



From Refuse to Resource: Recommendations for Marine Debris Management in Hawaii

Practicum Update

Department of Urban & Regional Planning, University of Hawaii at Manoa

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Team introduction

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Presentation Outline

Problem statement

Expert engagement review

Timeline update

Background

Recommendations

Feedback & discussion

Questions / comments / suggestions



Problem statement

Marine Debris

“Any persistent solid material that is manufactured or processed and directly or indirectly, **intentionally or unintentionally, disposed of or abandoned into the marine environment** or the Great Lakes.” - NOAA



Problem Definition

Lack of consensus on the **nature of the problem** and **how to manage** the end of life stage of manufactured plastics that are no longer deemed useful; marine debris is an **externality**

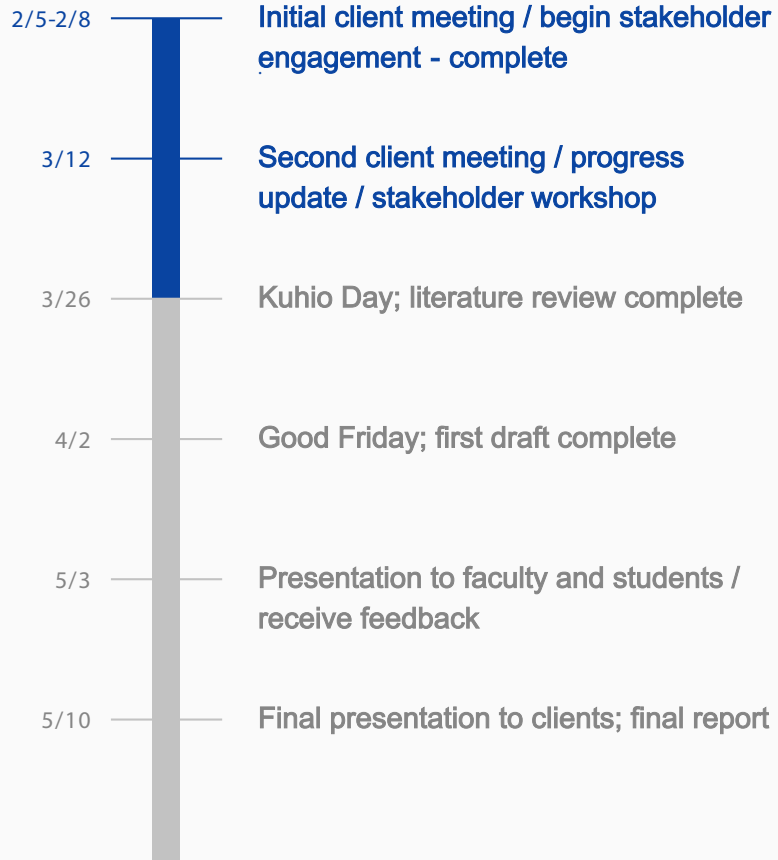


Our Research

Focus: **better management of plastic waste, collected and uncollected**

Long term **land-based solutions** for increase in plastic waste

Project Milestones



2021 FEBRUARY

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
31	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	1	2	3	4	5	6

2021 MARCH

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
28	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	1	2	3

2021 APRIL

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
28	29	30	31	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	1

2021 MAY

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
25	26	27	28	29	30	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	1	2	3	4	5

Background

Background

Waste Management and Recycling Systems on Oahu

MSW and non-recyclable plastics are sent to **H-Power** for waste-to-energy.

- A. Partly out of necessity. Oahu does not have the space to landfill everything.
- B. City contract w/ Covanta to supply certain tonnage to the facility



The City's H-Power waste-to-energy plant in Campbell Industrial Park.

Background

Waste Management and Recycling Systems on Oahu

- Recycling industry, no local materials processing facilities
- Economic hurdles
- Shipping of recyclables to the mainland and then most often to Southeast Asia

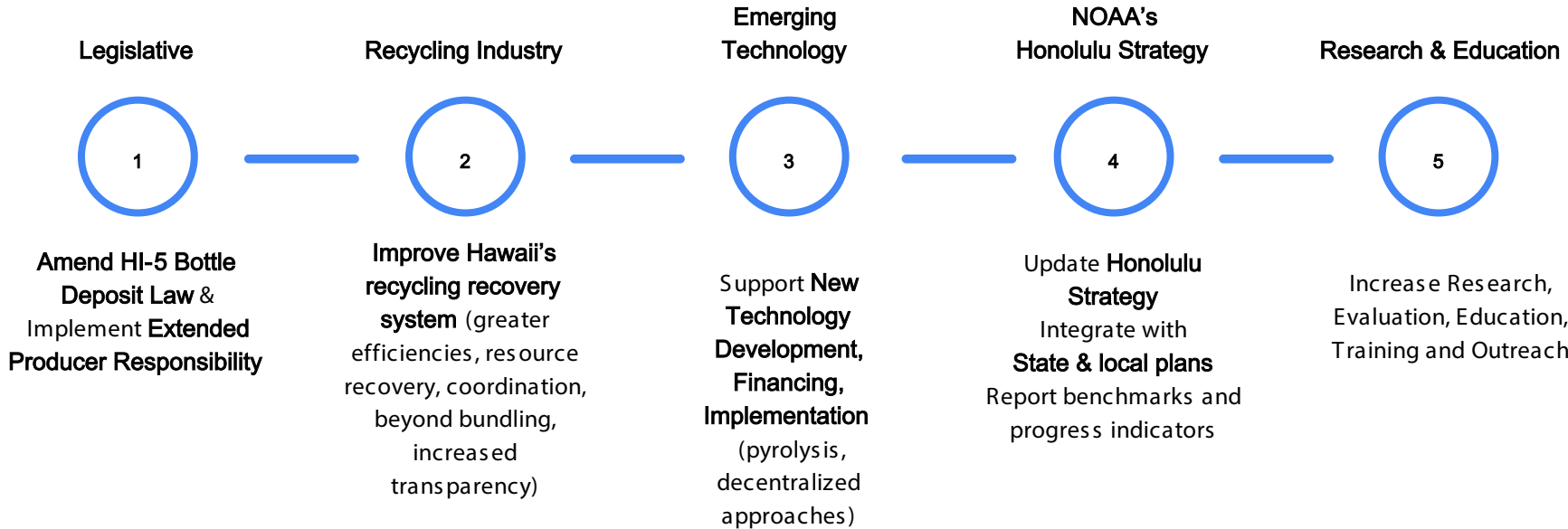


Background

Legislative Updates











- Plastic Source Reduction Working Group, Report to the Legislature (December 2020). Recommendations included:
 - Establishing a State-facilitated education campaign about waste reduction.
 - Undertaking a fair and careful study of Extended Producer Responsibility (EPR).
 - Creating a 15-30 cent user fee on single-use service ware items.

Our recommendations

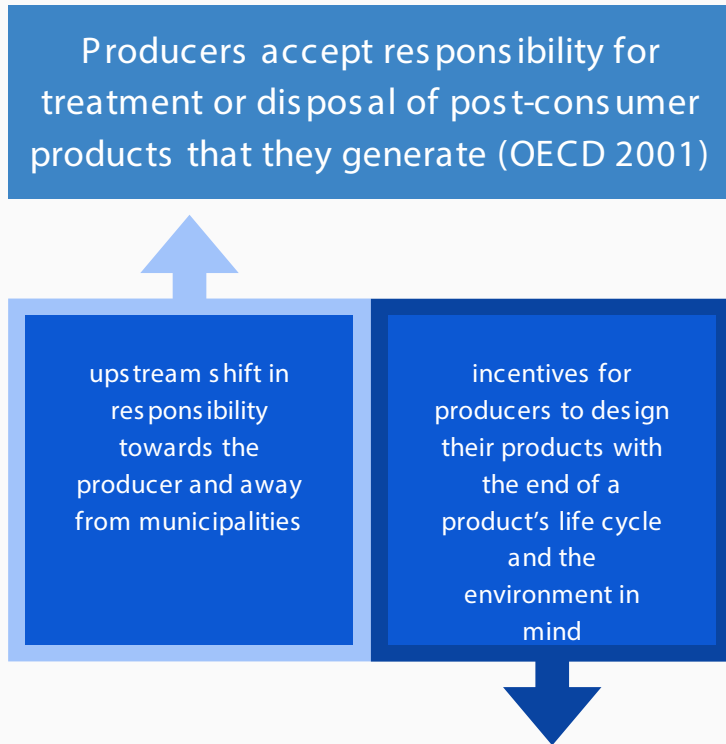


Changing HI-5 Program: Opportunities & Constraints

An increase in the bottle deposit fee may improve recycling rates

Opportunities			Constraints	
1	Captures negative externalities of single use plastics			Raising the cost of goods will disproportionately impact those of lower income
2	A step towards a ban on single use plastics			Addresses profitable recyclable products but not low-value plastics
3	Exports the cost burden to tourists due to the large visitor industry			Does not address producer responsibility
4	Could generate substantial revenues for recycling			Greater opportunity for skimming Auditing of funds would be required

Extended Producer Responsibility (EPR)

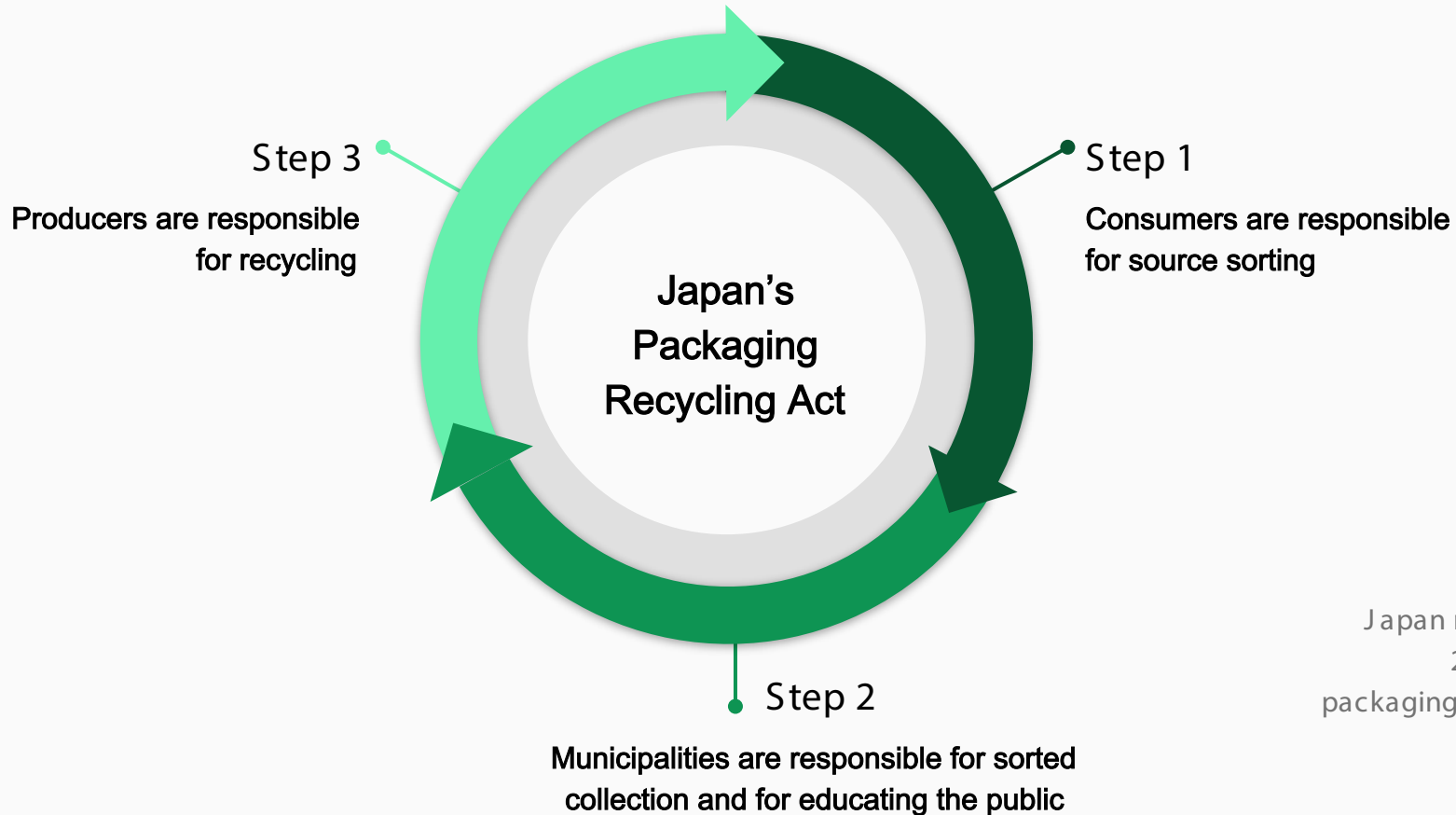


Considerations:

- **Weak EPR programs for plastic waste**
- **National framework needed**
- Most effective when programs **capture significant percentages** of post-consumer waste
- Primary achievement in the United States: **fund, create, or expand infrastructure for post consumer recycling**
- **Incentivize redesign** of products to be easier to recycle and less resource intensive
- Hawaii has the **opportunity to pilot** EPR

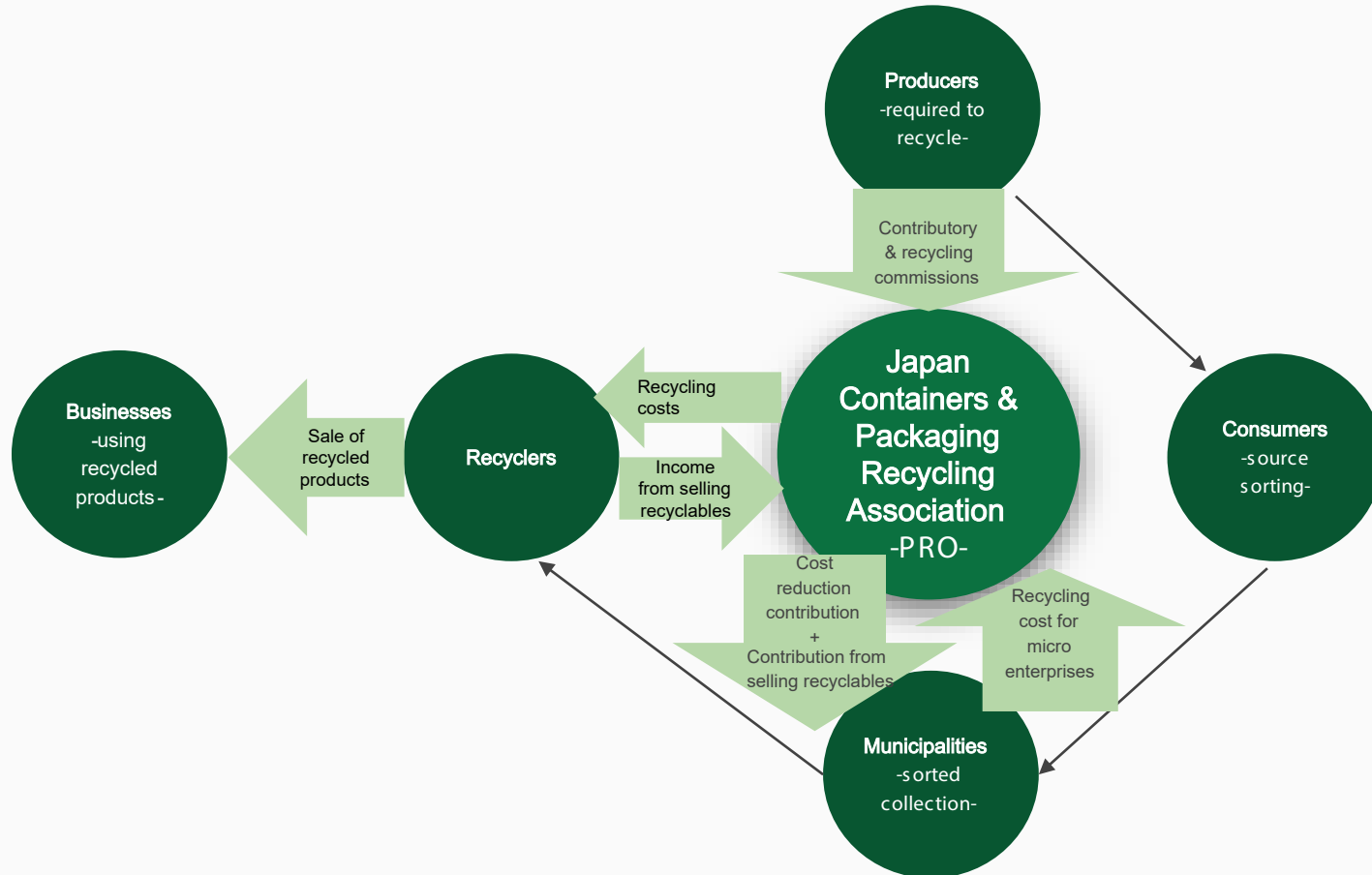
Sources: Lifset et al. 2013; Nash & Bosso 2013; OECD 2001

EPR in Japan: The Packaging Recycling Act



Japan revised the act in 2006 to include a packaging waste reduction component.

EPR in Japan: Producer Responsibility Organization (PRO) Flow Chart



Support emerging technologies

Pyrolysis and other emerging technologies can be used to turn refuse into a resource (biochar, activated carbon, and synthetic fuel)

Volume reduction is necessary for cleanup and disposal

Address zoning, permitting, health and safety and environmental concerns

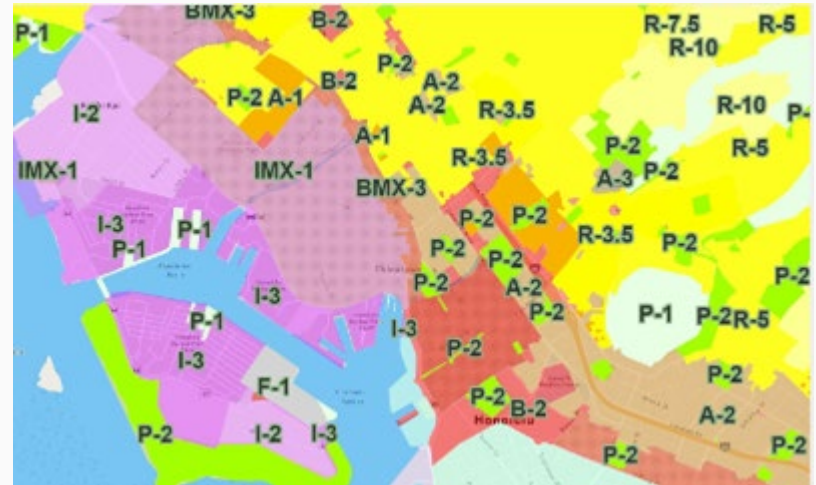
Consider Risk / Reward of the investment



Activated carbon is a byproduct of TCOM

Pyrolysis Facilities, Permitting Processes

- City and County of Honolulu
 - Land Use Ordinance
 - Conditional Use Permits
- State of Hawaii
 - Environmental Assessments & Environmental Impact Statements
 - Other State permitting requirements
 - Act 73, SLH 2020



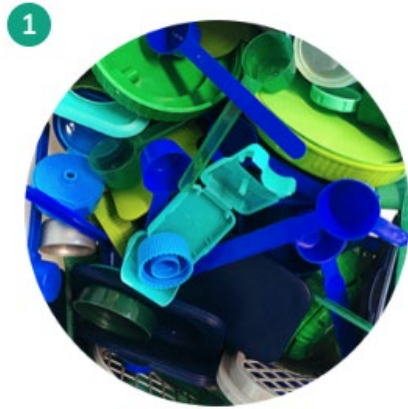
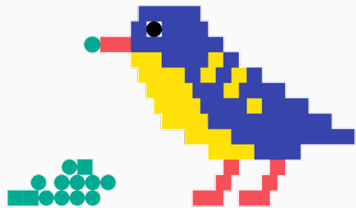
Other new recycling technologies

Enhance Reverse Vending Machines (RVM)



Other new recycling technologies

Decentralized Recycling Nodes, DIY-Open Source Methods
'Plastic Mills' and 'Sparrows' City of Seoul: plastic bottle caps



Collect



Break



Make

Update NOAA's Honolulu Strategy with progress indicators

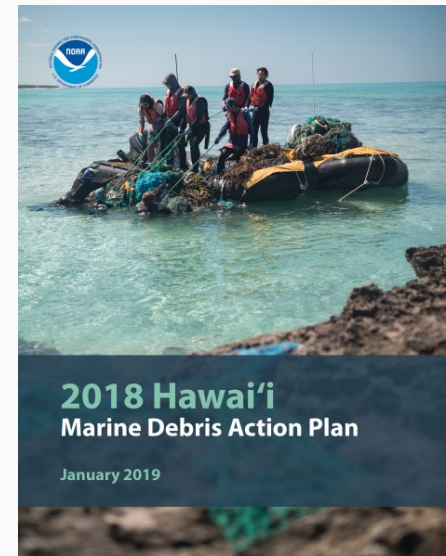
The Honolulu Strategy is a global **framework** for managing marine debris

Many goals are still **applicable** today

Need integration of regional and local plans (2018 Hawaii Marine Debris Action Plan)

Consider **SMART** (Specific, Measurable, Attainable, Relevant, Time-based) goals and enforcement authorities and implementation

Update could stimulate further global engagement and inclusion of technological and other



Honolulu Strategy Update

Recommendations for the Honolulu Strategy	
Goal A Strategies	Our Recommendations
Strategy A1. Conduct education and outreach on marine debris impacts and the need for improved solid waste management	Support training and education provided by local non -profits; 2019 Hawaii Marine Action Plan
Strategy A2. Employ market -based instruments to support solid waste management, in particular waste minimization	Economic benefits of pyrolysis requires research New recycling technologies
Strategy A4. Develop, strengthen, and enact legislation and policies to support solid waste minimization and management	Legislation changes: HI-5 and Extended Producer Responsibility

Research, education, and outreach

Research and education includes industry, producers, consumers, and general public

The lack of a **singular demand signal** for change perpetuates status quo

Education and **outreach** are the foundation for lasting and meaningful change

Celebrate victories and advancements with a **robust outreach campaign** that leverages social media



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Environment

#trashtag: The Coolest New Viral Challenge To Clean Up The Environment You Have To Join In On

by Andrea D. Steffen © March 22, 2019

White board exercise

We want to know what you think & whether our assessments / recommendations are on track or need adjusting

<http://tiny.cc/q28utz>

Discussion Questions for Jamboard Session

Bottle Deposit Fee

- Should the bottle deposit fee be raised?
- If yes, how much? (10 cents, 25 cents, 50 cents or more)?
- Where should increased revenues go?

Recycling Reform / Producer Responsibility

- What about decentralized recycling systems?
- How can Extended Producer Responsibility be implemented in Hawaii?

New Technologies / Approaches

- What are promising emerging technologies?
- What actions would support implementation of

Thanks!

Questions or feedback?

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Photo Credit: [Ocean Voyaging Institute](#)

References

- Caufield, C. (July 13, 2020). *Why Doesn't Honolulu Recycle More?* Honolulu Civil Beat.
- Container Recycling Institute. (2021). Bottle Bill Resource Guide. Retrieved March 05, 2021, from <https://www.bottlebill.org/index.php/current-and-proposed-laws/usa/additional-links>
- Lifset, R., Atasu, A., & Tojo, N. (2013). Extended Producer Responsibility: National, International, and Practical Perspectives. *Journal of Industrial Ecology*, 17(2), 162–166. <https://doi.org/10.1111/jiec.12022>
- Nash, J., & Bosso, C. (2013). Extended Producer Responsibility in the United States: Full Speed Ahead? *Journal of Industrial Ecology*, 17(2), 175–185. <https://doi.org/10.1111/j.1530-9290.2012.00572.x>
- OECD (2021) *Extended producer responsibility a guidance manual for governments*. (2001). OECD Publications Services.
- Rhodes, C. (2018). Plastic Pollution and Potential Solutions. *Science Progress (1916)* 101(3), 207–260.
- State of Hawaii Office of Solid Waste Management (OSWM). (2020). *Annual Report to the Thirtieth Legislature*
- State of Hawaii Public Utilities Commission (PUC). (2018). *Report to the 2019 Legislature on Hawaii's Renewable Portfolio Standards*.
- Trninić, M., Jovović, A., & Stojiljković, D. (2016). A steady state model of agricultural waste pyrolysis: A mini review. *Waste Management & Research* 34(9), 851–865.
- U.S. Environmental Protection Agency (EPA). (2011). *Available and Emerging Technologies for Reducing Greenhouse Gas Emissions from Municipal Solid Waste Landfills*
- Yamakawa, H. (1995). Title: The Packaging Recycling Act: The Application of EPR to Packaging Policies in Japan. *Kyoto*