
What Are We Wasting and What Can We Do About It?
WEDNESDAY, MAY 12TH 2021
12 NOON - 1PM

UVI, VIWMA, DPNR and EPA

presents...

Earth Day

2021

Tune in every Wednesday in May from 12 noon–1pm

5th What's Happening with Solid Waste and Sustainable Materials Management in the USVI?

http://bit.ly/solid-waste-usvi

12th What Are We Wasting and What Can We Do About It?

http://bit.ly/waste-audit

19th What Are Other Islands Doing with Their Materials?

http://bit.ly/island-solid-waste-examples

26th What Should We Do Next to Manage Our Materials more Sustainably?

http://bit.ly/community-vision-solid-waste

VIWMA Virgin Islands Waste Management Authority

CGTC Caribbean Green Technology Center

For more information visit: www.cgtc-usvi.com

Today's Agenda

- Virtual Waste Audit
- Tour of Bovoni by VIWMA Cordell Jacobs
- Waste Characterization – Who, What, When, Where, Why, How?
- Waste Characterization – Main Findings
- Sustainable Materials Market Analysis

Name 3 things you threw away in the trash today?

Go to: www.menti.com

Code: **4195 3233**

UVI CREATIVITY LAB

CREATIVITY TRANSFORMATION RESULTS

Name 3 things you threw away today?

Mentimeter

25

The Lifetime Of A Product

Residential Bin Sites and Bovoni Disposal Facility

Cordell Jacobs

Bovoni Landfill Operator


Hans Lollik Island
Great Thatch Island
Magens Bay Beach
Coral World Ocean Park
Mandal
MAFOLIE
Charlotte Amalie West
Anna's Retreat
HAVENSIGHT
Havensight
Estate Bovoni
Bolongo
St. Thomas East End Reserves
Water Island
Virgin Islands National Park
Pine Peace
Center Line Road Dumps...
Salt River Bay National Historic Park and...
Point Udall
Cotton Valley
Christiansted
Rainbow Beach
Mon Bijou
St Croix
Kingshill
Peter's Rest
St. Croix East End Marine Park
Frederiksted
Frederiksted Southeast
Concordia
Henry E. Rohlsen Airport
Anguilla Disposal Facil...






Environmental Impacts of Bin Sites

Tour of Bovoni Dumpsite

- Scrap metal baler shared between STT and STX
- Green waste is diverted

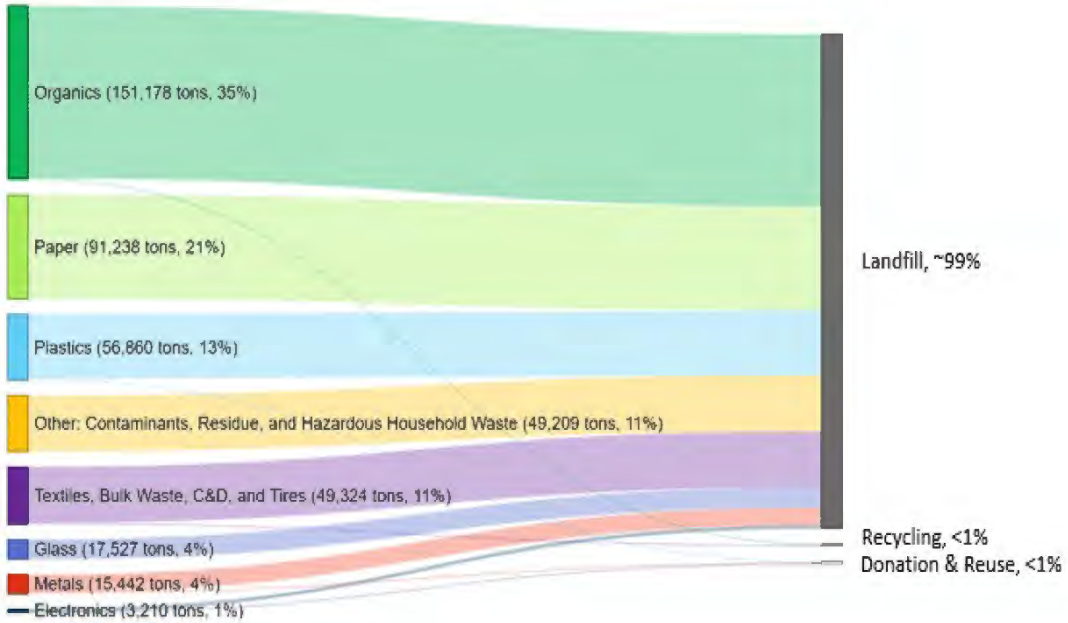

Main Entrance Road
Scrap Metal
Proposed Waste to Energy Plant
(not operational)
Household Hazardous Waste Dropoff
Green Waste Diversion
Scale House
(not operational)

Finding Treasure in Trash

Residential Waste Characterization

Waste Characterization noun \ˈwāst ˌker-ik-t(ə-)rə-ˈzā-shən \

- Definition: A waste characterization also known as a waste audit classifies and quantifies the types of residential or commercial solid waste through a representative sampling of the waste stream.



What?

A waste audit allows us to quantify our waste diversion potential

- Virgin Islanders throw away 40% more than the average American
- Disposal facilities are near capacity and few options for diversion exist
- We need to know composition of waste streams in order to design a strategy that meets the needs of the VI
- It reveals high impact waste streams that we should target which are easiest to reduce and divert
- Provide data to those who want to start a business or initiative in SMM field

Why?

Bovoni Team

Who?

WESTON SOLUTIONS
an employee-owned company

UNIVERSITY OF THE VIRGIN ISLANDS 1962

CGTC
Caribbean Green Technology Center

RRS | recycle.com

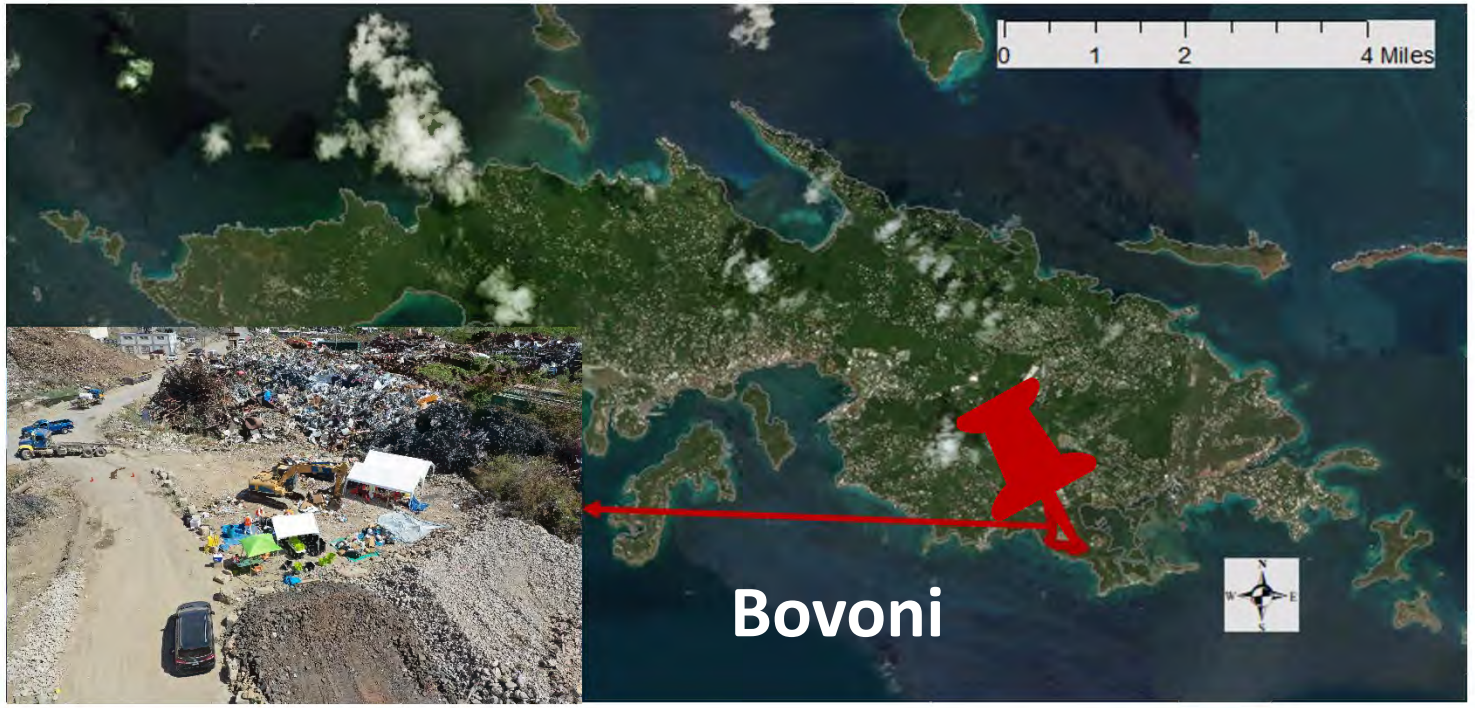
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

2019

May 13th-
17th

5 days

When?



Where?

ASTM 5231 Standard

Randomly selected truckloads

Random sampling of quadrants

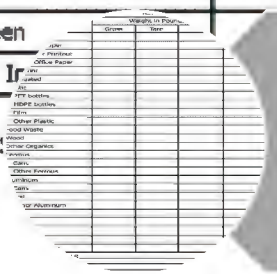
How?

Recorded by: _____

Component	Weight in Pounds			Percent of Total
	Gross	Tare		
Mixed Paper				
High Grade Paper				
Computer Printout				
Other Office Paper				
Newsprint				
Corrugated				
Plastic				
PET bottles				
HDPE bottles				
Film				
Other Plastic				
Food Waste				
Wood				
Other Organics				
Ferrous				
Cans				
Other Ferrous				
Aluminum				
Cans				
Foil				
Other Aluminum				
Glass				
Clear				
Brown				
Green				
Other Ir				
NOTE:				

Waste sorted until remaining particle size ½ inch

Waste weighed and recorded with 0.1 - 0.5 lb. precision



Waste category data sheet added to as necessary

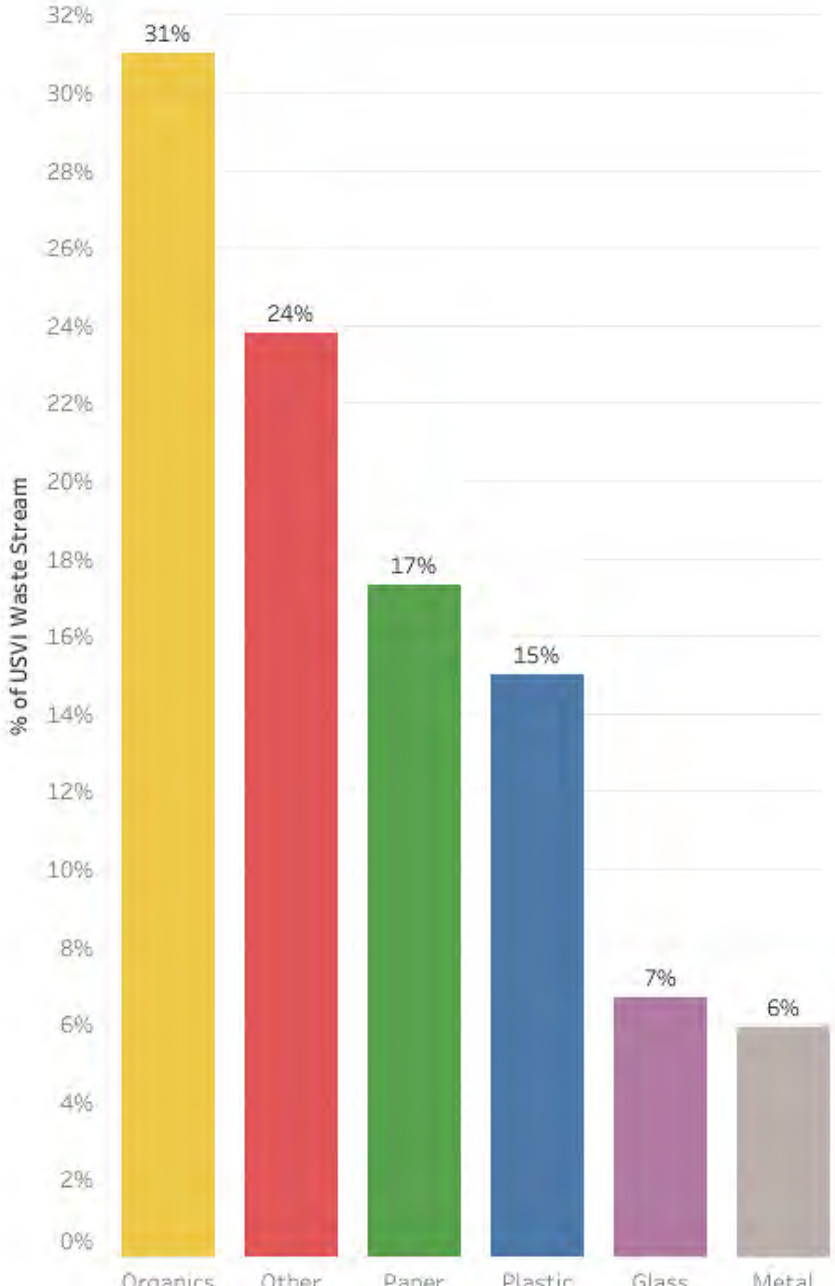
How?

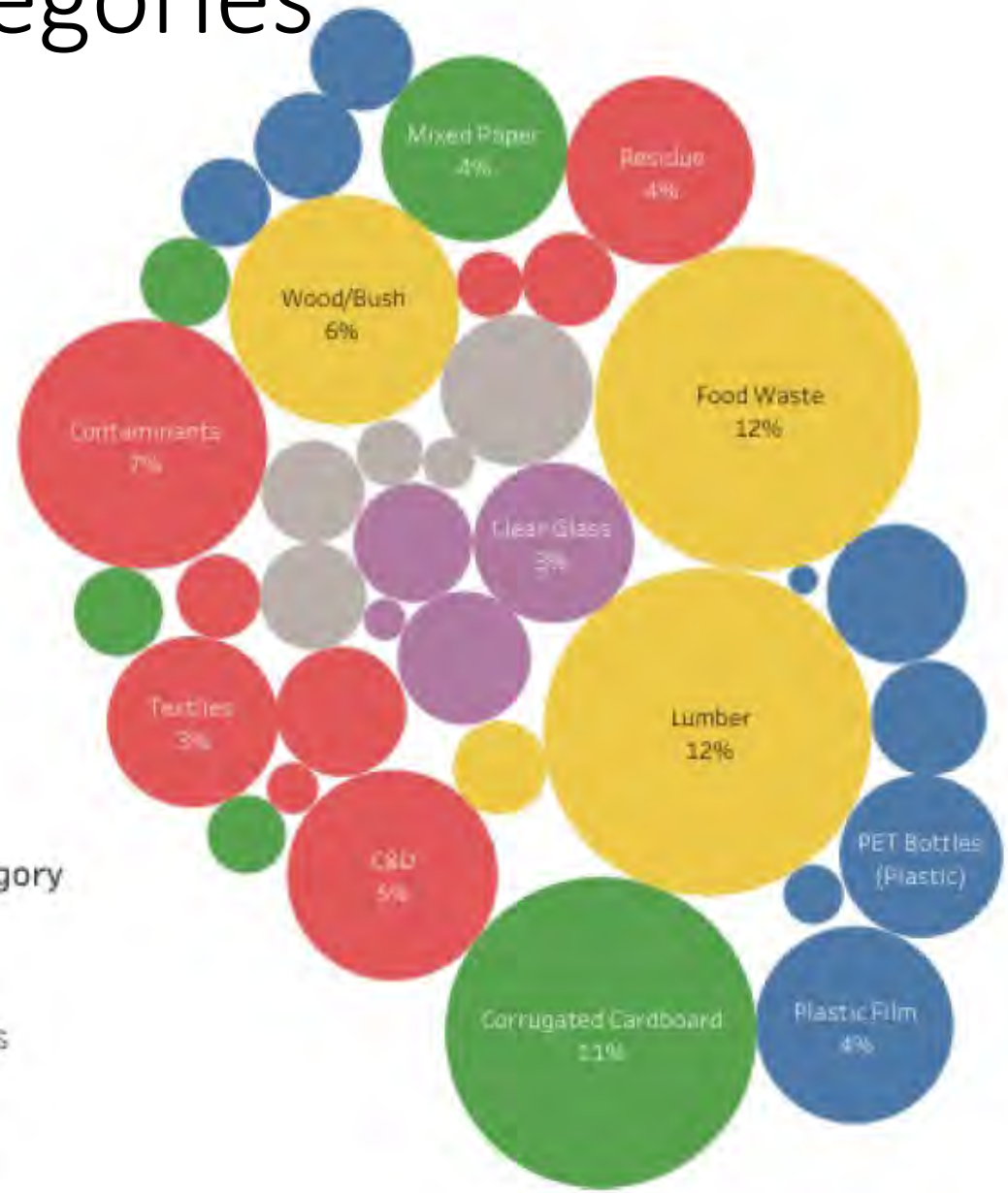
Some Observations during Waste Audit

Main Findings

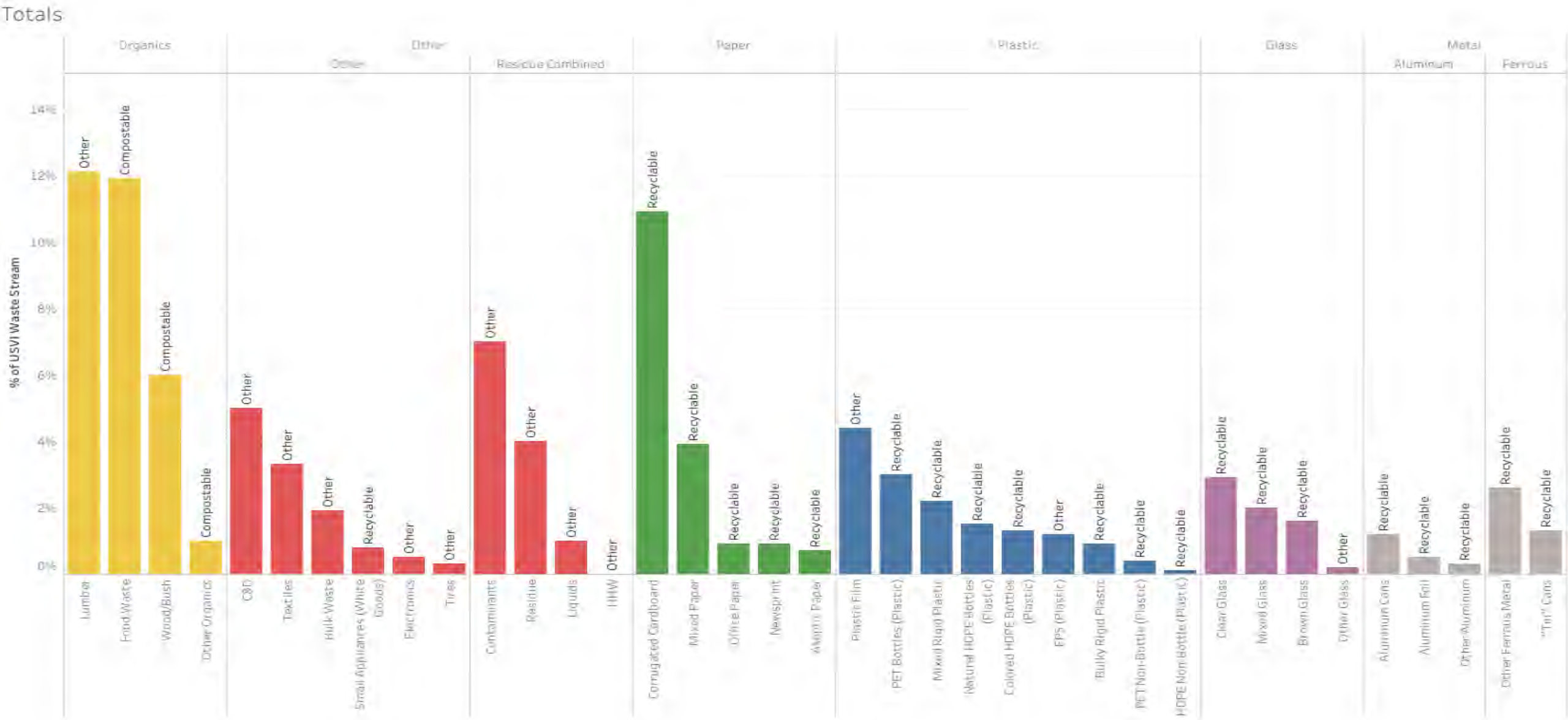
- **62%** of waste is recyclable or compostable
- Possible revenue stream from recycling is estimated at **$6M**
  - Does **not** consider expensive cost of sorting, collection, infrastructure, transportation & shipping
- Aluminum Cans, Plastic PET bottles and Cardboard are most profitable waste streams to recycle
- The amount of Food Waste is significant and can promote composting

Waste Categories



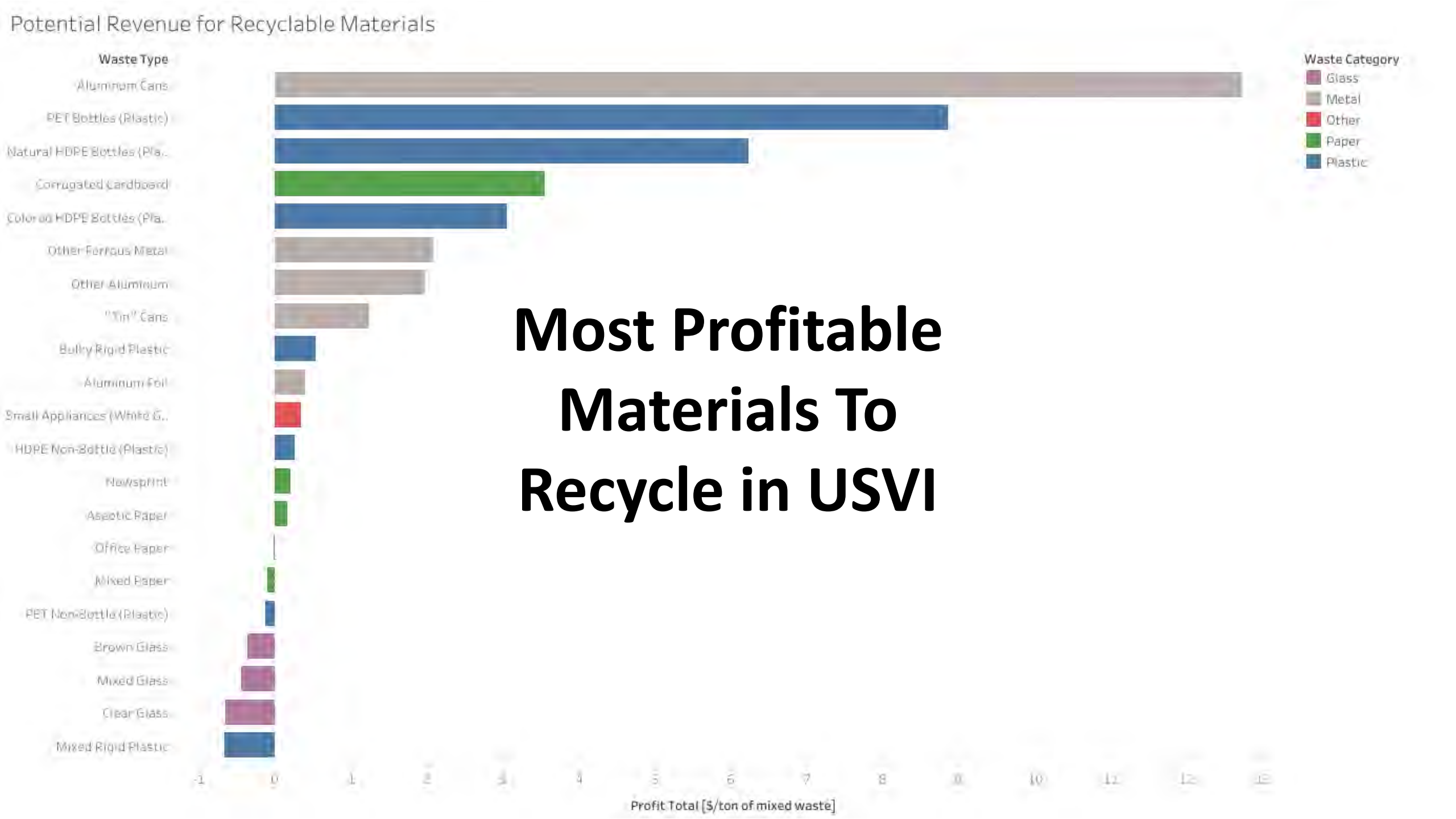


Breakdown by Waste Type

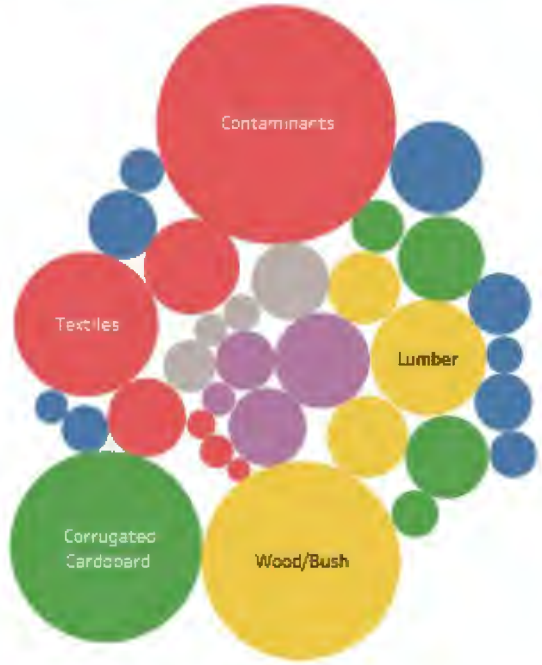


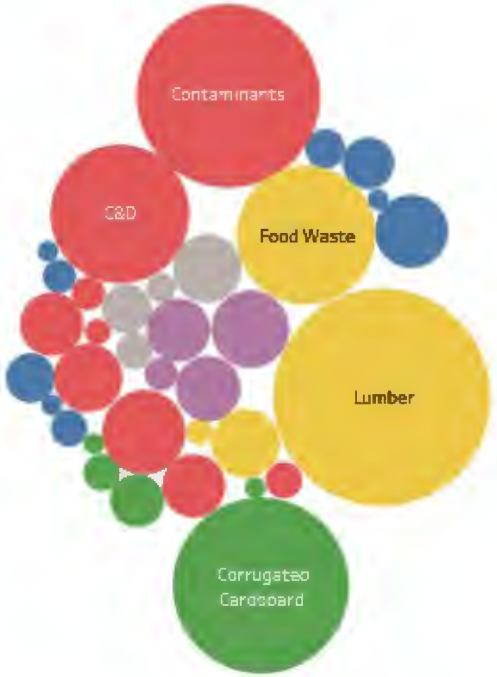
Average Commodity Revenue (ACR)

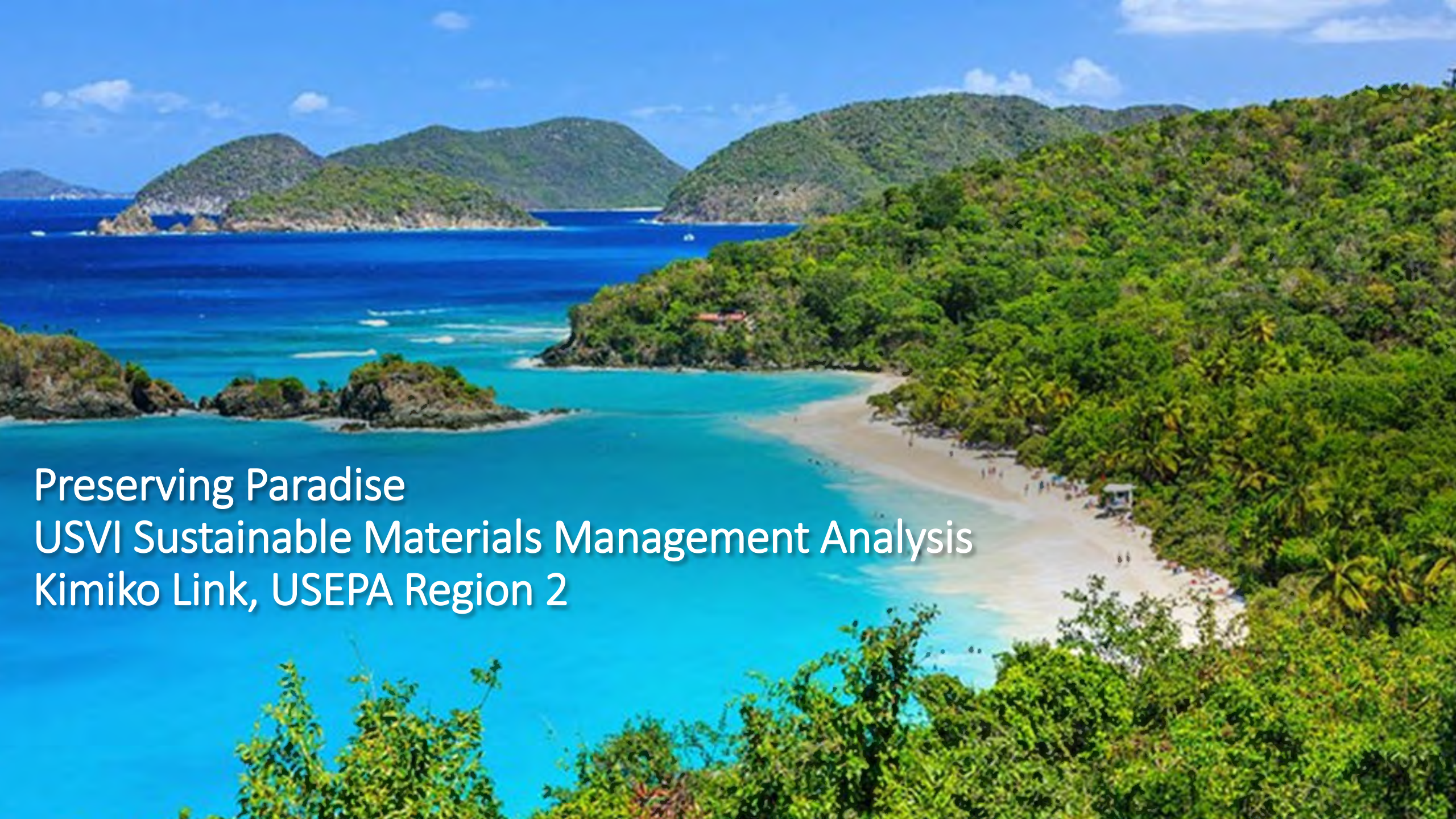
Material Type	Waste Characterization Nomenclature	Recycling Markets Nomenclature	Price ($/ton)	St. Thomas Bovoni ACR	St. John ACR	Anguilla St. Croix ACR
Aluminum	Cans	Aluminum Cans (Sorted, Baled, ¢lb., picked up)	1060.00	$34.88	$35.48	$19.05
Cartons	Aseptic	Aseptic Cartons (#52)	22.50	$0.45	$0.11	$0.34
Glass	Clear	3 Mix ($/ton del. as Recyclable or Disposable)	-22.50	$(1.49)	$(1.83)	$(3.16)
Glass	Mixed	3 Mix ($/ton del. as Recyclable or Disposable)	-22.50	$(1.02)	$(1.27)	$(1.71)
Glass	Brown	3 Mix ($/ton del. as Recyclable or Disposable)	-22.50	$(0.77)	$(1.23)	$(1.57)
Metal	"Tin" Cans	Steel Cans (Sorted, Baled, $/Gross ton, picked up)	95.00	$3.87	$1.75	$2.28
Paper	Corrugated	Corrugated Containers (#11)	32.50	$6.31	$13.51	$8.96
Paper	Mixed Paper	Mixed Paper (#54)	-2.50	$(0.32)	$(0.10)	$(0.22)
Paper	Office Paper	Mixed Paper (#54)	-2.50	$(0.08)	$(0.01)	$(0.08)
Paper	Newsprint	Sorted Residential Papers (SRPN #56)	22.50	$0.42	$0.39	$1.22
Plastic	PET Bottles	PET (Baled, ¢/lb., picked up)	295.00	$29.56	$9.58	$9.06
Plastic	Mixed Rigids (1-7)	Commingled (#3-7, Baled, ¢/lb., picked up)	-30.00	$(2.08)	$(1.32)	$(0.72)
Plastic	Bulky Rigids (mixed bulky)	Mixed Bulky Rigid (Baled, ¢/lb., picked up)	60.00	$1.25	$1.11	$2.12
Plastic	HDPE Non-Bottle (tubs and lids)	N/A, (Small part of stream, substituting tubs and lids with PP)	260.00	$0.52	$1.15	$1.63
Plastic	Colored HDPE Bottles	Colored HDPE (Baled, ¢/lb., picked up)	235.00	$9.72	$4.05	$4.61
Plastic	Natural HDPE Bottles	Natural HDPE (Baled, ¢/lb., picked up)	415.00	$20.38	$10.01	$6.46
Plastic	PET Non-Bottle	Commingled (#3-7, Baled, ¢/lb., picked up)	-30.00	$(0.31)	$(0.17)	$(0.42)
Metal	Other Ferrous	N/A	80.00	$5.18	$4.95	$3.32
Metal	Other Aluminum	N/A	660.00	$14.84	$7.15	$9.63
Metal	Small Appliances	White Goods (Loose, $/ton, picked up)	42.50	$0.38	$2.24	$0.16
			TOTAL	**$121.71**	**$85.53**	**$60.96**


Potential Revenue for Recyclable Materials
Waste Type
Aluminum Cans
PET Bottles (Plastic)
Natural HDPE Bottles (Pla..
Corrugated Cardboard
Colored HDPE Bottles (Pla..
Other Ferrous Metal
Other Aluminum
"Tin" Cans
Bulky Rigid Plastic
Aluminum Foil
Small Appliances (White G..
HDPE Non-Bottle (Plastic)
Newsprint
Aseptic Paper
Office Paper
Mixed Paper
PET Non-Bottle (Plastic)
Brown Glass
Mixed Glass
Clear Glass
Mixed Rigid Plastic
Waste Category
Glass
Metal
Other
Paper
Plastic
-1
0
1
2
3
4
5
6
7
8
9
10
11
12
13
Profit Total [$/ton of mixed waste]
Most Profitable Materials To Recycle in USVI

Recycling Revenue By Island





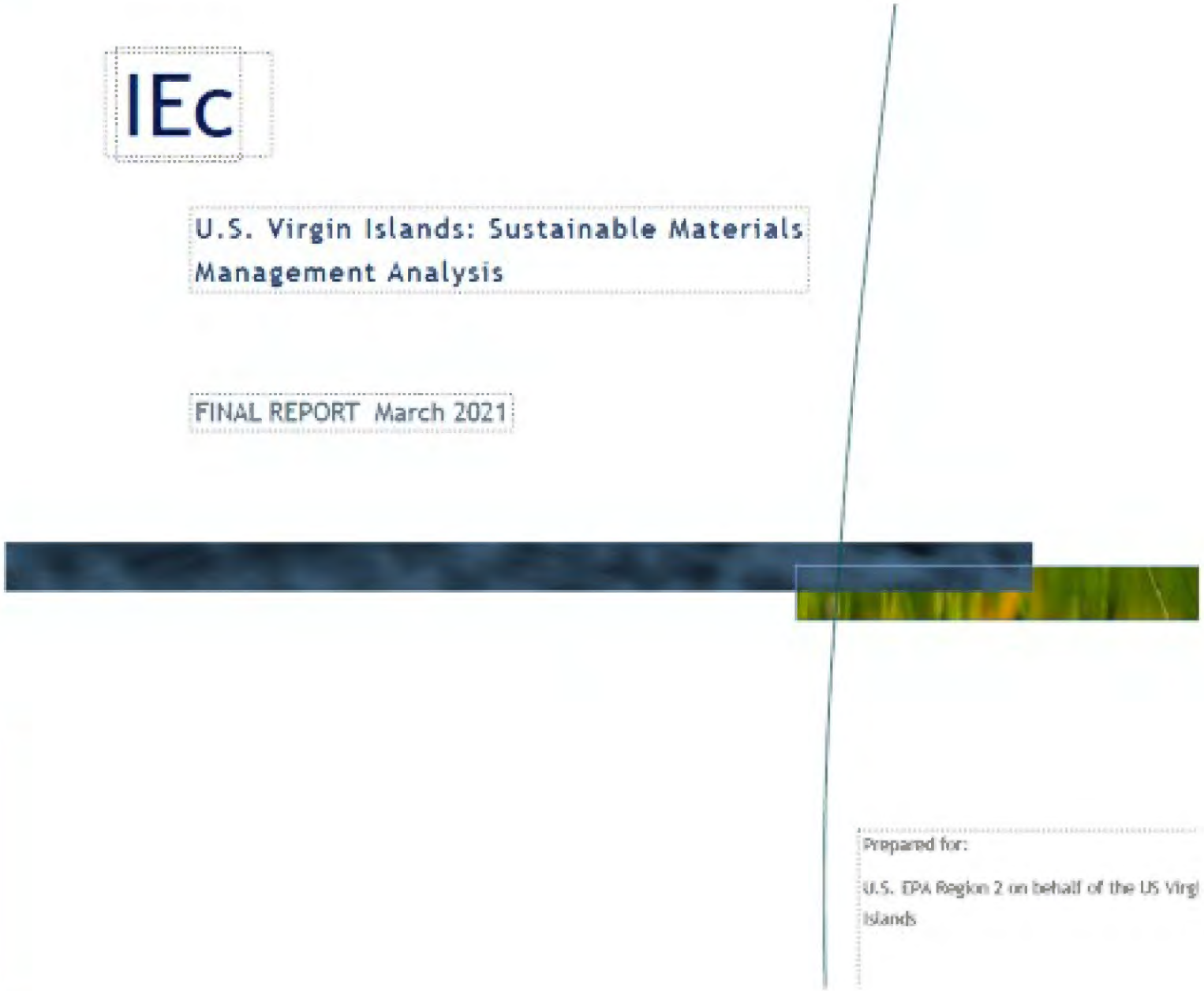


Preserving Paradise
USVI Sustainable Materials Management Analysis

Kimiko Link, USEPA Region 2

EPA's Sustainable Materials Management Hierarchy

USVI Sustainable Materials Management Analysis



Background

- Materials management is a growing concern in the Caribbean as populations continue to increase and with that, increased waste generation rates. In addition, isolated geography, limited disposal capacity, scare secondary materials markets and low reduction, reuse and recycling rates result in many reusable and recyclable commodities disposed in ever diminishing landfill space, resulting in the loss of the value of all the embodied energy, natural resources, and human capital from extraction, production, storage, distribution and use for these commodities, in addition to the human health and the environmental impacts from disposal.

- The recent hurricanes have brought to light the vulnerabilities of the islands, their infrastructure, their dependence on off-island supply chain and markets, and placed even more pressure on the materials management systems and disposal capacity. As a result, there is a renewed effort to build sustainability and resilience into every aspect of the recovery efforts, including not only avoiding unnecessary human health, environmental and financial disposal costs, but more importantly preserving the inherent value of materials themselves and building innovation, healthy and sustainable lifecycle systems, and economic growth based on valuation and preservation of this natural capital. This approach is at the core of sustainable materials management (SMM) and is the guiding principle for EPA's work in the materials management realm in general, and with its Puerto Rico and Virgin Islands disaster recovery work in particular.

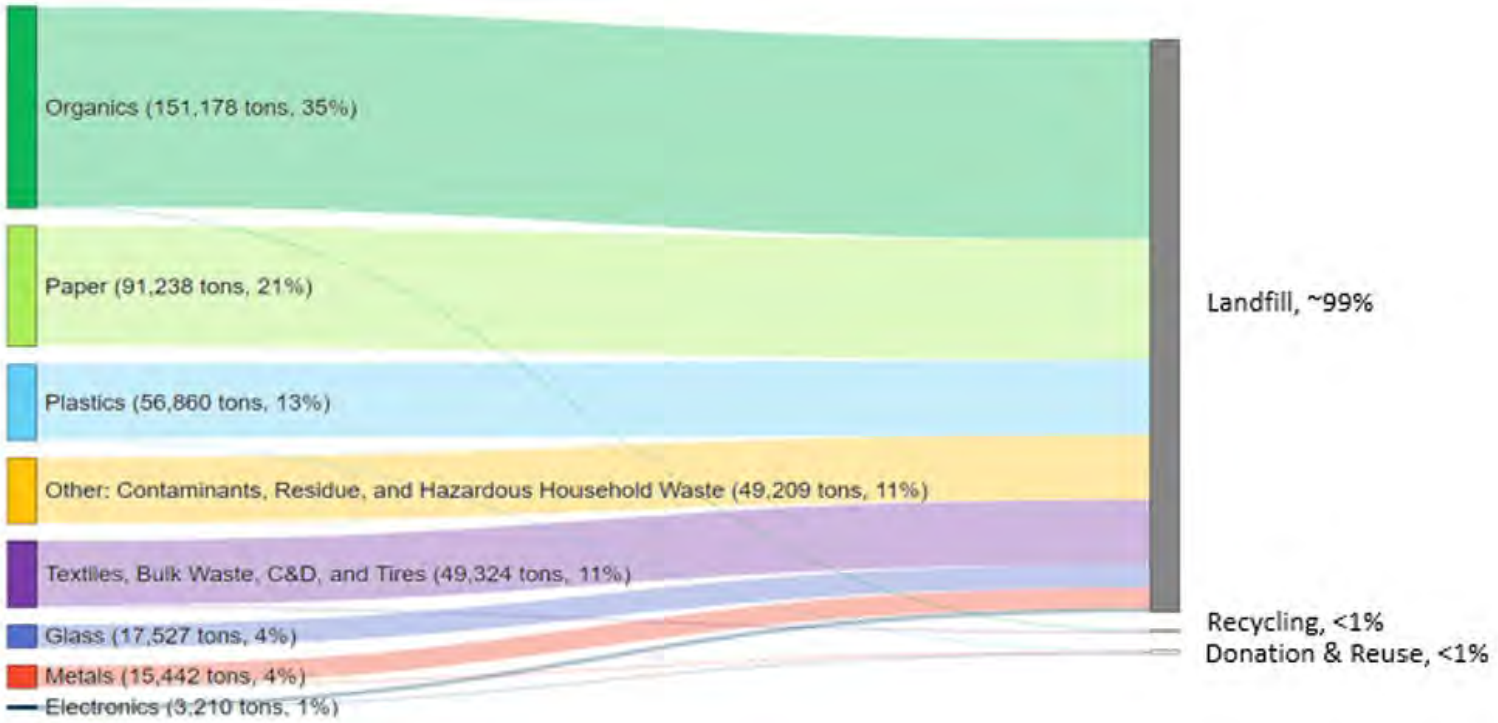
Objectives

- **Commodities Generation Data Collection:** Data reflecting MSW/reusable and recyclable commodities generation rates, separated by specific commodities where possible, in the VI, neighboring islands, and the wider Caribbean.
- **Historical approaches:** Historical approaches to commodities use and management, for example refillable glass bottles.
- **Existing Facilities Generating Discards:** Existing manufacturing and other types of facilities generating discards; explore opportunities for collaborative market development; include existing and proposed examples of scalable closed loop systems and commodities micro-enterprises world-wide.
- **Existing and Proposed Materials Management Facilities:** Existing and proposed management operations/facilities for deconstruction, reuse, repair, rental, recirculation, re-commerce, collaborative consumption, sharing and recycling (including materials recovery facilities and waste to energy facilities (WTEs)) located within the Virgin Islands and within the Caribbean basin.
- **Reduction Opportunities Including ReUse and Recycling:** USVI waste reduction opportunities per commodity and existing and potential markets for reuse and recycling, available or possible, locally in the Virgin Islands and Puerto Rico, in the wider Caribbean region, in the mainland US and internationally, particularly incorporating cradle to cradle, closed loop, collaborative, lifecycle assessment, circular economy approaches.
- **Policy and Program Options:** Options for reduction of materials usage and consumption, market development, and creating more resiliency following the triple bottom line – cost benefit analysis for island communities including but not limited to Pay As You Throw, Green Infrastructure and Building Codes, Green Purchasing Requirements, Deposit Programs, Advance Disposal Fees, Product Stewardship/Extended Producer Responsibility.

Objectives

- **Circular Economy and Economic Metrics: Green Jobs, Microenterprises, Sustainable Economies:** The natural capital and economic elements of the existing and potential materials management systems, including circular economy approaches and source reduction through closed loop systems to maximize reuse and minimize waste within a facility, within the Virgin Islands, and within the Pan-Caribbean basin. Technical and economic feasibility including jobs creation/green economy development of on-island and regional (Caribbean-wide) scalable micro-enterprise solutions including deconstruction, rescue/reuse/repair/recirculation/redistribution/re-commerce/collaborative consumption/sharing, recycling and secondary markets for reusables, commercial and heavy equipment, food, organics, cooking oil, glass, paper, plastics, textiles/fibers, building materials, wood/lumber, ceramics/concrete, waste oil, electronics, batteries, chemicals, metal, and appliances/white goods.
- **Export Scenarios:** Export market scenario and the post-National Sword export opportunities including commodities pricing range, export costs and requirements, export facilities/locations, and final use descriptions.
- **Barriers:** Current barriers to reuse/recirculation/recycling of these commodities, and guidance on infrastructure enhancements, policy and programmatic tools, and training necessary for such development.
- **Individual Commodities, General Summary and Recommendations:** Evaluate each commodity separately including findings and recommendations.

Current Waste Characterization/ Disposal Analysis



How can we capture these resources which are valuable commodities that can preserve resources, create green jobs, and help build resilience and sustainability?

- **Analyze waste diversion opportunities including source reduction and existing and potential markets for reuse, resale, repair, repurposing and recycling in the Virgin Islands and Puerto Rico**
- **Explores the opportunities for more sustainable market approaches to materials management including cradle to cradle, closed loop, collaborative, lifecycle assessment, circular economy approaches within the Virgin Islands and within the pan Caribbean basin.**
- **Results of the research shall be used to address human health and environmental concerns in the VI, to help create green jobs and develop a sustainable economy, and to inform an Integrated Sustainable Materials Management Plan for the Territory.**

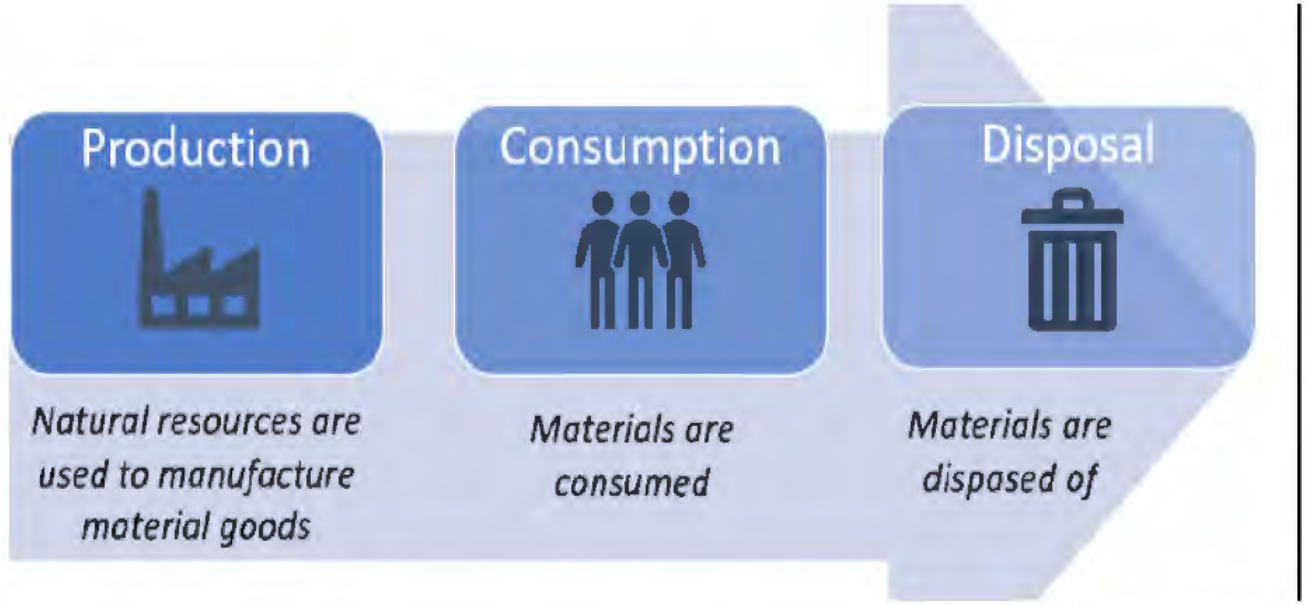
Linear Vs. Circular Economy

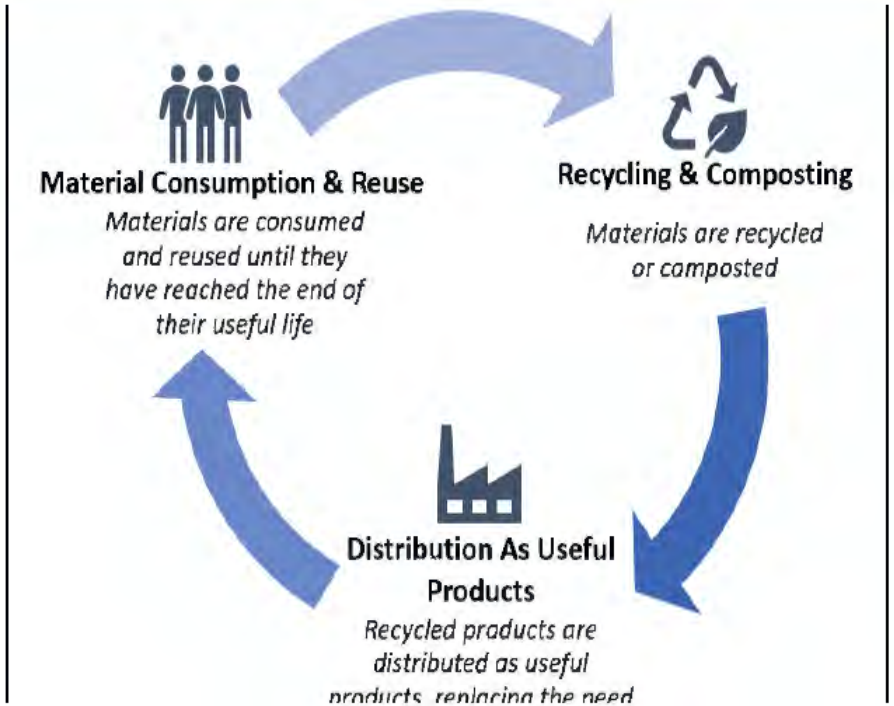
WHAT IS A CIRCULAR ECONOMY?

A circular economy aims to redefine growth, focusing on positive society-wide benefits. It entails gradually decoupling economic activity from the consumption of finite resources, and designing waste out of the system. Underpinned by a transition to renewable energy sources, the circular model builds economic, natural, and social capital. It is based on three principles:

- Design out waste and pollution
- Keep products and materials in use
- Regenerate natural systems

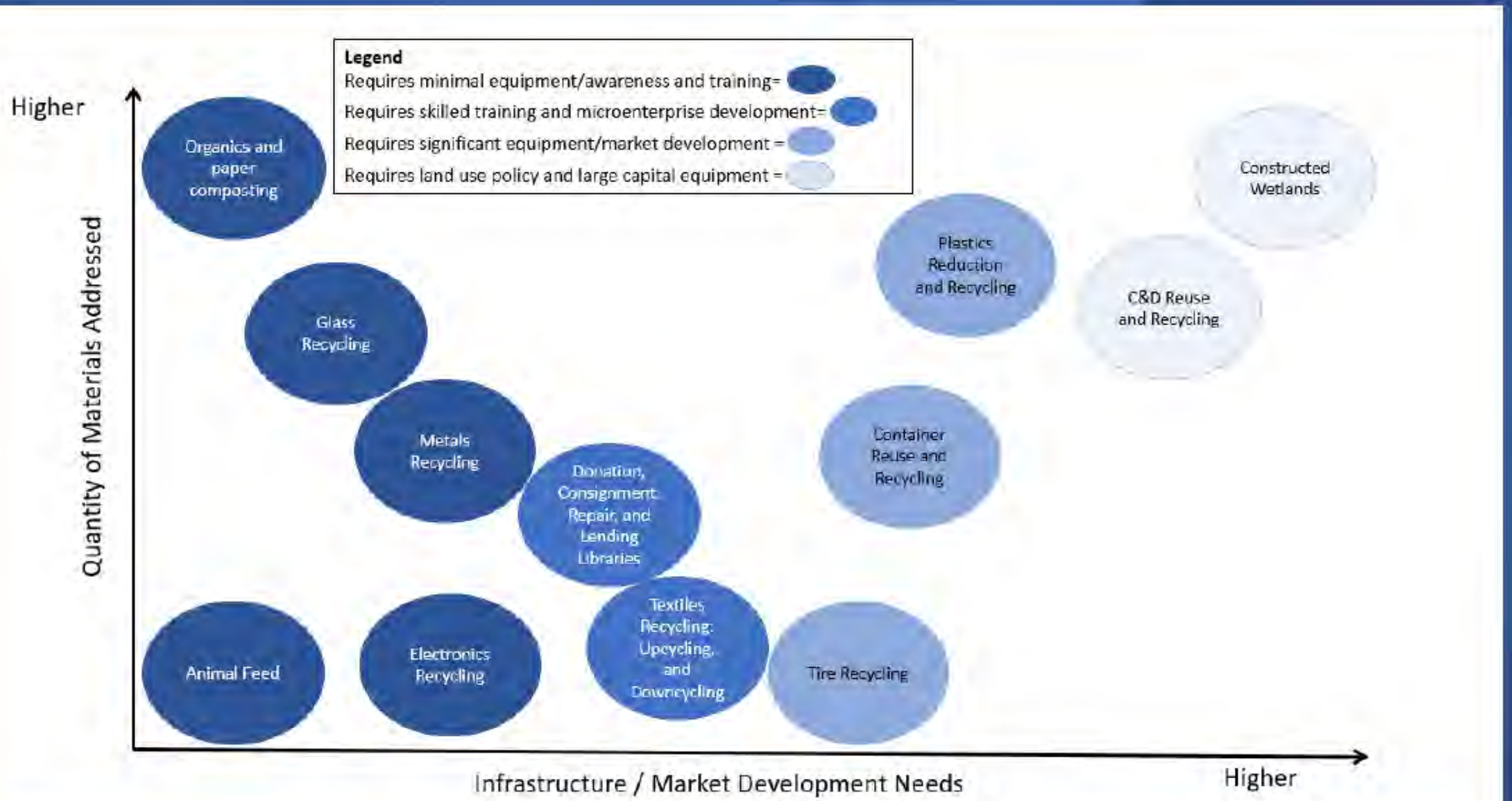
Source: Ellen MacArthur Foundation

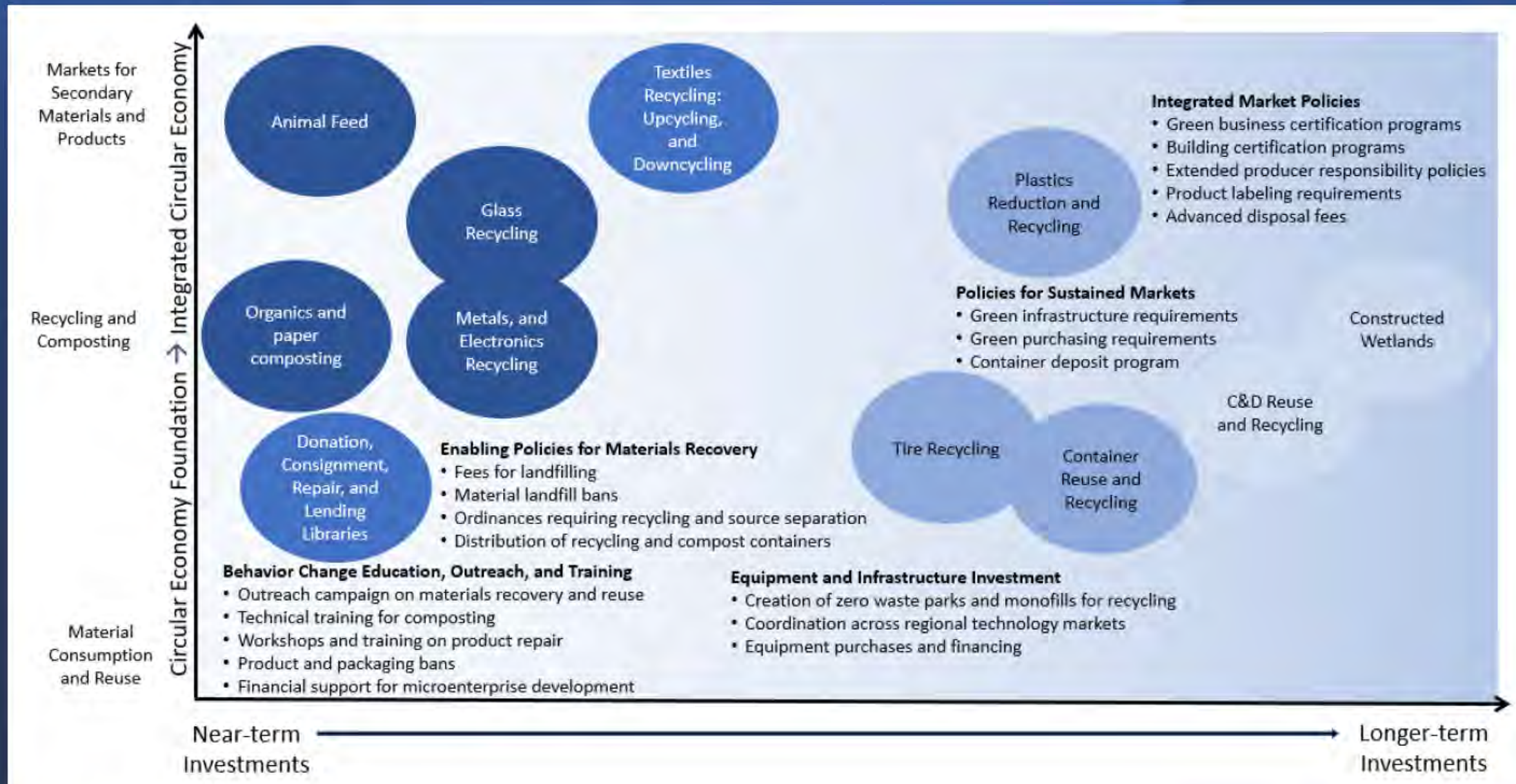




MATERIALS MANAGEMENT APPROACH	ALIGNED POLICY/PROGRAM APPROACH	MATERIAL STREAMS ADDRESSED	LAND REQUIREMENTS	HEAVY EQUIPMENT REQUIREMENTS	RESILIENCE REQUIREMENTS	JOBS CREATED	CAPITAL COSTS	OPERATING/ MAINTENANCE COSTS	EFFECTS ON IMPORT COSTS	EFFECTS ON EXPORT COSTS
Organics and Paper Composting	Organics landfill ban	Organic materials (yard waste, clean wood, food) and paper	Relatively flat land spanning 2 acres to 13 acres	• Garbage/dump trucks to collect organic materials • Brush chipper or a tub grinder to break up waste (e.g., disaster debris) • Magnet and screens • Water source • Front-end loader, bulldozer, compost turner; or composting vessel; or perforated	Compost areas should be located at least one foot above seasonal high-water table and 100 feet away from residences and businesses or fencing build around it to protect composting vessels from flying debris	70 jobs (e.g., skilled equipment operators for windrow turners, front-end loaders, and grinders)	Ranges from $300,000 to $600,000	Ranges from $50,000 to $225,000 annually	USVI farms spend $93,000 of fertilizer annually; assuming at least a share of this is imported, domestic composting could offset this cost	Exporting organics for landfilling could cost $16.8 million annually

Commodities Reuse/Recycling –
Policy, Requirements, Infrastructure Costs, Avoided Costs , Value-Added Benefits, Jobs Created

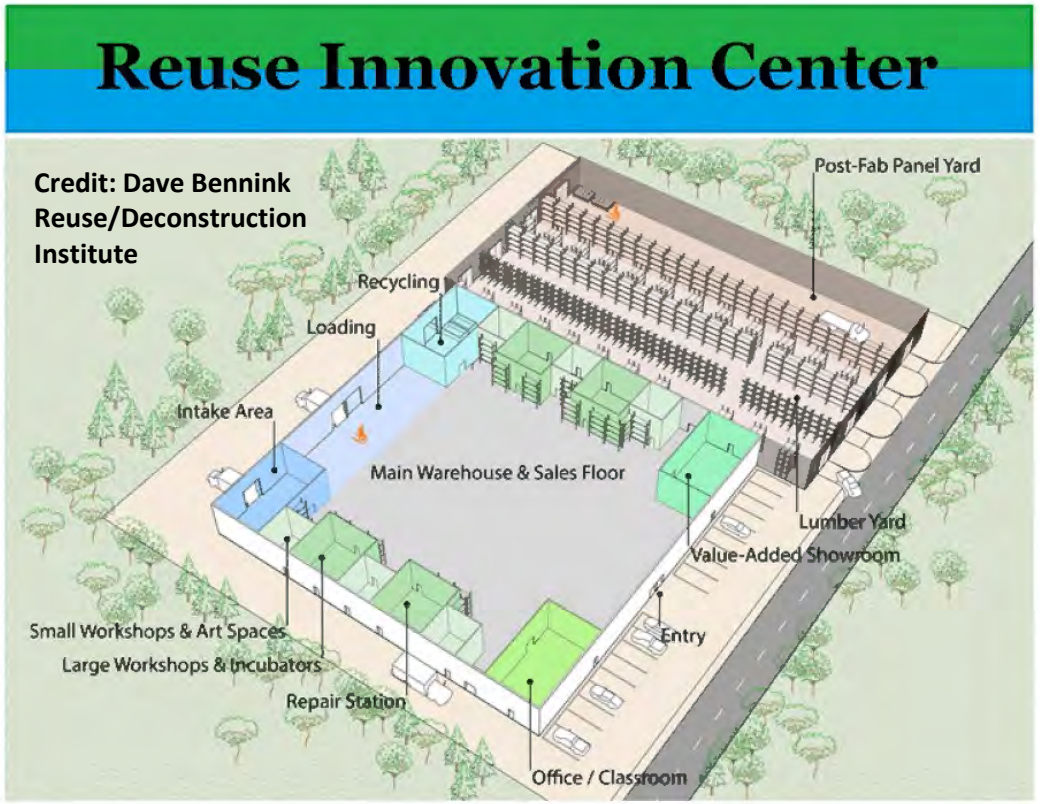

Legend
Requires minimal equipment/awareness and training=
Requires skilled training and microenterprise development=
Requires significant equipment/market development =
Requires land use policy and large capital equipment =
Higher
Quantity of Materials Addressed
Organics and paper composting
Glass Recycling
Metals Recycling
Donation, Consignment, Repair, and Lending Libraries
Animal Feed
Electronics Recycling
Textiles Recycling: Upcycling, and Downcycling
Tire Recycling
Container Reuse and Recycling
Plastics Reduction and Recycling
C&D Reuse and Recycling
Constructed Wetlands
Infrastructure / Market Development Needs
Higher

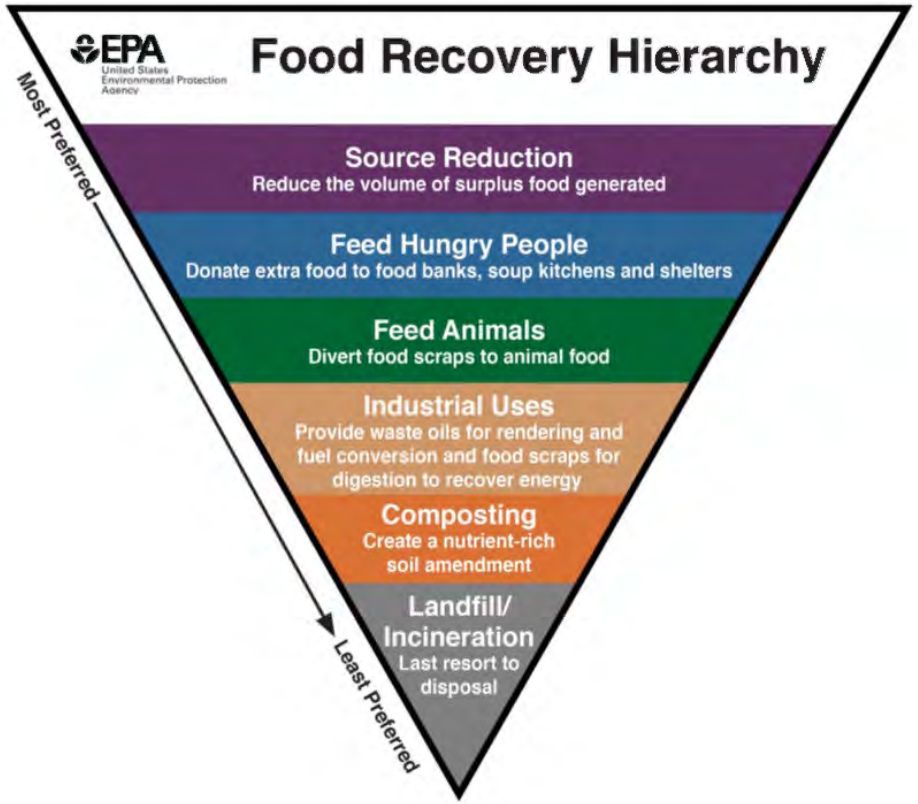

Markets for Secondary Materials and Products
Recycling and Composting
Material Consumption and Reuse
Circular Economy Foundation → Integrated Circular Economy
Animal Feed
Textiles Recycling: Upcycling, and Downcycling
Glass Recycling
Organics and paper composting
Metals, and Electronics Recycling
Donation, Consignment, Repair, and Lending Libraries
Plastics Reduction and Recycling
Integrated Market Policies
• Green business certification programs
• Building certification programs
• Extended producer responsibility policies
• Product labeling requirements
• Advanced disposal fees
Policies for Sustained Markets
• Green infrastructure requirements
• Green purchasing requirements
• Container deposit program
Constructed Wetlands
C&D Reuse and Recycling
Tire Recycling
Container Reuse and Recycling
Enabling Policies for Materials Recovery
• Fees for landfilling
• Material landfill bans
• Ordinances requiring recycling and source separation
• Distribution of recycling and compost containers
Behavior Change Education, Outreach, and Training
• Outreach campaign on materials recovery and reuse
• Technical training for composting
• Workshops and training on product repair
• Product and packaging bans
• Financial support for microenterprise development
Equipment and Infrastructure Investment
• Creation of zero waste parks and monofills for recycling
• Coordination across regional technology markets
• Equipment purchases and financing
Near-term Investments
Longer-term Investments

Type	Barrier	Associated Approaches	Examples of Policy/Program To Address Barriers
Behavioral	Residents and business require a shift in how they purchase, use, and sell goods and there is an economic disincentive to consider alternative materials management approaches to landfilling.	Applicable to all materials and management approaches	Establish public zero waste goal and transparent annual measurement program Landfill tipping fee and/or pay-as-you-throw fee program Ordinances requiring recycling and source separation
		Plastics waste prevention Metal, plastic, and glass beverage containers recycling Organics, C&D, electronic waste, and tires waste prevention and recycling/ composting	Implementation of product and packaging ban policies Beverage container deposit programs Material landfill bans Training programs (e.g., composting and C&D deconstruction)
Infra-structural	There is currently very little practice in source separation in the USVI and for curbside pick-up, streets are narrow and likely cannot accommodate multiple truck simultaneously picking up trash and recycling.	Applicable to all materials and management approaches	A program to distribute recycling containers Creation of zero waste parks Provision of appropriately sized recycling receptacles paired with every-other-week trash collection and weekly collection of recycling and organics Designating select areas at the landfill to drop-off recyclable materials by commodity type Streamlining permitting processes for implementation of new materials management strategies
Knowledge	Repair expertise and knowledge in prevention strategies and reuse opportunities is limited in the USVI.	Excess food, C&D, textiles, bulk items, and electronics donation and reuse Excess food, paper, plastics, metals, and glass waste prevention and recycling	Educational campaigns of useful strategies to prevent unnecessary consumption or extend the usable life of products through repair events or lending libraries Subsidized workshops on repair techniques Tourism education campaign on recycling practices and material bans
Market	There is currently little to no demand for recycled products in USVI.	Plastics prevention and bulk item and electronics recycling C&D waste prevention, reuse, and recycling Excess food, organics, paper, plastics, metals, and glass waste prevention and recycling	Product labeling requirements Green purchasing requirements Transparent advanced disposal fees Extended producer responsibility Green infrastructure requirements Building certification programs Green business certification programs

Commodities Capture Options

Capturing Valuable Commodities and Recirculating In the Economy





Technical and Economic Considerations

Container Reuse and Recycling

	CONTAINER REUSE AND RECYCLING TECHNICAL CONSIDERATIONS
Land Requirements	Minimal
Heavy Equipment Requirements	Additional dishwashing equipment and deposit return machines
Resilience Requirements	Minimal

	CONTAINER REUSE AND RECYCLING ECONOMIC CONSIDERATIONS
Jobs Created	Minimal (with the potential to create ~50 jobs under a container deposit program)
Capital Costs	Ranges from $3,000 to $25,000 per dishwasher (and $10,000 to $25,000 per deposit return machine)
Operating/ Maintenance Costs	Ranges from $600 to $1,200 annually per dishwasher (and $0.0391 per container returned under a container deposit program)
Effects on Import Costs	USVI imports $6 million in beer annually, some of which might be decreased by relying on kegs instead of single-use bottles and cans

Technical and Economic Considerations

Donation, Resale, Repair, Lending Libraries

	TECHNICAL CONSIDERATIONS
Land Requirements	Minimal; enough land for • storage container and a temporary structure or warehouse space to store/sell/distribute items or host repair events and equipment • refrigeration to store perishable food items
Heavy Equipment Requirements	None
Resilience Requirements	Items should be stored in structures or containers that are protected from flying debris

	DONATION AND CONSIGNMENT ECONOMIC CONSIDERATIONS
Jobs Created	6 to 15 jobs (cash register positions, managers, coordinators)
Capital Costs	Around $30,000 (cost of renting shop space, storage space, marketing, and storing equipment)
Operating/ Maintenance Costs	Around $53,000 annually
Effects on Import Costs	A portion of import costs spent on textiles, electronics, food, and bulk items could be offset by donation, consignment, and repair programs
Effects on Export Costs	None

Technical and Economic Considerations

Organics

	WINDROW	IN-VESSEL	AERATED STATIC PILE
Land Requirements	Relatively flat land around spanning 13 acres and should be located with setbacks to reduce odor concerns	Relatively flat land spanning around 2 acres	Relatively flat land around spanning 13 acres and should be located with setbacks to reduce odor concerns
Heavy Equipment Requirements	• Garbage/dump trucks to collect organic waste • Brush chipper or a tub grinder to break up waste • Magnet and screens to remove contaminants • Front-end loader, bulldozer, or compost turner • Water source	• Garbage/dump trucks to collect organic waste • Brush chipper or a tub grinder to break up waste • Magnet and screens to remove contaminants • Composting vessel for in-vessel composting only • Water source	• Garbage/dump trucks to collect organic waste • Magnet and screens to remove contaminants • Brush chipper or a tub grinder to break up waste • Perforated piping • Water source
Resilience Requirements	Compost areas should be located at least one foot above seasonal high-water table and 100 feet away from residences and businesses	Compost areas should have fencing build around it to protect composting vessels from flying debris	Compost areas should be located at least one foot above seasonal high-water table and 100 feet away from residences and businesses

	COMPOSTING ECONOMIC CONSIDERATIONS
Jobs Created	70 jobs (e.g., skilled equipment operators for windrow turners, front-end loaders, and grinders)
Capital Costs	Ranges from $300,000 to $600,000
Operating/ Maintenance Costs	Ranges from $50,000 to $225,000 annually
Effects on Import Costs	USVI farms spend $93,000 of fertilizer annually; composting could offset this cost.
Effects on Export Costs	Exporting organics for landfilling could cost $16.8 million annually

Technical and Economic Considerations

Animal Feed

	ANIMAL FEED TECHNICAL CONSIDERATIONS
Land Requirements	None
Heavy Equipment Requirements	• A truck or vehicle large enough to transport spent grain from the brewery to farm. • If necessary, a storage container to store spent grains not used immediately.
Resilience Requirements	None

	ANIMAL FEED ECONOMIC CONSIDERATIONS
Jobs Created	None
Capital Costs	$49,888 - per new pick-up truck
Operating/ Maintenance Costs	$3.31 a gallon for the quantity of gas used. $792 annually for maintenance.
Effects on Import Costs	May offset costs ($777,689) associated with importing animal feed
Effects on Export Costs	None

Technical and Economic Considerations

Glass

	GLASS RECYCLING TECHNICAL CONSIDERATIONS
Land Requirements	Up to 2,500 square feet
Heavy Equipment Requirements	Glass processing systems, such as those produced by Andela (the USVI already has five glass crushers), and glass furnaces for art applications
Resilience Requirements	If stored outdoors, the glass processing system will need to be protected from potential storm debris

	GLASS RECYCLING ECONOMIC CONSIDERATIONS
Jobs Created	2 to 4 jobs created (depending on the size of glass processing system and scale of art operations)
Capital Costs	$28,000 to $350,000 (depending on the size of glass processing system - the USVI already has five glass crushers) and $10,000 for a glass furnace for art applications
Operating/ Maintenance Costs	$8,400 to $16,900 (depending on the size of glass processing system) and around $1,000 for power and clean the furnace for art applications
Effects on Import Costs	The USVI imports sand and gravel from other islands; glass recycling could offset some of those costs
Effects on Export Costs	The alternative of exporting glass waste for landfilling could cost $1.9 million annually

Technical and Economic Considerations

Metal

	METALS RECYCLING TECHNICAL CONSIDERATIONS

Land Requirements	• Minimal and flexible; enough space to fit:
	  ○ Heavy equipment; at least 10" by 10" (width x height)
	  ○ Metal waste collection areas (some already exist)

Heavy Equipment Requirements	• Dump trucks to collect and haul metal waste • Baler to crush waste • Sorting and processing equipment
Resilience Requirements	Equipment should be stored in areas that are protected from flying debris

	METALS RECYCLING ECONOMIC CONSIDERATIONS
Jobs Created	Up to 18 jobs (e.g., metal sorters, skilled equipment operators)
Capital Costs	$100,000 to $1.5 million (cost of a baler for each island)
Operating/Maintenance Costs	$310,000 (mostly fuel and labor costs)
Effects on Import Costs	None (since materials would be recycled outside of the USVI)
Effects on Export Costs	Exporting metal waste for landfilling could cost $1.7 million annually

Technical and Economic Considerations

Plastics Reuse and Recycling

	PLASTICS REDUCTION TECHNICAL CONSIDERATIONS	PLASTICS RECYCLING TECHNICAL CONSIDERATIONS
Land Requirements	• Minimal; bottle-filling stations could be installed in existing buildings/infrastructure	• Minimal and flexible; enough space to fit: ○ Some small equipment; at least 5" 2" 5" (length x width x height) ○ Plastic collection areas (some already exist)
Heavy Equipment Requirements	None	• Trucks to collect and haul discarded plastics • Sorting and processing equipment • Shredder or extruders
Resilience Requirements	Equipment should be stored in areas that are protected from flying debris	Equipment should be stored in areas that are protected from flying debris

	PLASTICS REDUCTION ECONOMIC CONSIDERATIONS	PLASTICS RECYCLING ECONOMIC CONSIDERATIONS
Jobs Created	Varies depending on the scale of the program	Up to 3 jobs
Capital Costs	$4,000 to $4,500 (per bottle- filling station)	$14,000 (cost of equipment and space)
Operating/ Maintenance Costs	$600 to $650 per year (per bottle-filling station)	$72,000 per year (cost of rent, materials, and wages)
Effects on Import Costs	Bottle-filling stations can replace a portion of the amount spent importing plastic water bottles.	Recycled plastic products can replace a portion of the amount spent importing plastic furniture, construction materials, jewelry, and other plastic items.
Effects on Export Costs	Exporting plastic waste for landfilling could cost $6.3 million annually	

Technical and Economic Considerations

Tire Recycling

	TIRE BALING TECHNICAL CONSIDERATIONS	TIRE RETREADING TECHNICAL CONSIDERATIONS
Land Requirements	• Minimal and flexible; enough outdoor space to fit: o Heavy equipment; at least 30' by 14' (width x height) o Tire waste collection areas (some already exist)	• Would depend on the scale of the tire retread operation.
Heavy Equipment Requirements	Tire baler (may already exist within the USVI)	At a minimum, a curing chamber and any necessary digital inspection equipment. Computer-controlled machines can also assist in tire reconstruction.
Resilience Requirements	Equipment should be stored in areas that are protected from flying debris	An indoor, weather-shielded manufacturing facility would be necessary.

	TIRE BALING ECONOMIC CONSIDERATIONS	TIRE RETREADING ECONOMIC CONSIDERATIONS
Jobs Created	1 to 2 jobs created (depending on the size of tire processing system)	Depends on the size of the retread operation.
Capital Costs	$18,000 to $60,000 for tire balers	Depends on the size of the retread operation.
Operating/ Maintenance Costs	$1,200 annually for tire baling	Depends on the size of the retread operation.
Effects on Import Costs	Minimal	As high as $20 million annually, depending on the size of the in-territory retread operation and demand for retreaded tires.
Effects on Export Costs	Export costs for the entire annual tire supply total between $360,000 and $730,000; to the extent that tires can be used in the territory, this cost would be reduced	The cost of importing new tires would be reduced for each tire retreaded within the USVI. Raw materials would still need to be imported.

Technical and Economic Considerations

Textiles: Resale, Upcycling, Downcycling

	TEXTILE UPCYCLING AND DOWNCYCLING TECHNICAL CONSIDERATIONS
Land Requirements	Minimal; enough space for • hosting textile up/downcycling events • office/store space (if supporting micro-enterprises)
Heavy Equipment Requirements	None
Resilience Requirements	None

	TEXTILE UPCYCLING AND DOWNCYCLING ECONOMIC CONSIDERATIONS
Jobs Created	6 to 9 jobs (mostly for community event organizers, micro-enterprise owners, and skilled tailors)
Capital Costs	Minimal; includes cost of • equipment needed to recycle materials (i.e. tools to clean cut, and sew materials) • property (if renting a permanent spot for micro-enterprise or events)
Operating/Maintenance Costs	Minimal; includes cost of property rental or event space rental and labor
Effects on Import Costs	Recycled textile products can replace a portion of the amount spent importing bags, blankets, and cleaning rags
Effects on Export Costs	Exporting textile waste for landfilling could cost $1.3 million annually

Technical and Economic Considerations

Electronics

	ELECTRONICS RECYCLING TECHNICAL CONSIDERATIONS
Land Requirements	Minimal; enough space for 40-foot marine containers to store electronics while preparing for shipment
Heavy Equipment Requirements	Forklifts (already owned by the VIWMA)
Resilience Requirements	Electronic waste should be stored indoors or in impervious containers

	ELECTRONIC WASTE ECONOMIC CONSIDERATIONS
Jobs Created	None beyond current operations
Capital Costs	None beyond current operations
Operating/ Maintenance Costs	Around $82,000 annually (for shipping to a Certified Electronics Recycler)
Effects on Import Costs	None
Effects on Export Costs	None, already spending approximately $82,000 annually for shipping

Islands SMM Speaker Series

John Wackman, Founder, HV Repair Café now active in more than 40 communities in 12 counties in the Hudson Valley, Catskills and Capital region. Co-author of Repair Revolution

Cynthia Andela, New York Founder, Owner and President of Andela Glass with clients throughout the Caribbean.

Patrick Villemin, St. Marten, Solid Waste Director

Alan Hunt, Bermuda, Former Wider Caribbean Solid Waste Association/ReCaribe Executive Director

Clarkston Trott, Bermuda Solid Waste Manager

John Harder, Hawaii, Zero Waste Kauai Co-Founder and President, Waste Diversion Analyst-Kauai County, Maui County Solid Waste Director, US Commonwealth of the Northern Mariana Islands Solid Waste Director.

Timonie Hood, USEPA Region 9 Zero Waste Zero Waste and Green Buildings Coordinator with projects in the Pacific Islands

Charlotte McDevitt, British Virgin Islands, Green VI

Edison Garraway, Trinidad and Tobago, Former Solid Waste Manager

Jean Bonhotal, Director, Cornell Waste Management Institute with Projects On Engineering Applications of Compost in British Virgin Islands, Haiti, India and more

Norm Ruttan, President, IWasteNotSystems, Canada

Maryellen Etienne, Reuse International

International Islands Sustainable Materials Management Association

- How can we come together with our islands communities worldwide to help each other become more resilient and sustainable using what we have or generate on island or close by.

Thank you!

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