

- Packaging Glass - Collection in Europe

**How is glass collection organized
in EU-countries?**

Dipl.- Ing. Ulrich Ix

Rome, Oct 2016

FERVER

Fédération **e**uropéenne des **R**ecycleurs de **verre**
(European Federation of Glass Recyclers)

founded in 2004

based in Brussels

FERVER

41 Members – 72 Plants

18 European countries

> 1.800 Employees

> 70% of EU Glass Waste

A lot of members are family enterprises in 3rd or 4th generation

**emiliana
rottami** SpA

 **BERRYMAN**
Service to the Environment Since 1922

 **RHENUS
LOGISTICS**

 **FCC ambito**

ARW
MAGYARORSZÁG KFT.
H-3560 CsilDomalki, Kisdobos u. 21.

syklus
Glass- og metallgjenvinning

ECOSAN
reciclado y gestión de residuos

 **lavetri**

 **Reiling**
Unternehmensgruppe

 **Santos Jorge, S. A.**

 **УТИЛИТА**
национальные ресурсы

 **IPAQ**
GLASS RECYCLING

 **Green Glass**
SPECIALTÄT

Tecno  **Recuperi**

Muzaffer Pinarbaşı
İşletmeleri



 **GRC**
glass recycling
company

glasrecycling leezeringen

 **GRL**



S.A. minérale n.v

 **GRL**
G.R.L.-GLASRECYCLING nv

Svensk GlasÅtervinning

 **everglass**

MBR Recycling GmbH
Spezialist zur Aufbereitung von Flach- und Sondergläser

 **Rehab Glassco**

 **Eurovetro**

 **GRI**
G.R.I.-GLASRECYCLING nv

 **Ecopatè**

 **Uusioaines Oy**

Viridor

TÖNSMEIER
Entsorgungssysteme

 **Glass Tech
Recycling Ltd**

 **vidrologic**

 **MALTHA**

 **SIBELCO
EUROPE**
Sibelco Green Solutions

ITALY



Tecno  Recupero



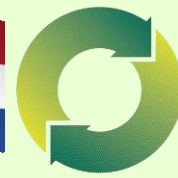
4 Members – 9 Plants

recycle > 50% of Italian Glass

- Packaging Glass - Collection in Europe

- Examples:**
- **The Netherlands**
 - **Germany**
 - **Austria**
 - **UK**

THE NETHERLANDS

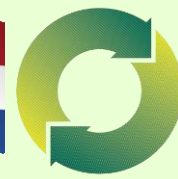


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Packaging Glass Collection Systems in Europe

Glass Collection in

THE NETHERLANDS



Facts

Inhabitants 16.900.000

Glass collection **total** (2014) **431.000. t**

Collection per inhabitant 25,5 kg/inh./a

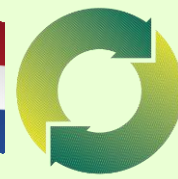
Recycling rate  (2014) \pm 78,7 %

Owner of collected glass

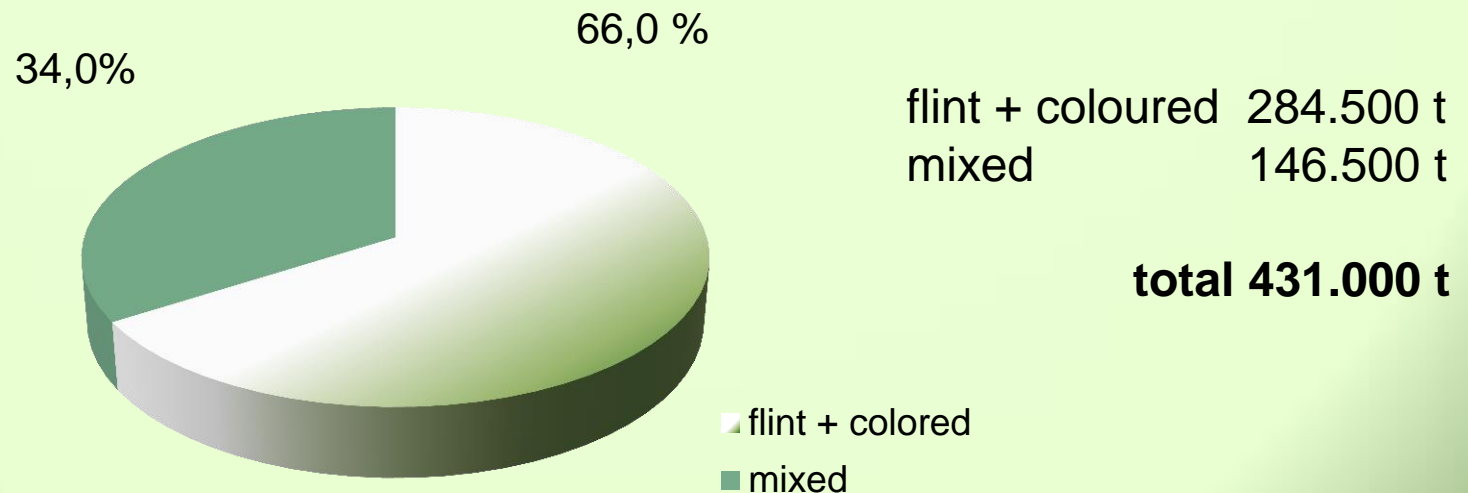
Municipalities or collectors



- if authorized by municipality
- glass sold via tenders



Collection 2014



Collection Systems

Bottle banks

flint

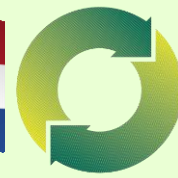
green/amber



Flint / amber / green



THE NETHERLANDS



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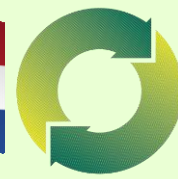
Packaging Glass Collection Systems in Europe

Distribution of

- ◆ glass recycling plants

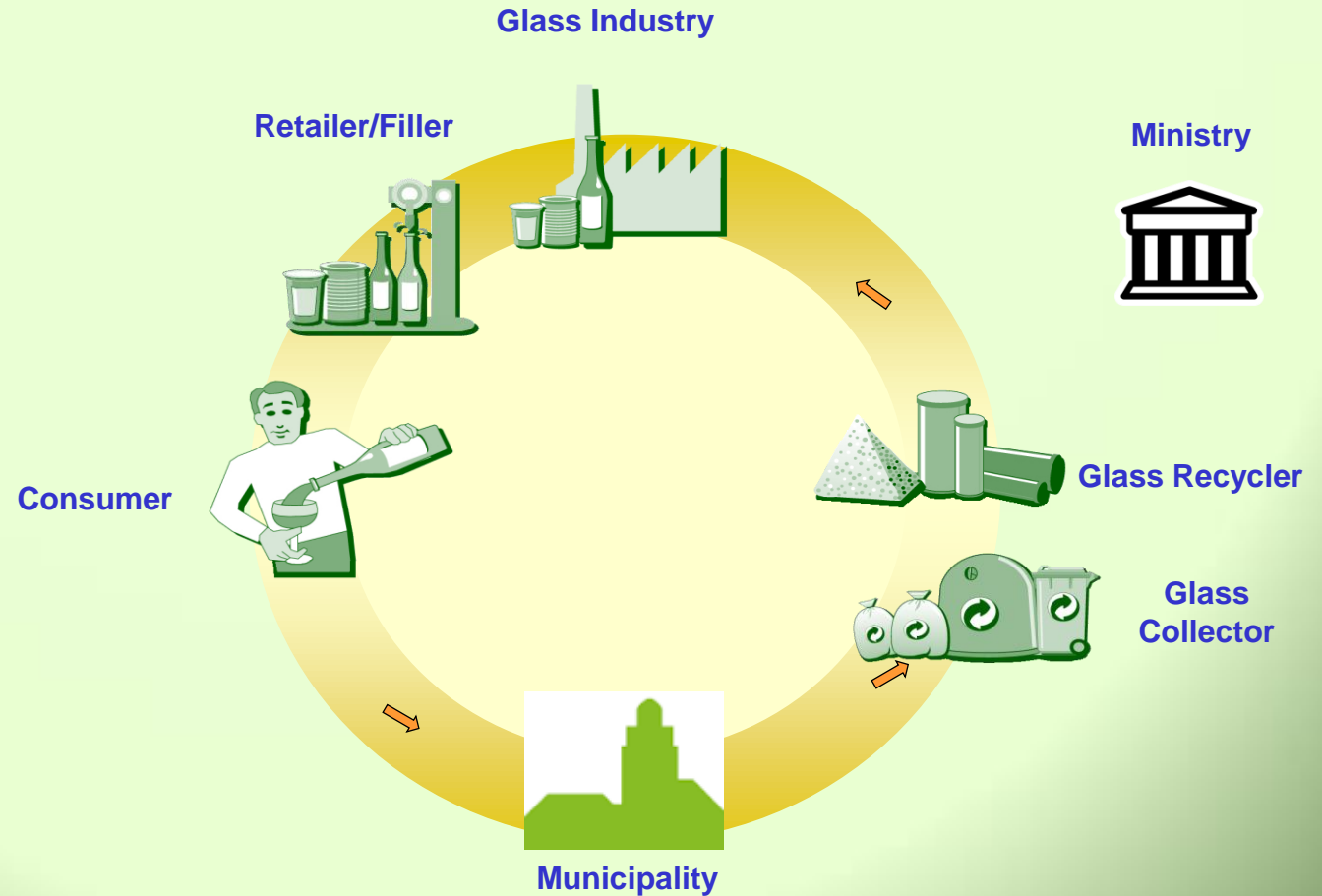


THE NETHERLANDS

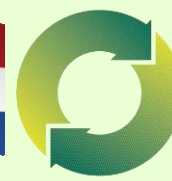


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Packaging Glass Collection Systems in Europe



THE NETHERLANDS



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Packaging Glass Collection Systems in Europe

Afvalfond

Responsible for collection

Nedvang

Responsible for contracts with municipalities, collectors, recyclers, monitoring, fund distribution. Non-profit organization.

Glass Industry

Retailer/Filler

Ministry



Consumer

Afvalfond & Nedvang

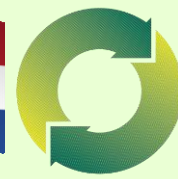
Glass Recycler

Glass Collector

Municipality



THE NETHERLANDS

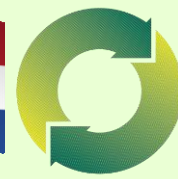


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Packaging Glass Collection Systems in Europe



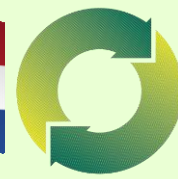
THE NETHERLANDS



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Packaging Glass Collection Systems in Europe






Packaging Glass Collection Systems in Europe

Negative:

- Appr. 1993 – 1996 1/3 of collection changed to mixed glass
- Low competition in organisation of collection (monopoly)
- Poor education and public relation to costumer (better in 2016 now)

Positive:

- No commingled collection (glass + paper + plastics + metal ...) 
- Short distance from collection to recycling plant (low breakage)

GERMANY



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Packaging Glass Collection Systems in Europe

Glass Collection in

GERMANY


GERMANY

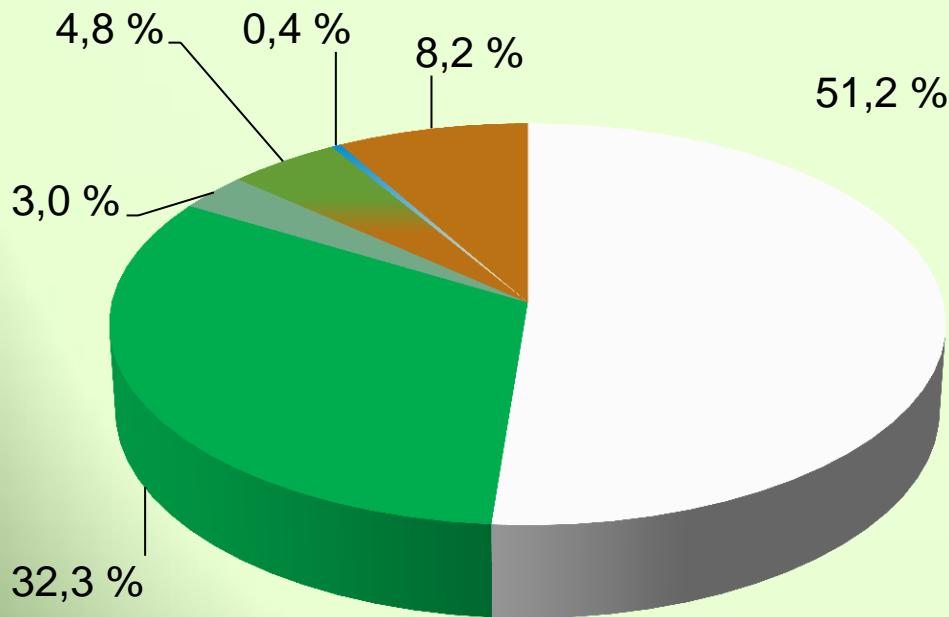


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Packaging Glass Collection Systems in Europe

Facts

Inhabitants	82.176.000
Glass collection total	(2014) 1.872.300 t
Collection per inhabitant	22,8 kg/inh./a
Recycling rate 	(2014) ± 89,0 %
Owner of collected glass	9 (10) Green Dot Systems (glass sold via tenders)

*Packaging Glass Collection Systems in Europe***Collection 2015**

- flint
- green
- mixed
- coloured
- glass + metal
- amber

	958.917 t
	605.177 t
	56.419 t
	90.510 t
	6.856 t
	154.417 t
total	1.872.296 t

GERMANY



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Packaging Glass Collection Systems in Europe

Collection Systems



Classical
bottle bank
3 colours



Bottle bank : flint and combination green/amber

GERMANY



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Packaging Glass Collection Systems in Europe

Collection Systems



Municipal collection centers : 3 colours

Transport in separate compartments on truck



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Packaging Glass Collection Systems in Europe

Collection Systems

Collected glass at storage yard of municipality



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Collection Systems



< 5%

Plastic bags
doorstep

Dustbin
mixed colours



Collection in
Compaction trucks



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Packaging Glass Collection Systems in Europe

„Not everything fits glass waste“

Public Relation



GERMANY

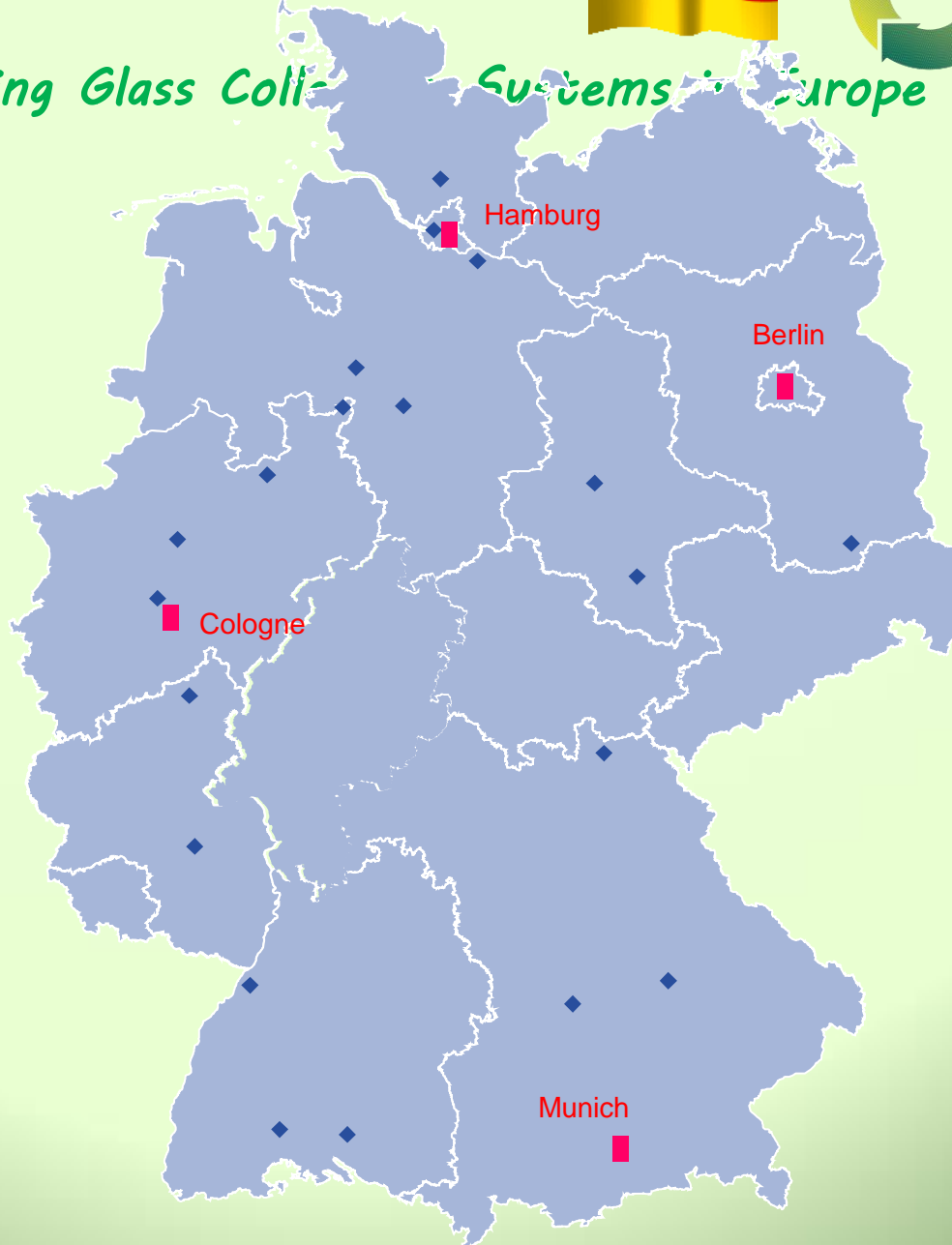


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Packaging Glass Collection Systems in Europe

Distribution of

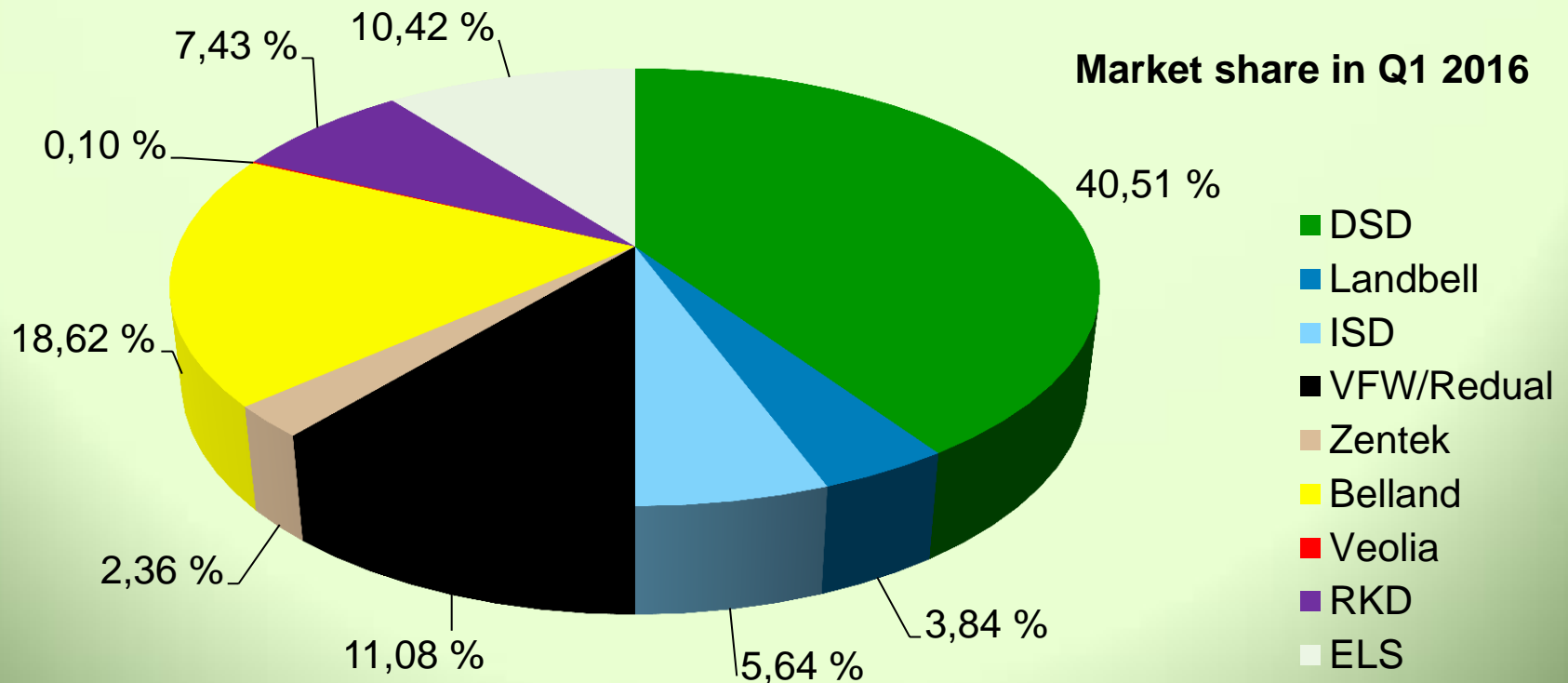
◆ glass recycling plants





Packaging Glass Collection Systems in Europe

2016 : 9 (10) Green Dot Systems
supervised by the antitrust authorities (real competition)

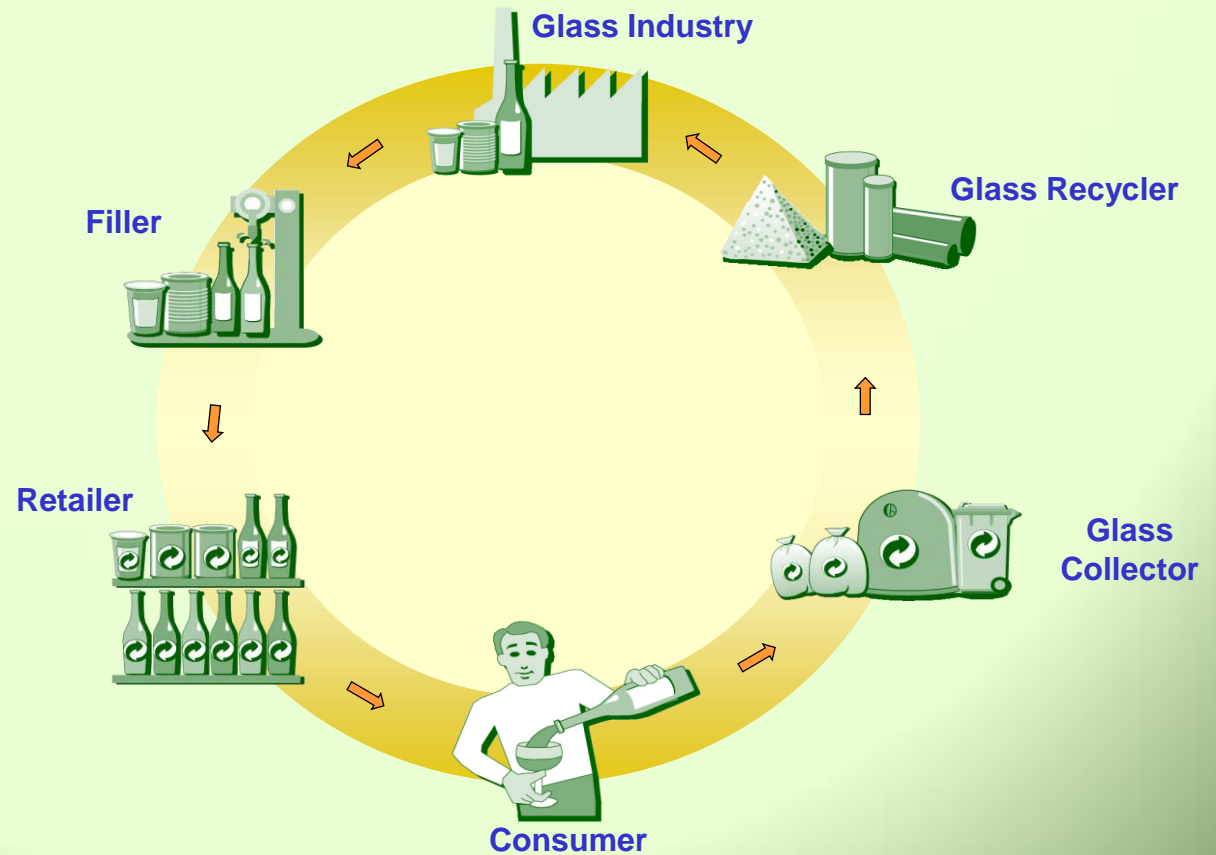


GERMANY



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Packaging Glass Collection Systems in Europe



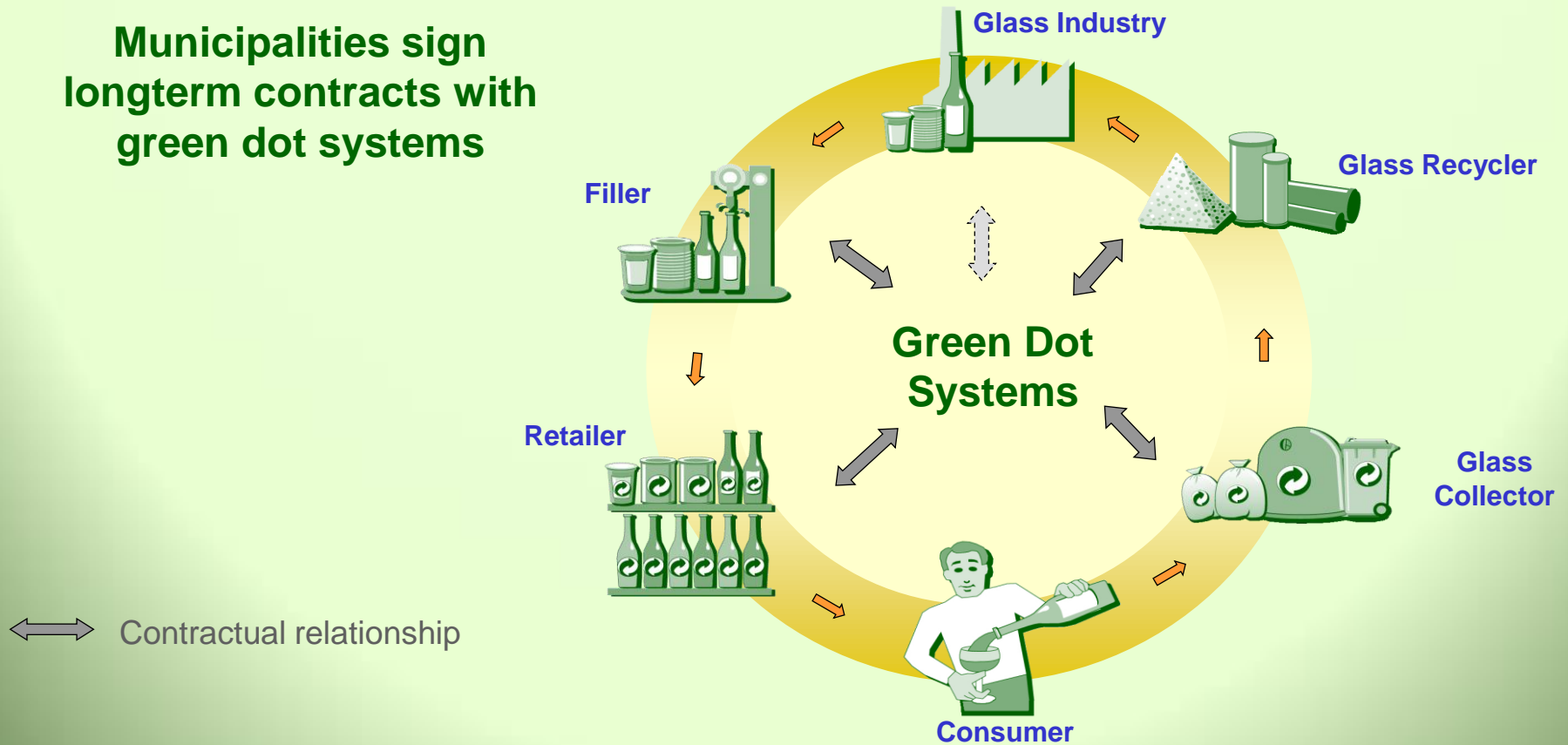
GERMANY



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Packaging Glass Collection Systems in Europe

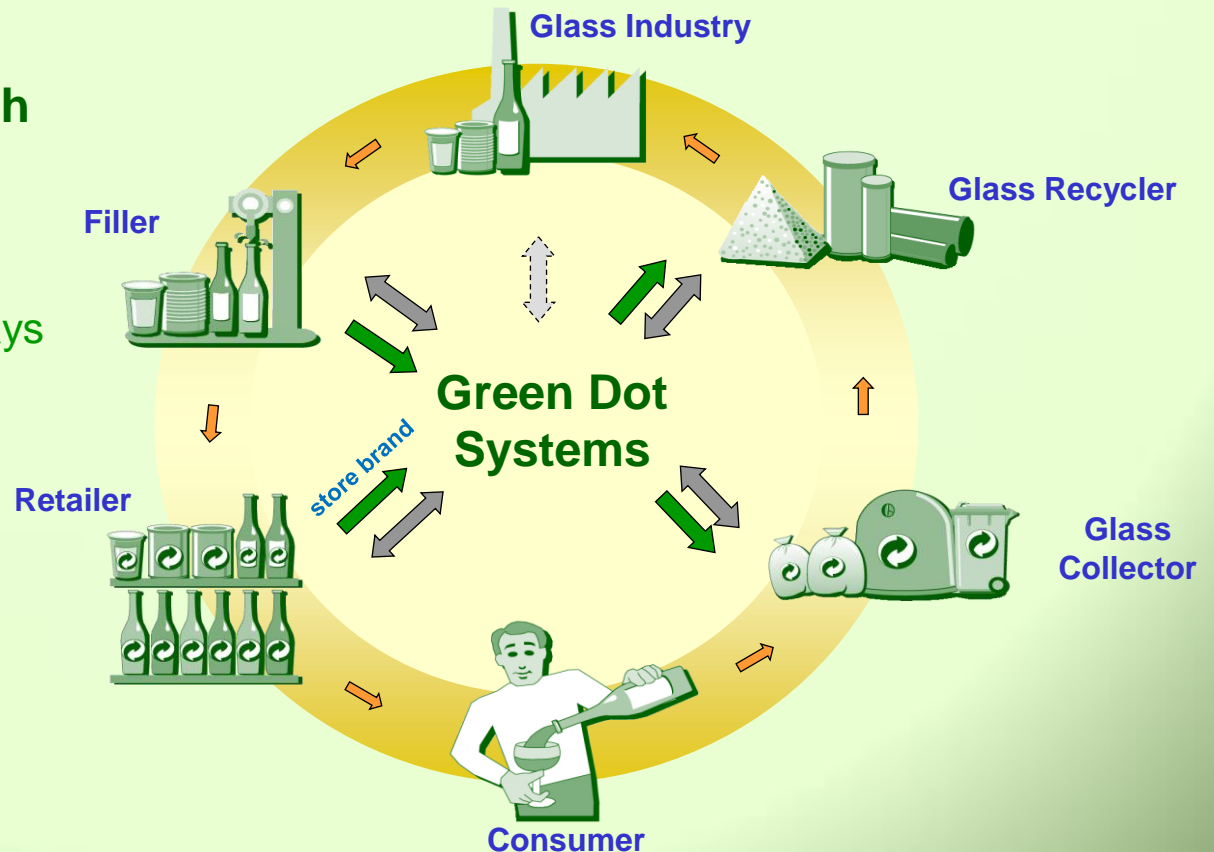
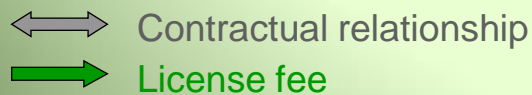
**Municipalities sign
longterm contracts with
green dot systems**



Packaging Glass Collection Systems in Europe

Municipalities sign longterm contracts with green dot systems

Producer / Retailer pays
license fee for
collection/recycling





Packaging Glass Collection Systems in Europe

Negative:

- Some participants in recycling loop are not really interested in glass and take no care of quality
- Poor education and public relation to consumers

Positive:

- Green dot systems in competition : Benefit for economy
- Colour separated collection with good glass quality standard
- No commingled collection (*glass + paper + plastics + metals ...*)



AUSTRIA



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Packaging Glass Collection Systems in Europe

Glass Collection in

AUSTRIA

AUSTRIA



FERVER

Packaging Glass Collection Systems in Europe

Facts

Inhabitants	8.700.000
Glass collection total	(2015) 235.100 t
Collection per inhabitant	27,0 kg/inh./a
Recycling rate 	(2014) ± 84,5 %
Owner of collected glass	5 Green Dot Systems

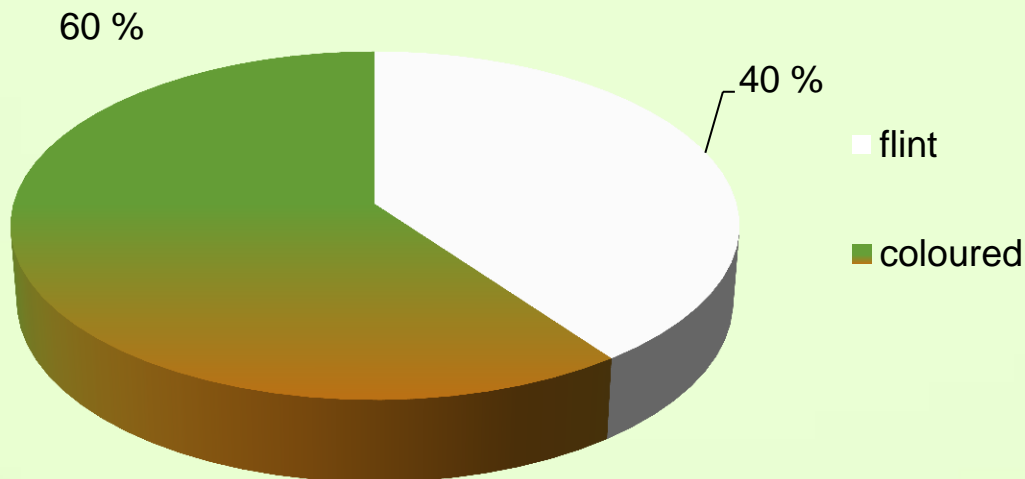
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Packaging Glass Collection Systems in Europe

Collection 2015



	94.040 t
	141.060 t
total	235.100 t

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Collection Systems

Bottle banks for flint and green/amber



AUSTRIA

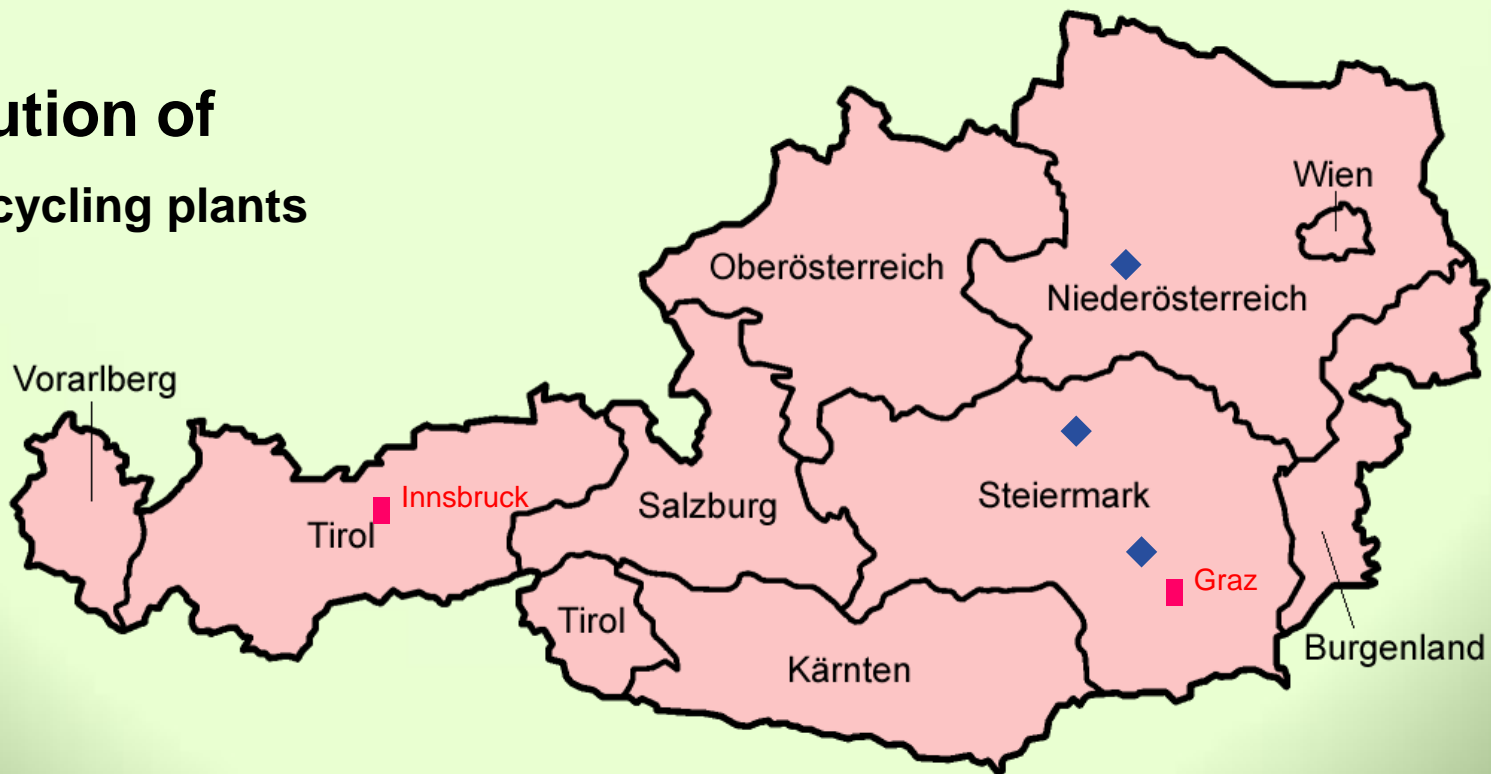


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Packaging Glass Collection Systems in Europe

Distribution of

◆ glass recycling plants



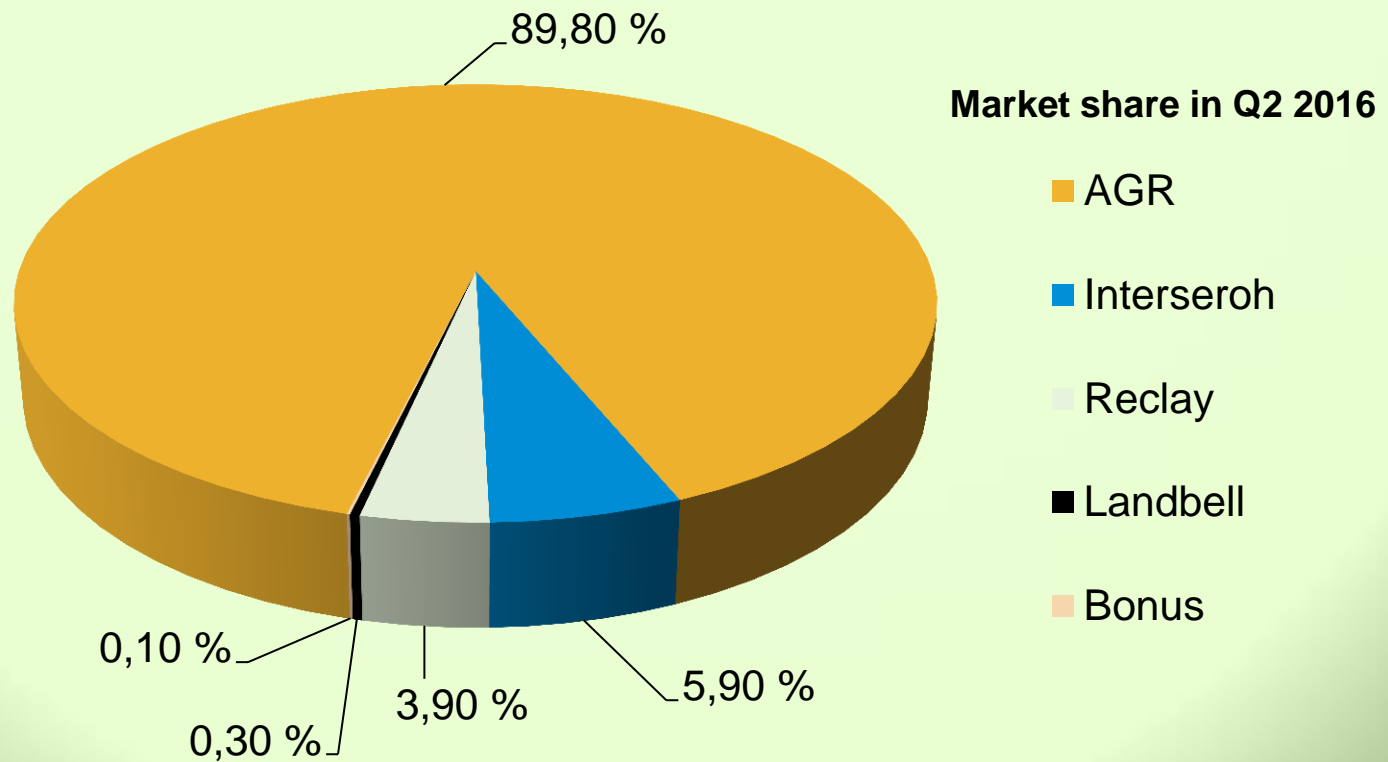
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2016 : 5 Green Dot Systems

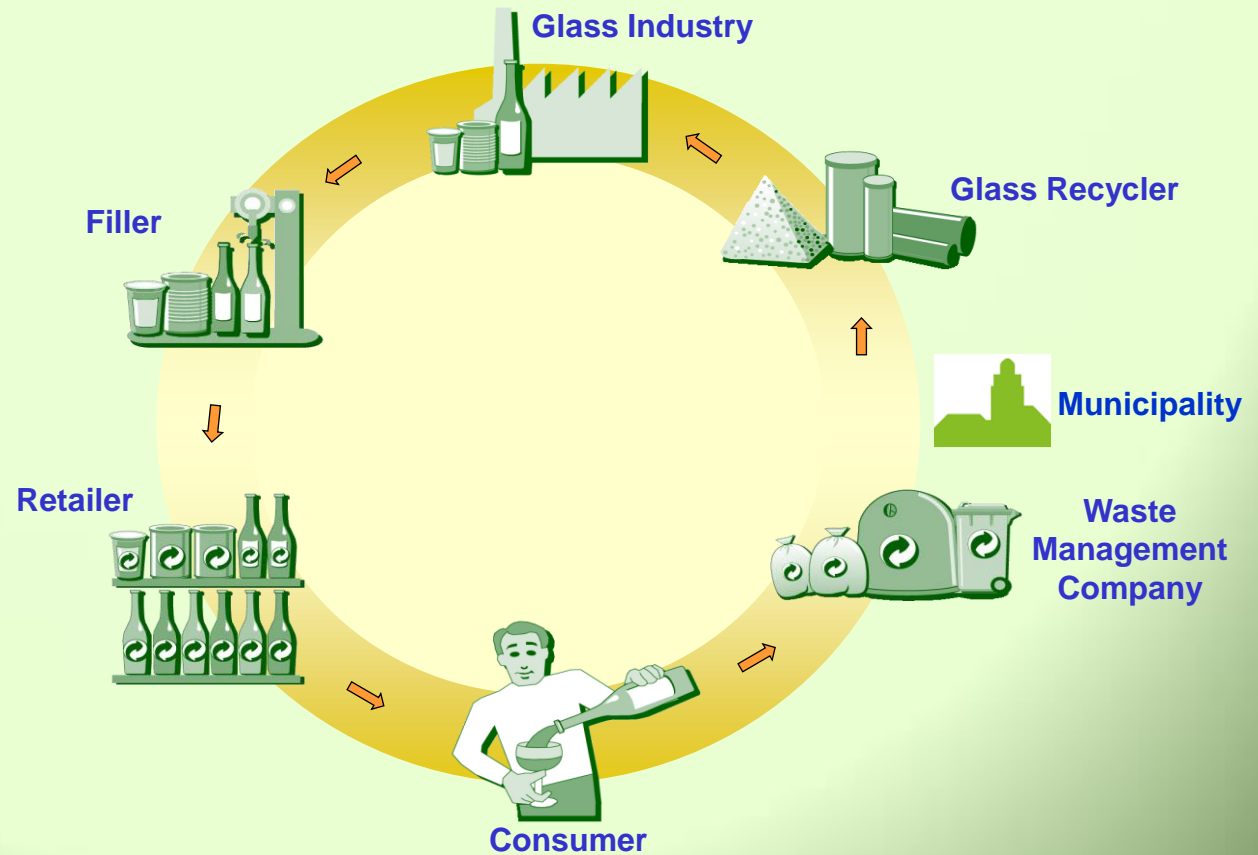


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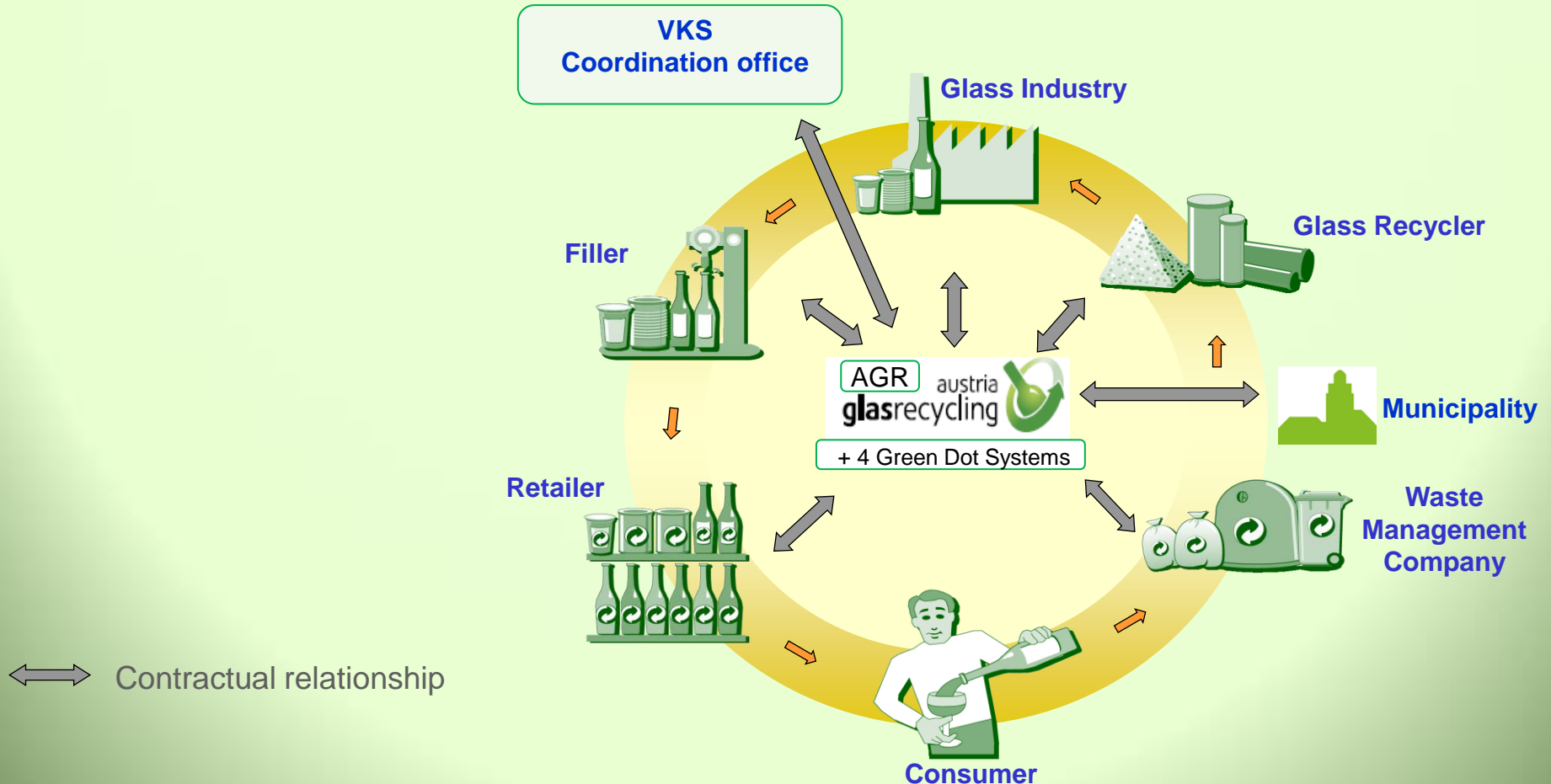


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Packaging Glass Collection Systems in Europe

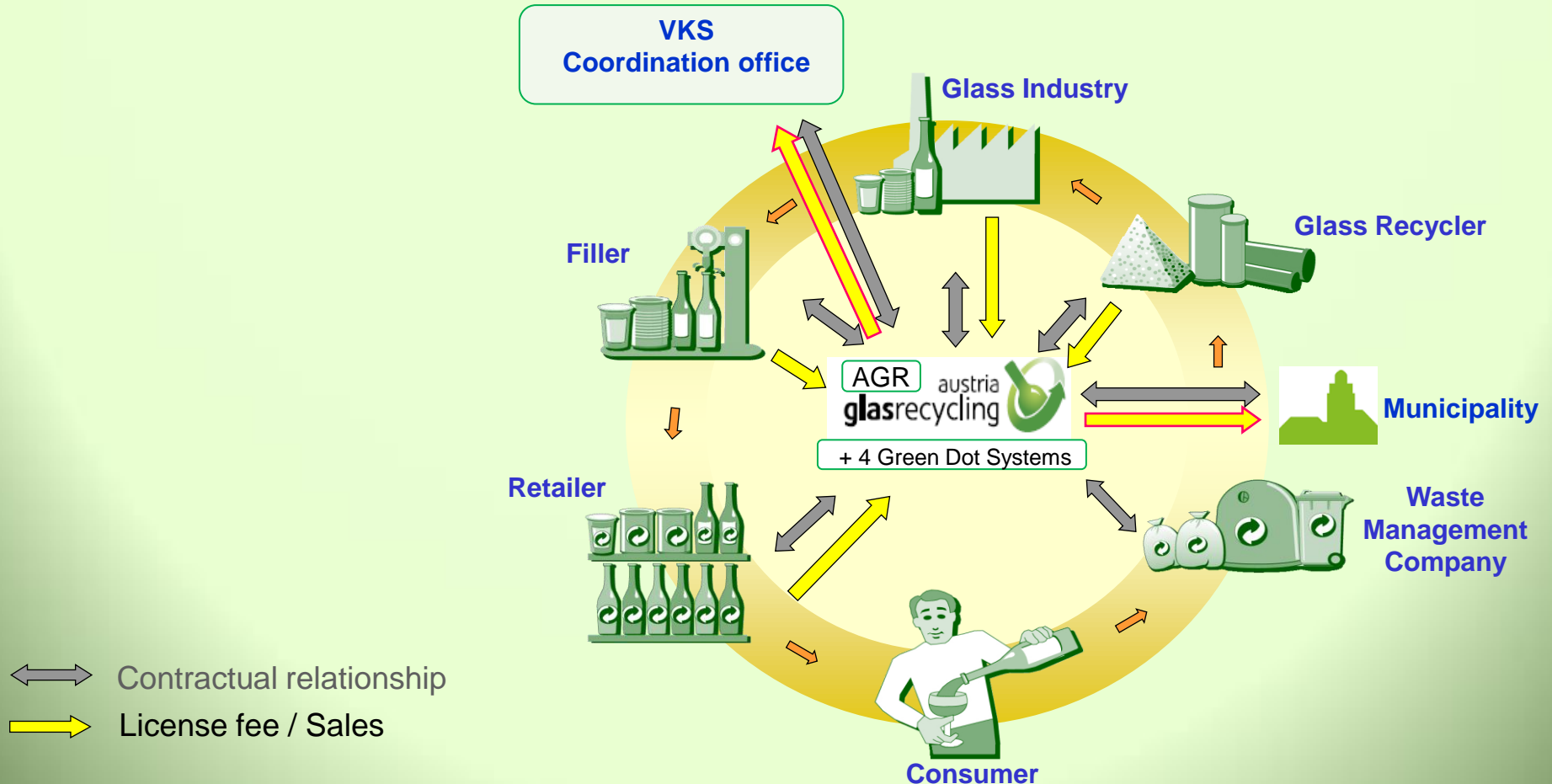


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Packaging Glass Collection Systems in Europe



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Packaging Glass Collection Systems in Europe

Negative:

- Green dot systems in low competition : changing now

Positive:

- Colour separated collection with good glass quality standard
- No commingled collection (*glass + paper + plastics + metals ...*)
- Excellent education (schools) and public relation to consumer

UNITED KINGDOM

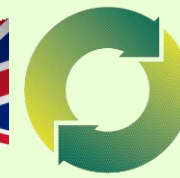


FERVER

Packaging Glass Collection Systems in Europe


Glass Collection in

UNITED KINGDOM



Packaging Glass Collection Systems in Europe

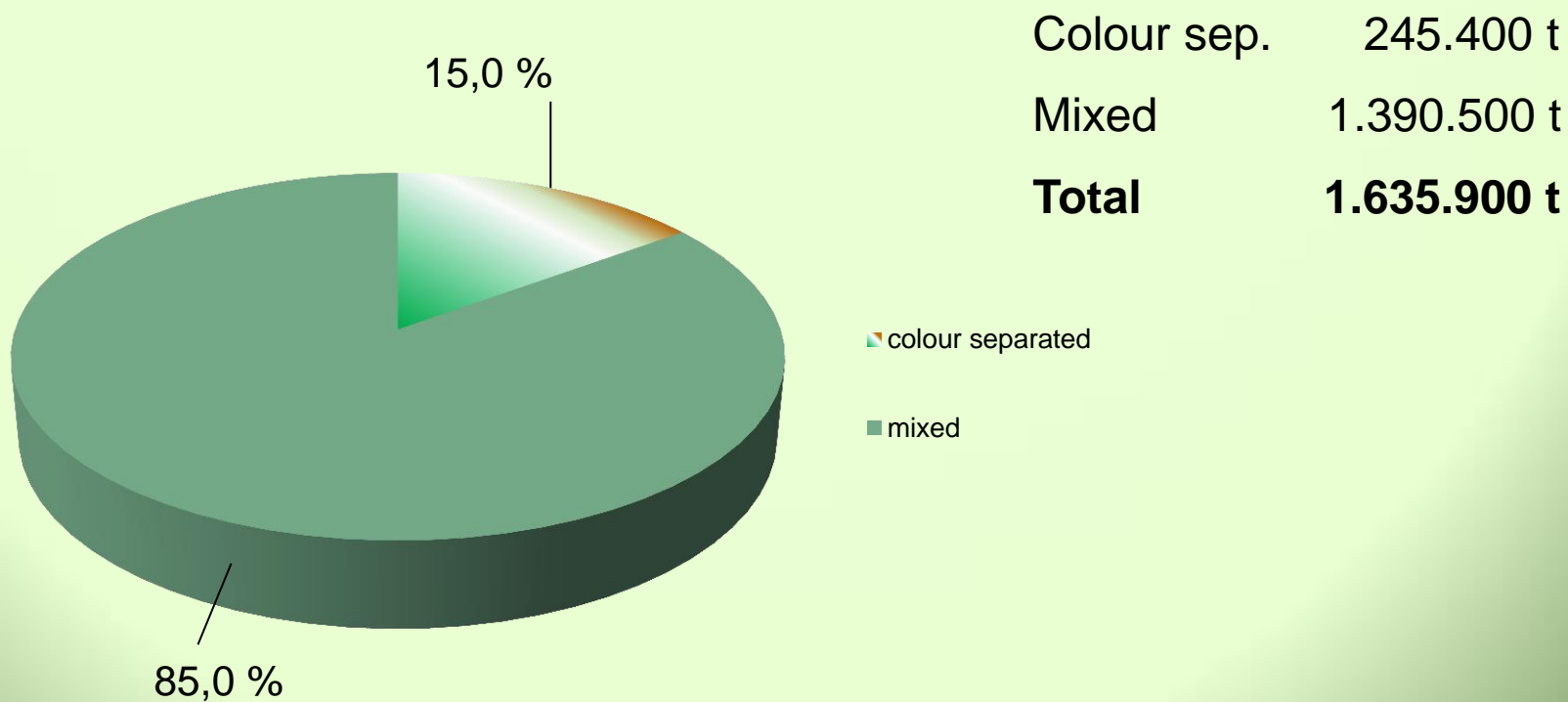
Facts

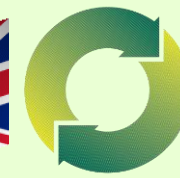
Inhabitants	60.460.000
Glass collection total	1.635.900 t
Collection per inhabitant	27,0 kg/inh./a
Recycling rate 	(2014) \pm 67,2 %
Owner of collected glass	Collectors/Municipalities



Packaging Glass Collection Systems in Europe

Collection 2014

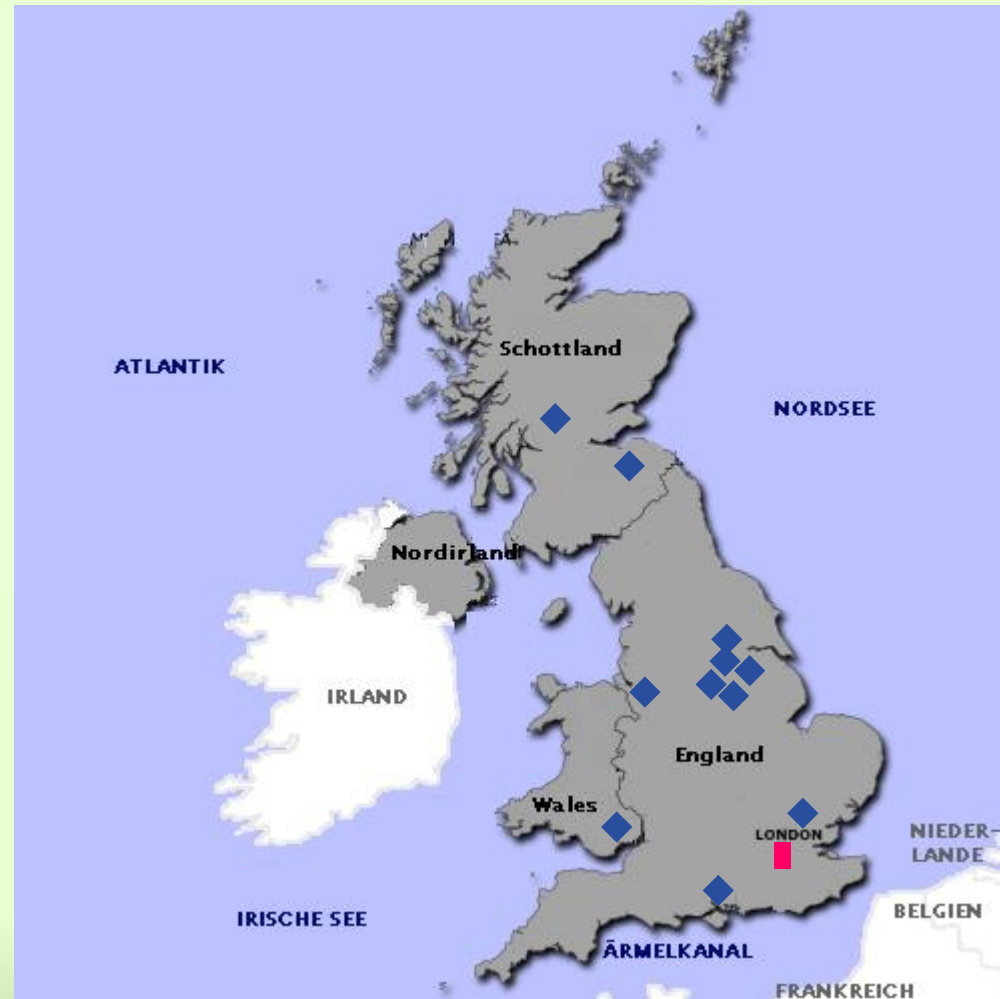




Packaging Glass Collection Systems in Europe

Distribution of

- ◆ glass recycling plants



Collection Systems

Bottle banks

< 15 %

- flint
- green
- amber



240 liter bin

- glass
 - paper
 - metals
 - plastic
- going to MRF



Doorstep collection in 60 liter boxes

Some collectors sort
on side of truck !



glass+cans

plastic

paper

UNITED KINGDOM



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Packaging Glass Collection Systems in Europe



MRF Plant

(Materials Recovery Facilities)



Principle of „Producer Responsibility“

- Criteria:
1. Handling over 50 tons/year and supplied to UK market
 2. Turnover more than £2 million (2.35 million €)

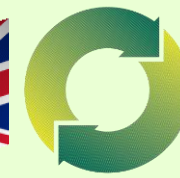
UK Government sets mandatory recycling targets to fulfill the *EU Directive on Packaging Waste 94/62/EC*

PRN (Packaging waste **R**ecovery **N**ote) = Certificate resp. Evidence

PERN (Packaging waste **E**xport **R**ecovery **N**ote)

- „top up“ subsidy over and above market prices (no financing of full costs of recycling)

Producers have to acquire unique evidence of recycling
- a PRN/PERN - issued by accredited reproprocessors
(price is negotiated between the parties)



Supply Chain Proportion of PRN-Responsibility

Activity	Example	Share of Responsibility
Raw material manufacturer	Sand supplier	6%
Converter		9%
Packer/Filler	Food manufacturer	37%
Seller	Retailer	48%
Importer	Bringing goods from abroad	Rolled up obligation

Glass Industry

Glass Industry 14%

Example: Retailer is obligated to buy 48% of PRNs

Calculation of business's (producers) individual obligation:

Packaging handled (t) x Share (%) x Business Target (%) = Obligation (t)

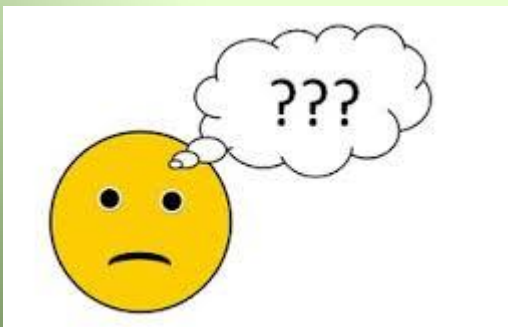


Packaging Glass Collection Systems in Europe

Negative:

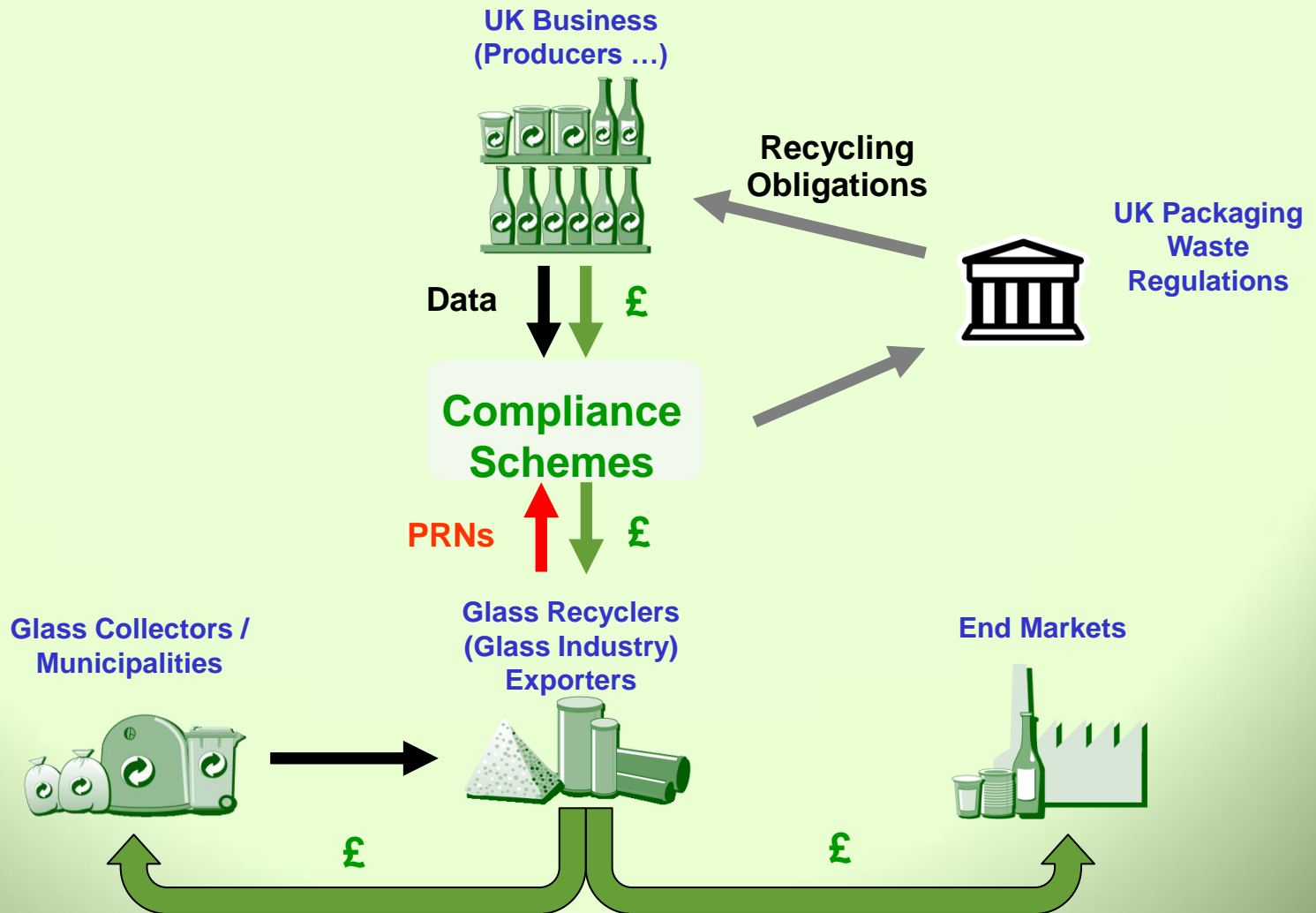
- 85% of collection is mixed glass and/or MRF material (glass/paper/metals/plastic)
- Collection with compaction trucks
- Collected glass (appr. 600.000 t/y) right into road construction (aggregates)
- No planning reliability due to changing PRN prices during the year

Positive:





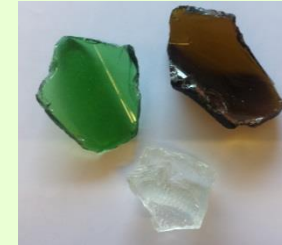
Packaging Glass Collection Systems in Europe



Why is mono-fraction and colour separated glass collection important?

Packaging Glass Collection Systems in Europe

Glass Cullet: Product Specification



CSP Ceramics, Porcelain, Stones



max. 25 g/ton*

Ferro-Metal



max. 2 g/ton*

Non-Ferro-Metal

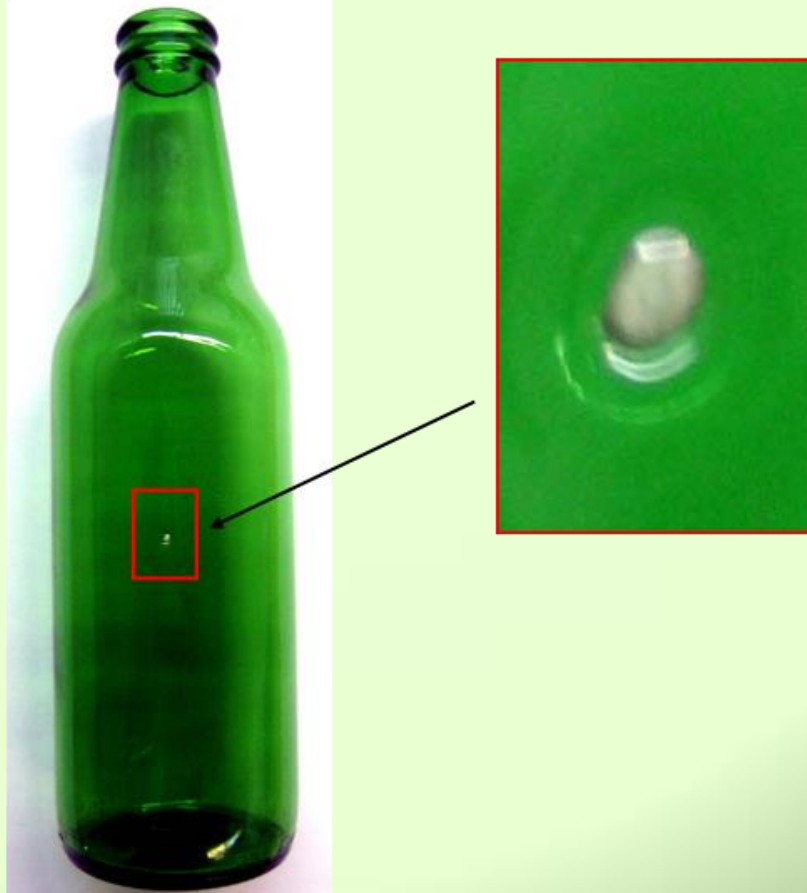


max. 3 g/ton*

* depending on country and customer

Packaging Glass Collection Systems in Europe

Example: Porcelain causes impurities !

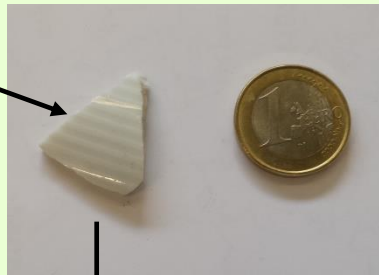


Packaging Glass Collection Systems in Europe

Example for Impurities:

Specification: CSP = 25 g/ton

Porcelain 2.6 g



If customer finds this piece in a 50 kg sample
=> 52 g/ton

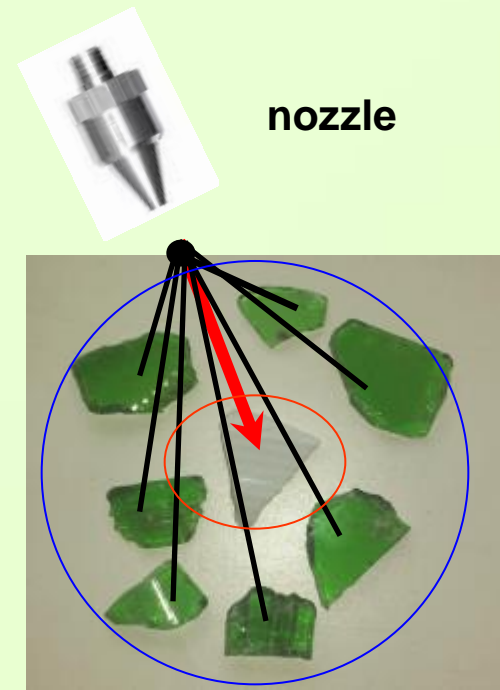
**Glass factory
rejects product !**

Separation of pollutions and colour sorting

High level of **sorting accuracy!**

To be sure to hit the identified pollution the blow radius must be wide enough.

Each shot means **loss of glass !**



Packaging Glass Collection Systems in Europe

Separation of pollutions



- **CSP** (ceramics, stones, porcelain)
- **labels**
- **caps**
- **other** non-transparent objects

⇒ **Glass loss up to 3 %**

1.000 tons of cullet production
⇒ **1 truckload of glass loss !!!**



Advantages of **separate** glass collection:

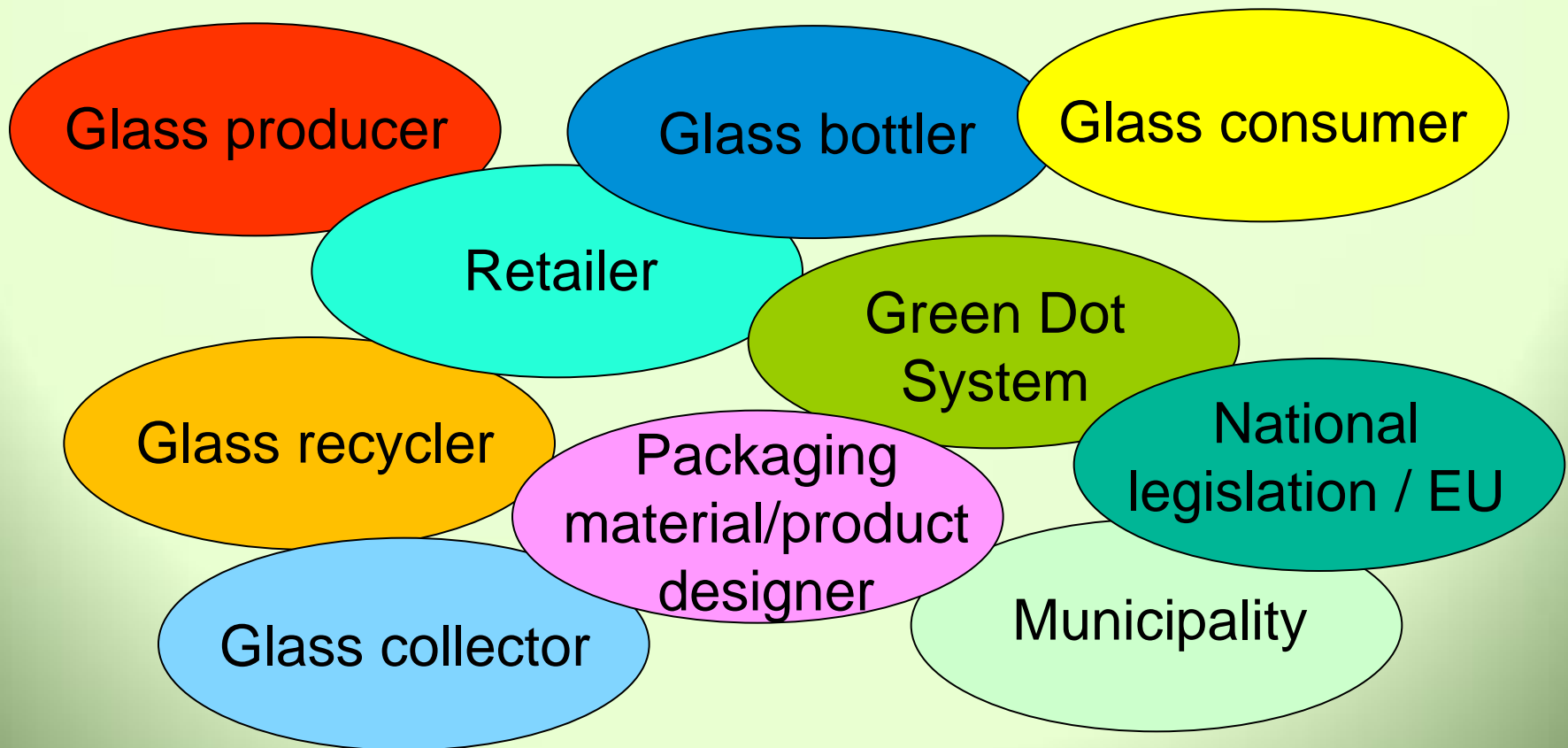
- ◆ Much better support and understanding by consumers
- ◆ Mono-fraction → low contamination of glass and no contamination **in** paper, plastics ...
- ◆ Low sorting residue / less material loss
- ◆ Low sorting costs
- ◆ Better recycling quality - high quality product
- ◆ Perfect for our environment and sustainability

Glass recycling : Increasing volumes in collection

- ◆ Packaging glass production increasing (young generation)
- ◆ Float glass production increasing (modern buildings)
- ◆ EU recycling targets raising
- ◆ Glass wool, -foam, -fiber, -abrasives, tiles ...
- ◆ New applications like water filtration, glass asphalt ...

Packaging Glass Collection Systems in Europe

Glass recycling at the responsibility of



Packaging Glass Collection Systems in Europe

*Thanks
for your attention!*