



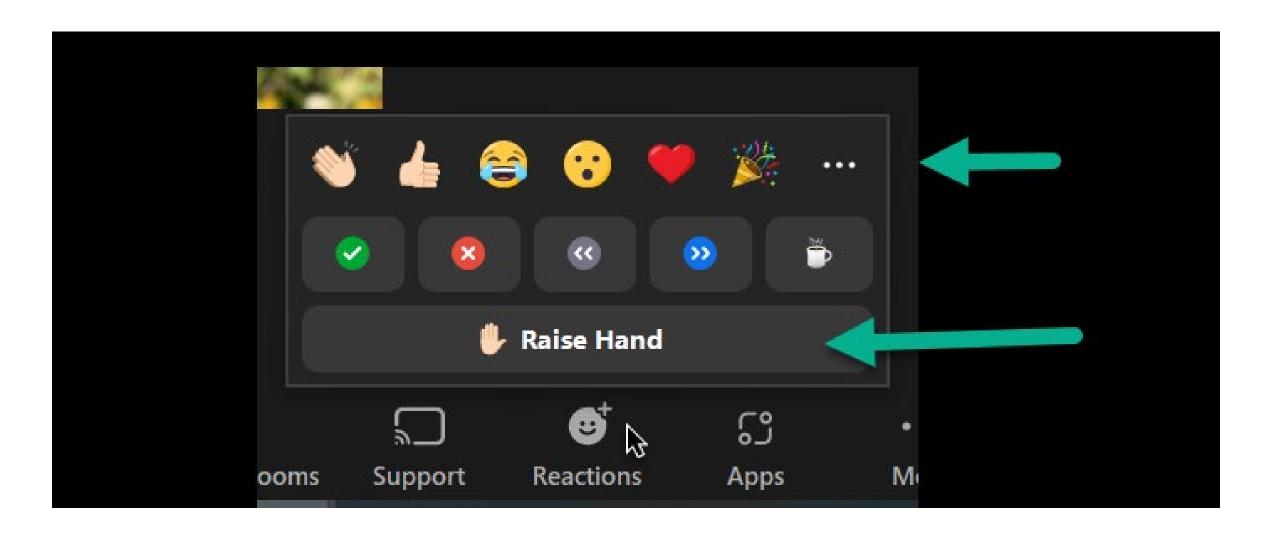
Recycling Development Center Advisory Board Meeting

February 9, 2022 | 9am - 12pm (Pacific time)



Participating in this meeting:

Board members and presenters may unmute themselves.

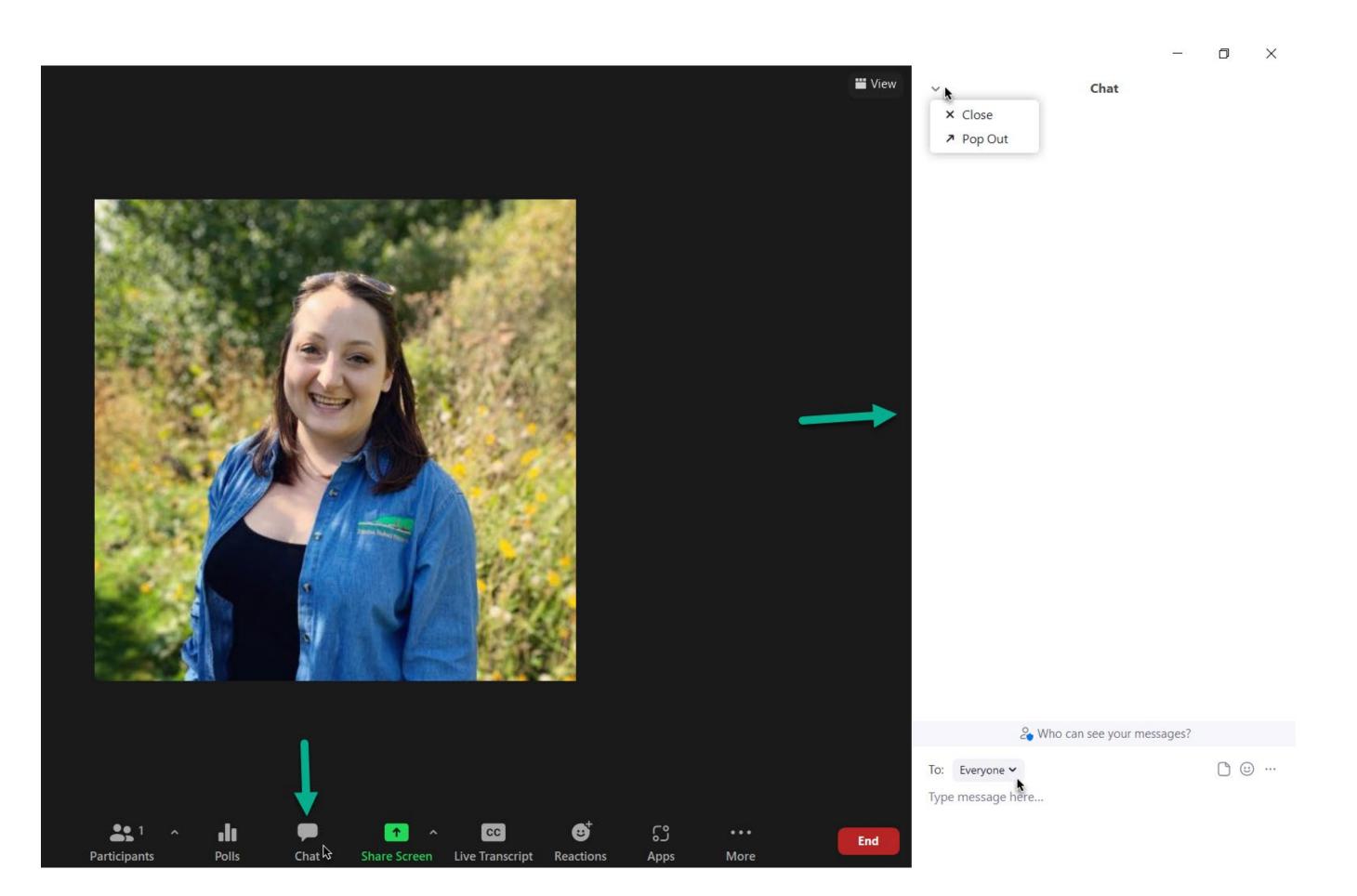


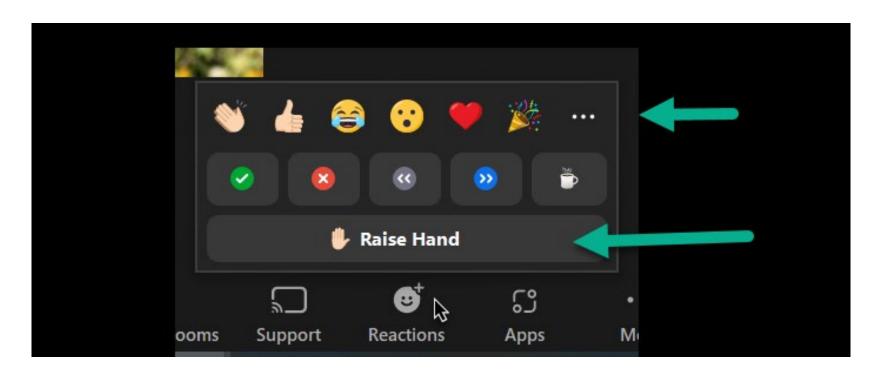


Participating in this meeting:

Participants may use reactions throughout.

For questions, please raise your hand or type them in the chat box.







Agenda

9:10 am Board roundtable, agency updates

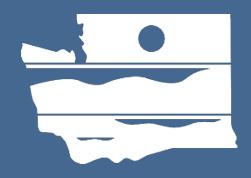
9:40 am Legislative update

9:55 am Innovation Cluster Accelerator Program

10:10 am Plastic presentations and discussion

11:55 am Wrap-up





Center updates

Board member roundtable

Ecology update

Commerce update

Attendee comments







Board roundtable:

Corinne Drennan



Karl Englund



Kyla Fisher



Nina Goodrich



Ruby Irving



Allen Langdon



Kris Major



Scott Morgan



Chris Piercy



Mike Range



Derek Ruckman



Tim Shestek



Jay Simmons



Heather Trim





Agency updates:

Kara Steward



Rob Duff







By nurturing projects that incorporate waste prevention, repair, reuse, recycling, and/or composting models, the NextCycle Washington program helps develop equitable local economies while reducing waste, keeping materials in use longer and regenerating natural systems.

Participants can be entrepreneurs/start-ups, small businesses, established corporations, non-profits, or a collaboration of entities. By providing technical and business support, NextCycle Washington helps accelerate projects that will improve the state's circular economy to an investment-ready status.

Register For Our Webinar: Help Us Design NextCycle Washington

REGISTER TODAY

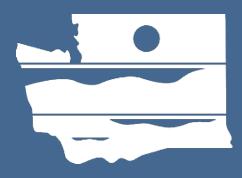


New board members....

- Ruby Irving, Klickitat County
- Kris Major, City of Spokane
- Chris Piercy, Kitsap County



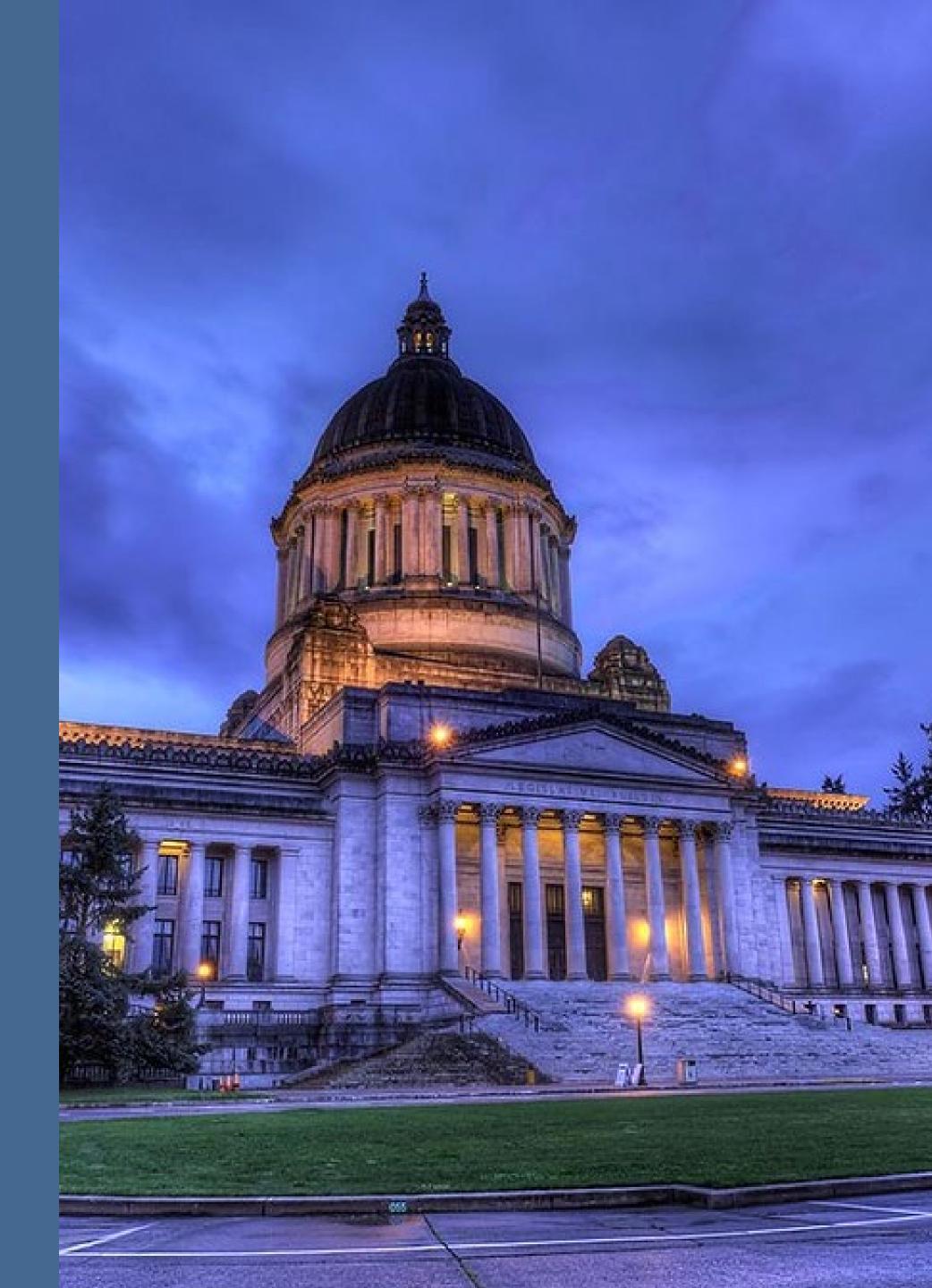




Legislative update

Julie Robertson, Department of Ecology





	Date	Day of Week	Day of Session
January	10	M	1
oanuar y	11	T	2
	12	W	3
	13	Th	4
	14	F	5
	15	S	6
	16	Su	7
	17	M	8
	18	Т	9
	19	W	10
	20	Th	11
	21	F	12
	22	S	13
	23	Su	14
	24	М	15
	25	T	16
	26	W	17
	27	Th	18
	28	F	19
	29	S	20
	30	Su	21
	31	M	22
	1	T	23
February	2	W	24
	3	Th	25
	4	F	26
	5		
		S	27
	6	Su	28
	7	M	29
	8	T	30
	9	W	31
	10	Th	32
	11	F	33
	12	S	34
	13	Su	35
	14	M	36
	15	Т	37
	16	W	38
	17	Th	39
	18	F	40
	19	S	41
	20	Su	42
	21	M	43
	22	T	44
	23	W	45
	24	Th	46
	25	F	47
	26	S	48
	27	Su	49
	28	M	50
March	1	T	51
Maron	2	W	52
	3	Th	53
	4	F	54
	5	S	55
	6	Su	56
	7	M	57
	8	T	58
	9	W	59
	10	Th	60

• First Day – Jan. 10



- Committee cutoff dates
 - Feb. 3 policy committee
 - Feb. 7 fiscal committee
 - Feb 15 original house
 - Feb 24 policy committee (opposite house)
 - Feb 28 fiscal committee (opposite house)
 - March 4 opposite house cutoff
- Sine Die March 10



ESHB 1518 - Environmental standards of paper products



Rep. Stonier



2SHB 1663 – Reduction of methane emissions from landfills



Rep. Duerr



2SHB 1799 – Organic materials management



Rep. Fitzgibbon



2SHB 1810 Fair servicing and repair of digital electronic products



Rep. Gregerson



SHB 1896 Batteries and the environment

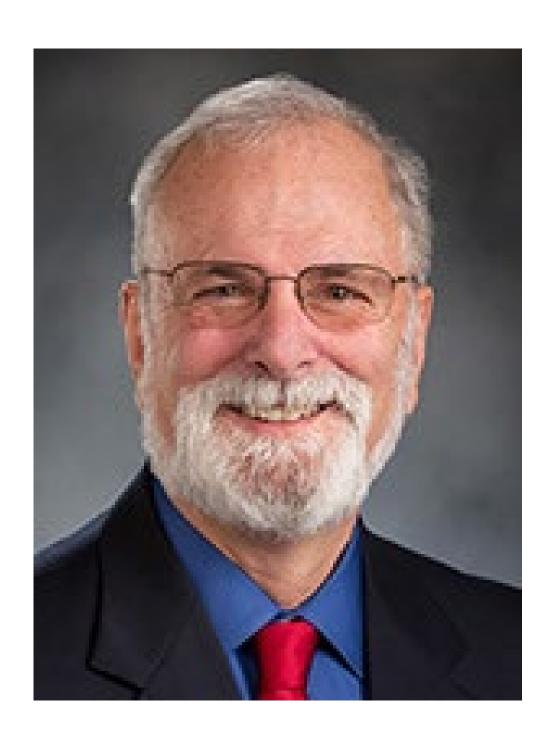


Rep. Harris-Talley



SSB 5526

Studying the global availability of lithium and critical materials for battery manufacturing



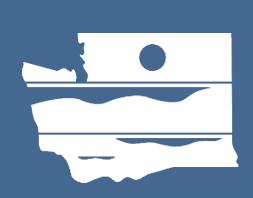
Senator Fortunato





Thank you.

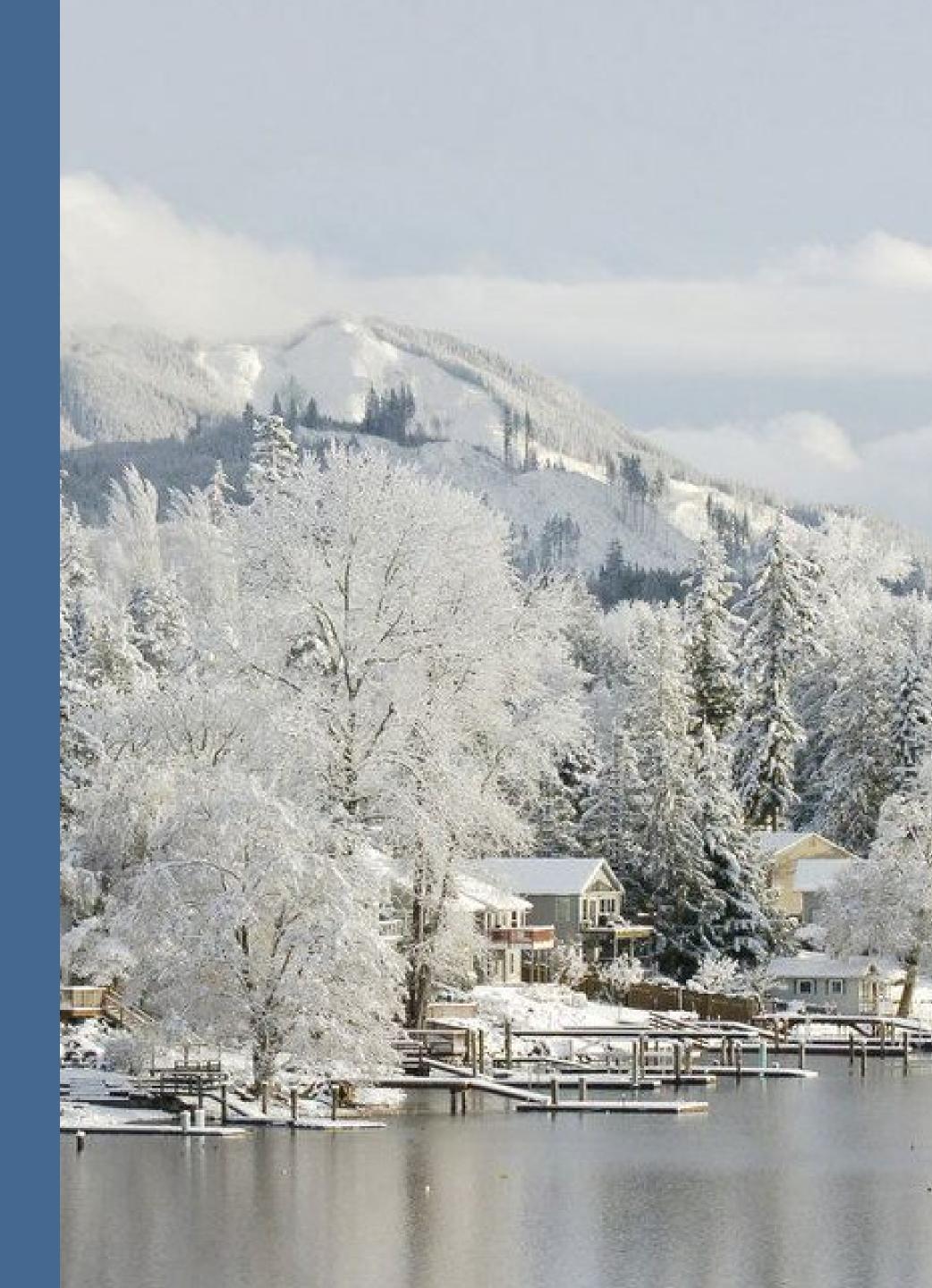
Julie Robertson
Legislative & Policy Coordinator
julie.robertson@ecy.wa.gov
360-763-2728



Innovation Cluster Accelerator Program

Stephanie Scott - Department of Commerce

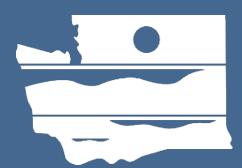




5 minute BREAK







Plastic presentations

- Karl Englund, Washington State University
- Bill Cooper, Cyclyx
- Nina Goodrich, Sustainable Packaging Coalition
- Jason Lammers, SnoCo Packaging Co and Caitlein Ryan, The Cannabis Alliance
- Allen Langdon, Circular Materials and Sandy Sigmund Return-It





Plastics Recycling Market Development for Washington State and the Northwest Region

RDC Board Meeting

2/9/22

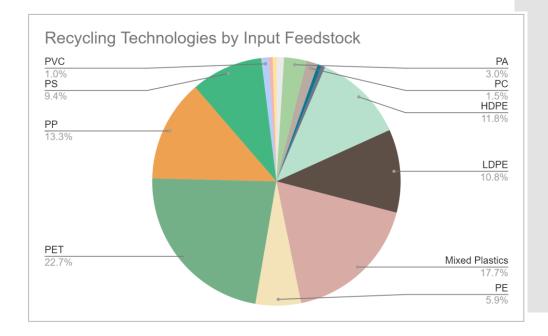
Project Supported by: WA DOE and DOC

Karl Englund, Hui Li, Kristin Brandt, Dane Camenzind, Sarah Dossey, Jonathan Hatt

Project Outputs

- Comprehensive report w/TEA
 - https://cmec.wsu.edu/project/ plastics-recycling-technology/
- **Plastics Recycling Market Development** for Washington State and the Northwest Region Karl Englund, Hui Li, Kristin Brandt, Dane Camenzind, and Sarah Dossey Composite Materials and Engineering Center June 30, 2021 WASHINGTON STATE & UNIVERSITY Prepared for: WA State Department of Commerce and WA State Department of Ecology For inquires, contact Karl Englund; englund@wsu.edu

- Database of plastic recyclers <u>https://bit.ly/PRTDatabase</u>
 - Recycling technologies, companies (300+), plastic type, etc..
 - Pivot table generation
 - Web-based data



What's in the report?

- Recycling technologies
 - Depolymerize or not...
 - All need/want clean, sorted materials
- Related members of supply chain
 - WA based
 - Info from DOE/Cascadia reports
- NW WA Supply chain evaluation
- TEA
 - Pyrolysis and glycolysis operation



Recycling technologies – no depolymerization

- Mechanical
 - Melt/soften and pelletize, often
 - 99% of recycled plastics
 - KW Plastics, Denton, Merlin, etc...
 - Composite decking
 - Often bypass reprocessors
 - Trex, Fiberon, AERT, etc...

- Additives
 - Assist in recyclability
 - Build MW, minimize degradation, etc..
 - Can make MR much more attractive
 - BASF, Avient, etc...





Recycling technologies -Depolymerization

- Chemical, Solvent
 - Breakdown with chemicals
 - Base monomer or other
 - Polymer specific
 - Ex: Glycolysis for PET
 - Process dictates end product
 - High capital investments
 - Potential to take mixed or contaminated??
 - <u>Eastman</u>, <u>Dupont/Teijin</u>, etc...
- Purification
 - No depolymerization
 - Deep chemical clean
 - Purecycle

- Thermal
 - Heat and anerobic conditions- predominate
 - Output can be returned to plastic
 - Oils and naptha
 - Agilyx/Cyclx, Alterra, Enerkem, etc..
- Biological
 - Enzymes breakdown structure
 - Ambercycle, BioXycle, etc..

Hybrid Recycling

- Combine technologies
 - Avangard Innovative/Honeywell
 - Mechanical and thermal conversion in one site



Your trusted source for recycling news and analysis



Resource Recycling~

Plastics Recycling Update~

E-Scrap News~

Conferences~

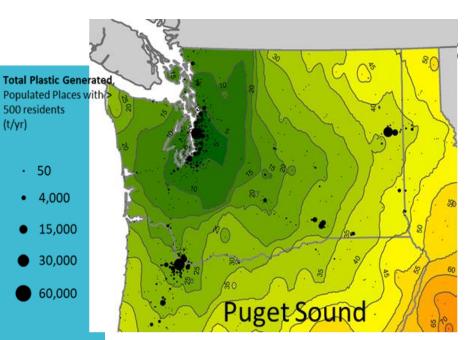
Avangard to 'cohabitate' mechanical, chemical recycling

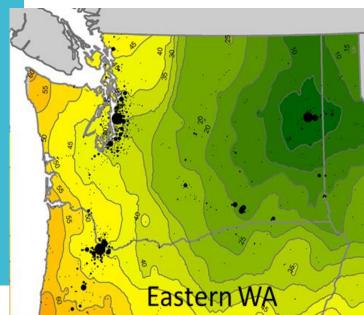
Published: February 8, 2022 Updated: February 8, 2022

by Jared Paben



Supply Chain



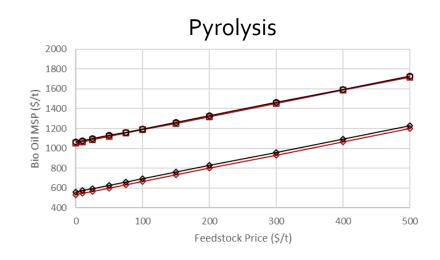


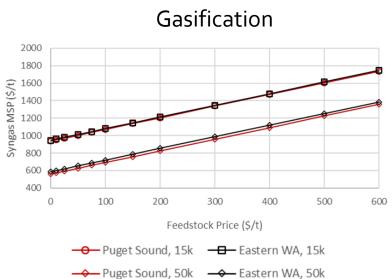
- Plastic (all types) use per capita was combined with census data to create maps of available plastic.
- The geolocated plastic feedstock, road networks and trucking costs were combined to create weighted average delivered feedstock costs to candidate facility locations.
- Sites: Puget Sound and Eastern Washington
 - high population density, access to additional high density locations, existing industrial activity
- Feedstock costs were used as an input into the techno-economic analyses for each candidate facility site.

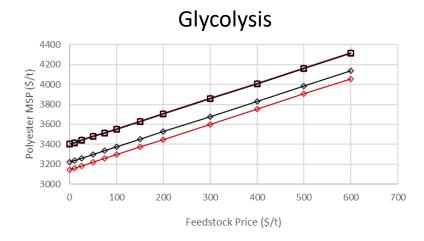
Techno-Economic Analyses

- Ratio factors are used to estimate outside battery limit costs from inside battery limit equipment costs with expected accuracy of ±30%.
- Three processes (pyrolysis, gasification, glycolysis) were modeled at multiple scales, locations, yields, feedstock prices and for repurposed facilities.
- TEA output is an estimated product minimum selling price (MSP)

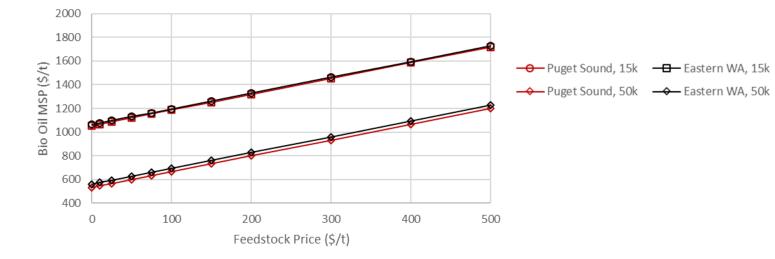
Techno-Economic Analyses

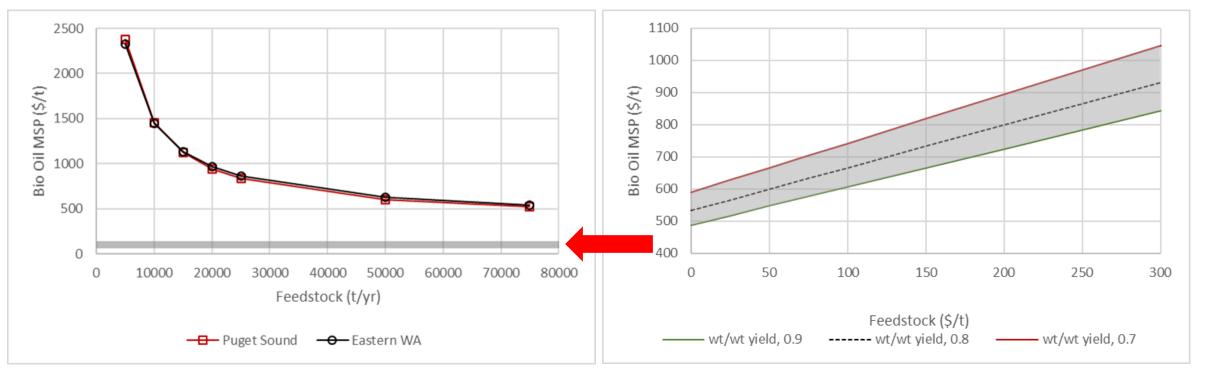






Techno-Economic Analyses: Pyrolysis





Summary

- Many options for plastics recycling technologies
 - All rely on clean feedstocks
 - Hybrid model shows promise
- TEA/Supply chain
 - Scale controls MSP more than location
 - Feedstock price and product yield are also influential
 - Price parity was not attained for the scenarios modeled.
- Many technologies fall short...NEED to consider the entire recycling supply chain
 - Design for deconstruction, better sorting capabilities, etc..



Leading the way to make plastics circular

Washington Recycling Development Center

Agilyx Snapshot

Overview



Founded

2004

F5

4 Global Locations



Bostor US



Number of Employees



100+



Key Partners

- Toyo AmSty
- ExxonMitsubishiChemical
- Braskem
- CP ChemNextChem
- Kumho

17 Years of Technology Development

16 Patents for Technology



c \$150m invested

Leader in Advanced Recycling

First commercial closed loop plastic to plastic facility



Recycling Pioneer

Technip

- Leader in advanced mixed-waste plastics recycling solutions
- Diversified revenue streams from technology license, equipment sales, operating royalties and feedstock service fees
- Working with a broad range of industries focused on petrochemical, retail and technology
- Sophisticated feedstock management and analytics

Corporate Structure and Key Activities

agilyx

- Asset-light, technology licensing model with multiple revenue streams
 - Feedstock IP (feedstock characterisations and recipes, supply chain optimisation)
 - Depolymerisation IP (Plastic-to-Plastic, Plasticto-intermediaries, Plastic-to-Fuels)



REGENYX

- Launched in 2018 as the first commercial closed loop plastic-toplastic facility
- 10 TPD plant that converts waste plastic into new plastic raw material with food grade quality

cyclyx

- Feedstock management system and the largest waste database in the industry
- Lowers the cost of feedstock
- Provides Agilyx with royalties for every kg of waste sourced



Agilyx Polystyrene processing: Output products & applications

















Polystyrene

Latex

Solution Styrene-Butadiene Rubber (SSBR)

Acrylonitrile Butadiene Styrene (ABS)



Agilyx Mixed Waste Plastics (MWP) processing:

Output products & applications





Polyethylene (via Naptha)





Polypropylene (via Naptha)

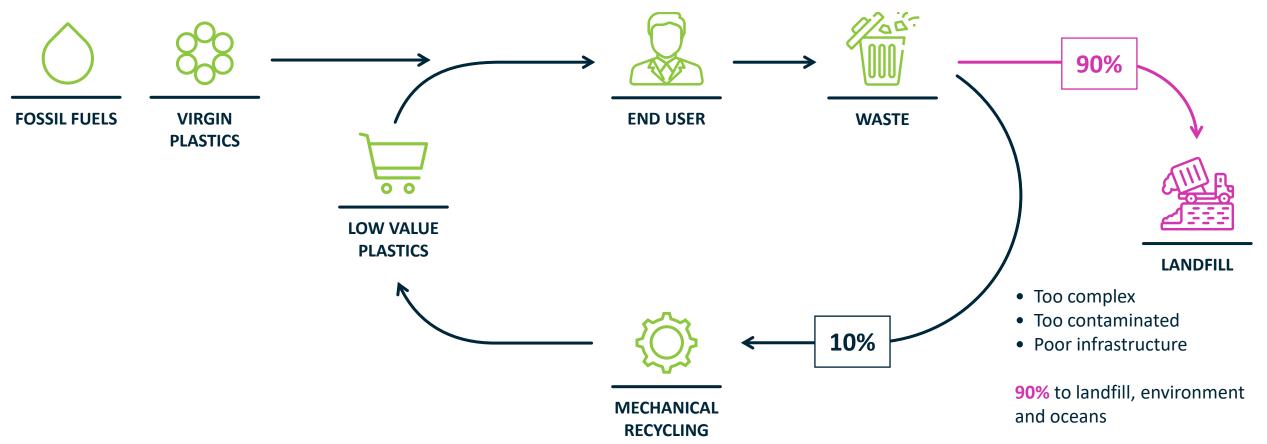




Bunker fuels



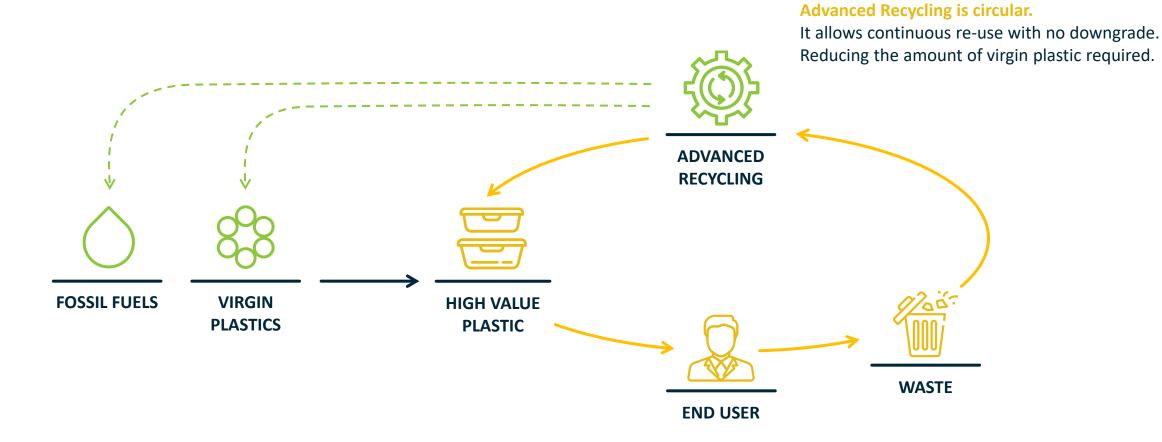
Mechanical Recycling: adds a limited loop to a linear process



Mechanical recycling is linear. After a few cycles mechanically recycled materials end up in a landfill or are incinerated, limiting overall recycling rate to ~10% (1)

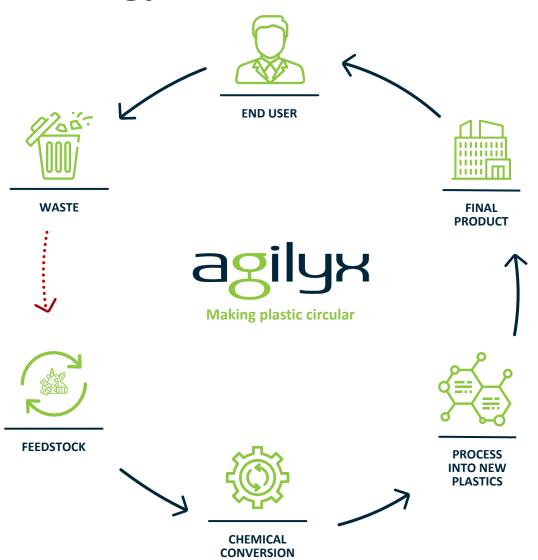
Source: 1) Geyer et al. (2017)

Advanced Recycling: making the linear process circular



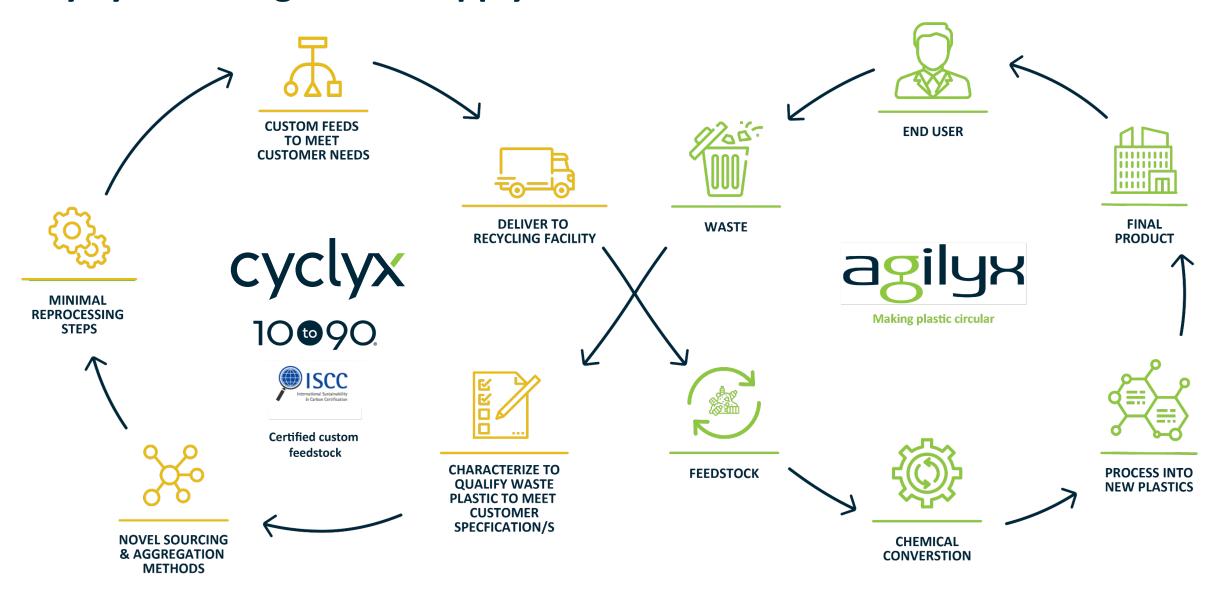
Agilyx Conversion Technology

Market currently not developed to convert waste plastics to useful feedstocks at the right scale





Cyclyx Creating a New Supply Chain for Waste Plastic





Cyclyx Brings a Completely New Approach to Plastics Recycling



Cyclyx International, LLC. ("Cyclyx") is a consortium-based company that has developed a variety of innovations that used in combination has the potential to greatly increase the recyclability of post use plastics.

10 to 90

Cyclyx has an ambitious mission: to increase the recyclability of post use plastics from 10% to 90%

- Enabling new recycling options that currently do not exist for ALL waste plastics
- Deploying new waste aggregation programs to divert
 ALL waste plastics from Landfill
- Developing new recycling facilities that have a greater ability to process ALL waste plastic
- Supporting entire recycling industry: existing mechanical and emerging advanced recycling
- Directing cost efficiencies to all Cyclyx members through a utility like model

Innovations Creating the New Plastic Recycling Model









CHEMICAL PROFILING TECHNOLOGIES

- Chemical Characterizations of waste plastics: largest chemical conversion database
- Development of custom feedstock recipes for wide range of recycled products
- Artificial Intelligence tools and predictive modeling



NEW / CUSTOM SUPPLY CHAINS

- Demand Based Custom Sourcing
- New takeback programs to capture new waste plastics
- New supply chains and sourcing
- Artificial Intelligence Optimized Logistics



CUSTOM PROCESSING

- Custom designed processing facilities
- Processing to Customer Product Specifications
- ISCC+ qualified feedstock



CONSORTIUM APPROACH

- International and multi-sector Consortium Model
- Operates as Profit Neutral Utility
- Financially Benefits all Members



Join Our Mission

10 to 90



Member Employee Activators 282,000+ (and growing!)













CORNING

























Contact Info:

Bill Cooper, SVP Strategic Partnerships Cyclyx International, LLC.

bcooper@cyclyx.com

+1 415-640-4089



How2Recycle Clarifying Packaging Recyclability

What is How2Recycle?

How does How2Recycle define recyclability?



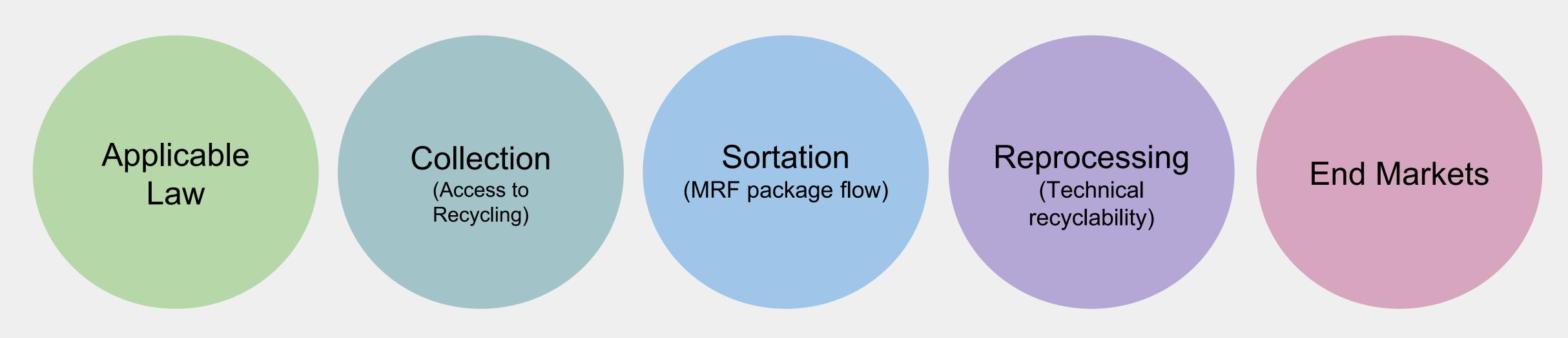


Over 400 brandowner and retailer members in the How2Recycle program in North America.





This is recyclability.



Consistency, Common Sense, Consumer Experience, Material Health

For complete criteria, visit the How2Recycle Guide to Recyclability at how2recycle.info/guide

Collection	. Access above 50% (Canada) or 60% (US) Access		
Sortation	 Size Shape Other attributes List of potentially relevant test protocols 		
Reprocessing	 Barriers, coatings, additives Color Closures Labels Attachments List of potentially relevant test protocols 		
End Markets	 Secondary material pricing Industry bale specifications Landfilling or incineration post-collection 		

Excerpt for conversation purposes only. For a complete list of assessment criteria, visit how2recycle.info/guide



How2Recycle reduces confusion by requiring <u>all</u> parts of the package to be labeled—including the parts that are <u>not recyclable</u>.



Widely Recyclable



*Not recycled in all communities

Sometimes Recyclable



Not Yet Recyclable



Store Drop-off

How2Recycle conducts a standardized recyclability assessment for every single package that features the label.

There are over 6500 unique How2Recycle labels in the marketplace, reflecting the vast complexity of packaging and recyclability today.



Behind every How2Recycle label is astandardized recyclability

assessment.







Not Yet Recyclable

Look a Like Packaging







New rule on material health

How2Recycle may render a package Not Yet Recyclable if it contains intentionally added substances that are harmful or potentially harmful to the environment and/or human or nonhuman animal health.

New rule on consumer preparation for recycling

Special instructions to consumers must be 'reasonable'; tightened requirements on label removal

New rules on interpreting access data

Guidance on how to manage inconclusive access to recycling results & more

New rule on end markets

Packages featuring Widely Recyclable labels must demonstrate 'strong end markets'.



Rule on all components Rule on size (less than 2 inches) Rules on disclosing coatings Rule on product residue Rules on labels and shrink sleeves Rule on closures and seals Rules on color: black, color and transparency Rule on PFAS







65%

Change their behavior as a result of the How2Recycle label or website.

Survey at how2recycle.info, 2020 for download at brandfolder com/

Survey at how2recycle.info, 2020. Report available for download at brandfolder.com/how2recycle

87%

Of consumers on a 2021 survey found the label somewhat (34%) to very helpful (53%) 2021 HCD research label testing study

How2Recycle is also helping improve packaging design.









Agenda

Part 1:	Intro
Part 2:	Successes
Part 3:	Proposals
Part 4:	Questions





The Cannabis Alliance is Washington State's largest industry association with just over 220 members including licensees, patients, students, and ancillary businesses.

Committees

Community Engagement

Development

Education

Equity & Justice

Events

Hemp

Human Resources

Legislative

Patient

Social Consumption

Sustainability

Membership

Volunteer

Womans

The sustainability committee began as the packaging waste and sustainability committee and has broadened the scope of work to all types of sustainability initiatives.

Sustainability



Reducing plastic waste

PACKAGE THICKNESS FROM 4ML TO 2ML
The Cannabis Alliance is dedicated to a sustainable industry in all its
forms and we are constantly looking for ways to reduce our
environmental impact. We brought this solution to the LCBs attention
and advocated for a 2mil standard in order to reduce our poly bag
waste by 50%. A 2 mil thick bag meets all FDA & USDA requirements for
food safety and provides adequate barrier protection.

Utilizing our partnership with Headset Data, along with some packaging sales data from a few of our packaging members, we were able to quantify the following waste reduction impacts.

	ANNUAL SALES	WEIGHT REDUCED IN GRAMS	WEIGHT REDUCED IN LBS	WEIGHT REDUCED IN TONS
gram bags	4,780,221	7,170,331	15,794	7.9
1/8th bags	9,064,673	18,129,346	39,932	20.0
1/4oz bags	1,173,857	3,521,571	7,757	3.9
1/2oz bags	485,025	2,425,127	5,342	2.7
Oz bags	733,267	4,399,602	9,691	4.8
Totals	16,237,043 bags	35,645,977 grams	78,516 lbs	39.3 tons

Reduction of plastic waste in landfills



- MADE FROM
 RECYCLED PLASTIC
- COMPETITIVE PRICING
- MADE IN USA
- RELIABLE SUPPLY CHAIN



CANNABIS PACKAGING SPECIALISTS

(360) 454-9200

info@snocopackaging.com

SnoCo Packaging invested in a mold to bring the most popular joint tube packaging from overseas to Everett, WA. We make these child resistant joint tubes from 100% recycled PP at a competitive price point to the overseas product.



Waste Reduction Opportunities





On Farms

- Nitrile Gloves Recycle Program
- Plant Waste Rules with LCB: allowing for composting and other sustainable uses.

Recycling

Many if not most items are made to be recyclable but very few items actually get recycled. A lot of cannabis packaging is too small to be recycled in the curbside system.



At Retail

PP recycle program joint tubes, jars, lids,etc

Vape Battery Recycle
Partner with
Call2Recycle

Concentrate Jar upcycle & recycle program



Contact Us

www.thecannabisalliance.us

Jason Lammers jason@snocopackaging.com

Caitlein Ryan
Caitlein.ryan@thecannabisalliance.us

American Chemical Council & Return-It

Plastic Film Recycling Pilot

PROGRAM OVERVIEW



Overview

ACC and Return-It will implement a four-month pilot conducted in King County, Washington State.

The purpose is to test a program that identifies best practices, develops the requisite services and measures participation and outcomes.

A tool kit of standards will be available to ensure consistent messaging for;

- Collection at retail locations
- Consumer/Public participation and engagement
- Transportation and auditing of material collected
- Recycling of the product collected in a responsible manner

An EPR Stewardship Plan template will also be developed for use in multiple jurisdictions or nationally across the U.S.



Operational Overview

Key Players:

ACC is the primary stakeholder and funding partner contracting with all key stakeholders to implement the following; Sponsors of the pilot – Dow Chemical, Nova Chemical, PAC and General Mills

- Return-It Oversees logistics, auditing and development of standard practices and the stewardship plan template
- Cascadia identify and sign-up retail collection partners in King County to participate in the pilot and collect material at their stores
- CWRR picks up and transport materials to Seadrunar
- Seadrunar sorts and bales materials, and prepares for shipping to Merlin
- Merlin Plastics recycling partner. Merlin will recycle the plastic film and sell the commodity for use in new products.

Stores will receive regular pickups and the material will be transported to be sorted and baled. Materials will be delivered to Merlin Plastics where Return-It and Merlin will conduct audits, collect tonnage and recycle materials.



Key Performance Estimates

- Pilot to be conducted Jan April, 2022
- Consumer Awareness plan and tool kit developed and presented to key stakeholders, steering committee and participating retail collection partners
- Bins and signage delivered to retailer collection partners
- 11 retail collection partners in the King County Area signed to participate
- Collection partners will print, use material in-store and distribute messages based on the tool kit plan
- Material pick-up from stores on a bi-weekly or monthly schedule dependant on volume.
- Estimated volume 600 lbs per store per month (about 10,000 lbs total)
- Return-It and Merlin will audit material collected and ensure it is recycled responsibly
- A final report on the KPI's and a Stewardship Plan template will be developed



Campaign Overview

Launch Event

- Public Outreach Campaign Key Elements – Social & traditional media
- Retail Partners –
 Resources, outreach
 plans
- Material audits, quality focus



Plastic Film Recycling Pilot

MARKETING MATERIALS



Participating retailer collection sites, staff/management level:

Customizable information piece; digital piece with downloadable version for printing. Designed in different formats to be adapted to the store needs



Participating retailers, customer level:

Toolkit with retailer assets available for download





Retail Bins

This retail collection bin has the capacity to hold significantly more material than traditional bins.

Size: 36X12

ORDER HERE

Counter Signage

The counter signage is a visible reminder to retail customers about recycling their household film packaging using at-store collection bins. recycling without increasing contamination.

DOWNLOAD HERE



Size: 11x17

Retail Poster

This poster is designed to go on or above your film recycling bin. Clear messages plus images have been found to be the most effective way to increase film recycling without increasing contamination.

DOWNLOAD HERE

Tip Card

This tip card is universally used by partners to spread the word. It is easy to hand out with receipts or use as a bag stuffer. recycling without increasing contamination.

DOWNLOAD HERE



Size: 4x7

Window Cling

This window cling, usually placed at the front entrance, allows you to announce to your customers your participation in a national program dedicated to enhancing plastic film recycling. You are also providing an importance service to enable your customers to recycle their household film packaging

Size: 8.5x11







Size: 4x7

Participating retailers, customer level:

In Store Signage/Collateral – e.g., shop stopers/danglers, counter signage with QR code redirecting to landing page

2 versions available in standard sizes:

- Ready to print
- Customizable areas with spot for store brand logo

All available for download - ready to print files

QR code with link to milk landing page on our website





Participating retailers, customer level:

Social Media – Geotargeted social media campaign (WRAP)

W.R.A.P. to post and retailers will repost

Social Media Toolkit – Available for retailers:

Develop a contact list of communications contacts at each participating retail partner.

- Copy deck, with different versions to share on social media and relevant hashtags
- Image assets, in different formats for all social media platforms with customizable branding area for logo placement.
- W.R.A.P's social distribution schedule to amplify messaging





Social Media Toolkit

Post type: Location awareness

Platforms: Facebook, Twitter, Instagram

Copy:

#<u>DYK Plastic</u> bags and wraps do not go on the curbside recycling bin. Make sure they get recycled and drop them off them at one of our <u>retailers</u> partners. To find a location visit https://plasticfilmrecycling.org/locations



Post Type: Educational

Platforms: Facebook, Twitter, Instagram

Copy:

#DYK plastic bubble-lined mailer can be recycled? Drop them off at your local participating retailer. To learn more about what can be recycled visit https://plasticfilmrecycling.org





Google Grant

Google Ad Grants shows your message to people searching for relevant information

Each qualifying nonprofit has access to up to \$10,000 per month in search ads shown on Google.com. Additional Google Ads may be purchased in a separate account.

To capitalize on any users actively seeking information on plastic film, packaging bags and wrap recycling, a keyword group focusing on each packaging type can be created for Google Ads Keyword Tool





Public Relations, Story Telling Opportunities

Podcast opportunities

Support with media release distribution

- Engage with City of Seattle and King County
 - Inquire regarding news and information distribution to residents possible inclusion of our messages

Blog opportunities

Revise media release into a blog story hosted on the W.R.A.P site

Social media posts linking to the podcast, release and blog post to amply distribution of the pilot information



2022 Pilot/Campaign Timeline

Item	January	February	March	April
Preparing outreach materials & retail partners for pilot implementation	Jan. 4-14 th			
Material audits	Jan/ Feb Baseline		March 7-14 th	April 4-18 th
Launch Consumer Awareness Campaign (press release, virtual launch event)		Feb 15 - 28		
Launch stakeholders public outreach efforts (social media, traditional)		Feb. 15 th		
Stewardship Plan Template Development			7-14 th	April 4-17 th
Campaign Report Results			March7-April 4 Distribution for input	April 29 ^{th-} Final Report
Stewardship Plan Development				April 30- May 15



Stewardship Plan Development

Responsibility of the producers, Brand Owners and/or agency

Products covered under the plan

Stakeholder consultation

Collection system – Public access levels

Management of products and environmental impacts

Consumer education and awareness

Performance management reporting

Recovery and participation results

Draft timeline – April 2022



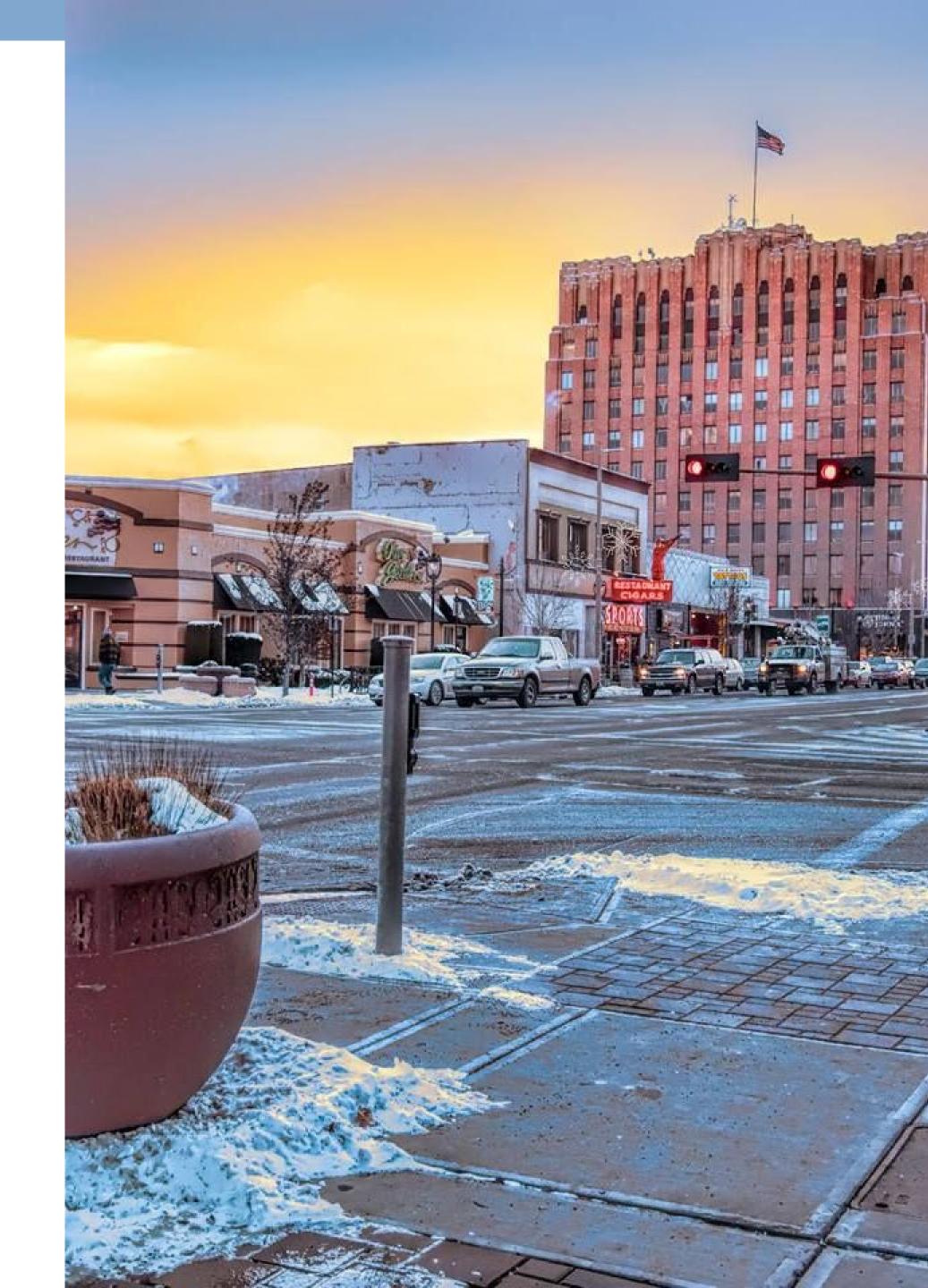
Wrap up

Next meeting:

- Wednesday, April 13, 2021
- Potential topics: further plastic discussion, move to discussion on textiles

Tasks from today:

- Notes from today will be posted next week
- Draft plastic summary





See you at the April 13th meeting

Link to the next ZOOM meeting will be included in an email update next week with today's notes.