



# ENVISION

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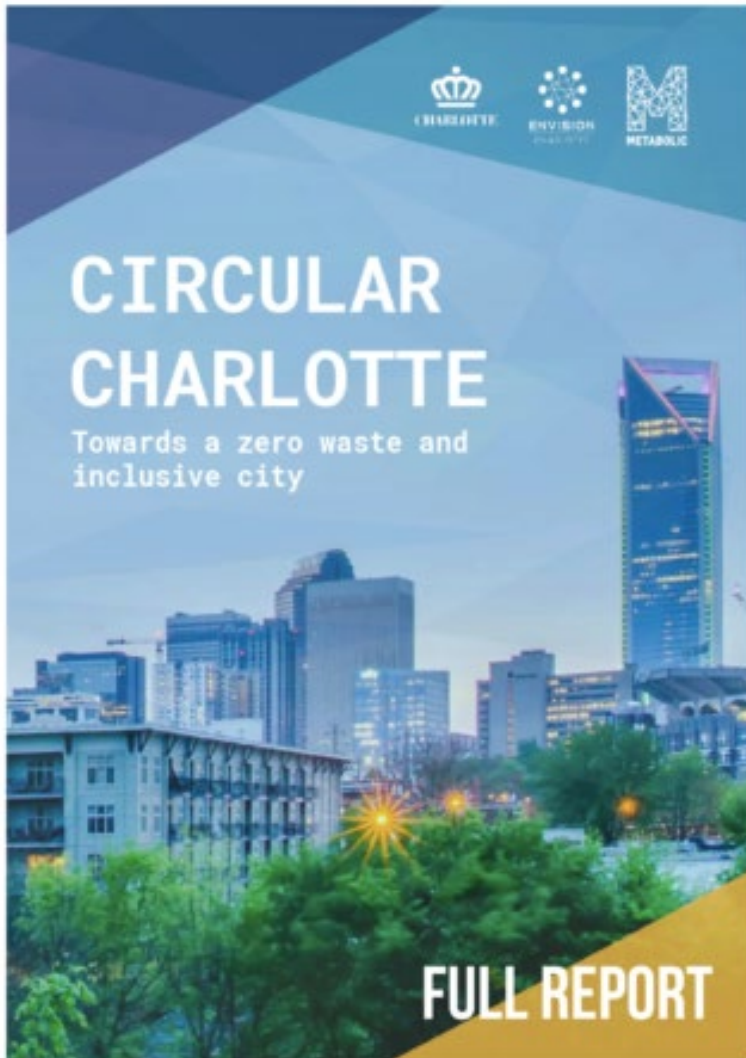
## CHARLOTTE





- ❖ Environmental Impact - around 42% of all U.S. greenhouse gas emissions can be attributed to extracting, processing, and disposing of materials, and recycling materials is less energy intensive than producing virgin materials. In 2014, the emissions reductions from recycling were equal to that of removing 38 million passenger cars from the road for a year ([Bradford, Broude & Truelove, 2018](#)).
- ❖ As much as 88% of waste in Charlotte is going to the landfill, the national average is 65%
- ❖ If Charlotte could divert up to 15% of the waste (by implementing the 5 business cases identified by Metabolic) we could have a CO<sub>2</sub>e savings of 379,000 tons/year from reduced landfill and upstream production – equivalent to the emissions 75,000 cars per year





2018 City of Charlotte and Envision Charlotte hired Metabolic to study Charlotte's waste stream and plan a strategy for Charlotte to transition to a circular economy

## CHARLOTTE'S CIRCULAR ECONOMY VISION



Zero Waste City



Innovative City of the Future



Resilient and Healthy City



City with Opportunities for All

## 5 Identified Business Cases

### Closed-Loop Textiles Chain

- 57,000 tons disposed on in Clt end up in landfill, 43% is reusable, the rest should be recycled into new textiles

Table 2: Closed-Loop Textiles Opportunities

OPPORTUNITY	VALUE
Total waste diverted from landfill (lbs/year)	210,000 lbs/year
Potential profits from case (\$/year)	\$201,800
Total jobs created (#)	9
CO <sub>2</sub> e emissions saved (tons)	1,226
Water use avoided (gallons)	345,341
Land use prevented (acres)	79

### Upcycling food waste into feed

- 150,000 tons of food waste from Clt households and small businesses end up in landfill DECAYING WASTE HIGH AMOUNTS OF METHANE EMISSIONS 25X MORE POTENT THAN CO<sub>2</sub>E

Table 3: Food Waste to Feed Costs and Benefits

COST	VALUE
Investment costs	\$2,000,000 - \$6,000,000
Rent	-
Personnel	\$3,700,000 - \$4,500,000
Fuel and utilities	\$724,400
Payments to 3rd parties	-
Total	\$2-6 mln + \$4.4-5.2 mln yearly

REVENUE	VALUE
Revenue from collection	\$667,000
Revenue from product sales	\$4,000,000 - \$7,000,000
Total	\$4.7 - 7.7 mln
Return on investment (10 yrs)	114%*
Payback period	6 years*

\* Based on a cautious financial projection using mid-range values for the parameters in the table.

## Concrete Recycling Chain

- Concrete account for 70% of all building waste, 50,000 tons ends up in landfill

**Table 9: Concrete Recycling Chain Costs and Benefits**

COST	VALUE	REVENUE	VALUE
Investment costs	\$300,000	Revenue from collection	-
Rent	-	Revenue from product sales	\$6.14 million
Personnel	\$80,000	Total	\$6.14 million
Fuel and utilities	\$175,604		
Glass purchasing	\$3.9 million	Return on investment	3,389%
Total	\$300,000 investment + \$4.14 mln in yearly costs	Payback period	1.5 years

## Reverse Logistics System for Materials

- Only 2% of plastics from households is being recycled

**Table 7: Incentivized Recycling Costs and Benefits**

COST	VALUE	REVENUE	VALUE
Investment costs	ST: \$1.7 mln, LT: \$12.6 mln	Revenue from product sales	ST: \$240,391 - \$589,821, LT: \$5,805,550 - \$14,305,480
Rent	-		
Personnel	ST: \$565,000, LT: \$2.1 mln	Total	ST: \$240,391 - \$589,821, LT: \$5,805,550 - \$14,305,480
Other overhead costs	ST: \$142,000, LT: \$724,000		
Payments to 3rd parties	-	Return on investment	ST: N/A, LT: 24% after year 5
Total	ST: \$1.7 mln investment + \$707,000/yearly, LT: \$12.6 mln investment + \$2.8 mln yearly	Payback period	ST: N/A, LT: 10.9 years

\*ST is short-term, LT is long term



# Innovation Barn

- University-affiliated student-startup incubator focused on new propositions around circular economy businesses

**Table 5: Materials Innovation Lab Costs and Benefits**

COST	VALUE
Investment costs	\$61,000
Rent	\$0 - \$28,800
Personnel	\$180,000
Fuel and utilities	\$2,720
Annual Seed Investments	\$600,000
Total	\$61,000 investment + \$182,700 - \$217,280

REVENUE	VALUE
Revenue from shares	\$214,286 (in year 3)
Other revenue*	\$69,000
Total	\$283,286
Return on investment	N/A
Payback period	N/A

*\*Assumed additional revenues from events, conferences, and executive trainings*



# CHARLOTTE'S WOOD WASTE PROJECT

As a compliment to the Innovation Barn – product will be available at Barn.

## “Wood Waste” in Charlotte



- **40,000+ pounds per Day**
  - Aging Canopy
  - Quantity increases during storms
  - Increased land development
- Tree Services take to private dumpsites or landfill
  - “Status Quo”
  - Waste wood emits formerly sequestered CO<sub>2</sub> back into the atmosphere, worsening climate change.

## Meanwhile...

- **Local Businesses are importing wood to Charlotte**
  - Grocery stores have firewood from Eastern Europe
  - Energy plants are using wood chips from other states





# CIRCULAR CLT

Powered by Envision Charlotte



## Center for Circular Wood Waste

- \$1/year land lease for 5 years
- Revenue share for City's Circular Charlotte efforts



## Phase 1

### Utilize Old Statesville Ave. Landfill

- Reduces Transit and Dump Costs
- Encourages Tree Services to Divert from other sites

### Open Property to "Immediate Impact Tenants"

Sapling/Tree Farm, Saw Mill,  
Firewood Processor, Bio Char Processor



## Local Products

## Phase 2

### Scale and Support

- Incentivize Businesses to buy Local Products
- Limit or Ban Importation of Wood Products

### Educate and Enhance

SkyWalk, Greenways, Trails, and Tours

Canopy Growth

*Waste Diverting,  
Carbon Sequestering*

Job Creation

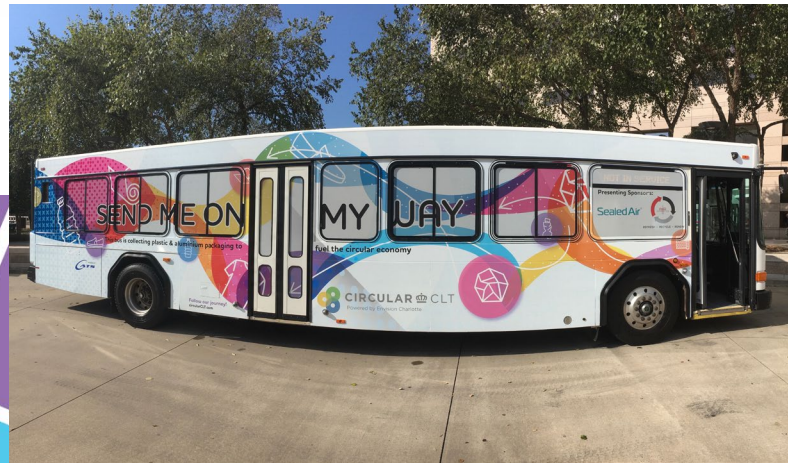
Reduced Landfill Use

# *Send Me on My Way*

September 2019 – July 2020

## Program Goals:

- Educate Charlotte citizens via employers about plastics
- Collect specific plastics as defined by campaign partners, via a retro-fitted City bus, and delivered for the extension of plastics life
- Bring awareness of the Circular Economy and Charlotte's Leadership in US



Thank you

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