

## 2.3. UA for resource efficiency and waste management

### **2.3.2 Waste-to-resources : the potential uses of bio-waste**

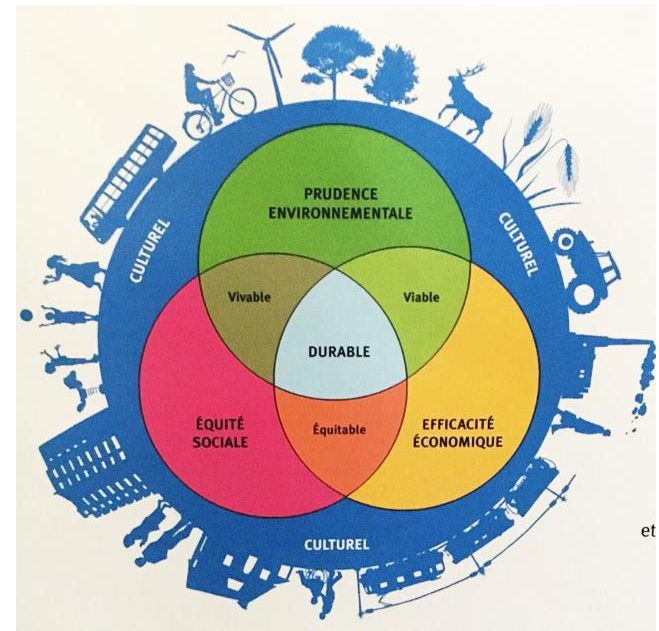
Laure Vidal-Beaudet

Agrocampus Ouest / Agreenium

## 2.3.5 Waste-to-resources: The potential uses of biowaste

### Plan

- Urban system
- Type of urban wastes
- Ways of recycling
- Potential uses of bio-wastes for plant production

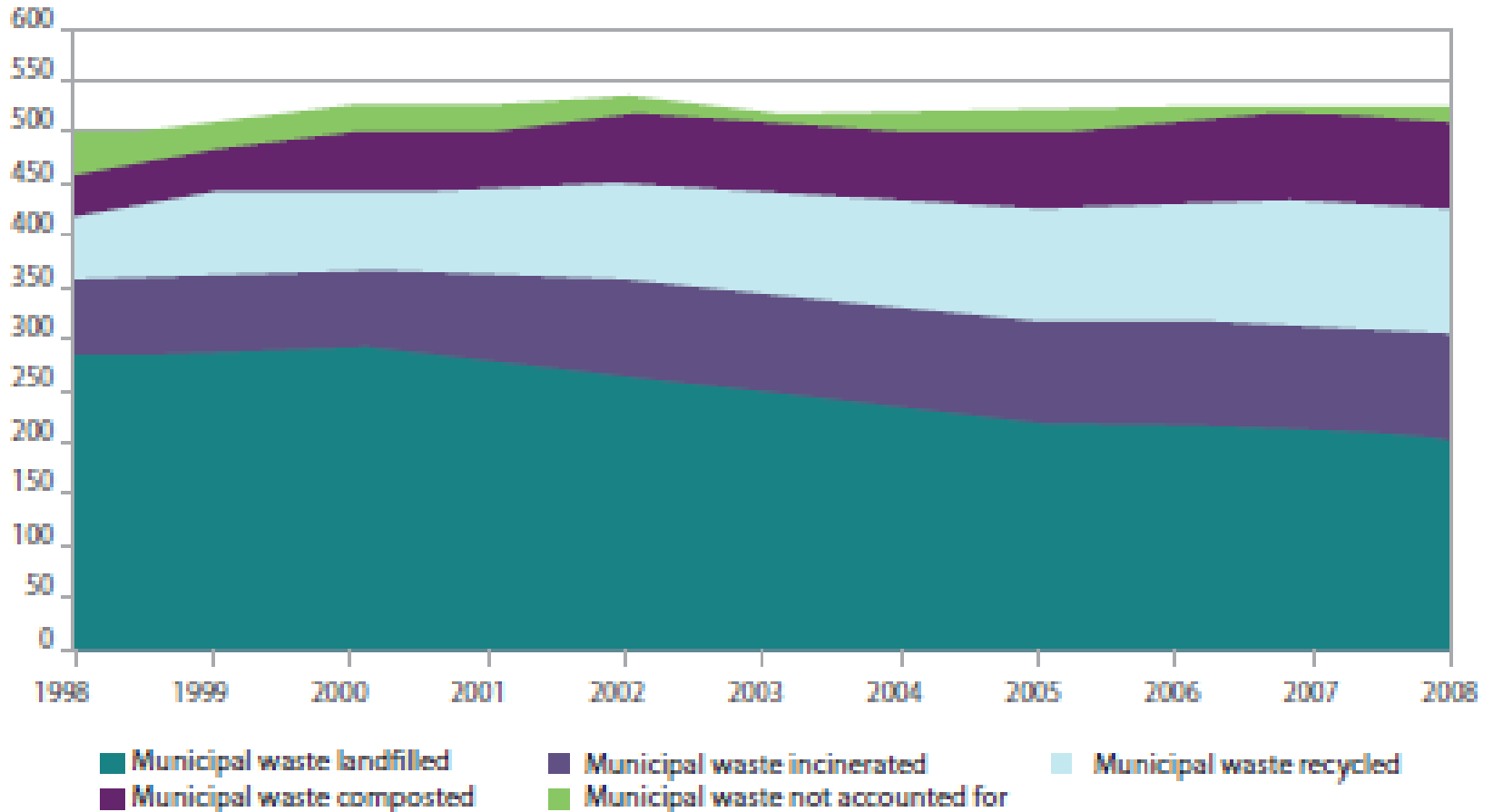


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# Ways of recycling



## Ways of municipal waste treatment in European Union

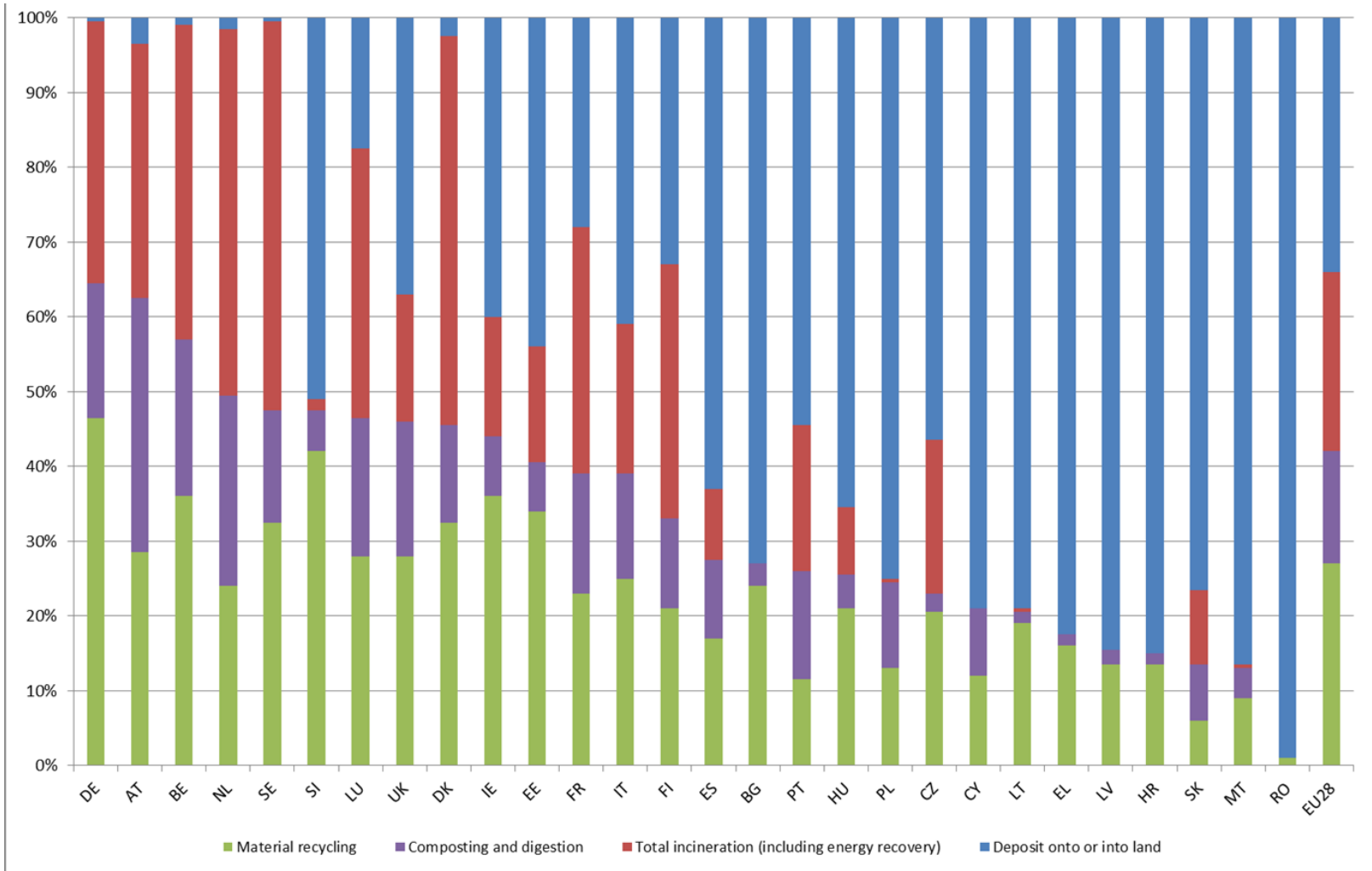


Source: Eurostat

# Ways of recycling



**Type of municipal waste treatments in 2012 in European Union countries**

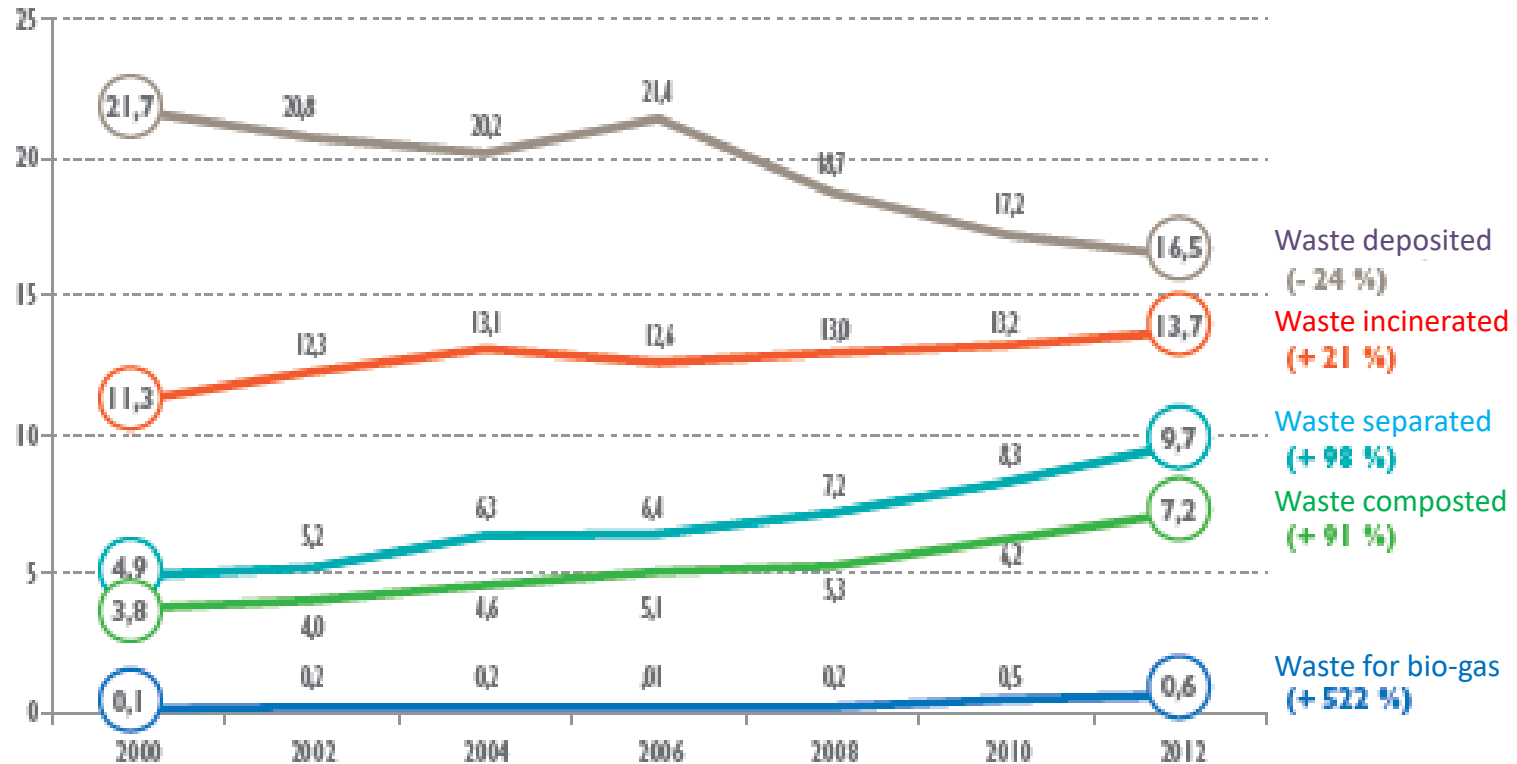


# Ways of recycling



**Mass evolution of treated waste in France from 2000 to 2012**

Millions of tons



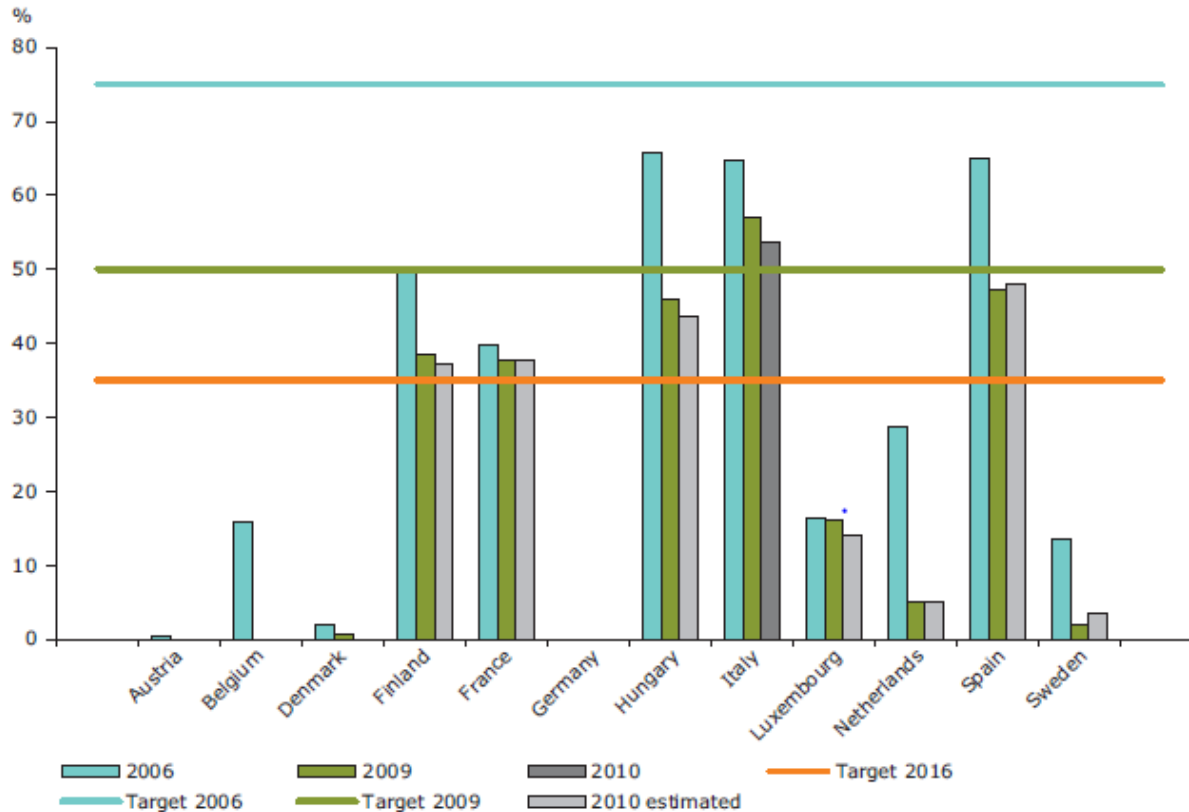
Source : ADEME – Enquêtes ITOM  
CHIFFRES-CLÉS DÉCHETS - Édition 2015

# Ways of recycling



**Landfilling management = the worst waste management option**

Percentage of biodegradable municipal waste landfilled in 2006, 2009 and 2010 compared with the amount generated in 1995 – countries without derogation periods



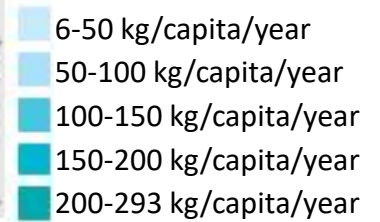
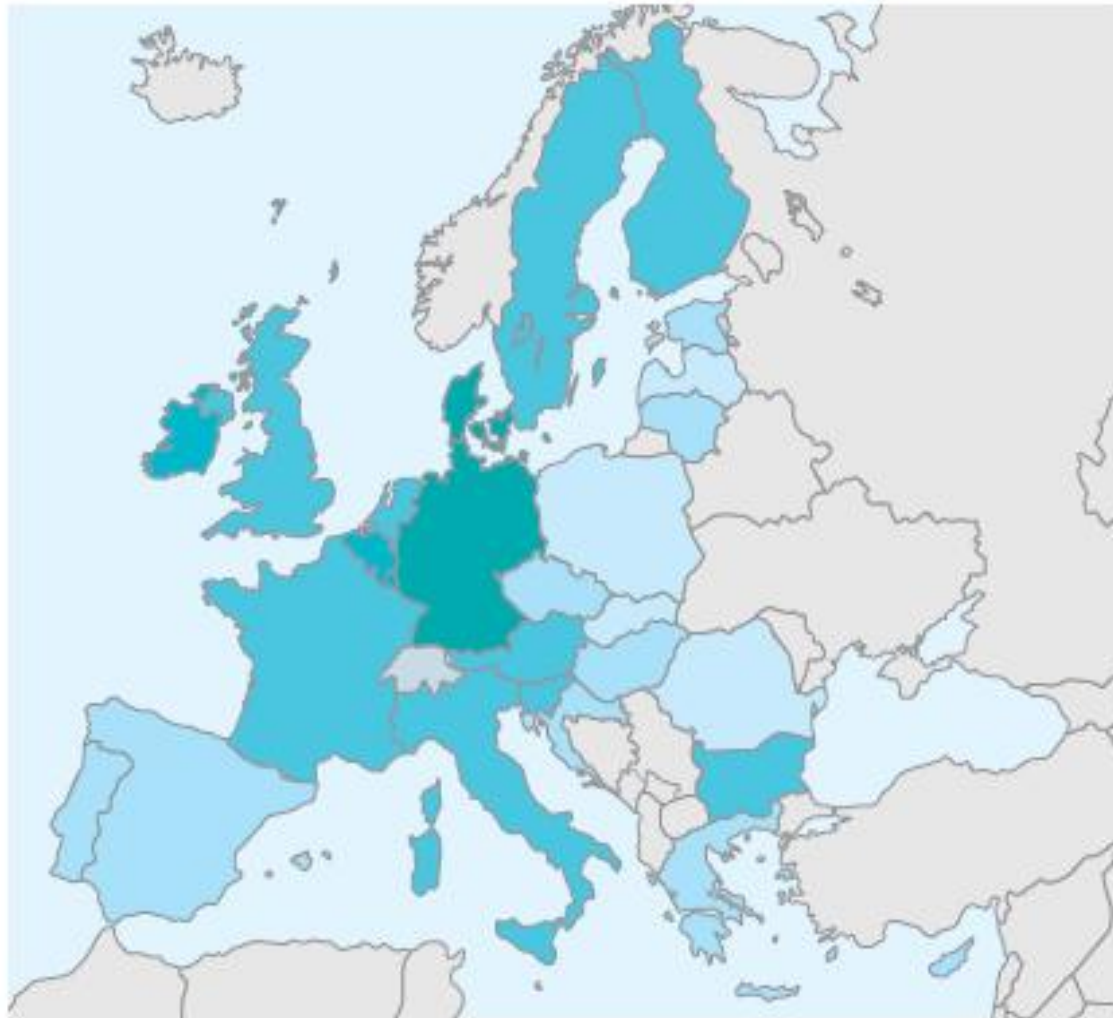
**Note:** 2010 data are estimated for all countries but Italy.

**Source:** Data provided by EU Member States to the European Commission (EC, 2012a), ETC/SCP (2013d) and ETC/SCP estimates.

# Ways of recycling



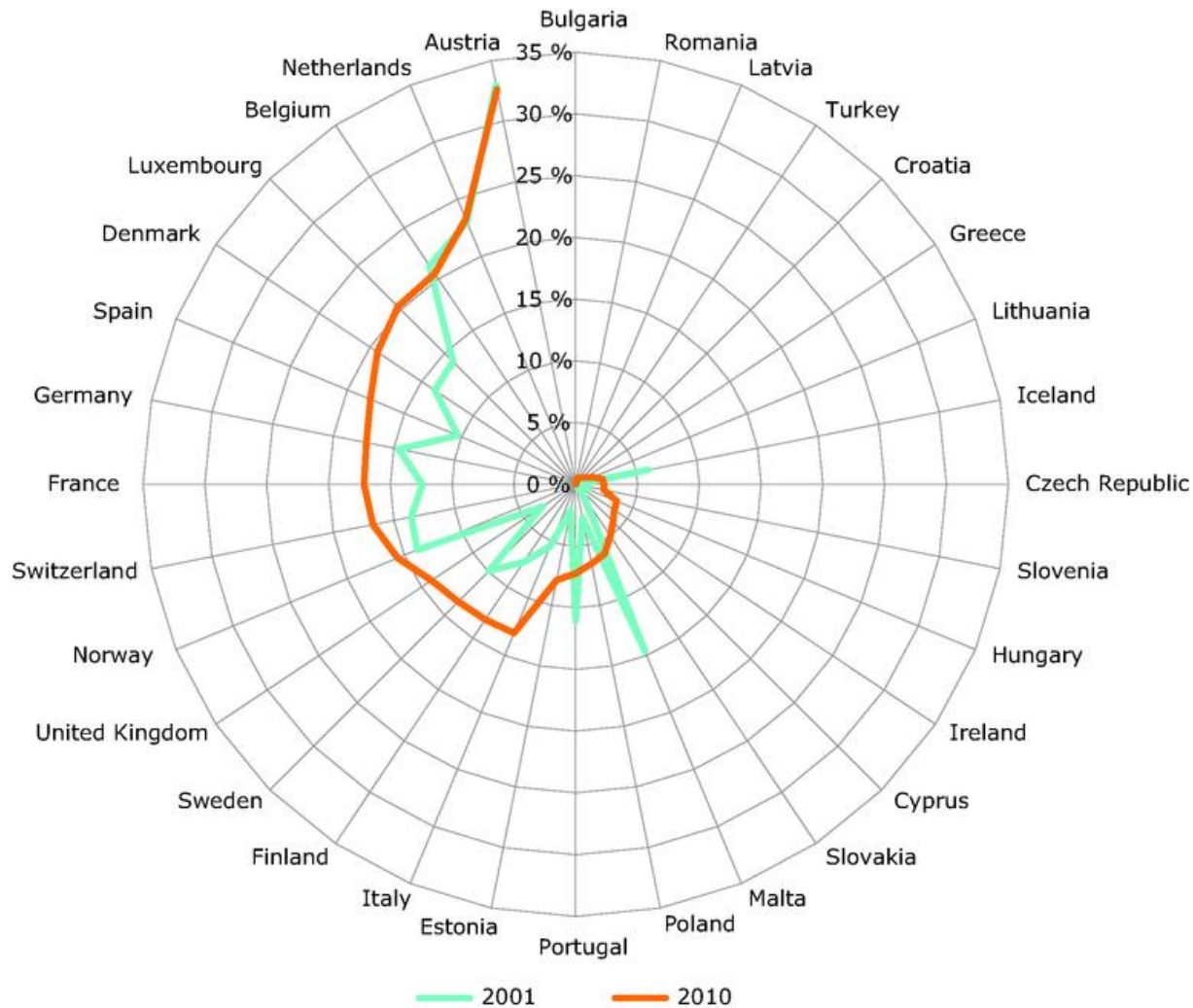
**Municipal waste sent for recycling in European countries in 2012 in kg/capita/year**



Source : Eurostat



## Bio-waste recycling as a percentage of municipal waste in 32 European countries, 2001 and 2010

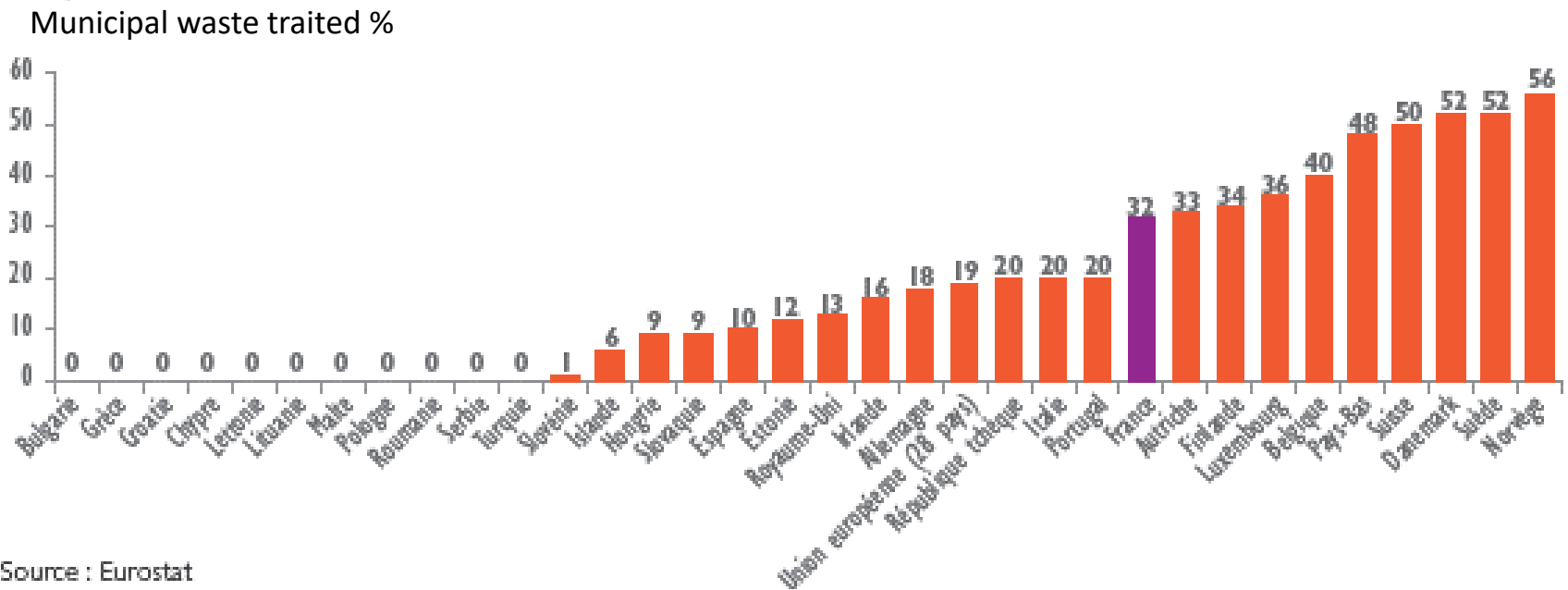




# Ways of recycling



First way of recycling = energy recovery rates of municipal waste in European countries



Source : Eurostat

# Ways of recycling



First way = primary energy production with municipal wastes in 2009 and 2010 (ktoe)

	2009	2010*
Germany	2 045,5	2 271,2
France**	1 207,7	1 214,0
Netherlands	774,8	817,0
Sweden	645,6	742,8
Italy	686,0	686,0
United Kingdom	540,6	557,6
Denmark	551,6	534,5
Belgium	236,9	329,4
Spain	319,2	215,5
Austria	171,6	189,2
Finland	133,8	145,4
Portugal	99,0	95,9
Czech Republic	53,6	62,7
Hungary	46,1	46,1
Slovakia	24,7	24,1
Luxembourg	16,7	21,7
Latvia	1,5	8,2
Ireland	5,4	6,4
Slovenia	0,0	2,7
Poland	0,7	1,3
<b>Total EU</b>	<b>7 561,2</b>	<b>7 971,8</b>

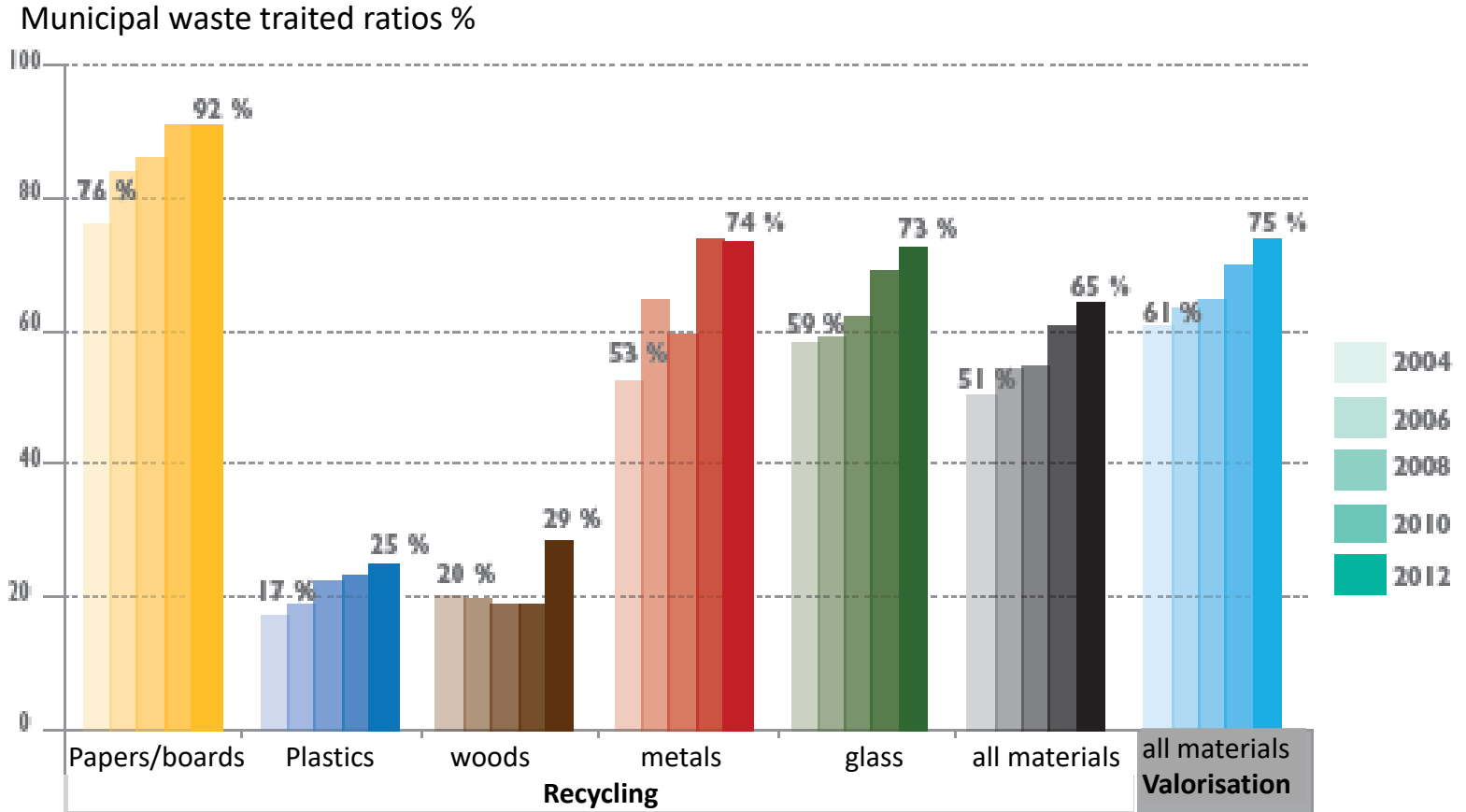
\* Estimation. Estimate. \*\* DOM non inclus. Overseas departments not included.  
- Les décimales sont séparées par une virgule. Decimals are written with a comma. Source: EurObserv'ER 2011

# Ways of recycling



**Second way = material valorisation**

**Rate of packaging recycling per material in France 2004 to 2012**

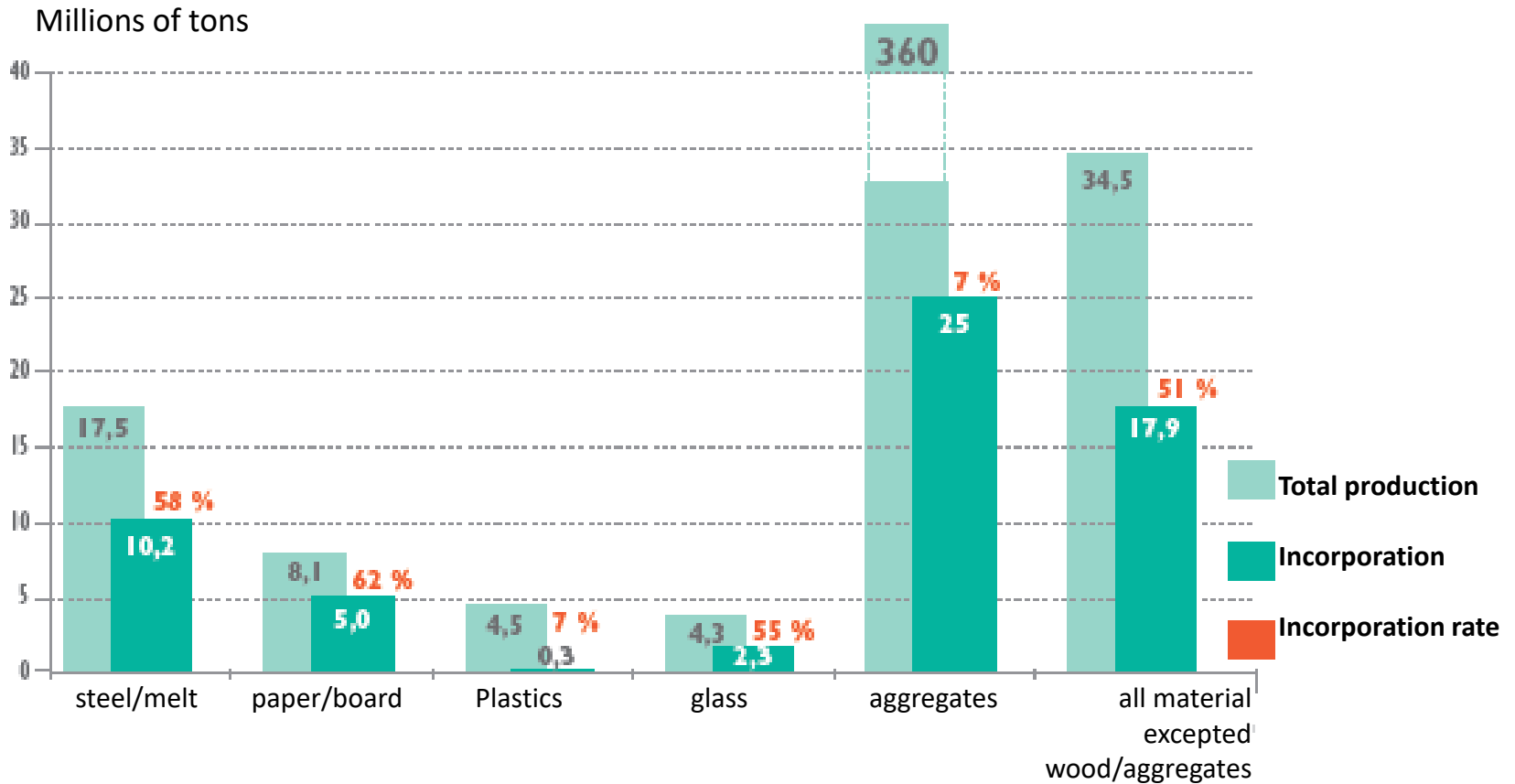


Source : Eurostat - Observatoire des filières REP

# Ways of recycling



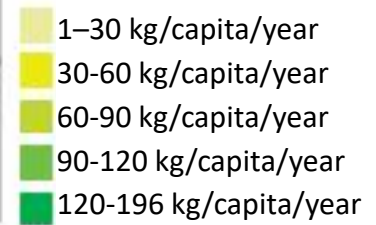
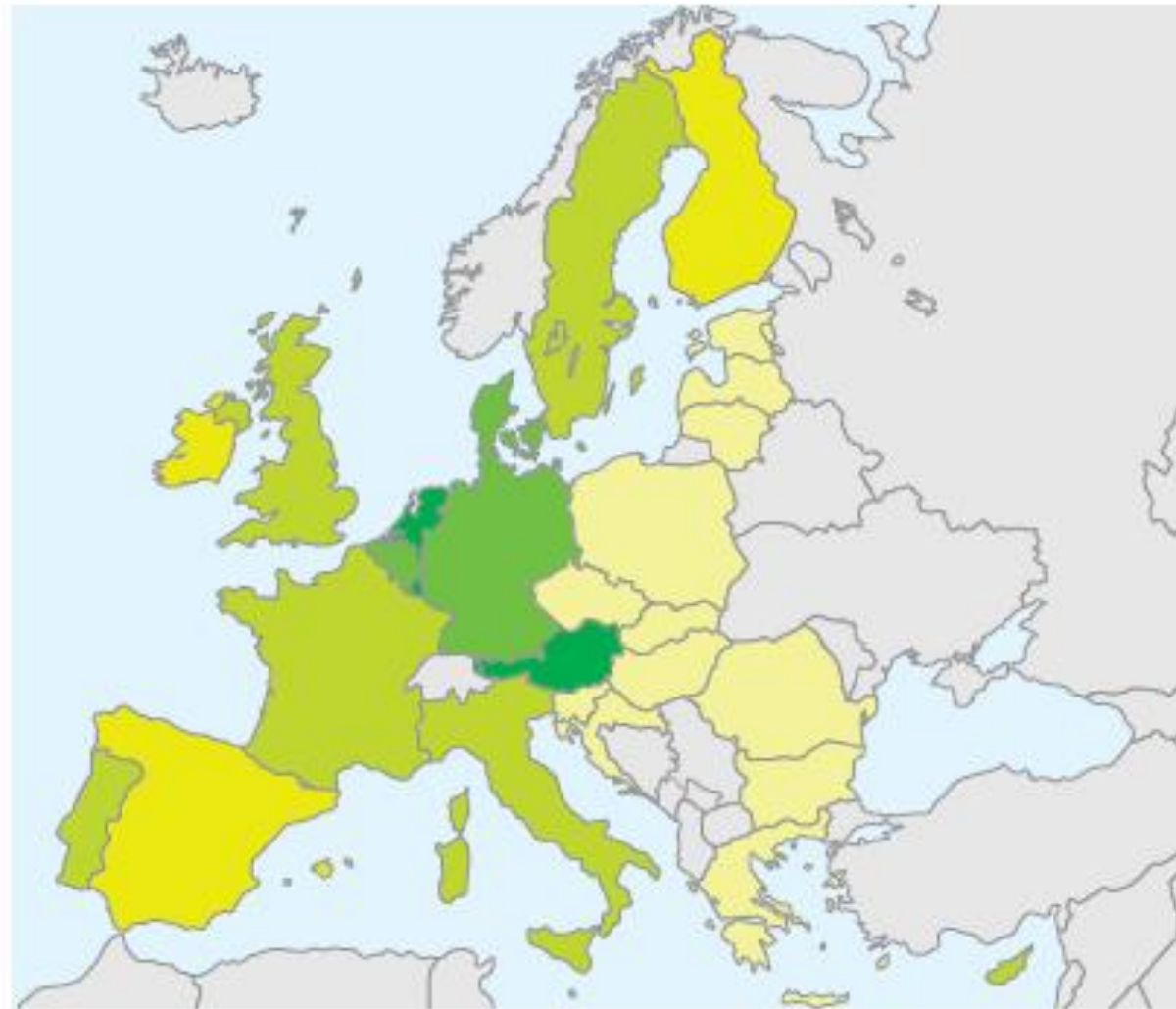
**Second way = material valorisation in new raw materials in France in 2012**



# Ways of recycling



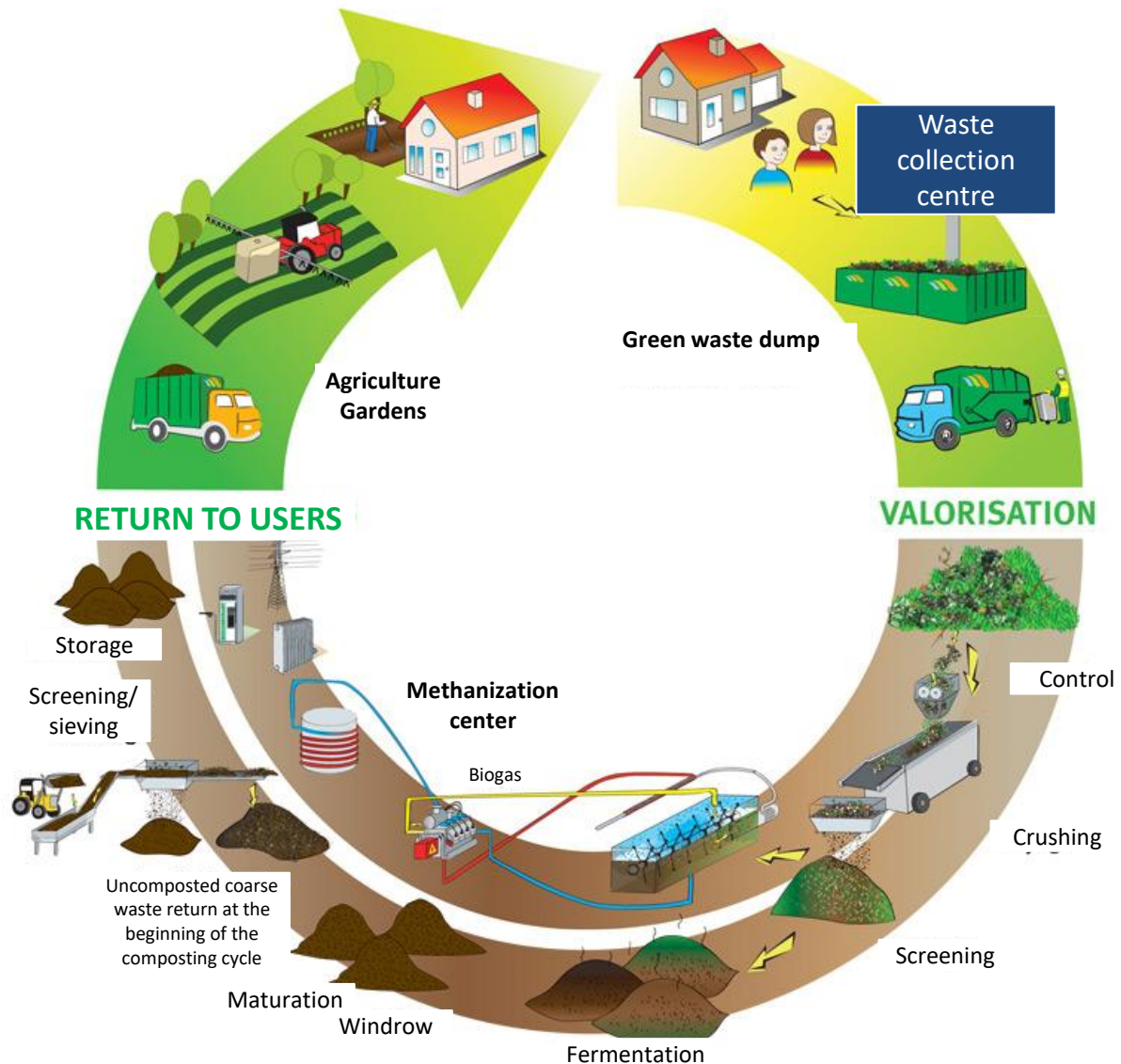
**Third way = Municipal wastes composted and methanised in European countries 2012 in kg/capita/year**



Source : Eurostat

# Ways of recycling

➔ Third way = waste composting process

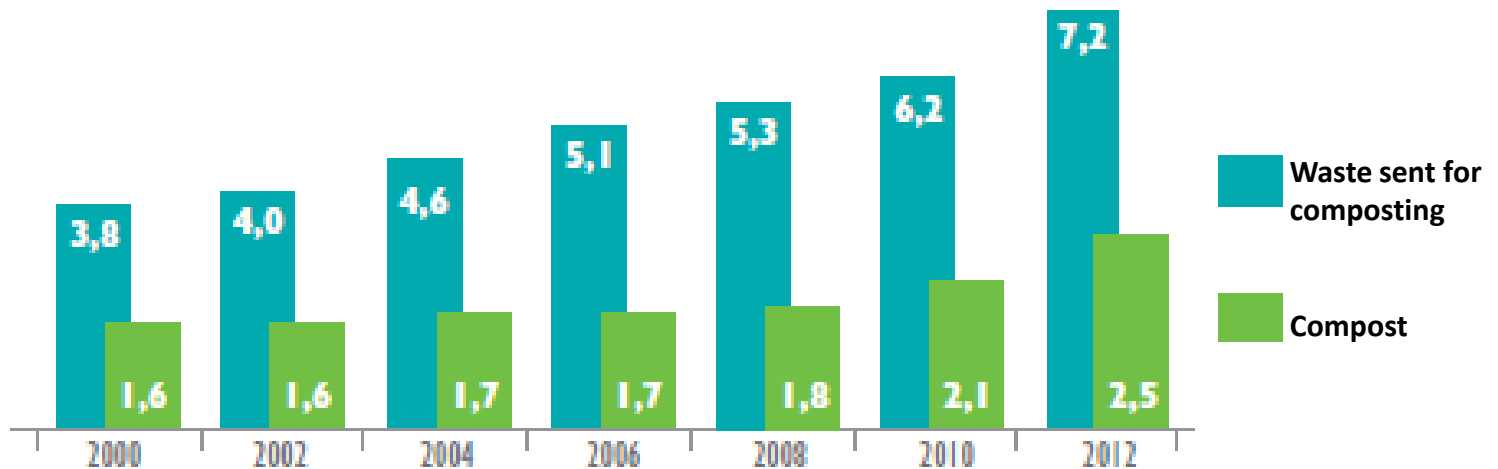


# Ways of recycling



**Third way = Evolution of Municipal wastes composted in France and quantity of compost produced**

Millions of tons

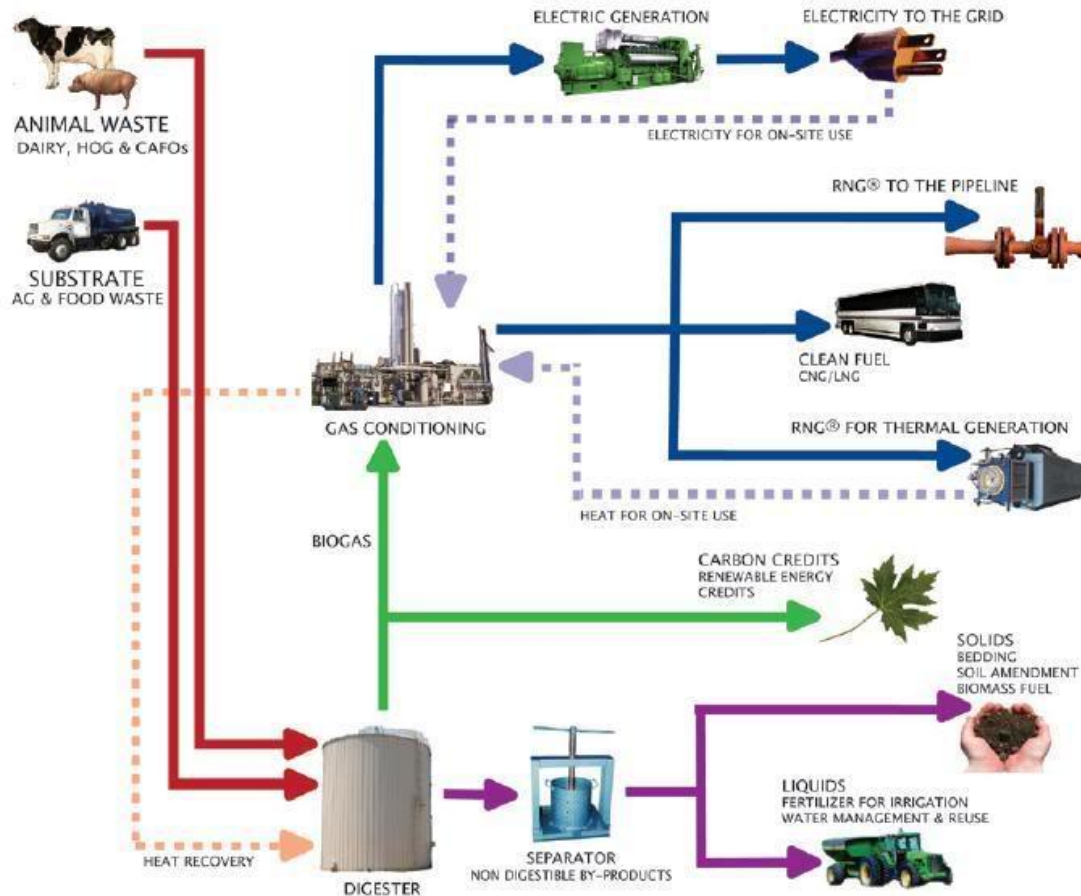


Source : ADEME – Enquêtes ITOM

# Ways of recycling



## Third way = biogas generation from bio-waste



Biogas production from agriculture and food industry waste slurry. Products are electricity, clean fuel, carbon credits and liquid and solid fertiliser. Source: BIOPACT (<http://www.sswm.info/>)