eReuse Collaborative BARCELONA Platform

Reuse of digital devices, figures and impact

- 1 job created for every 300+ devices.
- Avoid 90% of premature recycling.
- Job creation from product-as-a-service: (maintenance, repair, servicing).
- Increase 3-4x turnover than original purchase.
- More affordable and quality of second-hand devices.
- Responsible public and private procurement of devices, purchase long lasting devices that can be reused (avoid planned obsolescence).
- Increase Material Circularity Indicator by extending life span 4+ years when sharing usage (reuse).
- Decrease environmental impact in savings e-waste and CO2 emissions from reduction of recycling and manufacturing

eReuse figures and impact

- eReuse in 10+ cities and 8+ countries.
- 10,000 reused devices in custody until final recycling.
- 5,000+ devices entering to reuse circuits every year.

eReuse Barcelona, figures and impact

- 20 consolidated workplaces in 18 social reuse centers.
- 500,000 €/year of social economy activity created.
- 350.000 €/year in cost savings on subsidies from city governments related to closing digital divide.
- 16 million of computing usage hours created each year.
- 95% of created jobs are for bringing back people into the labor market.
- 4+ years of extended lifespan of devices.
- 92% reusability of devices.
- 95% recyclability after reuse.
- Decrease environmental impact with 43 ton savings of electronic waste and 864 tons of GHG emissions.

The Background

Everything started with a "what if we opt for reuse rather than premature recycling". In 2014 the Government of Catalonia planned to discard 30,000 computer devices per year until 2019. 92% of the devices were functional and 87% of them were potentially reusable locally by social entities, schools and people digitally excluded. The government wanted to involve all the active reuse centers to do all the work of refurbishing, channeling and tracking these devices. This was the request they made to a research group at the Universitat Politècnica de Catalunya. A few months later eReuse.org was launched. Today eReuse is active in 10+ cities and 8+ countries, with 10,000 reused devices in custody until final recycling, and 5.000 devices entering to networks each year.

What is eReuse.org

The mission of Electronic Reuse is to promote the avoidance of premature recycling of digital devices via the practice of reuse while ensuring the chain of custody and final recycling. We are a project under Pangea.org, a private, independent non-profit organization founded in 1993 to promote the strategic use of ICT. Our members are local groups, business and organizations with the goal to extend the lifetime of products through repair, refurbish, and reuse.

Our partners are international groups that promote social awareness about the social and environmental impact of electronics, social labor, zero waste, circular economy, fair electronics, the right to repair, the reduction of the digital divide, and social inclusion. We have been supported by EU Projects Chest #611333, TagItSmart.eu #688061, and the Association of Progressive Communications (APC.org).

What pain we are addressing

The increase in the so-called e-waste, the equivalent of 4,500 Eiffel towers in 2016, can hardly be mitigated by recycling alone, a term that comes from our current linear economy and which, if applied at 100%, would only reduce our carbon footprint by 1.6%, clearly we will not reach the 50% reduction target by 2050. The amount of obsolete electronic equipment is further driven by relatively short replacement cycles. Since technology changes quickly, many users replace devices, such as their mobile phone, regularly and often before the devices break.

This and other factors generated a volume of 44.7 million metric tonnes of e-waste in 2016. Only 20% (8.9 Mt) of waste is documented to be collected, and the fate of 76% (34.1 Mt) of e-waste is unknown; likely dumped, traded, or recycled under unknown conditions.

Dumping into landfills leads to toxins leaking into the environment, and incineration leads to emissions in the air. These disposal scenarios exist in both developed and developing countries and are not satisfactory, because they lead to a loss of secondary resources and damage the environment.

Today, most devices from business and public administration are discarded when considered amortized, and although they still have a value for use and are suitable for reuse, they are scrapped (recycled), or illegally exported to other countries via informal reuse circuits. Our challenge is the implementation of a circular economy from the perspective of extending the lifetime (or use) of electronic/digital devices as much as possible by repairing, updating, and reusing them.

Public authorities are willing to promote the positive aspects of reuse, but without a traceability solution and a commitment from consumers for reused products, it is uncertain if reused digital devices may end up being exported illegally and potentially polluting the environment. Such risk and slippage is the main drawback in the promotion and the practice of reuse in public and private organisations. **Traceability and its incentives is our solution.**

The circular economy of reuse

The positive aspects of reuse are well understood. Reuse effectively contributes to develop a circular economy, strengthen the creation of local employment, prevent the generation of waste, and reduce the digital divide.

However, why is it such a minority practice in Europe? When companies, governments, or individuals need to get rid of their digital devices to reuse, they don't know where to turn.
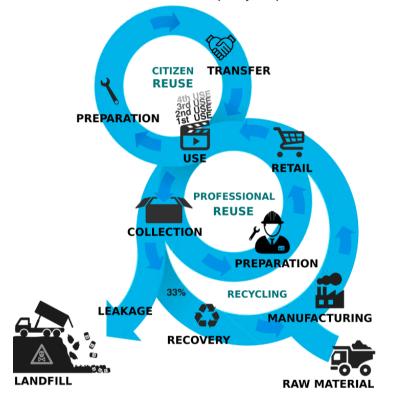
The reuse of electronic devices such as desktops, laptops or mobile phones is applied to devices that have already been manufactured and are no longer in use (disposal) and will be recycled unless they are not prepared for reuse (repaired, upgraded) and redistributed to other users.

We say a device or component is reusable if it has any use value for someone. If the use value of the device is high enough, it means that there is somewhere a potential user for that device as it is, and only a basic refurbishing processes, such as erasing data or restoring the operating system, is required (see citizen reuse loop in the figure).

If the use value is too low, its use value can be increased through several types of actions of preparation for reuse (see professional reuse loop):

repairing, replacing and updating: 1) repair a component. 2) replace a damaged component that can no be repaired, for example change the battery, 3) upgrade with a new or used component with higher performance (for example replacing a disk drive by SSD storage).

We define the Circular Economy of reuse as the result of performing all viable reuse processes (citizen and professional loops) until the use value of devices does not allow further reuse.

The cycle reach recycling to recover raw materials and manufacture new components. We should ensure that after multiple cycles of reuse devices end up being recycled (**traceability**), and that all at the time of recycling have low use value (**auditing**). In this way, reuse that is traceable to ensure final recycling, and auditable to ensure there is no premature recycling, society would not waste value from the computational resources in circulation (already manufactured) and we would make more efficient use of our resources (minerals, work, pollution capacity, etc).

What is an eReuse platform?

An eReuse platform is a set of open-source software web tools to support efficient reuse, certify involved stakeholders and their circularity, and share chain of custody information. It guarantees donors involved in the platform that these devices are reused and finally recycled, avoiding illegal trade and polluting the environment.

What is a eReuse circuit, as a collaborative platform?

When most of the local reuse centers collaborate and complement with each other (cost-oriented, not profit-oriented) we can say that an eReuse circuit as a collaborative platform has emerged. There are two platform levels. The first level involves only reuse centers. In this level each actor has its own platform. In the second level (collaborative), an entity focused on zero waste or/and digital divide create an collective platform. In Barcelona, for example, there are three circuits where 20+ reuse centers collaborate.

There are four main stakeholders: i) public administrations, interested in donation to the circuit, ii) reuse centers and professionals interested in added-value services to distribute, refurbish, repair, retail, enhance, or recycle second-hand devices, iii) customers, end users interested in using environmentally-friendly reused devices or just more cost-effective, iv) zero waste, digital divide focused organizations that manage the circuits and assign devices to reuse centers and retailers.

How it works?

Devices enter a circuit primarily through 3 channels: 1) collective procurement of new or used products, 2) charitable donation from public administrations and companies, e.g. a city council seeking to feed the local social economy and reuse surpluses for target groups in vulnerable situations, and 3) exchanges from other members of the circuit with stocks that cannot be processed internally.

Let's consider, for example, a donation from the public administration. When a donor, such as the city council of Barcelona, has devices, contacts its circuit manager, Pangea.org in Barcelona, responsible for referring the donation to a circuit member. Each circuit agrees upon its own rules for referral of donations to a member. In the Pangea circuit we consider the current potential for increased use value during the process of refurbishment.

Then the reuse center picks up the devices in the donors facilities and bring them to their facilities. There, the devices are repaired, registered in the device inventory and tagged. Thanks to the TagItsmart.eu EU project today we use quick scan and no duplicated tags. An smartphone app allows quick access to information about the life cycle of each devices.

The end result is an inventory with all the information about each device and internal components. This inventory is shared with retailers, such as Abacus.coop, a cooperative with more than 800,000 members that channels computers to schools, or donalo.org, that distributes devices to NGOs. The reuse center can check at any time where is each device and if and when they end up in a recycling point.

eReuse circuits in Barcelona?

Collaboration in Barcelona is the result of the need to scale up. In the past no entity in Barcelona could process more than 500 computers per month. Large donations were already a problem (e.g. warehouse, processing effort, find demand). Acting together and specialization now allows scaling up of reuse centers and retailers that together can process up to 3,000 devices per month without having to discard any donations.

The city council of Barcelona did not want to work with a single or few reuse centers, but reach all, so a coordinating entity was selected. Pangea.org, a zero waste and digital divide entity, coordinates the circuit and manages agreements with the city council and other donors. Pangea coordinates the distribution of devices across reuse centers while ensuring traceability and accountability.

The city councils

The result is that public administrations and local circular economy entities have formal, scalable and sustainable reuse circuits that offer traceability and guarantee proper recycling. City councils deliver device surpluses to citizens and organizations, with great effect in creating inclusive jobs, starting or accelerating efficiency and scaling up of local exchange/market of second hand computers and mobiles, and related jobs of transport, refurbishment, support, recycling.

These jobs start as volunteering that become stable jobs as local circuits grow and get enough volume and income from the sale of devices, with help from local governments and social enterprises.

The customers

The customers of eReuse circuits are citizens that prefer second hand devices for environmental reasons, citizens in risk of exclusion supported or advised by public social services, and organizations demanding larger volume of devices such as schools, social enterprises, environment or budget-concerned public or private organizations. Citizens benefit from a pool of devices at a lower economic and environmental cost, at well as creating local jobs (in social and commercial organizations) for the collection, refurbishment and support (computing-as-a-service) by locals for locals.

Computing and electronic devices registered in a local circuit are traceable, linked (privacy preserving) to its users (report usage), properly recycled at the end. Citizens can find out about where to get or drop them for reuse or recycle. Incentives can be created in cities to promote environmental sustainable practices (also measuring CO_2 savings). Citizens can purchase second-hand devices (in person or via e-commerce), with trusted origin, with a wide range of service providers to assist in maintenance, repair, improvement, repurchase (buy-back) or take-back services. In each city we work with local organizations (social enterprises) and city authorities, that are considering or trying use of IoT eReuse tools and services (itopie in Carouge, Revertia in Porto, Lakalle in Madrid, Pangea in Barcelona, ComputerAid in Manchester and Nairobi, etc).

Impact of eReuse in Barcelona

Our platform in Barcelona for the donation of computer equipment (computers, mobile phones, printers), provides the following benefits: 20 consolidated workplaces in 18 social reuse centers, 500.000 €/year of social economy created, 350.000 €/year in cost savings on subsidies from city governments related to addressing digital divide, waste prevention (92% of the devices given are reused) and 43 ton in savings of electronic waste and 864 ton of GHG emissions from usage of second hand devices, increased guarantee of recycling (95%) with recovery of raw materials (last year in Europe only 35%), development of the local economy, digital inclusion from the affordable supply of second hand (400 entities recipients of equipment each year), 16 million of computing hours created each year.

Future plans for eReuse

The eReuse community trains, transfers know-how and its open-source platform to reuse centers, to improve the processes to enable device traceability and guarantee reused devices are finally recycled, audit the performance of end-of-cycle recycling and the impacts generated by reuse in labor and digital inclusion.

The aim is to only recycle devices with low use value and no demand for reuse. Faced with this challenge eReuse communities empower local reuse centers and groups to create private and collaborative platforms. The result is more reuse and ensuring proper recycling in a traceable manner. eReuse is already being used in 10 cities with a total volume of 10,000 devices in use. The growth is based on the replication of the model in different cities and areas. Therefore, growth depends on the initial training of the seed organization for a circuit in a given location, and on the use of the tools remotely, downloadable support materials, remote assistance to circuits, periodic visits combined with local community events for followup (face-to-face support and training), collection of activity metrics, etc. That allows that a rather small core coordination team can steadily grow, given that local circuits are quite autonomous.