

SUNDAY, JULY 30

## Savor, Rinse, Repeat: The Return of Reusable Food and Beverage Containers

While takeout food has long been in practice around the world, it was not until the mid-20<sup>th</sup> century that single-use, non-biodegradable takeout containers became the norm. As restaurants catered to busy, on-the-go customers, single-use containers offered a durable, lightweight, and easy to buy and dispose option that quickly took hold in restaurants and food service businesses. Decades later, this amounts to an estimated 1 trillion food service containers thrown away each year just in the United States. In Canada, it accounts for nine percent of the country's overall plastics waste stream.



Enter **REUSABLES**, a Vancouver-based company aiming to roll back single-use containers and resurrect reusable packaging for food and beverages. Their durable stainless steel products (see above) are designed to be cycled through a closed-loop system that includes retailers, consumers, and the company itself. Reusables coordinates the point-of-distribution experience, collection, washing, re-distribution, and software systems needed to make reusable food and beverage containers a viable and consumer-focused commercial venture.

In the two cities in which they operate, Vancouver and Seattle, Reusables has 50,000 food service containers in circulation at more than 100 total restaurants, stores, and cafes. After consumers buy their food/drink, the store offers them the opportunity to sign up to participate in the program and receive their authentic "Reusables" container. Off they go! They then have 14 days to return the container to any of the vendors partnering with Reusables. If they fail to return the container, they will be charged between \$15-\$25 for the cost of replacement.

### QUESTIONS TO CONSIDER

- What policies are making the business case for companies like Reusables?
- How do single-use plastics bans at national, provincial, or municipal level affect their company?
- How do the economics of reusable containers work for Reusables and their partners? How many times does a container need to be reused for Reusables to make money? How many times can the containers be reused before they must be replaced?
- Is this a model that will only work in denser urban areas?
- Are compostable containers more environmentally-friendly than reusables? What are the advantages and disadvantages of each container type?

MONDAY, JULY 31

## Garbage, Organics, and Recyclables, Oh My! The Metro Vancouver Waste Hub



**Metro Vancouver** is a federation of 21 municipalities, one electoral area, and one treaty First Nation that collaboratively plan for and deliver regional-scale services in and around Vancouver. Their responsibilities include the operations of waste management facilities and systems.

We will kick off our Monday in Vancouver by visiting their just opened United Boulevard Recycling and Waste Centre. Perched on top a former landfill, this transfer station can process up to 600 tons of trash, recyclables, and organics per day. It acts as a staging hub for various types of waste that is then sent off to the appropriate end destination (i.e. composting site, recycling plant, waste-to-energy, landfill, etc.).

### TERMS TO KNOW

**Contamination** refers to the presence of unwanted or harmful substances mixed with waste materials. It occurs when non-recyclable, hazardous, or improperly sorted items are mistakenly included in a waste stream intended for recycling, composting, or disposal.

Contamination poses several challenges in waste management processes. For instance, it hampers recycling efforts by reducing the quality and value of recyclable materials. Contaminated waste may also require additional sorting, cleaning, or disposal measures, increasing operational costs and environmental impact. Furthermore, it can jeopardize the safety of workers involved in waste management activities.

**Extended producer responsibility (EPR)** is a policy approach that assigns cost and responsibility for managing end-of-life products to producers. In British Columbia, the primary extended producer responsibility statute is the **BC Recycling Regulation**. Regulated products include beverage containers, electronics, used motor oil, residential packaging, and more. EPR stewards report annually on their program performance, including quantities collected, recycling rates, and final fate of all collected materials.

Local governments may choose to get involved in EPR programs through the operation of recycling depots or other means. It is up to each municipality's discretion the extent to which it engages with EPR stewards.

California's landmark SB54 borrows tenets from British Columbia's produce responsibility model. BC showcases several different mature EPR programs that could be instructive for California as it implements SB54.

## **MEETING THEMES**

**Combatting Contamination** – Transfer stations like United Boulevard are the last best chance to prevent contamination before it gums up the works of expensive machinery or operations. Several enforcement officials work at Metro's transfer station inspecting loads of garbage, recyclables, and organics to prevent unwanted materials from hitching a ride. While product design and household/business sorting are the front lines in mitigating contamination, ongoing evaluation of the waste stream and continuously educating the public is required to reduce costly, dangerous, and wasteful practices.

## **Opportunities for Partnership Between EPR Programs and Municipalities**

– While EPR puts producers in the driver's seat for establishing collection and recycling programs, local governments can still have an important role to play in partnering with stewardship agencies to advance high levels of recovery. At Metro Vancouver's Recycling and Waste Centre, we'll see several EPR drop-off sites on property, including for bottles & cans, used oil, electronics, and more (see right). The producers value the co-location at a heavily frequented waste site as it helps promote their recovery efforts. For their part, Metro Vancouver benefits from seeing more waste end up with producers rather than landfills while generating some extra revenue by leasing out space on their land.



**Limited Space for New Investments** – Not unlike California, it can be difficult to identify appropriate land for new waste management facilities in Vancouver. Metro Vancouver worked around spatial limitations by building their new waste center on top of land they already owned...in this case, a landfill that reached the end of its useful life. Though the novel use of a brownfield site was a cost and time saver in some respects, it did come with its drawbacks, including some uneven terrain and the ongoing environmental mitigation and oversight to ensure it is safe for the public.

## **QUESTIONS TO CONSIDER**

- Where does Metro Vancouver send its waste that can't be reused, composted or recycled? How do local communities feel about waste-to-energy vs. landfilling?
- How much does it cost to dump garbage at the Metro facility versus your average California landfill? How effective are their prices in shaping Vancouverite behavior?
- Metro has several bans of materials that can be accepted at the facility – how effective are these bans?
- What issues are associated with building a transfer station on top of a former landfill? How is Metro Vancouver addressing the ongoing methane emissions from the still decomposing landfill?



MONDAY, JULY 31

## Breaking Down Drywalls – Gypsum Recycling in Action



*Drywall being dropped off at New West Gypsum Recycling.  
40 years ago, this waste would have gone to a Vancouver landfill. In California, much of it still does.*

For our second stop on Monday, we will visit **New West Gypsum Recycling (NWGR)**, one of the largest drywall recyclers in Canada. This family-run business was the first to take post-consumer gypsum back to drywall manufacturers to offer an alternative to mined gypsum.

Since 1985, NWGR has recycled 7.2 million tons of drywall materials, including paper, gypsum rock, and nails. We will see firsthand how wallboard is disassembled as we learn about circularity in the industry.

NWGR uses a mechanical process to separate the gypsum core from the paper backing, after which both materials enter separate recycling streams. The gypsum core is taken to a nearby wallboard manufacturing facility for use in new products. While the paper backing is sent to various paper recyclers for re-use. No chemicals or additives are used in the recycling process.

### TERMS TO KNOW

**Gypsum** is a rock valued for its use in the construction industry. There are three main sources of gypsum:

- 1) **Naturally occurring gypsum** that can be mined from ancient ocean beds
- 2) **Synthetic gypsum** created as a waste byproduct from coal-fired power plants.
- 3) **Recycled gypsum**

Gypsum rock is widely used to manufacture drywall. Gypsum can also be used in other applications, such as making plaster for wall and ceiling finishes, as an additive in cement production, and as a soil conditioner in agriculture. Its versatility, ease of use, and abundance make it a valuable mineral in various industries and a crucial component of modern construction materials.



## **MEETING THEMES**

**The Birth and Evolution of Waste Management Markets** – In response to odor and environmental impacts, the metropolitan region of Vancouver made it illegal to dispose of drywall in landfills in 1984. This ban kicked off the development of a new market for managing the waste, one that is still evolving to this day.

The Vancouver construction industry first turned to dumping it in the ocean, sending the rock back to the sea floor where it was naturally created in the first place. As the industry leaders looked for better alternatives, New West Gypsum Recycling emerged with a recycling solution in 1987. Over time, their proven success and the arrival of other drywall recyclers swayed policymakers to encourage recycling by banning the once-preferred practice of ocean dumping.

What is next for gypsum recycling in Canada, British Columbia, and Vancouver remains to be seen. While the recycling market seems to be prospering, New West Gypsum would suggest there is room to further boost recyclers as they look to outcompete naturally occurring and synthetic forms of gypsum.

For California, its gypsum pipeline is alive and well as 1.8 million tons of new drywall are needed each year in our state. With no statewide policy for managing post-consumer wallboard, drywall accounts for two percent of the waste ending up on landfills.

**Making Better Use of Construction Waste** – During our week together, we will learn about new approaches to better manage construction waste end-of-life. These bulky, sometimes toxic, materials often end up landfilled despite the many second-life opportunities that could await drywall, metals, masonry, pipes, carpet, and more. In California, it is estimated that construction waste comprises 20-30 percent of the landfill waste stream. How might California go about creating better outcomes for construction materials?

## **QUESTIONS TO CONSIDER**

- New West Gypsum touts that their recycled gypsum can cost as little as ~\$5/ton versus ~\$20/ton for mined gypsum – to what extent are drywall manufacturers making purchasing decisions based off of simple cost comparisons? What other factors affect the competitiveness of recycled gypsum?
- What would it take to make drywall products more recyclable? What feedback does New West Gypsum share with drywall manufacturers to ease the recyclability of their products? Are the manufacturers heeding their advice?
- Why would California benefit from encouraging more drywall recycling? What policies and programs could help to reduce or eliminate how much gypsum goes to landfill?
- New West Gypsum operates around the world, what successful recycling models might California wish to emulate? What are “green” tariffs and how might that help boost recycling?

MONDAY, JULY 31

## 99 Bottles of Beer on the Wall...What Happens Next?



We will wrap up our Monday with a special tour of a warehouse operated by **Brewers Distributor Limited (BDL)**. BDL is a private joint venture company owned by Labatt Breweries of Canada and Molson Breweries that is responsible for the 1) wholesale distribution of beer and 2) the collection of returnable, refillable and recyclable beer containers within the four Western Canadian Provinces, as well as Northwest Territories and the Yukon.

BDL operates nine distribution centers and four cross dock facilities (full containers going out and empties coming in). We will learn how, and why, BDL has the unique mission of operating two distinct business across several different provinces.

### **ORGANIZATION**

**Brewers Recycled Container Collection Council (BRCCC)** is a not-for-profit entity whose members represent over 95 percent of overall beer production in British Columbia and the majority of import production. These beer producers appointed BRCCC as their stewardship agency under the British Columbia extended producer responsibility regulation. Essentially, beer producers can join and pay into BRCCC to fulfill compliance with the Province's EPR rules.

BDL is the service provider with which the BRCCC contracts to effectuate their plan to recover, reuse, and recycle beer containers. On behalf of the BRCCC, BDL collects refillable glass beer, cider, and cooler bottles as well as imported and domestic metal beverage alcohol cans sold in British Columbia and the secondary packaging that accompanies those items (paperboard cartons, trays, etc.).

Due to the efforts of BRCCC and BDL, approximately 90 percent of all beer containers sold into British Columbia are recovered.

### **TERMS TO KNOW**

**Industry Standard Refillable Glass Bottle (ISB)** is an amber, refillable, screw top, 341mL bottle used by domestic Canadian brewers. The bottle is standardized to allow for easier reuse. After recovery and wash, ISB's can be sent to any participating beer manufacturer who will then refill the bottle with their particular brew.

## **MEETING THEMES**

**EPR: A Flexible, Cross-Jurisdictional Model** – As noted, BDL manages both the distribution of new beer containers and the recovery of empty containers. This novel dual mandate is a result of EPR regulations empowering producers (i.e. BRCCC) to come up with their own model, so long as the resulting system fulfills Provincial targets. It also enables producers to tap into their existing facilities and logistics to see that recovery efforts are optimized.

For example, BRCCC/BDL realized there were efficiencies and costs savings when recovery of used containers happened in conjunction with the distribution of new product. Simply, unopened beers could be dropped off at retailers, and instead of leaving with an empty truck, used containers could fill the truck for return to the warehouse. This “reverse logistics” approach demonstrates producer-driven innovation that leverages industry infrastructure and processes.

The EPR approach also allows producers who sell into different provinces to rely on a single service provider to fulfill their mandates. Rather than more prescriptive regulations that may inhibit cross-jurisdictional collaboration and operation, EPR largely leaves it up to the producers to devise a system to meet their targets. Provincial regulators require annual reporting from producers on their progress with periodic audits by third parties to ensure accurate and transparent information sharing and compliance.

**Making Refillables Viable** – After CFEE’s visit to Oregon and Washington in 2020, one inspired policymaker returned to California determined to allow reusable containers in our bottle recycling system. The resulting legislation, now passed and signed, enabled the preservation of reusable bottles so that they could be washed and refilled by beverage producers rather than being crushed for recycling. It also allowed for refillable bottles to flow through the state's Beverage Container Recycling Program (CRV/Bottle Bill), balancing the playing field between bottle washers and recyclers by paying the same amount.

BDL perhaps showcases the next step for California in our refillable journey. In 2022, 90 percent of the ISB’s in British Columbia were recovered along with 85 percent of the proprietary refillable bottles. These refillable beer containers were reused 15 times on average. What would it take for California to see these levels of recovery and reuse?

## **QUESTIONS TO CONSIDER**

- Are there beer producers who are not participating in BRCCC? How do they fulfill their recycling mandates?
- Does British Columbia prohibit certain types of containers? Or are these decisions left to producers as they explore how to best fulfill their EPR requirements?
- Why is the recovery of beer containers regulated separately from other beverage containers? Does it create inefficiencies?
- How many times can you wash and reuse an ISB before it needs to be crushed and recycled?
- What are the economics of ISB’s versus aluminum cans? What do consumers think about aluminum versus glass?
- Does California have any version of industry standard beverage container that supports the refillable concept?



TUESDAY, AUGUST 1

## Direct Air Capture – Making a Circular Carbon Economy



*Carbon Engineering Innovation Centre in Squamish*

North of Vancouver in the picturesque town of Squamish, **Carbon Engineering** operates a cutting edge research and development facility focused on the direct air capture of carbon dioxide. Carbon Engineering's goal is to improve the efficiency, scalability, and cost-effectiveness of their technology to make it more viable for large-scale implementation of direct carbon capture, storage, and use.

### **TERMS TO KNOW**

**Carbon Dioxide Removal (CDR):** Also known as negative emissions (or carbon drawdown), Carbon dioxide removal is a broad term that describes several activities that remove carbon dioxide from the atmosphere and permanently stores it, including underground or beneath the ocean floor. CDR includes direct air capture, forest expansion, soil carbon sequestration, spreading out crushed rocks that can absorb CO<sub>2</sub>, and various ocean-based techniques.

**Direct Air Capture (DAC)** refers to one type of CDR whereby CO<sub>2</sub> is vacuumed directly from the air and subsequently stored or utilized. This technology has gained significant attention due to its potential to remove CO<sub>2</sub> already floating in the atmosphere. The process is not unlike what plants and trees do every day, except DAC does it faster, with a smaller footprint but a much higher price tag. The Carbon Engineering Innovation Centre we will tour on Tuesday is an example of DAC.

**Carbon Capture, Utilization, and Storage (CCUS)** is a climate mitigation measure in which carbon dioxide waste is collected at the point source of emissions and either stored in geological formation or used for alternative purposes.

## **MEETING THEMES**

**Viewing CO<sub>2</sub> as a Waste Byproduct and Opportunity for the Circular Economy** – While we do not typically associate CO<sub>2</sub> with waste streams like plastics, paper, or organics, that is exactly what it is; just another byproduct of human consumption. And like uncaptured trash littering beaches or waterways, the uncontrolled disposal of CO<sub>2</sub> has its own set of environmental consequences that could be alleviated by applying circular economy concepts to its management.

Instead of forgetting about CO<sub>2</sub> once it has been emitted, you can instead collect it (not unlike your blue or green bins) and find alternative uses for it (not unlike recycling or composting). Early examples of CO<sub>2</sub> utilization include synthetic fuels, greenhouses to spur plant growth, chemicals, building materials, industrial processes, consumer goods, and surely more to come. There are also emerging markets for permanently storing CO<sub>2</sub> as governments incentivize sequestration as a needed climate mitigation measure. Although carbon capture will not take the place of investing in renewable energy, zero emission vehicles, and smarter land management, it will reduce CO<sub>2</sub>'s presence in the air and its effect on our climate as we close the carbon loop.

**The Brewing Battle Over Carbon Recycling & Storage Markets** – The International Panel on Climate Change (IPCC) is the scientific group assembled by the United Nations to monitor and assess all global science related to climate change. The IPCC has determined that to limit warming to 1.5 degrees Celsius, it will require the removal of 6.6 billion tons of CO<sub>2</sub> each year by 2050. That is more than the weight of all petroleum produced today.

In response to the work of these top climate scientists, governments around the world are grappling with how to incent the deployment of carbon removal technologies. Some have taken a more expansive view of supporting carbon capture (i.e. Denmark) while others are being very careful about the types of carbon removal industries they create (i.e. California).

Some believe even just encouraging DAC and storage might take the wind out the sails of transitioning to renewable resources. For others, DAC and usage does not warrant government support if it is just providing another feedstock for the carbon economy. And there are those that look at the DAC, other forms of CDR, and CCUS as several needed options to help mitigate emissions while maintaining our modern lifestyle. With advocates lining up all across the spectrum and companies touting their carbon capture credentials, the policy debates are just heating up as worsening climate impacts will continue to ratchet up pressure to do more.

## **QUESTIONS TO CONSIDER**

- How does Carbon Engineering's direct air capture technology compare to other carbon capture methods in terms of efficiency, scalability, and cost-effectiveness?
- Several carbon capture projects are beginning to take shape in California – how have they been funded? How has California policy enabled or hindered their development?
- What does Carbon Engineering think about building one of their projects in California?
- To what extent should California embrace DAC+usage (perhaps only carbon neutral) versus DAC+storage (carbon negative)?
- How can California leverage the captured CO<sub>2</sub> for various applications, such as the production of synthetic fuels, chemicals, or building materials? Are there any specific industries or sectors within the state that could benefit the most from these CO<sub>2</sub> utilization opportunities?

TUESDAY, AUGUST 1

## A Second Life for Buildings – Deconstruction Over Demolition

For our final meeting in Vancouver on Tuesday, we will visit with **Unbuilders**, a company specializing in the deconstruction of buildings. Rather than demolishing a structure and hauling the resulting waste to the dump, Unbuilders salvages building materials for recycling. We will see one of their active deconstruction job sites.

Unbuilders's process yields less than five percent landfill waste on average. This amounts to diverting 55 tons of waste and salvaging 11 tons of lumber! They proudly hold the City of Vancouver's record, with a 99 percent salvage and recycle rate on a single-family home.



*Unbuilders Founder Adam Corneil in front of one of their job sites. Adam will be on vacation during our visit, but we will meet with his deconstruction team.*

### MEETING THEMES

**Prizing Broader Benefits Over Short Term Costs** – While there is no disagreement that demolition is a faster and cheaper option up front, deconstruction offers an array of direct and indirect benefits that arguably make it a superior approach.

For example, as mentioned in a previous CFEE Briefer, construction debris accounts for 20-30 percent of all the trash ending up in California landfills. Of that waste, it is estimated that 90 percent comes from building demolition alone, suggesting that the Unbuilders model provides an opportunity to take a big bite out of the landfill waste stream.

Another impressive benefit comes from recovering the many wood products. One study found that if the 200,000 – 300,000 homes that are demolished in the United States year were deconstructed instead, the reclaimed lumber would be sufficient material to build 100,000 homes.

**A New Opportunity for Skilled Jobs** – According to Unbuilders, deconstruction jobs generate six jobs for every single demolition job. These jobs also require workers with additional training and skills to ensure careful dismantling in a safe and efficient manner. Further, deconstruction expands and creates new jobs for remanufacturing recovered materials. Unbuilders has increased the workload of their recycling partner Heritage Lumber, who specializes in the milling and processing of reclaimed old growth lumber.

### QUESTIONS TO CONSIDER

- How much longer does it take to deconstruct versus demolish?
- How does Unbuilders compete with traditional demo companies on a cost basis? What tax credits offset their costs?
- Are there types of buildings that cannot be deconstructed?
- What does the market look like for selling salvaged building materials? What is valuable, what is less so?
- What policy ideas would Unbuilders like to see implemented to incent their business model?



WEDNESDAY, AUGUST 2

## Welcome to Alberta! A Novel Approach to Waste Management



Our first day of meetings in Alberta will open with several leaders sharing their insights on the province's vision for waste management and its unique approach to resource stewardship. We will then examine their impressive bottles & cans recycling program, which typically ranks first in Canada with its 83 percent recycling rate (even ahead of British Columbia). Later, we will meet with one of Canada's largest plastics producers – NOVA Chemicals – and learn about their vision for circularity in the world of plastics. Our day will conclude with a savory and sustainable dinner at renowned local restaurant Deane House.

### **ORGANIZATIONS**

**The Alberta Recycling Management Authority (ARMA)** is a non-governmental entity that acts on behalf of the province to oversee end-of-life processing of tires, electronics, paint and used oil materials. Established in 1992, ARMA is authorized to levy and collect surcharges (environmental fees) on the sale or supply of designated material in or into Alberta. These funds are used to provide or pay for programs, infrastructure, and research that reduce waste and increase recycling.

ARMA is taking the lead on implementing an ambitious policy shift in how Alberta manages its waste. Due to launch in 2025, ARMA will oversee the newly-enacted extended producer responsibility (EPR) regulations. The EPR rules cover single-use products, packaging and paper products, as well as hazardous and special products.

**Emissions Reduction Alberta (ERA)** was created in 2009 to help deliver on Alberta's environmental and economic goals by investing revenues from the province's carbon tax. ERA invests in the pilot, demonstration and deployment of clean technology solutions that reduce GHGs, lower costs, attract investment, and create jobs in Alberta. For every dollar invested by ERA, \$5.50 has been invested by funding partners. We will learn about several of their funding programs that invest in cutting edge recycling projects.

**Beverage Container Management Board (BCMB)** is responsible for the regulation of Alberta's beverage container management system. Like ARMA, they are a not-for-profit, non-government organization given an oversight task that would typically be done by a public agency in California (i.e. CalRecycle). Their President will brief our group before we go out into Calgary to see bottle recycling in action.

**Alberta Beverage Container Recycling Corporation (ABCRC)** oversees the collection and recycling of more than 150,000 different types of regulated, non-refillable beverage containers sold in Alberta. Used beverage containers are transported from more than 220 independently-owned depots located throughout Alberta, then sorted and processed at ABCRC facilities. After processing, ABCRC sends containers to recyclers in Canada and the United States to remanufacture bottles made of plastic, glass, and aluminum.

**NOVA Chemicals** was spun off its parent company (NOVA Corporation) in 1998 to become a standalone plastics manufacturing company. The company generated \$4.5 billion in revenue last year. Their products include everything from flexible food packaging to heavy duty sacks, to trash liners, bottles, caps and much more! NOVA has sustainability goals of achieving the sale of 30 percent recycled content of polyethylene by 2030 and becoming carbon net zero by 2050.

## **MEETING THEMES**

**Systematic Investing in Circular Innovation** – In 2023, ERA invested \$44 million through its Circular Economy Challenge to projects across the province worth \$400 million in public and private investment. If successful, these projects will lead to cumulative greenhouse gas (GHG) reductions of up to 4.4 million tons by 2050—equal to offsetting the GHG footprint of 1 million homes. While the scale of the investment seems minor compared to California, proportionally it represents a sizable commitment to connecting the circular economy to Alberta’s decarbonization agenda.

**Another Successful Bottle Recycling Model – Can California Replicate Some of Alberta’s Methods?** Through CFEF travels to British Columbia, Oregon, Ontario, and Maine, our group has seen several successful beverage container management systems. Each demonstrate customer convenience, financial sustainability, and overall effectiveness that are clearly ahead of California. As we learn about Alberta’s prospering depot-driven model that is administered by non-government entities, what can we take away from their secret recipe that could boost California’s flagging bottle bill?

**Plastics Are Here to Stay...Is a Global Strategy Needed?** A 2022 report by the Organization for Economic Cooperation and Development (OECD) projects that the amount of plastic waste generated globally is set to almost triple by 2060. That same OECD report expects that approximately half of plastic waste will end up in landfills with less than one-fifth recycled. Fifteen percent will end up in uncontrolled dumpsites or waterways.

Not unlike viewing climate policy through a global lens, the scale of the plastics challenge may similarly warrant evaluating state-level planning for how well it aligns with and augments international actions. With SB54 providing an important vehicle for California to work with industry to reduce plastic waste and increase recyclability, it could also provide an opening to partner with industry and governments on a bigger scale so that better designed plastic products sold into California can also find a home in developing countries.

## **QUESTIONS TO CONSIDER**

- Why does Alberta empower so many non-government organizations to administer their recycling systems? How has this philosophy led to successes? What are the downside?
- How does Alberta structure its carbon pricing? How does it compare to California’s cap & trade?
- Does ERA invest in carbon capture projects? What technologies are looking promising on that front?
- Would Alberta’s bottle system work more smoothly if depot operations were standardized? What are the tradeoffs with allowing each depot owner to develop his or her own collection and sorting process?
- What does NOVA make of Alberta’s transition to EPR for plastics and packaging? Does the prospect of the new EPR regulations make them rethink their product design to make it more recyclable?

THURSDAY, AUGUST 3

## Organics and the Composting Opportunity

In California, the majority of waste that goes to landfills is organic material (24 million tons disposed in 2018 – see Exhibit A on Page 2). This not only leads to the loss of material that could have been harnessed for a higher, better purpose, but also the uncontrolled release of potent methane as it decomposes in landfills.

To see firsthand how we can better utilize organics, our Delegation will visit **Calgary's Composting Center**, which is capable of processing 110,000 tons of food scraps and yard waste per year and converting it into compost in just 60 days. Since the facility began operating in 2017, the city has successfully reduced 50 percent of the waste in black bins as residents opted to place their organics in the green bin instead.



With the Composting Center already processing 110,000 tons per year and composting demand on the rise, the City Council voted last year to invest \$50 million to expand the facility's total capacity to 175,000 tons. This upgrade will also add biogas capture capabilities in hopes of generating revenue from its sale.

### TERMS TO KNOW

**Organics** refers to food waste, green waste, landscape and pruning waste, nonhazardous wood waste, and food-soiled paper waste that is mixed in with food waste.

**Composting** is a natural process that converts organic waste into nutrient-rich soil. The facility we will visit in Calgary demonstrates "in-vessel" composting. This means that food scraps, yard trimmings, and other biodegradable materials are enclosed in containers where microorganisms decompose the organics while human operators manage temperature and moisture conditions inside the chamber. In-vessel allows for better emissions control while processing more waste and taking up less space than the windrow composting (which is done outdoors, uncontained). The end product – compost – can be used to enhance soil health, water retention, and plant growth.

### MEETING THEMES

**SB1383...A Long Way To Go** – Passed in 2016, SB1383 (Lara) established targets for reducing how much organic material ends up in landfills. Using 2014 as a baseline, California was supposed to divert 50 percent of its organics by 2020. The state not only failed to meet this target, but more organics ended up on landfills in 2020 than in 2014.

The next target is a 75 percent reduction by 2025, which amounts to 27 million tons of food waste, yard scraps, etc. that will need to find a final destination other than a landfill. While many of California's 206 organics recycling facilities have or will expand their capacity, one CalRecycle report suggested the state must construct 90-110 **new** facilities to handle this great swell of organics. There are only 21 new anaerobic digestion facilities in development right now.



The onus is on municipalities to implement SB1383, and should local jurisdictions fail to meet their obligations, they can be fined up to \$10,000 per day. It is not surprising given this daunting challenge and stiff penalties for non-compliance that hundreds of municipalities have asked CalRecycle for extensions for complying. While CalRecycle is providing financial and technical assistance to meet SB1383, many observers anticipate that California may blow right past the 2025 target absent additional state intervention.

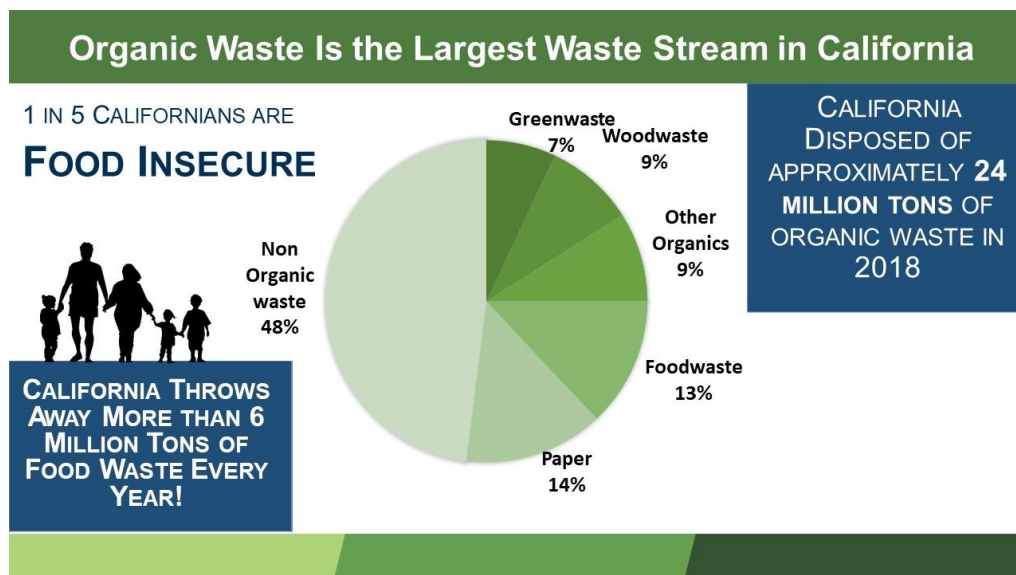
**Food for Thought – How Do We Enable Better Food Recovery?** SB1383 also stipulates that by 2025, California recover 20 percent of edible food to feed people in need. This challenge of food recovery is also being undertaken by Calgary, which has prohibited the disposal of edible food into trash bins. As a result, Calgary and California are both birthing markets as new and growing organizations partner with restaurants and grocery stores to help meet these goals and, most importantly, connect hungry people with edible food that would have otherwise gone to waste. What more support can be provided to grow this emerging food recovery economy?

**Public-Private Partnerships – An Opportunity for Municipalities** – The Calgary Composting Center serves as one example of how resource-strapped municipalities can collaborate with the private sector to deliver waste management solutions for their communities. The facility was built by several private vendors and is now operated by AIM Environmental Group. The City of Calgary provides the land and utilities while AIM brings expertise in composting technology and operations. This also allows Calgary to focus on public engagement where it feels it has better expertise. To meet the targets of SB1383, California cities are already exploring various partnerships with the private sector to expand their organics management capabilities.

**QUESTIONS TO CONSIDER**

- What has made Calgary’s consumer education and awareness campaigns so successful at source reduction and landfill diversion?
- What specific policies and regulations has Calgary implemented to support and incentivize composting? How can California align its legislative framework to promote similar composting initiatives?
- How is Calgary doing on food waste recovery? Any better or worse than the California experience?
- What strategies can California adopt to encourage collaboration between the public and private sectors for composting facility construction and operation?

**Exhibit A. Organic Waste in California**



THURSDAY, AUGUST 3

## Calgary Aggregate Recycling – Solutions for Construction Waste

For our final visit in Calgary, we will tour **Calgary Aggregate Recycling (CAR)**, a first-of-its-kind recycling operation in Canada. In the last three years, CAR has diverted over 825,000 tons of clean soil material, concrete, and asphalt rubble from landfill, recycling them for reuse. The figure on the right (zoom in) shows what materials are accepted for recycling and their cost per tonnage. At capacity, CAR believes it could channel more than 1.4 million tons of material from area landfills, simultaneously creating high-quality sand and aggregate products while reducing GHG emissions. Currently, 90-95 percent of what comes into CAR is recycled with only 5-10 percent needing to be landfilled.

### TERMS TO KNOW

**Aggregate** refers to a granular material used widely in various construction applications. Aggregates are a mixture of sand, gravel, crushed stone, slag, recycled concrete, and other inert materials. They are combined to form a mass of rock-like material that provides stability, strength, and bulk to concrete, asphalt, and other construction materials.

### MEETING THEMES












**The Greenhouse Gas Connection** – CAR touts that its recycling efforts could lead to a net reduction in GHG emissions. After evaluating this assertion, ERA (the organization making investments from the carbon tax) awarded CAR \$6.7 million to build their project, almost half of the total project cost.

ERA and CAR anticipate a GHG reduction of almost 25,000 tons annually as it avoids the need to extract or process virgin materials, generally a more energy-intensive process. Should CAR meet its diversion and GHG reduction targets, Alberta hopes to build similar GHG-focused recycling projects across the Province.

**The Construction Recycling Wheels Are in Motion...What More Can Be Done?** California already has an impressive constellation of construction waste recyclers. In 2010, 3.2 million tons of concrete and 12.6 million tons of asphalt were recycled in California. We are on track to do even more after Governor Newsom signed AB2953 (Salas), which required municipalities of a certain size to allow for the use of recycled materials in new or repaved roadways. How can California look to encourage recycled content for other construction materials?

### QUESTIONS TO CONSIDER

- Who are Calgary Aggregate Recycling's main customers? Are they selling directly back to construction companies or do they need to partner with another company for further remanufacturing?
- What construction materials are particularly suited for recycling – whether due to their ease of recycling, potential GHG reductions, or some other characteristic?
- Beyond roads, are there any low hanging fruit in the world of construction materials that California should consider for recycling content standards?
- CAR hopes to recycle 100 percent of the material it receives in the future – what is currently being landfilled?
- How does a carbon tax advantage CAR's recycled products versus non-recycled products?

MATERIAL TYPE	WE ACCEPT	COST PER TON
 CONTAMINATED SOIL	✓	\$ 40
 HYDROVAC DUMPING	✓	\$ 70
 CONTAMINATED SOIL WITH MIXED DEBRIS	✓	\$ 58
 ASPHALT RUBBLE	✓	\$ 7
 BRICKS AND MORTAR	✓	\$ 5
 CINDER BLOCKS	✓	\$ 5
 CLAY	✓	\$ 5
 CONCRETE RUBBLE	✓	\$ 5
 PAVING STONE AND TILE	✓	\$ 5
 REBAR	✓	\$ 30
 STREET SWEEPING	✓	\$ 80

THURSDAY, AUGUST 3

## Zero Waste Banff – Reuse and Recycling in the Rockies

Nestled in the Canadian Rocky Mountains, the Town of Banff (population ~7,800) attracts visitors from around the world who flock to see Canada's first national park and a UNESCO World Heritage site.

Given its status as a tourist destination in a protected landscape, Banff presents opportunities and challenges for implementing sustainable waste management practices. Its national park status allows for collaboration and support from park authorities, environmental organizations, and government agencies to advance its sustainability initiatives. However, the large transient population – 4.5 million visitors every year and thousands of seasonal workers – can make it difficult to establish successful waste management programs as public behavior is always a moving target.



### TERMS TO KNOW

**Zero Waste Banff** is the Town's ambitious goal to achieve zero waste, aiming to divert 70 percent of its waste from the landfill by 2028 and 100 percent by 2050. Its zero waste initiatives include comprehensive reuse and recycling programs, composting, waste reduction strategies, and a focus on circular economy principles.

During our visit, we will see one example of the Zero Waste Banff philosophy in action when we stop by their "Library of Things." This simple program allows residents to temporarily check out various items (power drills, cooking supplies, musical instruments, etc.) that may otherwise have been purchased and only used a few times.

**District Heating** refers to a heating network relying on a centralized source of heat that is piped to surrounding buildings. The central heat can be derived from an array of sources, ranging from hydrocarbons, geothermal, bioenergy, and more. Our Delegation will visit Banff's small-scale district heating operation that uses woody biomass to heat four municipal buildings. District heating is another example of Zero Waste Banff in practice as well as a climate smart alternative to natural gas heating.

### MEETING THEMES

**How Realistic Is Zero Waste Really?** While Banff has already made impressive strides to reducing its landfill waste by 30 percent compared to pre-pandemic levels, it will face serious challenges as it reaches deeper levels of landfill diversion. The primary obstacles are the 1) cost of finding zero waste alternatives and 2) the difficulty in encouraging waste reduction with its diverse, transient population. Banff is also challenged to establish a timeline that is practical without setting a target so far off in the future that it fails to motivate residents who may not be around to see it to its conclusion.





*Some of the woody biomass the feeds Banff's district heating*

### **Biomass For District Heating - California**

**Missing Out?** Banff's Biomass District Heating facility was a joint effort between the Government of Canada and the Town of Banff. With a total project cost of \$1.3 million, this initiative was made possible through funding from both entities. Through this partnership, the facility eliminates approximately 220 tons of wood waste from going to landfills each year. Additionally, over two decades, the facility will eliminate more than 4,400 tons of greenhouse gas emissions, which is equivalent to removing 1,800 cars from the road for one year.

California, with its renewable energy goals and abundant biomass resources, could explore the integration of biomass and waste-to-energy technologies in district heating. This approach would not only reduce landfill waste but also provide a cleaner, more renewable heat source, contributing to the state's building decarbonization efforts.

**Sustainability in a Tourist Destination** – Banff has developed waste management systems capable of handling increased volumes during peak tourist seasons, ensuring proper disposal and minimizing environmental impact. Education and outreach programs aimed at visitors has played a crucial role in promoting responsible waste disposal and fostering sustainable behaviors. Through these campaigns, visitor information centers, and signage, Banff has educated visitors about the Town's waste management practices and encourages them to participate actively in recycling, composting, and responsible waste disposal.

### **QUESTIONS TO CONSIDER**

- How has the community responded to Banff's zero waste goals? Are they buying in? What new costs might they be shouldering as zero waste investments get more extensive?
- What are the notable partnerships and collaborations that have contributed to Banff's early zero waste progress?
- The Town has banned businesses from putting recyclable and compostable material in the garbage – how has the ban been enforced? Has it been successful?
- Other than the biomass/district heating project, all of Banff's recyclable and compostable material is sent out of town – have municipal officials considered building a recycling or composting center in town?
- What economic benefits or cost savings have been realized through the implementation of zero waste practices in Banff?