



Erasmus+



# GUIDE

Rubbish is an economic / political / social factor –  
ICT as a tool for participation in public life



ICT – SOS FOR THE ENVIRONMENT



This guide was developed within the "ICT - SOS for the Environment" project, financed by the European Union through the Erasmus+ program



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# INTRODUCTION

Every day we consume various products and generate waste, which ends up being stored in landfills, most of the time without realizing that they will pollute the environment for decades or even hundreds of years. As a result, the problem of local soil pollution with solid household waste is becoming more and more acute, they are transported (thrown) into ravines, forest strips, riparian strips for the protection of rivers and water basins, on the side of roads, etc., constantly worsening the quality and lifetime.

Unfortunately, the low degree of awareness and involvement of the population in the correct management of the generated waste, including by not honoring the obligation to pay for sanitation services, etc., worsens over time the phenomenon of uncontrolled waste storage, the expansion of unauthorized landfill areas, but also the possibility of improving the quality of sanitation services.

Obviously, the created situation requires rethinking the way we act and make decisions, especially regarding the collection and disposal of generated waste, an activity as important as water and electricity supply. Through this guide implemented within the **"ICT - SOS for the environment"** project, we actually want to emphasize the importance of each of us in promoting an efficient waste management and disposal system. The recommendations and good practices in this guide, applied in one's own home, in commercial activities, in the office and in public institutions, can give positive and visible results in terms of environmental protection and health improvement.

**„Being a citizen entails not only a set of rights, but also obligations and commitments, including those to meet one's current needs without compromising the ability of future generations to meet their own needs”**

**1987: World Commission of Environment and Development Report "Our Common Future"**





# How ICTs can tackle the climate crisis

The Industrial Revolution, and the technology that enabled it, has been one of the primary drivers of climate change. Yet it's another industrial revolution and a new set of technologies that look set to help humanity avoid the worst effects of global warming.

The demand for telco services has been rapidly growing for many years now. As a result, the challenge from an environmental perspective is huge. Compared to many other sectors, the telco industry is not the largest contributor of carbon emissions, but as we enter a complete digitized world, this is set to increase. Many individuals, governments and organizations are working to find ways to reduce energy demand in a smarter way, encouraging new ideas for using existing and new ICT resources. If the sector gets it right, it can achieve sustainable growth and deliver smart solutions that will help mitigate climate change.

While ICTs are part of the overall issue, they are also vital to confronting the problems we face as a planet. Indeed, ICTs are a vital part of the solution. The industry has been at the forefront of innovation over the past few decades. We have the opportunity now to make it the forefront of the global battle against climate change.

Research from the Global e-Sustainability Initiative (GeSI) suggests that ICT can enable a 20% reduction of global carbon emissions by 2030. What this means is that we have an opportunity to hold emissions levels where they are today.

ICTs can impact climate change in three primary ways:

- by driving down emissions in the ICT sector itself through the introduction of more efficient equipment and networks;
- by reducing emissions and enabling energy efficiency in other sectors through, for example, substituting for travel and replacing physical objects by electronic ones (dematerialization); and
- by helping both developed and developing countries adapt to the negative effects of climate change using ICT-based systems to monitor weather and the environment worldwide.

ICT players are working to find ways to reduce energy demand in a smarter way, encouraging new ideas for using existing and new IT resources. Due to the fast-paced development of technologies, such as the internet of things, cloud computing and 5G networks, a tsunami of data is fast approaching. It is expected that datacenters will become one of the largest global energy users. Datacenters have the fastest growing carbon footprint in the entire ICT sector, mainly due to technological advances.

Datacenters tend to be a powerhouse of consumption and excess. They demand huge loads of energy and must remain online at all times of the day and night, which require incredible levels of reliability and performance.

As a way to cut down on datacenter power consumption, it makes sense to improve efficiencies across the board, and there are certainly ways to do that in the modern datacenter.

It's no secret that datacenter equipment and servers release a lot of heat, which means a large portion of expenditures come from cooling and air conditioning. The equipment must remain at a safe temperature, which calls for proper ventilation and cooling.

That power consumption can be lessened by optimizing not just the cooling operations with air economizers, but also the center where the equipment is housed. Proper insulation, for example, can help maintain temperatures within the room. By optimizing certain operations and processes, such as temperature control, it's possible to reduce datacenter power usage.

As previously mentioned, it is ironic that the creation of new technology is contributing to global warming, but can also reduce emissions and help the environment on the long term. One example of this is cloud computing.

When you think about reducing your environmental impact, you might consider carpooling to save gas and reduce the amount of emissions. Passengers who participate in a carpool can still take their own car when necessary. Cloud services, where client systems are hosted in a shared infrastructure are a similar concept. Each client system still has its own available resources when needed, but otherwise can share. Cloud providers have invested in advanced hardware technology and replaced equipment to offer improved performance with reduced power consumption. Cloud can help simplify IT by providing scalability, reducing provisioning time for a new system or application and enabling standardization. The transformations driven by cloud go deeper than just an infrastructure level. Choosing cloud can help your organization save on costs through efficient resource usage, and therefore contributes to reducing overall energy consumption.

The biggest impact ICT players can have on climate change is the ability to enable other sectors of the economy to reduce their greenhouse gas (GHG) emissions. This is through innovating new technologies that are more energy efficient, and also by providing the connectivity for digital solutions that reduce energy use.

Cities are responsible for the majority of the world's economic activity, energy consumption and greenhouse gas emissions. Therefore, to significantly cut emissions, urban centers will need to both use less energy and take greater advantage of periods when intermittent renewable energy is available. "Smart cities" are expected to play a pivotal role in achieving these objectives.

The term smart city can encompass a broad range of initiatives, for example, smart traffic management, smart urban lighting, smart parking, etc. Smart traffic management enables more efficient traffic flows, thereby easing congestion and lowering vehicle pollution. Intelligent street lighting can lower electricity demand by switching off when not required. Furthermore, mobile apps can help drivers find available parking spaces, reducing congestion and GHG emissions.

Already there are emerging technologies being used to cut emissions and help countries adapt to the effects of climate change. While climate change is a long-term phenomenon, an international team of researchers wanted to see what effect short-term weather extremes would have on urban power grids.

Extreme hot spells made increasingly likely by climate change could overload urban power grids and cause roving blackouts as an ever-greater share of humanity opt to live in cities. With more than half of mankind expected to live in cities by 2050, existing infrastructure relying on power from fossil fuels is likely to prove insufficient to meet growing demand, as well as the exploding use of air conditioning as urban heat skyrockets in summer.



According to lead study author Dasun Perera, “Extreme weather events could reduce reliability of power supply by 16 percent which can easily lead to blackouts resulting in huge economic losses.” The team also found that increasing hot and cold spells could affect the integration of renewable supplies within existing power grids. This, in turn, could have a significant impact on urban air quality and poses a further challenge to governments and cities seeking to shrink their carbon footprint.

Climate change has made weather patterns harder to predict, and extreme events such as droughts and floods have become more frequent and severe. Even with global efforts to reduce emissions, some climate change is inevitable. Action to adapt to its impacts is needed.

The industry already has an important role to play in adapting and responding to the effects of climate change. For example, mobile networks are facilitating access to information and coordinating assistance before, during and after climate-related emergencies. These efforts are often supported by operators’ in-house disaster response teams, while mobile technology has rapidly become an attractive delivery channel for many forms of aid.

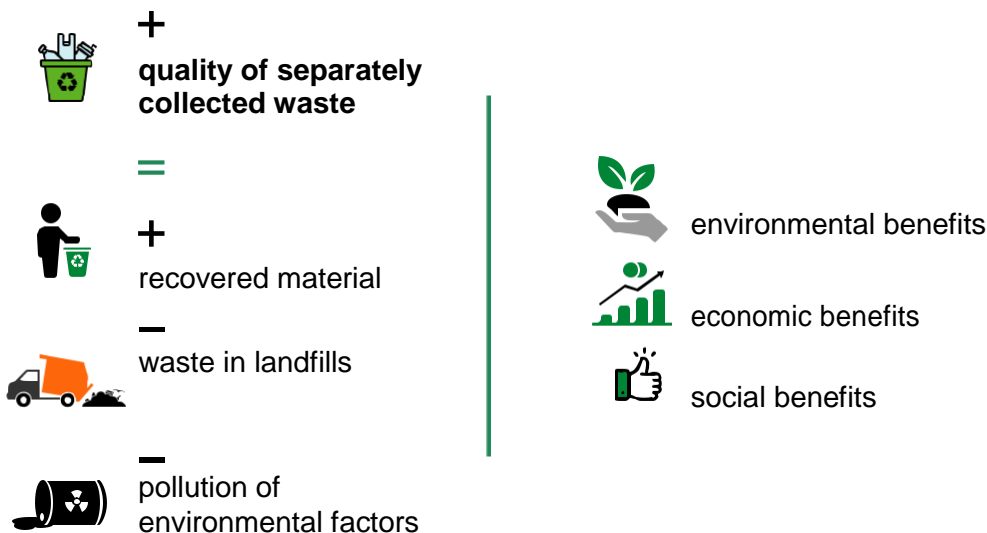
A good example, as part of a 4G Smart City Project in Taiwan, telco companies implemented a smart water disaster management system, allowing authorities to successfully predict flooding and the potential for disasters. Similarly, in Nepal, mobile operator Ncell partnered with the Department of Hydrology and Meteorology to send early-warning alerts to its customers living in high-risk areas of floods and landslides, encouraging them to move to government-designated safe locations when water levels become too high.

While the role of the ICT sector in mitigating climate change is well-recognized, less often discussed is the potential for the sector to enable society to prepare for and respond to imminent climate change impacts. In many cases, ICT contributes to both mitigation and adaptation efforts at the same time. The ICT sector must continue to play its part in tackling the current crisis and continue to innovate radically to reduce emissions.

# SEPARATE WASTE COLLECTION

A quality separate collection has a positive effect on the cost of sanitation services paid by each citizen.

## A GOOD separate collection = LOWER COSTS



## IMPORTANT

The separate collection of waste, according to the instructions from this Guide, transposes the provisions of the international legal framework.

Violation of waste management rules requires the application of the Contravention Code stipulations.

# 5

## REASONS TO COLLECT SEPARATELY



Reduce the amount of waste that ends up in landfills and on degraded land;



Reduce air, surface water and soil pollution;



Stop the spread of outbreaks of infection with a major health risk;



Contribute to the conservation of limited natural resources by using secondary raw material obtained from recycling in production;



Become an example to other members of the community, motivating them by example to make their own contribution to greening of their locality.

**Separate collection of waste for recycling is a small gesture that each of us can easily do to ensure that future generations will have a cleaner environment.**





# RULES FOR SEPARATE WASTE COLLECTION

Contrary to created stereotypes, the selective collection of recyclable waste (plastic, glass, paper, electronics, etc.) is not a complicated process and does not involve excessive costs. There is enough involvement, and if everyone started to collect correctly and hand in the waste they generate, the world would be a cleaner place and we would all contribute to a better future.

1. The route of separately collected waste includes several stages, but some basic rules must be kept in mind, which will ultimately guarantee the recycling of waste:
2. Separate the recyclable waste you generate from your home: plastic, paper, glass, metal, batteries, light bulbs, etc.
3. Rinse and squeeze all waste thoroughly to take up as little space as possible in the bin/net. Place the selectively collected waste in bins specially designed for recyclables, in bags or improvised spaces to be later handed over to the sanitation operator.

## ATTENTION!

Waste (packaging) that cannot be cleaned is collected as residual waste.

Plastic	The containers must be rinsed, emptied of liquid and pressed to gain space.
Glass	Glass containers must be emptied and rinsed before disposal in the bin or net.
Paper	Cardboard and paper should be folded to save space. Make sure they are clean and free of impurities, otherwise recycling them will be impossible.
Metal	Metal waste must be thoroughly rinsed and stored in special places arranged for their collection.
Electronics	Electrical and electronic equipment waste and used batteries must not be mixed with household waste under any circumstances. Either throw them in the special waste bin or hand them over directly to an authorized operator
Biodegradable	Deposit biodegradable waste or "Wet Fraction" only in specially designated containers.



## PLASTIC



### YES

- Plastic containers for beverages and those for dairy products;
- Cosmetic and detergent containers;
- Plastic and polystyrene casseroles, plastic plates and plastic bags;
- Plastic bags and foils used as packaging;

**NO:** Paint cans, thinners or other hazardous chemicals, used batteries and accumulators, medical waste (eg used syringes), waste electrical or electronic equipment.

## GLASS



### YES

- White, brown and green glass;
- Jars and bottles without lids;
- Shards of glass;
- Other glass objects;
- Jars without lids, glass cups;
- Glass packaging from cosmetic products, etc.;

**NO:** Mirrors, windows, light bulbs and neon lights, porcelain products, ceramics, crystal/heat-resistant dishes, etc.

## PAPER



### YES

- Food paper packaging;
- Food cardboard packaging (milk, juice, candies, etc.);
- Paper bags;
- Boxes and packaging made of plain or corrugated cardboard;
- Writing paper, wrapping paper;
- Newspapers and magazines;
- Books and notebooks;

**NO:** Paper and cardboard containing food residues, used napkins and kitchen paper, used cardboard cups, waxed or laminated paper.

### Important:

- Plastic degradation takes over 500 years.
- Plastic is made from petroleum, gasoline and coal.
- From 10 recycled bottles you can make a t-shirt or a square meter of carpet.
- Recycling a plastic bottle saves enough energy to run a 60 W light bulb for 6 hours.

### Important:

- The glass is 100% recyclable.
- Glass is mostly made from sand and requires an enormous amount of energy.
- Manufacturing glass from recycled materials (shards) saves a third of the energy used at the beginning.
- The natural duration of glass degradation is 4,000 years.
- Glass shards can also be used to obtain asphalt mixtures.

### Important:

- To obtain paper from recycled fibers, 70% less energy is used than for that from natural fibers.
- One ton of recycled paper saves: 15 trees, 2.5 barrels of oil, 4132 kWh, 2.26 m<sup>3</sup> of waste storage space, 26,497.88 liters of water, 26.8 kg of air pollutants.
- Paper needs about 5 years to biodegrade.

## METAL



### YES

- Beverage cans;
- Cans;
- Broken kitchen utensils;
- Tin foil from chocolate packaging;
- Pen springs and bent paper clips;
- Broken keys, etc.

**NO:** Paint cans, thinners or other hazardous chemicals, used batteries and accumulators, medical waste (eg used syringes), waste electrical or electronic equipment.

## ELECTRONICS



### YES

- Mobile phones, watches, computers, MP3 players, CD players;
- Iron, electric toothbrushes, toasters;
- Power cables and tools;
- Televisions, computers, game consoles;
- Fire alarms;
- Refrigerators, electric hobs, washing machines;
- Dryers and radiators;

**NO:** Mercury thermometers, fluorescent lamps, incandescent light bulbs, paints, medicines.

## BIODEGRADABLE



### YES

- Fresh or cooked fruit and vegetable scraps;
- Leftover rice, pasta, beans and cereals;
- Eggs and nuts shells;
- Coffee grounds/tea residues (including tea bags);
- Leftovers of bread, cereals and pastries;
- Expired food products;
- Leaves, grass, twigs and/or hay and straw;
- Newspapers, paper and cardboard, if wet and dirty;

**NO:** Treated or painted wood, animal fats and vegetable oils, dairy residues, soil, sand, gravel, etc.

### Important:

- A TV can run for three hours continuously on the energy saved by recycling an aluminum can.
- 630 steel boxes are recycled every second.
- A dose of aluminum degrades in approx. 500 years and is 100% recyclable.
- Recycling one ton of steel reduces air emissions by 86% and water pollution by 76%.

### Important:

- A used battery that ends up in the trash can and later on the landfill pollutes 1 square meter of land and 10 liters of water.
- 65% of the elements contained in a battery can be recovered and reused.
- 1 million mobile phones = 250 kg of silver, 24 kg of gold, 9 kg of palladium and 9 tons of copper.
- If we recycle 10,000 televisions, we recover 130 tons of glass, 30 tons of plastic, 25 tons of iron and 10 tons of copper.

### Important:

- One third of food or 1.3 billion tons of food ends up in the trash. This food waste produces 3.6 gigatons of carbon dioxide.
- From biodegradable waste you can get compost in your own household, an excellent fertilizer for the plants around the house and for the soil in the garden.



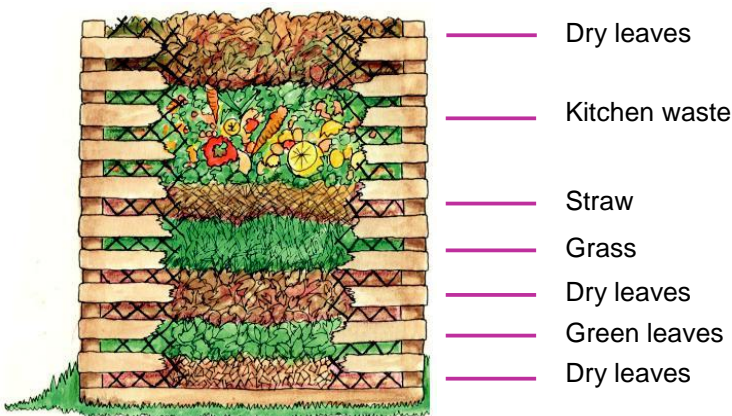
# WASTE COMPOSTING

Composting is a biological process that turns organic materials from waste and by-products into a humus-rich soil called compost or organic fertilizer.

Most importantly, by having a compost bin in the household and practicing home composting, we offer real solutions with double benefits for both the environment and the household, reducing the amount of waste going to landfill by up to 50% and generating a material similar to forest humus, which can be used as a natural fertilizer.

<b>YES, it is compostable</b> Carbon-rich matter (C)	<b>YES, it is compostable</b> Nitrogen-rich matter (N)	<b>It is NOT compostable</b>
Animal dung; Stale flowers; Grass cut, fresh hay; Food scraps; Vegetable residues; Coffee grounds;	Newsprint; Corrugated cardboard; Sawdust, wood chips; Tree bark; Dry leaves; Fruit residues; Eggshells, nut shells; Cardboard (packaging);	Leftover meat and fish; Dairy products; Fats and oils; Remnants of paint; Plastic, glass and metals; Batteries and accumulators; Ashes from the stove; Disposable diapers;

## COMPOST BIN





1

Separate waste collection  
in specially designed bins



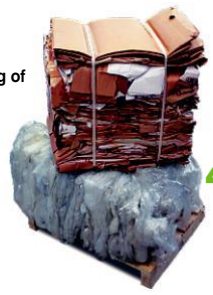
2

Waste transportation  
to the sorting station



3

Waste sorting



4

Baling of  
waste



Recycling of collected  
waste

6

Waste transportation  
to the recycling plant



5



7

Obtaining  
the new product

“The necessary changes would only come about by changing our attitude and behavior!”

(1992: Rio de Janeiro „ Earth Summit”  
Sustainable development support plan)