

A large pile of garbage, including plastic bags, cardboard, and other debris, under a clear blue sky. The image is used as a background for the conference title slide.

CANADIAN **SWANA**
CONFERENCE

April 4th, 2024

WASTE MANAGEMENT TONNAGE AND COSTING MODEL

for a 25-year Planning
Period

Sandra Messih, Executive
Director

STRATZER



WHAT IF...

WE COULD KNOW
WHAT WOULD
HAPPEN IN 25
YEARS?

STRATZER

ABOUT STRATZER

- Experts at your service for more than 25 years
- Four offices in Eastern Canada (including Toronto)
- 90 professionals specialized in circular economy and waste management
- 6 departments



STRATZER

INTRODUCTION



- **Niagara Region :**

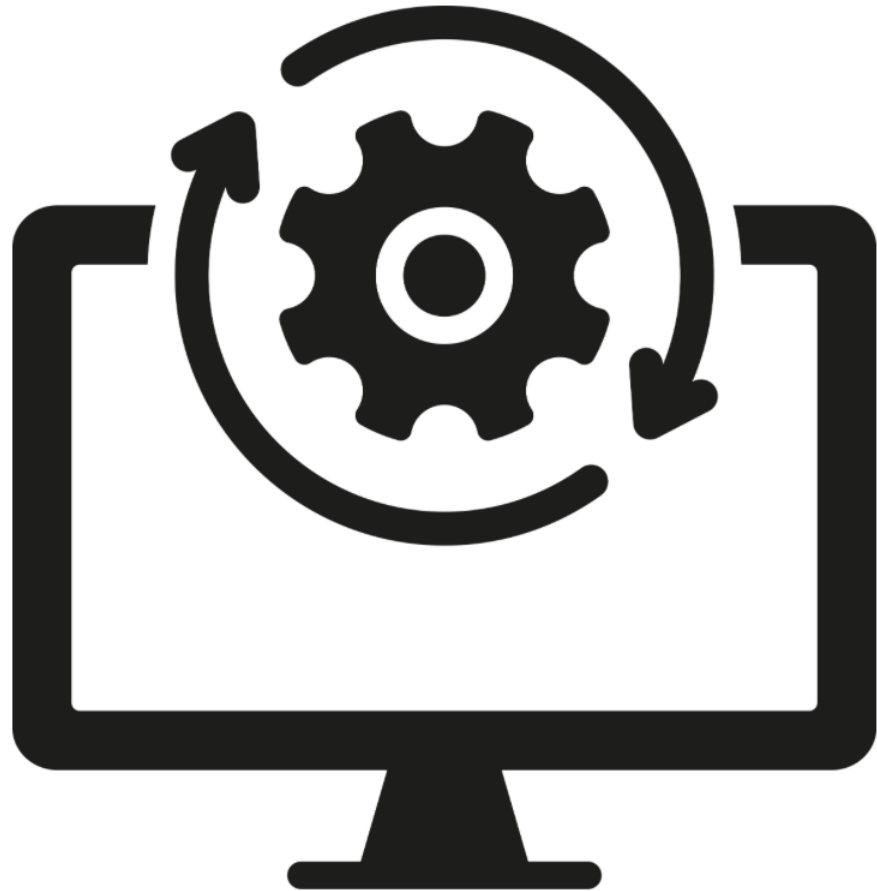
- 12 local area municipalities
- 472 500 residents and business owners
- 206 500 household units

- **Process of developing a 25 year Waste Management Strategic Plan**

- **Client's needs :**

- Upgrade of the Tonnage projection model (2024 to 2051)
- New Cost projection model (2024 to 2051)

THE MODELS NEED TO BE...

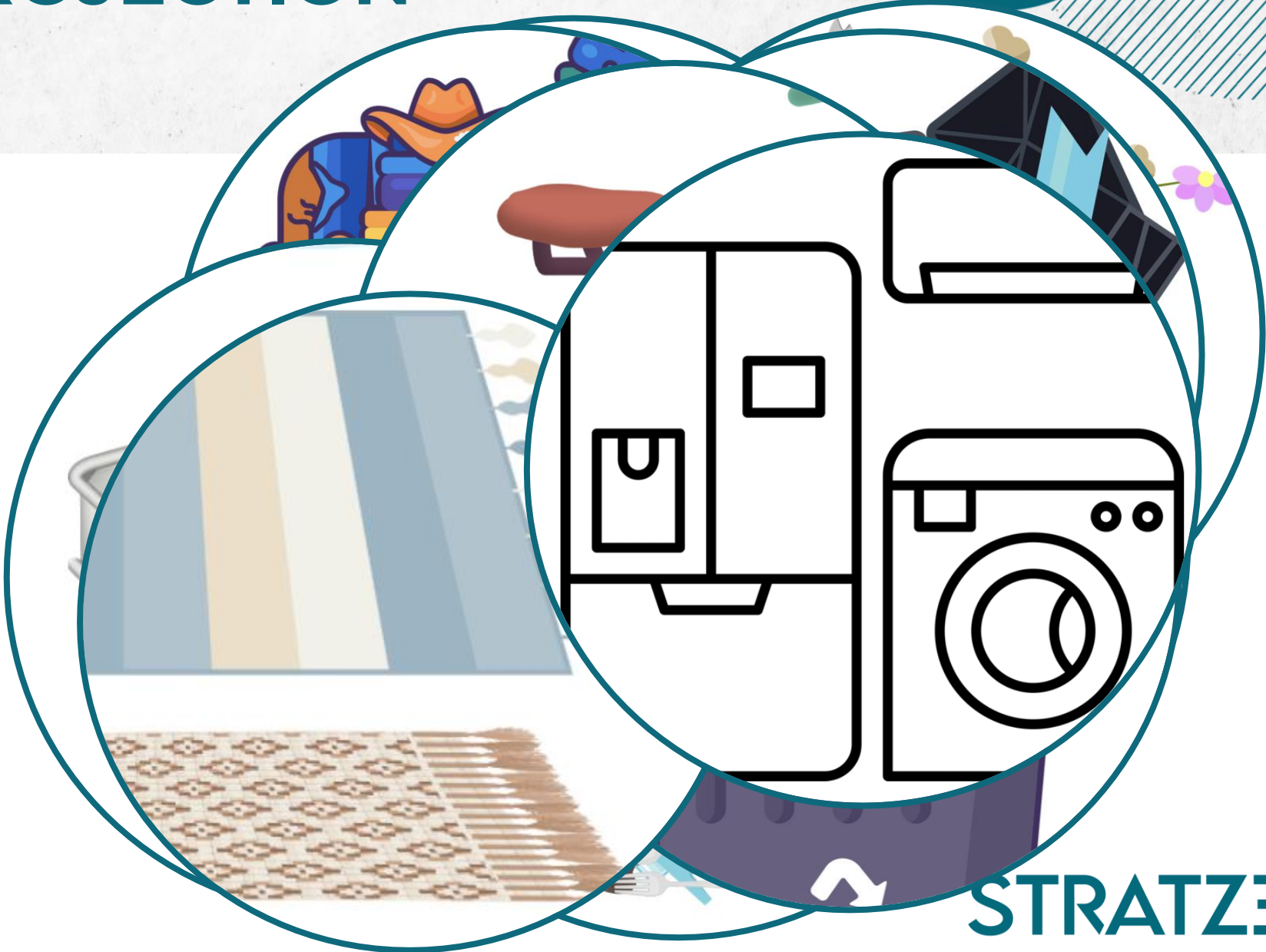


- **Linked** to one another
- Fully **accessible** and **editable** by Niagara Region
- **Upgradable** with new data and with new waste programs/initiatives

TONNAGE PROJECTION MODEL

By STREAM

- Landfilled
- Diverted
- Generated



METHODOLOGY

Tonnage projection model

- Use actual data (2011-2021) : **Multiple regression analysis**
 - Identify main constants in materials generation/collection
 - Identify variables impacting generation/collection
 - Validate constants and variables
- **Extrapolate data** for future years using constants and variables
- Add **extra parameters** to allow the client to adjust data if changes in the system (e.g. improvement of Multi-residential participation in SSO collection)

IDENTIFICATION OF VARIABLES

• Major External factors

• Demographic:

- Population growth
- % Single-Family Housing
- % 2 to 5 Housing units
- % Multi-Res > 5 units
- ICI units

• Economic:

- GDP
- Inflation
- Construction activities indicators
 - Investment in building construction
 - Value of building permits
 - Housing under construction (units)

• Major Internal factors

• Waste generation rate (kg/person)

- Single-Family Housing
- 2 to 5 Housing units
- Multi-Res > 5 units

• Collection rate (kg/person and kg/household)

- Garbage
- Blue Box performance
- SSO collection performance

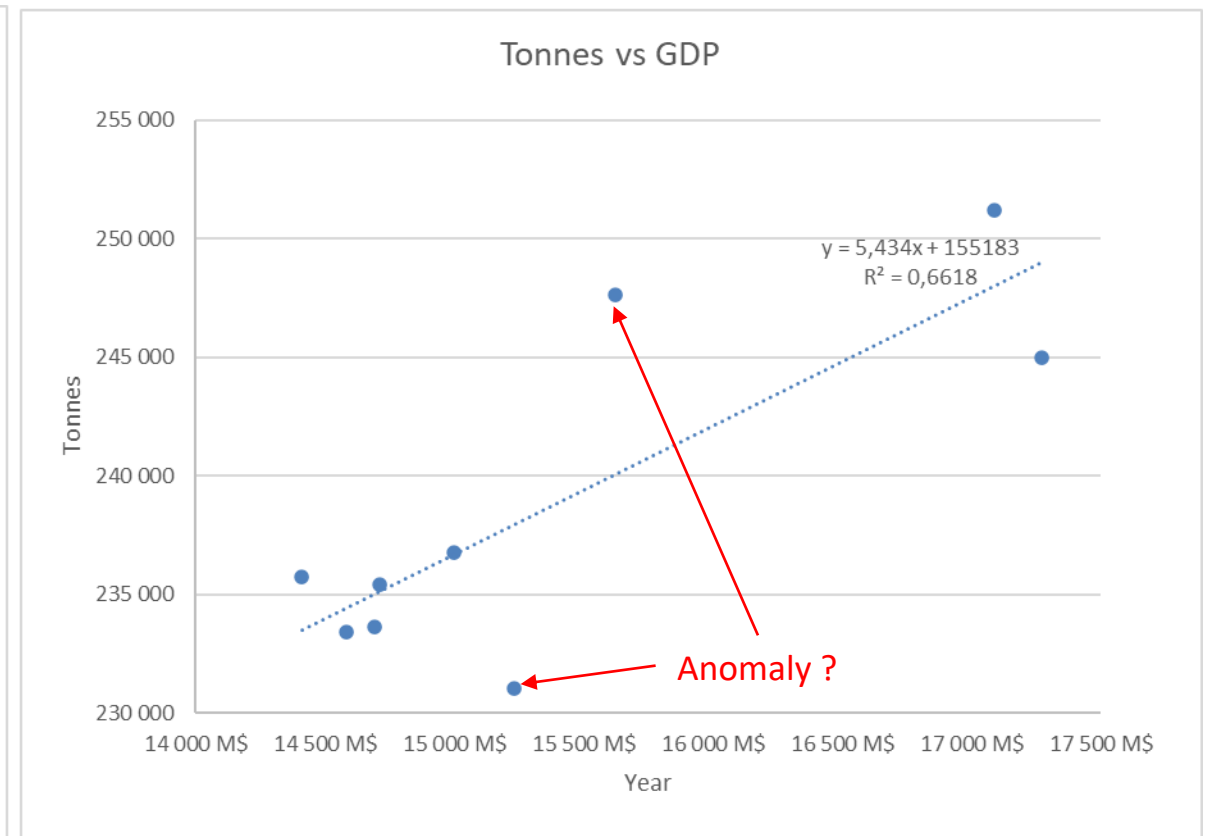
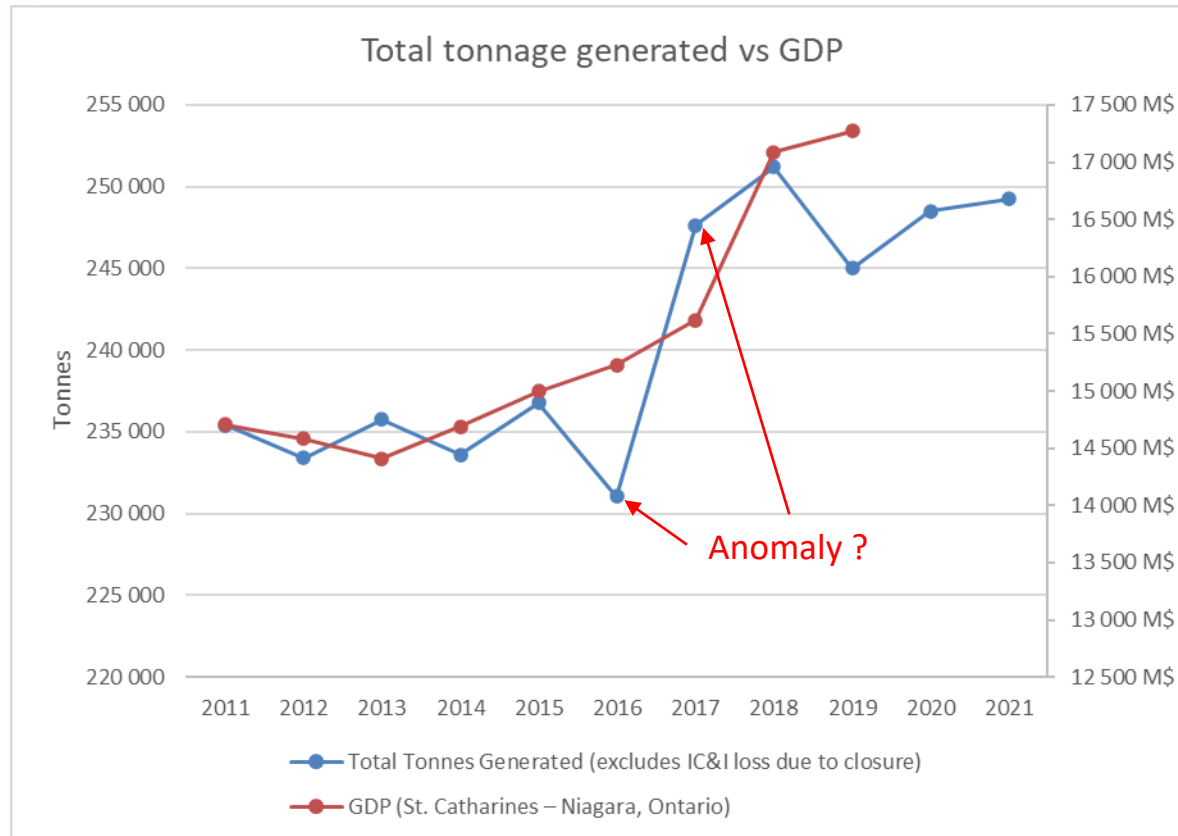
• Curbside service coverage rate

- % or Nbr of residential units and IC&I served

DRIVERS VALIDATION

Tonnage projection model

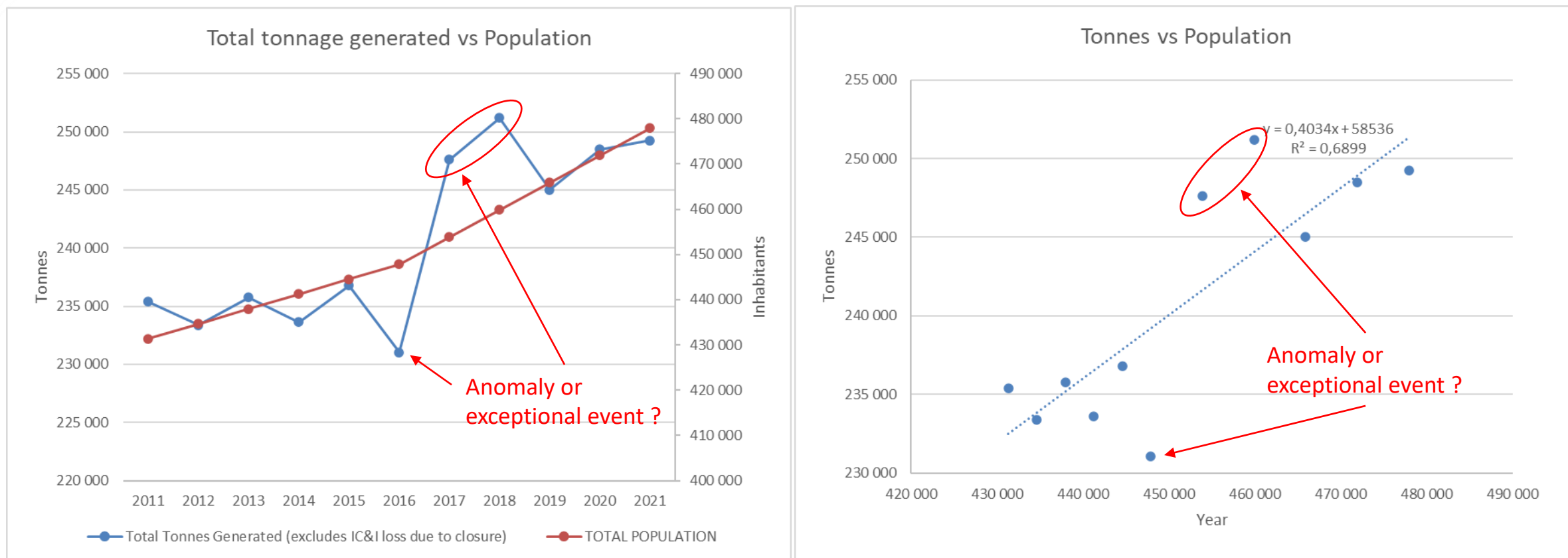
- GDP vs total **waste generated** (**highly significant**)



DRIVERS VALIDATION

Tonnage projection model

- Population vs total **waste generated** (highly significant)



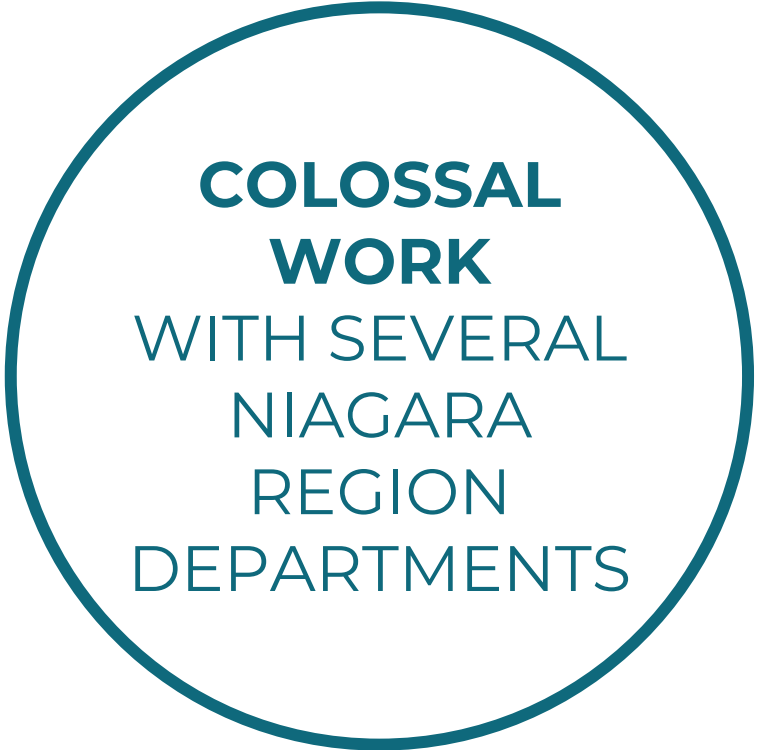
		Walker - Blue Box Program Residue		Predictive Walker - Blue Box Program Residue		Walker - Organics Program Residue		Predictive Walker - Organics Program Residue		0
W stream (Landfilled)		Based on recent yrs of historical	15,9%							4 771
		2011								
Initial Day collection ratio (kg/pers./yr)		Based on recent yrs of historical	0,01 kg/pers.	0,00	VARIABLES	Num ID	TONNAGES	TON PER SITE	REGRESSION	
Initial Curbside collection ratio (kg/pers./yr)		Based on recent yrs of historical	0,75 kg/pers.	0,11 kg/pers.						
Residential Self-Hauled ratio (kg/pers./yr)		Based on recent yrs of historical	0,06 kg/pers.	0,00 kg/pers.						
		2011								
Construction & Demolition (C&D) Waste		2011	2012							
Environmental Day collection ratio (kg/pers./yr)		Based on recent yrs of historical	0,00 kg/pers.	0,00 kg/pers.						
Residential Self-Hauled ratio (kg/pers./yr)		Based on recent yrs of historical	2,44 kg/pers.	6,71 kg/pers.	11					
IC&I Self-Hauled ratio (kg/employee/yr)		Based on recent yrs of historical	0,52 kg/empl.	2,80 kg/empl.	5,3					
		2011	2012							
Metal		2011	2012							
Environmental Day collection ratio (kg/pers./yr)		Based on recent yrs of historical	0,00 kg/pers.	0,00 kg/pers.	0,					
Residential Self-Hauled ratio (kg/pers./yr)		Based on recent yrs of historical	2,17 kg/pers.	1,33 kg/pers.	1					
IC&I Self-Hauled ratio (kg/employee/yr)		Based on recent yrs of historical	0,86 kg/empl.	1,71 kg/empl.						
		2011	2012							
Environmental Day collection ratio (kg/pers./yr)		Based on recent yrs of historical	0,00 kg/pers.	0,00 kg/pers.						
Residential Self-Hauled Tire ratio (kg/pers./yr)		Based on recent yrs of historical	0,31 kg/pers.	0,27 kg/pers.						
		2011	2012							
Initial Day collection ratio (kg/pers./yr)		Based on recent yrs of historical	0,01 kg/pers.	0,01 kg/pers.						
Initial Curbside collection ratio (kg/pers./yr)		Based on recent yrs of historical	0,00 kg/pers.	0,00 kg/pers.						
Residential Self-Hauled ratio (kg/pers./yr)		Based on recent yrs of historical	0,00 kg/pers.	0,00 kg/pers.						
		2011	2012							
Environmental Day collection ratio (kg/pers./yr)		Based on recent yrs of historical	0,00 kg/pers.	0,00 kg/pers.						
Residential Self-Hauled ratio (kg/pers./yr)		Based on recent yrs of historical	0,01 kg/pers.	0,01 kg/pers.						
		2011	2012							
Environmental Day collection ratio (kg/pers./yr)		Based on recent yrs of historical	0,00 kg/pers.	0,00 kg/pers.						
Residential Self-Hauled ratio (kg/pers./yr)		Based on recent yrs of historical	0,01 kg/pers.	0,01 kg/pers.						

COST PROJECTION MODEL

By STREAM

By FUNCTION

- Disposal
- Collections
- Compensations (salaries)
- Administration & planning
- Promotion & Education
- Processing (indirect allocation)
- Capital costs

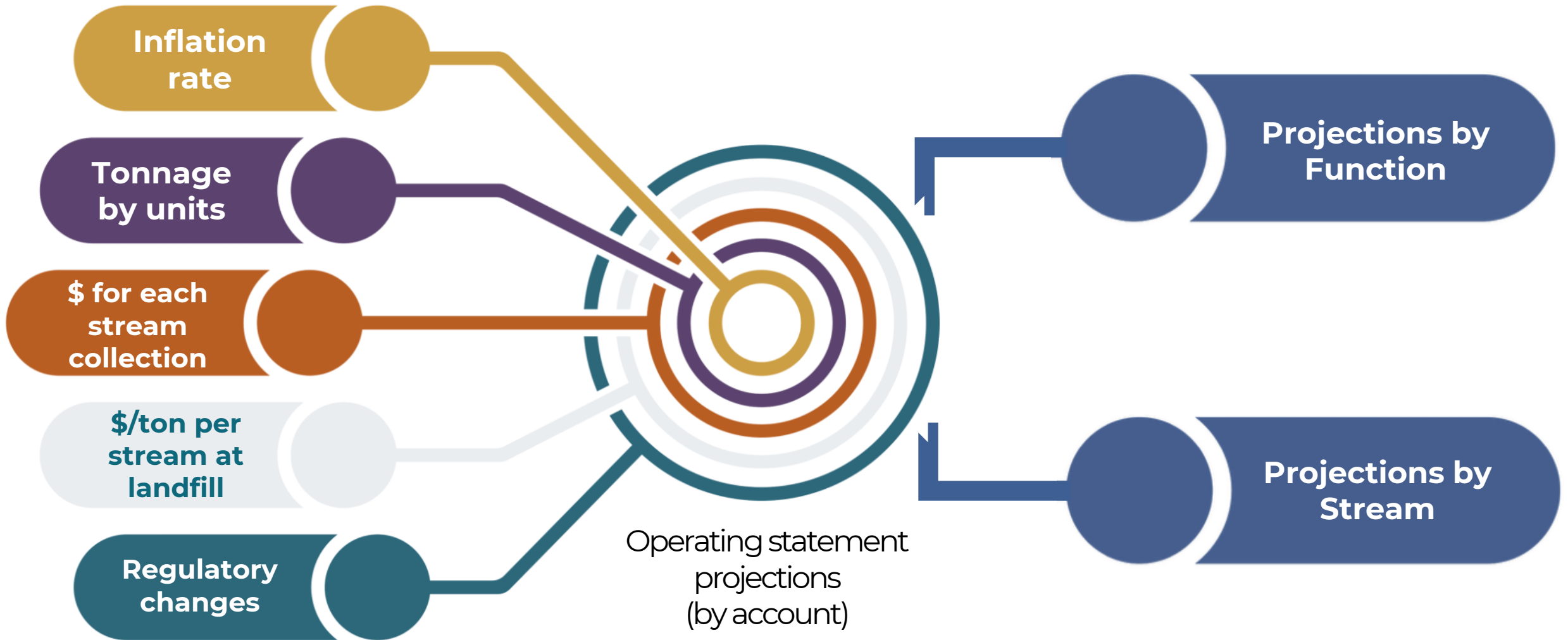


**COLOSSAL
WORK**
WITH SEVERAL
NIAGARA
REGION
DEPARTMENTS

STRATZER

STRUCTURE

Cost projection model



RESULTS

- Usefull to evaluate the impact on **expenses/revenues** and **tonnage performance** of Waste Management Plan actions
- Forecast **landfill capacity** and future closure (and cost associated)
- Usefull to estimate the **impacts** of a new diversion program

**POSSIBILITY OF PRODUCING A LESS PRECISE TOOL
DEPENDING ON PLANNING NEEDS**



CONCLUSION

To achieve a Long-Term Strategic Waste Management Plan : it's in best practices to use the right tools.

**Building a personalized projection tool requires time :
don't minimize it.**

BE SURE TO PLAN THE REQUIRED TRAINING TO USE IT!



STRATZER

**Thank you for
your attention!**

Questions or
comments?

STRATZER

Sandra Messih
s.messih@stratzer.ca
stratzer.ca

Proudly part of Cyrculia Inc.

Cyrculia 