E-WASTE PILOT PLANT

2018

POST IMPLEMENTATION ASSESSMENT REPORT

Contents

Project number.................................... 2ARG17013
Project Manager................................ Mrs. Maritza Delgado
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Date..19/07/2019

Introduction

The aim of the project is to establish a pilot plant in la Plata, Province of Buenos Aires, Argentina, that will provide concrete responses to the E-Waste problems in cities in line with the Sustainable Development Goals.

The project also seeks to contribute to the implementation of BDT's mandate as stated in WTDC Resolution 66 (Rev. Dubai, 2014) to provide assistance to developing countries in the use of ICTs to mitigate and address the effects of climate change, taking into account the impact of ICTs on the environment, as well as the achievement of one of the environmental sustainability goals set in the "Connect 2020 Agenda for Global Telecommunication /ICT Development" which calls for a reduction of E-Waste by 50% by 2020.

By the end of the project, the primary result was a fully functioning and operational e-waste pilot plant. This project also achieved a strong and effective multi-stakeholder approach which involved partners from the private, public and academic sector, working together to raise awareness and build capacity on the need to recycle ICT waste on a sound manner and tackle e-waste.

PARTNERS

National University of La Plata, Argentina (UNLP)

International Telecommunication Union (ITU)

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Background

More and more people are joining and benefiting from the opportunities of the digital economy and information society. As technologies change at great speed, and as access to and use of electrical and electronic equipment (EEE) increases, product lifecycles become shorter and many designs do not support repair or reuse.

As a result, the amount of electronic waste, or e-waste (WEEE), is growing rapidly. Used, broken, or obsolete equipment, such as phones, laptops, sensors, TVs, and batteries contain substances that pose considerable environmental and health risks, especially if treated inadequately. Most e-waste is not properly documented and not treated through appropriate recycling chains and methods.

The management of e-waste is one of the greatest challenges faced by the ICT sector. This stream requires sustainable management of products at the end of their useful lives due to the environmental, social and economic implications associated with it. It is important to understand that these wastes are heterogeneous and have specific characteristics. Therefore, their management, treatment and disposal must be carried responsibly.

In the last two decades, legislators, producers and recyclers have established "specialized treatment and recovery systems" in some countries to collect e-waste from the final owner and process it in treatment facilities suited to that purpose.

However, despite these efforts, data collection and technical processing of e-waste is uncommon, and most countries do not yet have these management systems in place. There is a large amount of e-waste that is neither collected nor treated in an environmentally friendly way.

Additionally, e-waste is still shipped from developed to developing countries. Often, the e-waste transferred to developing countries is processed by basic and inefficient techniques to extract materials and components (UNU, 2015).

Sustainable management must include the active participation of all actors, particularly those in the local environment and ICT sector. Countries must also have adequate management technological tools, waste electrical and electronic equipment (WEEE) management technical guidelines, efficient regulatory frameworks and sustainable business models.

ITU

As the UN specialized agency for ICTs, ITU helps Member States to take advantage of the opportunities of ICTs to address the challenges linked to climate change, and to address the issue of e-waste. This includes the identification of guidelines, awareness raising and capacity building activities, collaboration with other UN agencies, the implementation of projects and direct assistance to Member States.

National University of La Plata - Background – E-Waste Program

The E-Waste Program is a University Extension project of the School of Computer Science of the National University of La Plata, Argentina (UNLP) established in 2009, which seeks to extend the end-of-life of ICT equipment for social purposes. The team is made up of a group of professors and students of the Laboratory of Investigation in New Information Technologies (LINTI) and different schools of the UNLP concerned about environmental and social issues.

The programme seeks to strengthen the commitment of the UNLP with its local communities and country, through:

- raising awareness on the risks involved in the lack of treatment WEEE;
- enabling access to technology through the donation of computer equipment to disadvantaged sectors of society (institutions, social organizations, schools, libraries and other public-good and non-profit organizations) to reduce the digital divide and contribute to social equity;

- contributing to a safe final recycling and disposal of ICT equipment, avoiding the end stage of burning it in landfills; and
- generating public and private partnerships with different stakeholders with the aim of minimizing the ecological impact of WEEE.

One of the main activities of the e-waste pilot plant is to refurbish computers which are then donated to vulnerable populations, such as the ones in rural schools, indigenous communities and penitentiaries in La Plata and other communities in Argentina.

The plant works with students from different academic sectors/schools of the UNLP, such as Engineering or Computer Science, who receive scholarships and are responsible for different activities in the operations of the e-waste pilot plant, as well organize capacity building and trainings for students and persons interested in WEEE management.

During the implementation of this project, the following main activities were undertaken:
- Identification of premises for the establishment of the pilot plant.
- Design of the e-waste pilot plant and processes.
- Site preparation including furniture, telecommunications, electrical power and other utilities.
- Development of Terms of Reference and Technical Specifications of the required equipment.
- Procurement of the equipment.
- Development of guidelines and establishment of processes and procedures to be followed.
- Recruitment of relevant personnel.
- Installation and commissioning of the purchased equipment.
- Put in to operation of the e-waste pilot plant (Inaugural ceremony took place in La Plata on 06 September 2018).

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Scope of review

Based on the principals of Results Base Management (RBM) and the steps taken in the project management process, the project implementation review is a key input to the work related to ongoing and future projects. Such review of implemented projects provides details on the project delivery, achievement of the results and objectives. Accordingly, the purpose of the implementation review is to assess the level of achievement of the expected results and the project objectives based on the KPIs and targets defined in the project document, as well as to draw lessons learned, define challenges encountered and any other issues.

An onsite visit was undertaken by ITU from 03 to 07 September 2018.

The visit provided an excellent opportunity to see the e-waste pilot plant operate in La Plata, Argentina, as well as collect video footage and conduct interviews with the UNLP and many of the relevant stakeholders.

The implementation review was undertaken in close collaboration with the project partner the UNLP, who acted as the main focal point in La Plata, Argentina. UNLP made the local arrangements during the implementation of the project activities, in coordination with local authorities and many of the stakeholders involved.

The evaluation mission also included visits to the Universidad de la Plata, Municipality of La Plata, the Provisional House of the Government of Buenos Aires and beneficiary institutions. Many other stakeholders are involved and supporting the e-waste pilot plant and program, but due to the short time period of the mission, there was not enough time to meet with all of them. The below list details many of the interviews undertaken, which captures a good sample of the different stakeholders.

Office/Post	Organization	Name
Former President, who signed the ITU/UNLP project	UNLP	Dr. Raúl Perdomo
Secretariat of the Technological Linkage Department, School of Computer Science	UNLP	Dr. Javier Díaz
Pro Secretariat of Human Rights and Youth Program for incarcerated people	UNLP	Ms. Veronica Cruz Mr. Tristán Basile
Computer science faculty, Human Rights and SDGs	UNLP	Ms. Claudia Queiruga Ms. Lia Molinari
E-Waste program	UNLP	Ms. Viviana Ambrosi, Director Mr. Néstor Castro Mr. Jorge Bwellavista
Faculty of engineering, UIDET	UNLP	Mr. Marco Cippioneri Ms. Monica Salvioli
Provisional House, Computer Science Director and Corporate Social Responsibility Director	Government of the Province of Buenos Aires, Argentina	Mr. Guido Gallo Ms. Susana Finger
Ecological House, Sub Secretary of Environmental Management	Municipality of La Plata, Argentina	Mr. German Larrán
UNLP Students with scholarships and other staff, working at the e-waste pilot plant	UNLP / e-waste pilot plant	A group of UNLP Students with scholarships and other working as staff of the plant
Engineer students, internships and research students	UNLP	Several students doing internships and research at the e-waste pilot plant
Chief, Qom local indigenous community	Beneficiary Institution	Mr. Hugo Orlando Cardozo
"Centro Verde Esperanza", after school support center for vulnerable children	Beneficiary Institution	Ms. Viviana Harari
Marketing and Public Relations	Seguros Rivadavia	Mr. Pablo Manfreidini
Subsidiary La Plata	OSDE medical services	Mr. Daniel Di Santo
Biologist / consultant	Eco. Gestionar Group	Mr. Gustavo Fernández Protomastro

Dr. Raúl Perdomo, UNLP

Ms. Viviana Ambrosi, UNLP

Ms. Lia Molinari, UNLP

Mr. Guido Gallo, Government of the Province of Buenos Aires, Argentina

Ms. Viviana Harari, "Centro Verde Esperanza"

Dr. Javier Díaz, UNLP

Mr. Pablo Manfreidini,
Seguros Rivadavia

Mr. Hugo Orlando Cardozo,
Qom local indigenous community

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Results achievement

3.1 Establishment of an e-waste pilot plant.

Key performance indicator

The e-waste pilot plant is operational by the end of the project.

Achieved

Yes

Remarks

A fully functioning and operational e-waste pilot plant was established in La Plata, Argentina. All the equipment procured by ITU is fully operating.

3.2 E-waste recycling Guidelines and processes are developed taking into consideration international standards.

Key performance indicator

Availability of guidelines and definitions of the e-waste recycling and processes.

Achieved

Partially yes

Remarks

UNLP had submitted a first draft to be reviewed by the project manager. During the evaluation mission, a meeting was held where feedback was given to the UNLP representatives on to how to improve the document. The final version was expected soon.

3.3 Enhanced human capacity on e-waste recycling methods.

Key performance indicator

UNLP staff and students trained

Achieved

Yes

Remarks

UNLP organized weekly trainings and capacity building sessions on e-waste at the pilot plant for all students of UNLP and other stakeholders.

E-Waste Plant

Students at work

Enhanced human capacity training on e-waste recycling methods

Items from the E-Waste Plant

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Financial Status

Project cash contributions received as planned?

Y/N/Not applicable	Percentage (%)	Explanations
Yes	100%	The project was fully funded by ITU – CHF 68,700.

Is the level of expenditure at the expected level?

Y/N/Not applicable	Percentage (%)	Explanations
Yes	93%	Total expenditure: CHF 63,715.

Any funds remaining unused?

Y/N/Not applicable	Percentage (%)	Explanations
Yes	7%	CHF 3,034 is the remaining balance in the project account.

In-kind contributions

Y/N/Not applicable	Percentage (%)	Explanations
Yes		As the main partner in this project, the UNLP has worked on the e-waste program since 2009. Professors, researchers, graduates and students of the UNLP covered various roles in the implementation of this project and the establishment of the e-waste pilot plant.

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Findings

The findings of this review are as such provided in the below:

1.   PROJECT RELEVANCE:

According to the publication "The Global E-waste Monitor 2017 Quantities, Flows, and Resources" in 2016, 44.7 million metric tons (Mt) of e-waste were generated worldwide, equivalent to 6.1 kilograms per inhabitant (Kg. / inhabitant) annually. This, according to the source, equals almost 4,500 Eiffel Towers each year. By the year 2021 it is estimated that the amount of electronic waste will increase to 52.2 million metric tons, with 6.8 Kg. / inhabitant.

For Latin America, it was estimated that in 2016, 4.2 million metric tons (Mt) of electronic waste would be generated, with an average of 7.1 Kg / per inhabitant. The three main countries in Latin America with the highest generator of electronic waste in relative quantities in 2016 were Uruguay (10.8 Kg. / Per inhabitant), Chile (8.7 Kg. / Per inhabitant) and Argentina (8.4 Kg) / per inhabitant) in relation to the number of inhabitants.

The evaluation mission was able to review the main tasks, activities and actions carried out, as well the oversee the purchased equipment, within the framework of the international cooperation agreement and project document signed between ITU and UNLP for the successful design, implementation and start-up of the e-waste pilot plant; as well as those research, analysis and training activities that resulted of the implementation of this project.

The UNLP e-waste program was already in place, before the signing of this project, as a Computer Reconditioning Center (CRC). It was aimed at the reuse of components and the reconditioning of computer equipment for subsequent donation to low-income and vulnerable communities, based on a circular economy model.

The components or equipment severely damaged, with no possibility of repair or that have reached the end of their useful life, were removed by local companies dedicated to the safe final disposal of WEEE guaranteed and certified at the provincial and national level.

Due to the relevance of this project and effective establishment of the e-waste pilot plant, the UNLP e-waste program has been strengthened, sustainability of the program has been reinforced, by being able to better process the electronic equipment that enters the plant, improve the reconditioning and repair tasks of computer equipment, as well as create even more interest and involve many other actors who have decided to collaborate with the UNLP e-waste program.

In addition, this project has driven the creation and launch of communications campaigns to raise awareness in the local communities of La Plata, about the importance of using appropriate recycling methods for electrical and electronic equipment.

2.   STAKEHOLDER ENGAGEMENT:

The implementation of this project was successful, in part due to the effective efforts made by many different local stakeholders, namely the UNLP, the Municipality of La Plata, the Government of the Province of Buenos Aires, private sector companies, scrap recycling companies, NGOs and ITU, to accomplish a common goal of achieving the establishment of the e-waste pilot plant, making it fully operational and making it an integral part of the UNLP e-waste program

A significant aspect in the management of WEEE is the importance of the interrelation between diverse actors for the search of potential solutions and responsibilities along the chain of the life cycle that goes from the generation, transport, storage, reconditioning, recovery, reuse, recycling, decontamination, treatment and safe final disposal of WEEE. This was very palpable during the implementation of this project and the visit to the e-waste pilot plant. UNLP played an essential role in bringing many different stakeholders together onto a common and sustainable platform, to ensure a smooth implementation of the ITU/UNLP project.

3.   EFFECTIVENESS OF THE TECHNICAL SOLUTION:

In preparation of the implementation of the project, an agreement between the UNLP e-waste Program and the Government of the Province of Buenos Aires was signed, to install the e-waste pilot plant in the premises assigned by the Government, for the operation of its activities, and also the annexing of an additional deposit (called "Intermediate Deposit") in the proximity of the previous one. This Agreement was signed on November 6, 2017, which supported not only with the facilities, but strengthened the collaboration between the UNLP e-waste program and the Government of the Province of Buenos Aires.

Due to the fact that it was an experimental e-waste pilot plant, it was decided not to decentralize processes and equipment between the two deposits, concentrating the effort in one single location. In this way, the processes and procedures involved could be better executed and analyzed, and decentralized could then be considered according to growth expectations, space requirements, volumes of material to be processed, among others.

For the implementation of the pilot plant, it was necessary to start from the previous state of the premises, analyze the status, operation, flows and then perform a re-planning of spaces, roles and functions, especially based on the new equipment that was bought with the ITU funds.

Electrical and electronic equipment in general are manufactured with various materials, many of them metals. Some of these metals, such as cadmium, mercury, chromium, gold, silver and lead are used in small quantities for specific applications due to their particular characteristics, while other metals are used for structural purposes, for the manufacture of cabinets and other parts.

Research was undertaken by the UNLP on the metallic materials present in the computer equipment and other electronic components to determine the currents of materials to recover and their profitability. The research that was done, analyzed the local market, considered working in a circular economy model and made it viable for the pilot's plant sustainability.

UNLP also decided to prioritize the research on materials usually relegated in the recycling of WEEE, such as plastic, whose market value is significantly lower than that obtained from metals and recycling of plates, but no less polluting.

From this research and analysis, the plastics present in the electrical and electronic equipment and the percentage of use of each one were determined, with the purpose of selecting the currents of greater volume for grinding and reinsertion in the market. This initial investigation was corroborated with that provided by the a local recycling company. It was decided to give priority to the separation of ABS and PAI (High Impact Polystyrene, HIPS, PS-HI), since they are the two plastic resins that are most frequently found in electrical and electronic equipment and with the greatest potential for mechanical recycling. A cutting mill was purchased under the implementation of this project.

Government agencies, banks and service companies that handle sensitive information must resort to the destruction of data to preserve the confidentiality of their operations and their personnel. The safe elimination of computer files is equivalent, in this sense, to the crushing of paper. There are situations in which the deletion must be irreversible and definitive.

Consequently, when a computer is discarded, the importance of the sanitization of all the data must be given importance. The purchase of equipment related to the sanitization and destruction of hard disks was undertaken, in order to offer services for the removal of information to companies or other interested parties, concerned about the safety of their sensitive data. The offer of these services by the e-waste pilot plant could generate income to sustain the pilot's operations over time, beyond the financial support provided by the ITU during the implementation of this project.

As a result of this project, guidelines are under preparation by UNLP, for the establishment of an e-waste plant, the reconditioning of computer equipment and the recycling of WEEE. These will be based on the experience of previous work of the UNLP E-waste Program, the updating of its respective process manual, the implementation of the e-waste pilot project and lessons learned.

For the implementation of this project, members of the UNLP E-waste Program, who had the necessary expertise, where invited to support. UNLP staff were successfully trained to start in the new activities to be included in the new e-waste pilot plant and and expert consultant was also hired.

In addition, a call was made to UNLP students from different disciplines to work in the e-waste pilot plant and receive scholarships. This call had an enrollment of more than 100 students of the UNLP. The chosen students took up different roles and responsibilities in the operations related to the e-waste pilot plant.
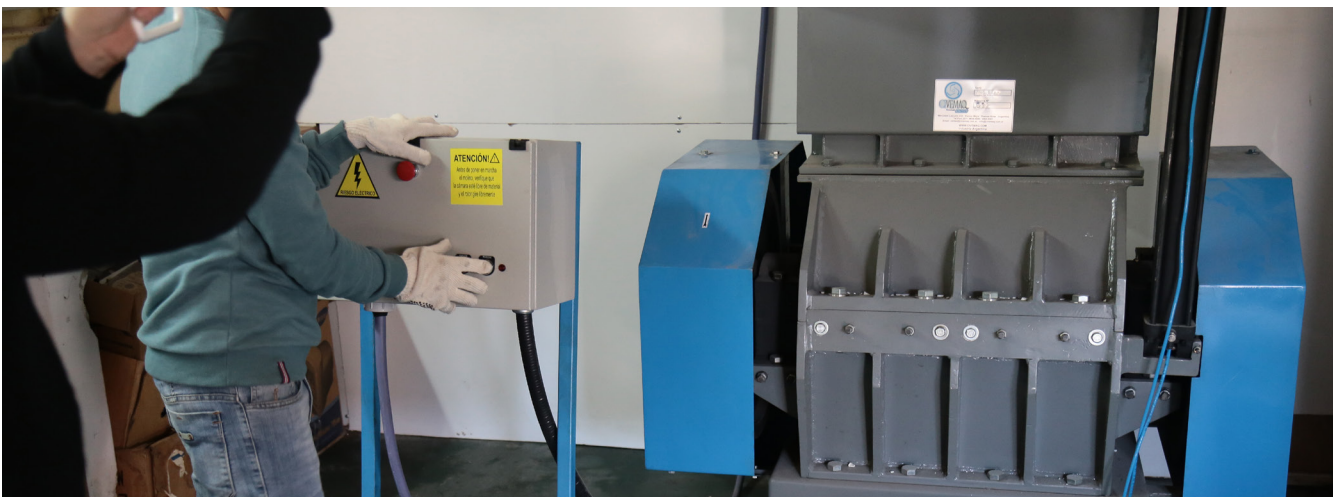

UNLP Staff of the E-Waste Plant

"Centro Verde Esperanza", after school support center for vulnerable children

Sanitization of data in computer files

E-Waste plant equipment

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Lessons learned

- As was the case in this project, delays in the implementation was mainly due to the procurement process and the purchase of the equipment.

- Several difficulties presented were related to the contracting conditions and guidelines of the ITU for the acquisition of equipment in Argentina and the difficult currency situation in the country, which delayed the process and required contact and follow up with each of the consulted providers. This condition caused the loss of suppliers and the search for new options in the local market, to avoid the costs of importing the equipment. In the future, it is important the research the legal requirements to locally purchase equipment, so as to weigh in the best purchase options and avoid delays.

- It is important to define the stakeholders that may be involved in the necessary interactions related to the operations and sustainability of an e-waste plant. Many of these stakeholders will be linked to the activities that they intend to carry out and to the actions needed in the management of WEEE. A champion such as the UNLP, needs to lead the efforts.

- The local population needs to learn about WEEE and where to deposit equipment they wish to dispose properly.

- The local government should consider the establishment of proper gathering centers of WEEE.

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Conclusions

Based on the interview sessions with different representatives of the UNLP, beneficiaries and other stakeholders, it can be concluded that:

- The project was implemented, activities were completed, equipment procured, installed and the e-waste pilot plant is now fully operational. The expected results of the project have been achieved despite the delays occurred during the implementation.
- This joint ITU and UNLP project enables for the first time in La Plata, Argentina the development of specialized treatment and recovery systems related to WEEE.
- The project addressed a genuine need to mitigate the impact of WEEE in La Plata, Argentina, which required strong collaboration with a variety of local stakeholders, such as government, private sector, NGOs and academia.
- Capacity building and research activities were important factors in the successful implementation of this project.
- This project will also produce a set of guidelines in the establishment of an e-waste plant in a developing country, to help minimize e-waste production, prevent illegal dumping and the improper treatment of e-waste, promote recycling, protect the environment, create jobs in the refurbishment and recycling sector and encourage social services, based on a circular economy.
- This project has provided concrete responses to the WEEE problems in La Plata, Argentina, in line with the Sustainable Development Goals.
- The e-waste pilot plant is contributing in the achievement of several of the 17 Sustainable Development Goals (SDGs), such as Goal 3 (Good health and Well-being), Goal 4 (quality education) Goal 6 (Clean water and Sanitation), Goal 11 (Sustainable Cities and Communities), Goal 12 (Responsible Consumption and Production), Goal 14 (Life Below Water), and Goal 8 (Decent Work and Economic Growth).

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Recommendations

The effective establishment of an e-waste pilot plant in La Plata, Argentina can be seen as an excellent example to address a genuine need to mitigate the impact of WEEE, as well as support and strengthen a well-established e-waste program, such as the one run by the UNLP. In view of the observations made above, the following recommendations are worthwhile to mention:

- In the establishment of an e-waste plant, the partner needs to take into account the regulatory framework applicable at the local, national and international level, and so that their processes and activities are carried out in a safe and responsible way with the environment. Therefore, the applicable legal framework, international regulations, international agreements and protocols related to WEEE must be analyzed beforehand.

- A research should be carried out of the WEEE management operators authorized in the local community and the costs linked to the final disposal. These operators are usually companies dedicated to the management of WEEE that process certain waste streams, commercialize and export to recovered EEE materials.

- Seek to create long standing partnerships with a variety of national and international stakeholders, from the public and private sectors, academia and international organizations, such as ITU, committed to the proper management of WEEE.

- A strategy and target group of who will be the beneficiaries of the recovered and refurbished electronic equipment needs to be defined. A linkage with the Sustainable Development Goals should be established.

- The implementation of a circular economy model should be considered. Recovery, reuse and recycling must be strategically planned to take advantage of the great potential of renewable natural resources, as well as to create sources of employment.

- It is recommend to define which of the following processes will be put into practice within the WEEE management chain in an e-waste pilot plant: recovery, valorization, treatment, recycling, reuse, final disposition.

- The destination of the materials must be analyzed from the perspective of the reuse of components, the recycling of WEEE and the elements that can be considered waste and require an adequate final disposition.

- Human resources play a fundamental role in the type of operations of the e-waste plant. Staff must be trained to operate safely. This training will require different types of expertise, according to the type of activity. Some will be basic operators and other cases, will need more know-how.

- The use of communication and educational campaigns is important to convey the vision, services and activities of the e-waste plant in the local community, especially by pointing out the relationship to the SDGs. These campaigns are helpful by raising awareness, sensitize and educate society about the importance of proper management and disposal of WEEE.

- Finally, this project is a good example of how to set up a e-waste plant, with proper WEEE management, supported by strong stakeholders engagement and based on a circular economy model.

The project will be formally closed. A closure report will be prepared by the ITU Project Manager.

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Annex

<table>
<tr><td colspan="4">Annex 1

List of equipment</td></tr>
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Item	Description	Quantity	Order No.	Supplier
1	Recycling grinding machine MGJ 40 40hp	1	318940	CIVEMAQ
2	Hydraulic pallet truck	1	319070	Pinturerias Rex
3	Foldable Hydraulic Engine Holst	1	319070	Pinturerias Rex
4	Three phase air compressor	1	319070	Pinturerias Rex
5	Electronic scale up to 20000kg	1	319403	Basculas Balser
6	Electronic balance	1	319403	Basculas Balser
7	Electric screwdriver	7	319364	Ferreteria La Brujula
8	Demagnetizer hard drive	1	319456	CSyDS
9	Crunch hard drive + 3 ITEMS	1	319337	CSyDS
10	Bar Code Scanners wireless + Bar Code Printer Labels + Software	1	319466	ID Systems
11	Pneumatic screwdriver	1	319679	Distribal
12	Secure erase software	1	319545	Lsoft technologies

This ITU project is contributing to the achievement of the Sustainable Development Goals

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