

FINANCE  
INNOVATE  
RECOVER



Presentation by Maryse Vermette, CEO of EEQ

## Glass recycling innovation: the Quebec case



Atlanta, Nov. 8, 2016

**eeq**  
Éco Entreprises Québec

## About Éco Entreprises Québec

- Private, non-for-profit organization
- Board of directors : 10 Brand owners representatives and 4 non-members
- EPR = financial responsibility only since 2005
- \$112 M (USD) a year in compensation to municipal curbside recycling services
- Based in Montreal, Quebec



# A Value Chain



## RECYCLABLE MATERIALS VALUE CHAIN

## COMPANIES AND ORGANIZATIONS

Use, marketing and reintroduction of  
containers, packaging and printed matter  
in a circular economy

## CONDITIONERS AND RECYCLERS

Conditioning and  
transformation of  
recovered materials  
  
Sale of recycled  
and transformed  
materials

## SORTING CENTRES

Manual and mechanical  
sorting, baling or  
bulking of materials  
  
Transaction between  
the sorting centre  
and conditioners  
and recyclers

**Together,  
greener  
and more  
effective**

## IN STORES

Purchase  
of products by  
consumers

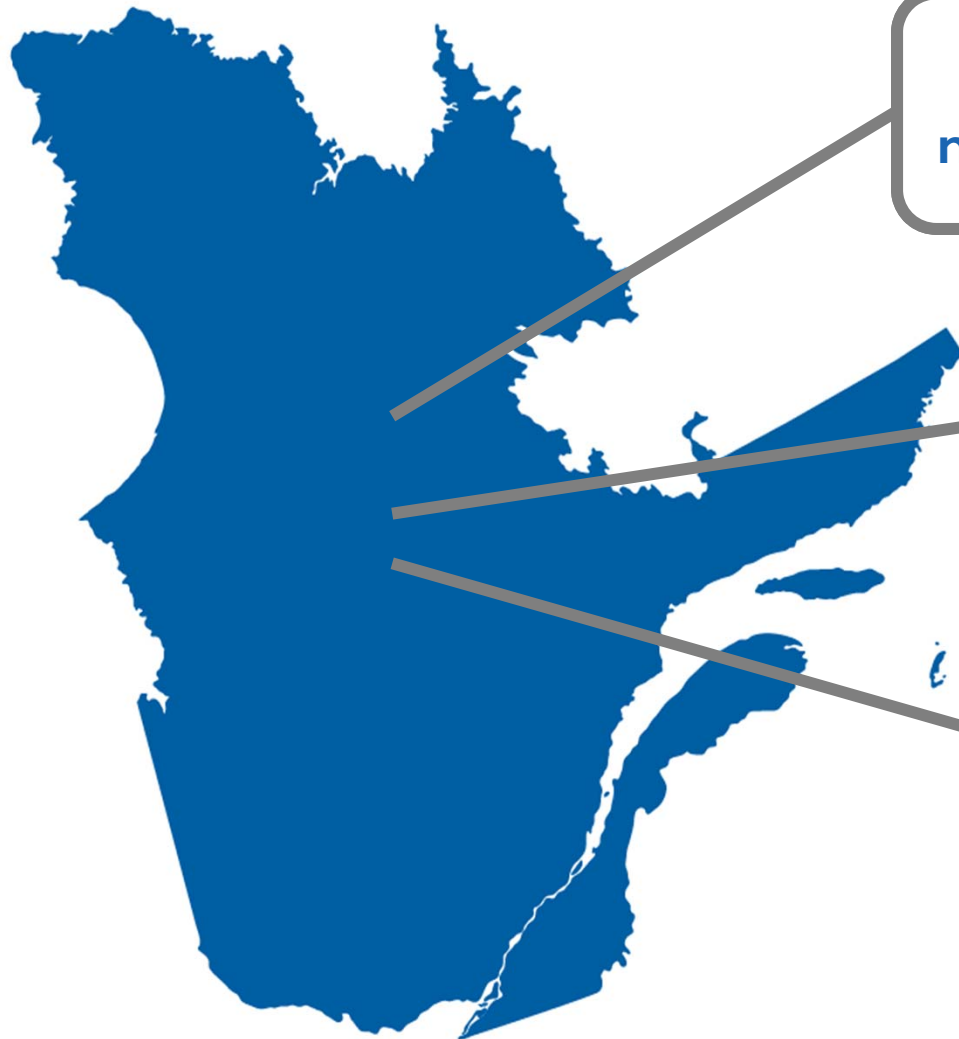
## AT HOME AND IN PUBLIC PLACES

Product consumption  
and placing CP&PM  
in recycling bins  
  
Door-to-door  
collection

## MUNICIPAL COLLECTION

Collection and transportation to the sorting centre

# Quebec Recycling Highlights



**8.3**  
million people

**1,667,441**  
surface km<sup>2</sup>

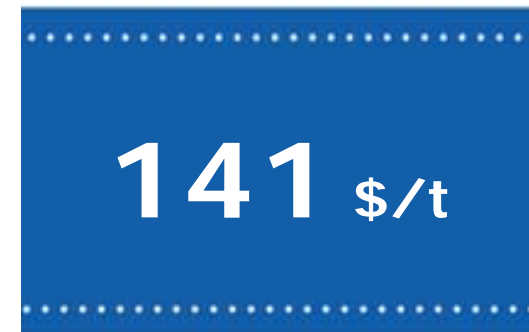
**23**  
sorting centres



# Quebec Recycling Highlights



- Recycling services since the **1980s**
- **600 municipalities** offer the service



## 5 Optimization Levers to Support the Industry's Evolution



Optimize what and how consumers recycle



Improve the quality of collected materials



Encourage information sharing and the **implementation** of best practices



Improve sorting centre **performance** and **efficiency**



**Apply** a regional or provincial perspective to **sorting and conditioning activities**

## Glass in the Quebec bin

- 776 000 tons of recyclable matter collected annually
- 111 600 tons of glass in the bin
- 40 000 tons of the glass in the bin is flint glass
- 1 out of 4 wine bottle is a clear glass bottle
- 62% of clear glass comes from oil bottles, jam jars, pickles, ketchup, salad dressing containers, etc.

**776 000**  
tons/year

**111 600**  
tons of glass



## Turning a crisis into an opportunity



### 3 factors came together to cause the situation:

- A severe decline in the demand for mineral wool, the primary end market for glass
- The shutdown of the main glass conditioner, Klareco
- Under-investment in recycling facilities for glass processing





## The Glass Works Plan



# The *Innovative Glass Works* Plan : higher quality, higher value



**\$5 M**  
investment

## 3 COMPONENTS OF THE *INNOVATIVE GLASS WORKS* PLAN

### MODERNIZE MATERIAL RECOVERY FACILITIES

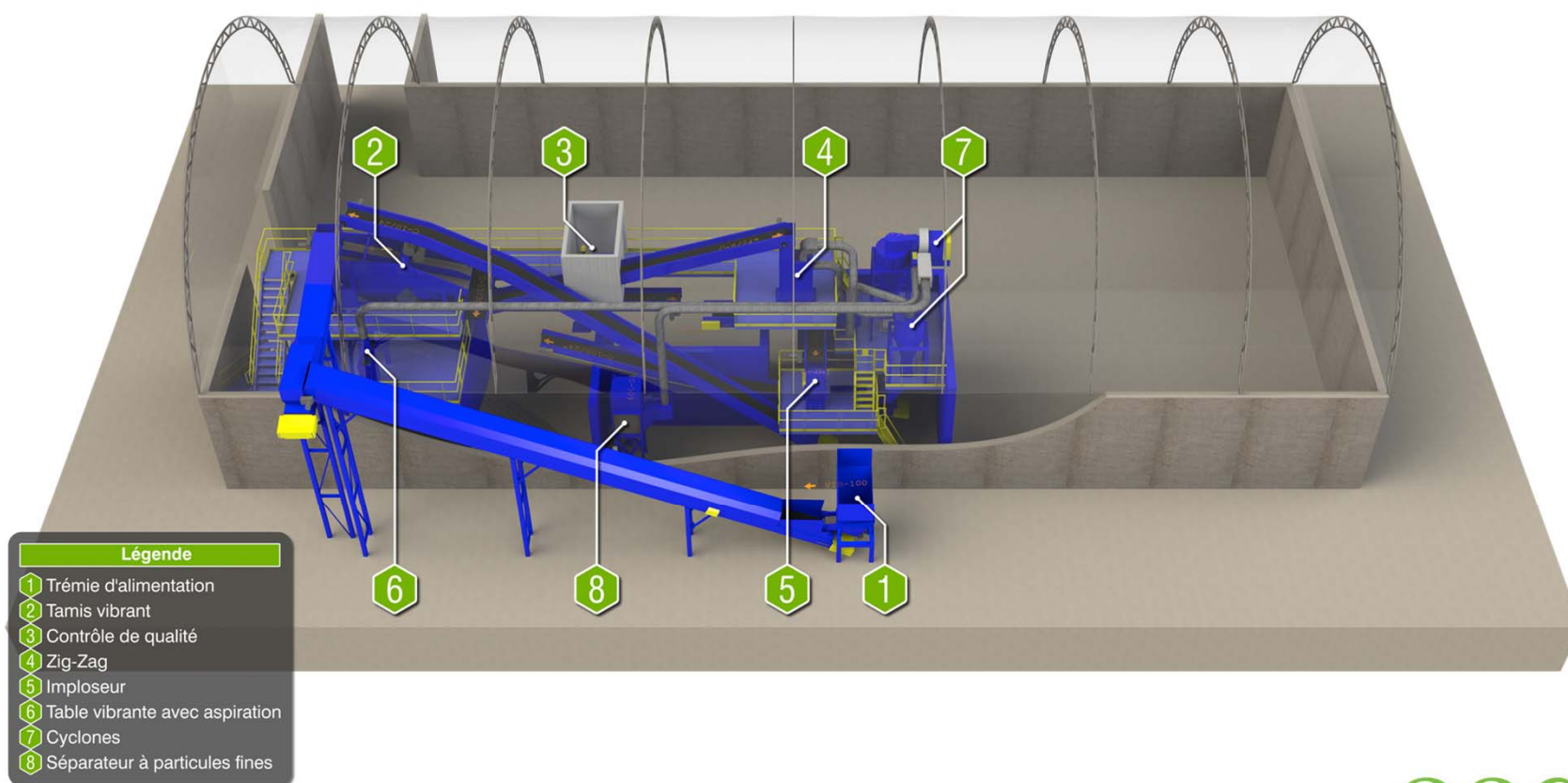
- 1) Demonstration projects (\$3.1 M)
- 2) R&D projects (\$1 M)

### STIMULATE AND DIVERSIFY THE DEVELOPMENT OF MARKET OUTLETS

- 3) Financial support to promote  
and develop market outlets for  
glass (\$0.9 M)



# Technologically-advanced equipment to sort and clean glass collected via curbside recycling



# Glass sorting and cleaning



## GLASS AFTER PROCESSING (VARIOUS SIZES POSSIBLE)



# Selecting MRFs in a nutshell – a rigorous approach



## Selection process:

- 5 meetings of internal and external experts
- **Over 700** hours of analysis
- **MRFs visits**
  - 11 MRFs visited out of 18 applicants
  - +3500 km by car or by plane
- **Glass characterization**
  - 1 new protocol of glass characterization developed
  - 90 glass samples analyzed
  - 665 kg of glass manually sorted
- **MRFs configuration plans**
  - **Over 30** work plans by ÉEQ, Machinex and Krysteline.





## Pilot projects - Investments



Investment Detail	Estimated Costs
Investment in equipment	2 070 000 \$
Financial participation support (average operating cost of 22\$/t)	730 000 \$
Project management Fees	225 000 \$
Transportation Costs (25% of Glass sorted)	85 000 \$
<b>Total</b>	<b>3 110 000 \$</b>

## Economic model for glass recycling

- **Pilot-project in 5 MRF**
  - 33,000 t of glass/year, which represents almost 30% of glass quantity in the curbside recycling system in Quebec
  - System throughput: from 1 t/h to 8 t/h → from regional MRF to large size MRF
  - Actual cost of managing glass: -20\$/t + transport
- **Cost of implementation and operation**
  - Cost of systems: from \$250,000 to \$1.12 M
  - MRFs investment: \$40,000 to \$190,000
  - Workforce: 1 sorter per shift for quality control of incoming glass
  - Electricity: 1.00 \$US/t of processed glass @ \$0.05/kwh
- **Revenue**
  - Increase sales not only for glass but also for other recovered materials such as steel, aluminium, plastics and fibers

## Turning a threat into an opportunity

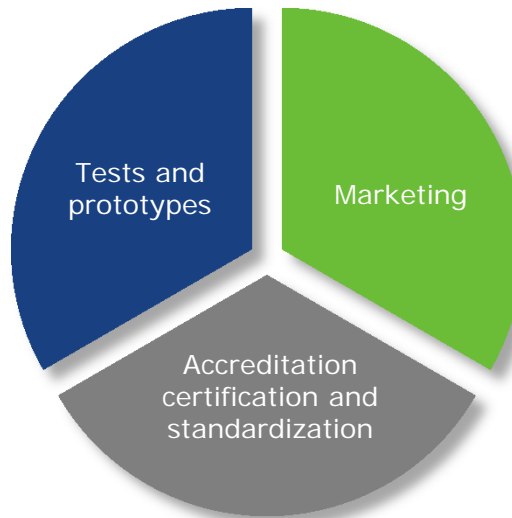


# Stimulating new end markets using recycled glass: support for recyclers and conditioners



## TESTS AND PROTOTYPES

- **Eligible expenses:** labour, equipment and materials supply/rental, external professional fees (excluded: equipment in sorting centres)
- **Up to \$75 K**



## MARKETING

- **Eligible expenses:** external professional and study fees
- **Up to \$20 K**

## ACCREDITATION, CERTIFICATION AND STANDARDIZATION

- **Eligible expenses:** external professional and study fees, applications for IP rights
- **Up to \$40 K**

# Market studies shows potential for new end markets



DATA CONCERNING THE DIFFERENT USES OF RECYCLED GLASS IN QUEBEC, ONTARIO,  
AND THE NORTH-EASTERN UNITED STATES\*

Uses	Advantages	Maturity Level	Product Value
Filters for drinking water, swimming pools and wastewater	Better resists proliferation of bacteria, reduces backwash, and saves water	Developing market	\$50 - \$220
Abrasives	No heavy metals or free silica, performance-enhancing angles	Developing market, in existence for ~7 years	\$150 – \$220
Glass wool	Recycled product, lower melting temperature	Exists for 10 years	\$70
Concrete with glass powder for non-structural works (sidewalks, street furniture, noise-abatement walls, etc.)	Easier to manipulate, more resistant on certain surfaces	Growth market	\$110 - \$150



# Foam glass



In Europe, a plant produces 30-50k t/y generates sales of 35-56M\$



Infrastructure work



Green roofs

## Cement additive



- Glass powder is produced locally and therefore incurs lower transportation costs compared to other cement additives that must be imported into Quebec.
- Glass powder provides concrete with very interesting properties, including:
  - Smaller environmental footprint
  - Impermeability to chloride ions
  - Better structural resistance
  - Better handling of concrete
- Growing in Quebec and in the U.S.



# Water Filtration



- In North America
  - Estimated growth of 8% of the water equipment market
  - No manufacturers for filtration glass used for drinking water treatment
  - Well-established elsewhere in the world
- In Quebec:
  - Estimated potential of 18,000t/y worth \$0.9 M - \$1.4M
  - Retail price ranges from 35 \$/t to 60\$/t



# Abrasive



- 14 main suppliers of glass abrasives in North America, two of which are in Quebec and four in other Canadian provinces.
- 152,000 t/y currently used in Quebec, Ontario and northeast U.S.
- The abrasives market is expected to continue its strong growth, estimated at 3.8%/year until 2019.
- Market worth between \$31M – \$40M/y at distribution price ranging from \$200-\$260



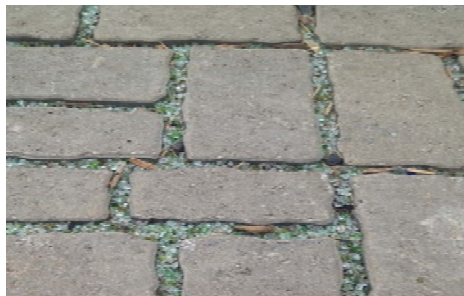


## Current end markets





# Glass: a multi-purpose material



## Market studies under way

- Supplementary Cementing Materials
- Slab and Cobblestone
- Exterior floor covering
- Foam glass
- Sandblast
- Septic tank media filter
- Swimming pool media filter
- Synthetic Turf
- Termite Barrier



## Key success factors

- A thorough analysis
- Support and investments from brand owners
- Support from the value chain and the government
- Strong partnership
- MRFs :
  - A tailored approach
  - Open communication channel with MRFs (under confidentiality agreements)
  - KPIs, including measurement of glass quality and 1<sup>st</sup> glass characterization protocol
  - Collaborative approach with MRF to develop a diversity of end markets
- Change management and strategic communications



# Key success factors

## A multi-disciplinary team



- Technical and economical analysts
- Scientific and environmental backgrounds
- Engineers
- Project manager
- Life cycle analysis expert
- Public Affairs Adviser
- Business Development
- Communications expert



## The next steps

- Discussions with remelt to take part in the pilot projects
- Gearing up for installation in the coming weeks
- Support of market outlets – launch of new business development activities







Questions?  
Thank you!