlined landfills should be a major focus for the state ISWM Plan. Forty seven percent felt that special waste is an important environmental issue.

Waste Diversion

Sixty eight percent of respondents felt that the existing solid waste hierarchy makes sense. Regarding the mandated waste diversion goals, 21 percent felt that lack of education, infrastructure and government support are reasons the state has not met these goals. To increase diversion, 63 percent thought that tax incentives should be given for private diversion efforts, 47 percent favored revising mandated goals, and 47 percent favored spending more money to support diversion.

A slight majority (53 percent) felt that there is strong public demand for source reduction, diversion, recycling and pollution prevention, and 42 percent felt that the state should respond to this demand through providing public education. A majority (74 percent) favored curbside recycling in Hawai'i, and also felt that "doing something good for the environment" is reason enough to implement it.

Fifty eight percent favored a combination of methods for increasing commercial recycling. Regarding responsibility for improving commercial recycling, respondents were split, with 37 percent identifying responsibility as both state (for funding and policy) and county (for implementation), and 32 percent identifying responsibility as county only. A majority (58 percent) thought that construction contractors should be required to source separate their waste, and that state and county should support construction and demolition (C&D) processing and recycling facilities (also 58 percent).

Infrastructure

The responsibility for ensuring adequate and efficient processing of recyclables was considered a state and county responsibility by 37 percent, and a private sector responsibility by 26 percent. A slight majority (53 percent) supported direct financial assistance, rather than government owned facilities, for recyclable processing. Forty seven percent felt that counties should be directly involved in supporting composting, with 42 percent favoring local, low tech businesses to conduct composting. Forty two percent felt that high tech waste management solutions, even if unproven, may be appropriate for Hawai'i, and 32 percent felt the state should dedicate some resources to emerging technologies (11 percent were opposed, and 11 percent felt that the federal government should provide resources).

Market Development

Financial assistance was favored by 42 percent to support local markets for recyclables. The continuance of the Clean Hawai'i Center (CHC) was favored by 53 percent, with 11 percent saying it should not continue. Fifty eight percent felt the CHC should be funded, rather than becoming a non-profit organization (only 11 percent supported the latter). Reduced shipping fees and special rates for recyclables were identified by 26 and 21 percent, respectively, as offering the best opportunities to reduce the negative impact of inter-island shipping costs on market development.

Economic Issues

Government subsidies for recycling were favored and opposed by an even number (37 percent voted yes, and 37 percent voted no). Front-end payment systems (e.g., ADF, refundable deposit, and producer take-back) were favored by 84 percent to support Hawai'i programs.

Funding Issues

Funding options that received the greatest support were as follows:

- Income or excise tax credits (79 percent; state responsibility),
- Tipping fee surcharge (74 percent; county responsibility),
- Residential user fees (74 percent; county responsibility),
- Avoided cost credits (63 percent; state responsibility), and
- Advanced disposal fees (58 percent; no clear opinion on who should implement).

No one favored a state excise tax increase. Sixty three percent supported a Bottle Bill, and 68 percent supported full-cost waste user fees. Forty two percent opposed increasing public funding for waste programs (32 percent favored this). A majority (63 percent) felt that full cost accounting should be required of municipalities. Support for using taxes to fund household hazardous waste programs was slight (42 percent, with 16 percent opposing).

Public Education

To increase public awareness, 37 percent felt that community forums would be useful, while 21 percent favored public education, and 16 percent favored media and public relations efforts. Thirty two percent felt that "not in my backyard" (NIMBY) could be effectively dealt with through long-term planning (21 percent) or community involvement (11 percent). The most effective ways to increase public awareness of recycling were regarded as follows:

- Variable rate user fees (74 percent),
- Curb-side recycling programs (68 percent), and
- Public information and public relations campaigns (53 percent).

Solid Waste Program Priorities

The top five program priorities were as follows:

- Improving interagency coordination,
- Organics management and composting,
- Commercial recycling and source reduction,
- Recycling promotion, and
- Public education.

The bottom four programs were as follows (least popular listed first):

- Development of a materials recovery facility (MRF),
- Enterprise zones/recycle parks,
- Technical assistance, and
- Special waste management.

County Responses

County government respondents numbered five, which represented 26 percent of all respondents. Responses to sections of the questionnaire where county roles were defined, or where county respondents showed a strong opinion, are summarized below.

Regulatory Issues - Eighty percent of county respondents felt that the state should put more resources toward timely, unbiased inspections of landfills, and that cooperation with counties, and monitoring were also important to implementing landfill regulations.

Environmental Issues - Eighty percent rated unlined landfills and illegal dumps as high priority issues, and 80 percent also felt that the state ISWM Plan should have this as a major focus.

Waste Diversion - Eighty percent felt that the existing solid waste hierarchy makes sense. Only one (20 percent) felt that curb-side recycling is feasible in Hawai'i, although 60 percent felt that "doing something good for the environment" would be reason enough to pursue curb-side programs. The majority who responded (26 percent) felt that construction contractors should not be required to source-separate (only one,

or 20 percent said they should). All (100 percent) of the county respondents thought C&D processing and recycling should be supported through either joint county and state, or private efforts.

Infrastructure - Forty percent agreed that the counties should be directly involved in supporting composting programs (one, or 20 percent, disagreed).

Funding - Funding options favored by county respondents included tipping fee surcharges (100 percent; county responsibility), residential user fees (100 percent; county responsibility), avoided cost credits (80 percent; half favored the state implementing these), and income or excise tax credits (60 percent; state responsibility). The majority (60 percent) did not favor increasing public funding for waste programs.

Public Education - Sixty percent felt that there is no way, other than case-by-case, to address NIMBY. County respondents also favored variable rate user fees (80 percent) for increasing public awareness for recycling. The majority (60 percent) felt that curbside recycling would not stimulate public awareness or enhance recycling.

Solid Waste Program Priorities - The top three selections were as follows:

- Organics management and composting,
- Commercial recycling and source reduction, and
- Public education.

The bottom three selections were as follows (least popular listed first):

- Development of a MRF,
- Residential recycling collection, and
- Enterprise zones/recycle parks.

CONCLUSIONS

The strongest support and clearest opinions from the SWAC were evident on issues of waste diversion and funding methods. The SWAC approved of the present solid waste management hierarchy. They viewed illegal dumps and unlined landfills as a high priority item for programs and to address in the ISWM Plan. They felt that commercial recycling was a high priority, and that a combination of methods should be used to promote it. They agreed that curbside recycling was both feasible and would enhance public awareness of recycling. They supported construction source separation and government support of C&D recycling. They also supported the continuance and funding of the CHC.

In general, the SWAC objected to increasing funding levels from the general public, but favored user and producer fees to support waste management. The SWAC felt strongly that front-end payment systems should be expanded, and new ones adopted. They strongly favored income or excise tax credits, but not increased excise taxes. Other sources of solid waste funding that were favored included tipping fee surcharges, and residential user fees. They also supported some form of a Bottle Bill, full-cost waste user fees, and municipal full cost accounting. They felt that both variable rate user fees and curbside recycling would stimulate public awareness and enhance public opinion of waste diversion.

In addition, the programs or concepts that received strongest SWAC support included improved interagency cooperation, organics management and composting, commercial recycling and source reduction, recycling promotion, and public education.

County responses were similar to the SWAC except in the following areas. County personnel felt more strongly that illegal dumps and unlined landfills should be a major focus of the ISWM Plan. They also did not feel that curbside recycling would be feasible, or that it would stimulate public awareness of recycling. They did not feel that construction contractors should be required to source separate their wastes, although they more strongly favored government support for C&D processing and recycling.

APPENDIX II

SUMMARY OF
SOLID WASTE ADVISORY COMMITTEE INPUT

II.1 Summary of Questionnaire Responses

II.2 Topic Summaries, SWAC Meetings, December 8 & 9, 1998

APPENDIX 11.2: TOPIC SUMMARIES, SWAC MEETINGS, DECEMBER 8 & 9, 1998

COMMERCIAL RECYCLING

Key Elements/Objectives

- Increase participation in commercial recycling.
- Broaden the scope of recoverables:
  - Metals,
  - Green waste,
  - Cardboard.
- Ensure adequate service options from recycling vendors:
  - Competition,
  - Reasonable prices,
  - Reliable service,
  - Geographic service area,
  - Efficient collection systems.
- Economics – participants should save or make money.
- Stable end markets for the materials.

Changes to Current System

- Combination of mandates, incentives, disincentives, increased awareness, and provide support in starting programs.
- Mandates should consider island differences - either an escape clause or county choice among options.
- Mandates or policy or programs should <u>come from industry</u>.
- Mandates can speed up participation and overcome apathy:
  - Clipboard,
  - Advisories,
  - Conflicts,
  - Miscellaneous.
- Some conflicting views on whether the state has a role to play in driving increased recycling.
- Existing goals (either percent or date) are unachievable.
- Clarify goal – is it to efficiently manage resources or to maximize recycling?

CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

Key Elements

- Investigate options for "problem" materials:
  - Concrete & asphalt - large volume.
  - Treated wood - limited options beyond disposal (leachate).
  - Grubbing material.
  - Demolition material - future problem; deconstruction solution?
- Investigate infrastructure needs and opportunities:
  - Collection and storage of materials if not immediately needed.
  - Recycling park (Sand Point model for other islands).
  - Problems permitting/setting up recycling businesses.
  - Burdensome permits for building projects.
  - Look at impact of landfill location and expansion - big impact.
- Investigate market development factors:
  - Funding for product research.
  - Funding mechanisms in general.
  - Mechanism for connecting industry to end uses - exchange.
  - Tipping fees - competition with "zero" illegal tipping fee.
  - Prices for recycled content materials.
- Investigate environmental impacts/benefits:
  - Air, water, noise, dust.
  - Disposal and recycling.
- Investigate options for mandates/policy/enforcement:
  - Connect to permitting process.
  - Illegal dumping.
  - Identify opportunities to educate and demonstrate.
  - Targeted education for industry.
  - Demonstration projects/case studies (e.g., Maui Recycling Group).
  - Understandable information to the public on disposal, recycling, remanufacturing options - costs/impacts.
- Clarify regulatory definitions:
  - Inert vs. solid waste relative to disposal/recycling.

Changes to Current System

- Specifications:
- Reuse of recycled concrete aggregate (RCA), glass, etc. (precedent).
  - Department of Transportation, other authority.
  - Public projects.
  - Private sector (provide to architects as part of permitting).
- Construction demolition landfill (CDL) "council" concept/public private partnership:
  - Ongoing function.
  - Policy development.
  - Planning resource.
  - Training.
- Networking:
  - Database; exchange.
  - Cue builders into resources.
- Mandates:
  - Require waste management plan as condition of permitting.
  - Require recycling (public/private projects).
  - Require use of recycled content products (public sector projects only).
- Targeted education campaign:
  - Public awareness campaign* ("year of the ....").
  - Industry - builders, architects*.
  - Owners.
  - Demonstration projects/evidence.
  - * Include information about illegal dumping.
- Permitting process
  - Streamline for recycling businesses.
  - Streamline for building projects.

FINANCIAL INCENTIVES

Key Elements

- Explore/expand advanced disposal fees (ADFs).
- Low interest loans or "grant/loans."
- Explore bottle bill for public redemption.
- Explore tax credits or reduced lease-rents.

- Expand public procurement to give preference to post-consumer goods.
- Explore mandated fees and pay-as-you-throw user fees.

Changes to Current System

- Increase glass ADF fee and expand to other materials.
- Balance fees to make it more attractive to recycle.
- Tax equity for commercial waste generators.
- Classify composting as a permissible land use on agriculture land.
- Expand recycling collections to rural areas.
- Institute user fees.
- Charge different tipping fees for different materials.
- Expand tax incentives and grants for recycling.

ILLEGAL DUMPING

Key Elements

- Define scope and focus of illegal dumping:
  - Who will police? DOH Inspectors?
  - What is the criminal process?
  - The state has responsibility for enforcing permitted landfills, and Litter Law.
- Commercial haulers who do not use permitted facilities:
  - Cost and convenience.
  - C&D have largest illegal dumps.
  - Require credits or waste manifests for C&D projects (contractor keeps his proof that he gave waste to a hauler; hauler keeps his proof that he gave it to a dump).
  - Should manage like hazardous or special waste.
- Community concerns:
  - Community should “see” how litter affects its surroundings.
  - Community awareness to battle ignorance.
  - Sponsor community clean-ups.
  - Green waste and bulky goods go to gulches and vacant lots in more rural areas (e.g., Big Island, Waianae Coast).
  - Green waste perceived to be “natural” by most.

Changes to Current System

- Public Education on litter and cigarette butts:
  - Make it socially unacceptable.
  - If public is less tolerant of illegal dumps, they may report more.
- Initial neighborhood enforcement.
- Target residential dumpers and C&D dumpers (where the problem is).
- Licensing for haulers to create tracking system with manifest.
- Impose stiffer fines for illegal dumping.
  - Criminalize the penalty system.
- Work with EPA to design regulations for easier approval of legal methods and C&D options.
- Use City/County Enforcement Officers to monitor.
- Add specific accountability language to laws ("Cradle-to-Grave" concept where "You are accountable whether you dump it or give it to someone else to dump." Current law says, "Generators are responsible for making sure it goes to a permitted landfill.")

LANDFILL IMPROVEMENTS

Key Elements

- Fire Prevention.
- Fire Response and network for response experts.
- Training - Best Management Practices (BMPs), Fire Prevention.
- Hazardous Waste Screening.
- Resources for regulation and enforcement action.
- Funds for operations.
- Groundwater monitoring.
- Litter (windblown).
- Landscaping to help improve aesthetics and address "not in my backyard" (NIMBY).
- Control cost - regulatory.
- Access to landfills.

Changes to Current System

- Create operational plan that is user friendly and addresses fire prevention, etc.
- Control and use of landfill gas emissions (primarily a closure issue).
- Adequate funding for landfills - operations, monitoring, development, tipping fees, enterprise funds.
- Emphasis on recycling programs to reduce litter/environmental impact.
- Additional regulatory staff.
- Improved response capabilities for county-run landfills.

- Streamline state procurement law - allow for quick response.
- Privatization of landfill - ownership, management.

ORGANIC WASTE MANAGEMENT

Key Elements

- Mandatory Diversion:
  - What is being done in each county?
  - Revisit diversion rates on each level.
- Education:
  - Educate public on home composting.
  - Have demonstration projects.
- General:
  - Have separate permitting for composting, entitlements, land use zones, etc.
  - Develop financial and regulatory incentives, especially for commercial use and agriculture.
  - Since 1991, what has moved forward and what has been prevented implementation of greenwaste programs?
  - Identify financial resources and alternative resources.
  - Target commercial arenas (e.g., golf courses, schools, private).
  - Address impacts on agricultural waste.

Changes to Current System

- Work with DOT to use mulch for other public facilities.
- Streamline the permitting process at the state and county levels.
- Set aside land (at least 2 acres) for organic waste purposes.
- Add composting to acceptable agricultural land uses.
- Adopt compost regulations collaboratively.
- Subsidize home composting. Provide bins, record keeping.
- Coordinate route and planned events for “Community Chipper.”
- Work with UH and its Department of Tropical Agriculture and Human Resources to develop composting specifications (standardize).
- Revisit dual agency regulation of biosolids - consolidate into one agency?
- Require conversion to mulching mowers for larger organizations, such as schools and residential associations.
- Look at landscaping scheduling. Consider growth inhibitors and reduced irrigation.
- Focus on curbside automated pickup (without food), instead of home composting, to encourage participation.
- Modify management practices to be recommendations and not mandates.

PROGRAM FUNDING

Key Elements

This topic should be an element of most of the other topics.

- Conduct Cost and Benefits Analyses to identify adequate funding levels for programs.
- Find different ways to fund programs; primarily recycling programs.
- Stabilize or increase funding support for recycling programs. Obtain support of government agencies.
- Fund transportation costs.
- Fund OSWM as a regulatory agency.
- Minimize steps for collection and dispersing of funds to raise efficiency and reduce cost.
- Examine program funding for counties.
- Share funding responsibilities with other agencies (e.g., DOT, DAGS).

Changes to Current System

- Establish state, federal, and county subsidies for recycling programs.
- Use subsidies to ensure programs break even, at a minimum (profit is optimal).
- Generate funding through bottle, can or plastics “Bill” and provide incentives.
- Seek legislative support for recycling program funding.
- Eliminate Tipping Fee surcharge, and fund OSWM with state general funds. (C&C recycling surcharge works at county levels.
- Adopt an ADF on white goods, lab and special wastes.
- State and federal governments should provide matching funds for solid waste to inspire counties.
- Dedicate more funds to solid waste and staff salary raises, not more parks.
- Use Maui County waste experiment as a model for funding commitments that generate information, benefits, and tangible diversion results, rather than on-going subsidies.

PUBLIC EDUCATION

Key Elements

- Develop statewide, overall policy (The Point) with counties tailoring programs to meet their needs.
- Target audience identification and tailoring message for target:
  - School children,
  - Agriculture,
  - Leadership,
  - Community groups.
- Evaluation process - internal and external.
- Research issues for development - make sure to include Hawaii-specific information.

- Partnerships and interagency cooperation.
- Use mass media, with generic messages (and logo) that address overall waste management, resource depletion, and broader environmental issues.
- Develop presentations, workshops, demonstration projects, and mass media messages.

Changes to Current System

- Governor's Proclamation to mandate recycling and buying recycled content and environmentally friendly products.
- School programs should be integrated into overall program responsibilities. Resources available to include a website to allow research on solid waste and environmental issues.
- Evaluation of programs with a plan for effectiveness and measurements to evaluate success and efficiency.
- Establish priority programs, based on risk, effectiveness, specific county needs and abilities, and tie funding to prioritization.
- Create a database for information on products, resources, and businesses. Publish on Internet and newspapers.
- Publicize the positive and negative consequences, offer consistent public information, and create ongoing public awareness.
- Program funding from landfill fees, fines, ADFs, grants, and other possible sources.
- Provide information for purchase practices, including what is recyclable and environmentally friendly, and what businesses make or distribute these materials (e.g., database).
- Presence at events and fairs, with environmentally friendly booth, recycled content display, and specifics on collection of recyclables.

RECYCLING MARKET DEVELOPMENT

Key Elements

- Objectives and criteria for market development.
- Assessment of existing and past market demand – an historic profile that includes drivers and impediments.
- Identification of future demand objectives – an inventory of potential supply and capacity needs.
- Assess effectiveness of Clean Hawaii Center (CHC).
- Collaborative strategic planning.

Changes to Current System

- Prioritize materials and commodities to target the big stuff, and the medium stuff where needed.
- Define organizational roles and responsibilities and improved interagency coordination – DBEDT, CHC, counties, private and non-profit sectors.
- Educate commercial users, public, and governmental purchasing.
- Implement mechanisms to promote market development:
  - Purchase price preferences,

  - Tax credits,
  - Seed money for entrepreneurs,
  - Incubators for new product ideas and demonstration projects,
  - Product use mandates.
- Develop financial and technical models to assess potential end uses including consumer demand, and feasibility studies.
- Create system to test and qualify products that meet specifications.
- Reduce costs of inter-island and off-island transport.

STATE'S ROLE

Key Elements

- Establish criteria for the state's role or involvement in waste diversion programs.
- Clearly define and articulate all roles and impact in each discussion paper (i.e., state, county, private sector, public).
- Focus on the overall common good to help define, and reduce the role of the state.
- Provide resources, networking and coordination to link counties and other agencies.
- Regarding diversion, determine cost effectiveness and support public awareness.
- Permit and regulate solid waste facilities and be the local regulatory presence.
- Set general guidelines - focus and direction.
- Address "special" wastes, such as medical.
- Work with other state agencies to include and improve diversion and recycling efforts within those agencies.
- Work to reduce illegal landfills.
- Take an affirmative role in developing and supporting new diversion facilities.
- Develop recycling markets within the General Master Plan.
- Play a role in Source Reduction on a national level.
- Be aware of the criteria of all other agencies and provide criteria and information changes and guidelines.

Public Education

- Develop statewide, overall policy.
- Present generic messages on environmental protection, resource depletion, and solid waste management through the mass media.
- Develop presentations, workshops, demonstration projects, and mass media messages for use by counties and private parties.

Recycling Market Development

- Assessments, analyses and feasibility studies:

  - Existing and past demands,
  - Future demand potential.
- Financial resources for R&D and seed money, etc.
- Incubator for new product ideas.
- Building interagency coordination and partnerships.
- Build financial and technical models.
- Incentive programs, tax credits, purchase price preferences, grants, etc.
- Procurement of recycled products that meet specifications.

Construction and Demolition Waste Management

- Connect materials to end uses (potential and current).
- Enforce violations of illegal dumping.
- Educate other public agencies to use materials.
- Develop specifications.

PUBLIC EDUCATION

DEFINITION OF THE TOPIC

A primary goal of a public education program on integrated solid waste management (ISWM) for the State of Hawai‘i would be to promote increased participation and awareness of the real costs and options of ISWM. A secondary goal would be to provide consistency between state and county education efforts. Topics that would fall within the scope of this public environmental education would include source reduction, recycling, and the full costs of waste management and illegal dumping. Additional goals of public education would be to do the following:

- Establish widespread awareness of solid waste issues;
- Motivate citizens to become environmental stewards by participating in source reduction and recycling programs;
- Provide elected officials with the information they need for decision making; and
- Establish public input to waste management decisions.

A process to gather feedback from the public and measure effectiveness of a program should be incorporated into the public education effort to facilitate improvement of the program.

CURRENT SITUATION IN HAWAI‘I

One of the powers and duties of the State Department of Health (DOH), Office of Solid Waste Management (OSWM), listed in Hawai‘i Revised Statutes (HRS) Chapter 342G-14 (3), is to “Promote source reduction, recycling, and bioconversion…through the provision of a comprehensive, innovative, and effective statewide public education and awareness program.” The DOH provides informational materials for public education, such as “The Hawaii Guide to Alternatives & Disposal of Household Hazardous Wastes,” “Environmental Services in Hawaii, 1997 Directory,” and “Managing Boat Wastes.” These and other publications are developed and distributed through the OSWM, other DOH offices, and other agencies.

Programs within DOH that have a focus on education are the Waste Minimization Program, which provides technical assistance to businesses for waste reduction, and the Polluted Runoff Control Program, which coordinates public activities that promote watershed protection. The state also provides support and coordination for county education efforts.

The City and County of Honolulu’s (City’s) Recycling Office, has a number of staff that are devoted to education and outreach to promote recycling. The Recycling Office’s “Partnership for the Environment” is a comprehensive business education program that provides its partners with guidance on how to reduce, reuse, and recycle materials. The program has an annual conference where awards are given to businesses that have distinguished themselves as partners, including neighbor island businesses that have chosen to participate.

The Recycling Office has sponsored other large events, including a recycled art fair, where children and adults can show their works, and a recycled fashion show. They have sponsored a television media campaign to promote recycling, and caring for the *'aina*. The community recycling program provides 59 bins at schools that are available to the school and surrounding community; an additional nine recycling sites are located at transfer stations and community centers. These sites are promoted through the schools and through materials prepared by the City. Composting workshops and demonstrations, teaching kits for schools, calendars, and a wide variety of publications are also available from the Recycling Office as part of its

community education and outreach efforts. The Recycling Office also responds to public inquiries, and has staff available at most times to address questions in person.

On Kaua'i, the county helps to fund a glass recycling program that includes public education for recycling. In Princeville, the Princeville Hotel sponsors the Princeville Plastic Project for recycling plastics, and recycling and education for North Shore residents.

Maui has active education conducted by Maui County and Maui Recycling Group. The county has a Recycling Coordinator who promotes recycling and reuse through publications, outreach at community fairs, and composting workshops. The county also has recycling drop bins in some island communities, and just began a curbside yard trimming pickup as a pilot program. The Maui Recycling Group develops and promotes other programs, such as the Hawai'i Materials Exchange (HIMEX), the Restaurant Waste Minimization Project, and home composting program under contract with Maui County and the state. They also publish a newsletter. Other non-profit groups on the island, such as Pacific Whale Foundation and Hawai'i Nature Center, include materials conservation and recycling messages in the educational programs they conduct. Maui Recycling Service offers curbside recycling pickup for residents who subscribe to their program.

On the Island of Hawai'i, two non-profit groups, Recycle Hawai'i and Renew Hawai'i, conduct public education and outreach. Recycle Hawai'i is a non-profit organization that performs education and outreach projects. Under county contract with the Department of Public Works, they do recycling education, organize household hazardous waste collections (semi-annual), perform business audits and information sessions on setting up recycling, conduct waste minimization workshops, organize Christmas tree-cycling, and conduct a school recycle challenge program. They give assistance to county staff to help address long-term planning on solid waste issues; this is conducted with assistance from the EPA.

State-sponsored programs include schools assistance, glass recycling, and investigation of "pay as you throw." Other sources of funds and programs include organization members and private and agency grants. Projects include an information hotline, a monthly column in *Kau Landing* alternative newspaper, information on recycling at transfer stations, and backyard composting workshops. They conduct used motor oil recycling, and have plans to develop permanent sites for used oil collection with business retailers' support. This program is funded through the county with state oil tax funds.

Renew Hawai'i conducts free backyard composting projects on a quarterly schedule. The workshops run for three hours and have had good attendance. In addition, Recycling Systems Hawai'i has designed a glass processing facility to include an educational display, as part of a glass recycling contract with the county.

Statewide, the television media have conducted environmental campaigns and given awards to individuals who make an impact on the environment, including hotels that recycle. *The Honolulu Advertiser's* environmental reporter, Jan Tenbruggencate, often reports on various aspects of solid waste and recycling, and his column is usually carried in a prominent position in the newspaper. Other statewide campaigns that emphasize solid waste issues and conservation include the phone book recycling, Christmas TreeCycling, and the Get the Drift and Bag It campaign, which is a statewide litter pickup at beaches and in the ocean. Multiple agencies and private businesses, as well as volunteers, support these projects. No statewide non-profit organizations that primarily focus on solid waste and recycling issues exist at present.

MODEL APPROACHES

Broad international goals for environmental education were defined in the Tbilisi Declaration (Intergovernmental Conference on Environmental Education, 1977) and are as follows:

- To foster clear awareness of, and concern about, economic, social, political and ecological interdependence in urban and rural areas;

- To provide every person with opportunities to acquire the knowledge, values, attitudes, commitment and skills needed to protect and improve the environment; and
- To create new patterns of behavior of individuals, groups and society as a whole towards the environment.

These goals can be narrowed and adapted to address public education on source reduction or recycling, but should be considered when defining the long-term and broader environmental goals of a public environmental education program.

There are four specific steps to perform for development of a successful and effective public education program:

1. Identify the overall education or awareness **goal**,
2. Identify the target **audience**,
3. Identify the **action** you expect of the audience, and
4. **Measure** the outcome.

These four components must be identified before a public education program can be developed and implemented. It is the last step, measurement, which creates a feedback loop for improving or revising a program to more effectively address its goals. A public education program without an overall goal, target audience, expected action, and feedback or measurement system may not accomplish an intended result. In addition, it can cause public frustration if there is interest in the topic (e.g., recycling) but no specific action for the public to perform (e.g., recycle at your local school), or long-term goal of the education (e.g., improve local use of resources, or encourage local remanufacturing industry).

Identification of the parties that will be developing, implementing and measuring the public education effort is also important. These parties may encompass government agencies, non-profit organizations, businesses or individuals that have a stake in the public education and end result. The cooperation of this group, from the initial stages of a program, is key to ensuring coordination and improvement in the program over the long run. Members of the group should have well defined roles and tasks – whether program development, oversight, funding, implementation, or assessment.

Example Programs

Master Recycler Composter (MRC), King County, WA. This program was initiated in 1990. It followed on the footsteps of earlier community successes in Master Composter and Master Conservationist programs run by Washington State Cooperative Extension and Seattle City Light, respectively. The MRC program was funded by King County and conducted by Washington Energy Extension Service. The overall goal of the project was to increase recycling and composting in the community by creating a group of people who had the background to motivate and encourage their community members to recycle and compost. To accomplish this, volunteers were selected and required to complete 27 hours of formal training, 16 hours of guided internships, and at least 40 hours of community service to receive MRC certification. They then initiated or took part in community events to highlight composting or recycling, including staffing information tables at hardware and garden stores, or participating in gardening or recycling forums. In addition to the trained MRCs, the program established demonstration composting sites throughout the county that included information on local recycling opportunities.

In Concert with the Environment, Los Angeles County, CA. This program, initiated in 1996, focused on high school students throughout the county, and provided teacher training to conduct lessons on water conservation, energy efficiency, recycling, and transportation issues. After completing the school-based work, students had the opportunity to find out about the issues in a 'real world' context by conducting surveys in their communities. The program was envisioned to have the following benefits:

- Teach future consumers about the benefits of conservation;
- Gather information on water and energy use through surveys; and
- Provide the county with data for future resource planning.

The target audience for this project was broad since both students and their communities received resource conservation information. Another unique aspect was that students provided necessary information to the utility for future planning efforts.

Minnesota Office of Environmental Assistance (MOEA), MN. MOEA is a state program that addresses environmental protection and conservation. A component of the state program is their technical assistance program (MnTAP), which provides both technical and community education for the region. Programs conducted by staff in both MOEA and MnTAP extend to government agencies, to assist in networking, coordination, and awareness of government staff and officials; and to the community, with workshops, grants, and voluntary challenge programs. MnTAP and MOEA have a high profile among federal, state, and local agencies involved in pollution prevention, technical assistance, and education because of the quality of materials and programs they conduct, and the follow-through they perform in tracking progress of programs.

RECOMMENDED TOPIC DEVELOPMENT STRATEGY

The specific challenges for addressing public education on ISWM issues in Hawai‘i include the islands' isolation (i.e., you can’t drive across a county line to participate in a neighbor county program), and statewide media run from O‘ahu (i.e., programs promoted on O‘ahu in mass media cause confusion on neighbor islands). To implement a public education program, the above issues must be kept in mind for program planning. In addition, there are a number of issues that would need to be more fully developed, as follows:

- Define the role the OSWM will play in community and statewide education (that role could range from directly conducting some educational programs [i.e., legislature awareness of solid waste issues in the State], to supporting through grants or materials programs conducted by county or other agency, non-profit, or private entities);
- Identify the key constituencies that can support, or limit success, of waste diversion initiatives;
- Identify existing organizations, within and outside of government, that could broaden community support for waste diversion,
- Assess methods of information transfer that work best in urban and rural settings, and that work best for specific target groups;
- Develop guidelines for establishing baseline data from which to measure changes and progress in education campaign.

A wide variety of public, or target audience specific, environmental education options exists. To decide how to proceed, the state should develop an advisory group (or use an existing one) that represents broad community, business, and government views. This group could assist the education process as follows:

- Serve to identify key issues, tied to state waste diversion goals, that may be successfully promoted through education;
- Assist in developing goals, target audience, actions, and measurement methods for a given education program;
- Provide a communication network to both inform the development of the education project, and also get

the word out when the project begins; and

- Assist in revising a project when feedback indicates goals are not being met.

The range of techniques for communicating with a target audience is broad: the media can be helpful if state-wide, general participation is desired, or small meetings or workshops with key audience members can be conducted. In all cases, some form of written materials, designed to attract the target audience's attention, should be developed. These materials are tools for the education, and rarely would have much impact without other oral and visual tools. But they are helpful as both a record of the information promoted during education, and to provide as reinforcement to interested members of a target audience.

Once an education program is developed, follow-through by the office or group conducting it is necessary to check on goals and success, and level of awareness of the target audience. This includes measurement, described above, and also reporting success (or failure) to the target audience so they don't feel that an education project 'just disappears.' A designated staff person either at the OSWM or organization conducting the project should be made responsible for the follow-through, including reporting results to target audience.

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RESIDENTIAL RECYCLING

DEFINITION OF THE TOPIC

For the purposes of this Discussion Paper, residential recycling should be separated from multi-family recycling and greenwaste recovery, even though, in the broadest sense of the term, these two forms of diversion typically occur in the residential sector. Residential recycling refers to the recovery of recyclable materials from single-family homes, duplexes, tri-plexes, four-plexes, and small apartment buildings ranging from five to 10 units. Recovery is usually accomplished through one of two basic methods: a collection service at curbside provided by either a jurisdiction or private company, or self-haul of materials to a drop-off or buy-back recycling center. Such centers may be for-profit enterprises run by private businesses or a jurisdiction, or non-profit activities organized by civic or environmental organizations. Recycling centers may include unmanned drop boxes, or manned buy-back recycling centers, and often are set up at transfer stations and landfills.

Multifamily recycling refers to materials recovery from medium and large apartment buildings containing 11 or more units. Recovery has been accomplished either through siting permanent or temporary storage bins or carts for recyclables that are periodically emptied by a service provider. Residents are responsible for placing materials in such bins or carts at their convenience. Green waste recovery is focused exclusively on the yard waste portion of the residential waste stream. Recovery is normally achieved through a regular, curbside collection service or by siting one or more periodic or permanent drop-off depots.

The most prevalent form of residential recycling in the U.S. is curbside collection. Major program design criteria include: collection frequency, collection day and time, materials collected, service provider, level of materials source separation or commingling, collection vehicle capacity and configuration, crew size, manual/semi-automated/automated pick-up, size and type of storage container used by residents, and level and type of rate incentives/benefits related to recycling program participation. Targeted materials are shown in Table 1:

Table 1: Materials That Have Potential for Being Recycled

Traditional Recyclables	Primary Recyclables	Limited Potential Recyclables
newspaper	magazines and other	clay-coated paper items
cardboard	mixed, “low-grade” waste paper	milk cartons
aluminum cans	tin cans	paint cans
clear, green, and brown glass	scrap metals	motor oil
PET/HDPE plastic bottles and containers	other forms of plastic (numbered 1-7)	aseptic containers (“juice boxes”)
	brown paper bags	aerosol “spray” containers
	telephone books	metal clothes hangers

Table 1: Materials That Have Potential for Being Recycled *(continued)*

Traditional Recyclables	Primary Recyclables	Traditional Recyclables
	aluminum foil	
	high-grade office paper (white, colored, computer print-out)	

CURRENT SITUATION IN HAWAI'I

Throughout Hawai'i's four main islands the county governments, in cooperation with private refuse and recycling companies, non-profit service and environmental groups, commercial businesses, and schools have established a network of community drop-off recycling centers where residents may bring materials. These centers are an attractive residential recycling option for several reasons: their low capital costs; the ability to site them at existing transfer stations or other established, convenient locations; low operation and maintenance costs; short implementation set-up time; availability of material storage bins from either public works departments or the private sector; visibility to the public; and ease of use. These are a few factors that have led to their adoption in the state as the preferred method of residential recycling, particularly on O'ahu.

All four counties have evaluated the feasibility of curbside residential recycling at different points over the last few years, especially in its application to the more densely populated portions of each island. However, the counties have faced several serious impediments to curbside residential recycling similar to those encountered by mainland jurisdictions that are primarily rural, are distant from either processing facilities or other markets, have limited resources, and have competing environmental or social service priorities. Examples of these barriers follow:

- Lack of existing infrastructure due to high capital expenditures for collection, processing, and storage equipment;
- High operating expenditures for labor, supplies, maintenance, transport (intra-island and inter-island), administration, and/or contracted program operators/services;
- Poor marketing position due to inadequate material quantities, fluctuating commodity prices, ongoing implementation costs, and overall diseconomies of scale;
- Residential refuse services (i.e., collection, access to transfer stations or landfills) provided for free or for a nominal fee with the balance paid through other assessments (e.g., property tax), rather than in a separate billing based on amount of usage; and,
- Perceived lack of political support, in and out of government, for devoting scarce funds to planning and developing curbside residential recycling programs when investments have been previously made in community recycling centers.

Thus, no county currently has a residential curbside recycling program provided either by county personnel, a contractor, or some combination of both. However, there are "subscription" curbside recycling services available to residents from private firms in some counties, and Maui County is pursuing a plan of action that calls for phasing in such services in the next two to three years. A summary of each county's residential recycling efforts is presented below:

O'ahu

Community drop-off recycling centers have been developed at approximately 60 schools throughout the City and County of Honolulu for use by households, businesses, and schools. Materials accepted at these sites are aluminum cans, glass bottles and jars, plastic beverage bottles (soda, milk, juice), newspaper, cardboard, white office paper, and colored office paper. As well, recycling opportunities also exist at Refuse and Recycling Convenience Centers (RRCC) and transfer stations. Large appliance, yard trimmings, or both can be brought to these sites for subsequent recycling and composting respectively. The City/County Community Recycling Center Program is being expanded in the near future to utilize shopping areas for siting recycling centers to increase program convenience. Revenue from the sale of recyclables is shared with the participating schools.

Maui

Maui County operates seven drop-off centers where citizens may bring newspaper, cardboard, and various kinds of plastics and metals for recycling. Maui Recycling Service offers private curbside recycling on a fee basis to residences. A county-supported task force, in coordination with staff from Maui County's Solid Waste Division/Public Works Department and representatives from neighborhood/community organizations, has been examining ways of enlarging the diversion rate through an integrated set of programs/policies. One of these would be step-by-step implementation of curbside residential recycling collection, along with mandatory refuse collection using automated vehicles, green waste recovery, and a "pay-as-you-throw" service fee structure. Residential waste collection is presently performed by county crews but is offered on a voluntary basis with those using the service paying a flat fee annually of $60 through their property tax assessments. This service is not currently charged in an across-the-board manner to all eligible residences, regardless of whether the service is actually used. Disposal at county-owned and operated landfills is free to residents. A three-year roll-out period, outlined below, is being considered for the new package of programs/policies that must ultimately be approved by the Maui County Council:

- Year 1: "Pay-as-you-throw" fees based on quantity of trash generated with incentives for practicing waste reduction and recycling.
- Year 2: Mandatory, automated refuse pickup with separate green waste collection.
- Year 3: Curbside residential recycling offered and charged to all targeted households.

Hawai'i

Community recycling drop-off centers are located at selected shopping centers and convenience/transfer stations. In the past, Hawai'i County has in contracted with a non-profit group, Recycle Hawai'i, to administer and manage recycling activities. This contract was recently terminated due to an impending county funding shortfall (see discussion below). Hawai'i County does not provide waste collection services. Private companies haul approximately 50 percent of the waste delivered to the two landfills in the County (South Hilo and Pu'uanahulu). The remaining 50 percent is self-hauled. Some haulers on a subscription basis offer limited curbside residential recycling services. Similarly, private residential refuse collection is arranged between the generator and hauler on a subscription basis. Due to the long haul distances and predominance of self-haul customers, Hawai'i County operates 21 convenience centers around the island. These centers have no staff, are open 24 hours a day, and are free of charge.

County-sponsored and supported curbside residential recycling collection on Hawai'i has been reviewed by the county, especially for the two major population centers in Hilo and Kailua-Kona. The principal financial, logistical, and institutional barriers to this initiative are: Intra- and inter-island transport distances and costs; payment for contracted, private sector materials collection, processing, and marketing, or capitalization of a county-operated program to perform these functions; the absence of historical precedents for levying standardized waste management charges either for refuse or recycling collection.

However, perhaps the most significant problem facing solid waste management in Hawai'i County is a predicted decrease in county revenues due to declining economic conditions, resulting in a narrower tax base. As a consequence, the Solid Waste Division of Hawaii County's Public Works Department has been asked to trim approximately $2 million from the annual budget of approximately $11 million dedicated to waste transfer, disposal, and diversion operations. This makes the possibility of Hawai'i County resources being dedicated to curbside residential recycling services unlikely at this time. In fact, the Solid Waste Division is looking at cutting costs through a variety of measures, with the closing of some convenience centers a clear option.

Kaua'i

Six community drop-off centers are conveniently sited at shopping centers around the Island of Kaua'i for residential recyclables. Kaua'i County recently began construction on the Kaua'i Resource X-change Center that will accept reusable building materials as well as mechanical and household items. The Center is to be located near the transfer station in Lihue and provide the opportunity for expanded diversion from both residential and commercial sources. County crews pick up residential waste weekly but residents do not get a garbage bill. Instead, this service is paid for through property taxes. Private haulers also collect small amounts of residential refuse. The county operates four transfer stations that are open to residents. From the county's perspective, the capital and operating cost differential between drop-off recycling centers and curbside recovery is a significant advantage of the former approach.

MODEL APPROACHES

Curbside recycling collection is a more systematic and effective strategy for recovering residential recyclables in comparison to other methods. In Hawaii, overcoming the various obstacles to this strategy that were previously identified above may require adopting or modifying unorthodox practices implemented by mainland jurisdictions challenged by a similar set of conditions:

- Widely dispersed population;
- Limited public sector resources;
- Remote markets;
- High capital, operating and transport costs for curbside recycling programs;
- Limited intermediate processing capacity;
- Inadequate material volumes to leverage favorable market consideration;
- Other pressing environmental, social, and economic issues commanding attention;
- Lack of a consensus with a strong institutional base that "advocates" waste reduction/recycling as a priority issue in the political arena;
- Volatile market prices and changing specifications that periodically produce inconsistent profit margins and operating losses; and
- A persistent perception that small quantities of recyclables, such as those generated from households, are highly valuable materials whose revenues should enable a curbside recycling program to "pay for itself" and not charge residents a monthly service fee.

The brief "case studies" that follow demonstrate how some of these problems have been addressed through innovative forms of cooperation and coordination between the public and private sectors in order to advance waste reduction/recycling in general and implement curbside residential recycling programs in particular.

Marion County, OR

Marion County, Oregon, has a population of roughly 250,000 with incorporated cities and communities ranging from Salem, the state's capitol, to largely suburban areas with light commercial zones, mini-malls, and centralized shopping centers, to small towns of less than 3,000 to 4,000 people located in rural

agricultural/farming portions of the county. To bolster the fiscal and operational stability of the county's solid waste management system, the county and its jurisdictions granted long-term exclusive franchises for residential waste disposal and recycling services that were distributed among nine haulers. This, in turn, provided the haulers with a sound basis on which to make the capital investments necessary for offering curbside recycling service to virtually all the county's single-family homes. The haulers also organized themselves into a formal association to share resources related to recycling collection and pool recovered materials for purposes of processing/marketing. They formed a partnership with a long-standing non-profit organization that historically had been in the forefront of recycling efforts in the county for the collective processing/marketing of residential recyclables from the individual curbside programs.

Dakota County, MN

Dakota County, Minnesota, is situated immediately south of the "Twin Cities" of Minneapolis-St. Paul and is divided into three distinct, parallel parts that run horizontally across the county. The upper tier or layer closest to the Twin Cities has an older housing stock and is more urban and industrial than the remainder of the county, the middle section consists mainly of suburban bedroom communities, large shopping malls, service businesses, office parks, and institutional/ research/educational clusters. The last portion of the county is highly rural and devoted to farming and agriculture with small towns, many with populations of less than a 1,000, spread out over the countryside.

In addition, the county had a long tradition of private sector solid waste operations with approximately 40 haulers providing services. These companies ranged in size from one- or two-truck "mom and pop" family businesses to Waste Management, Inc. and Browning-Ferris Industries. Dakota County, like other counties in the Twin Cities metropolitan area, was required to meet ambitious regional and state waste abatement levels. The county sought the involvement of its jurisdictions by passing on this waste reduction requirements to local authorities. Under these circumstances, the basic question faced by the public and private sectors was how to coherently organize the efforts of all parties into an efficient materials recovery system, focusing first on the residential sector.

There were several large end-use markets in the Twin Cities region, such as paper mills and a glass container manufacturing plant. Still, the prospect of each hauler/recyclables collector transporting their own materials directly to these markets did not seem sensible to representatives from the County, the jurisdictions, and the private sector. From several perspectives–transport economics, bargaining position with the markets, documentation of results–such an approach left much to be desired, and stimulated consideration of other alternative strategies. These problems were even more severe for the small agrarian towns, and the haulers serving them, in the southern part of the county.

With county sponsorship, a task force was formed of representatives from all key industry elements and participants in the county's solid waste disposal/recycling arena to evaluate different courses of action. Two key recommendations were put forth and ultimately implemented, among others. The first was the construction of a basic, low-cost facility where curbside residential recyclables, and eventually commercial materials, could be off-loaded and aggregated into larger loads for shipment to regional markets, either end users or full-scale materials recovery operations.

Only minimal processing and contaminant removal was to be performed at the "reload" facility; control over the quality of materials was the shared responsibility of collectors, generators, and jurisdictions. The facility was located on county property and operated by a private recycling processing and brokerage firm that was not in the refuse disposal business. Recyclable loads were individually weighed as they entered the site so that each hauler/jurisdiction had an ongoing record of their recovered tonnage. The haulers were paid for their materials by the county and sales revenues were used to partially offset payments to the haulers and the facility operator. Along with these arrangements the smaller rural communities, with the support and encouragement of the county, formed a single, collective entity for purposes of achieving the waste abatement goals, delivering materials to the reload site, and documenting their tonnage to the county.

Southwest Public Recycling Association and New England Resource Recovery Association

There are numerous examples across the country of the kind of public/private sector partnering for implementation of curbside residential recycling and other types of waste diversion programs that are described in the two case studies noted above. These have occurred within large counties such as Marion County, Oregon, and Dakota County, Minnesota, as well as between groups of smaller counties, or counties that are predominantly rural, within the same state.

However, there are two outstanding examples of such partnering initiatives that operate in a similar manner on a regional, multi-state level–the Southwest Public Recycling Association (SPRA) and the New England Resource Recovery Association (NERRA). Both of these non-profit membership organizations were formed in part as a response to the same recycling barriers facing Hawai'i's counties. They are based on the principle of combining financial, personnel, and operational resources, combining separate supply streams of recyclables, and leveraging the marketplace in order to make recycling more economical and effective than if the participating jurisdictions were acting on their own.

The membership base of both SPRA and NERRA has grown over the years to include major private sector recycling processors and markets in each region. Private and public association members pay dues to help cover market development, cooperative marketing, education, outreach, and technical assistance activities performed by association staff. A prime focus for SPRA and NERRA is bringing together suppliers of recyclables such as municipal curbside recovery programs, haulers, and large commercial generators with established processors and end markets. SPRA and NERRA then facilitate the development and implementation of long-term contractual agreements between these various parties so that suppliers have reliable outlets for their materials and processors/markets have steady flows of feedstock.

RECOMMENDED TOPIC DEVELOPMENT STRATEGY

Given the firm commitment of the City to expanding the community recycling network approach, and the apparent progress of Maui County in assembling credible support for phasing in curbside residential recycling on that island, one strategy would be to concentrate on recycling development in Hawai'i and Kaua'i counties. The state may also provide technical and political assistance to Maui with its transition to a new residential refuse and recycling system.

With the limited resources and current economic turndown, the state and counties should emphasize comprehensive greenwaste recovery, rather than focusing on other recyclable materials, from the residential sector. The large quantities of greenwaste, growing private sector activity in processing and composting greenwaste, and viable local uses for compost and mulch products that do not necessitate shipment make greenwaste an economically viable component for diversion.

Further development of the traditional recycling markets may require a cooperative marketing organization that could stockpile materials in anticipation of market upswings, and gain economies of scale. The role of the state in facilitating or operating such an organization could be explored in development of this topic. Without eliminating some of the significant barriers to cost effective recycling, it could not be expected to be self sustaining. Complementary changes to the system that could be undertaken include, as follows:

- Reducing inter-island transport costs for recyclables;
- Introducing financial incentives for residential waste reduction and diversion through externalized or variable rate structures;
- Dedicating funds toward research and development of expanded in-state materials markets;
- Enacting significantly increased penalties and enforcement for illegal dumping; and
- Undertaking a broad-based, long-term public education program.

Without broad-based changes in the solid waste management structure, it may not make sense to consider curbside residential recycling in areas other than O‘ahu and Maui.

It is apparent that there is no single appropriate technology for the entire state, and that a unique solution to reduce barriers to recycling should be developed in each county.

Further development of the residential recycling topic may include an assessment of waste recovery appropriate for each of the counties. An appropriate starting point would be to assess the potential for expansion of the community recycling center network on each island similar to what is occurring on O‘ahu. Alternatively, waste diversion from certain large generators could be examined for potential gains in waste diversion. This topic is discussed in commercial recycling.

COMMERCIAL RECYCLING

DEFINITION OF THE TOPIC

Develop courses of action for the advancement of recycling from the commercial (institutions and industries) and multifamily sectors by considering the following potential actions:

- Adopt policy initiatives or revisions on the state, county, and local levels;
- Develop relevant material handling, collection, and processing strategies and infrastructure;
- Define related private sector and public sector roles/responsibilities;
- Use financial incentives for both generators and service providers;
- Enact mandatory participation and/or program delivery requirements and disposal bans for designated materials;
- Provide technical assistance, education, promotion, and outreach by government and industry entities; and
- Formulate multi-party task forces or committees to facilitate and legitimize policy/program planning and implementation.

CURRENT SITUATION IN HAWAI‘I

With few exceptions, commercial and multifamily refuse throughout the state is collected and disposed of by private haulers. A large number of companies provide commercial recycling services, including waste haulers, independent recycling companies, and non-profit groups. Generally, commercial recycling is provided on a case-by-case basis to larger businesses that have the material volumes, desire to recycle, and storage space needed for efficient, cost-effective recovery programs. On Maui and in the City and County of Honolulu (City), service providers have established special recycling collection routes for the collection of glass containers from bars, restaurants, and other establishments retailing food and beverages for public consumption. However, a comprehensive, systematic commercial recycling program serving a variety of generators has yet to be implemented on any of the four major islands.

The quantity of materials diverted under existing programs is shown in Table 1. The data shows that the largest fraction of recovered materials comes from commercial sources.

Table 1: Diversion of Selected Materials from Commercial Sources on O‘ahu

Material	Glass	Cardboard	Paper		
			High-grade	Newspaper	Other
Total Material Recovered	10,700	35,100	5,300	14,100	7,800
Commercial Sources	9,500	32,370	5,276	8,140	7,240
Drop Box and Other Residential	1,200	176	24	6,000	560
Percentage Commercial	89	92	100	58	93

Source: Total quantity estimates from Department of Health records. Drop box quantities are rough estimates based on discussions with the Honolulu Refuse Division.

Widespread initiation of multifamily recycling has been hampered by the same set of obstacles encountered on the U.S. mainland:

- Transient tenant populations;
- Limited material storage space in apartments and at building sites;
- Inability to control contamination of recyclables;
- No financial motivation for resident involvement since building owners pay disposal costs;
- Logistical difficulties in accessing storage bins with conventional collection equipment;
- Limited building management availability to organize and encourage recycling due to more primary maintenance responsibilities;
- Necessity and costs of providing frequent collection service to prevent external storage containers from overflowing;
- Collection schedule inconsistencies due to varying material generation rates for different buildings; and
- Relatively small quantities of processable/marketable materials that result from these conditions.

The Department of Health (DOH) Office of Solid Waste Management (OSWM) has introduced a proposal for the 1998 legislative session that would modify Hawaii Revised Statutes (HRS) 342G to enact a phased-in, statewide mandate on the recycling of various commercially generated materials. The proposal would require all commercial and industrial buildings or complexes (i.e., office, wholesale, retail) greater than 20,000 square feet to separate and provide for the collection, for purposes of recycling, of corrugated cardboard, newspaper, and office paper generated on the premises. In addition, food and beverage establishments retailing liquor for consumption on-site would be required to separate and provide for the collection, for purposes of recycling, all glass containers.

The above proposal is an expansion of an existing City policy mandating diversion by offices (greater than 20,000 square feet) and bars and restaurants serving liquor that was enacted July 1, 1997. In addition to the above, the City also mandates food waste recycling from restaurants, unless the restaurant can demonstrate that the cost is greater than the cost of disposal. The City also coordinates a "Partnership for the Environment" program that offers voluntary, peer counseling about waste minimization and recycling opportunities, and promotes member businesses through a newsletter and awards program. A few hotels on O'ahu, such as ITT Sheraton, have recycling and diversion programs. On Maui, local businesses such as Maui Recycling Service offer commercial recycling services, and the Grand Wailea Resort has adopted an extensive recycling program.

An assessment of commercial recycling in Hawai'i, as in any other state, must be framed within the legal context of the *Carbone* decision (and other similar ones) regarding the authority of governmental bodies to control the "flow" of recyclables generated by nonresidential sources. According to this decision, commercial recyclables are viewed as free market commodities that cannot become the exclusive property of a given hauler or recycler through the mechanism of a franchise or contract. Thus, government agencies do not have the authority to regulate the flow of commercial recyclables either through a collection agreement or by directing generators to use only one designated service provider for collection. The decision supports the placement of commercial recyclables into the competitive marketplace.

HRS, Chapter 340A further defines the ownership of waste, and grants the counties the right to define the disposal method that is in the public interest. Public interest is defined as recovery of reusable materials while meeting minimum quantity contracts for resource recovery units. In practical terms, the regulation allows counties having resource recovery facilities (such as H-Power on O'ahu) to direct all necessary waste (that is not recyclable) to that facility in order to meet the minimum quantity contract.

MODEL APPROACHES

Multifamily Recycling

- Formation of task force consisting of haulers, recyclers, processors, public agency representatives, apartment building owners/landlords, tenant associations, civic groups, environmental organizations and other interested parties to organize, support, and promote multifamily recycling. The City of Portland, Oregon used this approach as part of its overall strategy to develop a mandatory commercial recycling program. Multifamily dwellings are considered in this context because they, along with businesses, are served by haulers operating in a free market environment, as opposed to the single-family residential sector which is served by haulers operating under exclusive franchises for refuse collection, recycling, and green waste recovery. Portland's mandatory commercial recycling program is similar to the existing City of Honolulu policy in that designated generators are responsible for establishing recycling on-site and making service arrangements with private sector or non-profit organizations.
- Grants, loans, or other financial assistance for the purchase of resident recycling bins and centralized containers for on-premises storage of recyclable materials.
- California's Department of Conservation has had a grant program for several years that involves jurisdictions submitting proposals and competing for funding to support the purchase of equipment for recycling programs. The activity receiving such support must recover containers covered by the state's beverage redemption law.
- Implementation of, and publicity for, model "case studies" of successful apartment building recycling programs. The City of Los Angeles, where apartment buildings are serviced by private haulers, has published a recycling guide for multifamily settings that includes "how-to" information based on specific projects. The City of Portland, Oregon has assisted in providing background material for newspaper articles on recycling at particular apartment complexes.
- Provision of mobile recycling drop-off centers for clusters of apartment buildings that would service different areas according to an advertised schedule. This option could utilize one or more compartmentalized "drop boxes" or other containers that are available in a variety of configurations to serve as a temporary recycling center for apartment residents. A version of such a collection method is found in Santa Monica, California, where City crews locate, retrieve, and replace recycling bins in alley areas between apartment buildings. The placement and use of the recycling bins only marginally impact traffic on regular streets. City personnel are involved because the City picks up all residential refuse and recyclables. Materials are taken to a section of the City's public works yard where a private company sorts, processes, and stores recyclables prior to marketing**.**
- Adoption of building code or ordinance language requiring that new multifamily construction include space "set-asides" adequate for the placement of recyclables storage containers according to the number of proposed residents/units per building.
- Adoption of building code or ordinance language requiring that new multi-family construction allow for the convenient, non-hazardous entry and departure of both refuse and recycling vehicles in a manner that does not necessitate excessive maneuvering by the collector nor pose a danger to

residents, pedestrians, or the truck crew.

- Adoption of building code or ordinance language requiring that each unit in a new multifamily building contain "built-in" storage space for recyclables and/or standardized recycling bins so that storing materials will not occupy limited floor space in an apartment. California's Integrated Waste Management Board has published model code and ordinance terms regarding the enactment of standards for the size and location of space for placement of recycling bins or carts at apartment buildings. The model language is designed to be modified by jurisdictions to fit local conditions.
- For high-rise apartment buildings, placement of separate compartmentalized chutes/storage bins to facilitate collection of recyclables without residents having to transport them down several floors to an outside collection point. Several of these types of systems have been installed in remodeled and new buildings in New York City.
- Incorporate smaller multi-tenant residences (10 units or less) into curbside residential recycling program. (This approach would become feasible only if curbside-recycling service has been implemented for single-family residences.)
- Require licensed, contracted, or franchised waste haulers to establish, maintain, and promote recycling programs at those apartment buildings they service for refuse collection. The City of West Hollywood, California, has adopted this policy strategy; most residents of this densely populated portion of Los Angeles County live in apartment buildings that vary widely in size and design. The City also set up neighborhood recycling drop-off centers to offer additional recycling opportunities to apartment dwellers.

Business, Commercial, and Institutional Recycling

- Formation of task force consisting of haulers, recyclers, processors, public agency representatives, business leaders and associations, civic groups, environmental organizations, and other interested parties to organize, support, and promote commercial business recycling. See first bullet point under multi-family recycling above. In addition, the December, 1997 issue of *Resource Recycling* contains an article, titled "A Snapshot of Commercial Recycling Programs in America," by Stephanie Benson. It makes the following point: "Advisory councils show promise as well...respondents agreed on the importance of advisory councils, with Portland and Los Angeles stating this was the most crucial stage when developing their programs. The support of business leaders and haulers is essential, especially when setting up a mandatory program." (Pg. 37)
- Development or expansion of intermediate processing capability to accept loads of mixed commercial waste and commingled waste paper grades for subsequent separation and upgrading into marketable commodities. In order to increase commercial sector waste reduction, sorting equipment and techniques have been developed and installed that do not require extensive separation of materials at the source, thus making recycling more convenient at the generator level as well. United Disposal Service, Inc., with operations throughout the northern, central, and southern portions of central Oregon, created a related recyclables processing/marketing company called Willamette Resources, Inc. Willamette Resources built a materials recovery facility in Wilsonville, Oregon, primarily to handle mixed loads of commercial and construction/demolition waste and commingled waste paper produced by United Disposal accounts. The facility is also open to other haulers, construction/demolition companies, and commercial self-haulers.
- Institution of "wet-dry" collection mode for commercial refuse to reduce contamination of waste paper by organic, putrescible items. The City/County of San Francisco, in coordination with its exclusive waste service contractor, Sunset Scavenger Company, has been organizing and implementing wet-dry collection routes to both expand waste paper recycling and initiate food waste

recovery for subsequent composting.

- Adoption of mandatory recycling service requirements for licensed, contracted, or franchised refuse haulers. The City of Redondo Beach, California requires its exclusively contracted waste hauler to provide commercial recycling services to generators that request them; commercial waste service rates incorporate both refuse disposal and recycling service charges.
- Adoption of mandatory program implementation requirements similar to those in the 1998 OSWM's legislative proposal discussed above. Honolulu and the City of Portland, Oregon, both have pursued mandatory commercial recycling program implementation guidelines similar to the modifications for HRS 342G proposed by the OSWM.
- Implementation of, and publicity for, model "case studies" of successful commercial business recycling programs organized according to various "generator" groupings such as hotels, restaurants/bars, large-scale malls, mini-malls, "low-rise" and "high-rise" office buildings, airports, golf courses, industrial parks, heavy and light manufacturing complexes, and military bases. The City of Los Angeles' commercial recycling program consists, in part, of promotional and informational materials for generator-based waste reduction measures that are distributed within specific business/industry sub-sectors.
- Provision of waste audits, program planning and start-up advice, promotional materials, staff training, follow-up trouble-shooting and monitoring and additional forms of technical assistance. The cities of Long Beach, Los Angeles, and San Francisco, California, Portland, Oregon, and Seattle, Washington, are among many in the country that offer these services to commercial generators either through staff or contractor resources.
- Revision of rate structures to provide significant financial incentives for waste reduction and recycling. Redondo Beach, California, revised commercial rate structures so that there would not be separate charges for recycling and refuse collection. This change emphasized an integrated waste service package for the commercial sector with markedly lower rates for generators that reduced the frequency and volume of refuse set out for collection.
- Allocation of avoided disposal cost payments or diversion credits to recycling service providers for certain materials during periods when market revenues fall below designated levels. Marion County, Oregon, has used diversion credits or payments to assist with implementation of innovative recycling programs such as food waste collection/processing from businesses and recovery of waste paper grades from small and medium commercial generators. Two entities, one entrepreneurial and the other a non-profit social service institution, are under contract with the county to receive such payments on a regular basis throughout the course of the food waste and waste paper pilot projects. The county is considering the use of diversion credits/payments as a market support mechanism.
- Identification of major commercial business sectors that are critical to Hawai‘i's economy and/or generate substantial quantities of waste for intensive development of high-profile waste reduction/recycling programs that can serve as leadership models. The City of Los Angeles has taken this strategic approach as a way of developing waste reduction priorities and targets in the city's extensive commercial sector.

RECOMMENDED TOPIC DEVELOPMENT STRATEGY

If the commercial recycling topic is selected for development in the Integrated Solid Waste Management (ISWM) Plan, an approach for assembling a practical waste reduction/recycling strategy applicable to a

variety of conditions throughout the state should be presented. That approach will be most productive and relevant if it is based on the solid waste realities encountered in the state, and recognizes the importance of coordinating a broad-based spectrum of environmental, political, and institutional support for the strategy. Some of those critical realities are as follows:

- Limited material collection, transportation, and processing facility infrastructure, particularly outside the City and County of Honolulu;
- An economy whose stability and growth are closely tied to the dynamics of the combined tourism, hospitality, and resort industry that is sensitive to public perception and "good corporate citizen" concerns;
- An ongoing, statewide debate about how to diversify and localize economic activities, prevent further environmental deterioration and preserve the integrity of unique ecosystems, and eliminate illegal dumping, open dumps, poorly operated waste transfer and disposal sites, and other unregulated, environmentally destructive waste handling practices;
- A dedicated group of solid waste professionals from the public and private sectors that are committed for both environmental and economic reasons to the expansion of waste reduction and recycling programs in the state; and
- Limited public sector resources, thus necessitating close cooperation between the public and private sectors for undertaking programs that will have substantive, measurable waste reduction and recycling impacts.

Given this context, the use of a task force or work group, as noted above, to function as representative, integrative clearinghouses for the analysis, evaluation, and selection of multi-family and commercial business waste reduction/recycling recommendations may offer the best opportunity for a program development process that will garner the widest possible support. In this regard, the ISWM Plan would provide the following:

- Describe and give examples of the task force/work group approach;
- Present a description of how either a multi-family, commercial, or combined task force/work group would operate;
- Summarize multi-family and commercial business waste reduction/recycling approaches, systems, and technologies implemented in other locations and their relevance to Hawai'i;
- Identify the options to be considered, the criteria to be used for assessment, and the procedures used for defining recommendations;
- Estimate the volume of materials that could realistically be recovered from major commercial sources, and identify the highest potential for cost effective materials recovery;
- Assess the probable cost or savings of commercial recycling in different communities, recognizing that the economics differ widely between O'ahu and neighbor island communities; and
- Propose how the task force/work group can refine the recommendations into a series of sequentially phased implementation steps that would actually involve the task force/work group membership.

ILLEGAL DUMPING

DEFINITION OF THE TOPIC

To develop a strategy to reduce illegal dumping, including the operation of open dumps and roadside dumping of municipal solid waste (MSW) and hazardous wastes. Increase enforcement and expand public and private sector awareness. Corrective actions for illegal dumping can be divided into two categories that correspond to the type of dumping considered.

The most serious type of illegal dumping involves operators of unpermitted landfills where commercial waste, usually construction and demolition (C&D) debris or land clearing debris is disposed with the knowledge, and for the profit of, the landowner or lessee. Waste is generally managed in some form to maximize the site capacity, but usually without the environmental controls required by permitted landfills. Operation of illegal dumps represents a potentially serious threat to human health and the environment from migration of hazardous materials or inappropriate future use of the site.

The second type of illegal dumping can be considered littering. Littering or roadside dumping often occurs on undeveloped and unsupervised property by individual or commercial waste generators and haulers who either do not wish to pay the tipping fee for legal disposal of their waste, do not have resources to transport waste, or do not know about the existing waste collection services provided by the counties.

CURRENT SITUATION IN HAWAI‘I

The incidence of both types of illegal dumping has risen because of new national requirements for environmentally sound management of solid waste, and the resulting increase in disposal costs. The Department of Health (DOH) Office of Solid Waste Management (OSWM) is currently investigating 14 improper landfills, and has reports of additional 112 alleged sites where illegal dumping has occurred. Some open dumps contain waste deposits of up to 30 feet thick, require heavy equipment for operating, and charge haulers for disposal, but have no environmental controls. They may have hazardous materials leaching into the environment and so represent a serious threat to local soil, air and groundwater. In addition to environmental degradation from leaching contaminants, uncontrolled disposal impacts communities by creating fire and explosion hazards, encouraging disease vectors such as rats and mosquitoes, reducing community property values, and creating a tempting but dangerous playground for children.

In recent years, fire and hazardous materials (HAZMAT) teams have responded to:

- Illegal dumps that caught fire and required evacuation of neighborhoods,
- Solvent and hazardous waste storage sites that leaked contaminants to groundwater, and
- Underground fires at unpermitted disposal sites.

One effect of illegal dumping is that it handicaps the legitimate solid waste community, who incurs the capital and operating expenses required by state regulations. The 1998 legislature responded to the threat from illegal landfills by strengthening the law against it. The Hawai‘i Revised Statutes (HRS) 342H-1 broadens the state’s authority over solid waste management, and adds criminal penalties up to $25,000, 30 days in jail, and loss of contractors license. It should be noted that the maximum fine for illegal dumping is still less than the cost of compliance at most solid waste disposal facilities.

Roadside dumping of MSW, white goods or hazardous substances represents the same problem but differs in the extent of advance planning and resources. Roadside dumping of solid and hazardous waste impacts tourism, the state’s main economic engine, requires a large amount of labor to remove, and impacts our own view of neighborhoods. Illegal landfills are often well hidden, while roadside dumping is often quite visible.

Illegal dumps exist because of the cost savings to haulers and profit to operators. Roadside dumping may be a result of:

- A lack of practical or convenient site for legitimate disposal,
- A lack of awareness of county collection assistance provided free of charge; or
- Misguided opinions that organic waste is "biodegradable" and thus not environmentally damaging.

OSWM does not have sufficient staff resources to investigate most of the reported illegal dumping cases, and compile the irrefutable evidence necessary to bring civil or criminal cases to court. Their approach has been to provide the owner/operator the opportunity to voluntarily cease activities, remove solid waste to a proper disposal location, and remediate remaining contaminants rather than facing legal consequences of their action.

A distinction should be made between inert waste and inert fill. OSWM has promoted diversion of inert fill for use as road base or clean fill, which can be done with only a grading permit. Another class of fill, termed inert waste may be disposed using permit by rule, which requires minimal regulatory compliance. Materials that qualify as inert waste may be soil that contains petroleum contaminants but at concentrations that are below state action levels.

MODEL APPROACHES

To eliminate illegal dumps and reduce roadside dumping the proponents and opponents of reform should be identified. One demonstrated method for reducing illegal dumping is to provide education of the risks involved, and to encourage community activism, pride and awareness. After encouragement has been given a chance to work, the state has an obligation to support the operators that are in compliance by finding and prosecuting those who are not in compliance.

One model that has been successful in reducing both roadside dumping and illegal landfills is Nani 'O Waianae, a non-profit environmental awareness group in Waianae area that receives support from OSWM. Nani 'O Waianae conducts forums, produces educational materials, and acts as a neighborhood watch for illegal dumping in conjunction with OSWM and the police. The group encourages environmental activism to reduce dumping in an area of O'ahu that has been particularly affected by unpermitted solid and hazardous waste dumps. Area residents are encouraged to report suspicious behavior to neighborhood leaders, who will then contact the responsible landowner or resident. The disapproval of community representatives is often sufficient to stop illegal dumping, and it is apparent that people are usually more willing to report suspicious behavior to a neighbor than to make a complaint to the police. Since its formation, OSWM believes that the incidence of roadside dumping and illegal landfilling has decreased due to internal community pressure and increased reporting of improper activities. The project has shown that when a community is provided with information and empowered by regulators, non-governmental organizations can provide internal enforcement through peer pressure and increased awareness.

RECOMMENDED TOPIC DEVELOPMENT STRATEGY

The recommended response to illegal dumping differs for unpermitted landfills and roadside dumping or littering; however, a common element is that a first step would be to improve public understanding of the environmental and/or social risks associated with these practices. Many people

in the community are often aware of illegal landfills. It is likely that the community would be less tolerant of illegal dumping if they knew that their drinking water contained volatile solvents, or that their children were exposed to lead, arsenic or poly-chlorinated biphenyls. Many people are not aware that private companies will provide labor and financial assistance for cleaning up beaches and highways. In addition, one of the most difficult parts of changing public attitudes is getting their attention.

Further development of this topic would involve developing a local model that would lead to reduced roadside dumping and illegal landfilling. This model may include, as follows:

- A method of increasing public awareness of the dangers of illegal dumping,
- A structure for community-based action,
- A voluntary system that allows dumpers to cease practices and clean up their sites,
- A regulatory structure that makes illegal dumping extremely unattractive for those who do not wish to comply, and
- A strategy for informing the public of the hazards and empowering neighborhood watch groups will be developed in the plan should this topic be selected.

Nani ‘O Waianae has provided a model for community support and public awareness that has been effective. Along with a strategy for detection of illegal dumping there should be a program to inform landowners or operators of illegal dumps that voluntary disclosure and cooperation with regulators will result not in criminal prosecution, but technical assistance from the DOH. This offer can be patterned after the program now implemented for hazardous waste. Any voluntary disclosures would reduce the time and public expense of bringing these sites into compliance. Finally, there must be increased enforcement of regulations against illegal dumping and roadside dumping.

After the community is informed of the risk and the grace period for voluntary disclosure has expired, there must be a broad based legal response to those that persist in illegal dumping. Existing penalties should be further increased so that it costs less to comply with regulations than to avoid them. The regulatory effort required to find and prosecute illegal dumpers is high, but necessary to deter illegal dumping.

Businesses that have supported the regulatory structure through their compliance with the solid waste permit system deserve to be rewarded. Eliminating their illegal competitors is the proper method to ensure that the legitimate waste management industry remains financially sound. Proper enforcement may require education of the police, fire and the judicial branches of the significant potential health risks associated with illegal dumping.

A regulatory structure is in place but has not been effectively implemented for several reasons, including the following:

- The DOH does not have a sufficient number of inspectors to increase enforcement. Currently three inspectors review hundreds of cases annually. In addition to over 200 permitted solid waste facilities, the DOH receives several hundred complaints of illegal activities on an annual basis.
- The legal process, whether civil or criminal, is very slow. By the time the case comes to trial

the activities may be removed, or remediated, and the courts are less likely to expend their limited resources on an issue that is already ceased to be a threat.

- Collecting a sufficient amount of evidence to bring a criminal trial to court could require a substantial part of the DOHs resources over a period of a year.
- Finally, there are significant loopholes available to illegal landfill operators within the regulatory overlap between the state and counties. A county grading permit allows that fill material be placed on the site, but not waste. However, the difference in material placed is a minor infraction of the county's regulation that does not reflect the serious threat to public health.

An assessment of the level of effort required for proper enforcement will be included in the topic build-out. The assessment would have the objective of identifying loopholes in the grading permit system, and the judicial process that makes it so difficult to obtain convictions for violators.

In the case of roadside dumping and littering voluntary disclosure and enforcement actions are not effective deterrents because many of the offenders are not commercial haulers or regular waste handlers. Combating occasional dumpers can only be done through empowerment of community-based activists who watch for and report illegal dumping. Experience shows that this community pride and protection comes from education of the issues, and is most effective when introduced early. The elementary education system is the best place to conduct environmental education. To a certain extent, we must infuse our children with better values, and wait until they grow up.

The topic development strategy for reducing incidental dumping would be to enlist resources for community-based action, education, local peer pressure and voluntary cleanup.

LANDFILL IMPROVEMENTS

TOPIC DEFINITION

To develop a strategy for upgrading the design and operation of all municipal solid waste, and construction and demolition landfills by the year 2000. Topics will include liners, operational standards, closure/post-closure requirements, landfill fires, gas and groundwater monitoring, and financial assurance.

STATE REGULATORY STRUCTURE

The federal regulation governing municipal solid waste landfills was published in 1991 and implemented gradually between 1991 and 1996 (Title 40 Code of Federal Regulations [CFR], Chapter 258, Resource Conservation and Recovery Act [RCRA], Subtitle D). Hawai‘i has a solid waste regulation (Hawai‘i Administrative Rules [HAR] 11-58.1), which has been approved by the U.S. Environmental Protection Agency (U.S. EPA). The approved solid waste regulation transfers control from the federal government to the state, and allows greater flexibility and local control over permitting, enforcement, and interpretation of design standards for municipal solid waste (MSW) landfills. The state regulation also covers construction and demolition (C&D) landfills, monofills, recycling, composting, and other solid waste disposal transport and recovery facilities.

Responsibility for implementation and enforcement of solid waste regulations is carried by the Department of Health (DOH), Office of Solid Waste Management (OSWM).

Landfills that were operating on October 9, 1993 are classified as existing landfills and are subject to all the requirements of the regulation, except for the design criteria requirement for an impervious bottom liner. Those that accept less than 20 tons/day (TPD) may be eligible for a small quantity exemption. Hawai‘i also has a “Permit by Rule” exemption for landfills that accept agricultural, clearing and grubbing, or greenwaste, and recycling collection points that handle less than 3,000 tons/year and meet certain conditions.

These regulations are intended to ensure that solid waste is disposed in a manner that is protective of human health and the environment, but is not intended to cause major financial problems for small communities or those with significant existing landfill capacity in unlined landfills. Major aspects of the regulations are described below.

Location Restrictions

Location restrictions discourage siting landfills near airports, floodplains, wetlands, fault areas, seismic impact zones, unstable areas, and tsunami inundation zones.

Design Criteria

Landfills must be constructed in accordance with a design approved by the Director of the DOH that ensures that public health and the environment are protected. Leachate from landfills must not contaminate surrounding soil or groundwater to the point where maximum contamination limits (MCLs) are exceeded in the uppermost aquifer. Other design requirements must prevent surface water run on and runoff, reduce vectors with daily and final cover, and reduce landfill gas concentrations. Landfills in existence prior to October 1993 are not required to retrofit with bottom liners or leachate collection, but other RCRA, Subtitle D criteria must be met. Bottom liners are required for any lateral expansions and for other landfill modifications at the Director’s discretion. Owners of unlined landfills are responsible for maintaining the same groundwater protection standards as those that have liners, and are liable for the cost of remediating groundwater that is significantly contaminated as a result of the landfill operation.

Operating Criteria

New and existing MSW landfills must develop, implement, and document their procedures for excluding hazardous waste, access control, application of daily cover, surface water run-on/runoff control, disease vector control, liquids restrictions, explosive gas control, record keeping for waste quantity, and compliance with clean air regulations.

Gas and Groundwater Monitoring

Explosive methane gas and groundwater in the vicinity of landfills must be monitored at regular intervals. If significant concentrations of landfill gas or groundwater contamination are discovered, an additional set of requirements for monitoring and control are implemented.

Closure/Post-closure Monitoring and Maintenance

MSW landfills must be closed within six months after ceasing to accept waste. Landfill closure requires design and installation of a final cover system that minimizes infiltration and resists erosion. Landfill operators must prepare a Closure/Post-Closure Plan that describes gas and groundwater monitoring, erosion control and other maintenance activities over a period of 30 years after closure. The period of post-closure may be reduced in an approved state.

Financial Assurance

Landfill owners must maintain financial resources sufficient to close the landfill at any time during its active life span. The operator must maintain a detailed cost estimate for the cost of closure of the largest remaining area requiring closure at any time over the life of the landfill.

CURRENT SITUATION IN HAWAI'I

Hawai'i's landfills are listed in Table 1 along with some aspects of their design, location and operating criteria. The aspects of landfill design and operations that are most significant to the protection of human health and the environment are bottom liner integrity, operational standards, closure/post-closure care, fires, and landfill gas management.

Bottom Liners

With the exception of Waimanalo Gulch on O'ahu the landfills in existence on October 9, 1993 are not lined. Unlined landfills include Kaneohe Marine Corps Air Station Landfill, and PVT C&D Landfill (O'ahu); Central Maui, Hana, and Kaulapapa (Maui); and South Hilo (Hawai'i).

All new landfills and lateral expansions of existing landfills are lined with the exception of Lana'i landfill, which has a small quantity exemption. Lined landfills now operating in Hawai'i include Waimanalo Gulch (O'ahu); Central Maui Phase IV (not opened), and DeCoit C&D Landfill (Maui); Naiwa, (Moloka'i); Kekaha (Kauai); and Puu'anahulu (Hawai'i). With proper design, construction supervision, and absence of fires, release of contaminants to groundwater is significantly reduced in lined landfills.

The state's policy is to require facilities to provide bottom liners under all lateral expansions, and only grant vertical expansion permits in instances where it is necessary to allow time for development of alternative disposal methods.

Operational Standards

An important operational issue at all landfills is screening waste for ineligible hazardous components. HAR 11-58.1-15(a) requires that landfills implement a hazardous waste exclusion program involving random inspection of loads, record-keeping of inspections, training operators to recognize hazardous materials, and notification of the OSWM if hazardous materials are discovered. Hazardous waste screening should be done at demolition sites (i.e., large C&D projects), landfill gates or collection points, and at the landfill working face. Some of Hawai‘i’s landfills have traditionally been lax in screening loads, and OSWM has issued numerous warnings to landfill operators to improve screening protocols.

Regular monitoring of landfill gas and groundwater is required under Hawai‘i regulations. The expense of environmental monitoring and reporting can be as much as $20,000 per year. While OSWM maintains records of most monitoring results, they do not have sufficient resources to perform thorough checks on the validity of results or methodology. Only Kaulapapa Landfill, Maui, has no ability to monitor gas and groundwater.

Daily cover is required for MSW landfills and weekly cover for C&D landfills. Cover materials must help to reduce odors, litter, and vectors. Some county and private landfills have difficulty complying with this regulation due to labor requirements or cost of materials.

Closure/Post-Closure Monitoring and Maintenance

Adequate post-closure care reduces leachate generation, reduces differential settlement, and lowers the risk of landfill fires. Eleven MSW landfills in the state ceased operations during the 1990s; 10 of them have been closed; and 5 have post-closure monitoring and maintenance that are adequate to maintain the integrity of the closed landfill over the required 30-year period. Waipahu Ash Landfill on O‘ahu ceased to accept waste in 1992 but has not been closed.

Landfill Fires

Maintaining the integrity of the top final cover layer is critical to prevention of landfill fires. Currently, OSWM is monitoring at least five underground fires at active or closed landfills. Landfill fires create nuisance odors for miles downwind and may represent a threat to public health in nearby neighborhoods.

Landfill Gas Management

Decomposing organic materials in active or closed landfills produce large quantities of greenhouse gases, such as carbon dioxide under aerobic conditions and methane under anaerobic conditions. Production of both types of gases is accelerated with moisture. In active landfills, carbon dioxide and methane are generally lost through the surface of the landfill in concentrations that are not dangerous; however, when final cover is placed, gases may be concentrated to levels that represent a hazard of explosion or asphyxiation. Landfill gas concentrations may be managed through active or passive venting systems. Olowalu Landfill, Maui, has an active gas collection system that is flared at the landfill. Active gas extraction systems apply negative pressure to the landfill through the collection system, which encourage air to enter the waste mass. The presence of oxygen may accelerate decomposition, increases heat, and support combustion. Landfills with active gas extraction must be carefully managed to avoid significant underground fires.

Other Regulatory Issues

Other issues include landfills that are located within the airport exclusion areas, litter control, and financial assurance.

South Hilo, Lana'i, Hana and Kaulapapa landfills are within the airport exclusion zones. The primary concern in this situation is bird aircraft strike hazard. Hawai'i lacks many of the bird species that frequent landfills on the mainland. This factor reduces this risk of locating landfills within the airport exclusion area, but does not eliminate it. Because small landfills may attract fewer birds, or birds may be easier to control at small sites, they are less likely to constitute a hazard to aircraft operating in the area.

All landfills are required to have security and litter control measures. Usually a perimeter fence serves both functions; however certain landfills are located in areas with turbulent winds where the litter control fence may not be high enough to keep litter within the landfill.

The financial assurance sections of RCRA, Subtitle D, were implemented later than many of the design and operating requirements. Due to a lack of personnel, the state has not been able to review the financial assurance funds for each landfill.

RECOMMENDED TOPIC DEVELOPMENT STRATEGY

Bottom Liners

The objective of Hawai'i's solid waste regulations is to promote efficient diversion and disposal of solid waste, without undue financial burdens on the Counties, and protect public health and the environment. As a state with an approved solid waste regulation, the DOH has the responsibility of interpreting those regulations to suit specific goals and objectives of the State. One of the priorities of OSWM is protection of the state's limited groundwater resources by eliminating unlined landfills as soon as it is practical. Closing unlined landfills is an important step to reduce potential environmental impact from landfills.

The risk of financial liability resulting from potential groundwater contamination is sufficient reason to close unlined landfills as soon as it is financially feasible. By nature, landfill construction requires large capital expenditures that are amortized over the life of the facility. For this reason, any premature closure of a landfill is quite expensive. Unlined landfills will continue in existence past the turn of the century, but as they are filled they will be replaced with new landfills or lateral expansions that have impervious liners. The possible exception to this is those landfills having a small quantity exemption. Discovery of groundwater contamination, or significant public demand for improved safety, could cause the state to revoke the small quantity exemption. A recommended topic development strategy would be to develop guidelines for closure of unlined landfills by the turn of the century.

Operational Standards

Disposal of incidental or hidden hazardous waste in unlined MSW or C&D landfills can result in a contaminant release to groundwater. One of the best methods for preventing groundwater contamination is to reduce the quantities of hazardous waste disposed improperly. Reducing disposal of incidental hazardous materials could be achieved through pre-screening at demolition sites, inspection of loads, and inspection of the landfill working face. Further development of this topic may include a more detailed pre-screening protocol for all landfills, and justification for allocating resources for increased enforcement by DOH.

Closure/Post-Closure Monitoring and Maintenance

Further development of the landfill improvement topic may involve assessing the closure and post-closure maintenance history for recently closed landfills, correlating any observed environmental problems with post-closure care. A further topic may be to assess the labor requirements for OSWM to perform regular inspections of closed landfills.

Landfill Fires

Landfill fires now burning in five landfills and represent a potential public health risk and probable expense for post-closure monitoring and maintenance. Another concern is that underground fires in lined landfills usually damage the bottom liners and leachate collection systems. Underground fires are very difficult to extinguish, and are best prevented rather than extinguished. An important topic for further development would be preparation of a fire prevention manual for operators.

Gas and Groundwater monitoring

A technical task force has recently adapted a protocol for groundwater analysis in Hawai‘i. This protocol specifies the well construction, sampling equipment and methods preferred by OSWM. It has not been widely implemented because wells, equipment and procedures have already been established in all of the operating landfills. Monitoring wells and equipment are difficult to change, sometimes requiring retrofitting or purchase of software for analysis of data. A recommended strategy for topic build-out would be to summarize differences between the actual and recommended groundwater monitoring practices with the objective of standardizing groundwater monitoring at the earliest practical time.

FINANCIAL INCENTIVES

DEFINITION OF THE TOPIC

This discussion paper examines financial incentives that can be applied at the local and statewide levels to promote increased recycling of wastes and to strengthen the financial viability of recycling programs operating within the state. The options addressed in this paper can be viewed as a sub-set of the broader range of legal, social, and economic instruments available to government to promote increased recycling.

The applicability and effectiveness of any of the options identified will need to be assessed within the context of the following:

- Local and state waste management-pricing policies (i.e., pricing policies for alternative waste management services such as full cost accounting and replacement costs);
- The competitive environment in which local recycling enterprises must operate (i.e., price and availability of competing materials supplies and existing private sector operators);
- How such options might be integrated with other policy options that may also be under consideration (i.e., see extended producer responsibility discussion paper); and
- Public and political desire to support diversion efforts in the face of higher near-term costs.

CURRENT SITUATION IN HAWAIʻI

The primary financial incentives already in place to support recycling programs include, as follows:

- Tipping fees charged at waste transfer and disposal sites for commercial haulers. All counties charge tipping fees for commercial waste haulers. The fees range from $35.00/ton in Hawaiʻi County to $67.50/ton in the City and County of Honolulu. Only Hawaiʻi County charges for residential drop-off; however, residents and small commercial haulers are able to use any of its 21 transfer stations free of charge. Recyclable materials can be dropped free of charge in any county.

- Per-can waste collection fees for residential or commercial waste generators. Kauaʻi County charges $11.00/32-gallon can for commercial collections, with *reduced rates* for multiple cans; Maui County charges $3.00/month for both residential and commercial accounts. The City and County of Honolulu does not charge for residential pick-up but has a volume-based fee for commercial waste collection of $1.00/cubic foot. Hawaiʻi County does not provide collection. Private haulers charge variable rates for commercial and residential service, but approximately 50 percent is self-hauled.

- Mandatory diversion ordinances for designated materials from commercial facilities. The City and County of Honolulu requires all large restaurants to recycle glass containers and food waste unless it can be demonstrated that diversion is not available without significant extra cost.

- Bans on commercial loads containing more than 10 percent green waste or construction and demolition (C&D) debris from landfills. The City and County of Honolulu implemented a ban on all loads containing more than 10 percent greenwaste at H-Power and Waimanalo Gulch. Greenwaste must go to a composting facility, while C&D debris is routed to PVT Landfill.

- Advanced Disposal Fee (ADF) funds to support use of recovered glass in a variety of commercial applications. A statewide charge of $0.015/container is levied on all glass containers at the level of the importer or wholesaler. The fund is paid into a special fund that is used by the Department of Health for education and training (not more than 10 percent), and redistributed to the counties based on population. Each county uses the funds for some form of glass buy-back to encourage collection of containers, Glasphalt paving projects, funding recycling organizations, supporting inter-island transport of recyclable materials, research and development on secondary markets, or public education.

- Diversion credits for recyclable materials in Hawai'i County. The county pays variable diversion credits to each recycler who applies for the cash diversion credit. To qualify, the recycler must demonstrate that the material was shipped off island or reused locally.

- State and local procurement policies giving preference to recycled materials. The Hawai'i State Department of Accounting and General Services is tasked with developing a recycled product procurement policy that prohibits discrimination against products with recycled content, and with adding purchase specifications to aid in procurement of recycled products.

Residential waste generators are not generally charged for waste management services in direct proportion to the quantities of wastes that they generate. Recycling alternatives (drop boxes, green waste sites, exchange centres, home composting, etc.) are provided at no direct charge to users as an incentive to generators to divert some wastes from disposal.

The primary strategy for promoting recycling has been to provide generators with opportunities to recycle (supported by mandates in the City and County of Honolulu), by providing drop boxes, greenwaste sites, exchange centers, and home composting instructions at no charge to the user. The primary economic drivers underpinning commercial recycling to date, therefore, have been the avoidance of alternative waste management costs and/or the prevailing market conditions for potentially recoverable materials. Residential recycling is motivated by personal commitment to environmental preservation. The costs of participating in recycling programs are largely being borne by the generators themselves: residential, through the time spent in separating materials at source and delivering materials to drop-off sites, and commercial, in their tax payments and service fees.

MODEL APPROACHES

The merits of any potential financial incentive option must be weighed against the cost to the community, with due consideration to the following:

- Competition for tax revenues that could be used to support other community services;

- Identification of any existing businesses that might be at a competitive disadvantage; and

- Whether the proposed intervention corrects a perceived market distortion (i.e., underpricing of the true costs to the community of waste disposal alternatives) or whether this simply represents an additional cost to the community.

Some other jurisdictions now require that a cost-benefit analysis be undertaken before any new initiatives of this type are given further consideration.

For the purposes of this discussion paper, the range of potential financial incentives that could be considered further are grouped within three broad categories:

1. Market Pull Incentives

These options seek to provide incentives to existing and potential end-users of recoverable materials in order to increase their use of recyclable materials. In theory, increased demand for these materials will stimulate increased separation and recycling of those materials for which collectors can realize a profit. Given an open economy, however, this increase in materials recovery may actually occur in other jurisdictions (although Hawai'i does benefit significantly from its relative geographic isolation).

Mechanisms that could be considered further include the following:

- Expanding and strengthening public sector procurement policies and encouraging private sector "buy recycled" efforts. Public sector strategies have included minimum content requirements, price preferences, and set-asides.
- Encouraging the integration of waste recycling objectives within broader state and local economic development programs.
- Using state and local tax incentives to encourage the development of designated "market development zones" for industries that utilize recovered materials (by lowering or waiving taxes or by providing more generous tax write-off provisions).
- Providing "consumption" tax credits tied to the quantities of recovered materials reprocessed.
- Direct financial support to establish new industries based on utilizing recovered waste materials (from general tax revenues or supported by recycling fees applied to designated products or services, such as the existing ADF on glass recyclables).

2. Direct Service Fees

Charging generators directly for waste management services provides both a financial incentive to reduce the quantity of waste disposed and a secure funding base for operating these services – including recycling. Evidence from other jurisdictions clearly indicates that materials recycling rates increase significantly when generators are charged the full costs of waste management services in proportion to the quantities of wastes they generate. While most jurisdiction choose to provide recycling alternatives at no cost to the user, some communities in North America are proposing to include charges for these services as well.

Options that might be considered further include:

- Simply identifying the full costs of providing waste management services for householders and industry as an educational tool (and often as a critical first step in moving towards applying user fees).
- Establishing a separate waste management utility with the power to charge fees on a cost recovery basis.
- Implementing variable-rate user pay programs for residential waste, whereby households are charged user fees in direct proportion to the quantity of waste set out for waste collection. Approaches can vary from blended systems (allowing each household to set out an agreed limit

for a fixed monthly fee with charges applied only to quantities above this amount) to charges on each set-out (with rates increasing for each additional container).

- Applying surcharges to commercial waste generators and/or waste management service providers to help support recycling programs.

3. Indirect Fees

The costs of local and/or statewide recycling programs can be incorporated into waste disposal fees to provide a greater incentive to reduce the quantity of waste disposed of and to provide a source of revenue to support recycling programs. The two most common approaches used in other jurisdictions are, as follows:

- Applying tipping fee surcharges at transfer and disposal facilities. Funds collected can then be used to implement programs designed to increase waste diversion.

- Paying to municipalities and/or to recycling program operators some or all of the costs that would have been incurred if the material recovered had been disposed of. In effect, this approach assigns a value to recycling over and above the actual savings from avoiding disposal charges. In practice, this cost is then incorporated into the fees charged for disposal of other wastes.

RECOMMENDED TOPIC DEVELOPMENT STRATEGY

Gaining broad community acceptance for any proposed financial incentives to expand and support recycling programs is a difficult challenge. Most citizens regard waste collection and disposal as an essential public service for which they already pay taxes. Moving to direct user fees for what has long been regarded as "free" public service takes considerable courage on the part of municipal politicians. In some jurisdictions, intervention by the state government has been required to successfully make this transition.

Recycling straddles both the "public good" and private enterprise. Ultimately, recovered materials are returned to the economy as tradable commodities. Increasing materials recycling rates necessarily affects a wide range of established commercial interests. What some will view as a financial incentive for the benefit of the community as a whole, others may regard as government interference in the marketplace.

The full economic, social, and environmental costs of creating and managing wastes are neither widely understood nor fully incorporated into the prices charged for waste management services. Without addressing this fundamental issue, it is difficult to construct a sustainable financial mechanism to promote recycling in isolation.

Moving forward on this issue is likely to require considerable consultation among state representatives, local government, the business community, and public interest groups. There will need to be an accounting demonstrating that the benefits to be gained will exceed the costs that will be incurred to provide additional financial incentives in support of recycling. This process can be aided by selecting a cross-section of key representatives from these sectors early in the solid waste management (SWM) planning process to address key issues such as:

- Defining the guiding principles by which any proposed financial mechanism should be assessed;

- Selecting a short-list of potential options that meet these guiding principles;
- Reviewing in greater depth the results achieved in other jurisdictions by implementing these mechanisms;
- Identifying a mix of preferred options most applicable to Hawai‘i;
- Completing a cost and benefit analysis of implementing these measures;
- Undertaking an education and public consultation program with key stakeholders and decision makers on the options under consideration; and
- Presenting the preferred options identified for implementation.

MARKET DEVELOPMENT

DEFINITION OF THE TOPIC

Recycling programs depend upon reliable collection of recyclables from the point of generation. Once the materials are collected, a critical element of a successful recycling program is the availability of an end user for the recyclable material. Without a demand for the recycled content material, collection can be costly and unreliable. End use for the recycled material can be considered demand. Once a manufacturer chooses to use the recyclable material in their production process, the manufacturer will need a consistent supply of high quality materials. The key to long term-viability is recognizing that this will never be a static condition, and requires continuous monitoring, evaluation and assessment. Recycling market development involves working with new processing or end-use technologies, new material and product applications, and constantly removing barriers that inhibit the expansion of end-use opportunities and material value.

CURRENT SITUATION IN HAWAI'I

Hawai'i's geography and isolation from global markets require that local capacity be developed to process recovered materials in a manner that enhances Hawai'i's economy. Supplying the volumes needed to furnish the "critical mass" to manufacturers to base load processing and manufacturing operations will require collaboration. Since the public sector controls much of the collection system for waste and recyclables, the collaboration must be between public and private entities.

The challenges of aggregating sufficient material are compounded by the high cost of transporting material between the islands and to overseas markets. This topic is addressed in the Discussion Paper on Inter-Island Transport.

Clean Hawai'i Center (CHC)

Currently, one market development program addresses the challenge of market development in Hawai'i. The CHC, housed in the State Department of Business, Economic Development and Tourism (DBEDT), was established in June, 1994. The staff at CHC reports in its Five-Year Report that they have awarded nearly $450,000 via 10 contracts to recycling businesses. These dollars have been more than doubled with matching funds and in-kind services, and the contracts have contributed 17 full-time jobs to Hawai'i's economy. The Center has also provided technical assistance to over 75 businesses and has held 10 workshops, seminars, and conferences to assist the development of local recycling businesses.

Currently the CHC has a number of projects that are in planning or early initiation stages, including as follows:

- A recycling park/Brownfields development project,
- Construction and demolition (C&D) debris minimization workshops,
- A Green Office Project,
- A U.S. Department of Energy (USDOE)-funded project to utilize treated wood,
- An investment forum for recycling entrepreneurs,
- A workshop on cooperative marketing, and
- A seminar on export development.

The legislation that created the CHC established a sunset date of June 1999. Therefore, the program and its accomplishments are currently under review.

Maui County

The Maui County Department of Public Works (DPW) has invested over $1 million in a recycling grant program, funding more than 30 different projects since 1990 to develop infrastructure and products. Their major focus has been the Remade on Maui Campaign (RMC), which promotes Maui recycling businesses that use 60% of the resources diverted from the Maui waste steam. Examples of Maui County activities include the following:

- A County grant helped purchase a paper shredder to produce products now being used by local flower growers.
- Maui Recycling Group has received grants, including $25,000 from DBEDT, for educational ads in the Recycling Guide to promote purchase of Remade in Maui products.
- Grants to Aloha Glass and Aloha Plastic for equipment purchase to manufacture plastic lumber and process recycled glass.
- Contracts with EKO and Maui Composting Company, local compost companies, have included requirements for compost product development.

MODEL APPROACHES

A systematic approach to market development has proven successful in both increasing the value of recovered materials and stimulating the local economy. The CWC, formerly Clean Washington Center in Seattle, is internationally recognized as a center of excellence in this field. Other successful programs in California and Minnesota have proven the value of such an investment. The CWC was established and funded for six years to provide technical and market development assistance to Washington State businesses to increase recycled material utilization.

CWC's work with rural and island communities included work in Washington State's San Juan Islands on the economic and technical feasibility of mixed colored glass recycling. Local processing capacity was installed and a closed loop system exists, which is capable of handling even heavy tourist season fluctuations in material generation.

In Christchurch, New Zealand, CWC was involved with the design and implementation of an entire program that is responsible for the handling, processing, and marketing of a newly implemented curbside collection program. The program owns and operates a site that includes material processing, and program staff provides technical assistance to local businesses and manufacturers in specific material utilization.

In various parts of the United Kingdom (UK), CWC is working with affiliated local partners to develop material specific opportunities and market development programs. These efforts are all based on a prioritization of materials and determination of material specific strategies that are driven by local economic and political factors.

It is a common myth that the goal of market development is to recover the materials and make the same products again. In reality, for a variety of technical and economic reasons, only a small percentage of recovered materials can be made into the same product. Market development programs must recognize that most new commercial applications will not come from the primary industry that generated the material. Rather, new, higher value uses do exist and programs must endeavor to find, validate and develop those uses.

A typical set of market development goals might include, as follows:

- To build on the existing engineering value in recovered waste materials (the inherent value of the energy and labor expended to produce the original product).

- To identify and develop new, higher value end markets for specific materials considering collection, processing and transportation costs.

In the manufacturing process, the price for recycled materials is defined at the point when the materials are substituted for virgin materials. Material prices fluctuate in response to local and global factors, trends to move more materials into the recycling stream and/or the move towards adding value and marketability to standard recyclables. However, the cost of supplying those materials to end markets includes collection, transportation and processing. These costs are either paid as part of the solid waste management system, or they must compete with virgin prices.

There are few locations worldwide where recycling market development has been institutionalized. However, as recycling expands, it is increasingly the subject of significant attention in both the US and overseas. A model approach to market development incorporates the following three paramount principles:

- Local and regional capacity development for processing and end use applications.
- Collaboration between public and private sectors. The public sector focus is on the collection and processing, the private sector focus is on value-added manufacturing and consumption.
- Building around existing entrepreneurs and manufacturers.

The critical elements of a market development program that should form the basis for expanding Hawai'i's program include the following.

Strategic Planning

A group process is essential to generate a framework and focal point for the market development strategy. Participants should include existing stakeholders including business owners and entrepreneurs, and interested government representatives. This group should outline a general market development strategy, or policy framework, for executing market development initiatives in Hawai'i. This strategy should address the following key issues:

- Material Priorities. The group can select priorities for market development so that strategic planning can be focused where it will be most effective.
- Material-Specific Strategies and Action Plans. For each priority material, a materials specific strategy should be developed. Such strategies consider current and potential volumes recovered, current markets, potential market opportunities, available processing technologies, and the economic feasibility of alternative uses based on local market conditions. This blueprint defines the role of the key stakeholders and the specific role of the market development organization. From this blueprint, an action plan for achieving the specific market opportunities identified can be developed for each material.
- Material Supply. The quantity of material available to develop a market must reach and maintain a critical mass. Since much of the supply of recyclable material is controlled by the public sector, a strategy for supply should be developed by the market development organization that includes public sector commitments as well as private action.
- Barriers to Trade. In Hawai'i, the issue of inter-island and mainland transport costs is a critical strategic factor in market development. This topic has been addressed in the discussion paper or Inter-Island Transportation.

Implementing New Commercial Uses for Recovered Materials in Hawai'i

Based on the blueprint, the market development organization will typically assist with pre-commercial research and development activities such as:

- Assisting existing manufacturers with trial runs using recycled materials, product testing, equipment modification, selecting new equipment, and new product development.
- Assisting new manufacturers with product development and testing, identifying proven technologies, finding local joint venture partners for proven technologies, securing adequate supply of recovered material, business planning, market analysis, and financing.
- Assisting in the introduction of new products to market by removing market barriers, such as government regulations and product standards testing.

Developing Capacity in Hawai'i to Process Recovered Materials to Meet End Market Specifications

Concurrent with developing new end markets, the market development program must assist existing processors to improve efficiency, lower contamination, identify new equipment, source adequate material supplies, and identify new market niches.

Developing a Buy Recycled Campaign

Develop local awareness with a campaign to close the loop on the recycling agenda. Introducing recycled products into the local marketplace, encouraging the purchase of recycled products by government, business and consumers is an important step. Within the government, changing procurement standards is critical. This question is addressed further in the discussion paper on Interagency Cooperation.

Chambers of commerce and local trade associations are excellent partners for promoting acceptance of recycled products within the business community. Lastly, an ongoing public education campaign is critical to getting products into the hands of consumers.

RECOMMENDED TOPIC DEVELOPMENT STRATEGY

Recycling business development is a critical issue for the ISWM Plan revision. It is the single largest barrier to increasing the state's recycling rate, it strikes at the heart of Hawai'i's sluggish economy, and it benefits present and future Hawai'i residents by building jobs that add value to locally generated resources. A participative process that results in the design of a systematic approach to development of local uses for recyclable and compostable materials would provide a great opportunity to improve the position of market development.

In the following action plan, the first step could be undertaken as a part of this ISWM Plan update, while the additional steps would most likely take place following completion of the ISWM Plan Revision.

STEP I:

The first step would be to convene a meeting of the best and brightest in Hawaii to develop a framework for a market development strategy. This meeting – call it a "Recycling Business Development Summit" – should include the strongest possible representation of the private sector, including the following:

- Recycling businesses,
- Commercial waste generators,
- Transportation firms,
- Investment professionals, and
- Representatives of the major public agencies and the State Legislature.

The format of the Summit should be purposeful and participative, in contrast to the traditional conference of speakers and listeners. It should strive to discover and weave together collective viewpoints regarding key questions. The outcome will hopefully lead to messages on key legislative issues, such as the future of state market development initiatives, and provide a framework for market development action plans recommended in the ISWM Plan revision.

It is recommended that an interactive group communication tool, called a Keypad Group Response System, be used to create strong participation dynamics. In this system questions or choices are posed to the group, participants input an answer (selecting structured choices from 1 to 10) on a personal keypad, and the rolled-up responses are immediately displayed via computer and projector. This process has the following advantages:

- It focuses the group on collective viewpoints, rather than on the viewpoints of individual speakers,
- Everyone gets heard, but anonymously, thereby encouraging candor, and
- It vastly increases the velocity of feedback and group decision making, increasing the amount of work that can be accomplished in a short time.

It would be essential to thoroughly plan and design the Summit in advance. The keypad technology, in fact, forces you to think through the questions you want to address, and what you expect to do with the feedback. A design team of five to six individuals should be assembled to refine the purpose and to develop the Summit's format and contents.

As a preliminary concept, the Summit could focus on three key issues, as follows:

1. The selection of priority materials for local market development action.

This includes an assessment of the following questions:

- What are the vulnerabilities and opportunities based on market conditions for materials currently being recovered?
- Which materials currently have healthy markets?
- Which materials have experienced a change in local market strength or diversity?
- What steps can be taken to strengthen existing markets, both short and long term?
- Where are new markets and greater diversification needed?

2. A strategy to overcome the key barrier to markets: the high cost of transportation both inter-island and overseas.
3. The strategic advantages, and the challenges, of developing a cooperative marketing structure to aggregate materials and provide enhanced market leverage for island recycling operations.

With these key strategic questions addressed, the ISWMP could put forth an integrated strategy for market development and inter-island transport.

STEP II:

The second step would be to organize working groups that address material-specific and project-specific challenges that come out of the Summit. These groups would include key government and private sector stakeholders who have a specific interest and expertise in the specific material or topic.

There is a substantial amount of information from which these working groups could base their considerations. For example, the CHC has performed several studies and produced material-specific reports, particularly on compost, plastics, paper and glass, and more recently on treated wood, that can provide the basis for this activity. Each material-specific working group would serve as the focal point for developing a strategy for market development. These strategies would address the following issues:

- Identification of the end uses and market approaches that would be most effective in Hawaii for the material.
- The necessary actions, key stakeholders, and resource commitments to achieve the scale and value of end markets identified.
- Identification of the critical mass of materials required to make development of an end use market feasible, and a strategy to secure that supply.
- Encouragement of a high degree of collaboration among stakeholders, including public agencies, between the public and private sectors, and within the private sector.
- Identification of "pre-commercial" (near market) research and development critical to opening new markets. This can include changing regulations to permit the use of recycled materials (when proven acceptable) and testing the use of recycled contents in a product when there are potential local business opportunities.

STEP III:

Based on the outcomes of the working groups, requests for proposals to perform feasibility studies and/or project development could be issued for a small number of materials that offer the greatest opportunities for local higher value markets. Priority consideration should be given to proposals that will not only perform a study but also commit to establishing an appropriate facility or facilities.

PROGRAM FUNDING

DEFINITION OF THE TOPIC

This discussion paper will examine alternative funding approaches and their impacts on how waste is managed in Hawai‘i. Its ultimate objective is to identify more stable, secure financing options for activities that will make disposal more environmentally sound and diversion more effective.

The basic question, when it comes to handling our trash, is who should pay, how much, and for what? But there are other related questions as well:

- What role, if any, should a county Public Works Department or state Office of Solid Waste Management play in setting solid waste service rates that are charged and collected by private companies?
- If rates are to be stratified according to the notion that “the more you use, the more you pay,” how can it be assured that an adequate funds will be available to cover costs?
- Should the total costs for a county or region’s solid waste management system be spread across all facets of the residential and commercial sectors? Or is it fairer for those directly receiving a service to carry the full responsibility for its payment?
- What is to be included when calculating the average per ton cost for waste disposal? Would it be sensible or realistic to expect that publicly sponsored recycling programs “pay for themselves” or make a profit, or should their cost be weighed against the alternative cost of disposal?

CURRENT SITUATION IN HAWAI‘I

Over the last several years a diverse approach to funding for solid waste management programs has emerged from the various counties. An overview of solid waste management program funding in each county and for the state is presented below.

State of Hawai‘i

The state collects a $.35/ ton surcharge on each ton of waste disposed at a permitted disposal facility. Revenues derived from this surcharge provide for technical support staffing in the State Department of Health’s (DOH’s) Office of Solid Waste Management.

An Advance Disposal Fee (ADF) for glass containers (food, beverages, and other items) has been instituted on a statewide basis. The City and County of Honolulu (City) processes the accounts for the state. Money collected is distributed to the counties for use in their own glass recovery programs. Funds are distributed in proportion to the *de facto* population, with some monies set aside for research and development and administration at the state level. Funding for used oil recovery programs are provided in a similar manner to the counties; however, the monies are accrued from a $.01/barrel tax on oil imports. The DOH allocates and manages the use of money derived from this assessment.

The Counties

Most solid waste management activities for disposal and diversion in the counties are funded through a combination of general fund sources, especially property and sales taxes, along with revenues from tipping fees collected at disposal sites charged mainly to private haulers and businesses that transport their own refuse. It is not unusual for individual residents to have free access to transfer stations/convenience centers and/or landfills for purposes of waste disposal. Similarly, charges for residential refuse collection by county crews are often “hidden” in annual property tax assessments rather than itemized. If there is a separate billing

for such services it is a flat, annual fee rather a monthly bill that fluctuates according to the amount of waste generated. The implementation of variable user fees for residential waste collection, based on the concept of "pay-as-you-throw" or "the more trash you set out, the more you pay," has been considered in one form or another by all the counties. However, no statewide approach to variable rates for the residential sector has been developed that is applicable to circumstances in each county.

On a county-by-county basis, the basic elements of each county's funding situation are as follows.

Kaua'i

- Residents do not receive a garbage bill.
- Property taxes contain charges for waste services.
- Landfill tipping fees and the County General Fund are the sources of revenues for solid waste activities.
- Tipping fee at Kekaha Landfill is $56/ton for commercial waste haulers while residents have free access to the landfill.
- The county budget for waste collection, disposal, and diversion is $4.8 million/year.

Hawai'i

- The county does not provide refuse collection services but does maintain 21 unattended transfer stations/convenience centers around the island. County crews transport waste from these locations to either South Hilo Landfill or Puu'anahulu Landfill.
- There is no charge for use of the convenience centers.
- The tipping fee at both landfills is $35/ton for commercial haulers and residents.
- Private companies haul approximately 50 percent of the waste delivered to both landfills. The remaining 50 percent is self-hauled.
- Tipping fees and the county's General Fund (through property taxes) are the sources of revenues for solid waste activities.
- The annual county budget for operation of the transfer stations, waste disposal, and diversion is $11 million. Of this amount, the General Fund supplies approximately $7.7 to $7.8 million.
- The county administration recently directed that $2 million be cut from the Solid Waste Division's budget due to an overall decline in county-collected revenues.
- Under one hypothetical scenario, county staff projected that if landfill tipping fees were to be relied upon as the sole source of funds for solid waste activities, the tipping fees would have to be increased to between $78 and $80/ton to generate the original $11 million budget. (There are about 138,000 tons/year of waste disposed in the county.)

Maui

- All landfills are owned and operated by Maui County (two municipal solid waste landfills on Maui, one each on Moloka'i and Lana'i).
- Use of landfills is free for residents; otherwise tipping fee is $37/ton.
- Three private waste haulers control almost all commercial refuse collection.

- County crews provide residential refuse collection to approximately 20,000 out of 26,000 households eligible for such service.
- The annual fee for the service is $60.
- The residential waste collection service thus generates $1.2 million for the county solid waste budget.
- The total county budget for waste collection, transfer, disposal, and diversion is $8.6 million.
- $3.6 million of this total is derived from disposal site tipping fees.
- The bulk of the remaining budget ($3.8 million = 44 percent) comes from the county's General Fund.
- The Solid Waste Division of the Public Works Department has established a goal of making solid waste activities self-funded and self-supporting (in essence, an "Enterprise Fund" operation), in part to create funding to support the expansion of recycling and waste reduction efforts.
- A three-year plan is being proposed to the County Council that will take steps to accomplish this goal, including:
  - mandatory residential refuse collection (meaning all eligible households are offered the service and billed for it, regardless of whether they use it or not);
  - eventual automation of this service;
  - monthly residential refuse collection billing based on variable, "pay as you throw" rates with an average monthly base rate of $12.33 per household;
  - implementation of curbside residential recycling service;
  - implementation of curbside residential green waste recovery (pilot project currently being conducted for 500 households);
  - institution of fees for residential use of transfer stations and landfills; and
  - an increase in the landfill tipping fee to $54/ton.

O'ahu

- The City and County of Honolulu (City) has one waste-to-energy incinerator (H-Power) and one landfill that accepts municipal solid waste (MSW) and incinerator ash (Waimanalo Gulch).
- Tipping fee for both disposal sites is $67.50/ton.
- The City has a recycling fund that is collected as a percentage of the tip fee at their disposal facilities.
- The City operates three transfer stations and six convenience centers.
- Residents can use the transfer stations and convenience centers for free.
- The City provides twice weekly refuse collection to single-family homes and a limited number of small businesses.
- There is no collection fee for residential waste services.
- City business waste collection service is billed at $1.00 per cubic foot.
- Private commercial haulers collect wastes from multi-family dwellings and most commercial sources on a variable rate basis. This accounts for approximately 60 percent of the total disposed tonnage.

- The annual budget for waste collection, transfer, disposal, and diversion for the City is $100.8 million (FY 98-99).

Solid waste is now funded primarily by mechanisms that are invisible to the public. Under this system there are no incentives for recycling, source reduction, or other types of waste management alternatives. The state has been in recession for the past 8 years and declining tax revenues have impacted public services. In conjunction with Hawai'i's reputation as "Tax Hell," the addition of any new taxes would be politically infeasible. Alternative funding mechanisms for waste management may be possible if they are justified by saving money for the public (*e.g., residents who throw away less than average will pay less than they are now paying, and those who throw away more than average will be charged more than they are currently paying*). The drawback of making waste management costs visible is that the lure of illegal dumping may increase for those who find paying for disposal to be unacceptable. Alternative methods for funding waste management and stimulating diversion are discussed in the following section.

MODEL APPROACHES

There are a large number of examples of program funding that could result in a more reliable fiscal foundation for solid waste management in Hawai'i. However in order to do this, public and private sector stakeholders will be challenged to consider what changes are appropriate in the Hawaiian context. Some of these ideas are organizational concepts for establishing funding systems that may be taken from successful programs in other states.

Full Cost Accounting (FCA). Full cost accounting is a method to identify the cost of all components of waste management. Knowing the full costs of municipal solid waste management can help managers and the public to make better decisions about each program element, improve the efficiency of services, and better plan for the future. FCA is usually the first step in managing the costs for waste management because it provides data on program elements necessary to identify the areas that could be improved.

Four states now require local governments to use FCA in reporting waste management costs to the public. Texas developed a FCA workbook for municipalities to assess rates that reflect the full cost of providing services. Many municipalities have applied FCA internally to help reduce the cost of services.

Maui County has decided to adopt FCA for their waste management system as a first step toward making waste management independent from the county's general fund. This process will be implemented over the next few years.

User Fees. Traditionally all counties in the state paid for waste management services through property taxes that were placed in the general fund and used as necessary for all county goods and services. All four counties have begun charging for disposal and collection of commercial waste but with the exception of Maui County none charge residents for collection or disposal services. The cost of waste management remains constant for residents regardless of the amount of waste generated. This creates the mistaken impression that waste management is free. User fees may take many forms; one common element is that residents are able to see the bill for waste collection and disposal. Some of the different types of user fees are discussed below.

User fees can take the form of fixed or variable rate pricing. The pay-as-you-throw system is the most commonly used system in mainland U.S. communities. A fixed charge per can system is commonly used in many communities. This system is occasionally combined with automated collection, so that all of the collection containers are standardized. Users either subscribe to 1, 2, or 3 cans for disposal each collection period, or tags can be purchased in advance to be affixed to each container, thus avoiding the subscription process. Alternatively some communities sell special colored bags that are used. Variable rate systems can be used for different size cans. No matter which system residents pay on a per unit basis for waste collection.

The potential benefits of unit pricing include:

- Waste reduction – Many communities report that introduction of user fees helped to achieve reduction of 25 to 45 percent on the amount of waste disposed.
- Reduced MSW management costs – As the amount of waste disposed is reduced, the overall cost of waste management declines. A portion of those savings is generally dedicated to improving recycling and diversion options.
- Increased waste prevention – People typically modify their purchase practices when they are aware that they will have to pay to dispose of unwanted packaging materials.
- Increase participation in recycling and composting program – Waste diversion alternatives are generally provided at a reduced cost to disposal to provide alternatives to the collection or disposal fee.
- More equitable allocation of costs – The more citizens use the service, the more they pay.

Another user fee system is a flat rate billing similar to sewer fees now imposed by many counties. Waste collection and disposal is billed separately on a monthly or annual basis. Maui County has had a flat rate system for residential collection for many years. The fees either should be mandatory for all residents or the collection crews must know their subscribers in the same manner as private haulers know their customers. Flat rate systems are easier to administer in many cases, but doesn't encourage waste reduction, as do variable rate systems.

Two tiered systems utilize a small basic rate and additional charges for each container. Under this system the fixed cost of waste management is covered, and variable costs associated with collection and disposal are covered by the unit charge.

While there are clearly benefits to user fees, there are also potential barriers. Some of the major barriers that Hawai‘i would face if user fees are implemented include a potential increase in illegal dumping, less uniform cash flow, additional administrative costs associated with collection of fees, and a public perception of increased costs. Perhaps the greatest barrier to user fees is overcoming resistance to change both among citizens and elected officials. The primary defense against undue resistance is informing residents about the existing cost and environmental risk of waste management practices.

Complementary waste diversion programs are required if volume based pricing systems are used. The following discussions are on other potential sources of revenue for waste collection, disposal or diversion programs. These are commonly referred to as alternative sources of funding, because they are usually insufficient as stand alone funding sources, but may be used for supplementary revenues to fund positions or programs that would not otherwise be possible.

Advance Disposal Fees (ADFs). An accepted method for supporting recycling efforts is advance disposal fees such as the fee placed on importers of glass containers in Hawai‘i. Under this regulation all importers pay a fee for each glass beverage container brought into the state. The fees are used by the state to fund recycling promotion and administration (10 percent), and returned to the counties for use in supporting glass recyclers as well as recycling promotion. This type of fee could easily be broadened to include other potentially recyclable items that traditionally are disposed rather than recycled. Top items on the list for potential ADFs are car batteries, tires, and whole automobiles. The concept of sharing the responsibility for disposal of a product with its manufacturer or importer is the subject of the discussion paper on Manufacturer’s Responsibility. A substantial ADF could be used to influence the manufacturer to modify or reduce packaging that is difficult to recycle or dispose.

Another alternative would be to add an ADF to the general excise tax for all goods imported into the state. This may be justified on the assumption that some portion of all goods will eventually require disposal.

Materials Revenues. Sale of recycled materials produces a revenue stream that is usually insufficient to cover the cost of collection, sorting, and shipping the materials to market in Asia or the U.S. mainland.

Franchising Fees. Franchising fees may take the form of payments by collection contractors to the government in exchange for protection from unlimited competition. A franchising system only is appropriate when competition for recycled good is so intense that each vendor could not get sufficient quantities of material to be profitable. This is not the case in Hawai'i. In some communities the fees are tied to gross revenues, which allows small contractors to pay less than large ones. The City of San Jose, California, requires commercial haulers to pay a rubbish franchise fee of 10 percent for the first $100,000 and 19.5 percent of gross receipts above $100,000. Each year the fee generates over $13 million for San Jose.

Permit and Business License Fees. Most waste management firms in Hawai'i are required to hold a solid waste management permit from the state. Haulers are required to have permits from the counties. The fees generated from permitting are generally used to partially support technical staff that supervises compliance with terms of the permits.

Tipping Fees. Tipping fees are now charged for certain segments of the population at all landfills in the state. Only Hawai'i County charges residents for disposal at the landfill; however, its extensive series of transfer stations reduce the need for residents to haul to the landfill.

Special Assessments. Special assessments either raise public revenues by imposition of special fees for development of certain types of facilities that are not desirable, or they can be used to promote desirable infrastructure by reducing fees for development. Hawai'i has a series of enterprise zones that are special designated areas for development of certain types for businesses including recycling and composting businesses. The enterprise zones have reduced taxes and permit fees for a period of years as an incentive for businesses to locate within the zone.

Fines and Penalties. Fines are generally an insignificant source of revenue because the labor involved in investigating, filing civil or criminal charges, and prosecuting the offense may cost more than the penalty.

General Fund Revenues. These are now the primary source of revenue for all counties. This fund is the primary source of money from the tax base that is used for most public services.

RECOMMENDED TOPIC DEVELOPMENT STRATEGY

Funding is the cornerstone of integrated waste management systems. Further work on the topic will require two lines of development: policy issues and practical implementation details.

Policy Issues

The ISWM Plan revision process can set a framework by providing information about the following:

- Policy options,
- How other communities have addressed options, and
- What the results have been.

However, the preferred policy approaches should be selected for Hawai'i through a deliberative decision-making process that builds consensus for action by involving key stakeholder and decision-makers.

A first challenge is to define the state's role in establishing statewide policies for solid waste system funding, and the role of local jurisdictions. Increasingly, states have defined system funding policies that are

implemented by local jurisdictions, sometimes on a mandatory basis and sometimes voluntarily.

There are four key policy issues relating to system funding, each with a variety of possible approaches, that should be addressed. The policy issues are:

- Full Cost Accounting – How should solid waste system costs be calculated? Traditionally most communities incorporated solid waste costs into public works budgets, and did not fully figure those costs separately. This has hidden the true cost of waste management. Increasingly communities are adopting full cost accounting, which is a systematic approach to incorporate all present and future outlays, overhead costs including oversight and support services, and operating costs.

  Once these principles are embraced, there are other accounting/policy issues that must be addressed. For example, should "full" costs include traditional system subsidies, such as the granting of State lands for disposal facilities, and "intangible" costs such as lost opportunity costs from the dedication of land to non-revenue producing functions such as waste disposal.

- The User Pay Principle – Should users of the solid waste system pay for the costs of that system, or should those costs be born by the general tax system? The trend is for communities to adopt a user pay system because it sends the appropriate economic message to the waste generator.

- Cost-of-Service or Quantity-Based Variable Fees – Should a residential fee system be structured on a cost-of-service basis, or should it also incorporate explicit incentives to encourage environmentally desirable waste behavior? Traditionally the charge for the first garbage can has been substantially higher than additional quantities. A trend is for communities to adopt volume-based "pay-as-you-throw" policies that charge on a linear or even an accelerated basis for larger quantities disposed.

- Diversion as an Enterprise or Service Component – Should recycling and composting systems be viewed as free enterprise systems that must pay their costs through market revenues, or as elements of waste service for which some costs would be covered by utility fees?

Several of these issues relate directly to efficiencies in the solid waste system. It has been demonstrated that a user pay system structured around quantity-based variable fees can be an effective incentive for source reduction. Given Hawai'i's high per capita waste generation rate, there may be significant opportunities to reduce the amount of disposed waste through implementation of a user pay policy.

In addition, this policy issues interface with those addressed in the Financial Incentives White Paper, and also some of the issues raised in the Manufacturer Responsibility White Paper. The three topics could be integrated into a single Position Paper.

It is recommended that a dedicated Program Funding Task Force be formed, perhaps as a subset of the SWAC, to work with the consulting team and the DOH to provide direction and to synthesize a policy-driven approach to program funding. The ISWM Plan team could support their decision-making process by evaluating the experience of other jurisdictions with similar challenges, identifying optional policy approaches, and performing cost/benefit analyses of the options being considered.

Practical Implementation Details

As the saying goes, "the devil is in the details." Several intrinsic practical barriers that must be overcome will bedevil implementing a user pay system in Hawai'i:

- A history of free disposal
- Substantial potential for illegal disposal problems due to 'rate shock'
- Substantial rural distances between unmanned, and no-charge disposal sites (Island of Hawai'i)

- Ohana housing making billing processes difficult
- Residential collection service is neither universal nor mandatory
- Sometimes incomplete accounting for households on collection routes.

Once a policy direction is clear, and the will to implement a policy-driven approach has been developed, these legal, technical, and logistical issues can be addressed, sometimes on a county-by-county basis, through strategic planning. Numerous communities around the country have demonstrated that illegal dumping problems and practical complexities can be overcome, and that the policy-based funding system is the cornerstone of an effective and efficient waste management system.

MANUFACTURER RESPONSIBILITY

DEFINITION OF THE TOPIC

The terms *manufacturer responsibility*, *extended producer responsibility (EPR)*, and *product stewardship* are commonly used to describe a policy approach aimed at shifting ultimate responsibility for the post consumer management of products from the government to the producer. The Organization for Economic Development and Cooperation (OECD) has defined EPR as follows:

> "The concept of EPR seeks to internalize costs for the treatment and disposal of post consumer products traditionally borne by municipalities. Producers accept their responsibility when they design their products to minimize life cycle environmental impacts, and when they accept the legal, physical, or socioeconomic responsibility for the environmental elements that cannot be eliminated by design. EPR provides a policy framework and incentives for product manufacturers to address both upstream and downstream environmental impacts."

Where the producer is not located within a jurisdiction, as is commonly the case in Hawai‘i, this responsibility is generally allocated to the importer of the product. For this paper, the term EPR will be applied to the acceptance of end-of-life responsibility by any private entity that is in the production, import, wholesale, and retail chain.

CURRENT SITUATION IN HAWAI‘I

Hawai‘i has some examples of EPR:

- An advance disposal fee (ADF) is charged against glass packages in Hawai‘i. In this case, a direct charge is applied against all glass bottles imported into the state and these funds are applied (at least in part) to the recovery and recycling of these containers. The fee now stands at $01.5 per container. The monies are paid to each county on a population basis and expended by each county somewhat differently.
- Lead acid batteries must be taken back by retailers, and the cost is born by the price of the new battery. Retailers must post signs for the public and take back up to the number sold. Disposal in municipal solid waste (MSW) is banned.
- Motor vehicle tires cannot be disposed in any way except delivery to a dealer or recycler. Retailers and wholesalers are mandated to accept used tires from customers. Retailers must post signs notifying customers that disposal is illegal and that they can recycle at the store.
- The "Partnership for Environment," run by the City and County of Honolulu (City), conveys an industry responsibility message by encouraging businesses to reduce waste, to express environmental preferences to their suppliers, and to lobby for reduced packaging and recycled packaging content.

In addition, interest has been expressed in expanding the ADF, as follows:

- Increasing the glass fees from the current level, that only partially covers the cost of collection and processing glass containers.
- Expanding the program to cover other materials, such as a levy on plastics packaging to help fund recovery of used plastics, or on motor vehicle tires to help fund market development for used tires.

MODEL APPROACHES

The concept of EPR is controversial. Critics of the concept argue that the responsibility for the environmental impact of the product at its end-of-life should rest with the final user or disposer of the product. Furthermore, it is charged that the experience with EPR programs to date has shown that such programs are prohibitively expensive and do not send direct price signals to consumers to encourage changes in their waste behavior. Some argue that waste management must be a shared responsibility among industry, consumers, and government.

Proponents of EPR counter that it is essential to internalize the true and full environmental costs of products into the production process, in order to create incentives for manufacturers to adopt more efficient and sustainable production practices, to conserve resources, and to design for less waste in the end.

A number of jurisdictions, especially in Europe, have adopted EPR policies in many different forms. At one extreme, Germany has adopted a "circle economy" law, whereby the legal responsibility for a product remains with the producer throughout its life cycle, and the recovery and reutilization of waste products is favored over disposal. The famous "Green Dot" or Duales System Deutschland (DSD) was established under a 1991 Packaging Ordinance that makes manufacturers directly responsible for their packaging waste. Either producers and retailers must directly take back packaging themselves, or set up a third-party organization (the "dual" system which operates parallel to municipal waste collection), which they fund to do so. The Green Dot on a package indicates that it can be recycled through that collection system.

The European Union (comprising 15 member countries) has adopted the concept of EPR as a priority waste management policy. While the focus of these efforts to date has been primarily on packaging materials, EPR programs are now being extended to include vehicles, batteries, tires, polyvinyl chloride (PVC) products, electrical, and electronic products. In Canada and Australia, the experience is more mixed, with examples of industry providing resources to governments to help in the transition from disposal-based waste management systems to an increasing emphasis on waste recovery and recycling.

In Canada, the U.S., and elsewhere, a persistent focus on beverage containers has resulted in the adoption of bottle bills. Several models exist, but in most the retailer collects a deposit fee, takes back the container, and returns the deposit to the customer, as a motivation to return the bottle. In California, separate, rather than in-store, redemption centers are established. These systems are quite different from Hawai'i's ADF in that they assign responsibility for redemption or recovery to the retail system, and the deposit fee is returned to the customer. The Hawai'i ADF provides no collection/recovery system and the fees are paid to the recycler. In some bottle bill programs, some of the resources (e.g., unredeemed deposits) can be used to defray the costs of operating the system.

There are numerous examples of industries implementing voluntary EPR-like programs, including the following:

- Voluntary beverage industry container recycling programs;
- National organizations promoting the proper use and management of specific products (e.g., steel, aluminum, plastics, polycoated paperboard);
- Anti-litter programs (e.g., Adopt-a-Highway); and
- National Nickel-Cadmium battery recovery program.

There are four broad approaches to promoting the concept of manufacturers responsibility, as follows:

- Consumer Action – This can be reinforced by adopting variable rate, pay as you throw programs. As consumers become more acutely aware of the costs of waste management, they usually seek

opportunities to reduce the quantities of waste that they generate. Companies producing and selling products should, in turn, respond to consumer demands by minimizing the use of materials that eventually become waste.

- Voluntary Initiatives – Promote voluntary actions on the part of manufacturers. These can take various forms, including:

  – Recognizing and promoting waste reduction successes of individual companies and industry sectors through awards, citations, or a voluntary registry;

  – Issuing challenges to individual companies or industry sectors to help achieve the state's waste reduction goals and objectives by helping support diversion programs;

  – Requesting formal or informal waste action plans from industry; and

  – Negotiating waste reduction agreements with key industry sectors.

- Back Drop Regulations – Implement regulations that set broad waste reduction targets for individual companies or industry sectors, and/or that impose sanctions on companies that do not achieve specific goals through voluntary initiatives. Generally, these programs should allow industry to determine how to achieve the goals. Examples of this type of regulation include, as follows:

  – Requiring direct take back of products or packaging, or participation in an approved scheme that will perform these functions on the company's behalf;

  – Requiring company specific waste reduction plans for approval by the state;

  – Requiring companies or sectors to file broader waste reduction plans for approval by the state;

  – Establishing broad material or product category waste reduction goals and target dates; and

  – Establishing multiple compliance alternatives, such as achieving recycling rates, reduction targets, or minimum content levels.

- Command and Control Regulations – Placing a legal obligation on the producers of designated materials and products, such as:

  – Setting material or product recycling rates by specified dates;

  – Imposing various "eco-taxes" on designated materials or products;

  – Specifying minimum secondary material content levels in products;

  – Requiring material or product take-backs or mandatory deposits; and

  – Banning the sale of products that do not meet established waste management criteria.

RECOMMENDED TOPIC DEVELOPMENT STRATEGY

Determining the most appropriate model for Hawai'i will require educating key decision-makers about the strengths, weaknesses, opportunities and problems likely to be encountered. The key criteria required for a successful program that promotes the principles of manufacturer responsibility are likely to include the following:

- An administratively simple approach to implementation and administration of the program;

- A level playing field for businesses competing in the Hawaii market (i.e., not leaving companies or sectors at a competitive advantage);
- Incentives to ensure that programs are operated at the lowest possible costs;
- An ability to pass on any new costs to the consumers of products that become waste; and
- A broad consensus within the community that this policy approach will result in net benefits to the state.

Information gathering would be necessary to pursue further development of this strategy within the Integrated Solid Waste Management (ISWM) Plan. This would include, as follows:

- A review of existing state powers to implement policies of this type;
- More extensive review of experiences with the primary EPR options that are being considered in other jurisdictions; and
- Data on the quantities of targeted materials or products sold in the state.

There is a growing body of experience with the design and implementation of specific EPR programs throughout the world. Numerous "producer responsibility organizations" exist and are managing EPR programs for such products as packaging, tires, batteries, household hazardous wastes, and electronics. These entities can serve as an important resource. As a result of this experience base, there is a growing network of people in government, industry and academia that could contribute to development of this strategy.

The following primary strategies are recommended for consideration in the ISWM Plan:

- Assess the adequacy of the current glass ADF to cover the costs of recovery, and make adjustments as needed.
- Develop a consensus as to how to pay for recovery and market development for certain critical materials, such as plastics and motor vehicle tires. Consider application of an ADF to fund the recovery of these materials.
- Promote a discussion with the major importers for Hawai‘i on how they could support further development of recycling of the products they import. For example, as noted above:

  – Support to governments to assist transition from disposal-based waste management systems to increased emphasis on waste recovery and recycling.

  – A guaranteed market price for recovered materials, such that when secondary material prices fall below some threshold, importers would "top up" the price.

SPECIAL WASTE MANAGEMENT

DEFINITION OF THE TOPIC

Special wastes are solid wastes that are targeted for diversion from disposal systems, but due to their hazardous nature or potential impacts on public health, require a higher level of regulatory oversight. The goal of the Integrated Solid Waste Management (ISWM) Plan is to develop environmentally responsible special waste management programs, targeting materials such as household hazardous waste (HHW), used motor oil, cooking oil and grease trap waste, auto salvage and white goods, lead acid batteries, scrap tires, contaminated soils (including in-place bio-remediation), and foreign and medical wastes. The discussion will include source reduction and non-toxic substitution for HHW, public education programs, commercial sector pollution prevention (P2) initiatives, development of programs for conditionally exempt small quantity generator (CESQG), and development of best management practices for various waste streams. The ISWM Plan should address facility development, operations standards, financial assistance, permitting, and enforcement.

CURRENT SITUATION IN HAWAI‘I

Various approaches to special waste management are being used in Hawai‘i. One of the most successful has been a take-back program for lead acid batteries and scrap tires. In 1997, statewide programs resulted in the collection of more than 400,000 batteries. In addition, 377,000 tires have been recovered on O‘ahu for recycling during 1998. While tire recycling activities have struggled with the bankruptcy of the state’s primary processor, the establishment of a new operator and development of stable markets for tire derived fuel (TDF) seem to be providing stability to the program.

Commercial used motor oil recovery programs collected approximately 2 million gallons of oil, and the City and County of Honolulu’s (City’s) “Do It Yourself” (DIY) oil eater box promotion diverted a possibly significant, but undetermined, amount of used oil to H-Power. Each Neighbor Island has developed DIY collection programs, but they currently receive only a fraction of the waste oil generated. Used oil recovery may face a major setback this year because all sugar mills, the major market for specification used oil fuel, have shut down.

Within the individual counties, a variety of other special waste diversion programs are in place. For example, the City accepts pre-screened HHW at a waste facility, collects and recycles abandoned and derelict vehicles, and recycles white goods from bulky waste collection, transfer stations, and convenience centers. Scrap metal, predominately junked cars and white goods, is one of the largest single elements diverted from the waste stream. At H-Power, a bottom ash metals recovery system extracts aluminum, other non-ferrous metals, and ferrous metals for recycling. Maui hosts businesses that process and convert cooking oil to diesel fuel. Neighbor Island counties have periodic HHW collection events held at varying intervals, and have auto salvage and white goods recovery programs that have met with varying degrees of success.

Medical waste, while a fairly small element in the waste stream (less than 1,000 tons/year [tpy]) is a major issue on all islands. Hospital incinerators are being phased out and few options exist for the pathological waste within the medical waste stream.

Cooking oil and grease trap waste is a growing problem in Hawai‘i. Grease trap waste is especially noxious and a cause for numerous odor complaints from residents and other businesses. Currently, no coordinated effort exists to manage this material.

The treatment of petroleum-contaminated soil (PCS) had reached a point where the large majority of the PCS remediation was being done in an environmentally sound manner. However, with the upcoming regulatory deadline for closing underground storage tanks (USTs) that are not in compliance, the volume is expected

to increase significantly and improper management and unpermitted disposal issues may cause significant concerns.

Hazardous waste generated by CESQGs currently is accepted at permitted municipal solid waste landfills (as allowed by 40 Code of Federal Regulations [CFR] 258). Little is being done to divert this significant waste element or promote waste minimization.

MODEL APPROACHES

The following approaches could be applicable to reducing the amount of special waste requiring disposal:

Household Hazardous Waste

- Enhanced public education campaigns, focusing on safer alternatives for household products, prevention of illegal dumping, and proper disposal alternatives;
- Enhanced residential used oil, lead-acid battery, tire, and white good programs;
- Periodic HHW collection events or permanent HHW collection facilities (for areas currently without them);
- Hazardous household product reuse programs (e.g., waste exchanges or free pickup at designated locations);
- Take-back programs for latex paint, used motor oil, batteries, tires, and white goods (possible public-private sector cooperation); and
- Advanced disposal fees for hazardous household products or "hard-to-handle" consumer products such as tires and white goods.

CESQG Programs

- Education campaigns focused on waste minimization and proper disposal;
- Periodic CESQG collection programs (perhaps coinciding with periodic HHW collection days) or permanent CESQG collection facilities (possibly at the same location as permanent HHW collection facilities); and
- CESQG waste exchange programs.

Medical Wastes

- Enhanced educational campaigns directed toward hospitals, clinics, nursing facilities, and offices emphasizing source reduction, good housekeeping, and proper disposal;
- Enhanced educational campaigns directed toward residents about home-health care-generated medical wastes; and
- Establishment of a public/private partnership for the management of pathological waste.

Contaminated Soil

- Private or public-sector development of soil treatment technologies;
- Encouragement of on-site treatment over removal and disposal; and
- Re-evaluation of cleanup levels.

Commercial Sector Initiatives

- Education campaigns promoting P2 initiatives.

Administrative and Enforcement Programs

- Government purchase preference for products made from recycled household hazardous or other special wastes, such as recycled paint or retread tires;
- Low- or no-interest loans or grants to special waste recycling businesses;
- Advance disposal fees for tires, white goods, used oil, and vehicles;
- Reduced or streamlined permitting for HHW and CESQG facilities and programs;
- Increased penalties for illegal disposal of special wastes;
- Establishment of a hauler manifesting system or registration for used tire haulers; and
- State involvement in the development of stable markets for used motor oil.

RECOMMENDED TOPIC DEVELOPMENT STRATEGY

Low-cost programs that lead to the minimization, proper handling, reuse (where practical and safe), recycling, or secure disposal of special wastes are preferred. Public education, source reduction and product reuse programs, which can be implemented using in-state resources, would be particularly appropriate for Hawai'i. Product reuse programs could take the form of either waste exchanges or free pickup stations at designated locations.

Additional information is needed regarding the scope and effectiveness of existing special waste programs (e.g., statistics on illegal disposal, or on the amount of HHW detected in load-checking programs at disposal facilities), including private-sector special waste diversion efforts.

Special waste management is a wide and varying problem. A coordinated effort clearly defining state, county, and private sector roles and responsibilities must be developed. In addition, as special waste management is a significant economic burden on the community, any further development should address funding requirements and responsibilities for each waste stream element. Program development should include all stakeholders who can contribute valuable insight in developing an approach such as the counties; large importers/retailers who sell motor oil, tires, appliances, and hazardous household products; members of the medical community; representatives of CESQGs; and environmental groups.

CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

DEFINITION OF THE TOPIC

Develop more or better options for construction and demolition (C&D) diversion; analyze barriers; develop transfer and processing capability; provide financial incentives, training, and technical assistance to generators; and develop better definitions between C&D and municipal solid waste (MSW) for disposal and permitting.

C&D waste is solid, largely inert, waste resulting from the construction, repair, renovation, demolition, or razing of buildings, roads, and other structures. The challenge is to develop and implement *a cost-effective strategic plan* that provides the highest and most enduring diversion rate of these materials as possible, while protecting human health and safety. This amounts to a significant increase in C&D materials recovery, while reducing illegal disposal. It requires substantive market development as well as significant changes in industry practice and attitudes. To develop an effective strategic plan requires an understanding of existing conditions, as well as an analysis of existing and potential factors that could inhibit or enhance C&D recovery.

CURRENT SITUATION IN HAWAI‘I

Composition and Quantity

C&D waste comprises primarily wood, drywall, concrete, and asphalt, with smaller amounts of metals, plastics, glass, and packaging materials. C&D waste is a major contributor to Hawai‘i’s solid waste stream. In 1995, over 2 million tons of solid waste was generated in Hawaii, of which 600,000 tons (estimated) was C&D material.[1] Based on this and national estimates from the U.S. Environmental Protection Agency (EPA), C&D waste contributes from 20 to 30 percent of the state’s solid waste stream. C&D waste diversion provides ample opportunity to help achieve Hawai‘i’s Year 2000 recycling goal of 50 percent.

Disposal Options

On O‘ahu, the legal alternatives to disposal at the MSW landfill are disposal at Island Demo, a C&D transfer station and recycling facility in Mapunapuna, or disposal at the PVT Land Company C&D landfill in Nanakuli. Maui also has a C&D landfill, the DeCoite C&D Landfill; operations are currently suspended. Where a C&D landfill is unavailable or inconvenient, C&D waste is delivered to MSW landfills or dumped illegally. (Recent regulatory changes have imposed a 10 percent upper limit per load on the amount of C&D material allowed for disposal at the MSW facility at Waimanalo Gulch. Anecdotal evidence, however, suggests that this ban is not regularly enforced.)

Recycling Options

O‘ahu’s recycling infrastructure supports recycling to some degree of most major components of C&D, including clean wood, green waste, concrete and asphalt, cardboard, glass, and metals (with the notable exception of drywall). Fewer options exist on neighbor islands, but all islands provide facilities for collecting and processing green waste, cardboard, and scrap metal. In 1997, there is limited information available on the amount of C&D waste recycled, including approximately 200, 000 tons of concrete and asphalt on O‘ahu. Better data is needed to make credible assumptions.

Special concerns and challenges for C&D waste management in Hawai‘i include:

- *Illegal Dumping*. Areas such as Leeward O‘ahu have seen a sharp increase in illegal dumping of C&D waste, threatening environmental and human health, and the tourism economy. This increase in illegal dumping is due in part to the recent restrictions on disposal of C&D waste at the MSW

landfill, designed to conserve valuable and costly MSW landfill space, as well as increased tipping fees.

- *Treated Wood*. Wood treated with chemicals to resist decay and termites is used widely in construction in Hawai'i. Treatments currently used in Hawai'i include ACZA (ammoniacal copper zinc arsenate), Hi-Bor (borate), and CCA (chromated copper arsenate). Treated wood poses special concerns for both disposal and recycling. (Engineered wood including glues or other additives and demolition wood can also be problematic, but this is not unique to Hawai'i.)

- Island Recycling. The recycling industry in Hawai'i faces a number of challenges unique to the islands, including a lack of local markets for recyclables and high shipping costs.[2]

Examples of current local efforts to implement or promote C&D waste diversion include:

- *Honolulu's C&D Transfer Station.* Island Demo maintains a successful side business that includes segregating mixed loads and recycling Honolulu inner-city C&D debris. Its success is in part due to its in-town location and its ability to use material handling equipment in other company operations. Island Demo is currently seeking additional space for expansion of its C&D recycling efforts.

- *Transcend Inc.* Demolition. Transcend, Inc., a demolition, excavating, and hauling company on O'ahu, recently diverted over 88,000 tons of waste from a recent demolition project, saving about $800,000 in disposal fees.

- *The Maui Recycling Group Pilot Program*. Under grant from Maui County, the Maui Recycling Group is currently setting up a pilot job-site-recycling project at the Liholani Golf Villas, with the long-term goal of documenting the cost savings resulting from job-site recycling, and establishing recycling procedures at all construction sites on Maui.

- *Green House Hawai'i Project*: The Green House Hawai'i Project is composed of volunteer architects, builders, and public agency personnel who promote resource-efficient building techniques, waste reduction, and use of recycled/remanufactured components. The organization prepares exhibits for trade shows and training programs for resource efficient builders. This project has spun off related programs, including the Department of Business, Economic Development, and Tourism's (DBEDT's) new advanced building technology training program (HABiT), which is funded by the U.S. Department of Energy.

- *Hawai'i C&D Waste Management Education and Business Development*. DBEDT and the Department of Health (DOH) have sponsored a pilot construction waste management workshop and C&D recycling business developmental forum to begin assessing problem areas in C&D waste management. DBEDT is planning to hold a second session of each this December to continue the effort. A C&D waste management guide is planned as part of this effort, which will be developed with input from the construction industry.

MODEL APPROACHES

Numerous successful programs on the mainland demonstrate the economic and environmental benefit of recovering, recycling, and re-using C&D waste stream components. Local efforts (see above) provide evidence that similar programs can produce positive results in Hawai'i as well.

Infrastructure Models

In-town Transfer Recycling Facility, Portland, OR

This facility is a publicly owned and operated transfer station built in 1990, with a flat floor plan to allow for sorting. The facility accepts full range of (non-hazardous) debris, including C&D. They currently recover four percent of C&D coming in, primarily wood and metal. This is reduced from previous rates because more private haulers are offering sorting and recycling services. The City of Portland feels the Metro Central transfer station really acts as a last resort given the availability of private recycling options. Most of the C&D they receive comes from small businesses that do not have equipment to grind wood on site. Typical load sizes are one to two drop boxes. This transfer station is part of a large-scale effort to promote and enforce C&D Recycling. Portland has a city ordinance requiring recycling for all projects valued at $25,000 or more. Education ongoing since 1988 includes demonstration projects and workshops promoting C&D recycling. For further information, see C&D Recycling Blooms in the City of Roses, *Waste Age*, 1996.

Mixed Construction, Demolition, and Landclearing (CDL) Recycling Facility, Los Angeles, CA

Community Recycling and Resource Recovery is a private business that accepts C&D material (about 100 tons per day), sorts mixed loads, and recycles between 85 and 95 percent. Wood is ground and used as boiler fuel and soil amendment. Metal is sold to metal recyclers. Dirt is used as landfill cover, and rock is crushed for fill. The facility charges $22-$24 per ton, which competes successfully (according to the owner) with local tipping fees of between $24 and $35 per ton.

Mixed CDL Receiving Facility, King County, WA

Waste Management Inc. (WMI) conducted an extensive remodel of an existing transfer station to create a mixed CDL receiving facility in King County. WMI diverts what it terms as rich loads (loads with a high content of targeted recyclables) from the transfer floor to a conveyer belt. Laborers handpick wood and cardboard from the loads. Currently, the facility is selecting only exceptionally clean wood. WMI hopes to expand operations to include more grades of wood as markets improve. Thus far, the company has not found it cost-effective to hand-pick drywall from the loads and transport it to New West Gypsum (NWG), since that company charges $55 per ton at the door for used drywall. Another example of mixed load recovery services include a privately-owned C&D landfill in Maryland, which operates a successful selective co-mingled recovery facility,

Eco-Industrial Park Development, Skagit County, WA

An advisory committee including solid waste planners, local developers, representatives from the building industry and environmental groups, and staff of the Economic Development Association of Skagit County was charged with investigating the development of an environmental industrial park. The park's emphasis was to be the recovery of waste, including CDL waste materials, in re-manufacturing businesses. The committe's work included working with a consultant team who performed a feasibility study. The final report for that study included information and recommendations that led to a participating recycler's decision to expand his business to include source-separated CDL recovery. His only required capital improvement was installing an asphalt pad to expand his receiving area, at a cost of $10,000.

Full Service CDL Recycling, Woodinville, WA

Construction Waste Management (CWM) developed the concept of full-service CDL recycling in the western Washington area and is highly successful in the Seattle/Snohomish/King County area. CWM collects source-separated materials to get full value out of the recycled material. During 1996, CWM investigated expanding its services in Kitsap County and set up accounts with local recycling outlets. CWM's fees in Kitsap County were higher than in the Seattle/Snohomish/King County area since recycling options are few in Kitsap and transportation to recycling outlets elsewhere require expensive transportation (over a bridge,

or on a ferry). As a result, he reports no customer inquiries and has dropped marketing efforts in Kitsap County. Full Circle, a small business developing in Kitsap County, is experimenting with full-service recycling on commercial projects, and it is believed a local company doing work on a smaller scale will do better in the relatively lukewarm Kitsap economy. Another type of recycling service is exemplified by a C&D curbside collection program in Des Moines, Iowa. This has improved C&D diversion from 20 to 50 percent. For further information, refer to "C&D Comes Curbside in Des Moines." *Waste Age*. July 1997.

Green Building Programs

Build a Better Kitsap, Kitsap County, WA

Build a Better Kitsap is a non-regulatory, market-driven incentive-based green building program. The local Home Builders Association (HBA)-sponsored program was initially a response to industry and public concerns about the potential for increased tipping fees and decreased waste management options for C&D debris in Kitsap County. (The County's only landfill is expected to close within the next five years; and all inert C&D landfills have closed.) The education and marketing program promotes over 30 options for waste reduction and recycling, as well as options addressing other environmental concerns. In the past year, the program has been enhanced to include remodeling, light commercial, and developer elements. The program has three star levels, with each level progressively more difficult. A basic requirement for qualification for the first level is a job-site recycling plan. A copy of the completed recycling plan must be submitted with the certification checklist.

In its first 18 months, more than 30 businesses have enrolled in the program, with nearly 20 homebuilding projects completed in a very flat housing market (including an inventory of homes sitting for months). *Build a Better Kitsap* has won local, regional, and national awards for innovation in industry education. This recognition has come from both the public and private sector. Educational components include a handbook, industry workshops, and a resource library. Promotional components include brochures, presentations, fact sheets with case studies, decals and yard signs. Kitsap County Public Works and the Washington State Department of Ecology provided funding. Substantive in-kind and other support was provided by the HBA of Kitsap County. It is important to note however, that *Build a Better Kitsap* has been developed (like the Portland example) as part of a larger effort to promote C&D diversion and recovery. Some of these efforts include:

- Central Market Buy Recycled Showcase video, signage, fact sheets, reports, and industry tours;
- A CDL Business Focus Group Report, in which nearly 25 key stakeholders participated;
- Two Demonstration Buildings (Project Teamwork, Central Market) demonstrating over a dozen cost-effective recycled content building products;
- Vocational High School Training Program, including teacher planning meetings, presentations by four visiting instructors, and four field trips (landfill, recyclers, and re-manufacturing plants.); and
- CDL Chapter, *Solid Waste Management Plan Update*, including 14 recommendations (eight educational, four technical assistance, and two facility-related).

HBA Metro Denver Built Green Program, Denver, CO

Similar to Build a Better Kitsap, the Built Green program is a non-regulatory, HBA-sponsored program. However, its primary focus has been on energy efficiency and material use, with minimal attention to waste reduction. This is largely due to low tipping fees and the perception that recycling services and recycled content building products are not available in the Metro Denver area. Nonetheless, the program offered a platform for education on waste reduction and recycled content. Technical assistance provided through an

Industry Partnership Project funded by the Colorado State Energy Office during the summer of 1998 revealed that recycling services and recycled content building products are indeed available, and raised awareness among the HBA leadership and Parade of Homes builders. As a result, the program will be including additional options for recycling and recycled content building materials. The three-year-old program has over 50 builder members enrolled, with hundreds of *Built Green* homes built, including production, custom, and semi-custom homes (in a very hot building market). The City of Boulder has a new Green Points program; qualifying through the program is a condition of permitting.

City of Austin Green Builder Program, Austin, TX

The first green building program developed in the nation, this is a voluntary program sponsored by a public municipality. Its major initial impetus was energy efficiency, since it was an outgrowth of a utility sponsored energy efficiency program. Like the Metro Denver program, however, it has broadened its focus significantly since its inception in 1991. The program has 50 builder members, and has a strong presence in the building market.

Regulatory and Policy Models

Mandatory Commercial Recycling, City of Portland, OR

In 1995, the City of Portland adopted an ordinance requiring businesses to recycle, effective January 1, 1996. In a summary of the requirement, City of Portland Environmental Services literature states that where building projects are valued at $25,000 or more, including both construction and demolition phases, the applicant for building permit must ensure that specific materials produced on the job site are recycled. Generally, these materials include rubble, land clearing debris, wood, metals, and corrugated cardboard. The penalty for not complying includes a 30-day grace period during which the city must offer assistance. After that, a penalty of up to $500 may be imposed.

The city is currently studying waste composition for large construction jobs to assess the program's effectiveness. Interviews with the program administrator indicate the program could be more effective if the building department was fully engaged in the project and could/would assist in enforcement, since they visit sites more frequently in conjunction with regular building inspections.

Voluntary Recycling, Greater Vancouver Regional District (GVRD), British Columbia (BC)

GVRD has initiated a voluntary code named 3Rs Code of Practice for the Building Industry. The code was developed in partnership with the building industry. The code encourages builders and developers to:

- Assess waste types and establish waste reduction plans at all project sites;
- Separate asphalt, concrete, clean wood, scrap metal and cardboard for recycling at construction and/or demolition sites;
- Reuse materials on construction and renovation sites;
- Salvage reusable materials from buildings during demolition and renovation;
- Where feasible, relocate entire buildings that would otherwise be demolished;
- Minimize damage to construction materials through proper on-site storage and handling; and
- Request suppliers to minimize product packaging and/or take back packing for reuse or recycling.

The GVRD will assess the effectiveness of the voluntary code in 1998. (A mandatory CDL recycling requirement for building projects of 2,000 square meters and above was included as a recommendation in

the 1995 Greater Vancouver Regional Solid Waste Management Plan. Feedback from the construction industry was strongly negative.)

Waste Management Specifications for County Projects, King County, WA:

The King County Solid Waste Division funded technical assistance for the development of construction waste management specifications and documented job-site recycling as part of a major regional building project where the specifications were tested. The highly successful project saved nearly $300,000. As a result, King County project managers are now incorporating waste management requirements in many County projects.

Waste Management Plan Requirement as a Condition of Permitting Los Angeles, CA

The City of Los Angeles Public Works Department requires waste management planning and documentation of recycling and disposal as a condition of obtaining a construction or demolition permit for public works contracts. The recycling guidelines are not mandated (the specification states "to the greatest extent feasible"); however, in many cases the economic advantages of recycling become evident.

Requirement of Invoices as Evidence of Proper Disposal/recycling to Reduce Illegal Dumping, WA

This is a good option and should be investigated further. King, Kitsap, and Spokane Counties, Washington do not do this. They all handle illegal dumping through local Health District enforcement protocol with varying levels of success. Receipts are required for documentation in Los Angeles program (see above). Staff of the Los Angeles Department of Public Works may be able to provide insight as to whether this has had any impact on illegal dumping.

RECOMMENDED TOPIC DEVELOPMENT STRATEGY

Assessment

An assessment would characterize types and quantities of C&D waste generated, as well as recycled, in Hawaii. Because it has been identified as a problem area, treated wood should be an important focus of this assessment.[3] High-volume locations or certain types of projects that generate large amounts of certain types of debris can point out the best opportunities for effective diversion. Current options statewide for C&D waste recycling (types of existing facilities, location, and capacities) and remanufacturing would also be evaluated. Current construction practices would be reviewed to identify problem areas and opportunities for change and education. Ideally research would include interviews with major generators and recyclers to gain an on-the-ground perspective. Local conditions would be evaluated in light of current understanding of C&D generation and recovery in general.

Key to this assessment would be an analysis of barriers to C&D materials recovery: Barriers identified at this time include low tipping fees on Oahu[4], perceived high labor costs/inconvenience associated with job-site waste separation, and lack of focus on C&D waste management within the local construction culture. For the recycling industry, barriers include economics (competition with low tipping fees, lack of equitable financial assistance from local governments),[5] lack of local end use markets, limited availability of long term leases for recycling businesses, and a difficult land-use and permitting process.

Any assessment should build on work completed or in progress, such as the waste audit currently being performed by Cascadia, and information provided by participants in a CDL Developmental Forum facilitated by O'Brien & Company in February 1998.

Strategic Plan Development

An accurate picture of current conditions and potential opportunities can provide pointers for

recommendations. Preliminary ideas for consideration include:

Market Development

- Develop or encourage development of increased "In-City" C&D transfer capacity on O'ahu.
- Establish a recycling (and remanufacturing) park at Sand Island, Mapunapuna.
- Provide technical assistance, training, and financial incentives to support the development or expansion of C&D recycling and re-manufacturing businesses.
- If required, clarify legal definitions for C&D and MSW waste to support C&D recovery.

Composite lumber products that use treated lumber along with plastics or polymers to create new building materials may hold promise for expanding markets for treated lumber and encourage local production of secondary market products. The Clean Hawaii Center currently sponsors this research which may show great promise for commercial development. Other market solutions for treated wood should be aggressively pursued.

Transform Industry Practices and Attitude

- Develop education and outreach programs targeted at the construction industry, technical and vocational school students and/or apprentices, policy implementers, and the general public (the industry's "customer base"). This would require a partnership between private industry trade groups and government.
- Develop regulatory incentives such as fast track permitting for projects where a recycling plan is included, or making a recycling plan a condition of permitting or contracts with the state or counties. Training or exams showing an understanding of best management practices for construction waste can also be tied to contractor licensing. Private industry trade groups should be enlisted in this effort.

The Plan elements should build on work already in progress. This includes construction industry environmental education programming being developed for Hawai'i's Advanced Building Technologies Program. In addition, to be effective, the plan should be developed in coordination with private industry trade groups to create buy-in, and should reflect lessons learned from similar efforts tried elsewhere. Workgroups formed at the CDL Business Developmental Forum held in February 1998 should be formalized into an ongoing task force with broader industry representation. The DOH and DBEDT can work in concert to coordinate this Task Force's activities.

[1] *Minimizing Construction & Demolition Waste*. February 1998. Published jointly by the State of Hawaii, Department of Health, Office of Solid Waste Management; State of Hawaii, Department of Business, Economic Development and Tourism, Clean Hawaii Center; Environmental Building Coalition of Hawaii; Building Industry Association of Hawaii; and the General Contractors Association of Hawai'i.
[2] Hildebrand, Celia L "Challenges in Island Recycling." *Recycling Today*. August 1997.
[3] The predominant use of lumber treated with copper chromium arsenate represents a unique challenge for recycling wood products in Hawai'i because arsenic compounds may be unsuitable for some secondary market products. Still unknown are any special concerns associated with some of the newer alternatives, including ACZA and HiBor treated wood.
[4] Flat rate tipping fees at PVT formerly averaged out to about $10 per ton for large loads. The tipping fee was recently changed to $29 per ton. Nonetheless, due to high labor costs, disposal costs still represent a relatively small portion of total construction costs, diminishing the financial incentive for recycling.
[5] For example, the state has provided land, free of charge to the counties, on which to build existing landfills and transfer stations.

ORGANIC WASTE MANAGEMENT

DEFINITION OF THE TOPIC

Municipal organic wastes come in many forms in Hawai‘i and from numerous sources, as follows:

- Yard debris, yard trimmings and greenwaste (terms used interchangeably) from residential and commercial sources;
- Food waste from residences, grocery, and restaurants;
- Waste paper and wood from residential and commercial sources;
- Biosolids (sewage sludge) generated by municipal and private wastewater treatment plants; and
- Miscellaneous organic wastes including textiles, leather, plastics, and rubber.

For the purposes of this discussion, our focus will be limited to organic material typically diverted from municipal solid waste (MSW) landfills through source separation and targeted for composting, or other bioconversion technologies. This will include greenwaste, food waste, biosolids, and soiled, non-recyclable paper. The following discussion will not address agricultural waste, although manure and crop residues may be integrated into municipal programs.

The goal of this discussion paper is to present options that will increase the diversion of organic wastes from disposal through the following mechanisms:

- Public education;
- Expanding capacity of existing composting facilities;
- Increasing use of compost products;
- Promoting agricultural composting;
- Expanding backyard and local-scale compost programs;
- Increasing awareness of value of compost to agriculture and horticulture; and
- Improving systems for commercial and residential organic waste collection and diversion.

In addition, the discussion will include cost-effectiveness related to viability of options, analysis of health/nuisance impacts of organic waste management. Examination of these issues would help to expedite diversion of organics by also addressing and ideally minimizing associated “not in my back yard” (NIMBY) issues.

THE CURRENT SITUATION IN HAWAI‘I

Organic material comprises roughly 30 percent of MSW generation nationwide, and has achieved an overall diversion rate of nearly 20 percent. Yard and landscape trimmings composting facilities, with growing amounts of biosolids and food waste being diverted through co-composting operations dominate this.

Past waste composition studies statewide and preliminary figures from the City and County of Honolulu (City) suggest that yard trimmings generation is substantially higher in Hawai‘i. Over 37 percent of residential waste in some neighborhoods are yard trimmings. Consolidated waste composition statistics for O‘ahu will be available soon, but it appears from preliminary numbers that yard trimmings island-wide will

be mid- to high-20 percent, and food waste accounts for a percentage in the mid teens.

In Hawai‘i, we currently divert over 85,000 tons, or approximately 5 percent of the MSW, of organic material a year through composting. Using a preliminary estimate of Hawai‘i’s waste composition, and the reported organic waste diversion numbers, it appears that only about 15 percent of Hawai‘i’s organic waste are being diverted from landfill. *(These numbers need verification with the new waste composition data when available.)*

The number and capacity of composting activities has increased substantially in Hawaii since 1991 when the original Integrated Solid Waste Management (ISWM) Plan was adopted. O‘ahu and Maui have several effective, private compost operations; some have capacities as great 30,000 tons/year. In addition O‘ahu, Maui, and Kaua‘i have implemented the collection of greenwaste at transfer stations and O‘ahu and Maui are testing the viability of curbside collection. Additionally, the City bans commercial loads of with greater than 10 percent yard trimmings from disposal, and Maui County provides a greatly reduced tipping fee for commercial “clean green.” O‘ahu has one of the most innovative food waste composting facilities in the country, recovering a substantial portion of restaurant waste from Waikiki. Kaua‘i County operates its own tub grinder and provides free mulch to commercial and residential gardeners, landscapers, and farmers. Hawai‘i County has a private contractor operating a clean green composting project at Hilo landfill.

Private businesses comprise the heart of organics diversion in Hawai‘i. Facilities, especially on O‘ahu and Maui, are taking several different mixes of incoming source separated material including yard trimmings, food waste, untreated lumber, biosolids, and agricultural residues. They use different processing technologies and formulas, and are exploring and developing different end use markets. These activities have built an excellent basis for the development of organic recovery in Hawai‘i. However, all counties have seen operations come and go. Composting can be a precarious business venture, especially before the supply chain is well developed and the products have proven their quality in the market. Successful projects in Hawai‘i have required a significant level of involvement from government, either through contractual diversion, material bans, land availability, research and development grants, or market development.

There are a number of good reasons for diverting organics from disposal. Organic material in landfills contribute to many environmental and management problems, especially leachate generation, toxicity, and methane generation. Due to its high moisture content, organics in waste that goes for incineration reduces incineration efficiencies. Probably the greatest incentive to divert organics is that many of these wastes can be diverted for less cost than disposal. Finally, the use of organic soil amendments can provide substantial physical, chemical, and biological benefits to Hawai‘i’s depleted soil.

Market opportunities for compost products are substantial in Hawai‘i, especially given that over 15,000 tons of organic soil amendments are imported each year. The soils of Hawai‘i are generally in need of organic materials and extensive resort and golf course development provides a natural market for products. Nationally, it has been demonstrated that potential demand for composted products, given a mix of different products and markets, greatly exceeds the potential supply of organics in the waste stream.[1]

Another interesting national perspective that has relevance for Hawai‘i is that greenwaste is one of the few waste materials that is actually decreasing in the amount generated, including what is disposed and diverted. It has been decreasing steadily in total and per capita tonnage since 1992. It has dropped from 23 percent of the nation’s waste in 1960 to 13 percent today. This, during a period when backyard burning was banned in many municipal areas, which contributed additional greenwaste to the MSW stream. This significant source reduction success story is, apparently, due to the increased attention to greenwaste by municipalities, which has caused a corresponding increase in home composting and grasscycling by residents.

These perspectives suggest that one of the greatest opportunities for increased diversion from Hawaii’s waste

stream is recovery of organic materials. It can reduce landfill reliance, while providing growth opportunities for local businesses and products of value to Hawai'i's tourism, agricultural, and landscape industries.

MODEL APPROACHES

A number of alternatives to disposal have been implemented in different parts of the country. The most prominent of these techniques include as follows:

Source Reduction Techniques

- Grasscycling (leaving clippings where they fall);
- Backyard composting (home compost units for yard trimmings and food scraps); and
- On-site institutional composting (modular vessel or open systems).

Centralized Composting Techniques

- Municipal or government operated composting (primarily "clean green" but often integrating biosolids);
- Commercial clean green composting (source-separated material processed generally in open systems);
- Commercial co-composting (biosolids or food waste, open or in-vessel systems); and
- Mixed waste composting or other mixed waste processing systems for the organic fraction (non-source-separated MSW in a variety of proprietary systems).

In addition, other diversion options include direct animal feed, such as pig farms, and production of animal feed from greenwaste. A statewide strategy should include a number of these approaches, some of them in combinations.

Seldom is the system designed solely by the public sector. Much of the success of organic waste management systems is dependent on initiatives by individual entrepreneurs. However, the public sector both benefits from these private initiatives, and has a substantial impact on their success or failure. Supportive public/private relationships, even partnerships, are essential to successful organics diversion.

By far, the predominant method for organics diversion from disposal in Hawai'i and nationwide is yard trimmings composting, often accompanied by other feedstock (e.g., food waste, mixed paper, agricultural residue, sewage sludge) as supplements. Composting of yard trimmings has achieved wide acceptance as a cost-effective approach[2] that attracts private investment.

Portland, Oregon - A Case Study

In Portland, the yard trimmings diversion program is mature. The program began in Portland, a community comparable in size to Honolulu, with a small number of operators who built successful composting businesses as adjuncts to other core businesses. They drew loads of yard debris from throughout the region, charged a tip fee, and sold a bulk product. These operators established the feasibility of composting and built a good reputation for the products in the marketplace.

With the growing support of governmental agencies for waste diversion, curbside collection of greenwaste was instituted throughout the region. With an increased supply, an expanding number of processors started up statewide. The Oregon Department of Environmental Quality developed tiered compost regulations

(including standardized Best Management Practices) to help control growing environmental and community problems in a way that encouraged, rather than dampened, growth of the industry. This move helped composting facilities to be better neighbors. The Metro regional government has lent further support to compost marketing efforts by establishing compost quality standards, and conducting a voluntary testing/certification program.

Today there are 14 composting facilities operating in the Portland metropolitan area, plus one operation that is transporting food waste to a distant, open composting system. The disposed waste stream in Portland has been depleted of yard trimmings. It was 22 to 25 percent yard trimmings 10 years ago, and now is 5 percent. It is estimated that 75 to 80 percent of the yard trimmings are being diverted.

Public Sector Action

Several key public sector action elements should be considered in the Hawai‘i ISWM Plan to support the expansion of organic processing enterprises and increase organics diversion. These options attack the problem at various points in the recovery chain: generation, collection, processing, and marketing. Following are several options, grouped according to the objective that they strive to achieve:

Initiatives to increase source reduction

- Promote grasscycling and home composting through public education; and
- Purchase and distribute backyard compost bins.

Initiatives to increase the supply of compostable material to processors

- Promote source separation and drop-off opportunities;
- Ban greenwaste disposal at transfer stations;
- Fund and operate convenient drop off locations for yard trimmings;
- Provide municipal or contract curbside collection of yard trimmings; and
- Mandate the collection of commercially generated organics from high volume generators.

Initiatives to promote start-up of new composting operations

- Provide land and support facilities for compost operators;
- Provide funding, grants and loans for start-up or enhancement of operations (recommended in the 1991 ISWM Plan); and
- Contract for or otherwise guarantee the supply of feedstock, with accompanying fee structure.

Initiatives to facilitate siting and environmental control of compost facilities

- Provide technical assistance and information regarding compost technologies, including management of a technologies database (recommended in the 1991 ISWM Plan);
- Adopt a statewide compost facility regulations relating to classification of types of facilities, permitting, design, construction, and operations; and
- Adopt local compost facility regulations regarding zoning and permitting, development standards, site design, and operation.

Initiatives to promote development of product markets

- Promote the use of compost products to prospective markets, including providing technical information about product quality and uses;
- Educate users relating to the environmental and horticultural benefits of compost;
- Implement public agency purchasing preferences (recommended in the 1991 ISWM Plan); and
- Develop compost technical product standards and testing program relating to technical aspects of product quality.

The aim of the evaluation and development of specific actions should be an integrated, phased strategic plan. Some of these actions are appropriate on a local level and some on a statewide level. The development of this strategic plan should be a coordinated effort of public and private entities.

RECOMMENDED TOPIC DEVELOPMENT STRATEGY

If organic waste management is selected for further development in the ISWM Plan, it would be important first to develop a more definitive picture of the organic infrastructure that exists in Hawai'i, and the potential volumes of recoverable material. The following steps would help to achieve this:

- Inventory the existing organics waste management infrastructure in the four counties, including processing capacity and existing markets, through detailed interviews with processors and key end users of compost products.
- Develop a first order approximation of potentially recoverable material from various sectors on an island-by-island basis using Hawai'i waste composition data and national recovery statistics.
- Further define specific barriers that are preventing growth of diversion in Hawaii. For example, in many communities the most substantial barriers in the early phases of system development have been development of a consistent and reliable supply of quality (clean) compostable waste materials, and acceptance and wide utilization of compost products in the marketplace.
- Identify case studies of communities that have faced and overcome similar barriers to develop an organics recovery system. In most cases, these efforts have involved coordination of government and industry. Three to five communities could be surveyed to document their baseline situation, how the state and local agencies attacked the problem, the system components that were developed, the roles of government and businesses, and their recovery statistics. Models for a process in Hawaii could be distilled from these case studies.
- Develop strategies to overcome the barriers. This process should involve the people who are keys to implementing the strategy, in order to simultaneously build the constituency for action. Public agencies in Hawai'i largely control the supply of compostable material, through public collection programs, operation of waste disposal facilities, and regulation of disposal. However, private operators are generally the developers and operators of processing and marketing systems. It is therefore particularly essential that the state, counties, and private operators work in close cooperation to develop the best integrated strategy for the composting infrastructure on each island.

The ISWM Plan could describe a process for developing the strategy and building a constituency. For example, a statewide organics management task force or work group could be established including representatives from the composting industry, local government, commercial generators of organics, and

prospective end users. The work group could use the supporting studies developed in the ISWM Plan to develop a consensus model of an organics management strategy. The strategy would identify statewide and local initiatives that would function in an integrated and mutually supportive system.

Following completion of the ISWM Plan, the existing Solid Waste Advisory Committee (SWAC) could provide the core membership for dedicated groups that would develop solutions to specific barriers, such as an advisory committee to the State DOH for development of compost regulations, or individual county strategy groups to design collection systems.

[1] Resource Recycling. August 1998. "Organics Take a Number."

[2] U.S. Environmental Protection Agency. 1998. *Organic Materials Management Strategies*. This study found that composting yard trimmings, including collection, resulted in a savings of $11 per ton over traditional disposal methods. Highly variable disposal rates in Hawai'i would make this equation variable from island to island.

LAND USE ISSUES

DEFINITION OF THE TOPIC

To balance the needs of environmentally responsible waste handling and disposal facilities with community concerns, based on an assessment of risks and benefits, in order to address the "not in my backyard" (NIMBY) responses.

CURRENT SITUATION IN HAWAI'I

The topic definition presented above acknowledges that there will be NIMBY reactions to siting and development of solid waste management facilities. Therefore, our objective in this discussion is not how to avoid NIMBY, but how to effectively deal with it. The primary defense against community outcry on new or existing facilities is to properly assess potential risks associated with solid waste facilities. Ensuring protection of human health and the environment and addressing the concerns of communities near solid waste facilities, while meeting the county's needs for waste management facilities, may help alleviate some of the community outcry. Each county has immediate needs for solid waste management facilities, including transfer stations, medical waste incinerators, recycling and composting facilities, petroleum-contaminated soil remediation sites, and landfills.

Determining the need for and providing solid waste infrastructure is primarily a county responsibility. Counties may need to provide support to private businesses who wish to develop solid waste facilities. Siting waste management facilities on public lands usually involves cooperation between a number of state and county agencies that define siting criteria for the facility. State agencies that will review and approve or disapprove of the development of a solid waste facility may include, as follows:

- The State Land Use Commission - Special Management Area (SMA) use permits in non-agricultural areas;
- The Department of Health (DOH) - Solid waste management permits;
- The Department of Land and Natural Resources (DLNR) - State leases, conservation districts, and archaeological preservation; and
- Office of Environmental Quality Control - Environmental impact statement (EIS) and environmental assessment (EA) review.

County agencies that review land use decisions may include, as follows:

- Department of Planning and Permitting - General Plan, Development Plan, and permits review and site plan approval;
- Planning Commission - Authorization of special land uses; and
- City Council - Zoning changes of development in a SMA.

Most of the permits are only approved contingent on approval of the other land use permits required by state and county regulatory agencies. All solid waste facilities are considered major developments requiring preparation of an EIS. While there have been significant efforts to streamline the process over the past decade, siting and permitting a landfill may require five years and take multiple pathways to reach the same end. A large portion of that time is spent addressing community concerns through public hearings and agency

reviews. The process is designed to force a proponent to evaluate, address, and mitigate health risks and quality of life (i.e., nuisance) issues that will be identified during the review period. An example of the decision tree showing two alternative paths to obtain land use permits for a landfill is presented in the attached figure. Smaller solid waste facilities may be more straightforward in the required land use permits, but because public funds are expended and most solid waste facilities have the potential to create environmental impacts, an environmental assessment will be required. This process ensures that regulatory agencies and the public will have the opportunity to express concerns. A solid waste permit application follows approval of land use permits.

Within the past year, much of the existing and proposed solid waste infrastructure has been threatened by community action groups that base their arguments on potential health risks or nuisance issues associated with operation of the facilities. Individuals and groups with complaints have used the complicated land use permit system as a tool to close or prevent a waste management facility from opening. Examples of industries that have been threatened or disrupted by NIMBY include Unisyn Biowaste Systems and Castle Medical Center's Medical Waste Incinerator. Proposed waste diversion facilities that have been stopped during planning include the proposed N-Viro Composting Facility and Koloa Transfer Station. Existing facilities such as H-Power and West Hawai'i Landfill were approved after years of debate and design changes that partially mitigated environmental or quality of life issues that were identified by the community.

Major solid waste facilities may be located in the same area for many years. Appropriate land use during the plantation era may not be appropriate during times of urban expansion and other changes in surrounding use patterns. Many times a permitted solid waste facility impacts developments that came after the facility was in operation. The question is whether the solid waste facility or the residential use is inappropriate.

The final effect of NIMBY reactions is to divert regulatory personnel from other duties for the purpose of investigating or responding to complaints that are often based on rumor, hearsay, or misunderstandings.

MODEL APPROACHES

NIMBY issues are commonly based on the premise that a solid waste management facility will create certain impacts such as odor, traffic, dust, noise, property devaluation, and risk of environmental and health damage. Proper siting and design can, in many cases, mitigate these perceived environmental impacts. Over the past two decades, native Hawaiian groups have become more active in land use issues because of ancestral rights. These spiritual and cultural impacts may be more difficult to mitigate than environmental impacts.

Environmental regulations and the land use permit system are designed to protect public health and to maintain an acceptable quality of life that is based on secondary environmental issues such as view plane, noise, and traffic. A primary responsibility of regulatory personnel is to ensure that new developments do not impact essential elements of public health or quality of life. New methods of quantifying health–based risks are available for use, and many engineering solutions are available to mitigate both environmental and aesthetic impacts of a development. Despite all efforts to the contrary, most developments affect the community where they are sited to some degree. It is up to the regulatory agencies and larger community to minimize the impact or the number of people impacted for the benefit of the larger community.

Almost all models for addressing community concerns over development advocate gaining public buy-in on the development addressing an important need that can serve the common good. In the case of solid waste management facilities, the basis of need is a means to dispose, recycle, transport, or divert waste in a manner that is protective of human health and the environment. During the discussion period on general principles, the attributes and restrictions (i.e., ground rules) should also be made known. Attributes may include the population to be served, space requirements, access and egress requirements, land ownership, or zoning. Restrictions may include budget, location restrictions, or proximity to sensitive receptors. The State

Department of Transportation (DOT) is currently engaged in this process with its public meetings to engage the community on O'ahu in discussions of transportation needs for the future.

Site selection for a solid waste facility should be based on the principle of greatest good with least impact, considering practical restrictions, and the community benefits that were accepted in the selection criteria discussed during the initial public review. The selection process must rely on facts and be fair, reproducible, and defensible. It must also reflect the community inputs that were previously documented, and include a thorough assessment of potential risks to public health and the environment. The health risk assessment portion must carefully consider and document each potential source of risk, particularly because it is likely regulatory agencies and project opponents will challenge the results.

Discussion of the need for a solid waste facility and general principles on which the site selection criteria is based must be generally accepted, and must occur before discussion of site selection. The objective of the original efforts should be to assist the affected community in understanding that, as follows:

- A significant need (or opportunity) for the proposed development exists;
- The proponent has the right or responsibility to resolve the problem;
- The approach to resolution is reasonable; and
- The proponent is willing to adapt the approach in response to concerns expressed by the affected community.

The essential first step in development of a solid waste facility is a broad-based understanding and acceptance that the development process will be fair. The result of the first step is an understanding that the facility will be sited somewhere within the affected community.

The first attempt at site selection should include a relatively large number of sites that roughly match the selection criteria. No priorities should be attached to the initial list. Upon publication of the initial list of sites, the entire community will become worried that the facility will be in their backyard. Public hearings should be held at this point to identify major arguments and issues that have not been previously identified. With proper background data on health risks associated with the project, the proponent forces NIMBY activists to attack the individual assumptions of the risk assessment or selection criteria rather than the development itself, because the community has already acknowledged the need. Should additional information become available during public hearings, it must be considered in the model. Several iterations of the potential site list should be presented with each round, eliminating those sites that do not match the selection criteria. Each time a site is eliminated, NIMBY opponents from that area become proponents of the project.

Kaua'i County employed this model for siting the Lihue Transfer Station. The county had decided to close the Halehaka Landfill near Lihue, and required an in-town transfer station for short-haul collection vehicles and residents. County proponents originally identified 6 to 10 locations for potential siting and defined the general requirements for location, access, and land area. Three rounds of public meetings were held for the community, and during each round, sites were eliminated that had "fatal flaws" or did not meet the selection criteria. By the final round, the site selected was near the airport within an industrial area that had easy access from Lihue and Kapa'a. The only significant opposition was from the Federal Aviation Administration (FAA) and airport administrators, who were concerned about aircraft safety if the transfer station attracted bird populations that would be a hazard to aircraft operations. This potential risk was mitigated by addition

of an enclosure to the facility design. The opposition to the chosen location was small in comparison to its supporters, who were composed of residents of neighborhoods that were eliminated from the selection list.

Community opposition to existing facilities is occasionally more difficult to resolve. An example is the former Unisyn Biowaste Technology Inc., which closed in 1999. Prior to closure, the facility disposed of 14,800 tons of restaurant food and other organic waste products in enclosed liquid fermentation chambers, and produced liquid fertilizer, compost, and energy. It had become a valuable component of Honolulu's waste disposal infrastructure by removing materials that would otherwise be disposed at the MSW landfill or as organic materials, resulting in biological oxygen demand in wastewater treatment plants. Unisyn was located in Waimanalo, O'ahu, an agricultural area that has traditionally been used for dairies, piggeries, and truck farming. The area has developed into a center for landscape nurseries and has become increasingly urbanized. Complaints of odors from the liquid stabilization ponds and receiving areas at Unisyn became a major issue for Waimanalo residents and politicians. Community groups found that after 10 years of operation, the facility had never obtained a conditional use permit (CUP) for construction and demanded that the facility be closed because it does not have the proper land use permits.

Resolution of the odor problem could possibly have been accomplished with engineering solutions such as enclosing the receiving area and aerating the stabilization ponds. A CUP could have been required retroactively, but the community probably would not have supported granting this permit, due to its historical opposition to the facility, despite implementation of mitigation measures.

RECOMMENDED STRATEGY FOR TOPIC DEVELOPMENT

Planning for and siting public facilities will present individual challenges for each project and community. Gaining public acceptance will always involve a thorough assessment of legitimate concerns for public health, safety, and quality of life issues. Despite these efforts, some level of NIMBY response to any solid waste facility is predictable. NIMBY responses can be overcome by sufficient attention to legitimate concerns and by enlisting support for the project from the majority of the larger community, who will likely benefit from the project.

Build-out of this topic may include preparation of a detailed conceptual model of site selection for siting public facilities that includes, as follows:

- Recommended scope and level of effort required to assess risks to public health and the environment;
- Conceptual siting criteria for solid waste facilities;
- Public participation plan outlining the steps to collect input, identify legitimate concerns, and gain acceptance of the project;
- Collection of planning literature containing case studies on NIMBY management in Hawai'i and elsewhere; and
- Recommendation for training of key agency managers.

INTER-ISLAND TRANSPORTATION

DEFINITION OF THE TOPIC

Reduce inter-island transportation costs for recovered materials and products manufactured from recycled materials. Address solutions to out-of-state shipping costs through such options as reduced rates and marketing cooperatives.

CURRENT SITUATION IN HAWAI'I

Inter-Island Shipping

Three companies are registered under the Hawai'i Public Utilities Commission (PUC) and authorized to ship merchandise inter-island. One company, Young Brothers, Ltd., also known as Hawaiian Tug & Barge, holds a virtual monopoly because they transport the vast majority of materials. The other two companies licensed by the PUC to provide inter-island transportation are Sause Brothers and Smith Maritime.

Young Brothers ships containers of merchandise in any desired quantity. Sause Brothers and Smith Maritime offer only rental of a barge, a tug boat and a captain. Chartering is relatively expensive: $1,000/day for the barge, plus the cost of tow or tug boat, fees to dock at the piers, and a captain and/or pilot (pilots bill at about $280/hour).

The PUC has direct regulatory oversight of licenses, services, and rates for Young Brothers, Sause Brothers, and Smith Maritime. The Department of Transportation (DOT) Harbors Division regulates the harbors and wharves into which the boats have access, including the containers that are stored on the dock to await shipment.

The cost of inter-island transport of recyclable commodities has long been recognized as a chief barrier to growth of recycling businesses, especially on the neighbor islands. Since the value of recyclables on a tonnage basis is relatively low, the high costs of transportation often leaves inadequate funds to cover the costs of collection, processing and return on investment. This is a barrier that is not faced by mainland recycling companies, and it is one of the principle reasons that recycling rates in Hawai'i lag behind those in the rest of the country.

In 1994 and 1995, a Transportation Task Force was convened by the Department of Business, Economic Development, and Tourism's (DBEDT's) Clean Hawai'i Center to review the issue of shipping costs, particularly inter-island. Clean Hawai'i Center issued a petition to Young Brothers requesting them to reduce their rates for recycled materials. Subsequently, Young Brothers, with PUC approval, established a reduced rate for shipping of recyclable materials, defining them as secondary materials destined for remelting or recycling. Among the materials eligible for this rate are scrap glass, paper, fiberboard (corrugated cardboard), metals, plastics, aluminum cans, and plastics. (This specific reduced rate does not apply to recycled content products; see discussion below on Hawai'i-made products.)

The following chart compares Young Brothers' rates to ship recyclables and general merchandise one-way inter-island. These rates are quoted as one-way charges and do not include wharfage and tax. They are averaged since they vary somewhat depending on points of origin and destination.

CONTAINER SIZE AND ESTIMATED WEIGHT	**RECYCLABLE MATERIALS COST PER CONTAINER** (COST PER TON)	**GENERAL MERCHANDISE COST PER CONTAINER** (COST PER TON)
20-foot container (20 tons)	$320 ($16)	$437 ($22)
40-foot container (33.5 tons)	$636 ($19)	$866 ($26)

Unfortunately, Young Brothers stated that 40-foot containers are rare and must be reserved at least two weeks in advance. As a result, the vast the majority of neighbor island recyclables are shipped in 20-foot containers.

These rate reductions were greatly appreciated by the recycling industry, but they did not resolve all concerns. One of the problems is that some recyclables, such as plastic, do not achieve the estimated weight per container. Since the rates are charged based on a full container and not on the weight of the container, they can result in a high tonnage rate. In addition, considering that the value of scrap materials is often quite low, the fee of $16 to $19 per ton can still require a major portion of the revenue.

The maximum weight that is allowed in a 20-foot standard container is 40,000 pounds (20 tons). A 40-foot container can hold 67,000 pounds (33.5 tons), and the 45-foot standard container can hold 73,375 pounds (37.7 tons). Assuming an average value of old newspapers is $30/ton, and that it costs a company approximately $16/ton to ship inter-island, the neighbor island processor would expect to earn only $14/ton, out of which must be paid labor, insurance, rent, building and equipment. (The above costs are estimates; values for newspapers and other secondary materials can vary widely over time and for different markets.)

Inter-island shipment of recyclable materials is rare at this time because of the high cost of transportation coupled with lack of end markets within the state. Neighbor island processors would rather broker and ship their own materials to end markets on the U.S. mainland or Asia. This allows them to ship directly from their island, rather than face a double charge of inter-island transportation costs in addition to out-of-state costs. Using larger containers also helps the processor to spread the cost of transportation over a larger volume. On occasion, they will ship materials through a Honolulu company if the added price of the inter-island transport is justified by higher profits that can be obtained from cooperative marketing.

Inter-island transportation of Hawai‘i-made recycled content products may receive a shipping rate reduction over rates charged to ship products manufactured out-of-state. Hawai‘i-made products fall under a State (and Young Brothers) policy to promote locally manufactured products.

A local manufacturer who relies on neighbor island markets for the recycled-content product still faces competition from out-of-state companies that can ship their products directly to neighbor island markets in larger containers. Matson Navigation Company barges and off-loading equipment can handle 45-foot containers as well as high-cube containers in 24-, 40- or 45-foot lengths. These larger containers may hold 20 to 100 percent more material than a Young Brothers container. More product per container allows a mainland company to spread the costs of transportation over a larger number of products. In some cases this advantage presents a significant cost barrier to local manufacturers who must ship products in smaller containers and thus pay a higher percentage of their earnings for transportation.

Overseas Shipping

Shipping rates to U.S. mainland and far east markets also present a substantial cost barrier for recycling, often more significant than inter-island shipping rates. Containers shipped between any Hawaiian port and any out-of-state port without stopping at another island may be shipped by a variety of international carriers, including Matson Navigation. These companies may not, however, ship materials inter-island.

The County of Maui has made a significant effort to reduce transportation costs for recyclables to the mainland. At the request of Maui Council member (and Mayor-elect) James Apana, in February 1998, Matson Navigation offered Maui County a reduced rate of $700 per standard 40-foot container, not including fuel or wharfage, for scrap cardboard, newspaper, office paper, and scrap cars and truck bodies going to the west coast. The County has further requested that scrap plastics be included. These rates represent approximately a 35 to 50 percent discount off current rates, as follows:

- The current cost of shipping these commodities in 40-foot containers ranges between $1,078 and $1,389, depending on the commodity.
- The regular shipping rate for construction materials (which would be similar to shipping plastic lumber) from Maui to Oakland, California, in standard 40-foot container is $2,677.
- A 40-foot container of cereal (which is similar in weight to plastic bags or cellulose insulation) costs $2,000 to ship from Maui to Oakland, California.

Note that these shipping rates are charged on a weight basis, with a minimum weight depending on container size, and so the actual costs can vary.

The terms of the Matson response to Maui restricted the reduced rate to only cases where the County of Maui is the direct customer. However, most recyclable materials are owned and would be shipped by private operators. The County therefore further requested that these terms be extended to situations where the County is jointly named as the shipper. This request is pending.

Another example of reduced rates has also occurred on Maui. It is understood that Matson extended a 50 percent reduced shipping rate to a Maui metal recycling operation for old corrugated containers, in consideration of depressed market prices. This further indicates that opportunities to address the issue of high shipping rates for recyclable materials exist.

It is important to note that under these discounted rates, a 40-foot standard container shipped from Maui to Oakland would cost approximately $21/ton for shipping costs. Given that the average value of recovered materials may be at $30/ton to $50/ton, even such a discounted rate would leave little revenue to cover other expenses.

Other Associated Transportation Costs

Overseas shipping also includes fuel charges, typically 1.5 percent of the ocean freight rate, and wharfage charges at each end, averaging approximately $100 for one 40-foot container.

In addition to the Young Brothers or Matson shipping charge, a recycling company must pay a local hauler to pick up the container from Young Brothers, deliver it to the recycling center, and transport it back to the wharf. This fee usually begins at $100 for a round trip to/from the wharf.

Young Brothers charges a rental fee of approximately $45 per day per container beginning on the third day after the container has been delivered to the renter, but has not yet been transported to the wharf. If a container remains on the wharf for longer than two days, the company renting it will be assessed a fine of at least $25/day by the barge company, which amount is paid to the DOT.

MODEL APPROACHES

There are several possible approaches that could be taken to provide further reductions of transportation costs for recyclable materials.

Negotiations for Rate Reductions with the Shipping Companies

Past requests to shipping companies have resulted in reductions or offers of reductions. It would be advantageous to advance these negotiations, demonstrating that the economics of recycling, backed up by the state waste diversion policy, warrant further reductions.

Legislation

The State could pass legislation to reduce transportation costs of secondary materials and Hawai‘i-made recycled content products. Implementation of this recommendation would require coordination from the Governor’s office between Department of Health, Office of Solid Waste Management (OSWM), DBEDT, and the PUC. A new rate structure would have to be proposed, sent for public hearings, assessed for public and private impact, and then approved by the PUC.

Statewide Marketing Cooperative

The recycling industry could develop and implement a statewide cooperative marketing structure for secondary materials, as follows:

- The cooperative could schedule transportation, containers, and delivery to end markets. Fees could be assessed by the cooperative and paid to the organization by member companies. The organization would pay expenses from fees and possibly a percentage assessed on the sale of recyclable materials to end markets.
- The program could be administered by a state agency such as the Clean Hawai‘i Center, by a non-profit corporation formed for this purpose, or through a management contract with Young Brothers.
- County government participation would be essential to the successful operation of any cooperative endeavor.

Purchase Inter-Island Transportation Company

The potential for a recycling cooperative to purchase and manage an inter-island transportation company could be explored. The cooperative could purchase a barge, a towing company, or the roll-off containers used to ship materials using Hawaiian Tug and Barge, Smith Maritime, and Sause Brothers.

Introduce Incentives to Young Brothers to Reduce Rates

The potential could be investigated to develop reduced shipping fees for recycling companies in exchange for profit sharing opportunity for Young Brothers. A base rate could be set for shipping of each material, based on average value of the material to the end market. If the material value exceeds the agreed-upon average for a six-month (or similar) period of time, the recycling companies could share the profits with Young Brothers, or adjust the rate charged.

RECOMMENDED TOPIC DEVELOPMENT STRATEGY

It is recommended that this topic be incorporated into Market Development and/or Manufacturer Responsibility, and that a single strategy be developed. The market development strategy proposes that, as an adjunct to the revision of the Integrated Solid Waste Management (ISWM) Plan, a meeting be convened of relevant stakeholders, especially those in the private sector. This meeting, perhaps called a "Recycling Business Development Summit," would include a participative process and would challenge participants to define a framework for market development. Three key topics would be addressed as follows:

- Select priority materials for market development action;
- Design a strategy to reduce the cost of transportation for recyclables, both inter-island and overseas; and
- Explore the potential advantages of building a cooperative marketing structure.

Based on the outcome of this meeting, the revision of the ISWM Plan could articulate a shared strategic vision of how to lower these key barriers to increased recycling, and define an action plan to achieve reductions in transportation costs for recyclable materials.

ISWM PLAN STRUCTURE

DEFINITION OF THE TOPIC

The objective of this paper is to identify improvements in the Integrated Solid Waste Management (ISWM) Plan process by:

- Assuring public input and validation,
- Providing better enforcement and implementation of county plans,
- Identifying the key implementers necessary for the plan to be effective,
- Providing state government mandates and support where appropriate,
- Ensuring revisions of separate county plans,
- Clarifying the role between counties and the state, including "who pays for what,"
- Identifying models from other states,
- Initiating possible changes in state law that establish a basis for plan changes,
- Empowering a body to oversee the entire system,
- Defining benchmarks and best management practices for waste generation and handling,
- Effectively measuring diversion rates and progress toward the goals, and
- Reviewing and revising diversion goals when necessary.

The Department of Health (DOH) is tasked by the ISWM Act (Hawaii Revised Statutes [HRS] 342G) to periodically revise the ISWM Plan. The DOH has identified the following objectives for this revision process:

- The Revision of the 1991 ISWM Plan will focus on identifying and recommending specific policy solutions and actions that will move the state toward achievement of the diversion goals, address major environmental issues, assess long term solid waste management costs, and provide a structure to address future capacity issues.
- The ISWM Plan revision will include discussion of the priority areas, policy prescriptions, and action plans for each.

An essential element of a successful planning process is that it simultaneously recommends solutions and builds support for those solutions. The following four principles of a planning process are essential to building that support:

PRINCIPLES OF EFFECTIVE PLANNING

1. There must be a shared recognition by the community that there is a substantial problem or opportunity that should be addressed.
2. The planning agency must be perceived as the right agency to address the problem or opportunity; in fact, the agency would be remiss in its mission if it did not do so.

3. The planning approach must be perceived as reasonable, sensible and responsible.

4. The agency must be perceived as listening to and caring about the input that is offered.

CURRENT SITUATION IN HAWAI'I

The existing Hawai'i ISWM Plan was adopted in March 1991 under the guidance of a State Solid Waste Task Force that included the following representatives:

- State Agencies (12),
- Recycling Industry (3)
- Counties (4),
- Environmental Groups (1),
- Military Services (2),
- Service Organizations (1), and
- Business Sector (3).

Following publication of the Plan, the Task Force was disbanded. For this revision of the Plan, a Solid Waste Advisory Committee (SWAC) has been reconstituted with the following membership structure:

- State Agencies (6)
- Recycling/Waste Industry (8)
- Counties (8)
- Environmental Groups (2)
- Military Services (1)
- Community/Service Organizations (2), and
- Business Sector and Associations (3).

The 1991 ISWM Plan contained numerous recommendations that revolved around the following four "cornerstones" or planning goals:

- A reorientation away from a disposal-based system to one that promotes source reduction, recycling and bioconversion first, disposal as a last resort.
- County responsibility in ensuring that local waste reduction and disposal programs are implemented…through a comprehensive local solid waste planning process.
- The development of local end-uses for recovered materials.
- A comprehensive and sustained public education campaign to provide the residents of Hawai'i the necessary information to effectively participate in waste reduction efforts.

These goals can be compared to the following goals that have been identified by the DOH for this 1998 Revision:

- Develop the structure necessary to make recycling work in Hawai'i. The Plan should focus on maximizing diversion while insuring long-range, cost-effective solutions.
- Address the primary environmental concerns relating to solid waste management by upgrading permitted operations.
- Develop a framework to minimize conflict over land use issues while allowing the maximum community input.

Judging from these goals, the focus on diversion as a priority waste management technique has remained, while environmental and community issues have risen in priority since 1991.

The 1991 Plan laid the foundation for Hawai'i's solid waste program by addressing the full range of priority programs and issues. It set goals and defined the solid waste planning framework. Substantial progress has been made in Hawai'i in environmentally responsible solid waste management since 1991. Many of the 1991 Plan's recommendations are incorporated into Hawai'i solid waste management statutes, including waste diversion goals and the state and local planning processes. Recycling rates have grown and disposal systems have been improved.

However, barriers to achieving some of those goals are as large today as they were in 1991. Some of these barriers are attributable to Hawaii's status as an island state, but others are self-created by a lack of cooperation and shared goals.

The key to overcoming both types of barriers is the coordinated effort of state and county agencies and the private sector. The planning process laid out in statute is clearly intended to foster such a coordinated effort. Responsibilities between the DOH and counties are clearly laid out. The DOH develops a statewide plan and counties develop their county plans, while the state issues planning guidelines, and reviews and approves the county plans.

RECOMMENDED PLAN DEVELOPMENT STRATEGIES

The Plan development process is as important, even in some ways more important, than the document itself. Following are recommendations in several areas that are intended to incorporate the planning principles described above into this revision process.

Strategic Vision

The ISWM Plan Revisions should articulate a strategic vision of what the state wishes to achieve through its solid waste program. This should be a shared vision synthesized from input by all affected sectors through a consensus building process. The SWAC has a key responsibility in reaching out to the community and expressing their concerns and visions.

The strategic vision can be the basis for policies and programs that are developed and implemented by the state and by each county. Some of the key questions that the ISWM Plan strategic vision should seek to answer are as follows:

- How does diversion fit into the waste management system in consideration of costs, local business development, and community environmental goals?

- How can the waste management system protect and restore the greatest assets of Hawai'i – its environmental quality and spectacular physical beauty?
- How can cooperative interrelationships between public agencies and private businesses be fostered whereby each serves their own mission and objectives while achieving a common set of waste management goals?
- From this strategic vision, statewide strategies can be developed that address a number of barriers and opportunities in waste management.

Statewide Integrated Strategies

This Plan Revision will focus on specific topics that are defined and selected by the SWAC and the DOH. It is recommended that these focus topics be selected such that they represent the major barriers to progress in Hawaii and that they provide real opportunities for improvement over the next three to five years. The primary program challenge is in making the choices to design specific strategies that offer the greatest hope for success, and committing to cooperatively implement those strategies.

The DOH and the consulting team can perform technical analysis to support this decision-making process. But consensus building takes commitment and effort from the participants. It is essential that SWAC members commit their best efforts to this process, evaluate the issues and options raised in the process and discuss them with their colleagues, and work hard with the other SWAC members to reach agreement on strategic directions.

Roles and Responsibilities

Because Hawai'i is an island state, it is especially critical that the strategies for success involve the cooperative efforts of all agencies and sectors. The state and county government roles in this, including funding roles and responsibilities, must be better defined. Though out-of-state markets play an important role, by and large, the people and businesses of Hawaii must fashion and implement their own solutions.

The public sector dominates waste collection in Hawai'i, the private sector dominates materials processing and markets, and the public and private sectors share in disposal systems. These lines, however, are not hard and fast. For example, though private markets dominate, public uses of some products are the most effective end use markets.

Defining roles requires neither a simple nor rigid formula. Different combinations of roles will fit different communities in Hawai'i. These planning decisions should be an opportunity to begin to develop new relationships.

The Solid Waste Advisory Committee

The ISWM Plan should not become a finished and finalized document when the consulting contract runs out. Rather, the Plan should be the basis for further work dedicated to addressing specific system barriers through cooperative decision-making. This will require a continued sharing of perspectives and decision making. If the SWAC is successful in building constructive strategies and solutions through this planning process, its efforts should be continued and expanded beyond the planning process.

It is recommended that, at the conclusion of the planning process, the DOH and the SWAC evaluate their progress and accomplishments, and address the question about whether the SWAC, or some reconstituted committee, has a future role to play.

Monitoring and Measuring Progress

The best efforts can go unnoticed if nobody measures progress. The ISWM Plan should design measurement tools and a monitoring system to track progress in source reduction, diversion and environmentally sound disposal. These tools, and the numbers they track, should be implemented in each county and provide common measures of progress.

The tracking system should also be consistent with national tracking methodologies, so that Hawai'i's progress can be evaluated relative to other states. The differences between Hawai'i's monitoring system and those used nationally will be described in the Existing Conditions chapter of the Revised Plan. However, the monitoring system should not lose the ability to track progress on all system components as they are defined in Hawai'i statute. This includes elements not included in the national methodology, such as construction and demolition debris and auto bodies. It is therefore recommended that Hawai'i implement a dual methodology in solid waste system tracking addressing both the full solid waste stream and the municipal solid waster stream as defined by the U.S. Environmental Protection Agency (U.S. EPA).

The Document

The 1991 Plan was written in the voice of the consultants. The Revised ISWM Plan will be written in the voice of the State of Hawai'i. The document will be structured to present the decisions made in this planning process by first describing the existing situation, then building the logic for the choices made, and finally describing recommended changes in policies, responsibilities, and programs.

The main document of the Plan will be concise, focused, and easily readable. The outline is as follows:

VOLUME I:

EXECUTIVE SUMMARY

I. INTRODUCTION

- A. OSWM Overview
- B. Plan Organization
- C. Goals and Objectives
- D. History of Planning Process

II. EXISTING CONDITIONS

- A. Methodology and Sources
- B. State and County Level Waste Management Systems
- C. Diversion Data and Trends
- D. Summary of County and Private Sector Solid Waste Management Systems
- E. Program Status and Planned Initiatives

III. FOCUSED NEEDS AND OPPORTUNITIES

This chapter will address the specific programs and initiatives that are addressed in the final chapter and build the logic for the recommendations.

IV. RECOMMENDATIONS AND GUIDANCE

A. State Policy Changes, Departmental Responsibilities, and Legislative Actions

B. County Programs

C. Private Sector Initiatives

The second volume will incorporate supporting materials, including five Appendices:

VOLUME II:

I. Planning Process and Solid Waste Advisory Committee
II. Summary of Solid Waste Advisory Committee Input
III. Discussion Papers
IV. Construction and Demolition Waste Management
V. Summary of Hawai‘i Statutes and Rules Relating to Solid Waste Management

PUBLIC/PRIVATE PARTNERSHIPS

DEFINITION OF THE TOPIC

Partnerships between government and the private sector may include voluntary public service organizations that are sponsored by government agencies, government contracts to private companies for procurement of goods or services, and true cost/labor sharing arrangements between government and industry. An objective of public/private partnerships may be to increase the flexibility and effectiveness of waste management services. These partnerships may also take advantage of private sector knowledge in the framework of public implementation resources and accountability. The United Public Workers (UPW) union, Local 152 AFSCME, has successfully challenged several formal public/private partnerships in Hawai‘i. The 1998 Hawai‘i State Legislature passed Act 230 to clarify the rights and responsibility of the government to contract for outside services. State law now mandates that public/private partnerships be more efficient than public services alone.

CURRENT SITUATION IN HAWAI‘I

The counties have a variety of solid waste management public/private partnerships already in existence through contracts for services. Examples of these partnerships include the following:

- The City and County of Honolulu’s (City’s) put-or-pay contract with the operators of H-Power, O‘ahu’s primary facility for waste disposal, which is privately owned and operated under a contract with the City. The contract places the burden of operation and maintenance on a private company that has specialized experience in the operation of a waste incinerator, and guarantees the operators a minimum quantity of waste. Legislation was required to ensure that the City could specify where waste was disposed of so that the minimum quantity could be guaranteed.
- TreeCycling (of Christmas trees) is an example of fundraising from private sectors. Labor is supplied by volunteers and state and county personnel for this diversion project.
- Telephone book recycling uses a partnership of both government and private collection resources.
- Each county has contracts with private companies for the collection of recyclable materials. The City has 59 drop boxes for collection of containers and paper. These boxes are serviced by Honolulu Recovery Inc., with a portion of the proceeds being returned to the schools where the drop boxes are located. Both Maui and Kaua‘i counties have similar arrangements with recycling contractors.
- Maui County and the City have contracted with private companies for greenwaste processing and composting services. Maui EKO, with support from Maui County, diverts all of the greenwaste and sewage sludge arriving at the Central Maui Landfill.
- The state and counties have implemented contracts with non-profit organizations such as Recycle Hawai‘i and the Maui Recycling Group to provide education and outreach for county recycling programs.
- Hawai‘i County has a contract with Recycle Hawai‘i to operate the county’s “Do It Yourself” oil drop program.
- The City developed the Partnership for the Environment program to link businesses to provide peer assistance in promoting recycling. Members of the Partnership who have experience establishing diversion programs from their own businesses advise others on selecting programs that fit their needs.
- Statewide, the Office of Solid Waste Management has contracted with the Maui Recycling Group to operate the Statewide Recycling Hot Line and the Hawai‘i Materials Exchange (HIMEX).
- The Hawai‘i State Department of Accounting and General Services (DAGS) contracts with waste and recycling haulers to service some state buildings and schools.

Public/private partnerships have traditionally been limited because of civil service regulations that prohibit services traditionally provided by municipal workers from being contracted to the private sector. The UPW successfully brought suit against the County of Hawai'i regarding privatization of the Pu'uanahulu Landfill. As a result of the Kono Decision, Waste Management of Hawai'i and Sanifill, Inc. (at Kekaha, Kaua'i) were forced to modify their contracts and relinquish traditional operations to civil service operators. The counties operate these two landfills with supervision from the private managers. This is an example of involuntary public/private partnerships.

The Hawai'i State Legislature has since passed a law (Act 230, 1998) that provides a mechanism for the state to select the method of operation that is most cost effective. The legislation defines a criterion for privatization called managed competition. Under this system, operating contracts for county waste services can be granted to private companies if it is demonstrated that the services can be provided more efficiently by the private sector. The Kono Decision does not affect waste operations in Honolulu because of clauses contained in the City's Charter that allow services to be contracted as it sees fit. At this time, there have been no tests of public/private sector competition.

MODEL APPROACHES

The types of public/private partnerships can be categorized as follows:

- Government contracts for services, including sanctioned monopolies;
- Government sponsorship of not-for-profit companies or organizations;
- Government-supplied labor or equipment funded by private partnerships; and
- Informal working arrangements such as the annual Christmas TreeCycling project.

RECOMMENDED TOPIC DEVELOPMENT STRATEGIES

Economic Risk Sharing

Primary factors for increasing flexibility in providing waste management services are the ability of both the public and private sectors to take economic risks, and the level of risk that can be taken.

Due to fluctuating international markets for secondary materials and the unpredictable rise and fall of prices for recyclable materials, private companies (especially those that heavily capitalized in the past five years) experience significant instability. That increased instability is translated by investors and traditional lenders as bad credit risk, and potential for lower than expected returns on investment. As a result, it may be more difficult for a private company to obtain financing for recycling activities than for the public sector. It is, however, an opportunity for the public sector to provide guarantees for loans and price stability (through service contracts), and to enable the private sector to expand services to gain sufficient volume to enjoy economies of scale. An example of this is H-Power, with high capital costs being borne by both government and the private sector, and operated under a contract that guarantees minimum volumes.

Public agencies must be willing to take on more risk, as they are ultimately responsible to the community to provide services related to public health and sanitation. Over time, however, the public sector has reduced its willingness to risk taxpayers' money or to incur the wrath of taxpayers, labor unions, or politicians.

For example, a company has determined that it will cost an average of $10.00/ton to provide curbside recycling services to single-family homes, the county could take the position of 'making the company whole' through a profit/loss guarantee. In this case, if market values rise, and the average profit per ton increases to $14.00, the county and the company can split the $4.00 "profit" with the county's share placed in reserve.

When the market values fall and the company earns less than $10.00/ton, the county and the company share the cost of this lower market.

Role of the State in Developing Processing Capabilities

The state has the ability to equalize the economics between solid waste collection and disposal, and recycling and recovery. As a result of the state granting land to counties to develop and operate solid waste facilities, the counties and their garbage contractors do not have to factor in the costs of land purchase or rental in their budgets. In instances where the state provides land, they do not pay the true cost of disposal. Since recycling is largely a private sector activity whose greatest expense is land and buildings, it appears to be more expensive than traditional disposal.

- A study involving the private sector's true expenses for land, construction, and maintenance would reveal the inequities of what is invested by the state for solid waste activities compared to recycling and diversion.
- The state and counties must be willing to reduce long-term economic risk to provide grant and loan funding resources to recycling, re-use and composting businesses. Conventional financing is often unavailable to recycling/re-use businesses because the industry is still seen as relatively young and unproven. The state, however, could assume the risk by guaranteeing loans and accepting machinery and equipment as collateral. The state and counties will ultimately benefit from an increase in recycling, composting and re-use activities when the life of the landfills is extended.
- The state could also take a more aggressive role in funding and promoting research and demonstration projects that use recycled content materials, composted soil, and similar secondary products. Many of these proposals could require revisions of state law or county ordinances. A study to identify the restrictions on state lending, financial partnerships, and grantmaking should be undertaken before legislation is written.
- Finally, the state could provide land and/or buildings for recycling business operations, processing, and remanufacturing similar to the land grants made to counties for solid waste disposal activities.

Privatization and Public/Private Partnerships

- Conduct a study to determine the cost impact of privatization on county and state budgets. For example, identify the number and types of jobs that may be lost (or that could be re-assigned) by counties that are currently providing services. If vehicles are taken out of service, calculate depreciation and loss as well as the savings to be expected due to reduced gasoline, repair, maintenance expenses.
- Involve the labor unions in discussions and decision-making that will produce privatization and ultimately will affect workers pay, performance evaluation, service changes, or reduction/increase in hours. In many communities however, it has been shown that privatization of service delivery jobs (such as in garbage collections) is a net benefit to the community.
- Present research and positive examples of how communities, families, and services are improved due to privatization. Highlight the economic and social benefits of privatization while discussing any potential negative impacts and how they will be mitigated.

Cost Control, Accountability, and Privatization

- Under the principal of *Managed Competition*, the counties could require public works departments to compete with the private sector when bidding on contracts. The Request for Proposals (RFP) can be designed so that all bidders will provide exactly the same information regarding budget categories such as land, equipment to be purchased, staff expenses, projected income, services to be delivered, etc. This will allow for a comparative review of proposals.

- Break down bids for services into required services. In general, the more the county can break down the bids for its required services, the better the opportunity to spread the risk and increase flexibility in service design and delivery. If each service such as garbage and materials collection, processing, marketing, disposal and public education is separated in the RFP, a company can bid on one or multiple aspects. This allows the private sector to showcase its knowledge and experience.
- Break down bids for service delivery into regions. For example, the city of Oakland, California, divided the municipality into four geographic regions. Bidders were permitted to bid on providing services to one, all four, or any combination of the service delivery areas. And perhaps the most famous of this type of managed competition in the solid waste community is the Solid Waste Authority of Seattle's division of garbage collection contracts into bids for geographically and demographically diverse neighborhoods. Two different companies were chosen to perform in each area and were evaluated on the basis of expenses, service delivery options (including garbage collection, recycling collection, and education), and processing of materials.
- Develop a cost/benefits analysis to provide full-scale privatization of garbage and recycling services by contracting all collection, processing, and disposal and education services to a private sector company. Use as a model the contracts implemented with landfills in the City and on the Island of Hawai'i.
- Develop performance benchmarks designed to reward success or penalize noncompliance to be incorporated into contract performance review and evaluations. Allow the bidders to indicate these benchmarks and to propose rewards in their proposals. Since the county is paying for these services, and the contracts are used as guarantee for project funding, the county becomes a business partner in the service delivery. As a business partner, the county should exercise its ability to periodically review expenses and profits.

Roadblocks to Public/Private Partnerships

Private Sector Issues

- Money borrowed to invest in equipment and facilities requires financing that will be based on long-term contracts. Short-term borrowing results in higher monthly payments and is often too expensive for a company.
- Larger companies often leverage their assets to negotiate lower interest rates, especially if they are a local operation of a national or regional company. Smaller companies usually must borrow at higher rates.

Public Sector Issues

- Counties want maximum flexibility to contract for services in collection, processing, and disposal of garbage, recyclable materials, and compostable materials. Shorter-term contracts provide the opportunity to redirect activities. The term must be balanced with the increased cost of amortizing equipment and start-up costs.
- The RFPs and contracts should be written to allow for periodic review of services for changes in collection, processing, and disposal strategies.
- Labor unions may protest any efforts to privatize garbage collection or disposal services, believing that it will ultimately affect workers pay, performance evaluation, or change in hours worked by remaining employees. If traditional civil service positions are contracted to private entities, public workers must be retrained and offered alternative employment within the municipal system.

INTERAGENCY COOPERATION

DEFINITION OF THE TOPIC

An objective of this discussion paper is to clarify the roles of state and county solid waste management agencies in funding and supervision of public and private waste management. A clear definition of the agency roles may improve interagency cooperation and facilitate government's ability to assume responsibility and become part of the solution in waste management issues.

CURRENT SITUATION IN HAWAI'I

Cooperation between federal, state, and county agencies regarding solid waste management and recycling in Hawai'i exists largely because of legislation and the role of the Solid Waste Advisory Committee (SWAC). A number of successful efforts have been initiated by either the State of Hawai'i's Office of Solid Waste Management (OSWM) or the Clean Hawai'i Center. These included conferences such as the Buy Recycled in Hawai'i conference and Christmas TreeCycling in cooperation with the Department of Accounting and General Services (DAGS). Once the Christmas trees are chipped, the material is used by the City and County of Honolulu (City) in parks, and the excess material is delivered to local compost contractors. When feasible, federal agencies, particularly the military, have participated in county and state discussions and cooperative arrangements.

In spite of legislative mandates, however, there has been limited cooperation between state and county regulatory agencies, purchasing agencies, and agencies responsible for land and natural resource management. There is also limited communication between the various state agencies. One reason for this lack of communication is overlapping and sometimes duplicated responsibilities among the state and counties, and state departments. Integrated solid waste management (ISWM) at the state level is administered by the Department of Health (DOH); however, the Department of Transportation (DOT), Department of General Services, and DAGS all have responsibilities for portions of the waste stream.

Finally, the Governor's office has yet to make a strong commitment to foster statewide agency cooperation in the area of solid waste management, recycling, composting, or procurement of recycled content products. Without leadership from the top, it is unlikely that department directors will feel the need to initiate or participate in meetings or cooperative arrangements to address the issues of waste management and recycling.

MODEL APPROACHES

The City has made a substantial commitment toward reorganization that would streamline operations in order to reduce overhead expenses. Some City departments that are involved with similar services have been combined under a single directorate; effectively eliminating the need for interagency cooperation within City government. The City has also established a solid waste management structure that utilizes its own recycled products. The City supports glass recycling through its Recycling Office by distributing funds from the glass advance disposal fee (ADF). The City Roads Division purchases glass for glasphalt. Similar agency cooperation exists in conjunction with greenwaste. The Roads Division chips and processes greenwaste into mulch that is later used by the Parks Division.

RECOMMENDED TOPIC DEVELOPMENT STRATEGIES

Clarify Commitments

It is important to interagency cooperation that the commitment of the state and individual counties to achieving solid waste management objectives is clear. Where possible, they should use public community meetings, facilitated agency meetings, and state and county council resolutions to achieve commitments and identify responsibilities, funding sources, and deadlines. Specifically, they should do the following:

- Conduct a thorough review of public law, ordinances, budgets, and staffing to identify agency responsibilities in achieving solid waste management. Include public works agencies, state and county financing, county administration/management, state and county land management agencies, state and county roads and transportation, public education and outreach, and state and county agencies responsible for enforcement of illegal dumping/littering. Include military bases and federal facilities and programs.
- Identify a matrix that clearly indicates responsibilities and funding sources of each agency and department, identifying current or potential involvement.
- Establish interagency cooperation through performance-based reviews and rewards of managers and programs. Hold managers accountable to the state legislature, to budget committees, to public review and comment, and to personnel actions for non-compliance.
- Develop criteria for performance-based reviews of managers based on their attention to and support of community goals and legislated mandates for waste collection, diversion, and recycling. Tie the established legislative mandates to job descriptions and performance.
- Develop goals, objectives, work plans, and staffing arrangements for each agency identified. Initiate recognition and rewards for departments and agencies that achieve their goals within specified timelines.
- Hold the public sector accountable for its performance towards goals (similar to the manner in which the private sector is held accountable under contracts and for deliverables) if the public sector is willing to enter into contracts and partnerships with the private sector.
- Establish legislative directives that define "who pays for what" services on state and county levels. For example, who should pay for education about the benefits of recycling and composting? How should the programs be funded? Some funding may come through an increase in tipping fees, a material diversion fee similar to the glass surcharge, a percentage tax on property taxes, or a percentage tax on recyclable products imported.
- Conduct a thorough study of cost/benefits derived from waste diversion activities. This could possibly be done by the Clean Hawai'i Center, using its role within the Department of Business, Economic Development, and Tourism (DBEDT) to analyze returns on investment dollars, core measures, and the value of employment and taxes to the local and state communities.

Increase Public Purchasing of Recycled Products

DAGS could develop a job and secure funding for a long-term recycling specialist. The job would include reviewing purchasing and contracting specifications and bids. The job would also include training and education of staff in all departments who are responsible for purchasing and the hiring of outside consultants.

- Develop and implement rewards for county and state purchasing departments or decision-makers for identifying and purchasing recycled content products.

- Revise product specifications to reflect functional product performance criteria and eliminate specification criteria that directly or indirectly preclude recycled content.
- Fund public and private sector projects to research and demonstrate specific recycled content products.
- Explore possibilities to implement federal Executive Order 13101 (approved September 1998) regarding recycled content products in a minimum of 36 categories.
- Explore cooperative purchasing opportunities between federal, state, and county agencies. Identify savings on purchasing greater quantities of recycled content products over existing purchases, as well as comparisons with non-recycled content products.
- Coordinate opportunities to conduct product demonstrations and source reduction activities with federal agencies (including state and county applications for federal funding) under Federal Executive Order 13101.
- Analyze county and state purchasing habits. Identify the top 15 products that are currently purchased without recycled content criteria, but which are available. Identify the top three manufacturers of these products, and implement demonstration projects in each county. Provide state funding through grants to agencies and counties to try new products.
- Research and recommend products for which there are no reasonable substitutes and for which recycled content are the only or the best alternative (e.g. plastic lumber, cellulose insulation, fiberglass insulation, tissue/toilet papers, oriented strand particleboard).
- Replace purchasing preferences for recycled content products with a purchasing goal of 25 percent of all products in individual agencies, allowing each agency to determine the best use of its dollars.

Land and Resource Availability

- Complete research initiated by Clean Hawai'i Center in 1994 regarding available federal, state, and county lands. Initiate a formal petition process to use lands for recycling, based on the agency's requirements (in ordinance or other legal commitment) to support solid waste management goals.
- Using research results from the above, develop and implement land set-asides for "recycling parks," providing low-cost leases for recycling business incubation. To avoid subsidization of companies that would compete with existing businesses that did not have such assistance, the land leases should be limited to research, product demonstrations, or limited term leases (under 2 years).
- Utilize DBEDT's Clean Hawai'i Center to develop cost/benefit analysis that establishes value of using property for waste diversion methods, versus lost value to the community of leaving property vacant or underutilized.

Communication Among Agencies

- Obtain top level commitment from the Governor's office, county mayors' offices, and state and county department heads to improve waste management and recycling activities statewide.
- Establish an interagency task force to facilitate achievement of solid waste management goals, conduct quarterly public meetings to review progress, and determine new courses of action.

SOURCE REDUCTION

DEFINITION OF THE TOPIC

Source reduction occurs before materials are considered wastes; reduction and reuse are two of the "3 Rs" that encompass activities that lead to source reduction. As defined by the U.S. Environmental Protection Agency (U.S. EPA), source reduction is "activities that reduce the volume or toxicity of the waste stream, including the design and manufacture of products and packaging with minimum toxic content, minimum volume of material, and/or a longer useful life." It is both a philosophy and a set of discrete activities. The philosophy emphasizes changes in production, consumption, and other behaviors that help to reduce waste generation. In practice, source reduction has been a large collection of small projects and individual actions that are often not related or encompassed by an overall program or organization. Even with this somewhat diffuse identity, source reduction is often at the top of the solid waste management hierarchy (as is the case in Hawai'i). Source reduction can yield lower cost waste diversion because materials are kept out of the waste stream, and the highest efficiency and longest-lived use of resources is promoted. Activities that can be included under a discussion of source reduction are those that keep materials in use, or result in reduction in the manufacture or purchase of materials that might end up being disposed.

This discussion paper addresses what is currently occurring in Hawai'i and model approaches to achieve success in implementing source reduction at the state and local levels, and introduce a strategy for further pursuing source reduction planning and activities. Source reduction overlaps with many other issues considered under integrated solid waste management (and included in discussion papers for the revision to the Integrated Solid Waste Management [ISWM] Plan). Related topics include manufacturer responsibility, purchasing practices, construction and demolition waste, and organic waste. In addition, as with other waste diversion efforts, public education and funding options are important to create support in implementing source reduction programs. These issues are addressed in more depth in other discussion papers.

CURRENT SITUATION IN HAWAI'I

Source reduction is defined as the first priority of solid waste management in Hawai'i Revised Statutes (HRS) 342G-2. Additional activities outlined in the statute to implement source reduction include an office paper reduction goal for state and county agencies of 25 percent by January 1, 1995 (using 1990 as the base year; HRS 342G-3); education promotion of source reduction by Department of Health's (DOH's) Office of Solid Waste Management (OSWM) [HRS 342G-14(3)]; promotion of enterprise zones for source reduction businesses [HRS 342G-14(10)]; and requirement for all state and county agencies to do double-sided copying (HRS 342G-44). Responsibility for implementation of these activities falls upon the OSWM, and in some cases, upon the State Department of Accounting and General Services (DAGS) and the counties. An assessment of the status of these activities has not been done to date.

The OSWM promotes backyard composting for the residential sector, and has developed a display and brochures for this. The City and County of Honolulu's (City's) Recycling Office also promotes backyard composting, and has a brochure, workshops and a demonstration compost site at the Pearl City Community Gardens (run by University of Hawai'i Cooperative Extension) to support this effort. In Maui County, the Maui Recycling Group, with funds from Maui County, has conducted backyard composting workshops with state support. The OSWM promotes "farm-scale" composting of institutionally generated green trimmings, to reduce the need for disposal of greenwaste as well as to augment landscaping opportunities within the institutions (i.e., farms, resorts, and state or county facilities). OSWM purchased and distributed a farm-scale compost technical publication to support implementation by institutions.

Other source reduction programs include the City's Partnership for the Environment program, which promotes purchasing practices to reduce packaging and waste for the commercial and government sectors. A statewide materials exchange network, HIMEX, is coordinated by the Maui Recycling Association, with support from OSWM, and has a newsletter and website (http://www.himex.org) to assist in bringing together parties that have or need used materials. Kaua'i County has plans to build an exchange center at their existing landfill, but that project has not been completed. When it is completed, the Kaua'i Resource Exchange will be the first physical center for materials exchange in the islands.

The DOH Solid and Hazardous Waste Branch (SHWB) houses a Waste Minimization program, supported by U.S. EPA funds, that promotes reductions in hazardous waste through technical assistance and business education materials and support. The Waste Minimization staff person works closely with OSWM to promote cross-media waste reduction. Waste Minimization projects have emphasized source reduction for businesses such as painting contractors and vehicle maintenance, the latter in partnership with Hickam Air Force Base.

WasteWise, a U.S. EPA program that is also being promoted by the state, is a partnership program in which partners commit to reducing waste, setting goals to achieve reduction, and measuring progress. WasteWise goals for the state's effort were due to be submitted to U.S. EPA in September 1998 (this had not yet occurred upon publication of this paper).

In addition, private source reduction efforts exist that address business purchasing and suppliers (ITT Sheraton Hotels has such a program), toner cartridge refilling (some small businesses), and reuse of clothing and furniture through thrift and consignment shops.

MODEL APPROACHES

Residential Community Programs

Source reduction for the residential sector can encompass education to improve purchasing practices and reduce waste, promotion of reuse through thrift and consignment stores, and adoption of backyard composting and grasscycling. A few model projects are described below:

Grasscycling – Household Residents

In the Puget Sound area, residents learn about grasscycling through the "Mower for Less" program, that also provides discounts on purchase of mulching lawn mowers. The program is supported by King County, City of Seattle, 15 environmental agencies and organizations, and the lawnmower manufacturer. More than 5,000 residents participated in this program by purchasing a mulching mower (with as much as a 50 percent discount), and 2,600 old mowers were turned in for recycling. Anticipated benefits include 2,500 fewer pounds of air pollution (associated with gas mowers), 1.5 million gallons of water saved, 5 percent decrease in grass waste (which would have gone to local composters), and reduced chemical fertilizer use. (Waste Prevention Forum, September 4, 1998)

[Note: Yard trimmings disposed of in the waste stream has been reduced substantially over the last 5 years. This can be attributed, at least in part, to home compost and grasscycling programs.]

Clothing and Textiles Reuse – Residents, Charities, Commercial

Montgomery County, Maryland, initiated a textile collection program in 1993. The county arranged for drop-off locations and curbside pickup for residents, and five charities received the materials. A brochure distributed to inform residents of the program identified charities, shelters, consignment shops, and used

clothing stores that accepted textile donations. Approximately 156 tons of textiles are collected annually, and a textile dealer, Dumont, pays the county for textiles collected. (U.S. EPA, 1997)

Landfill Salvage - Residents, Charities, Commercial

The Orange Regional Landfill, North Carolina, has a formal salvage program that diverts materials for recycling or reuse. A full-time staff person, who coordinates the program, has been employed since December 1997. Volumes of materials diverted include 160 tons of metals, 20 tons of wooden shipping pallets, and over 20 tons of building materials and household goods. Beneficiaries of the program include Habitat for Humanity, the PTA Thrift Shop, Salvation Army, the People's Channel (the Chapel Hill, North Carolina public access television channel), and SEEDS (an urban garden program in Durham, North Carolina). In addition, small-scale builders and other community groups have been able to save materials and money through the program. The landfill has received over $5,000 from the sale of these materials since the program began. (Waste Prevention Forum, August 21, 1998)

[Note: Although this program occurs after materials have been disposed, it could in part be considered as a model for materials exchanges at landfills or transfer stations.]

Commercial Sector Programs

The commercial sector can participate in source reduction that targets office paper reduction, toner cartridge reuse, electronics reuse and repair, construction practices that reduce waste such as advanced framing techniques, and commercial-scale onsite composting. In addition, the Landfill Salvage, described above, may also be applicable to some commercial enterprises. Two commercial sector model projects are outlined below:

Office Paper Reduction – Government, Commercial

In 1994, the U.S. EPA began its own Paper-Less Office Campaign with the goal to reduce office paper use by 15 percent. Within one year, they had exceeded their goal, with photocopying of paper down by 16 percent by 1995. Office paper reduction programs typically entail setting corporate goals for reduction, publicizing the goals, and encouraging employees to adopt specific paper reduction strategies. Companies that have paper reduction success stories to share include Legacy Health Systems (Portland, Oregon), Adobe Systems, Inc. (Itasca County, Minnesota), and Lawrence Berkeley Labs (Berkeley, California). Paper reduction through both duplex copying and computer networking has potential to significantly reduce the purchase and disposal of paper. According to U.S. EPA reports (September 1997), paper reduction through duplex copying could yield a savings of 613,000 tons/year of paper, and through computer networking could yield a savings of 690,700 tons/year (figures are based on national averages and volumes). (U.S. EPA, 1997; http://www.ciwmb.ca.gov/mrt/wpw/wpbiz/oprsavng.htm)

Paper Towel Reduction – Government, Commercial, and Visitor Industry

The City of Cambridge, Massachusetts, performed a study to calculate the potential paper and cost savings if paper towel reduction was implemented in city offices, which employ 2,605 people. The project proposed to replace tri-fold paper towels with roll paper towels. The payback period due to potential cost savings, which included calculating costs of replacing existing paper towel dispensers with new ones for rolls, would occur in less than 5 months. The waste reduction from this program was calculated to be approximately 1.68 million square feet (or 7.5 tons) of paper towels. (U.S. EPA, 1997)

Manufacturer/Supplier Programs

Manufacturer and supplier responsibility in source reduction is generally more centralized and company (i.e., manufacturer or supplier) specific. Such opportunities include packaging reduction (targeting suppliers, manufacturers, and consumers), toxicity and content reductions (performed by manufacturer; consumers can create pressure for this through purchasing choices or campaigns), and take-back programs (performed by supplier, manufacturer; pressure for this can be exerted by government and business entities, and other consumers). Hawai'i has few manufacturers, but many suppliers ship materials into the state. The greatest potential for success in this category of potential programs would be through government and commercial sector purchase requirements favoring durable goods, minimal or reusable packaging, and take-back programs.

RECOMMENDED TOPIC DEVELOPMENT STRATEGY

To further source reduction progress in the state, the OSWM, coordinating with the counties, should take the lead in proposing a statewide source reduction strategy that would include activities that target critical waste streams and/or audiences. Some portions of this strategy would apply to all four counties, such as backyard composting, while others may be relevant to just one or two, such as incorporating source reduction techniques into existing waste audit programs (e.g., the City's Partnership Program or U.S. EPA's WasteWise program). Further research would need to occur, based on recent waste stream analysis, to identify the highest potential wastes and/or generators that should be targeted for source reduction activities.

The statewide strategy should have the following aspects:

- Developed by the State with input/feedback from the counties and selected private and non-profit sector representatives (similar group to the existing SWAC);
- Prior to initiation of pilot projects, conduct an assessment of applicable source reduction ideas from other jurisdictions according to a "case study" approach; and
- First stage of implementation would include highly visible, low-cost pilot projects that result in documented reduction of waste.

These aspects would be further developed if Source Reduction became a position paper topic.

Two activities that presently offer potential are backyard composting and grasscycling for residents, and office paper reduction for the commercial sector. Both have existing support: the state and two counties have already initiated backyard composting programs, and language encouraging state office paper reduction exists (HRS 342G-3 and 44). These programs could be further developed and broadened, and source reduction philosophy could be promoted as an aspect of the programs.

An additional source reduction activity that would have potential in Hawai'i both for residents and commercial enterprises, would be a landfill salvage/exchange program. This type of program could occur locally, supported by existing infrastructure at convenience centers, transfer stations and landfills, and be further supported by the HIMEX exchange. Informational brochures produced to support this activity could also include a listing of all thrift and consignment shops, appliance repair, and other private and non-profit enterprises that support the reuse of materials. The impact on waste stream may not be significant, but the impact on increased awareness of what source reduction means and what it can accomplish, including cost savings, could be dramatic.

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California Integrated Waste Management Board. http://www.ciwmb.ca.gov (includes Waste Prevention World site, and Waste Prevention Information Exchange Database).

State of Hawai'i Department of Health and Painting and Decorating Contractors Association. 1994. *Reducing and Managing Painting Contractors' Wastes.*

United States Environmental Protection Agency. September 1997. *Source Reduction Program Potential Manual, A Planning Tool*. Produced by the U.S. EPA, Solid Waste and Emergency Response (5306W). EPA530-R-97-002

Waste Prevention Forum – A Project of the National Waste Prevention Coalition, Tom Watson, Coordinator, National Waste Prevention Coalition (e-mail: Tom.Watson@metroko.gov).

APPENDIX IV.1: CONSTRUCTION PHOTOGRAPHS

Figures 1 through 9 are photographs of recent job sites and construction practices on O‘ahu.

Industry Practices

Figure 1: Recycling Concrete Masonry Units

One O‘ahu contractor separates damaged concrete masonry units (CMUs) from other waste so the CMU supplier can take the material back for recycling. Because CMUs are heavy, this represents significant savings in disposal fees with little investment in time or money.

Infrastructure

Figure 2: Island Demo Expansion

Island Demo, a construction and demolition (C&D) transfer station and recycling facility on Oʻahu, is expanding its facility to increase its capacity six-fold. The expanded facility will accommodate larger trucks, making it more competitive with C&D disposal.

Figure 3: Island Demo Operations

Island Demo accepts mixed construction debris, then separates and recycles metals, cardboard, concrete, and other recyclables. Island Demo also provides a job-site bin service for local construction sites.

Construction and Demolition Composition

Figure 4: Renovation Waste

Commercial renovations typically produce significant amounts of wood, drywall, roofing, and packaging waste. This dumpster was sited at the Ala Moana Center shopping mall.

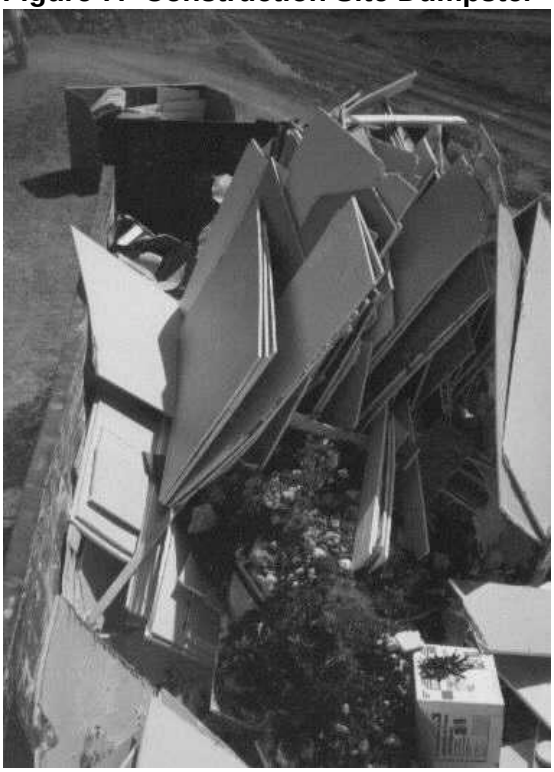
Figure 5: Building Demolition Waste

Demolition waste is generated from the demolition of housing, commercial buildings, and other structures. The waste stream materials are usually combined or contaminated with other materials such as lead-based paint (LBP) and asbestos-containing materials (ACM).

Figure 6: New Construction Waste

Many useful or recoverable materials are disposed during a construction project. This dumpster holds untreated luan mahogany used as packaging.

Figure 7: Construction Site Dumpster



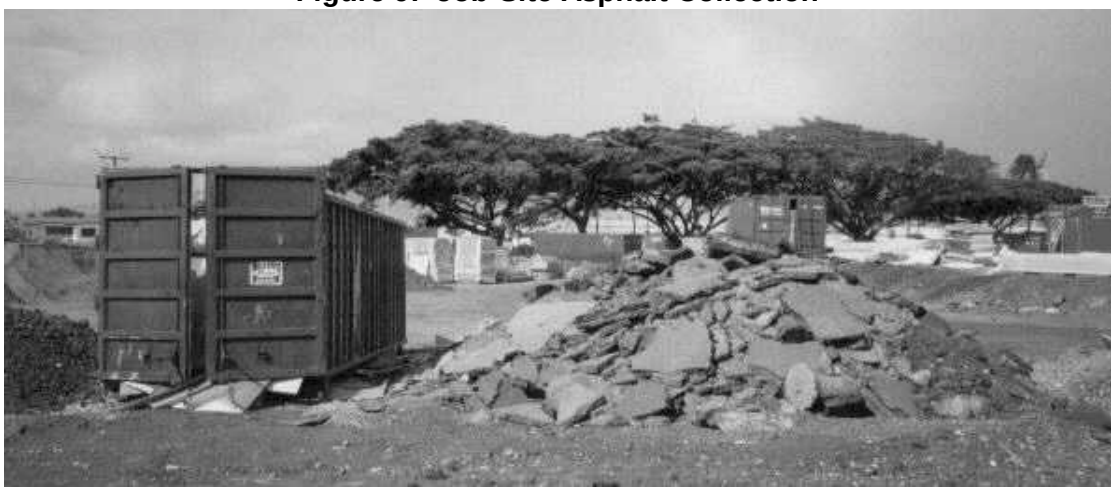
Different stages of construction often produce predominant amounts of predictable materials. If kept separate, they can be more easily recovered. This dumpster primarily contains drywall, but the load is contaminated with other waste.

Industry Practices (Waste Reduction)

Figures 8a and 8b: Steel Construction

Many contractors are seeking termite-proof alternatives to treated wood such as engineered steel. In this O'ahu project, the contractor used centralized production to reduce waste steel.

Figure 9: Job-Site Asphalt Collection



Keeping asphalt out of the dumpster and grinding for reuse on site as sub-base is economical for many contractors.

APPENDIX IV

CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

IV.1: CONSTRUCTION PHOTOGRAPHS

IV.2: MODEL PROGRAMS

IV.3: REFERENCES

APPENDIX III

DISCUSSION PAPERS

APPENDIX IV.2: MODEL PROGRAMS

Several successful programs on the U.S. mainland and in Hawai‘i demonstrate the economic and environmental benefits of recovering, recycling, and re-using construction and demolition (C&D) waste stream components. The models researched for this paper have demonstrated prior success in Hawai‘i or are adaptable to Hawai‘i. This Appendix describes these key programs in detail. (The C&D discussion paper [see Appendix III] briefly discusses several other model approaches.)

The models described below are of the following types:

- Green Builder Programs
- Job-Site Recycling Demonstration
- Private Re-Stores
- Regulatory and Policy Models
- Non-Regulatory Policy Models

Green Building Programs

Key Goals and Attributes	
· Voluntary, builder-driven, incentive-based · Can include multiple environmental goals, including waste reduction and recycling · Industry and public education component	· Emerging consumer and lending community interest and support · Can provide marketing edge and improved public relations for participating builders · Expandable and adaptable

Build a Better Kitsap, Kitsap County, Washington—*Build a Better Kitsap* is a non-regulatory, market-driven, incentive-based green building program. The local Home Builders Association (HBA)-sponsored program was initially a response to industry and public concerns about the potential for increased tipping fees and decreased waste management options for C&D debris in Kitsap County. (The County's only landfill is expected to close within the next five years, and all inert C&D landfills have closed.) The education and marketing program promotes over 30 options for waste reduction and recycling, as well as options addressing other environmental concerns. In the past year, the program has been enhanced to include remodeling, light commercial, and developer elements. The program has three star levels, with each level progressively more difficult. A basic requirement for qualification for the first level is a job-site recycling plan. A copy of the completed recycling plan must be submitted with the certification checklist. In its first 18 months, more than 30 businesses enrolled in the program, with nearly 20 homebuilding projects completed in a very flat housing market (including an inventory of homes sitting for months). *Build a Better Kitsap* has won local, regional, and national awards for innovation in industry education. This recognition has come from both the public and private sectors. Educational components include a handbook, industry workshops, and a resource library. Promotional components include brochures, presentations, fact sheets with case studies, decals and yard signs. Kitsap County Public Works and the Washington State Department of Ecology provided funding. Substantive in-kind and other support was provided by the HBA of Kitsap County. It is important to note however, that *Build a*

Better Kitsap has been developed as part of a larger effort to promote C&D diversion and recovery. Some of these efforts include, as follows:

- Central Market Buy Recycled Showcase video, signage, fact sheets, reports, and industry tours;
- A C&D Business Focus Group Report, in which nearly 25 key stakeholders participated;
- Two demonstration buildings (Project Teamwork, Central Market) demonstrating over a dozen cost-effective recycled content building products;
- Vocational High School Training Program, including teacher planning meetings, presentations by four visiting instructors, and four field trips (landfill, recyclers, and re-manufacturing plants); and
- C&D Chapter, Solid Waste Management Plan Update, including 14 recommendations (8 educational, 4 technical assistance, and 2 facility-related).

Clark County, Washington, has since implemented a green builder program modeled after *Build a Better Kitsap*. At present, the Master Builders Association of King and Snohomish Counties (the second-largest homebuilders association in the U.S.), along with the Public Works Departments of the two counties, are developing a *Build a Better Kitsap*-type green building program for their region, which includes the Seattle metropolitan area.

HBA Metro Denver Built Green Program, Denver, Colorado—Like *Build a Better Kitsap*, the *Built Green* program is a non-regulatory, HBA-sponsored program. However, its primary focus has been on energy efficiency and material use, with minimal attention to waste reduction. This is largely due to low tipping fees and the perception that recycling services and recycled content building products are not available in the Metro Denver area. Nonetheless the program offered a platform for education on waste reduction and recycled content. Technical assistance provided through an Industry Partnership Project funded by the Colorado State Energy Office during the summer of 1998 revealed that recycling services and recycled content building products are indeed available, and raised awareness among the HBA leadership and Parade of Homes builders. As a result, the program will be including additional options for recycling and recycled content building materials. The 3-year-old program has over 50 builder members enrolled, with hundreds of *Built Green* homes built, including production, custom, and semi-custom homes (in a very active building market).

City of Austin Green Builder Program, Austin, Texas—The first green building program developed in the nation, this is a voluntary program sponsored by a public municipality. Its initial impetus was energy efficiency since it was an outgrowth of a utility sponsored energy efficiency program. Like the Metro Denver program, however, it has broadened its focus significantly since its inception in 1991. The program has 50 builder members, and has a strong presence in the building market.

ConstructionWorks Program, King County, Washington—A program of the King County Public Works Department, Solid Waste Division, *ConstructionWorks* is an incentive program that recognizes construction companies or job sites that encourage the wise use of resources. In addition to publicly acknowledging these companies, it is a goal to use the program as an education tool for the rest of the industry. Representatives from the construction industry participated in the planning of this program.

To be recognized as a *ConstructionWorks* member, a company or job site must practice three waste prevention strategies, recycle at least 40 percent of its garbage, and use three or more recycled-content products. To be recognized as a Distinguished *ConstructionWorks* Member, a construction company or job site must practice six waste prevention strategies, recycle at least 60 percent of its garbage, and use six or more recycled-content products. A Distinguished Member is also required to conduct at least one activity that promotes waste prevention, recycling, and the use of recycled-content products to their employees, customers, and/or the community. Member benefits include the following:

- Recognition in the *ConstructionWorks* Advertising Campaign, including *The Puget Sound Business Journal's* special construction issue and/or *The Daily Journal of Commerce*;
- Recognition in local publications near the job site;
- Recognition through the King County Recycling Works newsletters;
- Listing in the Green Business Membership Directory;
- Achievement certificate;
- Hard hat decals;
- Nomination for a Green Globe business recognition award; and
- Letter of recognition from the King County Executive.

Recruitment of members has been by far the most difficult aspect of implementing the program, according to the Program Manager. Although recruitment efforts have increased, membership is much less than hoped (only 14 companies). As is true in Hawaiʻi, the industry perceives that waste management is only a small portion of the total construction cost, and recycling is voluntary. Program benefits are perceived as "nice to have" but are not strong incentives. Membership does include, however, some of the largest construction firms in the area.

The Program Manager also commented about the difficulty of communicating to contractors what waste prevention (or source reduction) means. Examples (case studies) work best for this. Other advice includes tying it to a larger environmental program. She also noted one benefit for the Solid Waste Division staff and participating companies: "It allows me to give letters of reference/endorsement for companies that participate. I can write a letter for companies that are putting in bids for construction jobs stating that they are members of *ConstructionWorks*. These companies would probably say that this is a benefit."

Job-Site Recycling Demonstration

Key Goals and Attributes	
· Documented economic savings for job-site recycling program on actual construction project on Maui · Proven success at obtaining building community "buy-in"	· Focused on what could be done within the existing recycling infrastructure · Made way for follow-on, larger scale project · Established inclusion of job-site recycling information in building permit package

Maui Recycling Group, Maui—Under a grant from Maui County, the Maui Recycling Group (MRG) conducted a pilot job-site recycling project during the construction of the Liholani Golf Villas on Maui, September 1998 through April 1999. According to the project report (see Appendix IV.3: References), 18 tons of drywall was diverted from the landfill and used by one of Maui's commercial compost companies as an addition to their feed stock. One thousand pounds of diverted plastic was delivered directly to Aloha Plastic Recycling in Kahului to be used in manufacturing new products. The total amount of cardboard diverted was approximately 2 tons, which was stockpiled along with cardboard collected from other sources for trading on the commodity market. The total amount of treated lumber diverted was 5 tons. This material was made available to the public on a "Giveaway Day," which was attended by more than 150 individuals.

By project's completion, the amount of material disposed of in Maui County landfills from this project was reduced by 35 percent from the original estimate, and the total cost of trash/recycling hauling services was 20 percent less than the original bid. The project not only diverted significant amounts of material from landfill disposal, but also demonstrated that on-site source separation on a construction site actually reduced costs. The project results were favorably received following the presentation to the local contractors association in July 1999.

MRG plans to sponsor a resolution for issue by the Maui County Council, which will instruct Maui County Department of Public Works to include job-site recycling information in the building permit application packet. This action would invoke no requirement for a recycling plan, but would provide valuable information, such as a sample plan, fact sheet, or brochure and names/phone numbers to call for assistance (the County's Recycling Office and/or MRG). The Maui County Building Department supports this.

MRG hopes to conduct a similar, but larger scale, job-site recycling program at a commercial project constructed with a union crew. The long-term goals of the Liholani Golf Villas and any future projects are (1) to document that recycling is beneficial to contractors (i.e., saves money; allows use of smaller, easy-to-use containers, and eases cleanup efforts) and (2) to encourage voluntary recycling at all construction sites on Maui.

According to Mr. Jeff Stark of the MRG, "Key in any recycling program is having the capacity to handle the materials. Focus on the things you *can* do."

Private Re-Stores

Key Goals and Attributes	
· Reduce waste sent to the landfill by providing mechanism for reuse of construction materials · Wide community support/participation	· Large volunteer involvement for pick-up, sorting, storage, and refurbishment · Large warehouse for storage and computer inventory

Habitat for Humanity Re-Store, Kauaʻi—The Kauaʻi Habitat for Humanity is a self-help home-building program on Kauaʻi. Their facilities include an older, large (20,000 square feet) warehouse that houses their office, pre-fabrication, and storage areas. The development of the existing used building materials store was evolutionary. Initially, they began to sort and palletize waste they generated from use of their centralized pre-fabrication area for donations to other non-profits or give-away to private individuals. Later, they obtained fixtures, mattresses, and other items from several of the post-hurricane renovation projects. In November 1998, they began to advertise to the community-at-large that they would pick up and accept donations of used building materials. Community response has been enthusiastic. The Re-Store representative noted that the current economic climate (i.e., high cost of new goods, depressed job market) supports reuse.

The Re-Store accepts all types of reuseable/recyclable *construction* materials. They avoid white goods because they do not have the in-house capability to repair appliances. Drywall is usually donated to a nursery since it is rarely suitable for reuse. Only unopened cans of paint are accepted, and these they give away. They accept used treated wood up to one foot in length and inventory, palletize, and sell it at half-retail cost for use as shims, forms, doghouses, or stakes for hothouses. (New, treated wood is used for Habitat for Humanity projects.) Carpeting is reused, if suitable, or used as ground cover for lawn maintenance, if not. They also receive merchandise from local department and hardware stores (i.e., discounted, returned, or discontinued items). A database contains an inventory of materials in stock.

Habitat for Humanity uses the materials on their own projects or cleans them for sale to the public one Saturday a month. (Summer 1999, with the help of numerous volunteers, the Re-Store was open to the public every day.) So far, they estimate that they have diverted 20,000 pounds of construction waste from landfill, which includes inventory on hand, and the Re-Store has not needed to take anything to the landfill.

Rebuilding Center, Portland, Oregon—In December 1997, the Rebuilding Center of Our United Villages in Portland, Oregon, began a five-month effort to research existing used building materials outlets, a project that included owner interviews and 18 site visits. The research resulted in a business plan based on the experience of successful stores that had been in business for 40 or more years. Financed with a $15,000 private loan and staffed by two full-time volunteers, the Rebuilding Center opened their doors in April 1998 in an industrial area in the center of Portland. They were successful in obtaining a $35,000 grant from Portland Metro for startup capital expenses, including purchase of a folklift, a flatbed truck with lift gate, power racking tools, a computer, and a facsimile machine.

After only one month in operation, the center was out of debt and self-sustaining. As of August 1999, the center has exceeded their business plan goals by four times and now has six full-time staff and 300 volunteers, comprising individuals from the community and groups such as AmeriCorps.

Paid staff are responsible for the majority of business operations. A dedicated volunteer coordinator keeps volunteers busy with sorting, cleaning, and special projects tasks. Currently housed in a 35,000-square-foot facility, they are preparing to move to a new facility nearly twice the size.

Advertisement is primarily by word of mouth and excellent press. In addition, staff have participated in some marketing efforts to local remodeling associations and have expended minimal monies for paid advertising.

Guiding principles for the organization include, as follows:

- Make building materials affordable for all income levels. In general, items are sold below the full market price.
- Foster the relationship with local community. Profits (termed "excess incomes") are reinvested in the community in various ways, including small grants to help individuals. Examples include programs for at-risk youth, community murals, food programs, and gardening. The only criteria are that all participants are from the same neighborhood, and the program benefits everyone in that neighborhood.
- Keep materials within the community. In general, items are not shipped outside the community, unless there is no local market. Although they get inquiries from places as far away as Texas, the center keeps items in the community, even though they might sell for more outside.
- Donate locally unusable items. Items such as single-pane aluminum windows and fire doors that no longer meet code are unusable in Portland. These items are shipped free to Honduras and Nicaragua to assist in disaster recovery in those countries. The Rebuilding Center has so far shipped at their own expense two 40-foot containers filled with windows, doors, recycled paint, and other items that would otherwise go to the landfill.

Their success is evidenced by the public recognition they have received. The Rebuilding Center was awarded a City of Portland "Best Business Award" and has been featured in the media numerous times. They have also been approached by others for assistance in setting up the model in other locations and are available to assist with a similar project in Hawaiʻi.

Head of the Rebuilding Center, Mr. Shane Endicott, says that the keys to their success include in-depth research to learn from others' mistakes, a business plan that patterned operations after other successful programs, and a committed staff and volunteers. He also recommends setting up the business with the intention of being self-sufficient in lieu of relying on grant/public monies for ongoing operation.

Regulatory and Policy Models

Key Goals and Attributes	
· Requires a Solid Resource Management (SRM) Plan for Public Works projects · Requires recycling to the "greatest extent feasible"	· Requires summary of solid waste disposal and diversion with request for payment · Demonstrated success in reducing waste

Waste Management Planning as a Requirement for Public Works Projects, Los Angeles, California—The City of Los Angeles' Public Works Department administers $200 million in construction projects each year. Specifications for their projects address waste management procedures, including recycling "to the greatest extent feasible" and two related submittals, as described below.

Volume 1 of their contract document, General Specifications, includes a SRM specification with recycling "guidelines." (These are not "requirements," as the city did not want to be liable for extra costs.) It specifies recycling "to greatest extent feasible." The specification requires two submittals:

1. SRM Plan—due after award of contract.
2. Summary of solid waste disposal and diversion as part of request for payment, with weight tickets attached.

The specification was in place by the end of 1994. By reference, it incorporates the Los Angeles *Construction, Demolition, and Landclearing (CDL) Directory* and the *Wood Use and Green Waste Directory*.

The Public Works Director noted that it is key to attend and participate in pre-bid and pre-construction meeting. At the meeting(s), the Project Engineer from the Bureau of Engineering will set a due date for and follow up on the SRM Plan submittal. In practice, staff may have to contact the contractor to request weight tickets when they are not attached to payment requests, as required.

The Los Angeles Public Works Director provided two case studies that demonstrate the effectiveness of using waste management specifications. One case study was the Playa Vista development, which achieved a 92 percent material recovery rate from the demolition of 11 buildings at a former Hughes aircraft plant. Nearly 75,000 tons of steel, wood, and concrete were recovered and more than 9,000 tons of green waste were converted to mulch. This equates to enough concrete for 15 miles of road and steel for more than 1,500 steel-frame, single-family homes.

On another project, developers of the new STAPLES Center diverted over 98 percent of the material from the existing building at the site, the Los Angeles Convention Center's North Hall, during its demolition.

These and other results have been positive, and contractors have been cooperative. While first fearing the program would increase administrative costs, the Public Works Director reports that contractors now acknowledge it has helped them better control their disposal costs.

The Public Works Department has been active in encouraging other city departments to adopt these requirements. So far, the Department of General Services has used this approach on one demolition

contract, and the Parks and Harbors Department and Department of Water and Power, both independent proprietary departments, are adopting similar requirements.

Non-Regulatory Policy Models

Key Goals and Attributes	
· Non-regulatory · Diverse public and private sector membership	· Facilitates state-wide consistency and communication · Leverages public and private resources through information sharing and coordination

Washington State Construction, Demolition, and Landclearing Council—The mission of the Washington State CDL Council, a council of the Washington State Recycling Association (WSRA), is to maximize waste prevention, recycling, and the use of recycled-content building materials within the state's construction industry. This is part of an overall resource-efficient approach to building. The Council also serves as an advisory group to WSRA.

CDL Council members include architects, consultants, contractors, developers, property managers, trade association representatives, state and local government personnel, and not-for-profit agency representatives. The goals of the CDL Council are as follows:

- Act as a statewide clearinghouse for information on waste prevention, job-site recycling, and the use of recycled-content building materials.
- Conduct educational and outreach activities, develop training opportunities, and provide direct technical assistance to encourage waste prevention, recycling, and the use of recycled-content building materials within the construction industry.
- Expand Council membership to include public, private, and not-for-profit entities from across the state and to develop relationships with state and national industry associations.
- Leverage both public and private resources through information sharing and coordination among members.
- Facilitate development of a comprehensive, statewide CDL recycling infrastructure including collection, processing, and remanufacture.
- Support policies conducive to CDL recycling.

The Washington State CDL Council provides a vehicle for the public and private sectors to work together to make the State a national leader in resource-efficient building. The Council hosts monthly work meetings and semi-annual forums designed for a wider audience. Participants meet and exchange information about the benefits and challenges of resource-efficient building with a diverse group of construction industry and solid waste professionals. Both the public and private sectors can benefit from this exchange in many ways.

Public sector participants may benefit as follows:

- Maximize limited resources by coordinating with other public agencies;
- Promote pollution prevention to the construction industry;
- Support market development for recycled construction materials;

- Discuss policy issues that affect construction waste management; and
- Deal with a simplified public procurement process.

Since WSRA (and the CDL Council) is a non-profit agency, there is already in place the financial vehicle for public sector agencies to fund and administer related events such as workshops and seminars. The public procurement process is simplified.

Private sector participants may receive the following benefits:

- Gain access to timely information and training opportunities on the latest trends in the building industry;
- Easily access the services of government agencies and the expertise of other construction industry professionals;
- Receive recognition for the company's efforts to prevent waste, recycle, and buy recycled; and
- Participate in discussions on policy issues that affect construction waste management.

Recent CDL Council efforts have included the following:

- With input from private businesses and others, the CDL Council formally commented on U.S. Environmental Protection Agency's (EPA's) proposed lead-based paint rule. The comment later pointed out some of the broader solid waste implications of the EPA's proposal and provided some alternate recommendations. As a result, the EPA has postponed implementation pending further investigation.
- Sponsored a sustainable building and salmon recovery workshop in Seattle. In partnering with industry to plan, promote, and present the workshop, Solid Waste agencies were able to develop new relationships with several building trade organizations.
- Presented two workshops on job-site recycling and use of recycled content building materials, both of which were well-attended.
- Provided a response to the Washington State Governor's plan on salmon recovery.

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APPENDIX V: SUMMARY OF HAWAIʻI STATUES AND RULES RELATING TO SOLID WASTE MANAGEMENT

Since the original Integrated Solid Waste Management (ISWM) Plan was finalized in 1991, significant changes have been made in Hawaiʻi's solid waste statutes and administrative rules. The Department of Health (DOH) Office of Solid Waste Management (OSWM) program authority was expanded to address changing technologies and to mitigate environmental impacts related to solid waste management. Brief summaries of the statutes granting authority to OSWM and rules that define their implementation and enforcement by OSWM are presented below.

HAWAIʻI REVISED STATUTES (HRS)

HRS 342G: Integrated Solid Waste Management. This Chapter was created in 1991 as a result of recommendations contained in the 1991 ISWM Plan. It established the DOH OSWM, a hierarchy for waste management, and waste diversion goals.

Portions of the statute required the following:

- That the state and each county prepare an ISWM Plan;
- That the state and counties revise their ISWM Plans on a regular basis;
- That the State Department of Accounting and General Services (DAGS) prepare a recycled product procurement plan and report on its progress;
- That state and county offices make double-sided copying a standard practice;
- That state office buildings institute an office paper recovery program;
- That state agencies assist in technical and market development for composting;
- That state agencies assist in technical and market development for recycling and diversion programs; and
- That counties be allowed to assess a solid waste surcharge through real property tax.

Subsequent amendments to this chapter provided for the following:

- Stipulate that a state recycling coordinator be hired;
- Delegate responsibility to provide recycling assistance to other state and county agencies;
- Establish the solid waste surcharge to support enforcement, education, and market development programs conducted by OSWM, and training for solid waste operators;
- Establish the glass Advance Disposal Fee (ADF) to support glass recycling efforts in the counties; and
- Provide the DOH with the responsibility to enforce the terms of HRS 342G.

HRS 342H: Solid Waste Pollution. This chapter provides the DOH with the permit authority for solid waste management facilities in the state. It prohibits the construction or operation of solid waste facilities without appropriate permits, allows DOH to delegate certain enforcement authority to the counties, and creates enforcement powers and penalties for violation of this chapter.

HRS 342I: Special Waste Recycling. This chapter prohibits disposal of lead-acid batteries and whole tires. Retailers and wholesalers of lead-acid batteries and tires are required to accept these items from customers and to ensure that the items are delivered to a permitted recycler. The law requires that the cost of a new lead-acid battery or tire includes the cost of disposal so that there is no incentive for the customer to take the items away for disposal to save money.

HRS 340A: Solid Waste. This regulation, in place prior to 1991, defines the owner of waste as the one who is in possession of it. It stipulates that a county can direct waste to the disposal facility that provides for the best public interest, so long as it does not hinder recycling. This regulation was necessary in order to guarantee that the minimum quantity of municipal solid waste (MSW) would be directed to the MSW incinerator (H-POWER), located on O'ahu.

HRS 128D: Environmental Response Law. One element of this law creates a $0.05 per barrel tax on oil imported into the state to fund oil spill preparedness. A portion of the tax, paid to the state by oil importers, funds the do-it-yourself oil-recycling program in each county, and a portion of the OSWM technical staff salaries for oil recycling permits issuance and facility inspection.

HRS 339: Litter Control. The state's litter control program was established in 1977. In 1995, the Litter Control Office was closed. This regulation has not been repealed, but the programs and responsibilities of the Litter Control Office have been eliminated, incorporated, or transferred to other state and county programs.

HAWAI'I ADMINISTRATIVE RULES (HAR)

The HAR detail how the DOH will implement the authorities granted to the Department by the statutes.

HAR 11-58.1: Solid Waste Management Control. This rule clarifies the permit procedures for owners and operators of solid waste facilities, and defines the design and operating requirements of solid waste management and disposal facilities. The Resource Conservation and Recovery Act (RCRA) Subtitle D only regulates MSW landfills that accept more than 20 tons per day. In contrast, HAR 11-58.1 addresses MSW landfills, construction and demolition (C&D) landfills, incinerators and refuse-derived fuel (RDF) processors, recyclers, composting facilities, auto salvage operations, remediation facilities, special waste processing and landfills, medical waste treatment/disposal facilities and used-oil recycling facilities. Each type of facility has specific requirements for the type of waste handled. Under this rule, the state may also permit certain low impact and small quantity activities through a permit-by-rule system. The permit-by-rule system allows operators to submit a letter and form detailing their activities. Permit-by-rule requires operators to maintain records, report quantities and disposition on an annual basis, and comply with operating procedures detailed in their initial permit request.

HAR 11-58.1 is the basis for the U.S. Environmental Protection Agency (EPA) approval of the state's solid waste management program. Without an EPA-approved program, the federal government would interpret and enforce MSW regulations in Hawai'i.

HAR 11-104: Management and Disposal of Infectious Waste. All medical and infectious waste is regulated under this chapter. The chapter defines infectious waste and requires that all infectious waste be rendered non-infectious prior to disposal as solid waste. OSWM has authority to permit medical and infectious waste disposal facilities, but does not have methods or authority to regulate or track generators or transporters of infectious waste.

Act 230: Relating to State Government. This bill was passed by the Hawai'i State Legislature in 1998 and amended in 1999, but has not yet been codified. The act establishes "a commission to develop a managed process that enables state and county governments to implement public/private competition for government services through a managed process determining whether a service can be provided more economically by a public agency or a private enterprise."

The Hawai'i State Supreme Court, as part of its landmark *Konno* decision (*Konno* v. *County of Hawai'i*, 85 Haw. 61, 937 P. 2d 397 [1997]), requested the Legislature to consider the existing law when it rendered the decision. Under existing civil service laws, services that have been traditionally provided by the civil service cannot legally be franchised to private contractors.

APPENDIX V

SUMMARY OF HAWAIʻI
STATUES AND RULES
RELATING TO SOLID WASTE MANAGEMENT