



LOTI Guide to Upcycling Retired Devices

About this guide	2
Digital Inclusion Innovation Programme (DIIP)	2
Definitions	3
Summary of Recommendations	4
Preparation: Put in place a device upcycling policy	5
Step 1: Source devices	6
Step 2: Collection and storage	8
Step 3: Data Wiping	10
Step 4: Refurbishment	11
Step 5: Distribution	12

About LOTI

The London Office of Technology and Innovation (LOTI) is a fast-moving city innovation unit, based at London Councils. We specialise in helping boroughs work together to bring the best of digital and data innovation to improve public services and outcomes for Londoners. Read all about our activities at: <https://loti.london>.

About this guide

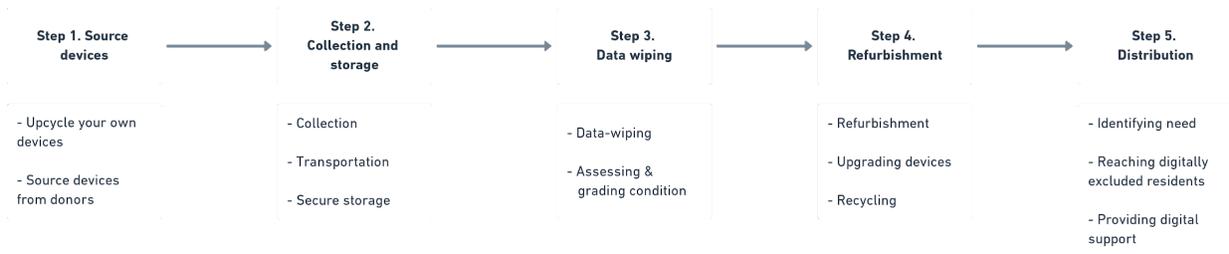
This guide has been developed based on research and lessons we have learned from conducting a device upcycling pilot with a public sector organisation in the autumn of 2021. The purpose of the document is to help organisations navigate the process of upcycling their retired devices (or those donated by businesses and other partners) and distributing them to digitally excluded residents who need them. This document will be updated regularly as we learn from our work in this area.

Digital Inclusion Innovation Programme (DIIP)

Device upcycling is one of several areas that LOTI is exploring as part of the [Digital Inclusion Innovation Programme \(DIIP\)](#). DIIP is a two-year programme running between June 2021 and May 2023, led by LOTI and funded by the GLA. The programme aims to support the delivery of London's Digital Access for All Mission, which aims to ensure that "Every Londoner has access to good connectivity, basic digital skills and the device or support they need to be online by 2025".

One specific factor that contributes to digital exclusion is a lack of (suitable) devices. Councils can address this challenge for their residents in a number of ways, such as creating device lending schemes, crowdfunding to purchase new machines, or providing access to devices in libraries. This guide specifically looks at how boroughs can increase the number of devices available to digitally excluded people by reducing the barriers to upcycling their and other organisations' retired devices.

1. High level outline of the device upcycling process



Definitions

In our engagement with boroughs and upcycling service providers, we've come across many different terms being used interchangeably to describe the re-purposing of used and retired devices. For clarity, here are the definitions we use in this guide.

Beneficiaries: Digitally excluded people to whom upcycling devices are provided.

Data wiping: Sometimes also referred to as device or data "sanitisation" or "erasure", this is the process of removing all files and data from a device to ensure that no information from the original user can be accessed or viewed by a new user.

(Digital) devices: Computing devices including desktop computers, laptops (or Chromebooks), tablets, and smartphones.

Device distribution: The process of identifying and distributing devices to beneficiaries.

Device upcycling: The process of adapting (e.g. by data wiping, refurbishing and upgrading) a used device, resulting in a higher specification or an improved functional state.

Device recycling: The process of recovering materials from digital devices, such as precious metals, for the purpose of reusing in the development of new products.

Device refurbishing: Part of the upcycling process that can include the repair of hardware (e.g. a broken screen) and the addition or updating of software to improve the functionality and performance of the device.

Retired devices: Used digital devices that are no longer required by their current owner. Many organisations 'retire' old devices once they reach a certain age or are replaced by newer equipment.

Transfer of ownership agreement: A legal document, sometimes also referred to as a 'gift agreement', which outlines the key terms and conditions in relation to the transfer of devices from a donor to the receiving organisation.

Upcycling service provider: An organisation that provides one or more services involved in the upcycling of devices, such as data wiping, device refurbishing and device upgrading.

Summary of Recommendations

The following list covers specific steps we recommend that all councils take to upcycling their devices to benefit digitally excluded people. The report will cover each step in detail.

1. Establish a formal device upcycling policy and incorporate it into your overall ICT and digital inclusion strategies.
2. If sourcing devices from within your organisation, conduct a detailed audit of all devices and establish your desired minimum quality threshold for those that will be upcycled. (For example you may decide to only include devices that are less than 5 years old, are in good working order, have minor defects such as broken screens or missing keyboards/mice etc.).
3. If sourcing devices from external donors, ensure a Transfer of Ownership agreement is in place that captures your and the donor organisation's key requirements in relation to minimum quality, logistics etc.
4. Whether sourcing devices internally or from donor organisations, ensure you:
 - a. Understand and make arrangements relating to collection and storage well in advance.
 - b. Establish data wiping requirements and standards.
5. Select a device upcycling provider that meets your organisation's needs and standards for data wiping, refurbishment, and distribution.
6. Ensure any refurbishment undertaken results in devices that are appropriate for use by the intended beneficiaries.
7. Collaborate with other donor organisations to increase device volumes in order to benefit from economies of scale.

Preparation: Put in place a device upcycling policy

To conduct device upcycling effectively and consistently, it's important to have a formal policy that's incorporated into your organisation's ICT and digital inclusion strategies. LOTI's research has found that digital inclusion initiatives of all kinds, and specifically those on device upcycling, struggle to achieve their full potential impact when they are dealt with in an ad hoc manner. In the absence of a formal policy, device upcycling often relies on one motivated individual using their own initiative and without adequate resources.

Key questions to consider

To prepare for writing a formal policy on device upcycling, it's helpful to consider the following questions:

- Does your organisation currently own or lease its IT equipment?
- What do your existing contracts say about what happens to devices when they are retired?
- How many devices do you typically retire each year?
- How much budget and resource are you able to spend on upcycling devices?
- Who would you ideally like to benefit from your retired devices?

Common pain points

- Some organisations lease devices and therefore have limited control over what happens to them at the end of their useful life.
- All organisations want to ensure that data from their devices is wiped effectively to ensure personal data and confidential files are protected. However, insisting on measures that are disproportionate to the risks involved may make device upcycling prohibitively costly and difficult.

Recommendations

1. Organisations should establish a formal device upcycling policy and incorporate it into their overall ICT and digital inclusion strategies. Policies should cover at least the following:
 - a. How device upcycling requirements will feature in all future purchasing or leasing contracts that source devices.
 - b. Who will be responsible for device upcycling. Name the role(s) responsible and set out how much time they can give to this task.
 - c. Expectations for what budget and resources can be allocated.
 - d. How device upcycling will complement the organisation's wider digital inclusion strategy.
 - e. How senior leaders will support the work.

- f. What thresholds need to be put in place to ensure data is wiped effectively. (Organisations should take a proportionate approach to risk when formulating this aspect of their policies.)

Step 1: Source devices

There are two main options for sourcing devices for upcycling. First, using your own organisation's retired devices. Second, requesting donations from other organisations and individuals. This step covers advice on how to handle both.

Option 1: Upcycling your own devices

Some organisations are able to source retired devices internally, typically as a result of a regular IT equipment refresh. Creating an inventory of all devices available for upcycling will help you better understand the volumes and quality of stock, and inform some of the steps and decisions you'll make as part of the upcycling process.

Key questions to consider

- When reviewing your inventory:
 - How many devices do you have?
 - What types of devices do you have available to upcycle (e.g. laptops, smartphones, etc.)?
 - What is their specification (i.e. model, make, year of manufacture etc.)?
 - What condition are they in? (E.g. Are they in working order? Are there any parts missing, if so what parts? Have they been scratched or damaged?)
- Where are the devices stored now? Are they easily accessible at any time?
- Do you have a budget for upcycling these devices? If so, what does it cover?
- Who will ultimately benefit from having these devices?

Common pain points

- Refurbishment costs can be high for severely broken devices (e.g. where there are missing or broken hard drives) and devices over five years old.
- Older devices, typically over five years old, may have greater cyber security risks, mainly due to running unsupported operating systems.
- Many organisations refresh their IT estate periodically (e.g. every five years) but not frequently enough to have an ongoing pipeline of available devices to upcycle.

Recommendations

1. Conduct an audit of exactly how many devices you have available for upcycling, together with details of their type, specification and condition.

2. Consider who you intend to be the beneficiaries of your devices. This can help inform your choice of upcycling service provider, and the level of refurbishment required. If you don't have an end recipient in mind at the start of your process, you may have more options when choosing an upcycling service provider, but it might create difficulties later, particularly if the upcycling service provider doesn't identify end recipients as part of their service offer.
3. For damaged devices, or devices over five years old, consider whether it's more economically advantageous to recycle and use the funds generated to support upcycling or purchasing of additional (new) devices.
4. If you do wish to upcycle devices over five years, (which come with increased cyber security risks):
 - a. First consider who might benefit from using them; and
 - b. Explore options with your selected upcycling service provider for applying free cyber security software.

Option 2: Sourcing devices from donors

Not all organisations have enough of their own devices to retire to meet the needs of digitally excluded residents. To address the high level of need during the Covid pandemic, several London boroughs used their relationships with local businesses, communities and third and private sector organisations to source additional devices. If your organisation is considering sourcing retired devices from others, this section will help you understand what you need to consider.

Key questions to consider

- Do you need a transfer of ownership agreement between the donor and your organisation?
- What are the donor and your organisation's needs for the delivery and storage of devices?
- What's the minimum threshold for the quality of devices you wish to accept?

Common pain points

- It can take time to agree and sign a transfer of ownership agreement, especially if both donor and recipient organisations insist on using their own versions. This can slow the whole process and cause difficulty in managing the transfer of devices to an upcycling service provider. It can also put pressure on the internal resources you've committed to undertake the upcycling process.
- The process of creating transfer of ownership agreements can become complicated if each organisation has a long list of conditions.
- Your organisation may lack storage facilities to receive large numbers of donated devices.

- Risk aversion about the process (e.g. fears of device or data theft) by donor organisations is common.

Recommendations

1. Engage with your legal team as early as possible to understand your organisation's position on what form of transfer of ownership agreement will be acceptable. To help, you can use or adapt [LOTI's template transfer of ownership / gift agreement](#).
2. If you plan to receive donated devices on your organisation's premises, engage your facilities team early in the process to discuss and agree:
 - a. Secure storage arrangements and timescales for storing devices
 - b. Whether the existing building insurance will cover the devices and if not what the options are for doing so.
3. Consider whether it would be easier for donated devices to be sent directly to the upcycling service provider. This helps avoid potential storage and insurance challenges.
4. If you plan for devices to be transported from the donor organisation directly to the upcycling service provider, plan for the impact on the transfer of ownership arrangements you'll require. There are three main options:
 - Have two transfer of ownership agreements: one between your organisation and the donor organisation, and another between your organisation and the upcycling service provider. Factor in the time it takes to get both agreed and signed before receiving devices.
 - Create one agreement between all three parties (your organisation, the donor and upcycling service provider) outlining each of your respective responsibilities.
 - Create a transfer of ownership agreement between the donor and upcycling service provider. This is the most effective way to manage the process.
5. In every part of the process, make decisions that satisfy your and donor organisations' security requirements but are also proportionate to actual risk posed.

Step 2: Collection and storage

Whether sourcing devices internally or from donors, you'll need to consider where the devices will be stored whilst they're waiting to be transferred to your selected upcycling service provider.

Key questions to consider

- Does your or the donor organisation require secure / tracked collection?
- Does your or the donor organisation require storage at a secure facility?

- Does the upcycling service provider offer a secure / tracked collection and storage at a secure facility?
- Can data wiping be undertaken in-house by either your or the donor organisation? (This can help remove the need for additional secure storage requirements.)

Common pain points

- Upcycling service providers may not be local to your area. This may increase delivery and collection costs and project timescales.

Recommendations:

1. Understand your and donor organisations' collection and storage requirements in advance (see step 1).
2. Consider undertaking data wiping of the devices either in-house or by the donor organisation. This can help cut / reduce secure storage requirements.

Choosing an upcycling service provider

Upcycling service providers are organisations that provide one or more services involved in the upcycling of devices, such as data wiping, device refurbishing and device upgrading. There's no shortage of these companies. However, it's important to make an informed choice about which of them to use based on your budget, which services you need, and any specific requirements you may have, for example regarding levels of security. In this section, you'll find details of the key questions, common pain points and recommendations you should explore in order to work with device upcycling providers effectively.

LOTI has prepared [a list of almost 40 upcycling service providers](#), including details of what services they provide, the costs they charge and what volumes they deal with. **Please note that LOTI has not vetted the organisations on this list. It's intended as a helpful resource to speed up your own research.**

We'll now explore each of the core services that upcycling service providers typically offer.

Step 3: Data Wiping

Data wiping, sometimes also referred to as device or data “sanitisation” or “erasure”, is the process of removing all files and data from a device to ensure that no information from the original user can be accessed or viewed by a new user. [LOTI's research into current device upcycling practices](#) revealed that many organisations would like to upcycle but are put off by doing so due to fear of data breaches from their retired devices. In this section, you'll find more details about how to approach this part of the process.

Key questions to consider

- If devices have been sourced internally, has or will the data be wiped by your organisation (on-site) or will this be undertaken by the upcycling service provider?
- If data wiping is to be undertaken by the upcycling service provider, what data wiping standard or certifications do you need?
- If sourced via a donor, will the donor wipe devices on their site, or will this be undertaken by the upcycling service provider you select?
- Do you require devices to be wiped within a certain timeframe?
- Do you need an audit trail and certification for each device?

Commons pain points

- Your or the donor organisation may not permit data wiping to be undertaken by a third party.
- Your organisation may not have the resource and/or capability to undertake data wiping in-house.
- Understanding your organisation's preferred requirements for data wiping standards and certifications might be difficult if a device upcycling policy is not in place.

Recommendations

1. Organisations should take a proportionate approach to risk when determining what data wiping standards need to be met.
2. Find out the options available for data wiping by engaging as early as possible with your relevant ICT colleagues, especially if your organisation does not permit data wiping by upcycling service providers.
3. For donated devices, make sure you understand the donors' data wiping preferences from the start so you can plan in advance.
4. If a data wiping audit trail (i.e. certification for each device) is required, ensure these requirements are captured in any discussions with the donor and upcycling service provider.
5. If your organisation does not have a device upcycling or data wiping policy, seek advice from your relevant Data / Information Officer, and/or IT team.
6. Consult the National Cyber Security Centre (NCSC) website which provides information and advice on data wiping devices. [This article](#) is one example of current guidance.

Step 4: Refurbishment

Refurbishing devices is part of the upcycling process that can include the repair of hardware (e.g. a broken screen) and the addition or updating of software to improve the functionality and performance of the device. Refurbishing devices to a good standard not only brings them back into use but also ensures they're safe to be taken on by someone in need.

Key questions to consider

- What are the minimum standards or levels of refurbishment you require?
 - Do you require operating system, hardware and software installations?
 - Do you require software upgrades?
 - Do you require any cyber security software?
 - Will PAT ([Portable Appliance Testing](#)) testing or similar safety tests be carried out by a qualified person?
- Do you have a budget to cover the desired refurbishment level?
- Do you need a destruction certificate for devices that are beyond repair or where it's not economically beneficial to refurbish?

- Will you require the supplier to provide a warranty within a certain period?
-
- Do you require refurbishing of devices within a specific timeframe?

Common pain points

- There can be high costs for:
 - Repairing severely damaged devices, e.g. with failed hard drives.
 - Devices with unsupported operating systems.
 - Installing and maintaining cyber security software.
 - Lower device volumes.
- Some upcycling service providers may not be able to handle larger volumes of devices.

Recommendations:

1. Use your device inventory (created as part of step 1) to have a detailed conversation with [device upcycling providers](#) about the type and quality of your devices and what level of refurbishment they will need.
2. Ensure the transfer of ownership agreement with the upcycling service provider clarifies responsibilities related to device warranty, software upgrades, technical support enquiries, PAT testing, etc.
3. Consider working with internet service providers or choose an upcycling service provider that offers some connectivity for the beneficiaries of devices, even if for a limited period of time.
4. Discuss potential volumes and timescales with the upcycling service provider well in advance.

Step 5: Distribution

Putting the refurbished devices into the hands of people who need them to get online may be the last but definitely the most rewarding part of this process!

Key questions to consider

- Do you have a budget for distributing devices?
- Will you identify and distribute devices or would you like the supplier to do so on your behalf?
- Do you have a preference for where devices are distributed? E.g. would you like them to be distributed in your local area or nationally?
- Would you like the devices to be distributed to particular groups or communities?
- Who is responsible for taking enquiries and providing technical support to beneficiaries once the devices are distributed?

Common pain points

1. Not all device upcycling providers are able to directly identify beneficiaries or have links to organisations that do, for example charities.
2. Some upcycling service providers may distribute devices nationally and cannot guarantee local residents will benefit.
3. Devices may not be used if beneficiaries don't have the right skills, connectivity and support to get online.
4. If there's a lack of technical support, it may deter people from using devices if they don't have the skills or someone to consult about basic technical issues.
5. Lack of wifi (or similar) might make it difficult for users to get online.

Recommendations:

1. If working with upcycling service providers that distribute but don't identify beneficiaries, you'll need to factor in internal resources to do the latter.
2. Work with your organisation's voluntary and community support (VCS) team to identify local VCS organisations that may be able to identify beneficiaries.
3. Work with other services such as Housing, Benefits, Social Care, etc. within your organisation to identify beneficiaries.
4. Work with VCS organisations or your internal adult education teams to put in place bespoke training sessions that meet beneficiaries' needs once you've identified them.
5. Negotiate with the upcycling service provider, local VCS or internal teams to put in place at least some technical support provision, even for a limited time.
6. Explore options for offering free connectivity (even for a period of time) to enable beneficiaries to get online.