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INTERNATIONAL URBAN COOPERATION  
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# SOLID AND WASTE MANAGEMENT

Perspectives from Europe

INTERNATIONAL URBAN COOPERATION PROGRAMME  
LATIN AMERICA AND THE CARIBBEAN

# SOLID WASTE MANAGEMENT

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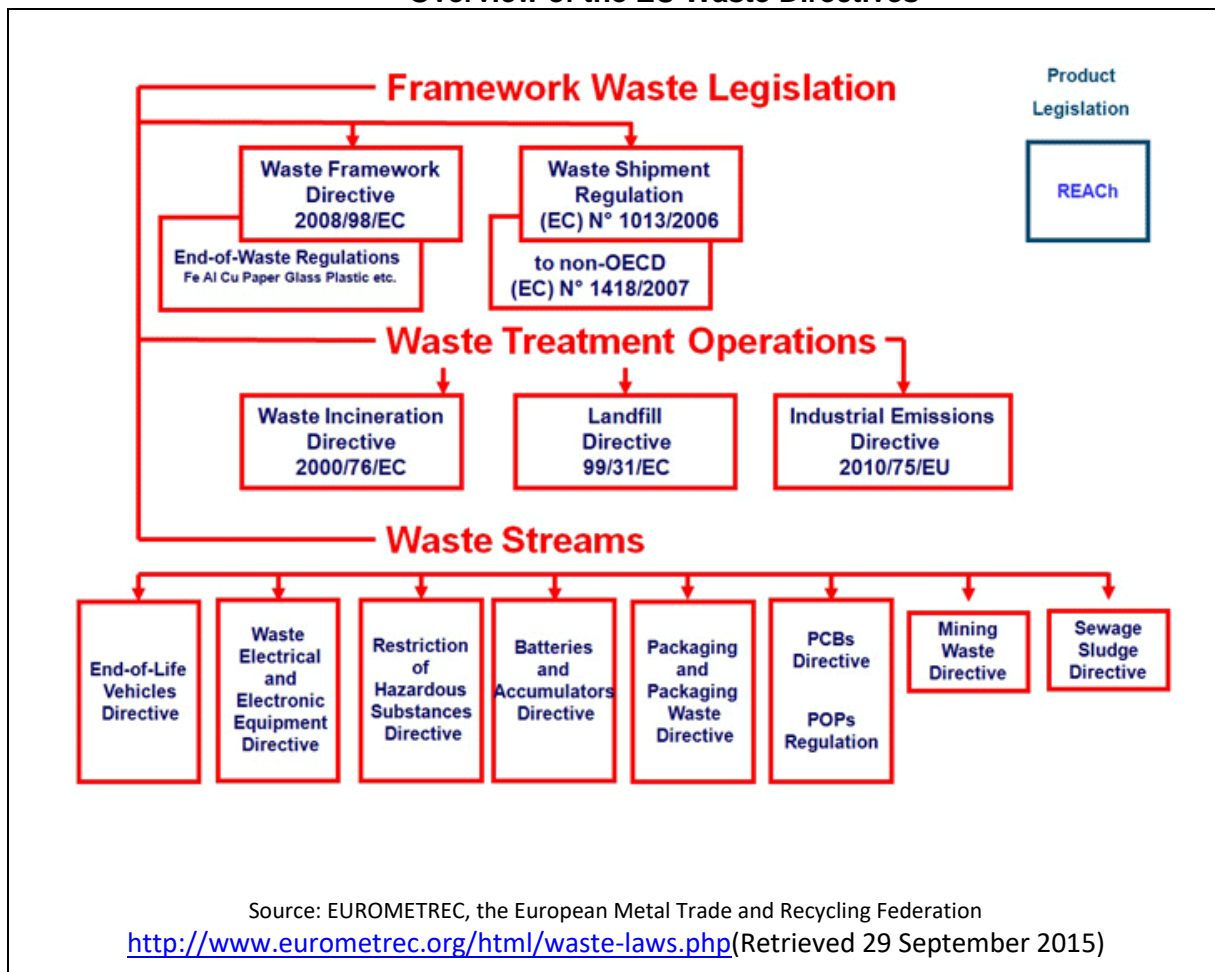


## Policy Analysis

Europe waste management Directives must be seen as minimum requirements. Every member-country is obliged to implement the EU Directives in their national law.

An EU Regulation is a legal act of the European Union that becomes immediately enforceable as law in all member states simultaneously. Regulations can be distinguished from Directives which need to be transposed into national law.

### Overview of the EU Waste Directives



## Norms and standards

In the EU definition of waste, processes, and procedures are not named Standards, but described in the Directives. For instance: Waste is categorised according to the EU Framework Directive. The main idea of the norms/standards is to have a common reference so, for instance, the vehicles and the containers fit when doing the work. The norms give of course also a methodology on how to comply with traffic regulation, occupational health, and operation efficiency. International Standards like ISO, DIN, EN, BS, or DS are organised by private business organisations and therefore not something you must comply

with. However, it is a good idea to follow them, but still not a must. Although you may find a certain piece of equipment described in an international standard, but national laws are prevailing and may overrule the use.

The European Union's approach to waste management is based on the "waste hierarchy" which sets the following priority order when shaping waste policy and managing waste at the operational level: prevention, (preparing for) reuse, recycling, recovery and, as the least preferred option, disposal.

In line with this the 7th Environment Action Programme sets the following priority objectives for waste policy in the EU:

- To reduce the amount of waste generated;
- To maximise recycling and re-use;
- To limit incineration to non-recyclable materials;
- To phase out landfilling to non-recyclable and non-recoverable waste;
- To ensure full implementation of the waste policy targets in all Member States.

The development and implementation of EU waste policy and legislation takes place within the context of a number of wider EU policies and programmes including 7th Environment Action Programme<sup>1</sup>, the Resource Efficiency Roadmap<sup>2</sup> and the Raw Materials Initiative<sup>3</sup>.

The 7th Environment Action Programme (EAP) will be guiding European environment policy until 2020. In order to give more long-term direction it sets out a vision beyond that, of where it wants the Union to be by 2050. The European Union does not quantify its strategy. It is the task of the member states to establish country targets.

The Waste Framework Directive – EU Directive 2008/98/EC<sup>4</sup> sets the basic concepts and definitions related to waste management, such as definitions of waste, recycling, recovery for the EU Members States. It explains when waste is considered to be waste and when it becomes a secondary raw material, and how to distinguish between waste and by-products.

The Directive lays down some basic waste management principles: it requires that waste be managed without endangering human health and harming the environment, and in particular without risk to water, air, soil, plants or animals, without causing a nuisance through noise or odours, and without adversely affecting the countryside or places of special interest. Waste legislation and policy of the EU Member States shall apply as a priority order the waste management hierarchy.

The present Directive, which replaces EU Directive 2006/12/EC on waste and Directives 75/439/EEC and 91/689/EEC regarding waste oils and hazardous waste, respectively, introduces the "polluter pays principle" and the "extended producer responsibility and includes two new recycling and recovery targets to be achieved by 2020: 50% preparing for re-use and recycling of certain waste materials from households and other origins similar to households, and 70% preparing for re-use, recycling and other recovery of construction and demolition waste.

<sup>1</sup> 7th Environment Action Programme, <http://ec.europa.eu/environment/action-programme/> (Retrieved 29 sept. 2015)

<sup>2</sup> Resource Efficiency Roadmap, [http://ec.europa.eu/environment/resource\\_efficiency/](http://ec.europa.eu/environment/resource_efficiency/) (Retrieved 29 sept. 2015)

<sup>3</sup> Raw Materials Initiative, [http://ec.europa.eu/enterprise/policies/raw-materials/index\\_en.htm](http://ec.europa.eu/enterprise/policies/raw-materials/index_en.htm) (Retrieved 29 sept. 2015)

<sup>4</sup> European commission Directive 2008/98/EC on waste  
<http://ec.europa.eu/environment/waste/framework/> (Retrieved 7 July 2015)

The Directive is, as it is stated, a Framework Directive that compile all activities and other Directives. The European Commission has also published “Guidance on the interpretation of key provisions of Directive 2008/98/EC on waste”. This guidance document is intended to assist both national authorities and economic operators with the aforementioned legislation, which includes some guidelines in implementing the Directive on national level<sup>5</sup>.

## The European List of Waste

Included as annex to the Framework Directive is “The European List of Waste” (see table below). In general, all types of waste may be identified in this List of Waste.

### The European List of Waste:

The European List of Waste – Chapters of the List
1. Wastes resulting from exploration, mining, quarrying, physical and chemical treatment of minerals
2. Wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing, food preparation and processing
3. Wastes from wood processing and the production of panels and furniture, pulp, paper and cardboard
4. Wastes from the leather, fur and textile industries
5. Wastes from petroleum refining, natural gas purification and pyrolytic treatment of coal
6. Wastes from inorganic chemical processes
7. Wastes from organic chemical processes
8. Wastes from the manufacture, formulation, supply and use (MFSU) of coatings (paints, varnishes and vitreous enamels), adhesives, sealants and printing inks
9. Wastes from the photographic industry
10. Wastes from thermal processes
11. Wastes from chemical surface treatment and coating of metals and other materials; non-ferrous hydro-metallurgy
12. Wastes from shaping and physical and mechanical surface treatment of metals and plastics

<sup>5</sup> [http://ec.europa.eu/environment/waste/framework/pdf/guidance\\_doc.pdf](http://ec.europa.eu/environment/waste/framework/pdf/guidance_doc.pdf) (retrieved 7 July 2015)

13. Oil wastes and wastes of liquid fuels (except edible oils, 05 and 12)
14. Waste organic solvents, refrigerants and propellants (except 07 and 08)
15. Waste packaging; absorbents, wiping cloths, filter materials and protective clothing not otherwise specified
16. Wastes not otherwise specified in the list
17. Construction and demolition wastes (including excavated soil from contaminated sites)
18. Wastes from human or animal health care and/or related research (except kitchen and restaurant wastes not arising from immediate health care)
19. Wastes from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial use
20. Municipal wastes (household waste and similar commercial, industrial and institutional wastes) including separately collected fractions
Source: The European Waste List <a href="http://ec.europa.eu/environment/waste/framework/list.htm">http://ec.europa.eu/environment/waste/framework/list.htm</a> (Retrieved 7 July 2015)

### The European List of Waste Chapter 20 - Municipal Wastes

20	MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS
20 01	separately collected fractions
20 01 01	paper and cardboard
20 01 02	glass
20 01 08	biodegradable kitchen and canteen waste
20 01 10	clothes
20 01 11	textiles
20 01 13*	solvents
20 01 14*	acids
20 01 15*	alkalines
20 01 17*	photochemicals
20 01 19*	pesticides
20 01 21*	fluorescent tubes and other mercury-containing waste
20 01 23*	discarded equipment containing chlorofluorocarbons
20 01 25	edible oil and fat
20 01 26*	oil and fat other than those mentioned in 20 01 25
20 01 27*	paint, inks, adhesives and resins containing dangerous substances
20 01 28	paint, inks, adhesives and resins other than those mentioned in 20 01 27
20 01 29*	detergents containing dangerous substances
20 01 30	detergents other than those mentioned in 20 01 29
20 01 31*	cytotoxic and cytostatic medicines
20 01 32	medicines other than those mentioned in 20 01 31
20 01 33*	batteries and accumulators included in 16 06 01, 16 06 02 or 16 06 03 and unsorted batteries and accumulators containing these batteries
20 01 34	batteries and accumulators other than those mentioned in 20 01 33
20 01 35*	discarded electrical and electronic equipment other than those mentioned in 20 01 21 and 20 01 23 containing hazardous components (6)
20 01 36	discarded electrical and electronic equipment other than those mentioned in 20 01 21, 20 01 23 and 20 01 35
20 01 37*	wood containing dangerous substances
20 01 38	wood other than that mentioned in 20 01 37
20 01 39	plastics
20 01 40	metals
20 01 41	wastes from chimney sweeping
20 01 99	other fractions not otherwise specified
20 02	garden and park wastes (including cemetery waste)
20 02 01	biodegradable waste
20 02 02	soil and stones
20 02 03	other non-biodegradable wastes
20 03	other municipal wastes
20 03 01	mixed municipal waste

20 03 02	waste from markets
20 03 03	street-cleaning residues
20 03 04	septic tank sludge
20 03 06	waste from sewage cleaning
20 03 07	bulky waste
20 03 99	municipal wastes not otherwise specified
* Any waste marked with an asterisk (*) is considered as a hazardous waste pursuant to Directive 91/689/EEC on hazardous waste, and subject to the provisions of that Directive unless Article 1(5) of that Directive applies.	
Source: <a href="http://ec.europa.eu/environment/waste/framework/list.htm">http://ec.europa.eu/environment/waste/framework/list.htm</a> (Retrieved 7 July 2015).	

## End-of-waste criteria

End-of-waste criteria specify when certain waste ceases to be waste and obtains a status of a product (or a secondary raw material).

To define End-of-waste criteria is important for introducing a circular economy. According to Article 6 (1) and (2) of the Waste Framework Directive 2008/98/EC, certain specified waste shall cease to be waste when it has undergone a recovery (including recycling) operation and complies with specific criteria to be developed in line with certain legal conditions, in particular:

- the substance or object is commonly used for specific purposes;
- there is an existing market or demand for the substance or object;
- the use is lawful (substance or object fulfils the technical requirements for the specific purposes and meets the existing legislation and standards applicable to products);
- the use will not lead to overall adverse environmental or human health impacts.

A methodology to develop the criteria has been elaborated by the Joint Research Centre of the EU.<sup>6</sup> After having agreed this methodology with the Member States, the Commission is now preparing a set of end-of-waste criteria for priority waste streams. So far, the criteria have been laid down for:

- iron, steel and aluminium scrap (see Council Regulation (EU) No 333/2011)<sup>7</sup>
- glass cullet (see Commission Regulation (EU) N° 1179/2012)<sup>8</sup>
- copper scrap (see Commission Regulation (EU) N° 715/2013)<sup>9</sup>

<sup>6</sup> Sustainable Production and Consumption (SUSPROC), <http://susproc.jrc.ec.europa.eu/activities/waste/index.html> (Retrieved 29 Sept. 2015).

<sup>7</sup> COUNCIL REGULATION (EU) No 333/2011 of 31 March 2011, <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32011R0333> (Retrieved 29 Sept. 2015).

<sup>8</sup> COMMISSION REGULATION (EU) No 1179/2012 of 10 December 2012, <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32012R1179> (Retrieved 29 Sept. 2015).

<sup>9</sup> COMMISSION REGULATION (EU) No 715/2013 of 25 July 2013, <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013R0715> (Retrieved 29 Sept. 2015)



Municipal Waste Collection and Treatment in Europe. In 2013, the total waste generation in the EU amounted to 2,5 billion tons. From this total only a limited (but increasing) share (36%) was recycled, while the remaining was incinerated or landfilled, of which some 600 million tons could be recycled or reused. Just in terms of household waste alone, each person in Europe is currently generating, on average, half of tonne of such waste. 43 % of it is reused, recycled, or composted, but in some countries more than 90% still goes to landfill.

It has to be noted that the definition of Municipal Solid Waste varies from country to country, and that Eurostat do not provide own statistical material but is collecting data from national statistical agencies only. Turning waste into a resource is one key to a circular economy. The objectives and targets set in European legislation have been key drivers to improve waste management, stimulate innovation in recycling, limit the use of landfilling, and create incentives to change consumer behaviour. If re-manufacture, reuse and recycle is thought into the processes, and if one industry's waste becomes another's raw material, then it is possible to move to a more circular economy where waste is eliminated and resources are used in an efficient and sustainable way. Integrated solid waste management helps to reduce health and environmental problems, reduces greenhouse gas emissions - directly by cutting emissions from landfills and indirectly by recycling materials, which reduce the extraction and consumption of new materials. Integrated solid waste management are limiting negative impacts at local level, for instance: on landscape deterioration due to landfilling, on local water – river, lakes and ground-water, and limiting air pollution, as well as littering. The development and implementation of EU waste policy and legislation takes place within the context of a number of wider EU policies and programmes including 7th Environment Action Programme<sup>10</sup>, the Resource Efficiency Roadmap <sup>11</sup> and the Raw Materials Initiative<sup>12</sup>. EU sets in line with the Environment Action Programme, the following priority objectives for waste policy:

- To reduce the amount of waste generated;
- To maximise recycling and re-use;
- To limit incineration to non-recyclable materials;
- To phase out landfilling to non-recyclable and non-energy-recoverable waste;
- To ensure full implementation of the waste policy targets in all Member States.

## Outlook

Today's waste management have three main focal points:

- How do we increase the amount of waste to be recycled instead of incinerated or landfilled? By increasing the amount of secondary raw materials in the production less virgin materials may be needed.
- How do we collect and transport the segregated waste fractions? The cheapest collection and transport option is having 1 fraction emptying one type of containers. The more fractions waste is separated into, the more complicated the transport will become. On the other hand, when the

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<sup>10</sup> <http://ec.europa.eu/environment/newprg/>

<sup>11</sup> [http://ec.europa.eu/environment/resource\\_efficiency/](http://ec.europa.eu/environment/resource_efficiency/)

<sup>12</sup> [http://ec.europa.eu/enterprise/policies/raw-materials/index\\_en.htm](http://ec.europa.eu/enterprise/policies/raw-materials/index_en.htm)

waste generator is segregating their own waste in to various fractions the material will be cleaner and the value higher.

- How do we secure the capacity for pre-treatment of the various fractions and that there is a market for the second-hand materials? Today the actual collection of materials for recycling is higher than the capacity for pre-treatment and the demand of materials from the production. This is indicated by the price for acceptance of secondary raw material.

Extended Producer Responsibility or the Polluter Pays Principle. Polluter pays is also known as Extended Producer Responsibility (EPR). This is a concept that was first described by Thomas Lindhqvist for the Swedish government in 1990. EPR seeks to shift the responsibility of dealing with waste from governments (and thus, taxpayers and society at large) to the entities producing it. In effect, it internalised the cost of waste disposal into the cost of a product, theoretically meaning that the producers will improve the waste profile of their products, thus decreasing waste and increasing possibilities for reuse and recycling.

In 1991, the German government passed a packaging law (Verpackungsverordnung) that requires manufacturers to take care of the recycling or disposal of any packaging material they sell. As a result of this law, German industry set up a "dual system" of waste collection, which picks up household packaging in parallel to the existing municipal waste-collection systems. The "Dual System Germany Ltd" (DSD) only collects packaging material from manufacturers who pay a license fee to DSD. DSD license fee payers can then add the Green Dot logo to their package labelling to indicate that this package should be placed into the separate yellow bags or yellow wheelie bins that will then be collected and emptied by DSD-operated waste collection vehicles. After the introduction of Green Dot in Germany many other countries have followed with their version of a Producers Responsibility Act.

The main idea of the Green Dot system is to generate enough funds to operate the system and not rely on market price on recyclable materials, and hereby also establish a market for products that could be more difficult or not profitable to recycle.

PRO EUROPE s.p.a. (PACKAGING RECOVERY ORGANISATION EUROPE), founded in 1995, is the umbrella organisation for European packaging and packaging waste recovery and recycling schemes which mainly use the "Green Dot" trademark as a financing symbol. In its primary role, PRO EUROPE is the general licensor of the "Green Dot" trademark.

The "Green Dot" has evolved into a proven concept in many countries as implementation of Producer Responsibility. Industry in twenty-eight nations is now using the "Green Dot" as the financing symbol for the organisation of recovery, sorting and recycling of sales packaging. Private-sector compliance schemes working toward this objective are today in place in twenty-two EU member states, viz., Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Estonia, France, Germany, Greece, Hungary, Ireland, Latvia, Lithuania, Luxembourg, Malta, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden as well as additional countries include Norway (as an EEA member), Croatia, Turkey, Serbia, Israel and Macedonia. Moreover, PRO EUROPE has concluded co-operation agreements with similar systems in UK and Canada.

## Private Public Partnership

Private Public Partnership (PPP) is a business relationship between a private-sector company and a public entity for the purpose of completing a project that will serve the public. PPP can be used to finance, build and operate projects such as public transportation networks, parks and convention centres. Financing of a project through a PPP can allow a project to be completed sooner or make it a possibility in the first place.

PPP's are typically medium to long term arrangements between the public and private sectors whereby some of the service obligations of the public sector are provided by the private sector, with clear agreement on shared objectives for delivery of public infrastructure and/ or public services. PPPs typically do not include service contracts or turnkey construction contracts, which are categorized as public procurement projects, or the privatization of utilities where there is a limited ongoing role for the public sector.

PPPs has been used, for instance in Germany, where construction and operation of sanitary landfills have been organised as 50/50 companies where the municipality provides land and the company design, built, operate, and close the site. Once the landfill is closed and temporarily sealed<sup>13</sup>, the site is given back to the municipality and the partnership company is dissolved.

Construction of companies with 50/50 ownership between a private and a public partner is a delicate balance: on one side the private partner is bringing capital and know-how, and the public partner a need and a market. However, if the public partner is expecting any profit it could be seen as illegal tax collection or re-distribution of public funds.

Another example of private public partnership is described in the **Erro! Fonte de referência não encontrada..**

Almost every municipality have today contracted their waste collection activities to private operators. The reason for doing so is, that the municipalities cannot afford to have municipal funds tied up in waste collection vehicles and containers, when the local investment budget also have to provide for schools, elderly care taking, etc. On the bottom line is the annual operation costs the same whether the task is organised by the municipality or tendered to a private operator when including financial costs like interests, and depreciation.

Although, contracting of activities like collection of waste and recyclable materials or operating treatment plants is not considered PPP but simple contracting of activities, are these contracts in Europe often called PPP.

## Waste to Energy and Incineration of Waste

Incineration of waste is a common method of waste treatment and in some countries; household waste has been incinerated for decades (for instance, in several EU countries incineration with energy recovery

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<sup>13</sup> Permanent seal of a landfill takes 10 to 20 years after that the landfill needs to be closed. Monitoring of the site may in principle take forever.

of household waste has taken place since 1970). EU flue gas treatment requirements (Incineration Directive<sup>14</sup>) are mandatory and have greatly reduced emissions. For example, the Directive dictates the minimum temperature of combustion gases (850°C or 1100°C depending on the chlorine content of waste) to oxidize the waste and destroy toxic gases. Furthermore, the Incineration Directive sets as an objective that critical loads and levels of certain pollutants such as nitrogen oxides (NO<sub>x</sub>), sulphur dioxide (SO<sub>2</sub>), heavy metals and dioxins should not be exceeded, and further sets as an objective with a 90% reduction of dioxin emissions of identified sources by 2005 and at least 70 % reduction from all pathways of cadmium (Cd), mercury (Hg) and lead (Pb) emissions in 1995. All incinerators in operation have to comply with the Incineration Directive; there is no exemptions given to older incineration plants build under previous versions of the Incineration Directive.<sup>15</sup> Incinerators are also popular when landfill capacity is limited, as they significantly reduce waste volumes, generally by over 95 percent.

## RENUNCIA

La ilustración de los estudios de caso de IUC-LAC solo fue posible mediante el uso de una amplia gama de materiales publicados, la mayoría de ellos disponibles en línea. Muchas de las ilustraciones (fotografías y gráficos) se originan en fuentes de Internet, y se reproducen aquí con citaciones y referencias adecuadas. El uso de estos materiales es únicamente con el propósito de compartir conocimientos, sin ningún uso o intención comercial.

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<sup>14</sup> Directive 2000/76/EC of the European Parliament and of the Council of 4 December 2000 on the incineration of waste  
<http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32000L0076> (Retrieved 15. June 2015)

<sup>15</sup> NO<sub>x</sub> and Dioxin Emissions from Waste Incineration Plants

<http://www.prewin.eu/download/category/47-infodocs?download=14:public> (Retrieved 15. June 2015)



# IUC-LAC PROGRAMME

The International Urban Cooperation Programme - Latin America and the Caribbean (IUC-LAC) connect cities in different regions of the world to get in touch and share solutions to common problems. This initiative is part of a long-term strategy of the European Union to promote sustainable urban development in collaboration with both the public and private sectors and with civil groups and citizens. Through participation in the IUC-LAC, Latin American municipalities exchange knowledge with their counterparts in Europe, thus building a greener and more prosperous future.

IUC-LAC activities promote the achievement of political objectives and important international agreements on urban development and climate change, such as the EU Urban Agenda, the UN Sustainable Development Goals and the Paris Agreement.

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\* All the aforementioned information is based on internet and published source mentioned in footnotes.

