

CEDaCI Circular Economy  
for the Data Centre Industry

# Transnational Business Case

## Deliverable 6.2.4



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## About CEDaCI

Circular Economy for the Data Centre Industry (CEDaCI) is a five year, Interreg North-West Europe-founded project across the UK, Germany, Netherlands and France. CEDaCI will create a robust Circular Economy for the Data Centre Industry by adopting a whole-life-cycle approach to the problem of sectoral e-waste.

The Data Centre Industry has grown rapidly and generates a large volume of WEEE. The current infrastructure for dealing with this waste is underdeveloped and consequently, there is a real and urgent need to address this now. CEDaCI is bringing together stakeholders from all equipment life cycle stages to turn this waste into a valuable resource and support the ongoing rapid growth of the DCI.



## Project Delivery Team

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## Introduction

This report considers the different variables that influence the transnational business case, and hence the purchasing decisions around second-hand hardware, across a number of different regulatory environments. The three major environments considered are the EU, post-Brexit Great Britain, and the US. The variables of notable influence that may affect the transnational business case today include the economic impact of COVID-19, the economic impact of energy price fluctuations, intellectual property regulations, and Brexit. We've also included the variables that are likely to improve the transnational business case in the future, such as certification & standardization, the impact of ESG in business decision making, and the increasing influence of circularity in the design process.

## Economic Impact of COVID-19

Before the COVID-19 outbreak, demand for used and certified pre-owned equipment was already on the rise in 2020, according to the IDC survey data<sup>1</sup>. In the same survey, IDC found that three quarters of those polled said their spending levels on non-new equipment would increase or remain the same as a direct result of the effects of the COVID-19 outbreak. Unfortunately, the survey did not ask for the reasons behind the behavioural shift – was it price? Was it lack of supply? Was it because companies were beginning their digital transformations, spurred by the Covid-19 pandemic and the need to work from home wherever possible?

The survey also provided scant insight into the types of workloads and customers that are using certified pre-owned equipment. Be it a production environment, disaster recovery operations, testing and development, spare parts or the use in edge locations, such insights would be invaluable in order to ascertain the remaining barriers to growth for the second-hand hardware market.

## Industry moves

In 2021, energy prices significantly increased across Europe and continued to grow. In the UK, the energy price caps were projected to increase by more than 51% to £1,925/yr in the spring of 2022<sup>2</sup>. The summary of the price rises in Europe, the UK and the US in 2021 is presented in Table 1.

1. <https://www.idc.com/getdoc.jsp?containerId=US46777820>
2. <https://www.moneysavingexpert.com/news/2022/01/martin-lewis--the-energy-price-cap-s-now-predicted-to-rise-a->

Table 1. Summary of the price rises in Europe, the UK and US.

	Europe	United Kingdom	United States
<b>Electricity prices</b>	<b>More than 300% increase</b> from January to September 2021 <sup>3</sup> .	<b>More than 300% increase</b> from January to September 2021 <sup>3</sup> .	<b>Prices remained largely flat</b> between January and December 2021 <sup>4</sup> .
<b>Gas prices</b>	<b>170% increase</b> from January to September 2021 <sup>5</sup> .	<b>Almost 300% increase</b> from January to September 2021 <sup>6</sup> .	<b>50% increase</b> from January to September 2021 <sup>7</sup> .
<b>Oil prices</b>	<b>35% raise</b> between January and December 2021 <sup>8</sup> .	<b>50% raise</b> between January and December 2021 <sup>9</sup> .	<b>50% raise</b> between January and December 2021 <sup>7</sup> .

The prices of gas also increased across all three regions and were predicted to continue to grow. However, the EU Gas Market observatory forecasted that the price increases in the UK and EU member states were additionally elevated due to higher reliance on imported gas<sup>10</sup>.

Furthermore, all regions experienced a notable rise in fuel costs, particularly Brent Crude, with near-record highs in September 2021. This increase was allegedly caused by the rising price of oil rather than a delivery crisis.

These cost fluctuations have a relatively higher impact on the secondary IT market than on new equipment because of the price differences in the equipment itself. Refurbished hardware retails 50-80% cheaper than new equipment, depending on make and model. An increase in shipment costs applies equally to new and refurbished equipment but will be a more significant proportion of the refurbished add-on price. This is further increased by shipping charges between the UK and Europe, as detailed in the Brexit section of this report.

3. <https://www.bloomberg.com/news/articles/2021-12-30/europe-has-never-paid-so-much-for-power-as-2021-costs-hit-record?leadSource=verify%20wall>
4. <https://www.eia.gov/outlooks/steo/report/electricity.php>
5. <https://www.bruegel.org/blog-post/europes-gas-and-electricity-price-surge-one>
6. <https://commonslibrary.parliament.uk/research-briefings/cdp-2022-0010/>
7. <https://www.eia.gov/todayinenergy/detail.php?id=50758>
8. <https://fred.stlouisfed.org/series/DCOILBRENTUEU>
9. <https://www.hl.co.uk/shares/trading-commodities/brent-crude-oil>
10. [https://energy.ec.europa.eu/system/files/2022-01/Quarterly%20report%20on%20European%20gas%20markets%20Q3\\_2021\\_FINAL.pdf](https://energy.ec.europa.eu/system/files/2022-01/Quarterly%20report%20on%20European%20gas%20markets%20Q3_2021_FINAL.pdf)

# Economic Analysis

## Intellectual Property Legislation

IT hardware is significantly cheaper when purchased in the US than in the EU, and it might be attractive to secondary market companies to take advantage of this. However, differences in Intellectual Property legislation and the EU's attitude toward protecting EU trade mean that sales from the US to the EU are problematic. Secondary market companies need to be aware of and guard against this. Regulatory bodies control trade by ensuring that goods first sold in a particular region (EU, APAC and EMEA) remain within that region for secondary sale. This strategy adds a layer of complexity to international operations and adds to the cost of doing business. It also affects the distances shipped. The cost constraints of shipping equipment between regions mean that the secondary market is likely to be more localised than the market for new goods, with significant shipping associated with the manufacturing stages.

### Manufacturer behaviour: Legal action

Risk of legal action by the manufacturers by failing to do so are well documented in the press. However, many cases are not part of public record because the secondary market company either settled out of court or closed business altogether.

#### Case studies include:

1. In 2016 HPE successfully sued reseller International Computer Purchasing Ltd for selling HPE equipment fraudulently obtained at a discounted prices and won damages of £1.95m by the UK High Court<sup>11,12</sup>.
2. In 2012, Oracle sued a company called M-Tech over imports of disk drives using the Oracle logo from the US to the UK. The lawsuit relied on the Trade Mark Directive (TMD). According to TMD article 5(1)a, a trademark owner may prevent third parties from using signs identical to his trademark in the course of business without his consent. Furthermore, article 7 of TMD states that article 5 is exhausted if the goods were first marketed in the European Economic Area (EEA) by the trade mark owner or a third party with the owner's consent. However, Oracle proved to the court that the hard disk drives were first marketed outside of the EEA<sup>13</sup>.

12. <https://arstechnica.com/tech-policy/2016/07/hpe-wins-high-court-fraud-fight-international-computer-purchasing-ltd/>

13. <https://www.computerweekly.com/microscope/news/450301249/High-Court-awards-HPE-195m-in-fraudulence-case>

## Results for customers: Fear, uncertainty and doubt

Certain manufacturers have dissuaded consumers from buying secondary hardware because of the issues described in the previous section. Moreover, it has been intimidated by manufacturers that there are dangers of using secondary hardware that is not authorised by the manufacturer<sup>14</sup>.

Manufacturer secondary equipment is more expensive than secondary market refurbished equipment and is often shipped to partner organisations to carry out the refurbishment. Such practice adds an extra layer of economic and carbon costs related to transport for the customer.

## Brexit

Once the UK officially left the EU, all agreements on Intellectual Property ceased to be valid. This means that goods originally sold in the UK after Brexit could potentially be out of region if they were shipped into Europe. This does not affect goods manufactured prior to 1st January 2001 according to *Article 61 of the Agreement on the withdrawal of the United Kingdom of Great Britain and Northern Ireland from the European Union and the European Atomic Energy Community*<sup>15</sup>, which states:

### Article 61 Exhaustion of rights

*"Intellectual property rights which were exhausted both in the Union and in the United Kingdom before the end of the transition period under the conditions provided for by Union law shall remain exhausted both in the Union and in the United Kingdom."*

It is not clear whether this would actually be enacted by the manufacturers at the time this report was created. The reason is that their codes are either APAC region (CN and SG), Americas (US, MX) or EMEA (CZ). Splitting the EMEA region into individual codes UK, EU, Middle East, and Africa would be expensive and challenging.

In conclusion, this report is looking at a grey area which secondary market suppliers need to be aware of and communicate to their customers.

14. [https://www.cisco.com/c/dam/m/en\\_in/events/sb-virtual-summit/pdf/B6287-grey-market-infographic\\_V2.pdf](https://www.cisco.com/c/dam/m/en_in/events/sb-virtual-summit/pdf/B6287-grey-market-infographic_V2.pdf)

15. <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:12020W/TXT>

### “Brexit charges”

1. Shipping charges through courier companies like DPD are now an additional £4-5 when delivering between the UK and Europe. Added costs are attributed to the increased amount of paperwork needed when the UK officially left the EU on 1st January 2021. Those changes add an extra layer of cost per shipment. While it will mainly impact single shipments of low-value components, additional shipping costs can be offset by ordering multiple items at a time (effectively sharing out the increase).
2. In addition, VAT payments are now payable on entry into the UK or the EU<sup>16</sup>. The rate on this will vary from country to country but is around 20%, with a minimum standard rate of 15%.

## Certification & Standardization

As pointed out above, OEM-approved used equipment is often more expensive than secondary market refurbished gear. In many cases, the server and storage OEMs will certify gear and provide hardware and software maintenance and financing. However, this certification process is not independent and effectively dissuades customers from purchasing refurbished equipment from independent refurbishers. The result is that customers are discouraged from using refurbished equipment unless authorised by the primary manufacturer.

The opportunity here exists around creating a certification, led by industry or legislation, that allows any refurbisher to refurbish, certify and sell equipment without the approval of primary manufacturers. Legally recognised certification would encourage customers (and prevent primary manufacturers from dissuading customers) to use refurbished equipment. Instead, the insistence of primary manufacturers on "approved used" equipment reduces competition, resulting in the verticalization of the second-hand market. This market would never grow as primary manufacturers view this market as smaller and less profitable than primary hardware markets.

A universal certification would facilitate the growth of the second-hand market, and this market more likely to be regional given the issues around IP protections and VAT tariffs.

16. <https://www.avalara.com/vatlive/en/vat-rates/european-vat-rates.html>



## The prominence of ESG

Corporations and enterprises are increasingly looking at embedding ESG into their daily operations. Adding ESG KPIs as non-functional design requirements or reporting ESG KPIs as a matter of governance and policy would certainly stimulate interest in reducing the environmental impact of IT hardware. Furthermore, it would indirectly facilitate the promotion of second-hand hardware markets.

This scenario might have a double-edged effect on the transnational business case. On the one hand, ESG reporting might encourage customers to consider transportation's environmental costs and incentivise the use of local second-hand hardware. On the other hand, the GRI<sup>17</sup>, EU<sup>18</sup>, Energy Star<sup>19</sup>, IFRS<sup>20</sup>, WEF<sup>21</sup>, FRC<sup>22</sup> and SASB<sup>23</sup> are all working together to create a standardised ESG reporting framework so that ESG data can be collected and disseminated in a manner as standardised as financial data. Such standardisation may impact encouraging international trade, considering the improvements in trust.

The future will reveal whether the increasing role of ESG in corporate decision-making will have a net positive or negative impact on the transnational business case. However, it will likely lead to a wholesale expansion in the global second-hand hardware market.

## The prominence of Circularity in Design

Design for circularity is still a relatively emerging field and is not applied universally by many manufacturers and designers. However, it could have truly transformational effects on the second-hand hardware market.

Whilst integrating circular economy principles may seem simple in theory, it is difficult to universally assess and quantify how circular the designs are, and whether integrating circularity environmental impact. The CEDaCI project has developed an Evaluator as part of the Circular Data Centre Compass - a state of

17. <https://29kjwb3arnds2g3gi4lq2sx1-wpengine.netdna-ssl.com/wp-content/uploads/Statement-of-Intent-to-Work-Together-Towards-Comprehensive-Corporate-Reporting.pdf>
18. [https://finance.ec.europa.eu/sustainable-finance/tools-and-standards/eu-taxonomy-sustainable-activities\\_en](https://finance.ec.europa.eu/sustainable-finance/tools-and-standards/eu-taxonomy-sustainable-activities_en)
19. <https://www.energystar.gov/>
20. <https://cdn.ifrs.org/content/dam/ifrs/project/sustainability-reporting/consultation-paper-on-sustainability-reporting.pdf>
21. [https://www3.weforum.org/docs/WEF\\_IBC\\_ESG\\_Metrics\\_Discussion\\_Paper.pdf](https://www3.weforum.org/docs/WEF_IBC_ESG_Metrics_Discussion_Paper.pdf)
22. <https://www.frc.org.uk/getattachment/cf85af97-4bd2-4780-a1ec-dc03b6b91fbf/Future-of-Corporate-Reporting-FINAL.pdf>
23. <https://www.sasb.org/>

the art, easy to use tool for improved decision-making. Also, the Open Compute Project (OCP) have been working on circularity standards for the past year, specific to IT hardware.

The impact of embedding circularity as a design requirement is potentially immense and difficult to quantify. It is difficult to say now whether the effects would be net positive or negative on the transnational business case because designing with circularity may disincentivise imports by bringing attention to environmental impacts in transportation and in foreign supply chains (upstream). On the other hand, circularity may encourage the sale and exports of a second-hand circular server, if it's domestic suppliers with lower environmental transportation impacts produced a server that was overall significantly more sustainable than a traditional server with a global supply chain. Again, we come to the same conclusion that the transnational business case is hard to quantify, but overall we'd likely see an expansion in the size of the second hand hardware market.

## Conclusion

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The regulatory landscape is still the primary factor when considering the import and export of second-hand hardware. This regulatory environment is subject to change should legislators change their priorities. European legislators can stipulate that equipment developed in one region can be changed/ improved and sold on in another region. This is known as "Mutual Recognition". "Mutual recognition" is a practical tool that legislators can use to recognise a region were to determine? that a standard of a product that was built/operated and sold in another region. This "mutual recognition" is not impossible. Indeed, many post-Brexit regulations and standards were deemed mutually recognisable and hence facilitated the flow of goods across borders. Likewise, it is legislators who determine the IP laws and protections, as well as tariffs such as VAT etc, and hence it is legislators and regulators who hold significant influence over the ease with which goods can flow internationally.

Other, more nuanced variables that affect the transnational business case in Europe revolve around Brexit, COVID-19 and other local economic factors that particularly affect currency strength and the price of transportation. Variables that we believe could significantly improve the transnational business case revolve around certification, mutual recognition of standards and the increasing prominence of ESG in business decision making, as well as circularity in the design process.