

## **POLLUTION PREVENTION PRODUCES POWER**

### **Description of Hawaii's Innovative Government Program**

- 1. Describe your innovation. What problem does it address? How exactly is your program or policy innovative? How has your innovation changed previous practice? Name the program or policy that is closest to yours.**

Three problems are addressed: large, local and specific. The large problem is that untold tons of ghostnet—fishing net that has been accidentally or purposely discarded from commercial fishing boats—floats on the ocean surface, posing a threat to shipping and marine life. The local problem is that much of the ghostnet drifts onto Hawaii's Northwest Islands, where it snags on reefs. There it has a "bulldozer" effect on the reefs, and strangles marine life, including the endangered Hawaiian Monk Seal. The specific problem is that the snagged net removed from the reefs was deposited in Oahu's one remaining landfill, both adding to a landfill problem and wasting an energy-rich resource.

The innovation began by diverting discarded commercial fishing net from Oahu's landfill to H-POWER, Oahu's garbage-to-electricity plant. The program generated many spin-off benefits, including papers presented at two marine science conferences

describing our approach to the problem, an in-depth documentary filmed by Japan TV and seen by 11 million Japanese viewers, a paper on our innovative approach published in a scientific journal, an internally-funded "port reception" facility to recycle voluntarily-gathered ghostnet, and a bill in Congress which would appropriate \$15 million to carry out marine debris clean up in the Pacific.

The second innovative solution involves recovering the ghostnet from the high seas before it snags on reefs. The pilot project is intended to serve as a model for the U.S. and other nations experiencing similar problems with ghostnet.

The program changed the previous practice of landfilling discarded net, to diverting the net to become fuel. The current change is shifting the previous practice of retrieving snagged net at a cost of \$25,000 per ton to retrieving ghostnet from the open sea and bringing it to a port reception facility at a small fraction of the cost. The program will be expanded if a federal bill to appropriate \$15 million is passed.

The closest program to this was a Northwest Straits Commission project which retrieved discarded net and crab pots off the coasts of Washington and Oregon. It did not have voluntary support, and its port reception component was discontinued for lack of funding.

## **2. What is the single most important achievement of your program or policy initiative to date?**

The single most important achievement is the unprecedented collaboration of a large group of extremely diverse entities. The collaboration includes the National Oceanic Atmospheric Administration (NOAA), NOAA's Sea Grant College at the University of Hawaii, NOAA's Pacific Islands Fisheries Science Center, NOAA's Coral Reef Ecosystem Division, NOAA's Pacific Islands Regional Office, and NOAA's Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve Division, the U.S. Navy, the U.S. Coast Guard, the City and County of Honolulu, The Ocean Conservancy, Schwitzer Industrial Steel (formerly Hawaii Metal Recycling), the Hawaii Longline Association, United Fishing Agency, Pacific Ocean Producers, Matson Navigation, Covanta Energy, Western Pacific Regional Fishery Management Council, the State of Hawaii Department of Transportation-Harbors Division and the State of Hawaii Department of Business, Economic Development and Tourism (DBEDT.) The contribution of each entity is explained in Section 16.

Each entity is a link in the program's chain. For instance: NOAA's Sea Grant College applies for and receives funding. It then secures permission to work in the Northwestern Islands from NOAA's Pacific Islands Regional Office. Since funding allows for the chartering of only one vessel, the U.S. Coast Guard provides additional manpower and vessels as necessary. The U.S Navy permits the nets to be off-loaded at

Pearl Harbor, facilitating the seamless pick up of the net by Schwitzer Steel. DBEDT publishes papers describing the continually evolving program.

A related achievement is that government agencies assume the additional responsibilities without additional personnel and private entities donate their time and expertise. Schwitzer Steel alone has donated well over \$70,000 in labor and heavy machinery costs.

**3. What are the three most important measures you use to evaluate your program's success? In qualitative or quantitative terms for each measure, please provide the outcomes of the last full year of program operation and, if possible, at least one prior year.**

The first measure of success is converting landfill trash to energy-producing fuel and the spin-off projects it generated. Over 50 tons of net had been going to Oahu's single overburdened landfill each year. This program diverts the net to H-POWER, Oahu's garbage-to-energy plant, producing energy electricity to power 42 homes for a year. Key to the success is Hawaii Metal Recycling (HMR) cutting the mounds of net at no cost to accommodate H-POWER's conveyor belts. Another key is H-POWER's accepting the net at no cost by forgiving tipping fees, yielding a savings of over \$20,000. To date, over 250 tons of net have been converted to fuel, producing a total of over 738,000 kilowatt-hours or about \$140,000 worth of electricity

The message of the program successfully expanded beyond Hawaii when the program was described at 2003 Asia Pacific Economic Cooperation (APEC) conference in Honolulu. Discussion following the presentation revealed that the process was unprecedented. Attendees included scientists and policy-makers from the U.S. West Coast, Pacific Islands, Australia, New Zealand, Taiwan Korea and Japan. They asked for and received a tour of HMR and H-POWER facilities for the purpose of sharing the information with their colleagues.

The second measure of success was getting word of the program out to 11 million Japanese, Japan's being one of the primary fishing fleets in the North Pacific. News from the APEC conference reached Japan Television, and resulted in their production of the documentary, *Plastic Ocean*. The station paid \$25,000 to charter a plane to the Northwest Hawaiian Islands to film the area, pristine except for the marine debris. *Plastic Ocean* set viewership records and reinforced Japan's policy of weighing the volume of net that goes out on each fishing boat going out, and weighing the net upon return as a means of ensuring that no net has been discarded.

The third measure of success is a voluntary net retrieval program and the recent establishment of a secured port reception area for discarded net at Pier 38 in Honolulu Harbor. Pier 38 is homeport for most of Hawaii's longline fishing boats. The Hawaii

Longline Association has agreed to voluntarily pick up ghostnet during its voyages and to deposit it in a locked container at Pier 38. The container is lockable to prevent the deposit of contaminants. When full, the Harbormaster will notify Schwitzer Steel (which recently purchased HMR.). Schwitzer will, at no cost, pick up the container and cut the contents to sizes acceptable to H-POWER. They will haul it to H-POWER where it is accepted without the usual \$80 per ton tipping fee. The success of this measure will be multiplied if U.S. Senate bill 362 (described in Section 7) passes.

**4. Please describe the target population served by your program or policy initiative. How does the program or policy initiative identify and select its clients or consumers? How many clients does your program or policy initiative currently serve? What percentage of the potential clientele does this represent?**

There are many levels of clients, ranging from the 900,000 residents of Oahu to North Pacific fishermen.

The broadest population served is the residents of Oahu. They benefit from less volume in the only remaining landfill, and from "free" electricity produced from burning the net. A subset of the Oahu population is the children and adults who learn about the program through media attention and trade show booths sponsored by Schwitzer Steel. Schwitzer Steel reports that, although their primary business is recycling some 160,000 tons of steel per year, the majority of questions concern the diversion of fishing net due to the publicity the program has received.

Another population served is the marine scientists who attended the 2003 Asia-Pacific Economic Cooperation Conference and those who attended the 2004 Pacific-Asia Congress Conference. Both groups, upon hearing of the program, asked to be taken on a tour to view the process in action for the purpose of bringing information back to their home nations.

North Pacific fishermen are another group of beneficiaries, as the chances of their propellers becoming entangled in ghostnet is reduced as more ghostnet is brought to port. The Hawaii Longline Association benefits from the favorable publicity given their group because of their voluntary effort.

Yet another population to benefit is the endangered Hawaiian Monk Seals, other marine animals and the reefs of the Northwest Hawaiian Islands.

The long-range target population is marine scientists and fishing fleet managers worldwide.

The numbers of those served and the percentages of each population are unknown at this time.

**5. What would you characterize as the program's most significant remaining shortcoming?**

The primary shortcoming is that only a small percentage of the ghostnet on the high seas is being harvested. While the program is highly successful in the Northwest Hawaiian Islands, it has only begun to impact an immense worldwide problem. Many nations and fishing fleets violate international regulations regarding the disposal of net on the high seas.

This program is intended to serve as a pilot project for governments and fishing fleets to utilize in addressing the ghostnet problem in a cost-effective manner.

**6. When and how was the program or policy initiative originally conceived in your jurisdiction? What individuals or groups are considered the primary initiators of your program? Please substantiate the claim that one or more government institutions played a formative role in the program's development.**

The program to harvest snagged net from the reefs of the Hawaiian Northwest Islands was originally conceived of in 1995 by Bud Antonelis and Ray Boland of the National Oceanic and Atmospheric Administration (NOAA.) They discovered net snagged on Northwest Hawaiian Islands reefs and brought samples to Hawaii to illustrate the problem to marine scientists. Dr. Christine Woolaway of the University of Hawaii Sea Grant College brought together an array of government agencies including Captain Terry Rice of the U.S. Coast Guard, the U.S. Navy, other divisions of NOAA and the City and County of Honolulu, whose jurisdiction includes the Northwestern Hawaiian Islands. The initial meetings resulted in funding from many of the agencies and the commencement of net harvesting in the Northwestern Hawaiian Islands.

The idea of converting the harvested net to fuel for H-POWER was conceived in 2001 by Howard Wiig of the State Department of Business, Economic Development, and Tourism. It was put into place in 2002 with the cooperation of Rene Mansho and James Banigan of Hawaii Metal Recycling and Colin Jones of Covanta Energy, which manages Honolulu's garbage-to-electricity plant, H-POWER

Sobhi Reynolds of Japan TV conceived the idea of producing a documentary in 2003 and completed and aired the program in 2004.

**7. Please identify the key milestones in program or policy development and implementation and when they occurred (e.g., pilot program authorization**

**enacted by state legislature in June 2001; pilot program accepted first clients, September 2001; expanded program approved by legislature in July 2002). How has the implementation strategy of your program or policy initiative evolved over time?**

1995. The problem of net snagged on Northwest Hawaiian Islands reefs was identified.
1996. The Multi-Agency Task Force on Marine Debris in the Northwest Hawaiian Islands was formed.
1997. A team of NOAA and U.S. Coast Guard divers harvested snagged net from the Northwest Hawaiian Islands and brought it to Honolulu Harbor, to be landfilled at Oahu's only landfill site.
2001. The State Department of Business, Economic Development and Tourism (DBEDT) was called into the Multi-Agency Task force to propose alternate solutions to landfilling the discarded net.
2002. DBEDT arranged for H-POWER to accept the net at no cost. When it was learned that the tangles of net were far too large to be accommodated by H-POWER's conveyor belts, DBEDT arranged for Hawaii Metal Recycling (HMR) to cut the net at no cost.
2003. When other agencies responsible for hauling the net from the docks to the HMR yard started charging for services, DBEDT arranged for HMR to use its own trucks to haul the net and store it on their site. Arrangements were made for the ships hauling the net from the Northwest Hawaiian Islands to dock at Pearl Harbor instead of crowded Kewalo Basin, allowing HMR trucks much quicker and easier access to the net.
2004. DBEDT presented a paper to the Asia-Pacific Economic Cooperation (APEC) conference held in Honolulu. The paper led to a tour of the HMR and H-POWER sites to view the program in action. The tours attracted the attention of Japan Television, and eventually to the production of *Plastic Ocean*. DBEDT presented a paper at the Pacific Congress of Marine Affairs (PACON) conference in Honolulu, and was invited to present an article for possible publication. The quantity of net recycled exceeded 100 tons for the first time. A power point presentation was shown at the annual meeting of the Council of State Governments-West.
2005. "A Cost Comparison of Various Methods of Retrieving Derelict Fishing Gear," was accepted for publication in the *Recent Advances in Marine Sciences and Technology, 2004*. The Hawaii Longline Association agreed to voluntarily

retrieve ghostnet from the high seas and bring it to Pier 38 for recycling. NOAA purchased a lockable storage container to hold the net at Pier 38. Matson Navigation agreed to transport the container at no charge from the West Coast. Senate Bill 362, appropriating \$15 million to address marine debris issues in the North Pacific, passed the Senate and is now before the House. A tracking buoy was attached to a very large mass of ghostnet in the North Pacific. The resulting GPS information is allowing NOAA to track ghostnet movements with unprecedented accuracy.

**8. Please describe the most significant obstacle(s) encountered thus far by your program. How have they been dealt with? Which ones remain?**

The initial obstacle overcome was finding a method of cutting mountainous tangles of net into sizes small enough to be accepted by H-POWER's conveyor belts. The obstacle was overcome when HMR found, by trial and error, that one steel-cutting machine could perform the work with newly-sharpened cutting blades.

Another obstacle overcome was the cost of hauling and storing net picked up at Honolulu's Kewalo Basin. Finding funding was difficult. Changing the location of the net drop off to Pearl Harbor enabled HMR to for pick up the net and store it at their facility at no cost.

The research vessel *Castitas* that was transporting divers and equipment during the 2005 season of net harvesting in the Hawaiian Northwest Islands ran aground. This obstacle was overcome by chartering the private vessel, *Freebird*.

**9. If your innovation is an adaptation or replication of another innovation, please identify the program or policy initiative and jurisdiction originating the innovation. In what ways has your program or policy initiative adapted or improved on the original innovation?**

The original inspiration for collecting ghostnet and providing dockside collection came from The Northwest Straits Commission, consisting of government and private sector officials from Oregon, Washington and Alaska. They established marine debris collection programs, particularly in Puget Sound. Pierside collection has since been stymied by lack of funding and most of the net recovered is landfilled.

This program improves on the Northwest program in three ways:

- The collected net is converted to fuel for electrical production;

- The root problem is being addressed by the Longliners Association voluntarily collecting ghostnet and depositing it at Pier 38;
- The on-going cost issue is addressed by the private sector voluntarily collecting and processing the net.

**10. What other individuals or organizations have been the most significant in (a) program development and (b) on-going implementation and operation? What roles have they played? What individuals or organizations are the strongest supporters of the program or policy initiative and why? What individuals or organizations are the strongest critics of the program or policy initiative and why? What is the nature of their criticism?**

Mr. Bud Antonelis of NOAA-Fisheries discovered the problem and brought it to the attention of Hawaii's marine scientists. Dr. Christine Woolaway of the University of Hawaii Sea Grant College was directly responsible for conceiving of and launching the original program to harvest snagged net from the Northwest Hawaiian Islands. Captain Terry Rice of the U.S. Coast Guard committed vessels and manpower to assist with the initial net-harvesting projects. As the program evolved and expanded, Howard Wiig of DBEDT, Sohbi Reynolds of Japan Television, and Rene Mansho and James Banigan of HMR, and Colin Jones of H-POWER joined the program, each playing a role in diverting net from the landfill to H-POWER. The prime motivator for each individual was the conviction that a serious problem needed solving, and that a unique collaborative effort it could get it done.

There are no known critics of the program.

**11. If your program or policy initiative has been formally evaluated or audited by an independent organization or group, please provide the name, address, and telephone number of a contact person from whom the materials are available. Please summarize the principal findings of the independent evaluator(s) and/or auditor(s). If your program has been the subject of an article, book, or other publication (including web-based) produced by an independent organization or group, please provide a complete citation.**

There has been no formal audit or evaluation of the program by an outside organization. Japan Television thoroughly studied the program in the course of deciding to produce a documentary, filming, but the study cannot be classified as a formal evaluation.

**12. To what extent do you believe your program or policy initiative is potentially replicable within other jurisdictions and why? To your knowledge, have any other jurisdictions or organizations established programs or implemented policies modeled specifically on your own?**

The intent of this program is to serve as a model to be replicated by U.S. ports in the Pacific, Atlantic and the Gulf of Mexico and by Asian and Pacific Islands fishing fleets and governments. Every effort has been made to keep marine scientists throughout the Pacific Basin informed as the program evolves.

No known entity has replicated or modeled this program.

**13. What is the program's current operating budget? What are the program's funding sources (e.g., local, state, federal, private)? What percentage of annual income is derived from each? Please provide any other pertinent budget information.**

Regarding the net-harvesting program, the Coast Guard, NOAA, the UH Sea Grant Program and other federal agencies have spent over \$3 million yearly to harvest snagged net from the Northwest Hawaiian Islands. This is primarily due to the logistics involved in operating ships, transporting large numbers of scientists to a remote site and the safety requirements involved in diving among tons of snagged net moving with the waves and currents.

Regarding the net-to-electricity portion of the program, most time involved with converting the net to fuel and shifting from a net-harvesting to a ghostnet retrieval program is done on a voluntary basis. The estimated cost of HMR hauling and cutting the net is \$250 an hour, due largely to wear and tear on very expensive heavy equipment. It is estimated that the value of HMR's contribution exceeds \$50,000 to date.

**14. Has the program or policy initiative received any awards or other honors? Yes  No . If yes, please list and describe the awards or honors and the sponsoring organizations.**

In 1998, the program received the "Al Gore Hammer Award for Reinventing Government."

In 2003, HMR received the "Environmentalist of the Year" award from the Hawaii Chapter of the Audubon Society.

In 2004, the Hawaii Audubon Society bestowed the same honor upon HMR.

In 2005, Hawaii's Living Reef, an environmental organization, voted HMR the "Industrialist of the Year."

The Council of State Governments-West, selected "From Pollution to Power: Transforming Marine Debris to Energy," a power point presentation describing the program, as a as a finalist in their 2004 Innovations Awards Program.

Plastic Ocean, Japan Television's documentary of the program, received the highest ever viewer ship rating of a documentary in Japan.

**15. Has the program received any press or other media attention to date?**

Yes  No  If yes, please list the sources and briefly describe relevant coverage.

Most recently, The *Honolulu Advertiser* covered the program with "New Cleanup Efforts to Fight Ocean Debris" on October 12, 2005. The *Honolulu Star-Bulletin* ran an in-depth story titled "Sea Debris: Cleanup Efforts on the Big Island and Northwestern Hawaii Isles Mark Progress Against Stray Nets and Plastic that Threaten Ocean Life" on October 28, 2005. The February 12, 2005 *Honolulu Advertiser* ran an article entitled "New Effort to Clean up Trash in Sea Under Way." On October 20, 2004 the *Advertiser* ran an article entitled "5 Tons of Net Removed from Bay." The articles described the collaboration of private and public entities, and presented an overview of progress to date.

In 2004, KHON TV news anchorman Gary Sprinkle ran a special on the HMR net cutting and H-POWER net burning process.

In addition, numerous articles have appeared in marine-oriented trade newsletters. The most recent trade article is "Talking Trash: NOAA Targets Marine Debris," in the Summer 2005 issue of *Ka Pili Kai*, the publication of the University of Hawaii Sea Grant College Program.

A media event is scheduled for January 6, 2006, to unveil the port reception project at Pier 38.

**16. Please attach an organization chart to show the current number, responsibilities, and reporting relationships of key program employees or staff.**

Due to the rapidly evolving nature of the program and to the multiplicity of organizations involved, there is no organizational chart in the conventional sense. The primary organizations involved and their responsibilities are:

- UH Sea Grant Program: primary funding and oversight
- The US Coast Guard: vessels and manpower for net transport
- NOAA:
  - Pacific Islands Fisheries Science Center: monitoring of net sites
  - Coral Reef Ecosystem Division: Reef damage assessment
  - Pacific Islands Regional Office: Permitting of activity within the Northwest Hawaiian Islands
  - Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve: preparation of reports regarding the impact of snagged nets on reefs and marine life.
- State Department of Business, Economic Development and Tourism: arrange for net-to-electricity program; arrange tours of HMR and H-POWER; estimate fuel value of net; arrange for awards to HMR for their contribution
- State Department of Transportation, Harbors Division: Permitting recycling sites on Pier 38; provide Pier security
- Covanta Energy (H-POWER): Waive \$80 per ton tipping fee for net.
- Schwitzer Steel Industries (formerly HMR): At no cost, haul net from Pearl Harbor to HMR site; store net; cut net to size suitable for H-POWER; arrange for net pick up from Pier 38.
- Matson Navigation: Transport container for net recycling from Portland to Honolulu at no cost.
- Hawaii Longline Association: Agree to retrieve ghostnet from the high seas and store at Pier 38 facility at no cost.
- Pacific Ocean Producers: Establish net retrieval and recycling program with fishing industry.
- Western Pacific Regional Fishery Management Council: Serve as fishing industry's representative in negotiating net retrieval and recycling program.