Glass is infinately Recyclable

FERVER
Fédération Européenne des Recycleurs de Verre

Presentation
July 2017

Raf Vanswartenbrouck
Business Development Manager
Rhenus Glass Recycling

Overview

Who are we?

The European Glass Recycling Market *(Packaging glass market)*

The European Glass Recycling Targets

The Belgian Green Dot System approach

- Close Loop or Open Loop ?
- Glass collection
- Glass Recycling versus quality

The ECO Balance of Glass Recycling

Who are we?

Fédération **E**uropéenne des **R**ecycleurs de **Ver**re

European Federation of Glass Recyclers

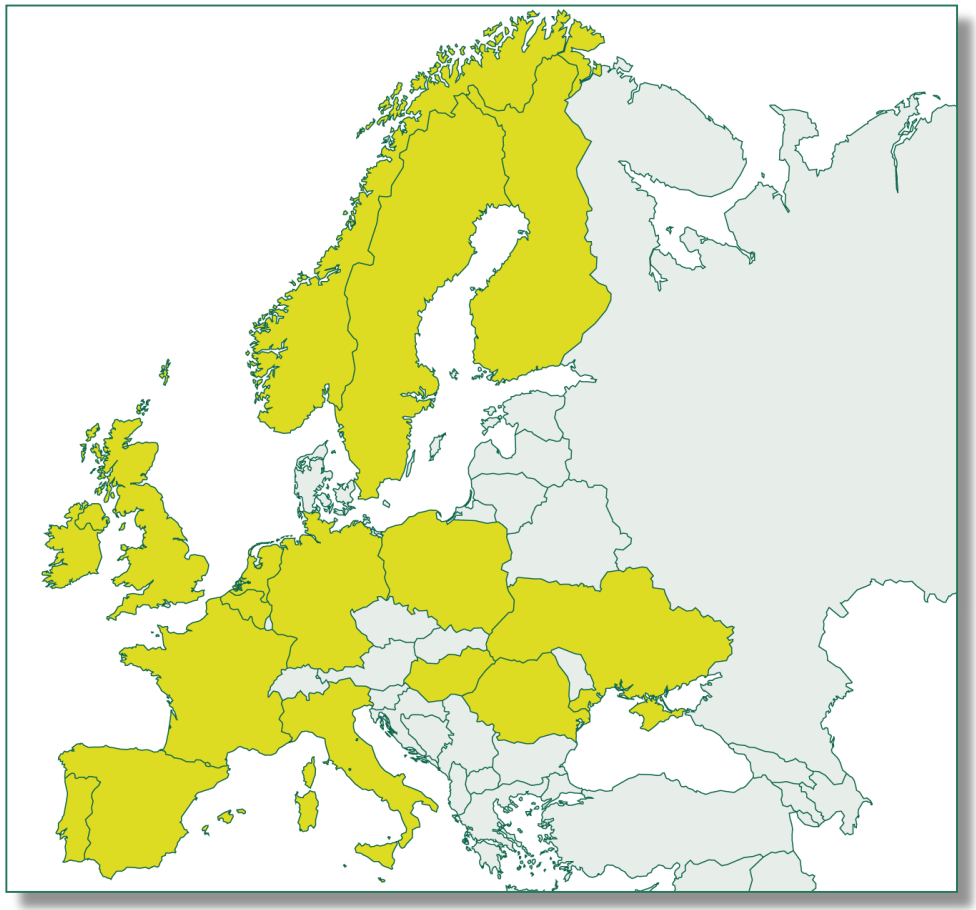
Founded in 2004 and based in Brussels (Belgium)

FERVER 2017

32 Members

16 European countries

~ 1.500 Employees



s.a. minérale n.v

FERVER 2017

Annual production : +16.000.000 ton

Annual Recycling : + 11.600.000 ton

FERVER members : 8.000.000 ton
(70% of all European Packaging Glass Waste)

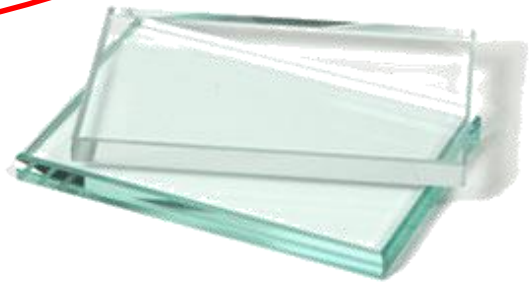
FERVER ongoing activities

- End-of-Waste criteria for cullet (EOW)
- Quality improvement of cullet
- Lead reduction in cullet (Pb)
- End-of-life Vehicles (ELV)
- Photovoltaic equipment recycling (PV)
- Sustainability (labels, design, collection …)

Glass Recycling in Europe

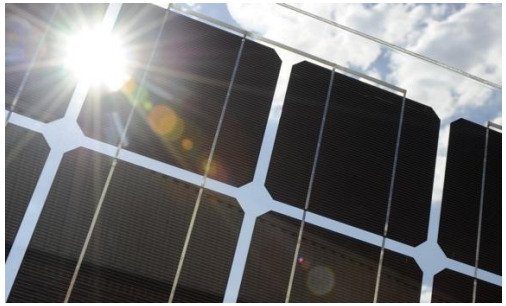
- Packaging glass

- Flat glass



- Automotive glass

- PV glass



Packaging Glass Recycling in Europe

Annual production : +16.000.000 ton

Annual Recycling : + 11.600.000 ton

Glass Recycling targets

Recycling glass

respecting nature

70 / 20

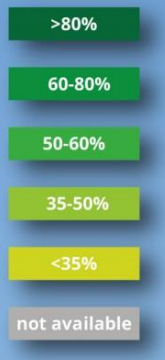
EU countries should recycle at least 70% of their Packaging Glass Waste by 2020.

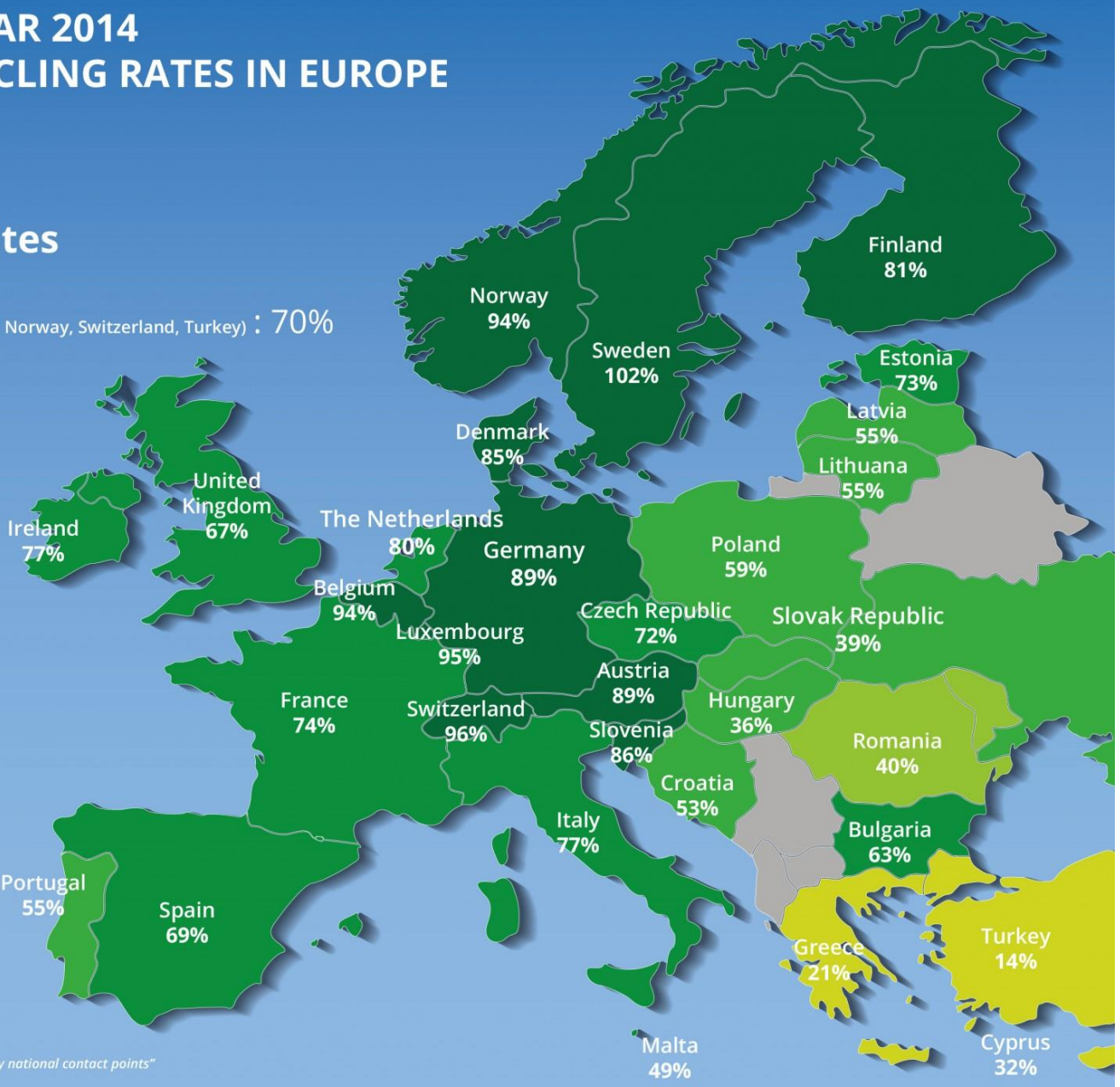
CONTAINER GLASS - YEAR 2014
COLLECTION FOR RECYCLING RATES IN EUROPE

Average rates

eu28 : 74%

europe (induding Norway, Switzerland, Turkey) : 70%

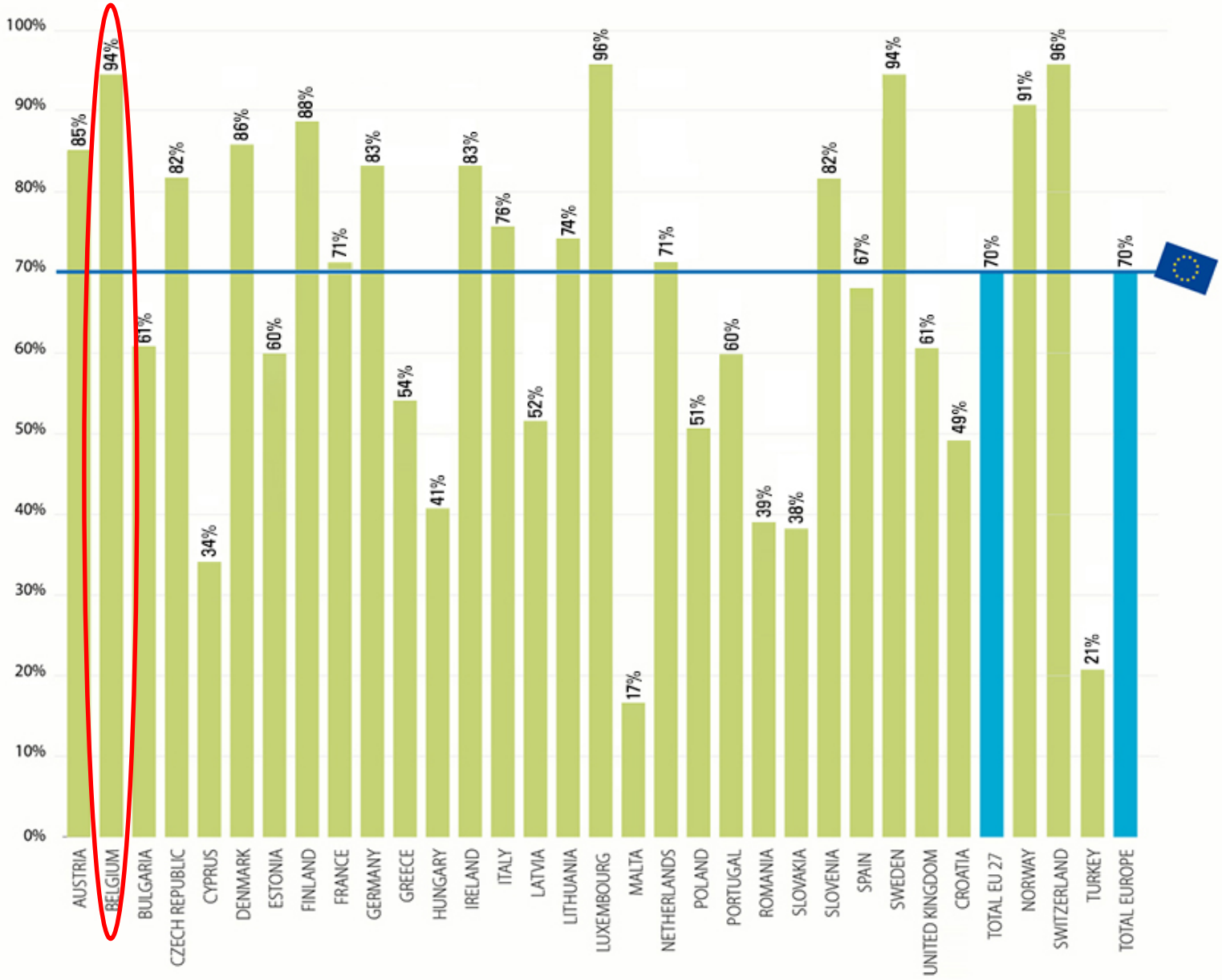




FEVE
The European Container Glass Federation

"Industry estimates based on the most recent available data provided by national contact points"

CONTAINER GLASS – YEAR 2012
COLLECTION FOR RECYCLING RATES IN EUROPE



Glass Recycling targets

Recycling glass

respecting nature

70 / 20

EU countries should recycle at least 70% of their Packaging Glass Waste by 2020.

90 / 30

EU countries should recycle at least 90% of their Packaging Glass Waste by 2030.

11.600.000 ton

Or **72,5%** of the 16.000.000 ton packaging glass produced in Europe

17.300.000* ton

Or **90%** of the 19.200.000* ton packaging glass produced in Europe.

**By an estimated consumption and production increase of 20% until 2030.*

Green Dot System

FOST PLUS

Market approach:

European tendering

a. Collection

- ***5 to 7 years***
- ***incl. bottle banks (privately owned)***
- ***incl. site cleaning***

b. Acquisition of the material streams

- ***3 to 4 years***
- ***colour separated***
- ***fixed pricing over the period***
- ***ownership of the glass waste goes from the Green Dot system to the recycler.***

Glass is a Raw Material again and again

Recycling:

Recycling is a process to change (waste) materials into new products to prevent waste of potentially useful materials, reduce the consumption of fresh raw materials.

Open-Loop Recycling

Closed-Loop Recycling

Open-Loop Recycling:

Downcycling

Closed-Loop Recycling

Upcycling

Collection

Methods of collection:

- Through the bottle bank

Mono bottle bank

Duo bottle bank

Underground bottle bank

Methods of collection:

- Curbside collection

> Collection

Methods of collection:

- through private public collection sites

> Collection

Methods of collection:

- through small stackable open bins

Quality

Quality of the collected glass waste:

- Color sorting:

The quality of color sorting at the source is mainly determinating the color of the new glass.

Quality of the collected glass waste:

- Color sorting:

Color sorting at the recycling plant

Practiced by 95% of the European Glass Recycling Plants

=

=

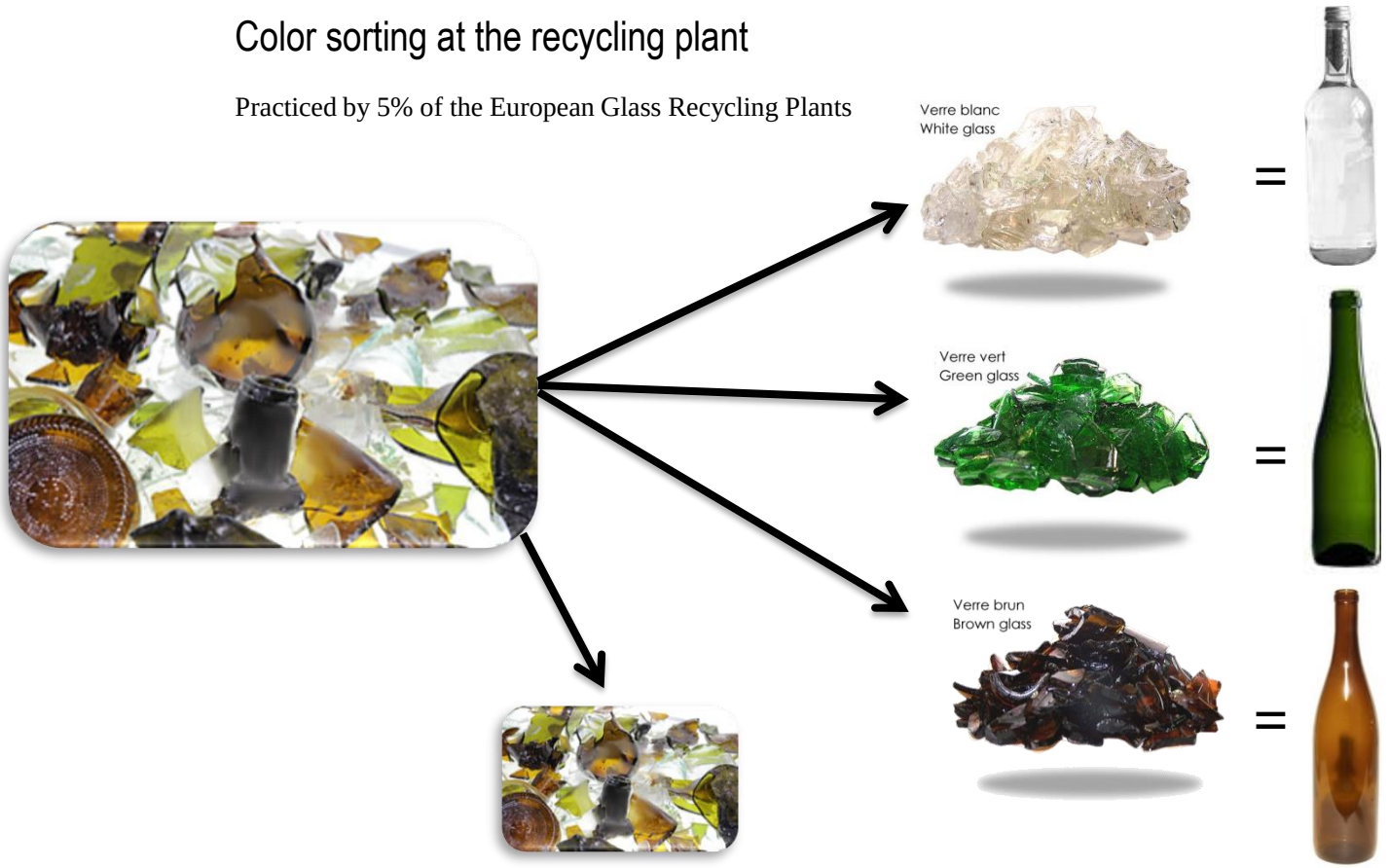
or

Quality of the collected glass waste:

- Color sorting:

Color sorting at the recycling plant

Practiced by 5% of the European Glass Recycling Plants



Quality of the collected glass waste:

- Color sorting:

Color sorting at the source gives the highest recovery rate

- **Color sorting if possible**
- **(> 90% color pureness)**

Quality of the collected glass waste:

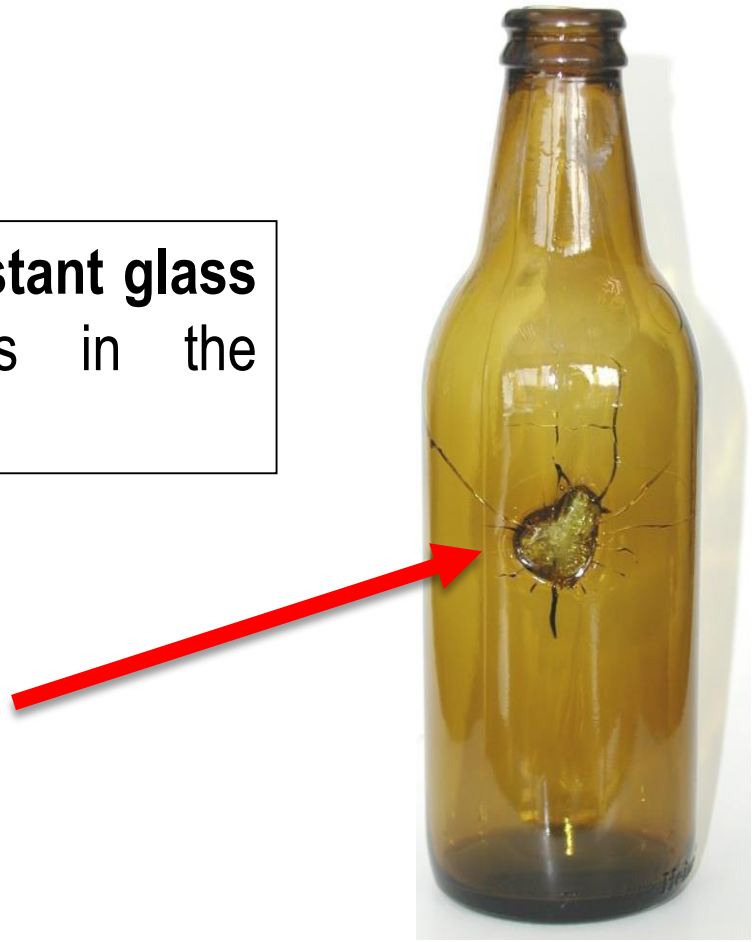
Unwanted pollution:

Ceramics and Heat Resistant glass causes serious problems in the production of new glass.

Quality of the collected glass waste:

Unwanted pollution:

Ceramics and Heat Resistant glass cause serious problems in the production of new glass.



Quality of the collected glass waste:

Unwanted pollution:

Organic contamination causes problems in the recycling and production process of new glass.

Quality of the collected glass waste:

Unwanted pollution:

Cristal Glass increases the heavy metal content in new glass.

Quality of the collected glass waste:

The operators play an important role:

Well trained and motivated operators can turn glass waste into a good recyclable quality.

Eco Balance

Eco Balance of Glass Recycling

> Eco balance

Men and environment

1. MINING PRIMARY RAW MATERIALS

+

LANDFILLING GLASS WASTE

=

DISTURBING the ECOLOGICAL BALANCE

Men and environment

2. Use of FURNACE READY CULLET

=

VALUABLE ALTERNATIVE FOR PRIMARY RAW MATERIALS

- Raw material batch for the production of green packaging glass

  90% FURNACE READY CULLET
  10% PRIMARY RAW MATERIALS

1 ton Furnace Ready Cullet **= 1 ton** new glass

1.2 ton Primary Raw Materials **= 1 ton** new glass

Men and environment

3. Use of FURNACE READY CULLET
=
REDUCTION OF THE MELTING TEMPERATURE
SAVES ENERGY
REDUCTION OF CO 2- EMISSIONS

SAVES ENERGY

☛ Per **4%** cullet use **1% energy saving**.
90 % cullet use = **±25 % energy saving**.

Per ton cullet use, 112 Kg fuel can be saved

☛Belgium: 360.000 ton cullet can save 40.320 ton fuel

Men and environment

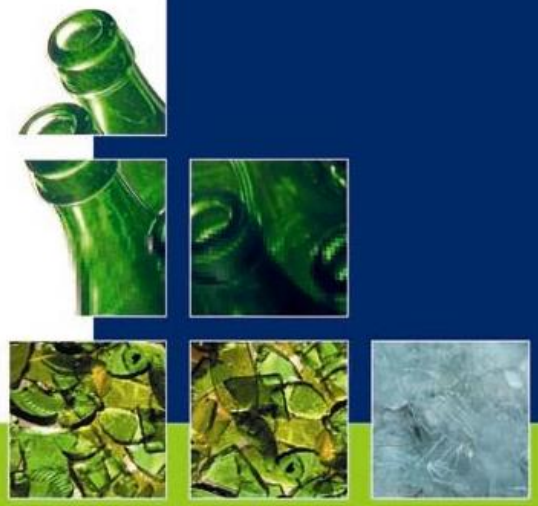
3. Use of FURNACE READY CULLET
=
REDUCTION OF THE MELTING TEMPERATURE
SAVES ENERGY
REDUCTION OF CO 2- EMISSIONS

REDUCTION OF CO 2- EMISSION

☛ **Per ton furnace Ready Cullet a reduction of 315 kg CO2 can be realised**, in comparison with the use of prmary raw materials. This includes processing and logistics of the cullet. (study British Glass)

☛ Belgium: 360.000 ton cullet = 113.400 ton CO2-savings
Europe: 10.000.000 ton cullet = 3.150.000 ton CO2-savings

Recycling glass



respecting

Nature

Glass is infinately Recyclable

FERVER
Fédération Européenne des Recycleurs de Verre